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Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
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CONTRACT NO. N62473-10-D-0809
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FINAL

SURVEY UNIT 226 PROJECT REPORT

September 18, 2012

DCN: RMAC-0809-0002-0087

PARCEL C STORM DRAIN AND
SANITARY SEWER REMOVAL
HUNTERS POINT NAVAL SHIPYARD
SAN FRANCISCO, CALIFORNIA

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SURVEY UNIT 226 PROJECT REPORT

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PARCEL C STORM DRAIN AND SANITARY SEWER REMOVAL HUNTERS POINT NAVAL SHIPYARD SAN FRANCISCO, CALIFORNIA

DCN: RMAC-0809-0002-0087

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Attachment 3 Excavated Soil Unit Scan Data (on CD only)

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Attachment 5 Excavated Soil Unit Off-Site Laboratory Reports (on CD only)

Attachment 6 Backfill Material RESRAD Report (on CD only)

Attachment 7 Trench Unit RESRAD Report (on CD only)

Attachment 8 Response to Comments

ABBREVIATIONS AND ACRONYMS

ALARA	as low as reasonably achievable
AM	Action Memorandum
^{214}Bi	bismuth-214
^{137}Cs	cesium-137
DoD	Department of Defense
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
FSS	Final Status Survey
HPNS	Hunters Point Naval Shipyard
IR	Installation Restoration
keV	kiloelectron volt
MDL	method detection limit
mrem/y	millirems per year
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi/g	picocuries per gram
^{226}Ra	radium-226
RASO	Radiological Affairs Support Office
ROC	radionuclide of concern
^{90}Sr	strontium-90
SUPR	Survey Unit Project Report
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
VSP	Visual Sample Plan

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1.0 INTRODUCTION

1.1 PURPOSE

This Survey Unit Project Report (SUPR) documents the work performed in Survey Unit 226 (inclusive of the trench and the associated excavated soil used as backfill). The work was conducted under the final Basewide Radiological Management Plan (TtEC 2012). This SUPR summarizes the scope, approach, and radiological surveys resulting from the removal of the storm drains and sanitary sewers located within Area 33 in Parcel C at Hunters Point Naval Shipyard (HPNS), San Francisco, California.

Information that was provided in the SUPRs Abstract (TtEC 2011) will be repeated only if there were exceptions to the information specific to Survey Unit 226.

1.2 BACKGROUND

Survey Unit 226 is the net sum of Trench Unit 226 and excavated soil from Excavated Soil Unit 442, which was used for backfill. There are 18 trench segments associated with Survey Unit 226. Two of the trench segments are located within Installation Restoration (IR) Site 28. The chemicals of concern associated with IR Site 28 include metals, pesticides, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), semivolatile organic compounds (SVOCs), total oil and grease, total petroleum hydrocarbons (TPH) quantified as diesel, total purgeable petroleum hydrocarbons, TPH quantified as gasoline, TPH quantified as motor oil, and volatile organic compounds (VOCs). No manholes were removed from Trench Unit 226.

Survey Unit 226 is located in Parcel C within Area 33 as identified on Figure 1-1. Trench Unit 226 is located on all four sides of Building 272, with the primary two sections on the east and west sides. The footprint of Trench Unit 226 was 326 linear feet. The total surface area was 3,616.67 square feet (336 square meters) of actual excavated trench, in varying depths up to 6 feet below ground surface.

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2.0 RELEASE CRITERIA

Release criteria information for Survey Unit 226 is presented in Section 2.0 of the SUPRs Abstract (TtEC 2011). No additional radionuclides of concern (ROCs) were identified.

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3.0 FINAL STATUS SURVEYS

3.1 OBJECTIVE OF THE FINAL STATUS SURVEY

The objective of the Final Status Survey (FSS) was to demonstrate that identified residual radioactivity levels inside the excavated trench and within the excavated soils used as backfill met the release criteria.

3.2 SURVEY UNIT

Survey Unit 226 is located within Area 33 and consists of two different types of survey units: trench and excavated soil. Survey Unit 226 is the sum of Trench Unit 226 and excavated soil from Excavated Soil Unit 442, which was used for backfill. There are 18 trench segments associated with Survey Unit 226. Two of the trench segments are located within IR Site 28. The chemicals of concern associated with IR Site 28 include metals, pesticides, PCBs, PAHs, SVOCs, total oil and grease, TPH quantified as diesel, total purgeable petroleum hydrocarbons, TPH quantified as gasoline, TPH quantified as motor oil, and VOCs.

No manholes were found in or removed from Trench Unit 226. No sediment samples were available or collected from the pipe removed from the trench segments associated with Trench Unit 226. However, 28 swipe samples were collected from the pipe segments associated with Trench Unit 226. Survey results for these sections showed no activity above the release criteria. The trench unit and excavated soil unit were systematically sampled independently.

3.2.1 Trench Survey Unit

Scan surveys and systematic sampling were performed in Trench Unit 226. Figure 3-1 shows the approximate systematic sampling locations, and provides the lengths of piping segments and locally assigned identification for each trench segment. Trench Unit 226 had a total surface area of 336 square meters. Systematic postexcavation samples were collected after a grid was established using Visual Sample Plan (VSP).

No measurements above the investigation level were identified during the performance of gamma scans in Trench Unit 226. Therefore, no additional surveys or sampling was performed. The trench unit gamma scan ranges, investigation level, and static measurement values are provided in Attachment 1.

VSP was used to generate 18 systematic sample locations based on a random start point and a triangular grid. Each sample was analyzed at the on-site laboratory by gamma spectroscopy for screening purposes in making time-critical radiological remediation decisions. None of the sample results identified activity above the release criterion for any ROC. These samples were

then sent to the off-site laboratory for final release of the trench unit. A summary of the 18 systematic sample results is provided in Table 3-1.

TABLE 3-1

Class 1 Soil Measurements - Trench Unit 226

Sample No.	Date	Time	^{137}Cs	Flag	MDL	≥MDL	^{90}Sr	Flag	MDL	≥MDL	^{226}Ra	Flag	MDL	≥MDL
			Results (pCi/g)											
1	9/19/2011	11:30:00	0.013	U	0.052	0.052					0.978		0.078	0.978
2	9/19/2011	11:33:00	-0.003	U	0.041	0.041					0.764		0.068	0.764
3	9/19/2011	11:36:00	0.006	U	0.046	0.046					1.040		0.069	1.040
4	9/19/2011	11:39:00	0.000	U	0.051	0.051	0.163		0.144	0.163	0.711		0.079	0.711
5	9/19/2011	11:42:00	0.000	U	0.054	0.054					0.468	J	0.067	0.468
6	9/19/2011	11:45:00	-0.009	U	0.033	0.033					0.256	J	0.070	0.256
7	9/19/2011	11:48:00	0.032	U	0.058	0.058					0.517	J	0.079	0.517
8	9/19/2011	11:51:00	0.000	U	0.054	0.054					0.599	J	0.100	0.599
9	9/19/2011	11:54:00	-0.004	U	0.034	0.034					0.369	J	0.067	0.369
10	9/19/2011	11:57:00	0.011	U	0.036	0.036	-0.047	U	0.157	0.157	0.539	J	0.075	0.539
11	9/19/2011	12:00:00	0.016	U	0.041	0.041					0.465	J	0.061	0.465
12	9/19/2011	12:40:00	-0.013	U	0.037	0.037					0.403	J	0.053	0.403
13	9/19/2011	12:43:00	0.007	U	0.052	0.052					0.506	J	0.055	0.506
14	9/19/2011	12:46:00	0.016	U	0.050	0.050					0.471	J	0.059	0.471
15	9/19/2011	12:49:00	-0.002	U	0.028	0.028					0.247	J	0.044	0.247
16	9/19/2011	12:52:00	0.000	U	0.021	0.021					0.432	J	0.054	0.432
17	9/19/2011	12:55:00	0.005	U	0.026	0.026					0.370	J	0.054	0.370
18	9/19/2011	12:58:00	0.000	U	0.051	0.051					0.357	J	0.056	0.357
		mean				**0.043**				**0.160**				**0.527**
		std dev				**0.011**				**0.004**				**0.221**
		median				**0.044**				**0.160**				**0.470**

Notes:
Information concerning flags associated with the on-site laboratory data can be found in Section 4.3 and a discussion of uncertainty can be found in Section 4.5 of the SUPRs Abstract (TtEC 2011).

Abbreviations and Acronyms:
^{137}Cs – cesium-137
MDL – method detection limit
pCi/g – picocuries per gram
^{226}Ra – radium-226
^{90}Sr – strontium-90
std dev – standard deviation
SUPR – Survey Unit Project Report

The cesium-137 (^{137}Cs) results show all 18 values less than the reported method detection limit (MDL) and had a "U" flag identified that will require the values to be considered less than the MDL. The radium-226 (^{226}Ra) results show all 18 values greater than the MDL. In addition, 14 of the 18 samples had a "J" qualifier flag associated with the activity reported.

The "U" flag indicates that "The result is less than the sample detection limit." The "J" flag indicates that "The result is greater than sample detection limit but less than stated reporting limit." These flag indications are printed on the off-site Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) accredited laboratory summary reports provided in Attachment 2. Section 4.3 of the SUPRs Abstract (TtEC 2011) also discusses these flags in more detail.

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Table 3-1 also contains a summary of the analytical results for radionuclides analyzed by methods other than gamma spectroscopy. The strontium-90 (^{90}Sr) results indicate that for one sample, the result is less than the MDL, as designated by the "U" qualifier flag.

Summary statistics (standard deviation, median, and mean activity greater than or equal to the MDL) are calculated and reported at the bottom of Table 3-1 for all radioanalytical results.

Complete off-site DoD ELAP accredited laboratory analytical reports for each Trench Unit 226 soil sample, including duplicate samples, are presented in Attachment 2.

3.2.2 Excavated Soil Unit

Excavated Soil Unit 442 was used to backfill Trench Unit 226. The gamma scan of Excavated Soil Unit 442 identified measurements above the investigation level. Therefore, additional samples were collected from this excavated soil unit. The scan data are presented in Attachment 3.

As shown on figures in the SUPRs Abstract (TtEC 2011), 18 systematic soil samples were collected at the excavated soil unit. Each sample was analyzed at the on-site laboratory by gamma spectroscopy for screening purposes in making time-critical radiological remediation decisions. Individual screening laboratory gamma spectroscopy reports are presented in Attachment 4. Two samples of the excavated soil unit were also analyzed for ^{90}Sr. Individual off-site gamma spectroscopy and ^{90}Sr reports are presented in Attachment 5.

3.2.2.1 Excavated Soil Unit 442

Eighteen additional biased samples were collected from Excavated Soil Unit 442. None of the sample results identified activity above the release criterion for any ROC. These samples were then sent to the off-site laboratory for final release of the excavated soil unit. Sample numbers 23 and 25 were randomly selected to be analyzed for ^{90}Sr. A summary of the systematic sample results for Excavated Soil Unit 442 is provided in Table 3-2.

The ^{137}Cs results show all 18 values less than the reported MDL and had a "U" flag identified that will require the values to be considered less than the MDL. The ^{226}Ra results show all 18 values greater than the MDL. In addition, 11 of the samples had a "J" qualifier flag associated with the activity reported.

The "U" flag indicates that "The result is less than the sample detection limit." The "J" flag indicates that "The result is greater than sample detection limit but less than stated reporting limit." These flag indications are printed on the off-site DoD ELAP accredited laboratory summary reports provided in Attachment 5. Section 4.3 of the SUPRs Abstract (TtEC 2011) also discusses these flags in more detail.

TABLE 3-2

Class 1 Soil Measurements - Excavated Soil Unit 442

Sample No.	Date	Time	^{137}Cs	Flag	MDL	≥MDL	^{90}Sr	Flag	MDL	≥MDL	^{226}Ra	Flag	MDL	≥MDL
			Results (pCi/g)											
19	6/15/2011	10:48:00	0.011	U	0.035	0.035					0.672	J	0.061	0.672
20	6/15/2011	10:50:00	-0.006	U	0.042	0.042					0.644	J	0.067	0.644
21	6/15/2011	10:52:00	0.015	U	0.040	0.040					0.570	J	0.046	0.570
22	6/15/2011	10:54:00	0.000	U	0.028	0.028					0.652	J	0.070	0.652
23	6/15/2011	10:56:00	0.023	U	0.046	0.046	0.034	U	0.116	0.116	0.852		0.058	0.852
24	6/15/2011	10:58:00	0.006	U	0.039	0.039					0.683	J	0.068	0.683
25	6/15/2011	11:00:00	0.004	U	0.036	0.036	0.226		0.118	0.226	0.712		0.072	0.712
26	6/15/2011	11:02:00	0.000	U	0.052	0.052					0.991		0.083	0.991
27	6/15/2011	11:04:00	-0.030	U	0.062	0.062					0.619	J	0.070	0.619
28	6/15/2011	11:06:00	0.013	U	0.036	0.036					0.670	J	0.065	0.670
29	6/15/2011	11:08:00	-0.028	U	0.063	0.063					0.939		0.059	0.939
30	6/15/2011	11:10:00	-0.011	U	0.050	0.050					0.807		0.065	0.807
31	6/15/2011	11:12:00	-0.002	U	0.039	0.039					0.713		0.052	0.713
32	6/15/2011	11:14:00	0.000	U	0.054	0.054					0.752		0.050	0.752
33	6/15/2011	11:16:00	0.015	U	0.041	0.041					0.665	J	0.070	0.665
34	6/15/2011	11:18:00	0.012	U	0.033	0.033					0.621	J	0.038	0.621
35	6/15/2011	11:20:00	0.022	U	0.024	0.024					0.560	J	0.054	0.560
36	6/15/2011	11:22:00	0.000	U	0.062	0.062					0.633	J	0.054	0.633
		mean				**0.043**				**0.171**				**0.709**
		std dev				**0.012**				**0.078**				**0.119**
		median				**0.041**				**0.171**				**0.671**

Notes:
Information concerning flags associated with the on-site laboratory data can be found in Section 4.3 and a discussion of uncertainty can be found in Section 4.5 of the SUPRs Abstract (TtEC 2011).

Abbreviations and Acronyms:
^{137}Cs – cesium-137
MDL – method detection limit
pCi/g – picocuries per gram
^{226}Ra – radium-226
^{90}Sr – strontium-90
std dev – standard deviation
SUPR – Survey Unit Project Report

Table 3-2 also contains a summary of the analytical results for radionuclides analyzed by methods other than gamma spectroscopy. The ^{90}Sr results indicate that for one sample, the result is less than the MDL, as designated by the "U" qualifier flag.

Summary statistics (standard deviation, median, and mean activity greater than or equal to the MDL) are calculated and reported at the bottom of Table 3-2 for all radioanalytical results.

Complete off-site DoD ELAP accredited laboratory analytical reports for each Excavated Soil Unit 442 soil sample, including duplicate samples, are presented in Attachment 5.

3.2.3 Import Fill Material

No additional import fill material was required to complete backfilling activities.

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3.3 REFERENCE AREA

Reference area sample information for Survey Unit 226 is presented in Section 3.3 of the SUPRs Abstract (TtEC 2011).

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4.0 LABORATORY ANALYSIS

Information concerning laboratory analysis is presented in Section 4.0 of the SUPRs Abstract (TtEC 2011). Specifically, information concerning flags associated with the off-site laboratory data can be found in Section 4.3 and discussion about uncertainty can be found in Section 4.5 of the SUPRs Abstract (TtEC 2011). The on-site laboratory results were used for screening purposes only for making radiological remediation decisions for time-critical actions. The on-site laboratory results are purposely biased conservatively high, which may have resulted in some remediation of soil that might not have occurred if the results from the off-site DoD ELAP accredited laboratory had been used. All definitive data for the final systematic samples are from the DoD ELAP accredited off-site laboratory. The minimum detectable activities and MDLs for both the on-site and off-site laboratory were well below the release criteria for the ROCs.

Results of the on-site and off-site laboratory data were reviewed to ensure that the activities for all ROCs were below the release criteria. These data were then evaluated by the Laboratory Manager. The on-site laboratory analyzed the samples directly for ^{226}Ra using the U.S. Environmental Protection Agency (EPA) 901.1 MOD method and calculating the ^{226}Ra activity from the 3.6 percent abundant 186.2 kiloelectron-volt (keV) gamma spectrum line for ^{226}Ra. The off-site DoD ELAP accredited laboratory counted the samples using the EPA 901.1 MOD method, and the ^{226}Ra results were calculated and reported from the 46.09 percent abundant 609.31 keV gamma spectrum line of bismuth-214 (^{214}Bi) after an in-growth period of greater than 21 days to allow the ^{214}Bi to approach secular equilibrium with ^{226}Ra.

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5.0 STATISTICAL TESTS

Because all sample results in Tables 3-1 and 3-2 were less than the release criteria for the ROCs, there is no basis for performing statistical tests for Trench Unit 226 or Excavated Soil Unit 442 per Section 8.2.2.1 of the Multi-Agency Radiation Survey and Site Investigation Manual (DoD et al. 2000).

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6.0 DOSE MODELING

6.1 MODELING INPUT PARAMETERS USING LARGER OF MDL OR REPORTED ACTIVITY

Table 6-1 shows the mean concentrations of ^{137}Cs, ^{226}Ra, and ^{90}Sr from using the actual activity and replacing it with the MDL value if the reported activity was less than the MDL. The activity used to model ^{226}Ra is based on the isotopic net concentration (with background ^{226}Ra subtracted). No background is subtracted from the ^{137}Cs or ^{90}Sr values, as these radionuclides are not naturally occurring or expected at drain piping depths from global fallout from nuclear weapons testing.

Table 6-1 also provides the average net concentrations of residual radioactivity of material used as backfill, as well as the trench unit average net concentrations of residual radioactivity.

TABLE 6-1

MODELING PARAMETERS USING LARGER OF MDL OR REPORTED ACTIVITY CONCENTRATIONS

Survey Unit 226	Residual Activity ≥ MDL (pCi/g)			Volume of Material (yd^3)	Percent of Fill	Weighted Sum (pCi/g) (Backfill)		
	^{137}Cs	^{90}Sr	^{226}Ra			^{137}Cs	^{90}Sr	^{226}Ra
ESU 442	0.043	0.171	0.709	234	100.00%	0.043	0.171	0.709
Backfill Material Average Activity	0.043	0.171	0.709	Weighted Sum Activity		0.043	0.171	0.709
Trench Unit Average Activity	0.043	0.160	0.527	Backfill Net Activity		0.043	0.171	0.084
Reference Area Average Activity	0.038	0.194	0.625	Trench Unit Net Activity		0.043	0.160	-0.098

Abbreviations and Acronyms:
^{137}Cs – cesium-137
ESU – excavated soil unit
MDL – method detection limit
pCi/g – picocuries per gram
^{226}Ra – radium-226
^{90}Sr – strontium-90
yd^3 – cubic yard

Using the data provided in Table 6-1, the average net concentrations of residual radioactivity of material used as backfill in Survey Unit 226 were 0.043 picocurie per gram (pCi/g) for ^{137}Cs, 0.171 pCi/g for ^{90}Sr, and 0.084 pCi/g for ^{226}Ra. The trench unit average net concentrations of residual radioactivity were 0.043 pCi/g for ^{137}Cs, 0.160 pCi/g for ^{90}Sr, and -0.098 pCi/g for ^{226}Ra.

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6.2 DOSE AND RISK MODELING RESULTS

Modeling resulted in a net residual dose of 1.113 millirems per year (mrem/y) with an increased cancer risk of 1.885×10^{-5} for the backfill material and 0.2961 mrem/y with an increased cancer risk of 4.031×10^{-6} for the trench unit.

Dose and risk modeling results for the backfill material and trench unit are summarized in Table 6-2. Based on these results, no further dose modeling is determined to be reasonable or prudent. The RESRAD reports can be found in Attachments 6 and 7.

TABLE 6-2

DOSE AND RISK MODELING SUMMARY

Dose and Risk Modeling Summary - Trench Unit 226										
Survey Unit	Modeling Parameter	Survey Area	Average Activity (pCi/g)			Net Activity (pCi/g)			Dose (mrem/y)	Cancer Risk
			^{137}Cs	^{90}Sr	^{226}Ra	^{137}Cs	^{90}Sr	^{226}Ra		
Backfill	Activity ≥ MDL	234 cy	0.043	0.171	0.709	0.043	0.171	0.084	1.113	1.885E-05
Trench Unit	Activity ≥ MDL	336 m^2	0.043	0.160	0.527	0.043	0.160	-0.098	0.2961	4.031E-06

Abbreviations and Acronyms:
^{137}Cs – cesium-137
cy – cubic yard
m^2 – square meter
MDL – method detection limit
mrem/y – millirems per year
pCi/g – picocuries per gram
^{226}Ra – radium-226
^{90}Sr – strontium-90

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7.0 RECOMMENDATION OF FINAL UNRESTRICTED RELEASE

7.1 RADIONUCLIDE-SPECIFIC RELEASE CRITERIA

The radionuclide-specific release criteria used for the FSS are equivalent to the ROC release criteria established in the final Base-wide Radiological Removal Action, Action Memorandum – Revision 2006 (AM) (DON 2006). The radionuclide-specific release criteria are presented in terms of mass activity concentrations and refer to average levels of radiation or radioactivity above background levels.

7.2 RADIONUCLIDE-SPECIFIC RELEASE CRITERIA MODELING

Radionuclide-specific release criteria were obtained from the AM and were then modeled using RESRAD Version 6.3, based on the 25 mrem/y total effective dose equivalent or were otherwise risk based; the final doses are all less than this 25 mrem/y release criterion. The model for the critical group was based on default RESRAD Version 6.5 parameters. This model shows that with all the radionuclide-specific release criteria combined (the ROCs), the dose to the average member of the critical group for this trench unit would be 10.2 mrem/y.

7.3 AS LOW AS REASONABLY ACHIEVABLE

As low as reasonably achievable (ALARA) is a philosophy of striving for excellence in the practice of health physics and is an important aspect of radiation-safety regulations. The National Council on Radiation Protection and Measurements has stated, "ALARA is simply the continuation of good radiation-protection programs and practices which traditionally have been effective in keeping the average and individual exposures for monitored workers well below the limits" (NCRP 1993). The application of ALARA clearly includes the consideration of economic and social factors, and thus will inherently be different for different sources or facilities.

The ALARA concept is founded on the professional judgment of radiation-safety managers and personnel and is not, therefore, able to be used as a measure as to whether or not a particular radiation-safety program is adequate in comparison with other programs. Additionally, the ALARA concept does not provide a numerical limit below which the ALARA concept is achieved.

7.4 ENVIRONMENTAL ALARA PROCESS

This section describes the steps taken to implement the environmental ALARA policy:

- Identification of Potential Radiological Impacts
- Review of Radiological Impacts

- Performance of Qualitative ALARA Analyses
- Performance of Quantitative ALARA Analyses

7.4.1 Identification of Potential Radiological Impacts

Each new radiological operation was subjected to ALARA reviews before work began to ensure that radiation exposures to workers, the public, and the environment met ALARA principles. ALARA reviews were conducted for all operations, practices, and procedures that have potential for individual or collective doses to workers. Reviews culminated in changes or additions to work planning documents, standard operating procedures, and radiological work permits.

These documents were used to identify activities that have potential for radiological environmental impacts and could require environmental ALARA analysis. If a radiological impact was identified that could impact the environment significantly, the Radiation Safety Officer communicated the impact to the work staff and the Radiological Affairs Support Office (RASO).

7.4.2 Review of Radiological Impacts

Radiological impacts to the environment, workers, and the public from field operations were assessed for compliance with ALARA principles. Results from radiological survey activities, and air, soil, sediment, and water samples were used to assess the radiological impacts of HPNS activities.

Environmental radiological impacts from radiological activities were determined using nine methods: 1) air monitoring stations located around the excavation site perimeter to track radiological impacts; several air-sampling devices monitor radionuclides in the ambient air, and the results of this monitoring are provided to the RASO on a monthly basis; 2) field monitoring and sampling to identify areas requiring additional remediation; 3) remediation of contaminated areas at or above the release criteria; 4) control of radiologically impacted areas and work sites; 5) frisking of personnel and examining equipment leaving a radiologically controlled area; 6) use of release criteria that equate to dose and risk; 7) review of historical radiological operations to allow complete investigation of all areas of radiological concern; 8) characterization of radiologically impacted sites to ensure complete removal of radioactive material above the release criteria; and 9) dosimetry worn by personnel to measure time-averaged doses from gamma radiation.

7.4.3 Performance of Qualitative ALARA Analyses

Laboratory analyses were performed for 19 different isotopes to ensure that any possible radioactive contamination has been identified. After each excavation was completed, the qualitative radiological impacts from operations were evaluated by performing a dose and risk

assessment. The results of analysis and assessments are provided to the RASO and regulatory agencies for review.

7.4.4 Performance of Quantitative ALARA Analyses

Based on qualitative ALARA analyses, excavation projects that could cause the potential dose to the public to exceed 100 millirems (individual) or 10 person-rems (collective) are subjected to quantitative ALARA analyses using the steps described below. To date, no operations at HPNS have resulted in an individual dose to the public greater than 100 millirems or a collective dose greater than 10 person-rems.

Quantitative ALARA analyses include societal, technological, economic, and public policy considerations. In addition, these ALARA analyses consider Nuclear Regulatory Commission guidance for performing the following environmental ALARA assessments:

- Identification of possible radiation protection systems, such as alternative operating methods or controls, that are reasonably achievable. The options range from the most rudimentary (base case) to the most technologically sophisticated systems.
- Quantification of exposures and doses to workers and the public in the vicinity of the work through air monitoring and dosimetry.
- Quantification of the economic factors, including the costs of purchasing, installing, operating, and maintaining the radiological equipment, and the potential health effects associated with the exposure of people and any other direct or indirect cost resulting from exposures to radiation during investigations and/or remediations.
- Identification and estimation of other health and non-health detriments and benefits, such as equipment loss and accidents.
- Evaluation of process alternatives using a quantitative cost-benefit analysis, when possible. When evaluations included assumptions, judgments, and limitations that could be quantified, and potential doses were well below the dose limit, qualitative analyses were used with full documentation.
- Implementation of the ALARA principles and monitoring of the results.

The following specific factors were used in performing a quantitative ALARA analysis:

- Dose to workers, the public, and the environment before and during work processes
- Residual dose to the local population
- Applicable alternative processes (treatments, operating methods, or controls) for site investigations or remediations
- Costs for each alternative evaluated
- Societal and environmental (positive and negative) impacts associated with alternatives

7.5 ALARA ANALYSIS RESULTS

Based on recent estimates of dose to the public from HPNS operations, only qualitative ALARA analyses were required. Much of the data and analyses used for environmental ALARA evaluations were developed as part of the routine work processes.

Qualitative ALARA analyses resulted in no gamma measurements above the investigation levels; none of the sample results identified activity above the release criteria for any ROC; no air sampling results were above 10 percent of the derived air concentration; and no personnel dosimetry badges processed identified gamma doses above background levels.

7.6 RECOMMENDATIONS

Dose modeling using RESRAD determined that the potential dose of Survey Unit 226 due to activity concentrations greater than or equal to the MDL has been determined to be 1.113 mrem/y with an increased cancer risk of 1.885×10^{-5} as shown in Table 6-2. These results are less than the Nuclear Regulatory Commission criterion of 25 mrem/y with an increased cancer risk that falls within the EPA risk management range of 10^{-4} to 10^{-6}, which supports free release. Therefore, no further action is recommended for Survey Unit 226.

8.0 REFERENCES

DoD (Department of Defense), Department of Energy, Nuclear Regulatory Commission, and U.S. Environmental Protection Agency. 2000. Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). NUREG-1575. August.

DON (Department of the Navy). 2006. Final Base-wide Radiological Removal Action, Action Memorandum – Revision 2006, Hunters Point Shipyard, San Francisco, California.

NCRP (National Council on Radiation Protection and Measurements). 1993. The National Council on Radiation Protection and Measurements, Report Number 116.

TtEC (Tetra Tech EC, Inc.). 2011. Final Survey Unit Project Reports Abstract for Sanitary Sewer and Storm Drain Removal Conducted after January 1, 2011, Hunters Point Naval Shipyard, San Francisco, California. July 8.

————. 2012. Final Basewide Radiological Management Plan, Hunters Point Naval Shipyard, San Francisco, California. February 3.

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FIGURES

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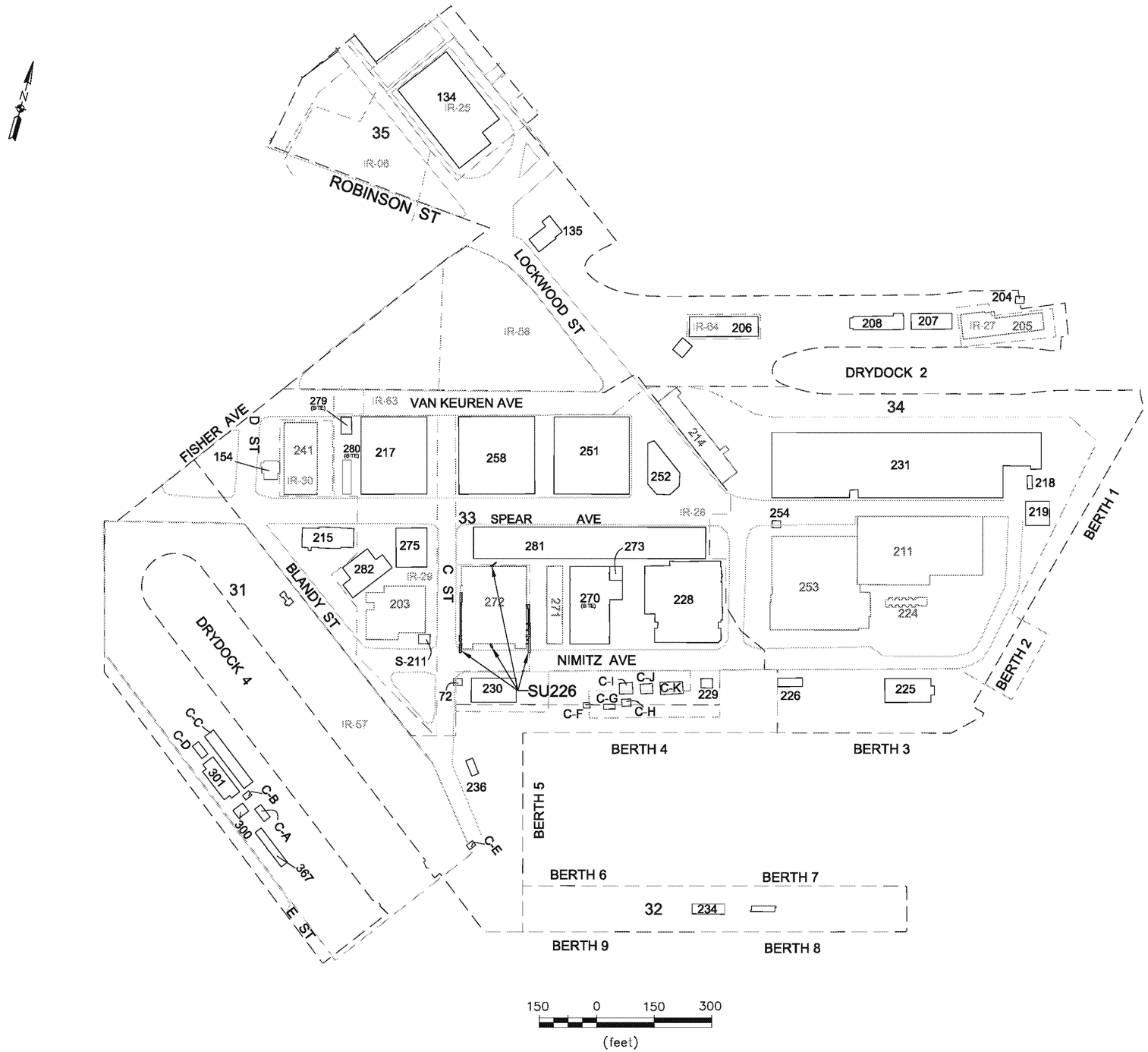


LEGEND

- SURVEY UNIT (SU)
- 33 — WORK AREA BOUNDARY AND NUMBER
- IR-4 — IR BOUNDARY AND NUMBER
- 140 — IMPACTED BUILDING BUILDING NUMBER
- 142 (SITE) — IMPACTED BUILDING FORMER BUILDING LOCATION
- 128 — NON-IMPACTED BUILDING BUILDING NUMBER
- 142 (SITE) — NON-IMPACTED BUILDING FORMER BUILDING LOCATION

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SURVEY UNIT 226 PROJECT REPORT

FIGURE 1-1

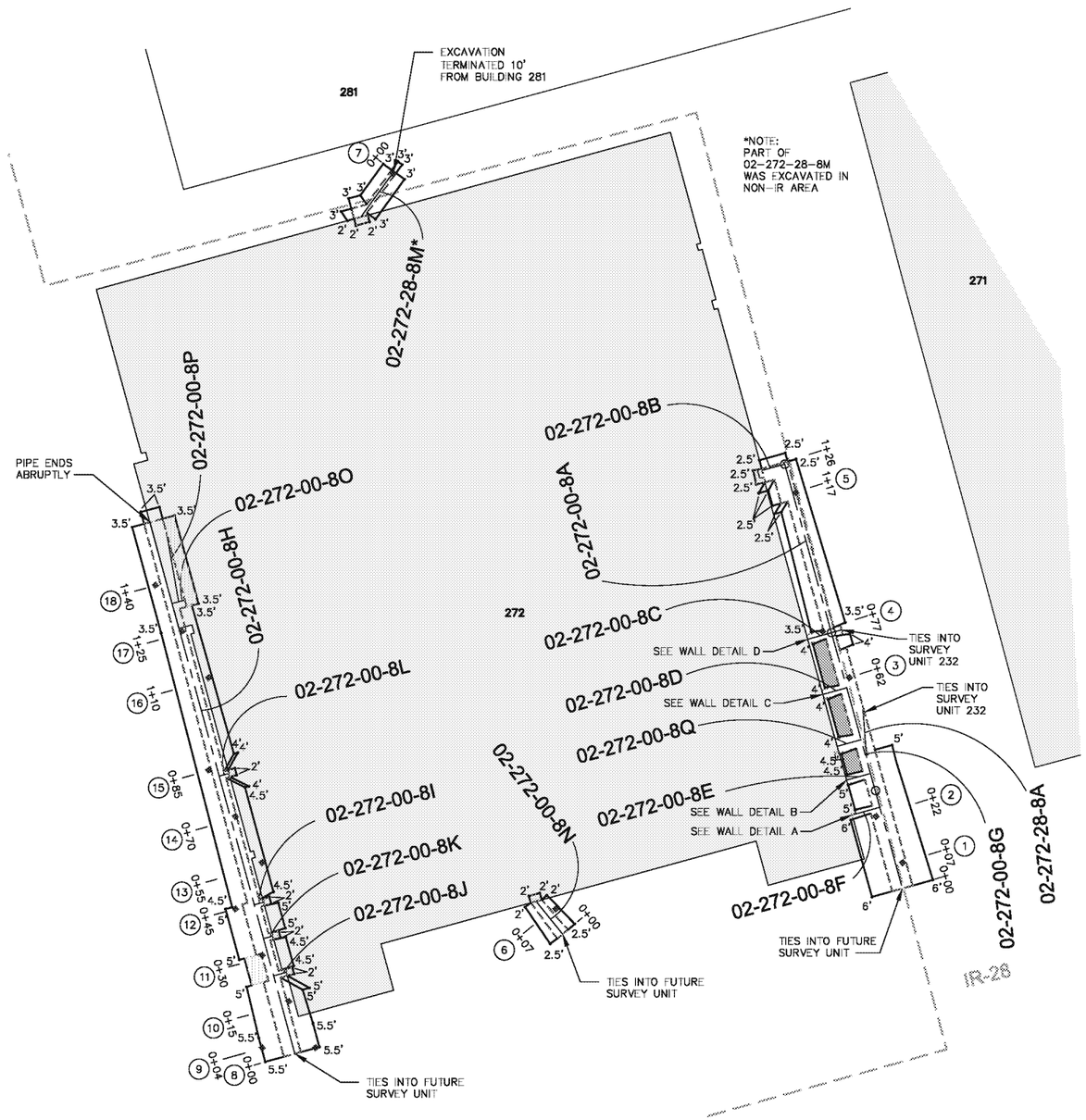
PARCEL C SURVEY UNIT KEY PLAN

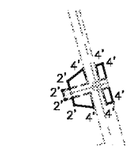
HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

\\Ecisfofile1\projects\CTO-02 CAD Files (Rad EMAC)\DWG Files\Survey Units\Figure 1-1 and 3-1\SU226_Figure 1-1_11-08-11.dwg





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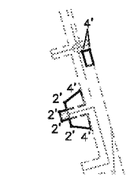

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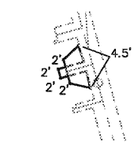

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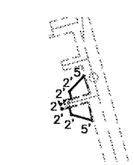

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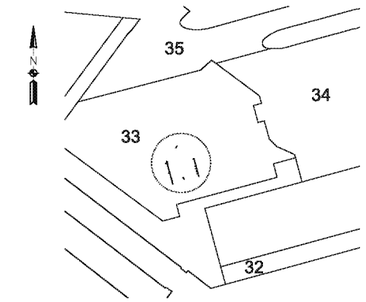
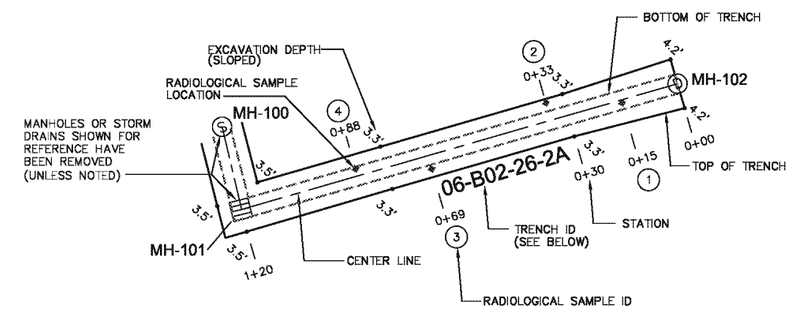


KEY PLAN

LEGEND



TRENCH ID

XX-XXX-XX-XX

- SEGMENT NO.
- IR SITE ID, 00 IF NON-IR SITE
- WORK/BLDG AREA
- CTO OR TO NUMBER

IR BOUNDARY
PARCEL BOUNDARY
WORK AREA BOUNDARY
EP EXTRANEOUS PIPE
140 IMPACTED BUILDING
140 NON-IMPACTED BUILDING
CONCRETE
ROCK

SURFACE AREA = 336 SQUARE METERS
TOTAL LENGTH OF TRENCH = 326 LINEAR FEET

20 0 20 40
(feet)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SURVEY UNIT 226 PROJECT REPORT

FIGURE 3-1

PARCEL C SURVEY UNIT 226, AREA 33

HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

REVISION: –
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

\\Ecisfofile1\projects\CTO-02 CAD Files (Rad EMAC)\DWG Files\Survey Units\Figure 1-1 and 3-1\SU226_Figure 3-1_11-08-11.dwg

ATTACHMENT 1

TRENCH UNIT 226
RADIATION/CONTAMINATION SURVEY FORM
(on CD only)

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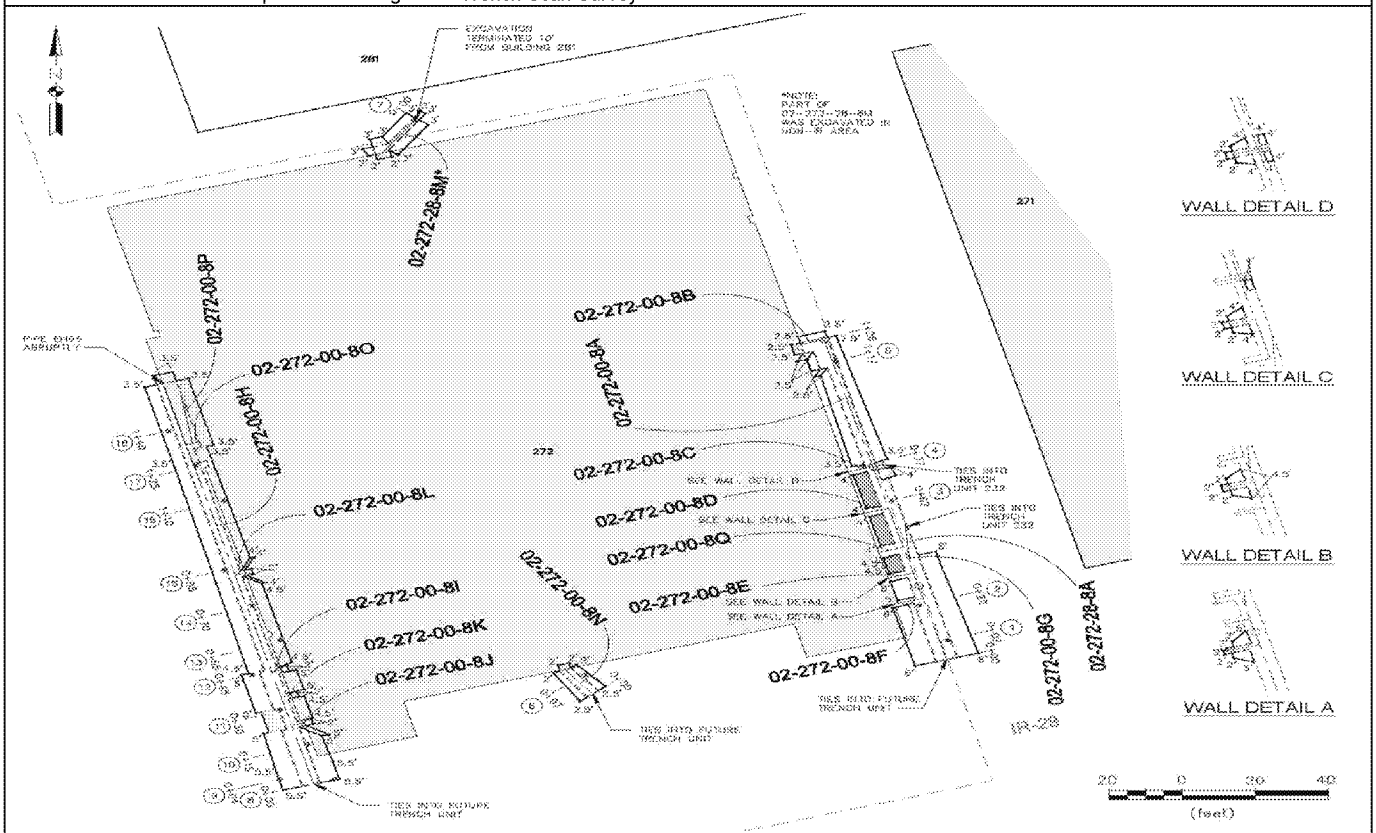
RADIATION/CONTAMINATION SURVEY SUPPLEMENT

Date: 9/19/2011	Time: 08:45	INSTRUMENTATION USED						
		Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm2)	Background + (dpm/100cm2)
Survey Number: HPS-SU-226								
Location: Parcel C								
Surveyor: R. Roberson								
Reviewed By: (Print & Sign)		2350-1 44-10	117563 215116	6/8/2012				

Isotopes of Concern: ^{226}Ra ^{90}Sr ^{137}Cs

Description of drawing: Trench Scan Survey



Comments:

Scan range for 2350-1 Instrument is 3.22 - 7.84 Kcpm

3 sigma investigation level for 2350-1 Instrument is 8028 cpm

Picture is representative of material surveyed.

denotes swipe location or fixed α/β readings

# denotes G/A radiation readings

#/# denotes contact / 1 meter radiation readings.

* denotes highest radiation reading on contact

LAW denotes large area masslinn wipe

Δ denotes static location.

