Date: _____

# 9626 Niagara Falls Blvd Onsite Gamma Spec Screening Lab

**Gamma Spectroscopy Detector work sheet.**

| Counted by (Initial,date) | Geometry Description | Analysis Number/Sample ID/Remarks | Sample Collection mmddyy hh:mm | Sample Quantity | Sample Units (GWET,GDRY,L, ft^3, etc) | Count Time (s) | Report Matches Sample Parameters (Initial, date) |
|---|---|---|---|---|---|---|---|
| CC/110416 | 450 cc SOIL | Duplicate N002-P05-S015-2230-02 | 10-25-16 1500 | 627.4 | GWET | 7200 | |
| CC/110716 | 450 cc SOIL | P006-S002-0004-01 | 10/14/16 1515 | 363.4 | GWET | 7200 | |
| CC/110716 | 450 cc SOIL | P006-S002-0412-01 | 10/14/16 1516 | 688.2 | GWET | 7200 | |
| CC/110716 | 450 cc SOIL | P006-S002-1218-01 | 10/14/16 1516 | 570.5 | GWET | 7200 | |
| CC/110916 | 450 cc SOIL | Duplicate P006-S001-0412-02 | 10/14/16 1432 | 652.7 | GWET | 7200 | |
| CC/110716 | 450 cc SOIL | P006-S001-0004-01 | 10/14/16 1432 | 367.2 | GWET | 7200 | |
| CC/110816 | 450 cc SOIL | P007-S001-0006-01 | 10/14/16 1545 | 458.4 | GWET | 7200 | |
| CC/110816 | 450 cc SOIL | P007-S001-0612-01 | 10/14/16 1545 | 579.6 | GWET | 7200 | |
| CC/110816 | 450 cc SOIL | P007-S001-1218-01 | 10/14/16 1546 | 564.5 | GWET | 7200 | |
| CC/110816 | 450 cc SOIL | P006-S001-1218-01 | 10/14/16 1432 | 455.6 | GWET | 7200 | |

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*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: ERT01,C:\GENIE2K\CAMFILES\SMP-P007-S001-0612-01.CNF

| | |
|---|---|
| Report Generated On | : 11/8/2016 12:46:56 PM |
| Sample Title | : P007-S001-0612-01 |
| Sample Description | : 450 cc Soil |
| Sample Identification | : |
| Sample Type | : |
| Sample Geometry | : |
| Peak Locate Threshold | : 3.00 |
| Peak Locate Range (in channels) | : 100 - 8192 |
| Peak Area Range (in channels) | : 100 - 8192 |
| Identification Energy Tolerance | : 1.000 keV |
| Sample Size | : 5.796E+002 GWET |
| Sample Taken On | : 10/14/2016 3:45:00 PM |
| Acquisition Started | : 11/8/2016 10:46:52 AM |
| Live Time | : 7200.0 seconds |
| Real Time | : 7202.0 seconds |
| Dead Time | : 0.03 % |

| | |
|---|---|
| Energy Calibration Used Done On | : 10/24/2016 |
| Efficiency Calibration Used Done On | : 9/27/2016 |
| Efficiency ID | : ERT0101 |

**********
***** P E A K A N A L Y S I S R E P O R T *****
**********

Detector Name: ERT01
Sample Title: P007-S001-0612-01
Peak Analysis Performed on: 11/8/2016 12:46:56 PM
Peak Analysis From Channel: 100
Peak Analysis To Channel: 8192

| | Peak No. | ROI start | ROI end | Peak centroid | Energy (keV) | FWHM (keV) | Net Peak Area | Net Area Uncert. | Continuum Counts |
|---|---|---|---|---|---|---|---|---|---|
| M | 1 | 295- | 315 | 300.07 | 74.97 | 0.90 | 2.56E+002 | 25.08 | 5.29E+002 |
| m | 2 | 295- | 315 | 309.04 | 77.22 | 0.90 | 4.40E+002 | 29.12 | 5.20E+002 |
| M | 3 | 329- | 383 | 337.00 | 84.21 | 1.54 | 1.17E+002 | 22.44 | 5.86E+002 |
| m | 4 | 329- | 383 | 349.59 | 87.36 | 1.54 | 2.79E+002 | 26.04 | 6.05E+002 |
| m | 5 | 329- | 383 | 360.01 | 89.96 | 1.55 | 1.92E+002 | 23.62 | 6.23E+002 |
| m | 6 | 329- | 383 | 372.80 | 93.16 | 1.55 | 3.22E+002 | 27.13 | 6.07E+002 |
| | 7 | 534- | 541 | 537.32 | 134.29 | 0.44 | 2.83E+001 | 23.19 | 2.51E+002 |
| | 8 | 739- | 753 | 744.04 | 185.98 | 1.08 | 2.59E+002 | 38.41 | 4.19E+002 |
| | 9 | 832- | 843 | 837.05 | 209.23 | 1.40 | 1.06E+002 | 28.38 | 2.78E+002 |
| M | 10 | 949- | 975 | 954.80 | 238.67 | 1.10 | 1.41E+003 | 41.20 | 2.78E+002 |
| m | 11 | 949- | 975 | 966.65 | 241.63 | 1.10 | 2.76E+002 | 20.77 | 2.52E+002 |
| | 12 | 1175- | 1188 | 1181.14 | 295.26 | 0.80 | 4.02E+002 | 31.99 | 2.24E+002 |
| | 13 | 1195- | 1206 | 1200.35 | 300.06 | 1.32 | 1.07E+002 | 22.24 | 1.54E+002 |
| | 14 | 1308- | 1316 | 1312.11 | 328.01 | 0.89 | 5.28E+001 | 16.21 | 9.82E+001 |
| | 15 | 1344- | 1360 | 1353.30 | 338.31 | 1.42 | 3.04E+002 | 31.74 | 2.25E+002 |
| | 16 | 1398- | 1414 | 1407.77 | 351.92 | 1.24 | 7.51E+002 | 36.38 | 1.82E+002 |
| | 17 | 1841- | 1858 | 1852.05 | 463.00 | 0.74 | 4.22E+001 | 24.71 | 1.74E+002 |
| | 18 | 2033- | 2057 | 2042.68 | 510.66 | 0.77 | 3.18E+002 | 34.32 | 2.05E+002 |
| | 19 | 2322- | 2345 | 2332.27 | 583.07 | 1.33 | 5.30E+002 | 33.23 | 1.44E+002 |
| | 20 | 2423- | 2447 | 2436.62 | 609.16 | 1.27 | 5.88E+002 | 35.53 | 1.61E+002 |
| | 21 | 2903- | 2915 | 2908.71 | 727.19 | 0.98 | 8.34E+001 | 16.98 | 7.76E+001 |
| | 22 | 3172- | 3187 | 3178.21 | 794.57 | 1.01 | 8.09E+001 | 16.73 | 6.61E+001 |
| | 23 | 3436- | 3449 | 3441.56 | 860.41 | 0.77 | 4.58E+001 | 15.04 | 6.52E+001 |
| | 24 | 3635- | 3654 | 3644.86 | 911.24 | 1.59 | 3.28E+002 | 24.11 | 7.24E+001 |
| M | 25 | 3850- | 3885 | 3858.60 | 964.68 | 1.54 | 8.37E+001 | 10.92 | 4.73E+001 |
| m | 26 | 3850- | 3885 | 3875.06 | 968.80 | 1.54 | 2.41E+002 | 17.11 | 5.97E+001 |
| | 27 | 4473- | 4492 | 4481.75 | 1120.48 | 0.96 | 1.35E+002 | 19.83 | 7.39E+001 |
| | 28 | 5831- | 5858 | 5845.22 | 1461.38 | 1.88 | 1.88E+003 | 44.95 | 3.15E+001 |
| | 29 | 6914- | 6928 | 6921.37 | 1730.44 | 0.36 | 2.96E+001 | 7.94 | 1.14E+001 |
| | 30 | 7051- | 7072 | 7061.41 | 1765.45 | 0.89 | 1.17E+002 | 12.10 | 7.89E+000 |

