

Radioactive Particulate Air Sampling Results Associated with the Woolsey Fire

***Santa Susana Field Laboratory
Ventura County, California***



January 2019

***Prepared for:
United States
Department of Energy***

***Prepared by:
North Wind, Inc.***

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Contract No. DE-EM0000837-DT0007583

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ACRONYMS AND ABBREVIATIONS

Boeing	The Boeing Company
CFR	Code of Federal Regulations
DCS	Derived Concentration Standard
DOE	U.S. Department of Energy
DTSC	State of California Department of Toxic Substances Control
EDD	electronic data deliverables
EPA	U.S. Environmental Protection Agency
ETEC	Energy Technology Engineering Center
GC	gas chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
MDA	minimum detectable activity
mrem	milirem
MS	mass spectrometry
NASA	National Aeronautics and Space Administration
pCi	pico-curies
PM ₁₀	particulate matter less than 10 microns in aerodynamic diameter
RP	responsible party
RMHF	Radioactive Materials Handling Facility
SSFL	Santa Susana Field Laboratory
uCi/ml	units of micro-curie
VOC	volatile organic compound

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1. INTRODUCTION

The National Aeronautics and Space Administration (NASA), the Boeing Company (Boeing), and the U.S. Department of Energy (DOE), also known as the responsible parties (RPs), are performing baseline air monitoring at the Santa Susana Field Laboratory (SSFL) site located in Ventura County, California. The SSFL is a business segment of Boeing. SSFL operates the 2,849-acre SSFL located atop a range of hills between the Simi and San Fernando valleys, north of Los Angeles. The westernmost 290 acres of the SSFL, known as Area IV, contains both DOE and Boeing facilities. The DOE portion is mainly contained within the 90 acres known as the Energy Technology Engineering Center (ETEC).

Monitoring the environment for potential impact from past nuclear operations has been a primary focus of DOE since the inception of operations in the mid-1950s.

In the mid-1950s, the Atomic Energy Commission, in concert with its contractor, Atomics International, then a Division of North American Aviation, began initial plans for nuclear research at its facilities in the west San Fernando Valley. In 1955, prior to initial operations, a comprehensive monitoring program was initiated to sample and monitor environmental levels of radioactivity in and around its facilities.

During the 60-year history of nuclear research and later environmental restoration, on-site and off-site environmental monitoring and media sampling has been extensive. In the early years, soil/vegetation sampling was conducted monthly. Sampling locations extended to the Moorpark freeway to the west, to the Ronald Reagan freeway to the north, to Reseda Avenue to the east, and to the Ventura freeway to the south. Samples were also taken around the Canoga and De Soto facilities as well as around the Chatsworth Reservoir. This extensive off-site sampling program was terminated in 1989 when all nuclear research and operations (except remediation) came to an end.

During the 1990s, extensive media sampling programs were conducted in the surrounding areas, including the Brandeis-Bardin Institute (now known as the American Jewish University) and the Santa Monica Mountains Conservancy to the north, Bell Canyon to the south, the Rocketdyne Recreation Center in West Hills to the east, and various private homes in Chatsworth and West Hills. Samples were also taken from such distant areas as Wildwood Park and Tapia Park. In addition, monitoring of off-site radiation, groundwater, and storm water runoff from the site were routinely performed during this time.

Ongoing radiological environmental sampling and monitoring ensures that DOE operations at the SSFL, including cleanup, do not adversely affect either on-site personnel or the surrounding community.

2. Sampling

North Wind operates four air monitoring stations as part of a Baseline Air Monitoring Program at the SSFL in accordance with the *Final Baseline Air Monitoring Work Plan, Santa Susana Field Laboratory, Ventura County, California* (NASA 2017), which was submitted to the State of California Department of Toxic Substances Control (DTSC) on September 21, 2017. DTSC approved the Work Plan. Final locations of the air monitoring locations were approved by DTSC on January 30, 2018 (DTSC 2018). These Perimeter Monitoring stations have been operating since April 2018 establishing baseline data. Four of these stations DOE-1 through DOE-4 collect airborne particulates on glass fiber filters that are changed approximately twice a week and are counted for gross alpha and gross beta radioactivity. These air monitors were operational during the Woolsey Fire that burned across portions of SSFL in November 2018. The design of the samplers, sampler locations and procedures are described in the referenced Work Plan. Gross alpha and gross beta data for the period 4/9/2018 through 11/30/2018, including the period of the fire¹, are

provided in Appendix A for 68 sampling events at the four air monitoring stations that are part of the Baseline Air Monitoring Program.

Figure 1 shows the air monitoring locations for the Baseline Air Monitoring Program. These locations were selected based on the areas to be remediated, with consideration of winds in the area, topographic features, and accessibility. The air monitoring sites were selected based on guidance obtained from the U.S. Environmental Protection Agency's (EPA's) *Quality Assurance Handbook for Air Pollution Measurement Systems*, Volume II, Ambient Air Monitoring Program (EPA 2013) and *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA 2000). Sites were evaluated per 40 Code of Federal Regulations (CFR) 58, DOE is responsible for DOE-1, DOE-2, DOE-3, and DOE-4 of the 14 monitoring locations, represented in Figure 1. VOCs, PM₁₀, and radionuclides are monitored at the four DOE monitoring locations and meteorological conditions are monitored at the DOE-4 location. The DOE monitoring locations DOE-1 through DOE-4 are presented in Figure 2.

Samples are also collected at two additional locations within the ETEC site. One sampler is at the Radioactive Materials Handling Facility (RMHF) and the other is at Area 20. These sample locations are shown on Figure 3. Ambient air sampling was performed continuously. These two air samplers operate on 7-day sampling cycles. Airborne particulate radioactivity was collected on glass fiber filters that were changed weekly. These samplers were also operational during the Woolsey fire. The air samplers at Area 20 and RMHF did not operate after the fire because electric line power was lost. Battery powered samplers were put into service on December 10, 2018 at Area 20 and December 17, 2018 at RMHF. These samplers operated sporadically through the end of the year using battery and generator power. The samplers will operate from ten to fifteen hours on a single battery charge and the gas generator must be shut off when personnel are not onsite causing the sporadic sampling. Results of all samplers beginning one month before the fire through the end of 2018 are provided in Appendix B.

There was damage to the electrical connections at DOE-4 causing the unit to be turned off on November 12, 2018 at 10:31 am. The blower on DOE-1 failed because the filter was saturated with water because of the heavy rain on December 17, 2018. Sampler DOE-4 was moved to location DOE-1 on December 17, 2018. The samplers at DOE-1 through DOE-3 have been operational since the fire except for DOE-2 that was shut off for approximately 24 hours during the heavy rain and DOE-1 has been shut off several times for a few hours because of the heavy rain. The samplers automatically track the air volume sampled so the volume is accurate even if the samplers are temporarily turned off.

As shown in Appendices A and B, gross alpha and beta concentrations during the fire are consistent with the level of gross alpha and beta concentrations before and after the fire, indicating that the fire had no impact on the gross alpha and gross beta concentrations. Most results before, during, and after the fire were less than their minimum detectable activity (MDA). The gross alpha results during the fire were all less than their MDA. The gross beta results from during the fire were all less than their MDA except at station DOE-2. The detected concentration of 2.67E-13 uCi/ml was within the range of other gross beta results collected before and after the fire.

Following analysis for gross alpha and gross beta radiation, sample filters are composited quarterly for individual radionuclide analysis at an off-site, State certified laboratory for the radionuclides specified in the *Final Baseline Air Monitoring Work Plan, Santa Susana Field Laboratory, Ventura County, California*. Two composites for each of the four Perimeter Monitoring stations, each composite containing 26 filters, had been analyzed. The first four composite samples were from filters collected from April 9 through July 9, 2018. The second four composite samples were from filters collected July 12 through October 11, 2018. This data is reported in Appendix C. Appendix C also shows the results of the four samples from the Perimeter Monitoring stations that were collected during the fire as shown in Table 1.

The air filters from the two locations within the ETEC Site were also sent to the off-site laboratory for the 20 individual radionuclides specified in the referenced Work Plan. Collection times are listed in Table 1 and sample results are shown in Appendix D.

¹ The principal burn days at SSFL were 11/8/2018 and 11/9/2018 that are included in the sampling period, 11/8/2018 to 11/13/2018.

Table 1. Sample Collection Times

Sampler	Sample Start Date and Time	Sample Collection Date and Time
DOE-1	11/8/18 11:40	11/13/18 7:06
DOE-2	11/8/18 11:40	11/12/18 10:16
DOE-3	11/8/18 11:59	11/13/18 7:15
DOE-4	11/8/18 12:08	11/12/18 10:31
RMHF	11/7/2018 10:25	11/9/2018 08:00
Area 20	11/7/2018 13:30	11/9/2018 08:05

The individual radionuclide analyses shown in Appendices C and D are reported by the laboratory in units of pico-curies (pCi)/sample. The laboratory also reports the minimum detectable concentration in pCi/sample. The laboratory results have been converted to units of micro-curie (uCi)/ml of air sampled. This was done by dividing the reported pCi/sample by the volume of air represented by the sample and converting pCi to uCi. The units of uCi/ml are standard units as listed in Department of Energy Federal Regulation.

The composite samples are representative of the entire volume of air that passed through each filter. The air samplers maintain a constant flow rate of 1.24 cubic feet per minute (cfm). This equates to 35,113 ml/min. The air filters as placed on the air sampler have a 4-inch diameter. A 47-milli-meter (1.85-inch) diameter circle is cut out of each filter so that it fits in the gross alpha/beta counter. Therefore, the air flow rate that passes through each individual air filter that forms a part of the composite is 752 ml/min (ratios of radius of each filter squared times sampler flow rate). The air sampler records the total sampling interval time, therefore the total air volume for each filter can be determined.

There are 26 filters in each composite sample. The volume of air that passed through each individual filter is summed to yield the total volume of air represented by each composite sample. The laboratory analyzes each composite sample for the individual radionuclides and provides a result in pCi/sample. This value, when divided by the air volume and units of pCi are converted to standard units of uCi, providing the air concentration (C) in units of uCi/ml according to the following equation:

$C = s/v \cdot k$ where:

C= the airborne concentration (uCi/ml);

s= laboratory result (pCi/sample)

v = total sample composite air volume (ml/sample);

k = 1E6 pCi/uCi.

Appendices E and F contain partial laboratory electronic data deliverables (EDDs) for samples collected during the fire. Appendix E has the data from the Perimeter Monitoring stations. Appendix F has the data

for the ETEC Site monitoring stations. The partial EDDs contain all the relevant information and have been truncated to fit within the appendices. Complete EDDs, full laboratory analytical reports including quality control information and laboratory data for the composite samples collected before the fire are available upon request.

Only naturally-occurring radionuclides were detected in the two sets of composite air filters collected before the fire. Detected were polonium-210, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-238, and beryllium-7. During the fire the naturally occurring radionuclides actinium-228, radium-226, radium-228, and thorium-230 were detected. Plutonium-239/240 was detected at DOE-3 at a concentration of $2.89\text{E-}15$ uCi/ml. Strontium-90 was detected at DOE-3 at a concentration of $3.43\text{E-}14$. Plutonium-239/240 was detected at Area 20 during the fire at a concentration of $8.73\text{E-}15$ uCi/ml, although this detection was at the MDA.

The Department of Energy Derived Concentration Standard (DCS) for inhaled air for Plutonium-239/240 is $2.4\text{E-}14$ uCi/ml. The Airborne DCS for strontium-90 is $2.5\text{E-}11$ uCi/ml uCi/ml. The DCS represent the concentration of a given radionuclide in air that results in a member of the public receiving 100 mrem effective dose following continuous exposure for one year (DOE, 2011). Although the man-made radionuclides plutonium 239/240 and strontium-90 were detected during the fire the concentrations were less than the DCS.

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3. SUMMARY

This report summarizes the air monitoring data collected before, during, and after the Woolsey fire. Four Perimeter samplers and two samplers within the ETEC site were operational.

The fire burned across portions of the SSFL on November 8 and 9, 2018. Air samplers operated continuously before the fire and collected airborne particulates on glass fiber filters. One of the four Perimeter monitors had fire damage and has not been operational since the fire, repairs are underway and the unit will be fully functional by the end of January 2019. Both ETEC site samplers require line electric power and have not been operational since the fire. However, battery-powered samplers were purchased and put in place and have been operating since December 10 at Area 20 and December 17 at RMHF.

Filters were analyzed for gross alpha and gross beta radiation. Samples were composited at each sample location on a quarterly basis and two sets of composite samples from the Perimeter samplers had been analyzed for individual radionuclides before the fire. Individual sampler filters were collected that were operational during the fire. These filters were also analyzed for individual radionuclides at the four Perimeter locations and the two ETEC site locations.

The results of gross alpha and gross beta radiation from before and after the fire appear to be no different than the gross alpha and gross beta results during the fire. Most sample results before, during, and after the fire are less than their MDA. The one gross beta result from Perimeter station DOE-2 that exceeded the MDA was still within the range of gross beta results before and during the fire.

Plutonium-239/249 and strontium-90 were detected above their MDA at stations DOE-3 and Pu-239/240 was detected at Area 20. These were not detected in the composite samples collected before the fire. The detected concentrations were low and did not exceed the DOE DCS. The DCS is an airborne concentration that would result in an effective dose of 100 mrem for continuous annual occupancy.