\+ Unless Otherwise Noted

All readings in μR/hr unless otherwise noted

K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: HPS-SU-226								
SURVEYOR: R. Roberson					LOCATION: Parcel C			
Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm2	Beta/Gamma dpm/100cm2	Alpha dpm/100cm2	Beta/Gamma dpm/100cm2	
1			5286					
2			5017					
3			5406					
4			5265					
5			5195					
6			5105					
7			5471					
8			5519					
9			5331					
10			5490					
11			5275					
12			5350					
13			5399					
14			5504					
15			5562					
16			5601					
17			5293					
18			5156					
Reviewer:							Date:	

ATTACHMENT 2

LABORATORY ANALYSIS REPORTS FOR TRENCH UNIT 226 (on CD only)

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TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-001
Sample Description: Parcel C

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:30
Acquisition Time: 10/4/2011 22:21:18
Analysis Time: 10/4/2011 23:06
Analysis Quantity: 3.410E+02 g

Spectrum ID: 8_20111004_018
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.049E-01	22.82	1.837E-01	1.920E-01	5.587E-02
Am-241	#AB	-3.989E-02	530.50	2.117E-01	2.117E-01	1.724E-01
Bi-212	#	9.925E-01	27.70	2.749E-01	2.832E-01	7.089E-02
Bi-214		6.469E-01	16.51	1.068E-01	1.152E-01	2.991E-02
Co-60	#AB	1.507E-02	243.10	3.664E-02	3.665E-02	2.868E-02
Cs-137	#AB	6.173E-03	432.60	2.670E-02	2.671E-02	2.134E-02
Eu-152	#AB	3.771E-02	181.50	6.845E-02	6.851E-02	5.328E-02
Eu-154	#AB	-6.165E-03	1240.00	7.646E-02	7.646E-02	6.212E-02
K-40		1.310E+01	8.98	1.177E+00	1.492E+00	2.317E-01
Pa-234	#AB	7.439E-02	223.30	1.661E-01	1.662E-01	1.279E-01
Pb-210	#AB	-4.260E-01	1550.00	6.605E+00	6.605E+00	5.415E+00
Pb-212		7.528E-01	10.91	8.214E-02	1.003E-01	3.423E-02
Pb-214		8.099E-01	12.98	1.052E-01	1.203E-01	3.123E-02
Ra-226		1.189E+00	49.46	5.882E-01	5.951E-01	4.258E-01
Th-230	#AB	1.389E+00	776.20	1.078E+01	1.078E+01	8.801E+00
Th-234		1.022E+00	56.42	5.768E-01	5.850E-01	3.467E-01
Tl-208	#	2.522E-01	18.64	4.700E-02	4.990E-02	1.382E-02
U-235		4.101E-02	98.27	4.030E-02	4.041E-02	3.111E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.114E+01

Analyst: Andrew Alexander

Reviewer: Philip Smith
Review Date: 10/5/2011 13:15

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-002
Sample Description: Parcel C

Detector: HPGe #11 51-TP32744A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:33
Acquisition Time: 10/4/2011 22:24:49
Analysis Time: 10/4/2011 23:09
Analysis Quantity: 3.020E+02 g

Spectrum ID: 11_20111004_019
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.14 %

Efficiency: HPGe #11 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/28/2011 17:38
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.047E-01	28.33	1.430E-01	1.472E-01	6.698E-02
Am-241	#AB	1.039E-01	182.20	1.892E-01	1.895E-01	1.489E-01
Bi-212	#	2.005E-01	123.80	2.481E-01	2.485E-01	1.844E-01
Bi-214		4.219E-01	21.69	9.153E-02	9.576E-02	4.450E-02
Co-60	#	7.974E-02	45.84	3.656E-02	3.696E-02	1.972E-02
Cs-137	#AB	-1.291E-02	273.00	3.525E-02	3.526E-02	2.789E-02
Eu-152	#AB	-1.800E-02	434.10	7.813E-02	7.814E-02	6.295E-02
Eu-154	#AB	-1.163E-02	857.30	9.968E-02	9.968E-02	8.072E-02
K-40		1.765E+01	7.73	1.365E+00	1.842E+00	6.147E-02
Pa-234	#AB	2.724E-02	684.50	1.864E-01	1.864E-01	1.504E-01
Pb-210	#AB	6.329E+00	133.20	8.431E+00	8.453E+00	6.526E+00
Pb-212		6.630E-01	12.57	8.331E-02	9.750E-02	3.685E-02
Pb-214		6.725E-01	15.43	1.038E-01	1.145E-01	3.187E-02
Ra-226		1.116E+00	56.95	6.353E-01	6.409E-01	4.607E-01
Th-230	#AB	-3.003E+00	472.30	1.418E+01	1.419E+01	1.153E+01
Th-234		1.091E+00	51.00	5.565E-01	5.662E-01	4.010E-01
Tl-208	#	2.566E-01	20.96	5.379E-02	5.643E-02	1.575E-02
U-235	AB	2.277E-02	187.40	4.267E-02	4.271E-02	3.394E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.914E+01

Analyst: Andrew Alexander

Reviewer: Philip Smith
Review Date: 10/5/2011 13:18

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-003
Sample Description: Parcel C

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:36
Acquisition Time: 10/5/2011 07:31:40
Analysis Time: 10/5/2011 09:01
Analysis Quantity: 4.050E+02 g

Spectrum ID: 12_20111005_003
Sample Type: SAMPLE
Matrix: S
Live Time: 5400 sec
Real Time: 5405 sec
Dead Time: 0.10 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		1.279E+00	10.19	1.302E-01	1.576E-01	3.172E-02
Am-241	#AB	5.794E-02	369.60	2.142E-01	2.142E-01	1.748E-01
Bi-212		9.716E-01	22.64	2.199E-01	2.298E-01	8.340E-02
Bi-214		8.766E-01	10.37	9.090E-02	1.081E-01	2.965E-02
Co-60	#AB	7.250E-03	55.65	4.035E-03	4.065E-03	1.477E-02
Cs-137	#AB	7.989E-03	241.80	1.932E-02	1.932E-02	1.542E-02
Eu-152	#AB	7.052E-03	767.20	5.410E-02	5.410E-02	4.427E-02
Eu-154	#AB	0.000E+00	2000.00	2.149E-02	2.149E-02	5.419E-02
K-40		8.609E+00	7.33	6.308E-01	8.728E-01	1.423E-01
Pa-234	#AB	3.147E-02	341.40	1.074E-01	1.075E-01	8.746E-02
Pb-210	#	0.000E+00	1230.00	2.201E+00	2.201E+00	0.000E+00
Pb-212		1.243E+00	5.38	6.682E-02	1.161E-01	2.637E-02
Pb-214		1.009E+00	8.56	8.637E-02	1.129E-01	3.123E-02
Ra-226		1.261E+00	37.79	4.767E-01	4.862E-01	3.575E-01
Th-230	#AB	0.000E+00	2000.00	9.093E+00	9.093E+00	1.107E+01
Th-234		1.271E+00	32.03	4.073E-01	4.250E-01	2.997E-01
Tl-208		4.346E-01	10.09	4.387E-02	5.253E-02	1.445E-02
U-235		6.641E-02	48.29	3.207E-02	3.246E-02	2.460E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.713E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:07

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-004
Sample Description: Parcel C

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:39
Acquisition Time: 10/5/2011 10:15:48
Analysis Time: 10/5/2011 11:01
Analysis Quantity: 3.090E+02 g

Spectrum ID: 8_20111005_006
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.09 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.028E-01	25.21	1.520E-01	1.576E-01	6.703E-02
Am-241	#AB	1.832E-01	129.50	2.372E-01	2.378E-01	1.864E-01
Bi-212	#	2.835E-01	86.04	2.439E-01	2.447E-01	1.713E-01
Bi-214		5.383E-01	18.22	9.808E-02	1.045E-01	2.966E-02
Co-60	#AB	1.194E-03	2796.00	3.338E-02	3.338E-02	2.736E-02
Cs-137	#AB	1.721E-02	185.30	3.190E-02	3.192E-02	2.456E-02
Eu-152	#AB	2.052E-02	332.40	6.819E-02	6.821E-02	5.432E-02
Eu-154	#AB	2.720E-03	3399.00	9.244E-02	9.244E-02	7.580E-02
K-40		8.587E+00	11.20	9.620E-01	1.135E+00	1.997E-01
Pa-234	#AB	0.000E+00	2000.00	3.655E-02	3.655E-02	2.968E-01
Pb-210	#AB	-1.201E+00	562.00	6.748E+00	6.749E+00	5.481E+00
Pb-212		6.702E-01	12.13	8.129E-02	9.608E-02	3.371E-02
Pb-214		5.716E-01	17.93	1.025E-01	1.105E-01	3.487E-02
Ra-226		1.050E+00	56.62	5.943E-01	5.996E-01	4.345E-01
Th-230	#AB	2.469E+00	535.40	1.322E+01	1.322E+01	1.076E+01
Th-234		1.226E+00	46.08	5.648E-01	5.768E-01	3.063E-01
Tl-208		2.084E-01	20.37	4.244E-02	4.464E-02	1.652E-02
U-235		3.212E-02	122.10	3.923E-02	3.930E-02	3.047E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.646E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-005
Sample Description: Parcel C

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:42
Acquisition Time: 10/5/2011 10:16:05
Analysis Time: 10/5/2011 11:01
Analysis Quantity: 3.150E+02 g

Spectrum ID: 9_20111005_006
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2707 sec
Dead Time: 0.26 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.547E-01	20.00	1.309E-01	1.386E-01	1.525E-02
Am-241	#AB	-3.530E-02	399.00	1.408E-01	1.409E-01	1.134E-01
Bi-212	#	1.635E-01	130.30	2.129E-01	2.132E-01	1.572E-01
Bi-214		3.474E-01	23.21	8.064E-02	8.391E-02	2.632E-02
Co-60	#AB	-4.108E-03	767.10	3.151E-02	3.151E-02	2.546E-02
Cs-137	#AB	2.139E-03	1323.00	2.830E-02	2.830E-02	2.309E-02
Eu-152	#	8.526E-02	79.88	6.810E-02	6.838E-02	4.834E-02
Eu-154	#AB	0.000E+00	2000.00	2.789E-02	2.789E-02	1.027E-01
K-40	#	7.228E+00	12.87	9.301E-01	1.059E+00	1.484E-01
Pa-234	#AB	0.000E+00	2000.00	3.497E-02	3.497E-02	2.881E-02
Pb-210	#AB	1.859E+00	229.80	4.272E+00	4.275E+00	3.366E+00
Pb-212		4.854E-01	14.49	7.036E-02	7.953E-02	3.419E-02
Pb-214		4.844E-01	19.28	9.341E-02	9.972E-02	3.277E-02
Ra-226		8.142E-01	63.84	5.197E-01	5.234E-01	3.754E-01
Th-230	#AB	1.631E+00	580.50	9.470E+00	9.474E+00	7.690E+00
Th-234		6.170E-01	66.90	4.128E-01	4.170E-01	3.009E-01
Tl-208	#	1.188E-01	31.74	3.769E-02	3.851E-02	2.125E-02
U-235		4.354E-02	76.06	3.312E-02	3.328E-02	2.436E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.453E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-005DUP
Sample Description: Parcel C

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:42
Acquisition Time: 10/10/2011 21:47:54
Analysis Time: 10/12/2011 18:01
Analysis Quantity: 3.150E+02 g

Spectrum ID: 9_20111010_016
Sample Type: DUP
Matrix: S
Live Time: 2700 sec
Real Time: 2705 sec
Dead Time: 0.19 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	3.053E-01	41.67	1.272E-01	1.290E-01	7.943E-02
Am-241	#AB	6.970E-02	219.00	1.527E-01	1.528E-01	1.208E-01
Bi-212	#	1.781E-01	117.80	2.097E-01	2.101E-01	1.526E-01
Bi-214		3.947E-01	22.33	8.813E-02	9.198E-02	3.580E-02
Co-60	#AB	9.829E-03	187.50	1.843E-02	1.844E-02	1.944E-02
Cs-137	#AB	8.043E-03	308.00	2.477E-02	2.478E-02	1.944E-02
Eu-152	#AB	1.030E-02	554.70	5.714E-02	5.714E-02	4.602E-02
Eu-154	#AB	-2.025E-02	432.50	8.759E-02	8.760E-02	6.945E-02
K-40	#	5.123E+00	16.03	8.210E-01	8.961E-01	3.426E-01
Pa-234	#AB	3.165E-02	371.40	1.175E-01	1.175E-01	9.116E-02
Pb-210	#AB	3.287E+00	140.50	4.617E+00	4.628E+00	3.550E+00
Pb-212		5.406E-01	15.46	8.361E-02	9.325E-02	3.537E-02
Pb-214	#	5.588E-01	16.57	9.261E-02	1.010E-01	2.938E-02
Ra-226		9.318E-01	55.45	5.167E-01	5.215E-01	3.642E-01
Th-230	#AB	2.484E-01	3875.00	9.624E+00	9.624E+00	7.912E+00
Th-234	#	3.607E-01	120.50	4.347E-01	4.361E-01	3.419E-01
Tl-208		1.457E-01	24.67	3.594E-02	3.722E-02	1.544E-02
U-235		3.575E-02	101.10	3.614E-02	3.625E-02	2.761E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.224E+01

Analyst: Andrew Alexander

Reviewer: Philip Smith
Review Date: 10/13/2011 07:53

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-006
Sample Description: Parcel C

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:45
Acquisition Time: 10/5/2011 11:02:20
Analysis Time: 10/5/2011 11:47
Analysis Quantity: 3.270E+02 g

Spectrum ID: 8_20111005_007
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.07 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		1.453E-01	60.22	8.746E-02	8.804E-02	5.143E-02
Am-241	#AB	0.000E+00	2000.00	8.311E-02	8.312E-02	9.756E-02
Bi-212	#AB	7.216E-02	267.50	1.930E-01	1.931E-01	1.505E-01
Bi-214	#	7.296E-02	71.04	5.183E-02	5.206E-02	3.490E-02
Co-60	#AB	-8.646E-03	340.00	2.940E-02	2.940E-02	2.310E-02
Cs-137	#AB	-2.082E-03	1141.00	2.376E-02	2.376E-02	1.932E-02
Eu-152	#AB	1.547E-02	342.10	5.291E-02	5.292E-02	4.188E-02
Eu-154	#AB	0.000E+00	2000.00	1.898E-02	1.898E-02	1.564E-02
K-40		5.378E+00	13.87	7.460E-01	8.358E-01	1.887E-01
Pa-234	#AB	0.000E+00	2000.00	2.442E-02	2.442E-02	2.845E-02
Pb-210	#AB	-3.816E-01	1290.00	4.924E+00	4.924E+00	4.024E+00
Pb-212		1.416E-01	28.49	4.034E-02	4.177E-02	2.088E-02
Pb-214		1.590E-01	31.77	5.052E-02	5.181E-02	1.890E-02
Ra-226	#	3.559E-01	104.10	3.707E-01	3.716E-01	2.833E-01
Th-230	#AB	1.010E-01	7585.00	7.658E+00	7.658E+00	6.300E+00
Th-234	#AB	1.207E-01	241.30	2.913E-01	2.915E-01	2.296E-01
Tl-208	#	3.850E-02	62.44	2.404E-02	2.418E-02	1.505E-02
U-235	#	2.933E-02	86.30	2.531E-02	2.541E-02	1.830E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 6.630E+00

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-007
Sample Description: Parcel C

Detector: HPGe #6 49-TN19510U
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:48
Acquisition Time: 10/5/2011 09:27:02
Analysis Time: 10/5/2011 10:12
Analysis Quantity: 3.140E+02 g

Spectrum ID: 6_20111005_004
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.06 %

Efficiency: HPGe #6 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 9/27/2011 14:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.334E-01	64.80	1.512E-01	1.520E-01	9.910E-02
Am-241	AB	5.031E-02	157.60	7.928E-02	7.940E-02	6.237E-02
Bi-212	#AB	1.909E-01	147.90	2.823E-01	2.825E-01	2.106E-01
Bi-214		1.555E-01	58.71	9.131E-02	9.181E-02	6.910E-02
Co-60	#AB	0.000E+00	2000.00	1.556E-02	1.556E-02	8.985E-02
Cs-137	#AB	-9.612E-03	432.00	4.153E-02	4.153E-02	3.327E-02
Eu-152	AB	-1.802E-02	493.10	8.887E-02	8.887E-02	7.160E-02
Eu-154	#AB	3.696E-02	250.40	9.254E-02	9.257E-02	6.966E-02
K-40		8.965E+00	12.95	1.161E+00	1.319E+00	3.117E-01
Pa-234	#AB	-1.523E-02	1517.00	2.311E-01	2.311E-01	1.885E-01
Pb-210	#AB	2.229E-01	349.10	7.782E-01	7.784E-01	7.271E-01
Pb-212		4.027E-01	19.30	7.771E-02	8.171E-02	4.592E-02
Pb-214		3.376E-01	33.05	1.116E-01	1.134E-01	5.937E-02
Ra-226	AB	2.253E-01	360.30	8.118E-01	8.120E-01	6.576E-01
Th-230	#AB	2.186E+00	332.00	7.258E+00	7.266E+00	5.863E+00
Th-234	#	7.632E-01	84.53	6.452E-01	6.492E-01	4.789E-01
Tl-208		1.599E-01	32.02	5.119E-02	5.211E-02	2.648E-02
U-235	#AB	0.000E+00	0.00	5.460E-02	5.460E-02	5.328E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.393E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 10/6/2011 12:03

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-008
Sample Description: Parcel C

Detector: HPGe #4 50-TP42236A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:51
Acquisition Time: 10/5/2011 09:26:50
Analysis Time: 10/5/2011 10:12
Analysis Quantity: 3.530E+02 g

Spectrum ID: 4_20111005_005
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2706 sec
Dead Time: 0.22 %

Efficiency: HPGe #4 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/19/2011 20:43
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.534E-01	18.94	1.617E-01	1.722E-01	4.026E-02
Am-241	#AB	-1.325E-02	1408.00	1.866E-01	1.866E-01	1.531E-01
Bi-212	#	4.586E-01	55.68	2.553E-01	2.572E-01	1.719E-01
Bi-214		5.862E-01	17.36	1.017E-01	1.090E-01	3.414E-02
Co-60	#AB	9.988E-03	357.90	3.574E-02	3.575E-02	2.849E-02
Cs-137	AB	1.630E-03	1668.00	2.719E-02	2.719E-02	2.227E-02
Eu-152	#AB	-5.507E-03	1288.00	7.095E-02	7.095E-02	5.805E-02
Eu-154	#AB	-3.922E-02	275.90	1.082E-01	1.082E-01	8.540E-02
K-40		1.705E+01	7.93	1.352E+00	1.804E+00	2.257E-01
Pa-234	#AB	0.000E+00	2000.00	3.041E-02	3.041E-02	2.020E-01
Pb-210	#AB	-2.589E+00	460.20	1.191E+01	1.192E+01	4.635E+00
Pb-212		8.647E-01	9.54	8.248E-02	1.057E-01	3.209E-02
Pb-214		7.516E-01	12.88	9.683E-02	1.110E-01	3.201E-02
Ra-226		5.502E-01	110.10	6.060E-01	6.074E-01	4.732E-01
Th-230	#AB	-2.777E+00	454.80	1.263E+01	1.264E+01	1.028E+01
Th-234	AB	6.560E-02	799.50	5.244E-01	5.245E-01	4.293E-01
Tl-208		3.241E-01	16.94	5.490E-02	5.898E-02	1.639E-02
U-235	AB	3.123E-02	131.40	4.104E-02	4.111E-02	3.237E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.154E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 10/6/2011 12:02

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-009
Sample Description: Parcel C

Detector: HPGe #3 51-TP32733A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:54
Acquisition Time: 10/5/2011 09:26:44
Analysis Time: 10/5/2011 10:11
Analysis Quantity: 3.540E+02 g

Spectrum ID: 3_20111005_005
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2705 sec
Dead Time: 0.17 %

Efficiency: HPGe #3 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/21/2011 13:54
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.159E-01	52.81	1.140E-01	1.150E-01	7.355E-02
Am-241	#AB	6.868E-02	222.70	1.529E-01	1.531E-01	1.219E-01
Bi-212		1.515E-01	131.20	1.988E-01	1.990E-01	1.477E-01
Bi-214		3.925E-01	22.45	8.810E-02	9.191E-02	2.823E-02
Co-60	#AB	7.680E-03	177.80	1.365E-02	1.366E-02	4.019E-02
Cs-137	#AB	1.761E-03	1211.00	2.132E-02	2.132E-02	1.735E-02
Eu-152	#AB	-4.366E-02	273.60	1.195E-01	1.195E-01	4.977E-02
Eu-154	#AB	1.497E-02	1194.00	1.788E-01	1.788E-01	1.464E-01
K-40		1.685E+01	8.30	1.398E+00	1.830E+00	3.465E-01
Pa-234	#AB	2.403E-02	611.70	1.470E-01	1.470E-01	1.181E-01
Pb-210	#AB	-1.010E+00	429.10	4.332E+00	4.333E+00	3.505E+00
Pb-212		3.733E-01	15.20	5.674E-02	6.351E-02	2.479E-02
Pb-214		3.353E-01	23.02	7.719E-02	8.089E-02	3.384E-02
Ra-226		5.780E-01	73.96	4.275E-01	4.297E-01	3.125E-01
Th-230	#AB	4.442E+00	213.40	9.477E+00	9.507E+00	7.551E+00
Th-234	#AB	-2.185E-01	198.00	4.326E-01	4.331E-01	3.454E-01
Tl-208		1.399E-01	29.12	4.073E-02	4.178E-02	1.344E-02
U-235	AB	2.935E-03	963.50	2.828E-02	2.828E-02	2.310E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.360E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 10/6/2011 12:01

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-010
Sample Description: Parcel C

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 11:57
Acquisition Time: 10/5/2011 07:30:09
Analysis Time: 10/5/2011 08:15
Analysis Quantity: 3.060E+02 g

Spectrum ID: 8_20111005_004
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.10 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.819E-01	50.14	1.414E-01	1.427E-01	9.099E-02
Am-241	#AB	1.043E-01	184.30	1.922E-01	1.925E-01	1.519E-01
Bi-212	#AB	2.048E-01	137.70	2.821E-01	2.825E-01	2.144E-01
Bi-214		4.630E-01	19.15	8.866E-02	9.389E-02	2.546E-02
Co-60	#AB	2.238E-02	48.51	1.085E-02	1.096E-02	4.761E-02
Cs-137	#	5.529E-02	57.72	3.191E-02	3.213E-02	2.020E-02
Eu-152	#AB	-4.403E-03	1610.00	7.088E-02	7.088E-02	5.801E-02
Eu-154	#AB	-1.824E-02	624.10	1.138E-01	1.138E-01	9.187E-02
K-40		1.615E+01	8.15	1.316E+00	1.736E+00	2.017E-01
Pa-234	#AB	-8.172E-03	2523.00	2.061E-01	2.061E-01	1.690E-01
Pb-210	#	5.959E+00	106.90	6.370E+00	6.396E+00	4.822E+00
Pb-212		5.532E-01	12.82	7.094E-02	8.258E-02	2.498E-02
Pb-214		3.527E-01	22.87	8.067E-02	8.458E-02	4.233E-02
Ra-226	#AB	4.132E-01	136.60	5.644E-01	5.653E-01	4.468E-01
Th-230	#AB	6.828E-01	2040.00	1.393E+01	1.393E+01	1.144E+01
Th-234	#AB	-2.113E-01	178.40	3.770E-01	3.776E-01	2.956E-01
Tl-208		2.066E-01	23.33	4.821E-02	5.013E-02	1.483E-02
U-235	#AB	5.386E-03	629.00	3.388E-02	3.388E-02	2.755E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.546E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-011
Sample Description: Parcel C

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:00
Acquisition Time: 10/5/2011 07:29:27
Analysis Time: 10/5/2011 08:14
Analysis Quantity: 3.310E+02 g

Spectrum ID: 9_20111005_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2707 sec
Dead Time: 0.26 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.081E-01	22.57	1.373E-01	1.436E-01	3.045E-02
Am-241	#AB	8.553E-02	164.20	1.405E-01	1.407E-01	1.094E-01
Bi-212	#	2.094E-01	89.60	1.876E-01	1.882E-01	1.286E-01
Bi-214		3.201E-01	22.48	7.197E-02	7.507E-02	2.273E-02
Co-60	#AB	4.611E-04	293.40	1.353E-03	1.353E-03	2.799E-02
Cs-137	#AB	1.847E-03	1385.00	2.558E-02	2.558E-02	2.087E-02
Eu-152	AB	2.540E-02	243.70	6.192E-02	6.194E-02	4.870E-02
Eu-154	#	6.757E-02	126.70	8.561E-02	8.573E-02	6.129E-02
K-40		1.659E+01	7.93	1.316E+00	1.756E+00	1.364E-01
Pa-234	#AB	-3.909E-02	433.30	1.694E-01	1.694E-01	1.350E-01
Pb-210	#AB	2.811E+00	152.60	4.289E+00	4.297E+00	3.311E+00
Pb-212		3.341E-01	18.64	6.226E-02	6.729E-02	3.507E-02
Pb-214		4.378E-01	18.95	8.296E-02	8.877E-02	3.033E-02
Ra-226	#	6.495E-01	75.15	4.881E-01	4.905E-01	3.598E-01
Th-230	#AB	2.254E+00	423.20	9.538E+00	9.546E+00	7.712E+00
Th-234	#	1.253E+00	41.16	5.157E-01	5.294E-01	2.569E-01
Tl-208	#	1.245E-01	28.07	3.496E-02	3.593E-02	1.784E-02
U-235	#AB	-2.237E-02	152.10	3.403E-02	3.407E-02	2.668E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.577E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-012
Sample Description: Parcel C

Detector: HPGe #10 51-TP42231A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:40
Acquisition Time: 10/5/2011 07:31:26
Analysis Time: 10/5/2011 08:16
Analysis Quantity: 3.800E+02 g

Spectrum ID: 10_20111005_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #10 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/28/2011 17:23
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.228E-01	45.52	1.014E-01	1.026E-01	5.697E-02
Am-241	#AB	0.000E+00	2000.00	3.758E-01	3.758E-01	3.144E-01
Bi-212	#	1.576E-01	132.80	2.093E-01	2.096E-01	1.556E-01
Bi-214	#	2.517E-01	28.41	7.150E-02	7.345E-02	3.849E-02
Co-60	#AB	5.289E-03	400.00	2.116E-02	2.116E-02	2.630E-02
Cs-137	#AB	-3.634E-03	720.70	2.619E-02	2.619E-02	2.119E-02
Eu-152	#AB	0.000E+00	2000.00	3.312E-02	3.312E-02	3.157E-02
Eu-154	#AB	5.739E-02	258.40	1.483E-01	1.483E-01	1.179E-01
K-40		1.199E+01	9.40	1.127E+00	1.406E+00	1.366E-01
Pa-234	#	2.567E-01	42.64	1.095E-01	1.109E-01	2.719E-02
Pb-210	#	0.000E+00	2000.00	1.622E+00	1.622E+00	0.000E+00
Pb-212		3.696E-01	16.64	6.150E-02	6.768E-02	3.066E-02
Pb-214		3.573E-01	23.07	8.243E-02	8.636E-02	3.568E-02
Ra-226	AB	3.969E-01	138.20	5.485E-01	5.493E-01	4.285E-01
Th-230	#AB	5.307E+00	356.20	1.890E+01	1.893E+01	1.521E+01
Th-234	#AB	-4.899E-01	113.60	5.566E-01	5.586E-01	4.296E-01
Tl-208	#	6.571E-02	51.81	3.404E-02	3.432E-02	2.390E-02
U-235		3.971E-02	91.05	3.616E-02	3.628E-02	2.739E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.948E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:06

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-013
Sample Description: Parcel C

Detector: HPGe #11 51-TP32744A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:43
Acquisition Time: 10/5/2011 07:31:48
Analysis Time: 10/5/2011 08:16
Analysis Quantity: 3.910E+02 g

Spectrum ID: 11_20111005_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.14 %

Efficiency: HPGe #11 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/28/2011 17:38
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.008E-01	35.85	1.079E-01	1.099E-01	5.976E-02
Am-241	#AB	-5.408E-02	298.80	1.616E-01	1.617E-01	1.299E-01
Bi-212	#	2.212E-01	83.67	1.851E-01	1.857E-01	1.288E-01
Bi-214	#	2.947E-01	22.88	6.744E-02	7.025E-02	3.297E-02
Co-60	#AB	-6.947E-03	481.50	3.345E-02	3.345E-02	2.691E-02
Cs-137	#AB	1.509E-02	145.30	2.193E-02	2.196E-02	1.635E-02
Eu-152	#AB	1.103E-02	500.30	5.519E-02	5.519E-02	4.451E-02
Eu-154	#AB	5.500E-03	1520.00	8.362E-02	8.362E-02	6.829E-02
K-40		1.261E+01	8.04	1.014E+00	1.345E+00	4.748E-02
Pa-234	#AB	-4.148E-02	383.10	1.589E-01	1.589E-01	1.265E-01
Pb-210	#AB	2.172E+00	281.60	6.116E+00	6.120E+00	4.888E+00
Pb-212		4.518E-01	12.67	5.726E-02	6.686E-02	2.146E-02
Pb-214		4.045E-01	18.87	7.634E-02	8.172E-02	2.491E-02
Ra-226		6.550E-01	64.15	4.202E-01	4.231E-01	3.031E-01
Th-230	#AB	-3.324E+00	288.70	9.597E+00	9.614E+00	7.708E+00
Th-234		5.147E-01	80.06	4.121E-01	4.150E-01	3.118E-01
Tl-208	#	9.519E-02	28.93	2.754E-02	2.826E-02	1.340E-02
U-235		2.951E-02	104.40	3.080E-02	3.088E-02	2.366E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.778E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:07

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-014
Sample Description: Parcel C

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:46
Acquisition Time: 10/5/2011 09:18:37
Analysis Time: 10/5/2011 10:03
Analysis Quantity: 3.360E+02 g

Spectrum ID: 8_20111005_005
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.508E-01	20.12	1.712E-01	1.811E-01	3.761E-02
Am-241	AB	1.659E-02	1009.00	1.674E-01	1.674E-01	1.369E-01
Bi-212		2.323E-01	91.28	2.121E-01	2.126E-01	1.490E-01
Bi-214		4.692E-01	20.79	9.756E-02	1.025E-01	3.036E-02
Co-60	#AB	5.311E-03	768.70	4.082E-02	4.082E-02	3.316E-02
Cs-137	#AB	0.000E+00	2000.00	4.856E-03	4.856E-03	4.099E-02
Eu-152	#	1.756E-01	43.00	7.552E-02	7.658E-02	4.753E-02
Eu-154	#AB	-4.216E-02	290.10	1.223E-01	1.224E-01	9.699E-02
K-40		2.459E+01	6.28	1.544E+00	2.314E+00	1.837E-01
Pa-234	#AB	-3.480E-02	597.80	2.080E-01	2.080E-01	1.681E-01
Pb-210	#AB	2.577E+00	267.30	6.888E+00	6.892E+00	5.523E+00
Pb-212		5.763E-01	12.75	7.350E-02	8.568E-02	3.191E-02
Pb-214		3.155E-01	24.21	7.639E-02	7.971E-02	4.269E-02
Ra-226	#AB	3.045E-01	172.60	5.255E-01	5.260E-01	4.209E-01
Th-230	#AB	4.325E+00	256.50	1.109E+01	1.112E+01	8.892E+00
Th-234	#AB	1.940E-01	229.20	4.447E-01	4.451E-01	3.558E-01
Tl-208	#	1.365E-01	30.06	4.103E-02	4.202E-02	2.388E-02
U-235	#AB	0.000E+00	2000.00	3.387E-02	3.387E-02	3.142E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 3.477E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-015
Sample Description: Parcel C

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:49
Acquisition Time: 10/5/2011 08:15:47
Analysis Time: 10/5/2011 09:01
Analysis Quantity: 3.830E+02 g

Spectrum ID: 9_20111005_004
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2708 sec
Dead Time: 0.28 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.500E-01	40.45	1.011E-01	1.026E-01	5.734E-02
Am-241	#AB	0.000E+00	2000.00	9.262E-02	9.262E-02	1.788E-01
Bi-212	#AB	1.310E-01	141.70	1.856E-01	1.859E-01	1.393E-01
Bi-214	#	1.968E-01	30.18	5.940E-02	6.084E-02	3.238E-02
Co-60	#AB	2.087E-03	1373.00	2.864E-02	2.864E-02	2.336E-02
Cs-137	#AB	-5.930E-03	409.80	2.430E-02	2.431E-02	1.943E-02
Eu-152	#AB	3.355E-02	202.00	6.778E-02	6.782E-02	5.343E-02
Eu-154	#AB	3.184E-02	204.70	6.518E-02	6.522E-02	4.886E-02
K-40		1.262E+01	8.62	1.087E+00	1.401E+00	1.318E-01
Pa-234	#AB	-5.076E-02	304.40	1.545E-01	1.545E-01	1.216E-01
Pb-210	#AB	-2.078E+00	209.30	4.350E+00	4.355E+00	3.446E+00
Pb-212		3.450E-01	16.29	5.620E-02	6.208E-02	2.959E-02
Pb-214		3.100E-01	19.32	5.990E-02	6.394E-02	2.542E-02
Ra-226	#	4.333E-01	97.75	4.235E-01	4.248E-01	3.212E-01
Th-230	#AB	2.429E-01	3817.00	9.271E+00	9.271E+00	7.623E+00
Th-234	#	8.440E-01	48.88	4.126E-01	4.204E-01	2.300E-01
Tl-208	#	9.535E-02	31.61	3.014E-02	3.080E-02	1.668E-02
U-235	#	2.874E-02	97.14	2.791E-02	2.800E-02	2.114E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.556E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:05

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-016
Sample Description: Parcel C

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:52
Acquisition Time: 10/4/2011 21:14:58
Analysis Time: 10/4/2011 22:16
Analysis Quantity: 3.950E+02 g

Spectrum ID: 12_20111004_016
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.08 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.237E-01	22.17	1.161E-01	1.216E-01	2.490E-02
Am-241	#AB	4.537E-02	421.70	1.913E-01	1.914E-01	1.547E-01
Bi-212	#	2.499E-01	81.58	2.039E-01	2.046E-01	1.436E-01
Bi-214		3.636E-01	20.28	7.373E-02	7.763E-02	2.260E-02
Co-60	#AB	-7.296E-03	408.10	2.977E-02	2.978E-02	2.377E-02
Cs-137	#AB	-9.628E-03	262.60	2.528E-02	2.529E-02	1.989E-02
Eu-152	#AB	-2.036E-02	282.90	5.761E-02	5.763E-02	4.577E-02
Eu-154	#AB	-7.087E-03	1051.00	7.446E-02	7.446E-02	6.047E-02
K-40		1.195E+01	8.27	9.879E-01	1.295E+00	1.479E-01
Pa-234	#AB	-7.420E-02	351.90	2.611E-01	2.612E-01	1.283E-01
Pb-210	#	0.000E+00	232.50	1.269E+00	1.270E+00	0.000E+00
Pb-212		3.860E-01	14.59	5.632E-02	6.357E-02	2.648E-02
Pb-214		3.366E-01	20.79	6.998E-02	7.407E-02	2.995E-02
Ra-226		4.782E-01	90.28	4.317E-01	4.332E-01	3.255E-01
Th-230	#AB	-3.039E+00	384.00	1.167E+01	1.168E+01	9.451E+00
Th-234	#AB	2.301E-01	181.90	4.185E-01	4.191E-01	3.323E-01
Tl-208	#	1.024E-01	31.86	3.262E-02	3.332E-02	1.894E-02
U-235		2.441E-02	117.60	2.870E-02	2.875E-02	2.211E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.469E+01

Analyst: Andrew Alexander

Reviewer: Philip Smith
Review Date: 10/5/2011 13:18

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-017
Sample Description: Parcel C

Detector: HPGe #10 51-TP42231A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:55
Acquisition Time: 10/5/2011 08:17:51
Analysis Time: 10/5/2011 09:03
Analysis Quantity: 3.700E+02 g

Spectrum ID: 10_20111005_004
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #10 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/28/2011 17:23
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		1.464E-01	71.41	1.046E-01	1.050E-01	6.998E-02
Am-241	#AB	-8.005E-04	40030.00	3.205E-01	3.205E-01	2.639E-01
Bi-212	#AB	0.000E+00	2000.00	2.049E-01	2.049E-01	1.883E-01
Bi-214		3.186E-01	22.31	7.107E-02	7.419E-02	1.894E-02
Co-60	#AB	6.419E-03	479.20	3.076E-02	3.076E-02	2.456E-02
Cs-137	#AB	8.811E-04	2653.00	2.338E-02	2.338E-02	1.915E-02
Eu-152	#AB	-1.370E-02	486.00	6.656E-02	6.657E-02	5.364E-02
Eu-154	AB	0.000E+00	2000.00	1.351E-02	1.351E-02	1.574E-02
K-40		9.611E+00	10.25	9.848E-01	1.193E+00	5.878E-02
Pa-234	#AB	2.979E-02	465.90	1.388E-01	1.388E-01	1.100E-01
Pb-210	#	0.000E+00	250.00	1.169E+00	1.170E+00	0.000E+00
Pb-212		2.717E-01	21.36	5.806E-02	6.166E-02	3.302E-02
Pb-214		2.699E-01	23.10	6.236E-02	6.533E-02	2.504E-02
Ra-226	#	4.713E-01	97.81	4.610E-01	4.624E-01	3.452E-01
Th-230	#AB	-6.417E+00	330.00	2.117E+01	2.120E+01	1.704E+01
Th-234	#AB	2.199E-01	234.10	5.148E-01	5.153E-01	4.099E-01
Tl-208		1.208E-01	30.56	3.691E-02	3.778E-02	1.626E-02
U-235	#	3.316E-02	90.36	2.996E-02	3.007E-02	2.218E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.150E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:06

TetraTech Hunter's Point Lab

Sample ID: 02-PCT-226-018
Sample Description: Parcel C

Detector: HPGe #11 51-TP32744A
Contract: Tetra Tech HPS
Unit Number: 226
Sample Time: 9/19/2011 12:58
Acquisition Time: 10/5/2011 08:18:58
Analysis Time: 10/5/2011 09:04
Analysis Quantity: 3.500E+02 g

Spectrum ID: 11_20111005_004
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.12 %

Efficiency: HPGe #11 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/28/2011 17:38
Library: GenericAnalysis.lib
Analysis Engine: Env32 G70W0.30

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	1.837E-01	58.80	1.080E-01	1.087E-01	7.047E-02
Am-241	#AB	1.190E-01	182.70	2.174E-01	2.176E-01	1.731E-01
Bi-212	#AB	8.266E-02	235.90	1.950E-01	1.951E-01	1.517E-01
Bi-214	#	2.200E-01	28.35	6.238E-02	6.409E-02	3.120E-02
Co-60	#AB	9.803E-04	1942.00	1.904E-02	1.904E-02	2.700E-02
Cs-137	#AB	9.179E-03	253.20	2.324E-02	2.325E-02	1.807E-02
Eu-152	#AB	-1.228E-02	446.00	5.477E-02	5.478E-02	4.393E-02
Eu-154	#AB	0.000E+00	2000.00	1.236E-02	1.236E-02	1.440E-02
K-40		8.523E+00	10.83	9.234E-01	1.100E+00	1.255E-01
Pa-234	#AB	3.135E-02	413.60	1.296E-01	1.297E-01	1.022E-01
Pb-210	#AB	-9.004E-01	646.90	5.825E+00	5.826E+00	4.726E+00
Pb-212		2.508E-01	19.89	4.989E-02	5.345E-02	2.439E-02
Pb-214		3.557E-01	22.08	7.854E-02	8.262E-02	2.985E-02
Ra-226		5.210E-01	85.96	4.479E-01	4.496E-01	3.336E-01
Th-230	#AB	-1.159E+00	664.00	7.697E+00	7.699E+00	6.245E+00
Th-234	#	3.171E-01	113.20	3.589E-01	3.602E-01	2.739E-01
Tl-208		1.371E-01	24.86	3.408E-02	3.527E-02	9.785E-03
U-235	AB	1.340E-02	238.70	3.199E-02	3.200E-02	2.553E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.076E+01

Analyst: Isaako Tapelu

Reviewer: Philip Smith
Review Date: 10/6/2011 12:07

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-001

Radiochemistry

Lab Sample ID: F1K010459-001
Work Order: MNL9K
Matrix: SOLID

Date Collected: 09/19/11 1130
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.807**		**0.210**		**0.0987**	30	**10/03/11**	**11/03/11**
Americium 241	0.00792	U	0.120		0.0980	30	10/03/11	11/03/11
Bismuth 212	**0.911**		**0.344**		**0.120**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.978**		**0.208**		**0.0780**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0130	U	0.0641	0.0700	0.0515	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0147		0.0450	30	10/03/11	11/03/11
Europium 152	0.0724	U	0.127		0.0970	30	10/03/11	11/03/11
Europium 154	0.0290	U	0.0558		0.290	30	10/03/11	11/03/11
Lead 210	1.09	U	1.52	1.50	1.26	30	10/03/11	11/03/11
Lead 212	**0.637**		**0.159**		**0.0763**	30	**10/03/11**	**11/03/11**
Lead 214	**0.967**		**0.182**		**0.0672**	30	**10/03/11**	**11/03/11**
Potassium 40	**15.2**		**2.01**		**0.417**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0428	U	0.128		0.159	30	10/03/11	11/03/11
Radium (226)	**0.978**		**0.208**	0.700	**0.0780**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.233**		**0.0798**		**0.0349**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.807**		**0.210**		**0.0987**	30	**10/03/11**	**11/03/11**
Thorium 234	0.551	U	0.584		0.964	30	10/03/11	11/03/11
Uranium 235	0.139	U	0.147		0.293	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-001 DUP

Radiochemistry

Lab Sample ID: F1K010459-001X
Work Order: MNL9K
Matrix: SOLID

Date Collected: 09/19/11 1130
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.965**		**0.239**		**0.0326**	30	**10/03/11**	**11/03/11**
Americium 241	0.0412	U	0.117		0.0938	30	10/03/11	11/03/11
Bismuth 212	**0.513**		**0.500**		**0.329**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.846**		**0.194**		**0.0713**	30	**10/03/11**	**11/03/11**
Cesium 137	-0.0349	U	0.0683	0.0700	0.0530	30	10/03/11	11/03/11
Cobalt 60	0.0212	U	0.0439		0.0425	30	10/03/11	11/03/11
Europium 152	0.0515	U	0.0829		0.106	30	10/03/11	11/03/11
Europium 154	0.121	U	0.315		0.239	30	10/03/11	11/03/11
Lead 210	**1.29**	J	**1.31**	1.50	**0.930**	30	**10/03/11**	**11/03/11**
Lead 212	**0.834**		**0.160**		**0.0723**	30	**10/03/11**	**11/03/11**
Lead 214	**1.04**		**0.209**		**0.0801**	30	**10/03/11**	**11/03/11**
Potassium 40	**13.7**		**1.93**		**0.323**	30	**10/03/11**	**11/03/11**
Protactinium 234	-0.0987	U	0.178		0.141	30	10/03/11	11/03/11
Radium (226)	**0.846**		**0.194**	0.700	**0.0713**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.215**		**0.0784**		**0.0367**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.965**		**0.239**		**0.0326**	30	**10/03/11**	**11/03/11**
Thorium 234	0.622	U	0.510		0.944	30	10/03/11	11/03/11
Uranium 235	**0.215**		**0.287**		**0.197**	30	**10/03/11**	**11/03/11**

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-002

Radiochemistry

Lab Sample ID: F1K010459-002
Work Order: MNL9M
Matrix: SOLID

Date Collected: 09/19/11 1133
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.805**		**0.222**		**0.0317**	30	**10/03/11**	**12/01/11**
Americium 241	0.0166	U	0.131		0.107	30	10/03/11	12/01/11
Bismuth 212	**0.427**		**0.395**		**0.279**	30	**10/03/11**	**12/01/11**
Bismuth 214	**0.764**		**0.182**		**0.0684**	30	**10/03/11**	**12/01/11**
Cesium 137	-0.00261	U	0.0506	0.0700	0.0413	30	10/03/11	12/01/11
Cobalt 60	0.0122	U	0.0660		0.0527	30	10/03/11	12/01/11
Europium 152	0.0270	U	0.149		0.104	30	10/03/11	12/01/11
Europium 154	0.0197	U	0.0430		0.339	30	10/03/11	12/01/11
Lead 210	**1.95**		**1.22**	1.50	**0.846**	30	**10/03/11**	**12/01/11**
Lead 212	**0.610**		**0.132**		**0.0591**	30	**10/03/11**	**12/01/11**
Lead 214	**0.906**		**0.173**		**0.0616**	30	**10/03/11**	**12/01/11**
Potassium 40	**18.2**		**2.25**		**0.299**	30	**10/03/11**	**12/01/11**
Protactinium 234	0.0534	U	0.176		0.125	30	10/03/11	12/01/11
Radium (226)	**0.764**		**0.182**	0.700	**0.0684**	30	**10/03/11**	**12/01/11**
Thallium 208	**0.264**		**0.0672**		**0.0220**	30	**10/03/11**	**12/01/11**
Thorium 232	**0.805**		**0.222**		**0.0317**	30	**10/03/11**	**12/01/11**
Thorium 234	0.548	U	0.579		0.859	30	10/03/11	12/01/11
Uranium 235	0.0787	U	0.224		0.177	30	10/03/11	12/01/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-003

Radiochemistry

Lab Sample ID: F1K010459-003
Work Order: MNL9P
Matrix: SOLID

Date Collected: 09/19/11 1136
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**1.64**		**0.266**		**0.0729**	30	**10/03/11**	**11/03/11**
Americium 241	0.0207	U	0.147		0.120	30	10/03/11	11/03/11
Bismuth 212	0.182	U	0.334		0.304	30	10/03/11	11/03/11
Bismuth 214	**1.04**		**0.218**		**0.0687**	30	**10/03/11**	**11/03/11**
Cesium 137	0.00560	U	0.0564	0.0700	0.0458	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0125		0.0564	30	10/03/11	11/03/11
Europium 152	0.0278	U	0.0446		0.132	30	10/03/11	11/03/11
Europium 154	**0.0903**		**0.0971**		**0.0851**	30	**10/03/11**	**11/03/11**
Lead 210	0.292	U	1.61	1.50	1.31	30	10/03/11	11/03/11
Lead 212	**1.26**		**0.215**		**0.0849**	30	**10/03/11**	**11/03/11**
Lead 214	**1.17**		**0.217**		**0.0670**	30	**10/03/11**	**11/03/11**
Potassium 40	**8.31**		**1.54**		**0.256**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.107	U	0.218		0.173	30	10/03/11	11/03/11
Radium (226)	**1.04**		**0.218**	0.700	**0.0687**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.480**		**0.107**		**0.0353**	30	**10/03/11**	**11/03/11**
Thorium 232	**1.64**		**0.266**		**0.0729**	30	**10/03/11**	**11/03/11**
Thorium 234	**1.01**		**0.663**		**0.899**	30	**10/03/11**	**11/03/11**
Uranium 235	0.195	U	0.315		0.251	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-004

Radiochemistry

Lab Sample ID: F1K010459-004
Work Order: MNL9Q
Matrix: SOLID

Date Collected: 09/19/11 1139
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	0.732		0.202		0.0310	30	10/03/11	11/03/11
Americium 241	-0.0747	U	0.136		0.109	30	10/03/11	11/03/11
Bismuth 212	0.399		0.463		0.246	30	10/03/11	11/03/11
Bismuth 214	0.711		0.195		0.0789	30	10/03/11	11/03/11
Cesium 137	0.0	U	0.0382	0.0700	0.0513	30	10/03/11	11/03/11
Cobalt 60	0.00303	U	0.0265		0.0208	30	10/03/11	11/03/11
Europium 152	0.0178	U	0.0277		0.0926	30	10/03/11	11/03/11
Europium 154	0.0590	U	0.132		0.227	30	10/03/11	11/03/11
Lead 210	0.275	U	1.36	1.50	1.10	30	10/03/11	11/03/11
Lead 212	0.796		0.135		0.0457	30	10/03/11	11/03/11
Lead 214	0.715		0.136		0.0479	30	10/03/11	11/03/11
Potassium 40	9.14		1.61		0.424	30	10/03/11	11/03/11
Protactinium 234	0.0840	U	0.117		0.127	30	10/03/11	11/03/11
Radium (226)	0.711		0.195	0.700	0.0789	30	10/03/11	11/03/11
Thallium 208	0.274		0.0694		0.0210	30	10/03/11	11/03/11
Thorium 232	0.732		0.202		0.0310	30	10/03/11	11/03/11
Thorium 234	1.21		1.11		0.642	30	10/03/11	11/03/11
Uranium 235	0.143	U	0.249		0.193	30	10/03/11	11/03/11

NOTE(S)

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U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-005

