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Idaho National Laboratory Site Offsite Environmental Surveillance Program Report: Third Quarter 2017

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EXECUTIVE SUMMARY

None of the radionuclides detected in samples collected during the third quarter of 2017 could be directly linked with INL Site activities. Levels of detected radionuclides were no different than values measured at other locations across the western United States. 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 public health.

This report for the third quarter of 2017 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, July 1 through September 30, 2017. All sample types (media) and the sampling schedule followed during 2017 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 water
- Milk
- Lettuce
- Grain
- Big game

Table E-1. Summary of results for the Third Quarter of 2017.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	In the third quarter, there was no statistical difference in gross alpha or gross beta activity between INL Site, Boundary and Distant groups for the quarter as a whole. The July and August Boundary group showed the highest concentrations, followed by the INL Site group. Although the Distant group was found with the lowest gross alpha concentrations, the differences between all the groups was very small and well within normal range. Seasonal variations appear to be the result of increased particulate concentrations in air resulting from agricultural activities and regional wildfires.
	Quarterly Composite	Gamma-emitting radionuclides, ^{90}Sr, actinides (americium and plutonium)	No ^{137}Cs or other human-made gamma-emitting radionuclides were detected in quarterly composites. Strontium-90 was not detected either. Amercium-241 and plutonium-239/240 were detected just above the 3s uncertainty level in the composite from the duplicate sampler at Blackfoot (but not in the composite from the primary sampler in Blackfoot). Amercium-241 was also found slightly above the 3s concentration in the composite collected from the Mud Lake sampler. The result was below the DOE Derived Concentration Standard (DCS) for americium-241.
	Charcoal Cartridge	Iodine-131	Iodine-131 was not detected in any of the 26 batches counted during the quarter.
Atmospheric Moisture	Liquid	Tritium	Ten of the 16 samples results showed tritium concentrations greater than the 3s uncertainty level during the quarter. No sample result exceeded the DCS for tritium in air.
Precipitation	Liquid	Tritium	14 samples were collected in the third quarter. Four of the results were greater than the 3s uncertainty. All results were within the range previously measured and were consistent with those reported across the region by the Environmental Protection Agency.
Surface Water (BLR)	Liquid	Gross alpha, gross beta, tritium	Gross alpha activity was detected in all samples and Gross beta was also reported in all but one sample. The concentrations were generally similar to previous results. Tritium was also detected in three samples. Concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous years.
Milk	Liquid	Iodine-131, other gamma-emitting	Forty-three milk samples were collected during the third quarter of 2017. Iodine-131 was not

Media	Sample Type	Analysis	Results
		radionuclides	detected in any weekly or monthly samples during the third quarter. No other human-made gamma-emitting radionuclides were found either.
Lettuce	Vegetation	Gamma-emitting radionuclides, ^{90}Sr	No human-made gamma-emitting radionuclides were found in any of the samples. Strontium-90 was detected in all of the samples analyzed, except the sample from Shelley which was well below the detection limit.
Grain	Vegetation	Gamma-emitting radionuclides and ^{90}Sr	No human-made gamma-emitting radionuclides were detected in any grain sample. Two of the 11 grain samples collected in 2017 contained a detectable concentration of ^{90}Sr. A lower detection limit was achieved in 2017 and the detectable results were close to this lower limit.
Large Game Animals	Tissue	Gamma-emitting radionuclides	Three game animals were sampled during the quarter. No human-made radionuclides were detected.

LIST OF ABBREVIATIONS

AEC	Atomic Energy Commission
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
NRTS	National Reactor Testing Station
ORAU	Oak Ridge Associated Universities
VNS-FS	Veolia Nuclear Solutions- Federal Services
WAI	Wastren Advantage Inc.

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 2017, 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 (VNS-FS), in conjunction with team members Idaho State University and Oak Ridge Associated Universities (ORAU).

This report contains monitoring results from the ESER Program for samples collected during the third quarter of 2017 (July 1- Sept 30, 2017).

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 on and around the INL Site
- drinking water from eight locations and surface water from three locations around the INL Site
- agricultural products, including milk at seven dairies around the INL Site, potatoes from at least six local producers, alfalfa from a local producer, 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 big game (pronghorn, mule deer, and elk) and waterfowl sampled on and near 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 Oak Ridge Associated Universities (ORAU).

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 [previously known as the Environmental Radiation Ambient Monitoring System (ERAMS) network] (EPA 2017). The EPA established the ERAMS network in 1973 with an emphasis on identifying trends in the accumulation of long-lived radionuclides in the environment. ERAMS was renamed RadNet in 2005 to reflect a new mission. RadNet is comprised of a nationwide network of sampling stations that provide air, precipitation, drinking water, and milk samples. 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 and for preparing quarterly reports on results from the environmental surveillance program. The quarterly reports are then consolidated into the INL Site Environmental Report for each calendar year. These annual reports also include 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 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. ESER currently defines a detection of radioactivity in an individual sample if the result exceeds the minimum detectable concentration (MDC) calculated by the laboratory after the analysis of a background sample (i.e., the *a posteriori* measurement) based on calculations derived by Curie (1968). 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 VNS-FS 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 Site. The INL Site 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 multiprogram 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.