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4. REFERENCES

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Figure 1
SSFL Air Monitoring Locations

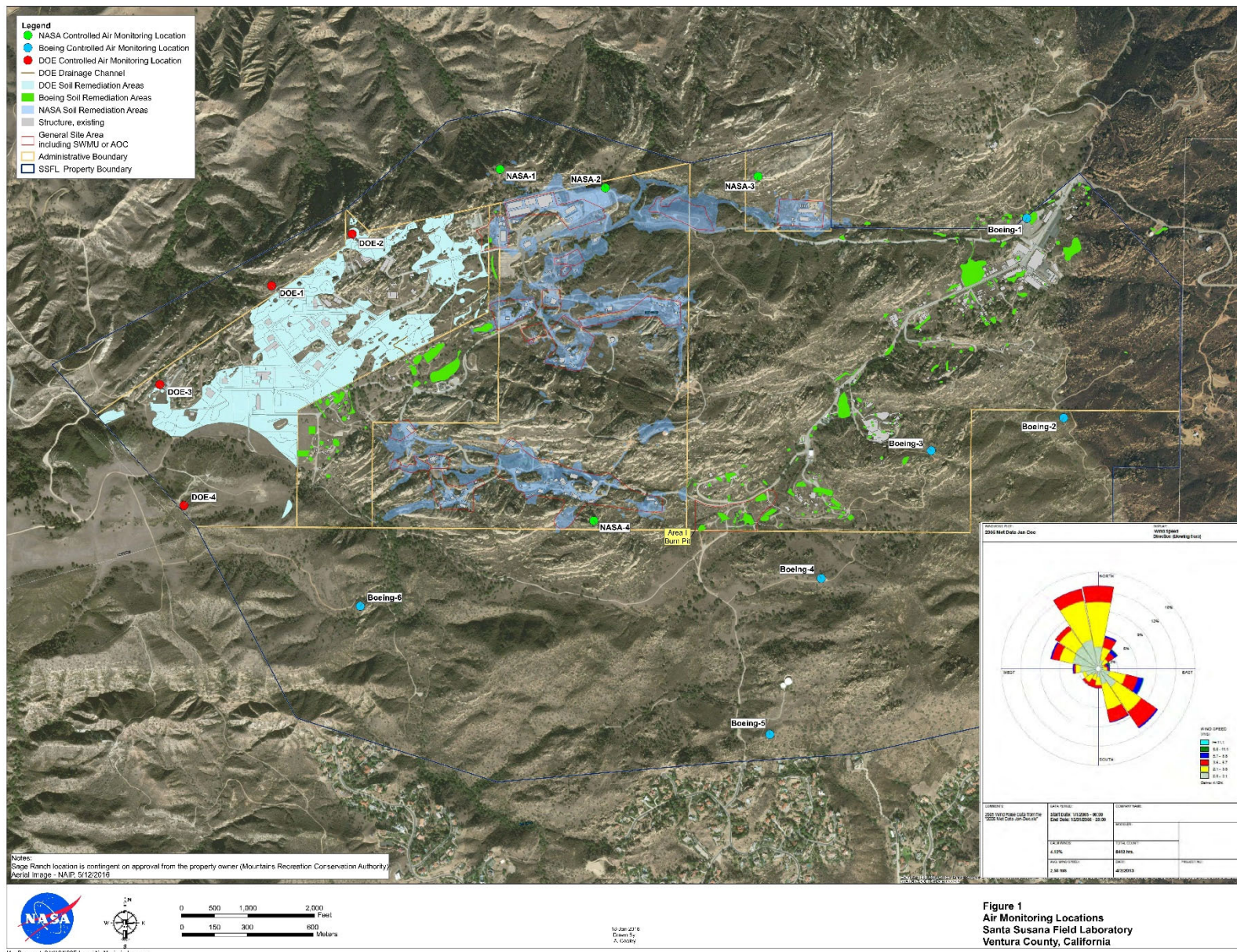


Figure 2

DOE Air Monitoring Locations

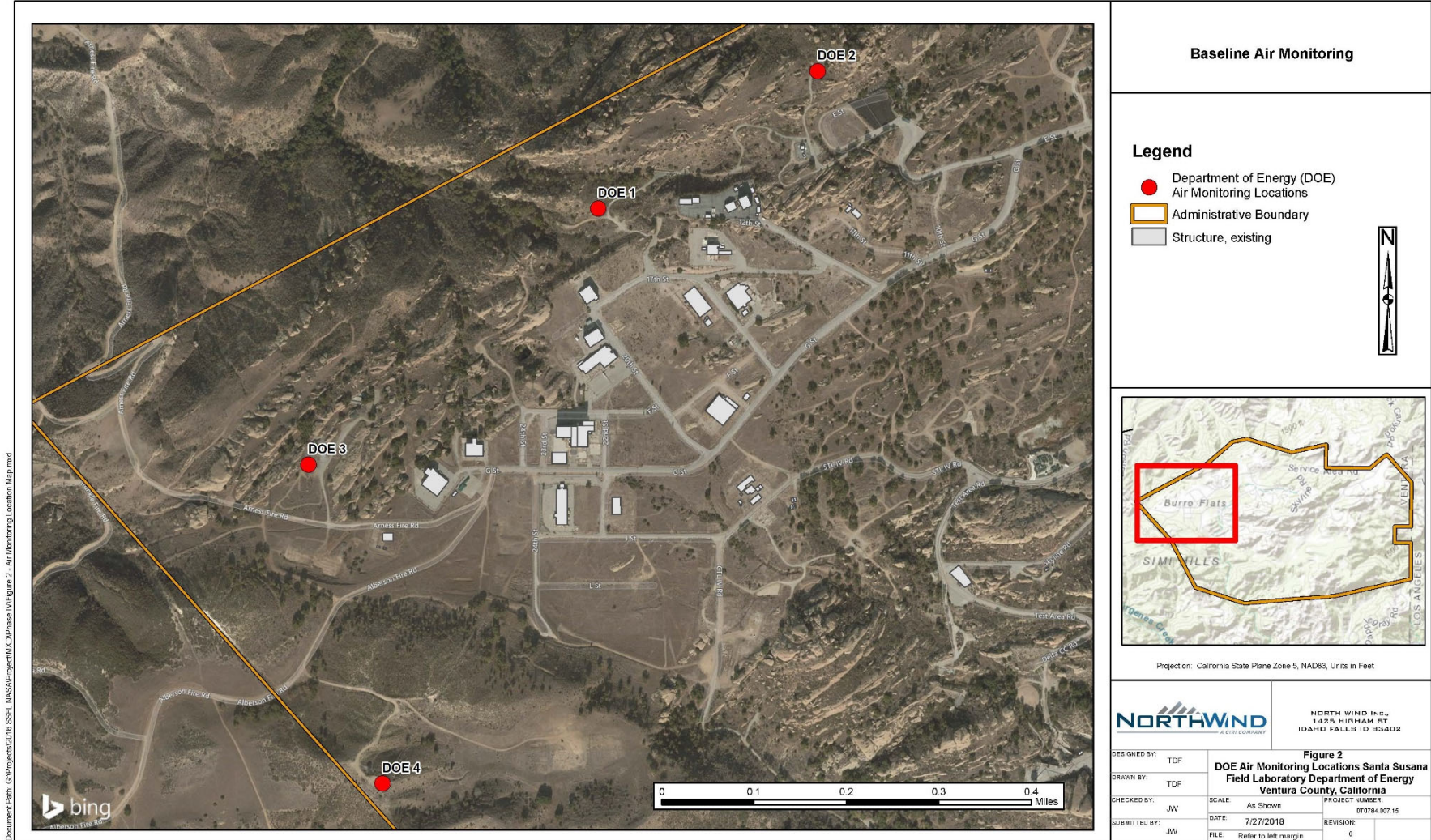
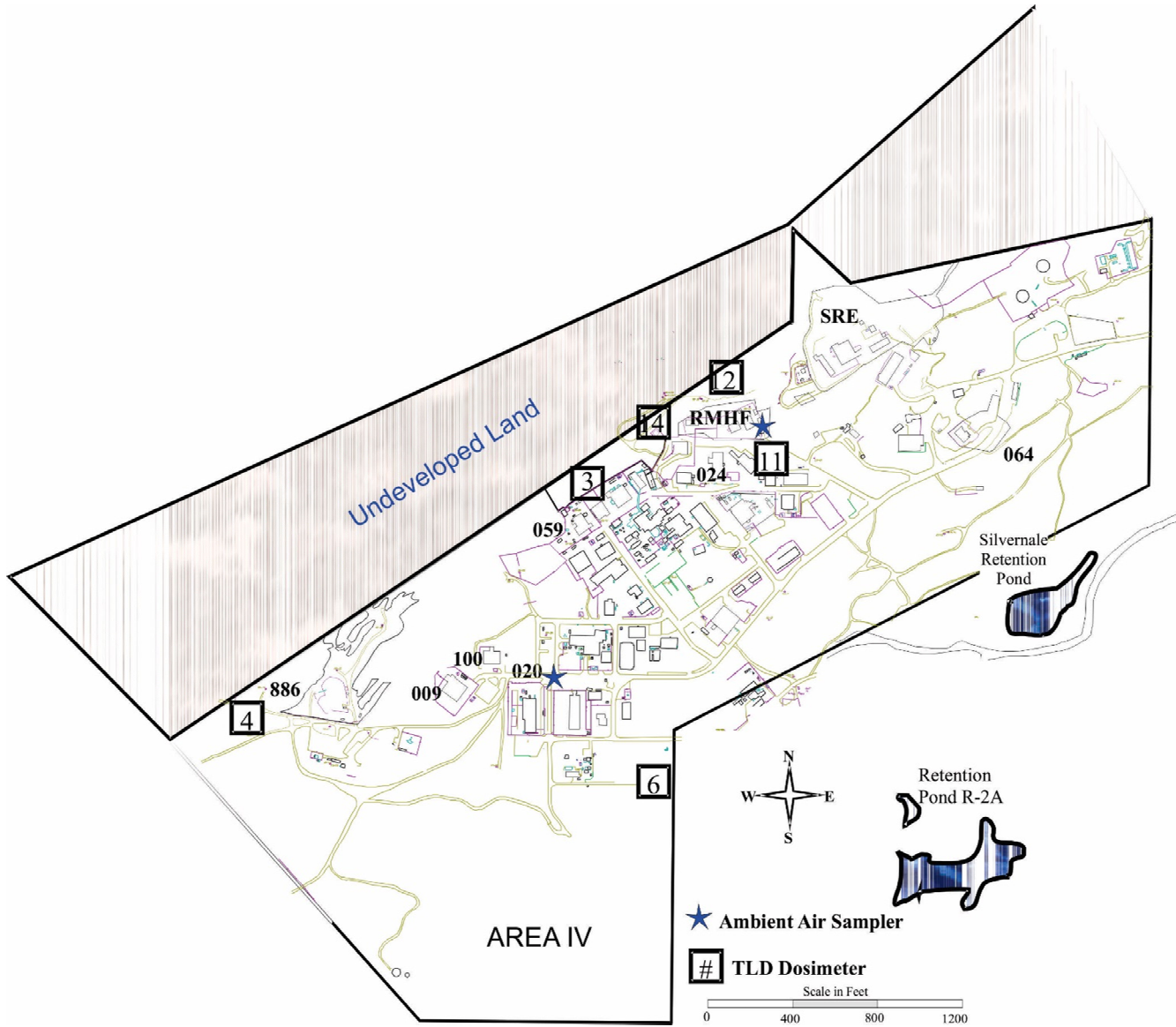


Figure 3
Ambient Air Samplers and TLD Dosimeter Locations



APPENDIX A

Gross Alpha and Gross Beta Air Sample Results Perimeter Samplers

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
Sample Location – DOE-1				
4/12/18	5.00E-15	1.57E-14	4.69E-14	6.12E-14
4/16/18	1.07E-14	1.19E-14	4.44E-14	4.65E-14
4/19/18	-3.38E-15	1.58E-14	-8.63E-16	6.18E-14
4/23/18	6.34E-15	1.19E-14	5.98E-14	4.65E-14
4/26/18	2.09E-14	1.57E-14	9.50E-14	6.15E-14
4/30/18	1.45E-14	1.19E-14	4.57E-14	4.64E-14
5/3/18	6.60E-15	1.17E-14	1.78E-14	5.81E-14
5/7/18	1.18E-14	8.77E-15	6.93E-14	4.37E-14
5/10/18	0.00E+00	1.17E-14	-1.37E-13	5.82E-14
5/14/18	6.46E-15	1.14E-14	4.51E-14	5.69E-14
5/17/18	1.58E-14	1.17E-14	1.95E-13	5.83E-14
5/21/18	6.81E-15	8.74E-15	5.39E-14	4.35E-14
5/24/18	1.65E-14	1.16E-14	5.88E-14	5.79E-14
5/29/18	-5.06E-16	6.99E-15	2.52E-14	3.48E-14
5/31/18	5.01E-15	1.76E-14	2.32E-14	8.75E-14
6/4/18	9.96E-15	6.70E-15	5.03E-14	4.50E-14
6/7/18	6.64E-15	8.96E-15	4.46E-14	6.02E-14
6/11/18	1.30E-14	6.69E-15	6.48E-14	4.49E-14
6/14/18	1.25E-14	8.96E-15	5.68E-14	6.02E-14
6/18/18	1.49E-14	6.69E-15	3.57E-14	4.49E-14
6/21/18	1.32E-14	8.90E-15	6.45E-14	5.98E-14
6/25/18	1.06E-14	6.74E-15	2.99E-14	4.52E-14
6/28/18	9.93E-15	8.91E-15	1.86E-14	5.98E-14
7/2/18	2.50E-15	1.73E-14	7.53E-14	6.21E-14
7/5/18	7.56E-15	1.74E-14	3.06E-14	6.25E-14
7/9/18	1.24E-15	1.30E-14	5.33E-14	4.66E-14
7/16/18	4.52E-15	1.34E-14	3.22E-14	6.23E-14
7/19/18	-8.54E-16	1.74E-14	6.43E-14	4.67E-14
7/23/18	2.52E-15	1.30E-14	1.13E-13	6.23E-14
7/26/18	9.19E-15	1.74E-14	6.49E-14	4.67E-14
7/30/18	7.53E-15	1.30E-14	3.67E-14	6.59E-14
8/2/18	1.01E-14	1.69E-14	5.00E-14	4.93E-14
8/6/18	1.01E-14	1.26E-14	3.25E-14	6.57E-14
8/9/18	4.22E-15	1.68E-14	5.49E-14	4.93E-14
8/13/18	1.19E-14	1.26E-14	4.14E-15	6.56E-14
8/16/18	8.52E-16	1.68E-14	3.12E-14	4.93E-14
8/20/18	3.17E-15	1.26E-14	6.33E-14	6.57E-14
8/23/18	5.03E-15	1.68E-14	3.80E-14	4.92E-14
8/27/18	1.32E-14	1.26E-14	2.58E-14	6.58E-14
8/30/18	8.39E-15	1.68E-14	6.19E-14	3.37E-14
9/4/18	8.51E-15	5.40E-15	6.18E-14	5.66E-14
9/7/18	1.09E-14	9.06E-15	1.00E-13	5.61E-14
9/10/18	1.16E-14	8.97E-15	7.47E-14	5.40E-14
9/13/18	1.04E-14	8.64E-15	7.01E-14	4.26E-14
9/17/18	1.07E-14	6.81E-15	6.17E-14	5.80E-14