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

**********
***** N U C L I D E M D A R E P O R T *****
**********

Detector Name: ERT01
Sample Geometry:
Sample Title: P007-S001-0612-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | K-40 | 1460.82* | 10.55 | 6.6071E-001 | 6.61E-001 | 1.9695E+001 |
| | Co-60 | 1173.23 | 99.85 | 8.9057E-002 | 7.58E-002 | -4.2498E-002 |
| | | 1332.49 | 99.98 | 7.5816E-002 | | 7.4519E-003 |
| > | | 2505.71 | 0.10 | 0.0000E+000 | | 0.0000E+000 |
| | Cs-137 | 32.06 | 5.54 | 1.0897E+003 | 8.64E-002 | -1.5235E+001 |
| | | 661.66 | 84.99 | 8.6443E-002 | | 2.4239E-002 |
| + | Tl-208 | 72.80 | 2.02 | 8.0717E+000 | 8.27E-002 | -2.0603E+000 |
| | | 74.97* | 3.41 | 2.7182E+000 | | 4.5128E+000 |
| | | 84.90* | 1.51 | 4.5587E+000 | | 3.2860E+000 |
| | | 277.36 | 6.31 | 8.6861E-001 | | 1.2999E-001 |
| | | 510.77* | 22.60 | 3.7658E-001 | | 3.6069E-001 |
| | | 583.19* | 84.50 | 8.2694E-002 | | 3.7492E-001 |
| | | 763.13 | 1.81 | 3.9092E+000 | | -1.8210E+000 |
| | | 860.56* | 12.42 | 4.1872E-001 | | 2.9410E-001 |
| + | Bi-212 | 39.86 | 1.06 | 5.6464E+002 | 7.29E-001 | -1.7503E+002 |
| | | 727.33* | 6.74 | 7.2937E-001 | | 8.7780E-001 |
| | | 785.37 | 1.11 | 6.2821E+000 | | 4.2835E-002 |
| | | 1620.74 | 1.51 | 4.3735E+000 | | -8.1318E-001 |
| | | 1806.00 | 0.09 | 5.9069E+001 | | -7.2037E+000 |
| + | Pb-212 | 74.81* | 10.40 | 8.9126E-001 | 8.94E-002 | 1.4797E+000 |
| | | 77.11* | 17.50 | 4.7530E-001 | | 1.3701E+000 |
| | | 87.30* | 7.81 | 8.2335E-001 | | 1.3954E+000 |
| | | 115.18 | 0.59 | 9.8342E+000 | | 6.1515E+000 |
| | | 238.63* | 43.30 | 8.9351E-002 | | 1.0731E+000 |
| | | 300.09* | 3.28 | 1.0921E+000 | | 1.2430E+000 |
| + | Bi-214 | 76.86* | 0.43 | 1.9051E+001 | 1.66E-001 | 5.4915E+001 |
| | | 89.81* | 0.24 | 2.4608E+001 | | 2.8259E+001 |
| | | 386.77 | 0.30 | 1.9207E+001 | | 8.3663E+000 |
| | | 454.77 | 0.29 | 1.9779E+001 | | -2.0195E+000 |
| | | 609.31* | 45.49 | 1.6555E-001 | | 7.8801E-001 |
| | | 665.45 | 1.53 | 4.7389E+000 | | 5.3747E-001 |
| | | 703.11 | 0.48 | 1.3957E+001 | | -9.2059E+000 |
| | | 719.86 | 0.39 | 1.7686E+001 | | -3.8625E+000 |
| | | 768.36 | 4.89 | 1.5875E+000 | | 5.9241E-001 |
| | | 786.10 | 0.31 | 2.2792E+001 | | -7.4116E+000 |
| | | 806.17 | 1.26 | 5.5606E+000 | | -2.8366E+000 |
| | | 934.06 | 3.10 | 2.4487E+000 | | 1.0140E+000 |
| | | 964.08* | 0.36 | 1.1120E+001 | | 1.9417E+001 |
| | | 1051.96 | 0.31 | 2.3064E+001 | | 3.7770E+000 |
| | | 1120.29* | 14.91 | 4.8392E-001 | | 8.4478E-001 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Bi-214 | 1133.66 | 0.25 | 3.2993E+001 | 1.66E-001 | 5.1122E+000 |
| | | 1155.19 | 1.63 | 5.6767E+000 | | 2.6214E-001 |
| | | 1207.68 | 0.45 | 2.0908E+001 | | 1.1731E+000 |
| | | 1238.11 | 5.79 | 1.8265E+000 | | 8.5675E-001 |
| | | 1280.96 | 1.43 | 6.2208E+000 | | 2.2395E+000 |
| | | 1377.67 | 4.00 | 1.9383E+000 | | 9.5023E-001 |
| | | 1385.31 | 0.76 | 9.3051E+000 | | -1.0329E+001 |
| | | 1401.50 | 1.27 | 4.7957E+000 | | -4.8486E+000 |
| | | 1407.98 | 2.15 | 3.0962E+000 | | -8.0407E-001 |
| | | 1509.23 | 2.11 | 3.1249E+000 | | 2.2804E+000 |
| | | 1538.50 | 0.38 | 1.5985E+001 | | 8.6533E+000 |
| | | 1543.32 | 0.20 | 3.0118E+001 | | 1.3769E+001 |
| | | 1583.22 | 0.69 | 1.0782E+001 | | 1.0096E+001 |
| | | 1594.73 | 0.25 | 3.1406E+001 | | 6.2851E+000 |
| | | 1599.31 | 0.23 | 3.1056E+001 | | 9.5048E+000 |
| | | 1661.28 | 1.15 | 4.8723E+000 | | -3.3808E-001 |
| | | 1683.99 | 0.22 | 2.0714E+001 | | 7.0016E+000 |
| | | 1729.59* | 2.92 | 1.2768E+000 | | 1.2769E+000 |
| | | 1764.49* | 15.40 | 2.5578E-001 | | 9.2800E-001 |
| | | 1847.42 | 2.11 | 2.6419E+000 | | 8.8281E-001 |
| | | 1873.16 | 0.22 | 2.2108E+001 | | -5.9066E+000 |
| > | | 2118.55 | 1.14 | 0.0000E+000 | | 0.0000E+000 |
| > | | 2204.21 | 5.08 | 0.0000E+000 | | 0.0000E+000 |
| + | Pb-214 | 53.28 | 1.20 | 4.8041E+001 | 1.27E-001 | -4.8071E+000 |
| | | 74.81* | 6.44 | 1.4044E+000 | | 2.3315E+000 |
| | | 77.11* | 10.80 | 7.5146E-001 | | 2.1661E+000 |
| | | 87.30* | 4.84 | 1.2963E+000 | | 2.1971E+000 |
| | | 242.00* | 7.43 | 4.7304E-001 | | 1.2167E+000 |
| | | 258.87 | 0.52 | 9.5376E+000 | | -6.2721E-001 |
| | | 274.80 | 0.47 | 1.1415E+001 | | -1.4887E+001 |
| | | 295.22* | 19.30 | 2.2566E-001 | | 7.6482E-001 |
| | | 351.93* | 37.60 | 1.2651E-001 | | 8.1514E-001 |
| | | 462.00 | 0.22 | 2.9328E+001 | | 3.5126E+001 |
| | | 533.66 | 0.19 | 3.0777E+001 | | -1.1905E+001 |
| | | 785.96 | 1.07 | 6.6340E+000 | | -8.8416E-001 |
| | | 839.04 | 0.59 | 1.3295E+001 | | 1.2481E+001 |
| + | Ra-224 | 81.07 | 0.13 | 7.2901E+001 | 8.79E-001 | -5.5614E+000 |
| | | 83.78* | 0.22 | 3.1722E+001 | | 2.2866E+001 |
| | | 240.99* | 4.10 | 8.7858E-001 | | 2.2597E+000 |
| + | Ra-226 | 81.07 | 0.20 | 4.7300E+001 | 1.40E+000 | -3.6084E+000 |
| | | 83.78* | 0.33 | 2.0477E+001 | | 1.4760E+001 |
| | | 94.90 | 0.15 | 4.8789E+001 | | -5.9002E+000 |
| | | 186.21* | 3.59 | 1.4029E+000 | | 1.7298E+000 |
| + | Ac-228 | 99.50 | 1.26 | 4.7945E+000 | 2.47E-001 | 1.0886E+000 |
| | | 129.07 | 2.50 | 2.5443E+000 | | 9.1896E-001 |
| | | 209.25* | 3.97 | 9.9893E-001 | | 8.4328E-001 |
| | | 270.24 | 3.55 | 1.6887E+000 | | 2.0761E+000 |
| | | 328.00* | 3.04 | 9.2804E-001 | | 6.9920E-001 |
| | | 338.32* | 11.40 | 4.5435E-001 | | 1.0946E+000 |
| | | 409.46 | 2.02 | 3.0269E+000 | | 1.6713E+000 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Ac-228 | 463.00* | 4.45 | 1.3070E+000 | 2.47E-001 | 4.8608E-001 |
| | | 755.31 | 1.03 | 6.4849E+000 | | -2.8390E+000 |
| | | 772.29 | 1.52 | 5.1336E+000 | | 3.9912E-003 |
| | | 794.94* | 4.31 | 1.1962E+000 | | 1.4167E+000 |
| | | 835.70 | 1.70 | 4.7122E+000 | | 2.2853E+000 |
| | | 911.20* | 26.20 | 2.4742E-001 | | 1.0210E+000 |
| | | 964.79* | 4.99 | 8.2902E-001 | | 1.4476E+000 |
| | | 968.96* | 15.90 | 2.9133E-001 | | 1.3128E+000 |
| | | 1588.20 | 3.06 | 2.6755E+000 | | 1.3420E+000 |
| | | 1630.62 | 1.52 | 3.6453E+000 | | -1.1957E+000 |
| | Th-228 | 84.37* | 1.26 | 5.4632E+000 | 5.46E+000 | 3.9380E+000 |
| | | 131.61 | 0.13 | 4.9039E+001 | | 2.4130E+000 |
| | | 166.41 | 0.10 | 5.4111E+001 | | 5.9220E-001 |
| | | 215.98 | 0.25 | 2.2371E+001 | | 4.4088E+000 |
| | Pa-234m | 258.23 | 0.07 | 6.8106E+001 | 8.94E+000 | 2.3193E+001 |
| | | 742.81 | 0.09 | 6.9425E+001 | | 5.7971E+000 |
| | | 766.36 | 0.32 | 2.3350E+001 | | -1.5988E-001 |
| | | 786.27 | 0.05 | 1.3089E+002 | | -6.2147E+001 |
| | | 1001.03 | 0.85 | 8.9399E+000 | | 2.6895E+000 |
| | | 1737.77 | 0.02 | 2.8771E+002 | | -9.4129E+001 |
| | Th-234 | 63.30 | 3.75 | 6.3665E+000 | 1.88E+000 | -4.3714E-001 |
| | | 92.59 | 4.33 | 1.8781E+000 | | 3.2656E+000 |
| | | 112.81 | 0.22 | 2.6288E+001 | | 3.4196E-001 |

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated
@ = Half-life too short to be able to perform the decay correction

**********
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
**********

Sample Title: P007-S001-0612-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

..... IDENTIFIED NUCLIDES .....