Radiochemistry

Lab Sample ID: F1K010459-005
Work Order: MNL9T
Matrix: SOLID

Date Collected: 09/19/11 1142
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.534**		**0.165**		**0.149**	30	**10/03/11**	**11/03/11**
Americium 241	0.0500	U	0.0960		0.0748	30	10/03/11	11/03/11
Bismuth 212	**0.308**		**0.378**		**0.275**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.468**		**0.149**		**0.0666**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0	U	0.0211	0.0700	0.0541	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0126		0.0147	30	10/03/11	11/03/11
Europium 152	0.0749	U	0.131		0.0842	30	10/03/11	11/03/11
Europium 154	0.0804	U	0.182		0.301	30	10/03/11	11/03/11
Lead 210	**1.32**	**J**	**1.36**	1.50	**1.11**	30	**10/03/11**	**11/03/11**
Lead 212	**0.466**		**0.128**		**0.0682**	30	**10/03/11**	**11/03/11**
Lead 214	**0.554**		**0.155**		**0.0785**	30	**10/03/11**	**11/03/11**
Potassium 40	**6.44**		**1.36**		**0.304**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0646	U	0.120		0.137	30	10/03/11	11/03/11
Radium (226)	**0.468**	**J**	**0.149**	0.700	**0.0666**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.176**		**0.0780**		**0.0374**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.534**		**0.165**		**0.149**	30	**10/03/11**	**11/03/11**
Thorium 234	0.196	U	0.237		1.11	30	10/03/11	11/03/11
Uranium 235	0.0443	U	0.228		0.190	30	10/03/11	11/03/11

NOTE(S)

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U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-006

Radiochemistry

Lab Sample ID: F1K010459-006
Work Order: MNL9V
Matrix: SOLID

Date Collected: 09/19/11 1145
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.138**		**0.151**		**0.101**	30	**10/03/11**	**11/03/11**
Americium 241	-0.0143	U	0.0874		0.0708	30	10/03/11	11/03/11
Bismuth 212	0.101	U	0.284		0.194	30	10/03/11	11/03/11
Bismuth 214	**0.256**		**0.137**		**0.0705**	30	**10/03/11**	**11/03/11**
Cesium 137	-0.00896	U	0.0414	0.0700	0.0327	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0223		0.0184	30	10/03/11	11/03/11
Europium 152	0.0345	U	0.114		0.0841	30	10/03/11	11/03/11
Europium 154	0.152	U	0.325		0.241	30	10/03/11	11/03/11
Lead 210	-0.565	U	2.01	1.50	1.11	30	10/03/11	11/03/11
Lead 212	**0.173**		**0.102**		**0.0575**	30	**10/03/11**	**11/03/11**
Lead 214	**0.228**		**0.0831**		**0.0630**	30	**10/03/11**	**11/03/11**
Potassium 40	**4.54**		**1.08**		**0.294**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0888	U	0.158		0.0900	30	10/03/11	11/03/11
Radium (226)	**0.256**	**J**	**0.137**	0.700	**0.0705**	30	**10/03/11**	**11/03/11**
Thallium 208	0.0313	U	0.0682		0.0389	30	10/03/11	11/03/11
Thorium 232	**0.138**		**0.151**		**0.101**	30	**10/03/11**	**11/03/11**
Thorium 234	-0.123	U	0.350		0.736	30	10/03/11	11/03/11
Uranium 235	0.0750	U	0.198		0.161	30	10/03/11	11/03/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-007

Radiochemistry

Lab Sample ID: F1K010459-007
Work Order: MNL9W
Matrix: SOLID

Date Collected: 09/19/11 1148
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.399**		**0.227**		**0.194**	30	**10/03/11**	**11/03/11**
Americium 241	-0.0274	U	1.72		0.0972	30	10/03/11	11/03/11
Bismuth 212	0.276	U	0.572		0.382	30	10/03/11	11/03/11
Bismuth 214	**0.517**		**0.175**		**0.0787**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0318	U	0.0703	0.0700	0.0578	30	10/03/11	11/03/11
Cobalt 60	-0.0102	U	0.0798		0.0637	30	10/03/11	11/03/11
Europium 152	-0.00737	U	0.0150		0.0997	30	10/03/11	11/03/11
Europium 154	0.202	U	0.427		0.306	30	10/03/11	11/03/11
Lead 210	**1.30**	**J**	**1.49**	1.50	**1.03**	30	**10/03/11**	**11/03/11**
Lead 212	**0.331**		**0.123**		**0.0550**	30	**10/03/11**	**11/03/11**
Lead 214	**0.341**		**0.125**		**0.0918**	30	**10/03/11**	**11/03/11**
Potassium 40	**10.2**		**2.11**		**0.382**	30	**10/03/11**	**11/03/11**
Protactinium 234	**0.113**		**0.199**		**0.0945**	30	**10/03/11**	**11/03/11**
Radium (226)	**0.517**	**J**	**0.175**	0.700	**0.0787**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.0854**		**0.0808**		**0.0443**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.399**		**0.227**		**0.194**	30	**10/03/11**	**11/03/11**
Thorium 234	**0.926**		**0.586**		**0.772**	30	**10/03/11**	**11/03/11**
Uranium 235	0.0188	U	0.0768		0.213	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-008

Radiochemistry

Lab Sample ID: F1K010459-008
Work Order: MNL90
Matrix: SOLID

Date Collected: 09/19/11 1151
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	1.47		0.339		0.0427	30	10/03/11	11/03/11
Americium 241	0.0857	U	0.123		0.0967	30	10/03/11	11/03/11
Bismuth 212	0.546		0.741		0.405	30	10/03/11	11/03/11
Bismuth 214	0.599		0.181		0.100	30	10/03/11	11/03/11
Cesium 137	-0.000380	U	0.0657	0.0700	0.0541	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0144		0.0168	30	10/03/11	11/03/11
Europium 152	0.0804	U	0.190		0.107	30	10/03/11	11/03/11
Europium 154	-0.00143	U	0.00997		0.402	30	10/03/11	11/03/11
Lead 210	1.19	J	1.44	1.50	1.11	30	10/03/11	11/03/11
Lead 212	0.794		0.168		0.0953	30	10/03/11	11/03/11
Lead 214	0.758		0.175		0.0586	30	10/03/11	11/03/11
Potassium 40	13.5		2.14		0.294	30	10/03/11	11/03/11
Protactinium 234	0.0918	U	0.234		0.169	30	10/03/11	11/03/11
Radium (226)	0.599	J	0.181	0.700	0.100	30	10/03/11	11/03/11
Thallium 208	0.326		0.0866		0.0279	30	10/03/11	11/03/11
Thorium 232	1.47		0.339		0.0427	30	10/03/11	11/03/11
Thorium 234	-0.163	U	0.350		1.26	30	10/03/11	11/03/11
Uranium 235	0.00799	U	0.0517		0.303	30	10/03/11	11/03/11

NOTE(S)

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J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-009

Radiochemistry

Lab Sample ID: F1K010459-009
Work Order: MNL91
Matrix: SOLID

Date Collected: 09/19/11 1154
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.258**		**0.152**		**0.126**	30	**10/03/11**	**11/03/11**
Americium 241	-0.00399	U	0.0968		0.0795	30	10/03/11	11/03/11
Bismuth 212	**0.342**		**0.397**		**0.184**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.369**		**0.139**		**0.0673**	30	**10/03/11**	**11/03/11**
Cesium 137	-0.00367	U	0.0414	0.0700	0.0337	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0129		0.0106	30	10/03/11	11/03/11
Europium 152	0.0309	U	0.0686		0.0867	30	10/03/11	11/03/11
Europium 154	0.0148	U	0.0456		0.277	30	10/03/11	11/03/11
Lead 210	0.304	U	0.915	1.50	0.728	30	10/03/11	11/03/11
Lead 212	**0.295**		**0.115**		**0.0557**	30	**10/03/11**	**11/03/11**
Lead 214	**0.501**		**0.135**		**0.0605**	30	**10/03/11**	**11/03/11**
Potassium 40	**19.5**		**2.22**		**0.285**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0879	U	0.160		0.101	30	10/03/11	11/03/11
Radium (226)	**0.369**	**J**	**0.139**	0.700	**0.0673**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.126**		**0.0570**		**0.0251**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.258**		**0.152**		**0.126**	30	**10/03/11**	**11/03/11**
Thorium 234	0.151	U	0.146		0.752	30	10/03/11	11/03/11
Uranium 235	0.182	U	0.149		0.198	30	10/03/11	11/03/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-010

Radiochemistry

Lab Sample ID: F1K010459-010
Work Order: MNL93
Matrix: SOLID

Date Collected: 09/19/11 1157
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.329**		**0.203**		**0.137**	30	**10/03/11**	**11/03/11**
Americium 241	0.0218	U	0.117		0.0950	30	10/03/11	11/03/11
Bismuth 212	0.0968	U	0.407		0.332	30	10/03/11	11/03/11
Bismuth 214	**0.539**		**0.177**		**0.0746**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0112	U	0.0458	0.0700	0.0359	30	10/03/11	11/03/11
Cobalt 60	0.0218	U	0.0741		0.0578	30	10/03/11	11/03/11
Europium 152	0.0222	U	0.115		0.112	30	10/03/11	11/03/11
Europium 154	0.00157	U	0.00829		0.365	30	10/03/11	11/03/11
Lead 210	**1.59**		**1.73**	1.50	**1.28**	30	**10/03/11**	**11/03/11**
Lead 212	**0.621**		**0.157**		**0.0780**	30	**10/03/11**	**11/03/11**
Lead 214	**0.522**		**0.141**		**0.0580**	30	**10/03/11**	**11/03/11**
Potassium 40	**15.8**		**2.25**		**0.313**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0910	U	0.198		0.141	30	10/03/11	11/03/11
Radium (226)	**0.539**	J	**0.177**	0.700	**0.0746**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.204**		**0.0739**		**0.0356**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.329**		**0.203**		**0.137**	30	**10/03/11**	**11/03/11**
Thorium 234	0.473	U	0.535		0.823	30	10/03/11	11/03/11
Uranium 235	**0.247**		**0.246**		**0.218**	30	**10/03/11**	**11/03/11**

NOTE(S)

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J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-011

Radiochemistry

Lab Sample ID: F1K010459-011
Work Order: MNL94
Matrix: SOLID

Date Collected: 09/19/11 1200
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.281**		**0.147**		**0.142**	30	**10/03/11**	**11/03/11**
Americium 241	0.0560	U	0.0965		0.0750	30	10/03/11	11/03/11
Bismuth 212	**0.358**		**0.484**		**0.262**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.465**		**0.138**		**0.0609**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0163	U	0.0527	0.0700	0.0414	30	10/03/11	11/03/11
Cobalt 60	-0.00232	U	0.0106		0.0473	30	10/03/11	11/03/11
Europium 152	0.0231	U	0.0541		0.0970	30	10/03/11	11/03/11
Europium 154	0.0132	U	0.0355		0.340	30	10/03/11	11/03/11
Lead 210	**1.26**	**J**	**1.93**	1.50	**1.25**	30	**10/03/11**	**11/03/11**
Lead 212	**0.473**		**0.148**		**0.0610**	30	**10/03/11**	**11/03/11**
Lead 214	**0.527**		**0.157**		**0.0634**	30	**10/03/11**	**11/03/11**
Potassium 40	**14.2**		**2.02**		**0.291**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0195	U	0.170		0.139	30	10/03/11	11/03/11
Radium (226)	**0.465**	**J**	**0.138**	0.700	**0.0609**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.150**		**0.0606**		**0.0304**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.281**		**0.147**		**0.142**	30	**10/03/11**	**11/03/11**
Thorium 234	0.613	U	1.14		0.945	30	10/03/11	11/03/11
Uranium 235	0.0204	U	0.0482		0.212	30	10/03/11	11/03/11

NOTE(S)

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U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-012

Radiochemistry

Lab Sample ID: F1K010459-012
Work Order: MNL96
Matrix: SOLID

Date Collected: 09/19/11 1240
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.378**		**0.153**		**0.102**	30	**10/03/11**	**11/03/11**
Americium 241	0.0292	U	0.0911		0.0731	30	10/03/11	11/03/11
Bismuth 212	**0.415**		**0.432**		**0.201**	30	**10/03/11**	**11/03/11**
Bismuth 214	**0.403**		**0.120**		**0.0529**	30	**10/03/11**	**11/03/11**
Cesium 137	-0.0127	U	0.0471	0.0700	0.0373	30	10/03/11	11/03/11
Cobalt 60	0.00174	U	0.00543		0.0400	30	10/03/11	11/03/11
Europium 152	0.0131	U	0.106		0.0860	30	10/03/11	11/03/11
Europium 154	-0.138	U	0.400		0.313	30	10/03/11	11/03/11
Lead 210	**1.15**	J	**1.42**	1.50	**0.905**	30	**10/03/11**	**11/03/11**
Lead 212	**0.357**		**0.0983**		**0.0495**	30	**10/03/11**	**11/03/11**
Lead 214	**0.397**		**0.131**		**0.0596**	30	**10/03/11**	**11/03/11**
Potassium 40	**11.8**		**1.69**		**0.289**	30	**10/03/11**	**11/03/11**
Protactinium 234	-0.00240	U	0.00307		0.106	30	10/03/11	11/03/11
Radium (226)	**0.403**	J	**0.120**	0.700	**0.0529**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.119**		**0.0563**		**0.0278**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.378**		**0.153**		**0.102**	30	**10/03/11**	**11/03/11**
Thorium 234	0.305	U	0.313		0.811	30	10/03/11	11/03/11
Uranium 235	**0.200**		**0.187**		**0.157**	30	**10/03/11**	**11/03/11**

NOTE(S)

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U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-013

Radiochemistry

Lab Sample ID: F1K010459-013
Work Order: MNL97
Matrix: SOLID

Date Collected: 09/19/11 1243
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	0.271		0.161		0.137	30	10/03/11	11/03/11
Americium 241	-0.0380	U	0.332		0.0907	30	10/03/11	11/03/11
Bismuth 212	0.368		0.440		0.303	30	10/03/11	11/03/11
Bismuth 214	0.506		0.143		0.0546	30	10/03/11	11/03/11
Cesium 137	0.00738	U	0.0598	0.0700	0.0516	30	10/03/11	11/03/11
Cobalt 60	0.00199	U	0.0745		0.0611	30	10/03/11	11/03/11
Europium 152	0.170		0.0970		0.0450	30	10/03/11	11/03/11
Europium 154	-0.0318	U	0.433		0.351	30	10/03/11	11/03/11
Lead 210	0.0262	U	0.903	1.50	0.803	30	10/03/11	11/03/11
Lead 212	0.410		0.112		0.0468	30	10/03/11	11/03/11
Lead 214	0.398		0.133		0.0663	30	10/03/11	11/03/11
Potassium 40	12.3		2.11		0.307	30	10/03/11	11/03/11
Protactinium 234	0.0236	U	0.173		0.0993	30	10/03/11	11/03/11
Radium (226)	0.506	J	0.143	0.700	0.0546	30	10/03/11	11/03/11
Thallium 208	0.0988		0.0842		0.0523	30	10/03/11	11/03/11
Thorium 232	0.271		0.161		0.137	30	10/03/11	11/03/11
Thorium 234	0.847		0.991		0.796	30	10/03/11	11/03/11
Uranium 235	0.0135	U	0.0732		0.150	30	10/03/11	11/03/11

NOTE(S)

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U Result is less than the sample detection limit.

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Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-014

Radiochemistry

Lab Sample ID: F1K010459-014
Work Order: MNL99
Matrix: SOLID

Date Collected: 09/19/11 1246
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.716**		**0.260**		**0.0897**	30	**10/03/11**	**11/03/11**
Americium 241	0.0359	U	0.133		0.107	30	10/03/11	11/03/11
Bismuth 212	0.177	U	0.572		0.417	30	10/03/11	11/03/11
Bismuth 214	**0.471**		**0.158**		**0.0591**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0160	U	0.0636	0.0700	0.0502	30	10/03/11	11/03/11
Cobalt 60	-0.0173	U	0.0720		0.0563	30	10/03/11	11/03/11
Europium 152	0.00774	U	0.0235		0.129	30	10/03/11	11/03/11
Europium 154	0.0424	U	0.0786		0.405	30	10/03/11	11/03/11
Lead 210	0.0420	U	1.27	1.50	1.04	30	10/03/11	11/03/11
Lead 212	**0.535**		**0.145**		**0.0879**	30	**10/03/11**	**11/03/11**
Lead 214	**0.457**		**0.197**		**0.0852**	30	**10/03/11**	**11/03/11**
Potassium 40	**25.1**		**3.13**		**0.309**	30	**10/03/11**	**11/03/11**
Protactinium 234	-0.000852	U	0.206		0.170	30	10/03/11	11/03/11
Radium (226)	**0.471**	J	**0.158**	0.700	**0.0591**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.252**		**0.0810**		**0.0296**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.716**		**0.260**		**0.0897**	30	**10/03/11**	**11/03/11**
Thorium 234	0.373	U	1.20		1.02	30	10/03/11	11/03/11
Uranium 235	-0.209	U	0.582		0.266	30	10/03/11	11/03/11

NOTE(S)

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U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-015

Radiochemistry

Lab Sample ID: F1K010459-015
Work Order: MNMAA
Matrix: SOLID

Date Collected: 09/19/11 1249
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.274**		**0.113**		**0.111**	30	**10/03/11**	**11/03/11**
Americium 241	-0.0117	U	0.0839		0.0683	30	10/03/11	11/03/11
Bismuth 212	0.122	U	0.294		0.209	30	10/03/11	11/03/11
Bismuth 214	**0.247**		**0.0878**		**0.0438**	30	**10/03/11**	**11/03/11**
Cesium 137	-0.00160	U	0.0337	0.0700	0.0275	30	10/03/11	11/03/11
Cobalt 60	0.00883	U	0.0407		0.0320	30	10/03/11	11/03/11
Europium 152	0.0186	U	0.0698		0.0783	30	10/03/11	11/03/11
Europium 154	0.000213	U	0.00135		0.255	30	10/03/11	11/03/11
Lead 210	-0.234	U	0.863	1.50	0.692	30	10/03/11	11/03/11
Lead 212	**0.294**		**0.0966**		**0.0486**	30	**10/03/11**	**11/03/11**
Lead 214	**0.379**		**0.102**		**0.0516**	30	**10/03/11**	**11/03/11**
Potassium 40	**12.3**		**1.74**		**0.368**	30	**10/03/11**	**11/03/11**
Protactinium 234	**0.132**		**0.165**		**0.0896**	30	**10/03/11**	**11/03/11**
Radium (226)	**0.247**	J	**0.0878**	0.700	**0.0438**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.127**		**0.0438**		**0.0162**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.274**		**0.113**		**0.111**	30	**10/03/11**	**11/03/11**
Thorium 234	0.546	U	0.387		0.624	30	10/03/11	11/03/11
Uranium 235	0.0230	U	0.167		0.135	30	10/03/11	11/03/11

NOTE(S)

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J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-016

Radiochemistry

Lab Sample ID: F1K010459-016
Work Order: MNMAC
Matrix: SOLID

Date Collected: 09/19/11 1252
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	0.205		0.177		0.127	30	10/03/11	11/03/11
Americium 241	-0.0129	U	0.101		0.0823	30	10/03/11	11/03/11
Bismuth 212	0.150	U	0.508		0.299	30	10/03/11	11/03/11
Bismuth 214	0.432		0.128		0.0543	30	10/03/11	11/03/11
Cesium 137	0.0	U	0.00972	0.0700	0.0209	30	10/03/11	11/03/11
Cobalt 60	0.00812	U	0.0281		0.0455	30	10/03/11	11/03/11
Europium 152	0.0193	U	0.0587		0.0947	30	10/03/11	11/03/11
Europium 154	0.0385	U	0.0616		0.193	30	10/03/11	11/03/11
Lead 210	0.234	U	1.38	1.50	1.07	30	10/03/11	11/03/11
Lead 212	0.429		0.0941		0.0441	30	10/03/11	11/03/11
Lead 214	0.252		0.0974		0.0604	30	10/03/11	11/03/11
Potassium 40	10.7		1.64		0.327	30	10/03/11	11/03/11
Protactinium 234	0.0835	U	0.130		0.111	30	10/03/11	11/03/11
Radium (226)	0.432	J	0.128	0.700	0.0543	30	10/03/11	11/03/11
Thallium 208	0.141		0.0467		0.0213	30	10/03/11	11/03/11
Thorium 232	0.205		0.177		0.127	30	10/03/11	11/03/11
Thorium 234	0.120	U	0.305		0.803	30	10/03/11	11/03/11
Uranium 235	0.197		0.219		0.135	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-017

Radiochemistry

Lab Sample ID: F1K010459-017
Work Order: MNMAE
Matrix: SOLID

Date Collected: 09/19/11 1255
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.445**		**0.154**		**0.0295**	30	**10/03/11**	**11/03/11**
Americium 241	0.0170	U	0.104		0.0848	30	10/03/11	11/03/11
Bismuth 212	0.193	U	0.305		0.222	30	10/03/11	11/03/11
Bismuth 214	**0.370**		**0.117**		**0.0539**	30	**10/03/11**	**11/03/11**
Cesium 137	0.00452	U	0.0322	0.0700	0.0257	30	10/03/11	11/03/11
Cobalt 60	**0.0238**		**0.0331**		**0.0206**	30	**10/03/11**	**11/03/11**
Europium 152	0.00417	U	0.0318		0.0677	30	10/03/11	11/03/11
Europium 154	0.0965	U	0.296		0.227	30	10/03/11	11/03/11
Lead 210	0.333	U	1.05	1.50	0.970	30	10/03/11	11/03/11
Lead 212	**0.262**		**0.111**		**0.0607**	30	**10/03/11**	**11/03/11**
Lead 214	**0.314**		**0.105**		**0.0586**	30	**10/03/11**	**11/03/11**
Potassium 40	**8.70**		**1.52**		**0.452**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0246	U	0.146		0.0794	30	10/03/11	11/03/11
Radium (226)	**0.370**	J	**0.117**	0.700	**0.0539**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.0600**		**0.0561**		**0.0388**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.445**		**0.154**		**0.0295**	30	**10/03/11**	**11/03/11**
Thorium 234	0.680	U	0.967		0.798	30	10/03/11	11/03/11
Uranium 235	0.0659	U	0.182		0.148	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-018

Radiochemistry

Lab Sample ID: F1K010459-018
Work Order: MNMAF
Matrix: SOLID

Date Collected: 09/19/11 1258
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1307066		Yld %
Actinium 228	**0.196**		**0.121**		**0.138**	30	**10/03/11**	**11/03/11**
Americium 241	0.0	U	0.0705		0.0815	30	10/03/11	11/03/11
Bismuth 212	0.0584	U	0.309		0.259	30	10/03/11	11/03/11
Bismuth 214	**0.357**		**0.121**		**0.0560**	30	**10/03/11**	**11/03/11**
Cesium 137	0.0	U	0.0145	0.0700	0.0507	30	10/03/11	11/03/11
Cobalt 60	0.0	U	0.0143		0.0118	30	10/03/11	11/03/11
Europium 152	0.0684	U	0.128		0.0976	30	10/03/11	11/03/11
Europium 154	0.0413	U	0.0794		0.298	30	10/03/11	11/03/11
Lead 210	-0.0175	U	1.12	1.50	0.995	30	10/03/11	11/03/11
Lead 212	**0.464**		**0.106**		**0.0479**	30	**10/03/11**	**11/03/11**
Lead 214	**0.345**		**0.113**		**0.0739**	30	**10/03/11**	**11/03/11**
Potassium 40	**7.37**		**1.34**		**0.407**	30	**10/03/11**	**11/03/11**
Protactinium 234	0.0132	U	0.159		0.121	30	10/03/11	11/03/11
Radium (226)	**0.357**	**J**	**0.121**	0.700	**0.0560**	30	**10/03/11**	**11/03/11**
Thallium 208	**0.150**		**0.0641**		**0.0304**	30	**10/03/11**	**11/03/11**
Thorium 232	**0.196**		**0.121**		**0.138**	30	**10/03/11**	**11/03/11**
Thorium 234	0.611	U	0.535		0.758	30	10/03/11	11/03/11
Uranium 235	0.0462	U	0.210		0.174	30	10/03/11	11/03/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-004

Radiochemistry

Lab Sample ID: F1K010458-001
Work Order: MNL89
Matrix: SOLID

Date Collected: 09/19/11 1139
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Total SR BY GFPC	**EPA-905 MOD**			**pCi/g**		**Batch # 1305196**		**Yld % 88.**
Strontium Total	0.163		0.158	0.320	0.144	400	**11/01/11**	**11/10/11**

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 02-PCT-226-010

Radiochemistry

Lab Sample ID: F1K010458-002
Work Order: MNL9D
Matrix: SOLID

Date Collected: 09/19/11 1157
Date Received: 11/01/11 1315

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Total SR BY GFPC	**EPA-905 MOD**			**pCi/g**		**Batch # 1305196**		**Yld % 85.**
Strontium Total	-0.0472	U	0.157	0.320	0.157	400	11/01/11	11/10/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

ATTACHMENT 3

EXCAVATED SOIL UNIT SCAN DATA
(on CD only)

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D03-0442

Sample ID	Gamma Total cps	Easting	Northing
1	[illegible]	6022395.54766	2089030.68462
2	[illegible]	6022394.78866	2089031.05878
3	[illegible]	6022394.33984	2089030.95659
4	[illegible]	6022394.34722	2089030.94139
5	[illegible]	6022394.84902	2089029.07401
6	[illegible]	6022394.84790	2089029.09011
7	[illegible]	6022394.80273	2089030.11320
8	[illegible]	6022395.60783	2089031.43596
9	[illegible]	6022397.32307	2089034.03275
10	[illegible]	6022399.14351	2089036.71492
11	[illegible]	6022401.16268	2089039.41673
12	[illegible]	6022403.25079	2089042.19209
13	[illegible]	6022405.34565	2089044.97716
14	[illegible]	6022407.48551	2089047.67444
15	[illegible]	6022409.59364	2089050.32669
16	[illegible]	6022411.67711	2089052.92828
17	[illegible]	6022413.71964	2089055.49298
18	*[illegible]*	*6022415.74067*	*2089058.04454*
19	[illegible]	6022417.72707	2089060.54184
20	[illegible]	6022419.81495	2089063.18075
21	[illegible]	6022421.98711	2089065.97481
22	[illegible]	6022423.98112	2089068.56393
23	[illegible]	6022425.96962	2089071.15387
24	[illegible]	6022428.04326	2089074.00058
25	[illegible]	6022430.27306	2089077.01409
26	[illegible]	6022432.70298	2089080.16143
27	[illegible]	6022435.10459	2089083.31206
28	**[illegible]**	**6022437.46342**	**2089086.43773**
29	[illegible]	6022439.70822	2089089.38088
30	[illegible]	6022442.08083	2089092.47815
31	[illegible]	6022444.59317	2089095.72037
32	[illegible]	6022446.86667	2089098.59182
33	[illegible]	6022449.09983	2089101.35989
34	**1147**	**6022451.26491**	**2089104.06517**
35	[illegible]	6022453.12845	2089106.60852
36	[illegible]	6022454.18012	2089109.28530
37	[illegible]	6022454.57378	2089111.20575
38	[illegible]	6022454.97977	2089109.48754
39	[illegible]	6022454.35845	2089113.10356
40	[illegible]	6022453.30427	2089116.68376
41	**1176**	**6022451.00085**	**2089119.88596**
42	[illegible]	6022448.96545	2089121.94259
43	[illegible]	6022446.08961	2089123.89745
44	[illegible]	6022449.70370	2089120.99293
45	[illegible]	6022453.86870	2089118.08894
46	[illegible]	6022458.79320	2089115.50371
47	[illegible]	6022459.50488	2089115.24595
48	*[illegible]*	*6022457.15105*	*2089116.71585*
49	[illegible]	6022454.23235	2089119.04474
50	[illegible]	6022451.31776	2089121.37133
51	[illegible]	6022448.40839	2089123.69699
52	[illegible]	6022445.57014	2089125.97284
53	[illegible]	6022442.75580	2089128.23762
54	[illegible]	6022439.96083	2089130.46057
55	[illegible]	6022437.10394	2089132.72239
56	[illegible]	6022434.17378	2089135.00869
57	[illegible]	6022431.14086	2089137.36708

Sample ID	Gamma Total cps	Easting	Northing
58	1112	6022428.05761	2089139.76530
59	1051	6022424.77380	2089142.22250
60	1048	6022421.49344	2089144.70371
61	1063	6022418.24013	2089147.23984
62	1096	6022415.02409	2089149.72103
63	1149	6022411.84495	2089152.16218
64	1193	6022408.79391	2089154.43171
65	1182	6022405.70928	2089156.72375
66	932	6022402.58863	2089159.03501
67	961	6022399.29254	2089161.17164
68	1039	6022396.03067	2089163.29400
69	925	6022392.67578	2089163.61390
70	1096	6022389.24677	2089163.45657
71	1110	6022385.96573	2089161.70973
72	1101	6022383.64664	2089159.66018
73	**1088**	**6022381.38739**	**2089156.49669**
74	1067	6022383.98620	2089159.34835
75	981	6022386.66732	2089162.82260
76	972	6022389.04544	2089167.19372
77	1137	6022390.11615	2089169.45267
78	1049	6022389.93660	2089168.51699
79	1017	6022387.75287	2089165.33559
80	1024	6022385.47408	2089162.23720
81	915	6022382.89341	2089159.38516
82	945	6022380.52578	2089156.63268
83	951	6022378.21449	2089153.83954
84	911	6022375.82823	2089150.87077
85	1014	6022373.42182	2089147.83207
86	969	6022371.03947	2089144.68893
87	1017	6022368.62885	2089141.55976
88	930	6022366.19972	2089138.45252
89	1078	6022363.85437	2089135.32746
90	*1074*	*6022361.70880*	*2089132.47609*
91	1017	6022359.75182	2089129.90688
92	1042	6022357.66842	2089127.20772
93	984	6022355.51271	2089124.44843
94	975	6022353.20777	2089121.45216
95	941	6022350.86985	2089118.38384
96	1042	6022348.52738	2089115.22201
97	1011	6022346.33182	2089112.24378
98	990	6022344.17160	2089109.29575
99	995	6022341.97476	2089106.36440
100	963	6022339.54064	2089103.14344
101	942	6022336.84847	2089099.64867
102	948	6022334.27702	2089096.31652
103	942	6022331.61429	2089093.03929
104	935	6022330.55055	2089088.81487
105	955	6022330.27818	2089084.66915
106	957	6022332.10595	2089080.72504
107	945	6022334.06767	2089078.26808
108	951	6022337.09848	2089076.03283
109	971	6022333.79738	2089078.86915
110	941	6022329.96896	2089081.60640
111	912	6022325.32701	2089083.80386
112	915	6022322.79494	2089084.31339
113	941	6022323.56651	2089084.79902
114	936	6022327.00667	2089082.40964

Sample ID	Gamma Total cps	Easting	Northing
115	944	6022330.34639	2089080.06495
116	907	6022333.56227	2089077.73196
117	1033	6022336.54607	2089075.59094
118	944	6022339.52961	2089073.48332
119	1045	6022342.59325	2089071.14517
120	954	6022345.71090	2089068.76201
121	*1011*	*6022348.87898*	*2089066.32919*
122	1027	6022352.08627	2089063.89385
123	1035	6022355.29827	2089061.49019
124	1021	6022358.32056	2089059.02419
125	1040	6022361.17431	2089056.73995
126	937	6022363.91698	2089054.71139
127	960	6022366.70578	2089052.64234
128	964	6022369.49940	2089050.54029
129	979	6022372.44902	2089048.56527
130	1015	6022375.44103	2089046.53584
131	1003	6022378.44721	2089044.41099
132	1003	6022381.54451	2089042.13519
133	933	6022384.53766	2089039.73901
134	935	6022387.82163	2089038.46476
135	972	6022391.13358	2089037.58598
136	970	6022394.58445	2089038.11127
137	964	6022397.82946	2089040.07311
138	975	6022400.73665	2089042.97319
139	1017	6022403.22120	2089046.34794
140	974	6022405.57344	2089049.56308
141	972	6022407.77237	2089052.63388
142	954	6022409.90177	2089055.49785
143	951	6022412.06373	2089058.30547
144	931	6022414.21110	2089061.22211
145	940	6022416.30241	2089064.01800
146	1017	6022418.39704	2089066.64766
147	975	6022420.50404	2089069.33055
148	954	6022422.59843	2089072.03097
149	1048	6022424.68993	2089074.70893
150	955	6022426.90310	2089077.54586
151	931	6022429.23459	2089080.54438
152	955	6022431.53359	2089083.55316
153	1012	6022433.80580	2089086.57015
154	1027	6022436.07815	2089089.54040
155	1021	6022438.34784	2089092.50073
156	1015	6022440.62185	2089095.44577
157	1009	6022442.78904	2089098.15780
158	1018	6022444.97516	2089100.79989
159	1034	6022447.11387	2089103.52427
160	1018	6022449.09696	2089106.10638
161	1018	6022450.82286	2089108.62081
162	1046	6022452.00866	2089111.38292
163	1024	6022452.90030	2089114.39338
164	1043	6022452.05940	2089117.42908
165	1038	6022450.73086	2089120.54446
166	1030	6022448.05168	2089123.23794
167	1014	6022445.10854	2089125.81001
168	1044	6022442.01242	2089128.26542
169	1015	6022438.81841	2089130.69973
170	1043	6022435.67413	2089133.11588
171	1021	6022432.59906	2089135.53900

Sample ID	Gamma Total cps	Easting	Northing
172	1019	6022429.38042	2089137.28356
173	1019	6022425.99194	2089138.78720
174	999	6022422.51034	2089138.10674
175	977	6022419.25061	2089137.07733
176	955	6022416.68548	2089134.75519
177	957	6022414.27107	2089132.19575
178	931	6022411.99296	2089129.46100
179	946	6022409.68102	2089126.63333
180	941	6022407.42542	2089123.85934
181	957	6022405.24551	2089121.12343
182	940	6022402.99562	2089118.25369
183	932	6022400.73261	2089115.33879
184	926	6022398.46691	2089112.33873
185	1012	6022396.17614	2089109.29904
186	1024	6022393.86681	2089106.21487
187	1025	6022391.56404	2089103.16715
188	1019	6022389.25054	2089100.11524
189	1021	6022386.82389	2089097.04767
190	1016	6022384.55363	2089094.18205
191	985	6022382.43406	2089091.52293
192	1012	6022380.33853	2089088.93360
193	1017	6022378.22228	2089086.34607
194	998	6022375.99325	2089083.68670
195	1049	6022373.74490	2089081.00049
196	1013	6022371.48194	2089078.28352
197	1010	6022369.19695	2089075.50435
198	1016	6022366.91068	2089072.71820
199	1017	6022364.76029	2089069.86728
200	1023	6022362.93347	2089066.96079
201	974	6022362.17754	2089063.65112
202	1021	6022362.66222	2089060.11425
203	955	6022364.00572	2089056.48976
204	951	6022366.87512	2089053.74275
205	994	6022369.96393	2089050.97373
206	1001	6022373.41907	2089048.35498
207	1016	6022376.83288	2089045.78749
208	1017	6022380.24422	2089043.20192
209	971	6022384.00579	2089040.95801
210	956	6022387.64598	2089039.35192
211	941	6022391.44235	2089039.43604
212	954	6022394.73608	2089040.88422
213	975	6022397.72196	2089043.30278
214	1007	6022400.08610	2089046.45397
215	941	6022402.31435	2089049.49899
216	1033	6022404.31854	2089052.50029
217	919	6022406.19314	2089055.23770
218	919	6022408.07485	2089057.93262
219	930	6022410.07431	2089060.70985
220	954	6022412.35826	2089063.82191
221	932	6022414.97451	2089067.23326
222	925	6022417.24033	2089070.19549
223	954	6022419.48429	2089073.13375
224	1011	6022421.96229	2089076.40672
225	943	6022424.34912	2089079.54163
226	945	6022426.66318	2089082.52439
227	943	6022429.00515	2089085.56022
228	921	6022431.32591	2089088.58910

Sample ID	Gamma Total cps	Easting	Northing
229	1024	6022433.59661	2089091.46498
230	1030	6022435.84816	2089094.34557
231	1035	6022438.04724	2089097.25657
232	1039	6022440.20539	2089100.05272
233	1041	6022442.41147	2089102.86619
234	1039	6022444.85199	2089105.91564
235	1037	6022446.98244	2089108.68710
236	1034	6022448.60651	2089111.31890
237	1031	6022449.56873	2089114.04858
238	1027	6022450.12449	2089117.12770
239	1024	6022448.60129	2089120.54992
240	1024	6022446.83119	2089123.76594
241	1023	6022444.21941	2089126.36605
242	1023	6022441.01201	2089129.06721
243	1027	6022437.60475	2089131.65340
244	1030	6022434.29370	2089134.13465
245	1033	6022430.94731	2089136.57477
246	1036	6022427.50888	2089138.89400
247	1039	6022423.81423	2089140.03957
248	1037	6022419.85200	2089140.62553
249	1036	6022416.74198	2089138.57975
250	1035	6022413.90571	2089136.44731
251	1033	6022411.75171	2089133.77793
252	1031	6022409.36229	2089130.81943
253	1031	6022406.93875	2089127.83572
254	1032	6022404.70267	2089124.91850
255	1032	6022402.62010	2089122.18963
256	1032	6022400.70972	2089119.63496
257	1033	6022398.67182	2089116.84871
258	1034	6022396.67281	2089114.02690
259	1034	6022394.65671	2089111.51409
260	1035	6022392.58083	2089108.92178
261	1037	6022390.45179	2089106.24465
262	1037	6022388.17277	2089103.35386
263	1036	6022385.90131	2089100.45213
264	1036	6022383.76902	2089097.74765
265	1037	6022381.57304	2089094.97863
266	1037	6022379.29465	2089092.16000
267	1037	6022376.84702	2089089.09314
268	1039	6022374.35048	2089085.94158
269	1041	6022371.76984	2089082.62235
270	*1039*	*6022369.24613*	*2089079.31653*
271	1034	6022366.83324	2089075.98367
272	1026	6022364.62953	2089072.93607
273	1024	6022362.37351	2089070.04034
274	1024	6022361.36775	2089066.76353
275	1024	6022360.79355	2089063.35790
276	1025	6022361.73019	2089059.80171
277	1026	6022363.70799	2089056.56816
278	1025	6022366.40145	2089053.61156
279	1021	6022369.71260	2089050.97741
280	1019	6022372.93963	2089048.44537
281	1018	6022376.11564	2089046.05822
282	1014	6022379.41281	2089043.57146
283	1012	6022382.53685	2089041.07160
284	1011	6022385.39349	2089039.83620
285	1012	6022388.39028	2089038.88191

Sample ID	Gamma Total cps	Easting	Northing
286	[illegible]	6022391.68247	2089039.15038
287	[illegible]	6022394.63912	2089040.44677
288	[illegible]	6022397.34814	2089042.55021
289	[illegible]	6022399.46547	2089045.36208
290	[illegible]	6022401.41978	2089047.99185
291	[illegible]	6022403.14896	2089050.48441
292	[illegible]	6022405.14227	2089053.38185
293	[illegible]	6022407.12325	2089056.28150
294	[illegible]	6022408.82449	2089058.75562
295	[illegible]	6022410.59901	2089061.31113
296	[illegible]	6022412.48355	2089063.92213
297	[illegible]	6022414.37217	2089066.49412
298	[illegible]	6022416.27201	2089069.03757
299	[illegible]	6022418.12635	2089071.54902
300	[illegible]	6022420.04416	2089074.12009
301	[illegible]	6022422.06256	2089076.72267
302	[illegible]	6022424.16456	2089079.42459
303	[illegible]	6022426.29822	2089082.16391
304	[illegible]	6022428.52073	2089084.97972
305	[illegible]	6022430.67701	2089087.71457
306	[illegible]	6022432.76305	2089090.37164
307	[illegible]	6022434.80329	2089093.01630
308	[illegible]	6022436.81979	2089095.67471
309	[illegible]	6022438.86755	2089098.33408
310	[illegible]	6022440.89073	2089100.99320
311	[illegible]	6022442.84442	2089103.68568
312	[illegible]	6022444.97445	2089106.51819
313	[illegible]	6022447.25141	2089109.27423
314	[illegible]	6022448.49702	2089112.43666
315	[illegible]	6022449.38710	2089115.59304
316	[illegible]	6022448.92338	2089118.86084
317	[illegible]	6022447.51435	2089122.04035
318	[illegible]	6022445.41260	2089125.08834
319	[illegible]	6022442.41346	2089127.71306
320	[illegible]	6022439.28671	2089130.32306
321	[illegible]	6022435.92568	2089132.78519
322	[illegible]	6022432.63449	2089135.26097
323	[illegible]	6022429.36154	2089137.77678
324	[illegible]	6022425.94738	2089140.26184
325	[illegible]	6022422.66469	2089142.22123
326	[illegible]	6022419.16630	2089142.83816
327	[illegible]	6022415.77444	2089142.33023
328	[illegible]	6022412.35154	2089141.08882
329	[illegible]	6022410.22173	2089138.19405
330	[illegible]	*6022408.10544*	*2089135.29411*
331	[illegible]	6022406.03023	2089132.36908
332	[illegible]	6022404.11812	2089129.67053
333	[illegible]	6022402.22534	2089126.97469
334	[illegible]	6022400.11293	2089124.17780
335	[illegible]	6022397.91794	2089121.35888
336	[illegible]	6022395.54395	2089118.59562
337	[illegible]	6022393.27944	2089115.82669
338	[illegible]	6022391.09658	2089113.04891
339	[illegible]	6022389.01139	2089110.39781
340	[illegible]	6022386.87851	2089107.68162
341	[illegible]	6022384.70337	2089104.89609
342	[illegible]	6022382.68007	2089102.25890

Sample ID	Gamma Total cps	Easting	Northing
343	1027	6022380.67005	2089099.59983
344	1032	6022378.51967	2089096.72551
345	1033	6022376.38639	2089093.89286
346	1024	6022374.24719	2089091.11939
347	1017	6022372.08340	2089088.31318
348	970	6022369.91762	2089085.51701
349	988	6022367.85922	2089082.73373
350	973	6022365.73839	2089079.87614
351	1014	6022363.54387	2089076.95263
352	1037	6022361.38269	2089074.02363
353	999	6022359.14075	2089071.22781
354	1038	6022358.33213	2089068.22662
355	1019	6022357.83883	2089065.11402
356	1051	6022358.65560	2089061.88226
357	1018	6022360.58283	2089058.79438
358	1003	6022363.22880	2089056.02353
359	995	6022366.06322	2089053.60255
360	1014	6022368.99748	2089051.17142
361	1006	6022372.10478	2089048.82118
362	1005	6022375.31810	2089046.41085
363	1006	6022378.54617	2089043.97830
364	970	6022381.93534	2089041.77484
365	958	6022385.18033	2089040.04022
366	951	6022388.58225	2089039.58865
367	963	6022391.80904	2089040.17654
368	966	6022395.08346	2089041.49725
369	967	6022397.03072	2089044.66584
370	972	6022399.11570	2089048.08078
371	1024	6022401.32146	2089051.75236
372	985	6022402.89353	2089054.12825
373	1007	6022404.77016	2089056.60538
374	1002	6022400.85757	2089052.05339
375	987	6022396.90229	2089047.29793
376	969	6022392.97366	2089042.28210
377	994	6022391.99434	2089041.00598
378	980	6022390.79812	2089039.58111
379	*944*	*6022393.29194*	*2089042.61826*
380	957	6022395.64121	2089045.55459
381	962	6022397.75437	2089048.46088
382	982	6022399.85505	2089051.31434
383	1002	6022401.98011	2089054.16294
384	963	6022404.11858	2089057.12885
385	990	6022406.23033	2089060.03636
386	996	6022408.34078	2089062.86687
387	1009	6022410.48299	2089065.75470
388	996	6022412.66094	2089068.68824
389	998	6022414.88699	2089071.86364
390	984	6022417.12855	2089075.03587
391	1005	6022419.40982	2089078.18767
392	998	6022421.84236	2089081.53522
393	1011	6022424.27218	2089084.88035
394	1045	6022426.60377	2089087.96795
395	1022	6022428.94122	2089091.09745
396	998	6022431.25156	2089094.29321
397	927	6022433.52771	2089097.56288
398	*1020*	*6022435.72923*	*2089100.81194*
399	1053	6022437.74423	2089103.77732

Sample ID	Gamma Total cps	Easting	Northing
400	1034	6022439.90764	2089106.93724
401	1075	6022442.24013	2089110.27746
402	1103	6022444.11806	2089113.86009
403	1064	6022445.86173	2089117.54564
404	1065	6022445.22381	2089121.26500
405	1078	6022443.78423	2089125.14619
406	1068	6022440.55236	2089128.70643
407	1098	6022437.38474	2089131.72021
408	1082	6022434.09098	2089134.56766
409	1103	6022430.40281	2089137.39628
410	1043	6022426.67875	2089140.12218
411	1019	6022422.82907	2089142.61829
412	1034	6022419.33392	2089143.73040
413	912	6022415.63964	2089144.22941
414	904	6022412.39272	2089142.22066
415	989	6022409.33431	2089140.03474
416	1022	6022406.82107	2089137.24458
417	969	6022404.20424	2089134.05712
418	967	6022401.69612	2089130.81169
419	928	6022399.48769	2089127.96348
420	848	6022397.35671	2089125.18413
421	920	6022395.34495	2089122.44215
422	978	6022393.32235	2089119.79672
423	974	6022391.24451	2089117.19299
424	984	6022389.20727	2089114.46699
425	997	6022387.09079	2089111.65957
426	1013	6022384.86726	2089108.79191
427	1034	6022382.68893	2089105.98039
428	990	6022380.51903	2089103.16895
429	987	6022378.27588	2089100.35692
430	1038	6022376.07783	2089097.57290
431	1007	6022373.96108	2089094.78870
432	1016	6022371.82765	2089092.00345
433	1009	6022369.70998	2089089.25844
434	1030	6022367.73815	2089086.67722
435	1000	6022365.70208	2089084.00007
436	1026	6022363.61671	2089081.21569
437	981	6022361.37990	2089078.19937
438	1014	6022359.09160	2089075.17725
439	1001	6022357.33849	2089071.95444
440	1013	6022355.98461	2089068.48376
441	1017	6022355.95727	2089064.52590
442	1014	6022357.64439	2089060.97049
443	1030	6022360.40364	2089057.77791
444	989	6022363.59915	2089055.31519
445	1004	6022366.91897	2089052.82384
446	999	6022370.41707	2089050.37732
447	1001	6022374.06160	2089047.79049
448	950	6022377.54788	2089045.15430
449	965	6022380.92679	2089044.00930
450	966	6022384.29617	2089043.27402
451	940	6022387.72009	2089043.97578
452	967	6022390.81512	2089045.81863
453	973	6022393.60616	2089048.48576
454	952	6022396.04815	2089051.81406
455	920	6022398.43202	2089055.10319
456	930	6022400.72036	2089058.37992