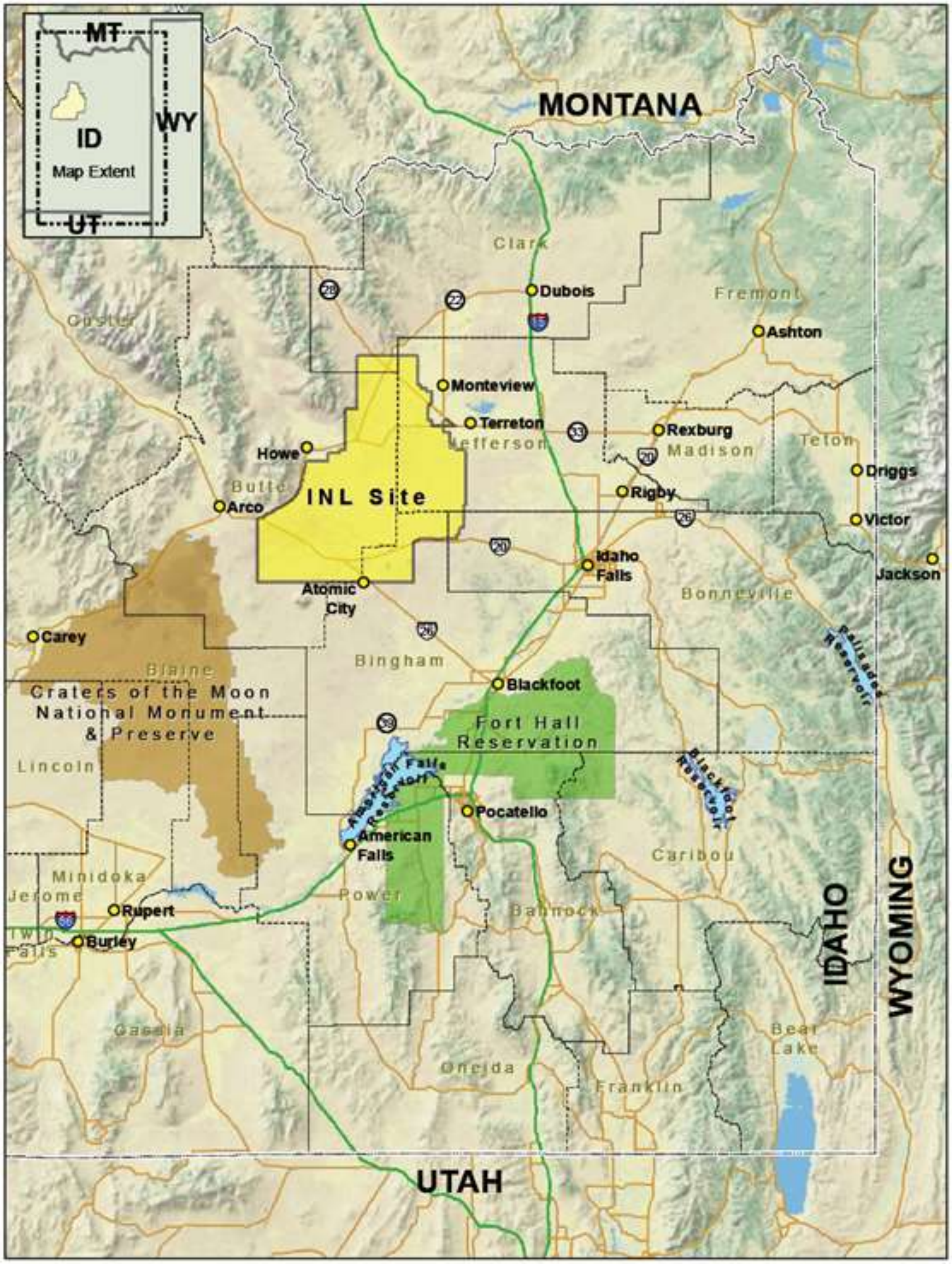

Figure 1. Location of the Idaho National Laboratory Site.

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 third quarter of 2017 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.

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 third quarter of 2017 (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 2017, 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 18,598 ft^3 (527 m^3) of air was sampled at each location, each week, at an average flow rate of 1.85 ft^3/min (0.05 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.

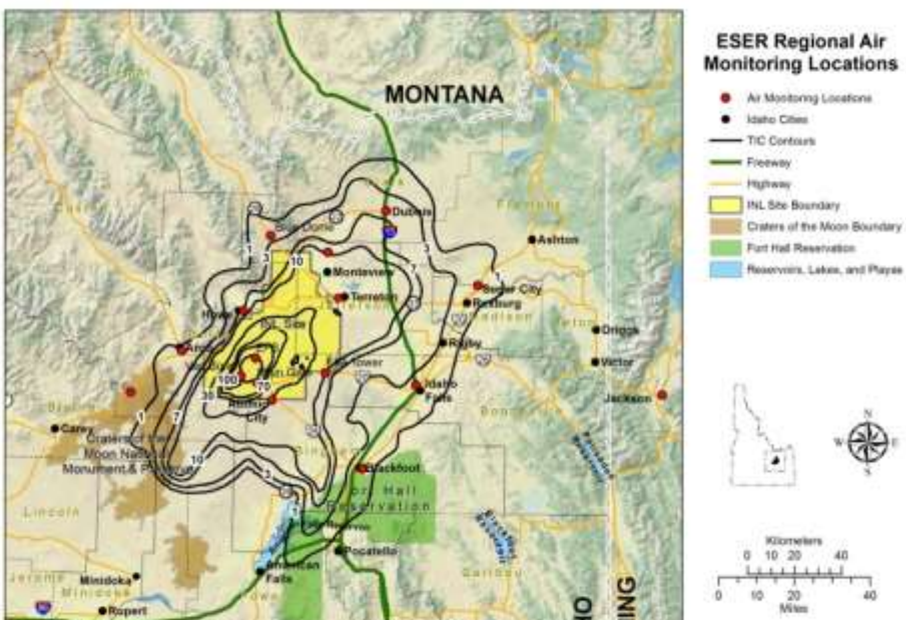

Figure 2. Low-volume air sampler locations. Total Integrated Concentration (TIC) contours were generated by the National Oceanic and Atmospheric Administration Air Resources Laboratory – Field Research Division using the MDIFF air transport and dispersion model and wind data from 35 meteorological stations on and around the INL Site in 2010.

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 and shown in Figures 3 through 6. Gross alpha data are tested for normality prior to statistical analyses, and generally show no consistent discernible distribution. Because there is no discernible distribution of the data, the nonparametric Kruskal-Wallis test of multiple independent groups was used to test for 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 data groups if the (p) value is less than 0.05. Values greater than 0.05 translate into a 95 percent confidence that the medians are statistically the same. Comparisons of gross alpha concentrations were made for the quarter and for each month of the quarter using this methodology. The p-value for each comparison is shown in Table D-1. In the third quarter, there was not a statistical difference between INL Site, Boundary, and Distant groups for the quarter as a whole. For the months of July and August the Boundary group showed the highest concentration, followed by the INL Site group. Although the Distant group was found with the lowest gross alpha concentrations, the differences between the groups was very small, as shown in Figure 3.