| Nuclide Name | Id Confidence | Energy (keV) | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|
| K-40 | 0.952 | 1460.82* | 10.55 | 1.96954E+001 | 7.07640E-001 |
| Ce-144 | 0.777 | 80.12 | 1.36 | | |
| | | 133.51* | 11.09 | 7.94541E-002 | 6.51106E-002 |
| Eu-152m | 0.998 | 89.85* | 69.90 | 9.89837E-002 | 1.26356E-002 |
| Tl-208 | 0.859 | 72.80 @ | 2.02 | | |
| | | 74.97* @ | 3.41 | 4.51277E+000 | 4.69664E-001 |
| | | 84.90* @ | 1.51 | 3.28601E+000 | 6.41764E-001 |
| | | 277.36 | 6.31 | | |
| | | 510.77* @ | 22.60 | 3.60691E-001 | 8.57849E-002 |
| | | 583.19* | 84.50 | 3.74924E-001 | 2.67979E-002 |
| | | 763.13 @ | 1.81 | | |
| | | 860.56* | 12.42 | 2.94100E-001 | 9.69064E-002 |
| Bi-211 | 0.880 | 351.03* | 13.00 | 2.36266E+000 | 1.50651E-001 |
| Bi-212 | 0.572 | 39.86 @ | 1.06 | | |
| | | 727.33* | 6.74 | 8.77796E-001 | 1.80892E-001 |
| | | 785.37 | 1.11 | | |
| | | 1620.74 | 1.51 | | |
| | | 1806.00 @ | 0.09 | | |
| Pb-212 | 0.986 | 74.81* | 10.40 | 1.47967E+000 | 1.59801E-001 |
| | | 77.11* | 17.50 | 1.37007E+000 | 1.09700E-001 |
| | | 87.30* | 7.81 | 1.39544E+000 | 1.45342E-001 |
| | | 115.18 @ | 0.59 | | |
| | | 238.63* | 43.30 | 1.07312E+000 | 5.78821E-002 |
| | | 300.09* | 3.28 | 1.24299E+000 | 2.62775E-001 |
| Bi-214 | 0.512 | 76.86* @ | 0.43 | 5.49155E+001 | 4.43625E+000 |
| | | 89.81* @ | 0.24 | 2.82588E+001 | 3.74706E+000 |
| | | 386.77 @ | 0.30 | | |
| | | 454.77 @ | 0.29 | | |
| | | 609.31* | 45.49 | 7.88009E-001 | 5.33931E-002 |
| | | 665.45 @ | 1.53 | | |
| | | 703.11 @ | 0.48 | | |
| | | 719.86 @ | 0.39 | | |
| | | 768.36 | 4.89 | | |
| | | 786.10 @ | 0.31 | | |
| | | 806.17 @ | 1.26 | | |
| | | 934.06 | 3.10 | | |
| | | 964.08* @ | 0.36 | 1.94168E+001 | 2.65197E+000 |
| | | 1051.96 @ | 0.31 | | |
| | | 1120.29* | 14.91 | 8.44776E-001 | 1.25688E-001 |
| | | 1133.66 @ | 0.25 | | |
| | | 1155.19 @ | 1.63 | | |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Bi-214 | 0.512 | 1207.68 | @ | 0.45 | | |
| | | 1238.11 | | 5.79 | | |
| | | 1280.96 | @ | 1.43 | | |
| | | 1377.67 | | 4.00 | | |
| | | 1385.31 | @ | 0.76 | | |
| | | 1401.50 | @ | 1.27 | | |
| | | 1407.98 | @ | 2.15 | | |
| | | 1509.23 | @ | 2.11 | | |
| | | 1538.50 | @ | 0.38 | | |
| | | 1543.32 | @ | 0.20 | | |
| | | 1583.22 | @ | 0.69 | | |
| | | 1594.73 | @ | 0.25 | | |
| | | 1599.31 | @ | 0.23 | | |
| | | 1661.28 | @ | 1.15 | | |
| | | 1683.99 | @ | 0.22 | | |
| | | 1729.59* | @ | 2.92 | 1.27694E+000 | 3.45105E-001 |
| | | 1764.49* | | 15.40 | 9.28002E-001 | 1.06149E-001 |
| | | 1847.42 | @ | 2.11 | | |
| | | 1873.16 | @ | 0.22 | | |
| | | 2118.55 | @ | 1.14 | | |
| | | 2204.21 | @ | 5.08 | | |
| Pb-214 | 0.942 | 53.28 | @ | 1.20 | | |
| | | 74.81* | | 6.44 | 2.33150E+000 | 2.54281E-001 |
| | | 77.11* | | 10.80 | 2.16611E+000 | 1.80795E-001 |
| | | 87.30* | | 4.84 | 2.19705E+000 | 2.32584E-001 |
| | | 242.00* | | 7.43 | 1.21668E+000 | 1.07637E-001 |
| | | 258.87 | @ | 0.52 | | |
| | | 274.80 | @ | 0.47 | | |
| | | 295.22* | | 19.30 | 7.64822E-001 | 6.86956E-002 |
| | | 351.93* | | 37.60 | 8.15137E-001 | 5.13298E-002 |
| | | 462.00 | @ | 0.22 | | |
| | | 533.66 | @ | 0.19 | | |
| | | 785.96 | @ | 1.07 | | |
| | | 839.04 | @ | 0.59 | | |
| Ra-224 | 0.898 | 81.07 | @ | 0.13 | | |
| | | 83.78* | @ | 0.22 | 2.28658E+001 | 4.54460E+000 |
| | | 240.99* | | 4.10 | 2.25974E+000 | 1.99011E-001 |
| Ra-226 | 0.875 | 81.07 | @ | 0.20 | | |
| | | 83.78* | @ | 0.33 | 1.47603E+001 | 2.93286E+000 |
| | | 94.90 | @ | 0.15 | | |
| | | 186.21* | | 3.59 | 1.72978E+000 | 3.30205E-001 |
| Ac-228 | 0.660 | 99.50 | @ | 1.26 | | |
| | | 129.07 | @ | 2.50 | | |
| | | 209.25* | | 3.97 | 8.43275E-001 | 2.30428E-001 |
| | | 270.24 | | 3.55 | | |
| | | 328.00* | | 3.04 | 6.99200E-001 | 2.17819E-001 |
| | | 338.32* | | 11.40 | 1.09459E+000 | 1.27799E-001 |
| | | 409.46 | @ | 2.02 | | |
| | | 463.00* | | 4.45 | 4.86083E-001 | 2.86113E-001 |
| | | 755.31 | @ | 1.03 | | |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Ac-228 | 0.660 | 772.29 | @ | 1.52 | | |
| | | 794.94* | | 4.31 | 1.41673E+000 | 2.98591E-001 |
| | | 835.70 | @ | 1.70 | | |
| | | 911.20* | | 26.20 | 1.02105E+000 | 8.60753E-002 |
| | | 964.79* | | 4.99 | 1.44762E+000 | 1.98077E-001 |
| | | 968.96* | | 15.90 | 1.31282E+000 | 1.06392E-001 |
| | | 1588.20 | | 3.06 | | |
| | | 1630.62 | @ | 1.52 | | |
| Th-231 | 0.839 | 81.23 | @ | 0.90 | | |
| | | 84.21* | | 6.60 | 7.33521E-001 | 1.49997E-001 |
| | | 89.95* | @ | 1.00 | 6.89496E+000 | 9.70737E-001 |

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.45
Errors quoted at 1.000 sigma

**********
***** INTERFERENCE CORRECTED REPORT *****
**********

| | Nuclide Name | | Nuclide Id Confidence | Wt mean Activity (pCi/GWET) | Wt mean Activity Uncertainty |
|---|---|---|---|---|---|
| | K-40 | | 0.952 | 1.969536E+001 | 7.076405E-001 |
| X | Cd-109 | | 0.929 | | |
| | Ce-144 | | 0.777 | 7.945411E-002 | 6.511064E-002 |
| | Eu-152m | | 0.998 | 8.842907E-002 | 1.277745E-002 |
| X | Tm-170 | | 0.999 | | |
| | Tl-208 | @ | 0.859 | 3.682528E-001 | 2.563205E-002 |
| | Bi-211 | | 0.880 | 3.136611E-001 | 2.312711E-001 |
| | Bi-212 | @ | 0.572 | 8.777959E-001 | 1.808919E-001 |
| | Pb-212 | @ | 0.986 | 1.019815E+000 | 4.652707E-002 |
| | Bi-214 | @ | 0.512 | 8.206266E-001 | 4.447648E-002 |
| | Pb-214 | @ | 0.942 | 7.069210E-001 | 6.170067E-002 |
| | Ra-224 | @ | 0.898 | 9.467759E-001 | 2.279879E-001 |
| | Ra-226 | @ | 0.875 | 1.729783E+000 | 3.289374E-001 |
| | Ac-228 | @ | 0.660 | 1.099751E+000 | 4.890511E-002 |
| X | Th-228 | | 0.498 | | |
| | Th-231 | @ | 0.839 | 5.349837E-001 | 1.444875E-001 |

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 11/8/2016 12:46:56 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

| Peak No. | Energy (keV) | Peak Size in Counts per Second | Peak CPS % Uncertainty | Peak Type | Tol. Nuclide |
|---|---|---|---|---|---|
| m 6 | 93.16 | 3.4190E-002 | 11.28 | Tol. | Yb-169<br>Th-227<br>Th-234 |

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

```
*************************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*************************************************************************
```

Filename: ERT01,C:\GENIE2K\CAMFILES\SMP-P007-S001-1218-01.CNF

| | |
|---|---|
| Report Generated On | : 11/8/2016 2:49:22 PM |
| Sample Title | : P007-S001-1218-01 |
| Sample Description | : 450 cc Soil |
| Sample Identification | : |
| Sample Type | : |
| Sample Geometry | : |
| Peak Locate Threshold | : 3.00 |
| Peak Locate Range (in channels) | : 100 - 8192 |
| Peak Area Range (in channels) | : 100 - 8192 |
| Identification Energy Tolerance | : 1.000 keV |
| Sample Size | : 5.645E+002 GWET |
| Sample Taken On | : 10/14/2016 3:46:00 PM |
| Acquisition Started | : 11/8/2016 12:49:19 PM |
| Live Time | : 7200.0 seconds |
| Real Time | : 7201.9 seconds |
| Dead Time | : 0.03 % |

| | |
|---|---|
| Energy Calibration Used Done On | : 10/24/2016 |
| Efficiency Calibration Used Done On | : 9/27/2016 |
| Efficiency ID | : ERT0101 |