Sample ID	Gamma Total cps	Easting	Northing
457	927	6022402.97060	2089061.62787
458	904	6022405.15543	2089064.80065
459	941	6022407.08975	2089067.59976
460	977	6022409.01597	2089070.36110
461	1016	6022410.96902	2089073.05998
462	957	6022412.93479	2089075.81805
463	931	6022414.86005	2089078.57848
464	911	6022416.78355	2089081.13714
465	924	6022418.81506	2089083.83126
466	1011	6022420.96441	2089086.65340
467	1044	6022423.12727	2089089.53879
468	1037	6022425.30538	2089092.47076
469	1041	6022427.52874	2089095.58369
470	931	6022429.75232	2089098.65577
471	945	6022432.01851	2089101.65585
472	1049	6022434.13745	2089104.51070
473	1051	6022436.24770	2089107.41233
474	1041	6022438.67682	2089110.53147
475	1070	6022440.90037	2089113.63627
476	1037	6022442.62486	2089116.91603
477	1041	6022443.46427	2089119.58217
478	1046	6022443.92225	2089122.28235
479	1060	6022442.91811	2089124.65320
480	1049	6022441.34916	2089127.47617
481	1055	6022438.63906	2089130.37692
482	1066	6022435.51457	2089133.22826
483	1111	6022432.18764	2089135.98812
484	1047	6022428.57172	2089138.61951
485	1034	6022425.02322	2089141.16165
486	1033	6022421.50988	2089143.56884
487	951	6022418.10244	2089144.97203
488	1049	6022414.51421	2089145.99059
489	925	6022411.14507	2089144.55150
490	921	6022408.00961	2089142.86885
491	945	6022405.56514	2089140.28599
492	1011	6022403.19590	2089137.51266
493	1043	6022400.91861	2089134.63988
494	915	6022398.71632	2089131.73627
495	836	6022396.55865	2089128.88601
496	851	6022394.45241	2089126.08397
497	857	6022392.32718	2089123.28395
498	911	6022390.18444	2089120.48948
499	955	6022388.06132	2089117.65384
500	1010	6022385.97408	2089114.87085
501	1043	6022383.91655	2089112.14514
502	1033	6022381.79299	2089109.30034
503	**1103**	**6022379.64418**	**2089106.38106**
504	1046	6022377.26335	2089103.33866
505	1037	6022374.99892	2089100.43153
506	1043	6022372.86768	2089097.64667
507	1038	6022370.84052	2089094.98305
508	952	6022368.79984	2089092.30330
509	1011	6022366.67599	2089089.35684
510	1040	6022364.56451	2089086.42671
511	1043	6022362.46637	2089083.51221
512	1022	6022360.51724	2089080.78393
513	1032	6022358.61059	2089078.12727

Sample ID	Gamma Total cps	Easting	Northing
514	1042	6022356.91795	2089075.54081
515	1040	6022355.46623	2089073.18211
516	1048	6022354.81295	2089070.79983
517	1062	6022354.65262	2089068.14666
518	1048	6022354.87970	2089065.28583
519	1011	6022356.66838	2089062.90167
520	1053	6022358.63569	2089060.46950
521	1037	6022361.03565	2089058.21681
522	1027	6022363.45523	2089056.12438
523	997	6022365.93951	2089054.10712
524	994	6022368.59399	2089052.17804
525	955	6022371.41765	2089050.11751
526	943	6022374.40128	2089047.91298
527	1010	6022376.95720	2089046.35324
528	921	6022379.50122	2089044.92074
529	939	6022382.41004	2089044.76960
530	942	6022385.45819	2089044.95997
531	930	6022388.42678	2089046.50143
532	941	6022390.73357	2089048.36926
533	941	6022392.67329	2089050.71356
534	964	6022394.61912	2089053.50540
535	942	6022396.53963	2089056.28474
536	974	6022398.40281	2089059.07343
537	941	6022400.10288	2089061.61315
538	973	6022401.79827	2089064.14626
539	976	6022403.65797	2089066.87856
540	947	6022405.49342	2089069.58367
541	929	6022407.29240	2089072.26984
542	942	6022408.98613	2089074.72856
543	937	6022410.71682	2089077.16788
544	935	6022412.60047	2089079.83234
545	935	6022414.53201	2089082.55769
546	955	6022416.52016	2089085.33774
547	1010	6022418.59460	2089088.17092
548	1074	6022420.72531	2089091.01501
549	1031	6022422.86080	2089093.99953
550	1028	6022424.92355	2089096.88518
551	995	6022426.91001	2089099.67448
552	1043	6022428.83730	2089102.34664
553	1053	6022430.77799	2089105.01029
554	1047	6022432.81162	2089107.77223
555	1034	6022434.94164	2089110.64807
556	1040	6022437.18615	2089113.62432
557	1041	6022439.07453	2089116.55999
558	1053	6022440.89040	2089119.36762
559	1037	6022441.17088	2089121.84153
560	1033	6022441.14284	2089124.70968
561	1047	6022439.81025	2089127.82603
562	1101	6022437.42151	2089130.92238
563	1087	6022434.38645	2089133.80006
564	1101	6022430.83275	2089136.61344
565	1048	6022427.18357	2089139.47300
566	1041	6022423.41879	2089142.35288
567	1044	6022420.12514	2089144.51566
568	1037	6022416.93493	2089146.58093
569	1041	6022413.43081	2089146.59582
570	974	6022409.90362	2089146.10509

Sample ID	Gamma Total cps	Easting	Northing
571	997	6022406.66047	2089144.04436
572	973	6022403.89387	2089141.70069
573	995	6022401.41108	2089139.13019
574	1020	6022399.30476	2089136.51642
575	925	6022397.14780	2089133.81701
576	874	6022394.96807	2089131.00993
577	854	6022392.73740	2089128.13915
578	870	6022390.49820	2089125.27716
579	*885*	*6022388.40438*	*2089122.41928*
580	956	6022386.31781	2089119.59020
581	1040	6022384.21521	2089116.80724
582	1068	6022382.00713	2089113.92020
583	1055	6022379.75577	2089111.00371
584	1064	6022377.44276	2089108.00650
585	1066	6022375.25012	2089105.17941
586	1021	6022373.15869	2089102.53741
587	1020	6022370.94849	2089099.70796
588	1018	6022368.67641	2089096.78413
589	979	6022366.29430	2089093.51692
590	979	6022364.00083	2089090.34981
591	1005	6022361.81840	2089087.26670
592	1026	6022359.65780	2089084.25285
593	1031	6022357.49675	2089081.26626
594	987	6022355.35307	2089078.31716
595	1023	6022353.49729	2089075.44979
596	1012	6022352.44695	2089072.39481
597	1020	6022352.25260	2089069.17474
598	1042	6022352.65338	2089065.70259
599	1029	6022355.27294	2089062.84071
600	1034	6022357.92109	2089060.11573
601	1023	6022360.77396	2089057.71113
602	1043	6022363.59207	2089055.43832
603	1002	6022366.45841	2089053.18993
604	1012	6022369.59670	2089050.94168
605	1013	6022372.84082	2089048.75397
606	1002	6022376.30775	2089046.81082
607	1004	6022379.61221	2089046.01921
608	992	6022383.09824	2089045.80475
609	946	6022385.85317	2089047.70859
610	974	6022388.34240	2089049.65767
611	979	6022390.06426	2089052.15326
612	957	6022391.60322	2089054.46515
613	978	6022393.08513	2089056.80411
614	955	6022394.73442	2089059.28419
615	990	6022396.45905	2089061.86327
616	1005	6022398.27957	2089064.52751
617	1010	6022400.02680	2089067.10890
618	1043	6022401.73820	2089069.65572
619	995	6022403.35979	2089072.10145
620	986	6022405.01865	2089074.56365
621	963	6022406.78339	2089076.99469
622	1001	6022408.60964	2089079.54149
623	992	6022410.41081	2089082.11902
624	*935*	*6022412.29624*	*2089084.53398*
625	986	6022414.34379	2089087.20337
626	992	6022416.50006	2089090.16741
627	1030	6022418.59814	2089093.02573

Sample ID	Gamma Total cps	Easting	Northing
628	957	6022420.64696	2089095.80376
629	1016	6022422.51386	2089098.28099
630	1016	6022424.29583	2089100.65292
631	1047	6022425.97651	2089102.93174
632	1042	6022427.95674	2089105.62454
633	1113	6022429.99969	2089108.39514
634	1167	6022431.97390	2089111.20014
635	1184	6022433.98902	2089114.01213
636	**1120**	**6022436.10654**	**2089116.78604**
637	1075	6022437.63775	2089119.41943
638	1147	6022439.00934	2089122.20342
639	1085	6022438.76371	2089125.56888
640	1107	6022437.92280	2089129.06041
641	1032	6022435.41717	2089132.26543
642	1051	6022432.41522	2089135.31251
643	1116	6022429.13212	2089138.21991
644	1119	6022425.43358	2089140.96342
645	1108	6022421.82522	2089143.60718
646	1152	6022418.28135	2089146.11574
647	1035	6022414.99169	2089147.73967
648	1047	6022411.63428	2089149.09283
649	1061	6022408.29172	2089148.35852
650	977	6022405.06584	2089147.16835
651	952	6022402.50938	2089144.53096
652	1051	6022400.23742	2089141.91345
653	976	6022398.10700	2089139.23561
654	910	6022396.10144	2089136.51471
655	944	6022394.12362	2089133.85908
656	971	6022392.13308	2089131.29934
657	975	6022389.99765	2089128.54519
658	916	6022387.82429	2089125.73724
659	916	6022385.60600	2089122.85487
660	1053	6022383.33809	2089119.90556
661	1033	6022381.02308	2089116.88733
662	1027	6022378.55130	2089113.62655
663	1051	6022376.09800	2089110.36931
664	1045	6022373.88315	2089107.38096
665	1033	6022371.71094	2089104.44665
666	1022	6022369.58546	2089101.56335
667	1014	6022367.64131	2089098.85523
668	1013	6022365.75689	2089096.14385
669	955	6022363.72807	2089093.42980
670	935	6022361.70373	2089090.70786
671	1017	6022359.70230	2089087.96442
672	1039	6022357.57109	2089085.02993
673	1016	6022355.37127	2089082.01463
674	944	6022353.15759	2089078.64933
675	1033	6022351.43017	2089075.52327
676	1047	6022351.02104	2089072.32839
677	978	6022351.61932	2089069.05289
678	1037	6022352.99312	2089065.70667
679	1032	6022355.88688	2089062.88755
680	1017	6022358.80810	2089060.15881
681	1041	6022361.86753	2089057.64416
682	1017	6022364.91790	2089055.23640
683	954	6022367.99437	2089052.85136
684	1015	6022371.32538	2089050.65284

Sample ID	Gamma Total cps	Easting	Northing
685	1031	6022374.65087	2089048.89194
686	904	6022378.27690	2089048.37588
687	999	6022381.68377	2089049.18295
688	924	6022385.00918	2089050.86084
689	954	6022387.00975	2089053.82676
690	94	6022389.09699	2089056.92796
691	951	6022391.26450	2089060.16877
692	1027	6022393.36840	2089063.27211
693	1047	6022395.47229	2089066.34313
694	1030	6022397.58435	2089069.42752
695	1031	6022399.76546	2089072.57029
696	1017	6022402.05535	2089075.74350
697	1040	6022404.32968	2089078.88373
698	1037	6022406.58371	2089081.97784
699	1035	6022408.66452	2089084.93683
700	924	6022410.83380	2089088.00892
701	972	6022413.10370	2089091.18549
702	1017	6022415.29691	2089094.17932
703	1017	6022417.47796	2089097.09741
704	955	6022419.56186	2089099.90234
705	1048	6022421.65730	2089102.71733
706	945	6022423.77092	2089105.53745
707	1072	6022425.88421	2089108.35901
708	1052	6022428.00964	2089111.19252
709	1075	6022430.15566	2089114.11427
710	1070	6022432.24406	2089116.97008
711	1047	6022434.25894	2089119.77153
712	1025	6022435.62324	2089122.38809
713	1048	6022436.74782	2089125.08125
714	945	6022436.51781	2089127.82509
715	1017	6022435.80738	2089130.87615
716	1061	6022433.61469	2089133.85872
717	1064	6022430.50626	2089136.99423
718	1033	6022427.01406	2089139.99289
719	1025	6022423.30393	2089142.82012
720	1011	6022419.73841	2089145.56194
721	1058	6022416.33761	2089148.24432
722	1033	6022412.71351	2089150.07598
723	1021	6022408.85557	2089151.58090
724	941	6022405.00044	2089150.28958
725	1017	6022401.49388	2089148.54254
726	1002	6022398.95590	2089145.44135
727	1004	6022396.54849	2089142.27296
728	955	6022394.25438	2089139.09432
729	951	6022392.15790	2089136.11758
730	924	6022390.03280	2089133.11779
731	940	6022387.86045	2089130.10826
732	942	6022385.60171	2089126.92498
733	972	6022383.34659	2089123.69074
734	1025	6022380.98101	2089120.53028
735	1019	6022378.53538	2089117.27137
736	1046	6022376.00253	2089113.91940
737	1047	6022373.50027	2089110.63789
738	1043	6022371.02111	2089107.41305
739	1041	6022368.71240	2089104.33613
740	1019	6022366.36399	2089101.15526
741	971	6022364.02249	2089097.83650

Sample ID	Gamma Total cps	Easting	Northing
742	931	6022361.68369	2089094.56936
743	1014	6022359.35489	2089091.35245
744	1014	6022357.15541	2089088.27639
745	978	6022354.92122	2089085.23895
746	1041	6022352.56357	2089082.30746
747	976	6022350.69864	2089079.26915
748	1021	6022348.96206	2089076.10550
749	1034	6022349.23080	2089072.58117
750	1023	6022350.01984	2089069.08038
751	1041	6022352.37685	2089066.00335
752	1044	6022355.12454	2089063.11211
753	1017	6022358.08217	2089060.39502
754	1052	6022361.16164	2089057.93002
755	1031	6022364.39416	2089055.37452
756	1029	6022367.80579	2089052.76181
757	1041	6022371.13978	2089051.13709
758	1014	6022374.64232	2089049.88172
759	943	6022378.12186	2089050.85255
760	1004	6022381.34587	2089052.17399
761	957	6022383.76473	2089054.75312
762	910	6022385.78928	2089057.18437
763	876	6022387.63185	2089059.64717
764	919	6022389.30476	2089062.10429
765	946	6022390.99608	2089064.58954
766	975	6022392.70389	2089067.10424
767	1017	6022394.57188	2089069.84675
768	1014	6022396.45193	2089072.59596
769	1017	6022398.19379	2089075.17682
770	1047	6022399.94843	2089077.75178
771	1015	6022401.75496	2089080.29375
772	1017	6022403.64328	2089082.93482
773	1064	6022405.56294	2089085.59884
774	1044	6022407.48625	2089088.32927
775	1004	6022409.41854	2089091.02785
776	976	6022411.42116	2089093.64957
777	954	6022413.27224	2089096.16336
778	1025	6022415.07776	2089098.72654
779	987	6022417.11481	2089101.41829
780	1024	6022419.22363	2089104.20325
781	1016	6022421.40612	2089107.07996
782	1051	6022423.53946	2089109.92586
783	1041	6022425.63217	2089112.73718
784	1014	6022427.57063	2089115.40571
785	1017	6022429.49623	2089118.06554
786	1047	6022431.39595	2089120.72603
787	1022	6022432.87357	2089123.51936
788	1015	6022434.21336	2089126.49534
789	1015	6022433.79523	2089129.87881
790	1016	6022432.79809	2089133.35955
791	1050	6022430.21316	2089136.50455
792	1017	6022427.17272	2089139.51855
793	1014	6022423.93112	2089142.36763
794	1047	6022420.60180	2089144.91168
795	1015	6022417.27026	2089147.41658
796	1015	6022413.90155	2089149.83516
797	1050	6022410.79404	2089151.37729
798	1017	6022407.56025	2089152.65264

Sample ID	Gamma Total cps	Easting	Northing
799	998	6022404.17451	2089151.73588
800	992	6022400.90494	2089150.42484
801	1033	6022398.22491	2089147.87763
802	987	6022395.94072	2089145.40013
803	1011	6022393.78654	2089142.80004
804	994	6022391.62365	2089139.80579
805	940	6022389.48384	2089136.84658
806	940	6022387.36363	2089133.92493
807	939	6022385.40145	2089131.19812
808	956	6022383.46934	2089128.49037
809	942	6022381.47775	2089125.72033
810	959	6022379.46655	2089122.91379
811	1031	6022377.44706	2089120.06267
812	1026	6022375.45623	2089117.30719
813	1015	6022373.43701	2089114.56963
814	1034	6022371.40486	2089111.71208
815	1060	6022369.36197	2089108.83424
816	1075	6022367.31446	2089105.93179
817	995	6022365.21442	2089102.95565
818	968	6022363.10020	2089099.96522
819	958	6022361.00774	2089096.94894
820	951	6022358.99084	2089094.01954
821	1007	6022357.07722	2089091.15812
822	1036	6022355.06869	2089088.19437
823	1003	6022353.06340	2089085.23754
824	1045	6022351.04180	2089082.51030
825	1033	6022349.24016	2089079.85133
826	1025	6022348.09110	2089077.01777
827	991	6022347.67125	2089073.83887
828	1026	6022347.72310	2089070.37788
829	1046	6022350.01715	2089067.60135
830	1065	6022352.43603	2089064.92869
831	1054	6022355.25199	2089062.63403
832	1023	6022358.03575	2089060.38884
833	1072	6022360.87532	2089058.10224
834	1082	6022364.13076	2089055.69715
835	1014	6022367.31864	2089053.66339
836	1019	6022370.73036	2089052.57013
837	991	6022374.02711	2089052.48543
838	996	6022377.44980	2089053.01575
839	980	6022379.85221	2089055.45797
840	939	6022382.15812	2089057.95520
841	912	6022384.13865	2089060.70062
842	907	6022385.98215	2089063.31508
843	928	6022387.79754	2089065.94435
844	943	6022389.70068	2089068.71409
845	*1043*	*6022391.54143*	*2089071.37909*
846	1024	6022393.34198	2089073.92390
847	1022	6022394.97422	2089076.24783
848	1045	6022396.57138	2089078.55372
849	996	6022398.26850	2089080.91472
850	1040	6022399.98297	2089083.31266
851	1007	6022401.69121	2089085.76422
852	1059	6022403.47628	2089088.27916
853	994	6022405.28614	2089090.78653
854	1019	6022407.06539	2089093.24782
855	1017	6022408.86249	2089095.72916

Sample ID	Gamma Total cps	Easting	Northing
856	980	6022410.68520	2089098.22493
857	990	6022412.52626	2089100.73304
858	1023	6022414.38440	2089103.26609
859	1040	6022416.37399	2089105.86259
860	1083	6022418.39101	2089108.51301
861	**1111**	**6022420.41108**	**2089111.23576**
862	1105	6022422.25553	2089113.78764
863	1094	6022424.04330	2089116.33602
864	1106	6022425.90721	2089118.90527
865	1086	6022427.73736	2089121.48939
866	1097	6022429.43517	2089124.15543
867	*1088*	*6022430.56425*	*2089126.52564*
868	1092	6022431.50310	2089129.03799
869	1096	6022431.03785	2089132.02847
870	1062	6022429.92966	2089135.40235
871	1132	6022427.25165	2089138.75193
872	1124	6022424.42010	2089141.65611
873	1137	6022421.39236	2089144.38175
874	1100	6022417.95751	2089146.97710
875	1120	6022414.56368	2089149.49141
876	1050	6022411.16832	2089151.86617
877	1076	6022407.52627	2089153.31597
878	1024	6022403.62305	2089154.36391
879	991	6022400.06604	2089152.61738
880	960	6022396.85833	2089150.60927
881	986	6022394.55816	2089147.65343
882	1045	6022392.29970	2089144.56959
883	1026	6022390.12290	2089141.45848
884	974	6022388.05439	2089138.52918
885	993	6022386.02914	2089135.67266
886	992	6022384.03243	2089132.89941
887	1006	6022382.02175	2089130.20637
888	994	6022379.94165	2089127.52070
889	973	6022377.79858	2089124.58980
890	987	6022375.52531	2089121.50605
891	1008	6022373.09900	2089118.28641
892	985	6022370.88162	2089115.31116
893	1009	6022368.69852	2089112.36617
894	1024	6022366.51709	2089109.30068
895	*967*	*6022364.33006*	*2089106.19933*
896	903	6022362.16562	2089103.04245
897	1009	6022359.97128	2089099.91572
898	992	6022357.75808	2089096.81854
899	1087	6022355.59555	2089093.75814
900	**1094**	**6022353.30008**	**2089090.45785**
901	1074	6022350.91334	2089086.88901
902	1073	6022348.61354	2089083.36772
903	1048	6022346.24668	2089080.00621
904	1016	6022345.80012	2089076.56684
905	1090	6022345.98321	2089072.87718
906	1066	6022347.98045	2089069.15482
907	1132	6022350.66455	2089065.95006
908	1112	6022353.83159	2089063.05343
909	1073	6022357.31927	2089060.14417
910	**1092**	**6022360.77579**	**2089057.37062**
911	1059	6022364.28748	2089054.84414
912	1040	6022367.81590	2089053.65026

Sample ID	Gamma Total cps	Easting	Northing
913	1057	6022371.62362	2089053.08697
914	1003	6022374.85906	2089055.09767
915	969	6022377.77190	2089057.22851
916	947	6022379.87871	2089060.00969
917	932	6022381.80256	2089062.70547
918	935	6022383.62767	2089065.38819
919	907	6022385.29670	2089067.97449
920	1009	6022387.21676	2089070.81817
921	1043	6022389.51431	2089073.83040
922	976	6022391.57503	2089076.61872
923	984	6022393.55716	2089079.35037
924	1011	6022395.35350	2089082.03690
925	1007	6022397.13416	2089084.68901
926	984	6022398.91589	2089087.29541
927	1032	6022400.87663	2089090.13887
928	998	6022402.86286	2089093.01852
929	960	6022404.88535	2089095.77854
930	997	6022406.92284	2089098.55516
931	1031	6022408.98016	2089101.34484
932	1034	6022410.97006	2089104.03922
933	1044	6022412.94172	2089106.70780
934	1092	6022414.89795	2089109.33652
935	1104	6022416.91200	2089112.05251
936	1057	6022418.97194	2089114.86459
937	1093	6022421.07974	2089117.76066
938	1115	6022423.22685	2089120.72747
939	1112	6022425.56512	2089123.93310
940	1095	6022427.53717	2089127.02847
941	1122	6022428.58186	2089130.29841
942	1050	6022428.51554	2089133.71330
943	1079	6022427.65033	2089137.30994
944	1112	6022424.96725	2089140.34491
945	1132	6022422.03609	2089143.38931
946	1115	6022418.65470	2089146.23606
947	1095	6022415.19012	2089148.91132
948	1133	6022411.72730	2089151.47179
949	1027	6022408.32628	2089153.52652
950	1051	6022404.95167	2089155.10091
951	1013	6022401.32182	2089155.26641
952	959	6022398.15824	2089154.28035
953	915	6022395.18486	2089152.42179
954	1004	6022392.93483	2089149.57920
955	1031	6022390.55658	2089146.49634
956	1002	6022388.11969	2089143.12059
957	981	6022385.78384	2089139.85877
958	984	6022383.49786	2089136.64128
959	1026	6022381.27554	2089133.59239
960	987	6022379.18794	2089130.71473
961	1031	6022377.25377	2089127.99483
962	1047	6022375.13150	2089124.99541
963	1042	6022372.98724	2089121.94027
964	959	6022370.79985	2089118.97325
965	971	6022368.66019	2089116.05021
966	1031	6022366.59294	2089113.15326
967	1069	6022364.56269	2089110.23575
968	972	6022362.56628	2089107.28918
969	950	6022360.46432	2089104.38431

Sample ID	Gamma Total cps	Easting	Northing
970	1032	6022358.40103	2089101.52150
971	1040	6022356.39064	2089098.69053
972	1037	6022354.45080	2089095.98514
973	1042	6022352.48282	2089093.25593
974	1043	6022350.28570	2089090.29579
975	1054	6022348.13028	2089087.39533
976	1067	6022346.01238	2089084.55764
977	1081	6022344.50477	2089081.84800
978	1085	6022343.17559	2089079.08998
979	1092	6022343.42017	2089076.34821
980	1095	6022344.01307	2089073.45405
981	1093	6022345.91507	2089070.76024
982	1101	6022348.21878	2089068.31288
983	1112	6022350.87392	2089066.06482
984	1091	6022353.88365	2089063.68162
985	1087	6022357.02451	2089061.15436
986	1075	6022360.26172	2089058.44036
987	1074	6022363.32613	2089056.78182
988	1079	6022366.56604	2089055.50457
989	*1054*	*6022369.88910*	*2089056.29967*
990	998	6022372.97532	2089057.39822
991	974	6022375.29497	2089059.74139
992	941	6022377.64967	2089062.48528
993	944	6022379.91379	2089065.39866
994	948	6022382.06351	2089068.40895
995	953	6022384.22869	2089071.49541
996	952	6022386.35447	2089074.69586
997	936	6022388.57994	2089077.99329
998	945	6022390.80635	2089081.26533
999	927	6022392.94560	2089084.30678
1000	931	6022395.09265	2089087.33449
1001	931	6022397.27389	2089090.32959
1002	934	6022399.49968	2089093.36802
1003	958	6022401.71717	2089096.37985
1004	982	6022403.80972	2089099.24378
1005	1017	6022405.91754	2089102.10277
1006	1019	6022408.07092	2089104.93424
1007	1024	6022410.19026	2089107.73436
1008	*1033*	*6022412.28894*	*2089110.51786*
1009	1061	6022414.33663	2089113.23580
1010	1117	6022416.24200	2089115.76103
1011	1139	6022418.01260	2089118.08782
1012	1157	6022419.78359	2089120.41960
1013	1172	6022421.59394	2089122.80849
1014	1183	6022423.61370	2089125.46810
1015	1193	6022425.39826	2089127.99528
1016	**1180**	**6022426.54019**	**2089130.62839**
1017	1191	6022427.04665	2089133.61258
1018	1191	6022427.06247	2089136.97205
1019	1184	6022424.67446	2089140.24788
1020	1158	6022422.10886	2089143.33254
1021	1141	6022419.00490	2089145.88575
1022	1153	6022415.81356	2089148.31677
1023	1173	6022412.58089	2089150.65140
1024	1192	6022409.43054	2089152.88505
1025	1197	6022406.43728	2089154.78958
1026	1193	6022403.35176	2089155.88476

Sample ID	Gamma Total cps	Easting	Northing
1027	1015	6022400.16247	2089156.09613
1028	1003	6022396.70583	2089155.67091
1029	995	6022393.71112	2089152.96305
1030	923	6022390.97472	2089150.30761
1031	946	6022388.73324	2089147.48276
1032	1021	6022386.59274	2089144.74704
1033	1049	6022384.46485	2089142.02448
1034	971	6022382.45320	2089139.16744
1035	1011	6022380.44519	2089136.32253
1036	1016	6022378.43222	2089133.49586
1037	1002	6022376.41945	2089130.68220
1038	1054	6022374.36290	2089127.81745
1039	1110	6022372.10156	2089124.67403
1040	1072	6022369.82419	2089121.52507
1041	1049	6022367.51465	2089118.38230
1042	**1130**	**6022365.42402**	**2089115.44465**
1043	1061	6022363.39586	2089112.51285
1044	977	6022361.29525	2089109.52314
1045	985	6022359.16613	2089106.48488
1046	1034	6022357.01671	2089103.39234
1047	1044	6022354.90568	2089100.42975
1048	1014	6022352.79099	2089097.52404
1049	1014	6022350.75041	2089094.67941
1050	1047	6022348.72734	2089091.86808
1051	1071	6022346.71043	2089089.09824
1052	1103	6022344.65467	2089086.23670
1053	1038	6022342.48002	2089083.45375
1054	1074	6022341.68865	2089080.27801
1055	1072	6022341.15286	2089077.32781
1056	1061	6022341.80945	2089074.59938
1057	1113	6022343.62913	2089071.64654
1058	1111	6022346.17686	2089068.90626
1059	1131	6022349.13586	2089066.70009
1060	1115	6022352.23777	2089064.40215
1061	1129	6022355.49604	2089062.03069
1062	1124	6022359.03885	2089059.92100
1063	1107	6022362.60925	2089057.85056
1064	1011	6022366.19058	2089058.16523
1065	1036	6022369.51501	2089058.87566
1066	1041	6022372.12553	2089061.07980
1067	94	6022374.45744	2089063.52870
1068	1017	6022376.57440	2089066.17322
1069	914	6022378.53261	2089068.88869
1070	1018	6022380.55202	2089071.70381
1071	1064	6022382.61546	2089074.63084
1072	961	6022384.71503	2089077.63757
1073	919	6022386.81290	2089080.65899
1074	917	6022388.86983	2089083.67112
1075	910	6022390.91045	2089086.62487
1076	980	6022392.97486	2089089.49210
1077	924	6022394.99477	2089092.25051
1078	957	6022397.01347	2089094.95856
1079	921	6022398.93807	2089097.62068
1080	941	6022400.92091	2089100.34009
1081	941	6022402.99128	2089103.09521
1082	956	6022405.17269	2089105.97193
1083	1042	6022407.33566	2089108.79141

Sample ID	Gamma Total cps	Easting	Northing
1084	1043	6022409.17700	2089111.29221
1085	1126	6022411.12688	2089113.92663
1086	1105	6022413.20279	2089116.68164
1087	1127	6022415.17932	2089119.30903
1088	1127	6022417.18073	2089121.97130
1089	1154	6022419.39644	2089124.94265
1090	1186	6022421.56455	2089127.97910
1091	1148	6022423.54488	2089131.17607
1092	1112	6022424.56147	2089134.22785
1093	1107	6022425.10100	2089137.54852
1094	1030	6022423.31677	2089140.80564
1095	1158	6022421.34348	2089143.85929
1096	1100	6022418.68051	2089146.31844
1097	1146	6022415.62216	2089148.79080
1098	1146	6022412.39038	2089151.17678
1099	1115	6022409.07446	2089153.58247
1100	1059	6022405.85699	2089155.76099
1101	1007	6022402.58569	2089157.46624
1102	1065	6022399.32951	2089158.18848
1103	1010	6022395.83839	2089158.39425
1104	946	6022393.03801	2089156.25611
1105	892	6022390.30028	2089153.88474
1106	1018	6022387.97204	2089150.92808
1107	*1068*	*6022385.82773*	*2089148.06455*
1108	1002	6022383.74266	2089145.16964
1109	958	6022381.62409	2089142.13718
1110	942	6022379.46766	2089139.04656
1111	1006	6022377.27728	2089135.89504
1112	1109	6022375.14742	2089132.83521
1113	1076	6022373.04692	2089129.80699
1114	1080	6022370.93881	2089126.91211
1115	1100	6022368.82799	2089123.97996
1116	982	6022366.75233	2089120.98367
1117	1098	6022364.69478	2089118.05117
1118	1097	6022362.62810	2089115.13575
1119	1014	6022360.55203	2089112.20381
1120	977	6022358.43167	2089109.20865
1121	998	6022356.26773	2089106.14978
1122	1034	6022354.17062	2089103.19437
1123	**1092**	**6022352.06521**	**2089100.24640**
1124	1045	6022349.95686	2089097.15850
1125	1027	6022347.81001	2089094.07559
1126	*1060*	*6022345.56314*	*2089091.04143*
1127	1043	6022343.29368	2089087.92584
1128	1019	6022340.92080	2089084.87309
1129	1069	6022340.07446	2089081.31026
1130	1078	6022339.75007	2089077.79119
1131	1070	6022341.16282	2089074.41521
1132	1096	6022343.39872	2089071.39961
1133	1100	6022346.13529	2089068.73973
1134	1089	6022348.92093	2089066.54458
1135	1160	6022351.79082	2089064.29675
1136	1118	6022354.75966	2089062.01511
1137	1084	6022357.81091	2089060.24294
1138	1049	6022360.97999	2089058.59544
1139	1046	6022364.40570	2089059.04838
1140	997	6022367.73675	2089060.01234

Sample ID	Gamma Total cps	Easting	Northing
1141	977	6022370.45041	2089062.58356
1142	990	6022372.81656	2089065.53739
1143	975	6022374.90038	2089068.76889
1144	1006	6022377.15611	2089072.00380
1145	984	6022379.40026	2089075.24925
1146	965	6022381.60732	2089078.52272
1147	936	6022383.89262	2089081.81087
1148	961	6022386.23941	2089085.11775
1149	971	6022388.70045	2089088.58299
1150	956	6022391.13990	2089091.97455
1151	950	6022393.59511	2089095.26525
1152	905	6022396.06459	2089098.63685
1153	870	6022398.51522	2089102.02579
1154	944	6022400.94138	2089105.35895
1155	954	6022403.33526	2089108.63481
1156	1055	6022405.70881	2089111.84458
1157	1091	6022407.98291	2089114.86878
1158	1086	6022410.24780	2089117.84080
1159	1159	6022412.48850	2089120.79587
1160	1181	6022414.84478	2089123.92382
1161	1133	6022417.29852	2089127.23822
1162	1140	6022419.46021	2089130.42185
1163	1112	6022421.64207	2089133.51130
1164	1106	6022421.96826	2089136.91150
1165	1092	6022421.72903	2089140.43673
1166	1117	6022419.73911	2089143.82480
1167	1149	6022417.14431	2089146.81365
1168	1159	6022414.15177	2089149.51322
1169	1092	6022410.93054	2089152.01323
1170	1062	6022407.53168	2089154.59661
1171	1045	6022403.91442	2089157.20891
1172	1031	6022400.06150	2089158.88973
1173	1030	6022395.96510	2089160.20342
1174	903	6022392.20224	2089158.33970
1175	870	6022388.81099	2089156.17209
1176	970	6022386.33939	2089153.02618
1177	1025	6022384.09626	2089149.92081
1178	1000	6022381.94106	2089146.72096
1179	986	6022379.51403	2089143.35626
1180	1031	6022377.11893	2089139.97131
1181	1053	6022374.81183	2089136.52712
1182	1056	6022372.41079	2089133.01520
1183	**1111**	**6022369.97424**	**2089129.49785**
1184	1022	6022367.52877	2089125.97023
1185	1067	6022365.14030	2089122.54024
1186	1035	6022362.79535	2089119.21730
1187	996	6022360.35377	2089115.76599
1188	1015	6022357.85834	2089112.24078
1189	1005	6022355.15548	2089108.49948
1190	1032	6022352.49934	2089104.82438
1191	1078	6022349.88881	2089101.21629
1192	1043	6022347.39442	2089097.79580
1193	1040	6022344.91751	2089094.41943
1194	1080	6022342.45959	2089091.04138
1195	1076	6022340.13941	2089087.63729
1196	1020	6022338.15718	2089084.07920
1197	1062	6022337.45212	2089080.39462

Sample ID	Gamma Total cps	Easting	Northing
1198	1077	6022337.41028	2089076.46843
1199	**1149**	**6022339.87168**	**2089073.65760**
1200	1198	6022342.78432	2089070.78735
1201	1107	6022346.46349	2089068.20902
1202	1101	6022350.28517	2089065.61968
1203	1109	6022354.04995	2089063.04919
1204	1047	6022357.85382	2089061.50146
1205	1103	6022361.55890	2089060.57296
1206	1049	6022365.25479	2089061.47049
1207	971	6022368.25627	2089063.52537
1208	1029	6022370.84305	2089066.50296
1209	1113	6022373.25540	2089070.35233
1210	1047	6022375.60065	2089074.11721
1211	952	6022377.86181	2089077.80814
1212	964	6022380.21801	2089081.47207
1213	937	6022382.57900	2089085.04772
1214	915	6022384.81308	2089088.23903
1215	970	6022387.12423	2089091.53694
1216	*904*	*6022389.51537*	*2089094.93938*
1217	911	6022391.96242	2089098.33596
1218	934	6022394.44005	2089101.72040
1219	939	6022396.93763	2089105.10495
1220	1047	6022399.45131	2089108.48269
1221	1063	6022402.00492	2089111.83577
1222	1113	6022404.59980	2089115.22269
1223	1148	6022407.20789	2089118.61538
1224	1173	6022409.83793	2089122.00518
1225	**1205**	**6022412.43108**	**2089125.37127**
1226	1157	6022414.96694	2089128.72925
1227	1161	6022417.24313	2089132.35112
1228	1110	6022419.47778	2089136.05692
1229	1141	6022419.18546	2089140.18871
1230	**1170**	**6022418.10617**	**2089144.23871**
1231	1152	6022415.09331	2089147.73427
1232	1157	6022411.63089	2089150.95291
1233	1149	6022407.95675	2089153.96027
1234	1142	6022404.25431	2089156.75029
1235	1034	6022400.78213	2089159.11389
1236	1008	6022397.31750	2089160.67489
1237	1004	6022393.93277	2089161.09811
1238	941	6022390.31660	2089160.85316
1239	911	6022387.59066	2089158.16756
1240	956	6022384.85166	2089155.22208
1241	1010	6022382.33099	2089151.81584
1242	1004	6022379.99913	2089148.44245
1243	980	6022377.77209	2089145.04706
1244	922	6022375.50849	2089141.76590
1245	940	6022373.30373	2089138.52092
1246	1032	6022371.20607	2089135.27985
1247	1067	6022368.93640	2089131.96470
1248	1087	6022366.57331	2089128.63806
1249	1043	6022364.10313	2089125.20137
1250	1027	6022361.67652	2089121.82772
1251	1004	6022359.29134	2089118.51863
1252	1013	6022356.82682	2089115.10921
1253	1008	6022354.35843	2089111.70510
1254	972	6022352.00016	2089108.39184

Sample ID	Gamma Total cps	Easting	Northing
1255	1067	6022349.73275	2089105.21985
1256	1054	6022347.54185	2089102.19946
1257	1052	6022345.42350	2089099.21158
1258	1062	6022343.31438	2089096.19179
1259	1078	6022341.15951	2089092.99556
1260	1095	6022339.02714	2089089.71171
1261	1097	6022337.02962	2089086.26986
1262	1087	6022336.07311	2089083.11252
1263	1073	6022335.57056	2089079.83688
1264	1061	6022337.01455	2089077.15771
1265	1061	6022338.66508	2089074.49145
1266	1075	6022340.98241	2089072.18122
1267	1117	6022343.50200	2089070.04505
1268	1122	6022346.18034	2089068.04043
1269	1142	6022349.10637	2089066.18787
1270	1135	6022352.26336	2089064.19082
1271	1114	6022355.65283	2089062.05164
1272	1063	6022359.08980	2089060.88157
1273	1073	6022362.69788	2089060.12762
1274	1074	6022365.69526	2089061.62571
1275	1103	6022368.69946	2089063.56113
1276	1125	6022371.21329	2089066.56325
1277	1061	6022373.67721	2089069.88280
1278	1042	6022376.02068	2089073.30641
1279	937	6022378.26408	2089076.58980
1280	1107	6022380.44535	2089079.78377
1281	993	6022382.56298	2089082.88939
1282	1031	6022384.50829	2089085.72426
1283	944	6022386.45470	2089088.55396
1284	964	6022388.62030	2089091.59914
1285	951	6022390.84480	2089094.68653
1286	927	6022393.16748	2089097.78746
1287	935	6022395.47198	2089100.82775
1288	941	6022397.76889	2089103.84082
1289	956	6022400.07247	2089106.75699
1290	1014	6022402.47989	2089109.82357
1291	1075	6022404.97392	2089113.05401
1292	1113	6022407.67823	2089116.46736
1293	1152	6022410.43946	2089119.89291
1294	1159	6022413.13009	2089123.31124
1295	1154	6022415.80511	2089126.74099
1296	1174	6022418.43921	2089130.20172
1297	1184	6022420.22092	2089133.73403
1298	1174	6022421.69375	2089137.49065
1299	1146	6022420.45563	2089141.46435
1300	1133	6022418.56279	2089145.33134
1301	1137	6022415.17941	2089148.57419
1302	1162	6022411.75094	2089151.49095
1303	1193	6022408.23669	2089154.25892
1304	1085	6022404.68870	2089157.00823
1305	1017	6022400.96476	2089159.60554
1306	992	6022396.88066	2089161.76523
1307	1018	6022393.18281	2089162.27682
1308	975	6022389.27935	2089161.86658
1309	832	6022386.10341	2089158.91983
1310	911	6022383.05603	2089155.84682
1311	971	6022380.35703	2089152.44414

Sample ID	Gamma Total cps	Easting	Northing
1312	1068	6022377.88585	2089149.16850
1313	952	6022375.45638	2089145.83421
1314	923	6022372.86705	2089142.18867
1315	1080	6022370.34840	2089138.67778
1316	1093	6022367.87094	2089135.32288
1317	1091	6022365.22991	2089131.68403
1318	960	6022362.56260	2089127.97618
1319	1049	6022359.93576	2089124.20271
1320	1094	6022357.34508	2089120.48251
1321	1070	6022354.78956	2089116.81627
1322	1045	6022352.19560	2089113.15029
1323	1078	6022349.59564	2089109.50632
1324	1049	6022347.01869	2089105.96251
1325	1051	6022344.57878	2089102.61180
1326	1018	6022342.27142	2089099.45746
1327	1042	6022339.88870	2089096.13485
1328	1037	6022337.49951	2089092.81974
1329	1037	6022335.60100	2089089.43419
1330	1061	6022334.18486	2089085.92067
1331	1001	6022334.24422	2089082.02782
1332	1130	6022335.57695	2089078.69477
1333	1125	6022337.82774	2089075.65208
1334	1102	6022340.79379	2089073.14653
1335	1113	6022343.80846	2089070.71233
1336	1109	6022346.98027	2089068.49038
1337	1073	6022350.72537	2089066.52330
1338	1081	6022354.63226	2089064.66197
1339	1080	6022358.57222	2089065.34644
1340	1090	6022362.39885	2089066.52948
1341	1010	6022365.74113	2089069.06381
1342	**1113**	**6022368.49392**	**2089071.65737**
1343	1168	6022371.04456	2089074.47860
1344	1029	6022373.64327	2089077.79618
1345	978	6022376.27483	2089081.15783
1346	933	6022378.93753	2089084.56487
1347	938	6022381.51410	2089087.87972
1348	960	6022384.10611	2089091.22684
1349	919	6022386.88157	2089094.81192
1350	954	6022389.64413	2089098.37674
1351	950	6022392.39656	2089101.91918
1352	957	6022395.17064	2089105.57067
1353	1020	6022397.93467	2089109.25775
1354	1127	6022400.69037	2089112.96493
1355	**1134**	**6022403.53990**	**2089116.77655**
1356	1168	6022406.49725	2089120.68213
1357	1166	6022409.38888	2089124.53956
1358	1175	6022412.24049	2089128.36447
1359	1173	6022414.96694	2089132.06767
1360	1099	6022417.15819	2089135.73174
1361	1095	6022418.10560	2089139.68587
1362	1042	6022417.71730	2089143.25074
1363	1144	6022416.41124	2089146.84022
1364	1142	6022413.32036	2089149.78377
1365	1109	6022410.11344	2089152.67381
1366	1116	6022406.66333	2089155.36291
1367	1073	6022403.37841	2089157.95886
1368	1011	6022400.25323	2089160.57051

Sample ID	Gamma Total cps	Easting	Northing
1369	1031	6022396.96587	2089162.07426
1370	964	6022393.57334	2089163.13679
1371	949	6022389.91028	2089162.71235
1372	977	6022386.59822	2089160.80816
1373	954	6022383.63822	2089157.87899
1374	1114	6022380.71865	2089154.50164
1375	98	6022377.82729	2089151.03700
1376	1039	6022375.05655	2089147.40995
1377	937	6022372.61993	2089144.07246
1378	92	6022370.29269	2089140.77104
1379	980	6022367.95431	2089137.52384
1380	1015	6022365.49846	2089134.14127
1381	1033	6022362.90355	2089130.63909
1382	1013	6022360.33583	2089127.11948
1383	1057	6022357.80580	2089123.61228
1384	1049	6022355.33867	2089120.25626
	1242	**Maximum**	
	62.61	**Std Dev**	
	1023.15	**Average**	
	842	**3 σ Investigation Level**	

Investigation Level Exceeded

Biased samples were collected at locations identified by **BOLD**

Systematic samples were collected at locations identified by *Italic*

ATTACHMENT 4

EXCAVATED SOIL UNIT
ON-SITE LABORATORY REPORTS
(on CD only)

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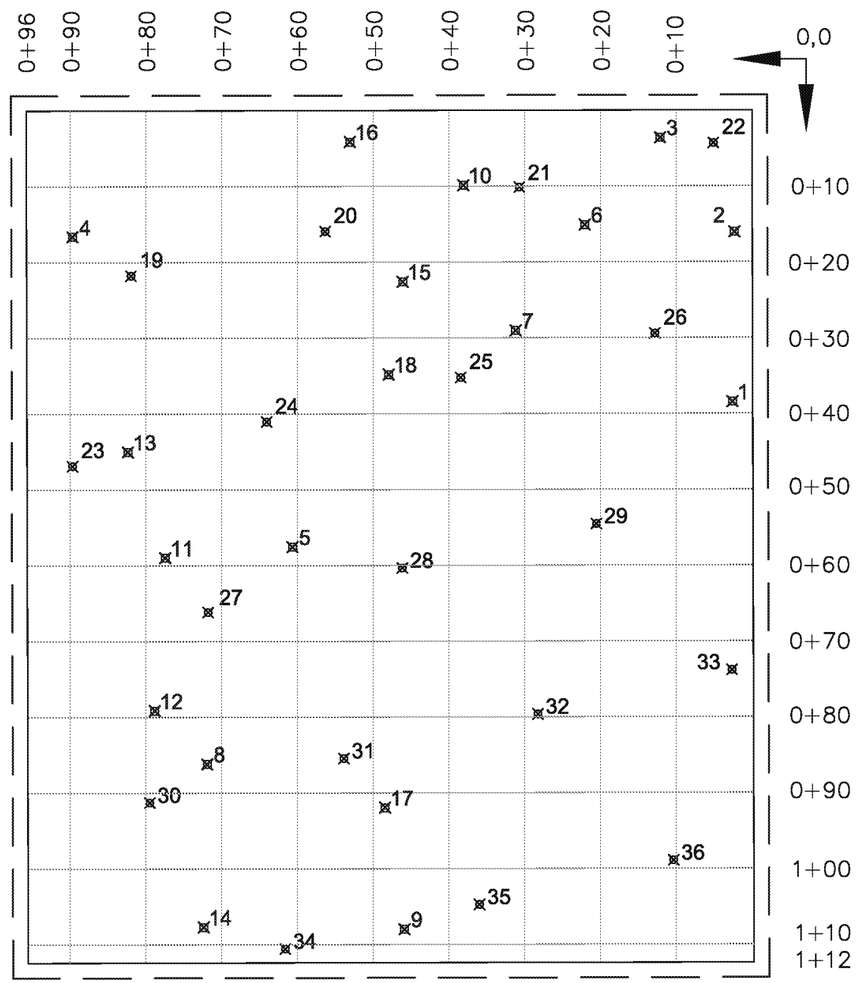
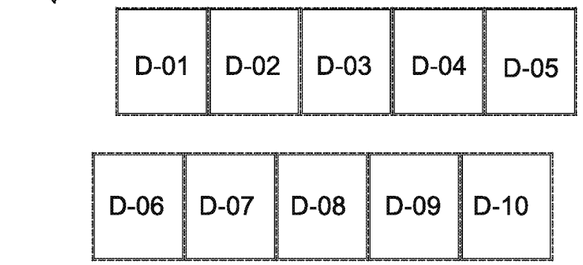
0442-D03

(NON-IR , WORK AREA 33 SOIL)





KEY PLAN

LEGEND:

1 BIASED

19 SYSTEMATIC

10 0 10 20

(feet)

BIASED SAMPLES 1–18
SYSTEMATIC SAMPLES 19–36

RECORD DRAWING

RADIOLOGICAL SCREENING YARD 3 (RSY3)
SOIL SAMPLING LOCATIONS AREA D03

HUNTERS POINT SHIPYARD-SAN FRANCISCO, CA

TETRA TECH EC, INC.