As an additional check, comparisons between gross alpha concentrations measured at Boundary and Distant locations were made on a weekly basis. The Mann-Whitney U test was used to compare the Boundary and Distant data because it is the most powerful nonparametric alternative to the t-test for independent samples. INL Site sample results were not included in this analysis because the onsite data, collected at only three locations, are not representative of the entire INL Site and would not aid in determining offsite impacts. There were five weeks where a statistical difference existed between the two sample groups (Table D-2). These were the weeks of July 5, July 26, August 2, August 23, and August 30. However, the concentrations were well within the range seen historically (the maximum background concentration from 2007-2016 was 8.26×10^{-15} μCi/ml).

Gross alpha data typically demonstrate seasonality during the year, with highest concentrations occurring in the third quarter. Figure 7 presents box plots of the gross alpha results grouped by month during the third quarter. The figure shows that the highest concentrations of gross alpha activity occurred in August and September when agricultural activities and particulate concentrations tend to be elevated around the INL Site (Figure 8). The wide range of gross alpha concentrations in September appears to reflect the high particulate concentrations in the beginning of the month, followed by a large decrease at the end. A scatterplot of weekly gross alpha concentrations appears to show a pattern similar to particulate

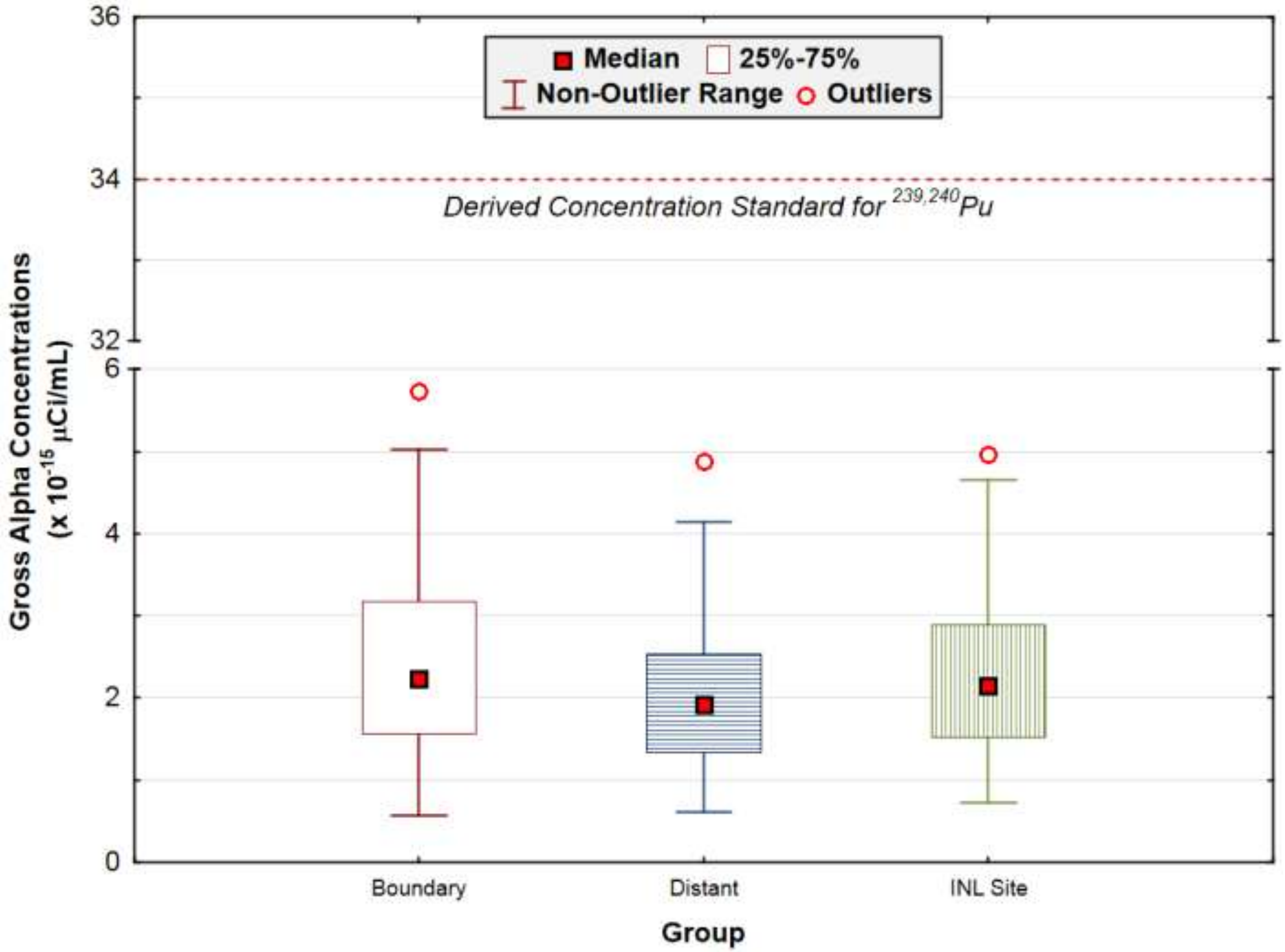

Figure 3. Gross Alpha Concentrations in Air at ESER INL Site, Boundary, and Distant Locations for the Third Quarter of 2017. The DOE Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}Pu$) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. 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.