**********
***** P E A K A N A L Y S I S R E P O R T *****
**********

Detector Name: ERT01
Sample Title: P007-S001-1218-01
Peak Analysis Performed on: 11/8/2016 2:49:22 PM
Peak Analysis From Channel: 100
Peak Analysis To Channel: 8192

| | Peak No. | ROI start | ROI end | Peak centroid | Energy (keV) | FWHM (keV) | Net Peak Area | Net Area Uncert. | Continuum Counts |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 249- | 257 | 253.77 | 63.40 | 0.55 | 4.32E+001 | 27.05 | 3.22E+002 |
| M | 2 | 297- | 316 | 299.94 | 74.94 | 0.89 | 2.37E+002 | 23.47 | 4.04E+002 |
| m | 3 | 297- | 316 | 309.04 | 77.22 | 0.90 | 4.67E+002 | 29.45 | 5.00E+002 |
| M | 4 | 342- | 376 | 349.53 | 87.34 | 0.89 | 1.43E+002 | 21.80 | 4.82E+002 |
| m | 5 | 342- | 376 | 360.17 | 90.00 | 0.90 | 9.75E+001 | 19.75 | 5.14E+002 |
| m | 6 | 342- | 376 | 371.93 | 92.94 | 0.90 | 1.63E+002 | 22.47 | 4.59E+002 |
| | 7 | 733- | 750 | 744.21 | 186.02 | 1.16 | 2.59E+002 | 40.63 | 4.28E+002 |
| | 8 | 829- | 848 | 837.39 | 209.32 | 0.88 | 1.81E+002 | 41.26 | 4.34E+002 |
| M | 9 | 948- | 976 | 954.61 | 238.62 | 1.12 | 1.39E+003 | 41.03 | 2.94E+002 |
| m | 10 | 948- | 976 | 966.76 | 241.66 | 1.13 | 2.88E+002 | 21.26 | 2.76E+002 |
| | 11 | 1072- | 1089 | 1081.00 | 270.22 | 1.39 | 1.08E+002 | 32.53 | 2.92E+002 |
| | 12 | 1104- | 1115 | 1108.08 | 276.99 | 0.63 | 4.13E+001 | 22.53 | 1.86E+002 |
| | 13 | 1173- | 1191 | 1180.87 | 295.19 | 1.12 | 4.29E+002 | 37.11 | 2.78E+002 |
| | 14 | 1196- | 1205 | 1200.60 | 300.13 | 0.99 | 6.61E+001 | 20.06 | 1.49E+002 |
| | 15 | 1301- | 1318 | 1312.24 | 328.04 | 0.33 | 6.52E+001 | 29.63 | 2.50E+002 |
| | 16 | 1345- | 1362 | 1352.80 | 338.18 | 0.95 | 2.95E+002 | 31.27 | 2.08E+002 |
| | 17 | 1398- | 1416 | 1407.47 | 351.85 | 1.25 | 7.80E+002 | 40.13 | 2.46E+002 |
| | 18 | 1631- | 1645 | 1637.20 | 409.29 | 0.69 | 2.41E+001 | 20.59 | 1.39E+002 |
| | 19 | 1843- | 1857 | 1851.66 | 462.90 | 0.84 | 9.38E+001 | 20.69 | 1.16E+002 |
| | 20 | 2031- | 2051 | 2041.96 | 510.48 | 1.30 | 3.04E+002 | 28.37 | 1.38E+002 |
| | 21 | 2324- | 2340 | 2331.53 | 582.88 | 1.27 | 4.68E+002 | 28.14 | 1.04E+002 |
| | 22 | 2424- | 2447 | 2436.26 | 609.07 | 1.46 | 6.04E+002 | 32.76 | 1.17E+002 |
| | 23 | 2902- | 2913 | 2908.01 | 727.01 | 1.03 | 6.12E+001 | 16.23 | 8.08E+001 |
| | 24 | 3016- | 3025 | 3020.68 | 755.19 | 0.79 | 2.69E+001 | 10.64 | 3.81E+001 |
| | 25 | 3066- | 3079 | 3073.75 | 768.45 | 0.61 | 3.07E+001 | 15.24 | 7.23E+001 |
| | 26 | 3434- | 3450 | 3440.34 | 860.11 | 0.68 | 5.53E+001 | 16.16 | 6.57E+001 |
| | 27 | 3634- | 3653 | 3643.83 | 910.99 | 1.30 | 3.30E+002 | 23.95 | 6.96E+001 |
| | 28 | 3728- | 3743 | 3734.73 | 933.71 | 0.94 | 4.89E+001 | 14.58 | 5.41E+001 |
| | 29 | 3866- | 3885 | 3874.98 | 968.78 | 1.55 | 1.70E+002 | 21.78 | 8.68E+001 |
| | 30 | 4472- | 4490 | 4481.25 | 1120.36 | 0.62 | 1.20E+002 | 21.07 | 9.60E+001 |
| | 31 | 5830- | 5858 | 5843.95 | 1461.06 | 1.60 | 1.98E+003 | 46.47 | 3.97E+001 |
| | 32 | 6517- | 6529 | 6523.03 | 1630.85 | 0.30 | 2.87E+001 | 7.75 | 1.13E+001 |
| | 33 | 7053- | 7069 | 7060.85 | 1765.31 | 1.56 | 1.04E+002 | 12.51 | 1.68E+001 |

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

**********
***** N U C L I D E M D A R E P O R T *****
**********

Detector Name: ERT01
Sample Geometry:
Sample Title: P007-S001-1218-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | K-40 | 1460.82* | 10.55 | 7.5568E-001 | 7.56E-001 | 2.1282E+001 |
| | Co-60 | 1173.23 | 99.85 | 9.2166E-002 | 7.89E-002 | 8.6920E-003 |
| | | 1332.49 | 99.98 | 7.8861E-002 | | 1.1946E-002 |
| > | | 2505.71 | 0.10 | 0.0000E+000 | | 0.0000E+000 |
| | Cs-137 | 32.06 | 5.54 | 1.1485E+003 | 8.37E-002 | 1.7320E+002 |
| | | 661.66 | 84.99 | 8.3711E-002 | | 3.8741E-002 |
| + | Tl-208 | 72.80 | 2.02 | 8.1524E+000 | 6.48E-002 | -1.3917E+001 |
| | | 74.97* | 3.41 | 2.4480E+000 | | 4.3065E+000 |
| | | 84.90 | 1.51 | 6.4328E+000 | | 1.5647E+000 |
| | | 277.36* | 6.31 | 6.0776E-001 | | 2.4325E-001 |
| | | 510.77* | 22.60 | 3.1647E-001 | | 3.3383E-001 |
| | | 583.19* | 84.50 | 6.4819E-002 | | 3.3925E-001 |
| | | 763.13 | 1.81 | 3.8572E+000 | | -1.5358E+000 |
| | | 860.56* | 12.42 | 4.5792E-001 | | 3.6466E-001 |
| + | Bi-212 | 39.86 | 1.06 | 5.9230E+002 | 7.44E-001 | 5.2403E+001 |
| | | 727.33* | 6.74 | 7.4398E-001 | | 6.6111E-001 |
| | | 785.37 | 1.11 | 6.6785E+000 | | 2.3617E+000 |
| | | 1620.74 | 1.51 | 4.9301E+000 | | 1.4810E+000 |
| | | 1806.00 | 0.09 | 4.7682E+001 | | -1.7137E+001 |
| + | Pb-212 | 74.81* | 10.40 | 8.0265E-001 | 9.41E-002 | 1.4120E+000 |
| | | 77.11* | 17.50 | 4.7866E-001 | | 1.4928E+000 |
| | | 87.30* | 7.81 | 7.5620E-001 | | 7.3773E-001 |
| | | 115.18 | 0.59 | 1.0361E+001 | | 1.1104E+000 |
| | | 238.63* | 43.30 | 9.4089E-002 | | 1.0869E+000 |
| | | 300.09* | 3.28 | 1.0471E+000 | | 7.8724E-001 |
| + | Bi-214 | 76.86* | 0.43 | 1.9184E+001 | 1.42E-001 | 5.9828E+001 |
| | | 89.81* | 0.24 | 2.2956E+001 | | 1.4744E+001 |
| | | 386.77 | 0.30 | 1.8678E+001 | | -7.3346E-001 |
| | | 454.77 | 0.29 | 1.9657E+001 | | -1.3465E+000 |
| | | 609.31* | 45.49 | 1.4242E-001 | | 8.3132E-001 |
| | | 665.45 | 1.53 | 4.8046E+000 | | 3.8962E-001 |
| | | 703.11 | 0.48 | 1.4199E+001 | | -1.0650E+001 |
| | | 719.86 | 0.39 | 1.7185E+001 | | -1.6279E+000 |
| | | 768.36* | 4.89 | 1.0380E+000 | | 4.6363E-001 |
| | | 786.10 | 0.31 | 2.4061E+001 | | -5.2626E+000 |
| | | 806.17 | 1.26 | 5.6950E+000 | | 1.3096E-001 |
| | | 934.06* | 3.10 | 1.6959E+000 | | 1.3342E+000 |
| | | 964.08 | 0.36 | 3.0882E+001 | | 8.5708E+000 |
| | | 1051.96 | 0.31 | 2.5004E+001 | | -1.1168E+001 |
| | | 1120.29* | 14.91 | 5.5454E-001 | | 7.7009E-001 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Bi-214 | 1133.66 | 0.25 | 3.5270E+001 | 1.42E-001 | 9.1240E+000 |
| | | 1155.19 | 1.63 | 5.5778E+000 | | -3.3506E-001 |
| | | 1207.68 | 0.45 | 2.2671E+001 | | -2.7343E+000 |
| | | 1238.11 | 5.79 | 1.9443E+000 | | 1.1149E+000 |
| | | 1280.96 | 1.43 | 6.1384E+000 | | -4.6836E+000 |
| | | 1377.67 | 4.00 | 2.1064E+000 | | 1.2080E+000 |
| | | 1385.31 | 0.76 | 9.1422E+000 | | -1.2083E+001 |
| | | 1401.50 | 1.27 | 5.2664E+000 | | -3.9178E+000 |
| | | 1407.98 | 2.15 | 3.3836E+000 | | 3.6876E-001 |
| | | 1509.23 | 2.11 | 2.9816E+000 | | -7.4311E-001 |
| | | 1538.50 | 0.38 | 1.4801E+001 | | 1.9388E+000 |
| | | 1543.32 | 0.20 | 2.6997E+001 | | -3.2970E+000 |
| | | 1583.22 | 0.69 | 1.0619E+001 | | 2.2439E+000 |
| | | 1594.73 | 0.25 | 3.3389E+001 | | 1.7507E+001 |
| | | 1599.31 | 0.23 | 2.9380E+001 | | 3.0787E+000 |
| | | 1661.28 | 1.15 | 4.8918E+000 | | -1.0156E+000 |
| | | 1683.99 | 0.22 | 2.5998E+001 | | 6.4187E+000 |
| | | 1729.59 | 2.92 | 2.2391E+000 | | -1.6975E-001 |
| | | 1764.49* | 15.40 | 3.2899E-001 | | 8.4275E-001 |
| | | 1847.42 | 2.11 | 2.7126E+000 | | 1.8892E+000 |
| | | 1873.16 | 0.22 | 2.2699E+001 | | 3.4027E+000 |
| > | | 2118.55 | 1.14 | 0.0000E+000 | | 0.0000E+000 |
| > | | 2204.21 | 5.08 | 0.0000E+000 | | 0.0000E+000 |
| + | Pb-214 | 53.28 | 1.20 | 4.9795E+001 | 1.55E-001 | 6.9426E+000 |
| | | 74.81* | 6.44 | 1.2646E+000 | | 2.2247E+000 |
| | | 77.11* | 10.80 | 7.5671E-001 | | 2.3599E+000 |
| | | 87.30* | 4.84 | 1.1905E+000 | | 1.1614E+000 |
| | | 242.00* | 7.43 | 5.0738E-001 | | 1.3067E+000 |
| | | 258.87 | 0.52 | 1.0270E+001 | | 5.2909E-001 |
| | | 274.80 | 0.47 | 1.1936E+001 | | 1.8173E+000 |
| | | 295.22* | 19.30 | 2.8493E-001 | | 8.3762E-001 |
| | | 351.93* | 37.60 | 1.5521E-001 | | 8.6845E-001 |
| | | 462.00* | 0.22 | 2.0371E+001 | | 2.1766E+001 |
| | | 533.66 | 0.19 | 3.3077E+001 | | 9.9718E+000 |
| | | 785.96 | 1.07 | 7.0171E+000 | | 2.8453E-001 |
| | | 839.04 | 0.59 | 1.3475E+001 | | 3.3170E-001 |
| + | Ra-224 | 81.07 | 0.13 | 7.6314E+001 | 9.42E-001 | -3.2510E+001 |
| | | 83.78 | 0.22 | 4.3297E+001 | | 6.1423E+000 |
| | | 240.99* | 4.10 | 9.4243E-001 | | 2.4271E+000 |
| + | Ra-226 | 81.07 | 0.20 | 4.9510E+001 | 1.53E+000 | -2.1092E+001 |
| | | 83.78 | 0.33 | 2.7947E+001 | | 3.9647E+000 |
| | | 94.90 | 0.15 | 5.0945E+001 | | -1.3199E+001 |
| | | 186.21* | 3.59 | 1.5338E+000 | | 1.7780E+000 |
| + | Ac-228 | 99.50 | 1.26 | 4.9954E+000 | 2.49E-001 | 9.4574E-001 |
| | | 129.07 | 2.50 | 2.6538E+000 | | 2.5020E+000 |
| | | 209.25* | 3.97 | 1.5032E+000 | | 1.4742E+000 |
| | | 270.24* | 3.55 | 1.5082E+000 | | 1.1154E+000 |
| | | 328.00* | 3.04 | 1.8393E+000 | | 8.8590E-001 |
| | | 338.32* | 11.40 | 4.5969E-001 | | 1.0901E+000 |
| | | 409.46* | 2.02 | 2.2805E+000 | | 5.7474E-001 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Ac-228 | 463.00* | 4.45 | 1.0369E+000 | 2.49E-001 | 1.1079E+000 |
| | | 755.31* | 1.03 | 3.3343E+000 | | 1.9541E+000 |
| | | 772.29 | 1.52 | 5.1758E+000 | | 2.2789E+000 |
| | | 794.94 | 4.31 | 1.8393E+000 | | 6.7926E-002 |
| | | 835.70 | 1.70 | 4.6505E+000 | | -1.1982E+000 |
| | | 911.20* | 26.20 | 2.4912E-001 | | 1.0574E+000 |
| | | 964.79 | 4.99 | 2.3458E+000 | | 5.3623E-001 |
| | | 968.96* | 15.90 | 4.6852E-001 | | 9.5105E-001 |
| | | 1588.20 | 3.06 | 2.8276E+000 | | 1.0541E+000 |
| | | 1630.62* | 1.52 | 2.4031E+000 | | 2.3988E+000 |
| | Th-228 | 84.37 | 1.26 | 7.5593E+000 | 7.56E+000 | 7.9456E-001 |
| | | 131.61 | 0.13 | 4.8813E+001 | | -1.0202E+001 |
| | | 166.41 | 0.10 | 5.5906E+001 | | 1.6613E+001 |
| | | 215.98 | 0.25 | 2.2341E+001 | | -1.3117E+001 |
| | Pa-234m | 258.23 | 0.07 | 7.4225E+001 | 8.83E+000 | 4.2813E+001 |
| | | 742.81 | 0.09 | 7.6599E+001 | | 2.9943E+001 |
| | | 766.36 | 0.32 | 2.3927E+001 | | -2.1566E+000 |
| | | 786.27 | 0.05 | 1.3918E+002 | | -3.9495E+001 |
| | | 1001.03 | 0.85 | 8.8258E+000 | | -4.0085E-001 |
| | | 1737.77 | 0.02 | 2.5885E+002 | | -3.3533E+002 |
| + | Th-234 | 63.30* | 3.75 | 4.4075E+000 | 1.23E+000 | 3.1566E-001 |
| | | 92.59* | 4.33 | 1.2259E+000 | | 7.0225E-001 |
| | | 112.81 | 0.22 | 2.7707E+001 | | 6.8591E-001 |