DRAWN BY: AEC | CHECKED BY: SH / LP | APPROVED BY: GC | DCN:

REV: | TASK: CTO 04

P:\CAD PROJECT FILES\CTO-RSY 3_PAD SURVEYS CAD FILES\DWG FILES\ACTIVE\04-PE-0442-D03.DWG
PLOT/UPDATE: JUN 14 2011 14:05:41

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-01
Sample Description: Parcel E

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:10
Acquisition Time: 6/16/2011 15:56:20
Analysis Time: 6/16/2011 16:41
Analysis Quantity: 3.060E+02 g

Spectrum ID: 8_20110616_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.617E-01	26.73	1.501E-01	1.551E-01	3.804E-02
Am-241	#AB	-4.914E-02	374.30	1.839E-01	1.840E-01	1.484E-01
Bi-212	#AB	1.355E-01	177.20	2.402E-01	2.404E-01	1.840E-01
Bi-214	#	2.609E-01	32.04	8.357E-02	8.536E-02	5.234E-02
Co-60	#AB	-3.084E-03	2828.00	8.724E-02	8.724E-02	2.613E-02
Cs-137	#AB	1.190E-02	212.70	2.530E-02	2.531E-02	1.932E-02
Eu-152	#AB	-1.918E-04	30890.00	5.924E-02	5.924E-02	4.878E-02
Eu-154	#AB	0.000E+00	2000.00	4.969E-02	4.969E-02	1.081E-01
K-40		8.011E+00	11.69	9.365E-01	1.092E+00	2.114E-01
Pa-234	#AB	-5.669E-02	316.50	1.795E-01	1.795E-01	1.409E-01
Pb-210	#AB	-5.895E-01	1171.00	6.906E+00	6.906E+00	5.651E+00
Pb-212		6.381E-01	13.31	8.491E-02	9.791E-02	3.201E-02
Pb-214		5.842E-01	18.78	1.097E-01	1.175E-01	4.325E-02
Ra-226		8.403E-01	69.53	5.842E-01	5.877E-01	4.309E-01
Th-230	#AB	-3.496E+00	331.20	1.158E+01	1.159E+01	9.328E+00
Th-234	AB	3.881E-01	129.20	5.013E-01	5.026E-01	3.922E-01
Tl-208		2.407E-01	16.78	4.039E-02	4.344E-02	3.949E-03
U-235		3.684E-02	103.20	3.801E-02	3.811E-02	2.909E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.171E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:39

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-02
Sample Description: Parcel E

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:12
Acquisition Time: 6/16/2011 15:57:31
Analysis Time: 6/16/2011 16:42
Analysis Quantity: 3.330E+02 g

Spectrum ID: 9_20110616_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.16 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.790E-01	33.40	1.266E-01	1.293E-01	7.207E-02
Am-241	#AB	-3.064E-02	8743.00	2.679E+00	2.679E+00	1.228E-01
Bi-212	#	2.321E-01	92.03	2.136E-01	2.142E-01	1.512E-01
Bi-214		3.405E-01	22.63	7.704E-02	8.032E-02	3.674E-02
Co-60	#AB	-6.164E-03	428.60	2.642E-02	2.642E-02	2.090E-02
Cs-137	#AB	1.395E-02	161.10	2.248E-02	2.250E-02	1.671E-02
Eu-152	#AB	-1.177E-02	588.50	6.926E-02	6.927E-02	5.612E-02
Eu-154	#AB	-1.949E-02	455.70	8.879E-02	8.880E-02	7.072E-02
K-40		7.514E+00	13.42	1.008E+00	1.137E+00	3.002E-01
Pa-234	#AB	8.834E-03	1963.00	1.734E-01	1.734E-01	1.419E-01
Pb-210	#AB	3.780E+00	133.70	5.054E+00	5.067E+00	3.912E+00
Pb-212		6.146E-01	13.70	8.418E-02	9.639E-02	3.140E-02
Pb-214		5.580E-01	16.45	9.178E-02	1.002E-01	3.261E-02
Ra-226		5.622E-01	104.70	5.885E-01	5.901E-01	4.554E-01
Th-230	#AB	7.085E+00	162.10	1.149E+01	1.155E+01	9.082E+00
Th-234	AB	2.439E-01	186.60	4.553E-01	4.559E-01	3.623E-01
Tl-208	#	1.452E-01	24.39	3.541E-02	3.670E-02	1.607E-02
U-235		3.103E-02	127.10	3.945E-02	3.952E-02	3.089E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.151E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:39

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-03
Sample Description: Parcel E

Detector: HPGe #11 51-TP32744A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:14
Acquisition Time: 6/16/2011 16:00:01
Analysis Time: 6/16/2011 16:45
Analysis Quantity: 3.230E+02 g

Spectrum ID: 11_20110616_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.13 %

Efficiency: HPGe #11 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/28/2011 17:38
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		7.178E-01	18.90	1.356E-01	1.445E-01	1.493E-02
Am-241	#AB	1.058E-01	159.70	1.690E-01	1.693E-01	1.317E-01
Bi-212	#	2.843E-01	83.17	2.365E-01	2.373E-01	1.661E-01
Bi-214	#	3.493E-01	24.54	8.572E-02	8.884E-02	5.011E-02
Co-60	#AB	-8.076E-03	4000.00	3.230E-01	3.230E-01	9.904E-03
Cs-137	#AB	-4.616E-03	461.00	2.128E-02	2.128E-02	1.689E-02
Eu-152	#AB	2.187E-02	282.30	6.176E-02	6.178E-02	4.882E-02
Eu-154	#AB	1.036E-02	807.60	8.365E-02	8.365E-02	6.753E-02
K-40		9.702E+00	10.78	1.046E+00	1.247E+00	2.416E-01
Pa-234	#AB	1.136E-02	1251.00	1.421E-01	1.421E-01	1.155E-01
Pb-210	#AB	5.287E+00	138.60	7.326E+00	7.343E+00	5.657E+00
Pb-212		5.974E-01	13.61	8.132E-02	9.325E-02	3.143E-02
Pb-214		5.751E-01	16.19	9.312E-02	1.019E-01	3.155E-02
Ra-226		6.369E-01	84.69	5.394E-01	5.415E-01	4.056E-01
Th-230	#AB	-6.112E+00	224.20	1.370E+01	1.374E+01	1.098E+01
Th-234	#AB	3.210E-02	1548.00	4.969E-01	4.969E-01	4.076E-01
Tl-208		2.041E-01	22.63	4.620E-02	4.815E-02	1.754E-02
U-235	AB	1.334E-02	289.50	3.861E-02	3.862E-02	3.107E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.855E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:40

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-04
Sample Description: Parcel E

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:16
Acquisition Time: 6/16/2011 16:01:37
Analysis Time: 6/16/2011 16:46
Analysis Quantity: 3.440E+02 g

Spectrum ID: 12_20110616_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.510E-01	24.60	1.356E-01	1.409E-01	3.260E-02
Am-241	#AB	1.140E-01	152.70	1.741E-01	1.744E-01	1.340E-01
Bi-212	#AB	1.146E-01	187.20	2.144E-01	2.146E-01	1.649E-01
Bi-214		3.684E-01	22.55	8.308E-02	8.664E-02	3.491E-02
Co-60	#AB	2.366E-03	501.90	1.188E-02	1.188E-02	5.113E-02
Cs-137	#AB	9.012E-03	310.30	2.796E-02	2.797E-02	2.213E-02
Eu-152	#AB	1.305E-03	4793.00	6.256E-02	6.256E-02	5.142E-02
Eu-154	#AB	8.409E-03	1066.00	8.963E-02	8.963E-02	7.285E-02
K-40		7.886E+00	10.81	8.529E-01	1.016E+00	5.373E-02
Pa-234	#AB	0.000E+00	2000.00	3.283E-02	3.283E-02	2.313E-01
Pb-210	#	0.000E+00	2123.00	1.618E+00	1.618E+00	0.000E+00
Pb-212		3.836E-01	17.92	6.873E-02	7.472E-02	3.862E-02
Pb-214		4.562E-01	18.80	8.578E-02	9.187E-02	2.895E-02
Ra-226	AB	3.725E-01	130.10	4.845E-01	4.854E-01	3.754E-01
Th-230	#AB	9.673E-01	1210.00	1.170E+01	1.170E+01	9.579E+00
Th-234	#AB	2.168E-02	2137.00	4.632E-01	4.632E-01	3.804E-01
Tl-208	#	1.318E-01	26.66	3.512E-02	3.620E-02	1.732E-02
U-235		3.841E-02	82.82	3.181E-02	3.194E-02	2.367E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.143E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:40

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-05
Sample Description: Parcel E

Detector: HPGe #1 50-TP42232A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:18
Acquisition Time: 6/16/2011 16:04:06
Analysis Time: 6/16/2011 16:49
Analysis Quantity: 3.290E+02 g

Spectrum ID: 1_20110616_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #1 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/20/2011 14:36
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	3.598E-01	38.58	1.388E-01	1.410E-01	8.235E-02
Am-241	#AB	-1.473E-01	217.80	3.208E-01	3.210E-01	2.549E-01
Bi-212	#AB	1.306E-01	160.10	2.090E-01	2.092E-01	1.570E-01
Bi-214		5.240E-01	18.77	9.836E-02	1.044E-01	3.897E-02
Co-60	#AB	1.328E-02	140.60	1.866E-02	1.868E-02	1.749E-02
Cs-137	#AB	2.357E-03	1082.00	2.550E-02	2.550E-02	2.072E-02
Eu-152	#AB	7.627E-03	854.10	6.514E-02	6.515E-02	5.295E-02
Eu-154	#AB	0.000E+00	2000.00	1.989E-02	1.989E-02	1.056E-01
K-40		6.190E+00	12.94	8.008E-01	9.108E-01	6.035E-02
Pa-234	#AB	0.000E+00	2000.00	2.548E-02	2.548E-02	2.968E-02
Pb-210	#	0.000E+00	273.20	1.723E+00	1.724E+00	0.000E+00
Pb-212		4.481E-01	19.50	8.739E-02	9.385E-02	4.011E-02
Pb-214		5.580E-01	17.72	9.887E-02	1.067E-01	3.435E-02
Ra-226	AB	1.726E-01	320.00	5.524E-01	5.526E-01	4.443E-01
Th-230	#AB	2.323E+00	639.20	1.485E+01	1.486E+01	1.208E+01
Th-234	#AB	4.947E-02	980.60	4.851E-01	4.851E-01	3.965E-01
Tl-208		1.938E-01	23.26	4.507E-02	4.687E-02	1.385E-02
U-235		6.290E-02	54.57	3.432E-02	3.465E-02	2.374E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.104E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:36

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-06
Sample Description: Parcel E

Detector: HPGe #2 50-TP42229A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:20
Acquisition Time: 6/16/2011 16:04:59
Analysis Time: 6/16/2011 16:50
Analysis Quantity: 3.220E+02 g

Spectrum ID: 2_20110616_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.12 %

Efficiency: HPGe #2 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/19/2011 21:26
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.010E-01	47.11	1.418E-01	1.434E-01	8.909E-02
Am-241	#AB	0.000E+00	2000.00	2.995E-01	2.995E-01	2.561E-01
Bi-212	#	3.651E-01	68.08	2.486E-01	2.498E-01	1.655E-01
Bi-214	#	5.003E-01	21.34	1.067E-01	1.118E-01	3.146E-02
Co-60	#AB	-2.593E-04	12940.00	3.354E-02	3.354E-02	2.760E-02
Cs-137	#AB	-9.220E-03	328.00	3.024E-02	3.025E-02	2.393E-02
Eu-152	#AB	3.595E-02	187.00	6.725E-02	6.730E-02	5.189E-02
Eu-154	#AB	-9.845E-03	904.30	8.903E-02	8.903E-02	7.200E-02
K-40	#	8.445E+00	11.77	9.941E-01	1.157E+00	2.615E-01
Pa-234	#AB	4.612E-02	334.90	1.544E-01	1.545E-01	1.206E-01
Pb-210	#	0.000E+00	4938.00	1.695E+00	1.695E+00	0.000E+00
Pb-212		5.924E-01	14.82	8.782E-02	9.880E-02	3.769E-02
Pb-214		5.382E-01	18.54	9.979E-02	1.071E-01	3.795E-02
Ra-226		5.946E-01	92.84	5.521E-01	5.539E-01	4.151E-01
Th-230	#AB	-4.813E-01	3346.00	1.610E+01	1.610E+01	1.324E+01
Th-234	#AB	3.940E-01	145.70	5.739E-01	5.751E-01	4.511E-01
Tl-208		2.050E-01	23.60	4.838E-02	5.026E-02	1.769E-02
U-235		3.894E-02	97.39	3.792E-02	3.804E-02	2.873E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.206E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:36

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-07
Sample Description: Parcel E

Detector: HPGe #3 51-TP32733A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:22
Acquisition Time: 6/16/2011 16:06:11
Analysis Time: 6/16/2011 16:51
Analysis Quantity: 3.150E+02 g

Spectrum ID: 3_20110616_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2705 sec
Dead Time: 0.17 %

Efficiency: HPGe #3 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/21/2011 13:54
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		7.354E-01	25.73	1.892E-01	1.960E-01	6.021E-02
Am-241	#AB	6.206E-02	299.10	1.856E-01	1.857E-01	1.495E-01
Bi-212	#	2.934E-01	84.04	2.465E-01	2.473E-01	1.743E-01
Bi-214		5.339E-01	17.41	9.295E-02	9.955E-02	2.420E-02
Co-60	#AB	5.796E-04	5012.00	2.905E-02	2.905E-02	2.386E-02
Cs-137	#AB	0.000E+00	2000.00	1.742E-02	1.742E-02	1.684E-02
Eu-152	#AB	-1.411E-03	4407.00	6.217E-02	6.217E-02	5.109E-02
Eu-154	#AB	-4.228E-02	228.40	9.656E-02	9.660E-02	7.444E-02
K-40		8.289E+00	11.64	9.649E-01	1.126E+00	1.392E-01
Pa-234	#AB	-7.246E-03	2095.00	1.518E-01	1.518E-01	1.241E-01
Pb-210	#AB	5.790E-01	843.50	4.884E+00	4.884E+00	3.986E+00
Pb-212		6.653E-01	13.48	8.968E-02	1.031E-01	3.584E-02
Pb-214		5.473E-01	19.67	1.076E-01	1.146E-01	4.712E-02
Ra-226		1.097E+00	51.35	5.635E-01	5.696E-01	4.057E-01
Th-230	#AB	0.000E+00	2000.00	1.254E+01	1.254E+01	9.558E+00
Th-234	#	6.566E-01	76.82	5.044E-01	5.083E-01	3.830E-01
Tl-208	#	2.743E-01	18.48	5.069E-02	5.387E-02	1.396E-02
U-235	AB	1.990E-02	205.70	4.092E-02	4.095E-02	3.268E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.375E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-08
Sample Description: Parcel E

Detector: HPGe #7 50-TP32731A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:24
Acquisition Time: 6/16/2011 15:55:18
Analysis Time: 6/16/2011 16:40
Analysis Quantity: 3.580E+02 g

Spectrum ID: 7_20110616_011
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.15 %

Efficiency: HPGe #7 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 5/3/2011 14:19
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	4.692E-01	31.57	1.481E-01	1.517E-01	7.525E-02
Am-241	#AB	-1.727E-01	240.60	4.153E-01	4.156E-01	3.315E-01
Bi-212	#AB	7.366E-02	348.20	2.564E-01	2.565E-01	2.040E-01
Bi-214		3.607E-01	24.96	9.003E-02	9.320E-02	4.654E-02
Co-60	#AB	8.571E-03	360.80	3.092E-02	3.093E-02	2.429E-02
Cs-137	#AB	-2.640E-03	1311.00	3.461E-02	3.461E-02	2.826E-02
Eu-152	#AB	3.046E-03	2265.00	6.898E-02	6.898E-02	5.654E-02
Eu-154	#AB	5.077E-02	211.00	1.071E-01	1.072E-01	8.206E-02
K-40		1.273E+01	10.34	1.317E+00	1.590E+00	2.338E-01
Pa-234	#AB	-6.018E-02	339.20	2.041E-01	2.041E-01	1.613E-01
Pb-210	#	0.000E+00	141.40	1.980E+00	1.985E+00	0.000E+00
Pb-212		6.444E-01	15.85	1.021E-01	1.134E-01	4.101E-02
Pb-214		5.644E-01	17.16	9.688E-02	1.051E-01	3.448E-02
Ra-226		6.149E-01	103.10	6.343E-01	6.360E-01	4.863E-01
Th-230	#AB	5.480E-01	3968.00	2.174E+01	2.174E+01	1.788E+01
Th-234	#AB	4.482E-01	161.00	7.216E-01	7.229E-01	5.717E-01
Tl-208		2.620E-01	18.88	4.946E-02	5.244E-02	1.222E-02
U-235		3.923E-02	100.60	3.948E-02	3.959E-02	3.004E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.682E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:38

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-09
Sample Description: Parcel E

Detector: HPGe #6 50-TP50818A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:26
Acquisition Time: 6/16/2011 16:13:29
Analysis Time: 6/16/2011 16:58
Analysis Quantity: 3.410E+02 g

Spectrum ID: 6_20110616_005
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2709 sec
Dead Time: 0.34 %

Efficiency: HPGe #6 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 6/14/2011 14:00
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.015E-01	25.96	1.561E-01	1.616E-01	3.864E-02
Am-241	#	1.789E-01	124.70	2.231E-01	2.236E-01	1.697E-01
Bi-212	#	2.565E-01	104.90	2.691E-01	2.697E-01	1.962E-01
Bi-214		4.439E-01	20.82	9.240E-02	9.703E-02	2.424E-02
Co-60	#AB	1.457E-02	250.90	3.655E-02	3.657E-02	2.835E-02
Cs-137	#AB	-1.010E-02	331.60	3.348E-02	3.349E-02	2.657E-02
Eu-152	AB	-4.023E-02	214.60	8.633E-02	8.638E-02	6.791E-02
Eu-154	#AB	-6.732E-03	1727.00	1.163E-01	1.163E-01	9.504E-02
K-40		1.404E+01	9.23	1.296E+00	1.627E+00	2.092E-01
Pa-234	#AB	3.039E-02	641.10	1.949E-01	1.949E-01	1.569E-01
Pb-210	#AB	8.227E-02	40280.00	3.314E+01	3.314E+01	2.730E+01
Pb-212		5.278E-01	17.05	8.997E-02	9.859E-02	4.101E-02
Pb-214		2.689E-01	30.95	8.322E-02	8.545E-02	5.276E-02
Ra-226		1.352E+00	48.06	6.495E-01	6.575E-01	4.472E-01
Th-230	#AB	-3.502E+00	410.60	1.438E+01	1.439E+01	1.161E+01
Th-234	#	6.147E-01	105.20	6.466E-01	6.492E-01	4.997E-01
Tl-208	#	1.080E-01	37.81	4.082E-02	4.145E-02	2.455E-02
U-235	AB	2.948E-02	153.10	4.513E-02	4.519E-02	3.545E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.855E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-10
Sample Description: Parcel E

Detector: HPGe #5 50-TP42234A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:28
Acquisition Time: 6/16/2011 17:06:26
Analysis Time: 6/16/2011 17:51
Analysis Quantity: 3.510E+02 g

Spectrum ID: 5_20110616_007
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.10 %

Efficiency: HPGe #5 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/18/2011 12:55
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.175E-01	36.81	1.169E-01	1.189E-01	6.520E-02
Am-241	#AB	1.025E-04	121500.00	1.245E-01	1.245E-01	1.026E-01
Bi-212	#	2.000E-01	105.60	2.112E-01	2.117E-01	1.538E-01
Bi-214		3.978E-01	21.01	8.356E-02	8.768E-02	2.616E-02
Co-60	#AB	-3.905E-03	732.20	2.859E-02	2.859E-02	2.310E-02
Cs-137	#AB	-1.028E-03	2029.00	2.086E-02	2.086E-02	1.705E-02
Eu-152	#AB	9.073E-03	566.80	5.142E-02	5.143E-02	4.146E-02
Eu-154	AB	0.000E+00	2000.00	1.203E-02	1.203E-02	9.000E-02
K-40		9.244E+00	10.62	9.815E-01	1.176E+00	2.338E-01
Pa-234	#AB	-3.767E-03	3366.00	1.268E-01	1.268E-01	1.039E-01
Pb-210	#AB	9.849E-01	335.00	3.299E+00	3.301E+00	2.650E+00
Pb-212		4.451E-01	15.86	7.058E-02	7.834E-02	3.253E-02
Pb-214		4.649E-01	16.61	7.720E-02	8.416E-02	2.349E-02
Ra-226	#	4.637E-01	96.18	4.459E-01	4.473E-01	3.374E-01
Th-230	#AB	-1.117E+00	818.90	9.149E+00	9.150E+00	7.473E+00
Th-234		8.421E-01	52.21	4.396E-01	4.469E-01	2.620E-01
Tl-208		1.649E-01	21.70	3.579E-02	3.743E-02	1.041E-02
U-235	#	2.903E-02	105.00	3.047E-02	3.055E-02	2.328E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.356E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-11
Sample Description: Parcel E

Detector: HPGe #5 50-TP42234A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:30
Acquisition Time: 6/16/2011 16:14:16
Analysis Time: 6/16/2011 16:59
Analysis Quantity: 3.490E+02 g

Spectrum ID: 5_20110616_006
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.10 %

Efficiency: HPGe #5 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/18/2011 12:55
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.322E-01	19.25	1.217E-01	1.294E-01	1.364E-02
Am-241	#AB	-3.777E-03	2276.00	8.596E-02	8.596E-02	7.043E-02
Bi-212	#AB	-4.272E-02	502.20	2.145E-01	2.146E-01	1.727E-01
Bi-214		4.656E-01	17.91	8.339E-02	8.900E-02	2.224E-02
Co-60	#AB	1.187E-03	1997.00	2.370E-02	2.370E-02	1.935E-02
Cs-137	#AB	-5.203E-03	491.80	2.559E-02	2.559E-02	2.054E-02
Eu-152	AB	8.964E-03	621.80	5.573E-02	5.574E-02	4.509E-02
Eu-154	#AB	4.427E-03	1903.00	8.426E-02	8.426E-02	6.888E-02
K-40		6.683E+00	11.74	7.849E-01	9.140E-01	1.876E-01
Pa-234	#AB	9.187E-02	151.70	1.394E-01	1.395E-01	1.021E-01
Pb-210	#	2.618E+00	118.20	3.095E+00	3.105E+00	2.352E+00
Pb-212		4.584E-01	14.53	6.662E-02	7.527E-02	2.849E-02
Pb-214		4.580E-01	18.37	8.414E-02	9.039E-02	2.809E-02
Ra-226		9.887E-01	40.54	4.008E-01	4.077E-01	2.525E-01
Th-230	#AB	4.137E+00	198.10	8.195E+00	8.225E+00	6.484E+00
Th-234	#AB	9.469E-02	443.10	4.195E-01	4.196E-01	3.517E-01
Tl-208		1.737E-01	23.56	4.092E-02	4.252E-02	1.263E-02
U-235	AB	2.703E-03	1220.00	3.298E-02	3.298E-02	2.702E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.682E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-12
Sample Description: Parcel E

Detector: HPGe #4 50-TP42236A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:32
Acquisition Time: 6/16/2011 17:03:29
Analysis Time: 6/16/2011 17:48
Analysis Quantity: 3.450E+02 g

Spectrum ID: 4_20110616_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.07 %

Efficiency: HPGe #4 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/19/2011 20:43
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.297E-01	25.17	1.334E-01	1.383E-01	6.072E-02
Am-241	#AB	-1.046E-01	176.80	1.849E-01	1.851E-01	1.469E-01
Bi-212	#	2.836E-01	88.36	2.506E-01	2.513E-01	1.825E-01
Bi-214		4.993E-01	15.83	7.903E-02	8.577E-02	2.483E-02
Co-60	#	9.261E-03	136.90	1.268E-02	1.269E-02	4.839E-03
Cs-137	#AB	8.758E-03	306.60	2.685E-02	2.686E-02	2.126E-02
Eu-152	#AB	-7.218E-03	803.60	5.800E-02	5.801E-02	4.714E-02
Eu-154	#AB	7.554E-03	1188.00	8.974E-02	8.974E-02	7.454E-02
K-40		1.116E+01	9.29	1.037E+00	1.298E+00	1.763E-01
Pa-234	#AB	1.344E-02	1003.00	1.348E-01	1.348E-01	1.092E-01
Pb-210	#AB	-4.122E-03	113100.00	4.662E+00	4.662E+00	3.840E+00
Pb-212		6.765E-01	12.02	8.130E-02	9.634E-02	2.966E-02
Pb-214		4.503E-01	18.20	8.195E-02	8.815E-02	3.572E-02
Ra-226		8.077E-01	67.60	5.460E-01	5.494E-01	4.055E-01
Th-230	#AB	0.000E+00	2000.00	8.717E+00	8.718E+00	1.193E+01
Th-234	#	5.821E-01	82.71	4.815E-01	4.847E-01	3.691E-01
Tl-208	#	1.942E-01	20.70	4.019E-02	4.221E-02	1.877E-02
U-235		4.962E-02	73.25	3.635E-02	3.654E-02	2.723E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.527E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-13
Sample Description: Parcel E

Detector: HPGe #2 50-TP42229A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:34
Acquisition Time: 6/16/2011 17:03:07
Analysis Time: 6/16/2011 17:48
Analysis Quantity: 3.390E+02 g

Spectrum ID: 2_20110616_011
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.13 %

Efficiency: HPGe #2 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/19/2011 21:26
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		7.861E-01	20.46	1.609E-01	1.699E-01	3.974E-02
Am-241	#AB	3.291E-02	937.60	3.086E-01	3.086E-01	2.524E-01
Bi-212	#AB	0.000E+00	2000.00	3.001E-01	3.001E-01	2.472E-01
Bi-214	#	6.388E-01	15.95	1.019E-01	1.104E-01	3.959E-02
Co-60	#AB	-4.050E-03	769.80	3.118E-02	3.118E-02	2.518E-02
Cs-137	#AB	5.049E-05	48860.00	2.467E-02	2.467E-02	2.031E-02
Eu-152	#AB	6.176E-05	126900.00	7.837E-02	7.837E-02	6.455E-02
Eu-154	#AB	2.456E-02	323.50	7.947E-02	7.949E-02	6.183E-02
K-40		7.017E+00	12.27	8.606E-01	9.911E-01	1.707E-01
Pa-234	#AB	7.347E-02	228.10	1.676E-01	1.677E-01	1.287E-01
Pb-210	#	0.000E+00	262.70	9.567E-01	9.573E-01	0.000E+00
Pb-212		6.899E-01	13.32	9.187E-02	1.059E-01	3.544E-02
Pb-214		7.827E-01	14.23	1.114E-01	1.249E-01	3.946E-02
Ra-226		1.220E+00	49.47	6.033E-01	6.103E-01	4.239E-01
Th-230	#AB	3.653E-01	3556.00	1.299E+01	1.299E+01	1.067E+01
Th-234		1.372E+00	46.95	6.443E-01	6.575E-01	3.613E-01
Tl-208		2.174E-01	19.88	4.321E-02	4.556E-02	1.405E-02
U-235	AB	2.556E-02	166.70	4.260E-02	4.264E-02	3.373E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.325E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:36

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-14
Sample Description: Parcel E

Detector: HPGe #1 50-TP42232A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:36
Acquisition Time: 6/16/2011 17:02:01
Analysis Time: 6/16/2011 17:47
Analysis Quantity: 3.610E+02 g

Spectrum ID: 1_20110616_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.08 %

Efficiency: HPGe #1 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/20/2011 14:36
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.097E-01	19.98	1.618E-01	1.713E-01	4.072E-02
Am-241	#AB	-2.097E-01	174.60	3.662E-01	3.667E-01	2.911E-01
Bi-212		2.751E-01	86.28	2.374E-01	2.381E-01	1.693E-01
Bi-214		5.786E-01	20.41	1.181E-01	1.243E-01	4.577E-02
Co-60	#AB	-1.320E-03	2519.00	3.326E-02	3.326E-02	2.726E-02
Cs-137	#AB	1.129E-02	243.50	2.750E-02	2.751E-02	2.149E-02
Eu-152	#AB	3.583E-04	20770.00	7.444E-02	7.444E-02	6.129E-02
Eu-154	#AB	4.791E-02	183.90	8.808E-02	8.814E-02	6.657E-02
K-40		1.400E+01	8.88	1.243E+00	1.584E+00	2.193E-01
Pa-234	#AB	1.322E-02	1190.00	1.573E-01	1.573E-01	1.280E-01
Pb-210	#	0.000E+00	392.20	1.253E+00	1.253E+00	0.000E+00
Pb-212		7.335E-01	11.98	8.787E-02	1.042E-01	3.555E-02
Pb-214		5.596E-01	19.52	1.092E-01	1.165E-01	4.666E-02
Ra-226		7.317E-01	78.16	5.719E-01	5.746E-01	4.295E-01
Th-230	#	1.232E+01	114.90	1.415E+01	1.430E+01	1.085E+01
Th-234	#AB	4.162E-01	145.60	6.058E-01	6.071E-01	4.794E-01
Tl-208		2.647E-01	21.09	5.581E-02	5.852E-02	1.809E-02
U-235		3.197E-02	122.60	3.920E-02	3.928E-02	3.056E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 3.079E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:36

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-15
Sample Description: Parcel E

Detector: HPGe #3 51-TP32733A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:38
Acquisition Time: 6/16/2011 17:05:30
Analysis Time: 6/16/2011 17:50
Analysis Quantity: 3.470E+02 g

Spectrum ID: 3_20110616_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2705 sec
Dead Time: 0.17 %

Efficiency: HPGe #3 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/21/2011 13:54
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.642E-01	34.98	1.274E-01	1.299E-01	7.169E-02
Am-241	#AB	-5.811E-02	280.60	1.631E-01	1.631E-01	1.310E-01
Bi-212	#	2.389E-01	91.04	2.175E-01	2.181E-01	1.551E-01
Bi-214	#	3.711E-01	20.47	7.597E-02	7.990E-02	2.167E-02
Co-60	#AB	1.304E-03	800.70	1.044E-02	1.044E-02	1.386E-02
Cs-137	#AB	6.298E-03	379.90	2.393E-02	2.393E-02	1.900E-02
Eu-152	#AB	4.702E-03	1205.00	5.665E-02	5.665E-02	4.624E-02
Eu-154	#AB	-2.108E-02	400.60	8.444E-02	8.446E-02	6.696E-02
K-40		8.821E+00	10.19	8.991E-01	1.091E+00	5.338E-02
Pa-234	#AB	-4.385E-02	334.00	1.465E-01	1.465E-01	1.150E-01
Pb-210	#AB	2.300E+00	168.90	3.883E+00	3.890E+00	3.030E+00
Pb-212		5.192E-01	14.56	7.561E-02	8.539E-02	3.029E-02
Pb-214	#	3.077E-01	23.71	7.297E-02	7.627E-02	4.271E-02
Ra-226		4.870E-01	102.60	4.996E-01	5.009E-01	3.887E-01
Th-230	#AB	-4.670E+00	236.90	1.106E+01	1.109E+01	8.878E+00
Th-234	#	9.223E-01	48.63	4.485E-01	4.571E-01	2.542E-01
Tl-208		1.773E-01	23.04	4.085E-02	4.252E-02	1.333E-02
U-235	AB	2.421E-02	133.10	3.222E-02	3.227E-02	2.509E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.454E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-16
Sample Description: Parcel E

Detector: HPGe #4 50-TP42236A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:40
Acquisition Time: 6/17/2011 06:50:38
Analysis Time: 6/17/2011 07:35
Analysis Quantity: 3.510E+02 g

Spectrum ID: 4_20110617_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.06 %

Efficiency: HPGe #4 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/19/2011 20:43
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		3.956E-01	30.14	1.192E-01	1.224E-01	5.914E-02
Am-241	#AB	-1.103E-01	168.60	1.859E-01	1.862E-01	1.476E-01
Bi-212	#	1.840E-01	110.90	2.040E-01	2.043E-01	1.493E-01
Bi-214		4.044E-01	18.37	7.427E-02	7.903E-02	2.690E-02
Co-60	#AB	7.216E-03	156.30	1.128E-02	1.129E-02	1.889E-02
Cs-137	#AB	-1.752E-02	180.40	3.160E-02	3.162E-02	2.458E-02
Eu-152	AB	-2.025E-02	304.70	6.170E-02	6.172E-02	4.913E-02
Eu-154	#AB	-1.431E-02	10090.00	1.444E+00	1.444E+00	7.254E-02
K-40	#	9.676E+00	10.74	1.039E+00	1.241E+00	3.742E-01
Pa-234	#AB	3.923E-02	406.20	1.593E-01	1.593E-01	1.268E-01
Pb-210	#AB	-2.449E+00	201.50	4.934E+00	4.940E+00	3.918E+00
Pb-212		4.316E-01	16.81	7.257E-02	7.971E-02	3.327E-02
Pb-214		4.088E-01	18.61	7.609E-02	8.160E-02	3.171E-02
Ra-226	#	7.805E-01	69.00	5.385E-01	5.417E-01	4.010E-01
Th-230	#AB	-3.226E+00	331.00	1.068E+01	1.069E+01	8.627E+00
Th-234	#AB	2.685E-01	164.40	4.414E-01	4.421E-01	3.502E-01
Tl-208	#	1.387E-01	26.24	3.639E-02	3.754E-02	1.940E-02
U-235		4.665E-02	80.05	3.734E-02	3.751E-02	2.834E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.278E+01

Analyst: Chanthachone Alexander

Reviewer: Philip Smith
Review Date: 6/17/2011 17:10

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-17
Sample Description: Parcel E

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:42
Acquisition Time: 6/16/2011 16:43:58
Analysis Time: 6/16/2011 17:29
Analysis Quantity: 3.520E+02 g

Spectrum ID: 8_20110616_011
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.12 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	4.162E-01	28.44	1.184E-01	1.219E-01	5.228E-02
Am-241	#AB	1.685E-02	653.60	1.101E-01	1.101E-01	8.916E-02
Bi-212	#	2.253E-01	102.30	2.305E-01	2.311E-01	1.685E-01
Bi-214		3.315E-01	25.49	8.452E-02	8.737E-02	3.810E-02
Co-60	#AB	-5.529E-03	4000.00	2.211E-01	2.211E-01	3.043E-02
Cs-137	#AB	1.000E-02	264.10	2.641E-02	2.642E-02	2.071E-02
Eu-152	#AB	1.534E-03	3932.00	6.030E-02	6.030E-02	4.954E-02
Eu-154	#AB	-3.613E-02	293.80	1.062E-01	1.062E-01	8.388E-02
K-40	#	1.138E+01	9.31	1.058E+00	1.325E+00	2.647E-01
Pa-234	#AB	-3.792E-02	502.00	1.903E-01	1.903E-01	1.530E-01
Pb-210	#AB	-3.191E+00	204.30	6.517E+00	6.525E+00	5.180E+00
Pb-212		5.975E-01	12.51	7.472E-02	8.756E-02	2.895E-02
Pb-214		4.094E-01	19.75	8.085E-02	8.607E-02	3.474E-02
Ra-226		6.625E-01	78.44	5.197E-01	5.221E-01	3.896E-01
Th-230	#AB	3.634E+00	280.80	1.021E+01	1.022E+01	8.193E+00
Th-234		1.239E+00	46.51	5.761E-01	5.881E-01	3.152E-01
Tl-208		2.092E-01	16.78	3.511E-02	3.777E-02	3.433E-03
U-235	AB	2.322E-02	154.40	3.585E-02	3.589E-02	2.826E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.915E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:39

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-18
Sample Description: Parcel E

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:46
Acquisition Time: 6/16/2011 16:45:57
Analysis Time: 6/16/2011 17:31
Analysis Quantity: 3.240E+02 g

Spectrum ID: 9_20110616_011
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.16 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		2.080E-01	58.17	1.210E-01	1.218E-01	8.408E-02
Am-241	#AB	7.021E-02	195.00	1.369E-01	1.370E-01	1.101E-01
Bi-212		2.759E-01	77.45	2.137E-01	2.145E-01	1.452E-01
Bi-214		3.514E-01	24.51	8.615E-02	8.929E-02	3.025E-02
Co-60	#AB	-9.881E-03	323.40	3.195E-02	3.196E-02	2.515E-02
Cs-137	#AB	1.273E-03	1554.00	1.978E-02	1.978E-02	1.611E-02
Eu-152	#AB	1.517E-02	390.00	5.914E-02	5.915E-02	4.726E-02
Eu-154	#AB	0.000E+00	2000.00	5.753E-02	5.753E-02	1.011E-01
K-40		5.757E+00	13.66	7.864E-01	8.838E-01	2.223E-01
Pa-234	#AB	8.635E-04	19400.00	1.675E-01	1.675E-01	1.379E-01
Pb-210	#AB	1.232E+00	233.50	2.876E+00	2.878E+00	2.221E+00
Pb-212		4.352E-01	17.77	7.734E-02	8.418E-02	3.406E-02
Pb-214		3.298E-01	23.79	7.845E-02	8.197E-02	3.086E-02
Ra-226		6.225E-01	84.87	5.283E-01	5.304E-01	3.973E-01
Th-230	#AB	3.545E-01	2497.00	8.851E+00	8.851E+00	7.266E+00
Th-234	#AB	3.277E-01	129.00	4.227E-01	4.238E-01	3.291E-01
Tl-208	#	1.241E-01	27.47	3.408E-02	3.506E-02	1.636E-02
U-235		3.660E-02	92.71	3.394E-02	3.405E-02	2.565E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.014E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:39

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-19
Sample Description: Parcel E

Detector: HPGe #10 51-TP42231A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:48
Acquisition Time: 6/17/2011 12:04:57
Analysis Time: 6/17/2011 12:50
Analysis Quantity: 3.530E+02 g

Spectrum ID: 10_20110617_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.08 %

Efficiency: HPGe #10 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/28/2011 17:23
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		4.671E-01	26.42	1.234E-01	1.276E-01	4.366E-02
Am-241	#AB	1.485E-01	285.50	4.240E-01	4.242E-01	3.388E-01
Bi-212	#	2.396E-01	90.36	2.165E-01	2.171E-01	1.509E-01
Bi-214		3.361E-01	25.22	8.475E-02	8.767E-02	3.842E-02
Co-60	#AB	0.000E+00	2000.00	9.401E-03	9.401E-03	5.476E-03
Cs-137	#AB	-5.824E-03	469.00	2.731E-02	2.731E-02	2.185E-02
Eu-152	#AB	-1.120E-02	632.90	7.087E-02	7.087E-02	5.742E-02
Eu-154	#AB	0.000E+00	2000.00	1.416E-02	1.416E-02	1.491E-01
K-40		8.007E+00	11.90	9.528E-01	1.106E+00	1.263E-01
Pa-234	#AB	6.125E-02	272.80	1.671E-01	1.671E-01	1.298E-01
Pb-210	#	0.000E+00	568.40	1.436E+00	1.437E+00	0.000E+00
Pb-212		4.176E-01	19.59	8.179E-02	8.779E-02	3.957E-02
Pb-214		4.139E-01	20.87	8.639E-02	9.140E-02	3.051E-02
Ra-226		5.328E-01	111.60	5.945E-01	5.959E-01	4.585E-01
Th-230	#AB	-9.755E+00	233.20	2.275E+01	2.281E+01	1.814E+01
Th-234	#AB	-2.509E-01	249.90	6.271E-01	6.276E-01	5.027E-01
Tl-208		1.706E-01	23.11	3.941E-02	4.101E-02	1.086E-02
U-235		4.995E-02	74.53	3.723E-02	3.742E-02	2.748E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.084E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:12

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-20
Sample Description: Parcel E

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:50
Acquisition Time: 6/17/2011 12:06:41
Analysis Time: 6/17/2011 12:51
Analysis Quantity: 3.520E+02 g

Spectrum ID: 12_20110617_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.493E-01	27.28	1.498E-01	1.546E-01	4.506E-02
Am-241	#	1.258E-01	126.90	1.595E-01	1.599E-01	1.203E-01
Bi-212	#	1.895E-01	110.60	2.097E-01	2.101E-01	1.529E-01
Bi-214	#	2.750E-01	26.26	7.221E-02	7.451E-02	4.117E-02
Co-60	#AB	5.497E-03	463.00	2.545E-02	2.545E-02	2.021E-02
Cs-137	#AB	0.000E+00	2000.00	2.170E-02	2.170E-02	2.714E-02
Eu-152	#AB	-9.742E-04	3958.00	3.855E-02	3.855E-02	3.163E-02
Eu-154	#AB	-1.121E-03	7343.00	8.228E-02	8.228E-02	6.764E-02
K-40		9.014E+00	10.00	9.014E-01	1.101E+00	5.251E-02
Pa-234	#AB	-4.632E-02	328.70	1.522E-01	1.523E-01	1.196E-01
Pb-210	#	0.000E+00	3456.00	1.967E+00	1.967E+00	0.000E+00
Pb-212		3.987E-01	16.70	6.657E-02	7.321E-02	3.558E-02
Pb-214		3.637E-01	22.58	8.213E-02	8.622E-02	3.491E-02
Ra-226	AB	2.214E-01	209.10	4.628E-01	4.631E-01	3.669E-01
Th-230	#AB	-2.683E+00	364.30	9.774E+00	9.784E+00	7.857E+00
Th-234	#AB	3.478E-01	132.30	4.600E-01	4.612E-01	3.596E-01
Tl-208		1.738E-01	19.96	3.469E-02	3.656E-02	8.092E-03
U-235		4.675E-02	64.97	3.038E-02	3.058E-02	2.181E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.171E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:03

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-20DUP
Sample Description: Parcel E

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:50
Acquisition Time: 6/17/2011 14:41:07
Analysis Time: 6/17/2011 15:26
Analysis Quantity: 3.520E+02 g

Spectrum ID: 12_20110617_010
Sample Type: DUP
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	4.697E-01	25.81	1.212E-01	1.255E-01	4.824E-02
Am-241	#AB	-9.699E-02	227.80	2.209E-01	2.211E-01	1.759E-01
Bi-212	#	1.418E-01	125.60	1.781E-01	1.784E-01	1.292E-01
Bi-214		2.057E-01	32.01	6.585E-02	6.727E-02	4.039E-02
Co-60	#AB	-1.816E-04	13510.00	2.453E-02	2.453E-02	2.019E-02
Cs-137	#AB	-7.074E-05	32220.00	2.279E-02	2.279E-02	1.876E-02
Eu-152	AB	8.193E-03	532.30	4.362E-02	4.362E-02	3.493E-02
Eu-154	#AB	1.569E-02	524.20	8.224E-02	8.225E-02	6.578E-02
K-40		8.879E+00	10.08	8.946E-01	1.090E+00	5.251E-02
Pa-234	#AB	3.459E-02	432.60	1.496E-01	1.497E-01	1.189E-01
Pb-210	#	0.000E+00	4000.00	1.086E+00	1.086E+00	0.000E+00
Pb-212		4.650E-01	16.27	7.568E-02	8.361E-02	3.046E-02
Pb-214		4.014E-01	19.65	7.889E-02	8.403E-02	2.715E-02
Ra-226	#	6.919E-01	70.12	4.852E-01	4.880E-01	3.555E-01
Th-230	#AB	-3.269E+00	383.40	1.253E+01	1.255E+01	1.014E+01
Th-234	#	5.248E-01	81.61	4.283E-01	4.312E-01	3.208E-01
Tl-208	#	1.864E-01	17.75	3.308E-02	3.532E-02	3.420E-03
U-235	#	4.650E-02	69.29	3.222E-02	3.241E-02	2.356E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.207E+01

Analyst: Philip Smith

Reviewer: Philip Smith
Review Date: 6/17/2011 17:03

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-21
Sample Description: Parcel E

Detector: HPGe #1 50-TP42232A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:52
Acquisition Time: 6/17/2011 12:09:06
Analysis Time: 6/17/2011 12:54
Analysis Quantity: 3.540E+02 g

Spectrum ID: 1_20110617_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #1 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/20/2011 14:36
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.096E-01	24.31	1.239E-01	1.288E-01	3.454E-02
Am-241	#AB	-4.196E-02	636.40	2.670E-01	2.670E-01	2.170E-01
Bi-212	#	2.209E-01	93.15	2.058E-01	2.063E-01	1.445E-01
Bi-214		4.168E-01	19.73	8.224E-02	8.683E-02	3.327E-02
Co-60	#AB	0.000E+00	2000.00	2.311E-02	2.311E-02	4.302E-02
Cs-137	#AB	-4.735E-03	537.90	2.547E-02	2.547E-02	2.045E-02
Eu-152	#AB	2.640E-02	223.50	5.900E-02	5.903E-02	4.602E-02
Eu-154	#AB	0.000E+00	2000.00	1.307E-02	1.307E-02	9.708E-02
K-40		9.653E+00	9.99	9.641E-01	1.178E+00	5.609E-02
Pa-234	#AB	-1.335E-03	12330.00	1.647E-01	1.647E-01	1.355E-01
Pb-210	#	0.000E+00	2000.00	1.449E+00	1.449E+00	0.000E+00
Pb-212		4.702E-01	15.78	7.420E-02	8.244E-02	3.234E-02
Pb-214		4.550E-01	19.62	8.929E-02	9.512E-02	3.313E-02
Ra-226	#	6.012E-01	83.01	4.991E-01	5.011E-01	3.709E-01
Th-230	#AB	-1.085E-02	141000.00	1.531E+01	1.531E+01	1.261E+01
Th-234	#AB	2.970E-01	158.50	4.706E-01	4.715E-01	3.693E-01
Tl-208		1.801E-01	23.26	4.189E-02	4.356E-02	1.287E-02
U-235	AB	-3.719E-03	873.40	3.248E-02	3.248E-02	2.651E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.283E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:03

