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Idaho National Laboratory Site Offsite Environmental Surveillance Program Report: Second Quarter 2018

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By
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Executive Summary

Some human-made radionuclides were detected in samples collected during the second quarter of 2018. All detected radionuclide concentrations were well below standards set by the U.S. Department of Energy (DOE) and regulatory standards established by the U.S. Environmental Protection Agency (EPA) for protection of the public.

This report for the second quarter of 2018 contains results from the Environmental Surveillance, Education, and Research (ESER) Program's monitoring of the Department of Energy's Idaho National Laboratory (INL) Site's offsite environment, April 1 through June 30, 2018. All sample types (media) and the sampling schedule followed during 2018 are listed in Appendix A. This report contains results for the following sample types:

- Air, including particulate air filters, charcoal cartridges, and atmospheric moisture
- Precipitation
- Surface and drinking water
- Milk
- Alfalfa
- Environmental radiation measurements using OSLDs

Table ES-1. Summary of Results for the Second Quarter of 2018.

Media	Sample Type	Analysis	Results
Air	Particulate Filters	Gross alpha, gross beta	There were no statistically significant differences in monthly and quarterly gross alpha and gross beta concentrations measured at Distant, Boundary, and INL Site sampling locations, with the exception of the gross alpha activity for the second quarter and the month of April. No result exceeded results for the past ten years or the Derived Concentration Standard (DCS) for plutonium-239 (an alpha-emitting radionuclide) or strontium-90 (a beta-emitting radionuclide) in air. Statistical differences do not appear to be linked to INL Site activities.
	Particulate Filters Quarterly Composite	Gamma-emitting radionuclides, ^{90}Sr, actinides (americium and plutonium)	No human-made gamma-emitting radionuclides were detected in any of the second quarter composite air samples. Americium-241, ^{238}Pu and $^{239/240}$Pu, human-made alpha-emitting radionuclides, were detected above 3s in the composite sample from Van Buren Boulevard. The concentrations of the plutonium isotopes were the maximum recorded in the past ten years by ESER. The ^{241}Am result was the second highest measured since 2009. All detections, however, are well below the DCSs and do not represent a public health concern. Potential sources are being investigated. Strontium-90, a human-made beta-emitting radionuclide was measured in the composite collected from Arco. The result was within those detected historically, from 2009 through 2017, and far below the DCS. It is most likely the result of resuspension of soil contaminated with fallout from past nuclear weapons testing.
	Charcoal Cartridge	Iodine-131	Iodine-131 was not detected in any of the 26 batches counted during the quarter.
Atmospheric Moisture	Liquid	Tritium	Eleven of seventeen results showed tritium concentrations greater than the 3s uncertainty during the quarter. No sample result exceeded results for the past ten years or the DCS for tritium in air.
Precipitation	Liquid	Tritium	A total of 28 samples were collected. All results were greater than the 3s uncertainty. All results were within the range previously measured in the past ten years and were consistent with those reported across the region by the Environmental Protection Agency.
Drinking/ Surface Water	Liquid	Gross alpha, gross beta, tritium	Gross alpha was detected in two of ten drinking water samples and in one of three surface water samples. Gross beta was detected in nine of ten drinking water samples and in all surface water samples. All concentrations were generally similar from previous results. Tritium was detected in four drinking water and surface water samples. Concentrations were similar to those measured historically in drinking and surface water and well below the DCS for tritium in drinking water.
Big Lost River (BLR)	Liquid	Gross alpha, gross beta, tritium	The BLR was sampled twice in the second quarter. Gross alpha activity was detected in 10 of 14 samples (including the control). Gross beta activity was detected 12 of 14 samples. The concentrations were generally similar to previous results. Tritium was also detected in nine samples. Concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous years. The tritium results were

Media	Sample Type	Analysis	Results
			below the DCS for drinking water.
Milk	Liquid	Iodine-131, other gamma-emitting radionuclides, strontium-90	Forty milk samples were collected at seven locations (including the offsite control sample from Colorado). No gamma emitting radionuclides of concern were detected. Strontium-90 was detected in three of seven samples. All were approximately the same concentration (including the offsite control from Colorado) indicating the INL Site is not the source. Tritium was detected in five samples at levels similar to previous measurements and to precipitation.
Alfalfa	Vegetation	Gamma-emitting radionuclides, strontium-90	No human-made gamma-emitting radionuclides were found in any of the four samples (including a duplicate) collected this year. Strontium-90 was found in one of three samples analyzed. The value was within measurements made in previous years.
Environmental Dosimeters	Environmental radiation	Ionizing radiation exposure	The average measurements over the six-month period were 0.32 mrem/day at Boundary and 0.33 mrem/day at Distant locations. The results are consistent with past results.

List of Abbreviations

AEC	Atomic Energy Commission
BLR	Big Lost River
CFA	Central Facilities Area
DCS	Derived Concentration Standard
DOE	Department of Energy
DOE – ID	Department of Energy Idaho Operations Office
EAL	Environmental Assessment Laboratory
EFS	Experimental Field Station
EPA	Environmental Protection Agency
ERAMS	Environmental Radiation Ambient Monitoring System
ESER	Environmental Surveillance, Education, and Research
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
INEL	Idaho National Engineering Laboratory
INEEL	Idaho National Engineering and Environmental Laboratory
ISU	Idaho State University
MDC	minimum detectable concentration
NRF	Naval Reactors Facility
NRTS	National Reactor Testing Station
ORAU	Oak Ridge Associated Universities
OSLD	Optically Stimulated Luminescent Dosimeter
RWMC	Radioactive Waste Management Complex
VNSFS	Veolia Nuclear Solutions – Federal Services

List of Units

Bq	becquerel
Ci	curie
g	gram
L	liter
µCi	microcurie
mL	milliliter
mrem	millirem
mR	milliRoentgen
pCi	picocurie

1. ESER PROGRAM DESCRIPTION

Operations at the Idaho National Laboratory (INL) Site are conducted under requirements imposed by the U.S. Department of Energy (DOE) under authority of the Atomic Energy Act and the U.S. Environmental Protection Agency (EPA) under a number of acts (e.g. the Clean Air Act and Safe Drinking Water Act). The requirements imposed by DOE are specified in DOE Orders. These requirements include those to monitor the effects of DOE activities both inside and outside the boundaries of DOE facilities (DOE 2011a, DOE 2015a). During calendar year 2018, environmental monitoring within the INL Site boundaries was primarily the responsibility of the INL and Idaho Cleanup Project (ICP) contractors.

At the beginning of the first quarter of 2018, ESER Program responsibilities were assumed by Veolia Nuclear Solutions-Federal Services (VNSFS), in conjunction with team members Idaho State University and Oak Ridge Associated Universities (ORAU). ORAU ceased operations in April 2018 and was replaced in May by GEL Laboratories.

This report contains monitoring results from the ESER Program for samples collected during the second quarter of 2018 (April 1- June 30, 2018).

The surveillance portion of the ESER Program is designed to satisfy the following program objectives:

- Verify compliance with applicable environmental laws, regulations, and DOE Orders
- Characterize and define trends in the physical, chemical, and biological condition of environmental media on and around the INL Site
- Assess the potential radiation dose to members of the public from INL Site effluents
- Present program results clearly and concisely through the use of reports, presentations, newsletter articles and press releases.

The goal of the surveillance program is to monitor different media at a number of potential exposure points within the various exposure pathways, including air, water, agricultural products, wildlife, and soil that could possibly contribute to the radiation dose received by the public.

Environmental samples collected include:

- air at 16 locations on and around the INL Site
- moisture in air at four locations around the INL Site
- precipitation from four locations (at the same sites where air moisture is sampled) on and around the INL Site
- drinking water from eight locations and surface water from three locations around the INL Site and five locations along the Big Lost River on the INL Site
- agricultural products, including milk at six dairies around the INL Site, potatoes from at least six local producers, alfalfa from three farms, grain (wheat and barley) from approximately 10 local producers, and lettuce from approximately nine home-owned and portable gardens on and around the INL Site
- soil from 13 locations around the INL Site biennially
- environmental dosimeters from 17 locations semi-annually
- various numbers of wildlife including dead bats, road-killed big game (pronghorn, mule deer, and elk) and waterfowl sampled from the INL Site.

Table A-1 in Appendix A lists samples, sampling locations, and collection frequency for the ESER Program.

The ESER Program used two laboratories to perform analyses on routine environmental samples collected during the quarter reported here. The ISU Environmental Assessment Laboratory (EAL) performed routine gross alpha, gross beta, tritium, and gamma spectrometry analyses. Analyses requiring radiochemistry including strontium-90 (^{90}Sr), plutonium-238 (^{238}Pu), plutonium-239/240 ($^{239/240}$Pu), and americium-241 (^{241}Am) were performed by GEL Laboratories.

In the event of non-routine occurrences, such as suspected releases of radioactive material, the ESER Program may increase the frequency of sampling and/or the number of sampling locations based on the nature of the release and wind distribution patterns. Any data found to be outside historical norms in the ESER Program is thoroughly investigated to determine if an INL Site origin is likely. Investigation may include re-sampling and/or re-analysis of prior samples.

In the event of any suspected worldwide nuclear incidents, like the 1986 Chernobyl accident or the 2011 Fukushima accident, the EPA may request additional sampling be performed through RadNet. RadNet is a nationwide environmental radiation monitoring system that monitors the nation's air, precipitation, and drinking water for radiation. The ESER Program currently operates a high-volume air sampler and collects precipitation and drinking water in Idaho Falls for this national program and routinely sends samples to EPA's Eastern Environmental Radiation Facility for analyses. The RadNet data collected at Idaho Falls are not reported by the ESER Program but are available through the EPA RadNet website (https://www.epa.gov/radnet).

Once samples have been collected and analyzed, the ESER Program has the responsibility for quality control of the data, entry into the ESER database, and reporting in quarterly reports. The quarterly reports are then consolidated into the INL Site Environmental Report for each calendar year. The annual report also includes data collected by other INL Site contractors.

The results reported in the quarterly and annual reports are assessed in terms of data quality and statistical significance with respect to laboratory analytical uncertainties, sample locations, reported INL Site releases, meteorological data, and worldwide events that might conceivably have an effect on the INL Site environment. First, field collection and laboratory information are reviewed to determine identifiable errors that would invalidate or limit use of the data. Examples of such limitations include insufficient sample volume, torn filters, evidence of laboratory cross-contamination or quality control issues. Data that pass initial screening are further evaluated using statistical methods. Statistical tools are necessary for data evaluation particularly since environmental measurements typically involve the determination of minute concentrations, which are difficult to detect and even more difficult to distinguish from other measurements.

Results are presented in this report with an analytical uncertainty term, s, where "s" is the estimated sample standard deviation (σ) assuming a Gaussian or normal distribution. All results are reported in this document, even those that do not necessarily represent detections. The term "detected", as used for the discussion of results in this report, does not imply any degree of risk to the public or environment, but rather indicates that the radionuclide was measured at a concentration sufficient for the analytical instrument to record a value that is statistically different from laboratory background. Laboratory measurements involve the analysis of a target sample and the analysis of a prepared laboratory blank (i.e., a sample which is identical to the sample collected in the environment, except that the radionuclide of interest is absent). In order to conclude that a radionuclide has been detected, it is essential to consider two fundamental aspects of the problem of detection: (1) the instrument signal for the sample must be greater than that observed for the blank before the decision can be made that the radionuclide has been detected; and (2) an estimate must be made of the minimum radionuclide concentration that will yield a sufficiently large observed signal before the correct decision can be made for detection or non-detection. Each laboratory currently defines a detection of radioactivity in an individual sample if the result exceeds a detection level calculated by the laboratory after the analysis of a background sample (i.e., the a posteriori measurement) based on calculations derived by Curie (1984). The MDC is defined as the concentration at which there is a 95 percent confidence that an analyte signal will be distinguishable from an analyte-free sample.

In addition ESER uses a three standard deviation criterion to identify a potentially false positive result. A false positive result is indicated when the range encompassing the result, plus or minus the total uncertainty at three standard deviations, includes zero (e.g., 2.5 +/- 1.0; range of -0.5 to 3.5). Statistically, the probability that a result can exceed the absolute value of its total uncertainty at three standard deviations by chance alone is less than 1 percent. A result that is greater than three times the total uncertainty of the measurement represents a statistically positive detection with over 99 percent confidence (DOE 2015b). The ESER reports measured radionuclide concentrations greater than or equal to their respective 3s uncertainties as being detected with confidence.

Concentrations between 2s and 3s are reported as questionably detected. That is, the radionuclide may be present in the sample; however, the probability that a result can exceed the absolute value of its total uncertainty at two standard deviations by chance alone may be as high as 5 percent. Measurements made between 2s and 3s are examined further to determine if they are a part of a pattern (temporal or spatial) that might warrant further investigation or recounting. For example, if a particular radionuclide is routinely detected at > 3s at a specific location, a sample result between 2s and 3s might be considered detected.

If a result is less than or equal to 2s there is even less statistical confidence that the radionuclide is present in the sample. Analytical results in this report are presented as the result value ± one standard deviation (1s) for reporting consistency with the annual report. To obtain the 2s or 3s values simply multiply the uncertainty term by 2 or 3.

For more information concerning the ESER Program, contact VNSFS at (208) 525-8250, or visit the Program's web page (http://www.idahoeser.com).

2. The INL Site

The INL Site is a nuclear energy and homeland security research and environmental management facility. It is owned and administered by the U.S. Department of Energy, Idaho Operations Office (DOE-ID) and occupies about 890 mi^2 (2,300 km^2) of the upper Snake River Plain in Southeastern Idaho (Figure 1). The history of the INL Site began during World War II when the U.S. Naval Ordnance Station was located in Pocatello, Idaho. This station, one of two such installations in the U.S., retooled large guns from U.S. Navy warships. The retooled guns were tested on the nearby, uninhabited plain, known as the Naval Proving Ground. In the years following the war, as the nation worked to develop nuclear power, the Atomic Energy Commission (AEC), predecessor to the DOE, became interested in the Naval Proving Ground and made plans for a facility to build, test, and perfect nuclear power reactors.

The Naval Proving Ground became the National Reactor Testing Station (NRTS) in 1949, under the AEC. By the end of 1951, a reactor at the NRTS became the first to produce useful amounts of electricity. Over time the site has operated 52 various types of reactors, associated research centers, and waste handling areas. The NRTS was renamed the Idaho National Engineering Laboratory (INEL) in 1974, and the Idaho National Engineering and Environmental Laboratory (INEEL) in January 1997. With renewed interest in nuclear power the DOE announced in 2003 that Argonne National Laboratory and the INEEL would be the lead laboratories for development of the next generation of power reactors. On February 1, 2005, the INEEL and Argonne National Laboratory-West became the INL. The INL is committed to providing international nuclear leadership for the 21st Century, developing and demonstrating compelling national security technologies, and delivering excellence in science and technology as one of the Department of Energy's multi-program national laboratories.

The Idaho Cleanup Project (ICP) is now a separately managed effort. The ICP is charged with safely and cost-effectively completing the majority of cleanup work from past laboratory missions in an ongoing process.

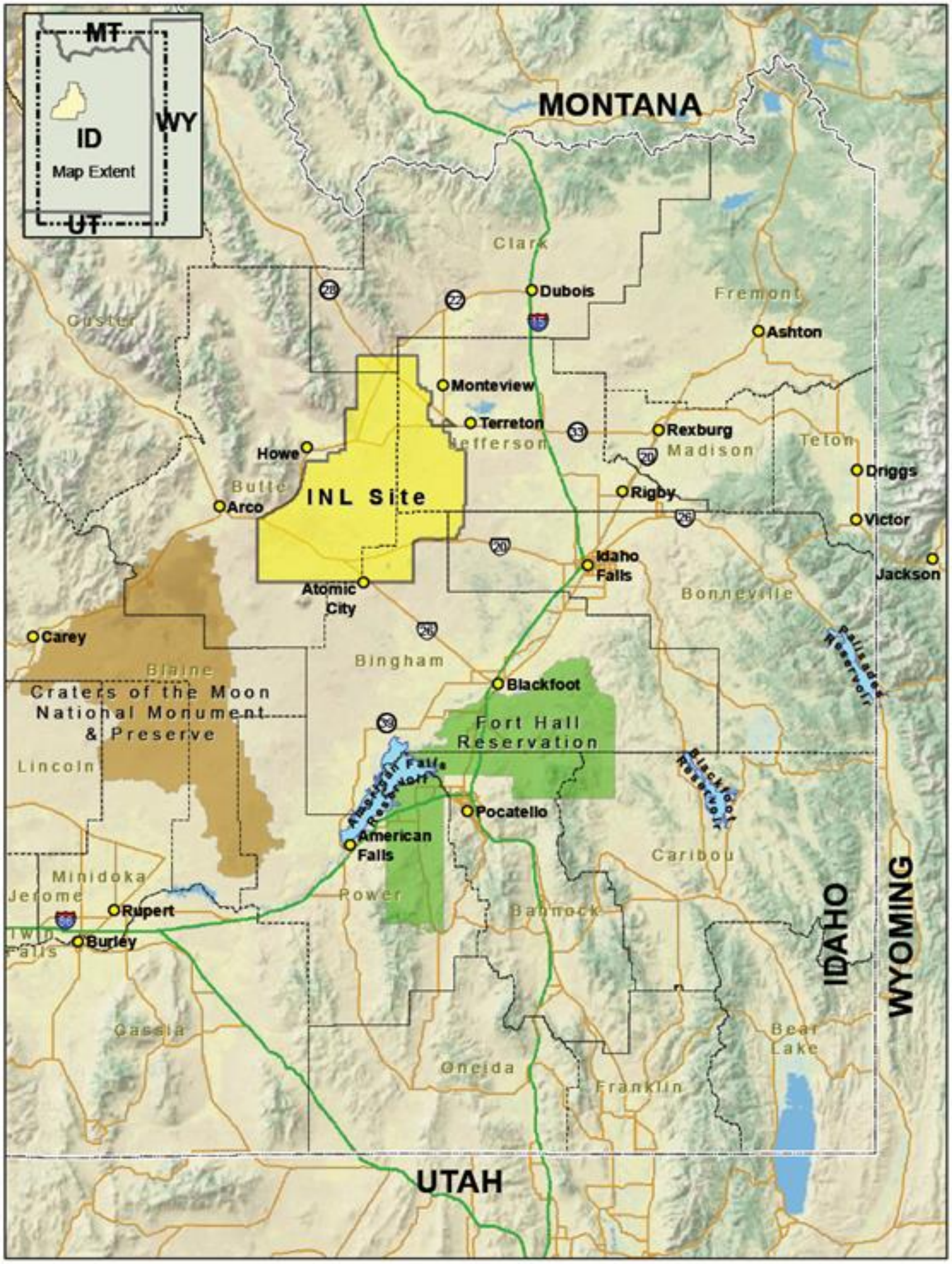

Figure 1. Location of the Idaho National Laboratory Site.

3. Air Sampling

The primary pathway by which radionuclides can move off the INL Site is through the air and for this reason the air pathway is the primary focus of monitoring on and around the INL Site. Samples for particulates and iodine-131 (^{131}I) gas in air were collected weekly for the duration of the quarter at 16 locations using low-volume air samplers. Moisture in the atmosphere was sampled at four locations around the INL Site and analyzed for tritium. Air sampling activities and results for the second quarter of 2018 are discussed below. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses and DOE Derived Concentration Standard (DCS) (DOE 2011b) values is provided in Appendix B.

3.1 Low-Volume Air Sampling

Radioactivity associated with airborne particulates was monitored continuously by 18 low-volume air samplers (two of which are used as replicate samplers) at 16 locations during the second quarter of 2018 (Figure 2). Three of these samplers are located on the INL Site, seven are situated off the INL Site near the boundary, and eight have been placed at locations distant to the INL Site. Samplers are divided into INL Site, Boundary, and Distant groups to determine if there is a gradient of radionuclide concentrations, increasing towards the INL Site. Each replicate sampler is relocated every other year to a new location. At the start of 2018, one replicate sampler was moved to Blue Dome (a Boundary location) and one was moved to Atomic City (also a Boundary location). An average of 19,998 ft^3 (566 m^3) of air was sampled at each location, each week, at an average flow rate of 1.98 ft^3/min (0.06 m^3/min). Particulates in air were collected on membrane particulate filters (1.2 µm pore size). Gases passing through the filter were collected with an activated charcoal cartridge.

Filters and charcoal cartridges were changed weekly at each station during the quarter. Each particulate filter was analyzed for gross alpha and gross beta radioactivity using thin-window gas flow proportional counting systems after waiting about four days for naturally-occurring daughter products of radon and thorium to decay.

The weekly particulate filters collected during the quarter for each location were composited and analyzed for gamma-emitting radionuclides. Selected composites were also analyzed by location for ^{90}Sr, ^{238}Pu, $^{239/240}$Pu, and ^{241}Am as determined by a rotating quarterly schedule.

Charcoal cartridges were analyzed for gamma-emitting radionuclides, specifically for iodine-131 (^{131}I). Iodine-131 is of particular interest because it is produced in relatively large quantities by nuclear fission, is readily accumulated in human and animal thyroids, and has a half-life of eight days. This means that any elevated level of ^{131}I in the environment could be from a recent release of fission products.

Gross alpha results are reported in Table C-1. Gross alpha data were tested for normality prior to statistical analyses, and generally showed no consistent discernible distribution. The data are graphically shown in Figures 3 through 6. Box and whiskers plots were used to present the non-parametric data. As shown in the figures all data were below were well below the DCS for $^{239/240}$Pu, the most conservative value for a human-made alpha-emitting radionuclide that might be detected at the INL Site. Nothing unusual was noted in the gross alpha data and all were well within measurements taken within the last ten years (2008-2017).

Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of measurements made in the past ten years, and because these values could not be attributed to mistakes in collection, analysis, or reporting procedures.