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
9/20/18	1.72E-14	9.28E-15	8.01E-14	4.26E-14
9/24/18	1.27E-14	6.83E-15	8.89E-14	5.55E-14
9/27/18	1.40E-14	8.88E-15	8.53E-14	4.28E-14
10/1/18	2.61E-15	1.08E-14	5.64E-14	5.75E-14
10/4/18	0.00E+00	1.45E-14	5.84E-14	4.26E-14
10/8/18	1.28E-15	1.07E-14	6.84E-14	5.71E-14
10/11/18	4.30E-15	1.44E-14	6.84E-14	5.71E-14
10/15/18	1.68E-15	9.81E-15	6.47E-14	2.21E-13
10/18/18	1.08E-14	1.31E-14	-3.54E-14	2.94E-13
10/22/18	5.05E-16	9.82E-15	2.01E-13	2.21E-13
10/25/18	1.00E-14	1.31E-14	2.22E-13	2.94E-13
10/29/18	7.57E-15	9.85E-15	2.42E-13	2.21E-13
11/1/18	6.90E-15	1.30E-14	1.85E-13	2.93E-13
11/5/18	-8.30E-17	9.92E-15	-5.11E-14	2.23E-13
11/8/18	2.18E-15	1.27E-14	4.19E-14	2.86E-13
11/13/18*	6.78E-15	8.17E-15	1.13E-13	1.84E-13
11/15/18	-4.70E-15	1.90E-14	3.33E-13	4.28E-13
11/19/18	2.87E-15	9.86E-15	2.41E-13	2.22E-13
11/21/18	1.55E-14	1.88E-14	9.07E-13	4.75E-13
11/26/18	1.92E-15	7.29E-15	8.33E-14	1.84E-13
11/29/18	6.71E-15	3.35E-14	-3.17E-14	7.39E-13
11/30/18	-3.54E-14	9.73E-14	-6.85E-13	2.15E-12
Sample Location – DOE-2				
4/12/18	1.01E-14	1.64E-14	3.40E-14	6.42E-14
4/16/18	1.21E-14	1.24E-14	4.77E-14	4.86E-14
4/19/18	-4.28E-15	1.66E-14	4.28E-15	6.48E-14
4/23/18	6.36E-15	1.24E-14	6.53E-14	4.87E-14
4/26/18	1.94E-14	1.65E-14	6.59E-14	6.45E-14
4/30/18	6.34E-15	1.24E-14	6.00E-14	4.86E-14
5/3/18	-8.43E-16	1.76E-14	3.83E-14	6.13E-14
5/7/18	8.70E-15	1.33E-14	5.70E-14	4.62E-14
5/10/18	1.41E-14	1.77E-14	5.33E-14	6.14E-14
5/14/18	-2.48E-15	1.32E-14	4.65E-14	4.57E-14
5/17/18	-4.93E-15	1.75E-14	-4.97E-15	6.10E-14
5/21/18	-3.74E-15	1.33E-14	6.39E-16	4.62E-14
5/24/18	4.11E-15	1.76E-14	4.57E-14	6.12E-14
5/29/18	3.95E-15	1.06E-14	1.50E-15	3.68E-14
5/31/18	-1.12E-14	2.65E-14	-8.71E-15	9.23E-14
6/4/18	-6.34E-16	1.21E-14	-9.94E-14	4.62E-14
6/7/18	9.96E-15	1.62E-14	3.42E-14	6.17E-14
6/11/18	9.89E-15	1.21E-14	5.35E-14	4.61E-14
6/14/18	1.08E-14	1.62E-14	8.14E-14	6.18E-14
6/18/18	4.31E-15	1.21E-14	3.71E-14	4.61E-14
6/21/18	6.59E-15	1.61E-14	2.27E-14	6.15E-14

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
6/25/18	8.09E-15	1.22E-14	2.45E-14	4.64E-14
6/28/18	2.48E-15	1.61E-14	2.26E-14	6.14E-14
7/2/18	5.00E-15	1.57E-14	4.48E-14	6.14E-14
7/5/18	1.66E-15	1.58E-14	5.87E-14	6.18E-14
7/9/18	1.32E-14	1.18E-14	7.11E-14	4.61E-14
7/16/18	7.08E-15	1.21E-14	7.19E-14	4.75E-14
7/19/18	-3.43E-15	1.61E-14	6.75E-14	6.29E-14
7/23/18	8.17E-15	1.18E-14	7.82E-14	4.62E-14
7/26/18	1.09E-14	1.58E-14	1.16E-13	6.17E-14
7/30/18	1.01E-14	1.18E-14	7.64E-14	4.63E-14
8/2/18	1.31E-14	1.23E-14	5.70E-14	6.34E-14
8/6/18	1.66E-14	9.23E-15	6.06E-14	4.75E-14
8/9/18	9.80E-15	1.23E-14	5.26E-14	6.32E-14
8/13/18	6.73E-15	9.22E-15	6.24E-14	4.74E-14
8/16/18	5.68E-15	1.23E-14	-3.41E-15	6.32E-14
8/20/18	7.96E-15	9.23E-15	4.65E-14	4.75E-14
8/23/18	1.39E-14	1.23E-14	7.81E-14	6.33E-14
8/27/18	1.22E-14	9.21E-15	7.19E-14	4.74E-14
8/30/18	1.30E-14	1.23E-14	5.86E-14	6.32E-14
9/4/18	5.80E-15	8.76E-15	5.42E-14	3.58E-14
9/7/18	5.69E-15	1.47E-14	8.26E-14	6.01E-14
9/10/18	2.41E-15	1.46E-14	9.92E-14	5.96E-14
9/13/18	6.22E-15	1.40E-14	7.64E-14	5.74E-14
9/17/18	0.00E+00	1.11E-14	6.22E-14	4.52E-14
9/20/18	-4.14E-15	1.51E-14	8.47E-14	6.16E-14
9/24/18	4.29E-15	1.11E-14	9.62E-14	4.53E-14
9/27/18	0.00E+00	1.44E-14	5.81E-14	5.90E-14
10/1/18	7.55E-15	1.18E-14	1.03E-13	4.42E-14
10/4/18	0.00E+00	1.59E-14	6.87E-14	5.94E-14
10/8/18	3.12E-15	1.18E-14	2.97E-14	4.40E-14
10/11/18	8.56E-16	1.58E-14	8.93E-14	5.90E-14
10/15/18	3.44E-15	9.81E-15	8.75E-14	2.21E-13
10/18/18	-2.46E-15	1.31E-14	-6.27E-14	2.94E-13
10/22/18	5.79E-15	9.82E-15	8.03E-14	2.21E-13
10/25/18	1.16E-14	1.31E-14	3.89E-13	2.94E-13
10/29/18	9.92E-15	9.84E-15	2.93E-13	2.21E-13
11/1/18	5.34E-15	1.30E-14	1.35E-13	2.93E-13
11/5/18	-8.30E-17	9.91E-15	-5.11E-14	2.23E-13
11/8/18	6.54E-16	1.27E-14	2.32E-14	2.86E-13
11/12/18*	7.66E-15	9.96E-15	2.67E-13	2.24E-13
11/15/18	-1.73E-15	1.35E-14	1.04E-13	3.04E-13
11/19/18	3.41E-15	9.75E-15	4.76E-14	2.19E-13
11/21/18	1.45E-15	1.89E-14	5.46E-13	4.75E-13
11/26/18	1.01E-15	7.29E-15	2.87E-14	1.84E-13

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
11/29/18	-1.71E-16	3.34E-14	5.96E-14	7.36E-13
11/30/18	-5.33E-15	9.44E-14	9.92E-14	2.08E-12
Sample Location – DOE-3				
4/12/18	-1.72E-15	2.06E-14	1.79E-14	6.55E-14
4/16/18	6.11E-16	1.56E-14	3.48E-14	4.95E-14
4/19/18	0.00E+00	2.08E-14	-9.44E-15	6.61E-14
4/23/18	7.66E-15	1.57E-14	3.56E-14	4.97E-14
4/26/18	-8.62E-16	2.08E-14	2.91E-14	6.58E-14
4/30/18	1.91E-15	1.56E-14	2.78E-14	4.96E-14
5/3/18	9.88E-15	1.66E-14	3.54E-14	5.92E-14
5/7/18	1.62E-14	1.25E-14	4.79E-14	4.47E-14
5/10/18	1.90E-14	1.66E-14	6.18E-14	5.92E-14
5/14/18	2.49E-15	1.24E-14	2.85E-14	4.45E-14
5/17/18	5.04E-15	1.69E-14	5.88E-14	6.03E-14
5/21/18	2.49E-15	1.25E-14	4.84E-14	4.46E-14
5/24/18	9.87E-15	1.65E-14	2.96E-14	5.92E-14
5/29/18	4.95E-15	9.94E-15	4.50E-14	3.55E-14
5/31/18	2.53E-15	2.50E-14	4.47E-14	8.93E-14
6/4/18	1.37E-14	8.54E-15	5.45E-14	4.32E-14
6/7/18	9.63E-15	1.14E-14	2.95E-14	5.78E-14
6/11/18	1.50E-14	8.53E-15	5.80E-14	4.32E-14
6/14/18	1.31E-14	1.14E-14	5.36E-14	5.78E-14
6/18/18	6.53E-15	8.53E-15	3.35E-14	4.32E-14
6/21/18	9.57E-15	1.14E-14	5.89E-14	5.75E-14
6/25/18	6.57E-15	8.59E-15	4.93E-14	4.35E-14
6/28/18	1.74E-14	1.14E-14	5.02E-14	5.75E-14
7/2/18	7.48E-15	1.56E-14	2.31E-14	5.90E-14
7/5/18	3.36E-15	1.57E-14	4.91E-14	5.94E-14
7/9/18	1.12E-14	1.17E-14	7.38E-14	4.43E-14
7/16/18	6.42E-15	1.21E-14	3.70E-14	4.55E-14
7/19/18	6.65E-15	1.57E-14	6.88E-14	5.91E-14
7/23/18	3.11E-15	1.18E-14	5.35E-14	4.44E-14
7/26/18	1.65E-15	1.57E-14	9.62E-14	5.92E-14
7/30/18	6.87E-15	1.18E-14	7.46E-14	4.44E-14
8/2/18	1.72E-15	1.95E-14	6.08E-14	6.00E-14
8/6/18	1.95E-15	1.46E-14	6.99E-14	4.49E-14
8/9/18	1.71E-15	1.94E-14	7.98E-14	5.99E-14
8/13/18	2.61E-15	1.46E-14	6.61E-14	4.49E-14
8/16/18	-4.30E-15	1.94E-14	7.72E-14	5.98E-14
8/20/18	-1.95E-15	1.46E-14	6.05E-14	4.49E-14
8/23/18	4.31E-15	1.94E-14	7.73E-14	5.99E-14
8/27/18	3.89E-15	1.45E-14	7.47E-14	4.48E-14
8/30/18	-9.50E-15	1.94E-14	5.65E-14	5.99E-14
9/4/18	5.89E-15	8.19E-15	6.00E-14	3.75E-14
9/7/18	9.04E-15	1.37E-14	4.71E-14	6.30E-14