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-22
Sample Description: Parcel E

Detector: HPGe #2 50-TP42229A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:54
Acquisition Time: 6/17/2011 12:10:37
Analysis Time: 6/17/2011 12:55
Analysis Quantity: 3.650E+02 g

Spectrum ID: 2_20110617_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.13 %

Efficiency: HPGe #2 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 1/19/2011 21:26
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		4.200E-01	29.60	1.243E-01	1.277E-01	5.879E-02
Am-241	#AB	-5.561E-02	465.50	2.589E-01	2.589E-01	2.098E-01
Bi-212	#	3.109E-01	73.26	2.278E-01	2.288E-01	1.559E-01
Bi-214		5.202E-01	17.96	9.344E-02	9.968E-02	2.699E-02
Co-60	#AB	-7.192E-03	497.00	3.574E-02	3.574E-02	2.872E-02
Cs-137	#AB	0.000E+00	2000.00	1.069E-02	1.069E-02	5.154E-03
Eu-152	#AB	-1.400E-02	439.10	6.150E-02	6.151E-02	4.937E-02
Eu-154	#AB	-1.406E-02	502.20	7.058E-02	7.059E-02	5.599E-02
K-40		1.092E+01	9.42	1.029E+00	1.282E+00	1.585E-01
Pa-234	#AB	3.625E-03	4272.00	1.548E-01	1.548E-01	1.271E-01
Pb-210	#	0.000E+00	241.60	3.628E-01	3.630E-01	0.000E+00
Pb-212		5.769E-01	16.75	9.663E-02	1.062E-01	4.237E-02
Pb-214		4.994E-01	21.45	1.071E-01	1.130E-01	4.490E-02
Ra-226		9.194E-01	57.72	5.306E-01	5.352E-01	3.794E-01
Th-230	#AB	-5.188E-01	2935.00	1.523E+01	1.523E+01	1.251E+01
Th-234	#	1.379E+00	43.35	5.977E-01	6.120E-01	3.167E-01
Tl-208	#	1.768E-01	23.14	4.091E-02	4.256E-02	2.105E-02
U-235	AB	2.723E-02	141.50	3.853E-02	3.858E-02	3.024E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.575E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:05

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-23
Sample Description: Parcel E

Detector: HPGe #3 51-TP32733A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:56
Acquisition Time: 6/17/2011 12:11:49
Analysis Time: 6/17/2011 12:57
Analysis Quantity: 3.290E+02 g

Spectrum ID: 3_20110617_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2705 sec
Dead Time: 0.17 %

Efficiency: HPGe #3 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/21/2011 13:54
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		9.051E-01	18.58	1.682E-01	1.796E-01	3.423E-02
Am-241	#AB	1.666E-02	802.70	1.337E-01	1.337E-01	1.089E-01
Bi-212	#AB	1.812E-01	136.60	2.475E-01	2.478E-01	1.875E-01
Bi-214		7.179E-01	17.88	1.284E-01	1.370E-01	4.296E-02
Co-60	#AB	6.488E-03	449.90	2.919E-02	2.919E-02	2.323E-02
Cs-137	#AB	4.186E-03	536.40	2.245E-02	2.245E-02	1.796E-02
Eu-152	#AB	-1.385E-02	474.70	6.575E-02	6.576E-02	5.299E-02
Eu-154	#AB	2.611E-03	3246.00	8.475E-02	8.475E-02	6.948E-02
K-40		6.960E+00	11.79	8.202E-01	9.542E-01	5.630E-02
Pa-234	#AB	-3.865E-02	538.70	2.082E-01	2.082E-01	1.679E-01
Pb-210	#AB	1.873E+00	261.80	4.905E+00	4.908E+00	3.927E+00
Pb-212		6.907E-01	12.69	8.766E-02	1.023E-01	3.315E-02
Pb-214		8.394E-01	14.23	1.195E-01	1.339E-01	4.241E-02
Ra-226		9.045E-01	63.81	5.772E-01	5.812E-01	4.319E-01
Th-230	#AB	0.000E+00	2000.00	1.038E+01	1.038E+01	9.959E+00
Th-234	#	1.274E+00	50.77	6.467E-01	6.580E-01	3.521E-01
Tl-208		2.509E-01	20.85	5.232E-02	5.491E-02	1.623E-02
U-235		4.235E-02	96.06	4.068E-02	4.081E-02	3.138E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.467E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:10

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-24
Sample Description: Parcel E

Detector: HPGe #4 50-TP42236A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 10:58
Acquisition Time: 6/17/2011 12:13:04
Analysis Time: 6/17/2011 12:58
Analysis Quantity: 3.300E+02 g

Spectrum ID: 4_20110617_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2701 sec
Dead Time: 0.05 %

Efficiency: HPGe #4 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/19/2011 20:43
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.398E-01	21.30	1.363E-01	1.433E-01	2.840E-02
Am-241	#AB	-4.824E-04	30630.00	1.477E-01	1.477E-01	1.217E-01
Bi-212	#	2.240E-01	93.92	2.104E-01	2.109E-01	1.495E-01
Bi-214		3.793E-01	22.83	8.659E-02	9.022E-02	3.414E-02
Co-60	#AB	1.039E-02	270.80	2.814E-02	2.815E-02	2.182E-02
Cs-137	#AB	1.307E-02	196.40	2.567E-02	2.569E-02	1.972E-02
Eu-152	#AB	1.429E-02	398.70	5.699E-02	5.700E-02	4.558E-02
Eu-154	#AB	-1.353E-02	4000.00	5.413E-01	5.413E-01	1.004E-01
K-40		6.903E+00	13.40	9.252E-01	1.044E+00	2.415E-01
Pa-234	#AB	-5.048E-03	2454.00	1.239E-01	1.239E-01	1.013E-01
Pb-210	#AB	-1.435E-02	22010.00	3.159E+00	3.159E+00	2.601E+00
Pb-212		5.646E-01	14.48	8.174E-02	9.242E-02	3.287E-02
Pb-214	#	3.949E-01	19.61	7.744E-02	8.251E-02	4.201E-02
Ra-226		6.818E-01	83.90	5.720E-01	5.743E-01	4.342E-01
Th-230	#AB	3.719E-01	2631.00	9.787E+00	9.787E+00	8.040E+00
Th-234	#AB	3.413E-01	138.90	4.740E-01	4.751E-01	3.735E-01
Tl-208		1.770E-01	24.22	4.288E-02	4.447E-02	1.498E-02
U-235		4.433E-02	83.68	3.709E-02	3.725E-02	2.809E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.076E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:10

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-25
Sample Description: Parcel E

Detector: HPGe #5 50-TP42234A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:00
Acquisition Time: 6/17/2011 12:14:05
Analysis Time: 6/17/2011 12:59
Analysis Quantity: 3.170E+02 g

Spectrum ID: 5_20110617_008
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.11 %

Efficiency: HPGe #5 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/18/2011 12:55
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.437E-01	20.67	1.744E-01	1.840E-01	5.003E-02
Am-241	#AB	6.985E-02	217.80	1.521E-01	1.522E-01	1.208E-01
Bi-212	#	2.939E-01	75.41	2.216E-01	2.225E-01	1.503E-01
Bi-214		5.839E-01	17.37	1.014E-01	1.087E-01	3.040E-02
Co-60	#AB	-5.303E-03	584.60	3.100E-02	3.100E-02	2.490E-02
Cs-137	#AB	1.482E-03	2038.00	3.019E-02	3.020E-02	2.473E-02
Eu-152	#AB	2.007E-02	345.90	6.940E-02	6.942E-02	5.553E-02
Eu-154	#AB	-1.463E-02	669.10	9.791E-02	9.792E-02	7.900E-02
K-40	#	6.748E+00	13.27	8.957E-01	1.013E+00	3.472E-01
Pa-234	#AB	0.000E+00	2000.00	3.448E-02	3.448E-02	1.378E-01
Pb-210	#AB	1.062E+00	299.60	3.183E+00	3.184E+00	2.538E+00
Pb-212		7.416E-01	13.26	9.835E-02	1.135E-01	4.213E-02
Pb-214		6.537E-01	14.45	9.448E-02	1.056E-01	2.766E-02
Ra-226		1.004E+00	61.61	6.187E-01	6.233E-01	4.574E-01
Th-230	#AB	4.510E+00	248.80	1.122E+01	1.125E+01	9.011E+00
Th-234	#AB	2.527E-01	192.30	4.858E-01	4.864E-01	3.993E-01
Tl-208		2.974E-01	17.99	5.350E-02	5.704E-02	1.461E-02
U-235	AB	3.093E-02	141.00	4.361E-02	4.367E-02	3.445E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.711E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-26
Sample Description: Parcel E

Detector: HPGe #6 50-TP50818A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:02
Acquisition Time: 6/17/2011 12:15:21
Analysis Time: 6/17/2011 13:00
Analysis Quantity: 3.200E+02 g

Spectrum ID: 6_20110617_007
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2709 sec
Dead Time: 0.33 %

Efficiency: HPGe #6 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 6/14/2011 14:00
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.597E-01	29.05	1.626E-01	1.672E-01	7.778E-02
Am-241	#AB	-8.147E-02	426.20	3.472E-01	3.473E-01	2.818E-01
Bi-212	#	3.077E-01	89.85	2.765E-01	2.773E-01	1.956E-01
Bi-214		7.102E-01	15.80	1.122E-01	1.218E-01	2.405E-02
Co-60	#AB	1.399E-03	738.30	1.033E-02	1.033E-02	3.540E-02
Cs-137	#AB	8.806E-03	387.10	3.409E-02	3.410E-02	2.716E-02
Eu-152	#AB	-3.850E-03	1971.00	7.589E-02	7.589E-02	6.215E-02
Eu-154	#AB	-4.681E-02	246.10	1.152E-01	1.153E-01	8.914E-02
K-40		9.479E+00	12.49	1.184E+00	1.357E+00	2.883E-01
Pa-234	#AB	0.000E+00	2000.00	2.957E-02	2.957E-02	1.702E-01
Pb-210	#AB	-2.343E+00	1557.00	3.646E+01	3.646E+01	2.989E+01
Pb-212		7.998E-01	14.90	1.192E-01	1.339E-01	5.206E-02
Pb-214		8.479E-01	16.20	1.374E-01	1.504E-01	5.066E-02
Ra-226		7.726E-01	98.26	7.591E-01	7.613E-01	5.818E-01
Th-230	#AB	1.473E-01	13900.00	2.048E+01	2.048E+01	1.687E+01
Th-234	#AB	5.340E-01	133.40	7.122E-01	7.140E-01	5.593E-01
Tl-208	#	2.497E-01	20.72	5.175E-02	5.435E-02	2.270E-02
U-235		8.475E-02	57.03	4.833E-02	4.876E-02	3.466E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.450E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-27
Sample Description: Parcel E

Detector: HPGe #7 50-TP32731A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:04
Acquisition Time: 6/17/2011 13:39:22
Analysis Time: 6/17/2011 14:24
Analysis Quantity: 3.580E+02 g

Spectrum ID: 7_20110617_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2707 sec
Dead Time: 0.25 %

Efficiency: HPGe #7 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 5/3/2011 14:19
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		1.080E+00	16.38	1.769E-01	1.921E-01	1.688E-02
Am-241	#AB	2.393E-01	170.10	4.072E-01	4.078E-01	3.202E-01
Bi-212	#	6.467E-01	44.13	2.854E-01	2.888E-01	1.696E-01
Bi-214	#	5.706E-01	19.03	1.086E-01	1.151E-01	5.224E-02
Co-60	#AB	1.526E-02	234.20	3.574E-02	3.576E-02	2.760E-02
Cs-137	#AB	-6.587E-03	504.40	3.323E-02	3.323E-02	2.672E-02
Eu-152	AB	-3.327E-02	264.80	8.809E-02	8.812E-02	7.010E-02
Eu-154	#AB	-5.194E-03	2431.00	1.263E-01	1.263E-01	1.035E-01
K-40		1.400E+01	9.34	1.307E+00	1.634E+00	1.586E-01
Pa-234	#AB	6.844E-03	2410.00	1.649E-01	1.649E-01	1.349E-01
Pb-210	#	0.000E+00	221.50	2.198E+00	2.200E+00	0.000E+00
Pb-212		9.403E-01	12.02	1.130E-01	1.339E-01	4.362E-02
Pb-214		6.463E-01	18.28	1.182E-01	1.270E-01	4.782E-02
Ra-226		6.958E-01	99.53	6.925E-01	6.945E-01	5.330E-01
Th-230	#AB	0.000E+00	2000.00	1.292E+01	1.292E+01	2.149E+01
Th-234	#AB	3.407E-01	228.40	7.782E-01	7.788E-01	6.251E-01
Tl-208		3.249E-01	16.88	5.483E-02	5.893E-02	1.496E-02
U-235		5.057E-02	88.88	4.494E-02	4.511E-02	3.421E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.955E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-28
Sample Description: Parcel E

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:06
Acquisition Time: 6/17/2011 13:41:15
Analysis Time: 6/17/2011 14:26
Analysis Quantity: 3.200E+02 g

Spectrum ID: 8_20110617_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.12 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.015E-01	22.94	1.150E-01	1.202E-01	1.537E-02
Am-241	#AB	9.441E-02	191.40	1.807E-01	1.809E-01	1.429E-01
Bi-212	#	2.184E-01	109.50	2.390E-01	2.395E-01	1.748E-01
Bi-214		3.071E-01	26.80	8.230E-02	8.481E-02	4.774E-02
Co-60	#AB	-1.642E-02	482.40	7.921E-02	7.922E-02	3.017E-02
Cs-137	#AB	6.216E-03	465.60	2.894E-02	2.894E-02	2.319E-02
Eu-152	#AB	-2.597E-04	25940.00	6.737E-02	6.737E-02	5.548E-02
Eu-154	#AB	-4.037E-02	247.80	1.000E-01	1.001E-01	7.772E-02
K-40		1.182E+01	9.35	1.105E+00	1.381E+00	2.022E-01
Pa-234	#AB	-1.579E-02	1103.00	1.741E-01	1.741E-01	1.416E-01
Pb-210	#AB	2.621E+00	247.10	6.478E+00	6.483E+00	5.164E+00
Pb-212		5.513E-01	15.07	8.308E-02	9.315E-02	3.555E-02
Pb-214		4.451E-01	20.96	9.328E-02	9.865E-02	4.012E-02
Ra-226		8.533E-01	64.12	5.471E-01	5.509E-01	3.981E-01
Th-230	#AB	4.609E-01	2119.00	9.765E+00	9.765E+00	8.013E+00
Th-234	#AB	-4.522E-01	113.00	5.108E-01	5.126E-01	3.980E-01
Tl-208	#	1.579E-01	25.95	4.096E-02	4.228E-02	2.107E-02
U-235	AB	1.746E-02	215.20	3.758E-02	3.760E-02	2.996E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.805E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-29
Sample Description: Parcel E

Detector: HPGe #9 51-TP42227A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:08
Acquisition Time: 6/17/2011 13:42:51
Analysis Time: 6/17/2011 14:28
Analysis Quantity: 3.080E+02 g

Spectrum ID: 9_20110617_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.14 %

Efficiency: HPGe #9 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:53
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		6.880E-01	22.85	1.572E-01	1.643E-01	5.680E-02
Am-241	#AB	-1.420E-01	236.90	3.363E-01	3.365E-01	1.610E-01
Bi-212		6.317E-01	35.97	2.272E-01	2.313E-01	7.671E-02
Bi-214		4.502E-01	20.32	9.148E-02	9.629E-02	4.302E-02
Co-60	#AB	-1.430E-02	232.40	3.323E-02	3.325E-02	2.564E-02
Cs-137	#AB	-8.106E-03	384.20	3.114E-02	3.115E-02	2.486E-02
Eu-152	#AB	2.637E-02	256.90	6.772E-02	6.775E-02	5.344E-02
Eu-154	#AB	2.658E-02	374.90	9.966E-02	9.968E-02	7.890E-02
K-40	#	1.306E+01	9.55	1.246E+00	1.546E+00	3.729E-01
Pa-234	#AB	-2.691E-02	760.40	2.046E-01	2.046E-01	1.658E-01
Pb-210	#AB	3.485E+00	175.30	6.109E+00	6.118E+00	4.827E+00
Pb-212		8.373E-01	10.93	9.149E-02	1.116E-01	2.958E-02
Pb-214		5.092E-01	18.04	9.186E-02	9.893E-02	3.715E-02
Ra-226	AB	2.513E-01	252.40	6.341E-01	6.344E-01	5.094E-01
Th-230	#AB	-4.735E+00	261.90	1.240E+01	1.243E+01	9.962E+00
Th-234	AB	3.670E-02	1495.00	5.487E-01	5.487E-01	4.503E-01
Tl-208	#	1.864E-01	24.12	4.498E-02	4.665E-02	2.345E-02
U-235		9.697E-02	39.04	3.786E-02	3.856E-02	2.507E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.028E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:12

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-30
Sample Description: Parcel E

Detector: HPGe #10 51-TP42231A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:10
Acquisition Time: 6/17/2011 13:43:47
Analysis Time: 6/17/2011 14:29
Analysis Quantity: 3.120E+02 g

Spectrum ID: 10_20110617_010
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.09 %

Efficiency: HPGe #10 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/28/2011 17:23
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228	#	5.378E-01	29.36	1.579E-01	1.622E-01	7.703E-02
Am-241	#AB	0.000E+00	2000.00	2.359E-01	2.359E-01	4.698E-01
Bi-212	#AB	1.446E-01	182.70	2.642E-01	2.643E-01	2.030E-01
Bi-214		4.426E-01	23.98	1.061E-01	1.102E-01	4.680E-02
Co-60	#AB	-5.721E-03	610.70	3.494E-02	3.494E-02	2.806E-02
Cs-137	#AB	2.204E-03	1208.00	2.662E-02	2.662E-02	2.165E-02
Eu-152	#AB	1.505E-02	516.10	7.769E-02	7.770E-02	6.267E-02
Eu-154	#AB	2.027E-03	5154.00	1.045E-01	1.045E-01	8.580E-02
K-40		1.385E+01	9.60	1.330E+00	1.646E+00	1.574E-01
Pa-234	#AB	0.000E+00	2000.00	2.842E-02	2.842E-02	3.311E-02
Pb-210	#	0.000E+00	205.50	1.588E+00	1.590E+00	0.000E+00
Pb-212		6.073E-01	16.11	9.784E-02	1.083E-01	4.052E-02
Pb-214		5.658E-01	21.24	1.202E-01	1.269E-01	4.402E-02
Ra-226	AB	4.942E-01	146.90	7.261E-01	7.270E-01	5.715E-01
Th-230	#AB	-1.226E+01	235.50	2.887E+01	2.894E+01	2.311E+01
Th-234	#AB	5.878E-02	1530.00	8.994E-01	8.994E-01	7.384E-01
Tl-208		2.003E-01	22.56	4.519E-02	4.712E-02	1.228E-02
U-235		5.946E-02	78.81	4.686E-02	4.708E-02	3.522E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.698E+01

Analyst: Joan Cosgrove

Reviewer: Philip Smith
Review Date: 6/17/2011 17:12

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-31
Sample Description: Parcel E

Detector: HPGe #6 50-TP50818A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:12
Acquisition Time: 6/16/2011 17:07:40
Analysis Time: 6/16/2011 17:53
Analysis Quantity: 3.660E+02 g

Spectrum ID: 6_20110616_006
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2709 sec
Dead Time: 0.32 %

Efficiency: HPGe #6 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 6/14/2011 14:00
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.026E-01	21.26	1.706E-01	1.795E-01	3.806E-02
Am-241	#AB	-9.948E-03	2417.00	2.404E-01	2.404E-01	1.974E-01
Bi-212	#	1.907E-01	116.80	2.227E-01	2.231E-01	1.621E-01
Bi-214		5.066E-01	23.87	1.209E-01	1.256E-01	4.205E-02
Co-60	#AB	1.233E-02	189.70	2.340E-02	2.341E-02	3.168E-02
Cs-137	#AB	7.164E-03	373.80	2.678E-02	2.678E-02	2.122E-02
Eu-152	#AB	-2.786E-02	287.30	8.003E-02	8.005E-02	6.370E-02
Eu-154	#AB	2.401E-03	4354.00	1.045E-01	1.045E-01	8.583E-02
K-40		1.396E+01	9.82	1.371E+00	1.684E+00	3.065E-01
Pa-234	#AB	3.982E-02	432.60	1.723E-01	1.723E-01	1.369E-01
Pb-210	#AB	1.667E+01	174.00	2.901E+01	2.905E+01	2.272E+01
Pb-212		5.135E-01	16.85	8.650E-02	9.498E-02	3.876E-02
Pb-214		5.045E-01	17.97	9.065E-02	9.768E-02	3.352E-02
Ra-226		6.236E-01	102.30	6.376E-01	6.394E-01	4.887E-01
Th-230	#AB	9.572E+00	163.00	1.560E+01	1.569E+01	1.229E+01
Th-234	#AB	3.782E-01	142.60	5.395E-01	5.407E-01	4.219E-01
Tl-208		2.083E-01	20.66	4.302E-02	4.519E-02	1.107E-02
U-235		5.774E-02	70.19	4.053E-02	4.076E-02	2.976E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 4.405E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:37

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-32
Sample Description: Parcel E

Detector: HPGe #12 51-TP32743A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:14
Acquisition Time: 6/16/2011 16:48:41
Analysis Time: 6/16/2011 17:33
Analysis Quantity: 3.270E+02 g

Spectrum ID: 12_20110616_009
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2702 sec
Dead Time: 0.06 %

Efficiency: HPGe #12 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 2/1/2011 09:56
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.947E-01	23.09	1.373E-01	1.434E-01	4.877E-02
Am-241	#AB	0.000E+00	2000.00	9.349E-02	9.349E-02	1.606E-01
Bi-212	#AB	1.651E-01	144.10	2.380E-01	2.383E-01	1.799E-01
Bi-214		4.006E-01	21.29	8.530E-02	8.940E-02	3.439E-02
Co-60	#AB	1.002E-02	169.40	1.697E-02	1.699E-02	2.722E-02
Cs-137	#AB	-4.073E-03	725.80	2.956E-02	2.956E-02	2.395E-02
Eu-152	#AB	-1.715E-02	387.70	6.649E-02	6.650E-02	5.329E-02
Eu-154	AB	-4.502E-02	232.40	1.047E-01	1.047E-01	8.136E-02
K-40		1.312E+01	8.60	1.128E+00	1.456E+00	5.652E-02
Pa-234	#AB	-7.729E-03	2327.00	1.798E-01	1.798E-01	1.473E-01
Pb-210	#	0.000E+00	681.30	2.168E+00	2.168E+00	0.000E+00
Pb-212		5.176E-01	14.76	7.641E-02	8.604E-02	2.999E-02
Pb-214		4.891E-01	20.78	1.016E-01	1.076E-01	3.781E-02
Ra-226		6.727E-01	90.07	6.059E-01	6.080E-01	4.628E-01
Th-230	#AB	-2.883E+00	451.80	1.302E+01	1.303E+01	1.056E+01
Th-234		1.027E+00	49.08	5.042E-01	5.136E-01	2.818E-01
Tl-208		1.896E-01	20.51	3.889E-02	4.088E-02	9.739E-03
U-235		4.542E-02	94.31	4.284E-02	4.298E-02	3.299E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.724E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:40

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-33
Sample Description: Parcel E

Detector: HPGe #11 51-TP32744A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:16
Acquisition Time: 6/16/2011 16:47:46
Analysis Time: 6/16/2011 17:32
Analysis Quantity: 3.220E+02 g

Spectrum ID: 11_20110616_011
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.14 %

Efficiency: HPGe #11 Tuna Can Soil Solid 83491-918
Efficiency Cal Date: 1/28/2011 17:38
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		4.754E-01	31.16	1.481E-01	1.517E-01	8.119E-02
Am-241	#AB	-5.464E-02	347.70	1.900E-01	1.900E-01	1.531E-01
Bi-212		9.008E-01	24.43	2.201E-01	2.286E-01	3.133E-02
Bi-214		6.178E-01	17.42	1.076E-01	1.152E-01	4.085E-02
Co-60	#AB	-3.064E-03	2423.00	7.423E-02	7.423E-02	2.880E-02
Cs-137	#AB	3.305E-03	689.40	2.279E-02	2.279E-02	1.835E-02
Eu-152	#AB	-2.263E-02	334.10	7.559E-02	7.561E-02	6.054E-02
Eu-154	#AB	-4.484E-02	248.70	1.115E-01	1.115E-01	8.730E-02
K-40		1.252E+01	9.52	1.192E+00	1.480E+00	2.505E-01
Pa-234	#AB	-1.831E-02	1017.00	1.862E-01	1.862E-01	1.514E-01
Pb-210	#AB	-2.539E-01	3164.00	8.034E+00	8.034E+00	6.602E+00
Pb-212		7.335E-01	12.10	8.878E-02	1.050E-01	3.410E-02
Pb-214		6.686E-01	14.69	9.821E-02	1.094E-01	3.334E-02
Ra-226	AB	4.300E-01	145.30	6.248E-01	6.257E-01	4.926E-01
Th-230	#AB	2.196E+00	560.00	1.230E+01	1.230E+01	1.001E+01
Th-234	#	7.205E-01	74.32	5.355E-01	5.399E-01	4.050E-01
Tl-208		2.342E-01	20.76	4.862E-02	5.105E-02	1.771E-02
U-235		5.932E-02	70.17	4.162E-02	4.186E-02	3.116E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.956E+01

Analyst: Chris Fluty

Reviewer: Philip Smith
Review Date: 6/17/2011 00:40

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-34
Sample Description: Parcel E

Detector: HPGe #10 51-TP42231A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:18
Acquisition Time: 6/17/2011 06:45:59
Analysis Time: 6/17/2011 07:31
Analysis Quantity: 3.530E+02 g

Spectrum ID: 10_20110617_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2703 sec
Dead Time: 0.10 %

Efficiency: HPGe #10 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 1/28/2011 17:23
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		5.748E-01	25.57	1.470E-01	1.523E-01	6.546E-02
Am-241	#AB	-1.172E-01	386.70	4.532E-01	4.533E-01	3.656E-01
Bi-212	#	4.733E-01	53.51	2.533E-01	2.553E-01	1.604E-01
Bi-214		5.450E-01	18.26	9.954E-02	1.060E-01	3.863E-02
Co-60	#AB	-6.726E-03	541.60	3.643E-02	3.643E-02	2.929E-02
Cs-137	#AB	-7.057E-03	396.20	2.796E-02	2.796E-02	2.226E-02
Eu-152	#AB	-1.271E-04	58300.00	7.412E-02	7.412E-02	6.105E-02
Eu-154	#AB	0.000E+00	2000.00	6.008E-02	6.008E-02	1.054E-01
K-40		1.268E+01	9.57	1.214E+00	1.504E+00	1.559E-01
Pa-234	#AB	3.566E-02	557.40	1.988E-01	1.988E-01	1.600E-01
Pb-210	#	0.000E+00	127.20	2.066E+00	2.072E+00	0.000E+00
Pb-212		7.050E-01	14.05	9.909E-02	1.128E-01	4.457E-02
Pb-214		6.665E-01	18.77	1.251E-01	1.340E-01	4.497E-02
Ra-226		1.176E+00	50.39	5.926E-01	5.993E-01	4.157E-01
Th-230	#AB	7.035E+00	349.90	2.462E+01	2.464E+01	1.988E+01
Th-234	#	1.099E+00	67.12	7.376E-01	7.450E-01	5.542E-01
Tl-208		3.050E-01	17.34	5.287E-02	5.662E-02	1.498E-02
U-235	AB	8.522E-03	523.00	4.456E-02	4.457E-02	3.628E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 2.530E+01

Analyst: Chanthachone Alexander

Reviewer: Philip Smith
Review Date: 6/17/2011 17:12

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-35
Sample Description: Parcel E

Detector: HPGe #8 51-TP42242A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:20
Acquisition Time: 6/17/2011 06:44:37
Analysis Time: 6/17/2011 07:29
Analysis Quantity: 3.510E+02 g

Spectrum ID: 8_20110617_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.13 %

Efficiency: HPGe #8 Tuna Can Soil Solid 83490-918
Efficiency Cal Date: 2/8/2011 08:42
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		7.044E-01	21.46	1.511E-01	1.588E-01	3.404E-02
Am-241	#AB	9.437E-02	169.50	1.599E-01	1.602E-01	1.257E-01
Bi-212	#	1.963E-01	110.30	2.165E-01	2.170E-01	1.585E-01
Bi-214		4.087E-01	18.21	7.443E-02	7.928E-02	2.517E-02
Co-60	#AB	2.088E-03	1551.00	3.239E-02	3.239E-02	2.705E-02
Cs-137	#AB	-3.553E-03	723.40	2.571E-02	2.571E-02	2.080E-02
Eu-152	#AB	-1.606E-02	423.10	6.792E-02	6.793E-02	5.468E-02
Eu-154	#AB	3.318E-03	2949.00	9.784E-02	9.784E-02	8.025E-02
K-40		1.378E+01	8.24	1.136E+00	1.491E+00	1.843E-01
Pa-234	#AB	5.571E-03	3005.00	1.674E-01	1.674E-01	1.373E-01
Pb-210	#AB	-2.150E+00	285.50	6.136E+00	6.140E+00	4.920E+00
Pb-212		5.237E-01	13.45	7.042E-02	8.100E-02	2.608E-02
Pb-214		5.081E-01	17.49	8.887E-02	9.612E-02	3.357E-02
Ra-226	AB	4.368E-01	129.90	5.675E-01	5.685E-01	4.447E-01
Th-230	#AB	-4.621E+00	248.40	1.148E+01	1.150E+01	9.212E+00
Th-234		1.040E+00	54.37	5.655E-01	5.742E-01	3.236E-01
Tl-208		2.329E-01	18.49	4.306E-02	4.576E-02	1.162E-02
U-235		4.421E-02	77.46	3.424E-02	3.441E-02	2.560E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.798E+01

Analyst: Chanthachone Alexander

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

TetraTech Hunter's Point Lab

Sample ID: 04-PE-D0442-36
Sample Description: Parcel E

Detector: HPGe #7 50-TP32731A
Contract: Tetra Tech HPS
Unit Number: D0442
Sample Time: 6/15/2011 11:22
Acquisition Time: 6/17/2011 06:44:19
Analysis Time: 6/17/2011 07:29
Analysis Quantity: 3.410E+02 g

Spectrum ID: 7_20110617_003
Sample Type: SAMPLE
Matrix: S
Live Time: 2700 sec
Real Time: 2704 sec
Dead Time: 0.16 %

Efficiency: HPGe #7 Tuna Can Soil Solid 83489-918
Efficiency Cal Date: 5/3/2011 14:19
Library: GenericAnalysis.lib
Analysis Engine: Env32 G53W4.26

Nuclide	Flags	Activity pCi/g	2-Sigma Counting Uncert %	2-Sigma Counting Uncert pCi/g	2-Sigma Total Uncert pCi/g	Minimum Detectable Activity pCi/g
Ac-228		8.976E-01	18.41	1.653E-01	1.766E-01	1.772E-02
Am-241	#AB	-1.654E-02	2326.00	3.847E-01	3.847E-01	3.158E-01
Bi-212		3.164E-01	89.72	2.839E-01	2.847E-01	2.026E-01
Bi-214		6.014E-01	17.55	1.056E-01	1.129E-01	2.738E-02
Co-60	#AB	1.328E-02	231.50	3.076E-02	3.077E-02	2.336E-02
Cs-137	#AB	-4.812E-03	647.50	3.116E-02	3.116E-02	2.514E-02
Eu-152	#AB	-1.603E-02	516.80	8.285E-02	8.286E-02	6.694E-02
Eu-154	#AB	3.165E-02	352.10	1.114E-01	1.115E-01	8.797E-02
K-40		1.365E+01	9.33	1.273E+00	1.592E+00	6.915E-02
Pa-234	#AB	1.097E-01	161.90	1.776E-01	1.778E-01	1.309E-01
Pb-210	#	0.000E+00	460.40	1.765E+00	1.766E+00	0.000E+00
Pb-212		8.015E-01	13.33	1.069E-01	1.232E-01	4.019E-02
Pb-214		6.363E-01	17.20	1.095E-01	1.187E-01	3.852E-02
Ra-226		6.365E-01	100.70	6.407E-01	6.425E-01	4.887E-01
Th-230	#AB	-1.631E+01	172.30	2.811E+01	2.825E+01	2.237E+01
Th-234	#AB	-1.478E-02	5196.00	7.678E-01	7.678E-01	6.317E-01
Tl-208		2.882E-01	17.38	5.009E-02	5.362E-02	9.374E-03
U-235		4.279E-02	106.20	4.544E-02	4.555E-02	3.497E-02

- All peaks for activity calculation had bad shape.
A - Activity < MDA
B - Activity < Critical Level

Total Activity 1.803E+01

Analyst: Chanthachone Alexander

Reviewer: Philip Smith
Review Date: 6/17/2011 17:11

ATTACHMENT 5

EXCAVATED SOIL UNIT
OFF-SITE LABORATORY REPORTS
(on CD only)

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Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-19

Radiochemistry

Lab Sample ID: F1G050464-001
Work Order: MKNHF
Matrix: SOLID

Date Collected: 06/15/11 1048
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.468**		**0.175**		**0.116**	30	**07/07/11**	**07/25/11**
Americium 241	0.0491	U	0.108		0.086	30	07/07/11	07/25/11
Bismuth 212	**0.422**		**0.471**		**0.239**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.672**		**0.162**		**0.060**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0113	U	0.0443	0.0700	0.034	30	07/07/11	07/25/11
Cobalt 60	-0.0157	U	0.0634		0.050	30	07/07/11	07/25/11
Europium 152	**0.114**		**0.108**		**0.075**	30	**07/07/11**	**07/25/11**
Europium 154	0.0382	U	0.0925		0.317	30	07/07/11	07/25/11
Lead 210	0.779	U	1.33	1.50	0.923	30	07/07/11	07/25/11
Lead 212	**0.464**		**0.117**		**0.057**	30	**07/07/11**	**07/25/11**
Lead 214	**0.635**		**0.132**		**0.041**	30	**07/07/11**	**07/25/11**
Potassium 40	**9.01**		**1.51**		**0.331**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0238	U	0.144		0.118	30	07/07/11	07/25/11
Radium (226)	**0.672**	J	**0.162**	0.700	**0.060**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.256**		**0.0695**		**0.024**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.468**		**0.175**		**0.116**	30	**07/07/11**	**07/25/11**
Thorium 234	0.478	U	0.346		0.834	30	07/07/11	07/25/11
Uranium 235	0.104	U	0.250		0.206	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-19 DUP

Radiochemistry

Lab Sample ID: F1G050464-001X
Work Order: MKNHF
Matrix: SOLID

Date Collected: 06/15/11 1048
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.362**		**0.160**		**0.075**	30	**07/07/11**	**07/25/11**
Americium 241	0.0617	U	0.0900		0.069	30	07/07/11	07/25/11
Bismuth 212	0.131	U	0.273		0.205	30	07/07/11	07/25/11
Bismuth 214	**0.490**		**0.128**		**0.051**	30	**07/07/11**	**07/25/11**
Cesium 137	0.00616	U	0.0311	0.0700	0.024	30	07/07/11	07/25/11
Cobalt 60	0.00102	U	0.0367		0.030	30	07/07/11	07/25/11
Europium 152	-0.0334	U	0.106		0.083	30	07/07/11	07/25/11
Europium 154	-0.0516	U	0.242		0.190	30	07/07/11	07/25/11
Lead 210	0.0	U	0.842	1.50	0.745	30	07/07/11	07/25/11
Lead 212	**0.558**		**0.110**		**0.044**	30	**07/07/11**	**07/25/11**
Lead 214	**0.531**		**0.128**		**0.058**	30	**07/07/11**	**07/25/11**
Potassium 40	**10.2**		**1.49**		**0.108**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0521	U	0.0936		0.111	30	07/07/11	07/25/11
Radium (226)	**0.490**	**J**	**0.128**	0.700	**0.051**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.175**		**0.0577**		**0.021**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.362**		**0.160**		**0.075**	30	**07/07/11**	**07/25/11**
Thorium 234	0.364	U	0.371		0.576	30	07/07/11	07/25/11
Uranium 235	0.0127	U	0.0303		0.181	30	07/07/11	07/25/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-20

Radiochemistry

Lab Sample ID: F1G050464-002
Work Order: MKNM9
Matrix: SOLID

Date Collected: 06/15/11 1050
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD			pCi/g			Batch # 1188036		Yld %
Actinium 228	**0.550**		**0.191**		**0.048**	30	**07/07/11**	**07/25/11**
Americium 241	-0.00781	U	0.105		0.085	30	07/07/11	07/25/11
Bismuth 212	**0.351**		**0.353**		**0.245**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.644**		**0.173**		**0.066**	30	**07/07/11**	**07/25/11**
Cesium 137	-0.00562	U	0.0513	0.0700	0.041	30	07/07/11	07/25/11
Cobalt 60	0.0	U	0.0201		0.011	30	07/07/11	07/25/11
Europium 152	0.0225	U	0.0820		0.082	30	07/07/11	07/25/11
Europium 154	0.0708	U	0.161		0.245	30	07/07/11	07/25/11
Lead 210	**2.33**		**1.83**	1.50	**1.06**	30	**07/07/11**	**07/25/11**
Lead 212	**0.520**		**0.123**		**0.058**	30	**07/07/11**	**07/25/11**
Lead 214	**0.307**		**0.126**		**0.083**	30	**07/07/11**	**07/25/11**
Potassium 40	**8.84**		**1.43**		**0.118**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0771	U	0.166		0.100	30	07/07/11	07/25/11
Radium (226)	**0.644**	J	**0.173**	0.700	**0.066**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.275**		**0.0710**		**0.019**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.550**		**0.191**		**0.048**	30	**07/07/11**	**07/25/11**
Thorium 234	0.817	U	0.575		0.829	30	07/07/11	07/25/11
Uranium 235	0.149	U	0.242		0.198	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-21

Radiochemistry

Lab Sample ID: F1G050464-003
Work Order: MKNNA
Matrix: SOLID

Date Collected: 06/15/11 1052
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.800**		**0.221**		**0.071**	30	**07/07/11**	**07/25/11**
Americium 241	0.0	U	0.0822		0.081	30	07/07/11	07/25/11
Bismuth 212	0.303	U	0.468		0.336	30	07/07/11	07/25/11
Bismuth 214	**0.570**		**0.156**		**0.046**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0149	U	0.0524	0.0700	0.040	30	07/07/11	07/25/11
Cobalt 60	0.0120	U	0.0501		0.037	30	07/07/11	07/25/11
Europium 152	0.0378	U	0.0856		0.084	30	07/07/11	07/25/11
Europium 154	0.0634	U	0.0962		0.347	30	07/07/11	07/25/11
Lead 210	**2.28**		**1.55**	1.50	**0.992**	30	**07/07/11**	**07/25/11**
Lead 212	**0.517**		**0.122**		**0.053**	30	**07/07/11**	**07/25/11**
Lead 214	**0.549**		**0.165**		**0.068**	30	**07/07/11**	**07/25/11**
Potassium 40	**8.61**		**1.82**		**0.340**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0517	U	0.125		0.096	30	07/07/11	07/25/11
Radium (226)	**0.570**	J	**0.156**	0.700	**0.046**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.210**		**0.0800**		**0.030**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.800**		**0.221**		**0.071**	30	**07/07/11**	**07/25/11**
Thorium 234	0.622	U	0.445		0.629	30	07/07/11	07/25/11
Uranium 235	0.0822	U	0.193		0.155	30	07/07/11	07/25/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-22

Radiochemistry

Lab Sample ID: F1G050464-004
Work Order: MKNNC
Matrix: SOLID

Date Collected: 06/15/11 1054
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	0.790		0.215		0.069	30	07/07/11	07/28/11
Americium 241	-0.00177	U	0.0893		0.073	30	07/07/11	07/28/11
Bismuth 212	0.515		0.582		0.310	30	07/07/11	07/28/11
Bismuth 214	0.652		0.190		0.070	30	07/07/11	07/28/11
Cesium 137	0.000120	U	0.0335	0.0700	0.027	30	07/07/11	07/28/11
Cobalt 60	0.0143	U	0.0398		0.071	30	07/07/11	07/28/11
Europium 152	0.0905	U	0.0942		0.096	30	07/07/11	07/28/11
Europium 154	0.0191	U	0.0790		0.110	30	07/07/11	07/28/11
Lead 210	0.0798	U	1.16	1.50	1.03	30	07/07/11	07/28/11
Lead 212	0.618		0.162		0.075	30	07/07/11	07/28/11
Lead 214	0.582		0.136		0.067	30	07/07/11	07/28/11
Potassium 40	10.3		1.97		0.330	30	07/07/11	07/28/11
Protactinium 234	0.0790	U	0.193		0.113	30	07/07/11	07/28/11
Radium (226)	0.652	J	0.190	0.700	0.070	30	07/07/11	07/28/11
Thallium 208	0.248		0.0835		0.030	30	07/07/11	07/28/11
Thorium 232	0.790		0.215		0.069	30	07/07/11	07/28/11
Thorium 234	0.339	U	0.513		0.799	30	07/07/11	07/28/11
Uranium 235	0.229		0.216		0.159	30	07/07/11	07/28/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-23

Radiochemistry

Lab Sample ID: F1G050464-005
Work Order: MKNND
Matrix: SOLID

Date Collected: 06/15/11 1056
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	0.670		0.218		0.111	30	07/07/11	07/25/11
Americium 241	-0.0644	U	0.138		0.110	30	07/07/11	07/25/11
Bismuth 212	1.08		0.365		0.069	30	07/07/11	07/25/11
Bismuth 214	0.852		0.179		0.058	30	07/07/11	07/25/11
Cesium 137	0.0231	U	0.0591	0.0700	0.046	30	07/07/11	07/25/11
Cobalt 60	0.0280	U	0.0603		0.045	30	07/07/11	07/25/11
Europium 152	0.00670	U	0.102		0.082	30	07/07/11	07/25/11
Europium 154	0.115	U	0.369		0.287	30	07/07/11	07/25/11
Lead 210	0.459	U	1.32	1.50	1.13	30	07/07/11	07/25/11
Lead 212	0.897		0.157		0.063	30	07/07/11	07/25/11
Lead 214	0.967		0.198		0.092	30	07/07/11	07/25/11
Potassium 40	4.09		1.13		0.504	30	07/07/11	07/25/11
Protactinium 234	0.0288	U	0.174		0.110	30	07/07/11	07/25/11
Radium (226)	0.852		0.179	0.700	0.058	30	07/07/11	07/25/11
Thallium 208	0.325		0.111		0.046	30	07/07/11	07/25/11
Thorium 232	0.670		0.218		0.111	30	07/07/11	07/25/11
Thorium 234	0.978		0.588		0.755	30	07/07/11	07/25/11
Uranium 235	0.183	U	0.296		0.205	30	07/07/11	07/25/11

NOTE(S)

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Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-24

Radiochemistry

Lab Sample ID: F1G050464-006
Work Order: MKNNE
Matrix: SOLID

Date Collected: 06/15/11 1058
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.753**		**0.198**		**0.052**	30	**07/07/11**	**07/25/11**
Americium 241	0.000224	U	0.0736		0.060	30	07/07/11	07/25/11
Bismuth 212	**0.356**		**0.473**		**0.278**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.683**		**0.177**		**0.068**	30	**07/07/11**	**07/25/11**
Cesium 137	0.00560	U	0.0478	0.0700	0.038	30	07/07/11	07/25/11
Cobalt 60	0.00578	U	0.0262		0.012	30	07/07/11	07/25/11
Europium 152	0.0414	U	0.0681		0.105	30	07/07/11	07/25/11
Europium 154	0.0106	U	0.0747		0.257	30	07/07/11	07/25/11
Lead 210	1.14	U	1.42	1.50	1.16	30	07/07/11	07/25/11
Lead 212	**0.569**		**0.119**		**0.049**	30	**07/07/11**	**07/25/11**
Lead 214	**0.565**		**0.135**		**0.060**	30	**07/07/11**	**07/25/11**
Potassium 40	**7.97**		**1.39**		**0.125**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0229	U	0.147		0.120	30	07/07/11	07/25/11
Radium (226)	**0.683**	J	**0.177**	0.700	**0.068**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.283**		**0.0719**		**0.015**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.753**		**0.198**		**0.052**	30	**07/07/11**	**07/25/11**
Thorium 234	**1.12**		**0.707**		**0.934**	30	**07/07/11**	**07/25/11**
Uranium 235	0.135	U	0.249		0.199	30	07/07/11	07/25/11

NOTE(S)

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Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-25

Radiochemistry

Lab Sample ID: F1G050464-007
Work Order: MKNNF
Matrix: SOLID

Date Collected: 06/15/11 1100
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.694**		**0.231**		**0.134**	30	**07/07/11**	**07/25/11**
Americium 241	0.0295	U	0.129		0.104	30	07/07/11	07/25/11
Bismuth 212	**0.453**		**0.474**		**0.218**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.712**		**0.187**		**0.072**	30	**07/07/11**	**07/25/11**
Cesium 137	0.00382	U	0.0444	0.0700	0.036	30	07/07/11	07/25/11
Cobalt 60	-0.0110	U	0.0634		0.050	30	07/07/11	07/25/11
Europium 152	0.0957	U	0.114		0.123	30	07/07/11	07/25/11
Europium 154	-0.196	U	0.480		0.371	30	07/07/11	07/25/11
Lead 210	**1.34**	J	**1.55**	1.50	**1.05**	30	**07/07/11**	**07/25/11**
Lead 212	**0.992**		**0.182**		**0.073**	30	**07/07/11**	**07/25/11**
Lead 214	**0.706**		**0.159**		**0.061**	30	**07/07/11**	**07/25/11**
Potassium 40	**7.30**		**1.42**		**0.369**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0288	U	0.156		0.116	30	07/07/11	07/25/11
Radium (226)	**0.712**		**0.187**	0.700	**0.072**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.329**		**0.0846**		**0.028**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.694**		**0.231**		**0.134**	30	**07/07/11**	**07/25/11**
Thorium 234	0.610	U	0.658		1.09	30	07/07/11	07/25/11
Uranium 235	0.0187	U	0.0978		0.251	30	07/07/11	07/25/11

NOTE(S)

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J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-26