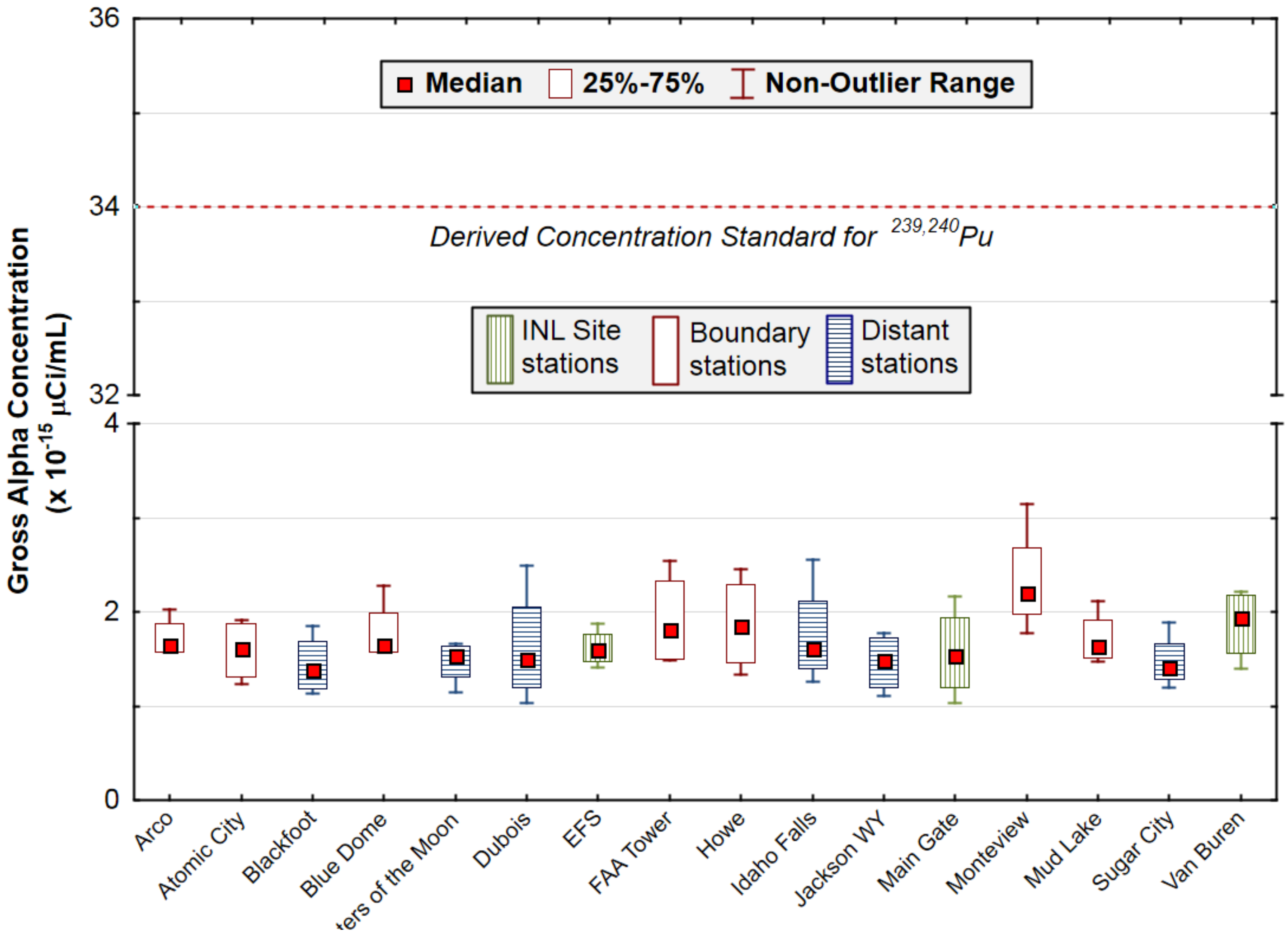

Figure 4. July Gross Alpha Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 4 at each location. The Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}$Pu) in air which, if inhaled for a year, would result in a dose 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.