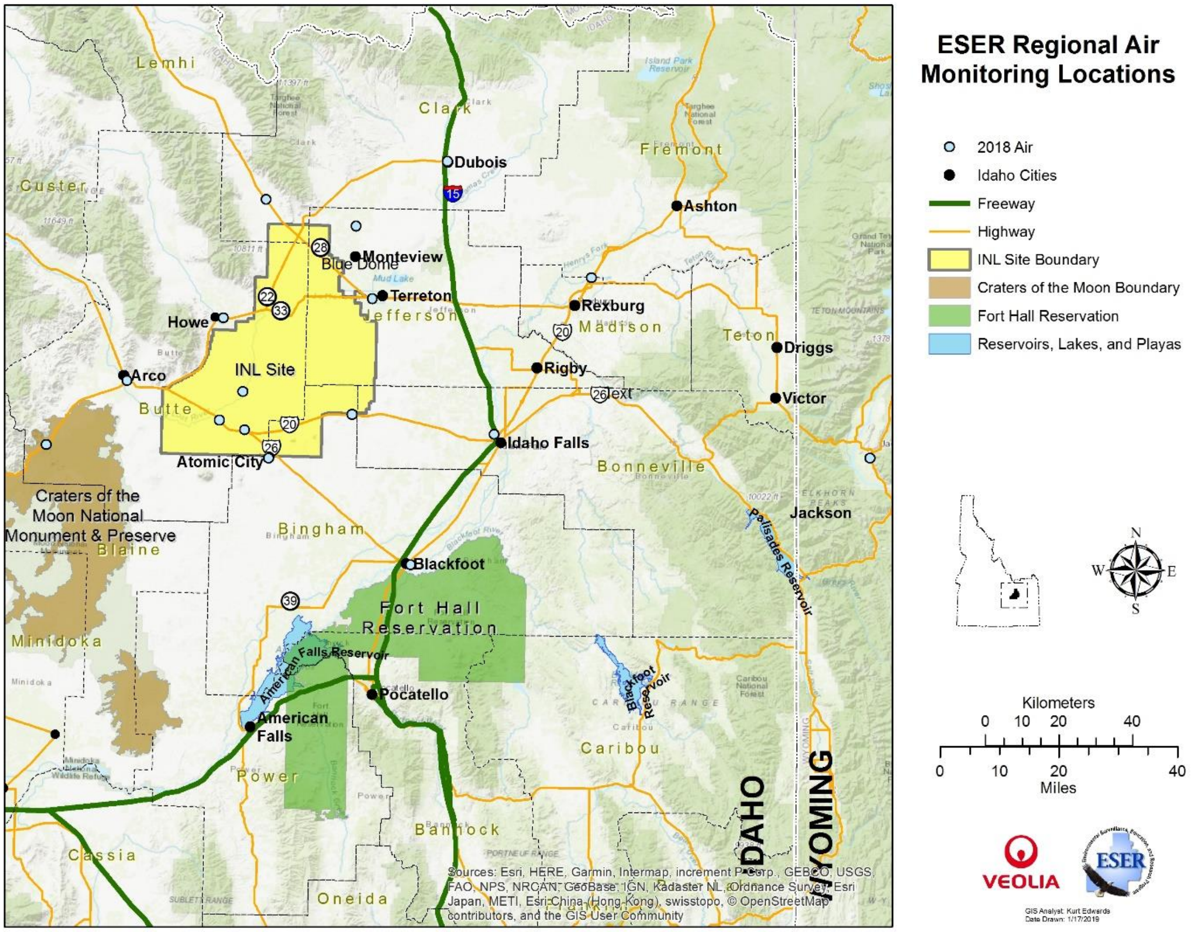

Figure 2. ESER air monitoring locations.

Because there is no discernible distribution of the data, the nonparametric Kruskal-Wallis (K-W) test of multiple independent groups was used to test if there are statistical differences between INL Site, Boundary, and Distant locations. The use of nonparametric tests, such as Kruskal-Wallis, gives less weight to outlier and extreme values thus allowing a more appropriate comparison of data groups. A statistically significant difference exists between groups if the (p) value is less than 0.05. Values greater than 0.05 translate into a 95 percent confidence that the groups are statistically the same. The p value for each comparison is shown in Table D-1. The results show that at least one of the locations groups was different from at least on the others during the second quarter and during the month of April.

The K-W test does not indicate which of the groups are different from one another or how many of the groups are different from each other. The multiple comparison test was thus used to determine which of the groups were different during the second quarter and the month of April (Table D-2). The results of the multiple comparison test of second quarter data show that the gross alpha concentrations for the INL Site group were statistically different (lower) than those of Boundary and Distant location groups. The Boundary and Distant groups were statistically the same. The differences between the INL Site and other groups are slight however, as shown in Figure 3, and probably reflect differences in geography as well as the low number of INL Site samples (n=38) as compared with the Boundary group (n=90) and the Distant group (n=78). The results of the multiple comparison test of April data show that the INL Site group differs only from the Distant group. The INL Site data rank lower than the Distant data, but do not differ from the Boundary group.

Gross beta results are presented in Table C-1 and displayed in Figures 7 through 10. The data are tested quarterly and generally are found to be neither normally nor log-normally distributed. Box and whiskers plots were used to present the non-parametric data. Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of measurements made in the past ten years, and because these values could not be attributed to mistakes in collection, analysis, or reporting procedures. There was no statistically significant difference in the data between groups for the quarter as a whole, using the Kruskal-Wallis ANOVA by ranks test (Table D-1). There were also no statistical differences between location groups during any month of the quarter.

Iodine-131 was not detected in any of the 26 sets of charcoal cartridges measured during the second quarter. Weekly ^{131}I results for each location are listed in Table C-2 of Appendix C.

The results of analyses of quarterly composited filters are presented in Table C-3 of Appendix C. No ^{137}Cs or other human-made gamma-emitting radionuclides were found in quarterly composited filters. Srontium-90, a beta-emitting radionuclide with a half-life of approximately 30 years, was detected in one composite sample collected at Arco. The ^{90}Sr result was far below the DCS and within concentrations measured during the period from 2008 through 2017. It is most likely due to resuspension of soil contaminated with fallout from historical nuclear weapons testing.

Alpha-emitting radionuclides ^{238}Pu, $^{239/240}$Pu, and ^{241}Am were detected in the Van Buren Gate filter composite at elevated levels compared to historical measurements by the ESER program. This was also one of the infrequent times americium and plutonium isotopes have been detected together in an ESER Program filter composite. Thorough examination of quality assurance and control data, including analytical results from blanks and performance evaluation samples, does not suggest inadvertent contamination of the filter in the field or laboratory. Although the measurements were elevated, they are well below public health standards (i.e., DCSs) and therefore do not represent a public health concern.

A possible source of the radionuclides measured in the Van Buren Gate sample is the Radioactive Waste Management Complex (RWMC). Plutonium isotopes and ^{241}Am are often detected in low-volume air filters collected around the Subsurface Disposal Area, as well as in soil contaminated from past flooding (in 1962 and 1969) of pits and trenches containing transuranic waste originating from the Rocky Flats Plant. The Van Buren Gate is also situated in the predominant downwind direction from the RWMC. This and other possible sources will be investigated further.

3.2 Atmospheric Moisture Sampling

Atmospheric moisture is collected by pulling air through a column of absorbent material (molecular sieve material) to absorb water vapor. The water is then extracted from the absorbent material by heat distillation. The resulting water samples are then analyzed for tritium using liquid scintillation.

Results were available for seventeen atmospheric moisture samples collected at the INL Site, Boundary, and Distant locations during the second quarter of 2018 (Figure 11). Eleven of the results exceeded the 3s uncertainty level for tritium, with similar results to those reported during the past ten years (2008-2017). Results also remain similar between the four sampling locations. All samples were significantly below the DOE DCS for tritium in air of 1.4×10^{-8} $\mu Ci/mL_{air}$ with a maximum reported value of 1.74×10^{-12} $\mu Ci/mL_{air}$ at Idaho Falls. Results are shown in Table C-4, Appendix C.

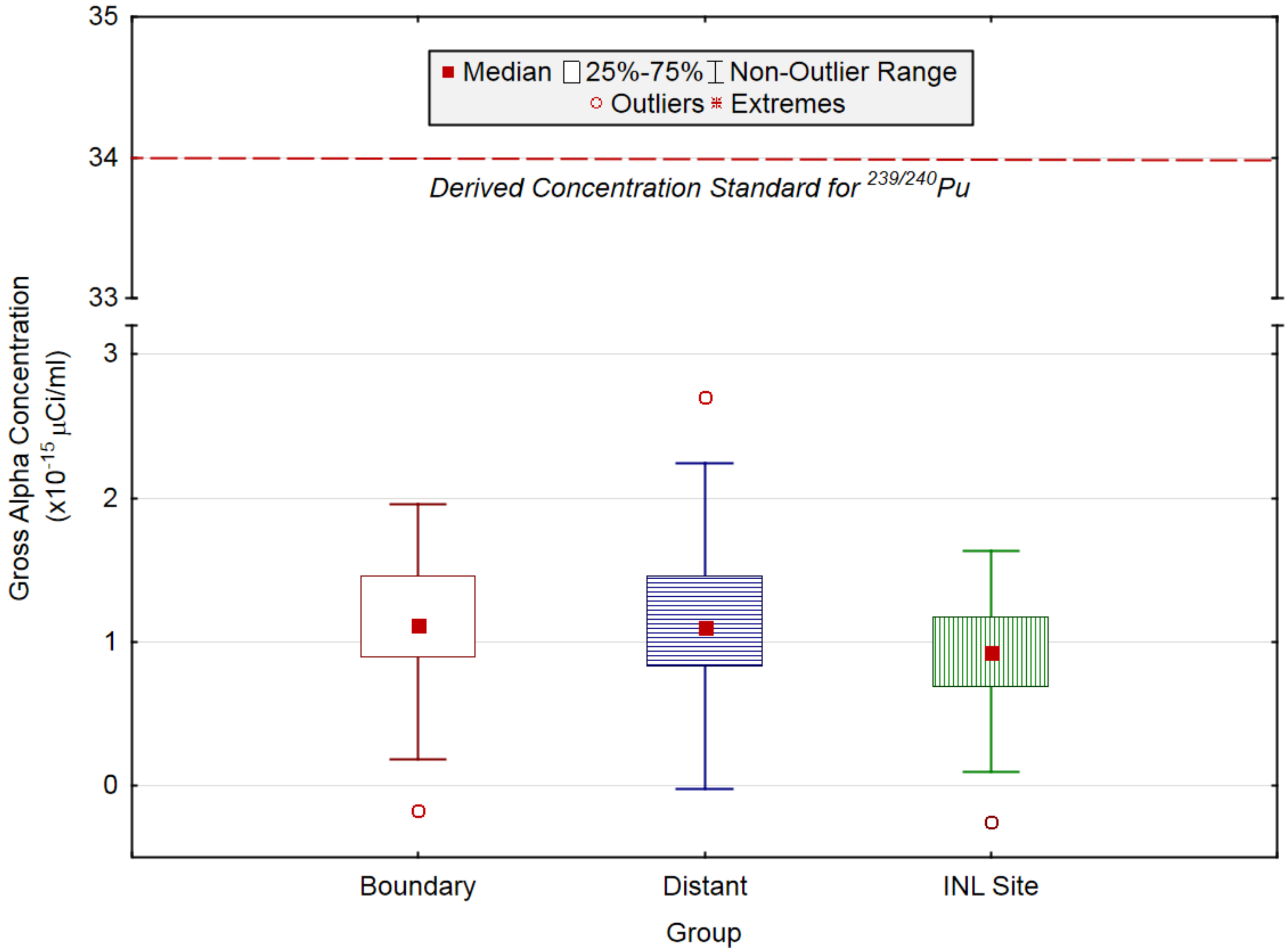

Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations for the second quarter of 2018. The DOE Derived Concentration Standard (DCS) is the concentration of plutonium-239 ($^{239/240}$Pu) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{238}U, ^{234}U, ^{232}Th, ^{226}Ra and ^{210}Po) in uncertain proportions, a meaningful DCS cannot be constructed for gross alpha concentrations. The DCS for $^{239/240}$Pu is shown because it is the most restrictive human-made alpha emitter.

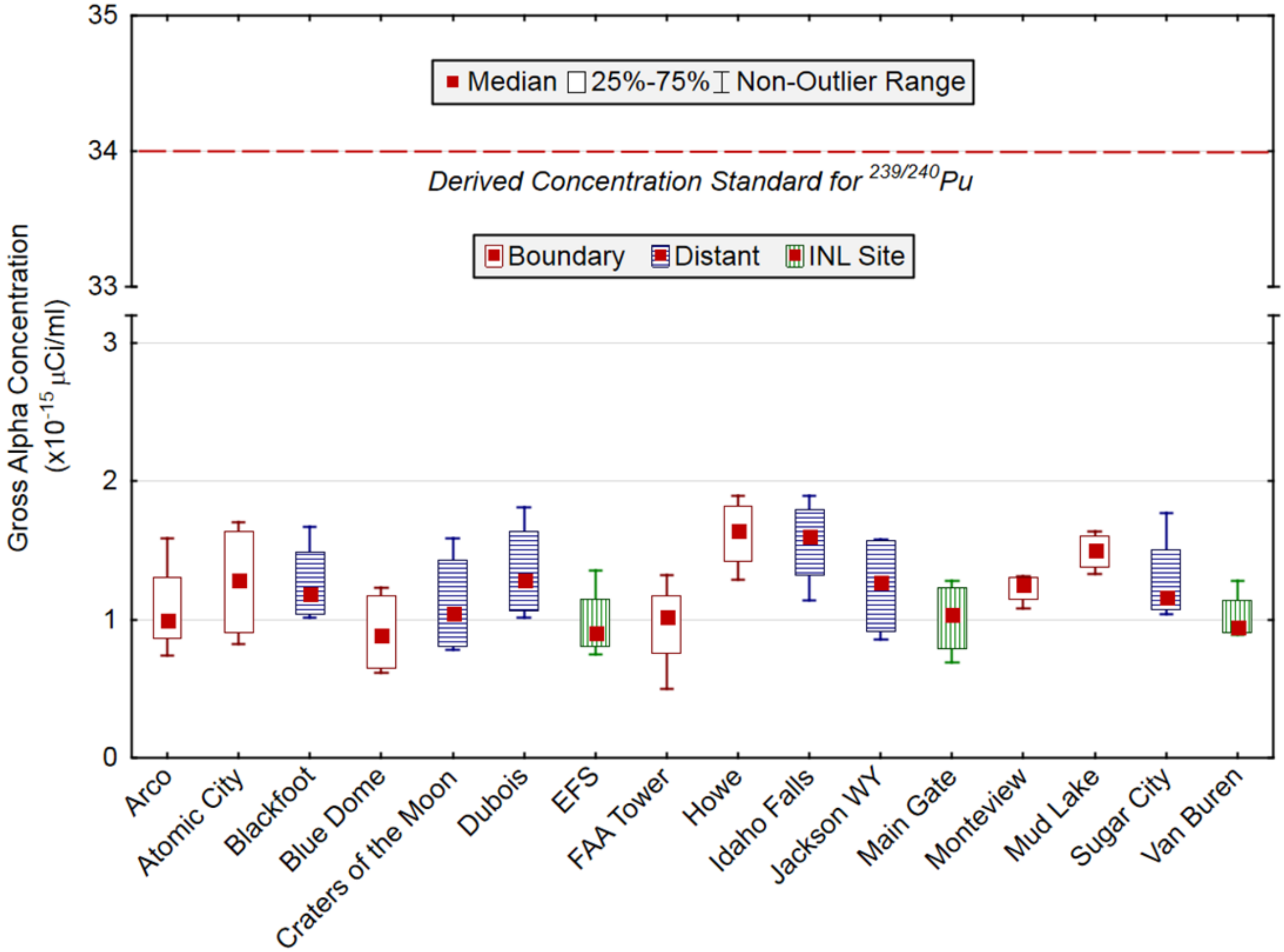

Figure 4. April gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location. The Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}Pu$) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{238}U, ^{234}U, ^{232}Th, ^{226}Ra and ^{210}Po) in uncertain proportions, a meaningful DCS cannot be constructed for gross alpha concentrations. The DCS for $^{239/240}Pu$ is shown because it is the most restrictive human-made alpha emitter.

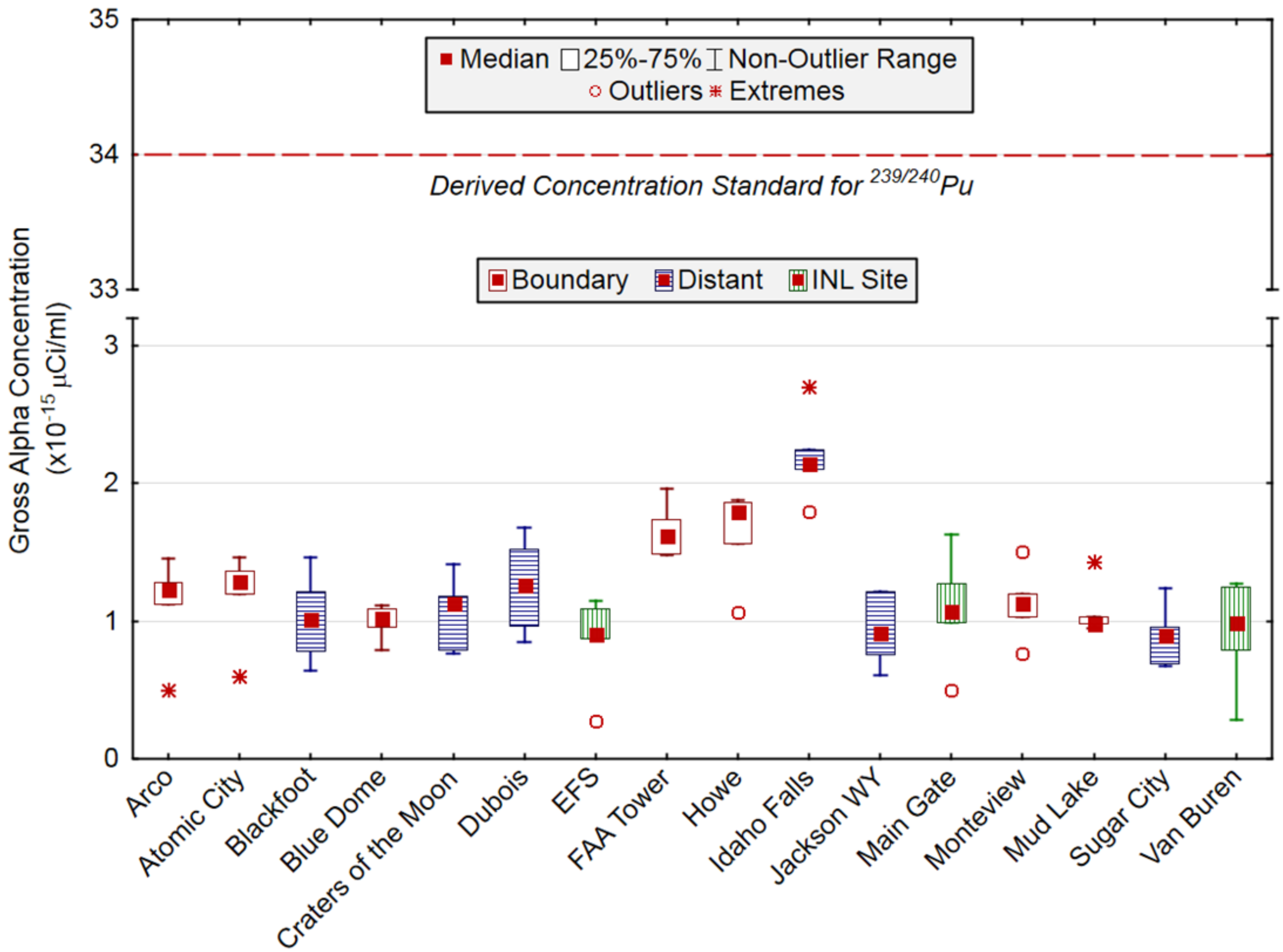

Figure 5. May gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location. The Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}Pu$) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{238}U, ^{234}U, ^{232}Th, ^{226}Ra and ^{210}Po) in uncertain proportions, a meaningful DCS cannot be constructed for gross alpha concentrations. The DCS for $^{239/240}Pu$ is shown because it is the most restrictive human-made alpha emitter.

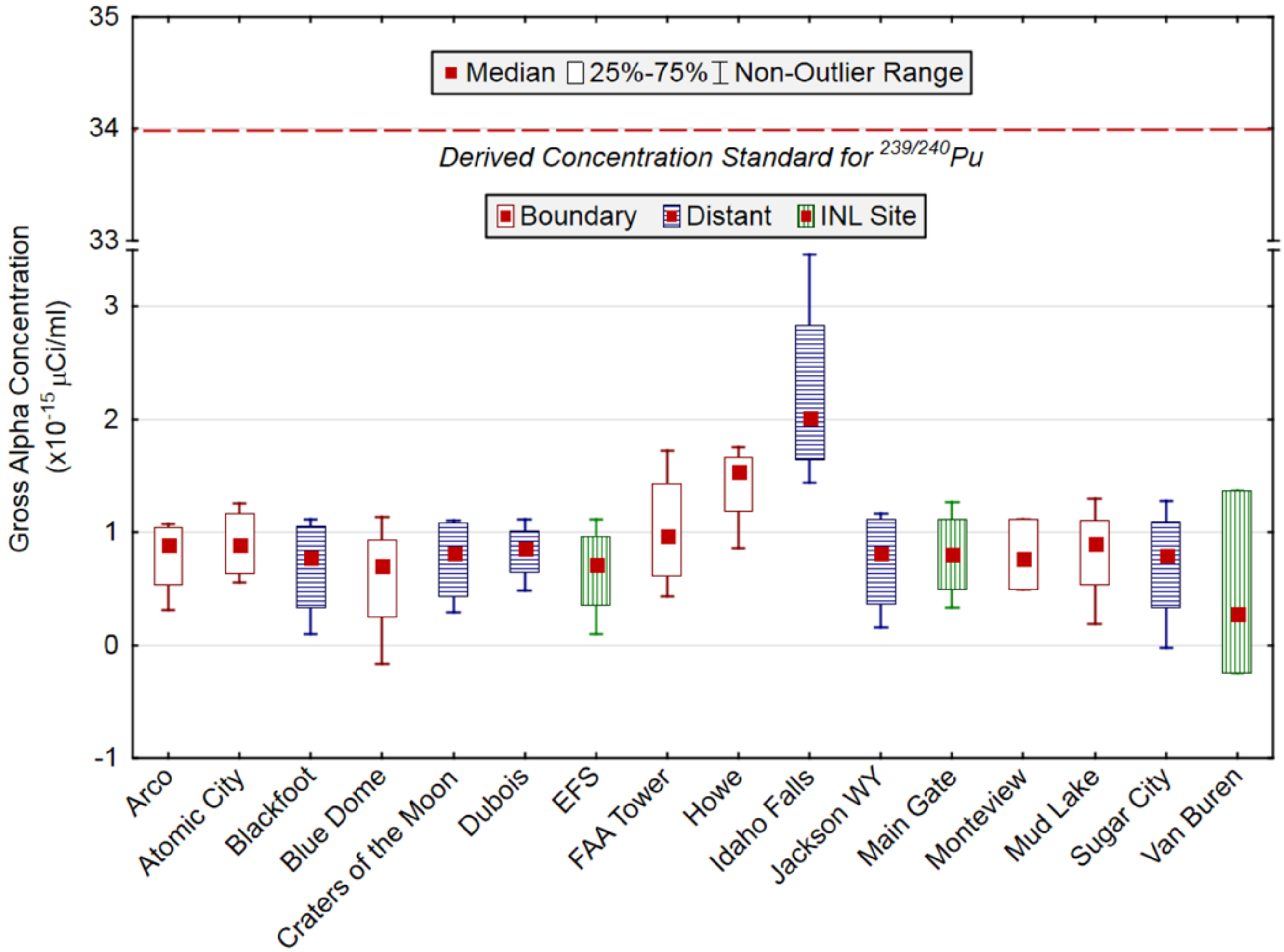

Figure 6. June gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location (except for Monteview and Van Buren, n=3). The Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}Pu$) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{238}U, ^{234}U, ^{232}Th, ^{226}Ra and ^{210}Po) in uncertain proportions, a meaningful DCS cannot be constructed for gross alpha concentrations. The DCS for $^{239/240}Pu$ is shown because it is the most restrictive human-made alpha emitter.