Radiochemistry

Lab Sample ID: F1G050464-008
Work Order: MKNNG
Matrix: SOLID

Date Collected: 06/15/11 1102
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.992**		**0.234**		**0.079**	30	**07/07/11**	**07/25/11**
Americium 241	0.0934	U	0.128		0.098	30	07/07/11	07/25/11
Bismuth 212	**0.636**		**0.668**		**0.351**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.991**		**0.247**		**0.082**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0	U	0.0491	0.0700	0.051	30	07/07/11	07/25/11
Cobalt 60	-0.00253	U	0.0802		0.065	30	07/07/11	07/25/11
Europium 152	0.0628	U	0.116		0.108	30	07/07/11	07/25/11
Europium 154	0.137	U	0.384		0.283	30	07/07/11	07/25/11
Lead 210	0.925	U	1.43	1.50	1.18	30	07/07/11	07/25/11
Lead 212	**0.847**		**0.190**		**0.080**	30	**07/07/11**	**07/25/11**
Lead 214	**1.01**		**0.198**		**0.097**	30	**07/07/11**	**07/25/11**
Potassium 40	**8.24**		**1.94**		**0.568**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.000432	U	0.196		0.162	30	07/07/11	07/25/11
Radium (226)	**0.991**		**0.247**	0.700	**0.082**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.328**		**0.0956**		**0.031**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.992**		**0.234**		**0.079**	30	**07/07/11**	**07/25/11**
Thorium 234	0.790	U	0.685		0.927	30	07/07/11	07/25/11
Uranium 235	0.133	U	0.153		0.235	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-27

Radiochemistry

Lab Sample ID: F1G050464-009
Work Order: MKNNH
Matrix: SOLID

Date Collected: 06/15/11 1104
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**1.22**		**0.265**		**0.049**	30	**07/07/11**	**07/25/11**
Americium 241	0.0426	U	0.126		0.102	30	07/07/11	07/25/11
Bismuth 212	**0.674**		**0.628**		**0.401**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.619**		**0.192**		**0.070**	30	**07/07/11**	**07/25/11**
Cesium 137	-0.0300	U	1.53	0.0700	0.062	30	07/07/11	07/25/11
Cobalt 60	0.0	U	0.0339		0.019	30	07/07/11	07/25/11
Europium 152	**0.111**		**0.196**		**0.111**	30	**07/07/11**	**07/25/11**
Europium 154	0.0545	U	0.111		0.283	30	07/07/11	07/25/11
Lead 210	**1.77**		**1.61**	1.50	**1.06**	30	**07/07/11**	**07/25/11**
Lead 212	**1.19**		**0.211**		**0.079**	30	**07/07/11**	**07/25/11**
Lead 214	**0.970**		**0.186**		**0.074**	30	**07/07/11**	**07/25/11**
Potassium 40	**11.8**		**2.23**		**0.585**	30	**07/07/11**	**07/25/11**
Protactinium 234	-0.0766	U	0.186		0.148	30	07/07/11	07/25/11
Radium (226)	**0.619**	J	**0.192**	0.700	**0.070**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.371**		**0.113**		**0.041**	30	**07/07/11**	**07/25/11**
Thorium 232	**1.22**		**0.265**		**0.049**	30	**07/07/11**	**07/25/11**
Thorium 234	0.608	U	0.661		0.989	30	07/07/11	07/25/11
Uranium 235	-0.00000326	U	0.310		0.255	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-28

Radiochemistry

Lab Sample ID: F1G050464-010
Work Order: MKNNJ
Matrix: SOLID

Date Collected: 06/15/11 1106
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.527**		**0.183**		**0.114**	30	**07/07/11**	**07/25/11**
Americium 241	-0.0444	U	0.110		0.087	30	07/07/11	07/25/11
Bismuth 212	**0.287**		**0.312**		**0.246**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.670**		**0.167**		**0.064**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0126	U	0.0452	0.0700	0.035	30	07/07/11	07/25/11
Cobalt 60	0.00503	U	0.0253		0.043	30	07/07/11	07/25/11
Europium 152	0.0375	U	0.0629		0.103	30	07/07/11	07/25/11
Europium 154	0.0285	U	0.117		0.206	30	07/07/11	07/25/11
Lead 210	0.711	U	1.02	1.50	0.783	30	07/07/11	07/25/11
Lead 212	**0.568**		**0.174**		**0.079**	30	**07/07/11**	**07/25/11**
Lead 214	**0.550**		**0.137**		**0.055**	30	**07/07/11**	**07/25/11**
Potassium 40	**11.3**		**1.65**		**0.119**	30	**07/07/11**	**07/25/11**
Protactinium 234	-0.0172	U	0.0486		0.130	30	07/07/11	07/25/11
Radium (226)	**0.670**	**J**	**0.167**	0.700	**0.064**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.272**		**0.0703**		**0.020**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.527**		**0.183**		**0.114**	30	**07/07/11**	**07/25/11**
Thorium 234	0.272	U	0.478		0.855	30	07/07/11	07/25/11
Uranium 235	0.0633	U	0.114		0.227	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-29

Radiochemistry

Lab Sample ID: F1G050464-011
Work Order: MKNNK
Matrix: SOLID

Date Collected: 06/15/11 1108
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	0.582		0.221		0.161	30	07/07/11	07/25/11
Americium 241	0.000332	U	0.127		0.104	30	07/07/11	07/25/11
Bismuth 212	0.393	U	0.711		0.416	30	07/07/11	07/25/11
Bismuth 214	0.939		0.217		0.059	30	07/07/11	07/25/11
Cesium 137	-0.0284	U	0.176	0.0700	0.063	30	07/07/11	07/25/11
Cobalt 60	0.00537	U	0.0301		0.054	30	07/07/11	07/25/11
Europium 152	0.0489	U	0.0978		0.138	30	07/07/11	07/25/11
Europium 154	0.108	U	0.230		0.284	30	07/07/11	07/25/11
Lead 210	-0.0931	U	1.64	1.50	1.34	30	07/07/11	07/25/11
Lead 212	0.781		0.171		0.075	30	07/07/11	07/25/11
Lead 214	0.861		0.194		0.047	30	07/07/11	07/25/11
Potassium 40	14.0		2.32		0.316	30	07/07/11	07/25/11
Protactinium 234	0.0704	U	0.181		0.167	30	07/07/11	07/25/11
Radium (226)	0.939		0.217	0.700	0.059	30	07/07/11	07/25/11
Thallium 208	0.324		0.110		0.040	30	07/07/11	07/25/11
Thorium 232	0.582		0.221		0.161	30	07/07/11	07/25/11
Thorium 234	1.20		1.46		1.19	30	07/07/11	07/25/11
Uranium 235	0.280		0.338		0.267	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-30

Radiochemistry

Lab Sample ID: F1G050464-012
Work Order: MKNNL
Matrix: SOLID

Date Collected: 06/15/11 1110
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.488**		**0.228**		**0.141**	30	**07/07/11**	**07/25/11**
Americium 241	0.0272	U	0.122		0.098	30	07/07/11	07/25/11
Bismuth 212	0.191	U	0.422		0.314	30	07/07/11	07/25/11
Bismuth 214	**0.807**		**0.194**		**0.065**	30	**07/07/11**	**07/25/11**
Cesium 137	-0.0110	U	0.0615	0.0700	0.049	30	07/07/11	07/25/11
Cobalt 60	**0.0399**		**0.0502**		**0.033**	30	**07/07/11**	**07/25/11**
Europium 152	0.0724	U	0.134		0.101	30	07/07/11	07/25/11
Europium 154	0.0427	U	0.103		0.318	30	07/07/11	07/25/11
Lead 210	0.428	U	1.63	1.50	1.38	30	07/07/11	07/25/11
Lead 212	**0.781**		**0.176**		**0.076**	30	**07/07/11**	**07/25/11**
Lead 214	**0.881**		**0.185**		**0.067**	30	**07/07/11**	**07/25/11**
Potassium 40	**17.0**		**2.19**		**0.133**	30	**07/07/11**	**07/25/11**
Protactinium 234	**0.138**		**0.238**		**0.128**	30	**07/07/11**	**07/25/11**
Radium (226)	**0.807**		**0.194**	0.700	**0.065**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.308**		**0.0848**		**0.024**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.488**		**0.228**		**0.141**	30	**07/07/11**	**07/25/11**
Thorium 234	**1.96**		**1.38**		**0.866**	30	**07/07/11**	**07/25/11**
Uranium 235	-0.00863	U	0.0444		0.244	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-31

Radiochemistry

Lab Sample ID: F1G050464-013
Work Order: MKNNM
Matrix: SOLID

Date Collected: 06/15/11 1112
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD			pCi/g			Batch # 1188036		Yld %
Actinium 228	**0.548**		**0.180**		**0.056**	30	**07/07/11**	**07/25/11**
Americium 241	0.0140	U	0.117		0.095	30	07/07/11	07/25/11
Bismuth 212	0.0781	U	0.245		0.303	30	07/07/11	07/25/11
Bismuth 214	**0.713**		**0.155**		**0.051**	30	**07/07/11**	**07/25/11**
Cesium 137	-0.00173	U	0.0472	0.0700	0.038	30	07/07/11	07/25/11
Cobalt 60	0.0174	U	0.0353		0.034	30	07/07/11	07/25/11
Europium 152	**0.0833**		**0.0931**		**0.075**	30	**07/07/11**	**07/25/11**
Europium 154	0.00583	U	0.00819		0.317	30	07/07/11	07/25/11
Lead 210	0.441	U	1.05	1.50	0.908	30	07/07/11	07/25/11
Lead 212	**0.530**		**0.119**		**0.056**	30	**07/07/11**	**07/25/11**
Lead 214	**0.608**		**0.174**		**0.074**	30	**07/07/11**	**07/25/11**
Potassium 40	**11.0**		**1.73**		**0.525**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.00759	U	0.0146		0.131	30	07/07/11	07/25/11
Radium (226)	**0.713**		**0.155**	0.700	**0.051**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.281**		**0.0705**		**0.023**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.548**		**0.180**		**0.056**	30	**07/07/11**	**07/25/11**
Thorium 234	0.306	U	0.513		0.794	30	07/07/11	07/25/11
Uranium 235	0.113	U	0.212		0.196	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-32

Radiochemistry

Lab Sample ID: F1G050464-014
Work Order: MKNNN
Matrix: SOLID

Date Collected: 06/15/11 1114
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.557**		**0.215**		**0.129**	30	**07/07/11**	**07/25/11**
Americium 241	-0.0462	U	0.113		0.089	30	07/07/11	07/25/11
Bismuth 212	**0.384**		**0.536**		**0.381**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.752**		**0.187**		**0.050**	30	**07/07/11**	**07/25/11**
Cesium 137	0.000333	U	0.0660	0.0700	0.054	30	07/07/11	07/25/11
Cobalt 60	0.00671	U	0.0479		0.051	30	07/07/11	07/25/11
Europium 152	0.0820	U	0.143		0.107	30	07/07/11	07/25/11
Europium 154	-0.252	U	0.554		0.415	30	07/07/11	07/25/11
Lead 210	-0.321	U	2.97	1.50	1.38	30	07/07/11	07/25/11
Lead 212	**0.638**		**0.160**		**0.069**	30	**07/07/11**	**07/25/11**
Lead 214	**0.645**		**0.157**		**0.071**	30	**07/07/11**	**07/25/11**
Potassium 40	**13.0**		**2.35**		**0.368**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.0975	U	0.225		0.128	30	07/07/11	07/25/11
Radium (226)	**0.752**		**0.187**	0.700	**0.050**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.268**		**0.0959**		**0.035**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.557**		**0.215**		**0.129**	30	**07/07/11**	**07/25/11**
Thorium 234	0.721	U	0.627		0.970	30	07/07/11	07/25/11
Uranium 235	-0.000360	U	0.00428		0.214	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-33

Radiochemistry

Lab Sample ID: F1G050464-015
Work Order: MKNNP
Matrix: SOLID

Date Collected: 06/15/11 1116
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**1.03**		**0.230**		**0.034**	30	**07/07/11**	**07/27/11**
Americium 241	0.0175	U	0.0855		0.069	30	07/07/11	07/27/11
Bismuth 212	**0.460**		**0.453**		**0.314**	30	**07/07/11**	**07/27/11**
Bismuth 214	**0.665**		**0.178**		**0.070**	30	**07/07/11**	**07/27/11**
Cesium 137	0.0153	U	0.0517	0.0700	0.040	30	07/07/11	07/27/11
Cobalt 60	0.0106	U	0.0581		0.046	30	07/07/11	07/27/11
Europium 152	0.0588	U	0.100		0.108	30	07/07/11	07/27/11
Europium 154	0.0389	U	0.0615		0.236	30	07/07/11	07/27/11
Lead 210	**1.62**		**1.33**	1.50	**0.929**	30	**07/07/11**	**07/27/11**
Lead 212	**0.743**		**0.159**		**0.073**	30	**07/07/11**	**07/27/11**
Lead 214	**0.632**		**0.151**		**0.064**	30	**07/07/11**	**07/27/11**
Potassium 40	**13.5**		**1.96**		**0.363**	30	**07/07/11**	**07/27/11**
Protactinium 234	0.0891	U	0.132		0.146	30	07/07/11	07/27/11
Radium (226)	**0.665**	J	**0.178**	0.700	**0.070**	30	**07/07/11**	**07/27/11**
Thallium 208	**0.214**		**0.0680**		**0.028**	30	**07/07/11**	**07/27/11**
Thorium 232	**1.03**		**0.230**		**0.034**	30	**07/07/11**	**07/27/11**
Thorium 234	0.434	U	0.518		0.981	30	07/07/11	07/27/11
Uranium 235	0.0708	U	0.225		0.184	30	07/07/11	07/27/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-34

Radiochemistry

Lab Sample ID: F1G050464-016
Work Order: MKNNQ
Matrix: SOLID

Date Collected: 06/15/11 1118
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD			pCi/g			Batch # 1188036		Yld %
Actinium 228	**0.942**		**0.171**		**0.054**	30	**07/07/11**	**07/25/11**
Americium 241	-0.00520	U	0.0774		0.063	30	07/07/11	07/25/11
Bismuth 212	**0.930**		**0.382**		**0.117**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.621**		**0.126**		**0.038**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0122	U	0.0423	0.0700	0.033	30	07/07/11	07/25/11
Cobalt 60	-0.0168	U	0.0599		0.047	30	07/07/11	07/25/11
Europium 152	0.0401	U	0.102		0.095	30	07/07/11	07/25/11
Europium 154	0.0550	U	0.281		0.223	30	07/07/11	07/25/11
Lead 210	0.678	U	1.25	1.50	0.991	30	07/07/11	07/25/11
Lead 212	**0.788**		**0.150**		**0.060**	30	**07/07/11**	**07/25/11**
Lead 214	**0.680**		**0.148**		**0.055**	30	**07/07/11**	**07/25/11**
Potassium 40	**11.4**		**1.66**		**0.373**	30	**07/07/11**	**07/25/11**
Protactinium 234	-0.0632	U	0.154		0.123	30	07/07/11	07/25/11
Radium (226)	**0.621**	J	**0.126**	0.700	**0.038**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.285**		**0.0603**		**0.012**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.942**		**0.171**		**0.054**	30	**07/07/11**	**07/25/11**
Thorium 234	0.268	U	0.285		0.992	30	07/07/11	07/25/11
Uranium 235	0.156	U	0.134		0.221	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
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J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-35

Radiochemistry

Lab Sample ID: F1G050464-017
Work Order: MKNNR
Matrix: SOLID

Date Collected: 06/15/11 1120
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	**0.628**		**0.213**		**0.108**	30	**07/07/11**	**07/25/11**
Americium 241	-0.00539	U	0.0710		0.058	30	07/07/11	07/25/11
Bismuth 212	**0.523**		**0.452**		**0.279**	30	**07/07/11**	**07/25/11**
Bismuth 214	**0.560**		**0.141**		**0.053**	30	**07/07/11**	**07/25/11**
Cesium 137	0.0222	U	0.0343	0.0700	0.024	30	07/07/11	07/25/11
Cobalt 60	-0.00129	U	0.0429		0.035	30	07/07/11	07/25/11
Europium 152	0.0616	U	0.115		0.096	30	07/07/11	07/25/11
Europium 154	0.0289	U	0.226		0.288	30	07/07/11	07/25/11
Lead 210	**1.70**		**1.46**	1.50	**0.983**	30	**07/07/11**	**07/25/11**
Lead 212	**0.548**		**0.117**		**0.055**	30	**07/07/11**	**07/25/11**
Lead 214	**0.676**		**0.152**		**0.060**	30	**07/07/11**	**07/25/11**
Potassium 40	**14.0**		**1.86**		**0.118**	30	**07/07/11**	**07/25/11**
Protactinium 234	0.100	U	0.138		0.128	30	07/07/11	07/25/11
Radium (226)	**0.560**	J	**0.141**	0.700	**0.053**	30	**07/07/11**	**07/25/11**
Thallium 208	**0.213**		**0.0698**		**0.023**	30	**07/07/11**	**07/25/11**
Thorium 232	**0.628**		**0.213**		**0.108**	30	**07/07/11**	**07/25/11**
Thorium 234	**2.28**		**1.19**		**0.750**	30	**07/07/11**	**07/25/11**
Uranium 235	0.110	U	0.129		0.250	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-36

Radiochemistry

Lab Sample ID: F1G050464-018
Work Order: MKNNT
Matrix: SOLID

Date Collected: 06/15/11 1122
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Gamma Ra-226 & hits by EPA 901.1 MOD				pCi/g		Batch # 1188036		Yld %
Actinium 228	0.549		0.212		0.095	30	07/07/11	07/25/11
Americium 241	0.0451	U	0.131		0.106	30	07/07/11	07/25/11
Bismuth 212	0.491		0.455		0.318	30	07/07/11	07/25/11
Bismuth 214	0.633		0.147		0.054	30	07/07/11	07/25/11
Cesium 137	0.0	U	0.0436	0.0700	0.062	30	07/07/11	07/25/11
Cobalt 60	0.00255	U	0.0304		0.012	30	07/07/11	07/25/11
Europium 152	0.0917	U	0.110		0.111	30	07/07/11	07/25/11
Europium 154	0.0108	U	0.418		0.343	30	07/07/11	07/25/11
Lead 210	-0.0407	U	1.30	1.50	1.07	30	07/07/11	07/25/11
Lead 212	0.699		0.169		0.080	30	07/07/11	07/25/11
Lead 214	0.827		0.187		0.074	30	07/07/11	07/25/11
Potassium 40	13.0		1.87		0.343	30	07/07/11	07/25/11
Protactinium 234	-0.00854	U	0.0221		0.129	30	07/07/11	07/25/11
Radium (226)	0.633	J	0.147	0.700	0.054	30	07/07/11	07/25/11
Thallium 208	0.371		0.0829		0.025	30	07/07/11	07/25/11
Thorium 232	0.549		0.212		0.095	30	07/07/11	07/25/11
Thorium 234	0.428	U	0.484		0.969	30	07/07/11	07/25/11
Uranium 235	0.143	U	0.262		0.213	30	07/07/11	07/25/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-23

Radiochemistry

Lab Sample ID: F1G050455-001
Work Order: MKNDR
Matrix: SOLID

Date Collected: 06/15/11 1056
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Total SR BY GFPC	**EPA-905 MOD**			**pCi/g**		**Batch # 1186146**		**Yld % 88.**
Strontium Total	0.0342	U	0.121	0.320	0.116	400	07/05/11	07/21/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

U Result is less than the sample detection limit.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-23 DUP

Radiochemistry

Lab Sample ID: F1G050455-001X
Work Order: MKNDR
Matrix: SOLID

Date Collected: 06/15/11 1056
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Total SR BY GFPC	EPA-905 MOD			pCi/g		Batch # 1186146		Yld % 88.
Strontium Total	0.122		0.131	0.320	0.119	400	07/05/11	07/21/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

Tetra Tech EC, Inc.

Client Sample ID: 04-PE-D0442-25

Radiochemistry

Lab Sample ID: F1G050455-002
Work Order: MKNDT
Matrix: SOLID

Date Collected: 06/15/11 1100
Date Received: 07/05/11 1110

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDL	Count Time	Prep Date	Analysis Date
Total SR BY GFPC	EPA-905 MOD			pCi/g		Batch # 1186146		Yld % 87.
Strontium Total	0.226		0.138	0.320	0.118	400	07/05/11	07/21/11

NOTE(S)

Data are incomplete without the case narrative.
Bold results are greater than the MDL.

The MDL is an estimate of the measured concentration at which there is a 99% confidence that a given analyte is given sample matrix. This is functionally analogous to the "critical value" or the "limit of detection".

Ra-226 results analyzed by EPA 901.1 MOD were calculated and reported from the 46.09 percent abundant 609.31 KeV line of Bi-214.

ATTACHMENT 6

BACKFILL MATERIAL
RESRAD REPORT
(on CD only)

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(1)
A-1	Ba-137m (Source: FGR 12)	3.606E+00	3.606E+00	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(4)
A-1	Cs-137 (Source: FGR 12)	7.510E-04	7.510E-04	DCF1(5)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(6)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(7)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(8)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(9)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(10)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(11)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(12)
A-1	Sr-90 (Source: FGR 12)	7.043E-04	7.043E-04	DCF1(13)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(14)
A-1	Y-90 (Source: FGR 12)	2.391E-02	2.391E-02	DCF1(15)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(1)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(2)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(3)
B-1	Sr-90+D	1.308E-03	1.300E-03	DCF2(4)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(1)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(2)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(3)
D-1	Sr-90+D	1.528E-04	1.420E-04	DCF3(4)
D-34	Food transfer factors:			
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(1,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(1,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(2,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(2,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(3,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(3,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(4,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(4,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(4,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(1,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(2,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(2,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(3,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(3,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(4,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	3.360E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Cs-137	4.300E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pb-210	8.400E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.400E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Sr-90	1.710E-01	0.000E+00	---	S1(4)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(4)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.623E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.663E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.374E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.516E-03	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.168E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.168E-01	FMEAT
R018	Contamination fraction of milk	-1	-1	0.168E-01	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	336.00 square meters	Cs-137	4.300E-02
Thickness:	2.00 meters	Pb-210	8.400E-02
Cover Depth:	0.00 meters	Ra-226	8.400E-02
		Sr-90	1.710E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.113E+00	1.102E+00	1.082E+00	1.017E+00	8.762E-01	6.304E-01	3.484E-01	2.204E-01
M(t):	4.450E-02	4.408E-02	4.327E-02	4.067E-02	3.505E-02	2.522E-02	1.394E-02	8.815E-03

Maximum TDOSE(t): 1.113E+00 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.422E-02	0.0667	6.092E-08	0.0000	0.000E+00	0.0000	2.485E-03	0.0022	2.173E-04	0.0002	7.096E-05	0.0001	1.955E-05	0.0000
Pb-210	2.663E-04	0.0002	8.613E-05	0.0001	0.000E+00	0.0000	1.758E-01	0.1580	6.010E-04	0.0005	2.928E-04	0.0003	5.531E-03	0.0050
Ra-226	4.840E-01	0.4350	3.374E-05	0.0000	0.000E+00	0.0000	1.328E-01	0.1194	3.927E-04	0.0004	4.688E-04	0.0004	1.105E-03	0.0010
Sr-90	2.132E-03	0.0019	9.907E-06	0.0000	0.000E+00	0.0000	2.259E-01	0.2030	4.561E-03	0.0041	1.354E-03	0.0012	2.368E-04	0.0002
Total	5.606E-01	0.5039	1.298E-04	0.0001	0.000E+00	0.0000	5.370E-01	0.4826	5.772E-03	0.0052	2.187E-03	0.0020	6.893E-03	0.0062

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.701E-02	0.0692
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.826E-01	0.1641
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.188E-01	0.5562
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.341E-01	0.2105
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.113E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.252E-02	0.0658	5.953E-08	0.0000	0.000E+00	0.0000	2.428E-03	0.0022	2.123E-04	0.0002	6.934E-05	0.0001	1.910E-05	0.0000
Pb-210	2.577E-04	0.0002	8.335E-05	0.0001	0.000E+00	0.0000	1.701E-01	0.1544	5.817E-04	0.0005	2.834E-04	0.0003	5.353E-03	0.0049
Ra-226	4.826E-01	0.4379	3.627E-05	0.0000	0.000E+00	0.0000	1.379E-01	0.1251	4.109E-04	0.0004	4.767E-04	0.0004	1.271E-03	0.0012
Sr-90	2.071E-03	0.0019	9.621E-06	0.0000	0.000E+00	0.0000	2.193E-01	0.1990	4.429E-03	0.0040	1.315E-03	0.0012	2.300E-04	0.0002
Total	5.575E-01	0.5059	1.293E-04	0.0001	0.000E+00	0.0000	5.298E-01	0.4807	5.634E-03	0.0051	2.144E-03	0.0019	6.873E-03	0.0062

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.525E-02	0.0683
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.767E-01	0.1603
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.227E-01	0.5651
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.274E-01	0.2063
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.102E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	6.924E-02	0.0640	5.684E-08	0.0000	0.000E+00	0.0000	2.318E-03	0.0021	2.027E-04	0.0002	6.620E-05	0.0001	1.824E-05	0.0000
Pb-210	2.413E-04	0.0002	7.807E-05	0.0001	0.000E+00	0.0000	1.594E-01	0.1473	5.448E-04	0.0005	2.654E-04	0.0002	5.013E-03	0.0046
Ra-226	4.800E-01	0.4437	4.107E-05	0.0000	0.000E+00	0.0000	1.473E-01	0.1362	4.435E-04	0.0004	4.910E-04	0.0005	1.585E-03	0.0015
Sr-90	1.953E-03	0.0018	9.073E-06	0.0000	0.000E+00	0.0000	2.068E-01	0.1912	4.177E-03	0.0039	1.240E-03	0.0011	2.169E-04	0.0002
Total	5.514E-01	0.5098	1.283E-04	0.0001	0.000E+00	0.0000	5.158E-01	0.4769	5.368E-03	0.0050	2.063E-03	0.0019	6.834E-03	0.0063

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.184E-02	0.0664
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-01	0.1530
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.299E-01	0.5823
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.144E-01	0.1983
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	5.888E-02	0.0579	4.834E-08	0.0000	0.000E+00	0.0000	1.972E-03	0.0019	1.724E-04	0.0002	5.630E-05	0.0001	1.551E-05	0.0000
Pb-210	1.919E-04	0.0002	6.208E-05	0.0001	0.000E+00	0.0000	1.267E-01	0.1246	4.332E-04	0.0004	2.111E-04	0.0002	3.986E-03	0.0039
Ra-226	4.707E-01	0.4629	5.530E-05	0.0001	0.000E+00	0.0000	1.751E-01	0.1722	5.398E-04	0.0005	5.326E-04	0.0005	2.519E-03	0.0025
Sr-90	1.590E-03	0.0016	7.389E-06	0.0000	0.000E+00	0.0000	1.685E-01	0.1657	3.402E-03	0.0033	1.010E-03	0.0010	1.767E-04	0.0002
Total	5.313E-01	0.5226	1.248E-04	0.0001	0.000E+00	0.0000	4.723E-01	0.4645	4.547E-03	0.0045	1.810E-03	0.0018	6.698E-03	0.0066

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.110E-02	0.0601
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.316E-01	0.1294
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.495E-01	0.6387
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-01	0.1718
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.017E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	3.707E-02	0.0423	3.043E-08	0.0000	0.000E+00	0.0000	1.241E-03	0.0014	1.085E-04	0.0001	3.544E-05	0.0000	9.764E-06	0.0000
Pb-210	9.969E-05	0.0001	3.225E-05	0.0000	0.000E+00	0.0000	6.582E-02	0.0751	2.250E-04	0.0003	1.096E-04	0.0001	2.071E-03	0.0024
Ra-226	4.451E-01	0.5080	7.973E-05	0.0001	0.000E+00	0.0000	2.216E-01	0.2529	7.019E-04	0.0008	5.968E-04	0.0007	4.145E-03	0.0047
Sr-90	8.848E-04	0.0010	4.111E-06	0.0000	0.000E+00	0.0000	9.372E-02	0.1070	1.893E-03	0.0022	5.619E-04	0.0006	9.828E-05	0.0001
Total	4.831E-01	0.5514	1.161E-04	0.0001	0.000E+00	0.0000	3.824E-01	0.4364	2.928E-03	0.0033	1.304E-03	0.0015	6.324E-03	0.0072

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.846E-02	0.0439
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.836E-02	0.0780
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.722E-01	0.7672
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.716E-02	0.1109
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.762E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.336E-03	0.0116	6.023E-09	0.0000	0.000E+00	0.0000	2.457E-04	0.0004	2.148E-05	0.0000	7.015E-06	0.0000	1.932E-06	0.0000
Pb-210	1.007E-05	0.0000	3.258E-06	0.0000	0.000E+00	0.0000	6.651E-03	0.0106	2.274E-05	0.0000	1.108E-05	0.0000	2.092E-04	0.0003
Ra-226	3.657E-01	0.5802	8.963E-05	0.0001	0.000E+00	0.0000	2.313E-01	0.3669	7.450E-04	0.0012	5.724E-04	0.0009	4.955E-03	0.0079
Sr-90	1.136E-04	0.0002	5.280E-07	0.0000	0.000E+00	0.0000	1.204E-02	0.0191	2.431E-04	0.0004	7.216E-05	0.0001	1.262E-05	0.0000
Total	3.732E-01	0.5920	9.342E-05	0.0001	0.000E+00	0.0000	2.503E-01	0.3970	1.032E-03	0.0016	6.627E-04	0.0011	5.178E-03	0.0082

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.613E-03	0.0121
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.907E-03	0.0110
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.034E-01	0.9572
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.248E-02	0.0198
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.304E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.169E-05	0.0002	5.885E-11	0.0000	0.000E+00	0.0000	2.401E-06	0.0000	2.099E-07	0.0000	6.855E-08	0.0000	1.888E-08	0.0000
Pb-210	1.442E-08	0.0000	4.664E-09	0.0000	0.000E+00	0.0000	9.519E-06	0.0000	3.255E-08	0.0000	1.586E-08	0.0000	2.995E-07	0.0000
Ra-226	2.086E-01	0.5988	5.305E-05	0.0002	0.000E+00	0.0000	1.359E-01	0.3900	4.384E-04	0.0013	3.331E-04	0.0010	2.950E-03	0.0085
Sr-90	3.228E-07	0.0000	1.500E-09	0.0000	0.000E+00	0.0000	3.419E-05	0.0001	6.904E-07	0.0000	2.050E-07	0.0000	3.585E-08	0.0000
Total	2.087E-01	0.5990	5.306E-05	0.0002	0.000E+00	0.0000	1.359E-01	0.3901	4.393E-04	0.0013	3.333E-04	0.0010	2.950E-03	0.0085

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.439E-05	0.0002
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.886E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.483E-01	0.9996
Sr-90	1.597E-05	0.0000	8.101E-09	0.0000	0.000E+00	0.0000	4.447E-07	0.0000	4.620E-08	0.0000	2.522E-08	0.0000	5.194E-05	0.0001
Total	1.597E-05	0.0000	8.101E-09	0.0000	0.000E+00	0.0000	4.447E-07	0.0000	4.620E-08	0.0000	2.522E-08	0.0000	3.484E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	6.613E-12	0.0000	5.429E-18	0.0000	0.000E+00	0.0000	2.215E-13	0.0000	1.936E-14	0.0000	6.323E-15	0.0000	1.742E-15	0.0000
Pb-210	1.599E-18	0.0000	5.173E-19	0.0000	0.000E+00	0.0000	1.056E-15	0.0000	3.610E-18	0.0000	1.759E-18	0.0000	3.322E-17	0.0000
Ra-226	2.925E-02	0.1327	7.437E-06	0.0000	0.000E+00	0.0000	1.905E-02	0.0864	6.146E-05	0.0003	4.669E-05	0.0002	4.135E-04	0.0019
Sr-90	3.941E-16	0.0000	1.831E-18	0.0000	0.000E+00	0.0000	4.174E-14	0.0000	8.430E-16	0.0000	2.503E-16	0.0000	4.378E-17	0.0000
Total	2.925E-02	0.1327	7.437E-06	0.0000	0.000E+00	0.0000	1.905E-02	0.0864	6.146E-05	0.0003	4.669E-05	0.0002	4.135E-04	0.0019

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.862E-12	0.0000
Pb-210	3.330E-15	0.0000	6.978E-18	0.0000	0.000E+00	0.0000	8.623E-17	0.0000	9.581E-19	0.0000	7.864E-19	0.0000	4.522E-15	0.0000
Ra-226	1.668E-01	0.7570	2.985E-04	0.0014	0.000E+00	0.0000	4.328E-03	0.0196	5.058E-05	0.0002	5.831E-05	0.0003	2.204E-01	1.0000
Sr-90	2.602E-13	0.0000	1.320E-16	0.0000	0.000E+00	0.0000	7.248E-15	0.0000	7.542E-16	0.0000	4.112E-16	0.0000	3.120E-13	0.0000
Total	1.668E-01	0.7570	2.985E-04	0.0014	0.000E+00	0.0000	4.328E-03	0.0196	5.058E-05	0.0002	5.831E-05	0.0003	2.204E-01	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137+D	Cs-137+D	1.000E+00	1.791E+00	1.750E+00	1.671E+00	1.421E+00	8.945E-01	1.770E-01	1.730E-03	1.596E-10
Pb-210+D	Pb-210+D	1.000E+00	2.174E+00	2.104E+00	1.970E+00	1.567E+00	8.138E-01	8.223E-02	1.177E-04	5.383E-14
Ra-226+D	Ra-226+D	1.000E+00	7.327E+00	7.306E+00	7.265E+00	7.124E+00	6.735E+00	5.534E+00	3.157E+00	8.615E-01
Ra-226+D	Pb-210+D	1.000E+00	4.002E-02	1.073E-01	2.329E-01	6.076E-01	1.267E+00	1.650E+00	9.897E-01	1.762E+00
Ra-226+D	∑DSR(j)		7.367E+00	7.414E+00	7.498E+00	7.732E+00	8.002E+00	7.184E+00	4.146E+00	2.624E+00
Sr-90+D	Sr-90+D	1.000E+00	1.369E+00	1.330E+00	1.254E+00	1.021E+00	5.682E-01	7.298E-02	3.037E-04	1.825E-12

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	1.396E+01	1.429E+01	1.496E+01	1.759E+01	2.795E+01	1.412E+02	1.445E+04	1.567E+11
Pb-210	1.150E+01	1.188E+01	1.269E+01	1.596E+01	3.072E+01	3.040E+02	2.124E+05	*7.634E+13
Ra-226	3.394E+00	3.372E+00	3.334E+00	3.233E+00	3.124E+00	3.480E+00	6.030E+00	9.529E+00
Sr-90	1.826E+01	1.880E+01	1.994E+01	2.448E+01	4.400E+01	3.426E+02	8.231E+04	1.370E+13

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Cs-137	4.300E-02	0.000E+00	1.791E+00	1.396E+01	1.791E+00	1.396E+01
Pb-210	8.400E-02	0.000E+00	2.174E+00	1.150E+01	2.174E+00	1.150E+01
Ra-226	8.400E-02	33.58 ± 0.07	8.007E+00	3.122E+00	7.367E+00	3.394E+00
Sr-90	1.710E-01	0.000E+00	1.369E+00	1.826E+01	1.369E+00	1.826E+01

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	Cs-137	1.000E+00	7.701E-02	7.525E-02	7.184E-02	6.110E-02	3.846E-02	7.613E-03	7.439E-05	6.862E-12
Pb-210	Pb-210	1.000E+00	1.826E-01	1.767E-01	1.655E-01	1.316E-01	6.836E-02	6.907E-03	9.886E-06	4.522E-15
Pb-210	Ra-226	1.000E+00	3.361E-03	9.014E-03	1.957E-02	5.104E-02	1.064E-01	1.386E-01	8.314E-02	1.480E-01
Pb-210	∑DOSE(j)		1.859E-01	1.857E-01	1.851E-01	1.826E-01	1.748E-01	1.455E-01	8.315E-02	1.480E-01
Ra-226	Ra-226	1.000E+00	6.155E-01	6.137E-01	6.103E-01	5.984E-01	5.658E-01	4.648E-01	2.651E-01	7.236E-02
Sr-90	Sr-90	1.000E+00	2.341E-01	2.274E-01	2.144E-01	1.746E-01	9.716E-02	1.248E-02	5.194E-05	3.120E-13

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	Cs-137	1.000E+00	4.300E-02	4.202E-02	4.012E-02	3.412E-02	2.148E-02	4.251E-03	4.154E-05	3.832E-12
Pb-210	Pb-210	1.000E+00	8.400E-02	8.129E-02	7.614E-02	6.054E-02	3.145E-02	3.178E-03	4.548E-06	5.045E-16
Pb-210	Ra-226	1.000E+00	0.000E+00	2.565E-03	7.429E-03	2.194E-02	4.751E-02	6.257E-02	3.757E-02	5.267E-03
Pb-210	∑S(j):		8.400E-02	8.386E-02	8.357E-02	8.248E-02	7.896E-02	6.574E-02	3.757E-02	5.267E-03
Ra-226	Ra-226	1.000E+00	8.400E-02	8.376E-02	8.330E-02	8.167E-02	7.722E-02	6.344E-02	3.619E-02	5.073E-03
Sr-90	Sr-90	1.000E+00	1.710E-01	1.661E-01	1.566E-01	1.275E-01	7.096E-02	9.113E-03	2.588E-05	3.161E-14

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 0.50 seconds

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Time= 3.000E+00 10
Time= 1.000E+01 13
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Cancer Risk Slope Factors Summary Table
Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Cs-137+D	2.55E-06	5.32E-10	SLPF(1,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(2,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(3,1)
Sf-1	Sr-90+D	1.96E-08	4.82E-10	SLPF(4,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Cs-137+D	1.12E-10	1.12E-10	SLPF(1,2)
Sf-2	Pb-210+D	3.08E-08	1.58E-08	SLPF(2,2)
Sf-2	Ra-226+D	2.83E-08	2.82E-08	SLPF(3,2)
Sf-2	Sr-90+D	4.33E-10	4.25E-10	SLPF(4,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(1,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(2,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(3,3)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(4,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.04E-11	3.04E-11	SLPF(1,4)
Sf-3	Pb-210+D	2.66E-09	8.81E-10	SLPF(2,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(3,4)
Sf-3	Sr-90+D	7.40E-11	5.59E-11	SLPF(4,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(1,5)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(2,5)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(3,5)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(4,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
At-218	3.570E-09	5.341E-01	5.341E-01	5.341E-01	5.341E-01	5.341E-01	5.341E-01	5.341E-01	5.341E-01
Ba-137m	2.690E-06	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01
Bi-210	2.760E-09	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01	5.228E-01
Bi-214	7.480E-06	5.150E-01	5.150E-01	5.150E-01	5.150E-01	5.150E-01	5.150E-01	5.150E-01	5.150E-01
Cs-137	5.320E-10	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01
Pb-210	1.410E-09	5.353E-01	5.353E-01	5.353E-01	5.353E-01	5.353E-01	5.353E-01	5.353E-01	5.353E-01
Pb-214	9.820E-07	5.226E-01	5.226E-01	5.226E-01	5.226E-01	5.226E-01	5.226E-01	5.226E-01	5.226E-01
Po-210	3.950E-11	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01
Po-214	3.860E-10	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01
Po-218	4.260E-11	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01
Ra-226	2.290E-08	5.332E-01	5.332E-01	5.332E-01	5.332E-01	5.332E-01	5.332E-01	5.332E-01	5.332E-01
Rn-222	1.740E-09	5.126E-01	5.126E-01	5.126E-01	5.126E-01	5.126E-01	5.126E-01	5.126E-01	5.126E-01
Sr-90	4.820E-10	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01
Tl-210	0.000E+00	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01	6.000E-01
Y-90	1.910E-08	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.932E-03	5.028E+01	4.397E+00	1.436E+00	3.955E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.651E+01
Pb-210	3.774E-03	2.456E+01	8.394E-02	4.090E-02	7.726E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.545E+01
Ra-226	3.774E-03	9.822E+01	2.863E-01	3.506E-01	7.726E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.963E+01
Sr-90	7.683E-03	1.500E+03	3.026E+01	8.986E+00	1.573E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.540E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.211E-06	0.0643	4.680E-12	0.0000	4.067E-08	0.0022	3.557E-09	0.0002	1.161E-09	0.0001	3.200E-10	0.0000
Pb-210	5.429E-09	0.0003	3.383E-09	0.0002	2.471E-06	0.1311	8.505E-09	0.0005	4.129E-09	0.0002	7.752E-08	0.0041
Ra-226	1.058E-05	0.5613	3.070E-09	0.0002	1.455E-06	0.0772	4.242E-09	0.0002	5.193E-09	0.0003	1.144E-08	0.0006
Sr-90	3.434E-08	0.0018	6.645E-11	0.0000	2.852E-06	0.1513	5.760E-08	0.0031	1.710E-08	0.0009	2.991E-09	0.0002
Total	1.183E-05	0.6277	6.524E-09	0.0003	6.819E-06	0.3617	7.390E-08	0.0039	2.758E-08	0.0015	9.227E-08	0.0049

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E-06	0.0667
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.570E-06	0.1363
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.206E-05	0.6397
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.964E-06	0.1572
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.211E-06	0.0643	4.680E-12	0.0000	0.000E+00	0.0000	4.067E-08	0.0022	3.557E-09	0.0002	1.161E-09	0.0001	3.200E-10	0.0000
Pb-210	3.559E-09	0.0002	2.218E-09	0.0001	0.000E+00	0.0000	1.615E-06	0.0857	5.523E-09	0.0003	2.691E-09	0.0001	5.082E-08	0.0027
Ra-226	1.058E-05	0.5614	4.235E-09	0.0002	0.000E+00	0.0000	2.311E-06	0.1226	7.224E-09	0.0004	6.631E-09	0.0004	3.814E-08	0.0020
Sr-90	3.434E-08	0.0018	6.645E-11	0.0000	0.000E+00	0.0000	2.852E-06	0.1513	5.760E-08	0.0031	1.710E-08	0.0009	2.991E-09	0.0002
Total	1.183E-05	0.6277	6.524E-09	0.0003	0.000E+00	0.0000	6.819E-06	0.3617	7.390E-08	0.0039	2.758E-08	0.0015	9.227E-08	0.0049

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E-06	0.0667
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.680E-06	0.0891
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-05	0.6870
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.964E-06	0.1572
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.888E-03	4.913E+01	4.296E+00	1.403E+00	3.865E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.522E+01
Pb-210	3.768E-03	2.460E+01	8.472E-02	4.111E-02	7.713E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.550E+01
Ra-226	3.764E-03	9.795E+01	2.856E-01	3.497E-01	7.705E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.936E+01
Sr-90	7.461E-03	1.457E+03	2.942E+01	8.732E+00	1.527E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.496E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.184E-06	0.0633	4.573E-12	0.0000	3.974E-08	0.0021	3.475E-09	0.0002	1.135E-09	0.0001	3.126E-10	0.0000
Pb-210	5.418E-09	0.0003	3.376E-09	0.0002	2.467E-06	0.1319	8.495E-09	0.0005	4.123E-09	0.0002	7.736E-08	0.0041
Ra-226	1.055E-05	0.5643	3.061E-09	0.0002	1.451E-06	0.0776	4.230E-09	0.0002	5.179E-09	0.0003	1.141E-08	0.0006
Sr-90	3.335E-08	0.0018	6.453E-11	0.0000	2.770E-06	0.1481	5.594E-08	0.0030	1.661E-08	0.0009	2.905E-09	0.0002
Total	1.177E-05	0.6297	6.506E-09	0.0003	6.727E-06	0.3598	7.214E-08	0.0039	2.704E-08	0.0014	9.199E-08	0.0049

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.0657
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.566E-06	0.1372
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.203E-05	0.6432
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.879E-06	0.1539
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.870E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.184E-06	0.0633	4.573E-12	0.0000	0.000E+00	0.0000	3.974E-08	0.0021	3.475E-09	0.0002	1.135E-09	0.0001	3.126E-10	0.0000
Pb-210	3.445E-09	0.0002	2.146E-09	0.0001	0.000E+00	0.0000	1.563E-06	0.0836	5.345E-09	0.0003	2.604E-09	0.0001	4.918E-08	0.0026
Ra-226	1.055E-05	0.5644	4.291E-09	0.0002	0.000E+00	0.0000	2.354E-06	0.1259	7.380E-09	0.0004	6.697E-09	0.0004	3.959E-08	0.0021
Sr-90	3.335E-08	0.0018	6.453E-11	0.0000	0.000E+00	0.0000	2.770E-06	0.1481	5.594E-08	0.0030	1.661E-08	0.0009	2.905E-09	0.0002
Total	1.177E-05	0.6297	6.506E-09	0.0003	0.000E+00	0.0000	6.727E-06	0.3598	7.214E-08	0.0039	2.704E-08	0.0014	9.199E-08	0.0049

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.0657
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.626E-06	0.0870
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.297E-05	0.6934
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.879E-06	0.1539
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.870E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.802E-03	4.691E+01	4.102E+00	1.339E+00	3.690E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.272E+01
Pb-210	3.755E-03	2.451E+01	8.442E-02	4.097E-02	7.687E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.541E+01
Ra-226	3.743E-03	9.741E+01	2.840E-01	3.477E-01	7.662E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.880E+01
Sr-90	7.036E-03	1.374E+03	2.774E+01	8.235E+00	1.440E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.411E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.130E-06	0.0614	4.367E-12	0.0000	3.795E-08	0.0021	3.318E-09	0.0002	1.084E-09	0.0001	2.985E-10	0.0000
Pb-210	5.395E-09	0.0003	3.361E-09	0.0002	2.457E-06	0.1335	8.460E-09	0.0005	4.106E-09	0.0002	7.704E-08	0.0042
Ra-226	1.049E-05	0.5702	3.044E-09	0.0002	1.443E-06	0.0784	4.206E-09	0.0002	5.150E-09	0.0003	1.135E-08	0.0006
Sr-90	3.145E-08	0.0017	6.085E-11	0.0000	2.612E-06	0.1419	5.275E-08	0.0029	1.566E-08	0.0009	2.739E-09	0.0001
Total	1.166E-05	0.6336	6.471E-09	0.0004	6.549E-06	0.3559	6.874E-08	0.0037	2.600E-08	0.0014	9.142E-08	0.0050