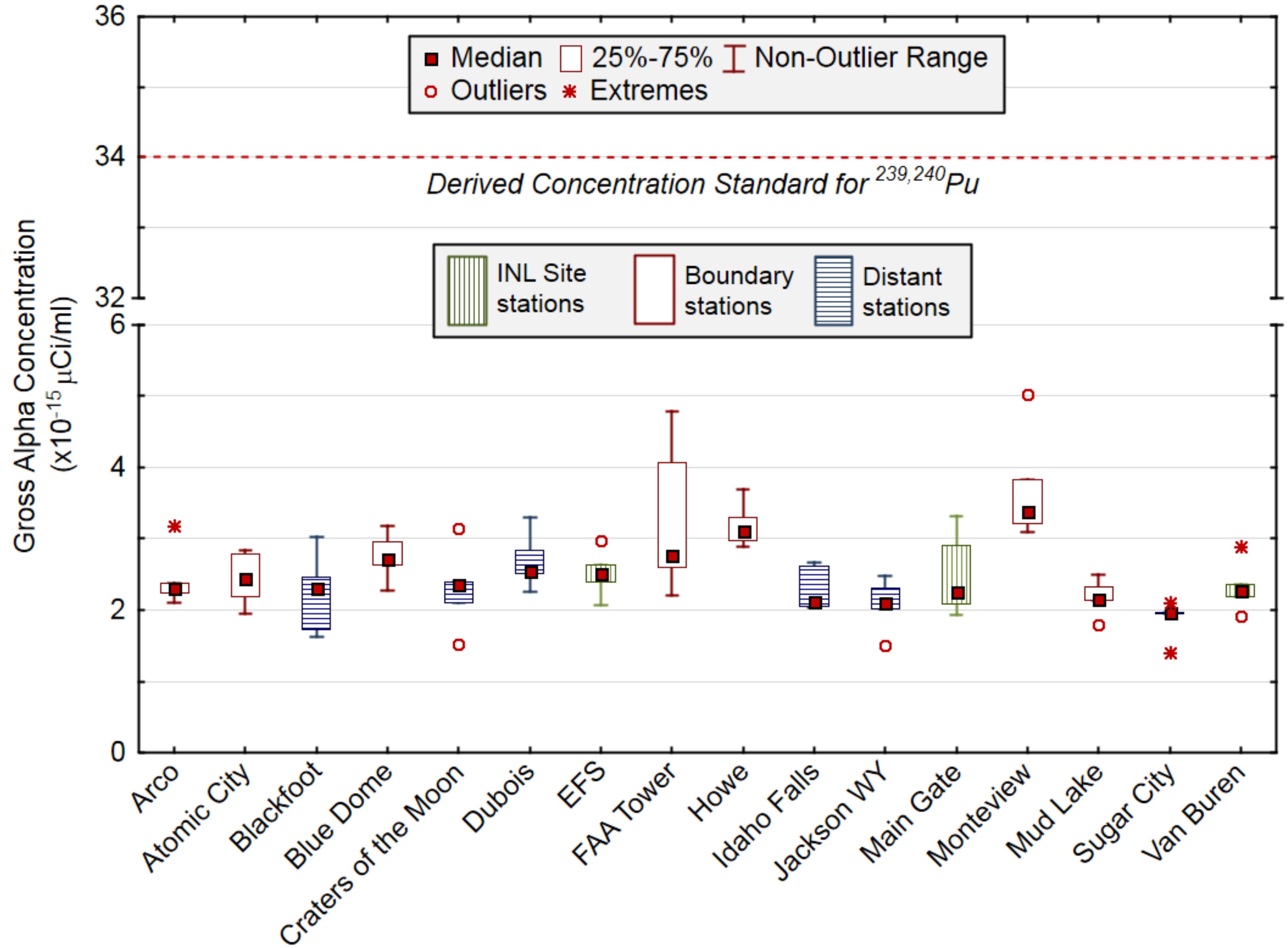

Figure 5. August Gross Alpha Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 5 at each location. The Derived Concentration Standard (DCS) is the concentration of plutonium-239/240 ($^{239/240}$Pu) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as 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.

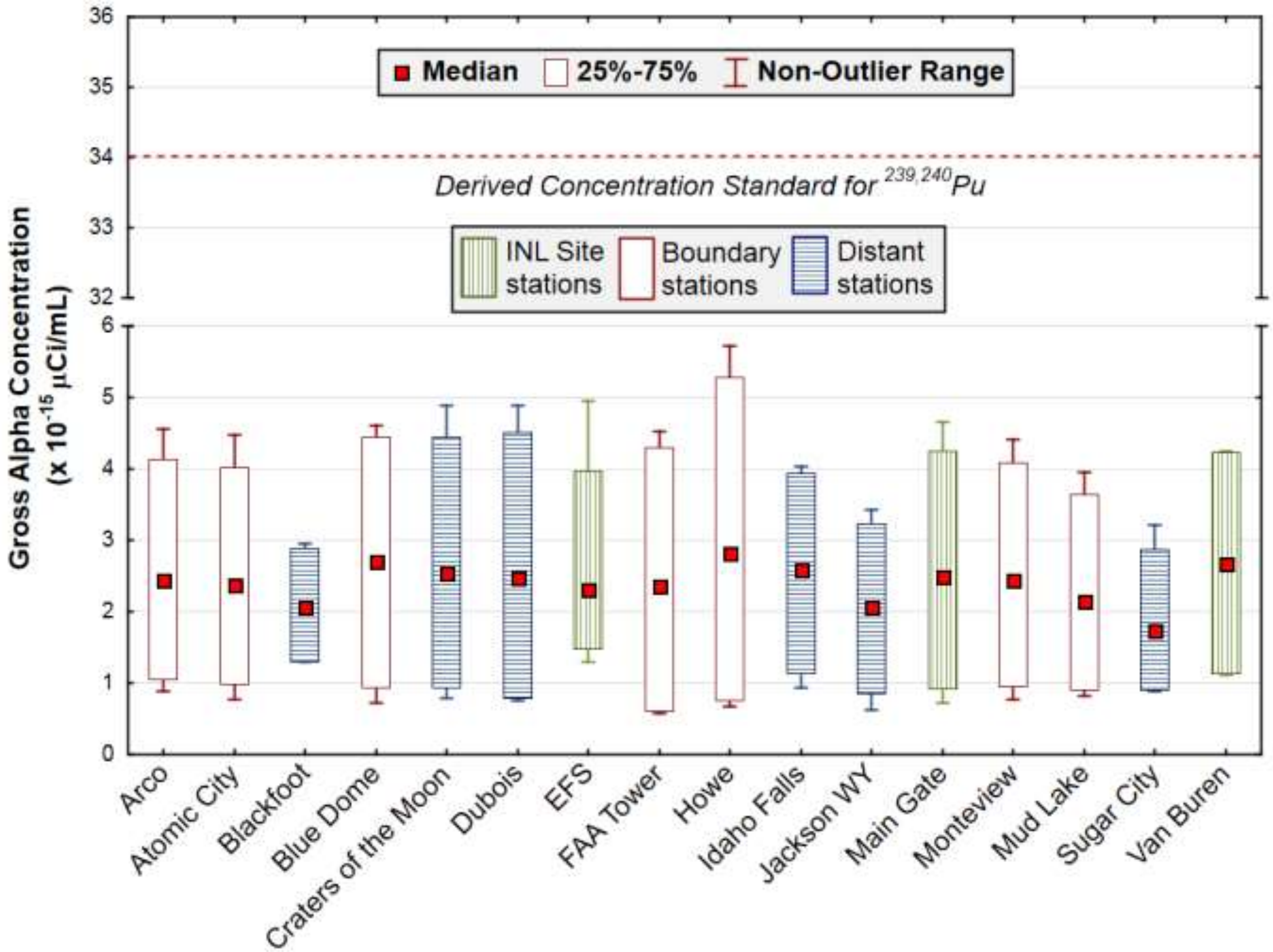

Figure 6. September Gross Alpha Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 4 at each location. The Derived Concentration Standard (DCS) is the concentration of $^{239/240}Pu$ in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such as 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.