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated
@ = Half-life too short to be able to perform the decay correction

**********
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
**********

Sample Title: P007-S001-1218-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

..... IDENTIFIED NUCLIDES .....

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| K-40 | 0.991 | 1460.82* | | 10.55 | 2.12819E+001 | 7.58523E-001 |
| Eu-152m | 0.996 | 89.85* | | 69.90 | 5.16452E-002 | 1.06055E-002 |
| Tl-208 | 0.921 | 72.80 | @ | 2.02 | | |
| | | 74.97* | @ | 3.41 | 4.30649E+000 | 4.51565E-001 |
| | | 84.90 | @ | 1.51 | | |
| | | 277.36* | | 6.31 | 2.43254E-001 | 1.33207E-001 |
| | | 510.77* | @ | 22.60 | 3.33833E-001 | 7.34770E-002 |
| | | 583.19* | | 84.50 | 3.39251E-001 | 2.35215E-002 |
| | | 763.13 | @ | 1.81 | | |
| | | 860.56* | | 12.42 | 3.64662E-001 | 1.06970E-001 |
| Bi-211 | 0.899 | 351.03* | | 13.00 | 2.51720E+000 | 1.66488E-001 |
| Bi-212 | 0.564 | 39.86 | @ | 1.06 | | |
| | | 727.33* | | 6.74 | 6.61113E-001 | 1.76640E-001 |
| | | 785.37 | | 1.11 | | |
| | | 1620.74 | | 1.51 | | |
| | | 1806.00 | @ | 0.09 | | |
| Pb-212 | 0.986 | 74.81* | | 10.40 | 1.41203E+000 | 1.53562E-001 |
| | | 77.11* | | 17.50 | 1.49276E+000 | 1.15706E-001 |
| | | 87.30* | | 7.81 | 7.37728E-001 | 1.17151E-001 |
| | | 115.18 | @ | 0.59 | | |
| | | 238.63* | | 43.30 | 1.08693E+000 | 5.87997E-002 |
| | | 300.09* | | 3.28 | 7.87237E-001 | 2.40936E-001 |
| Bi-214 | 0.590 | 76.86* | @ | 0.43 | 5.98280E+001 | 4.68149E+000 |
| | | 89.81* | @ | 0.24 | 1.47440E+001 | 3.07357E+000 |
| | | 386.77 | @ | 0.30 | | |
| | | 454.77 | @ | 0.29 | | |
| | | 609.31* | | 45.49 | 8.31321E-001 | 5.17845E-002 |
| | | 665.45 | @ | 1.53 | | |
| | | 703.11 | @ | 0.48 | | |
| | | 719.86 | @ | 0.39 | | |
| | | 768.36* | | 4.89 | 4.63628E-001 | 2.30476E-001 |
| | | 786.10 | @ | 0.31 | | |
| | | 806.17 | @ | 1.26 | | |
| | | 934.06* | | 3.10 | 1.33420E+000 | 3.98805E-001 |
| | | 964.08 | @ | 0.36 | | |
| | | 1051.96 | @ | 0.31 | | |
| | | 1120.29* | | 14.91 | 7.70093E-001 | 1.36545E-001 |
| | | 1133.66 | @ | 0.25 | | |
| | | 1155.19 | @ | 1.63 | | |
| | | 1207.68 | @ | 0.45 | | |
| | | 1238.11 | | 5.79 | | |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Bi-214 | 0.590 | 1280.96 | @ | 1.43 | | |
| | | 1377.67 | | 4.00 | | |
| | | 1385.31 | @ | 0.76 | | |
| | | 1401.50 | @ | 1.27 | | |
| | | 1407.98 | @ | 2.15 | | |
| | | 1509.23 | @ | 2.11 | | |
| | | 1538.50 | @ | 0.38 | | |
| | | 1543.32 | @ | 0.20 | | |
| | | 1583.22 | @ | 0.69 | | |
| | | 1594.73 | @ | 0.25 | | |
| | | 1599.31 | @ | 0.23 | | |
| | | 1661.28 | @ | 1.15 | | |
| | | 1683.99 | @ | 0.22 | | |
| | | 1729.59 | @ | 2.92 | | |
| | | 1764.49* | | 15.40 | 8.42747E-001 | 1.11234E-001 |
| | | 1847.42 | @ | 2.11 | | |
| | | 1873.16 | @ | 0.22 | | |
| | | 2118.55 | @ | 1.14 | | |
| | | 2204.21 | @ | 5.08 | | |
| Pb-214 | 0.945 | 53.28 | @ | 1.20 | | |
| | | 74.81* | | 6.44 | 2.22474E+000 | 2.44299E-001 |
| | | 77.11* | | 10.80 | 2.35988E+000 | 1.91186E-001 |
| | | 87.30* | | 4.84 | 1.16142E+000 | 1.85740E-001 |
| | | 242.00* | | 7.43 | 1.30670E+000 | 1.13797E-001 |
| | | 258.87 | @ | 0.52 | | |
| | | 274.80 | @ | 0.47 | | |
| | | 295.22* | | 19.30 | 8.37615E-001 | 8.04394E-002 |
| | | 351.93* | | 37.60 | 8.68450E-001 | 5.67760E-002 |
| | | 462.00* | @ | 0.22 | 2.17655E+001 | 4.94549E+000 |
| | | 533.66 | @ | 0.19 | | |
| | | 785.96 | @ | 1.07 | | |
| | | 839.04 | @ | 0.59 | | |
| Ra-224 | 0.825 | 81.07 | @ | 0.13 | | |
| | | 83.78 | @ | 0.22 | | |
| | | 240.99* | | 4.10 | 2.42714E+000 | 2.10389E-001 |
| Ra-226 | 0.774 | 81.07 | @ | 0.20 | | |
| | | 83.78 | @ | 0.33 | | |
| | | 94.90 | @ | 0.15 | | |
| | | 186.21* | | 3.59 | 1.77801E+000 | 3.57254E-001 |
| Ac-228 | 0.673 | 99.50 | @ | 1.26 | | |
| | | 129.07 | @ | 2.50 | | |
| | | 209.25* | | 3.97 | 1.47425E+000 | 3.46763E-001 |
| | | 270.24* | | 3.55 | 1.11535E+000 | 3.40623E-001 |
| | | 328.00* | | 3.04 | 8.85903E-001 | 4.05593E-001 |
| | | 338.32* | | 11.40 | 1.09011E+000 | 1.28860E-001 |
| | | 409.46* | @ | 2.02 | 5.74737E-001 | 4.91447E-001 |
| | | 463.00* | | 4.45 | 1.10792E+000 | 2.54768E-001 |
| | | 755.31* | @ | 1.03 | 1.95409E+000 | 7.78052E-001 |
| | | 772.29 | @ | 1.52 | | |
| | | 794.94 | | 4.31 | | |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Ac-228 | 0.673 | 835.70 | @ | 1.70 | | |
| | | 911.20* | | 26.20 | 1.05744E+000 | 8.80775E-002 |
| | | 964.79 | | 4.99 | | |
| | | 968.96* | | 15.90 | 9.51048E-001 | 1.27326E-001 |
| | | 1588.20 | | 3.06 | | |
| | | 1630.62* | @ | 1.52 | 2.39878E+000 | 6.57591E-001 |
| Th-234 | 0.933 | 63.30* | | 3.75 | 3.15661E-001 | 9.34273E-001 |
| | | 92.59* | | 4.33 | 7.02252E-001 | 1.91250E-001 |
| | | 112.81 | @ | 0.22 | | |