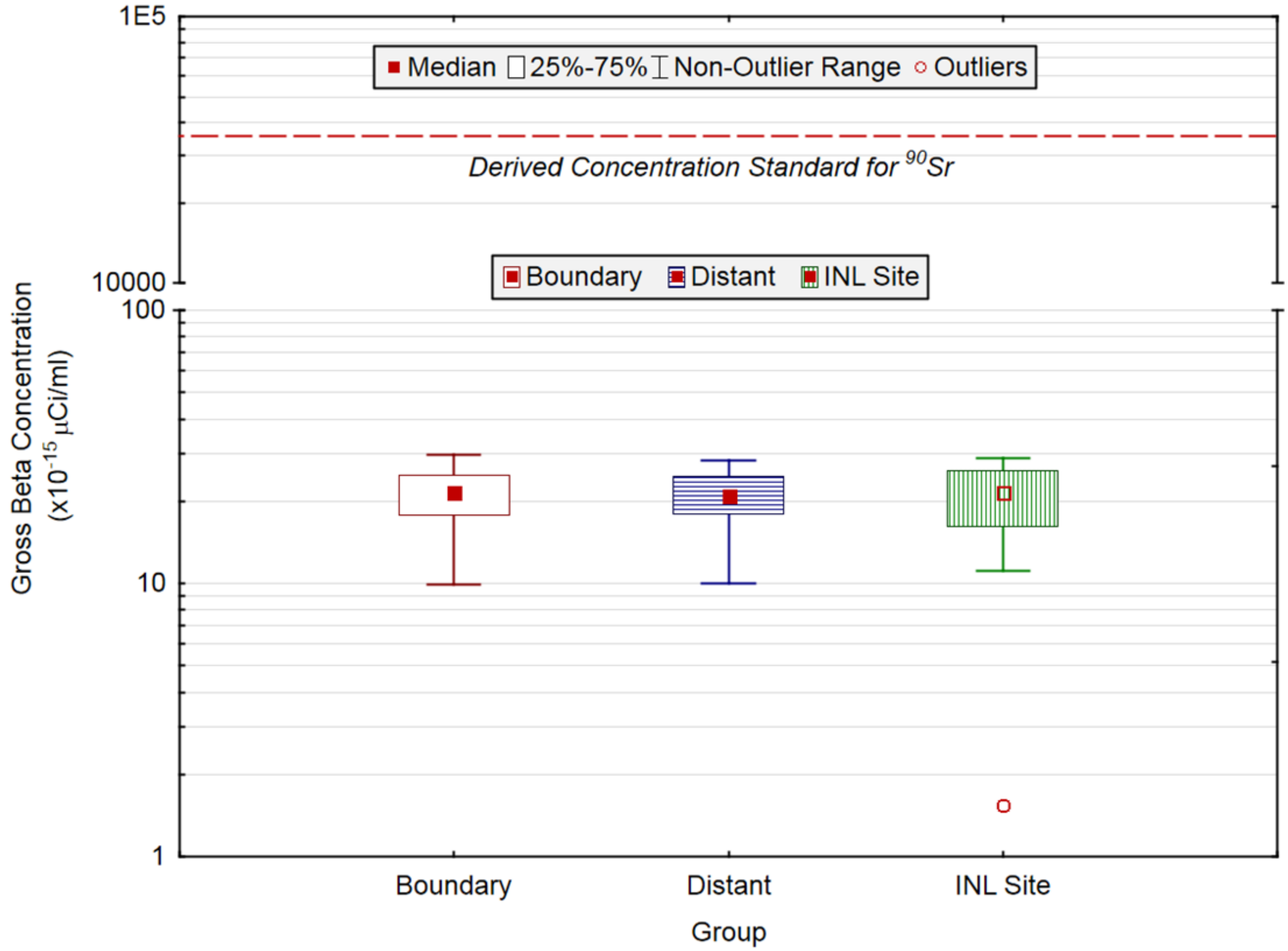

Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the second quarter of 2018. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{40}K, ^{228}Ra, and ^{210}Pb) in uncertain proportions, a meaningful DCS cannot be constructed for gross beta concentrations. The DCS for ^{90}Sr is shown because it is the most restrictive human-made beta emitter.

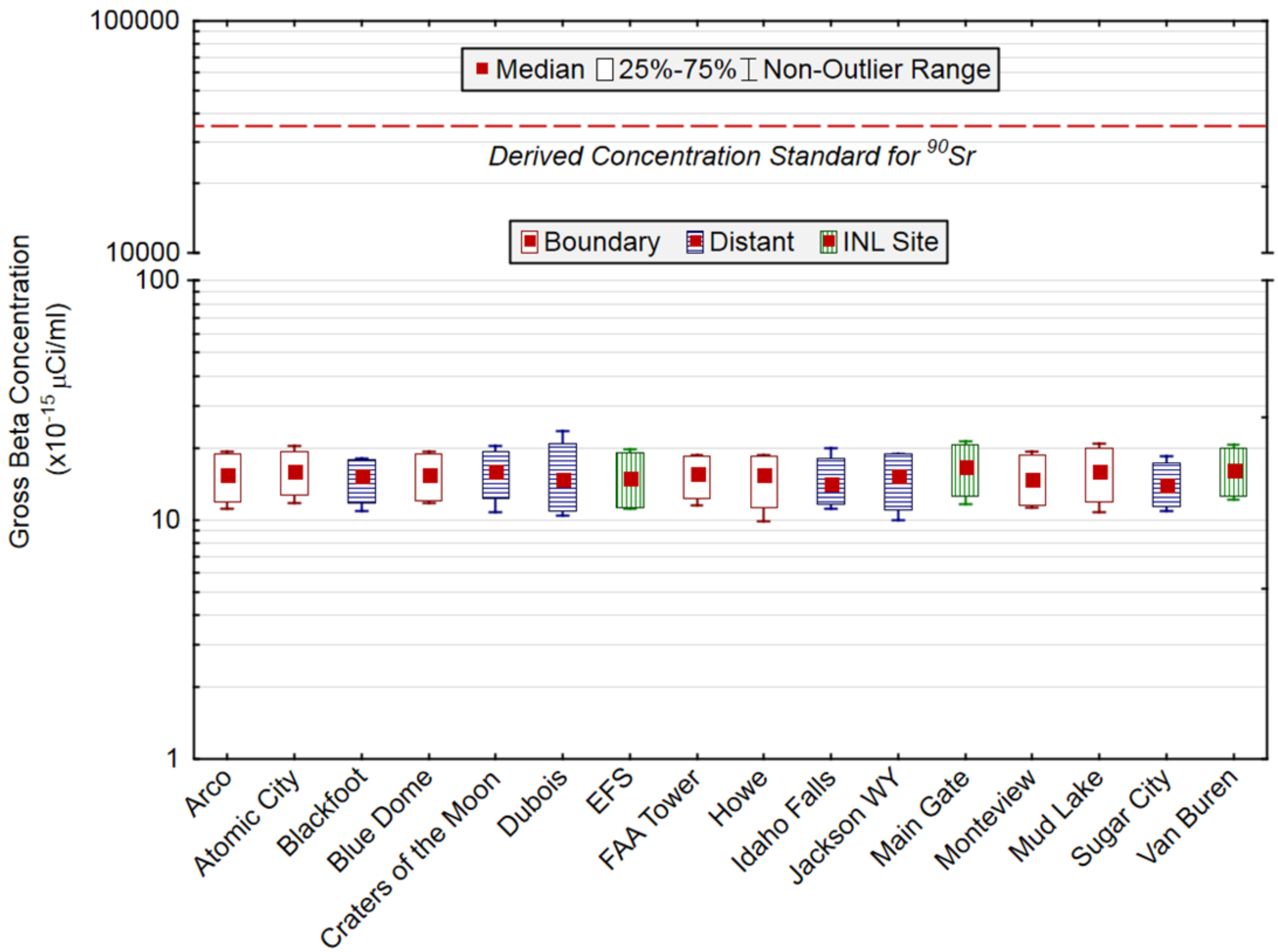

Figure 8. April gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{40}K, ^{228}Ra, and ^{210}Pb) in uncertain proportions, a meaningful DCS cannot be constructed for gross beta concentrations. The DCS for ^{90}Sr is shown because it is the most restrictive human-made beta emitter.

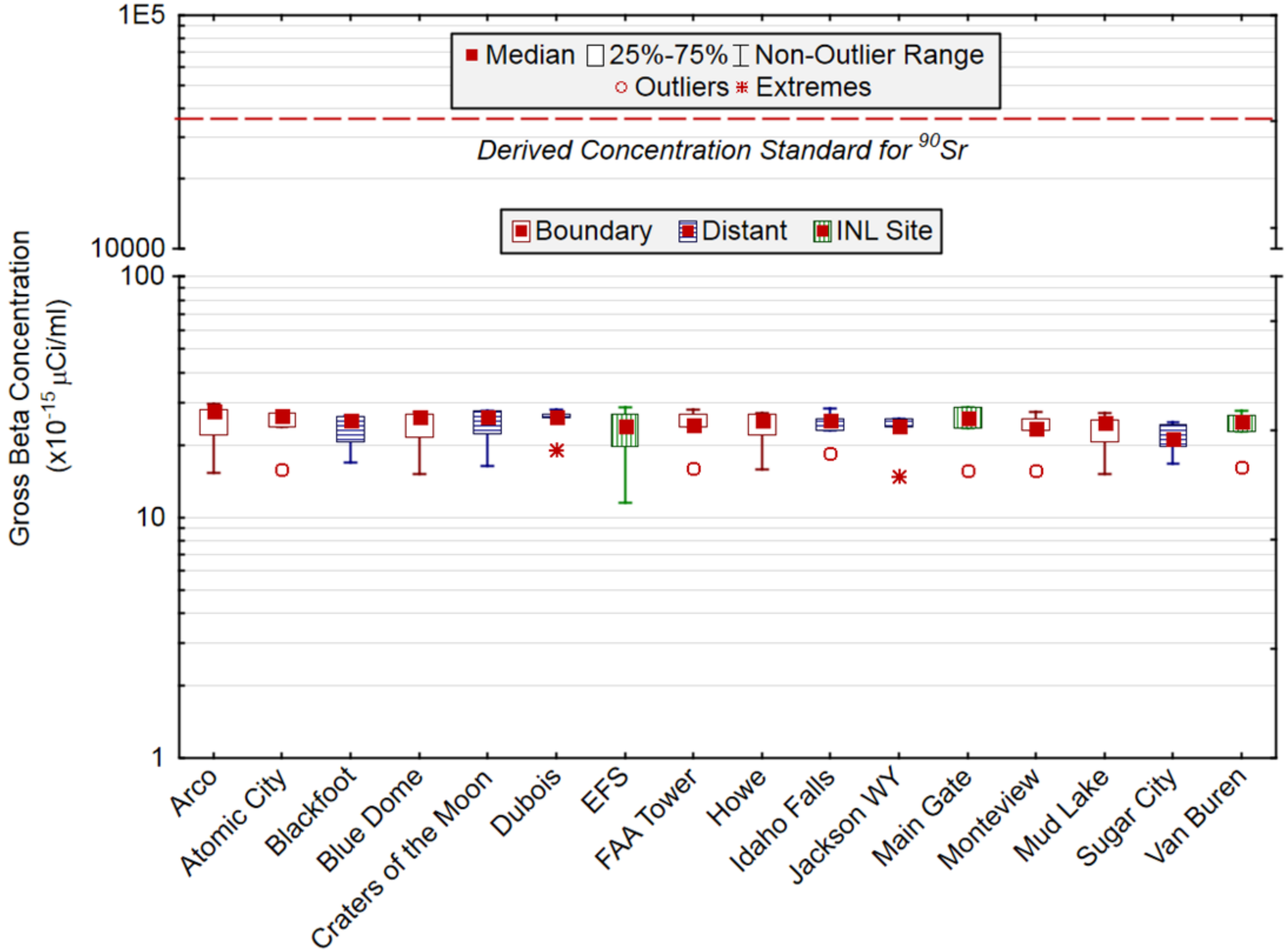

Figure 9. May gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{40}K, ^{228}Ra, and ^{210}Pb) in uncertain proportions, a meaningful DCS cannot be constructed for gross beta concentrations. The DCS for ^{90}Sr is shown because it is the most restrictive human-made beta emitter.

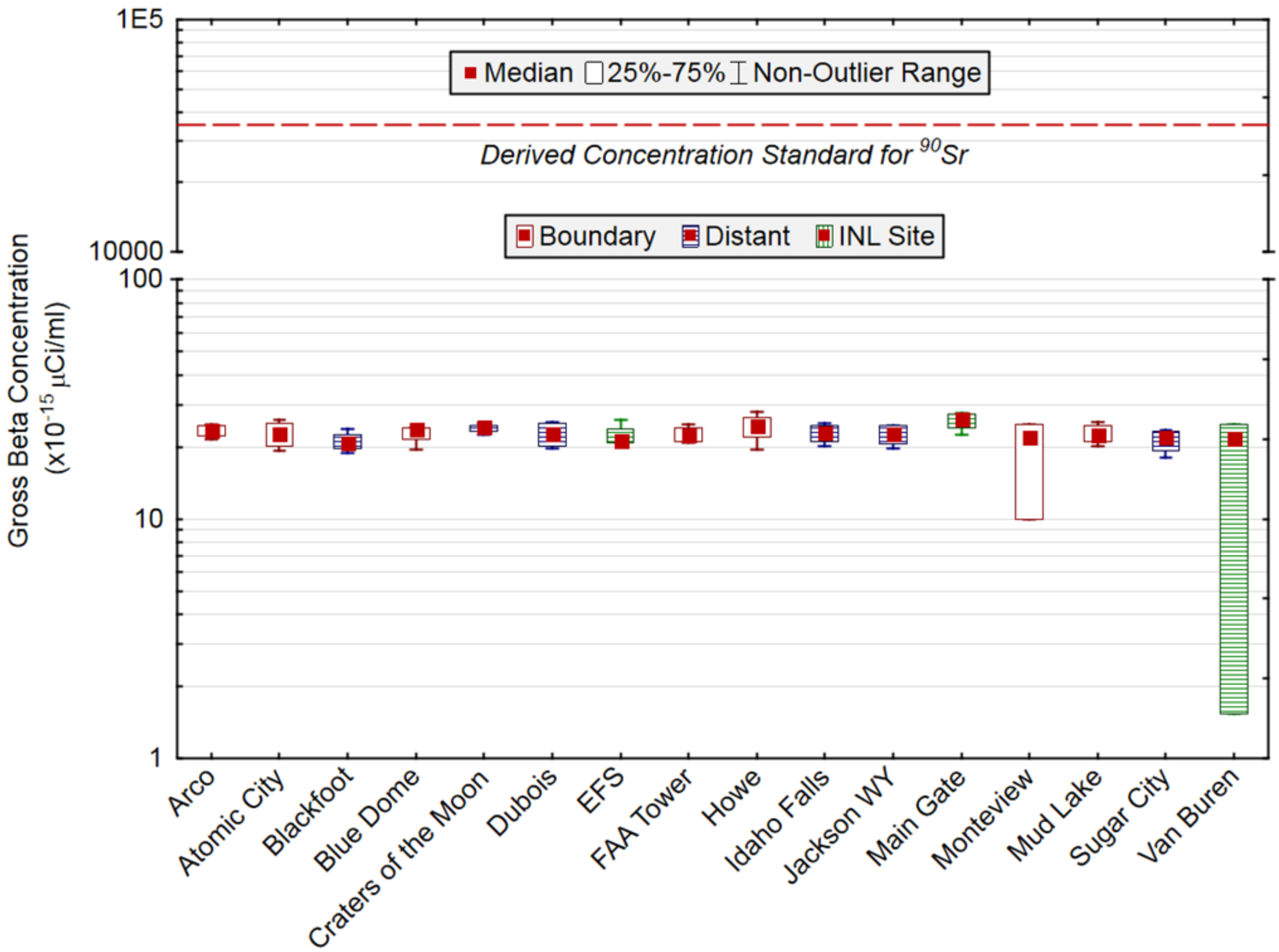

Figure 10. June gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as ^{40}K, ^{228}Ra, and ^{210}Pb) in uncertain proportions, a meaningful DCS cannot be constructed for gross beta concentrations. The DCS for ^{90}Sr is shown because it is the most restrictive human-made beta emitter.

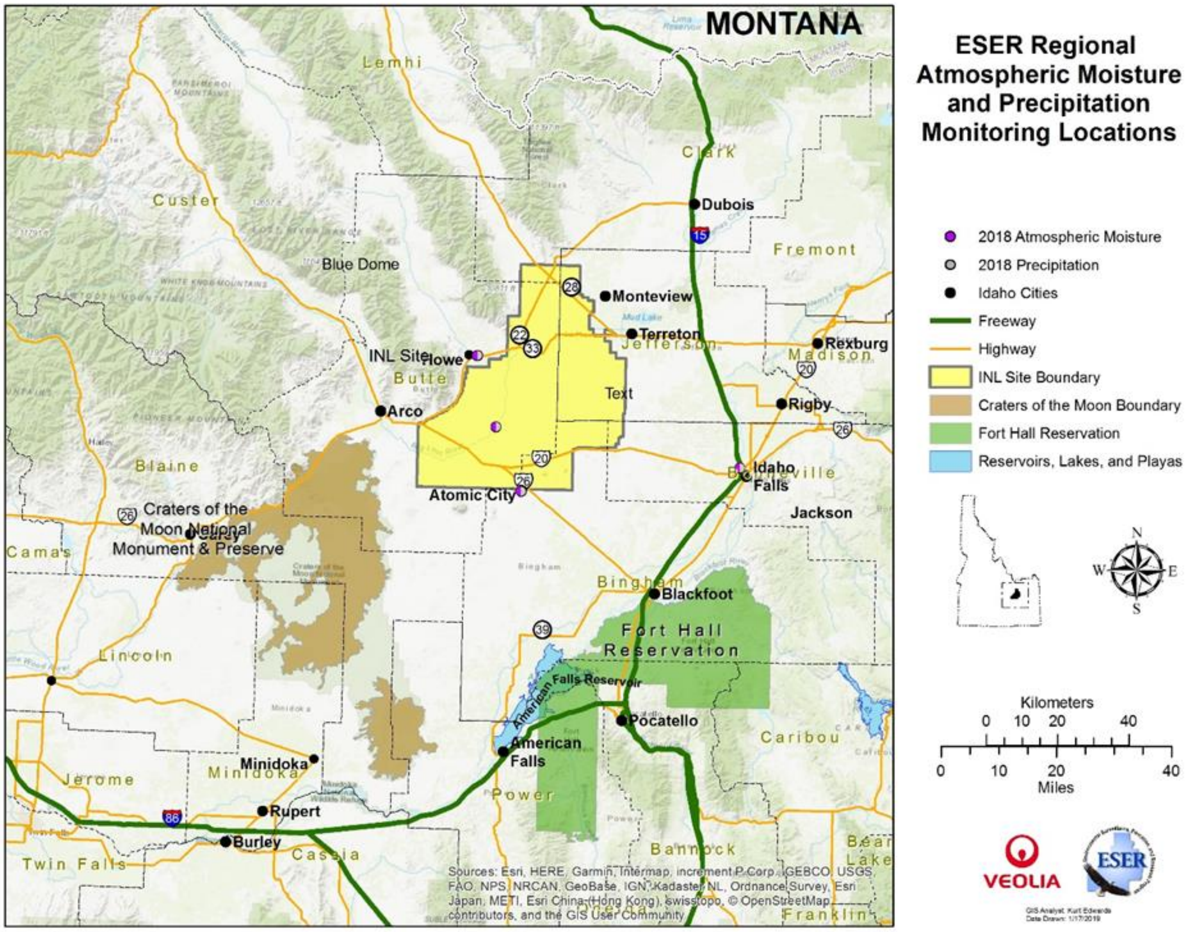

Figure 11. ESER atmospheric moisture and precipitation monitoring locations.

4. Precipitation and Water Sampling

4.1 Precipitation Sampling

Precipitation samples are gathered when sufficient precipitation occurs to allow for the collection of the minimum sample volume of approximately 50 mL (Figure 11). Samples are taken of monthly composites from Idaho Falls, and weekly (when available) from the EFS on the INL Site and Atomic City and Howe on the INL Site boundary. These are the same locations that atmospheric moisture samples are collected at. Precipitation samples are analyzed for tritium. Storm events in the second quarter of 2018 produced sufficient precipitation to yield 28 samples.

Tritium was measured above the 3s values in all of the 28 samples. These results are listed in Table C-5 (Appendix C). Low levels of tritium exist in the environment at all times as a result of cosmic ray reactions with water molecules in the upper atmosphere. Long-term data collected around the globe since 1961 by the International Atomic Energy Agency suggest that that tritium levels have steadily decreased since the Nuclear Test Ban Treaty in 1963 and are close to their pre-nuclear test values (Cauquoin et al. 2015) and that there are no longer remnants of fallout from nuclear weapons testing. When detected, tritium values have remained well within the historical range and the range measured across the country by the EPA Radnet program (EPA 2018). Most samples have values up to about 150 pCi/L, with occasional values ranging up to about 300-400 pCi/L. The maximum value in the second quarter was 299 pCi/L in an Atomic City sample collected on May 2.

4.2 Water Sampling

Drinking water samples were collected at eight locations (plus a duplicate). A control sample of bottled water was also prepared. Surface water samples were collected at three Thousand Springs locations. All samples were analyzed for gross alpha, gross beta, and tritium. Locations are shown in Figure 12 and results are listed in Table C-6 of Appendix C. During the summer of 2020, a review of Appendix C, Table C-6 determined the activity concentration values reported for the media were correct, however, the sampling dates for the drinking water samples were incorrect. The incorrect values were due to the collection dates not being updated at the time the table was created. The sampling dates for the drinking water samples were updated with the correct values.

Gross alpha activity was detected in two of the 10 drinking water samples (Craters of the Moon and the Rest Area duplicate samples) and in one of the three surface water samples. Gross beta activity was detected in nine of the 10 drinking water samples (all except the control), and in all three of the surface water samples. All concentrations were generally similar to previous results from drinking and surface water sampling. Natural levels of radioactive decay products of thorium and uranium exist in the Snake River Plain Aquifer and are the likely source of the measured concentrations. The highest reported value was 6.8 pCi/L in the sample from Alpheus Spring near Twin Falls. This location has historically shown the highest levels of natural activity.

Tritium was also detected in three of the 10 drinking water samples and one of the three surface water samples. The concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous results. The maximum value was 209 pCi/L at Minidoka. The results are well below the DCS of 1.9×10^6 pCi/L for tritium in drinking water.

The Big Lost River (BLR) flowed on the INL Site during the second quarter. Samples were collected during April and June at five locations (plus a duplicate). A control sample was collected from Birch Creek. All samples were analyzed for gross alpha, gross beta, tritium, and gamma-emitting radionuclides. Results are listed in Table C-7 of Appendix C and include two collection events, one in April and one in June.

Gross alpha activity was detected in ten of fourteen samples. The highest reported gross alpha value was 6.94 pCi/L in a duplicate sample from the BLR at NRF. Gross beta activity was detected in twelve of the samples. The highest reported gross beta value was 11.4 pCi/L in a duplicate sample from BLR at NRF. Concentrations were generally similar to previous results from the BLR sampling. Tritium was detected in nine samples from the BLR. The highest reported value was 136 pCi/L in the sample collected at the Rest Area. Concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous years.