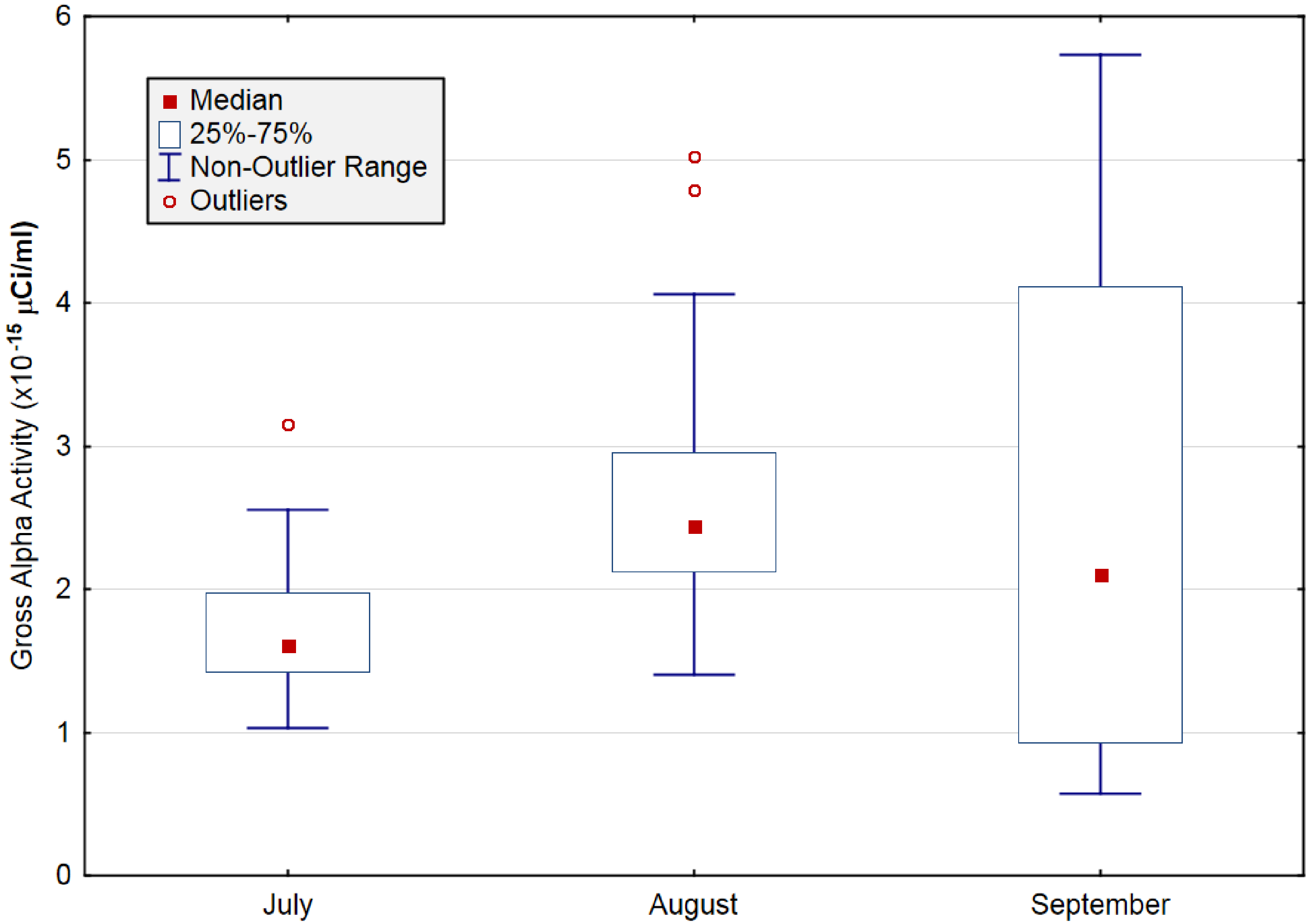

Figure 7. Gross alpha Concentrations in Air During the Months of July, August, and September of 2017.

