Energy*Solutions*, LLC.
Technical Support Document

RS-TD-313196-001
Radionuclides of Concern During LACBWR Decommissioning
Revision 5

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Summary of Changes in this Revision:

- Rev. 0 – Initial issuance.
- Rev. 1 – Replace FRS with FSS and BFM Dose Factors with DCGLs. Perform calculations with new DCGLs. Decay correct mixture data. Additional calculations of insignificant contributor dose from HTD radionuclides.
- Rev. 2 – Major revision. Added radionuclide data from an additional eighteen (18) concrete core samples, recalculated radionuclide fractions using three methods, added the dose contribution from Np-237, and recalculated the insignificant contributor dose for soil, Rx Bldg, WGTV, and buried pipe.
- Rev. 3 – Corrected Table cross reference error in section 6.3. Modifies Table 37 to include all three mixtures. Added Section 6.5 with two new Tables.
- Rev. 4 – Corrected Table cross reference errors in section 6.6. Modified values in Tables 43 through 46 to account for revised Buried Group DCGLs due to addition of Low Pressure Service Water Pipe to group as documented in RS-TD-313196-004 Rev 3.
- Rev. 5 – Updated buried pipe DCGLs and associated IC dose analysis in Tables 43 through 46 based on TSD RS-TD-313196-004 Rev 4.

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ACRONYMS AND ABBREVIATIONS

BWR	Boiling water reactor
Ci	Curie
DCGL	Derived Concentration Guideline Level
DPC	Dairyland Power Cooperative
FESW	Fuel Element Storage Well
FSS	Final Status Survey
LACBWR	La Crosse Boiling Water Reactor
LSE	LACBWR Site Enclosure Area
MDC	Minimum Detectable Concentration
MWe	Megawatts electric
MTU	Metric Ton Uranium
MWD	Megawatt-days
NRC	United States Nuclear Regulatory Commission
NORM	Naturally Occurring Radioactive Material
ORNL	Oak Ridge National Laboratory
pCi/g	PicoCuries per gram
PWR	Pressurized water reactor
TENORM	Technologically Enhanced Naturally Occurring Radioactive Materials

1. INTRODUCTION

An important part of assessing and developing characterization plans, Final Status Survey (FSS) plans and performing dose assessments at La Crosse Boiling Water Reactor (LACBWR) is the identification of radionuclides that could result in a significant dose contribution at the time of license termination. A technical evaluation was performed to document an initial suite of Radionuclides of Concern (ROC) for the decommissioning of LACBWR. A final ROC list is also developed that provides the radionuclides that will undergo detailed evaluation for FSS design and dose modeling in the License Termination Plan (LTP) (Chapters 5 and 6).

A systematic approach was taken including reviewing applicable nuclear industry guidance documents, relevant LACBWR specific historical information and representative available sample radionuclide data. The selection of the initial suite of radionuclides includes identifying the potential radionuclides as well as eliminating those radionuclides which would not be present due to decay or may be present but in insignificant concentrations.

The mixture fraction of each radionuclide in the initial suite at the time of license termination is determined using the results of concrete and soil characterization sample analyses. The mixture fraction will be used in conjunction with the dose assessment methods developed for Chapter 6 of the LACBWR LTP to calculate the relative dose significance of the radionuclides in the initial suite. In accordance with NUREG-1757, Volume 2, Revision 1, section 3.3, radionuclides that contribute, in aggregate, less than 10% of the 25 mrem/yr dose criteria are considered to be "insignificant". The insignificant contributor radionuclides may be eliminated from further consideration in FSS and from detailed dose modeling but the aggregate dose from the insignificant contributors must be accounted for in demonstrating compliance. The remaining radionuclides, after the insignificant contributors are removed, and the associated mixture fractions, will comprise the final ROC list that will undergo evaluation in the LTP.

2. INDUSTRY DOCUMENT REVIEW

For the development of the suite of potential radionuclides of concern, several nuclear industry guidance documents were reviewed, including NUREG/CR-3474 [1] and NUREG/CR-4289 [2]. NUREG/CR-3474 provides tables of theoretical activation products for both pressurized water reactors (PWR) and boiling water reactors (BWR) based on typical materials of construction, anticipated impurities, assumed neutron flux, etc. An initial list of radionuclides, as shown in Table 1 was developed by listing those radionuclides noted in both Table 5.14 "Activity Inventory of BWR Internals at Shutdown (Total Ci)" and Table 5.15, "Inventories of PWR and BWR Vessel Walls at Shutdown (Total Ci)" from NUREG/CR-3474. Radionuclides with half-lives of less than two years were also noted, however as the LACBWR reactor was shut down in April of 1987, it is not expected that these short-lived radionuclides are present.

3. INITIAL SUITE OF RADIONUCLIDES

3.1. Activation Product Considerations

Table 1 lists the radionuclides that may be present at LACBWR in accordance with NUREG/CR-3474. The list includes radionuclides that would not likely be found at LACBWR due to their low abundance or a radioactive half-life where any concentration that would have been present during operation has since decayed. In order to assess if a potential activation product was present at LACBWR, a total inventory for each radionuclide was assumed using the activity inventories provided in Table 5.14 and Table 5.15 of NUREG/CR-3474. From this information,

an assumed percentage of total inventory for each radionuclide (decayed to January 1, 2015) was derived. The January 1, 2015 date represents a near-term date when characterization and data assessments are expected to occur. The results of this evaluation are provided in Table 2. Radionuclide half-lives were obtained from [3].

Table 1: NUREG/CR-3474 Identified Activation Product Radionuclides

Radionuclide	Half Life (Years)
H-3	1.24E+01
C-14	5.73E+03
Cl-36	3.01E+05
Ar-39	2.69E+02
Ca-41	1.40E+05
Mn-53	3.70E+06
Mn-54	8.56E-01
Fe-55	2.70E+00
Ni-59	7.50E+04
Co-60	5.27E+00
Ni-63	9.60E+01
Zn-65	6.69E-01
Se-79	6.50E+04
Kr-81	2.10E+05
Kr-85	1.07E+01
Sr-90	2.91E+01
Nb-92m	2.78E-02
Zr-93	1.53E+06
Mo-93	3.50E+03
Nb-94	2.03E+04
Tc-99	2.13E+05
Ag-108m	4.18E+02
Sn-121m	5.50E+01
I-129	1.57E+07
Ba-133	1.07E+01
Cs-134	2.06E+00
Cs-135	2.30E+06
Cs-137	3.00E+01
Pm-145	1.77E+01
Sm-146	1.00E+08
Sm-151	9.00E+01
Eu-152	1.33E+01
Eu-154	8.80E+00
Eu-155	4.96E+00
Tb-158	1.50E+02
Ho-166m	1.20E+03
Hf-178m	3.10E+01
Pb-205	1.43E+07
U-233	1.58E+05
Pu-239/240	2.41E+04

Table 2: NUREG/CR-3474 Radionuclides and Total Activity Fractions

Radionuclide	Shroud Activity (Ci)	Vessel Cladding Activity (Ci)	Vessel Walls Activity (Ci)	Total Activity (at time of shutdown 04/30/1987) (1) (Ci)	Fraction of Total Activity (at shutdown)	Total Activity (decayed to 01/01/2015) (2) (Ci)	Fraction of Total Activity (decayed)	Discounted due to Low Abundance (<0.1%)
H-3	1.83E+02	1.40E-02	6.10E-02	1.83E+02	1.24E-02	3.86E+01	4.86E-02	Yes (3)
C-14	1.03E+02	2.80E-03	1.20E-02	1.03E+02	6.99E-03	1.03E+02	1.30E-01	No
Cl-36	2.24E+00	5.70E-05	1.43E-04	2.24E+00	1.52E-04	2.24E+00	2.82E-03	Yes
Ar-39	<2.67E-01	<3.00E-05	<1.10E-03	2.68E-01	1.82E-05	2.50E-01	3.15E-04	Yes
Ca-41	2.00E-02	5.20E-07	2.00E-06	2.00e-02	1.36E-06	2.00E-02	2.52E-05	Yes
Mn-53	6.50E-03	8.00E-07	1.00E-05	6.51E-03	4.42E-07	6.51E-03	8.19E-06	Yes
Mn-54	1.17E+04	1.14E+00	1.27E+01	1.17E+04	7.95E-01	2.11E-06	2.65E-09	Yes
Fe-55	9.29E+05	2.36E+01	1.14E+02	9.29E+05	6.31E+01	8.21E+02	1.03E+00	No
Ni-59	6.04E+02	1.80E-02	8.00E-02	6.04E+02	4.10E-02	6.04E+02	7.60E-01	No
Co-60	4.50E+05	1.38E+01	9.55E+01	4.50E+05	3.05E+01	1.18E+04	1.48E+01	No
Ni-63	8.01E+04	2.30E+00	9.55E+00	8.01E+04	5.44E+00	6.61E+04	8.32E+01	No
Zn-65	1.55E+03	4.10E-02	2.90E-02	1.55E+03	1.05E-01	5.41E-10	6.81E-13	Yes
Se-79	1.40E-03	9.80E-08	1.00E-06	1.40E-03	9..51E-08	1.40E-03	7.76E-06	Yes
Kr-81	<2.24E-04	<5.40E-12	<3.04E-11	2.24E-04	1.52E-08	2.24E-04	2.87E-07	Yes
Kr-85	<8.15E-01	<5.00E-06	<2.20E-05	8.15E-01	5.53E-05	1.37E-01	1.72E-04	Yes
Sr-90	<2.11E+00	<1.40E-05	<6.10E-05	2.11E+00	1.43E-04	1.08E+00	1.36E-03	Yes (3)
Nb-92m	6.33E-07	2.20E-10	2.90E-09	6.36E-07	4.32E-11	0.00E+00	0.00E+00	Yes
Zr-93	1.4E-04	6.90E-09	8.10E-08	1.41E-04	9.57E-09	1.41E-04	1.77E-07	Yes
Mo-93	1.08E+00	4.40E-05	7.96E-04	1.08E+00	7.33E-05	1.07E+00	1.35E-03	Yes
Nb-94	8.86E-01	2.80E-05	7.20E-05	8.86E-01	6.01E-05	8.85E-01	1.11E-03	Yes (3)
Tc-99	2.10E-01	9.00E-06	1.59E-04	2.10E-01	1.43E-05	2.10E-01	2.64E-04	Yes
Ag-108m	<2.18E-01	<9.00E-06	<7.80E-05	2.18E-01	1.48E-05	2.08E-01	2.62E-04	Yes
Sn-121m	1.07E-02	1.00E-06	1.40E-05	1.07E-02	7.27E-07	6.90E-03	8.68E-06	Yes
I-129	<5.90E-07	<4.40E-12	1.88E-12	5.09E-07	4.00E-11	5.90E-07	7.42E-10	Yes
Ba-133	<1.00e+01	<3.50E-04	<2.20E-03	1.00E+01	6.79E-04	1.61E+00	2.03E-03	Yes
Cs-134	<3.37E+01	<9.80E-04	<3.50E-03	3.37E+01	2.29E-03	3.10E-03	3.90E-06	Yes
Cs-135	<3.80E-04	<3.67E-10	<2.46E-09	3.80E-04	2.58E-08	3.80E-04	4.78E-07	Yes
Cs-137	<2.11E+00	<2.00E-05	<1.38E-04	2.11E+00	2.99E-07	1.12E+00	1.41E-03	Yes (3)
Pm-145	<4.40E-03	<1.30E-07	<9.41E-08	4.40E-03	2.27E-14	1.50E-03	1.89E-06	Yes
Sm-146	4.07E-10	4.50E-14	6.20E-13	4.08E-10	2.77E-14	4.08E-10	5.13E-13	Yes
Sm-151	5.30E-02	1.80E-05	1.45E-04	5.32E-02	3.61E-06	4.30E-02	5.41E-05	Yes
Eu-152	3.09E-07	3.85E-03	1.70E-02	2.09E-02	1.41E-06	5.10E-03	1.09E-02	Yes (3)
Eu-154	1.28E+01	4.60E-04	4.50E-03	1.28E+01	3.43E-04	1.37E+00	1.72E-03	Yes (3)
Eu-155	5.06E+00	1.70E-05	1.88E-04	5.06E+00	3.43E-04	9.00E-02	1.13E-04	Yes
Tb-158	5.30E-03	6.31E-07	8.00E-06	5.31E-03	3.60E-07	4.80E-03	6.04E-06	Yes
Ho-166m	3.93E-01	1.10E-05	1.59E-04	3.93E-01	2.67E-05	3.87E-01	4.87E-04	Yes
Hf-178m	<5.20E-01	<4.30E-05	<7.09E-04	5.21E-01	3.53E-05	2.81E-01	3.54E-04	Yes
Pb-205	4.00E-06	2.58E-10	3.04E-09	4.00E-06	2.72E-10	4.00E-06	5.03E-09	Yes
U-233	<2.35E-03	<1.30E-07	<2.00E-06	2.25E-03	1.53E-07	2.25E-03	2.83E-06	Yes
Pu-239/240	<3.80E-02	<3.00E-06	<6.80E-05	3.81E-02	2.58E+02	3.81E-02	4.79E05	Yes (3)

Notes (1) – Assumes same inventory of radionuclides exist at LACBWR at time of plant shutdown on 04/30/87

(2) – Decay calculations were performed using Oak Ridge National Laboratory "Decay Calculator"

(3) – Radionuclides meet the criteria for low abundance but cannot be discounted due to other means of production or due to detection at concentrations greater than Minimum Detectable Concentrations by actual sample analysis. 10 CFR 61 waste stream analysis has positively identified H-3, Sr-90, Cs-137, Eu-152, Eu-154 and Pu-239.

Based on the evaluation conducted on the NUREG/CR-3474 activation product radionuclides, the following radionuclides, listed in Table 3, were identified as radionuclides at low abundance that contribute less than 0.01% of the total decayed activity in Table 2 and could be considered for discounting:

Table 3: List of Radionuclides Considered for Discounting

Cl-36	Ar-39	Ca-41	Mn-53	Mn-54
Zn-65	Se-79	Kr-81	Kr-85	Nb-92m
Zr-93	Mo-93	Tc-99	Ag-108m	Sn-121m
I-129	Ba-133	Cs-134	Cs-135	Pm-145
Sm-146	Sm-151	Eu-155	Tb-158	Ho-166m
Hf-178m	Pb-205	U-233		

Several additional radionuclides meet the criteria for low abundance but cannot be discounted due to other means of production or due to detection at concentrations greater than Minimum Detectable Concentrations (MDC) by actual sample analysis. 10 CFR 61 waste stream analysis has positively identified H-3, Sr-90, Cs-137, Eu-152, Eu-154 and Pu-239.

3.2. NUREG/CR-4289

NUREG/CR-4289 presents the potential fission and activation products that may be present in representative Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR). The referenced BWRs include an Allis Chalmers BWR similar to LACBWR (Pathfinder). Radionuclides with half lives of two or more years identified in NUREG/CR-4289 as being present in BWRs were compared with the list of radionuclides in NUREG/CR-3474. NUREG/CR-4289 incorporated and confirmed previous BWR data that was generated during a previous study, NUREG/CR-0672, Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor [3].

A review of this guidance document concluded that the following additional radionuclides (as shown in Table 4) should be considered for addition to the suite of potential radionuclides of concern at LACBWR. Of the five additional radionuclides noted, three (Ru-106, Ce-144 and Cm-242) have half-lives less than 2 years. Consequently, these radionuclides have been discounted for consideration as potential radionuclide that could be present at LACBWR.

Table 4: Additional Potential Radionuclides Identified in NUREG/CR-4289

Radionuclide	Half Life (Years)
Ru-106	1.01E+00
Ce-144	7.80E-01
Pu-238	8.77E+01
Am-241	4.32E+02
Cm-242	4.47E-01

4. REVIEW OF LACBWR SPECIFIC DATA

4.1. Review of Spent Fuel Radionuclide Inventory

In June of 1987, all 333 fuel assemblies were removed from the reactor vessel and placed in the Fuel Element Storage Well (FESW). At that time, a document titled LACBWR Initial Site Characterization Survey for SAFSTOR [4] stated the following;

"The 72 fuel assemblies removed from the reactor in June 1987 have assembly average exposures ranging from 4,678 to 19,259 megawatt-days per metric ton of uranium. The exposures of the 261 fuel assemblies discharged during previous refueling range from 7,575 to 21,532 MWD/MTU. The oldest fuel stored was discharged from the reactor in August 1972. Forty-nine of the A-C fuel assemblies discharged prior to May 1982 contain one or more fuel rods with visible cladding defects and 54 additional A-C fuel assemblies discharged prior to December 1980 contain one or more leaking fuel rods as indicated by higher than normal fission product activity observed during dry sipping tests.

The established radioactivity inventory in the 333 spent fuel assemblies was performed by using the computer program Fact 1 and hand calculations performed by Dr. S. Raffety (Nuclear Engineer) during July of 1987. Activity in the fuel assemblies' hardware is based on neutron activation of this hardware. All activity values have been decay corrected to January 1988."

In subsequent updates to the Dairyland Power Cooperative (DPC) Decommissioning Plan, the following additional clarifications were made;

- The spent fuel radioactivity inventory was derived from the computer program FACT-1, DPC, July 1987 and hand calculations;
- The half life information was obtained from the computer program, TPASGAM, Nuclide Identification Package, J. Keller, Analytical Chemistry Division, Oak Ridge National Laboratory (ORNL), June 1986; and,
- The activity of some radionuclides (Cr-51, Fe-55, Fe-59, Ni-59, Co-60, Ni-63, and Nb-94) in fuel assembly hardware were based on neutron activation analysis.

Table 5 provides the January 1988 inventory data and the activity decay corrected to January 1, 2015.

Table 5: LAC-TR-138 Report, Spent Fuel Inventory Radionuclides

Radionuclide	Half Life (Years)	Activity (at 01/01/1988) (1) (Ci)	Percent of Total Activity (at shutdown)	Total Activity (decayed to 01/01/2015) (2) (Ci)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	1.226E+01	5.510E+02	0.005%	1.206E+02	0.005%	Yes
Cr-51	7.590E-02	3.002E+03	0.030%	Negligible[3]		
Fe-55	2.700E+00	5.254E+05	5.238%	5.506E+02	0.022%	No
Fe-59	1.220E-01	5.120E+02	0.005%	Negligible[3]		Yes
Ni-59	8.000E+04	2.870E+02	0.003%	2.870E+02	0.011%	No
Co-60	5.270E+00	6.395E+04	0.638%	1.833E+03	0.073%	No
Ni-63	1.000E+02	3.540E+04	0.353%	2.936E+04	1.161%	No
Se-79	6.500E+04	5.520E-01	0.000%	5.520E-01	0.000%	Yes
Kr-85	1.072E+01	1.160E+05	1.157%	2.034E+04	0.805%	No
Sr-89	1.385E-01	1.009E+05	1.006%	Negligible[3]		Yes
Sr-90	2.770E+01	1.147E+06	11.436%	5.999E+05	23.729%	No
Zr-93	1.500E+06	1.110E-01	0.000%	1.110E-01	0.000%	Yes
Nb-94	2.000E+04	1.590E+01	0.000%	1.589E+01	0.001%	Yes
Nb-95	9.580E-02	3.555E+05	3.544%	Negligible[3]		Yes
Zr-95	1.750E-01	3.520E+02	0.004%	Negligible[3]		Yes
Tc-99	2.120E+05	2.760E+02	0.003%	2.760E+02	0.011%	No
Ru-103	1.075E-01	6.334E+04	0.632%	Negligible[3]		Yes
Ru-106	1.008E+00	1.524E+06	15.195%	Negligible[3]		Yes
Ag-110m	6.990E-01	1.018E+05	1.015%	Negligible[3]		Yes
Cd-113m	1.359E+01	1.780E+01	0.000%	4.720E+00	0.000%	Yes
Sn-121m	7.600E+01	4.440E+00	0.000%	2.899E+00	0.000%	Yes
Sb-125	2.760E+00	2.730E+02	0.003%	3.071E-01	0.000%	Yes
Sn-126	1.000E+05	7.010E-01	0.000%	7.009E-01	0.000%	Yes
Te-127m	2.990E-01	8.238E+04	0.821%	Negligible[3]		Yes
Te-129m	9.340E-02	1.170E+03	0.012%	Negligible[3]		Yes
I-129	1.570E+07	3.900E-01	0.000%	3.900E-01	0.000%	Yes
I-131	2.200E-02	2.000E-03	0.000%	Negligible[3]		Yes
Cs-134	2.070E+00	3.291E+05	3.281%	3.785E+01	0.001%	Yes
Cs-135	3.000E+06	1.400E+01	0.000%	1.400E+01	0.001%	Yes
Cs-137	3.014E+01	1.666E+06	16.610%	8.958E+05	35.434%	No
Ce-141	8.890E-02	2.638E+04	0.263%	Negligible[3]		Yes
Ce-144	7.801E-01	2.636E+06	26.282%	Negligible[3]		Yes
Pm-147	2.620E+00	4.129E+04	0.412%	3.278E+01	0.001%	Yes
Sm-151	9.316E+01	1.510E+00	0.000%	1.227E+00	0.000%	Yes
Eu-152	1.360E+01	5.110E+02	0.005%	1.281E+02	0.005%	Yes
Eu-154	8.750E+00	4.020E+03	0.040%	4.547E+02	0.018%	No
Eu-155	4.960E+00	1.680E+02	0.002%	3.288E+00	0.000%	Yes
Eu-156	4.160E-02	8.630E+00	0.000%	Negligible[3]		Yes
U-234	2.440E+05	6.370E+01	0.001%	6.370E+01	0.003%	Yes
U-235	7.040E+08	1.890E+00	0.000%	1.890E+00	0.000%	Yes
U-236	2.340E+07	6.320E+00	0.000%	6.320E+00	0.000%	Yes
U-238	4.470E+09	1.220E+01	0.000%	1.220E+01	0.000%	Yes
Np-237	2.140E+06	2.190E+00	0.000%	2.190E+00	0.000%	Yes
Pu-238	8.774E+01	1.262E+04	0.126%	1.018E+04	0.403%	No
Pu-239	2.410E+04	8.837E+03	0.088%	8.833E+03	0.349%	No
Pu-240	6.550E+03	7.165E+03	0.071%	7.150E+03	0.283%	No
Pu-241	1.440E+01	1.138E+06	11.346%	3.091E+05	12.227%	No
Pu-242	3.760E+05	8.580E+00	0.000%	8.580E+00	0.000%	Yes
Am-241[4]	4.320E+02	1.474E+04	0.147%	6.418E+05	25.387%	No
Am-242m	4.329E+02	4.900E+02	0.005%	4.291E+02	0.017%	No
Cm-242	4.459E-01	1.858E+04	0.185%	Negligible[3]		Yes
Am-243	7.380E+03	6.310E+01	0.001%	6.294E+01	0.002%	Yes
Cm-244	1.812E+01	3.603E+03	0.036%	1.279E+03	0.051%	No

Notes (1) – Activity data from LAC-TR-138 Initial Site Characterization Report – January 1988
(2) – Decay calculations were performed using Oak Ridge National Laboratory "Decay Calculator"
(3) – Radionuclides with half-lives of less than 2 years decayed to negligible activity concentrations after 17 year decay period.
(4) – Am-241 decay corrected activity concentration includes contribution of in-growth due to decay of Pu-241.

Table 6 presents radionuclides that are greater than 0.01% of the total activity.

Table 6: Key Radionuclides from Decay Corrected Fuel Inventory

Radionuclide	Percent of Total Activity (decayed)
Fe-55	0.022%
Ni-59	0.011%
Co-60	0.073%
Ni-63	1.161%
Kr-85	0.805%
Sr-90	23.729%
Tc-99	0.011%
Cs-137	35.434%
Eu-154	0.018%
Pu-238	0.403%
Pu-239	0.349%
Pu-240	0.283%
Pu-241	12.227%
Am-241*	25.387%
Am-242m	0.017%
Cm-244	0.051%

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

Table 5 shows that the primary radionuclide is Cs-137, with other long-lived beta emitting radionuclides (Sr-90, Ni-63, Pu-241) and alpha emitting radionuclides (Am-241) being significant contributors. There were a number of other radionuclides noted at decay-corrected concentrations > 0.01%, but less than 0.1% of the total activity. These included the following common activation products as well as transuranic radionuclides Fe-55, Ni-59, Co-60, Kr-85, Tc-99, Eu-154, Pu-238, Pu-239, Pu-240, Am-242m, and Cm-244. Among these radionuclides, Kr-85 is a noble gas and likely not present as a contaminant. Tc-99, Am-242m, and Cm-244 levels were all calculated at concentrations closer to 0.01%, well below 0.1%.

The review of the fuel inventory also took into account the potential increase of Am-241 from the beta decay of Pu-241 to Am-241. Table 6 indicates that both Pu-241 and Am-241 could be significant potential contaminant contributors to systems and structures affected by failed fuel events and contaminated water spills. Therefore, both Pu-241 and Am-241 are included in the initial suite of radionuclides for consideration.

4.2. Analysis of Representative 10 CFR 61 Sample Data

Historical 10 CFR Part 61 analyses performed on LACBWR materials have also identified and confirmed other radionuclides which were present in waste streams which were not identified in Table 1. Table 7 through Table 12 summarizes the 10 CFR 61 radiological analyses results from *10 CFR 61 Analytical Reports by Thermo Analytical and Eberline Services of LACBWR samples for Dairyland Power Cooperative, 1998 to 2010* [5], which were decay corrected to January 1, 2015.

Table 7: Review of LACBWR 10 CFR 61 Data - Turbine Building Feed Pipe Smears (ID: 97-009)

Radionuclide	Activity (sample date 02/02/98) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	7.25E-04	0.043%	2.80E-04	0.080%	No
C-14	7.12E-05	0.004%	7.11E-05	0.020%	No
Fe-55	6.75E-01	40.244%	9.19E-03	2.635%	No
Ni-59	1.89E-03	0.113%	1.89E-03	0.542%	No
Co-60	7.08E-01	42.176%	7.64E-02	21.908%	No
Ni-63	2.63E-01	15.702%	2.34E-01	67.101%	No
Sr-90	1.44E-04	0.009%	9.59E-05	0.028%	No
Sb-125	1.50E-03	0.089%	2.13E-05	0.006%	Yes
Cs-137	2.01E-04	0.012%	1.36E-04	0.039%	No
Pu-238	7.25E-04	0.043%	6.34E-04	0.182%	No
Pu-239/240	5.07E-04	0.030%	5.06E-04	0.145%	No
Am-241*	1.65E-03	0.099%	1.49E-02	4.273%	No
Pu-241	2.41E-02	1.436%	1.06E-02	3.040%	No
Cm-243/244	3.91E-06	0.000%	2.61E-06	0.001%	Yes

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

Table 8: Review of LACBWR 10 CFR 61 Data - Shutdown Condenser Smears (ID: SD-COND)

Radionuclide	Activity (sample date 05/10/00) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	1.03E-04	0.003%	4.50E-05	0.005%	Yes
C-14	1.58E-04	0.005%	1.57E-04	0.017%	No
Fe-55	7.83E-01	23.788%	1.90E-02	2.026%	No
Ni-59	5.86E-03	0.178%	5.86E-03	0.625%	No
Co-60	1.80E+00	54.762%	2.62E-01	27.942%	No
Ni-63	6.43E-01	19.539%	5.81E-01	61.963%	No
Sr-90	7.53E-04	0.023%	5.29E-04	0.056%	No
Cs-137	2.08E-03	0.063%	1.48E-03	0.158%	No
Pu-238	1.72E-03	0.052%	1.53E-03	0.163%	No
U-238	6.36E-07	0.000%	6.36E-07	0.000%	Yes
Pu-239/240	1.09E-03	0.033%	1.09E-03	0.116%	No
Am-241*	2.92E-03	0.089%	2.65E-02	2.826%	No
Pu-241	4.76E-02	1.446%	3.80E-02	4.053%	No
Cm-243/244	6.53E-04	0.020%	4.60E-04	0.049%	No

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

Table 9: Review of LACBWR 10 CFR 61 Data - Lower Cavity Shield Block Concrete (ID: CONCRETE)

Radionuclide	Activity (sample date 01/13/03) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	4.71E-04	22.795%	2.40E-04	38.256%	No
C-14	6.37E-05	3.082%	6.36E-05	10.138%	No
Fe-55	9.41E-05	4.552%	4.50E-06	0.717%	No
Co-60	1.39E-03	67.030%	2.87E-04	45.748%	No
Ni-63	1.01E-05	0.486%	9.25E-06	1.474%	No
Eu-152	4.24E-05	2.054%	2.30E-05	3.666%	No

Table 10: Review of LACBWR 10 CFR 61 Data - Thermo Shield Metal (ID: THERMO SHIELD)

Radionuclide	Activity (sample date 06/18/07) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	2.34E-03	1.919%	1.53E-03	4.236%	No
C-14	3.00E-04	0.245%	2.99E-04	0.828%	No
Mn-54	8.87E-04	0.727%	1.96E-06	0.005%	Yes
Fe-55	8.04E-02	65.921%	1.18E-02	32.668%	No
Co-60	2.34E-02	19.138%	8.66E-03	23.975%	No
Ni-63	1.03E-02	8.401%	9.73E-03	26.937%	No
Sr-90	2.33E-04	0.191%	1.94E-04	0.537%	No
Cs-137	1.02E-03	0.838%	8.60E-04	2.381%	No
Eu-152	4.28E-04	0.351%	2.91E-04	0.806%	No
U-233/234	5.38E-07	0.000%	5.38E-07	0.001%	Yes
Pu-238	8.72E-05	0.072%	8.22E-05	0.228%	No
U-238	3.91E-07	0.000%	3.91E-07	0.001%	Yes
Pu-239/240	7.44E-05	0.061%	7.44E-05	0.206%	No
Am-241*	3.69E-04	0.302%	1.04E-03	2.879%	No
Pu-241	2.23E-03	1.827%	1.55E-03	4.291%	No
Cm-243/244	8.63E-06	0.007%	7.21E-06	0.020%	No

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

Table 11: Review of LACBWR 10 CFR 61 Data - FCP Pipe Internal Surface Resin -Dry Powder (ID: FCP)

Radionuclide	Activity (sample date 09/04/07) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	1.35E-02	0.004%	8.93E-03	0.003%	Yes
C-14	9.05E-02	0.029%	9.04E-02	0.034%	No
Fe-55	3.15E+00	1.021%	4.89E-01	0.182%	No
Co-60	4.02E+01	13.033%	1.53E+01	5.698%	No
Ni-63	2.53E+02	82.102%	2.41E+02	89.759%	No
Sr-90	7.48E-03	0.002%	6.27E-03	0.002%	Yes
Cs-137	2.87E-02	0.009%	2.42E-02	0.009%	Yes
Eu-154	1.48E-01	0.048%	8.20E-02	0.031%	No
U-233/234	1.50E-04	0.000%	1.50E-04	0.000%	Yes
U-235/236	2.07E-05	0.000%	2.07E-05	0.000%	Yes
Pu-238	3.31E-01	0.107%	3.13E-01	0.117%	No
Pu-239/240	3.04E-01	0.099%	3.04E-01	0.113%	No
Am-241*	1.31E+00	0.423%	4.12E+00	1.534%	No
Pu-241	9.59E+00	3.107%	6.72E+00	2.503%	No
Cm-243/244	4.51E-02	0.015%	3.78E-02	0.014%	No

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

Table 12: Review of LACBWR 10 CFR 61 Data - CRUD from FESW Pool Bottom Filter Media (ID: FESW BOTTOM CRUD)

Radionuclide	Activity (sample date 12/28/10) (uCi/g)	Percent of Total Activity	Total Activity (decayed to 01/01/2015) (2) (uCi/g)	Percent of Total Activity (decayed)	Low Abundance (<0.01%)
H-3	2.51E-02	0.779%	2.00E-02	0.722%	No
C-14	9.02E-04	0.028%	9.02E-04	0.033%	No
Fe-55	8.10E-03	0.251%	2.92E-03	0.105%	No
Ni-59	1.60E-02	0.495%	1.59E-02	0.574%	No
Co-60	9.24E-01	28.670%	5.45E-01	19.684%	No
Ni-63	2.15E+00	66.796%	2.09E+00	75.486%	No
Sr-90	5.34E-03	0.166%	4.85E-03	0.175%	No
Cs-137	1.33E-02	0.413%	1.21E-02	0.437%	No
U-233/234	8.15E-06	0.000%	8.15E-06	0.000%	Yes
U-235/236	1.74E-06	0.000%	1.74E-06	0.000%	Yes
Pu-238	2.52E-03	0.078%	2.44E-03	0.088%	No
U-238	2.64E-06	0.000%	2.64E-06	0.000%	Yes
Pu-239/240	2.09E-03	0.065%	2.09E-03	0.075%	No
Am-241*	1.54E-02	0.479%	2.53E-02	0.914%	No
Pu-241	5.68E-02	1.761%	4.67E-02	1.687%	No
Cm-242	5.91E-05	0.002%	1.16E-07	0.000%	Yes
Cm-243/244	5.63E-04	0.017%	5.12E-04	0.018%	No

*Includes in-growth increase of Am-241 from the radioactive decay of Pu-241.