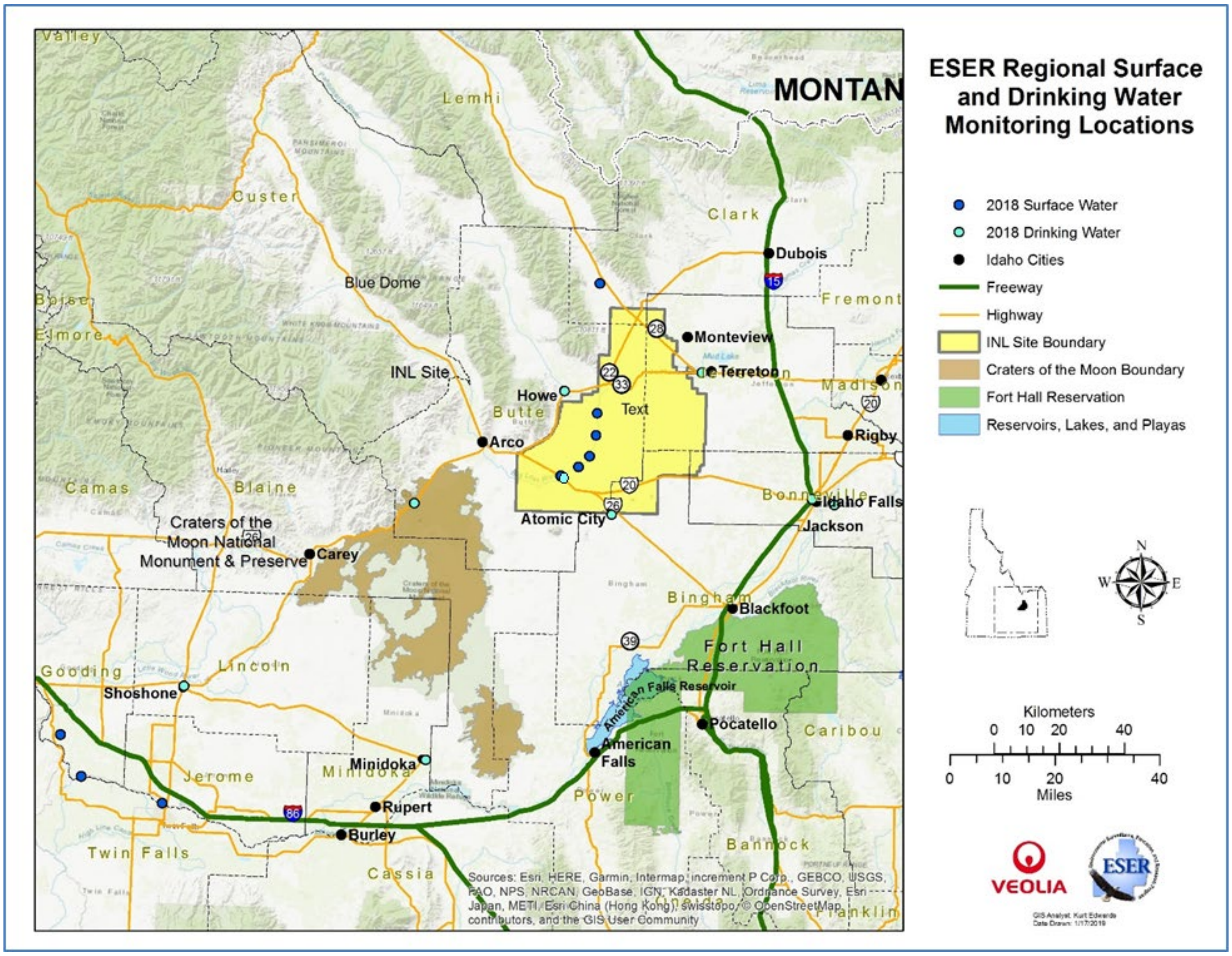

Figure 12. ESER surface and drinking water monitoring locations.

5. Agricultural Product, Wildlife, and Soil Sampling

Another potential pathway for contaminants to reach humans is through the food chain. The ESER Program samples multiple agricultural products and game animals from around the INL Site and Southeast Idaho. Specifically, milk, alfalfa, grain, potatoes, lettuce, large game animals, and waterfowl are sampled. Milk is sampled throughout the year and large game animals are sampled whenever large game animals are killed onsite from vehicle collisions. Alfalfa is collected during the second quarter, lettuce and grain are sampled during the third quarter, while potatoes are collected during the fourth quarter. Waterfowl are collected in either the third or fourth quarter. See Table A-1, Appendix A, for more details on agricultural product and wildlife sampling. This section discusses results from milk and wildlife samples available during the second quarter of 2018.

5.1 Milk Sampling

Milk samples were collected weekly at Idaho Falls and Terreton. Monthly samples were collected at five other locations around the INL Site (Figure 13) during the second quarter of 2018. In addition to the local locations, commercially-available organic milk (from Colorado) was purchased as a control sample each month. All samples were analyzed for gamma emitting radionuclides, with particular emphasis on ^{131}I. Semi-annual samples were collected and analyzed for ^{90}Sr and tritium.

Neither ^{131}I nor ^{137}Cs was detected in any weekly or monthly samples during the second quarter. No other human-made gamma-emitting radionuclides were found either. Data for ^{131}I and ^{137}Cs in milk samples are listed in Appendix C, Table C-8.

Results for ^{90}Sr and tritium are listed in Appendix C, Table C-9. Strontium-90 was detected in three of seven samples analyzed. The maximum concentration of 0.21 pCi/L from Blackfoot is in the lower portion of the range for these values over the past several years. The presence of ^{90}Sr at similar levels in samples from near the INL Site and Distant from the INL Site (as well as the organic milk from Colorado), does not indicate an INL Site impact of the results. There is no DCS for ^{90}Sr in milk; however, for comparison the results were well below the drinking water DCS of 1.1×10^3 pCi/L.

Tritium was also detected in five of seven samples analyzed, with a maximum value of 171 pCi/L in the sample from Minidoka. All results were similar to those previously measured and similar to those found in other liquid media like precipitation. There is no DCS for tritium in milk, but the results were well below the DCS for tritium in drinking water (1.9×10^6 pCi/L).

5.2 Alfalfa Sampling

Four samples of alfalfa (including one duplicate) were obtained from growers in the Howe, Mud Lake, and Idaho Falls areas. All samples were analyzed for gamma-emitting radionuclides and three samples for ^{90}Sr. Data for ^{137}Cs and ^{90}Sr in alfalfa samples are listed in Appendix C, Table C-10.

No human-made gamma-emitting radionuclides were found in any of the samples this year. Strontium-90 was detected at 135 pCi/kg in one sample collected at Idaho Falls. During the five years alfalfa has been collected, ^{90}Sr concentrations have been in the 70-150 pCi/kg range.

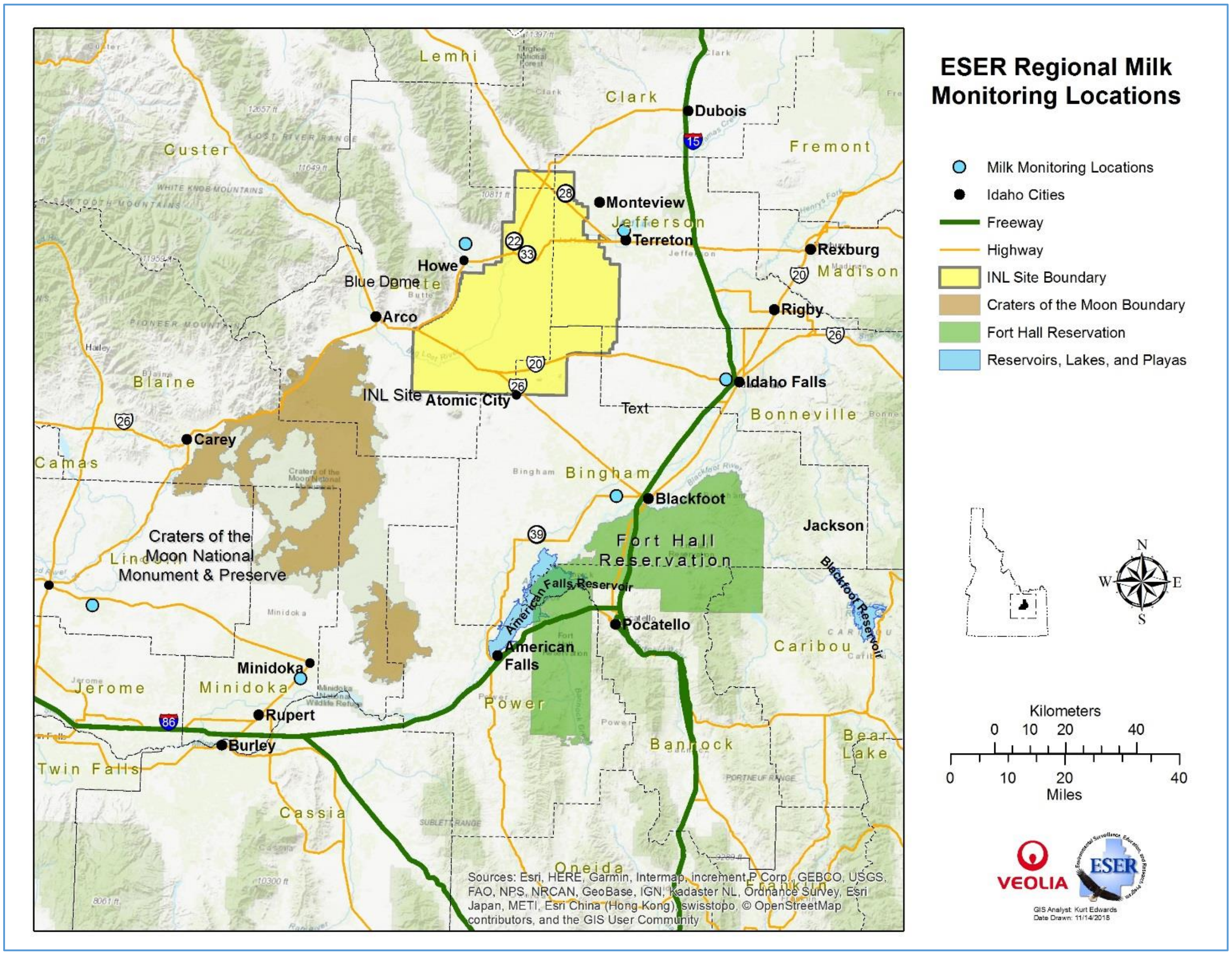

Figure 13. ESER milk monitoring locations.

6. Environmental Radiation

An array of optically stimulated luminescent dosimeters (OSLDs) is distributed throughout the Eastern Snake River Plain to monitor for environmental radiation (Figure 14). Two OSLDs are in place at each location. OSLDs are changed out at the beginning of May and again at the beginning of November after six months in the field.

OSLD results from dosimeters collected during the second quarter are displayed in Appendix C, Table C-11. Results are presented in dose units of millirem (mrem). The Boundary OSLD values ranged from 51.65 mrem at Blue Dome to 64.6 mrem at Mud Lake, with an overall average of 59.04 mrem. This equates to an average dose of 0.32 mrem per day. Distant results varied from 52.7 mrem at Dubois to 74.2 mrem at Sugar City. The Distant average was 59.72 mrem, which also equates to 0.33 mrem per day. Results vary between sampling locations based on the geologic composition of the soils in the vicinity of the OSLD and the elevation of the station.

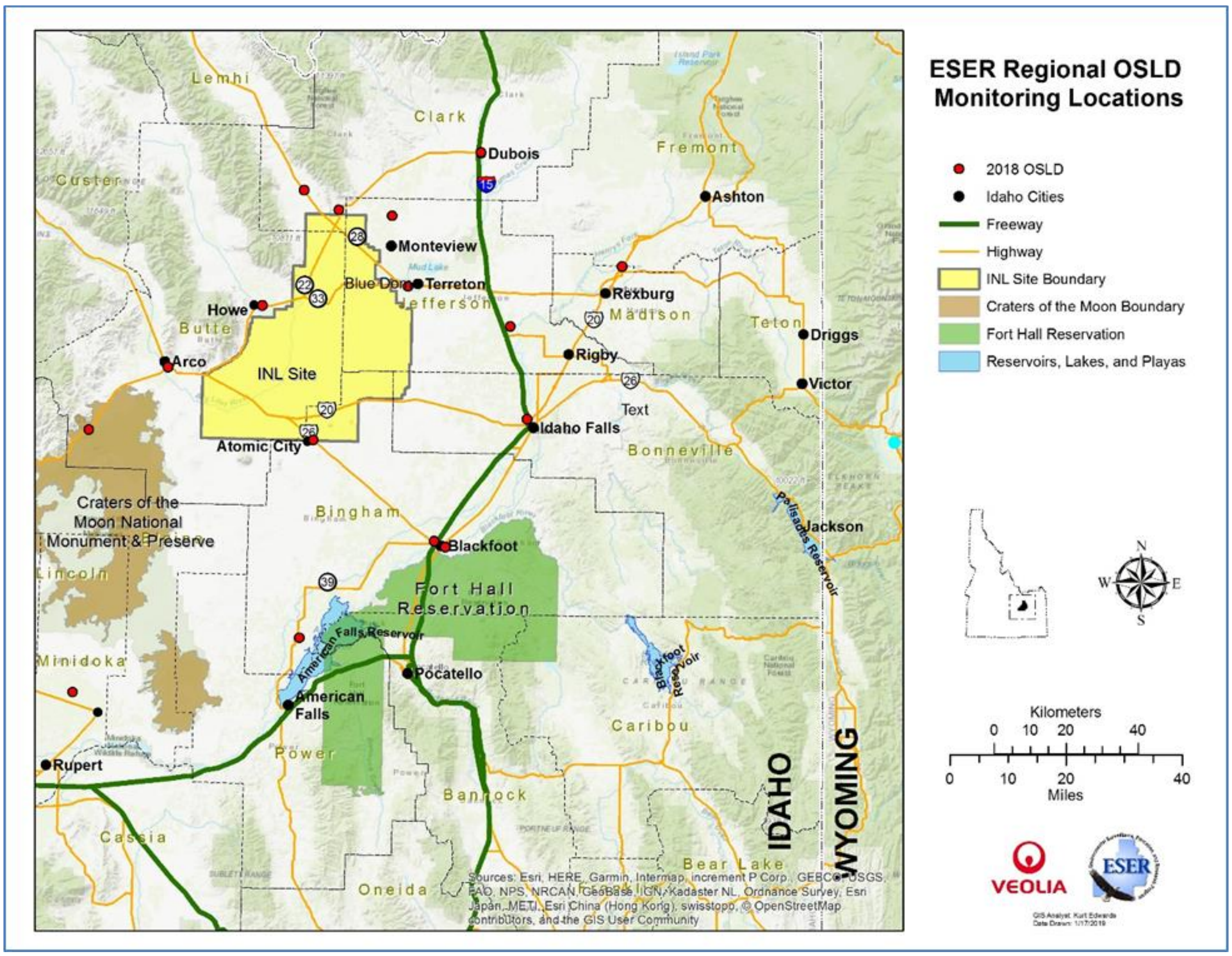

Figure 14. ESER optically stimulated luminescent dosimeter (OSLD) locations.

7. Quality Assurance

The ESER Quality Assurance Program consists of five ongoing tasks which measure:

1. method uncertainty
2. data completeness
3. data accuracy, using spike, performance evaluation and laboratory control samples
4. data precision, using split samples, duplicate samples and recounts
5. presence of contamination in samples, using blanks.

Sample results are compared to criteria described in the Quality Assurance Project Plan for the INL Site Offsite Environmental Surveillance Program (VNSFS 2018a). Criteria established by DOE for Quality Assurance activities include:

- Quality assurance program
- Personnel training and qualification
- Quality improvement process
- Documents and records
- Established work processes
- Established standards for design and verification
- Established procurement requirements
- Inspection and acceptance testing
- Management assessment
- Independent assessment

Assessments of ESER data quality are achieved through analysis of spike, performance evaluation, and duplicate samples; through sample recounts; through analysis of blank samples; and through comparison of sample results to established method quality objectives. These assessments are documented in the ESER Quality Assurance for the Second Quarter of 2018 (VNSFS 2018b).

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VNSFS, 2018b, Environmental Quality Assurance Report for the 2nd Quarter 2018, Environmental Surveillance, Education, and Research Program.

APPENDIX A

SUMMARY OF SAMPLING SCHEDULE

Table A-1. Summary of the ESER Program's Sampling Schedule

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INL Site
AIR SAMPLING				
LOW-VOLUME AIR				
Gross Alpha, Gross Beta, ^{131}I	weekly	Blackfoot, Craters of the Moon, Dubois, Idaho Falls, Jackson WY, Sugar City	Arco, Atomic City, FAA Tower, Howe, Monteview, Mud Lake, Blue Dome	Main Gate, EFS, Van Buren
Gamma Spec	quarterly	Blackfoot, Craters of the Moon, Dubois, Idaho Falls, Jackson WY, Sugar City	Arco, Atomic City, FAA Tower, Howe, Monteview, Mud Lake, Blue Dome	Main Gate, EFS, Van Buren
^{90}Sr, Transuranics	quarterly	Rotating schedule	Rotating schedule	Rotating schedule
ATMOSPHERIC MOISTURE				
Tritium	2 to 13 weeks	Idaho Falls	Atomic City, Howe	EFS
PRECIPITATION				
Tritium	monthly	Idaho Falls	None	None
Tritium	weekly	None	Atomic City, Howe	EFS
DRINKING WATER				
Gross Alpha, Gross Beta, Tritium	Semiannually	Craters of the Moon, Idaho Falls, Minidoka, Shoshone	Atomic City, Howe, Mud Lake, Rest Area	None
SURFACE WATER				
Gross Alpha, Gross Beta, Tritium	Semiannually	Buhl, Hagerman, Twin Falls	None	Big Lost River (when flowing)
ENVIRONMENTAL RADIATION SAMPLING				
TLDs/OSLDs				
Gamma Radiation	semiannual	Aberdeen, Blackfoot (2), Craters of the Moon, Dubois, Idaho Falls, Jackson WY, Minidoka, Sugar City, Roberts	Arco, Atomic City, Birch Creek, Blue Dome, Howe, Monteview, Mud Lake	None
SOIL SAMPLING				
SOIL				
Gamma Spec, ^{90}Sr, Transuranics	biennially	Carey, Blackfoot, St. Anthony	Butte City, Monteview, Atomic City, FAA Tower, Howe, Mud Lake (2), Birch Creek, Frenchman's Cabin	None

Table A-1. Summary of the ESER Program's Sampling Schedule (continued)

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INL Site
FOODSTUFF SAMPLING				
MILK				
Gamma Spec (^{131}I)	weekly	Idaho Falls	Terreton	None
Gamma Spec (^{131}I)	monthly	Blackfoot, Dietrich, Fort Hall, Idaho Falls, Minidoka	Howe, Terreton	None
Tritium, ^{90}Sr	Semi-annually	Blackfoot, Dietrich, Fort Hall, Idaho Falls, Minidoka	Howe, Terreton	None
POTATOES				
Gamma Spec, ^{90}Sr	annually	Varies among Blackfoot, Idaho Falls, Rupert, Shelley, Hamer, Driggs, occasional samples across the U.S.	Varies among Arco, Monteview, Mud Lake, Terreton	None
ALFALFA				
Gamma Spec, ^{90}Sr	annually	Idaho Falls	Howe, Mud Lake	None
GRAIN				
Gamma Spec, ^{90}Sr	annually	Varies among American Falls, Blackfoot, Carey, Idaho Falls, Rupert/Minidoka, Roberts	Varies among Arco, Monteview, Mud Lake, Taber, Terreton	None
LETTUCE				
Gamma Spec, ^{90}Sr	annually	Varies among Blackfoot, Carey, Idaho Falls, Rigby, Sugar City	Varies among Arco, Atomic City, FAA Tower, Howe, Monteview	EFS
BIG GAME				
Gamma Spec	varies	Occasional samples across the U.S.	Public Highways	INL Site roads
WATERFOWL				
Gamma Spec, ^{90}Sr, Transuranics	annually	Varies among: Heise, Firth, Fort Hall, Mud Lake, Market Lake, and American Falls	None	INL Site wastewater disposal ponds

APPENDIX B

SUMMARY OF MDCs AND DCSs

Table B-1. Summary of Approximate Minimum Detectable Concentrations for Radiological Analyses Performed during Second Quarter 2018

Sample Type	Analysis	Average Minimum Detectable Concentration[a] (MDC)	Derived Concentration Standard[b] (DCS)
Air (particulate filter)[e]	Gross alpha[c]	5.8×10^{-16} µCi/mL	3.4×10^{-14} µCi/mL
	Gross beta[d]	1.4×10^{-15} µCi/mL	2.5×10^{-11} µCi/mL
	^{137}Cs	8.7×10^{-17} µCi/mL	9.8×10^{-11} µCi/mL
	^{90}Sr	1.9×10^{-17} µCi/mL	2.5×10^{-11} µCi/mL
	^{241}Am	4.6×10^{-18} µCi/mL	4.1×10^{-14} µCi/mL
	^{238}Pu	7.8×10^{-18} µCi/mL	3.7×10^{-14} µCi/mL
	$^{239/240}$Pu	8.7×10^{-18} µCi/mL	3.4×10^{-14} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	5.2×10^{-16} µCi/mL	2.3×10^{-19} µCi/mL
Air (atmospheric moisture)	^{3}H	87.2 pCi/L_{water} 5.6×10^{-13} µCi/mL_{air}	2.1×10^{-7} µCi/mL_{air}
Air (precipitation)	^{3}H	85.5 pCi/L	1.9×10^{-3} µCi/mL
Drinking Water/Surface Water	Gross alpha	1.09 pCi/L	1.7×10^{-7} µCi/mL
	Gross beta	1.31 pCi/L	1.1×10^{-6} µCi/mL
	^{3}H	86.7 pCi/L	1.9×10^{-3} µCi/mL
	^{137}Cs (BLR[f])	0.91 pCi/L	--[g]
Milk	^{3}H	85.8 pCi/L	--
	^{90}Sr	0.075 pCi/L	--
	^{131}I	0.5 pCi/L	--
	^{137}Cs	1.0 pCi/L	--
Alfalfa	^{137}Cs	1.81 pCi/kg	--
	^{90}Sr	79.7 pCi/kg	--

a. The MDC is an estimate of the concentration of radioactivity in a given sample type that can be identified with a 95 percent level of confidence. MDCs are calculated and reported by the laboratories based on actual ESER sample results following analysis.
b. DCSs, set by the DOE, represent reference values for radiation exposure. They are based on a radiation dose of 100 mrem/yr for exposure through a particular exposure mode such as direct exposure, inhalation, or ingestion of water.
c. Based on the most restrictive human-made alpha emitter (^{239}Pu).
d. Based on the most restrictive human-made beta emitter (^{90}Sr).
e. The approximate MDC is based on an average filtered air volume (pressure corrected) of 445 m^3/week.
f. BLR = Big Lost River
g. – No appropriate DCS available