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
9/10/18	9.79E-15	1.36E-14	8.01E-14	6.24E-14
9/13/18	6.27E-15	1.31E-14	6.38E-14	6.01E-14
9/17/18	3.72E-15	1.03E-14	5.77E-14	4.74E-14
9/20/18	6.74E-15	1.41E-14	5.24E-14	6.45E-14
9/24/18	4.95E-15	1.03E-14	5.84E-14	4.74E-14
9/27/18	1.05E-14	1.35E-14	5.26E-14	6.17E-14
10/1/18	5.99E-15	1.00E-14	9.78E-14	4.39E-14
10/4/18	1.25E-14	1.34E-14	6.97E-14	5.89E-14
10/8/18	0.00E+00	9.95E-15	6.87E-14	4.37E-14
10/11/18	8.84E-15	1.33E-14	8.23E-14	5.85E-14
10/15/18	2.26E-15	9.81E-15	1.45E-13	2.21E-13
10/18/18	5.37E-15	1.31E-14	1.47E-13	2.94E-13
10/22/18	8.14E-15	9.82E-15	1.10E-13	2.21E-13
10/25/18	3.80E-15	1.31E-14	8.30E-14	2.94E-13
10/29/18	6.39E-15	9.85E-15	2.14E-13	2.21E-13
11/1/18	-1.67E-15	1.30E-14	-2.57E-14	2.93E-13
11/5/18	-1.86E-15	9.92E-15	-4.38E-14	2.23E-13
11/8/18	4.46E-15	1.27E-14	1.52E-13	2.86E-13
11/13/18*	1.40E-15	8.17E-15	1.14E-13	1.84E-13
11/15/18	-1.58E-16	1.88E-14	1.75E-13	4.23E-13
11/19/18	4.66E-15	9.92E-15	-4.98E-15	2.23E-13
11/21/18	6.12E-15	1.88E-14	-4.54E-14	4.75E-13
11/26/18	3.27E-15	7.29E-15	1.19E-13	1.84E-13
11/29/18	-6.82E-15	1.64E-14	-7.41E-14	3.62E-13
Sample Location – DOE-4				
4/12/18	2.05E-14	1.54E-14	9.25E-14	5.63E-14
4/16/18	1.05E-14	1.17E-14	6.77E-14	4.27E-14
4/19/18	8.45E-16	1.56E-14	2.82E-14	5.69E-14
4/23/18	2.50E-15	1.17E-14	4.78E-14	4.27E-14
4/26/18	1.48E-14	1.55E-14	1.05E-13	5.66E-14
4/30/18	7.46E-15	1.17E-14	7.74E-14	4.27E-14
5/3/18	8.38E-15	1.57E-14	7.39E-15	6.25E-14
5/7/18	1.45E-14	1.19E-14	8.61E-14	4.72E-14
5/10/18	1.17E-14	1.57E-14	6.81E-14	6.25E-14
5/14/18	6.34E-16	1.17E-14	1.89E-14	4.65E-14
5/17/18	1.66E-15	1.58E-14	2.06E-14	6.27E-14
5/21/18	5.03E-15	1.19E-14	1.30E-14	4.71E-14
5/24/18	1.25E-14	1.57E-14	3.94E-14	6.24E-14
5/29/18	3.52E-15	9.45E-15	6.42E-15	3.75E-14
5/31/18	-1.29E-15	2.37E-14	-1.86E-14	9.43E-14
6/4/18	1.33E-14	1.01E-14	1.85E-14	4.44E-14
6/7/18	9.37E-15	1.35E-14	-8.17E-16	5.93E-14
6/11/18	1.14E-14	1.00E-14	5.62E-14	4.43E-14
6/14/18	1.87E-14	1.35E-14	5.05E-14	5.93E-14

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
6/18/18	3.80E-15	1.00E-14	3.83E-14	4.43E-14
6/21/18	5.92E-15	1.34E-14	5.50E-14	5.90E-14
6/25/18	1.09E-14	1.01E-14	2.47E-14	4.46E-14
6/28/18	9.32E-15	1.34E-14	2.55E-14	5.90E-14
7/2/18	1.44E-14	1.02E-14	1.58E-14	6.06E-14
7/5/18	1.36E-14	1.03E-14	2.54E-14	6.10E-14
7/9/18	1.14E-14	7.65E-15	4.21E-14	4.55E-14
7/16/18	1.37E-14	7.86E-15	4.51E-14	4.68E-14
7/19/18	1.35E-14	1.02E-14	5.78E-14	6.07E-14
7/23/18	8.91E-15	7.67E-15	4.34E-14	4.56E-14
7/26/18	1.19E-14	1.02E-14	6.19E-14	6.09E-14
7/30/18	1.91E-14	7.66E-15	5.29E-14	4.56E-14
8/2/18	1.12E-14	1.62E-14	7.22E-14	6.05E-14
8/6/18	7.06E-15	1.21E-14	6.75E-14	4.53E-14
8/9/18	1.03E-14	1.61E-14	6.08E-14	6.04E-14
8/13/18	2.58E-15	1.21E-14	7.11E-14	4.53E-14
8/16/18	8.73E-16	1.61E-14	1.94E-14	6.03E-14
8/20/18	2.59E-15	1.21E-14	6.08E-14	4.53E-14
8/23/18	6.02E-15	1.61E-14	4.45E-14	6.04E-14
8/27/18	6.43E-15	1.21E-14	3.34E-14	4.52E-14
8/30/18	-1.70E-15	1.61E-14	1.78E-14	6.03E-14
9/4/18	4.26E-15	8.92E-15	2.40E-14	3.85E-14
9/7/18	2.38E-15	1.50E-14	1.88E-14	6.46E-14
9/10/18	3.16E-15	1.48E-14	7.97E-14	6.41E-14
9/13/18	1.21E-14	1.43E-14	8.33E-14	6.17E-14
9/17/18	5.37E-15	1.12E-14	5.92E-14	4.86E-14
9/20/18	4.88E-15	1.53E-14	7.98E-14	6.62E-14
9/24/18	3.59E-15	1.13E-14	6.13E-14	4.87E-14
9/27/18	3.13E-15	1.47E-14	5.54E-14	6.34E-14
10/1/18	2.00E-15	1.34E-14	7.45E-14	4.58E-14
10/4/18	1.82E-15	1.80E-14	6.07E-14	6.15E-14
10/8/18	6.75E-16	1.33E-14	1.09E-14	4.55E-14
10/11/18	9.05E-16	1.78E-14	4.72E-14	6.11E-14
10/15/18	2.85E-15	9.81E-15	2.15E-14	2.21E-13
10/18/18	3.81E-15	1.31E-14	1.41E-13	2.94E-13
10/22/18	8.13E-15	9.82E-15	7.56E-14	2.21E-13
10/25/18	1.45E-15	1.31E-14	2.61E-13	2.94E-13
10/29/18	5.21E-15	9.85E-15	1.52E-13	2.21E-13
11/1/18	-1.67E-15	1.30E-14	-2.57E-14	2.93E-13
11/5/18	2.29E-15	9.92E-15	1.37E-13	2.23E-13
11/8/18	4.46E-15	1.27E-14	6.68E-14	2.86E-13
**11/12/18*	9.46E-15	9.98E-15	1.66E-13	2.24E-13

*Values are from the samples collected during the fire.

**The fire took this station off line.

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APPENDIX B

Gross alpha and Beta Results from Samplers at RMHF and at Area 20

Sample Collection Date	Gross Alpha (uCi/ml)	Gross Alpha MDA (uCi/ml)	Gross Beta (uCi/ml)	Gross Beta MDC (uCi/ml)
Sample Location – Area 20				
10/3/18	2.60E-15	1.22E-14	1.47E-13	2.86E-13
10/10/218	6.75E-15	1.25E-14	4.89E-14	2.87E-13
10/17/18	-4.23E-15	1.38E-14	-1.15E-13	3.00E-13
10/24/18	1.02E-15	1.26E-14	2.49E-13	2.83E-13
10/30/18	2.55E-15	1.04E-14	2.55E-13	2.49E-13
11/7/18	6.58E-15	7.74E-14	3.26E-12	1.76E-12
11/9/18*	0.00	7.74E-14	2.09E-13	1.76E-12
12/10/18	9.15E-15	1.21E-13	-1.26E-12	2.57E-12
12/17/18	-8.82E-16	2.56E-14	-1.22E-13	5.45E-13
12/24/18	1.54E-15	2.03E-14	4.78E-14	4.32E-13
12/31/18	-2.98E-14	1.17E-13	-1.06E-12	2.49E-12
Sample Location – RMHF				
10/3/18	1.56E-15	1.22E-14	8.61E-14	2.86E-13
10/10/218	5.19E-16	1.25E-14	-1.04E-13	2.87E-13
10/17/18	1.06E-15	1.38E-14	1.08E-15	3.00E-13
10/24/18	-1.54E-15	1.26E-14	2.55E-13	2.83E-13
10/30/18	-1.46E-15	8.84E-15	1.19E-13	2.12E-13
11/7/18	-1.48E-14	6.94E-14	2.37E-12	1.58E-12
11/9/18*	2.95E-15	6.94E-14	1.21E-13	1.58E-12
12/17/18	4.64E-16	2.25E-14	-1.07E-13	4.78E-13
12/24/18	5.75E-15	1.94E-14	-2.46E-13	4.13E-13
12/31/18	2.40E-15	1.16E-13	-1.31E-12	2.47E-12

*Sample collected during fire

APPENDIX C

Laboratory Analytical Results from Perimeter Air Samplers

First Composite Samples April 9 through July 9, 2018

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Location DOE-1 – Air volume/sample = 9.63E8 ml				
Americium-241	0.276	0.442	U	2.87E-16
Plutonium-238	0.0598	0.0966	U	6.21E-17
Plutonium-239/240	-0.018	0.0917	U	-1.87E-17
Polonium-210	5.19	3.32		5.39E-15
Thorium-228	0.681	0.308		7.07E-16
Thorium-230	1.13	0.373		1.17E-15
Thorium-232	0.752	0.183		7.81E-16
Uranium-233/234	0.886	0.473		9.20E-16
Uranium-235/236	0.105	0.315	U	1.09E-16
Uranium-238	0.674	0.253		7.00E-16
Beryllium-7	1.06	0.238		1.10E-15
Cesium-137	-0.0345	0.173	U	-3.58E-17
Cobalt-60	-0.0405	0.153	U	-4.21E-17
Manganese-54	-0.0666	0.152	U	-6.92E-17
Potassium-40	0.541	1.3	U	5.62E-16
Strontium-90	0.0947	1.12	U	9.83E-17
Plutonium-241	1.32	3.96	U	1.37E-15
Location DOE-2 – Air volume/sample = 9.74E8 ml				
Americium-241	0.425	0.433	U	4.36E-16
Plutonium-238	0.0315	0.129	U	3.23E-17
Plutonium-239/240	0.0316	0.0605	U	3.24E-17
Polonium-210	10.6	2.27		1.09E-14
Thorium-228	0.518	0.327		5.32E-16
Thorium-230	0.735	0.356		7.55E-16
Thorium-232	0.47	0.181		4.83E-16
Uranium-233/234	0.614	0.524		6.30E-16
Uranium-235/236	0	0.316	U	0.00E+00
Uranium-238	0.655	0.409		6.72E-16
Beryllium-7	1.18	1.04		1.21E-15
Cesium-137	-0.0532	0.271	U	-5.46E-17
Cobalt-60	-0.0197	0.152	U	-2.02E-17
Manganese-54	0.00609	0.124	U	6.25E-18
Potassium-40	1.45	1.67	U	1.49E-15
Strontium-90	0.133	1.41	U	1.37E-16
Plutonium-241	1.78	3.98	U	1.83E-15
Location DOE-3 – Air volume/sample = 1.01E9 ml				
Americium-241	0.0593	0.383	U	5.87E-17
Plutonium-238	0.065	0.105	U	6.44E-17
Plutonium-239/240	-0.0456	0.12	U	-4.51E-17
Polonium-210	2.93	5.4	U	2.90E-15
Thorium-228	0.246	0.323	U	2.44E-16
Thorium-230	0.897	0.383		8.88E-16
Thorium-232	0.479	0.19		4.74E-16

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Uranium-233/234	0.747	0.499		7.40E-16
Uranium-235/236	-0.0251	0.486	U	-2.49E-17
Uranium-238	0.584	0.498		5.78E-16
Beryllium-7	1.55	0.31		1.53E-15
Cesium-137	0.032	0.106	U	3.17E-17
Cobalt-60	0.00753	0.11	U	7.46E-18
Manganese-54	-0.0281	0.113	U	-2.78E-17
Potassium-40	0.547	1.22	U	5.42E-16
Strontium-90	-0.546	1.17	U	-5.41E-16
Plutonium-241	2.15	4.21	U	2.13E-15
Location DOE-4 – Air volume/sample = 9.74E8 ml				
Americium-241	0.37	0.46	U	3.80E-16
Plutonium-238	0.0129	0.124	U	1.32E-17
Plutonium-239/240	0.0259	0.0496	U	2.66E-17
Polonium-210	5.46	1.36	U	5.61E-15
Thorium-228	0.565	0.348		5.80E-16
Thorium-230	0.876	0.398		8.99E-16
Thorium-232	0.514	0.21		5.28E-16
Uranium-233/234	0.929	0.511		9.54E-16
Uranium-235/236	0	0.308	U	0.00E+00
Uranium-238	1.3	0.399		1.33E-15
Beryllium-7	0.288	1.09	U	2.96E-16
Cesium-137	-0.0891	0.193	U	-9.15E-17
Cobalt-60	-0.0263	0.183	U	-2.70E-17
Manganese-54	-0.00925	0.127	U	-9.50E-18
Potassium-40	-0.0099	1.65	U	-1.02E-17
Strontium-90	0.168	1.41	U	1.72E-16
Plutonium-241	1.88	4.18	U	1.93E-15

Second Composite Samples July 16 through October 10, 2018¹

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Location DOE-1 – Air volume/sample = 9.83E8 ml				
Actinium-228	15.4	36.8	U	1.57E-14
Beryllium-7	136	64.5		1.38E-13
Cesium-137	2.82	11.7	U	2.87E-15
Cobalt-60	1.24	13	U	1.26E-15
Manganese-54	1.84	10	U	1.87E-15
Potassium-40	-15.4	212	U	-1.57E-14
Radium-226 ²	287	120		2.92E-13
Radium-228 ²	15.4	36.8	U	1.57E-14
Polonium-210	8.48	0.157		8.63E-15