While the majority of the decay-corrected 10 CFR 61 results show that the predominant radionuclides were Co-60 and Ni-63, the results also indicated the presence of a number of transuranic nuclides (e.g. Pu-238, Pu-239/240, Am-241, Pu-241). According to the LACBWR Initial Site Characterization for SAFSTOR report, earlier Dry Active Waste (DAW) 10 CFR 61 analysis in 1987 indicated predominant radionuclides of Fe-55 (8.8E-1 uCi) and Co-60 (7.76E-1 uCi). However, due to its relatively short half-life (2.7 years), Fe-55 concentrations would be expected to decay significantly between the time of 10 CFR 61 analyses and January 1, 2015.

Depending upon the type of sample, Co-60 concentrations ranged from 6 to 45% of the total activity and Ni-63 concentrations were between 1.5% and 90%. Other radionuclides noted above 0.01% of the total activity in some of the samples were H-3, C-14, Fe-55, Ni-59, Sr-90, Sb-125, Cs-137, Eu-152, Pu-238, Pu-239/240, Am-241, Pu-241, and Cm-244. While Sb-125 was noted, it was at a very low level (0.01%) and detected in only one of the samples. As it and was not previously identified as a radionuclide for consideration in any of the literature reviews, it will be excluded from the initial radionuclide suite.

The Am-241 activity values included the in-growth from the concurrent Pu-241 concentrations and Am-241 activity percentages ranged from 0.9 to 4.3% of total activity. While initially noted in some of the gamma spectroscopy reports, the concentrations of uranium radionuclides such as U-233/234, U-235/236 and U-238, which are also naturally occurring radionuclides, constituted negligible fractions of the total activity of the samples and none of the decay corrected results were greater than 0.1% of activity levels. Based on this LACBWR data, these radionuclides will be excluded from the initial radionuclide suite.

4.3. Review of Other LACBWR Historical Information

In 1995, LACBWR performed surveys and sampling to obtain site radiological data during SAFSTOR. In addition to the spent fuel radionuclide inventory assessment previously discussed, other radionuclide studies and determinations included:

- core internal/reactor radionuclide inventory;
- plant loose surface radionuclide inventory;
- plant systems internal radionuclide inventory;
- reactor biological shield activation survey;
- circulating cooling water outfall area radionuclide inventory; and,
- site soil contamination determination survey.

Table 13 presents a summary of the identified radionuclides noted in these studies and determinations. This information was reviewed to determine if there were any radionuclides that had not been previously considered for the radionuclides of concern. Attention was also paid to key radionuclides associated with lower elevations plant areas and soil as these areas are of significant interest during the FSS phase of the decommissioning.

Table 13: Review of LAC-TR-138 Initial Site Characterization Report

Study/Noted Date	Summary of Study and Results	Notes
Core Internal/Reactor Radionuclide Inventory	Reactor component radioactivity and radionuclide inventories were estimated using a mix of activation analysis theory calculations and some data from laboratory analysis of irradiated metal samples. Estimated Curie contents as of January 1, 1988 indicates total of 327,317 Curies for reactor components and materials. Of this, approximately 98% of the activity is comprised by Fe-55 (64%), Co-60 (31%) and Ni-63 (3%). The remaining 2% is estimated to be contributed by various short-lived (half-lives < 5 years) and long-lived (half-lives > 5 years) radionuclides.	The reactor vessel and its components were processed, packaged and disposed of in 2007. The components that were in the Fuel Element Storage Well (FESW) were processed, packaged and disposed of in 2006.
Plant Loose Surface Radionuclide Inventory	Plant loose surface contamination and radionuclide composition was assessed through a loose surface contamination smear campaign throughout key LACBWR buildings, including the Waste Treatment Building, Turbine Building, and Containment Building. The total estimated activity within the loose surface contamination was 101.66 uCi and the contamination levels in the below grade areas of the Containment Building (now called Reactor Building) accounted for 72% of the activity. The predominant identified radionuclides and their activity contributions as of January 1, 1988 were Co-60 (43%), Fe-55 (43%), Cs-137 (8%), and Mn-54 (3.5%).	With decay to January 1, 2015, the expected radionuclides contributing activity would be Cs-137 (with 30.1 year half-life) and Co-60 (with 5.27 year half-life). The shorter lived radionuclides, Fe-55 (2.73 year half-life) and Mn-54 (0.86 year half-life) would decay significantly by January 1, 2015.
Plant Systems Internal Radionuclide Inventory	Scrapings from various plant systems were obtained to provide data on activity levels and radionuclide composition in these systems. The primary radionuclides identified consisted of Co-60, Cs-137, Mn-54 and Fe-55 as of January 1, 1988. Other noted radionuclides in lesser activity levels included Co-57, Co-58, Fe-59, Zn-65, Nb-95, Ru-103, Cs-134, and Ce-144. While total alpha activity was also measured in the samples, the individual alpha isotopic mixture was not determined. For this data set, the total alpha radioactivity of 3.95E+04 uCi represented 4.2% of the system total 9.39E+07 uCi content.	With decay to January 1, 2015, the primary radionuclides contributing activity would be Cs-137 (with 30.1 year half-life) and Co-60 (with 5.27 year half-life). The shorter lived radionuclides, Fe-55 (2.73 year half-life) and Mn-54 (0.86 year half-life) would decay significantly by January 1, 2015.

Study/Noted Date	Summary of Study and Results	Notes
Reactor Biological Shield Activation Survey	In October 1993, a reactor biological shield activation survey was performed and consisted of dose rate measurements at a boring location, smears of a removed core section and gamma spectroscopy analysis of additional sectioned core pieces. The analysis indicated that the biological shield concrete is activated at a distance of up to56" from the inside of the shield wall. The gamma spectroscopy results indicated the presence of two radionuclides: Co-60 and Eu-152. The Co-60 activity ranged from 1.79E-3 uCi/sample at 39 inches to 2.01E-5 uCi/sample at 52 inches. Eu-152 was present at a concentration of 9.57E-4 uCi/sample at 39 inches to 9.08E-5 uCi/sample at 52 inches.	The presence of Eu-152 in this sample as well as another concrete sample (10 CFR 61 analysis of the Lower Cavity Shield Block concrete) confirms that Eu-152 should be included in the Radionuclides of Concern. With a 13.6 year half-life, Eu-152 would still be a constituent in activated concrete sections at LACBWR that may be handled in any dismantlement activities in 2015.
Circulating Cooling Water Outfall Area Radionuclide Inventory	In February 1994, LACBWR contracted Environmental Marine Services to perform a sampling survey in the outfall area. Sediment samples were taken from distances ranging from 60' to 150' from the outfall at the Mississippi River's edge. The samples were analyzed by gamma spectroscopy and the radionuclides Co-60 and Cs-137 were noted. Co-60 activity concentrations ranged from 0.009 to 1.33 pCi/g and Cs-137 activity concentrations ranged from 0.007 to 2.23 pCi/g.	Considering their respective half-lives (5.27 and 30.1 years), Co-60 and Cs-137 may still be measured in the Mississippi River sediment in 2015, but at very low levels.
Site Soil Contamination Determination Survey	An initial soil survey was performed in August-September 1995 at LACBWR within the LSE fenced area. Soil samples were taken in accordance with NUREG/CR-5489, "Manual for Conducting Radiological Surveys in Support of License Termination". The area was gridded into 69 areas of $100m^2$ each and soil samples were obtained from the top 15 cm in each grid location. Gamma spectroscopy analysis indicated Co-60 activity concentrations ranging from 0.003 to 0.77 pCi/g and Cs-137 activity concentrations from 0.012 to 1.3 pCi/g. Eu-155 was also listed in 15 of the samples from 0.011 to 0.057 pCi/g.	With their half-lives, Co-60 and Cs-137 would still be expected to be measured in the site soil in 2015, but at very low levels. Due to the nearby G3 fossil station and its noted NORM radionuclides such as Pb-212, Pb-214, and Ac-228 which can interfere with and cause misidentification as Eu-155, the Eu-155 levels are not considered to be valid plant-derived radionuclide results.

5. INITIAL SUITE OF LACBWR RADIONUCLIDES

Based upon the review of theoretical radionuclides noted in NUREG BWR studies, the specific nuclear engineering review of fuel inventory at LACBWR and other site-specific LACBWR sample results (e.g. 10 CFR 61 reports, piping internals results, etc.), an initial suite of radionuclides was generated for consideration as listed in Table 14. A review of the guidance documents and past radiological data could justify the exclusion of Tc-99 due to low abundance and Eu-155 due to a relatively short half-life. However, Eu-155 was retained due to the potential for the presence of residual dust from the demolition of activated concrete in the end-state condition. Tc-99 was retained because it was positively identified in a few LACBWR samples, albeit at very low concentrations.

Table 14: Initial Suite of LACBWR Site-Specific Radionuclides

Radionuclide	Half Life (Years)
H-3	1.24E+01
C-14	5.73E+03
Fe-55	2.70E+00
Ni-59	7.50E+04
Co-60	5.27E+00
Ni-63	9.60E+01
Sr-90	2.91E+01
Nb-94	2.03E+04
Tc-99	2.13E+05
Cs-137	3.00E+01
Eu-152	1.33E+01
Eu-154	8.80E+00
Eu-155	4.76E+00
Pu-238	8.78E+01
Pu-239/240	6.60+E03
Pu-241	1.44E+01
Am-241	4.32E+02
Cm-243/244*	1.81E+01

*Listed half-life is the shortest half-life for the radionuclides in the pair

6. INSIGNIFICANT DOSE CONTRIBUTORS AND RADIONUCLIDE MIXTURE

One of the objectives of site characterization is to establish the radionuclide profiles for the various contaminated media for the purposes of ALARA analysis, dose assessment and FSS planning. The evaluation provided in this section determines the radionuclide mixture fractions of the initial suite of radionuclides and selects the radionuclides that are "insignificant dose contributors" as defined in NUREG-1757, Vol. 2, Rev 1. The radionuclides remaining after the insignificant dose contributors are eliminated are the radionuclides of concern (ROCs) that will undergo detailed analysis on Chapters 4, 5 and 6 of the LACBWR LTP. The insignificant contributor (IC) dose fraction will be accounted for by adjusting the final soil, basement, and buried pipe DCGLs for the ROC in [7]. This TSD section is divided into three subsections; one for determining radionuclide mixture fractions using three methods, a second to establish the IC dose fraction for basements and soil, and a third to determine the IC dose fraction from buried pipe.

Characterization of the structural surfaces of basements that could remain at the "end-state" consisted primarily of the acquisition and radiological analysis of concrete core samples from the

walls and floors of the Reactor Building (Rx Bldg), Waste Gas Tank Vault (WGTV), Waste Treatment Building (WTB) and the balance of the basement structures (primarily the Piping Tunnels). A characterization campaign was conducted in June/July 2015 and a second "continuing characterization" campaign was conducted in July/August 2017. Since the completion of the first characterization campaign, site management determined that the only two basement structures that will remain will be the Rx Bldg and the WGTV. The prior revision to this TSD (Revision 1) evaluated the first campaign and this current revision evaluates both data sets as one. Chapter 2 of the LACBWR LTP only provides the data from the first characterization campaign.

In the first characterization campaign (June and July of 2015), a series of concrete core samples were taken from the 615 foot elevation concrete floor and the concrete floor and east wall on the 621 foot elevation in the Reactor Building, the 630 foot elevation concrete floor of the WTB and the 633 foot elevation concrete floor of the Piping Tunnels. The locations where the core samples were taken are illustrated in Figure 1. Concrete core samples were collected from a total of twelve (12) locations, six (6) in the Reactor Building, three (3) in the WTB and three (3) in the Piping Tunnel. These twelve locations, representing 20 samples (when considering samples from various depths) were evaluated in the prior revision of this TSD (Revision 1).

In the second characterization campaign (July and August 2017), an additional eighteen samples were collected from eighteen locations between the WGTV and the Rx Bldg as shown in Table 15. This TSD revision (Revision 2), combines the analysis from all 30 locations, representing 38 sample results.

Table 15: Sample ID's and Location Descriptions for the 2017 Continuing Characterization Campaign

Sample ID	Building	Elevation	Surface (floor/wall)
B1-010-04A-CJFC-009-CV	WGTV	621'	Floor
B1-010-04A-CJFC-010-CV	WGTV	621'	Floor
B1-010-04A-CJFC-011-CV	WGTV	621'	Floor
B1-010-04A-CJFC-012-CV	WGTV	621'	Floor
B1-010-04A-CJFC-013-CV	WGTV	618'	Floor
B1-010-04A-CJFC-014-CV	WGTV	618'	Floor
B1-010-04A-CJWC-015-CV	WGTV	621'	Wall
B1-010-04A-CJFC-016-CV	WGTV	621'	Floor
B1-010-001-CJFC-A01-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A02-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A03-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A04-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A05-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A06-CV	Rx Bldg	617'	Floor
B1-010-001-CJFC-A07-CV	Rx Bldg	621'	Floor
B1-010-001-CJFC-A08-CV	Rx Bldg	621'	Floor
B1-010-001-CJFC-A09-CV	Rx Bldg	621'	Floor
B1-010-001-CJFC-A10-CV	Rx Bldg	621'	Floor

For both sampling campaigns (2015 and 2017), the selection of concrete core locations were biased toward locations where physical or observed radiological measurements indicated the presence of fixed surface and/or volumetric contamination of the concrete media. When possible, locations were determined based upon elevated observed contact dose rates or count rates. In addition, visual observations of floor and wall surfaces were used to identify potential locations of surface contamination, such as discoloration or standing water. The goal was to identify, to the extent possible, the locations that exhibited the highest potential of representing the worst case bounding radiological condition for concrete in each survey unit. This judgmental sampling approach was implemented to optimize the detection sensitivities to determine the radionuclide fractions of gamma emitters as well as Hard-to-Detect (HTD) radionuclides.

For the first campaign, the cores were obtained using a 3 inch diameter concrete core bit to a depth of 6 inches or until refusal was encountered due to rebar. Prior to sample preparation, cores were wiped down and smear surveyed to ensure that any activity identified was not from cross contamination. The cores were then sectioned into ½ inch thick "pucks". The concrete pucks were then weighed and counted on both sides (top and bottom) using the on-site gamma spectroscopy system with the count time adjusted to achieve a MDC of 2.0 pCi/g for Cs-137. If activity was detected at a concentration greater than MDC in the puck representing the first ½ inch of concrete, then the puck that represented the second ½ inch of concrete was analyzed. Subsequent pucks that represented concrete at deeper depths were not analyzed if the puck representing the concrete above was less than MDC. The concrete pucks representing the first ½ inch of concrete at each sample location were sent to Test America Laboratory (TA) for gamma spectroscopy and HTD analyses for the beta and alpha emitting radionuclides in the initial suite. In addition, the concrete pucks representing the concrete radioactivity deeper than ½ inch deep at Reactor Building sample locations #001, #003, #005 and #006 and WTB sample locations #001 and #002 were also sent for isotopic analysis.

For the second sampling campaign, the first ½ inch of each sample was sent to an offsite laboratory (General Engineering Laboratory, GEL) for analysis for the same profile of radionuclides as for the samples sent to the Test America Laboratory from the first campaign (i.e., the initial suite).

For both campaigns, reported concrete core puck activities were decay corrected from the sample dates to the anticipated license termination date of March 2020. Attachment 2 provides the analysis results from each campaign. This attachment identified the analysis lab, the sample collection date, the result (pCi/g), the 2 sigma uncertainty (pCi/g), the MDC (pCi/g) at the time of analysis, and whether the laboratory identified a positive detection for each of the 20 initial suite radionuclides and each of the 38 samples. [Note that due to alpha energy resolution limitations, the laboratories report two radionuclide pairs; Pu-239/240, and Cm-243/244. Each of these pairs are considered a single reported nuclide in this analysis.] Attachment 2 also shows the following two values for each sample and radionuclide:

- decayed result of the reported value and whether or not it was detected, and
- the decayed MDC separately.

This data is used in the determination of the radionuclide mixtures and the potential dose from IC radionuclides and their associated relative contributions.

6.1. Radionuclide Mixture Fractions

The radionuclide mixture fractions are derived from the results of the 38 samples from the two campaigns listed in Attachment 2. Three separate core populations were analyzed.; the reactor building (Rx Bldg) samples only, the WGTV samples only, and the combination of all 38 samples. The Rx Bldg and WGTV samples were analyzed separately to recognize the potential that these may contain different radionuclide mixtures. The combination of all 38 samples represents potential soil or buried pipe radionuclide mixtures since it is not possible to segregate these types of source terms and these sources do not contain sufficient quantities of residual activity to allow for reliable quantification.

For each of these three populations, k, the radionuclide fractions were determined from the decayed analytical data using three separate approaches as described below. The three methods were chosen to represent common and conservative methods in determining activity fractions to ensure that the final selection of the radionuclide mixtures account for variability and represent conservative estimates. Each of the three analysis methods use the actual reported laboratory values, whether detected or less than the reported MDC values.

1. The first was to calculate the radionuclide activity fraction, $fA_{i,j,k}$, for each sample, j, each radionuclide, i, within each population, k, from the reported radionuclide activity concentrations, $C_{i,j,k}$, using Equation 1 and then calculating the average activity fraction, $fA_{i,j,k}$, for each radionuclide, i, and population, k, of N samples using Equation 2.

$$fA_{i,j,k} = \frac{C_{i,j,k}}{\sum(j)C_{i,j,k}} \qquad \text{Equation 1}$$

$$fA_{i,k} = \frac{\sum(j)fA_{i,j,i}}{N} \qquad \text{Equation 2}$$

2. The second was to calculate the 75th percentile of the population of samples from Equation 1 above. Once the 75th percentile fraction were calculated for each radionuclide, $f_{i,k,.75}$, data set was re-normalized to determine the percentile-based activity fractions, $fA_{i,k,.75}$ using Equation 3.

$$fA_{i,k,.75} = \frac{f_{i,j,k,.75}}{\sum(j)fA_{i,j,k,.75}} \qquad \text{Equation 3}$$

3. The third was to calculate the individual radionuclide ratios to Cs-137 for each sample, $R_{i,Cs\text{-}137,j}$, calculate the 75th percentile for the sample group, $R_{i,Cs\text{-}137,k,.75}$ then renormalize to determine the activity fractions, $f_RA_{i,k,.75}$ using Equation 4.

$$f_R A_{i,k,.75} = \frac{R_{i,Cs-137,k,.75}}{\sum(i) R_{i,Cs-137,k,.75}} \qquad \text{Equation 4}$$

These three methods differ from the analysis method performed for 12 cores results in revision 1 to this TSD where the radionuclide ratios effectively represented activity-weighted averages which provided a higher weighting to those samples with higher activity. The analyses described above remove the activity weighting and give equal statistical weight to each of the sample results. The results of the three methods are provided within each of the following subsections.

6.1.1. Nuclide Fractions for Soil and Buried Pipe

Table 16 and Table 17 provide the radionuclide activity fractions for all sample data that will represent the soil and buried pipe activity fractions. The data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each fractional data set, and the normalized 75th data set as described above. Table 18 and Table 19 provide the radionuclide activity ratios to Cs-137 for all sample data that will represent the soil fractions. Similar to the previous two tables, the data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each ratio data set, and the normalized 75th data set as described above.

Table 16: Radionuclide Activity Fractions, $fA_{i,j}$ and $fA_{i,j,.75}$, Using All Cores Sample Data for Soils and Buried Pipe, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-04A-CJFC-009-CV	4.71E-01	-1.07E-01	-2.37E-01	-3.34E-02	2.73E-03	1.37E-01	1.46E-02	-4.27E-03	1.00E-02	7.63E-01
B1-010-04A-CJFC-010-CV	2.37E-01	-1.32E-02	-1.11E-01	-1.40E-02	2.72E-03	3.56E-01	1.21E-02	2.10E-03	-3.16E-02	5.10E-01
B1-010-04A-CJFC-011-CV	2.89E-01	-5.21E-02	1.10E-01	7.83E-02	0.00E+00	1.58E-01	7.73E-03	3.32E-03	-3.24E-02	4.40E-01
B1-010-04A-CJFC-012-CV	4.08E-01	2.16E-01	-7.14E-01	-3.16E-02	1.90E-02	6.20E-01	-6.34E-03	-1.99E-04	-1.53E-01	1.03E+00
B1-010-04A-CJFC-013-CV	6.37E-03	-7.41E-03	-1.23E-02	-7.29E-03	7.71E-04	3.96E-02	4.86E-04	1.21E-05	-2.01E-03	9.66E-01
B1-010-04A-CJFC-014-CV	2.95E-02	-9.37E-05	-1.70E-02	1.67E-03	1.17E-03	6.94E-02	6.77E-04	-2.50E-05	1.89E-02	8.53E-01
B1-010-04A-CJWC-015-CV	5.17E-01	1.75E-01	1.67E-01	-4.77E-02	-4.63E-03	2.24E-01	-3.26E-02	5.85E-03	-8.47E-02	-1.09E-03
B1-010-04A-CJFC-016-CV	3.22E-01	4.97E-02	-2.11E-01	4.84E-02	4.72E-03	1.24E-01	-3.81E-03	9.57E-04	-5.21E-03	5.94E-01
B1-010-001-CJFC-A01-CV	6.18E-03	3.20E-03	7.74E-04	4.40E-03	3.77E-01	1.68E-01	6.57E-02	-5.81E-04	3.11E-02	2.87E-01
B1-010-001-CJFC-A02-CV	5.46E-03	1.55E-03	4.02E-03	6.55E-04	5.28E-01	8.12E-02	4.00E-02	4.41E-04	-1.25E-04	2.61E-01
B1-010-001-CJFC-A03-CV	7.26E-03	1.20E-03	4.03E-03	1.45E-04	4.93E-02	5.21E-02	1.76E-02	5.46E-06	2.10E-03	8.55E-01
B1-010-001-CJFC-A04-CV	2.43E-02	3.09E-03	1.05E-03	-2.88E-03	3.94E-02	4.84E-02	4.01E-02	-1.23E-04	1.31E-02	8.22E-01
B1-010-001-CJFC-A05-CV	1.86E-02	-2.13E-03	-1.33E-03	-2.00E-03	2.72E-02	9.67E-02	1.13E-01	-3.97E-05	3.10E-03	7.27E-01
B1-010-001-CJFC-A06-CV	6.44E-03	4.83E-04	-2.19E-03	5.57E-04	2.08E-02	7.81E-02	2.28E-01	5.77E-05	1.84E-03	6.62E-01
B1-010-001-CJFC-A07-CV	8.77E-02	5.05E-03	3.60E-02	5.31E-03	4.71E-02	6.00E-02	4.88E-02	2.55E-04	3.07E-03	6.50E-01
B1-010-001-CJFC-A08-CV	4.58E-02	-5.16E-03	6.19E-04	-3.67E-03	2.44E-02	4.52E-02	1.72E-02	-6.46E-05	-2.41E-03	7.96E-01
B1-010-001-CJFC-A09-CV	3.02E-03	-5.38E-04	-1.76E-04	1.33E-04	2.96E-03	4.39E-03	4.90E-02	5.40E-05	4.20E-03	9.33E-01
B1-010-001-CJFC-A10-CV	1.45E-02	1.67E-03	-2.92E-03	-1.00E-03	1.61E-01	2.31E-01	5.43E-02	2.97E-04	-4.84E-04	4.26E-01
B1001101-CJ-FC-001-CV 0-1/2	4.47E-04	-2.39E-05	4.10E-04	0.00E+00	9.15E-04	5.60E-03	9.09E-04	-1.77E-05	3.59E-06	9.92E-01
B1001101-CJ-FC-001-CV 1/2-1	3.45E-01	-1.60E-02	1.47E-01	0.00E+00	2.04E-03	1.72E-01	6.65E-03	5.27E-05	3.50E-03	4.01E-01
B1001101-CJ-FC-002-CV 0-1/2	6.54E-03	-6.31E-04	8.06E-03	0.00E+00	1.01E-03	1.10E-02	2.37E-02	-3.95E-05	-2.43E-04	9.45E-01
B1001101-CJ-FC-003-CV 0-1/2	6.99E-03	-6.18E-04	3.63E-03	0.00E+00	3.92E-02	2.46E-01	3.73E-02	2.40E-04	-2.38E-04	6.93E-01
B1001101-CJ-FC-003-CV 1/2-1	6.33E-01	-3.70E-02	1.23E-01	0.00E+00	1.53E-02	1.89E-01	1.74E-02	-9.15E-05	-8.43E-03	1.44E-01
B1001101-CJ-FC-004-CV 0-1/2	1.18E-02	-1.89E-03	7.91E-03	0.00E+00	5.18E-02	2.92E-01	3.24E-02	-5.29E-05	5.22E-04	6.53E-01
B1001101-CJ-FC-005-CV 0-1/2	6.87E-03	-2.31E-04	7.43E-03	7.82E-03	1.20E-01	6.46E-01	8.13E-02	-2.68E-04	5.38E-04	1.78E-01
B1001101-CJ-FC-005-CV 1/2-1	3.01E-01	-6.56E-02	2.33E-01	0.00E+00	3.78E-03	4.42E-01	3.42E-02	-1.44E-03	-1.16E-02	6.74E-02
B1001101-CJ-WC-006-CV 0-1/2	2.38E-03	5.64E-05	2.63E-03	0.00E+00	8.11E-04	9.55E-03	4.68E-03	1.88E-05	6.14E-05	9.85E-01
B1001101-CJ-WC-006-CV 1/2-1	4.27E-01	-3.80E-02	2.84E-01	0.00E+00	-2.16E-03	3.46E-01	1.98E-02	2.92E-03	3.71E-03	1.96E-01
B1008101-CJ-FC-002-CV 0-1/2	1.68E-02	3.00E-03	2.80E-02	0.00E+00	2.04E-02	1.51E-01	7.81E-03	0.00E+00	-5.71E-04	8.22E-01
B1008101-CJ-FC-003-CV 0-1/2	2.17E-01	7.08E-01	9.27E-03	0.00E+00	2.48E-03	2.01E-02	9.89E-04	7.41E-05	-2.40E-05	4.24E-02
B1008101-CJ-FC-004-CV 0-1/2	3.78E-02	3.17E-03	8.13E-02	0.00E+00	3.07E-02	1.69E-01	7.85E-03	4.76E-05	1.77E-03	7.29E-01
B1002101-CJ-FC-001-CV 0-1/2	1.22E-04	9.80E-05	9.08E-04	1.27E-02	9.93E-03	1.53E-01	1.70E-02	1.89E-05	2.19E-05	8.20E-01
B1002101-CJ-FC-001-CV 1/2-1	2.38E-02	-2.03E-03	1.87E-02	0.00E+00	6.13E-02	6.15E-01	2.48E-02	3.26E-03	-1.14E-02	3.92E-01
B1002101-CJ-FC-001-CV 1-1.5	6.98E-02	-9.24E-02	1.28E-01	0.00E+00	4.76E-02	3.88E-01	2.04E-01	4.16E-03	3.09E-02	3.88E-01
B1002101-CJ-FC-001-CV 1.5-2	7.43E-03	3.82E-02	2.42E-01	0.00E+00	4.82E-02	5.70E-01	9.63E-03	-3.45E-03	3.28E-03	2.25E-01
B1002101-CJ-FC-002-CV 0-1/2	5.10E-05	5.98E-04	1.06E-04	1.64E-02	6.28E-03	8.88E-02	7.58E-03	-1.36E-05	3.08E-05	8.86E-01
B1002101-CJ-FC-002-CV 1/2-1	1.76E-03	1.68E-02	4.34E-03	0.00E+00	1.21E-02	4.59E-01	8.45E-03	-1.10E-04	4.48E-04	5.06E-01
B1002101-CJ-FC-003-CV 0-1/2	5.39E-04	-3.40E-04	2.15E-03	0.00E+00	3.88E-03	5.74E-02	5.22E-03	3.20E-05	5.24E-05	9.35E-01
Average Fraction	1.20E-01	2.12E-02	7.87E-03	8.42E-04	4.62E-02	1.95E-01	3.21E-02	3.29E-04	-5.74E-03	5.88E-01
75th Percentile Fraction	2.32E-01	3.07E-03	3.40E-02	4.54E-04	3.91E-02	2.71E-01	3.94E-02	2.49E-04	3.09E-03	8.46E-01
75th Perc. Normalized Fraction	1.54E-01	2.04E-03	2.26E-02	3.01E-04	2.59E-02	1.80E-01	2.61E-02	1.66E-04	2.05E-03	5.62E-01