APPENDIX C

SAMPLE ANALYSIS RESULTS

Table C-1. Weekly Gross Alpha and Gross Beta Concentrations in Air

		GROSS ALPHA							GROSS BETA						
Sampling Group and Location	**Sampling Date**	**Result ± 1s Uncertainty (x 10^{-15} µCi/mL)**			**Result ± 1s Uncertainty (x 10^{-11} Bq/mL)**			**Result > 3s**	**Result ± 1s Uncertainty (x 10^{-15} µCi/mL)**			**Result ± 1s Uncertainty (x 10^{-11} Bq/mL)**			**Result > 3s**
BOUNDARY															
ARCO	4/4/2018	1.01E-15	±	2.57E-16	3.74E-15	±	9.51E-16	Yes	1.85E-14	±	6.38E-16	6.85E-14	±	2.36E-15	Yes
	4/11/2018	7.43E-16	±	2.44E-16	2.75E-15	±	9.03E-16	Yes	1.11E-14	±	5.64E-16	4.11E-14	±	2.09E-15	Yes
	4/18/2018	9.78E-16	±	2.33E-16	3.62E-15	±	8.62E-16	Yes	1.26E-14	±	5.57E-16	4.66E-14	±	2.06E-15	Yes
	4/25/2018	1.59E-15	±	2.62E-16	5.88E-15	±	9.69E-16	Yes	1.93E-14	±	6.40E-16	7.14E-14	±	2.37E-15	Yes
	5/2/2018	1.12E-15	±	1.77E-16	4.14E-15	±	6.55E-16	Yes	2.21E-14	±	6.29E-16	8.18E-14	±	2.33E-15	Yes
	5/9/2018	1.23E-15	±	1.81E-16	4.55E-15	±	6.70E-16	Yes	2.97E-14	±	7.01E-16	1.10E-13	±	2.59E-15	Yes
	5/16/2018	4.97E-16	±	1.30E-16	1.84E-15	±	4.81E-16	Yes	1.54E-14	±	5.29E-16	5.70E-14	±	1.96E-15	Yes
	5/23/2018	1.28E-15	±	1.75E-16	4.74E-15	±	6.48E-16	Yes	2.77E-14	±	6.77E-16	1.02E-13	±	2.50E-15	Yes
	5/30/2018	1.45E-15	±	1.76E-16	5.37E-15	±	6.51E-16	Yes	2.80E-14	±	6.76E-16	1.04E-13	±	2.50E-15	Yes
	6/6/2018	1.07E-15	±	1.76E-16	3.96E-15	±	6.51E-16	Yes	2.50E-14	±	6.61E-16	9.25E-14	±	2.45E-15	Yes
	6/13/2018	7.55E-16	±	1.52E-16	2.79E-15	±	5.62E-16	Yes	2.41E-14	±	6.43E-16	8.92E-14	±	2.38E-15	Yes
	6/20/2018	3.13E-16	±	1.73E-16	1.16E-15	±	6.40E-16	No	2.15E-14	±	6.04E-16	7.96E-14	±	2.23E-15	Yes
	6/27/2018	1.02E-15	±	1.72E-16	3.77E-15	±	6.36E-16	Yes	2.31E-14	±	6.32E-16	8.55E-14	±	2.34E-15	Yes
ATOMIC CITY	4/4/2018	1.58E-15	±	2.89E-16	5.85E-15	±	1.07E-15	Yes	1.83E-14	±	6.55E-16	6.77E-14	±	2.42E-15	Yes
	4/11/2018	9.87E-16	±	2.53E-16	3.65E-15	±	9.36E-16	Yes	1.17E-14	±	5.66E-16	4.33E-14	±	2.09E-15	Yes
	4/18/2018	8.25E-16	±	2.42E-16	3.05E-15	±	8.95E-16	Yes	1.37E-14	±	6.04E-16	5.07E-14	±	2.23E-15	Yes
	4/25/2018	1.70E-15	±	2.75E-16	6.29E-15	±	1.02E-15	Yes	2.03E-14	±	6.68E-16	7.51E-14	±	2.47E-15	Yes
	5/2/2018	1.20E-15	±	1.80E-16	4.44E-15	±	6.66E-16	Yes	2.38E-14	±	6.43E-16	8.81E-14	±	2.38E-15	Yes
	5/9/2018	1.46E-15	±	1.84E-16	5.40E-15	±	6.81E-16	Yes	2.74E-14	±	6.59E-16	1.01E-13	±	2.44E-15	Yes
	5/16/2018	5.96E-16	±	1.44E-16	2.21E-15	±	5.33E-16	Yes	1.59E-14	±	5.65E-16	5.88E-14	±	2.09E-15	Yes
	5/23/2018	1.29E-15	±	1.69E-16	4.77E-15	±	6.25E-16	Yes	2.72E-14	±	6.49E-16	1.01E-13	±	2.40E-15	Yes
	5/30/2018	1.36E-15	±	1.75E-16	5.03E-15	±	6.48E-16	Yes	2.65E-14	±	6.75E-16	9.81E-14	±	2.50E-15	Yes
	6/6/2018	1.25E-15	±	1.80E-16	4.63E-15	±	6.66E-16	Yes	2.43E-14	±	6.42E-16	8.99E-14	±	2.38E-15	Yes
	6/13/2018	1.07E-15	±	1.68E-16	3.96E-15	±	6.22E-16	Yes	2.60E-14	±	6.60E-16	9.62E-14	±	2.44E-15	Yes
	6/20/2018	5.57E-16	±	1.76E-16	2.06E-15	±	6.51E-16	Yes	1.94E-14	±	5.65E-16	7.18E-14	±	2.09E-15	Yes
	6/27/2018	7.16E-16	±	1.52E-16	2.65E-15	±	5.62E-16	Yes	2.10E-14	±	5.96E-16	7.77E-14	±	2.21E-15	Yes
QA-1	4/4/2018	6.40E-16	±	2.41E-16	2.37E-15	±	8.92E-16	No	1.77E-14	±	6.31E-16	6.55E-14	±	2.33E-15	Yes
(ATOMIC CITY)	4/11/2018	9.08E-16	±	2.43E-16	3.36E-15	±	8.99E-16	Yes	1.08E-14	±	5.43E-16	4.00E-14	±	2.01E-15	Yes
	4/18/2018	8.97E-16	±	2.40E-16	3.32E-15	±	8.88E-16	Yes	1.26E-14	±	5.82E-16	4.66E-14	±	2.15E-15	Yes
	4/25/2018	1.32E-15	±	2.52E-16	4.88E-15	±	9.32E-16	Yes	1.85E-14	±	6.34E-16	6.85E-14	±	2.35E-15	Yes
	5/2/2018	9.52E-16	±	1.68E-16	3.52E-15	±	6.22E-16	Yes	2.18E-14	±	6.20E-16	8.07E-14	±	2.29E-15	Yes
	5/9/2018	1.17E-15	±	1.75E-16	4.33E-15	±	6.48E-16	Yes	2.41E-14	±	6.40E-16	8.92E-14	±	2.37E-15	Yes
	5/16/2018	4.16E-16	±	1.30E-16	1.54E-15	±	4.81E-16	Yes	1.58E-14	±	5.54E-16	5.85E-14	±	2.05E-15	Yes
	5/23/2018	9.04E-16	±	1.49E-16	3.34E-15	±	5.51E-16	Yes	2.65E-14	±	6.37E-16	9.81E-14	±	2.36E-15	Yes
	5/30/2018	1.31E-15	±	1.74E-16	4.85E-15	±	6.44E-16	Yes	2.61E-14	±	6.76E-16	9.66E-14	±	2.50E-15	Yes
	6/6/2018	1.03E-15	±	1.69E-16	3.81E-15	±	6.25E-16	Yes	2.38E-14	±	6.33E-16	8.81E-14	±	2.34E-15	Yes
	6/13/2018	8.46E-16	±	1.54E-16	3.13E-15	±	5.70E-16	Yes	2.31E-14	±	6.23E-16	8.55E-14	±	2.31E-15	Yes
	6/20/2018	2.56E-16	±	1.62E-16	9.47E-16	±	5.99E-16	No	1.86E-14	±	5.54E-16	6.88E-14	±	2.05E-15	Yes
	6/27/2018	7.69E-16	±	1.54E-16	2.85E-15	±	5.70E-16	Yes	2.13E-14	±	5.98E-16	7.88E-14	±	2.21E-15	Yes
BLUE DOME	4/4/2018	1.23E-15	±	2.65E-16	4.55E-15	±	9.81E-16	Yes	1.94E-14	±	6.43E-16	7.18E-14	±	2.38E-15	Yes
	4/11/2018	6.18E-16	±	2.39E-16	2.29E-15	±	8.84E-16	No	1.17E-14	±	5.73E-16	4.33E-14	±	2.12E-15	Yes
	4/18/2018	6.72E-16	±	2.39E-16	2.49E-15	±	8.84E-16	No	1.24E-14	±	6.00E-16	4.59E-14	±	2.22E-15	Yes
	4/25/2018	1.11E-15	±	2.47E-16	4.11E-15	±	9.14E-16	Yes	1.85E-14	±	6.44E-16	6.85E-14	±	2.38E-15	Yes
	5/2/2018	9.59E-16	±	1.67E-16	3.55E-15	±	6.18E-16	Yes	2.15E-14	±	6.14E-16	7.96E-14	±	2.27E-15	Yes
	5/9/2018	1.11E-15	±	1.75E-16	4.11E-15	±	6.48E-16	Yes	2.68E-14	±	6.75E-16	9.92E-14	±	2.50E-15	Yes
	5/16/2018	7.90E-16	±	1.46E-16	2.92E-15	±	5.40E-16	Yes	1.52E-14	±	5.28E-16	5.62E-14	±	1.95E-15	Yes
	5/23/2018	1.09E-15	±	1.62E-16	4.03E-15	±	5.99E-16	Yes	2.63E-14	±	6.51E-16	9.73E-14	±	2.41E-15	Yes
	5/30/2018	1.02E-15	±	1.57E-16	3.77E-15	±	5.81E-16	Yes	2.73E-14	±	6.75E-16	1.01E-13	±	2.50E-15	Yes
	6/6/2018	7.36E-16	±	1.57E-16	2.72E-15	±	5.81E-16	Yes	2.42E-14	±	6.42E-16	8.95E-14	±	2.38E-15	Yes
	6/13/2018	1.13E-15	±	1.72E-16	4.18E-15	±	6.36E-16	Yes	2.41E-14	±	6.49E-16	8.92E-14	±	2.40E-15	Yes

Table C-1. Weekly Gross Alpha and Gross Beta Concentrations in Air

		GROSS ALPHA							GROSS BETA						
Sampling Group and Location	**Sampling Date**	**Result ± 1s Uncertainty ($x\ 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x\ 10^{-11}$ Bq/mL)**			**Result > 3s**	**Result ± 1s Uncertainty ($x\ 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x\ 10^{-11}$ Bq/mL)**			**Result > 3s**
	6/20/2018	-1.71E-16	±	1.68E-16	-6.33E-16	±	6.22E-16	No	1.95E-14	±	6.25E-16	7.22E-14	±	2.31E-15	Yes
	6/27/2018	6.68E-16	±	1.59E-16	2.47E-15	±	5.88E-16	Yes	2.36E-14	±	6.52E-16	8.73E-14	±	2.41E-15	Yes
QA-2	4/4/2018	1.02E-15	±	2.55E-16	3.77E-15	±	9.44E-16	Yes	2.04E-14	±	6.50E-16	7.55E-14	±	2.41E-15	Yes
(BLUE DOME)	4/11/2018	6.66E-16	±	2.43E-16	2.46E-15	±	8.99E-16	No	1.10E-14	±	5.68E-16	4.07E-14	±	2.10E-15	Yes
	4/18/2018	8.36E-16	±	2.46E-16	3.09E-15	±	9.10E-16	Yes	1.32E-14	±	6.06E-16	4.88E-14	±	2.24E-15	Yes
	4/25/2018	1.20E-15	±	2.41E-16	4.44E-15	±	8.92E-16	Yes	2.02E-14	±	6.39E-16	7.47E-14	±	2.36E-15	Yes
	5/2/2018	1.06E-15	±	1.65E-16	3.92E-15	±	6.11E-16	Yes	2.28E-14	±	6.05E-16	8.44E-14	±	2.24E-15	Yes
	5/9/2018	1.27E-15	±	1.84E-16	4.70E-15	±	6.81E-16	Yes	2.79E-14	±	6.90E-16	1.03E-13	±	2.55E-15	Yes
	5/16/2018	6.89E-16	±	1.44E-16	2.55E-15	±	5.33E-16	Yes	1.66E-14	±	5.53E-16	6.14E-14	±	2.05E-15	Yes
	5/23/2018	9.26E-16	±	1.54E-16	3.43E-15	±	5.70E-16	Yes	2.66E-14	±	6.51E-16	9.84E-14	±	2.41E-15	Yes
	5/30/2018	1.02E-15	±	1.56E-16	3.77E-15	±	5.77E-16	Yes	2.64E-14	±	6.63E-16	9.77E-14	±	2.45E-15	Yes
	6/6/2018	7.68E-16	±	1.59E-16	2.84E-15	±	5.88E-16	Yes	2.41E-14	±	6.42E-16	8.92E-14	±	2.38E-15	Yes
	6/13/2018	1.28E-15	±	1.75E-16	4.74E-15	±	6.48E-16	Yes	2.62E-14	±	6.56E-16	9.69E-14	±	2.43E-15	Yes
	6/20/2018	1.40E-16	±	1.68E-16	5.18E-16	±	6.22E-16	No	1.77E-14	±	5.70E-16	6.55E-14	±	2.11E-15	Yes
	6/27/2018	9.56E-16	±	1.73E-16	3.54E-15	±	6.40E-16	Yes	2.19E-14	±	6.35E-16	8.10E-14	±	2.35E-15	Yes
HOWE	4/4/2018	1.29E-15	±	2.67E-16	4.77E-15	±	9.88E-16	Yes	1.82E-14	±	6.32E-16	6.73E-14	±	2.34E-15	Yes
	4/11/2018	1.74E-15	±	2.76E-16	6.44E-15	±	1.02E-15	Yes	9.91E-15	±	5.30E-16	3.67E-14	±	1.96E-15	Yes
	4/18/2018	1.55E-15	±	2.54E-16	5.74E-15	±	9.40E-16	Yes	1.27E-14	±	5.52E-16	4.70E-14	±	2.04E-15	Yes
	4/25/2018	1.89E-15	±	2.74E-16	6.99E-15	±	1.01E-15	Yes	1.87E-14	±	6.33E-16	6.92E-14	±	2.34E-15	Yes
	5/2/2018	1.56E-15	±	1.93E-16	5.77E-15	±	7.14E-16	Yes	2.21E-14	±	6.20E-16	8.18E-14	±	2.29E-15	Yes
	5/9/2018	1.86E-15	±	2.06E-16	6.88E-15	±	7.62E-16	Yes	2.71E-14	±	6.78E-16	1.00E-13	±	2.51E-15	Yes
	5/16/2018	1.06E-15	±	1.61E-16	3.92E-15	±	5.96E-16	Yes	1.58E-14	±	5.40E-16	5.85E-14	±	2.00E-15	Yes
	5/23/2018	1.79E-15	±	1.96E-16	6.62E-15	±	7.25E-16	Yes	2.69E-14	±	6.69E-16	9.95E-14	±	2.48E-15	Yes
	5/30/2018	1.88E-15	±	1.95E-16	6.96E-15	±	7.22E-16	Yes	2.53E-14	±	6.54E-16	9.36E-14	±	2.42E-15	Yes
	6/6/2018	1.58E-15	±	1.93E-16	5.85E-15	±	7.14E-16	Yes	2.47E-14	±	6.45E-16	9.14E-14	±	2.39E-15	Yes
	6/13/2018	1.75E-15	±	1.97E-16	6.48E-15	±	7.29E-16	Yes	2.81E-14	±	6.81E-16	1.04E-13	±	2.52E-15	Yes
	6/20/2018	8.63E-16	±	1.96E-16	3.19E-15	±	7.25E-16	Yes	1.96E-14	±	5.85E-16	7.25E-14	±	2.16E-15	Yes
	6/27/2018	1.50E-15	±	1.97E-16	5.55E-15	±	7.29E-16	Yes	2.44E-14	±	6.64E-16	9.03E-14	±	2.46E-15	Yes
MONTEVIEW	4/4/2018	1.31E-15	±	2.65E-16	4.85E-15	±	9.81E-16	Yes	1.94E-14	±	6.38E-16	7.18E-14	±	2.36E-15	Yes
	4/11/2018	1.21E-15	±	2.52E-16	4.48E-15	±	9.32E-16	Yes	1.12E-14	±	5.39E-16	4.14E-14	±	1.99E-15	Yes
	4/18/2018	1.08E-15	±	2.31E-16	4.00E-15	±	8.55E-16	Yes	1.19E-14	±	5.34E-16	4.40E-14	±	1.98E-15	Yes
	4/25/2018	1.30E-15	±	2.49E-16	4.81E-15	±	9.21E-16	Yes	1.78E-14	±	6.22E-16	6.59E-14	±	2.30E-15	Yes
	5/2/2018	1.03E-15	±	1.70E-16	3.81E-15	±	6.29E-16	Yes	2.29E-14	±	6.26E-16	8.47E-14	±	2.32E-15	Yes
	5/9/2018	1.50E-15	±	1.90E-16	5.55E-15	±	7.03E-16	Yes	2.74E-14	±	6.72E-16	1.01E-13	±	2.49E-15	Yes
	5/16/2018	7.62E-16	±	1.44E-16	2.82E-15	±	5.33E-16	Yes	1.57E-14	±	5.32E-16	5.81E-14	±	1.97E-15	Yes
	5/23/2018	1.13E-15	±	1.58E-16	4.18E-15	±	5.85E-16	Yes	2.35E-14	±	6.03E-16	8.70E-14	±	2.23E-15	Yes
	5/30/2018	1.20E-15	±	1.68E-16	4.44E-15	±	6.22E-16	Yes	2.56E-14	±	6.69E-16	9.47E-14	±	2.48E-15	Yes
	6/6/2018	7.67E-16	±	1.54E-16	2.84E-15	±	5.70E-16	Yes	2.19E-14	±	6.06E-16	8.10E-14	±	2.24E-15	Yes
	6/13/2018	1.11E-15	±	1.66E-16	4.11E-15	±	6.14E-16	Yes	2.50E-14	±	6.40E-16	9.25E-14	±	2.37E-15	Yes
	6/27/2018	4.89E-16	±	1.60E-16	1.81E-15	±	5.92E-16	Yes	9.96E-15	±	5.39E-16	3.69E-14	±	1.99E-15	Yes
MUD LAKE	4/4/2018	1.33E-15	±	2.59E-16	4.92E-15	±	9.58E-16	Yes	1.90E-14	±	6.20E-16	7.03E-14	±	2.29E-15	Yes
	4/11/2018	1.43E-15	±	2.65E-16	5.29E-15	±	9.81E-16	Yes	1.08E-14	±	5.43E-16	4.00E-14	±	2.01E-15	Yes
	4/18/2018	1.57E-15	±	2.61E-16	5.81E-15	±	9.66E-16	Yes	1.30E-14	±	5.66E-16	4.81E-14	±	2.09E-15	Yes
	4/25/2018	1.64E-15	±	2.70E-16	6.07E-15	±	9.99E-16	Yes	2.08E-14	±	6.70E-16	7.70E-14	±	2.48E-15	Yes
	5/2/2018	9.80E-16	±	1.65E-16	3.63E-15	±	6.11E-16	Yes	2.07E-14	±	5.95E-16	7.66E-14	±	2.20E-15	Yes
	5/9/2018	1.43E-15	±	1.89E-16	5.29E-15	±	6.99E-16	Yes	2.71E-14	±	6.76E-16	1.00E-13	±	2.50E-15	Yes
	5/16/2018	1.03E-15	±	1.54E-16	3.81E-15	±	5.70E-16	Yes	1.52E-14	±	5.16E-16	5.62E-14	±	1.91E-15	Yes
	5/23/2018	9.48E-16	±	1.59E-16	3.51E-15	±	5.88E-16	Yes	2.54E-14	±	6.58E-16	9.40E-14	±	2.43E-15	Yes
	5/30/2018	9.79E-16	±	1.55E-16	3.62E-15	±	5.74E-16	Yes	2.48E-14	±	6.55E-16	9.18E-14	±	2.42E-15	Yes
	6/6/2018	8.93E-16	±	1.67E-16	3.30E-15	±	6.18E-16	Yes	2.55E-14	±	6.61E-16	9.44E-14	±	2.45E-15	Yes
	6/13/2018	1.30E-15	±	1.75E-16	4.81E-15	±	6.48E-16	Yes	2.34E-14	±	6.29E-16	8.66E-14	±	2.33E-15	Yes