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Thorium-228	0.341	0.299		3.47E-16
Thorium-230	0.756	0.346		7.69E-16
Thorium-232	0.457	0.148		4.65E-16
Uranium-233/234	0.591	0.197		6.01E-16
Uranium-235/236	0.0245	0.158	U	2.49E-17
Uranium-238	0.655	0.175		6.66E-16
Plutonium-238	0.141	0.226	U	1.43E-16
Plutonium-239/240	-0.0512	0.21	U	-5.21E-17
Strontium-90	-0.0908	1.14	U	-9.24E-17
Americium-241	-0.118	0.467	U	-1.20E-16
Radium-228	1.57	3.17	U	1.60E-15
Plutonium-241	-0.315	5.59	U	-3.20E-16
Radium-226	0.771	1.17	U	7.84E-16
Location DOE-2 – Air volume/sample = 9.82E8 ml				
Actinium-228	7.1	46.1	U	7.23E-15
Beryllium-7	101	65.6		1.03E-13
Cesium-137	-0.328	17.6	U	-3.34E-16
Cobalt-60	-0.0474	15.5	U	-4.83E-17
Manganese-54	0.854	10	U	8.70E-16
Potassium-40	142	173	U	1.45E-13
Radium-226 ²	-86.2	300	U	-8.78E-14
Radium-228 ²	7.1	46.1	U	7.23E-15
Polonium-210	7.84	0.178		7.98E-15
Thorium-228	0.656	0.333		6.68E-16
Thorium-230	0.816	0.366		8.31E-16
Thorium-232	0.606	0.159		6.17E-16
Uranium-233/234	0.935	0.197		9.52E-16
Uranium-235/236	0.069	0.103	U	7.03E-17
Uranium-238	0.836	0.217		8.51E-16
Plutonium-238	0.0257	0.21	U	2.62E-17
Plutonium-239/240	0.0963	0.124	U	9.81E-17
Strontium-90	0.196	1.04	U	2.00E-16
Radium-228	-0.0962	2.75	U	-9.80E-17
Americium-241	0.0806	0.195	U	8.21E-17
Plutonium-241	-1.12	5.04	U	-1.14E-15
Radium-226	0.795	1.12	U	8.10E-16
Location DOE-3 – Air volume/sample = 9.83E8 ml				
Actinium-228	-27.4	54.1	U	-2.79E-14
Beryllium-7	36.6	123	U	3.72E-14
Cesium-137	-0.838	19.2	U	-8.52E-16
Cobalt-60	-3.26	18.1	U	-3.32E-15
Manganese-54	-5.73	14	U	-5.83E-15
Potassium-40	-1.43	165	U	-1.45E-15
Radium-226 ²	0	227	U	0.00E+00
Radium-228 ²	-27.4	54.1	U	-2.79E-14

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Polonium-210	8.89	0.185		9.04E-15
Thorium-228	0.481	0.378		4.89E-16
Thorium-230	0.575	0.39		5.85E-16
Thorium-232	0.327	0.18		3.33E-16
Uranium-233/234	0.831	0.24		8.45E-16
Uranium-235/236	0.00948	0.235	U	9.64E-18
Uranium-238	0.844	0.147		8.59E-16
Plutonium-238	0.0818	0.277	U	8.32E-17
Plutonium-239/240	0.0252	0.0756	U	2.56E-17
Americium-241	0.0657	0.203	U	6.68E-17
Strontium-90	0.139	1.14	U	1.41E-16
Radium-228 ²	0.359	2.96	U	3.65E-16
Plutonium-241	-1.92	5.27	U	-1.95E-15
Radium-226	0.882	1.07	U	8.97E-16
Location DOE-4 – Air volume/sample = 9.83E8 ml				
Actinium-228	12.1	30.3	U	1.23E-14
Beryllium-7	179	47.6		1.82E-13
Cesium-137	-2.5	16.4	U	-2.54E-15
Cobalt-60	1.11	15.2	U	1.13E-15
Manganese-54	-4.62	14	U	-4.70E-15
Potassium-40	59.4	165	U	6.04E-14
Radium-226 ²	0	238	U	0.00E+00
Radium-228 ²	12.1	30.3	U	1.23E-14
Polonium-210	9.04	0.248		9.20E-15
Thorium-228	0.638	0.33		6.49E-16
Thorium-230	0.524	0.371		5.33E-16
Thorium-232	0.405	0.195		4.12E-16
Uranium-233/234	0.697	0.131		7.09E-16
Uranium-235/236	0.0842	0.189	U	8.57E-17
Uranium-238	0.358	0.167		3.64E-16
Plutonium-238	0.0683	0.212	U	6.95E-17
Plutonium-239/240	0.0373	0.139	U	3.79E-17
Strontium-90	0.831	1.2	U	8.45E-16
Americium-241	0.19	0.209	U	1.93E-16
Radium-228	0.337	2.81	U	3.43E-16
Plutonium-241	-2.27	5.75	U	-2.31E-15
Radium-226	0.633	1.07	U	6.44E-16

¹Actinium-228 analysis was added the second quarter. Radium-226 and radium-228 analyses by bamma spectroscopy and by chemical extraction and alpha/beta analysis was added this quarter.

²Results determined by gamma spectroscopy have a higher minimum detectable concentration than when determined by radium extraction and alpha or beta analysis. Radium-226 analyses by gamma spectroscopy have an interference with uranium-235 that is hard to resolve. All results for radium-226 and radium-228 are less than the airborne effluent limits shown in 10CFR20 Appendix B, Table 2 even when the higher MDC values are used.

Samples Collected during Fire from Perimeter Samplers

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Location DOE-1 – Air volume/sample = 5.19E7 ml				
Actinium-228	28	21.7		5.39E-13
Beryllium-7	-1.36	112	U	-2.62E-14
Cesium-137	-2.12	18.8	U	-4.08E-14
Cobalt-60	0.64	15.9	U	1.23E-14
Manganese-54	4.01	12	U	7.73E-14
Potassium-40	18.6	197	U	3.58E-13
Radium-226 ¹	6.88	219	U	1.33E-13
Radium-228 ¹	28	21.7		5.39E-13
Uranium-233/234	0.187	0.216	U	3.60E-15
Uranium-235/236	0.0269	0.173	U	5.18E-16
Uranium-238	0.0934	0.178	U	1.80E-15
Americium-241	0	0.155	U	0.00E+00
Plutonium-238	0.0411	0.243	U	7.92E-16
Plutonium-239/240	0.0935	0.102	U	1.80E-15
Polonium-210	0.398	0.422	U	7.67E-15
Strontium-90	0.0259	1.17	U	4.99E-16
Radium-228 ²	3.37	4.38	U	6.49E-14
Plutonium-241	0.855	6.16	U	1.65E-14
Thorium-228	-0.0457	0.788	U	-8.81E-16
Thorium-230	0.516	0.796	U	9.94E-15
Thorium-232	0.0506	0.366	U	9.75E-16
Radium-226 ²	0.574	0.706	U	1.11E-14
Location DOE-2 – Air volume/sample =4.26E7 ml				
Actinium-228	11.6	26.4	U	2.72E-13
Beryllium-7	29.9	109	U	7.02E-13
Cesium-137	-10.3	20.8	U	-2.42E-13
Cobalt-60	-2.23	14.6	U	-5.23E-14
Manganese-54	-7.21	15.2	U	-1.69E-13
Potassium-40	-103	218	U	-2.42E-12
Radium-226 ¹	249	136		5.85E-12
Radium-228 ¹	11.6	26.4	U	2.72E-13
Americium-241	-0.0335	0.258	U	-7.86E-16
Plutonium-238	0.0821	0.283	U	1.93E-15
Plutonium-239/240	0.116	0.169	U	2.72E-15
Uranium-233/234	0.0837	0.147	U	1.96E-15
Uranium-235/236	-0.00947	0.183	U	-2.22E-16
Uranium-238	-0.0076	0.147	U	-1.78E-16
Polonium-210	0.217	0.333	U	5.09E-15

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Strontium-90	0.418	1.14	U	9.81E-15
Radium-228	0.84	4.29	U	1.97E-14
Plutonium-241	-0.723	7.68	U	-1.70E-14
Thorium-228	-0.0448	0.915	U	-1.05E-15
Thorium-230	1.12	0.804		2.63E-14
Thorium-232	0.166	0.522	U	3.90E-15
Radium-226 ²	0.24	0.924	U	5.63E-15
Location DOE-3 – 5.19E7 ml				
Actinium-228	0.711	47.4	U	1.37E-14
Beryllium-7	-17	146	U	-3.28E-13
Cesium-137	-10.9	22.2	U	-2.10E-13
Cobalt-60	-15.4	27	U	-2.97E-13
Manganese-54	0.471	12	U	9.08E-15
Potassium-40	0	146	U	0.00E+00
Radium-226 ¹	-56	255	U	-1.08E-12
Radium-228 ¹	0.711	47.4	U	1.37E-14
Americium-241	0.104	0.213	U	2.00E-15
Plutonium-238	0.0261	0.293	U	5.03E-16
Plutonium-239/240	0.15	0.126		2.89E-15
Uranium-233/234	0.0559	0.155	U	1.08E-15
Uranium-235/236	0.0398	0.119	U	7.67E-16
Uranium-238	0.215	0.154		4.14E-15
Polonium-210	0.131	0.422	U	2.52E-15
Strontium-90	1.78	1.19		3.43E-14
Radium-228	2.54	4.39	U	4.89E-14
Plutonium-241	0.73	5.93	U	1.41E-14
Thorium-228	0.0434	0.684	U	8.36E-16
Thorium-230	0.976	0.796		1.88E-14
Thorium-232	0.29	0.433	U	5.59E-15
Radium-226	0.554	0.746	U	1.07E-14
Location DOE-4 – Air volume/sample = 4.25E7 ml				
Actinium-228	23.1	15.3		5.44E-13
Beryllium-7	21.2	79.4	U	4.99E-13
Cesium-137	9.09	11.6	U	2.14E-13
Cobalt-60	1.13	17.7	U	2.66E-14
Manganese-54	-8.01	16.3	U	-1.88E-13
Potassium-40	-82.4	193	U	-1.94E-12
Radium-226 ¹	25.9	183	U	6.09E-13
Radium-228 ¹	23.1	15.3		5.44E-13
Americium-241	0.0931	0.239	U	2.19E-15
Plutonium-238	0.0598	0.269	U	1.41E-15

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Plutonium-239/240	0.0532	0.0798	U	1.25E-15
Uranium-233/234	0.0434	0.162	U	1.02E-15
Uranium-235/236	-0.009	0.174	U	-2.12E-16
Uranium-238	0.0144	0.162	U	3.39E-16
Polonium-210	0.367	0.371	U	8.64E-15
Strontium-90	0.0195	1.08	U	4.59E-16
Radium-228	0.919	3.8	U	2.16E-14
Plutonium-241	-0.484	6.13	U	-1.14E-14
Thorium-228	-0.44	0.93	U	-1.04E-14
Thorium-230	0.221	0.731	U	5.20E-15
Thorium-232	0.135	0.522	U	3.18E-15
Radium-226	0.304	0.738	U	7.15E-15

¹Results determined by gamma spectroscopy have a higher minimum detectable concentration than when determined by radium extraction and alpha or beta analysis. Radium-226 analyses by gamma spectroscopy have an interference with uranium-235 that is hard to resolve. All results for radium-226 and radium-228 are less than the airborne effluent limits shown in 10CFR20 Appendix B, Table 2 even when the higher MDC values are used.

APPENDIX D

Samples Collected during Fire from ETEC Site Samplers

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Location				
RMHF – Air volume/sample = 7.96E6 ml				
Actinium-228	7.22	33.4	U	9.07E-13
Beryllium-7	-33	109	U	-4.15E-12
Cesium-137	0	14.4	U	0.00E+00
Cobalt-60	1.25	10.9	U	1.57E-13
Manganese-54	-4.93	13.3	U	-6.19E-13
Potassium-40	-43.2	157	U	-5.43E-12
Radium-226	-44.1	216	U	-5.54E-12
Radium-228	7.22	33.4	U	9.07E-13
Polonium-210	0.247	0.169		3.10E-14
Plutonium-238	0	0.284	U	0.00E+00
Plutonium- 239/240	0.019	0.122	U	2.39E-15
Thorium-228	0.149	0.338	U	1.87E-14
Thorium-230	-0.0361	0.357	U	-4.54E-15
Thorium-232	0.011	0.143	U	1.38E-15
Uranium- 233/234	0.14	0.187	U	1.76E-14
Uranium- 235/236	0.0174	0.195	U	2.19E-15
Uranium-238	0.0349	0.173	U	4.38E-15
Americium-241	-0.0374	0.246	U	-4.70E-15
Plutonium-241	0.645	5.5	U	8.10E-14
Strontium-90	0.663	1.03	U	8.33E-14
Location				
Area 20– Air volume/sample = 8.87E6 ml				
Actinium-228	13.3	30.2	U	1.50E-12
Beryllium-7	-39.7	141	U	-4.48E-12
Cesium-137	4.64	17.6	U	5.23E-13
Cobalt-60	0	7	U	0.00E+00
Manganese-54	-1.64	14.1	U	-1.85E-13
Potassium-40	-111	263	U	-1.25E-11
Radium-226	-105	251	U	-1.18E-11
Radium-228	13.3	30.2	U	1.50E-12
Polonium-210	0.0505	0.186	U	5.69E-15
Plutonium-238	0.238	0.261	U	2.68E-14
Plutonium- 239/240	0.0774	0.0774		8.73E-15
Thorium-228	0.134	0.295	U	1.51E-14
Thorium-230	0.153	0.368	U	1.72E-14
Thorium-232	0.0892	0.168	U	1.01E-14