Table 17: Radionuclide Activity Fractions, $fA_{i,j}$ and $fA_{i,j,.75}$, Using All Cores Sample Data for Soils and Buried Pipe, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-04A-CJFC-009-CV	1.15E-02	-1.82E-02	7.08E-03	1.55E-02	-5.25E-04	-5.34E-04	-2.76E-02	-2.27E-03	-6.30E-04	4.79E-04
B1-010-04A-CJFC-010-CV	-1.86E-03	-4.41E-03	6.47E-03	-6.72E-04	9.08E-04	-6.04E-04	4.80E-02	1.51E-03	2.19E-04	4.02E-04
B1-010-04A-CJFC-011-CV	3.65E-03	-3.60E-03	3.83E-03	2.44E-03	4.59E-04	2.80E-04	-1.45E-02	3.40E-03	1.22E-03	1.41E-04
B1-010-04A-CJFC-012-CV	1.72E-03	-5.74E-03	1.30E-02	-1.14E-02	-2.00E-03	-2.38E-03	-3.98E-01	7.27E-03	1.04E-02	1.08E-04
B1-010-04A-CJFC-013-CV	-2.82E-03	-1.27E-04	2.44E-04	-2.51E-04	6.83E-04	3.41E-04	1.57E-02	2.03E-03	-4.27E-05	-9.74E-06
B1-010-04A-CJFC-014-CV	1.93E-03	-5.47E-04	3.45E-04	-6.31E-05	1.51E-03	1.78E-03	3.27E-02	4.49E-03	8.38E-05	8.07E-05
B1-010-04A-CJWC-015-CV	2.29E-03	-8.17E-03	1.88E-02	2.92E-03	3.38E-04	3.30E-03	5.97E-02	8.15E-04	6.95E-04	7.66E-04
B1-010-04A-CJFC-016-CV	9.00E-03	8.71E-03	-5.67E-03	8.20E-04	1.66E-03	-1.50E-04	5.81E-02	4.91E-03	4.79E-05	-3.03E-04
B1-010-001-CJFC-A01-CV	-4.17E-04	1.89E-03	3.29E-05	-2.36E-06	3.07E-03	2.70E-03	3.77E-02	1.14E-02	1.26E-03	1.75E-04
B1-010-001-CJFC-A02-CV	1.39E-03	5.90E-04	3.43E-04	-2.92E-05	3.91E-03	3.33E-03	4.82E-02	1.78E-02	8.96E-04	4.73E-04
B1-010-001-CJFC-A03-CV	-1.97E-03	3.81E-04	1.29E-03	4.54E-06	5.32E-04	5.12E-04	8.70E-03	2.03E-03	2.71E-04	5.36E-05
B1-010-001-CJFC-A04-CV	6.80E-04	1.23E-04	3.29E-04	-4.95E-05	5.10E-04	4.59E-04	7.27E-03	1.55E-03	2.65E-05	4.87E-05
B1-010-001-CJFC-A05-CV	1.46E-03	2.48E-04	2.93E-04	-7.67E-06	1.20E-03	1.03E-03	9.78E-03	5.16E-03	8.10E-04	5.61E-05
B1-010-001-CJFC-A06-CV	-1.52E-03	1.26E-04	-5.41E-04	9.15E-06	2.01E-04	2.06E-04	4.76E-03	4.81E-04	6.24E-05	5.46E-05
B1-010-001-CJFC-A07-CV	1.43E-03	-2.47E-03	2.44E-03	-3.97E-04	2.34E-03	2.98E-03	3.34E-02	1.61E-02	2.23E-04	1.98E-04
B1-010-001-CJFC-A08-CV	5.63E-03	2.13E-03	5.16E-04	-9.39E-05	4.49E-03	3.56E-03	5.03E-02	1.37E-02	1.11E-03	1.72E-04
B1-010-001-CJFC-A09-CV	1.11E-04	-1.86E-05	5.98E-05	3.28E-06	2.15E-04	2.12E-04	2.66E-03	5.01E-04	8.77E-05	1.57E-06
B1-010-001-CJFC-A10-CV	1.45E-05	1.51E-03	1.17E-03	2.94E-04	6.58E-03	7.53E-03	7.83E-02	1.90E-02	1.32E-03	2.16E-04
B1001101-CJ-FC-001-CV 0-1/2	2.99E-04	2.71E-05	2.75E-05	1.37E-06	2.50E-05	1.94E-05	1.06E-04	5.95E-05	4.05E-06	7.61E-06
B1001101-CJ-FC-001-CV 1/2-1	-1.41E-03	7.93E-04	1.66E-03	-1.13E-04	-7.44E-04	-2.95E-04	-5.57E-02	4.82E-04	6.38E-04	-3.35E-04
B1001101-CJ-FC-002-CV 0-1/2	3.18E-04	-1.30E-05	1.71E-04	-2.39E-05	1.30E-03	1.67E-03	2.46E-02	1.28E-03	-8.39E-05	3.21E-04
B1001101-CJ-FC-003-CV 0-1/2	7.60E-04	2.91E-04	-2.73E-04	-4.98E-07	6.40E-04	6.17E-04	7.49E-03	1.81E-03	6.52E-05	9.86E-05
B1001101-CJ-FC-003-CV 1/2-1	2.31E-03	8.09E-03	-2.18E-04	-6.60E-04	-3.27E-04	-2.88E-04	-6.88E-02	1.17E-03	5.69E-04	0.00E+00
B1001101-CJ-FC-004-CV 0-1/2	4.35E-04	1.31E-03	1.86E-04	-6.79E-05	1.36E-03	1.15E-03	-2.10E-02	2.08E-03	1.77E-04	-1.67E-04
B1001101-CJ-FC-005-CV 0-1/2	9.38E-04	1.33E-03	1.72E-05	1.47E-05	2.05E-03	1.48E-03	2.19E-02	4.77E-03	1.43E-04	3.13E-04
B1001101-CJ-FC-005-CV 1/2-1	1.05E-04	7.70E-03	5.92E-04	-1.59E-03	-2.45E-04	-7.27E-04	2.52E-02	1.12E-03	-1.68E-04	0.00E+00
B1001101-CJ-WC-006-CV 0-1/2	1.78E-05	6.51E-05	2.74E-04	-9.86E-06	2.05E-05	2.55E-05	-8.10E-04	3.49E-05	2.21E-06	-3.49E-06
B1001101-CJ-WC-006-CV 1/2-1	2.54E-03	5.84E-03	2.69E-04	4.56E-04	-6.08E-04	5.35E-03	-2.33E-01	9.10E-04	-3.56E-04	-5.01E-04
B1008101-CJ-FC-002-CV 0-1/2	1.54E-03	2.36E-03	4.04E-03	1.79E-04	9.77E-04	-6.13E-04	-5.11E-02	1.14E-03	-1.36E-04	3.18E-04
B1008101-CJ-FC-003-CV 0-1/2	1.08E-03	6.16E-05	2.40E-04	-1.13E-04	1.90E-04	3.77E-05	-7.29E-04	8.85E-05	-3.75E-06	-2.37E-05
B1008101-CJ-FC-004-CV 0-1/2	-3.84E-03	-1.72E-03	1.30E-04	5.91E-04	7.99E-04	1.03E-03	-5.26E-02	2.11E-03	-1.65E-04	3.66E-04
B1002101-CJ-FC-001-CV 0-1/2	1.24E-04	1.67E-04	7.12E-06	-2.33E-06	1.72E-04	2.48E-04	8.10E-04	6.16E-04	7.88E-05	3.50E-05
B1002101-CJ-FC-001-CV 1/2-1	3.41E-03	-2.02E-02	4.35E-03	-2.51E-03	1.89E-03	-5.93E-04	-8.84E-02	3.92E-03	-2.02E-03	-4.66E-04
B1002101-CJ-FC-001-CV 1-1.5	1.46E-02	9.79E-03	9.55E-03	-5.12E-05	2.63E-03	4.97E-05	-4.91E-03	2.31E-03	1.58E-03	5.07E-04
B1002101-CJ-FC-001-CV 1.5-2	1.01E-02	1.92E-02	5.14E-03	-7.07E-04	3.54E-04	9.42E-04	-1.71E-01	1.74E-03	3.00E-03	5.38E-04
B1002101-CJ-FC-002-CV 0-1/2	1.56E-05	1.25E-04	2.08E-05	9.17E-07	1.20E-04	1.00E-04	1.14E-03	3.50E-04	1.18E-05	1.48E-05
B1002101-CJ-FC-002-CV 1/2-1	-5.97E-04	4.77E-04	1.59E-04	-5.15E-05	1.54E-04	1.51E-04	-2.09E-03	6.41E-04	1.23E-05	4.38E-06
B1002101-CJ-FC-003-CV 0-1/2	1.16E-04	5.20E-05	-1.64E-06	-8.82E-06	8.50E-05	1.06E-04	1.00E-03	2.83E-04	-1.04E-06	1.31E-05
Average Fraction	1.62E-03	1.52E-04	1.96E-03	1.17E-04	9.49E-04	9.13E-04	-1.59E-02	3.57E-03	5.54E-04	1.06E-04
75th Percentile Fraction	2.19E-03	1.45E-03	2.24E-03	8.00E-06	1.46E-03	1.29E-03	2.42E-02	4.24E-03	6.80E-04	2.69E-04
75th Perc. Normalized Fraction	1.45E-03	9.65E-04	1.49E-03	5.31E-06	9.69E-04	8.60E-04	1.61E-02	2.81E-03	4.51E-04	1.79E-04

Table 18: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j}$, Using All Cores Sample Data for Soils(k) and Buried Pipe, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-04A-CJFC-009-CV	6.17E-01	-1.40E-01	-3.11E-01	-4.38E-02	3.58E-03	1.79E-01	1.91E-02	-5.59E-03	1.31E-02	1.00E+00
B1-010-04A-CJFC-010-CV	4.64E-01	-2.59E-02	-2.18E-01	-2.74E-02	5.33E-03	6.97E-01	2.38E-02	4.12E-03	-6.20E-02	1.00E+00
B1-010-04A-CJFC-011-CV	6.56E-01	-1.18E-01	2.50E-01	1.78E-01	0.00E+00	3.60E-01	1.76E-02	7.53E-03	-7.35E-02	1.00E+00
B1-010-04A-CJFC-012-CV	3.97E-01	2.10E-01	-6.94E-01	-3.07E-02	1.85E-02	6.03E-01	-6.16E-03	-1.94E-04	-1.49E-01	1.00E+00
B1-010-04A-CJFC-013-CV	6.59E-03	-7.67E-03	-1.28E-02	-7.55E-03	7.98E-04	4.10E-02	5.03E-04	1.25E-05	-2.08E-03	1.00E+00
B1-010-04A-CJFC-014-CV	3.46E-02	-1.10E-04	-1.99E-02	1.96E-03	1.37E-03	8.13E-02	7.93E-04	-2.93E-05	2.21E-02	1.00E+00
B1-010-04A-CJWC-015-CV	-4.76E+02	-1.62E+02	-1.54E+02	4.39E+01	4.26E+00	-2.06E+02	3.00E+01	-5.39E+00	7.80E+01	1.00E+00
B1-010-04A-CJFC-016-CV	5.42E-01	8.37E-02	-3.56E-01	8.15E-02	7.96E-03	2.09E-01	-6.41E-03	1.61E-03	-8.77E-03	1.00E+00
B1-010-001-CJFC-A01-CV	2.15E-02	1.11E-02	2.70E-03	1.53E-02	1.31E+00	5.84E-01	2.29E-01	-2.03E-03	1.08E-01	1.00E+00
B1-010-001-CJFC-A02-CV	2.09E-02	5.92E-03	1.54E-02	2.51E-03	2.02E+00	3.10E-01	1.53E-01	1.69E-03	-4.79E-04	1.00E+00
B1-010-001-CJFC-A03-CV	8.50E-03	1.40E-03	4.71E-03	1.69E-04	5.77E-02	6.09E-02	2.06E-02	6.38E-06	2.45E-03	1.00E+00
B1-010-001-CJFC-A04-CV	2.96E-02	3.76E-03	1.28E-03	-3.50E-03	4.80E-02	5.89E-02	4.88E-02	-1.49E-04	1.60E-02	1.00E+00
B1-010-001-CJFC-A05-CV	2.55E-02	-2.92E-03	-1.82E-03	-2.75E-03	3.75E-02	1.33E-01	1.55E-01	-5.46E-05	4.26E-03	1.00E+00
B1-010-001-CJFC-A06-CV	9.72E-03	7.30E-04	-3.31E-03	8.40E-04	3.15E-02	1.18E-01	3.44E-01	8.71E-05	2.77E-03	1.00E+00
B1-010-001-CJFC-A07-CV	1.35E-01	7.76E-03	5.54E-02	8.17E-03	7.25E-02	9.22E-02	7.50E-02	3.93E-04	4.72E-03	1.00E+00
B1-010-001-CJFC-A08-CV	5.76E-02	-6.48E-03	7.78E-04	-4.61E-03	3.07E-02	5.68E-02	2.16E-02	-8.11E-05	-3.03E-03	1.00E+00
B1-010-001-CJFC-A09-CV	3.24E-03	-5.77E-04	-1.89E-04	1.43E-04	3.18E-03	4.70E-03	5.25E-02	5.78E-05	4.51E-03	1.00E+00
B1-010-001-CJFC-A10-CV	3.41E-02	3.93E-03	-6.86E-03	-2.35E-03	3.77E-01	5.44E-01	1.28E-01	6.99E-04	-1.14E-03	1.00E+00
B1001101-CJ-FC-001-CV 0-1/2	4.51E-04	-2.40E-05	4.14E-04	0.00E+00	9.22E-04	5.65E-03	9.17E-04	-1.78E-05	3.62E-06	1.00E+00
B1001101-CJ-FC-001-CV 1/2-1	8.61E-01	-3.99E-02	3.66E-01	0.00E+00	5.08E-03	4.30E-01	1.67E-02	1.31E-04	8.73E-03	1.00E+00
B1001101-CJ-FC-002-CV 0-1/2	6.92E-03	-6.68E-04	8.53E-03	0.00E+00	1.07E-03	1.16E-02	2.56E-02	-4.18E-05	-2.57E-04	1.00E+00
B1001101-CJ-FC-003-CV 0-1/2	1.01E-02	-8.92E-04	5.23E-03	0.00E+00	5.65E-02	3.55E-01	5.59E-02	3.46E-04	-3.43E-04	1.00E+00
B1001101-CJ-FC-003-CV 1/2-1	4.40E+00	-2.57E-01	8.54E-01	0.00E+00	1.07E-01	1.32E+00	1.23E-01	-6.36E-04	-5.86E-02	1.00E+00
B1001101-CJ-FC-004-CV 0-1/2	1.80E-02	-2.90E-03	1.21E-02	0.00E+00	7.93E-02	4.47E-01	5.14E-02	-8.10E-05	8.00E-04	1.00E+00
B1001101-CJ-FC-005-CV 0-1/2	3.85E-02	-1.30E-03	4.17E-02	4.39E-02	6.76E-01	3.63E+00	4.97E-01	-1.51E-03	3.02E-03	1.00E+00
B1001101-CJ-FC-005-CV 1/2-1	4.46E+00	-9.74E-01	3.46E+00	0.00E+00	5.61E-02	6.56E+00	5.25E-01	-2.14E-02	-1.72E-01	1.00E+00
B1001101-CJ-WC-006-CV 0-1/2	2.42E-03	5.72E-05	2.67E-03	0.00E+00	8.23E-04	9.70E-03	4.77E-03	1.91E-05	6.23E-05	1.00E+00
B1001101-CJ-WC-006-CV 1/2-1	2.18E+00	-1.94E-01	1.45E+00	0.00E+00	-1.10E-02	1.77E+00	1.03E-01	1.49E-02	1.90E-02	1.00E+00
B1008101-CJ-FC-002-CV 0-1/2	2.04E-02	3.65E-03	3.41E-02	0.00E+00	2.48E-02	1.84E-01	9.58E-03	0.00E+00	-6.95E-04	1.00E+00
B1008101-CJ-FC-003-CV 0-1/2	5.12E+00	1.67E+01	2.19E-01	0.00E+00	5.85E-02	4.75E-01	2.34E-02	1.75E-03	-5.67E-04	1.00E+00
B1008101-CJ-FC-004-CV 0-1/2	5.18E-02	4.35E-03	1.12E-01	0.00E+00	4.21E-02	2.32E-01	1.09E-02	6.53E-05	2.43E-03	1.00E+00
B1002101-CJ-FC-001-CV 0-1/2	1.49E-04	1.19E-04	1.11E-03	1.55E-02	1.21E-02	1.87E-01	2.11E-02	2.31E-05	2.67E-05	1.00E+00
B1002101-CJ-FC-001-CV 1/2-1	6.08E-02	-5.18E-03	4.78E-02	0.00E+00	1.57E-01	1.57E+00	6.50E-02	8.32E-03	-2.91E-02	1.00E+00
B1002101-CJ-FC-001-CV 1-1.5	1.80E-01	-2.38E-01	3.30E-01	0.00E+00	1.23E-01	9.98E-01	6.60E-01	1.07E-02	7.95E-02	1.00E+00
B1002101-CJ-FC-001-CV 1.5-2	3.30E-02	1.70E-01	1.08E+00	0.00E+00	2.14E-01	2.53E+00	4.32E-02	-1.53E-02	1.46E-02	1.00E+00
B1002101-CJ-FC-002-CV 0-1/2	5.76E-05	6.75E-04	1.19E-04	1.86E-02	7.09E-03	1.00E-01	8.62E-03	-1.54E-05	3.47E-05	1.00E+00
B1002101-CJ-FC-002-CV 1/2-1	3.48E-03	3.31E-02	8.57E-03	0.00E+00	2.39E-02	9.07E-01	1.68E-02	-2.17E-04	8.84E-04	1.00E+00
B1002101-CJ-FC-003-CV 0-1/2	5.76E-04	-3.64E-04	2.30E-03	0.00E+00	4.15E-03	6.14E-02	5.62E-03	3.42E-05	5.61E-05	1.00E+00
75th Percentile Each Core	3.43E-01	3.89E-03	5.35E-02	1.68E-03	7.76E-02	5.98E-01	1.18E-01	3.81E-04	4.67E-03	1.00E+00
75th Normalized Fract.	1.51E-01	1.72E-03	2.36E-02	7.40E-04	3.43E-02	2.64E-01	5.22E-02	1.68E-04	2.06E-03	4.41E-01

Table 19: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j}$, Using All Cores Sample Data for Soils(k) and Buried Pipe, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-04A-CJFC-009-CV	1.51E-02	-2.39E-02	9.29E-03	2.03E-02	-6.89E-04	-7.01E-04	-3.62E-02	-2.97E-03	-8.26E-04	6.28E-04
B1-010-04A-CJFC-010-CV	-3.65E-03	-8.63E-03	1.27E-02	-1.32E-03	1.78E-03	-1.18E-03	9.40E-02	2.97E-03	4.28E-04	7.88E-04
B1-010-04A-CJFC-011-CV	8.28E-03	-8.18E-03	8.70E-03	5.54E-03	1.04E-03	6.37E-04	-3.29E-02	7.71E-03	2.76E-03	3.20E-04
B1-010-04A-CJFC-012-CV	1.68E-03	-5.58E-03	1.27E-02	-1.11E-02	-1.95E-03	-2.32E-03	-3.87E-01	7.06E-03	1.01E-02	1.05E-04
B1-010-04A-CJFC-013-CV	-2.92E-03	-1.32E-04	2.52E-04	-2.60E-04	7.07E-04	3.53E-04	1.63E-02	2.10E-03	-4.42E-05	-1.01E-05
B1-010-04A-CJFC-014-CV	2.27E-03	-6.41E-04	4.04E-04	-7.39E-05	1.77E-03	2.09E-03	3.83E-02	5.26E-03	9.82E-05	9.46E-05
B1-010-04A-CJWC-015-CV	-2.11E+00	7.53E+00	-1.74E+01	-2.69E+00	-3.11E-01	-3.04E+00	-5.49E+01	-7.51E-01	-6.40E-01	-7.05E-01
B1-010-04A-CJFC-016-CV	1.52E-02	1.47E-02	-9.56E-03	1.38E-03	2.80E-03	-2.52E-04	9.78E-02	8.26E-03	8.07E-05	-5.10E-04
B1-010-001-CJFC-A01-CV	-1.45E-03	6.58E-03	1.15E-04	-8.22E-06	1.07E-02	9.42E-03	1.31E-01	3.97E-02	4.40E-03	6.11E-04
B1-010-001-CJFC-A02-CV	5.31E-03	2.26E-03	1.31E-03	-1.12E-04	1.49E-02	1.27E-02	1.84E-01	6.80E-02	3.43E-03	1.81E-03
B1-010-001-CJFC-A03-CV	-2.31E-03	4.46E-04	1.51E-03	5.31E-06	6.22E-04	5.99E-04	1.02E-02	2.38E-03	3.17E-04	6.27E-05
B1-010-001-CJFC-A04-CV	8.27E-04	1.50E-04	4.00E-04	-6.02E-05	6.20E-04	5.58E-04	8.84E-03	1.88E-03	3.22E-05	5.92E-05
B1-010-001-CJFC-A05-CV	2.00E-03	3.41E-04	4.03E-04	-1.06E-05	1.65E-03	1.42E-03	1.34E-02	7.10E-03	1.11E-03	7.72E-05
B1-010-001-CJFC-A06-CV	-2.30E-03	1.91E-04	-8.17E-04	1.38E-05	3.03E-04	3.11E-04	7.19E-03	7.27E-04	9.41E-05	8.25E-05
B1-010-001-CJFC-A07-CV	2.20E-03	-3.79E-03	3.75E-03	-6.11E-04	3.59E-03	4.57E-03	5.14E-02	2.48E-02	3.42E-04	3.04E-04
B1-010-001-CJFC-A08-CV	7.06E-03	2.67E-03	6.47E-04	-1.18E-04	5.63E-03	4.47E-03	6.32E-02	1.73E-02	1.40E-03	2.16E-04
B1-010-001-CJFC-A09-CV	1.19E-04	-1.99E-05	6.41E-05	3.51E-06	2.30E-04	2.28E-04	2.85E-03	5.37E-04	9.40E-05	1.68E-06
B1-010-001-CJFC-A10-CV	3.42E-05	3.56E-03	2.75E-03	6.90E-04	1.55E-02	1.77E-02	1.84E-01	4.46E-02	3.11E-03	5.07E-04
B1001101-CJ-FC-001-CV 0-1/2	3.01E-04	2.73E-05	2.77E-05	1.38E-06	2.52E-05	1.96E-05	1.07E-04	6.00E-05	4.08E-06	7.67E-06
B1001101-CJ-FC-001-CV 1/2-1	-3.53E-03	1.98E-03	4.13E-03	-2.82E-04	-1.86E-03	-7.34E-04	-1.39E-01	1.20E-03	1.59E-03	-8.34E-04
B1001101-CJ-FC-002-CV 0-1/2	3.37E-04	-1.37E-05	1.81E-04	-2.52E-05	1.37E-03	1.77E-03	2.60E-02	1.35E-03	-8.88E-05	3.40E-04
B1001101-CJ-FC-003-CV 0-1/2	1.10E-03	4.20E-04	-3.93E-04	-7.18E-07	9.23E-04	8.91E-04	1.08E-02	2.61E-03	9.41E-05	1.42E-04
B1001101-CJ-FC-003-CV 1/2-1	1.61E-02	5.62E-02	-1.52E-03	-4.59E-03	-2.28E-03	-2.00E-03	-4.78E-01	8.17E-03	3.96E-03	0.00E+00
B1001101-CJ-FC-004-CV 0-1/2	6.66E-04	2.01E-03	2.85E-04	-1.04E-04	2.08E-03	1.76E-03	-3.22E-02	3.19E-03	2.71E-04	-2.55E-04
B1001101-CJ-FC-005-CV 0-1/2	5.27E-03	7.46E-03	9.68E-05	8.27E-05	1.15E-02	8.29E-03	1.23E-01	2.68E-02	8.05E-04	1.75E-03
B1001101-CJ-FC-005-CV 1/2-1	1.56E-03	1.14E-01	8.78E-03	-2.36E-02	-3.63E-03	-1.08E-02	3.74E-01	1.66E-02	-2.49E-03	0.00E+00
B1001101-CJ-WC-006-CV 0-1/2	1.81E-05	6.61E-05	2.78E-04	-1.00E-05	2.08E-05	2.59E-05	-8.22E-04	3.54E-05	2.24E-06	-3.55E-06
B1001101-CJ-WC-006-CV 1/2-1	1.30E-02	2.98E-02	1.37E-03	2.33E-03	-3.11E-03	2.73E-02	-1.19E+00	4.65E-03	-1.82E-03	-2.56E-03
B1008101-CJ-FC-002-CV 0-1/2	1.88E-03	2.88E-03	4.92E-03	2.18E-04	1.19E-03	-7.45E-04	-6.21E-02	1.39E-03	-1.65E-04	3.86E-04
B1008101-CJ-FC-003-CV 0-1/2	2.55E-02	1.45E-03	5.67E-03	-2.66E-03	4.48E-03	8.89E-04	-1.72E-02	2.09E-03	-8.84E-05	-5.58E-04
B1008101-CJ-FC-004-CV 0-1/2	-5.26E-03	-2.36E-03	1.78E-04	8.10E-04	1.10E-03	1.42E-03	-7.22E-02	2.90E-03	-2.27E-04	5.02E-04
B1002101-CJ-FC-001-CV 0-1/2	1.52E-04	2.04E-04	8.68E-06	-2.84E-06	2.10E-04	3.03E-04	9.88E-04	7.51E-04	9.60E-05	4.26E-05
B1002101-CJ-FC-001-CV 1/2-1	8.71E-03	-5.17E-02	1.11E-02	-6.42E-03	4.83E-03	-1.51E-03	-2.26E-01	1.00E-02	-5.15E-03	-1.19E-03
B1002101-CJ-FC-001-CV 1-1.5	3.76E-02	2.52E-02	2.46E-02	-1.32E-04	6.77E-03	1.28E-04	-1.26E-02	5.94E-03	4.08E-03	1.31E-03
B1002101-CJ-FC-001-CV 1.5-2	4.49E-02	8.54E-02	2.29E-02	-3.14E-03	1.58E-03	4.19E-03	-7.60E-01	7.75E-03	1.33E-02	2.39E-03
B1002101-CJ-FC-002-CV 0-1/2	1.76E-05	1.41E-04	2.34E-05	1.04E-06	1.35E-04	1.13E-04	1.29E-03	3.95E-04	1.34E-05	1.67E-05
B1002101-CJ-FC-002-CV 1/2-1	-1.18E-03	9.43E-04	3.13E-04	-1.02E-04	3.05E-04	2.98E-04	-4.12E-03	1.27E-03	2.43E-05	8.65E-06
B1002101-CJ-FC-003-CV 0-1/2	1.24E-04	5.56E-05	-1.75E-06	-9.43E-06	9.09E-05	1.13E-04	1.07E-03	3.02E-04	-1.11E-06	1.40E-05
75th Percentile Each Core	6.63E-03	3.39E-03	4.72E-03	4.86E-06	2.62E-03	1.77E-03	3.52E-02	8.06E-03	1.33E-03	3.75E-04
75th Normalized Fraction	2.93E-03	1.50E-03	2.08E-03	2.15E-06	1.16E-03	7.80E-04	1.56E-02	3.56E-03	5.85E-04	1.65E-04

Table 20 summarizes the radionuclide activity fractions using the three methods described above. This shows that two nuclides have a negative average (Tc-99 and Pu-241) using the average reported values but these values are low and have a very small contribution to the average values. In contrast, none of the fractions using the 75th percentile methods show negative values.

Table 20 : Radionuclide Activity Fractions for Soils Using Three Methods

Nuclide	Average Activity Fractions, $fA_{i,}$	75 Percentile of the Activity Average Fractions, $fA_{i,,.75}$	75th Percentile of the Individual Core Ratios to Cs-137, $f_RA_{i,.75}$
H-3	1.20E-01	1.54E-01	1.51E-01
C-14	2.12E-02	2.04E-03	1.72E-03
Fe-55	7.87E-03	2.26E-02	2.36E-02
Ni-59	8.42E-04	3.01E-04	7.40E-04
Co-60	4.62E-02	2.59E-02	3.43E-02
Ni-63	1.95E-01	1.80E-01	2.64E-01
Sr-90	3.21E-02	2.61E-02	5.22E-02
Nb-94	3.29E-04	1.66E-04	1.68E-04
Tc-99	-5.74E-03	2.05E-03	2.06E-03
Cs-137	5.88E-01	5.62E-01	4.41E-01
Eu-152	1.62E-03	1.45E-03	2.93E-03
Eu-154	1.52E-04	9.65E-04	1.50E-03
Eu-155	1.96E-03	1.49E-03	2.08E-03
Np-237	1.17E-04	5.31E-06	2.15E-06
Pu-238	9.49E-04	9.69E-04	1.16E-03
Pu-239/240	9.13E-04	8.60E-04	7.80E-04
Pu-241	-1.59E-02	1.61E-02	1.56E-02
Am-241	3.57E-03	2.81E-03	3.56E-03
Am-243	5.54E-04	4.51E-04	5.85E-04
Cm-243/244	1.06E-04	1.79E-04	1.65E-04

6.1.2. Nuclide Fractions for Reactor Building

Table 21 and Table 22provide the radionuclide activity fractions for all sample data that will represent the reactor building (Rx Bldg) mixture. The data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each fractional data set, and the normalized 75th data set as described above. Table 23 and Table 24 provide the radionuclide activity ratios to Cs-137 for all sample data that will represent the Rx Bldg fractions. Similar to the previous two tables, the data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each ratio data set, and the normalized 75th data set as described above.