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.45
Errors quoted at 1.000 sigma

**********
***** I N T E R F E R E N C E C O R R E C T E D R E P O R T *****
**********

| | Nuclide Name | | Nuclide Id Confidence | Wt mean Activity (pCi/GWET) | Wt mean Activity Uncertainty |
|---|---|---|---|---|---|
| | K-40 | | 0.991 | 2.128192E+001 | 7.585232E-001 |
| X | Cd-109 | | 0.926 | | |
| | Eu-152m | | 0.996 | 4.877175E-002 | 1.059729E-002 |
| | Tl-208 | @ | 0.921 | 3.371558E-001 | 2.246301E-002 |
| | Bi-211 | | 0.899 | 5.746106E-001 | 2.588407E-001 |
| | Bi-212 | @ | 0.564 | 6.611128E-001 | 1.766397E-001 |
| | Pb-212 | @ | 0.986 | 9.398033E-001 | 4.710586E-002 |
| | Bi-214 | @ | 0.590 | 8.203336E-001 | 4.323378E-002 |
| | Pb-214 | @ | 0.945 | 6.702056E-001 | 6.954579E-002 |
| | Ra-224 | @ | 0.825 | 1.182260E+000 | 2.451008E-001 |
| | Ra-226 | @ | 0.774 | 1.778010E+000 | 3.572544E-001 |
| | Ac-228 | @ | 0.673 | 1.052647E+000 | 5.591610E-002 |
| | Th-234 | @ | 0.933 | 6.867042E-001 | 1.873644E-001 |

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

********** U N I D E N T I F I E D P E A K S **********

Peak Locate Performed on: 11/8/2016 2:49:22 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

| Peak No. | Energy (keV) | Peak Size in Counts per Second | Peak CPS % Uncertainty | Peak Type | Tol. Nuclide |
|---|---|---|---|---|---|

All peaks were identified.

```
*********************************************************************
*****        G A M M A   S P E C T R U M   A N A L Y S I S        *****
*********************************************************************
```

Filename: ERT01,C:\GENIE2K\CAMFILES\SMP-P006-S001-1218-01.CNF

| | |
|---|---|
| Report Generated On | : 11/8/2016 5:01:31 PM |
| Sample Title | : P006-S001-1218-01 |
| Sample Description | : 450 cc Soil |
| Sample Identification | : |
| Sample Type | : |
| Sample Geometry | : |
| Peak Locate Threshold | : 3.00 |
| Peak Locate Range (in channels) | : 100 - 8192 |
| Peak Area Range (in channels) | : 100 - 8192 |
| Identification Energy Tolerance | : 1.000 keV |
| Sample Size | : 4.556E+002 GWET |
| Sample Taken On | : 10/14/2016 2:32:00 PM |
| Acquisition Started | : 11/8/2016 3:01:27 PM |
| Live Time | : 7200.0 seconds |
| Real Time | : 7201.7 seconds |
| Dead Time | : 0.02 % |

| | |
|---|---|
| Energy Calibration Used Done On | : 10/24/2016 |
| Efficiency Calibration Used Done On | : 9/27/2016 |
| Efficiency ID | : ERT0101 |

**********
***** P E A K A N A L Y S I S R E P O R T *****
**********

Detector Name: ERT01
Sample Title: P006-S001-1218-01
Peak Analysis Performed on: 11/8/2016 5:01:31 PM
Peak Analysis From Channel: 100
Peak Analysis To Channel: 8192

| | Peak No. | ROI start | ROI end | Peak centroid | Energy (keV) | FWHM (keV) | Net Peak Area | Net Area Uncert. | Continuum Counts |
|---|---|---|---|---|---|---|---|---|---|
| M | 1 | 295- | 315 | 300.22 | 75.01 | 0.96 | 2.57E+002 | 23.31 | 3.99E+002 |
| m | 2 | 295- | 315 | 309.05 | 77.22 | 0.96 | 4.37E+002 | 28.03 | 4.21E+002 |
| M | 3 | 344- | 385 | 348.82 | 87.16 | 1.32 | 1.62E+002 | 22.44 | 4.34E+002 |
| m | 4 | 344- | 385 | 360.49 | 90.08 | 1.32 | 1.18E+002 | 20.55 | 5.22E+002 |
| m | 5 | 344- | 385 | 371.95 | 92.95 | 1.33 | 3.16E+002 | 25.87 | 4.36E+002 |
| | 6 | 514- | 522 | 517.29 | 129.28 | 0.48 | 5.26E+001 | 23.91 | 2.38E+002 |
| | 7 | 738- | 751 | 743.95 | 185.95 | 0.71 | 2.19E+002 | 32.74 | 3.09E+002 |
| | 8 | 831- | 850 | 837.42 | 209.32 | 0.79 | 1.47E+002 | 39.05 | 3.91E+002 |
| M | 9 | 946- | 975 | 954.62 | 238.63 | 1.08 | 1.21E+003 | 38.51 | 2.89E+002 |
| m | 10 | 946- | 975 | 966.48 | 241.59 | 1.08 | 2.26E+002 | 19.63 | 2.64E+002 |
| | 11 | 1173- | 1188 | 1180.85 | 295.19 | 0.99 | 3.80E+002 | 31.87 | 2.12E+002 |
| | 12 | 1193- | 1206 | 1200.02 | 299.98 | 0.99 | 4.72E+001 | 23.93 | 1.91E+002 |
| | 13 | 1347- | 1360 | 1353.10 | 338.25 | 0.84 | 2.71E+002 | 26.43 | 1.55E+002 |
| | 14 | 1398- | 1418 | 1407.63 | 351.89 | 0.96 | 7.38E+002 | 38.18 | 1.97E+002 |
| | 15 | 1843- | 1859 | 1851.36 | 462.83 | 0.44 | 8.31E+001 | 20.77 | 1.11E+002 |
| | 16 | 2031- | 2054 | 2042.21 | 510.55 | 0.87 | 2.90E+002 | 31.53 | 1.75E+002 |
| | 17 | 2324- | 2346 | 2331.99 | 583.00 | 1.42 | 4.74E+002 | 28.23 | 8.13E+001 |
| | 18 | 2427- | 2445 | 2436.34 | 609.09 | 1.46 | 5.81E+002 | 29.24 | 8.09E+001 |
| | 19 | 2656- | 2666 | 2660.83 | 665.21 | 0.39 | 1.99E+001 | 11.54 | 4.71E+001 |
| | 20 | 2903- | 2914 | 2909.03 | 727.27 | 1.43 | 8.63E+001 | 16.07 | 6.87E+001 |
| | 21 | 3067- | 3078 | 3073.09 | 768.29 | 0.37 | 2.14E+001 | 13.63 | 6.56E+001 |
| | 22 | 3171- | 3185 | 3178.40 | 794.62 | 0.46 | 5.60E+001 | 13.63 | 4.50E+001 |
| | 23 | 3435- | 3448 | 3440.74 | 860.21 | 0.87 | 3.69E+001 | 14.08 | 5.81E+001 |
| | 24 | 3634- | 3654 | 3644.08 | 911.05 | 0.89 | 3.11E+002 | 22.12 | 4.82E+001 |
| | 25 | 3730- | 3742 | 3735.98 | 934.02 | 0.88 | 1.08E+001 | 11.89 | 4.92E+001 |
| M | 26 | 3850- | 3883 | 3858.14 | 964.57 | 1.41 | 4.77E+001 | 9.56 | 6.15E+001 |
| m | 27 | 3850- | 3883 | 3875.11 | 968.81 | 1.42 | 1.81E+002 | 15.32 | 5.86E+001 |
| | 28 | 4472- | 4492 | 4480.15 | 1120.08 | 0.84 | 1.46E+002 | 17.44 | 4.35E+001 |
| | 29 | 5307- | 5318 | 5312.45 | 1328.18 | 0.86 | 8.70E+000 | 6.49 | 1.33E+001 |
| | 30 | 5831- | 5857 | 5844.27 | 1461.14 | 1.67 | 1.67E+003 | 42.97 | 4.05E+001 |
| | 31 | 7052- | 7069 | 7061.39 | 1765.45 | 0.68 | 7.62E+001 | 11.94 | 1.98E+001 |