Radionuclide	Result (pCi/sample)	Minimum Detectable Concentration (pCi/sample)	Data Qualifier	Airborne Concentration (uCi/ml)
Uranium- 233/234	0.123	0.0923		1.39E-14
Uranium- 235/236	0.0766	0.115	U	8.64E-14
Uranium-238	0.115	0.149	U	1.30E-15
Americium-241	0.0902	0.255	U	1.02E-14
Plutonium-241	1.2	5.71	U	1.35E-13

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APPENDIX E

Laboratory Data for Perimeter Samplers during Fire

#sys_samp	lab_anl_m	analysis_date	subsample	subsample	analyst_na	instrumen	comme	chemical_name	result_value	result_errr	result_tpy	lab_qualifi	method_detection_limit	reporting_	quantitatic	result_unit
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Actinium-228	28		TRG			21.7			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Beryllium-7	-1.36		TRG	U		112			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Cesium-137	-2.12		TRG	U		18.8	20	20	pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Cobalt-60	0.64		TRG	U		15.9			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Manganese-54	4.01		TRG	U		12			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Potassium-40	18.6		TRG	U		197			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Radium-226	6.88		TRG	U		219			pci/sample
DOE-1_11:GA-01-R	11/28/2018	6:56	1	sample	KLS	GAMMAVISION	Radium-228	28		TRG			21.7			pci/sample
DOE-1_11:A-01-R	12/5/2018	22:41	0.3	sample	ALS	ALPHAVISION	Uranium-232	18.9		SUR			0	0	0	pci/sample
DOE-1_11:A-01-R	12/5/2018	22:41	0.3	sample	ALS	ALPHAVISION	Uranium-233/2:	0.187		TRG	U		0.216	1	1	pci/sample
DOE-1_11:A-01-R	12/5/2018	22:41	0.3	sample	ALS	ALPHAVISION	Uranium-235/2:	0.0269		TRG	U		0.173	1	1	pci/sample
DOE-1_11:A-01-R	12/5/2018	22:41	0.3	sample	ALS	ALPHAVISION	Uranium-238	0.0934		TRG	U		0.178	1	1	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:27	0.3	sample	ALS	ALPHAVISION	Americium-241	0		TRG	U		0.155	1	1	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:27	0.3	sample	ALS	ALPHAVISION	Americium-243	23.9		SUR	S		0	0	0	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:37	0.3	sample	ALS	ALPHAVISION	Plutonium-238	0.0411		TRG	U		0.243	1	1	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:37	0.3	sample	ALS	ALPHAVISION	Plutonium-239/	0.0935		TRG	U		0.102	1	1	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:37	0.3	sample	ALS	ALPHAVISION	Pu-242 (T)	19.3		SUR			0	0	0	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:44	0.2	sample	ALS	ALPHAVISION	Polonium-210	0.398		TRG	U		0.422	0.5	0.5	pci/sample
DOE-1_11:A-01-R	12/6/2018	22:44	0.2	sample	ALS	ALPHAVISION	Polonium-209	8.88		SUR			0	0	0	pci/sample
DOE-1_11:SR-03-RC	12/10/2018	12:18	0.25	sample	CDR	GFPCBLUE	Strontium-90	0.0259		TRG	U		1.17	3	3	pci/sample
DOE-1_11:SR-03-RC	12/10/2018	12:18	0.25	sample	CDR	GFPCBLUE	Sr Carrier	0.0916		SUR			0	0	0	g
DOE-1_11:SR-03-RC	12/10/2018	12:18	0.25	sample	CDR	GFPCBLUE	Y Carrier	0.0245		SUR			0	0	0	g
DOE-1_11:E904	12/11/2018	9:22	0.1	sample	CDR	GFPCPROTEAN	Radium-228	3.37		TRG	U		4.38	1	1	pci/sample
DOE-1_11:E904	12/11/2018	9:22	0.1	sample	CDR	GFPCPROTEAN	Ba Carrier	0.037		SUR			0	0	0	g
DOE-1_11:E904	12/11/2018	9:22	0.1	sample	CDR	GFPCPROTEAN	Y Carrier	0.0224		SUR			0	0	0	g
DOE-1_11:ST-RC-024	12/11/2018	21:15	0.3	sample	RTM	LSCTEAL	Plutonium-241	0.855		TRG	U		6.16	5	5	pci/sample
DOE-1_11:ST-RC-024	12/11/2018	21:15	0.3	sample	RTM	LSCTEAL	Pu-242 (T)			SUR			0	0	0	pci/sample
DOE-1_11:A-01-R	12/12/2018	21:43	0.1	sample	ALS	ALPHAVISION	Thorium-228	-0.0457		TRG	U		0.788	1	1	pci/sample
DOE-1_11:A-01-R	12/12/2018	21:43	0.1	sample	ALS	ALPHAVISION	Thorium-230	0.516		TRG	U		0.796	1	1	pci/sample
DOE-1_11:A-01-R	12/12/2018	21:43	0.1	sample	ALS	ALPHAVISION	Thorium-232	0.0506		TRG	U		0.366	1	1	pci/sample
DOE-1_11:A-01-R	12/12/2018	21:43	0.1	sample	ALS	ALPHAVISION	Thorium-229	61.7		SUR			0	0	0	pci/sample
DOE-1_11:E903.0	12/24/2018	11:38	0.1	sample	CDR	GFPCORANGE	Radium-226	0.574		TRG	U		0.706	1	1	pci/sample
DOE-1_11:E903.0	12/24/2018	11:38	0.1	sample	CDR	GFPCORANGE	Ba Carrier	0.037		SUR			0	0	0	g
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Actinium-228	11.04		TRG	U		26.4			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Americium-241	3.04		TRG	U		10.3			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Beryllium-7	21.16		TRG	U		79.9			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Cesium-137	-2.285		TRG	U		16.1	20	20	pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Cobalt-60	-8.765		TRG	U		20.2			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Manganese-54	-2.959		TRG	U		14			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Potassium-40	1.889		TRG	U		129			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Radium-226	31.13		TRG	U		207			pci/sample
DOE-1_11:GA-01-R	11/28/2018	8:02	1	sample	KLS	GAMMAVISION	Radium-228	11.04		TRG	U		26.4			pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Actinium-228	11.6		TRG	U		26.4			pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Beryllium-7	29.9		TRG	U		109			pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Cesium-137	-10.3		TRG	U		20.8	20	20	pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Cobalt-60	-2.23		TRG	U		14.6			pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Manganese-54	-7.21		TRG	U		15.2			pci/sample
DOE-2_11:GA-01-R	11/28/2018	6:58	1	sample	KLS	GAMMAVISION	Potassium-40	-103		TRG	U		218			pci/sample

DOE-2_11:GA-01-R	11/28/2018 6:58	1 sample	KLS	GAMMAVISION	Radium-226	249	TRG		136		pci/sample
DOE-2_11:GA-01-R	11/28/2018 6:58	1 sample	KLS	GAMMAVISION	Radium-228	11.6	TRG	U	26.4		pci/sample
DOE-2_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-241	-0.0335	TRG	U	0.258	1	1 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-243	17	SUR		0	0	0 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-238	0.0821	TRG	U	0.283	1	1 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	0.116	TRG	U	0.169	1	1 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	18	SUR		0	0	0 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	20.2	SUR		0	0	0 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	0.0837	TRG	U	0.147	1	1 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-235/2:	-0.00947	TRG	U	0.183	1	1 pci/sample
DOE-2_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	-0.0076	TRG	U	0.147	1	1 pci/sample
DOE-2_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	0.217	TRG	U	0.333	0.5	0.5 pci/sample
DOE-2_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	9.6	SUR		0	0	0 pci/sample
DOE-2_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	0.418	TRG	U	1.14	3	3 pci/sample
DOE-2_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0894	SUR		0	0	0 g
DOE-2_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0244	SUR		0	0	0 g
DOE-2_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Radium-228	0.84	TRG	U	4.29	1	1 pci/sample
DOE-2_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Ba Carrier	0.0363	SUR		0	0	0 g
DOE-2_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Y Carrier	0.0209	SUR		0	0	0 g
DOE-2_11:ST-RC-024	12/11/2018 22:22	0.3 sample	RTM	LSCTEAL	Plutonium-241	-0.723	TRG	U	7.68	5	5 pci/sample
DOE-2_11:ST-RC-024	12/11/2018 22:22	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
DOE-2_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-228	-0.0448	TRG	U	0.915	1	1 pci/sample
DOE-2_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-230	1.12	TRG		0.804	1	1 pci/sample
DOE-2_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-232	0.166	TRG	U	0.522	1	1 pci/sample
DOE-2_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-229	56.5	SUR		0	0	0 pci/sample
DOE-2_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	0.24	TRG	U	0.924	1	1 pci/sample
DOE-2_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0363	SUR		0	0	0 g
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Actinium-228	0.711	TRG	U	47.4		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Beryllium-7	-17	TRG	U	146		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Cesium-137	-10.9	TRG	U	22.2	20	20 pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Cobalt-60	-15.4	TRG	U	27		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Manganese-54	0.471	TRG	U	12		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Potassium-40	0	TRG	U	146		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Radium-226	-56	TRG	U	255		pci/sample
DOE-3_11:GA-01-R	11/28/2018 8:07	1 sample	KLS	GAMMAVISION	Radium-228	0.711	TRG	U	47.4		pci/sample
DOE-3_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-241	0.104	TRG	U	0.213	1	1 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-243	17.6	SUR		0	0	0 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-238	0.0261	TRG	U	0.293	1	1 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	0.15	TRG		0.126	1	1 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	20	SUR		0	0	0 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	19.8	SUR		0	0	0 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	0.0559	TRG	U	0.155	1	1 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-235/2:	0.0398	TRG	U	0.119	1	1 pci/sample
DOE-3_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	0.215	TRG		0.154	1	1 pci/sample
DOE-3_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	0.131	TRG	U	0.422	0.5	0.5 pci/sample
DOE-3_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	8.37	SUR		0	0	0 pci/sample
DOE-3_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	1.78	TRG		1.19	3	3 pci/sample
DOE-3_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0881	SUR		0	0	0 g
DOE-3_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0245	SUR		0	0	0 g

DOE-3_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Radium-228	2.54	TRG	U	4.39	1	1 pci/sample
DOE-3_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Ba Carrier	0.0354	SUR		0	0	0 g
DOE-3_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Y Carrier	0.0221	SUR		0	0	0 g
DOE-3_11:ST-RC-024	12/11/2018 23:28	0.3 sample	RTM	LSCTEAL	Plutonium-241	0.73	TRG	U	5.93	5	5 pci/sample
DOE-3_11:ST-RC-024	12/11/2018 23:28	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
DOE-3_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-228	0.0434	TRG	U	0.684	1	1 pci/sample
DOE-3_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-230	0.976	TRG		0.796	1	1 pci/sample
DOE-3_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-232	0.29	TRG	U	0.433	1	1 pci/sample
DOE-3_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-229	60.2	SUR		0	0	0 pci/sample
DOE-3_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	0.554	TRG	U	0.746	1	1 pci/sample
DOE-3_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0354	SUR		0	0	0 g
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Actinium-228	23.1	TRG		15.3		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Beryllium-7	21.2	TRG	U	79.4		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Cesium-137	9.09	TRG	U	11.6	20	20 pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Cobalt-60	1.13	TRG	U	17.7		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Manganese-54	-8.01	TRG	U	16.3		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Potassium-40	-82.4	TRG	U	193		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Radium-226	25.9	TRG	U	183		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:12	1 sample	KLS	GAMMAVISION	Radium-228	23.1	TRG		15.3		pci/sample
DOE-4_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-241	0.0931	TRG	U	0.239	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-243	18.8	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-238	0.0598	TRG	U	0.269	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	0.0532	TRG	U	0.0798	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:36	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	19	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	19.3	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	0.0434	TRG	U	0.162	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-235/2:	-0.009	TRG	U	0.174	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	0.0144	TRG	U	0.162	1	1 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	0.367	TRG	U	0.371	0.5	0.5 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	9.52	SUR		0	0	0 pci/sample
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	0.0195	TRG	U	1.08	3	3 pci/sample
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0906	SUR		0	0	0 g
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0247	SUR		0	0	0 g
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Radium-228	0.919	TRG	U	3.8	1	1 pci/sample
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Ba Carrier	0.0372	SUR		0	0	0 g
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Y Carrier	0.0219	SUR		0	0	0 g
DOE-4_11:ST-RC-024	12/12/2018 0:35	0.3 sample	RTM	LSCTEAL	Plutonium-241	-0.484	TRG	U	6.13	5	5 pci/sample
DOE-4_11:ST-RC-024	12/12/2018 0:35	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-228	-0.44	TRG	U	0.93	1	1 pci/sample
DOE-4_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-230	0.221	TRG	U	0.731	1	1 pci/sample
DOE-4_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-232	0.135	TRG	U	0.522	1	1 pci/sample
DOE-4_11:A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-229	58	SUR		0	0	0 pci/sample
DOE-4_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	0.304	TRG	U	0.738	1	1 pci/sample
DOE-4_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0372	SUR		0	0	0 g
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Actinium-228	-22.2	TRG	U	55.4		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Beryllium-7	24.2	TRG	U	83		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Cesium-137	-1.11	TRG	U	21.3	20	20 pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Cobalt-60	-19.9	TRG	U	34.5		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Manganese-54	0.707	TRG	U	14.2		pci/sample

DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Potassium-40	-100	TRG	U	268		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Radium-226	34.4	TRG	U	249		pci/sample
DOE-4_11:GA-01-R	11/28/2018 9:09	1 sample	KLS	GAMMAVISION	Radium-228	-22.2	TRG	U	55.4		pci/sample
DOE-4_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-241	0.0192	TRG	U	0.182	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:28	0.3 sample	ALS	ALPHA VISION	Americium-243	18.4	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	21.2	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	0.193	TRG		0.191	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-235/2:	-0.00962	TRG	U	0.186	1	1 pci/sample
DOE-4_11:A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	0.054	TRG	U	0.149	1	1 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:37	0.3 sample	ALS	ALPHA VISION	Plutonium-238	0.134	TRG	U	0.143	1	1 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:37	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	-0.00496	TRG	U	0.143	1	1 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:37	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	19.5	SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	0.135	TRG	U	0.389	0.5	0.5 pci/sample
DOE-4_11:A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	8.61	SUR		0	0	0 pci/sample
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	0.0217	TRG	U	1.35	3	3 pci/sample
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0865	SUR		0	0	0 g
DOE-4_11:SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0235	SUR		0	0	0 g
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Radium-228	0.747	TRG	U	4.8	1	1 pci/sample
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Ba Carrier	0.0356	SUR		0	0	0 g
DOE-4_11:E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Y Carrier	0.0195	SUR		0	0	0 g
DOE-4_11:ST-RC-024	12/12/2018 1:41	0.3 sample	RTM	LSCTEAL	Plutonium-241	0.227	TRG	U	6.1	5	5 pci/sample
DOE-4_11:ST-RC-024	12/12/2018 1:41	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
DOE-4_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-228	0.113	TRG	U	0.663	1	1 pci/sample
DOE-4_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-230	0.225	TRG	U	0.915	1	1 pci/sample
DOE-4_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-232	0.012	TRG	U	0.561	1	1 pci/sample
DOE-4_11:A-01-R	12/13/2018 21:05	0.1 sample	ALS	ALPHA VISION	Thorium-229	61.8	SUR		0	0	0 pci/sample
DOE-4_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	0.394	TRG	U	0.957	1	1 pci/sample
DOE-4_11:E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0356	SUR		0	0	0 g
LCS 160-4C GA-01-R	11/28/2018 5:48	100 g	KLS	GAMMAVISION	Americium-241	379.2	SC		1.8		pci/sample
LCS 160-4C GA-01-R	11/28/2018 5:48	100 g	KLS	GAMMAVISION	Cesium-137	128.4	SC		0.763	20	20 pci/sample
LCS 160-4C GA-01-R	11/28/2018 5:48	100 g	KLS	GAMMAVISION	Cobalt-60	91.33	SC		0.407		pci/sample
LCS 160-4C E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	112.2	SC		0.824	1	1 pci/sample
LCS 160-4C E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0367	SUR		0	0	0 g
LCS 160-4C E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Radium-228	80.55	SC		3.39	1	1 pci/sample
LCS 160-4C E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0367	SUR		0	0	0 g
LCS 160-4C E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Y Carrier	0.022	SUR		0	0	0 g
LCS 160-4C SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	35.33	SC		1.13	3	3 pci/sample
LCS 160-4C SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0914	SUR		0	0	0 g
LCS 160-4C SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0243	SUR		0	0	0 g
LCS 160-4C A-01-R	12/18/2018 22:33	0.3 sample	ALS	ALPHA VISION	Americium-241	14.82	SC		0.154	1	1 pci/sample
LCS 160-4C A-01-R	12/18/2018 22:33	0.3 sample	ALS	ALPHA VISION	Americium-243	21.68	SUR		0	0	0 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-238	16.9	SC		0.311	1	1 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	18.15	SC		0.229	1	1 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	14.39	SUR		0	0	0 pci/sample
LCS 160-4C ST-RC-024	12/11/2018 19:03	0.3 sample	RTM	LSCTEAL	Plutonium-241	96.41	SC		7.92	5	5 pci/sample
LCS 160-4C ST-RC-024	12/11/2018 19:03	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	13.64	SUR		0	0	0 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	24.14	SC		0.303	1	1 pci/sample
LCS 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	22.58	SC		0.257	1	1 pci/sample

LCS 160-4C A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	42.15	SC	0.376	0.5	0.5 pci/sample
LCS 160-4C A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	9.444	SUR	0	0	0 pci/sample
LCS 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-230	36.37	SC	0.773	1	1 pci/sample
LCS 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-229	61.41	SUR	0	0	0 pci/sample
LCSD 160-4 E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	107.1	SC	0.709	1	1 pci/sample
LCSD 160-4 E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.034	SUR	0	0	0 g
LCSD 160-4 E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Radium-228	82.11	SC	4.07	1	1 pci/sample
LCSD 160-4 E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.034	SUR	0	0	0 g
LCSD 160-4 E904	12/11/2018 9:19	0.1 sample	CDR	GFPCORANGE	Y Carrier	0.0215	SUR	0	0	0 g
LCSD 160-4 SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Strontium-90	40.21	SC	1.14	3	3 pci/sample
LCSD 160-4 SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0921	SUR	0	0	0 g
LCSD 160-4 SR-03-RC	12/10/2018 12:18	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0236	SUR	0	0	0 g
LCSD 160-4 A-01-R	12/6/2018 22:27	0.3 sample	ALS	ALPHA VISION	Americium-241	14.36	SC	0.136	1	1 pci/sample
LCSD 160-4 A-01-R	12/6/2018 22:27	0.3 sample	ALS	ALPHA VISION	Americium-243	21.31	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-238	18.99	SC	0.268	1	1 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	17.66	SC	0.173	1	1 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	20.31	SUR	0	0	0 pci/sample
LCSD 160-4 ST-RC-024	12/11/2018 20:09	0.3 sample	RTM	LSCTEAL	Plutonium-241	77.51	SC	5.83	5	5 pci/sample
LCSD 160-4 ST-RC-024	12/11/2018 20:09	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-232	16.58	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-233/2:	20.16	SC	0.248	1	1 pci/sample
LCSD 160-4 A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHA VISION	Uranium-238	20.7	SC	0.195	1	1 pci/sample
LCSD 160-4 A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-210	44.17	SC	0.353	0.5	0.5 pci/sample
LCSD 160-4 A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHA VISION	Polonium-209	10.01	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-230	39.48	SC	0.78	1	1 pci/sample
LCSD 160-4 A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHA VISION	Thorium-229	53.43	SUR	0	0	0 pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Actinium-228	0.2484	TRG	0.153		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Americium-241	-0.02031	TRG U	0.207		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Beryllium-7	-0.3664	TRG U	1.31		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Cesium-137	-0.02285	TRG U	0.159	20	20 pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Cobalt-60	0.01861	TRG U	0.146		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Manganese-54	0.03026	TRG U	0.0709		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Potassium-40	-0.5914	TRG U	1.29		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Radium-226	2.712	TRG	1.37		pci/sample
MB 160-4C GA-01-R	11/28/2018 5:46	100 g	KLS	GAMMAVISION	Radium-228	0.2484	TRG	0.153		pci/sample
MB 160-4C E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Radium-226	-0.06888	TRG U	0.874	1	1 pci/sample
MB 160-4C E903.0	12/24/2018 11:38	0.1 sample	CDR	GFPCORANGE	Ba Carrier	0.0337	SUR	0	0	0 g
MB 160-4C E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Radium-228	2.36	TRG U	4.32	1	1 pci/sample
MB 160-4C E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Ba Carrier	0.0337	SUR	0	0	0 g
MB 160-4C E904	12/11/2018 9:22	0.1 sample	CDR	GFPCPROTEAN	Y Carrier	0.0208	SUR	0	0	0 g
MB 160-4C SR-03-RC	12/10/2018 12:19	0.25 sample	CDR	GFPCBLUE	Strontium-90	0.7624	TRG U	1.11	3	3 pci/sample
MB 160-4C SR-03-RC	12/10/2018 12:19	0.25 sample	CDR	GFPCBLUE	Sr Carrier	0.0899	SUR	0	0	0 g
MB 160-4C SR-03-RC	12/10/2018 12:19	0.25 sample	CDR	GFPCBLUE	Y Carrier	0.0243	SUR	0	0	0 g
MB 160-4C A-01-R	12/6/2018 22:27	0.3 sample	ALS	ALPHA VISION	Americium-241	0.04232	TRG U	0.256	1	1 pci/sample
MB 160-4C A-01-R	12/6/2018 22:27	0.3 sample	ALS	ALPHA VISION	Americium-243	21.47	SUR	0	0	0 pci/sample
MB 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-238	0.1716	TRG U	0.245	1	1 pci/sample
MB 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Plutonium-239/	0.05089	TRG U	0.17	1	1 pci/sample
MB 160-4C A-01-R	12/5/2018 22:30	0.3 sample	ALS	ALPHA VISION	Pu-242 (T)	19.14	SUR	0	0	0 pci/sample
MB 160-4C ST-RC-024	12/11/2018 17:56	0.3 sample	RTM	LSCTEAL	Plutonium-241	-0.6625	TRG U	6.26	5	5 pci/sample

MB 160-4C ST-RC-024	12/11/2018 17:56	0.3 sample	RTM	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
MB 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHAVISION	Uranium-232	18.38	SUR		0	0	0 pci/sample
MB 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHAVISION	Uranium-233/2:	0.02813	TRG	U	0.0844	1	1 pci/sample
MB 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHAVISION	Uranium-235/2:	0	TRG	U	0.105	1	1 pci/sample
MB 160-4C A-01-R	12/5/2018 22:41	0.3 sample	ALS	ALPHAVISION	Uranium-238	0.1263	TRG	U	0.157	1	1 pci/sample
MB 160-4C A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHAVISION	Polonium-210	0.04168	TRG	U	0.353	0.5	0.5 pci/sample
MB 160-4C A-01-R	12/6/2018 22:44	0.2 sample	ALS	ALPHAVISION	Polonium-209	11.81	SUR		0	0	0 pci/sample
MB 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHAVISION	Thorium-228	-0.1593	TRG	U	1.02	1	1 pci/sample
MB 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHAVISION	Thorium-230	0.2126	TRG	U	1.02	1	1 pci/sample
MB 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHAVISION	Thorium-232	0.08692	TRG	U	0.658	1	1 pci/sample
MB 160-4C A-01-R	12/12/2018 21:43	0.1 sample	ALS	ALPHAVISION	Thorium-229	50.46	SUR		0	0	0 pci/sample

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APPENDIX F

Laboratory Data for ETEC Site Samplers during Fire

#sys_samp	lab_anl_m	analysis_date	subsample	subsample	instrument	comment	chemical_name	result_value	result_errc	result_type	lab_qualifi	method	detection_limit	reporting_quantitativ	result_unit
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Actinium-228	8.34		TRG	U		36.6		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Beryllium-7	21.4		TRG	U		71.5		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Cesium-137	3.43		TRG	U		12.9	20	20 pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Cobalt-60	0.0322		TRG	U		8.46		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Manganese-54	-6.25		TRG	U		12.2		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Potassium-40	-75.7		TRG	U		200		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Radium-226	43.2		TRG	U		109		pci/sample
BLANK-20:	GA-01-R	11/14/2018 18:04	1	sample	GAMMAVISION		Radium-228	8.34		TRG	U		36.6		pci/sample
BLANK-20:	A-01-R	11/27/2018 22:44	0.2	sample	ALPHAVISION		Polonium-210	0		TRG	U		0.206	0.5	0.5 pci/sample
BLANK-20:	A-01-R	11/27/2018 22:44	0.2	sample	ALPHAVISION		Polonium-209	13.4		SUR			0	0	0 pci/sample
BLANK-20:	A-01-R	11/28/2018 13:59	0.3	sample	ALPHAVISION		Thorium-228	0.138		TRG	U		0.363	1	1 pci/sample
BLANK-20:	A-01-R	11/28/2018 13:59	0.3	sample	ALPHAVISION		Thorium-230	0.0413		TRG	U		0.357	1	1 pci/sample
BLANK-20:	A-01-R	11/28/2018 13:59	0.3	sample	ALPHAVISION		Thorium-232	0.011		TRG	U		0.143	1	1 pci/sample
BLANK-20:	A-01-R	11/28/2018 13:59	0.3	sample	ALPHAVISION		Thorium-229	21.1		SUR			0	0	0 pci/sample
BLANK-20:	A-01-R	11/28/2018 22:03	0.3	sample	ALPHAVISION		Uranium-232	22.2		SUR			0	0	0 pci/sample
BLANK-20:	A-01-R	11/28/2018 22:03	0.3	sample	ALPHAVISION		Uranium-233/23	0.0424		TRG	U		0.158	1	1 pci/sample
BLANK-20:	A-01-R	11/28/2018 22:03	0.3	sample	ALPHAVISION		Uranium-235/23	-0.0176		TRG	U		0.197	1	1 pci/sample
BLANK-20:	A-01-R	11/28/2018 22:03	0.3	sample	ALPHAVISION		Uranium-238	0.0212		TRG	U		0.137	1	1 pci/sample
BLANK-20:	A-01-R	11/29/2018 14:07	0.3	sample	ALPHAVISION		Plutonium-238	0.0934		TRG	U		0.149	1	1 pci/sample
BLANK-20:	A-01-R	11/29/2018 14:07	0.3	sample	ALPHAVISION		Plutonium-239/2	0.0267		TRG	U		0.178	1	1 pci/sample
BLANK-20:	A-01-R	11/29/2018 14:07	0.3	sample	ALPHAVISION		Pu-242 (T)	21		SUR			0	0	0 pci/sample
BLANK-20:	A-01-R	11/29/2018 23:19	0.3	sample	ALPHAVISION		Americium-241	0.149		TRG	U		0.239	1	1 pci/sample
BLANK-20:	A-01-R	11/29/2018 23:19	0.3	sample	ALPHAVISION		Americium-243	17.3		SUR			0	0	0 pci/sample
BLANK-20:	ST-RC-024	12/3/2018 17:49	0.3	sample	LSCTEAL		Plutonium-241	1.31		TRG	U		5.45	5	5 pci/sample
BLANK-20:	ST-RC-024	12/3/2018 17:49	0.3	sample	LSCTEAL		Pu-242 (T)			SUR			0	0	0 pci/sample
BLANK-20:	SR-03-RC	12/5/2018 12:23	0.25	sample	GFPCPURPLE		Strontium-90	0.688		TRG	U		1.29	3	3 pci/sample
BLANK-20:	SR-03-RC	12/5/2018 12:23	0.25	sample	GFPCPURPLE		Sr Carrier	0.0903		SUR			0	0	0 g
BLANK-20:	SR-03-RC	12/5/2018 12:23	0.25	sample	GFPCPURPLE		Y Carrier	0.024		SUR			0	0	0 g
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Actinium-228	-2.064		TRG	U		43.5		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Americium-241	4.434		TRG	U		7.76		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Beryllium-7	20.34		TRG	U		76.3		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Cesium-137	-2.35		TRG	U		15.5	20	20 pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Cobalt-60	1.112		TRG	U		15.1		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Manganese-54	1.82		TRG	U		6.98		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Potassium-40	-45.18		TRG	U		165		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Radium-226	0		TRG	U		294		pci/sample
BLANK-20:	GA-01-R	11/14/2018 19:11	1	sample	GAMMAVISION		Radium-228	-2.064		TRG	U		43.5		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Actinium-228	7.22		TRG	U		33.4		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Beryllium-7	-33		TRG	U		109		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Cesium-137	0		TRG	U		14.4	20	20 pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Cobalt-60	1.25		TRG	U		10.9		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Manganese-54	-4.93		TRG	U		13.3		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Potassium-40	-43.2		TRG	U		157		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Radium-226	-44.1		TRG	U		216		pci/sample
A-3-RMHF:	GA-01-R	11/14/2018 18:08	1	sample	GAMMAVISION		Radium-228	7.22		TRG	U		33.4		pci/sample
A-3-RMHF:	A-01-R	11/27/2018 22:44	0.2	sample	ALPHAVISION		Polonium-210	0.247		TRG			0.169	0.5	0.5 pci/sample
A-3-RMHF:	A-01-R	11/27/2018 22:44	0.2	sample	ALPHAVISION		Polonium-209	13.4		SUR			0	0	0 pci/sample
A-3-RMHF:	A-01-R	11/28/2018 13:57	0.3	sample	ALPHAVISION		Plutonium-238	0		TRG	U		0.284	1	1 pci/sample
A-3-RMHF:	A-01-R	11/28/2018 13:57	0.3	sample	ALPHAVISION		Plutonium-239/2	0.019		TRG	U		0.122	1	1 pci/sample