Table 21: Radionuclide Activity Fractions, $fA_{i,j}$ and , $fA_{i,j,.75}$, for Rx Bldg, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-001-CJFC-A10-CV	1.45E-02	1.67E-03	-2.92E-03	-1.00E-03	1.61E-01	2.31E-01	5.43E-02	2.97E-04	-4.84E-04	4.26E-01
B1-010-001-CJFC-A09-CV	3.02E-03	-5.38E-04	-1.76E-04	1.33E-04	2.96E-03	4.39E-03	4.90E-02	5.40E-05	4.20E-03	9.33E-01
B1-010-001-CJFC-A08-CV	4.58E-02	-5.16E-03	6.19E-04	-3.67E-03	2.44E-02	4.52E-02	1.72E-02	-6.46E-05	-2.41E-03	7.96E-01
B1-010-001-CJFC-A07-CV	8.77E-02	5.05E-03	3.60E-02	5.31E-03	4.71E-02	6.00E-02	4.88E-02	2.55E-04	3.07E-03	6.50E-01
B1-010-001-CJFC-A06-CV	6.44E-03	4.83E-04	-2.19E-03	5.57E-04	2.08E-02	7.81E-02	2.28E-01	5.77E-05	1.84E-03	6.62E-01
B1-010-001-CJFC-A05-CV	1.86E-02	-2.13E-03	-1.33E-03	-2.00E-03	2.72E-02	9.67E-02	1.13E-01	-3.97E-05	3.10E-03	7.27E-01
B1-010-001-CJFC-A04-CV	2.43E-02	3.09E-03	1.05E-03	-2.88E-03	3.94E-02	4.84E-02	4.01E-02	-1.23E-04	1.31E-02	8.22E-01
B1-010-001-CJFC-A03-CV	7.26E-03	1.20E-03	4.03E-03	1.45E-04	4.93E-02	5.21E-02	1.76E-02	5.46E-06	2.10E-03	8.55E-01
B1-010-001-CJFC-A02-CV	5.46E-03	1.55E-03	4.02E-03	6.55E-04	5.28E-01	8.12E-02	4.00E-02	4.41E-04	-1.25E-04	2.61E-01
B1-010-001-CJFC-A01-CV	6.18E-03	3.20E-03	7.74E-04	4.40E-03	3.77E-01	1.68E-01	6.57E-02	-5.81E-04	3.11E-02	2.87E-01
B1001101-CJ-WC-006-CV 1/2-1	4.27E-01	-3.80E-02	2.84E-01	0.00E+00	-2.16E-03	3.46E-01	1.98E-02	2.92E-03	3.71E-03	1.96E-01
B1001101-CJ-WC-006-CV 0-1/2	2.38E-03	5.64E-05	2.63E-03	0.00E+00	8.11E-04	9.55E-03	4.68E-03	1.88E-05	6.14E-05	9.85E-01
B1001101-CJ-FC-005-CV 1/2-1	3.01E-01	-6.56E-02	2.33E-01	0.00E+00	3.78E-03	4.42E-01	3.42E-02	-1.44E-03	-1.16E-02	6.74E-02
B1001101-CJ-FC-005-CV 0-1/2	6.87E-03	-2.31E-04	7.43E-03	7.82E-03	1.20E-01	6.46E-01	8.13E-02	-2.68E-04	5.38E-04	1.78E-01
B1001101-CJ-FC-004-CV 0-1/2	1.18E-02	-1.89E-03	7.91E-03	0.00E+00	5.18E-02	2.92E-01	3.24E-02	-5.29E-05	5.22E-04	6.53E-01
B1001101-CJ-FC-003-CV 1/2-1	6.33E-01	-3.70E-02	1.23E-01	0.00E+00	1.53E-02	1.89E-01	1.74E-02	-9.15E-05	-8.43E-03	1.44E-01
B1001101-CJ-FC-003-CV 0-1/2	6.99E-03	-6.18E-04	3.63E-03	0.00E+00	3.92E-02	2.46E-01	3.73E-02	2.40E-04	-2.38E-04	6.93E-01
B1001101-CJ-FC-002-CV 0-1/2	6.54E-03	-6.31E-04	8.06E-03	0.00E+00	1.01E-03	1.10E-02	2.37E-02	-3.95E-05	-2.43E-04	9.45E-01
B1001101-CJ-FC-001-CV 0-1/2	4.47E-04	-2.39E-05	4.10E-04	0.00E+00	9.15E-04	5.60E-03	9.09E-04	-1.77E-05	3.59E-06	9.92E-01
Average	8.33E-02	-6.94E-03	3.65E-02	4.65E-04	7.87E-02	1.56E-01	4.87E-02	8.32E-05	2.12E-03	5.88E-01
75th Percentile Fraction	3.51E-02	1.37E-03	7.76E-03	3.51E-04	4.97E-02	2.34E-01	5.16E-02	1.44E-04	3.08E-03	8.39E-01
75th Perc. Normalized Fraction	2.77E-02	1.08E-03	6.12E-03	2.76E-04	3.92E-02	1.85E-01	4.07E-02	1.14E-04	2.43E-03	6.61E-01

Table 22: Radionuclide Activity Fractions, $fA_{i,j}$ and , $fA_{i,j,.75}$, for Rx Bldg, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-001-CJFC-A10-CV	1.45E-05	1.51E-03	1.17E-03	2.94E-04	6.58E-03	7.53E-03	7.83E-02	1.90E-02	1.32E-03	2.16E-04
B1-010-001-CJFC-A09-CV	1.11E-04	-1.86E-05	5.98E-05	3.28E-06	2.15E-04	2.12E-04	2.66E-03	5.01E-04	8.77E-05	1.57E-06
B1-010-001-CJFC-A08-CV	5.63E-03	2.13E-03	5.16E-04	-9.39E-05	4.49E-03	3.56E-03	5.03E-02	1.37E-02	1.11E-03	1.72E-04
B1-010-001-CJFC-A07-CV	1.43E-03	-2.47E-03	2.44E-03	-3.97E-04	2.34E-03	2.98E-03	3.34E-02	1.61E-02	2.23E-04	1.98E-04
B1-010-001-CJFC-A06-CV	-1.52E-03	1.26E-04	-5.41E-04	9.15E-06	2.01E-04	2.06E-04	4.76E-03	4.81E-04	6.24E-05	5.46E-05
B1-010-001-CJFC-A05-CV	1.46E-03	2.48E-04	2.93E-04	-7.67E-06	1.20E-03	1.03E-03	9.78E-03	5.16E-03	8.10E-04	5.61E-05
B1-010-001-CJFC-A04-CV	6.80E-04	1.23E-04	3.29E-04	-4.95E-05	5.10E-04	4.59E-04	7.27E-03	1.55E-03	2.65E-05	4.87E-05
B1-010-001-CJFC-A03-CV	-1.97E-03	3.81E-04	1.29E-03	4.54E-06	5.32E-04	5.12E-04	8.70E-03	2.03E-03	2.71E-04	5.36E-05
B1-010-001-CJFC-A02-CV	1.39E-03	5.90E-04	3.43E-04	-2.92E-05	3.91E-03	3.33E-03	4.82E-02	1.78E-02	8.96E-04	4.73E-04
B1-010-001-CJFC-A01-CV	-4.17E-04	1.89E-03	3.29E-05	-2.36E-06	3.07E-03	2.70E-03	3.77E-02	1.14E-02	1.26E-03	1.75E-04
B1001101-CJ-WC-006-CV 1/2-1	2.54E-03	5.84E-03	2.69E-04	4.56E-04	-6.08E-04	5.35E-03	-2.33E-01	9.10E-04	-3.56E-04	-5.01E-04
B1001101-CJ-WC-006-CV 0-1/2	1.78E-05	6.51E-05	2.74E-04	-9.86E-06	2.05E-05	2.55E-05	-8.10E-04	3.49E-05	2.21E-06	-3.49E-06
B1001101-CJ-FC-005-CV 1/2-1	1.05E-04	7.70E-03	5.92E-04	-1.59E-03	-2.45E-04	-7.27E-04	2.52E-02	1.12E-03	-1.68E-04	0.00E+00
B1001101-CJ-FC-005-CV 0-1/2	9.38E-04	1.33E-03	1.72E-05	1.47E-05	2.05E-03	1.48E-03	2.19E-02	4.77E-03	1.43E-04	3.13E-04
B1001101-CJ-FC-004-CV 0-1/2	4.35E-04	1.31E-03	1.86E-04	-6.79E-05	1.36E-03	1.15E-03	-2.10E-02	2.08E-03	1.77E-04	-1.67E-04

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1001101-CJ-FC-003-CV 1/2-1	2.31E-03	8.09E-03	-2.18E-04	-6.60E-04	-3.27E-04	-2.88E-04	-6.88E-02	1.17E-03	5.69E-04	0.00E+00
B1001101-CJ-FC-003-CV 0-1/2	7.60E-04	2.91E-04	-2.73E-04	-4.98E-07	6.40E-04	6.17E-04	7.49E-03	1.81E-03	6.52E-05	9.86E-05
B1001101-CJ-FC-002-CV 0-1/2	3.18E-04	-1.30E-05	1.71E-04	-2.39E-05	1.30E-03	1.67E-03	2.46E-02	1.28E-03	-8.39E-05	3.21E-04
B1001101-CJ-FC-001-CV 0-1/2	2.99E-04	2.71E-05	2.75E-05	1.37E-06	2.50E-05	1.94E-05	1.06E-04	5.95E-05	4.05E-06	7.61E-06
Average	7.53E-04	1.50E-03	3.66E-04	-1.10E-04	1.42E-03	1.66E-03	2.09E-03	5.28E-03	3.37E-04	7.88E-05
75th Percentile Fraction	1.41E-03	1.70E-03	4.29E-04	3.91E-06	2.11E-03	2.84E-03	2.89E-02	8.28E-03	6.84E-04	1.86E-04
75th Perc. Normalized Fraction	1.11E-03	1.34E-03	3.39E-04	3.08E-06	1.67E-03	2.24E-03	2.28E-02	6.53E-03	5.40E-04	1.47E-04

Table 23: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j,.75}$, for Rx Bldg, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-001-CJFC-A10-CV	3.41E-02	3.93E-03	-6.86E-03	-2.35E-03	3.77E-01	5.44E-01	1.28E-01	6.99E-04	-1.14E-03	1.00E+00
B1-010-001-CJFC-A09-CV	3.24E-03	-5.77E-04	-1.89E-04	1.43E-04	3.18E-03	4.70E-03	5.25E-02	5.78E-05	4.51E-03	1.00E+00
B1-010-001-CJFC-A08-CV	5.76E-02	-6.48E-03	7.78E-04	-4.61E-03	3.07E-02	5.68E-02	2.16E-02	-8.11E-05	-3.03E-03	1.00E+00
B1-010-001-CJFC-A07-CV	1.35E-01	7.76E-03	5.54E-02	8.17E-03	7.25E-02	9.22E-02	7.50E-02	3.93E-04	4.72E-03	1.00E+00
B1-010-001-CJFC-A06-CV	9.72E-03	7.30E-04	-3.31E-03	8.40E-04	3.15E-02	1.18E-01	3.44E-01	8.71E-05	2.77E-03	1.00E+00
B1-010-001-CJFC-A05-CV	2.55E-02	-2.92E-03	-1.82E-03	-2.75E-03	3.75E-02	1.33E-01	1.55E-01	-5.46E-05	4.26E-03	1.00E+00
B1-010-001-CJFC-A04-CV	2.96E-02	3.76E-03	1.28E-03	-3.50E-03	4.80E-02	5.89E-02	4.88E-02	-1.49E-04	1.60E-02	1.00E+00
B1-010-001-CJFC-A03-CV	8.50E-03	1.40E-03	4.71E-03	1.69E-04	5.77E-02	6.09E-02	2.06E-02	6.38E-06	2.45E-03	1.00E+00
B1-010-001-CJFC-A02-CV	2.09E-02	5.92E-03	1.54E-02	2.51E-03	2.02E+00	3.10E-01	1.53E-01	1.69E-03	-4.79E-04	1.00E+00
B1-010-001-CJFC-A01-CV	2.15E-02	1.11E-02	2.70E-03	1.53E-02	1.31E+00	5.84E-01	2.29E-01	-2.03E-03	1.08E-01	1.00E+00
B1001101-CJ-WC-006-CV 1/2-1	2.18E+00	-1.94E-01	1.45E+00	0.00E+00	-1.10E-02	1.77E+00	1.03E-01	1.49E-02	1.90E-02	1.00E+00
B1001101-CJ-WC-006-CV 0-1/2	2.42E-03	5.72E-05	2.67E-03	0.00E+00	8.23E-04	9.70E-03	4.77E-03	1.91E-05	6.23E-05	1.00E+00
B1001101-CJ-FC-005-CV 1/2-1	4.46E+00	-9.74E-01	3.46E+00	0.00E+00	5.61E-02	6.56E+00	5.25E-01	-2.14E-02	-1.72E-01	1.00E+00
B1001101-CJ-FC-005-CV 0-1/2	3.85E-02	-1.30E-03	4.17E-02	4.39E-02	6.76E-01	3.63E+00	4.97E-01	-1.51E-03	3.02E-03	1.00E+00
B1001101-CJ-FC-004-CV 0-1/2	1.80E-02	-2.90E-03	1.21E-02	0.00E+00	7.93E-02	4.47E-01	5.14E-02	-8.10E-05	8.00E-04	1.00E+00
B1001101-CJ-FC-003-CV 1/2-1	4.40E+00	-2.57E-01	8.54E-01	0.00E+00	1.07E-01	1.32E+00	1.23E-01	-6.36E-04	-5.86E-02	1.00E+00
B1001101-CJ-FC-003-CV 0-1/2	1.01E-02	-8.92E-04	5.23E-03	0.00E+00	5.65E-02	3.55E-01	5.59E-02	3.46E-04	-3.43E-04	1.00E+00
B1001101-CJ-FC-002-CV 0-1/2	6.92E-03	-6.68E-04	8.53E-03	0.00E+00	1.07E-03	1.16E-02	2.56E-02	-4.18E-05	-2.57E-04	1.00E+00
B1001101-CJ-FC-001-CV 0-1/2	4.51E-04	-2.40E-05	4.14E-04	0.00E+00	9.22E-04	5.65E-03	9.17E-04	-1.78E-05	3.62E-06	1.00E+00
75th Percentile Each Core	4.81E-02	2.58E-03	2.85E-02	5.05E-04	9.30E-02	5.64E-01	1.54E-01	2.17E-04	4.38E-03	1.00E+00
75th Normalized Fraction	2.36E-02	1.27E-03	1.40E-02	2.48E-04	4.58E-02	2.77E-01	7.59E-02	1.07E-04	2.16E-03	4.92E-01

Table 24: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j,.75}$, for Rx Bldg, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-001-CJFC-A10-CV	3.42E-05	3.56E-03	2.75E-03	6.90E-04	1.55E-02	1.77E-02	1.84E-01	4.46E-02	3.11E-03	5.07E-04
B1-010-001-CJFC-A09-CV	1.19E-04	-1.99E-05	6.41E-05	3.51E-06	2.30E-04	2.28E-04	2.85E-03	5.37E-04	9.40E-05	1.68E-06
B1-010-001-CJFC-A08-CV	7.06E-03	2.67E-03	6.47E-04	-1.18E-04	5.63E-03	4.47E-03	6.32E-02	1.73E-02	1.40E-03	2.16E-04
B1-010-001-CJFC-A07-CV	2.20E-03	-3.79E-03	3.75E-03	-6.11E-04	3.59E-03	4.57E-03	5.14E-02	2.48E-02	3.42E-04	3.04E-04
B1-010-001-CJFC-A06-CV	-2.30E-03	1.91E-04	-8.17E-04	1.38E-05	3.03E-04	3.11E-04	7.19E-03	7.27E-04	9.41E-05	8.25E-05
B1-010-001-CJFC-A05-CV	2.00E-03	3.41E-04	4.03E-04	-1.06E-05	1.65E-03	1.42E-03	1.34E-02	7.10E-03	1.11E-03	7.72E-05
B1-010-001-CJFC-A04-CV	8.27E-04	1.50E-04	4.00E-04	-6.02E-05	6.20E-04	5.58E-04	8.84E-03	1.88E-03	3.22E-05	5.92E-05
B1-010-001-CJFC-A03-CV	-2.31E-03	4.46E-04	1.51E-03	5.31E-06	6.22E-04	5.99E-04	1.02E-02	2.38E-03	3.17E-04	6.27E-05
B1-010-001-CJFC-A02-CV	5.31E-03	2.26E-03	1.31E-03	-1.12E-04	1.49E-02	1.27E-02	1.84E-01	6.80E-02	3.43E-03	1.81E-03
B1-010-001-CJFC-A01-CV	-1.45E-03	6.58E-03	1.15E-04	-8.22E-06	1.07E-02	9.42E-03	1.31E-01	3.97E-02	4.40E-03	6.11E-04
B1001101-CJ-WC-006-CV 1/2-1	1.30E-02	2.98E-02	1.37E-03	2.33E-03	-3.11E-03	2.73E-02	-1.19E+00	4.65E-03	-1.82E-03	-2.56E-03
B1001101-CJ-WC-006-CV 0-1/2	1.81E-05	6.61E-05	2.78E-04	-1.00E-05	2.08E-05	2.59E-05	-8.22E-04	3.54E-05	2.24E-06	-3.55E-06
B1001101-CJ-FC-005-CV 1/2-1	1.56E-03	1.14E-01	8.78E-03	-2.36E-02	-3.63E-03	-1.08E-02	3.74E-01	1.66E-02	-2.49E-03	0.00E+00
B1001101-CJ-FC-005-CV 0-1/2	5.27E-03	7.46E-03	9.68E-05	8.27E-05	1.15E-02	8.29E-03	1.23E-01	2.68E-02	8.05E-04	1.75E-03
B1001101-CJ-FC-004-CV 0-1/2	6.66E-04	2.01E-03	2.85E-04	-1.04E-04	2.08E-03	1.76E-03	-3.22E-02	3.19E-03	2.71E-04	-2.55E-04
B1001101-CJ-FC-003-CV 1/2-1	1.61E-02	5.62E-02	-1.52E-03	-4.59E-03	-2.28E-03	-2.00E-03	-4.78E-01	8.17E-03	3.96E-03	0.00E+00
B1001101-CJ-FC-003-CV 0-1/2	1.10E-03	4.20E-04	-3.93E-04	-7.18E-07	9.23E-04	8.91E-04	1.08E-02	2.61E-03	9.41E-05	1.42E-04
B1001101-CJ-FC-002-CV 0-1/2	3.37E-04	-1.37E-05	1.81E-04	-2.52E-05	1.37E-03	1.77E-03	2.60E-02	1.35E-03	-8.88E-05	3.40E-04
B1001101-CJ-FC-001-CV 0-1/2	3.01E-04	2.73E-05	2.77E-05	1.38E-06	2.52E-05	1.96E-05	1.07E-04	6.00E-05	4.08E-06	7.67E-06
75th Percentile Each Core	3.74E-03	5.07E-03	1.34E-03	4.41E-06	4.61E-03	6.43E-03	9.30E-02	2.10E-02	1.26E-03	3.22E-04
75th Normalized Fraction	1.84E-03	2.49E-03	6.61E-04	2.17E-06	2.27E-03	3.17E-03	4.58E-02	1.03E-02	6.18E-04	1.58E-04

Table 25 summarizes the radionuclide activity fractions using the three methods described above. This shows that two nuclides have a negative average (C-14 and Np-237) using the average reported values but these values are low and have a very small contribution to the average values. In contrast, none of the fractions using the 75th percentile methods show negative values.

Table 25: Radionuclide Activity Fractions for Rx Bldg Using Three Methods

Nuclide	Average Activity Fractions, fA_i	75 Percentile of the Activity Average Fractions, $fA_{i,.75}$	75th Percentile of the Individual Core Ratios to Cs-137, $f_RA_{i,.75}$
H-3	8.33E-02	2.77E-02	2.36E-02
C-14	-6.94E-03	1.08E-03	1.27E-03
Fe-55	3.65E-02	6.12E-03	1.40E-02
Ni-59	4.65E-04	2.76E-04	2.48E-04
Co-60	7.87E-02	3.92E-02	4.58E-02
Ni-63	1.56E-01	1.85E-01	2.77E-01
Sr-90	4.87E-02	4.07E-02	7.59E-02
Nb-94	8.32E-05	1.14E-04	1.07E-04
Tc-99	2.12E-03	2.43E-03	2.16E-03
Cs-137	5.88E-01	6.61E-01	4.92E-01
Eu-152	7.53E-04	1.11E-03	1.84E-03
Eu-154	1.50E-03	1.34E-03	2.49E-03
Eu-155	3.66E-04	3.39E-04	6.61E-04
Np-237	-1.10E-04	3.08E-06	2.17E-06
Pu-238	1.42E-03	1.67E-03	2.27E-03
Pu-239/240	1.66E-03	2.24E-03	3.17E-03
Pu-241	2.09E-03	2.28E-02	4.58E-02
Am-241	5.28E-03	6.53E-03	1.03E-02
Am-243	3.37E-04	5.40E-04	6.18E-04
Cm-243/244	7.88E-05	1.47E-04	1.58E-04

6.1.3. Nuclide Fractions for Waste Gas Tank Vault

Table 26 and Table 27 provide the radionuclide activity fractions for all sample data that will represent the WGTV mixture. The data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each fractional data set, and the normalized 75th data set as described above. Table 28 and Table 29 provide the radionuclide activity ratios to Cs-137 for all sample data that will represent the WGTV fractions. Similar to the previous two tables, the data is subdivided into two tables to allow for convenient inspection of all 20 radionuclides. The last three rows of these tables provide the average fraction, the 75th percentile of each ratio data set, and the normalized 75th data set as described above.

For this source term, we have treated analysis of Np-237 activity fractions different than the other source-terms. As seen in Attachment 2, Np-237 was not detected in any of the 38 samples. The average reported activity fraction and the normalized 75th percentile fraction are 6.07E-5 and 4.12E-4 respectively. These clearly suggest the absence of Np-237. However, even at these low fractions, these values artificially skew the IC dose analysis provided below in section 6.2 since the Np-237 DCGLs for this pathway are much lower than the other pathways and radionuclides. Therefore, we have included the Np-237 IC dose using an alternate approach to eliminate this artifact as further explained in section 6.2. As such, each of the Np-237 fractions have been set to zero for the radionuclide fractions shown in this section.

Table 26: Radionuclide Activity Fractions, $fA_{i,j}$ *and* , $fA_{i,j,.75}$, for WGTV, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-04A-CJFC-009-CV	4.71E-01	-1.07E-01	-2.37E-01	-3.34E-02	2.73E-03	1.37E-01	1.46E-02	-4.27E-03	1.00E-02	7.63E-01
B1-010-04A-CJFC-010-CV	2.37E-01	-1.32E-02	-1.11E-01	-1.40E-02	2.72E-03	3.56E-01	1.21E-02	2.10E-03	-3.16E-02	5.10E-01
B1-010-04A-CJFC-011-CV	2.89E-01	-5.21E-02	1.10E-01	7.83E-02	0.00E+00	1.58E-01	7.73E-03	3.32E-03	-3.24E-02	4.40E-01
B1-010-04A-CJFC-012-CV	4.08E-01	2.16E-01	-7.14E-01	-3.16E-02	1.90E-02	6.20E-01	-6.34E-03	-1.99E-04	-1.53E-01	1.03E+00
B1-010-04A-CJFC-013-CV	6.37E-03	-7.41E-03	-1.23E-02	-7.29E-03	7.71E-04	3.96E-02	4.86E-04	1.21E-05	-2.01E-03	9.66E-01
B1-010-04A-CJFC-014-CV	2.95E-02	-9.37E-05	-1.70E-02	1.67E-03	1.17E-03	6.94E-02	6.77E-04	-2.50E-05	1.89E-02	8.53E-01
B1-010-04A-CJWC-015-CV	5.17E-01	1.75E-01	1.67E-01	-4.77E-02	-4.63E-03	2.24E-01	-3.26E-02	5.85E-03	-8.47E-02	-1.09E-03
B1-010-04A-CJFC-016-CV	3.22E-01	4.97E-02	-2.11E-01	4.84E-02	4.72E-03	1.24E-01	-3.81E-03	9.57E-04	-5.21E-03	5.94E-01
Average	2.85E-01	3.27E-02	-1.28E-01	-7.03E-04	3.31E-03	2.16E-01	-8.92E-04	9.69E-04	-3.51E-02	6.44E-01
75th Percentile Frac	4.24E-01	8.11E-02	1.83E-02	1.34E-02	3.23E-03	2.57E-01	8.83E-03	2.40E-03	9.97E-04	8.82E-01
75th Perc. Norm. Frac.	2.41E-01	4.60E-02	1.04E-02	7.58E-03	1.83E-03	1.46E-01	5.01E-03	1.36E-03	5.66E-04	5.00E-01

Table 27: Radionuclide Activity Fractions, $fA_{i,j}$ and , $fA_{i,j,.75}$, for WGTV, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-04A-CJFC-009-CV	1.15E-02	-1.82E-02	7.08E-03	1.55E-02	-5.25E-04	-5.34E-04	-2.76E-02	-2.27E-03	-6.30E-04	4.79E-04
B1-010-04A-CJFC-010-CV	-1.86E-03	-4.41E-03	6.47E-03	-6.72E-04	9.08E-04	-6.04E-04	4.80E-02	1.51E-03	2.19E-04	4.02E-04
B1-010-04A-CJFC-011-CV	3.65E-03	-3.60E-03	3.83E-03	2.44E-03	4.59E-04	2.80E-04	-1.45E-02	3.40E-03	1.22E-03	1.41E-04
B1-010-04A-CJFC-012-CV	1.72E-03	-5.74E-03	1.30E-02	-1.14E-02	-2.00E-03	-2.38E-03	-3.98E-01	7.27E-03	1.04E-02	1.08E-04
B1-010-04A-CJFC-013-CV	-2.82E-03	-1.27E-04	2.44E-04	-2.51E-04	6.83E-04	3.41E-04	1.57E-02	2.03E-03	-4.27E-05	-9.74E-06
B1-010-04A-CJFC-014-CV	1.93E-03	-5.47E-04	3.45E-04	-6.31E-05	1.51E-03	1.78E-03	3.27E-02	4.49E-03	8.38E-05	8.07E-05
B1-010-04A-CJWC-015-CV	2.29E-03	-8.17E-03	1.88E-02	2.92E-03	3.38E-04	3.30E-03	5.97E-02	8.15E-04	6.95E-04	7.66E-04
B1-010-04A-CJFC-016-CV	9.00E-03	8.71E-03	-5.67E-03	8.20E-04	1.66E-03	-1.50E-04	5.81E-02	4.91E-03	4.79E-05	-3.03E-04
Average	3.18E-03	-4.01E-03	5.52E-03	0.00E+00	3.79E-04	2.54E-04	-2.82E-02	2.77E-03	1.49E-03	2.08E-04
75th Percentile Frac	4.99E-03	-4.42E-04	8.58E-03	0.00E+00	1.06E-03	7.01E-04	5.05E-02	4.59E-03	8.26E-04	4.21E-04
75th Perc. Norm. Frac.	2.83E-03	-2.51E-04	4.87E-03	0.00E+00	6.00E-04	3.98E-04	2.87E-02	2.61E-03	4.69E-04	2.39E-04

Table 28: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j,.75}$, for WGTV, First Set of Radionuclides

Sample ID	H-3	C-14	Fe-55	Ni-59	Co-60	Ni-63	Sr-90	Nb-94	Tc-99	Cs-137
B1-010-04A-CJFC-009-CV	6.17E-01	-1.40E-01	-3.11E-01	-4.38E-02	3.58E-03	1.79E-01	1.91E-02	-5.59E-03	1.31E-02	1.00E+00
B1-010-04A-CJFC-010-CV	4.64E-01	-2.59E-02	-2.18E-01	-2.74E-02	5.33E-03	6.97E-01	2.38E-02	4.12E-03	-6.20E-02	1.00E+00
B1-010-04A-CJFC-011-CV	6.56E-01	-1.18E-01	2.50E-01	1.78E-01	0.00E+00	3.60E-01	1.76E-02	7.53E-03	-7.35E-02	1.00E+00
B1-010-04A-CJFC-012-CV	3.97E-01	2.10E-01	-6.94E-01	-3.07E-02	1.85E-02	6.03E-01	-6.16E-03	-1.94E-04	-1.49E-01	1.00E+00
B1-010-04A-CJFC-013-CV	6.59E-03	-7.67E-03	-1.28E-02	-7.55E-03	7.98E-04	4.10E-02	5.03E-04	1.25E-05	-2.08E-03	1.00E+00
B1-010-04A-CJFC-014-CV	3.46E-02	-1.10E-04	-1.99E-02	1.96E-03	1.37E-03	8.13E-02	7.93E-04	-2.93E-05	2.21E-02	1.00E+00
B1-010-04A-CJWC-015-CV	-4.76E+02	-1.62E+02	-1.54E+02	4.39E+01	4.26E+00	-2.06E+02	3.00E+01	-5.39E+00	7.80E+01	1.00E+00
B1-010-04A-CJFC-016-CV	5.42E-01	8.37E-02	-3.56E-01	8.15E-02	7.96E-03	2.09E-01	-6.41E-03	1.61E-03	-8.77E-03	1.00E+00
75th Percentile Each Core	5.61E-01	2.08E-02	-1.81E-02	1.06E-01	1.06E-02	4.21E-01	2.03E-02	2.24E-03	1.54E-02	1.00E+00
75th Normalized Fraction	2.52E-01	9.37E-03	-8.13E-03	4.74E-02	4.76E-03	1.89E-01	9.12E-03	1.01E-03	6.91E-03	4.49E-01

Table 29: Radionuclide Activity Ratios to Cs-137, $f_R A_{i,j,.75}$, for WGTV, Second Set of Radionuclides

Sample ID	Eu-152	Eu-154	Eu-155	Np-237	Pu-238	Pu-239/240	Pu-241	Am-241	Am-243	Cm-243/244
B1-010-04A-CJFC-009-CV	1.51E-02	-2.39E-02	9.29E-03	2.03E-02	-6.89E-04	-7.01E-04	-3.62E-02	-2.97E-03	-8.26E-04	6.28E-04
B1-010-04A-CJFC-010-CV	-3.65E-03	-8.63E-03	1.27E-02	-1.32E-03	1.78E-03	-1.18E-03	9.40E-02	2.97E-03	4.28E-04	7.88E-04
B1-010-04A-CJFC-011-CV	8.28E-03	-8.18E-03	8.70E-03	5.54E-03	1.04E-03	6.37E-04	-3.29E-02	7.71E-03	2.76E-03	3.20E-04
B1-010-04A-CJFC-012-CV	1.68E-03	-5.58E-03	1.27E-02	-1.11E-02	-1.95E-03	-2.32E-03	-3.87E-01	7.06E-03	1.01E-02	1.05E-04
B1-010-04A-CJFC-013-CV	-2.92E-03	-1.32E-04	2.52E-04	-2.60E-04	7.07E-04	3.53E-04	1.63E-02	2.10E-03	-4.42E-05	-1.01E-05
B1-010-04A-CJFC-014-CV	2.27E-03	-6.41E-04	4.04E-04	-7.39E-05	1.77E-03	2.09E-03	3.83E-02	5.26E-03	9.82E-05	9.46E-05
B1-010-04A-CJWC-015-CV	-2.11E+00	7.53E+00	-1.74E+01	-2.69E+00	-3.11E-01	-3.04E+00	-5.49E+01	-7.51E-01	-6.40E-01	-7.05E-01
B1-010-04A-CJFC-016-CV	1.52E-02	1.47E-02	-9.56E-03	1.38E-03	2.80E-03	-2.52E-04	9.78E-02	8.26E-03	8.07E-05	-5.10E-04
75th Percentile Each Core	9.98E-03	3.57E-03	1.01E-02	0.00E+00	1.77E-03	4.24E-04	5.22E-02	7.22E-03	1.01E-03	3.97E-04
75th Normalized Fraction	4.49E-03	1.60E-03	4.56E-03	0.00E+00	7.95E-04	1.90E-04	2.35E-02	3.25E-03	4.55E-04	1.78E-04

Table 30 summarizes the radionuclide activity fractions using the three methods described above. This shows that six nuclides have a negative average using the average reported values and one nuclide having a negative fraction using the 75th percentile methods. The latter have very low fractions with very small contribution to the overall averages. The frequency of these negative values is higher for the WGTV and is likely caused from the lower number of samples as compared to the other source terms.