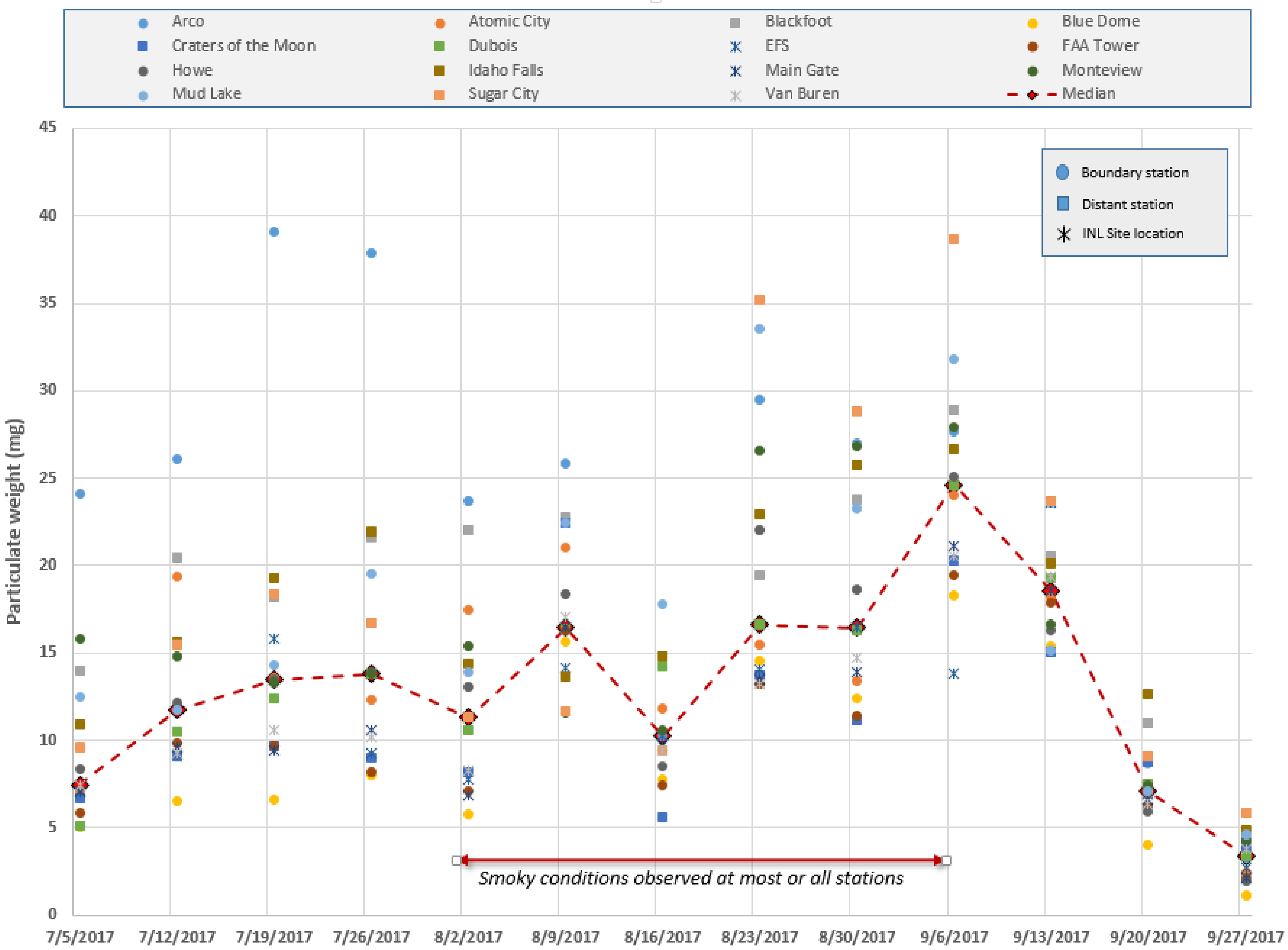

Figure 8. Weekly Weight of Particulates on Air Filters Collected During the Third Quarter.

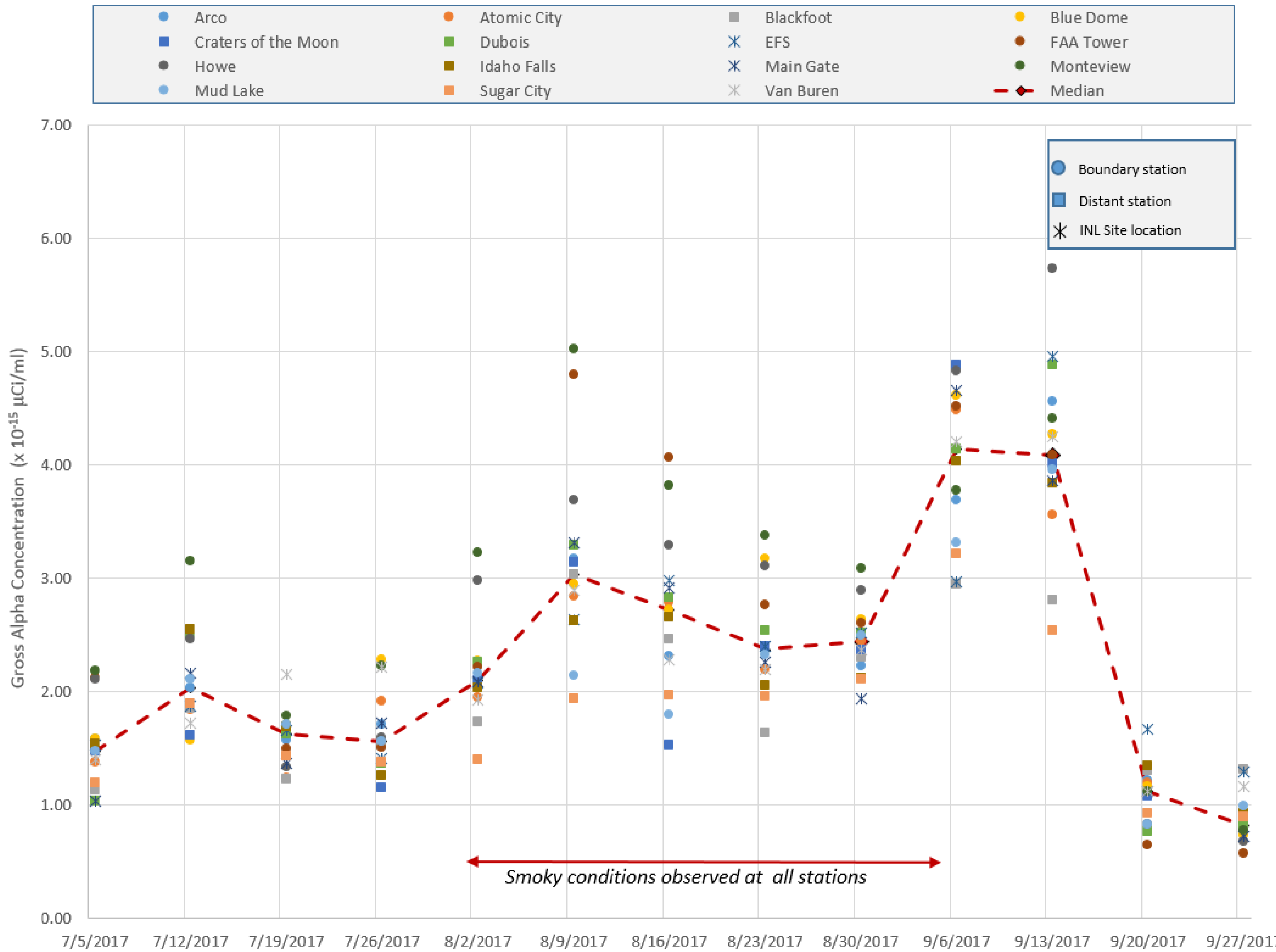

Figure 9. Weekly Gross Alpha Concentrations During the Third Quarter.

concentrations (Figure 9). The relationship between particulate weight and gross alpha activity was tested statistically using a linear regression analysis. The regression showed a positive correlation between particulate concentration that is weak (the correlation coefficient [r^2] in this case is 0.23, which is far less a perfect correlation of 1). The data appear as a cluster and are best visualized using a bagplot (Figure 10). A bagplot is a bivariate (i.e., two variables) generalization of a boxplot and therefore provides insight in the distribution of data points in both axes. A bagplot adds three features to a scatterplot. First is the depth median, which is the point with the highest possible Tukey depth. It is analogous to (but not identical to) to the common univariate median. Second is a polygon that encloses 50% of the points around the depth median. This is called the 'bag', and is analogous to the box in a box and whisker plot. Third is a polygon that is a convex hull around the points inside a region that is 3 times the size of the bag. This is called the 'loop', and is analogous to the whiskers on a box and whisker plot. Points located outside of the loop are outliers similar to outliers on a box and whisker plot.