Table C-1. Weekly Gross Alpha and Gross Beta Concentrations in Air

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
	6/20/2018	1.84E-16 ± 1.72E-16	6.81E-16 ± 6.36E-16	No	2.02E-14 ± 6.01E-16	7.47E-14 ± 2.22E-15	Yes
	6/27/2018	9.13E-16 ± 1.69E-16	3.38E-15 ± 6.25E-16	Yes	2.18E-14 ± 6.29E-16	8.07E-14 ± 2.33E-15	Yes
DISTANT							
BLACKFOOT	4/4/2018	1.67E-15 ± 2.77E-16	6.18E-15 ± 1.02E-15	Yes	1.81E-14 ± 6.21E-16	6.70E-14 ± 2.30E-15	Yes
	4/11/2018	1.07E-15 ± 2.37E-16	3.96E-15 ± 8.77E-16	Yes	1.09E-14 ± 5.18E-16	4.03E-14 ± 1.92E-15	Yes
	4/18/2018	1.01E-15 ± 2.42E-16	3.74E-15 ± 8.95E-16	Yes	1.27E-14 ± 5.76E-16	4.70E-14 ± 2.13E-15	Yes
	4/25/2018	1.31E-15 ± 2.40E-16	4.85E-15 ± 8.88E-16	Yes	1.78E-14 ± 6.01E-16	6.59E-14 ± 2.22E-15	Yes
	5/2/2018	7.78E-16 ± 1.49E-16	2.88E-15 ± 5.51E-16	Yes	2.05E-14 ± 5.73E-16	7.59E-14 ± 2.12E-15	Yes
	5/9/2018	1.46E-15 ± 1.82E-16	5.40E-15 ± 6.73E-16	Yes	2.65E-14 ± 6.43E-16	9.81E-14 ± 2.38E-15	Yes
	5/16/2018	6.39E-16 ± 1.37E-16	2.36E-15 ± 5.07E-16	Yes	1.69E-14 ± 5.43E-16	6.25E-14 ± 2.01E-15	Yes
	5/23/2018	1.01E-15 ± 1.51E-16	3.74E-15 ± 5.59E-16	Yes	2.55E-14 ± 6.16E-16	9.44E-14 ± 2.28E-15	Yes
	5/30/2018	1.21E-15 ± 1.58E-16	4.48E-15 ± 5.85E-16	Yes	2.62E-14 ± 6.30E-16	9.69E-14 ± 2.33E-15	Yes
	6/6/2018	1.11E-15 ± 1.68E-16	4.11E-15 ± 6.22E-16	Yes	2.38E-14 ± 6.16E-16	8.81E-14 ± 2.28E-15	Yes
	6/13/2018	9.92E-16 ± 1.54E-16	3.67E-15 ± 5.70E-16	Yes	2.11E-14 ± 5.81E-16	7.81E-14 ± 2.15E-15	Yes
	6/20/2018	9.53E-17 ± 1.47E-16	3.53E-16 ± 5.44E-16	No	1.88E-14 ± 5.37E-16	6.96E-14 ± 1.99E-15	Yes
	6/27/2018	5.72E-16 ± 1.45E-16	2.12E-15 ± 5.37E-16	Yes	2.05E-14 ± 5.90E-16	7.59E-14 ± 2.18E-15	Yes
CRATERS OF THE MOON	4/4/2018	1.27E-15 ± 2.67E-16	4.70E-15 ± 9.88E-16	Yes	1.82E-14 ± 6.33E-16	6.73E-14 ± 2.34E-15	Yes
	4/11/2018	7.80E-16 ± 2.34E-16	2.89E-15 ± 8.66E-16	Yes	1.08E-14 ± 5.36E-16	4.00E-14 ± 1.98E-15	Yes
	4/18/2018	8.29E-16 ± 2.35E-16	3.07E-15 ± 8.70E-16	Yes	1.38E-14 ± 5.92E-16	5.11E-14 ± 2.19E-15	Yes
	4/25/2018	1.59E-15 ± 2.67E-16	5.88E-15 ± 9.88E-16	Yes	2.04E-14 ± 6.62E-16	7.55E-14 ± 2.45E-15	Yes
	5/2/2018	7.91E-16 ± 1.61E-16	2.93E-15 ± 5.96E-16	Yes	2.23E-14 ± 6.26E-16	8.25E-14 ± 2.32E-15	Yes
	5/9/2018	1.41E-15 ± 1.88E-16	5.22E-15 ± 6.96E-16	Yes	2.76E-14 ± 6.79E-16	1.02E-13 ± 2.51E-15	Yes
	5/16/2018	7.67E-16 ± 1.51E-16	2.84E-15 ± 5.59E-16	Yes	1.63E-14 ± 5.60E-16	6.03E-14 ± 2.07E-15	Yes
	5/23/2018	1.13E-15 ± 1.65E-16	4.18E-15 ± 6.11E-16	Yes	2.62E-14 ± 6.53E-16	9.69E-14 ± 2.42E-15	Yes
	5/30/2018	1.18E-15 ± 1.64E-16	4.37E-15 ± 6.07E-16	Yes	2.78E-14 ± 6.72E-16	1.03E-13 ± 2.49E-15	Yes
	6/6/2018	1.10E-15 ± 1.74E-16	4.07E-15 ± 6.44E-16	Yes	2.42E-14 ± 6.42E-16	8.95E-14 ± 2.38E-15	Yes
	6/13/2018	1.07E-15 ± 1.66E-16	3.96E-15 ± 6.14E-16	Yes	2.51E-14 ± 6.47E-16	9.29E-14 ± 2.39E-15	Yes
	6/20/2018	2.86E-16 ± 1.76E-16	1.06E-15 ± 6.51E-16	No	2.24E-14 ± 6.23E-16	8.29E-14 ± 2.31E-15	Yes
	6/27/2018	5.73E-16 ± 1.53E-16	2.12E-15 ± 5.66E-16	Yes	2.42E-14 ± 6.53E-16	8.95E-14 ± 2.42E-15	Yes
DUBOIS	4/4/2018	1.46E-15 ± 2.74E-16	5.40E-15 ± 1.01E-15	Yes	1.82E-14 ± 6.32E-16	6.73E-14 ± 2.34E-15	Yes
	4/11/2018	1.01E-15 ± 2.48E-16	3.74E-15 ± 9.18E-16	Yes	1.04E-14 ± 5.40E-16	3.85E-14 ± 2.00E-15	Yes
	4/18/2018	1.12E-15 ± 2.37E-16	4.14E-15 ± 8.77E-16	Yes	1.14E-14 ± 5.37E-16	4.22E-14 ± 1.99E-15	Yes
	4/25/2018	1.81E-15 ± 3.55E-16	6.70E-15 ± 1.31E-15	Yes	2.36E-14 ± 8.73E-16	8.73E-14 ± 3.23E-15	Yes
	5/2/2018	9.63E-16 ± 1.88E-16	3.56E-15 ± 6.96E-16	Yes	2.61E-14 ± 7.26E-16	9.66E-14 ± 2.69E-15	Yes
	5/9/2018	1.68E-15 ± 2.11E-16	6.22E-15 ± 7.81E-16	Yes	2.79E-14 ± 7.22E-16	1.03E-13 ± 2.67E-15	Yes
	5/16/2018	8.46E-16 ± 1.58E-16	3.13E-15 ± 5.85E-16	Yes	1.90E-14 ± 6.01E-16	7.03E-14 ± 2.22E-15	Yes
	5/23/2018	1.26E-15 ± 1.70E-16	4.66E-15 ± 6.29E-16	Yes	2.69E-14 ± 6.57E-16	9.95E-14 ± 2.43E-15	Yes
	5/30/2018	1.52E-15 ± 1.81E-16	5.62E-15 ± 6.70E-16	Yes	2.62E-14 ± 6.67E-16	9.69E-14 ± 2.47E-15	Yes
	6/6/2018	9.06E-16 ± 1.69E-16	3.35E-15 ± 6.25E-16	Yes	2.47E-14 ± 6.60E-16	9.14E-14 ± 2.44E-15	Yes
	6/13/2018	1.11E-15 ± 1.73E-16	4.11E-15 ± 6.40E-16	Yes	2.54E-14 ± 6.69E-16	9.40E-14 ± 2.48E-15	Yes
	6/20/2018	4.86E-16 ± 1.85E-16	1.80E-15 ± 6.85E-16	No	1.97E-14 ± 5.97E-16	7.29E-14 ± 2.21E-15	Yes
	6/27/2018	8.13E-16 ± 1.64E-16	3.01E-15 ± 6.07E-16	Yes	2.06E-14 ± 6.16E-16	7.62E-14 ± 2.28E-15	Yes
IDAHO FALLS	4/4/2018	1.70E-15 ± 2.79E-16	6.29E-15 ± 1.03E-15	Yes	1.64E-14 ± 6.06E-16	6.07E-14 ± 2.24E-15	Yes
	4/11/2018	1.14E-15 ± 2.53E-16	4.22E-15 ± 9.36E-16	Yes	1.11E-14 ± 5.46E-16	4.11E-14 ± 2.02E-15	Yes
	4/18/2018	1.50E-15 ± 2.57E-16	5.55E-15 ± 9.51E-16	Yes	1.21E-14 ± 5.54E-16	4.48E-14 ± 2.05E-15	Yes
	4/25/2018	1.89E-15 ± 2.79E-16	6.99E-15 ± 1.03E-15	Yes	1.99E-14 ± 6.57E-16	7.36E-14 ± 2.43E-15	Yes
	5/2/2018	2.24E-15 ± 2.20E-16	8.29E-15 ± 8.14E-16	Yes	2.31E-14 ± 6.36E-16	8.55E-14 ± 2.35E-15	Yes
	5/9/2018	2.70E-15 ± 2.36E-16	9.99E-15 ± 8.73E-16	Yes	2.54E-14 ± 6.62E-16	9.40E-14 ± 2.45E-15	Yes
	5/16/2018	2.14E-15 ± 2.11E-16	7.92E-15 ± 7.81E-16	Yes	1.84E-14 ± 5.83E-16	6.81E-14 ± 2.16E-15	Yes

Table C-1. Weekly Gross Alpha and Gross Beta Concentrations in Air

		GROSS ALPHA							GROSS BETA						
Sampling Group and Location	**Sampling Date**	**Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)**			**Result > 3s**	**Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)**			**Result > 3s**
	5/23/2018	1.79E-15	±	1.94E-16	6.62E-15	±	7.18E-16	Yes	2.82E-14	±	6.73E-16	1.04E-13	±	2.49E-15	Yes
	5/30/2018	2.10E-15	±	2.07E-16	7.77E-15	±	7.66E-16	Yes	2.57E-14	±	6.69E-16	9.51E-14	±	2.48E-15	Yes
	6/6/2018	2.20E-15	±	2.18E-16	8.14E-15	±	8.07E-16	Yes	2.41E-14	±	6.46E-16	8.92E-14	±	2.39E-15	Yes
	6/13/2018	3.46E-15	±	2.59E-16	1.28E-14	±	9.58E-16	Yes	2.51E-14	±	6.67E-16	9.29E-14	±	2.47E-15	Yes
	6/20/2018	1.44E-15	±	2.31E-16	5.33E-15	±	8.55E-16	Yes	2.01E-14	±	6.23E-16	7.44E-14	±	2.31E-15	Yes
	6/27/2018	1.84E-15	±	2.15E-16	6.81E-15	±	7.96E-16	Yes	2.21E-14	±	6.53E-16	8.18E-14	±	2.42E-15	Yes
JACKSON	4/4/2018	1.58E-15	±	2.77E-16	5.85E-15	±	1.02E-15	Yes	1.87E-14	±	6.34E-16	6.92E-14	±	2.35E-15	Yes
	4/11/2018	9.79E-16	±	2.37E-16	3.62E-15	±	8.77E-16	Yes	1.00E-14	±	5.15E-16	3.70E-14	±	1.91E-15	Yes
	4/18/2018	8.52E-16	±	2.25E-16	3.15E-15	±	8.33E-16	Yes	1.20E-14	±	5.46E-16	4.44E-14	±	2.02E-15	Yes
	4/25/2018	1.56E-15	±	2.57E-16	5.77E-15	±	9.51E-16	Yes	1.89E-14	±	6.28E-16	6.99E-14	±	2.32E-15	Yes
	5/2/2018	9.15E-16	±	1.64E-16	3.39E-15	±	6.07E-16	Yes	2.40E-14	±	6.33E-16	8.88E-14	±	2.34E-15	Yes
	5/9/2018	1.21E-15	±	1.73E-16	4.48E-15	±	6.40E-16	Yes	2.57E-14	±	6.42E-16	9.51E-14	±	2.38E-15	Yes
	5/16/2018	6.08E-16	±	1.42E-16	2.25E-15	±	5.25E-16	Yes	1.48E-14	±	5.44E-16	5.48E-14	±	2.01E-15	Yes
	5/23/2018	7.55E-16	±	1.45E-16	2.79E-15	±	5.37E-16	Yes	2.37E-14	±	6.27E-16	8.77E-14	±	2.32E-15	Yes
	5/30/2018	1.21E-15	±	1.72E-16	4.48E-15	±	6.36E-16	Yes	2.57E-14	±	6.82E-16	9.51E-14	±	2.52E-15	Yes
	6/6/2018	1.07E-15	±	1.70E-16	3.96E-15	±	6.29E-16	Yes	2.45E-14	±	6.35E-16	9.07E-14	±	2.35E-15	Yes
	6/13/2018	1.16E-15	±	1.76E-16	4.29E-15	±	6.51E-16	Yes	2.44E-14	±	6.61E-16	9.03E-14	±	2.45E-15	Yes
	6/20/2018	1.58E-16	±	1.72E-16	5.85E-16	±	6.36E-16	No	1.98E-14	±	6.01E-16	7.33E-14	±	2.22E-15	Yes
	6/27/2018	5.55E-16	±	1.50E-16	2.05E-15	±	5.55E-16	Yes	2.13E-14	±	6.18E-16	7.88E-14	±	2.29E-15	Yes
SUGAR CITY	4/4/2018	1.23E-15	±	2.69E-16	4.55E-15	±	9.95E-16	Yes	1.62E-14	±	6.19E-16	5.99E-14	±	2.29E-15	Yes
	4/11/2018	1.10E-15	±	2.51E-16	4.07E-15	±	9.29E-16	Yes	1.09E-14	±	5.44E-16	4.03E-14	±	2.01E-15	Yes
	4/18/2018	1.04E-15	±	2.32E-16	3.85E-15	±	8.58E-16	Yes	1.18E-14	±	5.39E-16	4.37E-14	±	1.99E-15	Yes
	4/25/2018	1.77E-15	±	2.85E-16	6.55E-15	±	1.05E-15	Yes	1.84E-14	±	6.64E-16	6.81E-14	±	2.46E-15	Yes
	5/2/2018	6.87E-16	±	1.41E-16	2.54E-15	±	5.22E-16	Yes	1.97E-14	±	5.54E-16	7.29E-14	±	2.05E-15	Yes
	5/9/2018	1.24E-15	±	1.76E-16	4.59E-15	±	6.51E-16	Yes	2.48E-14	±	6.39E-16	9.18E-14	±	2.36E-15	Yes
	5/16/2018	6.76E-16	±	1.33E-16	2.50E-15	±	4.92E-16	Yes	1.67E-14	±	5.19E-16	6.18E-14	±	1.92E-15	Yes
	5/23/2018	9.58E-16	±	1.64E-16	3.54E-15	±	6.07E-16	Yes	2.43E-14	±	6.63E-16	8.99E-14	±	2.45E-15	Yes
	5/30/2018	9.01E-16	±	1.30E-16	3.33E-15	±	4.81E-16	Yes	2.13E-14	±	5.35E-16	7.88E-14	±	1.98E-15	Yes
	6/6/2018	6.89E-16	±	1.55E-16	2.55E-15	±	5.74E-16	Yes	2.30E-14	±	6.33E-16	8.51E-14	±	2.34E-15	Yes
	6/13/2018	1.28E-15	±	1.65E-16	4.74E-15	±	6.11E-16	Yes	2.35E-14	±	5.97E-16	8.70E-14	±	2.21E-15	Yes
	6/20/2018	-2.36E-17	±	1.54E-16	-8.73E-17	±	5.70E-16	No	1.80E-14	±	5.58E-16	6.66E-14	±	2.06E-15	Yes
	6/27/2018	8.97E-16	±	1.67E-16	3.32E-15	±	6.18E-16	Yes	2.08E-14	±	6.15E-16	7.70E-14	±	2.28E-15	Yes
INL SITE															
EFS	4/4/2018	1.35E-15	±	5.47E-16	5.00E-15	±	2.02E-15	No	1.85E-14	±	1.17E-15	6.85E-14	±	4.33E-15	Yes
	4/11/2018	7.51E-16	±	2.33E-16	2.78E-15	±	8.62E-16	Yes	1.11E-14	±	5.41E-16	4.11E-14	±	2.00E-15	Yes
	4/18/2018	8.64E-16	±	2.29E-16	3.20E-15	±	8.47E-16	Yes	1.15E-14	±	5.47E-16	4.26E-14	±	2.02E-15	Yes
	4/25/2018	9.39E-16	±	2.30E-16	3.47E-15	±	8.51E-16	Yes	1.98E-14	±	6.36E-16	7.33E-14	±	2.35E-15	Yes
	5/2/2018	8.75E-16	±	1.69E-16	3.24E-15	±	6.25E-16	Yes	1.98E-14	±	6.17E-16	7.33E-14	±	2.28E-15	Yes
	5/9/2018	1.15E-15	±	1.73E-16	4.26E-15	±	6.40E-16	Yes	2.70E-14	±	6.60E-16	9.99E-14	±	2.44E-15	Yes
	5/16/2018	2.72E-16	±	1.50E-16	1.01E-15	±	5.55E-16	No	1.15E-14	±	6.07E-16	4.26E-14	±	2.25E-15	Yes
	5/23/2018	9.02E-16	±	1.89E-16	3.34E-15	±	6.99E-16	Yes	2.87E-14	±	8.12E-16	1.06E-13	±	3.00E-15	Yes
	5/30/2018	1.09E-15	±	1.62E-16	4.03E-15	±	5.99E-16	Yes	2.40E-14	±	6.52E-16	8.88E-14	±	2.41E-15	Yes
	6/6/2018	1.11E-15	±	1.80E-16	4.11E-15	±	6.66E-16	Yes	2.59E-14	±	6.76E-16	9.58E-14	±	2.50E-15	Yes
	6/13/2018	8.14E-16	±	1.52E-16	3.01E-15	±	5.62E-16	Yes	2.17E-14	±	6.08E-16	8.03E-14	±	2.25E-15	Yes
	6/20/2018	9.23E-17	±	1.64E-16	3.42E-16	±	6.07E-16	No	2.09E-14	±	6.00E-16	7.73E-14	±	2.22E-15	Yes
	6/27/2018	6.17E-16	±	1.52E-16	2.28E-15	±	5.62E-16	Yes	2.09E-14	±	6.11E-16	7.73E-14	±	2.26E-15	Yes
MAIN GATE	4/4/2018	1.17E-15	±	2.62E-16	4.33E-15	±	9.69E-16	Yes	2.01E-14	±	6.51E-16	7.44E-14	±	2.41E-15	Yes
	4/11/2018	8.99E-16	±	2.49E-16	3.33E-15	±	9.21E-16	Yes	1.16E-14	±	5.65E-16	4.29E-14	±	2.09E-15	Yes
	4/18/2018	6.87E-16	±	2.22E-16	2.54E-15	±	8.21E-16	Yes	1.35E-14	±	5.73E-16	5.00E-14	±	2.12E-15	Yes
	4/25/2018	1.28E-15	±	2.56E-16	4.74E-15	±	9.47E-16	Yes	2.13E-14	±	6.76E-16	7.88E-14	±	2.50E-15	Yes
	5/2/2018	1.27E-15	±	1.84E-16	4.70E-15	±	6.81E-16	Yes	2.35E-14	±	6.44E-16	8.70E-14	±	2.38E-15	Yes

Table C-1. Weekly Gross Alpha and Gross Beta Concentrations in Air

		GROSS ALPHA							GROSS BETA						
Sampling Group and Location	**Sampling Date**	**Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)**			**Result > 3s**	**Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)**			**Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)**			**Result > 3s**
	5/9/2018	1.63E-15	±	1.95E-16	6.03E-15	±	7.22E-16	Yes	2.88E-14	±	6.85E-16	1.07E-13	±	2.53E-15	Yes
	5/16/2018	5.02E-16	±	1.34E-16	1.86E-15	±	4.96E-16	Yes	1.57E-14	±	5.45E-16	5.81E-14	±	2.02E-15	Yes
	5/23/2018	1.07E-15	±	1.64E-16	3.96E-15	±	6.07E-16	Yes	2.87E-14	±	6.83E-16	1.06E-13	±	2.53E-15	Yes
	5/30/2018	9.90E-16	±	1.58E-16	3.66E-15	±	5.85E-16	Yes	2.60E-14	±	6.74E-16	9.62E-14	±	2.49E-15	Yes
	6/6/2018	1.26E-15	±	1.83E-16	4.66E-15	±	6.77E-16	Yes	2.69E-14	±	6.73E-16	9.95E-14	±	2.49E-15	Yes
	6/13/2018	9.71E-16	±	1.69E-16	3.59E-15	±	6.25E-16	Yes	2.55E-14	±	6.77E-16	9.44E-14	±	2.50E-15	Yes
	6/20/2018	3.29E-16	±	2.22E-16	1.22E-15	±	8.21E-16	No	2.78E-14	±	7.83E-16	1.03E-13	±	2.90E-15	Yes
	6/27/2018	6.51E-16	±	1.54E-16	2.41E-15	±	5.70E-16	Yes	2.24E-14	±	6.27E-16	8.29E-14	±	2.32E-15	Yes
VAN BUREN GATE	4/4/2018	1.28E-15	±	2.69E-16	4.74E-15	±	9.95E-16	Yes	1.94E-14	±	6.49E-16	7.18E-14	±	2.40E-15	Yes
	4/11/2018	8.91E-16	±	2.45E-16	3.30E-15	±	9.07E-16	Yes	1.21E-14	±	5.65E-16	4.48E-14	±	2.09E-15	Yes
	4/18/2018	9.13E-16	±	2.35E-16	3.38E-15	±	8.70E-16	Yes	1.30E-14	±	5.72E-16	4.81E-14	±	2.12E-15	Yes
	4/25/2018	9.89E-16	±	2.44E-16	3.66E-15	±	9.03E-16	Yes	2.05E-14	±	6.71E-16	7.59E-14	±	2.48E-15	Yes
	5/2/2018	1.25E-15	±	1.81E-16	4.63E-15	±	6.70E-16	Yes	2.28E-14	±	6.31E-16	8.44E-14	±	2.33E-15	Yes
	5/9/2018	1.27E-15	±	1.83E-16	4.70E-15	±	6.77E-16	Yes	2.64E-14	±	6.73E-16	9.77E-14	±	2.49E-15	Yes
	5/16/2018	2.84E-16	±	1.19E-16	1.05E-15	±	4.40E-16	No	1.62E-14	±	5.44E-16	5.99E-14	±	2.01E-15	Yes
	5/23/2018	7.90E-16	±	1.50E-16	2.92E-15	±	5.55E-16	Yes	2.78E-14	±	6.73E-16	1.03E-13	±	2.49E-15	Yes
	5/30/2018	9.92E-16	±	1.59E-16	3.67E-15	±	5.88E-16	Yes	2.52E-14	±	6.69E-16	9.32E-14	±	2.48E-15	Yes
	6/6/2018	-2.52E-16	±	8.04E-17	-9.32E-16	±	2.97E-16	No	1.54E-15	±	3.34E-16	5.70E-15	±	1.24E-15	Yes
	6/13/2018	1.37E-15	±	1.83E-16	5.07E-15	±	6.77E-16	Yes	2.48E-14	±	6.55E-16	9.18E-14	±	2.42E-15	Yes
	6/20/2018	2.80E-16	±	1.77E-16	1.04E-15	±	6.55E-16	No	2.17E-14	±	6.18E-16	8.03E-14	±	2.29E-15	Yes

Table C-2. Weekly Iodine-131 Activity in Air.