Table 30: Radionuclide Activity Fractions for WGTV Using Three Methods

Nuclide	Average Activity Fractions, fA_i	75 Percentile of the Activity Average Fractions, $fA_{i,.75}$	75th Percentile of the Individual Core Ratios to Cs-137, $f_RA_{i,.75}$
H-3	2.85E-01	2.41E-01	2.52E-01
C-14	3.27E-02	4.60E-02	9.37E-03
Fe-55	-1.28E-01	1.04E-02	-8.13E-03
Ni-59	-7.03E-04	7.58E-03	4.74E-02
Co-60	3.31E-03	1.83E-03	4.76E-03
Ni-63	2.16E-01	1.46E-01	1.89E-01
Sr-90	-8.92E-04	5.01E-03	9.12E-03
Nb-94	9.69E-04	1.36E-03	1.01E-03
Tc-99	-3.51E-02	5.66E-04	6.91E-03
Cs-137	6.44E-01	5.00E-01	4.49E-01
Eu-152	3.18E-03	2.83E-03	4.49E-03
Eu-154	-4.01E-03	-2.51E-04	1.60E-03
Eu-155	5.52E-03	4.87E-03	4.56E-03
Np-237	0.00E+00	0.00E+00	0.00E+00
Pu-238	3.79E-04	6.00E-04	7.95E-04
Pu-239/240	2.54E-04	3.98E-04	1.90E-04
Pu-241	-2.82E-02	2.87E-02	2.35E-02
Am-241	2.77E-03	2.61E-03	3.25E-03
Am-243	1.49E-03	4.69E-04	4.55E-04
Cm-243/244	2.08E-04	2.39E-04	1.78E-04

6.2. Insignificant Dose Contributors and Radionuclides of Concern

NUREG-1757, Vol. 2, Rev. 1 defines radionuclides as "insignificant dose contributors" if the sum of the dose from the group of insignificant contributors is less than 10% of the total dose from all radionuclides combined. The insignificant contributors can be eliminated from further detailed consideration in the LTP and FSS. However, the dose contribution from the insignificant contributors must be accounted for in the final DCGLs. The radionuclides remaining after the insignificant contributors are removed are the ROC for LACBWR.

The Relative Dose Fraction, $RDF_{i,k}$, for nuclide i and population k is calculated using the applicable DCGLs [7], the nuclide activity fractions from Table 20, Table 25, Table 30, and Equation 5. The results of these calculations are provided in Table 31 through Table 33.

$$RDF_{i,k} = \frac{fA_{i,k}}{DCGL_{i,k}} \left[\frac{1}{\sum(i) \frac{fA_{i,k}}{DCGL_{i,k}}} \right] \qquad \text{Equation 5}$$

Where the values of $DCGL_{i,k}$ are from Table 35 in [7].

Table 31: Relative Dose Fractions, $RDF_{i,k}$, Using Reported Averages

		Normalized Fractions from the Average Activity Fractions Using Reported Concentrations			Combined Relative Doses, $RDF_{i,k}$		
Nuclide	ROC ?	Soil Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction	Soil	Rx Bldg	WGTV
H-3		1.20E-01	8.33E-02	2.85E-01	4.93E-04	3.68E-04	2.07E-03
C-14		2.12E-02	-6.94E-03	3.27E-02	6.21E-06	-2.49E-04	2.62E-03
Fe-55		7.87E-03	3.65E-02	-1.28E-01	5.54E-08	3.14E-05	-2.37E-04
Ni-59		8.42E-04	4.65E-04	-7.03E-04	2.33E-09	4.24E-08	-1.44E-07
Co-60	Y	4.62E-02	7.87E-02	3.31E-03	2.58E-01	3.46E-01	2.21E-02
Ni-63		1.95E-01	1.56E-01	2.16E-01	1.48E-06	3.88E-05	1.09E-04
Sr-90	Y	3.21E-02	4.87E-02	-8.92E-04	3.49E-04	7.13E-02	-3.25E-03
Nb-94		3.29E-04	8.32E-05	9.69E-04	1.17E-03	2.27E-04	3.94E-03
Tc-99		-5.74E-03	2.12E-03	-3.51E-02	-1.16E-03	3.85E-04	-1.00E-02
Cs-137	Y	5.88E-01	5.88E-01	6.44E-01	7.25E-01	5.86E-01	9.78E-01
Eu-152	Y	1.62E-03	7.53E-04	3.18E-03	4.09E-03	1.44E-03	9.04E-03
Eu-154	Y	1.52E-04	1.50E-03	-4.01E-03	4.14E-04	3.10E-03	-1.23E-02
Eu-155		1.96E-03	3.66E-04	5.52E-03	1.25E-04	1.82E-05	4.10E-04
Np-237		1.17E-04	-1.10E-04	0.00E+00	1.05E-02	-1.71E-02	0.00E+00
Pu-238		9.49E-04	1.42E-03	3.79E-04	4.10E-05	1.68E-03	9.19E-04
Pu-239/240		9.13E-04	1.66E-03	2.54E-04	4.38E-05	2.18E-03	7.47E-04
Pu-241		-1.59E-02	2.09E-03	-2.82E-02	-3.13E-05	5.45E-05	-1.55E-03
Am-241		3.57E-03	5.28E-03	2.77E-03	2.35E-04	3.92E-03	4.32E-03
Am-243		5.54E-04	3.37E-04	1.49E-03	2.13E-04	3.31E-04	2.97E-03
Cm-243/244		1.06E-04	7.88E-05	2.08E-04	2.64E-05	2.88E-05	1.34E-04
				Sum	1.00E+00	1.00E+00	1.00E+00
				ROC Frac	9.88E-01	1.01E+00	9.94E-01
				IC Frac	1.17E-02	-8.07E-03	6.45E-03

Table 32: Relative Dose Fractions, $RDF_{i,k}$, Using 75th Percentiles of the Averages

		Normalized Fractions from the 75th Percentile of Average Activity Fractions Using Reported Concentrations			Combined Relative Doses, $RDF_{i,k}$		
Nuclide	ROC ?	Soil Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction	Soil	Rx Bldg	WGTV
H-3		1.54E-01	2.77E-02	2.41E-01	7.46E-04	1.35E-04	2.13E-03
C-14		2.04E-03	1.08E-03	4.60E-02	7.04E-07	4.28E-05	4.52E-03
Fe-55		2.26E-02	6.12E-03	1.04E-02	1.88E-07	5.80E-06	2.34E-05
Ni-59		3.01E-04	2.76E-04	7.58E-03	9.82E-10	2.77E-08	1.89E-06
Co-60	Y	2.59E-02	3.92E-02	1.83E-03	1.71E-01	1.90E-01	1.49E-02
Ni-63		1.80E-01	1.85E-01	1.46E-01	1.61E-06	5.07E-05	9.00E-05
Sr-90	Y	2.61E-02	4.07E-02	5.01E-03	3.36E-04	6.56E-02	2.23E-02
Nb-94		1.66E-04	1.14E-04	1.36E-03	6.95E-04	3.43E-04	6.78E-03
Tc-99		2.05E-03	2.43E-03	5.66E-04	4.87E-04	4.86E-04	1.97E-04
Cs-137	Y	5.62E-01	6.61E-01	5.00E-01	8.18E-01	7.26E-01	9.28E-01
Eu-152	Y	1.45E-03	1.11E-03	2.83E-03	4.32E-03	2.35E-03	9.84E-03
Eu-154	Y	9.65E-04	1.34E-03	-2.51E-04	3.10E-03	3.06E-03	-9.43E-04
Eu-155		1.49E-03	3.39E-04	4.87E-03	1.12E-04	1.85E-05	4.42E-04
Np-237		5.31E-06	3.08E-06	0.00E+00	5.62E-04	5.26E-04	0.00E+00
Pu-238		9.69E-04	1.67E-03	6.00E-04	4.94E-05	2.17E-03	1.78E-03
Pu-239/240		8.60E-04	2.24E-03	3.98E-04	4.87E-05	3.24E-03	1.43E-03
Pu-241		1.61E-02	2.28E-02	2.87E-02	3.74E-05	6.54E-04	1.92E-03
Am-241		2.81E-03	6.53E-03	2.61E-03	2.19E-04	5.34E-03	4.97E-03
Am-243		4.51E-04	5.40E-04	4.69E-04	2.05E-04	5.84E-04	1.14E-03
Cm-243/244		1.79E-04	1.47E-04	2.39E-04	5.25E-05	5.92E-05	1.88E-04
				Sum	1.00E+00	1.00E+00	1.00E+00
				ROC	9.97E-01	9.86E-01	9.74E-01
				IC Dose	3.22E-03	1.36E-02	2.56E-02

Table 33: Relative Dose Fractions, $RDF_{i,k}$, Using 75th Percentiles of the Nuclide Ratios to Cs-137

		Normalized Fractions from the 75th Percentile of Ratios to Cs-137 from Individual Cores Using Reported Concentrations			Combined Relative Doses, $RDF_{i,k}$		
Nuclide	ROC ?	Soil Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction	Soil	Rx Bldg	WGTV
H-3		1.51E-01	2.36E-02	2.52E-01	8.27E-04	1.26E-04	2.33E-03
C-14		1.72E-03	1.27E-03	9.37E-03	6.69E-07	5.51E-05	9.61E-04
Fe-55		2.36E-02	1.40E-02	-8.13E-03	2.22E-07	1.46E-05	-1.91E-05
Ni-59		7.40E-04	2.48E-04	4.74E-02	2.72E-09	2.73E-08	1.24E-05
Co-60	Y	3.43E-02	4.58E-02	4.76E-03	2.55E-01	2.43E-01	4.05E-02
Ni-63		2.64E-01	2.77E-01	1.89E-01	2.66E-06	8.35E-05	1.22E-04
Sr-90	Y	5.22E-02	7.59E-02	9.12E-03	7.57E-04	1.34E-01	4.24E-02
Nb-94		1.68E-04	1.07E-04	1.01E-03	7.96E-04	3.51E-04	5.22E-03
Tc-99		2.06E-03	2.16E-03	6.91E-03	5.52E-04	4.72E-04	2.51E-03
Cs-137	Y	4.41E-01	4.92E-01	4.49E-01	7.25E-01	5.92E-01	8.70E-01
Eu-152	Y	2.93E-03	1.84E-03	4.49E-03	9.82E-03	4.25E-03	1.63E-02
Eu-154	Y	1.50E-03	2.49E-03	1.60E-03	5.42E-03	6.22E-03	6.29E-03
Eu-155		2.08E-03	6.61E-04	4.56E-03	1.77E-04	3.96E-05	4.32E-04
Np-237		2.15E-06	2.17E-06	0.00E+00	2.56E-04	4.06E-04	0.00E+00
Pu-238		1.16E-03	2.27E-03	7.95E-04	6.65E-05	3.24E-03	2.46E-03
Pu-239/240		7.80E-04	3.17E-03	1.90E-04	4.98E-05	5.01E-03	7.15E-04
Pu-241		1.56E-02	4.58E-02	2.35E-02	4.08E-05	1.44E-03	1.64E-03
Am-241		3.56E-03	1.03E-02	3.25E-03	3.12E-04	9.27E-03	6.46E-03
Am-243		5.85E-04	6.18E-04	4.55E-04	2.99E-04	7.31E-04	1.15E-03
Cm-243/244		1.65E-04	1.58E-04	1.78E-04	5.48E-05	6.99E-05	1.46E-04
				Sum	1.00E+00	1.00E+00	1.00E+00
				ROC Frac	9.97E-01	9.79E-01	9.76E-01
				IC Frac	3.44E-03	2.13E-02	2.42E-02

In addition to the RDFs for each nuclide and population, Table 30 through Table 33 show the relative doses for the ROC and IC nuclides as ROC Frac and IC Frac respectively. This shows that the IC dose fraction ranges from approximately 0.3% to 2.56% (not including negative values) of the total dose depending on the source and the method used for determining the fractions. The highest value for the IC dose fraction is from the WGTV using 75th percentiles of the averages (Table 32). As noted above, the activity fraction for Np-237 was set to zero for the WGTV in Table 31through Table 33 and must be included in the final calculation of the IC dose fraction.

As discussed earlier, Np-237 was not detected in any of the 38 samples. Table 34 provides summary detection statistics for all samples and for the WGTV. The maximum MDC among all samples is 0.239 pCi/g and was used to calculate the Np-237 IC dose fraction for the WGTV. The mass-based concentration (pCi/g) is converted to areal-based concentration (pCi/m^2) by assuming a contamination depth of 1.27 cm (0.5 inch) corresponding to the thickness of each

concrete puck and a concrete density of 2.35 g/cm^3. The 0.239 pCi/g MDC corresponds to 7.13E3 pCi/m^2. From [7], the WGTV $DCGL_B$ is 1.51E5 pCi/m^2. Using Equation 6 through Equation 8, the dose fraction from the IC nuclides, DF_{IC}, is calculated by adding the dose contribution of Np-237, $H_{Np\text{-}237}$ (1.18 mrem), to the remaining IC dose fractions, $DF_{IC}^{/}$ scaled to 25 mrem ($25*DF_{IC}^{/}$). Table 35 provides the total IC dose fraction for each method of calculating the activity fractions and for four of the Np-237 results shown in Table 34. This shows that the DF_{IC} from all IC nuclides including Np-237 ranges from 0.0071 to 0.0729. The maximum IC dose fraction is well bounded by the IC dose fraction of 10% assigned to adjust the DCGLs in [7].

$$DF_{IC'} = \frac{\sum_{i \neq Np-237}(i) RDF_{i(IC),j}}{\sum_{i \neq Np-237}(i) RDF_{i,j}} \qquad \text{Equation 6}$$

$$DF_{ROC} = 1 - DF_{IC'} \qquad \text{Equation 7}$$

$$DF_{IC} = \frac{25DF_{IC'} + H_{Np-237}}{25} \qquad \text{Equation 8}$$

Table 34: Np-237 Detection Statistics

Parameter	Value, pCi/g
Min MDC All Samples	0.015
Min MDC WGTV	0.078
Max MDC All Samples	0.239
Max MDC WGTV	0.239
Min Result	-0.062
Max Result	0.102
Average Result	-0.002

Table 35: IC Dose Fractions for WGTV Using All Activity Fraction Methods and Various Np-237 Detections

Method Description	IC Dose Fraction Using Max MDC for Np-237	IC Dose Fraction Using Avg. MDC for Np-237	IC Dose Fraction Using Max Reported Conc. for Np-237	IC Dose Fraction Using Avg. Reported Conc. for Np-237
Average Activity Fractions	0.0537	0.0320	0.0266	0.0071
75 Percentile of the Activity Average Fractions	0.0729	0.0512	0.0458	0.0263
75th Percentile of the Individual Core Ratios to Cs-137	0.0714	0.0497	0.0443	0.0248

6.3. Selection of Overall Nuclide Fraction

To support FSS activities, a single radionuclide mix is desired for each potential source-term rather than a set of values as has been used in 6.1 and 6.2 representing three statistical/mathematical methods. In evaluating the three methods, it appears that the two methods involving the use of the 75th percentiles result in very similar results, particularly the IC dose fractions. The results were not fully as expected since we initially expected that the method using the 75th percentiles of the individual sample ratios to Cs-137 would yield higher IC dose fractions in all cases. However, the data shows that the IC dose fractions are maximized slightly higher for soil and the Rx Bldg using the Cs-ratio method but slightly lower for the WGTV as compared to the 75th percentile of the activity averages (2.42E-02 versus 2.56E-02). But we believe this is within the overall uncertainties and variance of the data sets and that the methods are effectively very similar.

In addition to the IC dose fraction analysis from 6.2, we have performed a comparison of the methods using a 'ratio-of-the-ratios' based on the final activity fractions of the three methods. This was performed by calculating the ratio of the fractions of the 'average' ratios to the '75th activity percentile' and the '75th percentile of the Cs-137 fractions' to the '75th activity percentile' fractions for all of the 38 concrete core samples. This calculation is shown in Table 36 and includes the overall average, minimums and maximums in the last three rows. This analysis shows that the 75th percentile ratios shown in the last column have less variability than the second column suggesting that these two methods are very close for activity fractions and corroborate the conclusion from the IC dose analysis. For consistency and simplicity, we have chosen the '75th percentile of the Cs-137 fractions' to represent the overall nuclide mix for soils/buried pipe, the Rx Bldg, and the WGTV as reproduced in Table 37.

Lastly, we believe that using the 75th percentile provides sufficient overall conservatism in the development of the radionuclide mixtures. We do recognize that a higher percentile value will provide a different mixture profile, but such an approach would give undo weight to outliers of

the samples population. In addition, there is prior precedence in using the 75th percentile, particularly in the parameter selection process for dose modeling to support DCGL calculations and that this approach also results in satisfactory conservatism.

Table 36: Ratios of Activity Fractions Methods

Nuclide	Ratio of Average Fraction to 75th Percentile of the Activity Fractions	Ratio of 75th Percentile to Individual Cs-137 Ratios
H-3	7.80E-01	9.82E-01
C-14	1.04E+01	8.43E-01
Fe-55	3.49E-01	1.05E+00
Ni-59	2.80E+00	2.46E+00
Co-60	1.78E+00	1.32E+00
Ni-63	1.08E+00	1.47E+00
Sr-90	1.23E+00	2.00E+00
Nb-94	1.99E+00	1.02E+00
Tc-99	-2.80E+00	1.00E+00
Cs-137	1.05E+00	7.86E-01
Eu-152	1.12E+00	2.01E+00
Eu-154	1.58E-01	1.55E+00
Eu-155	1.31E+00	1.40E+00
Np-237	2.21E+01	4.04E-01
Pu-238	9.80E-01	1.19E+00
Pu-239/240	1.06E+00	9.07E-01
Pu-241	-9.87E-01	9.67E-01
Am-241	1.27E+00	1.26E+00
Am-243	1.23E+00	1.30E+00
Cm-243/244	5.93E-01	9.25E-01
Average	2.38	1.24
Min	-2.80	0.40
Max	22.12	2.46

Table 37: Radionuclide Mixture for LABWR Soils and Miscellaneous Materials

Nuclide	Soils/Piping Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction
H-3	1.51E-01	2.36E-02	2.52E-01
C-14	1.72E-03	1.27E-03	9.37E-03
Fe-55	2.36E-02	1.40E-02	-8.13E-03
Ni-59	7.40E-04	2.48E-04	4.74E-02
Co-60	3.43E-02	4.58E-02	4.76E-03
Ni-63	2.64E-01	2.77E-01	1.89E-01
Sr-90	5.22E-02	7.59E-02	9.12E-03
Nb-94	1.68E-04	1.07E-04	1.01E-03
Tc-99	2.06E-03	2.16E-03	6.91E-03
Cs-137	4.41E-01	4.92E-01	4.49E-01
Eu-152	2.93E-03	1.84E-03	4.49E-03
Eu-154	1.50E-03	2.49E-03	1.60E-03
Eu-155	2.08E-03	6.61E-04	4.56E-03
Np-237	2.15E-06	2.17E-06	0.00E+00
Pu-238	1.16E-03	2.27E-03	7.95E-04
Pu-239/240	7.80E-04	3.17E-03	1.90E-04
Pu-241	1.56E-02	4.58E-02	2.35E-02
Am-241	3.56E-03	1.03E-02	3.25E-03
Am-243	5.85E-04	6.18E-04	4.55E-04
Cm-243/244	1.65E-04	1.58E-04	1.78E-04

6.4. Sr-90 Surrogate Relationship

From the data provided in sections 6.1, 6.2, and 6.3, it is evident that Cs-137 is the predominant ROC gamma-emitting radionuclide. Also, Sr-90 is identified as an ROC while also being a HTD radionuclide. The ratio of Sr-90 to Cs-137 is required to develop a surrogate relationship as defined in MARSSIM such that the concentration of Sr-90 can be inferred from the concentration of Cs-137 in cases where samples are not subject to HTD analysis during FSS activities. Table 46 shows the activity fractions for Sr-90 and Cs-137 from all 38 samples. As shown by an "ND" notation, there are some instances where Sr-90 and/or Cs-137 was not detected and there are 30 samples where both nuclides were detected. This table provides two sets of results. The first set shows the reported activity if detected, and if not detected, the MDC is used. For this set, there is one instance where both Sr-90 and Cs-137 were not detected. The second set shows the reported activity if detected and a zero if not detected. For each of these data sets the Sr-90 to Cs-137 ratios are calculated as shown in the last two columns. For the sample where neither nuclide was detected, the ratio of the MDC's was not used since this is merely a ratio of the detectability of the two nuclides for that specific sample and has no relationship to the activity ratio. For each set of ratios, the average, minimum, maximum, 75th and 95th percentile of the ratios are shown for each building in Table 39. This shows that the two methods produce the same ratios for the Rx Bldg, Tunnel, and WTB because both Sr-90 and Cs-

137 were detected in all of these samples. For the WTGV, the ratios using the reported values are zero since no Sr-90 was detected whereas the ratios are non-zero when using the MDC values.

The final surrogate ratio for Sr-90 to Cs-137 could be either the 75th or 95th percentile values with the MDC substituted since either could provide reasonable conservatism as applied to the final status surveys. However, since the difference between the 75th and 95th percentiles are relatively large for the Rx Bldg and WTB, we will use the 95th percentiles for all cases. These final values are summarized in Table 40.

Table 38: Sr-90 to Cs-137 Activity Fractions and Ratios

		Activity Fractions Based on Decayed Reported or MDC Activities		Activity Fractions Based on Decayed Reported Activities		MDC or Reported	Reported
Sample ID	Building	Sr-90	Cs-137	Sr-90	Cs-137	Sr-90/Cs-137	Sr-90/Cs-137
B1-010-04A-CJFC-009-CV	WGTV	8.26E-03	1.58E-01	ND	7.63E-01	5.23E-02	0.00E+00
B1-010-04A-CJFC-010-CV	WGTV	7.94E-03	2.28E-01	ND	5.10E-01	3.49E-02	0.00E+00
B1-010-04A-CJFC-011-CV	WGTV	9.12E-03	1.72E-01	ND	4.40E-01	5.30E-02	0.00E+00
B1-010-04A-CJFC-012-CV	WGTV	1.08E-02	1.44E-01	ND	1.03E+00	7.53E-02	0.00E+00
B1-010-04A-CJFC-013-CV	WGTV	1.04E-03	8.66E-01	ND	9.66E-01	1.20E-03	0.00E+00
B1-010-04A-CJFC-014-CV	WGTV	1.90E-03	7.68E-01	ND	8.53E-01	2.47E-03	0.00E+00
B1-010-04A-CJWC-015-CV	WGTV	1.35E-02	3.52E-03	ND	ND	Not Used	0.00E+00
B1-010-04A-CJFC-016-CV	WGTV	9.75E-03	1.89E-01	ND	5.94E-01	5.15E-02	0.00E+00
B1-010-001-CJFC-A01-CV	Rx Bldg	6.34E-02	2.77E-01	6.57E-02	2.87E-01	2.29E-01	2.29E-01
B1-010-001-CJFC-A02-CV	Rx Bldg	3.92E-02	2.56E-01	4.00E-02	2.61E-01	1.53E-01	1.53E-01
B1-010-001-CJFC-A03-CV	Rx Bldg	1.72E-02	8.36E-01	1.76E-02	8.55E-01	2.06E-02	2.06E-02
B1-010-001-CJFC-A04-CV	Rx Bldg	3.91E-02	8.02E-01	4.01E-02	8.22E-01	4.88E-02	4.88E-02
B1-010-001-CJFC-A05-CV	Rx Bldg	1.09E-01	7.02E-01	1.13E-01	7.27E-01	1.55E-01	1.55E-01
B1-010-001-CJFC-A06-CV	Rx Bldg	2.23E-01	6.48E-01	2.28E-01	6.62E-01	3.44E-01	3.44E-01
B1-010-001-CJFC-A07-CV	Rx Bldg	3.96E-02	5.28E-01	4.88E-02	6.50E-01	7.50E-02	7.50E-02
B1-010-001-CJFC-A08-CV	Rx Bldg	1.56E-02	7.21E-01	1.72E-02	7.96E-01	2.16E-02	2.16E-02
B1-010-001-CJFC-A09-CV	Rx Bldg	4.83E-02	9.21E-01	4.90E-02	9.33E-01	5.25E-02	5.25E-02
B1-010-001-CJFC-A10-CV	Rx Bldg	5.05E-02	3.96E-01	5.43E-02	4.26E-01	1.28E-01	1.28E-01
B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	9.07E-04	9.89E-01	9.09E-04	9.91E-01	9.17E-04	9.17E-04
B1001101-CJ-FC-001-CV 1/2-1	Tunnel	4.43E-03	2.65E-01	6.65E-03	3.98E-01	1.67E-02	1.67E-02
B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	2.29E-02	8.92E-01	2.37E-02	9.22E-01	2.56E-02	2.56E-02
B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	3.69E-02	6.60E-01	3.73E-02	6.68E-01	5.59E-02	5.59E-02
B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	1.06E-02	8.62E-02	1.74E-02	1.41E-01	1.23E-01	1.23E-01
B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	2.92E-02	5.68E-01	3.24E-02	6.32E-01	5.14E-02	5.14E-02
B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	7.96E-02	1.60E-01	8.13E-02	1.64E-01	4.97E-01	4.97E-01
B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	2.13E-02	4.06E-02	3.42E-02	6.51E-02	5.25E-01	5.25E-01
B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	4.65E-03	9.73E-01	4.68E-03	9.80E-01	4.77E-03	4.77E-03
B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	7.74E-03	7.51E-02	1.98E-02	1.92E-01	1.03E-01	1.03E-01

		Activity Fractions Based on Decayed Reported or MDC Activities		Activity Fractions Based on Decayed Reported Activities		MDC or Reported	Reported
Sample ID	Building	Sr-90	Cs-137	Sr-90	Cs-137	Sr-90/Cs-137	Sr-90/Cs-137
B1008101-CJ-FC-002-CV 0-1/2	Tunnel	5.18E-03	5.41E-01	7.81E-03	8.16E-01	9.58E-03	9.58E-03
B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6.56E-03	2.81E-01	9.89E-04	4.23E-02	2.34E-02	2.34E-02
B1008101-CJ-FC-004-CV 0-1/2	Tunnel	5.74E-03	5.29E-01	7.85E-03	7.24E-01	1.09E-02	1.09E-02
B1002101-CJ-FC-001-CV 0-1/2	WTB	1.69E-02	8.02E-01	1.70E-02	8.07E-01	2.11E-02	2.11E-02
B1002101-CJ-FC-001-CV 1/2-1	WTB	1.23E-02	1.90E-01	2.48E-02	3.82E-01	6.50E-02	6.50E-02
B1002101-CJ-FC-001-CV 1-1.5	WTB	1.21E-01	1.83E-01	2.04E-01	3.09E-01	6.60E-01	6.60E-01
B1002101-CJ-FC-001-CV 1.5-2	WTB	4.22E-03	9.76E-02	9.63E-03	2.23E-01	4.32E-02	4.32E-02
B1002101-CJ-FC-002-CV 0-1/2	WTB	7.57E-03	8.79E-01	7.58E-03	8.79E-01	8.62E-03	8.62E-03
B1002101-CJ-FC-002-CV 1/2-1	WTB	8.16E-03	4.85E-01	8.45E-03	5.02E-01	1.68E-02	1.68E-02
B1002101-CJ-FC-003-CV 0-1/2	WTB	5.18E-03	9.21E-01	5.22E-03	9.30E-01	5.62E-03	5.62E-03

Table 39 : Summary of Sr-90 to Cs-137 Ratios for Each Building Using Different Methods

	Sr-90/Cs-137 MDC or Reported					Sr-90/Cs-137 Reported				
Parameter	WGTV	Rx Bldg	Tunnel	WTB	All	WGTV	Rx Bldg	Tunnel	WTB	All
Average	3.87E-02	1.38E-01	1.51E-02	1.17E-01	1.02E-01	0.00E+00	1.38E-01	1.51E-02	1.17E-01	9.20E-02
Minimum	1.20E-03	9.17E-04	9.58E-03	5.62E-03	9.17E-04	0.00E+00	9.17E-04	9.58E-03	5.62E-03	0.00E+00
Maximum	7.53E-02	5.25E-01	2.34E-02	6.60E-01	6.60E-01	0.00E+00	5.25E-01	2.34E-02	6.60E-01	6.60E-01
75th Percentile	5.25E-02	1.54E-01	1.84E-02	5.41E-02	1.03E-01	0.00E+00	1.54E-01	1.84E-02	5.41E-02	9.60E-02
95th Percentile	6.75E-02	5.00E-01	2.24E-02	4.82E-01	5.02E-01	0.00E+00	5.00E-01	2.24E-02	4.82E-01	5.01E-01

Table 40: Final Sr-90 to Cs-137 Surrogate Ratios

Building or Area	Sr-90/Cs-137 Surrogate Activity Ratio
WGTV	6.75E-02
Rx Bldg	5.00E-01
Tunnel[1]	2.24E-02
WTB[1]	4.82E-01
Soils[2]	5.02E-01

[1] These buildings are not in the site end-state.
[2] The soil designation represents all concrete core bores and could also be used for other miscellaneous structures to remain if needed.

6.5. Gamma Emitting ROC Mixture

In order to support gross gamma measurements during characterization and final status surveys, an ROC mixture for gamma emitting radionuclides can be used to calculate the sensitivity of gross gamma detectors for a specific mixture. This determination begins with the re-normalized

ROC fractions listed in Table 37 for the ROC's identified in Table 33. These fractions are provided in Table 41, including Sr-90.

Table 41: ROC Mixture Fractions

Radionuclide	Soil/Pipe Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction
Co-60	6.44E-02	7.41E-02	1.01E-02
Sr-90	9.81E-02	1.23E-01	1.94E-02
Cs-137	8.29E-01	7.96E-01	9.57E-01
Eu-152	5.49E-03	2.97E-03	9.56E-03
Eu-154	2.81E-03	4.04E-03	3.42E-03

Using the data in Table 41, the ROC mixture fraction for only the gamma emitters are re-normalized against the total gamma ROC activity and shown in Table 42 where the values for Soil/Pipe is intended to be applied to above grade buildings and other materials not associated with the Rx Bldg or WGTV.