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.173E-06	0.0637
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.555E-06	0.1388
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.196E-05	0.6499
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.715E-06	0.1475
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.840E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.130E-06	0.0614	4.367E-12	0.0000	0.000E+00	0.0000	3.795E-08	0.0021	3.318E-09	0.0002	1.084E-09	0.0001	2.985E-10	0.0000
Pb-210	3.226E-09	0.0002	2.010E-09	0.0001	0.000E+00	0.0000	1.464E-06	0.0796	5.006E-09	0.0003	2.439E-09	0.0001	4.607E-08	0.0025
Ra-226	1.050E-05	0.5703	4.395E-09	0.0002	0.000E+00	0.0000	2.435E-06	0.1323	7.660E-09	0.0004	6.816E-09	0.0004	4.232E-08	0.0023
Sr-90	3.145E-08	0.0017	6.085E-11	0.0000	0.000E+00	0.0000	2.612E-06	0.1419	5.275E-08	0.0029	1.566E-08	0.0009	2.739E-09	0.0001
Total	1.166E-05	0.6336	6.471E-09	0.0004	0.000E+00	0.0000	6.549E-06	0.3559	6.874E-08	0.0037	2.600E-08	0.0014	9.142E-08	0.0050

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.173E-06	0.0637
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.523E-06	0.0828
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.299E-05	0.7060
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.715E-06	0.1475
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.840E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.533E-03	3.989E+01	3.488E+00	1.139E+00	3.138E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.483E+01
Pb-210	3.706E-03	2.419E+01	8.332E-02	4.043E-02	7.587E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.508E+01
Ra-226	3.670E-03	9.551E+01	2.785E-01	3.409E-01	7.512E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.688E+01
Sr-90	5.731E-03	1.119E+03	2.259E+01	6.707E+00	1.173E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.149E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+01 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	9.611E-07	0.0551	3.714E-12	0.0000	3.227E-08	0.0018	2.822E-09	0.0002	9.215E-10	0.0001	2.539E-10	0.0000
Pb-210	5.313E-09	0.0003	3.310E-09	0.0002	2.419E-06	0.1386	8.330E-09	0.0005	4.043E-09	0.0002	7.586E-08	0.0043
Ra-226	1.029E-05	0.5896	2.985E-09	0.0002	1.415E-06	0.0811	4.124E-09	0.0002	5.049E-09	0.0003	1.113E-08	0.0006
Sr-90	2.562E-08	0.0015	4.956E-11	0.0000	2.127E-06	0.1219	4.296E-08	0.0025	1.275E-08	0.0007	2.231E-09	0.0001
Total	1.128E-05	0.6464	6.348E-09	0.0004	5.993E-06	0.3434	5.824E-08	0.0033	2.277E-08	0.0013	8.947E-08	0.0051

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.974E-07	0.0572
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.516E-06	0.1442
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.173E-05	0.6720
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.211E-06	0.1267
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+01 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	9.611E-07	0.0551	3.714E-12	0.0000	0.000E+00	0.0000	3.227E-08	0.0018	2.822E-09	0.0002	9.215E-10	0.0001	2.539E-10	0.0000
Pb-210	2.565E-09	0.0001	1.598E-09	0.0001	0.000E+00	0.0000	1.164E-06	0.0667	3.980E-09	0.0002	1.939E-09	0.0001	3.663E-08	0.0021
Ra-226	1.029E-05	0.5897	4.697E-09	0.0003	0.000E+00	0.0000	2.669E-06	0.1530	8.474E-09	0.0005	7.153E-09	0.0004	5.036E-08	0.0029
Sr-90	2.562E-08	0.0015	4.956E-11	0.0000	0.000E+00	0.0000	2.127E-06	0.1219	4.296E-08	0.0025	1.275E-08	0.0007	2.231E-09	0.0001
Total	1.128E-05	0.6464	6.348E-09	0.0004	0.000E+00	0.0000	5.993E-06	0.3434	5.824E-08	0.0033	2.277E-08	0.0013	8.947E-08	0.0051

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.974E-07	0.0572
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.211E-06	0.0694
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.303E-05	0.7468
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.211E-06	0.1267
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.745E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	9.650E-04	2.511E+01	2.196E+00	7.170E-01	1.975E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.822E+01
Pb-210	3.548E-03	2.316E+01	7.975E-02	3.871E-02	7.263E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.401E+01
Ra-226	3.469E-03	9.030E+01	2.633E-01	3.223E-01	7.102E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.159E+01
Sr-90	3.188E-03	6.224E+02	1.257E+01	3.731E+00	6.527E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.393E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+01 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	6.050E-07	0.0394	2.338E-12	0.0000	2.032E-08	0.0013	1.776E-09	0.0001	5.801E-10	0.0000	1.598E-10	0.0000
Pb-210	5.065E-09	0.0003	3.156E-09	0.0002	2.306E-06	0.1503	7.940E-09	0.0005	3.854E-09	0.0003	7.232E-08	0.0047
Ra-226	9.727E-06	0.6340	2.822E-09	0.0002	1.337E-06	0.0872	3.899E-09	0.0003	4.774E-09	0.0003	1.052E-08	0.0007
Sr-90	1.425E-08	0.0009	2.757E-11	0.0000	1.184E-06	0.0771	2.390E-08	0.0016	7.096E-09	0.0005	1.241E-09	0.0001
Total	1.035E-05	0.6747	6.007E-09	0.0004	4.847E-06	0.3159	3.752E-08	0.0024	1.630E-08	0.0011	8.424E-08	0.0055

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-07	0.0409
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.398E-06	0.1563
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.109E-05	0.7226
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.230E-06	0.0802
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.534E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+01 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	6.050E-07	0.0394	2.338E-12	0.0000	0.000E+00	0.0000	2.032E-08	0.0013	1.776E-09	0.0001	5.801E-10	0.0000	1.598E-10	0.0000
Pb-210	1.333E-09	0.0001	8.303E-10	0.0001	0.000E+00	0.0000	6.048E-07	0.0394	2.068E-09	0.0001	1.007E-09	0.0001	1.903E-08	0.0012
Ra-226	9.731E-06	0.6342	5.147E-09	0.0003	0.000E+00	0.0000	3.039E-06	0.1980	9.772E-09	0.0006	7.620E-09	0.0005	6.381E-08	0.0042
Sr-90	1.425E-08	0.0009	2.757E-11	0.0000	0.000E+00	0.0000	1.184E-06	0.0771	2.390E-08	0.0016	7.096E-09	0.0005	1.241E-09	0.0001
Total	1.035E-05	0.6747	6.007E-09	0.0004	0.000E+00	0.0000	4.847E-06	0.3159	3.752E-08	0.0024	1.630E-08	0.0011	8.424E-08	0.0055

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-07	0.0409
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.291E-07	0.0410
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.286E-05	0.8379
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.230E-06	0.0802
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.534E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.910E-04	4.970E+00	4.346E-01	1.419E-01	3.910E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.586E+00
Pb-210	2.954E-03	1.928E+01	6.639E-02	3.222E-02	6.047E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.999E+01
Ra-226	2.850E-03	7.419E+01	2.163E-01	2.648E-01	5.835E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.525E+01
Sr-90	4.095E-04	7.994E+01	1.614E+00	4.792E-01	8.382E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.211E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+02 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.198E-07	0.0105	4.627E-13	0.0000	4.021E-09	0.0004	3.516E-10	0.0000	1.148E-10	0.0000	3.163E-11	0.0000
Pb-210	4.198E-09	0.0004	2.615E-09	0.0002	1.911E-06	0.1680	6.581E-09	0.0006	3.194E-09	0.0003	5.994E-08	0.0053
Ra-226	7.992E-06	0.7023	2.319E-09	0.0002	1.099E-06	0.0966	3.204E-09	0.0003	3.922E-09	0.0003	8.642E-09	0.0008
Sr-90	1.830E-09	0.0002	3.541E-12	0.0000	1.520E-07	0.0134	3.070E-09	0.0003	9.113E-10	0.0001	1.594E-10	0.0000
Total	8.118E-06	0.7134	4.938E-09	0.0004	3.166E-06	0.2782	1.321E-08	0.0012	8.142E-09	0.0007	6.877E-08	0.0060

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.243E-07	0.0109
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.988E-06	0.1747
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.109E-06	0.8005
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.580E-07	0.0139
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+02 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.198E-07	0.0105	4.627E-13	0.0000	0.000E+00	0.0000	4.021E-09	0.0004	3.516E-10	0.0000	1.148E-10	0.0000	3.163E-11	0.0000
Pb-210	1.347E-10	0.0000	8.389E-11	0.0000	0.000E+00	0.0000	6.111E-08	0.0054	2.089E-10	0.0000	1.018E-10	0.0000	1.923E-09	0.0002
Ra-226	7.996E-06	0.7027	4.850E-09	0.0004	0.000E+00	0.0000	2.949E-06	0.2592	9.576E-09	0.0008	7.014E-09	0.0006	6.666E-08	0.0059
Sr-90	1.830E-09	0.0002	3.541E-12	0.0000	0.000E+00	0.0000	1.520E-07	0.0134	3.070E-09	0.0003	9.113E-10	0.0001	1.594E-10	0.0000
Total	8.118E-06	0.7134	4.938E-09	0.0004	0.000E+00	0.0000	3.166E-06	0.2782	1.321E-08	0.0012	8.142E-09	0.0007	6.877E-08	0.0060

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.243E-07	0.0109
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.356E-08	0.0056
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-05	0.9696
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.580E-07	0.0139
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.866E-06	4.857E-02	4.247E-03	1.387E-03	3.821E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.459E-02
Pb-210	1.688E-03	1.102E+01	3.794E-02	1.841E-02	3.456E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.142E+01
Ra-226	1.626E-03	4.232E+01	1.234E-01	1.511E-01	3.329E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.293E+01
Sr-90	1.163E-06	2.270E-01	4.585E-03	1.361E-03	2.381E-04	1.054E-01	5.348E-05	2.935E-03	3.050E-04	1.665E-04	3.421E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.170E-09	0.0002	4.521E-15	0.0000	3.929E-11	0.0000	3.436E-12	0.0000	1.122E-12	0.0000	3.091E-13	0.0000
Pb-210	2.398E-09	0.0004	1.494E-09	0.0002	1.092E-06	0.1724	3.758E-09	0.0006	1.824E-09	0.0003	3.423E-08	0.0054
Ra-226	4.559E-06	0.7198	1.323E-09	0.0002	6.268E-07	0.0990	1.827E-09	0.0003	2.237E-09	0.0004	4.930E-09	0.0008
Sr-90	5.199E-12	0.0000	1.006E-14	0.0000	4.317E-10	0.0001	8.719E-12	0.0000	2.588E-12	0.0000	4.527E-13	0.0000
Total	4.562E-06	0.7204	2.816E-09	0.0004	1.719E-06	0.2714	5.598E-09	0.0009	4.065E-09	0.0006	3.916E-08	0.0062

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-09	0.0002
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.135E-06	0.1793
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.196E-06	0.8204
Sr-90	1.809E-10	0.0000	1.182E-13	0.0000	6.487E-12	0.0000	6.741E-13	0.0000	3.679E-13	0.0000	6.373E-10	0.0001
Total	1.809E-10	0.0000	1.182E-13	0.0000	6.487E-12	0.0000	6.741E-13	0.0000	3.679E-13	0.0000	6.333E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.170E-09	0.0002	4.521E-15	0.0000	0.000E+00	0.0000	3.929E-11	0.0000	3.436E-12	0.0000	1.122E-12	0.0000	3.091E-13	0.0000
Pb-210	1.927E-13	0.0000	1.201E-13	0.0000	0.000E+00	0.0000	8.747E-11	0.0000	2.990E-13	0.0000	1.457E-13	0.0000	2.752E-12	0.0000
Ra-226	4.561E-06	0.7202	2.816E-09	0.0004	0.000E+00	0.0000	1.718E-06	0.2713	5.586E-09	0.0009	4.061E-09	0.0006	3.916E-08	0.0062
Sr-90	5.199E-12	0.0000	1.006E-14	0.0000	0.000E+00	0.0000	4.317E-10	0.0001	8.719E-12	0.0000	2.588E-12	0.0000	4.527E-13	0.0000
Total	4.562E-06	0.7204	2.816E-09	0.0004	0.000E+00	0.0000	1.719E-06	0.2714	5.598E-09	0.0009	4.065E-09	0.0006	3.916E-08	0.0062

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-09	0.0002
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.098E-11	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.331E-06	0.9997
Sr-90	1.809E-10	0.0000	1.182E-13	0.0000	0.000E+00	0.0000	6.487E-12	0.0000	6.741E-13	0.0000	3.679E-13	0.0000	6.373E-10	0.0001
Total	1.809E-10	0.0000	1.182E-13	0.0000	0.000E+00	0.0000	6.487E-12	0.0000	6.741E-13	0.0000	3.679E-13	0.0000	6.333E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.722E-13	4.481E-09	3.918E-10	1.279E-10	3.524E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.036E-09
Pb-210	2.366E-04	1.545E+00	5.318E-03	2.581E-03	4.844E-02	1.822E+01	3.816E-02	4.719E-01	5.256E-03	4.307E-03	2.034E+01
Ra-226	2.279E-04	5.932E+00	1.730E-02	2.118E-02	4.666E-02	2.592E+01	1.572E-02	6.764E-01	9.330E-03	2.041E-02	3.266E+01
Sr-90	1.420E-15	2.772E-10	5.599E-12	1.662E-12	2.907E-13	1.728E-09	8.769E-13	4.814E-11	5.009E-12	2.731E-12	2.070E-09

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.079E-16	0.0000	4.171E-22	0.0000	3.625E-18	0.0000	3.170E-19	0.0000	1.035E-19	0.0000	2.851E-20	0.0000
Pb-210	3.361E-10	0.0001	2.094E-10	0.0001	1.530E-07	0.0563	5.268E-10	0.0002	2.557E-10	0.0001	4.799E-09	0.0018
Ra-226	6.390E-07	0.2352	1.854E-10	0.0001	8.786E-08	0.0323	2.562E-10	0.0001	3.136E-10	0.0001	6.910E-10	0.0003
Sr-90	6.348E-21	0.0000	1.228E-23	0.0000	5.272E-19	0.0000	1.065E-20	0.0000	3.161E-21	0.0000	5.528E-22	0.0000
Total	6.394E-07	0.2353	3.948E-10	0.0001	2.409E-07	0.0886	7.830E-10	0.0003	5.693E-10	0.0002	5.490E-09	0.0020

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-16	0.0000
Pb-210	1.463E-06	0.5384	3.967E-09	0.0015	4.906E-08	0.0181	5.464E-10	0.0002	4.477E-10	0.0002	1.676E-06	0.6169
Ra-226	3.016E-07	0.1110	2.442E-10	0.0001	1.051E-08	0.0039	1.449E-10	0.0001	3.171E-10	0.0001	1.041E-06	0.3831
Sr-90	2.540E-18	0.0000	1.660E-21	0.0000	9.112E-20	0.0000	9.481E-21	0.0000	5.169E-21	0.0000	3.195E-18	0.0000
Total	1.765E-06	0.6494	4.211E-09	0.0015	5.957E-08	0.0219	6.914E-10	0.0003	7.648E-10	0.0003	2.717E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.079E-16	0.0000	4.171E-22	0.0000	0.000E+00	0.0000	3.625E-18	0.0000	3.170E-19	0.0000	1.035E-19	0.0000	2.851E-20	0.0000
Pb-210	2.138E-23	0.0000	1.332E-23	0.0000	0.000E+00	0.0000	9.703E-21	0.0000	3.317E-23	0.0000	1.616E-23	0.0000	3.053E-22	0.0000
Ra-226	6.394E-07	0.2353	3.948E-10	0.0001	0.000E+00	0.0000	2.409E-07	0.0886	7.830E-10	0.0003	5.693E-10	0.0002	5.490E-09	0.0020
Sr-90	6.348E-21	0.0000	1.228E-23	0.0000	0.000E+00	0.0000	5.272E-19	0.0000	1.065E-20	0.0000	3.161E-21	0.0000	5.528E-22	0.0000
Total	6.394E-07	0.2353	3.948E-10	0.0001	0.000E+00	0.0000	2.409E-07	0.0886	7.830E-10	0.0003	5.693E-10	0.0002	5.490E-09	0.0020

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-16	0.0000
Pb-210	2.486E-20	0.0000	6.744E-23	0.0000	0.000E+00	0.0000	8.334E-22	0.0000	9.260E-24	0.0000	7.600E-24	0.0000	3.587E-20	0.0000
Ra-226	1.765E-06	0.6494	4.211E-09	0.0015	0.000E+00	0.0000	5.957E-08	0.0219	6.914E-10	0.0003	7.648E-10	0.0003	2.717E-06	1.0000
Sr-90	2.540E-18	0.0000	1.660E-21	0.0000	0.000E+00	0.0000	9.112E-20	0.0000	9.481E-21	0.0000	5.169E-21	0.0000	3.195E-18	0.0000
Total	1.765E-06	0.6494	4.211E-09	0.0015	0.000E+00	0.0000	5.957E-08	0.0219	6.914E-10	0.0003	7.648E-10	0.0003	2.717E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

ATTACHMENT 7

TRENCH UNIT
RESRAD REPORT
(on CD only)

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Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ba-137m (Source: FGR 12)	3.606E+00	3.606E+00	DCF1(1)
A-1	Cs-137 (Source: FGR 12)	7.510E-04	7.510E-04	DCF1(2)
A-1	Sr-90 (Source: FGR 12)	7.043E-04	7.043E-04	DCF1(3)
A-1	Y-90 (Source: FGR 12)	2.391E-02	2.391E-02	DCF1(4)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(1)
B-1	Sr-90+D	1.308E-03	1.300E-03	DCF2(2)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(1)
D-1	Sr-90+D	1.528E-04	1.420E-04	DCF3(2)
D-34	Food transfer factors:			
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(1,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(1,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(1,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(2,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(2,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(2,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(1,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(1,2)
D-5				
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(2,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(2,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	3.360E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Cs-137	4.300E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Sr-90	1.600E-01	0.000E+00	---	S1(2)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(2)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	4.600E+03	4.600E+03	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.623E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	3.000E+01	3.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.516E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.168E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.168E-01	FMEAT
R018	Contamination fraction of milk	-1	-1	0.168E-01	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	336.00 square meters	Cs-137	4.300E-02
Thickness:	2.00 meters	Sr-90	1.600E-01
Cover Depth:	0.00 meters		

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.961E-01	2.880E-01	2.725E-01	2.245E-01	1.294E-01	1.929E-02	1.230E-04	7.154E-12
M(t):	1.184E-02	1.152E-02	1.090E-02	8.981E-03	5.175E-03	7.715E-04	4.919E-06	2.862E-13

Maximum TDOSE(t): 2.961E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.422E-02	0.2506	6.092E-08	0.0000	0.000E+00	0.0000	2.485E-03	0.0084	2.173E-04	0.0007	7.096E-05	0.0002	1.955E-05	0.0001
Sr-90	1.995E-03	0.0067	9.270E-06	0.0000	0.000E+00	0.0000	2.113E-01	0.7137	4.267E-03	0.0144	1.267E-03	0.0043	2.216E-04	0.0007
Total	7.621E-02	0.2574	9.331E-06	0.0000	0.000E+00	0.0000	2.138E-01	0.7221	4.485E-03	0.0151	1.338E-03	0.0045	2.412E-04	0.0008

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.701E-02	0.2601
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.191E-01	0.7399
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.961E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.252E-02	0.2518	5.953E-08	0.0000	0.000E+00	0.0000	2.428E-03	0.0084	2.123E-04	0.0007	6.934E-05	0.0002	1.910E-05	0.0001
Sr-90	1.938E-03	0.0067	9.002E-06	0.0000	0.000E+00	0.0000	2.052E-01	0.7126	4.144E-03	0.0144	1.230E-03	0.0043	2.152E-04	0.0007
Total	7.445E-02	0.2585	9.061E-06	0.0000	0.000E+00	0.0000	2.077E-01	0.7210	4.357E-03	0.0151	1.300E-03	0.0045	2.343E-04	0.0008

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.525E-02	0.2613
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.128E-01	0.7387
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.880E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	6.924E-02	0.2541	5.684E-08	0.0000	0.000E+00	0.0000	2.318E-03	0.0085	2.027E-04	0.0007	6.620E-05	0.0002	1.824E-05	0.0001
Sr-90	1.827E-03	0.0067	8.489E-06	0.0000	0.000E+00	0.0000	1.935E-01	0.7103	3.908E-03	0.0143	1.160E-03	0.0043	2.029E-04	0.0007
Total	7.106E-02	0.2608	8.546E-06	0.0000	0.000E+00	0.0000	1.959E-01	0.7188	4.111E-03	0.0151	1.226E-03	0.0045	2.212E-04	0.0008

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.184E-02	0.2637
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.006E-01	0.7363
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.725E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	5.888E-02	0.2623	4.834E-08	0.0000	0.000E+00	0.0000	1.972E-03	0.0088	1.724E-04	0.0008	5.630E-05	0.0003	1.551E-05	0.0001
Sr-90	1.488E-03	0.0066	6.914E-06	0.0000	0.000E+00	0.0000	1.576E-01	0.7021	3.183E-03	0.0142	9.450E-04	0.0042	1.653E-04	0.0007
Total	6.037E-02	0.2689	6.962E-06	0.0000	0.000E+00	0.0000	1.596E-01	0.7109	3.356E-03	0.0149	1.001E-03	0.0045	1.808E-04	0.0008

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.110E-02	0.2721
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.634E-01	0.7279
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.245E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	3.707E-02	0.2865	3.043E-08	0.0000	0.000E+00	0.0000	1.241E-03	0.0096	1.085E-04	0.0008	3.544E-05	0.0003	9.764E-06	0.0001
Sr-90	8.279E-04	0.0064	3.847E-06	0.0000	0.000E+00	0.0000	8.769E-02	0.6778	1.771E-03	0.0137	5.257E-04	0.0041	9.196E-05	0.0007
Total	3.790E-02	0.2929	3.877E-06	0.0000	0.000E+00	0.0000	8.893E-02	0.6874	1.879E-03	0.0145	5.612E-04	0.0043	1.017E-04	0.0008

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.846E-02	0.2973
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.091E-02	0.7027
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.294E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.336E-03	0.3803	6.023E-09	0.0000	0.000E+00	0.0000	2.457E-04	0.0127	2.148E-05	0.0011	7.015E-06	0.0004	1.932E-06	0.0001
Sr-90	1.063E-04	0.0055	4.940E-07	0.0000	0.000E+00	0.0000	1.126E-02	0.5839	2.274E-04	0.0118	6.752E-05	0.0035	1.181E-05	0.0006
Total	7.443E-03	0.3859	5.000E-07	0.0000	0.000E+00	0.0000	1.151E-02	0.5966	2.489E-04	0.0129	7.454E-05	0.0039	1.374E-05	0.0007

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.613E-03	0.3947
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.168E-02	0.6053
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.929E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	7.169E-05	0.5829	5.885E-11	0.0000	0.000E+00	0.0000	2.401E-06	0.0195	2.099E-07	0.0017	6.855E-08	0.0006	1.888E-08	0.0002
Sr-90	3.020E-07	0.0025	1.403E-09	0.0000	0.000E+00	0.0000	3.199E-05	0.2601	6.460E-07	0.0053	1.918E-07	0.0016	3.354E-08	0.0003
Total	7.199E-05	0.5854	1.462E-09	0.0000	0.000E+00	0.0000	3.439E-05	0.2796	8.559E-07	0.0070	2.603E-07	0.0021	5.243E-08	0.0004

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.439E-05	0.6049
Sr-90	1.494E-05	0.1215	7.580E-09	0.0001	0.000E+00	0.0000	4.161E-07	0.0034	4.323E-08	0.0004	2.360E-08	0.0002	4.859E-05	0.3951
Total	1.494E-05	0.1215	7.580E-09	0.0001	0.000E+00	0.0000	4.161E-07	0.0034	4.323E-08	0.0004	2.360E-08	0.0002	1.230E-04	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	6.613E-12	0.9244	5.429E-18	0.0000	0.000E+00	0.0000	2.215E-13	0.0310	1.936E-14	0.0027	6.323E-15	0.0009	1.742E-15	0.0002
Sr-90	3.688E-16	0.0001	1.713E-18	0.0000	0.000E+00	0.0000	3.906E-14	0.0055	7.888E-16	0.0001	2.342E-16	0.0000	4.096E-17	0.0000
Total	6.614E-12	0.9245	7.142E-18	0.0000	0.000E+00	0.0000	2.605E-13	0.0364	2.015E-14	0.0028	6.557E-15	0.0009	1.783E-15	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.862E-12	0.9592
Sr-90	2.435E-13	0.0340	1.235E-16	0.0000	0.000E+00	0.0000	6.782E-15	0.0009	7.057E-16	0.0001	3.847E-16	0.0001	2.920E-13	0.0408
Total	2.435E-13	0.0340	1.235E-16	0.0000	0.000E+00	0.0000	6.782E-15	0.0009	7.057E-16	0.0001	3.847E-16	0.0001	7.154E-12	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137+D	Cs-137+D	1.000E+00	1.791E+00	1.750E+00	1.671E+00	1.421E+00	8.945E-01	1.770E-01	1.730E-03	1.596E-10
Sr-90+D	Sr-90+D	1.000E+00	1.369E+00	1.330E+00	1.254E+00	1.021E+00	5.682E-01	7.298E-02	3.037E-04	1.825E-12

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	1.396E+01	1.429E+01	1.496E+01	1.759E+01	2.795E+01	1.412E+02	1.445E+04	1.567E+11
Sr-90	1.826E+01	1.880E+01	1.994E+01	2.448E+01	4.400E+01	3.426E+02	8.231E+04	1.370E+13

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Cs-137	4.300E-02	0.000E+00	1.791E+00	1.396E+01	1.791E+00	1.396E+01
Sr-90	1.600E-01	0.000E+00	1.369E+00	1.826E+01	1.369E+00	1.826E+01

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	Cs-137	1.000E+00	7.701E-02	7.525E-02	7.184E-02	6.110E-02	3.846E-02	7.613E-03	7.439E-05	6.862E-12
Sr-90	Sr-90	1.000E+00	2.191E-01	2.128E-01	2.006E-01	1.634E-01	9.091E-02	1.168E-02	4.859E-05	2.920E-13

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Cs-137	Cs-137	1.000E+00	4.300E-02	4.202E-02	4.012E-02	3.412E-02	2.148E-02	4.251E-03	4.154E-05	3.832E-12
Sr-90	Sr-90	1.000E+00	1.600E-01	1.554E-01	1.465E-01	1.193E-01	6.639E-02	8.527E-03	2.422E-05	2.957E-14

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 0.44 seconds

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Cancer Risk Slope Factors Summary Table
Risk Library: FGR 13 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Cs-137+D	2.55E-06	5.32E-10	SLPF(1,1)
Sf-1	Sr-90+D	1.96E-08	4.82E-10	SLPF(2,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Cs-137+D	1.12E-10	1.12E-10	SLPF(1,2)
Sf-2	Sr-90+D	4.33E-10	4.25E-10	SLPF(2,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(1,3)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(2,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.04E-11	3.04E-11	SLPF(1,4)
Sf-3	Sr-90+D	7.40E-11	5.59E-11	SLPF(2,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(1,5)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(2,5)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Risk Slope and Environmental Transport Factors for the Ground Pathway

Nuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless) t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ba-137m	2.690E-06	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01	5.117E-01
Cs-137	5.320E-10	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01	5.305E-01
Sr-90	4.820E-10	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01	5.330E-01
Y-90	1.910E-08	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01	5.135E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.932E-03	5.028E+01	4.397E+00	1.436E+00	3.955E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.651E+01
Sr-90	7.189E-03	1.403E+03	2.831E+01	8.408E+00	1.472E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.441E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.211E-06	0.3005	4.680E-12	0.0000	4.067E-08	0.0101	3.557E-09	0.0009	1.161E-09	0.0003	3.200E-10	0.0001
Sr-90	3.213E-08	0.0080	6.217E-11	0.0000	2.669E-06	0.6621	5.389E-08	0.0134	1.600E-08	0.0040	2.799E-09	0.0007
Total	1.244E-06	0.3085	6.685E-11	0.0000	2.709E-06	0.6722	5.745E-08	0.0143	1.716E-08	0.0043	3.119E-09	0.0008

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E-06	0.3119
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E-06	0.6881
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.031E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.211E-06	0.3005	4.680E-12	0.0000	0.000E+00	0.0000	4.067E-08	0.0101	3.557E-09	0.0009	1.161E-09	0.0003	3.200E-10	0.0001
Sr-90	3.213E-08	0.0080	6.217E-11	0.0000	0.000E+00	0.0000	2.669E-06	0.6621	5.389E-08	0.0134	1.600E-08	0.0040	2.799E-09	0.0007
Total	1.244E-06	0.3085	6.685E-11	0.0000	0.000E+00	0.0000	2.709E-06	0.6722	5.745E-08	0.0143	1.716E-08	0.0043	3.119E-09	0.0008

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.257E-06	0.3119
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E-06	0.6881
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.031E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.888E-03	4.913E+01	4.296E+00	1.403E+00	3.865E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.522E+01
Sr-90	6.981E-03	1.363E+03	2.752E+01	8.171E+00	1.429E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.400E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.184E-06	0.3018	4.573E-12	0.0000	3.974E-08	0.0101	3.475E-09	0.0009	1.135E-09	0.0003	3.126E-10	0.0001
Sr-90	3.121E-08	0.0080	6.037E-11	0.0000	2.592E-06	0.6608	5.234E-08	0.0133	1.554E-08	0.0040	2.718E-09	0.0007
Total	1.215E-06	0.3098	6.495E-11	0.0000	2.631E-06	0.6710	5.581E-08	0.0142	1.667E-08	0.0043	3.030E-09	0.0008

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.3132
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.694E-06	0.6868
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.922E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.184E-06	0.3018	4.573E-12	0.0000	0.000E+00	0.0000	3.974E-08	0.0101	3.475E-09	0.0009	1.135E-09	0.0003	3.126E-10	0.0001
Sr-90	3.121E-08	0.0080	6.037E-11	0.0000	0.000E+00	0.0000	2.592E-06	0.6608	5.234E-08	0.0133	1.554E-08	0.0040	2.718E-09	0.0007
Total	1.215E-06	0.3098	6.495E-11	0.0000	0.000E+00	0.0000	2.631E-06	0.6710	5.581E-08	0.0142	1.667E-08	0.0043	3.030E-09	0.0008

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.3132
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.694E-06	0.6868
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.922E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.802E-03	4.691E+01	4.102E+00	1.339E+00	3.690E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.272E+01
Sr-90	6.584E-03	1.285E+03	2.596E+01	7.705E+00	1.348E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.320E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.130E-06	0.3044	4.367E-12	0.0000	3.795E-08	0.0102	3.318E-09	0.0009	1.084E-09	0.0003	2.985E-10	0.0001
Sr-90	2.943E-08	0.0079	5.694E-11	0.0000	2.444E-06	0.6583	4.936E-08	0.0133	1.465E-08	0.0039	2.563E-09	0.0007
Total	1.160E-06	0.3123	6.130E-11	0.0000	2.482E-06	0.6685	5.268E-08	0.0142	1.574E-08	0.0042	2.861E-09	0.0008

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.173E-06	0.3159
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.540E-06	0.6841
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.713E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.130E-06	0.3044	4.367E-12	0.0000	0.000E+00	0.0000	3.795E-08	0.0102	3.318E-09	0.0009	1.084E-09	0.0003	2.985E-10	0.0001
Sr-90	2.943E-08	0.0079	5.694E-11	0.0000	0.000E+00	0.0000	2.444E-06	0.6583	4.936E-08	0.0133	1.465E-08	0.0039	2.563E-09	0.0007
Total	1.160E-06	0.3123	6.130E-11	0.0000	0.000E+00	0.0000	2.482E-06	0.6685	5.268E-08	0.0142	1.574E-08	0.0042	2.861E-09	0.0008

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.173E-06	0.3159
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.540E-06	0.6841
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.713E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.533E-03	3.989E+01	3.488E+00	1.139E+00	3.138E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.483E+01
Sr-90	5.362E-03	1.047E+03	2.114E+01	6.276E+00	1.098E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.075E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	9.611E-07	0.3135	3.714E-12	0.0000	3.227E-08	0.0105	2.822E-09	0.0009	9.215E-10	0.0003	2.539E-10	0.0001
Sr-90	2.397E-08	0.0078	4.637E-11	0.0000	1.991E-06	0.6492	4.020E-08	0.0131	1.193E-08	0.0039	2.087E-09	0.0007
Total	9.851E-07	0.3213	5.009E-11	0.0000	2.023E-06	0.6597	4.302E-08	0.0140	1.286E-08	0.0042	2.341E-09	0.0008

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.974E-07	0.3253
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.069E-06	0.6747
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.066E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	9.611E-07	0.3135	3.714E-12	0.0000	0.000E+00	0.0000	3.227E-08	0.0105	2.822E-09	0.0009	9.215E-10	0.0003	2.539E-10	0.0001
Sr-90	2.397E-08	0.0078	4.637E-11	0.0000	0.000E+00	0.0000	1.991E-06	0.6492	4.020E-08	0.0131	1.193E-08	0.0039	2.087E-09	0.0007
Total	9.851E-07	0.3213	5.009E-11	0.0000	0.000E+00	0.0000	2.023E-06	0.6597	4.302E-08	0.0140	1.286E-08	0.0042	2.341E-09	0.0008

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.974E-07	0.3253
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.069E-06	0.6747
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.066E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	9.650E-04	2.511E+01	2.196E+00	7.170E-01	1.975E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.822E+01
Sr-90	2.983E-03	5.824E+02	1.176E+01	3.491E+00	6.107E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.982E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	6.050E-07	0.3401	2.338E-12	0.0000	2.032E-08	0.0114	1.776E-09	0.0010	5.801E-10	0.0003	1.598E-10	0.0001
Sr-90	1.333E-08	0.0075	2.580E-11	0.0000	1.107E-06	0.6226	2.236E-08	0.0126	6.639E-09	0.0037	1.161E-09	0.0007
Total	6.184E-07	0.3476	2.814E-11	0.0000	1.128E-06	0.6340	2.414E-08	0.0136	7.219E-09	0.0041	1.321E-09	0.0007

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-07	0.3530
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.151E-06	0.6470
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.779E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	6.050E-07	0.3401	2.338E-12	0.0000	0.000E+00	0.0000	2.032E-08	0.0114	1.776E-09	0.0010	5.801E-10	0.0003	1.598E-10	0.0001
Sr-90	1.333E-08	0.0075	2.580E-11	0.0000	0.000E+00	0.0000	1.107E-06	0.6226	2.236E-08	0.0126	6.639E-09	0.0037	1.161E-09	0.0007
Total	6.184E-07	0.3476	2.814E-11	0.0000	0.000E+00	0.0000	1.128E-06	0.6340	2.414E-08	0.0136	7.219E-09	0.0041	1.321E-09	0.0007

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-07	0.3530
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.151E-06	0.6470
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.779E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.910E-04	4.970E+00	4.346E-01	1.419E-01	3.910E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.586E+00
Sr-90	3.831E-04	7.479E+01	1.510E+00	4.484E-01	7.843E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.683E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.198E-07	0.4401	4.627E-13	0.0000	4.021E-09	0.0148	3.516E-10	0.0013	1.148E-10	0.0004	3.163E-11	0.0001
Sr-90	1.713E-09	0.0063	3.313E-12	0.0000	1.422E-07	0.5227	2.872E-09	0.0106	8.527E-10	0.0031	1.491E-10	0.0005
Total	1.215E-07	0.4464	3.776E-12	0.0000	1.463E-07	0.5375	3.224E-09	0.0118	9.675E-10	0.0036	1.808E-10	0.0007

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.243E-07	0.4567
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E-07	0.5433
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.721E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.198E-07	0.4401	4.627E-13	0.0000	0.000E+00	0.0000	4.021E-09	0.0148	3.516E-10	0.0013	1.148E-10	0.0004	3.163E-11	0.0001
Sr-90	1.713E-09	0.0063	3.313E-12	0.0000	0.000E+00	0.0000	1.422E-07	0.5227	2.872E-09	0.0106	8.527E-10	0.0031	1.491E-10	0.0005
Total	1.215E-07	0.4464	3.776E-12	0.0000	0.000E+00	0.0000	1.463E-07	0.5375	3.224E-09	0.0118	9.675E-10	0.0036	1.808E-10	0.0007

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.243E-07	0.4567
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E-07	0.5433
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.721E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.866E-06	4.857E-02	4.247E-03	1.387E-03	3.821E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.459E-02
Sr-90	1.088E-06	2.124E-01	4.290E-03	1.274E-03	2.228E-04	9.863E-02	5.004E-05	2.747E-03	2.854E-04	1.558E-04	3.201E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.170E-09	0.6463	4.521E-15	0.0000	3.929E-11	0.0217	3.436E-12	0.0019	1.122E-12	0.0006	3.091E-13	0.0002
Sr-90	4.864E-12	0.0027	9.411E-15	0.0000	4.040E-10	0.2231	8.158E-12	0.0045	2.422E-12	0.0013	4.236E-13	0.0002
Total	1.175E-09	0.6490	1.393E-14	0.0000	4.433E-10	0.2448	1.159E-11	0.0064	3.544E-12	0.0020	7.327E-13	0.0004

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-09	0.6707
Sr-90	1.693E-10	0.0935	1.106E-13	0.0001	6.070E-12	0.0034	6.307E-13	0.0003	3.443E-13	0.0002	5.963E-10	0.3293
Total	1.693E-10	0.0935	1.106E-13	0.0001	6.070E-12	0.0034	6.307E-13	0.0003	3.443E-13	0.0002	1.811E-09	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.170E-09	0.6463	4.521E-15	0.0000	0.000E+00	0.0000	3.929E-11	0.0217	3.436E-12	0.0019	1.122E-12	0.0006	3.091E-13	0.0002
Sr-90	4.864E-12	0.0027	9.411E-15	0.0000	0.000E+00	0.0000	4.040E-10	0.2231	8.158E-12	0.0045	2.422E-12	0.0013	4.236E-13	0.0002
Total	1.175E-09	0.6490	1.393E-14	0.0000	0.000E+00	0.0000	4.433E-10	0.2448	1.159E-11	0.0064	3.544E-12	0.0020	7.327E-13	0.0004

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-09	0.6707
Sr-90	1.693E-10	0.0935	1.106E-13	0.0001	0.000E+00	0.0000	6.070E-12	0.0034	6.307E-13	0.0003	3.443E-13	0.0002	5.963E-10	0.3293
Total	1.693E-10	0.0935	1.106E-13	0.0001	0.000E+00	0.0000	6.070E-12	0.0034	6.307E-13	0.0003	3.443E-13	0.0002	1.811E-09	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Cs-137	1.722E-13	4.481E-09	3.918E-10	1.279E-10	3.524E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.036E-09
Sr-90	1.329E-15	2.594E-10	5.238E-12	1.555E-12	2.720E-13	1.617E-09	8.205E-13	4.505E-11	4.687E-12	2.556E-12	1.937E-09

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.079E-16	0.9386	4.171E-22	0.0000	3.625E-18	0.0315	3.170E-19	0.0028	1.035E-19	0.0009	2.851E-20	0.0002
Sr-90	5.939E-21	0.0001	1.149E-23	0.0000	4.933E-19	0.0043	9.962E-21	0.0001	2.957E-21	0.0000	5.173E-22	0.0000
Total	1.080E-16	0.9386	4.286E-22	0.0000	4.118E-18	0.0358	3.269E-19	0.0028	1.065E-19	0.0009	2.903E-20	0.0003

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-16	0.9740
Sr-90	2.376E-18	0.0207	1.553E-21	0.0000	8.525E-20	0.0007	8.871E-21	0.0001	4.836E-21	0.0000	2.990E-18	0.0260
Total	2.376E-18	0.0207	1.553E-21	0.0000	8.525E-20	0.0007	8.871E-21	0.0001	4.836E-21	0.0000	1.150E-16	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	1.079E-16	0.9386	4.171E-22	0.0000	0.000E+00	0.0000	3.625E-18	0.0315	3.170E-19	0.0028	1.035E-19	0.0009	2.851E-20	0.0002
Sr-90	5.939E-21	0.0001	1.149E-23	0.0000	0.000E+00	0.0000	4.933E-19	0.0043	9.962E-21	0.0001	2.957E-21	0.0000	5.173E-22	0.0000
Total	1.080E-16	0.9386	4.286E-22	0.0000	0.000E+00	0.0000	4.118E-18	0.0358	3.269E-19	0.0028	1.065E-19	0.0009	2.903E-20	0.0003

Total Excess Cancer Risk CNRS(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.120E-16	0.9740
Sr-90	2.376E-18	0.0207	1.553E-21	0.0000	0.000E+00	0.0000	8.525E-20	0.0007	8.871E-21	0.0001	4.836E-21	0.0000	2.990E-18	0.0260
Total	2.376E-18	0.0207	1.553E-21	0.0000	0.000E+00	0.0000	8.525E-20	0.0007	8.871E-21	0.0001	4.836E-21	0.0000	1.150E-16	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

ATTACHMENT 8

RESPONSE TO COMMENTS

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RESPONSE TO COMMENTS ON
DRAFT SURVEY UNIT PROJECT REPORTS FOR SURVEY UNITS 213, 221, 226, AND 231 (WORK PACKAGE 47)
PARCEL C STORM DRAIN AND SANITARY SEWER REMOVAL
HUNTERS POINT NAVAL SHIPYARD
SAN FRANCISCO, CALIFORNIA

Comments from Ryan Miya, Ph.D.
Senior Hazardous Substances Scientist
San Francisco Peninsula Team Leader
Brownfields and Environmental Restoration Program – Berkeley
Department of Toxic Substances Control

Comments Dated: May 22, 2012

COMMENTS ON ALL DRAFT SUPRs	RESPONSE
Comment 1. Section 3.2.1 – Trench Survey Unit. Please provide the dates of excavation, soil sampling, and backfilling at each trench survey unit.	**Response 1.** The Navy will provide this information in the Parcel C Radiological Removal Action Completion Report (Radiological RACR).
Comment 2. Section 3.2.2 – Excavated Soil Units. Please specify if any additional analyses on the excavated soil units beyond the radiological analyses were conducted in order to verify the quality of the backfill.	**Response 2.** The Navy conducted additional soil analyses only if the origin of the excavated soil was from an identified Installation Restoration site. If the excavated soil was not obtained from an Installation Restoration site, only radiological analyses were performed.
Comment 3. Section 3.2.3 – Import Fill Material. Please specify if any additional analyses on the import fill material beyond the radiological analyses were conducted in order to verify the quality of the backfill.	**Response 3.** Additional analyses for chemicals of concern were performed on the import fill material as specified in the Hunters Point Shipyard Project Backfill Review and Acceptance Procedure provided in Appendix C to the Final Parcel C Design Plan and Final Sampling and Analysis Plan – SAP Worksheet #17 – Sampling Design and Rationale. The Navy has provided this information in the Survey Unit Project Reports Abstract, Section 3.2.4.

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RESPONSE TO COMMENTS ON DRAFT SURVEY UNIT PROJECT REPORTS FOR SURVEY UNITS 213, 221, 226, AND 231 (WORK PACKAGE 47) PARCEL C STORM DRAIN AND SANITARY SEWER REMOVAL HUNTERS POINT NAVAL SHIPYARD SAN FRANCISCO, CALIFORNIA	
Comment 4. Please provide some additional details regarding the concrete that was observed along the bottom and/or sidewalls of each survey unit as presented in Figure 3-1. For example, any information regarding its purpose and historic use(s), surface scan results, and if it was left in place or removed as a component of the current storm drain and sanitary sewer removal would be useful information to be incorporated into each report.	**Response 4.** The Navy will provide this information in the Parcel C Radiological RACR.
COMMENT ON DRAFT SURVEY UNIT 221	
Comment 5. Section 3.2.2.2 – Excavated Soil Unit 492. The total volume of soil remediated from each excavated soil unit identified as having contamination present that exceeded the release criteria should be provided in the text.	**Response 5.** The Parcel C Radiological RACR will provide Table 3-4 that summarizes the elevated sample results, radionuclides of concern (if present), and estimated soil volume remediated for each excavated soil survey unit derived from excavation of the Parcel C storm drain and sanitary sewer systems.
COMMENT ON DRAFT SURVEY UNIT 226	
Comment 6. Please consider adding the Import Fill Material section (3.2.3) back into the report for consistency and instead stating that no import fill material was required to complete backfilling activities for Survey Unit 226 in this section.	**Response 6.** For consistency, the Navy has revised Section 3.2.3 to read *"No additional import fill material was required to complete backfilling activities."*

RESPONSE TO COMMENTS ON
DRAFT SURVEY UNIT PROJECT REPORTS FOR SURVEY UNITS 213, 221, 226, AND 231 (WORK PACKAGE 47)
PARCEL C STORM DRAIN AND SANITARY SEWER REMOVAL
HUNTERS POINT NAVAL SHIPYARD
SAN FRANCISCO, CALIFORNIA

Comments from Larry Morgan
Senior Health Physicist
Environmental Management Branch (EMB)
California Department of Public Health (CDPH)

Comments Dated: May 7, 2012

GENERAL COMMENTS	RESPONSE
Comment 1. Section 3.2.2, Excavated Soil Units, second paragraph starts with the sentence: "As shown on figures in the SUPRs Abstract (TtEC 2011), 18 soil samples were collected at each excavated soil unit." Please specify the specific figures in the SUPRs Abstract being referred to in this sentence. For example if the sentence refer to Section 3.2.4 of the SUPRs Abstract and Figure 3-1, then specify that reference in the document.	**Response 1.** Each Survey Unit Project Report (SUPR) refers to either Figure 3-1 (RSY-2), 3-2 (RSY-3), or 3-3 (RSY-4) of the SUPRs Abstract to provide the reader with the systematic sampling pattern design, as specified in Section 3.2.2 of the SUPR. Additionally, if excavated soil is used for backfill, Attachment 4 of each SUPR will also include the Excavated Soil Unit sampling map.
Comment 2. It appears the offsite laboratory is reporting their Bi-214 as Ra-226 results and then using the reporting limit established for Ra-226 which results in J flags reported for most of the 609 keV peak data. There is no reporting limit for Bi-214 and applying the Ra-226 reporting limit to the Bi-214 data seems inappropriate and may be unnecessary or misleading. And the reporting limit is for Ra-226, not for Bi-214, per the offsite laboratory summary reports for the offsite laboratory in Attachment 2. Please review and discuss this with the offsite laboratory and clarify the basis for the reporting limit.	**Response 2.** Comment noted. The Navy recognizes the validity of this comment. The Navy has discussed this issue and believes it will not be beneficial to change the reporting limit at this time. However, the Navy will consider modifications during the next revision to the Sampling and Analysis Plan.
Comment 3. EMB may need to obtain independent confirmation soil samples from the survey units covered by this work package from the Sanitary Sewer and Storm Drain Removal Project.	**Response 3.** Comment noted.