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} μCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
BOUNDARY								
ARCO	04/04/18	-1.80	±	1.03	-6.66	±	3.81	No
	04/11/18	-1.08	±	1.60	-4.00	±	5.92	No
	04/18/18	-0.45	±	1.45	-1.66	±	5.37	No
	04/25/18	-1.00	±	0.99	-3.70	±	3.65	No
	05/02/18	-1.23	±	0.92	-4.55	±	3.41	No
	05/09/18	1.14	±	1.04	4.22	±	3.85	No
	05/16/18	-1.96	±	1.40	-7.25	±	5.18	No
	05/23/18	-0.20	±	0.98	-0.75	±	3.61	No
	05/30/18	-1.48	±	1.41	-5.48	±	5.22	No
	06/06/18	0.15	±	1.01	0.57	±	3.74	No
	06/13/18	0.99	±	0.95	3.66	±	3.52	No
	06/20/18	1.10	±	0.99	4.07	±	3.66	No
	06/27/18	0.36	±	1.46	1.32	±	5.40	No
ATOMIC CITY	04/04/18	-1.88	±	1.07	-6.96	±	3.96	No
	04/11/18	-1.06	±	1.57	-3.92	±	5.81	No
	04/18/18	-0.49	±	1.58	-1.80	±	5.85	No
	04/25/18	-1.05	±	1.03	-3.89	±	3.81	No
	05/02/18	-1.22	±	0.91	-4.51	±	3.36	No
	05/09/18	1.08	±	0.99	4.00	±	3.65	No
	05/16/18	-2.12	±	1.52	-7.84	±	5.62	No
	05/23/18	-0.19	±	0.92	-0.71	±	3.40	No
	05/30/18	-1.53	±	1.45	-5.66	±	5.37	No
	06/06/18	0.15	±	0.97	0.55	±	3.60	No
	06/13/18	0.98	±	0.94	3.63	±	3.49	No
	06/20/18	1.05	±	0.95	3.89	±	3.50	No
	06/27/18	0.34	±	1.41	1.27	±	5.22	No
QA-1	04/04/18	-1.81	±	1.03	-6.70	±	3.81	No
(ATOMIC CITY)	04/11/18	-1.03	±	1.53	-3.81	±	5.66	No
	04/18/18	-0.48	±	1.55	-1.77	±	5.74	No
	04/25/18	-1.02	±	1.00	-3.77	±	3.70	No
	05/02/18	-1.22	±	0.91	-4.51	±	3.36	No
	05/09/18	1.12	±	1.02	4.14	±	3.77	No
	05/16/18	-2.06	±	1.47	-7.62	±	5.44	No
	05/23/18	-0.19	±	0.91	-0.70	±	3.37	No
	05/30/18	-1.56	±	1.48	-5.77	±	5.48	No
	06/06/18	0.15	±	0.97	0.54	±	3.58	No
	06/13/18	0.96	±	0.93	3.57	±	3.43	No
	06/20/18	1.05	±	0.94	3.89	±	3.48	No
	06/27/18	0.34	±	1.41	1.27	±	5.22	No
BLUE DOME	04/04/18	-0.25	±	0.89	-0.91	±	3.30	No
	04/11/18	0.86	±	0.97	3.19	±	3.60	No
	04/18/18	-1.14	±	1.03	-4.22	±	3.81	No
	04/25/18	2.69	±	1.56	9.95	±	5.77	No
	05/02/18	3.62	±	1.87	13.39	±	6.92	No
	05/09/18	1.05	±	0.97	3.89	±	3.59	No
	05/16/18	-0.60	±	0.87	-2.21	±	3.22	No
	05/23/18	-0.91	±	2.03	-3.35	±	7.51	No
	05/30/18	-0.60	±	0.91	-2.21	±	3.36	No
	06/06/18	-0.99	±	0.92	-3.66	±	3.40	No
	06/13/18	1.88	±	1.51	6.96	±	5.59	No

Table C-2. Weekly Iodine-131 Activity in Air.

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	06/20/18	0.65	±	1.50	2.42	±	5.55	No
	06/27/18	-0.73	±	0.93	-2.68	±	3.44	No
QA-2	04/04/18	-0.24	±	0.88	-0.90	±	3.27	No
(BLUE DOME)	04/11/18	0.87	±	0.99	3.22	±	3.65	No
	04/18/18	-1.12	±	1.02	-4.14	±	3.77	No
	04/25/18	2.52	±	1.46	9.32	±	5.40	No
	05/02/18	3.40	±	1.75	12.58	±	6.48	No
	05/09/18	1.06	±	0.98	3.92	±	3.61	No
	05/16/18	-0.61	±	0.89	-2.26	±	3.29	No
	05/23/18	-0.90	±	2.02	-3.33	±	7.47	No
	05/30/18	-0.59	±	0.90	-2.19	±	3.33	No
	06/06/18	-0.99	±	0.92	-3.66	±	3.40	No
	06/13/18	1.81	±	1.45	6.70	±	5.37	No
	06/20/18	0.60	±	1.37	2.21	±	5.07	No
	06/27/18	-0.73	±	0.93	-2.68	±	3.44	No
HOWE	04/04/18	-0.25	±	0.90	-0.92	±	3.32	No
	04/11/18	0.82	±	0.92	3.02	±	3.41	No
	04/18/18	-0.99	±	0.90	-3.65	±	3.31	No
	04/25/18	2.59	±	1.50	9.58	±	5.55	No
	05/02/18	3.60	±	1.86	13.32	±	6.88	No
	05/09/18	1.05	±	0.96	3.89	±	3.57	No
	05/16/18	-0.60	±	0.88	-2.23	±	3.25	No
	05/23/18	-0.93	±	2.09	-3.44	±	7.73	No
	05/30/18	-0.59	±	0.90	-2.19	±	3.34	No
	06/06/18	-0.98	±	0.91	-3.63	±	3.36	No
	06/13/18	1.84	±	1.47	6.81	±	5.44	No
	06/20/18	0.58	±	1.34	2.16	±	4.96	No
	06/27/18	-0.73	±	0.93	-2.69	±	3.44	No
MONTEVIEW	04/04/18	-0.24	±	0.88	-0.90	±	3.25	No
	04/11/18	0.80	±	0.90	2.95	±	3.34	No
	04/18/18	-0.98	±	0.88	-3.61	±	3.27	No
	04/25/18	2.60	±	1.50	9.62	±	5.55	No
	05/02/18	3.60	±	1.85	13.32	±	6.85	No
	05/09/18	1.03	±	0.94	3.81	±	3.49	No
	05/16/18	-0.59	±	0.86	-2.19	±	3.19	No
	05/23/18	-0.86	±	1.93	-3.18	±	7.14	No
	05/30/18	-0.61	±	0.93	-2.27	±	3.45	No
	06/06/18	-0.96	±	0.89	-3.53	±	3.28	No
	06/13/18	1.79	±	1.44	6.62	±	5.33	No
	06/27/18	-0.83	±	1.07	-3.07	±	3.96	No
MUD LAKE	04/04/18	-0.24	±	0.85	-0.87	±	3.15	No
	04/11/18	0.82	±	0.92	-3.74	±	3.40	No
	04/18/18	-1.01	±	0.92	9.84	±	5.70	No
	04/25/18	2.66	±	1.54	13.02	±	6.70	No
	05/02/18	3.52	±	1.81	3.89	±	3.56	No
	05/09/18	1.05	±	0.96	-2.13	±	3.09	No
	05/16/18	-0.58	±	0.84	-3.50	±	7.84	No
	05/23/18	-0.95	±	2.12	-2.24	±	3.40	No
	05/30/18	-0.61	±	0.92	-3.70	±	3.44	No
	06/06/18	-1.00	±	0.93	6.73	±	5.40	No
	06/13/18	1.82	±	1.46	2.23	±	5.11	No

Table C-2. Weekly Iodine-131 Activity in Air.

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	06/20/18	0.60	±	1.38	-2.65	±	3.40	No
	06/27/18	-0.72	±	0.92	-2.65	±	3.40	No
DISTANT								
BLACKFOOT	04/04/18	-1.74	±	0.99	-6.44	±	3.67	No
	04/11/18	-0.96	±	1.42	-3.54	±	5.25	No
	04/18/18	-0.47	±	1.52	-1.74	±	5.62	No
	04/25/18	-0.96	±	0.94	-3.53	±	3.47	No
	05/02/18	-1.11	±	0.83	-4.11	±	3.07	No
	05/09/18	1.06	±	0.97	3.92	±	3.59	No
	05/16/18	-1.93	±	1.38	-7.14	±	5.11	No
	05/23/18	-0.18	±	0.88	-0.68	±	3.26	No
	05/30/18	-1.38	±	1.31	-5.11	±	4.85	No
	06/06/18	0.14	±	0.93	0.52	±	3.42	No
	06/13/18	0.91	±	0.88	3.37	±	3.24	No
	06/20/18	0.99	±	0.89	3.67	±	3.29	No
	06/27/18	0.34	±	1.41	1.27	±	5.22	No
CRATERS	04/04/18	-1.79	±	1.02	-6.62	±	3.77	No
	04/11/18	-1.01	±	1.51	-3.74	±	5.59	No
	04/18/18	-0.47	±	1.52	-1.74	±	5.62	No
	04/25/18	-1.03	±	1.01	-3.81	±	3.74	No
	05/02/18	-1.22	±	0.91	-4.51	±	3.37	No
	05/09/18	1.13	±	1.03	4.18	±	3.81	No
	05/16/18	-2.07	±	1.48	-7.66	±	5.48	No
	05/23/18	-0.20	±	0.96	-0.73	±	3.53	No
	05/30/18	-1.48	±	1.40	-5.48	±	5.18	No
	06/06/18	0.15	±	0.98	0.55	±	3.61	No
	06/13/18	0.97	±	0.94	3.60	±	3.47	No
	06/20/18	1.13	±	1.01	4.18	±	3.74	No
	06/27/18	0.37	±	1.50	1.35	±	5.55	No
DUBOIS	04/04/18	-0.25	±	0.90	-0.92	±	3.32	No
	04/11/18	0.83	±	0.93	3.05	±	3.45	No
	04/18/18	-1.00	±	0.91	-3.70	±	3.36	No
	04/25/18	3.77	±	2.18	13.95	±	8.07	No
	05/02/18	4.22	±	2.17	15.61	±	8.03	No
	05/09/18	1.14	±	1.05	4.22	±	3.89	No
	05/16/18	-0.65	±	0.94	-2.39	±	3.47	No
	05/23/18	-0.90	±	2.03	-3.34	±	7.51	No
	05/30/18	-0.60	±	0.91	-2.22	±	3.38	No
	06/06/18	-1.02	±	0.95	-3.77	±	3.50	No
	06/13/18	1.91	±	1.54	7.07	±	5.70	No
	06/20/18	0.60	±	1.38	2.23	±	5.11	No
	06/27/18	-0.72	±	0.92	-2.66	±	3.40	No
IDAHO FALLS	04/04/18	-0.25	±	0.89	-0.91	±	3.29	No
	04/11/18	0.82	±	0.92	3.02	±	3.42	No
	04/18/18	-1.02	±	0.92	-3.77	±	3.41	No
	04/25/18	2.65	±	1.53	9.81	±	5.66	No
	05/02/18	3.64	±	1.88	13.47	±	6.96	No
	05/09/18	1.05	±	0.96	3.89	±	3.56	No
	05/16/18	-0.62	±	0.90	-2.30	±	3.34	No
	05/23/18	-0.91	±	2.04	-3.37	±	7.55	No
	05/30/18	-0.61	±	0.93	-2.26	±	3.43	No

Table C-2. Weekly Iodine-131 Activity in Air.

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	06/06/18	-0.99	±	0.92	-3.67	±	3.41	No
	06/13/18	1.89	±	1.52	6.99	±	5.62	No
	06/20/18	0.63	±	1.45	2.34	±	5.37	No
	06/27/18	-0.75	±	0.96	-2.78	±	3.56	No
JACKSON	04/04/18	-1.76	±	1.01	-6.51	±	3.74	No
	04/11/18	-0.98	±	1.46	-3.64	±	5.40	No
	04/18/18	-0.45	±	1.44	-1.65	±	5.33	No
	04/25/18	-0.99	±	0.97	-3.65	±	3.58	No
	05/02/18	-1.18	±	0.88	-4.37	±	3.26	No
	05/09/18	1.08	±	0.99	4.00	±	3.65	No
	05/16/18	-2.08	±	1.49	-7.70	±	5.51	No
	05/23/18	-0.20	±	0.96	-0.74	±	3.54	No
	05/30/18	-1.60	±	1.51	-5.92	±	5.59	No
	06/06/18	0.15	±	0.96	0.54	±	3.53	No
	06/13/18	1.03	±	0.99	3.81	±	3.65	No
	06/20/18	1.15	±	1.03	4.26	±	3.81	No
	06/27/18	0.36	±	1.48	1.33	±	5.48	No
SUGAR CITY	04/04/18	-0.26	±	0.93	-0.95	±	3.43	No
	04/11/18	0.82	±	0.92	3.02	±	3.42	No
	04/18/18	-0.99	±	0.90	-3.67	±	3.33	No
	04/25/18	2.83	±	1.63	10.47	±	6.03	No
	05/02/18	3.24	±	1.67	11.99	±	6.18	No
	05/09/18	1.01	±	0.93	3.74	±	3.44	No
	05/16/18	-0.55	±	0.80	-2.04	±	2.96	No
	05/23/18	-0.99	±	2.21	-3.65	±	8.18	No
	05/30/18	-0.48	±	0.73	-1.77	±	2.69	No
	06/06/18	-1.00	±	0.92	-3.69	±	3.42	No
	06/13/18	1.67	±	1.34	6.18	±	4.96	No
	06/20/18	0.57	±	1.31	2.12	±	4.85	No
	06/27/18	-0.71	±	0.91	-2.63	±	3.37	No
INL SITE								
EFS	04/04/18	-4.34	±	2.48	-16.06	±	9.18	No
	04/11/18	-1.01	±	1.51	-3.74	±	5.59	No
	04/18/18	-0.46	±	1.47	-1.68	±	5.44	No
	04/25/18	-0.99	±	0.97	-3.64	±	3.58	No
	05/02/18	-1.28	±	0.95	-4.74	±	3.53	No
	05/09/18	1.10	±	1.00	4.07	±	3.70	No
	05/16/18	-2.76	±	1.97	-10.21	±	7.29	No
	05/23/18	-0.27	±	1.29	-0.99	±	4.77	No
	05/30/18	-1.55	±	1.47	-5.74	±	5.44	No
	06/06/18	0.16	±	1.02	0.57	±	3.77	No
	06/13/18	0.97	±	0.93	3.57	±	3.44	No
	06/20/18	1.11	±	0.99	4.11	±	3.68	No
	06/27/18	0.36	±	1.47	1.32	±	5.44	No
MAIN GATE	04/04/18	-1.77	±	1.01	-6.55	±	3.74	No
	04/11/18	-1.06	±	1.58	-3.92	±	5.85	No
	04/18/18	-0.45	±	1.47	-1.68	±	5.44	No
	04/25/18	-1.04	±	1.02	-3.85	±	3.77	No
	05/02/18	-1.23	±	0.92	-4.55	±	3.40	No
	05/09/18	1.11	±	1.02	4.11	±	3.77	No
	05/16/18	-2.03	±	1.45	-7.51	±	5.37	No

Table C-2. Weekly Iodine-131 Activity in Air.

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($x\ 10^{-15}$ μCi/mL)			Result ± 1s Uncertainty ($x\ 10^{-11}$ Bq/mL)			Result > 3s
	05/23/18	-0.20	±	0.97	-0.74	±	3.59	No
	05/30/18	-1.55	±	1.47	-5.74	±	5.44	No
	06/06/18	0.15	±	0.99	0.56	±	3.65	No
	06/13/18	1.04	±	1.00	3.85	±	3.70	No
	06/20/18	1.43	±	1.28	5.29	±	4.74	No
	06/27/18	0.36	±	1.47	1.32	±	5.44	No
VAN BUREN GATE	04/04/18	-1.79	±	1.03	-6.62	±	3.81	No
	04/11/18	-1.04	±	1.55	-3.85	±	5.74	No
	04/18/18	-0.46	±	1.49	-1.70	±	5.51	No
	04/25/18	-1.05	±	1.03	-3.89	±	3.81	No
	05/02/18	-1.21	±	0.91	-4.48	±	3.35	No
	05/09/18	1.15	±	1.05	4.26	±	3.89	No
	05/16/18	-1.99	±	1.42	-7.36	±	5.25	No
	05/23/18	-0.20	±	0.97	-0.74	±	3.57	No
	05/30/18	-1.57	±	1.49	-5.81	±	5.51	No
	06/06/18	0.15	±	0.99	0.56	±	3.66	No
	06/13/18	1.00	±	0.96	3.69	±	3.55	No
	06/20/18	1.14	±	1.02	4.22	±	3.77	No

Table C-3. Quarterly Cesium-137, Strontium-90, and Actinide Concentrations in Composite Air Filters.

Sampling Group and Location	Sampling Date	Analyte	Result ± 1s Uncertainty (x 10^{-18} µCi/mL)			Result ± 1s Uncertainty (x 10^{-14} Bq/mL)			Result > 3s
BOUNDARY									
ARCO	06/27/18	CESIUM-137	67.40	±	84.4	249.38	±	312.28	No
	06/27/18	STRONTIUM-90	55.70	±	5.19	206.09	±	19.20	**Yes**
ATOMIC CITY	06/27/18	CESIUM-137	-79.30	±	82.30	-293.41	±	304.51	No
	06/27/18	STRONTIUM-90	1.00	±	4.94	3.70	±	18.28	No
QA-1 (ATOMIC CITY)	06/27/18	CESIUM-137	-35.81	±	81.13	-132.51	±	300.16	No
	06/27/18	STRONTIUM-90	13.10	±	8.66	48.47	±	32.04	No
BLUE DOME	06/27/18	AMERICIUM-241	2.21	±	1.65	8.18	±	6.11	No
	06/27/18	CESIUM-137	42.90	±	82.80	158.73	±	306.36	No
	06/27/18	PLUTONIUM-238	-2.95	±	2.17	-10.92	±	8.03	No
	06/27/18	PLUTONIUM-239/240	-11.40	±	4.00	-42.18	±	14.80	No
(QA-2) BLUE DOME	06/27/18	AMERICIUM-241	2.21	±	1.39	8.18	±	5.14	No
	06/27/18	CESIUM-137	-236.44	±	113.89	-874.81	±	421.39	No
	06/27/18	PLUTONIUM-238	1.54	±	1.23	5.70	±	4.55	No
	06/27/18	PLUTONIUM-239/240	1.02	±	1.47	3.77	±	5.44	No
FAA TOWER	06/27/18	CESIUM-137	70.90	±	64.60	262.33	±	239.02	No
	06/27/18	STRONTIUM-90	3.67	±	4.87	13.58	±	18.02	No
HOWE	06/27/18	CESIUM-137	51.80	±	65.70	191.66	±	243.09	No
MONTEVIEW	06/27/18	AMERICIUM-241	3.75	±	2.01	13.88	±	7.44	No
	06/27/18	CESIUM-137	155.00	±	117.00	573.50	±	432.90	No
	06/27/18	PLUTONIUM-238	-1.82	±	2.18	-6.73	±	8.07	No
	06/27/18	PLUTONIUM-239/240	-7.97	±	3.57	-29.49	±	13.21	No
MUD LAKE	06/27/18	CESIUM-137	-13.50	±	79.00	-49.95	±	292.30	No
DISTANT									
BLACKFOOT	06/27/18	CESIUM-137	-92.40	±	97.40	-341.88	±	360.38	No
CRATERS OF THE MOON	06/27/18	CESIUM-137	105.00	±	71.20	388.50	±	263.44	No
	06/27/18	STRONTIUM-90	-4.10	±	9.33	-15.17	±	34.52	No
DUBOIS	06/27/18	CESIUM-137	-148.00	±	110.00	-547.60	±	407.00	No
IDAHO FALLS	06/27/18	CESIUM-137	-57.40	±	83.50	-212.38	±	308.95	No
JACKSON	06/27/18	AMERICIUM-241	3.47	±	1.86	12.84	±	6.88	No
	06/27/18	CESIUM-137	-1.46	±	100.00	-5.40	±	370.00	No
	06/27/18	PLUTONIUM-238	1.84	±	1.58	6.81	±	5.85	No
	06/27/18	PLUTONIUM-239/240	1.57	±	1.55	5.81	±	5.74	No
SUGAR CITY	06/27/18	AMERICIUM-241	1.19	±	1.26	4.40	±	4.66	No

Table C-3. Quarterly Cesium-137, Strontium-90, and Actinide Concentrations in Composite Air Filters.

	06/27/18	CESIUM-137	-29.10	±	96.20	-107.67	±	355.94	No
	06/27/18	PLUTONIUM-238	-0.86	±	2.25	-3.18	±	8.33	No
	06/27/18	PLUTONIUM-239/240	2.57	±	1.89	9.51	±	6.99	No
INL SITE									
EFS	06/27/18	AMERICIUM-241	3.12	±	1.42	11.54	±	5.25	No
	06/27/18	CESIUM-137	158.00	±	134.00	584.60	±	495.80	No
	06/27/18	PLUTONIUM-238	-1.79	±	2.17	-6.62	±	8.03	No
	06/27/18	PLUTONIUM-239/240	1.49	±	1.57	5.51	±	5.81	No
MAIN GATE	06/27/18	CESIUM-137	-13.90	±	81.70	-51.43	±	302.29	No
	06/27/18	STRONTIUM-90	0.27	±	4.24	0.99	±	15.69	No
VAN BUREN GATE	06/27/18	AMERICIUM-241	45.00	±	4.16	166.50	±	15.39	**Yes**
	06/27/18	CESIUM-137	-256.00	±	123.00	-947.20	±	455.10	No
	06/27/18	PLUTONIUM-238	13.40	±	3.26	49.58	±	12.06	**Yes**
	06/27/18	PLUTONIUM-239/240	54.50	±	4.50	201.65	±	16.65	**Yes**

Table C-4. Tritium Concentrations in Atmospheric Moisture

Sampling Group and Location	Start Date	Sampling Date	Result ± 1s Uncertainty (x 10^{-13} µCi/mL_{air})			Result ± 1s Uncertainty (x 10^{-9} Bq/mL_{air})			Result > 3s
BOUNDARY									
ATOMIC CITY	02/21/18	04/04/18	4.22	±	1.21	15.61	±	4.48	**Yes**
ATOMIC CITY	04/04/18	05/09/18	2.01	±	1.08	7.44	±	4.00	No
ATOMIC CITY	05/09/18	05/30/18	2.15	±	1.53	7.96	±	5.66	No
ATOMIC CITY	05/30/18	06/20/18	2.50	±	1.74	9.24	±	6.44	No
HOWE	03/28/18	04/25/18	5.25	±	1.59	19.43	±	5.88	**Yes**
HOWE	04/25/18	05/17/18	5.63	±	1.79	20.83	±	6.62	**Yes**
HOWE	05/17/18	05/30/18	6.31	±	2.79	23.35	±	10.32	No
HOWE	05/30/18	06/20/18	15.10	±	2.15	55.87	±	8.00	**Yes**
DISTANT									
IDAHO FALLS	03/21/18	04/18/18	4.63	±	1.41	17.13	±	5.22	**Yes**
IDAHO FALLS	04/18/18	05/09/18	0.10	±	1.22	0.36	±	4.51	No
IDAHO FALLS	05/09/18	05/23/18	3.52	±	1.96	13.02	±	7.25	No
IDAHO FALLS	05/23/18	06/06/18	17.39	±	2.22	64.34	±	8.22	**Yes**
IDAHO FALLS	06/06/18	06/27/18	11.22	±	1.48	41.50	±	5.47	**Yes**
INL SITE									
EFS	03/14/18	04/18/18	6.71	±	1.23	24.83	±	4.55	**Yes**
EFS	04/18/18	05/16/18	7.34	±	1.34	27.16	±	4.96	**Yes**
EFS	05/16/18	06/06/18	9.22	±	1.66	34.11	±	6.16	**Yes**
EFS	06/06/18	06/27/18	12.80	±	1.41	47.36	±	5.21	**Yes**