Table 42: Gamma ROC Mixture Fractions

Radionuclide	Soil/Pipe Mix Fraction	Rx Bldg Mix Fraction	WGTV Mix Fraction
Co-60	7.14E-02	8.44E-02	1.03E-02
Cs-137	9.19E-01	9.08E-01	9.76E-01
Eu-152	6.09E-03	3.39E-03	9.75E-03
Eu-154	3.11E-03	4.60E-03	3.49E-03

6.6. Buried Pipe Insignificant Dose Contributors and Radionuclides of Concern

DCGLs for buried pipe were also established to demonstrate compliance with the 25 mrem/yr unrestricted release criterion in [7]. For these, the buried piping was separated into two categories. The first category included the summation and grouping of all impacted buried pipe other than the Circulating Water Discharge Piping and was designated as the "Group". The second category consisted of the Circulating Water Discharge Pipe only. The Buried Pipe DCGLs from [7] are reproduced in Table 43 where the summed DCGLs are calculated using Equation 9.

$$DCGL_{i,k} = \sum (n)\, {}^{1}/_{DCGL_{i,k,n}} \qquad \text{Equation 9}$$

Table 43: Buried Pipe DCGLs

	DCGLs, dpm/100 cm^2					
Radionuclide	Buried Pipe Group Excavation	Buried Pipe Group Insitu	Buried Pipe Circ Water Excavation	Buried Pipe Circ Water Insitu	Buried Pipe Group Summed	Buried Pipe Circ Water Summed
H-3	9.65E+08	4.59E+08	1.34E+09	1.61E+08	3.11E+08	3.42E+08
C-14	4.81E+09	4.65E+07	4.81E+09	2.60E+07	4.61E+07	4.61E+07
Fe-55	5.98E+10	1.27E+09	7.81E+10	2.03E+26	1.25E+09	1.25E+09
Ni-59	1.52E+11	1.15E+10	1.99E+11	2.03E+26	1.07E+10	1.09E+10
Co-60	8.44E+04	6.37E+06	8.62E+04	2.51E+08	8.33E+04	8.50E+04
Ni-63	5.56E+10	4.61E+09	7.26E+10	1.11E+11	4.26E+09	4.33E+09
Sr-90	4.03E+07	5.81E+05	4.29E+07	8.55E+05	5.73E+05	5.73E+05
Nb-94	1.27E+05	1.02E+08	1.29E+05	1.02E+08	1.27E+05	1.29E+05
Tc-99	2.41E+07	2.00E+07	3.43E+07	6.50E+06	1.09E+07	1.26E+07
Cs-137	3.60E+05	1.82E+07	3.67E+05	6.53E+08	3.53E+05	3.60E+05
Eu-152	1.82E+05	2.71E+08	1.86E+05	5.08E+14	1.82E+05	1.86E+05
Eu-154	1.70E+05	1.87E+08	1.73E+05	9.89E+17	1.69E+05	1.73E+05
Eu-155	6.62E+06	1.20E+09	6.71E+06	2.03E+26	6.58E+06	6.68E+06
Np-237	1.52E+04	6.52E+03	2.09E+04	4.34E+03	4.57E+03	4.97E+03
Pu-238	9.79E+06	9.79E+05	1.27E+07	6.82E+07	8.90E+05	9.09E+05
Pu-239/240	8.81E+06	8.06E+05	1.14E+07	8.15E+05	7.38E+05	7.53E+05
Pu-241	3.58E+08	4.56E+07	4.37E+08	2.45E+08	4.04E+07	4.13E+07
Am-241	6.46E+06	1.62E+06	7.84E+06	8.88E+06	1.30E+06	1.35E+06
Am-243	1.11E+06	1.51E+06	1.16E+06	1.90E+06	6.38E+05	6.54E+05
Cm-243/244	1.71E+06	6.41E+06	1.79E+06	3.11E+08	1.35E+06	1.40E+06

To determine which nuclides can be eliminated by the "10% rule", the DCGLs derived for buried pipe at LACBWR from the last two columns of Table 43 were used in conjunction with the radionuclide mixture fractions in Table 20 for the three methods of calculating the nuclide fractions. From this, the Relative Dose Fractions are calculated for the Buried Pipe Group and Buried Pipe Circ water using Equation 5 and in Table 44 through Table 46. These tables show that the maximum IC dose fraction ranges from 0.00455 (0.455%) to 0.0150 (1.50%).

Table 44: Relative Dose Fractions Using Average Dose Fractions from Reported Concentrations

			Combined Relative Doses	
Nuclide	ROC ?	Soil Mix Fraction (Normalized Fractions from the Average Activity Fractions Using Reported Concentrations)	Buried Pipe Group Summed	Buried Pipe Circ Water Summed
H-3		1.20E-01	1.67E-04	1.54E-04
C-14		2.12E-02	1.99E-04	2.03E-04
Fe-55		7.87E-03	2.73E-06	2.76E-06
Ni-59		8.42E-04	3.40E-08	3.40E-08
Co-60	Y	4.62E-02	2.39E-01	2.39E-01
Ni-63		1.95E-01	1.98E-05	1.98E-05
Sr-90	Y	3.21E-02	2.42E-02	2.46E-02
Nb-94		3.29E-04	1.12E-03	1.12E-03
Tc-99		-5.74E-03	-2.27E-04	-2.00E-04
Cs-137	Y	5.88E-01	7.19E-01	7.19E-01
Eu-152	Y	1.62E-03	3.85E-03	3.85E-03
Eu-154	Y	1.52E-04	3.88E-04	3.87E-04
Eu-155		1.96E-03	1.28E-04	1.29E-04
Np-237		1.17E-04	1.11E-02	1.04E-02
Pu-238		9.49E-04	4.61E-04	4.59E-04
Pu-239/240		9.13E-04	5.35E-04	5.34E-04
Pu-241		-1.59E-02	-1.70E-04	-1.69E-04
Am-241		3.57E-03	1.19E-03	1.17E-03
Am-243		5.54E-04	3.75E-04	3.72E-04
Cm-243/244		1.06E-04	3.40E-05	3.34E-05
		Sum	1.00E+00	1.00E+00
		ROC Dose Fract.	9.87E-01	9.86E-01
		IC Dose Fract.	1.50E-02	1.42E-02

Table 45: Relative Dose Fractions Using 75th Percentile of the Activity Fractions

			Combined Relative Doses	
Nuclide	ROC ?	Soil Mix Fraction (Normalized Fractions from the 75th Percentile of Average Activity Fractions Using Reported Concentrations)	Buried Pipe Group Summed	Buried Pipe Circ Water Summed
H-3		1.54E-01	2.51E-04	2.33E-04
C-14		2.04E-03	2.24E-05	2.29E-05
Fe-55		2.26E-02	9.18E-06	9.31E-06
Ni-59		3.01E-04	1.43E-08	1.43E-08
Co-60	Y	2.59E-02	1.58E-01	1.58E-01
Ni-63		1.80E-01	2.14E-05	2.15E-05
Sr-90	Y	2.61E-02	2.31E-02	2.36E-02
Nb-94		1.66E-04	6.64E-04	6.64E-04
Tc-99		2.05E-03	9.53E-05	8.40E-05
Cs-137	Y	5.62E-01	8.07E-01	8.07E-01
Eu-152	Y	1.45E-03	4.05E-03	4.05E-03
Eu-154	Y	9.65E-04	2.89E-03	2.89E-03
Eu-155		1.49E-03	1.15E-04	1.15E-04
Np-237		5.31E-06	5.90E-04	5.52E-04
Pu-238		9.69E-04	5.53E-04	5.52E-04
Pu-239/240		8.60E-04	5.91E-04	5.91E-04
Pu-241		1.61E-02	2.02E-04	2.02E-04
Am-241		2.81E-03	1.10E-03	1.08E-03
Am-243		4.51E-04	3.59E-04	3.57E-04
Cm-243/244		1.79E-04	6.73E-05	6.62E-05
		Sum	1.00E+00	1.00E+00
		ROC Dose Fract.	9.95E-01	9.96E-01
		IC Dose Fract.	4.64E-03	4.55E-03

Table 46: Relative Dose Fractions Using the Normalized 75th Percentiles of the Ratios to Cs-137

			Combined Relative Doses	
Nuclide	ROC ?	Soil Mix Fraction (Normalized Fractions from the 75th Percentile of Ratios to Cs-137 from Individual Cores Using Reported Concentrations)	Buried Pipe Group Summed	Buried Pipe Circ Water Summed
H-3		1.51E-01	2.72E-04	2.52E-04
C-14		1.72E-03	2.08E-05	2.12E-05
Fe-55		2.36E-02	1.06E-05	1.07E-05
Ni-59		7.40E-04	3.87E-08	3.88E-08
Co-60	Y	3.43E-02	2.30E-01	2.30E-01
Ni-63		2.64E-01	3.47E-05	3.47E-05
Sr-90	Y	5.22E-02	5.10E-02	5.19E-02
Nb-94		1.68E-04	7.44E-04	7.43E-04
Tc-99		2.06E-03	1.05E-04	9.29E-05
Cs-137	Y	4.41E-01	6.99E-01	7.00E-01
Eu-152	Y	2.93E-03	8.98E-03	8.98E-03
Eu-154	Y	1.50E-03	4.94E-03	4.93E-03
Eu-155		2.08E-03	1.77E-04	1.78E-04
Np-237		2.15E-06	2.63E-04	2.46E-04
Pu-238		1.16E-03	7.27E-04	7.26E-04
Pu-239/240		7.80E-04	5.91E-04	5.91E-04
Pu-241		1.56E-02	2.15E-04	2.15E-04
Am-241		3.56E-03	1.53E-03	1.51E-03
Am-243		5.85E-04	5.13E-04	5.10E-04
Cm-243/244		1.65E-04	6.86E-05	6.75E-05
		Sum	1.00E+00	1.00E+00
		ROC Dose Fract.	9.95E-01	9.95E-01
		IC Dose Fract.	5.28E-03	5.20E-03

To account for any additional, unspecified variability and to provide confidence that future HTD analyses will not result in a dose that exceeds the maximum IC dose fraction of 0.0150, the IC dose percentage of 10% assigned to soil and basements will also be used to adjust the Buried Pipe DCGLs to conservatively account for the dose from the eliminated IC radionuclides.

7. REFERENCES

[1] "NUREG/CR-3474, Long-Lived Activation Products in Reactor Materials, Pacific Northwest Laboratory, 1984".

[2] "NUREG/CR-4289, Residual Radionuclide Concentration Within and Around Commercial Nuclear Power Plants; Origin, Distribution, Inventory, and Decommissioning Assessment, Pacific Northwest Laboratory, 1985".

[3] International Commission on Radiological Protection, ICRP Publication 38, "Radionuclide Transformations Energy and Intensity of Emissions", Oxford, England: Pergamon Press, 1983.

[4] "NUREG/CR-0672, H. D. Oak, et al., Technology, Safety and Costs of Decommissioning a Reference Boiling Water Reactor Power Station, prepared by Pacific Northwest Laboratory, Richland, Washington, for U.S. Nuclear Regulatory Commission, June 1980".

[5] "Dairyland Power Corporation LAC-TR-138, Initial Site Characterization Survey for SAFSTOR – December 2009".

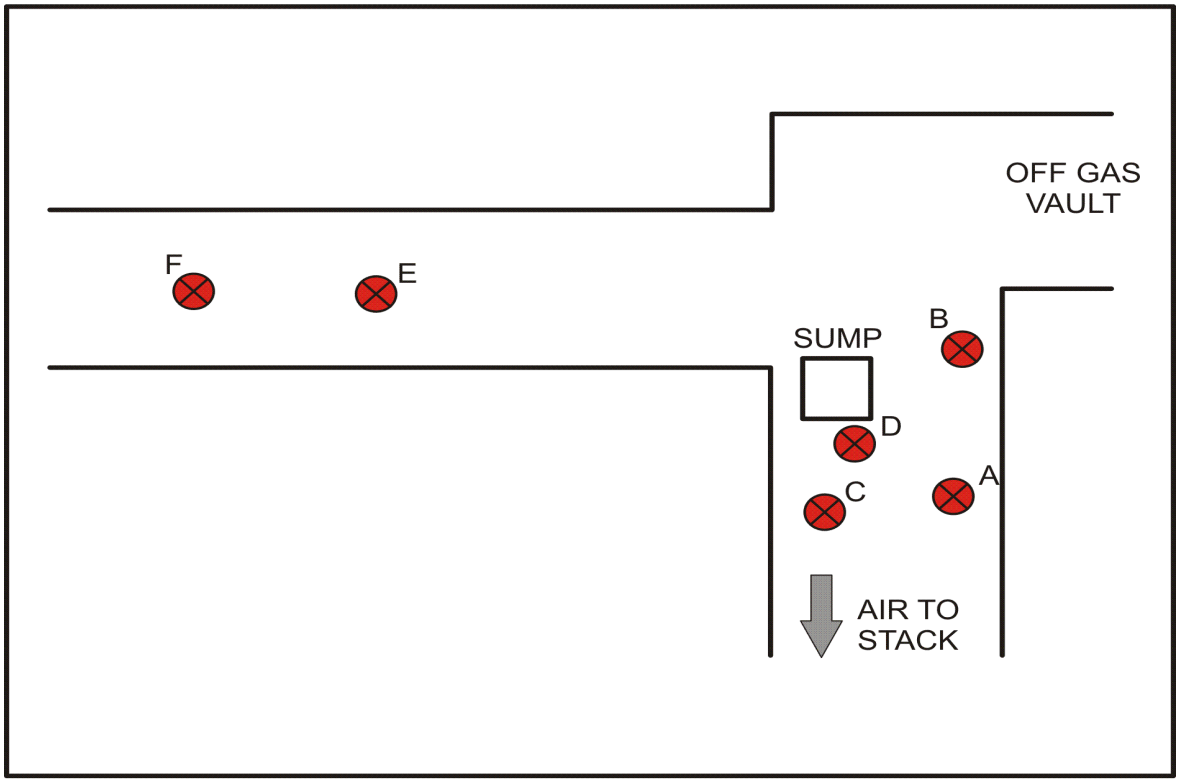
[6] "10 CFR 61 Analytical Reports of LACBWR samples for Dairyland Power Cooperative by Thermo Analytical and Eberline Services, 1998 to 2010".

[7] "EnergySolutions TSD RS-TD-313196-004, "LACBWR Soil DCGL, Basement Concrete DCGL, and Buried Pipe DCGL", Revision 4".

ATTACHMENT 1 - Figures

Figure 1 Concrete Core Sampling Locations

PIPE TUNNEL



A	B1008101-CJ-FC-001-CV
B	B1008101-CJ-FC-002-CV
C	B1008101-CJ-FC-003-CV
D	B1008101-CJ-FC-004-CV
E	B1008101-CJ-FC-005-CV
F	B1008101-CJ-FC-006-CV

15081803.a

Figure 1 (continued) Concrete Core Sampling Locations

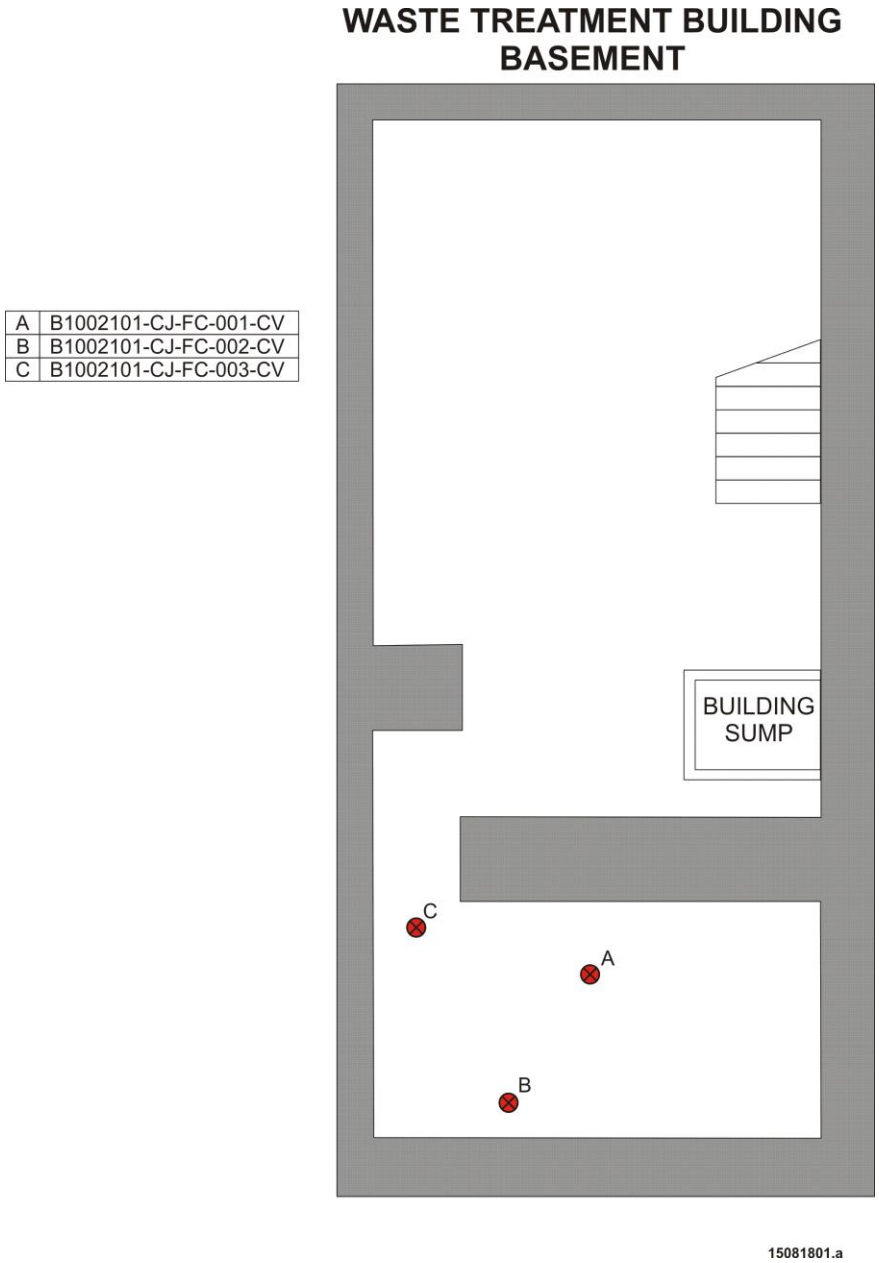
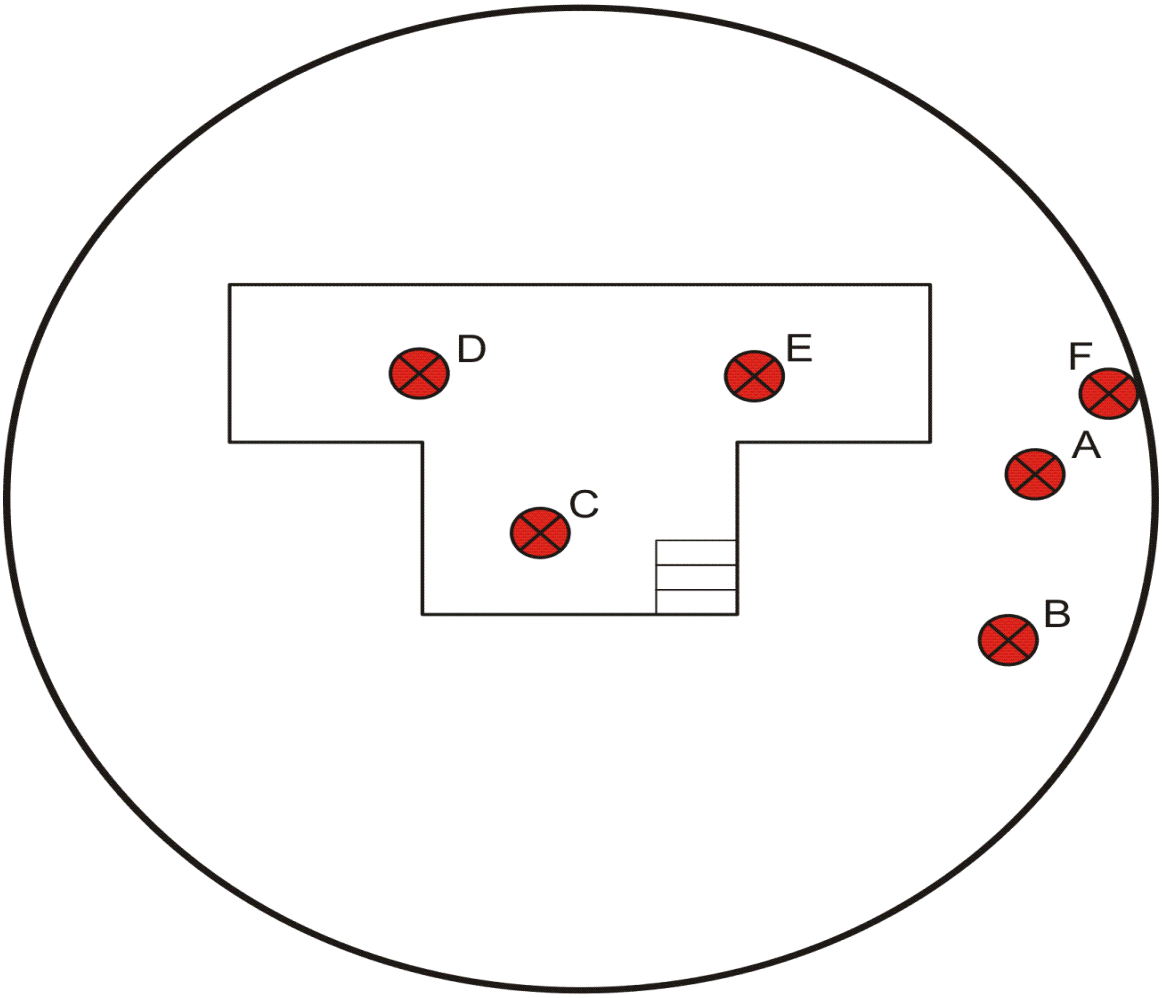


Figure 1 (continued) Concrete Core Sampling Locations

REACTOR BUILDING BASEMENT AND SUB-BASEMENT



A	B1001101-CJ-FC-001-CV
B	B1001101-CJ-FC-002-CV
C	B1001101-CJ-FC-003-CV
D	B1001101-CJ-FC-004-CV
E	B1001101-CJ-FC-005-CV
F	B1001101-CJ-WC-006-CV

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ATTACHMENT 2
Concrete Core Isotopic Analysis Results

Concrete Core Isotopic Analysis Results

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
EL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	H-3	3.57E+00	4.31E+00	7.26		3.10E+00	6.31
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	C-14	-7.04E-01	1.87E+00	3.25		-7.04E-01	3.25
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Fe-55	-2.95E+00	6.45E+00	8.65		-1.56E+00	4.59
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Ni-59	-2.20E-01	2.42E+00	4.32		-2.20E-01	4.32
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Co-60	2.50E-02	6.29E-02	0.148		1.80E-02	0.11
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Ni-63	9.15E-01	1.99E+00	3.36		8.99E-01	3.30
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Sr-90	1.02E-01	1.59E-01	0.279		9.60E-02	0.26
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Nb-94	-2.81E-02	5.35E-02	0.091		-2.81E-02	0.09
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Tc-99	6.59E-02	8.83E-01	1.52		6.59E-02	1.52
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Cs-137	5.32E+00	3.89E-01	0.127	Y	5.02E+00	0.12
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Eu-152	8.62E-02	1.81E-01	0.356		7.58E-02	0.31
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Eu-154	-1.46E-01	1.98E-01	0.328		-1.20E-01	0.27
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Eu-155	6.72E-02	1.33E-01	0.252		4.67E-02	0.17
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Np-237	1.02E-01	1.11E-01	0.169		1.02E-01	0.17
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Pu-238	-3.53E-03	8.18E-03	0.0242		-3.46E-03	0.02
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Pu-239/240	-3.52E-03	8.17E-03	0.0242		-3.52E-03	0.02
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Pu-241	-2.05E-01	1.26E+00	2.16		-1.82E-01	1.91
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Am-241	-1.50E-02	4.32E-02	0.0958		-1.49E-02	0.10
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Am-243	-4.15E-03	9.63E-03	0.0285		-4.15E-03	0.03
GEL	B1-010-04A-CJFC-009-CV	WGTV	08/29/17	Cm-243/244	3.35E-03	1.86E-02	0.0357		3.15E-03	0.03
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	H-3	4.83E+00	4.34E+00	7.19		4.20E+00	6.25
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	C-14	-2.34E-01	1.84E+00	3.17		-2.34E-01	3.17
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Fe-55	-3.71E+00	6.68E+00	9.00		-1.97E+00	4.78
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Ni-59	-2.48E-01	1.80E+00	3.37		-2.48E-01	3.37
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Co-60	6.69E-02	9.85E-02	0.217		4.81E-02	0.16
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Ni-63	6.41E+00	1.98E+00	3.19	Y	6.30E+00	3.14
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Sr-90	2.28E-01	2.03E-01	0.335		2.15E-01	0.32
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Nb-94	3.72E-02	5.73E-02	0.125		3.72E-02	0.12
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Tc-99	-5.60E-01	8.59E-01	1.50		-5.60E-01	1.50
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Cs-137	9.57E+00	5.07E-01	0.141	Y	9.04E+00	0.13
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Eu-152	-3.75E-02	2.23E-01	0.403		-3.30E-02	0.35
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Eu-154	-9.50E-02	1.94E-01	0.346		-7.80E-02	0.28
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Eu-155	1.65E-01	1.74E-01	0.334		1.15E-01	0.23

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Np-237	-1.19E-02	5.04E-02	0.123		-1.19E-02	0.12
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Pu-238	1.64E-02	2.61E-02	0.036		1.61E-02	0.04
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Pu-239/240	-1.07E-02	2.09E-02	0.0582		-1.07E-02	0.06
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Pu-241	9.58E-01	2.34E+00	3.98		8.49E-01	3.53
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Am-241	2.69E-02	2.90E-02	0.033		2.68E-02	0.03
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Am-243	3.87E-03	2.15E-02	0.0412		3.87E-03	0.04
GEL	B1-010-04A-CJFC-010-CV	WGTV	08/30/17	Cm-243/244	7.57E-03	2.08E-02	0.0361		7.12E-03	0.03
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	H-3	4.29E+00	4.28E+00	7.15		3.73E+00	6.21
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	C-14	-6.72E-01	1.79E+00	3.11		-6.72E-01	3.11
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Fe-55	2.68E+00	6.85E+00	9.03		1.42E+00	4.79
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Ni-59	1.01E+00	2.18E+00	4.79		1.01E+00	4.79
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Co-60	0.00E+00	1.15E-01	0.146		0.00E+00	0.11
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Ni-63	2.08E+00	2.16E+00	3.62		2.04E+00	3.56
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Sr-90	1.06E-01	1.81E-01	0.320		9.98E-02	0.30
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Nb-94	4.28E-02	5.79E-02	0.113		4.28E-02	0.11
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Tc-99	-4.18E-01	7.03E-01	1.23		-4.18E-01	1.23
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Cs-137	6.02E+00	4.08E-01	0.138	Y	5.68E+00	0.13
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Eu-152	5.35E-02	1.79E-01	0.351		4.71E-02	0.31
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Eu-154	-5.66E-02	1.90E-01	0.371		-4.65E-02	0.30
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Eu-155	7.12E-02	1.49E-01	0.285		4.95E-02	0.20
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Np-237	3.15E-02	8.07E-02	0.149		3.15E-02	0.15
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Pu-238	6.04E-03	1.37E-02	0.0235		5.92E-03	0.02
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Pu-239/240	3.62E-03	1.40E-02	0.027		3.62E-03	0.03
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Pu-241	-2.11E-01	1.32E+00	2.27		-1.87E-01	2.01
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Am-241	4.40E-02	4.19E-02	0.0539		4.38E-02	0.05
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Am-243	1.57E-02	2.69E-02	0.0235		1.57E-02	0.02
GEL	B1-010-04A-CJFC-011-CV	WGTV	08/30/17	Cm-243/244	1.93E-03	2.02E-02	0.0422		1.82E-03	0.04
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	H-3	2.01E+00	4.21E+00	7.25		1.75E+00	6.30
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	C-14	9.23E-01	1.92E+00	3.27		9.23E-01	3.27
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Fe-55	-5.75E+00	6.74E+00	9.14		-3.05E+00	4.85
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Ni-59	-1.35E-01	6.71E-01	1.67		-1.35E-01	1.67
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Co-60	1.13E-01	6.66E-02	0.182		8.13E-02	0.13
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Ni-63	2.70E+00	1.81E+00	3.00		2.65E+00	2.95
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Sr-90	-2.88E-02	1.93E-01	0.352		-2.71E-02	0.33

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Nb-94	-8.53E-04	4.97E-02	0.0948		-8.53E-04	0.09
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Tc-99	-6.56E-01	8.43E-01	1.48		-6.56E-01	1.48
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Cs-137	4.66E+00	3.53E-01	0.139	Y	4.40E+00	0.13
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Eu-152	8.38E-03	1.62E-01	0.310		7.37E-03	0.27
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Eu-154	-2.99E-02	1.65E-01	0.334		-2.46E-02	0.27
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Eu-155	8.03E-02	1.21E-01	0.240		5.58E-02	0.17
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Np-237	-4.88E-02	8.44E-02	0.239		-4.88E-02	0.24
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Pu-238	-8.73E-03	2.37E-02	0.0631		-8.56E-03	0.06
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Pu-239/240	-1.02E-02	2.90E-02	0.073		-1.02E-02	0.07
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Pu-241	-1.92E+00	2.44E+00	4.23		-1.70E+00	3.75
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Am-241	3.12E-02	4.96E-02	0.0686		3.11E-02	0.07
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Am-243	4.43E-02	7.20E-02	0.116		4.43E-02	0.12
GEL	B1-010-04A-CJFC-012-CV	WGTV	08/31/17	Cm-243/244	4.92E-04	3.65E-02	0.0811		4.63E-04	0.08
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	H-3	1.82E+00	4.28E+00	7.39		1.58E+00	6.42
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	C-14	-1.84E+00	1.86E+00	3.29		-1.84E+00	3.29
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Fe-55	-5.77E+00	6.82E+00	9.29		-3.06E+00	4.93
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Ni-59	-1.81E+00	1.81E+00	2.86		-1.81E+00	2.86
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Co-60	2.66E-01	1.33E-01	0.118	Y	1.91E-01	0.08
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Ni-63	1.00E+01	2.21E+00	3.48	Y	9.83E+00	3.42
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Sr-90	1.28E-01	1.77E-01	0.305		1.21E-01	0.29
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Nb-94	3.00E-03	4.87E-02	0.100		3.00E-03	0.10
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Tc-99	-4.98E-01	8.61E-01	1.50		-4.98E-01	1.50
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Cs-137	2.54E+02	2.53E+00	0.332	Y	2.40E+02	0.31
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Eu-152	-7.97E-01	8.05E-01	1.34		-7.01E-01	1.18
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Eu-154	-3.84E-02	1.54E-01	0.309		-3.15E-02	0.25
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Eu-155	8.70E-02	5.49E-01	0.897		6.05E-02	0.62
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Np-237	-6.24E-02	6.51E-02	0.226		-6.24E-02	0.23
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Pu-238	1.73E-01	7.38E-02	0.0542	Y	1.70E-01	0.05
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Pu-239/240	8.46E-02	5.44E-02	0.0541	Y	8.46E-02	0.05
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Pu-241	4.40E+00	2.99E+00	4.97		3.90E+00	4.40
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Am-241	5.05E-01	1.47E-01	0.0518	Y	5.03E-01	0.05
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Am-243	-1.06E-02	4.78E-02	0.120		-1.06E-02	0.12
GEL	B1-010-04A-CJFC-013-CV	WGTV	08/31/17	Cm-243/244	-2.57E-03	2.22E-02	0.0514		-2.42E-03	0.05
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	H-3	5.15E+00	4.14E+00	6.82		4.47E+00	5.93