A-3-RMHF A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Pu-242 (T)	20.6	SUR		0	0	0 pci/sample
A-3-RMHF A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-228	0.149	TRG	U	0.338	1	1 pci/sample
A-3-RMHF A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-230	-0.0361	TRG	U	0.357	1	1 pci/sample
A-3-RMHF A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-232	0.011	TRG	U	0.143	1	1 pci/sample
A-3-RMHF A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-229	18.8	SUR		0	0	0 pci/sample
A-3-RMHF A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-232	22.3	SUR		0	0	0 pci/sample
A-3-RMHF A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-233/23	0.14	TRG	U	0.187	1	1 pci/sample
A-3-RMHF A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-235/23	0.0174	TRG	U	0.195	1	1 pci/sample
A-3-RMHF A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-238	0.0349	TRG	U	0.173	1	1 pci/sample
A-3-RMHF A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-241	-0.0374	TRG	U	0.246	1	1 pci/sample
A-3-RMHF A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-243	20	SUR		0	0	0 pci/sample
A-3-RMHF ST-RC-024	12/3/2018 18:55	0.3 sample	LSCTEAL	Plutonium-241	0.645	TRG	U	5.5	5	5 pci/sample
A-3-RMHF ST-RC-024	12/3/2018 18:55	0.3 sample	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
A-3-RMHF SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Strontium-90	0.663	TRG	U	1.03	3	3 pci/sample
A-3-RMHF SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Sr Carrier	0.0863	SUR		0	0	0 g
A-3-RMHF SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Y Carrier	0.0246	SUR		0	0	0 g
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Actinium-228	13.3	TRG	U	30.2		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Beryllium-7	-39.7	TRG	U	141		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Cesium-137	4.64	TRG	U	17.6	20	20 pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Cobalt-60	0	TRG	U	7		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Manganese-54	-1.64	TRG	U	14.1		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Potassium-40	-111	TRG	U	263		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Radium-226	-105	TRG	U	251		pci/sample
A-2-2040-: GA-01-R	11/14/2018 18:09	1 sample	GAMMAVISION	Radium-228	13.3	TRG	U	30.2		pci/sample
A-2-2040-: A-01-R	11/27/2018 22:44	0.2 sample	ALPHA VISION	Polonium-210	0.0505	TRG	U	0.186	0.5	0.5 pci/sample
A-2-2040-: A-01-R	11/27/2018 22:44	0.2 sample	ALPHA VISION	Polonium-209	15.3	SUR		0	0	0 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-238	0.238	TRG	U	0.261	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-239/240	0.0774	TRG		0.0774	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Pu-242 (T)	19.6	SUR		0	0	0 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-228	0.134	TRG	U	0.295	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-230	0.153	TRG	U	0.368	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-232	0.0892	TRG	U	0.168	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-229	19.9	SUR		0	0	0 pci/sample
A-2-2040-: A-01-R	11/28/2018 14:04	0.3 sample	ALPHA VISION	Americium-241	0.0902	TRG	U	0.255	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 14:04	0.3 sample	ALPHA VISION	Americium-243	20.2	SUR		0	0	0 pci/sample
A-2-2040-: A-01-R	11/28/2018 22:04	0.3 sample	ALPHA VISION	Uranium-232	18.3	SUR		0	0	0 pci/sample
A-2-2040-: A-01-R	11/28/2018 22:04	0.3 sample	ALPHA VISION	Uranium-233/23	0.123	TRG		0.0923	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 22:04	0.3 sample	ALPHA VISION	Uranium-235/23	0.0766	TRG	U	0.115	1	1 pci/sample
A-2-2040-: A-01-R	11/28/2018 22:04	0.3 sample	ALPHA VISION	Uranium-238	0.115	TRG	U	0.149	1	1 pci/sample
A-2-2040-: ST-RC-024	12/3/2018 20:01	0.3 sample	LSCTEAL	Plutonium-241	1.2	TRG	U	5.71	5	5 pci/sample
A-2-2040-: ST-RC-024	12/3/2018 20:01	0.3 sample	LSCTEAL	Pu-242 (T)		SUR		0	0	0 pci/sample
A-2-2040-: SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Strontium-90	0.313	TRG	U	1.1	3	3 pci/sample
A-2-2040-: SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Sr Carrier	0.0849	SUR		0	0	0 g
A-2-2040-: SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Y Carrier	0.0236	SUR		0	0	0 g
LCS 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMAVISION	Americium-241	29940	SC		109		pci/sample
LCS 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMAVISION	Cesium-137	9739	SC		41.8	20	20 pci/sample
LCS 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMAVISION	Cobalt-60	6772	SC		19.8		pci/sample
LCS 160-4C A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-241	14.64	SC		0.216	1	1 pci/sample
LCS 160-4C A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-243	18.15	SUR		0	0	0 pci/sample
LCS 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-238	16.73	SC		0.249	1	1 pci/sample

LCS 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-239/240	17.62	SC	0.149	1	1 pci/sample
LCS 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Pu-242 (T)	19.17	SUR	0	0	0 pci/sample
LCS 160-4C ST-RC-024	12/3/2018 15:36	0.3 sample	LSCTEAL	Plutonium-241	78.58	SC	6.16	5	5 pci/sample
LCS 160-4C ST-RC-024	12/3/2018 15:36	0.3 sample	LSCTEAL	Pu-242 (T)		SUR	0	0	0 pci/sample
LCS 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-230	11.79	SC	0.36	1	1 pci/sample
LCS 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-229	20.78	SUR	0	0	0 pci/sample
LCS 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-232	14.24	SUR	0	0	0 pci/sample
LCS 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-233/235	21.91	SC	0.315	1	1 pci/sample
LCS 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-238	21.13	SC	0.115	1	1 pci/sample
LCS 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Strontium-90	31.33	SC	1.13	3	3 pci/sample
LCS 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Sr Carrier	0.0825	SUR	0	0	0 g
LCS 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Y Carrier	0.0236	SUR	0	0	0 g
LCS 160-4C A-01-R	11/27/2018 22:43	0.2 sample	ALPHA VISION	Polonium-210	46.11	SC	0.196	0.5	0.5 pci/sample
LCS 160-4C A-01-R	11/27/2018 22:43	0.2 sample	ALPHA VISION	Polonium-209	12.46	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-241	12.78	SC	0.223	1	1 pci/sample
LCSD 160-4 A-01-R	11/29/2018 23:19	0.3 sample	ALPHA VISION	Americium-243	19.54	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-238	17.34	SC	0.252	1	1 pci/sample
LCSD 160-4 A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-239/240	17.63	SC	0.151	1	1 pci/sample
LCSD 160-4 A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Pu-242 (T)	20.18	SUR	0	0	0 pci/sample
LCSD 160-4 ST-RC-024	12/3/2018 16:42	0.3 sample	LSCTEAL	Plutonium-241	66.94	SC	5.82	5	5 pci/sample
LCSD 160-4 ST-RC-024	12/3/2018 16:42	0.3 sample	LSCTEAL	Pu-242 (T)		SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-230	13.39	SC	0.361	1	1 pci/sample
LCSD 160-4 A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-229	20.54	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-232	14.42	SUR	0	0	0 pci/sample
LCSD 160-4 A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-233/235	22.04	SC	0.274	1	1 pci/sample
LCSD 160-4 A-01-R	11/28/2018 22:03	0.3 sample	ALPHA VISION	Uranium-238	23.83	SC	0.198	1	1 pci/sample
LCSD 160-4 SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Strontium-90	33.14	SC	1.14	3	3 pci/sample
LCSD 160-4 SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Sr Carrier	0.094	SUR	0	0	0 g
LCSD 160-4 SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Y Carrier	0.024	SUR	0	0	0 g
LCSD 160-4 A-01-R	11/27/2018 22:43	0.2 sample	ALPHA VISION	Polonium-210	42.77	SC	0.0515	0.5	0.5 pci/sample
LCSD 160-4 A-01-R	11/27/2018 22:43	0.2 sample	ALPHA VISION	Polonium-209	12.39	SUR	0	0	0 pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Actinium-228	-3.067	TRG U	52.2		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Americium-241	-1.297	TRG U	9.59		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Beryllium-7	12.75	TRG U	106		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Cesium-137	-4.38	TRG U	20.1	20	20 pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Cobalt-60	-0.2684	TRG U	14.6		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Manganese-54	3.055	TRG U	12.1		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Potassium-40	-47.88	TRG U	192		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Radium-226	-121.6	TRG U	235		pci/sample
MB 160-4C GA-01-R	11/14/2018 18:07	1 sample	GAMMA VISION	Radium-228	-3.067	TRG U	52.2		pci/sample
MB 160-4C A-01-R	11/28/2018 14:04	0.3 sample	ALPHA VISION	Americium-241	0.00653	TRG U	0.205	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 14:04	0.3 sample	ALPHA VISION	Americium-243	21.33	SUR	0	0	0 pci/sample
MB 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-238	0.0678	TRG U	0.237	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Plutonium-239/240	0.08021	TRG U	0.153	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 13:57	0.3 sample	ALPHA VISION	Pu-242 (T)	19.49	SUR	0	0	0 pci/sample
MB 160-4C ST-RC-024	12/3/2018 14:30	0.3 sample	LSCTEAL	Plutonium-241	1.009	TRG U	5.8	5	5 pci/sample
MB 160-4C ST-RC-024	12/3/2018 14:30	0.3 sample	LSCTEAL	Pu-242 (T)		SUR	0	0	0 pci/sample
MB 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-228	0.218	TRG U	0.386	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-230	0.0007997	TRG U	0.368	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHA VISION	Thorium-232	-0.02188	TRG U	0.166	1	1 pci/sample

MB 160-4C A-01-R	11/28/2018 13:59	0.3 sample	ALPHAVISION	Thorium-229	18.64	SUR		0	0	0 pci/sample
MB 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHAVISION	Uranium-232	18.6	SUR		0	0	0 pci/sample
MB 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHAVISION	Uranium-233/23	-0.01524	TRG	U	0.269	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHAVISION	Uranium-235/23	0	TRG	U	0.114	1	1 pci/sample
MB 160-4C A-01-R	11/28/2018 22:03	0.3 sample	ALPHAVISION	Uranium-238	0.06086	TRG	U	0.203	1	1 pci/sample
MB 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Strontium-90	-0.333	TRG	U	1.09	3	3 pci/sample
MB 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Sr Carrier	0.0875	SUR		0	0	0 g
MB 160-4C SR-03-RC	12/5/2018 12:23	0.25 sample	GFPCPURPLE	Y Carrier	0.0248	SUR		0	0	0 g
MB 160-4C A-01-R	11/27/2018 22:43	0.2 sample	ALPHAVISION	Polonium-210	0.03104	TRG	U	0.119	0.5	0.5 pci/sample
MB 160-4C A-01-R	11/27/2018 22:43	0.2 sample	ALPHAVISION	Polonium-209	14.19	SUR		0	0	0 pci/sample

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