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma

**********
***** N U C L I D E M D A R E P O R T *****
**********

Detector Name: ERT01
Sample Geometry:
Sample Title: P006-S001-1218-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | K-40 | 1460.82* | 10.55 | 9.2275E-001 | 9.23E-001 | 2.2239E+001 |
| | Co-60 | 1173.23 | 99.85 | 1.1830E-001 | 8.76E-002 | 5.8684E-002 |
| | | 1332.49 | 99.98 | 8.7598E-002 | | -2.4816E-002 |
| > | | 2505.71 | 0.10 | 0.0000E+000 | | 0.0000E+000 |
| | Cs-137 | 32.06 | 5.54 | 1.2593E+003 | 9.08E-002 | -2.9179E+002 |
| | | 661.66 | 84.99 | 9.0814E-002 | | -2.9313E-002 |
| + | Tl-208 | 72.80 | 2.02 | 9.6641E+000 | 8.03E-002 | -2.6381E+000 |
| | | 74.97* | 3.41 | 3.0082E+000 | | 5.7723E+000 |
| | | 84.90 | 1.51 | 7.3946E+000 | | -2.5633E+000 |
| | | 277.36 | 6.31 | 1.0607E+000 | | 5.0904E-001 |
| | | 510.77* | 22.60 | 4.4343E-001 | | 3.7262E-001 |
| | | 583.19* | 84.50 | 8.0256E-002 | | 4.2574E-001 |
| | | 763.13 | 1.81 | 4.9023E+000 | | -8.7379E-001 |
| | | 860.56* | 12.42 | 5.0486E-001 | | 3.0149E-001 |
| + | Bi-212 | 39.86 | 1.06 | 6.9186E+002 | 8.53E-001 | -1.1062E+002 |
| | | 727.33* | 6.74 | 8.5256E-001 | | 1.1566E+000 |
| | | 785.37 | 1.11 | 7.8904E+000 | | 6.2136E+000 |
| | | 1620.74 | 1.51 | 5.3401E+000 | | 6.3701E-001 |
| | | 1806.00 | 0.09 | 6.4499E+001 | | -2.3132E+000 |
| + | Pb-212 | 74.81* | 10.40 | 9.8634E-001 | 1.16E-001 | 1.8927E+000 |
| | | 77.11* | 17.50 | 5.4517E-001 | | 1.7305E+000 |
| | | 87.30* | 7.81 | 8.9448E-001 | | 1.0387E+000 |
| | | 115.18 | 0.59 | 1.1424E+001 | | 5.3615E+000 |
| | | 238.63* | 43.30 | 1.1563E-001 | | 1.1690E+000 |
| | | 300.09* | 3.28 | 1.6113E+000 | | 6.9642E-001 |
| + | Bi-214 | 76.86* | 0.43 | 2.1847E+001 | 1.36E-001 | 6.9346E+001 |
| | | 89.81* | 0.24 | 2.8623E+001 | | 2.2162E+001 |
| | | 386.77 | 0.30 | 2.1442E+001 | | 3.5379E+000 |
| | | 454.77 | 0.29 | 2.3022E+001 | | -4.0649E+000 |
| | | 609.31* | 45.49 | 1.3581E-001 | | 9.9109E-001 |
| | | 665.45* | 1.53 | 2.8187E+000 | | 1.0754E+000 |
| | | 703.11 | 0.48 | 1.6971E+001 | | 3.8640E-001 |
| | | 719.86 | 0.39 | 1.9452E+001 | | -6.0181E+000 |
| | | 768.36* | 4.89 | 1.1662E+000 | | 4.0068E-001 |
| | | 786.10 | 0.31 | 2.8225E+001 | | 1.8869E+001 |
| | | 806.17 | 1.26 | 7.1270E+000 | | 5.0262E-002 |
| | | 934.06* | 3.10 | 1.8876E+000 | | 3.6620E-001 |
| | | 964.08* | 0.36 | 1.6020E+001 | | 1.4073E+001 |
| | | 1051.96 | 0.31 | 3.0980E+001 | | -9.7544E+000 |
| | | 1120.29* | 14.91 | 4.8569E-001 | | 1.1646E+000 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Bi-214 | 1133.66 | 0.25 | 3.8917E+001 | 1.36E-001 | -1.3855E+001 |
| | | 1155.19 | 1.63 | 6.5667E+000 | | -4.8022E-001 |
| | | 1207.68 | 0.45 | 2.4671E+001 | | -1.6037E+001 |
| | | 1238.11 | 5.79 | 2.2632E+000 | | 9.5183E-001 |
| | | 1280.96 | 1.43 | 7.3092E+000 | | -6.1727E-001 |
| | | 1377.67 | 4.00 | 2.4123E+000 | | 4.3594E-001 |
| | | 1385.31 | 0.76 | 1.1327E+001 | | -1.3162E+001 |
| | | 1401.50 | 1.27 | 6.3168E+000 | | -3.0519E+000 |
| | | 1407.98 | 2.15 | 3.7682E+000 | | 2.3928E-001 |
| | | 1509.23 | 2.11 | 3.7809E+000 | | 3.3146E-001 |
| | | 1538.50 | 0.38 | 1.9455E+001 | | 9.5956E+000 |
| | | 1543.32 | 0.20 | 3.7661E+001 | | 7.3795E-001 |
| | | 1583.22 | 0.69 | 1.3075E+001 | | 5.8543E+000 |
| | | 1594.73 | 0.25 | 3.5816E+001 | | 1.8909E+001 |
| | | 1599.31 | 0.23 | 2.9828E+001 | | -1.3882E+001 |
| | | 1661.28 | 1.15 | 6.1302E+000 | | 2.6058E+000 |
| | | 1683.99 | 0.22 | 2.9019E+001 | | 3.2721E+000 |
| | | 1729.59 | 2.92 | 2.8475E+000 | | 4.4242E-001 |
| | | 1764.49* | 15.40 | 4.4986E-001 | | 7.4819E-001 |
| | | 1847.42 | 2.11 | 3.4043E+000 | | -4.5831E-001 |
| | | 1873.16 | 0.22 | 3.0055E+001 | | 7.2431E-001 |
| > | | 2118.55 | 1.14 | 0.0000E+000 | | 0.0000E+000 |
| > | | 2204.21 | 5.08 | 0.0000E+000 | | 0.0000E+000 |
| + | Pb-214 | 53.28 | 1.20 | 5.8077E+001 | 1.79E-001 | 1.0023E+001 |
| | | 74.81* | 6.44 | 1.5538E+000 | | 2.9816E+000 |
| | | 77.11* | 10.80 | 8.6173E-001 | | 2.7353E+000 |
| | | 87.30* | 4.84 | 1.4080E+000 | | 1.6350E+000 |
| | | 242.00* | 7.43 | 6.1557E-001 | | 1.2704E+000 |
| | | 258.87 | 0.52 | 1.1563E+001 | | 2.6531E+000 |
| | | 274.80 | 0.47 | 1.3686E+001 | | -1.2560E+001 |
| | | 295.22* | 19.30 | 2.9018E-001 | | 9.2073E-001 |
| | | 351.93* | 37.60 | 1.7947E-001 | | 1.0180E+000 |
| | | 462.00* | 0.22 | 2.5743E+001 | | 2.3903E+001 |
| | | 533.66 | 0.19 | 3.8330E+001 | | 1.4500E+001 |
| | | 785.96 | 1.07 | 8.1970E+000 | | 4.5744E+000 |
| | | 839.04 | 0.59 | 1.5320E+001 | | 3.3584E+000 |
| + | Ra-224 | 81.07 | 0.13 | 8.8114E+001 | 1.14E+000 | -6.5973E+001 |
| | | 83.78 | 0.22 | 5.0403E+001 | | -1.6334E+001 |
| | | 240.99* | 4.10 | 1.1436E+000 | | 2.3601E+000 |
| + | Ra-226 | 81.07 | 0.20 | 5.7158E+001 | 1.52E+000 | -4.2795E+001 |
| | | 83.78 | 0.33 | 3.2529E+001 | | -1.0542E+001 |
| | | 94.90 | 0.15 | 5.8670E+001 | | -4.2131E+000 |
| | | 186.21* | 3.59 | 1.5173E+000 | | 1.7789E+000 |
| + | Ac-228 | 99.50 | 1.26 | 5.4701E+000 | 2.68E-001 | 2.1865E-001 |
| | | 129.07* | 2.50 | 1.6756E+000 | | 8.1095E-001 |
| | | 209.25* | 3.97 | 1.7737E+000 | | 1.4852E+000 |
| | | 270.24 | 3.55 | 1.9904E+000 | | 2.0906E+000 |
| | | 328.00 | 3.04 | 2.3348E+000 | | 7.9831E-001 |
| | | 338.32* | 11.40 | 4.5323E-001 | | 1.2434E+000 |
| | | 409.46 | 2.02 | 3.5384E+000 | | -3.2606E-001 |

| | Nuclide Name | Energy (keV) | Yield (%) | Line MDA (pCi/GWET) | Nuclide MDA (pCi/GWET) | Activity (pCi/GWET) |
|---|---|---|---|---|---|---|
| + | Ac-228 | 463.00* | 4.45 | 1.3106E+000 | 2.68E-001 | 1.2169E+000 |
| | | 755.31 | 1.03 | 7.7550E+000 | | -2.6218E+000 |
| | | 772.29 | 1.52 | 5.9873E+000 | | -2.3824E-001 |
| | | 794.94* | 4.31 | 1.2411E+000 | | 1.2483E+000 |
| | | 835.70 | 1.70 | 5.3227E+000 | | -9.8593E-001 |
| | | 911.20* | 26.20 | 2.6774E-001 | | 1.2314E+000 |
| | | 964.79* | 4.99 | 1.1947E+000 | | 1.0495E+000 |
| | | 968.96* | 15.90 | 3.6748E-001 | | 1.2563E+000 |
| | | 1588.20 | 3.06 | 3.0481E+000 | | 7.3582E-001 |
| | | 1630.62 | 1.52 | 5.8514E+000 | | 1.2420E+000 |
| | Th-228 | 84.37 | 1.26 | 8.8535E+000 | 8.85E+000 | -2.0485E+000 |
| | | 131.61 | 0.13 | 5.5659E+001 | | 2.7129E+001 |
| | | 166.41 | 0.10 | 6.4499E+001 | | -7.4475E+000 |
| | | 215.98 | 0.25 | 2.7047E+001 | | -1.5859E+000 |
| | Pa-234m | 258.23 | 0.07 | 8.1521E+001 | 1.02E+001 | 1.8272E+001 |
| | | 742.81 | 0.09 | 8.9228E+001 | | 9.7571E-001 |
| | | 766.36 | 0.32 | 2.8421E+001 | | 5.5943E+000 |
| | | 786.27 | 0.05 | 1.6203E+002 | | 9.8006E+001 |
| | | 1001.03 | 0.85 | 1.0224E+001 | | -1.9193E+000 |
| | | 1737.77 | 0.02 | 3.1663E+002 | | -2.4353E+002 |
| | Th-234 | 63.30 | 3.75 | 7.7319E+000 | 2.26E+000 | -1.6828E+000 |
| | | 92.59 | 4.33 | 2.2628E+000 | | 4.8615E+000 |
| | | 112.81 | 0.22 | 3.0716E+001 | | 1.4865E+000 |

+ = Nuclide identified during the nuclide identification
* = Energy line found in the spectrum
> = Calculated MDA is zero due to zero counts in the region, or the region is outside the spectrum, or has not been calculated
@ = Half-life too short to be able to perform the decay correction

**********
***** N U C L I D E I D E N T I F I C A T I O N R E P O R T *****
**********

Sample Title: P006-S001-1218-01
Nuclide Library Used: C:\GENIE2K\CAMFILES\ERT_LIBRARY_LMDA.NLB

..... IDENTIFIED NUCLIDES .....