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	C-14	-1.42E-02	1.91E+00	3.28		-1.42E-02	3.28
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Fe-55	-4.84E+00	6.31E+00	8.50		-2.57E+00	4.51
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Ni-59	2.53E-01	1.81E+00	3.48		2.53E-01	3.48
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Co-60	2.46E-01	1.05E-01	0.174	Y	1.77E-01	0.13
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Ni-63	1.07E+01	2.05E+00	3.20	Y	1.05E+01	3.15
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Sr-90	1.09E-01	1.91E-01	0.340		1.03E-01	0.32
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Nb-94	-3.79E-03	6.12E-02	0.115		-3.79E-03	0.11
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Tc-99	2.86E+00	1.22E+00	1.96	Y	2.86E+00	1.96
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Cs-137	1.37E+02	1.90E+00	0.234	Y	1.29E+02	0.22
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Eu-152	3.33E-01	8.23E-01	0.991		2.93E-01	0.87
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Eu-154	-1.01E-01	1.44E-01	0.234		-8.29E-02	0.19
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Eu-155	7.52E-02	3.54E-01	0.638		5.23E-02	0.44
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Np-237	-9.56E-03	4.41E-02	0.111		-9.56E-03	0.11
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Pu-238	2.33E-01	7.65E-02	0.0592	Y	2.28E-01	0.06
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Pu-239/240	2.70E-01	8.20E-02	0.0615	Y	2.70E-01	0.06
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Pu-241	5.59E+00	1.88E+00	3.01	Y	4.95E+00	2.67
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Am-241	6.83E-01	1.23E-01	0.0172	Y	6.80E-01	0.02
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Am-243	1.27E-02	2.24E-02	0.034		1.27E-02	0.03
GEL	B1-010-04A-CJFC-014-CV	WGTV	08/31/17	Cm-243/244	1.30E-02	2.30E-02	0.0348		1.22E-02	0.03
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	H-3	3.73E+00	4.37E+00	7.35		3.24E+00	6.39
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	C-14	1.10E+00	1.93E+00	3.28		1.10E+00	3.28
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Fe-55	1.97E+00	5.82E+00	7.62		1.05E+00	4.05
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Ni-59	-2.99E-01	1.92E+00	3.92		-2.99E-01	3.92
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Co-60	-4.03E-02	5.70E-02	0.0974		-2.90E-02	0.07
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Ni-63	1.43E+00	2.36E+00	3.98		1.41E+00	3.91
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Sr-90	-2.17E-01	1.72E-01	0.385		-2.04E-01	0.36
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Nb-94	3.67E-02	4.87E-02	0.109		3.67E-02	0.11
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Tc-99	-5.31E-01	8.13E-01	1.42		-5.31E-01	1.42
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Cs-137	-7.21E-03	5.22E-02	0.100		-6.81E-03	0.09
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Eu-152	1.63E-02	1.29E-01	0.258		1.43E-02	0.23
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Eu-154	-6.24E-02	1.93E-01	0.386		-5.12E-02	0.32
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Eu-155	1.70E-01	1.59E-01	0.219		1.18E-01	0.15
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Np-237	1.83E-02	4.64E-02	0.0778		1.83E-02	0.08
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Pu-238	2.16E-03	1.20E-02	0.023		2.12E-03	0.02

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Pu-239/240	2.07E-02	2.00E-02	0.0124	Y	2.07E-02	0.01
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Pu-241	4.22E-01	1.52E+00	2.59		3.74E-01	2.30
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Am-241	5.13E-03	1.93E-02	0.0324		5.11E-03	0.03
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Am-243	4.36E-03	1.64E-02	0.0275		4.36E-03	0.03
GEL	B1-010-04A-CJWC-015-CV	WGTV	08/31/17	Cm-243/244	5.10E-03	1.91E-02	0.0322		4.80E-03	0.03
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	H-3	3.91E+00	4.36E+00	7.32		3.40E+00	6.36
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	C-14	5.25E-01	1.91E+00	3.26		5.25E-01	3.26
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Fe-55	-4.20E+00	6.74E+00	9.07		-2.23E+00	4.82
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Ni-59	5.11E-01	7.91E-01	2.47		5.11E-01	2.47
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Co-60	6.93E-02	1.36E-01	0.315		4.99E-02	0.23
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Ni-63	1.33E+00	2.27E+00	3.84		1.31E+00	3.77
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Sr-90	-4.27E-02	1.75E-01	0.343		-4.02E-02	0.32
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Nb-94	1.01E-02	8.81E-02	0.179		1.01E-02	0.18
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Tc-99	-5.50E-02	9.07E-01	1.56		-5.50E-02	1.56
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Cs-137	6.64E+00	6.36E-01	0.219	Y	6.27E+00	0.21
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Eu-152	1.08E-01	3.01E-01	0.601		9.50E-02	0.53
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Eu-154	1.12E-01	3.07E-01	0.727		9.20E-02	0.60
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Eu-155	-8.62E-02	1.79E-01	0.314		-5.99E-02	0.22
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Np-237	8.66E-03	5.65E-02	0.116		8.66E-03	0.12
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Pu-238	1.79E-02	1.92E-02	0.0219		1.75E-02	0.02
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Pu-239/240	-1.58E-03	1.47E-02	0.0342		-1.58E-03	0.03
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Pu-241	6.92E-01	1.47E+00	2.50		6.13E-01	2.22
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Am-241	5.20E-02	4.25E-02	0.0436	Y	5.18E-02	0.04
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Am-243	5.06E-04	2.32E-02	0.0511		5.06E-04	0.05
GEL	B1-010-04A-CJFC-016-CV	WGTV	08/31/17	Cm-243/244	-3.40E-03	1.51E-02	0.0393		-3.20E-03	0.04
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	H-3	3.33E+00	5.04E+00	8.59		2.88E+00	7.42
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	C-14	1.49E+00	1.94E+00	3.26		1.49E+00	3.26
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Fe-55	6.96E-01	5.99E+00	7.85		3.61E-01	4.07
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Ni-59	2.05E+00	3.41E+00	4.40		2.05E+00	4.40
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Co-60	2.47E+02	4.04E+00	0.670	Y	1.76E+02	0.48
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Ni-63	7.95E+01	3.28E+00	3.72	Y	7.81E+01	3.65
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Sr-90	3.26E+01	1.08E+00	0.278	Y	3.06E+01	0.26
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Nb-94	-2.71E-01	4.43E-01	0.737		-2.71E-01	0.74
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Tc-99	1.45E+01	1.11E+00	1.36	Y	1.45E+01	1.36

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Cs-137	1.42E+02	2.55E+00	0.839	Y	1.34E+02	0.79
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Eu-152	-2.22E-01	9.99E-01	1.76		-1.94E-01	1.54
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Eu-154	1.08E+00	1.07E+00	2.06		8.80E-01	1.68
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Eu-155	2.24E-02	6.96E-01	1.20		1.54E-02	0.82
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Np-237	-1.10E-03	5.20E-02	0.117		-1.10E-03	0.12
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Pu-238	1.46E+00	1.32E-01	0.00925	Y	1.43E+00	0.01
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Pu-239/240	1.26E+00	1.23E-01	0.0275	Y	1.26E+00	0.03
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Pu-241	1.99E+01	1.52E+00	1.93	Y	1.76E+01	1.70
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Am-241	5.33E+00	3.67E-01	0.0316	Y	5.31E+00	0.03
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Am-243	5.89E-01	1.01E-01	0.0274	Y	5.89E-01	0.03
GEL	B1-010-001-CJFC-A01-CV	Rx Bldg	07/27/17	Cm-243/244	8.71E-02	5.02E-02	0.0401	Y	8.18E-02	0.04
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	H-3	5.10E+00	5.14E+00	8.59		4.41E+00	7.42
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	C-14	1.25E+00	1.91E+00	3.22		1.25E+00	3.22
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Fe-55	6.26E+00	6.86E+00	8.90		3.24E+00	4.61
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Ni-59	5.29E-01	1.66E+00	3.33		5.29E-01	3.33
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Co-60	6.00E+02	6.90E+00	1.15	Y	4.27E+02	0.82
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Ni-63	6.67E+01	2.77E+00	3.00	Y	6.55E+01	2.95
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Sr-90	3.44E+01	1.12E+00	0.251	Y	3.23E+01	0.24
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Nb-94	3.56E-01	7.37E-01	1.26		3.56E-01	1.26
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Tc-99	-1.01E-01	9.29E-01	1.60		-1.01E-01	1.60
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Cs-137	2.24E+02	3.65E+00	1.34	Y	2.11E+02	1.26
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Eu-152	1.28E+00	1.59E+00	2.86		1.12E+00	2.50
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Eu-154	5.84E-01	1.90E+00	3.41		4.76E-01	2.78
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Eu-155	4.04E-01	1.11E+00	1.90		2.77E-01	1.30
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Np-237	-2.36E-02	3.05E-02	0.103		-2.36E-02	0.10
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Pu-238	3.22E+00	1.96E-01	0.0203	Y	3.15E+00	0.02
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Pu-239/240	2.69E+00	1.79E-01	0.0248	Y	2.69E+00	0.02
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Pu-241	4.41E+01	1.93E+00	1.98	Y	3.89E+01	1.75
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Am-241	1.44E+01	8.91E-01	0.0874	Y	1.43E+01	0.09
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Am-243	7.23E-01	1.82E-01	0.0709	Y	7.23E-01	0.07
GEL	B1-010-001-CJFC-A02-CV	Rx Bldg	07/27/17	Cm-243/244	4.07E-01	1.54E-01	0.079	Y	3.82E-01	0.07
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	H-3	5.93E+00	4.41E+00	7.21		5.12E+00	6.23
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	C-14	8.45E-01	1.92E+00	3.27		8.45E-01	3.27
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Fe-55	5.48E+00	6.93E+00	9.02		2.84E+00	4.67

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Ni-59	1.02E-01	2.01E+00	4.16		1.02E-01	4.16
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Co-60	4.89E+01	2.81E+00	0.540	Y	3.48E+01	0.38
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Ni-63	3.74E+01	2.62E+00	3.49	Y	3.67E+01	3.43
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Sr-90	1.32E+01	6.42E-01	0.179	Y	1.24E+01	0.17
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Nb-94	3.85E-03	3.47E-01	0.633		3.85E-03	0.63
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Tc-99	1.48E+00	8.98E-01	1.48		1.48E+00	1.48
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Cs-137	6.40E+02	7.52E+00	1.07	Y	6.03E+02	1.01
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Eu-152	-1.59E+00	1.97E+00	3.17		-1.39E+00	2.78
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Eu-154	3.30E-01	8.82E-01	1.92		2.69E-01	1.57
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Eu-155	1.33E+00	1.61E+00	1.48		9.11E-01	1.01
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Np-237	3.20E-03	4.51E-02	0.0964		3.20E-03	0.10
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Pu-238	3.83E-01	7.39E-02	0.0279	Y	3.75E-01	0.03
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Pu-239/240	3.61E-01	7.25E-02	0.0358	Y	3.61E-01	0.04
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Pu-241	6.96E+00	1.45E+00	2.23	Y	6.14E+00	1.97
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Am-241	1.44E+00	1.76E-01	0.0266	Y	1.43E+00	0.03
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Am-243	1.91E-01	6.24E-02	0.033	Y	1.91E-01	0.03
GEL	B1-010-001-CJFC-A03-CV	Rx Bldg	07/27/17	Cm-243/244	4.03E-02	3.30E-02	0.0338	Y	3.78E-02	0.03
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	H-3	1.32E+01	5.59E+00	8.63	Y	1.14E+01	7.46
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	C-14	1.45E+00	1.89E+00	3.19		1.45E+00	3.19
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Fe-55	9.48E-01	6.74E+00	8.93		4.91E-01	4.63
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Ni-59	-1.35E+00	1.31E+00	1.88		-1.35E+00	1.88
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Co-60	2.60E+01	1.06E+00	0.221	Y	1.85E+01	0.16
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Ni-63	2.31E+01	2.35E+00	3.38	Y	2.27E+01	3.32
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Sr-90	2.00E+01	8.77E-01	0.194	Y	1.88E+01	0.18
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Nb-94	-5.74E-02	1.19E-01	0.202		-5.74E-02	0.20
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Tc-99	6.15E+00	9.80E-01	1.42	Y	6.15E+00	1.42
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Cs-137	4.09E+02	3.10E+00	0.404	Y	3.85E+02	0.38
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Eu-152	3.64E-01	9.68E-01	1.71		3.19E-01	1.50
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Eu-154	7.09E-02	3.68E-01	0.723		5.78E-02	0.59
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Eu-155	2.25E-01	7.46E-01	1.25		1.54E-01	0.86
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Np-237	-2.32E-02	5.58E-02	0.144		-2.32E-02	0.14
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Pu-238	2.44E-01	6.84E-02	0.0268	Y	2.39E-01	0.03
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Pu-239/240	2.15E-01	6.50E-02	0.0356	Y	2.15E-01	0.04
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Pu-241	3.86E+00	1.80E+00	2.93	Y	3.41E+00	2.58

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Am-241	7.27E-01	1.20E-01	0.0312	Y	7.24E-01	0.03
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Am-243	1.24E-02	2.82E-02	0.0483		1.24E-02	0.05
GEL	B1-010-001-CJFC-A04-CV	Rx Bldg	07/27/17	Cm-243/244	2.43E-02	2.47E-02	0.0244		2.28E-02	0.02
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	H-3	1.06E+01	5.35E+00	8.43	Y	9.17E+00	7.29
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	C-14	-1.05E+00	1.83E+00	3.19		-1.05E+00	3.19
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Fe-55	-1.26E+00	6.78E+00	9.00		-6.55E-01	4.68
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Ni-59	-9.89E-01	2.00E+00	3.41		-9.89E-01	3.41
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Co-60	1.89E+01	1.27E+00	0.341	Y	1.35E+01	0.24
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Ni-63	4.86E+01	2.83E+00	3.59	Y	4.77E+01	3.53
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Sr-90	5.93E+01	1.51E+00	0.191	Y	5.57E+01	0.18
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Nb-94	-1.96E-02	1.80E-01	0.320		-1.96E-02	0.32
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Tc-99	1.53E+00	1.08E+00	1.78		1.53E+00	1.78
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Cs-137	3.81E+02	4.20E+00	0.599	Y	3.59E+02	0.56
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Eu-152	8.21E-01	1.21E+00	2.17		7.19E-01	1.90
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Eu-154	1.50E-01	4.51E-01	0.989		1.22E-01	0.81
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Eu-155	2.11E-01	7.80E-01	1.33		1.45E-01	0.91
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Np-237	-3.79E-03	4.88E-02	0.115		-3.79E-03	0.11
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Pu-238	6.05E-01	1.24E-01	0.0362	Y	5.93E-01	0.04
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Pu-239/240	5.09E-01	1.15E-01	0.043	Y	5.09E-01	0.04
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Pu-241	5.47E+00	2.63E+00	4.29	Y	4.83E+00	3.79
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Am-241	2.56E+00	2.48E-01	0.0436	Y	2.55E+00	0.04
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Am-243	4.00E-01	1.00E-01	0.044	Y	4.00E-01	0.04
GEL	B1-010-001-CJFC-A05-CV	Rx Bldg	07/31/17	Cm-243/244	2.95E-02	3.01E-02	0.0297		2.77E-02	0.03
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	H-3	6.21E+00	4.48E+00	7.31		5.37E+00	6.32
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	C-14	4.03E-01	1.91E+00	3.27		4.03E-01	3.27
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Fe-55	-3.52E+00	6.87E+00	9.23		-1.83E+00	4.80
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Ni-59	4.64E-01	1.62E+00	3.25		4.64E-01	3.25
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Co-60	2.44E+01	1.14E+00	0.279	Y	1.74E+01	0.20
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Ni-63	6.63E+01	2.92E+00	3.38	Y	6.51E+01	3.32
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Sr-90	2.02E+02	2.78E+00	0.196	Y	1.90E+02	0.18
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Nb-94	4.81E-02	1.34E-01	0.243		4.81E-02	0.24
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Tc-99	1.53E+00	1.07E+00	1.77		1.53E+00	1.77
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Cs-137	5.86E+02	3.97E+00	0.634	Y	5.52E+02	0.60
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Eu-152	-1.45E+00	1.21E+00	2.08		-1.27E+00	1.82

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Eu-154	1.29E-01	3.63E-01	0.732		1.05E-01	0.60
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Eu-155	-6.57E-01	8.90E-01	1.49		-4.51E-01	1.02
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Np-237	7.63E-03	5.73E-02	0.116		7.63E-03	0.12
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Pu-238	1.71E-01	5.45E-02	0.024	Y	1.68E-01	0.02
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Pu-239/240	1.72E-01	5.43E-02	0.0207	Y	1.72E-01	0.02
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Pu-241	4.50E+00	1.68E+00	2.71	Y	3.97E+00	2.39
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Am-241	4.03E-01	9.38E-02	0.0308	Y	4.01E-01	0.03
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Am-243	5.20E-02	3.72E-02	0.0417	Y	5.20E-02	0.04
GEL	B1-010-001-CJFC-A06-CV	Rx Bldg	07/31/17	Cm-243/244	4.85E-02	3.45E-02	0.0266	Y	4.55E-02	0.02
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	H-3	6.51E+00	5.23E+00	8.61		5.63E+00	7.44
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	C-14	3.24E-01	1.87E+00	3.20		3.24E-01	3.20
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Fe-55	4.45E+00	6.97E+00	9.15		2.31E+00	4.76
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Ni-59	3.41E-01	2.24E+00	4.71		3.41E-01	4.71
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Co-60	4.25E+00	5.69E-01	0.235	Y	3.03E+00	0.17
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Ni-63	3.92E+00	2.16E+00	3.57	Y	3.85E+00	3.51
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Sr-90	3.33E+00	4.12E-01	0.349	Y	3.13E+00	0.33
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Nb-94	1.64E-02	8.70E-02	0.177		1.64E-02	0.18
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Tc-99	1.97E-01	8.74E-01	1.49		1.97E-01	1.49
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Cs-137	4.43E+01	1.40E+00	0.245	Y	4.17E+01	0.23
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Eu-152	1.05E-01	4.72E-01	0.813		9.20E-02	0.71
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Eu-154	-1.94E-01	4.03E-01	0.744		-1.58E-01	0.61
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Eu-155	2.28E-01	2.61E-01	0.506		1.57E-01	0.35
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Np-237	-2.55E-02	5.45E-02	0.151		-2.55E-02	0.15
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Pu-238	1.53E-01	5.01E-02	0.0294	Y	1.50E-01	0.03
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Pu-239/240	1.91E-01	5.50E-02	0.0242	Y	1.91E-01	0.02
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Pu-241	2.43E+00	1.58E+00	2.62		2.14E+00	2.31
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Am-241	1.04E+00	1.25E-01	0.0213	Y	1.04E+00	0.02
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Am-243	1.43E-02	2.65E-02	0.046		1.43E-02	0.05
GEL	B1-010-001-CJFC-A07-CV	Rx Bldg	07/31/17	Cm-243/244	1.35E-02	1.71E-02	0.0213		1.27E-02	0.02
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	H-3	7.34E+00	4.56E+00	7.35		6.35E+00	6.36
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	C-14	-7.15E-01	2.92E+00	4.98		-7.15E-01	4.98
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Fe-55	1.65E-01	6.61E+00	8.78		8.57E-02	4.56
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Ni-59	-5.08E-01	5.80E-01	0.519		-5.08E-01	0.52
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Co-60	4.75E+00	5.21E-01	0.182	Y	3.38E+00	0.13

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Ni-63	6.37E+00	2.22E+00	3.60	Y	6.26E+00	3.54
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Sr-90	2.54E+00	3.20E-01	0.192	Y	2.39E+00	0.18
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Nb-94	-8.94E-03	8.56E-02	0.156		-8.94E-03	0.16
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Tc-99	-3.34E-01	9.06E-01	1.57		-3.34E-01	1.57
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Cs-137	1.17E+02	1.99E+00	0.319	Y	1.10E+02	0.30
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Eu-152	8.89E-01	1.02E+00	1.22		7.79E-01	1.07
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Eu-154	3.61E-01	2.86E-01	0.729		2.95E-01	0.59
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Eu-155	1.04E-01	4.73E-01	0.805		7.14E-02	0.55
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Np-237	-1.30E-02	4.46E-02	0.123		-1.30E-02	0.12
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Pu-238	6.34E-01	1.11E-01	0.0238	Y	6.21E-01	0.02
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Pu-239/240	4.93E-01	9.83E-02	0.0366	Y	4.93E-01	0.04
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Pu-241	7.89E+00	1.39E+00	2.10	Y	6.96E+00	1.85
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Am-241	1.91E+00	1.93E-01	0.0333	Y	1.90E+00	0.03
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Am-243	1.54E-01	6.01E-02	0.0466	Y	1.54E-01	0.05
GEL	B1-010-001-CJFC-A08-CV	Rx Bldg	07/31/17	Cm-243/244	2.54E-02	2.67E-02	0.0332		2.39E-02	0.03
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	H-3	5.58E+00	5.10E+00	8.47		4.83E+00	7.32
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	C-14	-8.59E-01	1.80E+00	3.13		-8.59E-01	3.13
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Fe-55	-5.41E-01	7.43E+00	9.87		-2.81E-01	5.13
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Ni-59	2.13E-01	1.92E+00	3.54		2.13E-01	3.54
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Co-60	6.64E+00	6.53E-01	0.256	Y	4.73E+00	0.18
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Ni-63	7.13E+00	2.32E+00	3.75	Y	7.00E+00	3.68
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Sr-90	8.32E+01	1.83E+00	0.235	Y	7.82E+01	0.22
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Nb-94	8.61E-02	1.37E-01	0.271		8.61E-02	0.27
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Tc-99	6.71E+00	8.67E-01	1.21	Y	6.71E+00	1.21
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Cs-137	1.58E+03	7.48E+00	0.929	Y	1.49E+03	0.88
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Eu-152	2.03E-01	2.41E+00	4.11		1.78E-01	3.60
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Eu-154	-3.64E-02	3.40E-01	0.658		-2.97E-02	0.54
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Eu-155	1.39E-01	1.65E+00	2.72		9.54E-02	1.87
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Np-237	5.23E-03	9.86E-02	0.209		5.23E-03	0.21
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Pu-238	3.50E-01	8.87E-02	0.0315	Y	3.43E-01	0.03
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Pu-239/240	3.39E-01	8.70E-02	0.0272	Y	3.39E-01	0.03
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Pu-241	4.80E+00	1.59E+00	2.55	Y	4.24E+00	2.25
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Am-241	8.03E-01	1.26E-01	0.0154	Y	8.00E-01	0.02
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Am-243	1.40E-01	5.63E-02	0.0546	Y	1.40E-01	0.05

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
GEL	B1-010-001-CJFC-A09-CV	Rx Bldg	08/01/17	Cm-243/244	2.67E-03	1.48E-02	0.0284		2.51E-03	0.03
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	H-3	4.13E+00	4.24E+00	7.08		3.57E+00	6.12
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	C-14	4.11E-01	1.93E+00	3.29		4.11E-01	3.29
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Fe-55	-1.38E+00	6.99E+00	9.35		-7.18E-01	4.86
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Ni-59	-2.46E-01	1.76E+00	3.26		-2.46E-01	3.26
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Co-60	5.54E+01	1.79E+00	0.386	Y	3.95E+01	0.27
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Ni-63	5.79E+01	2.97E+00	3.63	Y	5.69E+01	3.57
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Sr-90	1.42E+01	7.74E-01	0.282	Y	1.33E+01	0.27
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Nb-94	7.31E-02	2.10E-01	0.369		7.31E-02	0.37
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Tc-99	-1.19E-01	1.03E+00	1.78		-1.19E-01	1.78
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Cs-137	1.11E+02	1.88E+00	0.481	Y	1.05E+02	0.45
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Eu-152	4.08E-03	7.05E-01	1.25		3.57E-03	1.10
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Eu-154	4.56E-01	5.55E-01	1.12		3.72E-01	0.91
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Eu-155	4.19E-01	5.20E-01	0.915		2.88E-01	0.63
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Np-237	7.22E-02	8.85E-02	0.105		7.22E-02	0.10
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Pu-238	1.65E+00	1.73E-01	0.0261	Y	1.62E+00	0.03
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Pu-239/240	1.85E+00	1.83E-01	0.026	Y	1.85E+00	0.03
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Pu-241	2.18E+01	1.43E+00	1.74	Y	1.92E+01	1.54
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Am-241	4.69E+00	2.51E-01	0.0167	Y	4.67E+00	0.02
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Am-243	3.25E-01	1.04E-01	0.0505	Y	3.25E-01	0.05
GEL	B1-010-001-CJFC-A10-CV	Rx Bldg	08/01/17	Cm-243/244	5.65E-02	2.91E-02	0.0212	Y	5.31E-02	0.02
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	H-3	3.95E+00	1.35E+00	1.59	Y	3.03E+00	1.22
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	C-14	-1.62E-01	7.93E-01	1.40		-1.62E-01	1.40
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	9.13E+00	7.88E+00	16.00		2.78E+00	4.88
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	0.00E+00	3.25E-01	0.25		0.00E+00	0.25
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	1.15E+01	1.25E+00	0.38	Y	6.21E+00	0.20
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	3.93E+01	4.11E+00	0.40	Y	3.80E+01	0.39
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	6.91E+00	6.80E-01	0.04	Y	6.17E+00	0.04
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	-1.20E-01	1.89E-01	0.31		-1.20E-01	0.31
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	2.44E-02	3.30E-01	0.57		2.44E-02	0.57
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	7.50E+03	7.81E+02	7.09	Y	6.73E+03	6.37
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	2.58E+00	5.23E+00	9.02		2.03E+00	7.09
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	2.66E-01	3.98E-01	2.41		1.84E-01	1.67
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	3.69E-01	1.14E+00	4.44		1.86E-01	2.24

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	9.29E-03	2.14E-02	0.04		9.29E-03	0.04
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	1.76E-01	6.50E-02	0.06	Y	1.70E-01	0.05
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	1.32E-01	5.54E-02	0.05	Y	1.32E-01	0.05
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	9.02E-01	1.66E+00	2.70		7.19E-01	2.15
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	4.07E-01	1.07E-01	0.05	Y	4.04E-01	0.05
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	2.75E-02	3.03E-02	0.05		2.75E-02	0.05
TA	B1001101-CJ-FC-001-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	5.79E-02	3.71E-02	0.03	Y	5.17E-02	0.03
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	H-3	9.72E+00	1.95E+00	1.56	Y	7.47E+00	1.20
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	C-14	-3.46E-01	8.06E-01	1.44		-3.46E-01	1.44
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Fe-55	1.04E+01	1.02E+01	21.30		3.17E+00	6.50
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Ni-59	0.00E+00	1.51E-01	0.26		0.00E+00	0.26
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Co-60	8.17E-02	7.84E-02	0.17		4.41E-02	0.09
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Ni-63	3.85E+00	4.74E-01	0.43	Y	3.73E+00	0.41
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Sr-90	1.62E-01	4.09E-02	0.05	Y	1.45E-01	0.05
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Nb-94	1.14E-03	7.77E-02	0.14		1.14E-03	0.14
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Tc-99	7.57E-02	3.10E-01	0.53		7.57E-02	0.53
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Cs-137	9.66E+00	1.10E+00	0.15	Y	8.67E+00	0.14
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Eu-152	-3.89E-02	5.47E-02	0.51		-3.06E-02	0.40
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Eu-154	2.48E-02	1.71E-01	1.26		1.71E-02	0.87
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Eu-155	7.09E-02	1.18E-01	0.38		3.58E-02	0.19
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Np-237	-2.45E-03	1.71E-02	0.05		-2.45E-03	0.04
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Pu-238	-1.67E-02	2.55E-02	0.07		-1.61E-02	0.06
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Pu-239/240	-6.37E-03	1.76E-02	0.05		-6.37E-03	0.05
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Pu-241	-1.51E+00	1.36E+00	2.50		-1.20E+00	1.99
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Am-241	1.05E-02	1.95E-02	0.04		1.04E-02	0.04
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Am-243	1.38E-02	1.91E-02	0.03		1.38E-02	0.03
TA	B1001101-CJ-FC-001-CV 1/2-1	Tunnel	6/23/2015	Cm-243/244	-8.11E-03	9.40E-03	0.05		-7.24E-03	0.04
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	H-3	3.64E+00	1.33E+00	1.62	Y	2.80E+00	1.24
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	C-14	-2.70E-01	7.94E-01	1.41		-2.70E-01	1.41
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	1.13E+01	5.54E+00	9.95	Y	3.45E+00	3.03
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	0.00E+00	1.83E-01	0.29		0.00E+00	0.29
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	8.00E-01	1.72E-01	0.12	Y	4.32E-01	0.06
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	4.86E+00	5.81E-01	0.49	Y	4.70E+00	0.48
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	1.16E+01	1.13E+00	0.05	Y	1.04E+01	0.04

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	-1.69E-02	9.47E-02	0.17		-1.69E-02	0.16
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	-1.04E-01	3.22E-01	0.56		-1.04E-01	0.56
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	4.50E+02	4.69E+01	0.60	Y	4.04E+02	0.54
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	1.73E-01	9.24E-01	2.15		1.36E-01	1.69
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	-8.02E-03	8.20E-01	1.46		-5.54E-03	1.01
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	1.45E-01	5.03E-01	0.84		7.33E-02	0.42
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	-1.02E-02	9.17E-03	0.04		-1.02E-02	0.04
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	5.75E-01	4.36E-01	0.62		5.54E-01	0.59
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	7.15E-01	4.13E-01	0.47	Y	7.15E-01	0.47
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	1.32E+01	1.51E+01	23.50		1.05E+01	18.74
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	5.50E-01	4.19E-01	0.40	Y	5.46E-01	0.40
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	-3.59E-02	1.40E-01	0.43		-3.59E-02	0.43
TA	B1001101-CJ-FC-002-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	1.54E-01	2.60E-01	0.47		1.37E-01	0.42
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	H-3	7.24E+00	1.58E+00	1.36	Y	5.56E+00	1.04
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	C-14	-4.92E-01	8.06E-01	1.46		-4.92E-01	1.46
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	9.45E+00	4.95E+00	9.04	Y	2.88E+00	2.76
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	0.00E+00	8.06E-01	0.37		0.00E+00	0.36
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	5.77E+01	5.88E+00	0.33	Y	3.11E+01	0.18
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	2.02E+02	2.11E+01	0.59	Y	1.96E+02	0.57
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	3.45E+01	3.33E+00	0.04	Y	3.08E+01	0.04
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	1.91E-01	2.03E-01	0.39		1.91E-01	0.39
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	-1.89E-01	3.30E-01	0.59		-1.89E-01	0.59
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	6.14E+02	6.40E+01	0.73	Y	5.51E+02	0.66
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	7.68E-01	1.30E+00	2.87		6.04E-01	2.26
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	3.35E-01	5.36E-01	5.46		2.32E-01	3.77
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	-4.29E-01	9.14E-01	1.51		-2.17E-01	0.76
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	-3.96E-04	1.61E-02	0.04		-3.96E-04	0.04
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	5.28E-01	1.11E-01	0.06	Y	5.09E-01	0.06
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	4.91E-01	1.04E-01	0.03	Y	4.91E-01	0.03
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	7.47E+00	2.16E+00	2.64	Y	5.96E+00	2.10
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	1.45E+00	2.50E-01	0.05	Y	1.44E+00	0.05
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	5.19E-02	3.33E-02	0.03	Y	5.19E-02	0.03
TA	B1001101-CJ-FC-003-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	8.79E-02	4.96E-02	0.04	Y	7.84E-02	0.04
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	H-3	1.26E+01	2.24E+00	1.57	Y	9.68E+00	1.21