Table C-5. Monthly and Weekly Tritium Concentrations in Precipitation

Location	Start Date	End Date	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
BOUNDARY									
ATOMIC CITY	04/11/18	04/18/18	98.40	±	23.50	3.64	±	0.87	Yes
ATOMIC CITY	04/18/18	04/25/18	113.00	±	23.70	4.18	±	0.88	Yes
ATOMIC CITY	04/25/18	05/02/18	155.00	±	24.00	5.74	±	0.89	Yes
ATOMIC CITY	05/09/18	05/16/18	160.00	±	24.00	5.92	±	0.89	Yes
ATOMIC CITY	05/16/18	05/23/18	161.00	±	24.00	5.96	±	0.89	Yes
ATOMIC CITY	05/23/18	05/30/18	152.00	±	24.40	5.62	±	0.90	Yes
ATOMIC CITY	05/30/18	06/06/18	158.00	±	24.30	5.85	±	0.90	Yes
ATOMIC CITY	06/13/18	06/20/18	97.80	±	23.50	3.62	±	0.87	Yes
ATOMIC CITY	06/20/18	06/27/18	197.00	±	24.80	7.29	±	0.92	Yes
HOWE	04/04/18	04/11/18	130.00	±	23.40	4.81	±	0.87	Yes
HOWE	04/11/18	04/18/18	167.00	±	23.90	6.18	±	0.88	Yes
HOWE	04/18/18	04/25/18	133.00	±	24.00	4.92	±	0.89	Yes
HOWE	04/25/18	05/02/18	138.00	±	23.20	5.11	±	0.86	Yes
HOWE	05/09/18	05/16/18	146.00	±	23.30	5.40	±	0.86	Yes
HOWE	05/16/18	05/23/18	192.00	±	24.00	7.10	±	0.89	Yes
HOWE	05/23/18	05/30/18	209.00	±	24.50	7.73	±	0.91	Yes
HOWE	05/30/18	06/06/18	108.00	±	23.90	4.00	±	0.88	Yes
HOWE	06/12/18	06/20/18	93.60	±	23.80	3.46	±	0.88	Yes
DISTANT									
IDAHO FALLS	03/31/18	04/30/18	87.20	±	22.80	3.23	±	0.84	Yes
IDAHO FALLS	04/30/18	05/31/18	299.00	±	25.20	11.06	±	0.93	Yes
IDAHO FALLS	05/31/18	06/30/18	117.00	±	24.10	4.33	±	0.89	Yes
INL SITE									
EFS	04/04/18	04/11/18	238.00	±	24.80	8.81	±	0.92	Yes
EFS	04/25/18	05/02/18	209.00	±	24.40	7.73	±	0.90	Yes
EFS	05/09/18	05/16/18	145.00	±	23.60	5.37	±	0.87	Yes
EFS	05/16/18	05/23/18	171.00	±	23.60	6.33	±	0.87	Yes
EFS	05/23/18	05/30/18	191.00	±	23.90	7.07	±	0.88	Yes
EFS	05/30/18	06/06/18	170.00	±	25.10	6.29	±	0.93	Yes
EFS	06/13/18	06/20/18	82.70	±	24.00	3.06	±	0.89	Yes

Table C-6. Gross Alpha, Gross Beta, and Tritium Concentrations in Surface and Drinking Water

Location	Sampling Date[a]	Analyte	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
SURFACE WATER									
Alpheus Spring	5/22/2018	GROSS ALPHA	0.80	±	0.40	0.03	±	0.01	No
		GROSS BETA	6.80	±	0.48	0.25	±	0.02	**Yes**
		TRITIUM	37.10	±	23.00	1.37	±	0.85	No
Bill Jones, Jr. Trout Farm	5/22/2018	GROSS ALPHA	0.92	±	0.30	0.03	±	0.01	**Yes**
		GROSS BETA	3.60	±	0.42	0.13	±	0.02	**Yes**
		TRITIUM	58.20	±	23.30	2.16	±	0.86	No
Clear Springs	5/22/2018	GROSS ALPHA	0.88	±	0.39	0.03	±	0.01	No
		GROSS BETA	4.57	±	0.46	0.17	±	0.02	**Yes**
		TRITIUM	78.10	±	23.60	2.89	±	0.87	**Yes**
DRINKING WATER									
Atomic City	5/23/2018	GROSS ALPHA	0.42	±	0.31	0.02	±	0.01	No
		GROSS BETA	3.90	±	0.44	0.14	±	0.02	**Yes**
		TRITIUM	65.50	±	23.10	2.43	±	0.86	No
Control	5/29/2018	GROSS ALPHA	-0.28	±	0.16	-0.01	±	0.01	No
		GROSS BETA	0.59	±	0.34	0.02	±	0.01	No
		TRITIUM	54.20	±	23.30	2.01	±	0.86	No
Craters of the Moon	5/23/2018	GROSS ALPHA	1.25	±	0.30	0.05	±	0.01	**Yes**
		GROSS BETA	2.35	±	0.41	0.09	±	0.02	**Yes**
		TRITIUM	47.40	±	22.90	1.76	±	0.85	No
Howe	5/23/2018	GROSS ALPHA	0.93	±	0.34	0.03	±	0.01	No
		GROSS BETA	1.86	±	0.40	0.07	±	0.01	**Yes**
		TRITIUM	53.20	±	23.00	1.97	±	0.85	No
Idaho Falls	5/29/2018	GROSS ALPHA	0.33	±	0.40	0.01	±	0.01	No
		GROSS BETA	3.81	±	0.45	0.14	±	0.02	**Yes**
		TRITIUM	103.00	±	23.70	3.81	±	0.88	**Yes**
Minidoka	5/22/2018	GROSS ALPHA	1.04	±	0.42	0.04	±	0.02	No
		GROSS BETA	4.92	±	0.46	0.18	±	0.02	**Yes**
		TRITIUM	209.00	±	25.00	7.74	±	0.93	**Yes**
Mud Lake	5/23/2018	GROSS ALPHA	0.15	±	0.25	0.01	±	0.01	No
		GROSS BETA	4.34	±	0.42	0.16	±	0.02	**Yes**
		TRITIUM	34.80	±	22.70	1.29	±	0.84	No
Rest Area	5/23/2018	GROSS ALPHA	0.82	±	0.30	0.03	±	0.01	No
		GROSS BETA	2.75	±	0.41	0.10	±	0.02	**Yes**
		TRITIUM	60.30	±	23.00	2.23	±	0.85	No

[a] During the summer of 2020, a review of the table detemined the activity concentration values reported for the media were correct, however, the sampling dates for the drinking water samples were incorrect. The drinking water sampling dates were updated to the correct sampling dates. The sampling dates for the surface water samples were correct and did not need an update.

Table C-6. Gross Alpha, Gross Beta, and Tritium Concentrations in Surface and Drinking Water

Location	Sampling Date[a]	Analyte	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
Rest Area (Duplicate)	5/23/2018	GROSS ALPHA	1.21	±	0.36	0.04	±	0.01	**Yes**
		GROSS BETA	3.39	±	0.44	0.13	±	0.02	**Yes**
		TRITIUM	75.50	±	24.30	2.80	±	0.90	**Yes**
Shoshone	5/22/2018	GROSS ALPHA	0.55	±	0.33	0.02	±	0.01	No
		GROSS BETA	3.04	±	0.42	0.11	±	0.02	**Yes**
		TRITIUM	54.40	±	22.90	2.01	±	0.85	No

[a] During the summer of 2020, a review of the table detemined the activity concentration values reported for the media were correct, however, the sampling dates for the drinking water samples were incorrect. The drinking water sampling dates were updated to the correct sampling dates. The sampling dates for the surface water samples were correct and did not need an update.

Table C-7. Gross Alpha, Gross Beta, and Tritium Concentrations in the Big Lost River (BLR)

Location	Sampling Date	Analyte	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
SURFACE WATER									
BLR at Rest Area	04/16/18	GROSS ALPHA	1.07	±	0.42	0.04	±	0.02	No
		GROSS BETA	2.31	±	0.46	0.09	±	0.02	Yes
		TRITIUM	136.00	±	30.60	5.04	±	1.13	Yes
BLR at Rest Area (Duplicate)	04/16/18	GROSS ALPHA	1.48	±	0.48	0.05	±	0.02	Yes
		GROSS BETA	2.61	±	0.48	0.10	±	0.02	Yes
		TRITIUM	94.80	±	30.10	3.51	±	1.11	Yes
BLR at INTEC	04/16/18	GROSS ALPHA	1.40	±	0.45	0.05	±	0.02	Yes
		GROSS BETA	3.04	±	0.47	0.11	±	0.02	Yes
		TRITIUM	67.90	±	30.30	2.51	±	1.12	No
BLR at EFS	04/16/18	GROSS ALPHA	-9.78	±	0.71	-0.36	±	0.03	No
		GROSS BETA	2.78	±	0.48	0.10	±	0.02	Yes
		TRITIUM	86.20	±	30.50	3.19	±	1.13	No
BLR at NRF	04/16/18	GROSS ALPHA	2.57	±	0.50	0.10	±	0.02	Yes
		GROSS BETA	3.61	±	0.50	0.13	±	0.02	Yes
		TRITIUM	108.00	±	30.60	4.00	±	1.13	Yes
BLR at Sinks	04/16/18	GROSS ALPHA	0.62	±	0.40	0.02	±	0.01	No
		GROSS BETA	3.94	±	0.41	0.15	±	0.02	Yes
		TRITIUM	91.30	±	30.40	3.38	±	1.13	Yes
BLR Control (Birch Creek)	04/16/18	GROSS ALPHA	1.53	±	0.47	0.06	±	0.02	Yes
		GROSS BETA	0.49	±	0.45	0.02	±	0.02	No
		TRITIUM	117.00	±	30.30	4.33	±	1.12	Yes
BLR at Rest Area	06/15/18	GROSS ALPHA	2.35	±	0.42	0.09	±	0.02	Yes
		GROSS BETA	6.43	±	0.48	0.24	±	0.02	Yes
		TRITIUM	119.00	±	24.00	4.41	±	0.89	Yes
BLR at INTEC	06/15/18	GROSS ALPHA	3.59	±	0.51	0.13	±	0.02	Yes
		GROSS BETA	9.13	±	0.52	0.34	±	0.02	Yes
		TRITIUM	97.50	±	23.50	3.61	±	0.87	Yes
BLR at EFS	06/15/18	GROSS ALPHA	3.59	±	0.52	0.13	±	0.02	Yes
		GROSS BETA	9.12	±	0.53	0.34	±	0.02	Yes
		TRITIUM	61.90	±	23.10	2.29	±	0.86	No
BLR at NRF	06/15/18	GROSS ALPHA	2.45	±	0.42	0.09	±	0.02	Yes
		GROSS BETA	6.85	±	0.48	0.25	±	0.02	Yes
		TRITIUM	63.70	±	23.10	2.36	±	0.86	No
BLR at NRF (Duplicate)	06/15/18	GROSS ALPHA	6.94	±	0.71	0.26	±	0.03	Yes
		GROSS BETA	11.40	±	0.60	0.42	±	0.02	Yes
		TRITIUM	41.30	±	23.10	1.53	±	0.86	No

Table C-7. Gross Alpha, Gross Beta, and Tritium Concentrations in the Big Lost River (BLR)

Location	Sampling Date	Analyte	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
BLR at Sinks	06/15/18	GROSS ALPHA	1.52	±	0.33	0.06	±	0.01	**Yes**
		GROSS BETA	4.51	±	0.44	0.17	±	0.02	**Yes**
		TRITIUM	99.30	±	23.80	3.68	±	0.88	**Yes**
BLR Control (Birch Creek)	06/15/18	GROSS ALPHA	0.98	±	0.36	0.04	±	0.01	No
		GROSS BETA	0.19	±	0.41	0.01	±	0.02	No
		TRITIUM	76.10	±	23.50	2.82	±	0.87	**Yes**

Table C-8
Weekly and Monthly Iodine-131 and Cesium-137 Concentrations in Milk

		Iodine-131							Cesium-137						
Location	Sampling Date	Result ± 1s Uncertainty (pCi†/L)			Result ± 1s Uncertainty (Bq‡/L)			Result > 3s	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
BLACKFOOT	04/09/18	-0.63	±	2.02	-0.02	±	0.07	No	-1.90	±	1.41	-0.07	±	0.05	No
	05/06/18	0.11	±	1.14	0.00	±	0.00	No	1.31	±	0.98	0.00	±	0.00	No
	06/06/18	0.68	±	1.10	0.00	±	0.00	No	0.74	±	0.86	0.00	±	0.00	No
Duplicate	06/06/18	5.34	±	1.81	0.00	±	0.00	No	1.95	±	1.50	0.00	±	0.00	No
CONTROL	04/03/18	-1.83	±	2.05	-0.07	±	0.08	No	1.02	±	1.33	0.04	±	0.05	No
	05/08/18	2.30	±	1.88	0.09	±	0.07	No	-1.84	±	1.56	-0.07	±	0.06	No
	06/06/18	-4.18	±	2.10	-0.15	±	0.08	No	-0.58	±	1.32	-0.02	±	0.05	No
DIETRICH	04/02/18	0.27	±	1.07	0.01	±	0.04	No	0.81	±	0.84	0.03	±	0.03	No
	05/08/18	-1.07	±	1.88	-0.04	±	0.07	No	0.87	±	1.39	0.03	±	0.05	No
	06/05/18	0.92	±	1.85	0.03	±	0.07	No	-0.78	±	1.32	-0.03	±	0.05	No
HOWE	04/03/18	-0.06	±	1.15	0.00	±	0.04	No	0.01	±	0.94	0.00	±	0.03	No
	05/08/18	-0.37	±	1.96	-0.01	±	0.07	No	-2.10	±	1.38	-0.08	±	0.05	No
	06/05/18	0.87	±	1.05	0.03	±	0.04	No	2.22	±	0.89	0.08	±	0.03	No
IDAHO FALLS	04/03/18	1.25	±	1.10	0.05	±	0.04	No	0.11	±	0.93	0.00	±	0.03	No
	04/09/18	1.03	±	1.10	0.04	±	0.04	No	0.25	±	0.80	0.01	±	0.03	No
	04/17/18	0.04	±	1.59	0.00	±	0.06	No	0.14	±	1.44	0.01	±	0.05	No
	04/24/18	1.68	±	1.59	0.06	±	0.06	No	0.98	±	1.47	0.04	±	0.05	No
	05/01/18	-1.48	±	1.87	-0.05	±	0.07	No	-0.91	±	1.33	-0.03	±	0.05	No
	05/08/18	0.36	±	0.97	0.01	±	0.04	No	1.28	±	0.87	0.05	±	0.03	No
	05/15/18	0.36	±	1.62	0.01	±	0.06	No	1.63	±	1.42	0.06	±	0.05	No
	05/23/18	-1.75	±	0.95	-0.06	±	0.04	No	0.55	±	0.80	0.02	±	0.03	No
	05/29/18	-0.42	±	0.95	-0.02	±	0.04	No	0.87	±	0.93	0.03	±	0.03	No
	06/05/18	-0.46	±	0.95	-0.02	±	0.04	No	0.36	±	0.84	0.01	±	0.03	No
	06/12/18	-0.33	±	1.61	-0.01	±	0.06	No	-2.17	±	1.59	-0.08	±	0.06	No
	06/19/18	0.43	±	1.59	0.02	±	0.06	No	-0.98	±	1.50	-0.04	±	0.06	No
	06/26/18	1.57	±	1.58	0.06	±	0.06	No	1.47	±	1.45	0.05	±	0.05	No
MINIDOKA	04/02/18	-1.20	±	1.81	-0.04	±	0.07	No	2.43	±	1.49	0.09	±	0.06	No
	05/08/18	-2.58	±	1.85	-0.10	±	0.07	No	2.06	±	1.37	0.08	±	0.05	No
	06/05/18	-1.42	±	2.06	-0.05	±	0.08	No	1.47	±	1.38	0.05	±	0.05	No
TERRETON	04/03/18	-0.91	±	1.08	-0.03	±	0.04	No	0.18	±	0.82	1.48	±	0.03	No
	04/11/18	1.82	±	1.50	0.07	±	0.06	No	0.06	±	1.47	0.86	±	0.05	No
	04/18/18	-1.14	±	0.98	-0.04	±	0.04	No	-0.79	±	0.94	-0.54	±	0.03	No
	04/25/18	-0.42	±	0.97	-0.02	±	0.04	No	0.72	±	0.94	0.25	±	0.03	No
	05/02/18	-0.39	±	1.52	-0.01	±	0.06	No	1.33	±	1.45	0.63	±	0.05	No
	05/08/18	-0.51	±	1.08	-0.02	±	0.04	No	0.43	±	0.95	0.35	±	0.04	No
	05/16/18	1.03	±	0.98	0.04	±	0.04	No	1.04	±	0.96	1.07	±	0.04	No
	05/23/18	-1.08	±	0.99	-0.04	±	0.04	No	0.12	±	0.94	0.46	±	0.03	No
	05/30/18	-1.40	±	1.73	-0.05	±	0.06	No	-1.75	±	1.37	-0.93	±	0.05	No
	06/05/18	-0.08	±	1.04	0.00	±	0.04	No	-0.98	±	0.96	1.48	±	0.04	No
	06/13/18	-0.79	±	0.98	-0.03	±	0.04	No	0.53	±	0.95	-0.56	±	0.04	No
	06/20/18	0.33	±	0.97	0.01	±	0.04	No	1.49	±	0.99	1.58	±	0.04	No
	06/27/18	1.90	±	1.69	0.07	±	0.06	No	2.58	±	1.42	0.28	±	0.05	No

Table C-9. Strontium-90 and Tritium Concentrations in Milk

Location	Sampling Date	Strontium-90 Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
BLACKFOOT	05/06/18	0.21	±	0.05	0.01	±	0.00	Yes
CONTROL	05/08/18	0.04	±	0.05	0.00	±	0.00	No
DIETRICH	05/08/18	0.16	±	0.05	0.01	±	0.00	Yes
HOWE	05/08/18	0.14	±	0.05	0.01	±	0.00	Yes
IDAHO FALLS	05/08/18	0.10	±	0.05	0.00	±	0.00	No
MINIDOKA	05/08/18	0.05	±	0.05	0.00	±	0.00	No
TERRETON	05/08/18	0.11	±	0.05	0.00	±	0.00	No
		Tritium						
		Concentration ± 1s (pCi/L)			**Concentration ± 1s (Bq/L)**			**Result > 3s**
BLACKFOOT	05/06/18	164.00	±	30.10	6.07	±	1.11	Yes
CONTROL	05/08/18	12.20	±	32.80	0.45	±	1.21	No
DIETRICH	05/08/18	134.00	±	29.90	4.96	±	1.11	Yes
HOWE	05/08/18	-34.20	±	31.20	-1.27	±	1.16	No
IDAHO FALLS	05/08/18	151.00	±	30.00	5.59	±	1.11	Yes
MINIDOKA	05/08/18	171.00	±	30.20	6.33	±	1.12	Yes
TERRETON	05/08/18	136.00	±	29.90	5.04	±	1.11	Yes

Table C-10. Gamma-emitting Radionuclides and Strontium-90 in Alfalfa

Location	Sampling Date	Result ± 1s Uncertainty pCi/kg			Result ± 1s Uncertainty Bq/kg			Result > 3s
Cesium-137								
HOWE	06/13/18	46.60	±	56.40	1.73	±	2.09	No
IDAHO FALLS	06/12/18	41.20	±	57.50	1.53	±	2.13	No
IDAHO FALLS (duplicate)	06/12/18	-52.90	±	56.50	-1.96	±	2.09	No
MUD LAKE	06/13/18	40.20	±	54.20	1.49	±	2.01	No
Strontium-90								
HOWE	06/13/18	-36.70	±	15.30	-1.36	±	0.57	No
IDAHO FALLS	06/12/18	135.00	±	24.80	5.00	±	0.92	**Yes**
MUD LAKE	06/13/18	43.00	±	19.80	1.59	±	0.73	No

Table C-11. Environmental Radiation Measurements Using OSLDs

Location	Start Date	End Date	Radiation Measurement ± 2s Uncertainty mrem			Exposure mrem/day
BOUNDARY						
ARCO	11/08/17	05/09/18	59.90	±	5.99	0.33
ATOMIC CITY	11/08/17	05/09/18	61.65	±	6.17	0.34
BIRCH CREEK	11/08/17	05/09/18	55.15	±	5.51	0.30
BLUE DOME	11/08/17	05/09/18	51.65	±	5.16	0.28
HOWE	11/08/17	05/09/18	61.25	±	6.13	0.34
MONTEVIEW	11/08/17	05/09/18	59.05	±	5.90	0.32
MUD LAKE	11/08/17	05/09/18	64.60	±	6.47	0.35
Boundary Average			**59.04**			**0.32**
DISTANT						
ABERDEEN	11/06/17	05/08/18	61.50	±	6.15	0.34
BLACKFOOT	11/08/17	05/09/18	60.60	±	6.06	0.33
CRATERS	11/08/17	05/09/18	58.85	±	5.89	0.32
DUBOIS	11/08/17	05/09/18	52.70	±	5.27	0.29
IDAHO FALLS	11/08/17	05/09/18	59.25	±	5.92	0.32
JACKSON	11/09/17	05/14/18	53.00	±	5.30	0.29
MINIDOKA	11/06/17	05/10/18	55.45	±	5.55	0.30
MOUNTAIN VIEW	11/08/17	05/09/18	55.05	±	5.51	0.30
ROBERTS	11/06/17	05/08/18	66.60	±	6.66	0.37
SUGAR CITY	11/08/17	05/09/18	74.20	±	7.41	0.41
Distant Average			**59.72**			**0.33**

APPENDIX D

STATISTICAL ANALYSIS RESULTS

Table D-1. Results of the Kruskal-Wallis statistical test between INL Site, Boundary, and Distant sample groups by quarter and by month.

Parameter	P[a]
Gross Alpha	
Quarter	0.0114
April	0.0373
May	0.1009
June	0.4346
Gross Beta	
Quarter	0.8300
April	0.4201
May	0.8599
June	0.5269

a. A 'p' value greater than 0.05 signifies no statistical difference between data groups. Any values below 0.05 are indicated in red.

Table D-2. Results of multiple comparisons between location groups when medians are shown by the Kruskal-Wallis test to be different.[a]

Gross Alpha	**Second Quarter**		
	All Groups Multiple Comparisons p values (2-tailed); Coded Result (2nd-Qtr-18-LVf in 2nd-Qtr-18-LVf.stw) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 206) =8.948199 p =.0114 Include condition: v8="gross alpha"		
Depend.: Coded Result	Boundary R:110.55	Distant R:108.04	INL Site R:77.487
Boundary		1.000000	0.012432
Distant	1.000000		0.028735
INL Site	0.012432	0.028735	
Gross Alpha	**April**		
	month=4 Multiple Comparisons p values (2-tailed); Coded Result (Spreadsheet in 2nd-Qtr-18-LVf.stw) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 64) =6.579503 p =.0373 Include condition: v8="gross alpha"		
Depend.: Coded Result	Boundary R:33.679	Distant R:37.125	INL Site R:20.500
Boundary		1.000000	0.120682
Distant	1.000000		0.034658
INL Site	0.120682	0.034658	

a. Results of the Kruskal-Wallis test in Table D-1 show that at least one of the location group medians was different in the second quarter and in April. The multiple comparison test shown in the tables above identify where the differences are (the estimated p values in red indicate a significant difference between two groups).