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| K-40 | 0.984 | 1460.82* | | 10.55 | 2.22393E+001 | 8.27574E-001 |
| Eu-152m | 0.991 | 89.85* | | 69.90 | 7.76290E-002 | 1.37171E-002 |
| Tl-208 | 0.834 | 72.80 | @ | 2.02 | | |
| | | 74.97* | @ | 3.41 | 5.77233E+000 | 5.59716E-001 |
| | | 84.90 | @ | 1.51 | | |
| | | 277.36 | | 6.31 | | |
| | | 510.77* | @ | 22.60 | 3.72624E-001 | 1.00334E-001 |
| | | 583.19* | | 84.50 | 4.25744E-001 | 2.93039E-002 |
| | | 763.13 | @ | 1.81 | | |
| | | 860.56* | | 12.42 | 3.01492E-001 | 1.15309E-001 |
| Bi-211 | 0.889 | 351.03* | | 13.00 | 2.95083E+000 | 1.95866E-001 |
| Bi-212 | 0.574 | 39.86 | @ | 1.06 | | |
| | | 727.33* | | 6.74 | 1.15657E+000 | 2.18255E-001 |
| | | 785.37 | | 1.11 | | |
| | | 1620.74 | | 1.51 | | |
| | | 1806.00 | @ | 0.09 | | |
| Pb-212 | 0.985 | 74.81* | | 10.40 | 1.89266E+000 | 1.91471E-001 |
| | | 77.11* | | 17.50 | 1.73047E+000 | 1.35671E-001 |
| | | 87.30* | | 7.81 | 1.03867E+000 | 1.51402E-001 |
| | | 115.18 | @ | 0.59 | | |
| | | 238.63* | | 43.30 | 1.16899E+000 | 6.48816E-002 |
| | | 300.09* | | 3.28 | 6.96419E-001 | 3.53958E-001 |
| Bi-214 | 0.613 | 76.86* | @ | 0.43 | 6.93455E+001 | 5.48737E+000 |
| | | 89.81* | @ | 0.24 | 2.21616E+001 | 3.99586E+000 |
| | | 386.77 | @ | 0.30 | | |
| | | 454.77 | @ | 0.29 | | |
| | | 609.31* | | 45.49 | 9.91087E-001 | 5.83683E-002 |
| | | 665.45* | @ | 1.53 | 1.07542E+000 | 6.23938E-001 |
| | | 703.11 | @ | 0.48 | | |
| | | 719.86 | @ | 0.39 | | |
| | | 768.36* | | 4.89 | 4.00679E-001 | 2.55232E-001 |
| | | 786.10 | @ | 0.31 | | |
| | | 806.17 | @ | 1.26 | | |
| | | 934.06* | | 3.10 | 3.66201E-001 | 4.02036E-001 |
| | | 964.08* | @ | 0.36 | 1.40734E+001 | 2.87681E+000 |
| | | 1051.96 | @ | 0.31 | | |
| | | 1120.29* | | 14.91 | 1.16458E+000 | 1.41568E-001 |
| | | 1133.66 | @ | 0.25 | | |
| | | 1155.19 | @ | 1.63 | | |
| | | 1207.68 | @ | 0.45 | | |
| | | 1238.11 | | 5.79 | | |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Bi-214 | 0.613 | 1280.96 | @ | 1.43 | | |
| | | 1377.67 | | 4.00 | | |
| | | 1385.31 | @ | 0.76 | | |
| | | 1401.50 | @ | 1.27 | | |
| | | 1407.98 | @ | 2.15 | | |
| | | 1509.23 | @ | 2.11 | | |
| | | 1538.50 | @ | 0.38 | | |
| | | 1543.32 | @ | 0.20 | | |
| | | 1583.22 | @ | 0.69 | | |
| | | 1594.73 | @ | 0.25 | | |
| | | 1599.31 | @ | 0.23 | | |
| | | 1661.28 | @ | 1.15 | | |
| | | 1683.99 | @ | 0.22 | | |
| | | 1729.59 | @ | 2.92 | | |
| | | 1764.49* | | 15.40 | 7.48188E-001 | 1.29568E-001 |
| | | 1847.42 | @ | 2.11 | | |
| | | 1873.16 | @ | 0.22 | | |
| | | 2118.55 | @ | 1.14 | | |
| | | 2204.21 | @ | 5.08 | | |
| Pb-214 | 0.945 | 53.28 | @ | 1.20 | | |
| | | 74.81* | | 6.44 | 2.98157E+000 | 3.05019E-001 |
| | | 77.11* | | 10.80 | 2.73530E+000 | 2.23930E-001 |
| | | 87.30* | | 4.84 | 1.63497E+000 | 2.40323E-001 |
| | | 242.00* | | 7.43 | 1.27041E+000 | 1.24948E-001 |
| | | 258.87 | @ | 0.52 | | |
| | | 274.80 | @ | 0.47 | | |
| | | 295.22* | | 19.30 | 9.20734E-001 | 8.61404E-002 |
| | | 351.93* | | 37.60 | 1.01804E+000 | 6.67994E-002 |
| | | 462.00* | @ | 0.22 | 2.39028E+001 | 6.11223E+000 |
| | | 533.66 | @ | 0.19 | | |
| | | 785.96 | @ | 1.07 | | |
| | | 839.04 | @ | 0.59 | | |
| Ra-224 | 0.837 | 81.07 | @ | 0.13 | | |
| | | 83.78 | @ | 0.22 | | |
| | | 240.99* | | 4.10 | 2.36006E+000 | 2.31271E-001 |
| Ra-226 | 0.770 | 81.07 | @ | 0.20 | | |
| | | 83.78 | @ | 0.33 | | |
| | | 94.90 | @ | 0.15 | | |
| | | 186.21* | | 3.59 | 1.77889E+000 | 3.58050E-001 |
| Ac-228 | 0.655 | 99.50 | @ | 1.26 | | |
| | | 129.07* | @ | 2.50 | 8.10952E-001 | 3.70219E-001 |
| | | 209.25* | | 3.97 | 1.48517E+000 | 4.03637E-001 |
| | | 270.24 | | 3.55 | | |
| | | 328.00 | | 3.04 | | |
| | | 338.32* | | 11.40 | 1.24341E+000 | 1.37396E-001 |
| | | 409.46 | @ | 2.02 | | |
| | | 463.00* | | 4.45 | 1.21689E+000 | 3.14133E-001 |
| | | 755.31 | @ | 1.03 | | |
| | | 772.29 | @ | 1.52 | | |
| | | 794.94* | | 4.31 | 1.24826E+000 | 3.07993E-001 |

| Nuclide Name | Id Confidence | Energy (keV) | | Yield (%) | Activity (pCi/GWET) | Activity Uncertainty |
|---|---|---|---|---|---|---|
| Ac-228 | 0.655 | 835.70 | @ | 1.70 | | |
| | | 911.20* | | 26.20 | 1.23141E+000 | 1.01233E-001 |
| | | 964.79* | | 4.99 | 1.04948E+000 | 2.14703E-001 |
| | | 968.96* | | 15.90 | 1.25632E+000 | 1.17020E-001 |
| | | 1588.20 | | 3.06 | | |
| | | 1630.62 | @ | 1.52 | | |

* = Energy line found in the spectrum.
@ = Energy line not used for Weighted Mean Activity
Energy Tolerance : 1.000 keV
Nuclide confidence index threshold = 0.45
Errors quoted at 1.000 sigma

**********
***** INTERFERENCE CORRECTED REPORT *****
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| | Nuclide Name | | Nuclide Id Confidence | Wt mean Activity (pCi/GWET) | Wt mean Activity Uncertainty |
|---|---|---|---|---|---|
| | K-40 | | 0.984 | 2.223926E+001 | 8.275741E-001 |
| X | Cd-109 | | 0.886 | | |
| | Eu-152m | | 0.991 | 7.431422E-002 | 1.370199E-002 |
| | Tl-208 | @ | 0.834 | 4.193524E-001 | 2.817471E-002 |
| | Bi-211 | | 0.889 | 5.137399E-001 | 2.919815E-001 |
| | Bi-212 | @ | 0.574 | 1.156571E+000 | 2.182548E-001 |
| | Pb-212 | @ | 0.985 | 1.086273E+000 | 5.341632E-002 |
| | Bi-214 | @ | 0.613 | 9.463054E-001 | 4.842137E-002 |
| | Pb-214 | @ | 0.945 | 8.407995E-001 | 7.617417E-002 |
| | Ra-224 | @ | 0.837 | 7.980937E-001 | 2.695981E-001 |
| | Ra-226 | @ | 0.770 | 1.778885E+000 | 3.580498E-001 |
| | Ac-228 | @ | 0.655 | 1.225759E+000 | 5.731777E-002 |

? = Nuclide is part of an undetermined solution
X = Nuclide rejected by the interference analysis
@ = Nuclide contains energy lines not used in Weighted Mean Activity

Errors quoted at 1.000 sigma

********** UNIDENTIFIED PEAKS **********

Peak Locate Performed on: 11/8/2016 5:01:31 PM
Peak Locate From Channel: 100
Peak Locate To Channel: 8192

| | Peak No. | Energy (keV) | Peak Size in Counts per Second | Peak CPS % Uncertainty | Peak Type | Tol. Nuclide |
|---|---|---|---|---|---|---|
| m | 5 | 92.95 | 3.3352E-002 | 11.06 | Tol. | Yb-169<br>Th-227<br>Th-234 |
| | 29 | 1328.18 | 9.0063E-004 | 102.56 | | |

M = First peak in a multiplet region
m = Other peak in a multiplet region
F = Fitted singlet

Errors quoted at 1.000 sigma