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	C-14	-5.66E-01	7.65E-01	1.39		-5.66E-01	1.39
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Fe-55	6.16E+00	6.96E+00	14.30		1.88E+00	4.36
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Ni-59	0.00E+00	1.57E-01	0.26		0.00E+00	0.26
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Co-60	4.35E-01	9.61E-02	0.06	Y	2.35E-01	0.03
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Ni-63	2.99E+00	3.92E-01	0.40	Y	2.89E+00	0.39
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Sr-90	3.04E-01	5.23E-02	0.05	Y	2.72E-01	0.05
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Nb-94	-1.40E-03	8.60E-02	0.15		-1.40E-03	0.15
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Tc-99	-1.29E-01	3.39E-01	0.60		-1.29E-01	0.60
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Cs-137	2.45E+00	3.48E-01	0.11	Y	2.20E+00	0.10
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Eu-152	4.50E-02	1.54E-01	0.35		3.54E-02	0.27
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Eu-154	1.79E-01	3.83E-01	1.02		1.24E-01	0.71
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Eu-155	-6.60E-03	1.64E-01	0.28		-3.33E-03	0.14
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Np-237	-1.01E-02	1.80E-02	0.05		-1.01E-02	0.05
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Pu-238	-5.20E-03	2.87E-02	0.06		-5.01E-03	0.06
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Pu-239/240	-4.40E-03	1.72E-02	0.05		-4.40E-03	0.05
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Pu-241	-1.32E+00	1.48E+00	2.66		-1.05E+00	2.12
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Am-241	1.81E-02	2.39E-02	0.04		1.80E-02	0.04
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Am-243	8.71E-03	1.63E-02	0.03		8.71E-03	0.03
TA	B1001101-CJ-FC-003-CV 1/2-1	Rx Bldg	6/23/2015	Cm-243/244	0.00E+00	4.67E-03	0.02		0.00E+00	0.01
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	H-3	4.49E+00	1.42E+00	1.59	Y	3.45E+00	1.22
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	C-14	-5.55E-01	7.95E-01	1.45		-5.55E-01	1.45
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	7.60E+00	4.04E+00	7.07	Y	2.32E+00	2.16
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	0.00E+00	4.67E-01	0.28		0.00E+00	0.28
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	2.81E+01	2.95E+00	0.19	Y	1.52E+01	0.10
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	8.83E+01	9.20E+00	0.47	Y	8.55E+01	0.45
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	1.10E+01	1.07E+00	0.04	Y	9.83E+00	0.04
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	-1.55E-02	1.55E-01	0.26		-1.55E-02	0.26
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	1.53E-01	3.52E-01	0.59		1.53E-01	0.59
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	2.13E+02	2.22E+01	0.44	Y	1.91E+02	0.39
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	1.62E-01	6.11E-01	1.57		1.27E-01	1.23
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	5.57E-01	8.63E-01	3.07		3.85E-01	2.12
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	1.08E-01	1.38E-01	0.85		5.46E-02	0.43
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	-1.99E-02	2.01E-02	0.06		-1.99E-02	0.06
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	4.13E-01	3.20E-01	0.43		3.98E-01	0.41

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	3.36E-01	2.65E-01	0.33	Y	3.36E-01	0.32
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	-7.72E+00	1.44E+01	26.00		-6.16E+00	20.73
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	6.14E-01	4.36E-01	0.44	Y	6.09E-01	0.44
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	5.18E-02	1.36E-01	0.29		5.18E-02	0.29
TA	B1001101-CJ-FC-004-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	-5.47E-02	7.76E-02	0.43		-4.88E-02	0.39
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	H-3	2.96E+00	1.20E+00	1.52	Y	2.27E+00	1.17
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	C-14	-7.66E-02	8.10E-01	1.41		-7.66E-02	1.41
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	8.07E+00	5.23E+00	9.77		2.46E+00	2.98
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	2.59E+00	8.13E-01	0.27	Y	2.59E+00	0.27
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	7.39E+01	7.51E+00	0.37	Y	3.99E+01	0.20
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	2.21E+02	2.30E+01	0.43	Y	2.14E+02	0.41
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	3.28E+01	3.17E+00	0.04	Y	2.93E+01	0.04
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	-8.88E-02	3.17E-01	0.53		-8.88E-02	0.53
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	1.78E-01	3.36E-01	0.56		1.78E-01	0.56
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	6.57E+01	6.97E+00	0.57	Y	5.90E+01	0.51
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	3.95E-01	7.46E-01	1.24		3.11E-01	0.98
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	6.37E-01	8.31E-01	5.65		4.40E-01	3.91
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	1.13E-02	4.14E-01	0.70		5.71E-03	0.35
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	4.88E-03	9.77E-03	0.01		4.88E-03	0.01
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	7.06E-01	1.34E-01	0.07	Y	6.80E-01	0.06
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	4.89E-01	1.06E-01	0.04	Y	4.89E-01	0.04
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	9.09E+00	2.27E+00	2.54	Y	7.25E+00	2.03
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	1.59E+00	2.73E-01	0.05	Y	1.58E+00	0.04
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	4.75E-02	3.39E-02	0.03	Y	4.75E-02	0.03
TA	B1001101-CJ-FC-005-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	1.16E-01	5.90E-02	0.04	Y	1.03E-01	0.04
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	H-3	4.18E+00	1.52E+00	1.85	Y	3.21E+00	1.42
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	C-14	-7.01E-01	7.33E-01	1.35		-7.01E-01	1.35
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Fe-55	8.17E+00	5.34E+00	9.87		2.49E+00	3.01
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Ni-59	0.00E+00	1.65E-01	0.27		0.00E+00	0.27
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Co-60	7.48E-02	8.01E-02	0.17		4.04E-02	0.09
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Ni-63	4.87E+00	5.70E-01	0.43	Y	4.71E+00	0.42
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Sr-90	4.23E-01	6.27E-02	0.05	Y	3.78E-01	0.05
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Nb-94	-1.54E-02	7.35E-02	0.13		-1.54E-02	0.13
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Tc-99	-1.24E-01	3.07E-01	0.54		-1.24E-01	0.54

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Cs-137	8.01E-01	1.72E-01	0.12	Y	7.19E-01	0.11
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Eu-152	1.43E-03	5.35E-03	0.37		1.12E-03	0.29
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Eu-154	1.19E-01	2.45E-01	0.92		8.23E-02	0.64
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Eu-155	1.25E-02	1.48E-01	0.26		6.32E-03	0.13
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Np-237	-1.70E-02	1.63E-02	0.05		-1.70E-02	0.05
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Pu-238	-2.71E-03	2.26E-02	0.05		-2.61E-03	0.05
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Pu-239/240	-7.76E-03	7.79E-03	0.04		-7.76E-03	0.04
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Pu-241	3.37E-01	1.51E+00	2.53		2.69E-01	2.02
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Am-241	1.20E-02	1.70E-02	0.02		1.19E-02	0.02
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Am-243	-1.79E-03	2.24E-02	0.05		-1.79E-03	0.05
TA	B1001101-CJ-FC-005-CV 1/2-1	Rx Bldg	6/23/2015	Cm-243/244	0.00E+00	4.89E-03	0.02		0.00E+00	0.02
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	H-3	4.21E+00	1.44E+00	1.70	Y	3.23E+00	1.31
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	C-14	7.66E-02	8.32E-01	1.44		7.66E-02	1.44
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Fe-55	1.17E+01	5.53E+00	9.32	Y	3.57E+00	2.84
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Ni-59	0.00E+00	2.30E-01	0.26		0.00E+00	0.26
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Co-60	2.04E+00	2.64E-01	0.05	Y	1.10E+00	0.03
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Ni-63	1.34E+01	1.43E+00	0.42	Y	1.30E+01	0.41
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Sr-90	7.15E+00	7.03E-01	0.03	Y	6.39E+00	0.03
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Nb-94	2.56E-02	8.97E-02	0.15		2.56E-02	0.15
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Tc-99	8.34E-02	3.41E-01	0.58		8.34E-02	0.58
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Cs-137	1.49E+03	1.55E+02	0.72	Y	1.34E+03	0.65
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Eu-152	3.08E-02	2.21E+00	3.66		2.42E-02	2.88
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Eu-154	1.28E-01	6.79E-01	1.19		8.85E-02	0.82
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Eu-155	7.37E-01	8.96E-01	1.47		3.72E-01	0.74
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Np-237	-1.34E-02	1.02E-02	0.04		-1.34E-02	0.04
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Pu-238	2.89E-02	2.70E-02	0.04		2.78E-02	0.04
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Pu-239/240	3.46E-02	2.63E-02	0.03	Y	3.46E-02	0.03
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Pu-241	-1.38E+00	1.47E+00	2.65		-1.10E+00	2.11
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Am-241	4.77E-02	4.09E-02	0.05		4.73E-02	0.05
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Am-243	3.00E-03	1.12E-02	0.03		3.00E-03	0.03
TA	B1001101-CJ-WC-006-CV 0-1/2	Rx Bldg	6/23/2015	Cm-243/244	-5.32E-03	7.54E-03	0.04		-4.75E-03	0.04
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	H-3	3.59E+00	1.35E+00	1.64	Y	2.76E+00	1.26
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	C-14	-2.46E-01	8.36E-01	1.49		-2.46E-01	1.49
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Fe-55	6.03E+00	7.05E+00	14.50		1.84E+00	4.42

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Ni-59	0.00E+00	1.47E-01	0.26		0.00E+00	0.26
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Co-60	-2.59E-02	2.40E-01	0.21		-1.40E-02	0.11
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Ni-63	2.31E+00	3.35E-01	0.40	Y	2.24E+00	0.38
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Sr-90	1.46E-01	3.35E-02	0.04	Y	1.30E-01	0.03
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Nb-94	1.89E-02	5.95E-02	0.14		1.89E-02	0.14
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Tc-99	2.40E-02	3.24E-01	0.56		2.40E-02	0.56
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Cs-137	1.41E+00	2.58E-01	0.15	Y	1.27E+00	0.14
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Eu-152	2.09E-02	1.13E-01	0.43		1.64E-02	0.34
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Eu-154	5.46E-02	1.37E-01	1.27		3.77E-02	0.88
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Eu-155	3.44E-03	1.96E-01	0.34		1.74E-03	0.17
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Np-237	2.95E-03	2.05E-02	0.04		2.95E-03	0.04
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Pu-238	-4.08E-03	1.60E-02	0.04		-3.93E-03	0.04
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Pu-239/240	3.46E-02	2.77E-02	0.03	Y	3.46E-02	0.03
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Pu-241	-1.89E+00	1.27E+00	2.36		-1.51E+00	1.88
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Am-241	5.93E-03	1.71E-02	0.04		5.89E-03	0.04
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Am-243	-2.30E-03	4.60E-03	0.03		-2.30E-03	0.03
TA	B1001101-CJ-WC-006-CV 1/2-1	Rx Bldg	6/23/2015	Cm-243/244	-3.63E-03	5.15E-03	0.03		-3.24E-03	0.03
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	H-3	3.82E-01	5.59E-01	0.94		2.93E-01	0.72
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	C-14	5.25E-02	7.94E-01	1.37		5.25E-02	1.37
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Fe-55	1.61E+00	3.37E+00	6.55		4.89E-01	1.99
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Ni-59	0.00E+00	1.51E-01	0.23		0.00E+00	0.23
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Co-60	6.62E-01	1.31E-01	0.06	Y	3.57E-01	0.03
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Ni-63	2.73E+00	3.55E-01	0.35	Y	2.64E+00	0.34
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Sr-90	1.54E-01	4.11E-02	0.05	Y	1.38E-01	0.05
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Nb-94	0.00E+00	6.57E-02	0.21		0.00E+00	0.21
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Tc-99	-9.98E-03	3.35E-01	0.58		-9.98E-03	0.58
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Cs-137	1.60E+01	1.78E+00	0.18	Y	1.44E+01	0.16
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Eu-152	3.43E-02	5.63E-02	0.63		2.70E-02	0.50
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Eu-154	5.98E-02	2.39E-01	1.20		4.13E-02	0.83
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Eu-155	1.40E-01	2.15E-01	0.36		7.06E-02	0.18
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Np-237	3.13E-03	2.18E-02	0.05		3.13E-03	0.05
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Pu-238	1.77E-02	3.31E-02	0.06		1.71E-02	0.06
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Pu-239/240	-1.07E-02	1.91E-02	0.05		-1.07E-02	0.05
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Pu-241	-1.12E+00	1.48E+00	2.71		-8.92E-01	2.16

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Am-241	2.01E-02	2.66E-02	0.04		1.99E-02	0.04
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Am-243	-2.37E-03	1.66E-02	0.04		-2.37E-03	0.04
TA	B1008101-CJ-FC-002-CV 0-1/2	Tunnel	6/18/2015	Cm-243/244	6.22E-03	1.25E-02	0.02		5.55E-03	0.02
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	H-3	5.99E+01	7.95E+00	3.97		4.60E+01	3.05
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	C-14	1.50E+02	1.90E+01	5.74		1.50E+02	5.74
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Fe-55	6.46E+00	7.05E+00	14.50		1.96E+00	4.41
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Ni-59	0.00E+00	1.71E-01	0.24		0.00E+00	0.24
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Co-60	9.74E-01	1.62E-01	0.14	Y	5.25E-01	0.08
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Ni-63	4.40E+00	5.10E-01	0.36	Y	4.26E+00	0.34
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Sr-90	2.35E-01	4.08E-02	0.04	Y	2.10E-01	0.03
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Nb-94	1.57E-02	8.09E-02	0.14		1.57E-02	0.14
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Tc-99	-5.09E-03	3.43E-01	0.59		-5.09E-03	0.59
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Cs-137	1.00E+01	1.13E+00	0.15	Y	8.98E+00	0.14
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Eu-152	2.91E-01	2.70E-01	0.47		2.29E-01	0.37
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Eu-154	1.89E-02	5.18E-02	1.41		1.30E-02	0.97
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Eu-155	1.01E-01	2.08E-01	0.35		5.09E-02	0.18
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Np-237	-2.39E-02	2.45E-02	0.07		-2.39E-02	0.07
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Pu-238	4.17E-02	3.82E-02	0.06		4.02E-02	0.05
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Pu-239/240	7.98E-03	1.71E-02	0.03		7.98E-03	0.03
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Pu-241	-1.94E-01	1.47E+00	2.55		-1.55E-01	2.03
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Am-241	1.89E-02	2.94E-02	0.05		1.88E-02	0.05
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Am-243	-7.94E-04	2.28E-02	0.05		-7.94E-04	0.05
TA	B1008101-CJ-FC-003-CV 0-1/2	Tunnel	6/18/2015	Cm-243/244	-5.62E-03	7.98E-03	0.04		-5.01E-03	0.04
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	H-3	1.20E+00	6.85E-01	0.99	Y	9.21E-01	0.76
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	C-14	7.74E-02	8.29E-01	1.43		7.74E-02	1.43
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Fe-55	6.52E+00	5.82E+00	11.50		1.98E+00	3.50
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Ni-59	0.00E+00	1.62E-01	0.23		0.00E+00	0.23
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Co-60	1.39E+00	2.55E-01	0.10	Y	7.49E-01	0.05
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Ni-63	4.26E+00	4.92E-01	0.34	Y	4.12E+00	0.33
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Sr-90	2.16E-01	4.08E-02	0.04	Y	1.93E-01	0.04
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Nb-94	1.16E-03	8.05E-02	0.14		1.16E-03	0.14
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Tc-99	4.31E-02	3.50E-01	0.60		4.31E-02	0.60
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Cs-137	1.98E+01	2.15E+00	0.17	Y	1.78E+01	0.15
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Eu-152	-1.19E-01	3.44E-01	0.58		-9.35E-02	0.46

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Eu-154	-6.08E-02	2.96E-01	1.37		-4.20E-02	0.95
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Eu-155	6.27E-03	2.20E-01	0.38		3.16E-03	0.19
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Np-237	1.44E-02	3.52E-02	0.07		1.44E-02	0.07
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Pu-238	2.02E-02	3.02E-02	0.05		1.95E-02	0.05
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Pu-239/240	2.52E-02	2.76E-02	0.04		2.52E-02	0.04
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Pu-241	-1.61E+00	1.43E+00	2.61		-1.28E+00	2.08
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Am-241	5.19E-02	3.48E-02	0.03	Y	5.15E-02	0.03
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Am-243	-4.03E-03	5.72E-03	0.03		-4.03E-03	0.03
TA	B1008101-CJ-FC-004-CV 0-1/2	Tunnel	6/18/2015	Cm-243/244	1.00E-02	1.42E-02	0.02		8.92E-03	0.01
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	H-3	8.20E-01	6.37E-01	0.99		6.29E-01	0.76
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	C-14	5.05E-01	8.50E-01	1.41		5.05E-01	1.41
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Fe-55	1.54E+01	7.43E+00	13.80	Y	4.68E+00	4.19
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Ni-59	6.55E+01	8.69E+00	0.31	Y	6.55E+01	0.31
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Co-60	9.50E+01	9.60E+00	0.42	Y	5.12E+01	0.23
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Ni-63	8.17E+02	8.50E+01	0.47	Y	7.91E+02	0.46
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Sr-90	9.98E+01	9.60E+00	0.04	Y	8.91E+01	0.04
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Nb-94	9.76E-02	1.49E-01	0.48		9.76E-02	0.47
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Tc-99	1.13E-01	3.33E-01	0.56		1.13E-01	0.56
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Cs-137	4.71E+03	4.91E+02	1.69	Y	4.23E+03	1.52
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Eu-152	8.15E-01	1.41E+00	5.94		6.41E-01	4.67
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Eu-154	1.25E+00	1.98E+00	5.46		8.63E-01	3.77
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Eu-155	7.28E-02	1.28E+00	2.12		3.67E-02	1.07
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Np-237	-1.20E-02	2.27E-02	0.06		-1.20E-02	0.06
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Pu-238	9.20E-01	5.11E-01	0.62	Y	8.86E-01	0.60
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Pu-239/240	1.28E+00	5.37E-01	0.47	Y	1.28E+00	0.47
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Pu-241	5.24E+00	1.62E+01	26.70		4.17E+00	21.27
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Am-241	3.20E+00	9.89E-01	0.43	Y	3.18E+00	0.42
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Am-243	4.06E-01	3.10E-01	0.30	Y	4.06E-01	0.30
TA	B1002101-CJ-FC-001-CV 0-1/2	WTB	6/17/2015	Cm-243/244	2.02E-01	2.67E-01	0.42		1.80E-01	0.37
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	H-3	2.75E-01	5.43E-01	0.93		2.11E-01	0.71
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	C-14	-1.80E-02	8.24E-01	1.44		-1.80E-02	1.44
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Fe-55	5.47E-01	2.84E+00	5.51		1.66E-01	1.67
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Ni-59	0.00E+00	1.70E-01	0.25		0.00E+00	0.24
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Co-60	1.01E+00	1.68E-01	0.15	Y	5.44E-01	0.08

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Ni-63	5.64E+00	6.33E-01	0.37	Y	5.46E+00	0.36
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Sr-90	2.53E-01	4.89E-02	0.05	Y	2.26E-01	0.05
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Nb-94	2.89E-02	5.43E-02	0.10		2.89E-02	0.10
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Tc-99	-1.01E-01	2.89E-01	0.51		-1.01E-01	0.51
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Cs-137	3.87E+00	4.96E-01	0.14	Y	3.47E+00	0.12
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Eu-152	3.85E-02	1.07E-01	0.44		3.03E-02	0.35
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Eu-154	-2.60E-01	8.59E-01	1.48		-1.79E-01	1.02
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Eu-155	7.65E-02	1.62E-01	0.27		3.86E-02	0.14
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Np-237	-2.23E-02	2.28E-02	0.06		-2.23E-02	0.06
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Pu-238	1.74E-02	3.26E-02	0.06		1.68E-02	0.06
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Pu-239/240	-5.26E-03	1.33E-02	0.04		-5.26E-03	0.04
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Pu-241	-9.84E-01	1.51E+00	2.68		-7.84E-01	2.14
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Am-241	3.50E-02	3.10E-02	0.04		3.47E-02	0.04
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Am-243	-1.79E-02	1.28E-02	0.05		-1.79E-02	0.05
TA	B1002101-CJ-FC-001-CV 1/2-1	WTB	6/17/2015	Cm-243/244	-4.64E-03	6.58E-03	0.04		-4.14E-03	0.03
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	H-3	7.63E-01	6.38E-01	1.00		5.86E-01	0.77
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	C-14	-7.76E-01	7.63E-01	1.41		-7.76E-01	1.41
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Fe-55	3.54E+00	3.15E+00	5.67		1.08E+00	1.72
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Ni-59	0.00E+00	1.59E-01	0.23		0.00E+00	0.23
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Co-60	7.42E-01	1.48E-01	0.07	Y	4.00E-01	0.04
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Ni-63	3.36E+00	4.07E-01	0.33	Y	3.25E+00	0.32
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Sr-90	2.41E+00	2.50E-01	0.05	Y	2.15E+00	0.04
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Nb-94	3.49E-02	6.63E-02	0.15		3.49E-02	0.15
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Tc-99	2.59E-01	3.42E-01	0.56		2.59E-01	0.56
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Cs-137	3.63E+00	4.93E-01	0.15	Y	3.26E+00	0.13
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Eu-152	1.56E-01	2.36E-01	0.42		1.23E-01	0.33
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Eu-154	1.19E-01	3.82E-01	1.40		8.21E-02	0.97
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Eu-155	1.59E-01	2.04E-01	0.34		8.01E-02	0.17
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Np-237	-4.30E-04	1.75E-02	0.04		-4.30E-04	0.04
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Pu-238	2.29E-02	3.51E-02	0.06		2.21E-02	0.06
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Pu-239/240	4.17E-04	2.06E-02	0.05		4.17E-04	0.05
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Pu-241	-5.17E-02	1.64E+00	2.82		-4.12E-02	2.25
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Am-241	1.95E-02	1.96E-02	0.01	Y	1.94E-02	0.01
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Am-243	1.33E-02	1.84E-02	0.03		1.33E-02	0.03

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1002101-CJ-FC-001-CV 1-1.5	WTB	6/17/2015	Cm-243/244	4.77E-03	9.56E-03	0.01		4.25E-03	0.01
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	H-3	9.42E-02	5.12E-01	0.92		7.23E-02	0.70
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	C-14	3.72E-01	8.19E-01	1.38		3.72E-01	1.38
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Fe-55	7.77E+00	1.14E+01	25.00		2.36E+00	7.59
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Ni-59	0.00E+00	1.88E-01	0.26		0.00E+00	0.26
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Co-60	8.72E-01	1.61E-01	0.14	Y	4.70E-01	0.07
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Ni-63	5.73E+00	6.46E-01	0.39	Y	5.55E+00	0.38
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Sr-90	1.06E-01	3.15E-02	0.04	Y	9.46E-02	0.04
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Nb-94	-3.36E-02	8.34E-02	0.14		-3.36E-02	0.14
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Tc-99	3.19E-02	3.08E-01	0.53		3.19E-02	0.53
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Cs-137	2.44E+00	3.43E-01	0.15	Y	2.19E+00	0.13
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Eu-152	1.25E-01	1.95E-01	0.38		9.82E-02	0.30
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Eu-154	2.71E-01	4.06E-01	0.96		1.87E-01	0.66
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Eu-155	9.93E-02	1.96E-01	0.33		5.01E-02	0.16
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Np-237	-6.88E-03	1.90E-02	0.05		-6.88E-03	0.05
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Pu-238	3.58E-03	2.96E-02	0.06		3.45E-03	0.06
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Pu-239/240	9.17E-03	2.11E-02	0.04		9.17E-03	0.04
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Pu-241	-2.09E+00	1.46E+00	2.70		-1.67E+00	2.15
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Am-241	1.71E-02	2.46E-02	0.04		1.70E-02	0.04
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Am-243	2.92E-02	2.62E-02	0.03	Y	2.92E-02	0.03
TA	B1002101-CJ-FC-001-CV 1.5-2	WTB	6/17/2015	Cm-243/244	5.87E-03	1.54E-02	0.03		5.24E-03	0.03
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	H-3	1.71E+00	8.46E-01	1.18	Y	1.31E+00	0.91
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	C-14	1.54E+01	2.31E+00	1.51	Y	1.54E+01	1.51
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Fe-55	8.96E+00	3.64E+00	5.86	Y	2.72E+00	1.78
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Ni-59	4.23E+02	5.52E+01	0.45	Y	4.23E+02	0.45
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Co-60	3.00E+02	3.02E+01	0.76	Y	1.62E+02	0.41
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Ni-63	2.36E+03	2.45E+02	0.66	Y	2.28E+03	0.64
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Sr-90	2.20E+02	2.11E+01	0.05	Y	1.96E+02	0.05
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Nb-94	-3.50E-01	5.67E-01	0.94		-3.50E-01	0.93
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Tc-99	7.92E-01	3.73E-01	0.56	Y	7.92E-01	0.56
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Cs-137	2.54E+04	2.65E+03	4.14	Y	2.28E+04	3.72
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Eu-152	5.10E-01	9.56E-01	13.70		4.01E-01	10.77
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Eu-154	4.65E+00	4.39E+00	7.17		3.21E+00	4.95
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Eu-155	1.06E+00	9.88E-01	7.37		5.34E-01	3.72

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Np-237	2.36E-02	2.70E-02	0.04		2.36E-02	0.04
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Pu-238	3.20E+00	8.25E-01	0.50	Y	3.08E+00	0.48
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Pu-239/240	2.58E+00	7.13E-01	0.29	Y	2.58E+00	0.29
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Pu-241	3.69E+01	1.71E+01	24.00	Y	2.94E+01	19.12
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Am-241	9.08E+00	2.03E+00	0.68	Y	9.01E+00	0.68
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Am-243	3.05E-01	2.86E-01	0.39		3.05E-01	0.39
TA	B1002101-CJ-FC-002-CV 0-1/2	WTB	6/17/2015	Cm-243/244	4.28E-01	4.20E-01	0.55		3.82E-01	0.49
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	H-3	8.46E-01	7.16E-01	1.12		6.49E-01	0.86
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	C-14	6.18E+00	1.34E+00	1.42	Y	6.18E+00	1.42
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Fe-55	5.27E+00	1.14E+01	25.30		1.60E+00	7.68
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Ni-59	0.00E+00	6.16E-01	0.27		0.00E+00	0.27
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Co-60	8.27E+00	9.07E-01	0.11	Y	4.45E+00	0.06
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Ni-63	1.75E+02	1.83E+01	0.44	Y	1.69E+02	0.43
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Sr-90	3.52E+00	3.56E-01	0.05	Y	3.14E+00	0.04
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Nb-94	-4.06E-02	1.35E-01	0.23		-4.06E-02	0.23
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Tc-99	1.65E-01	3.12E-01	0.52		1.65E-01	0.52
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Cs-137	2.08E+02	2.17E+01	0.36	Y	1.87E+02	0.32
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Eu-152	-2.80E-01	9.50E-01	1.58		-2.20E-01	1.24
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Eu-154	2.55E-01	2.59E-01	1.90		1.76E-01	1.31
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Eu-155	1.16E-01	2.05E-01	0.86		5.85E-02	0.44
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Np-237	-1.90E-02	1.67E-02	0.06		-1.90E-02	0.06
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Pu-238	5.90E-02	4.58E-02	0.06		5.68E-02	0.06
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Pu-239/240	5.57E-02	3.95E-02	0.05	Y	5.57E-02	0.05
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Pu-241	-9.65E-01	1.69E+00	2.97		-7.69E-01	2.37
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Am-241	2.38E-01	7.96E-02	0.05	Y	2.36E-01	0.05
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Am-243	4.54E-03	2.83E-02	0.06		4.54E-03	0.06
TA	B1002101-CJ-FC-002-CV 1/2-1	WTB	6/17/2015	Cm-243/244	1.81E-03	1.79E-02	0.04		1.61E-03	0.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	H-3	8.36E-01	6.24E-01	0.96		6.42E-01	0.74
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	C-14	-4.05E-01	8.03E-01	1.44		-4.05E-01	1.44
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Fe-55	8.43E+00	8.21E+00	17.00		2.56E+00	5.16
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Ni-59	0.00E+00	4.84E-01	0.33		0.00E+00	0.33
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Co-60	8.57E+00	9.40E-01	0.15	Y	4.62E+00	0.08
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Ni-63	7.06E+01	7.37E+00	0.55	Y	6.83E+01	0.53
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Sr-90	7.00E+00	6.91E-01	0.05	Y	6.25E+00	0.04

Analysis Lab	Sample ID	Bldg	Sample Date	Radionuclide	Result, pCi/g	2 sigma Unc., pCi/g	MDC, pCi/g	Detected ?	Decayed Reported Result, pCi/g	Decayed MDC, pCi/g
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Nb-94	3.81E-02	5.99E-02	0.21		3.81E-02	0.21
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Tc-99	6.24E-02	3.18E-01	0.54		6.24E-02	0.54
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Cs-137	1.24E+03	1.29E+02	0.82	Y	1.11E+03	0.73
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Eu-152	1.76E-01	5.14E-01	2.60		1.38E-01	2.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Eu-154	8.97E-02	2.02E-01	2.32		6.19E-02	1.60
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Eu-155	-3.87E-03	1.03E+00	1.71		-1.95E-03	0.86
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Np-237	-1.05E-02	9.48E-03	0.04		-1.05E-02	0.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Pu-238	1.05E-01	5.14E-02	0.06	Y	1.01E-01	0.05
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Pu-239/240	1.26E-01	5.13E-02	0.04	Y	1.26E-01	0.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Pu-241	1.50E+00	1.64E+00	2.56		1.20E+00	2.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Am-241	3.39E-01	9.86E-02	0.04	Y	3.36E-01	0.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Am-243	-1.24E-03	1.22E-02	0.04		-1.24E-03	0.04
TA	B1002101-CJ-FC-003-CV 0-1/2	WTB	6/17/2015	Cm-243/244	1.75E-02	2.03E-02	0.02	Y	1.56E-02	0.02