Figure 10 shows that while gross alpha activity tends to increase as a function of particulate concentration there is considerable variability and a few outliers. There are obviously some other variables, besides particulate concentration, which explain the variability in the gross alpha results. One such variable may be the presence of smoke in the air from regional wildfires observed at most or all stations during the period from August 2 through September 6, 2017. Everhart (2010) demonstrates that gross alpha activity can increase during wildfire events. During the Cerro Grande fire that burned part of Los Alamos National Laboratory in May 2000, samples were collected more frequently (weekly) than normal (biweekly) because buildup of smoke particles on the filters was decreasing the air flow. To evaluate potential human exposure to air contaminants, the samples were analyzed as soon as possible and for additional specific radionuclides. Analyses showed that the smoke from the fire included resuspended radon decay products that had been accumulating for many years on the vegetation and the litter that burned. Gross alpha appeared to have increases at all stations during the fire due to increases in concentrations of polonium-210 (an alpha-emitting radon decay product). Site-to-site variability also peaked during the fire because resuspended radon decay products did not equally impact all of the sampling locations. This may help to explain some of the high concentrations and variability of gross alpha activity at the INL Site and vicinity during August and the first week of September.

Gross beta results are presented in Table C-1 and displayed as box plots in Figures 11 through 14. The data are tested quarterly and generally are found to be neither normally nor log-normally distributed. Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of background measurements made in the past ten years (a maximum concentration of 127 x 10^{-15} μCi/ml was measured during the period from 2007-2016), and because these values could not be attributed to mistakes in collection, analysis, or reporting procedures. No statistical differences were noted in the quarterly data or during any month of the quarter (Table D-1). Weekly comparisons were also made using the same method as for the gross alpha data and no statistical differences were found during any week of the quarter (Table D-2).

The boxplot of data categorized by month (Figure 15) shows higher concentrations in August and September with the highest variability in September. Weekly beta concentrations (Figure 16) are similar to weekly particulate concentrations (Figure 8) in that concentrations peak in August and early September and show the largest range of values in the second half of September. A linear regression was performed of gross beta activity versus particulate concentrations and shows a positive, weak, linear relationship (r^2 = 0.18). A bagplot of the two

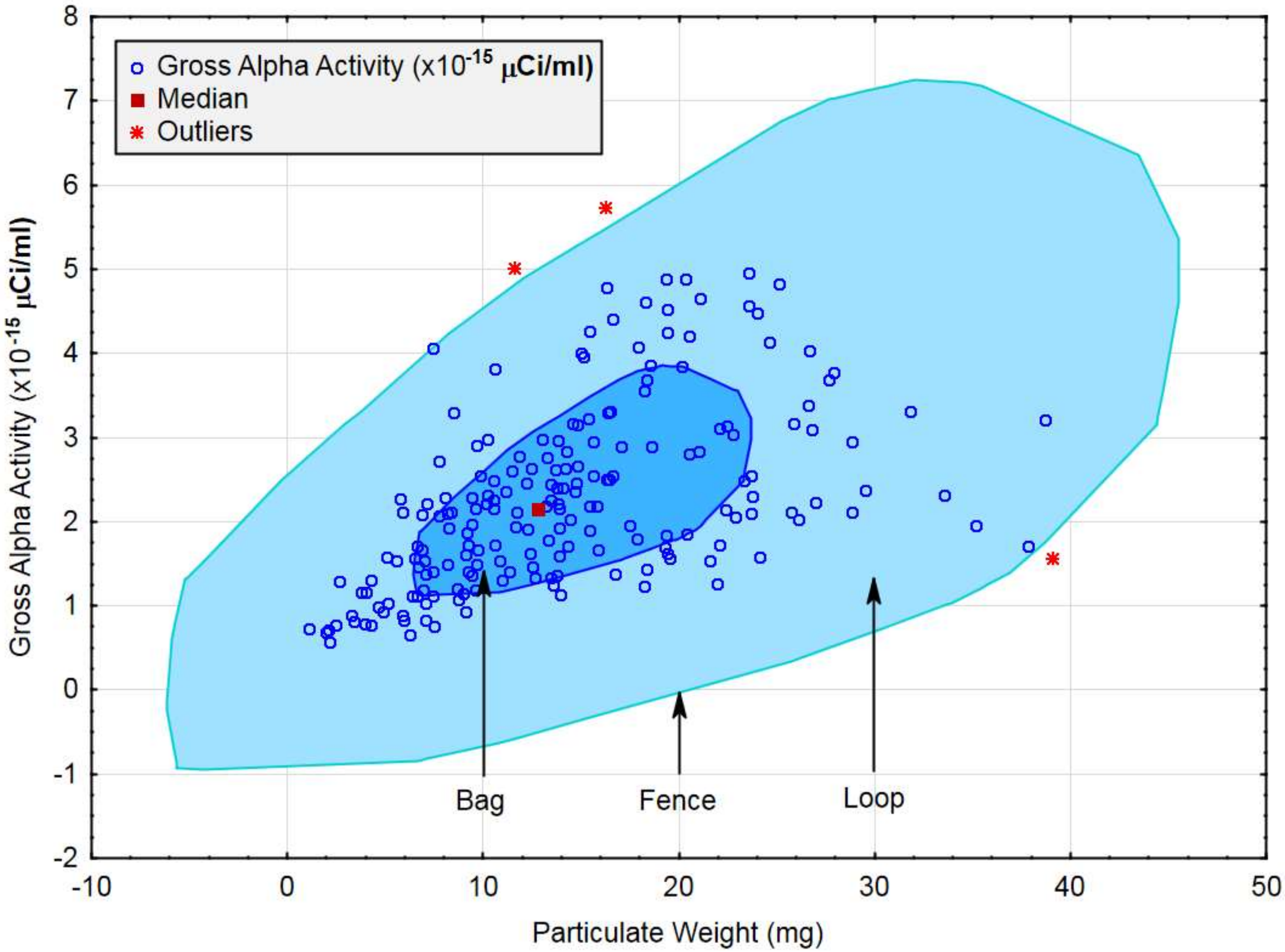

Figure 10. Bagplot of Particulate Weight versus Gross Alpha Activity. The inner dark-blue polygon is called the 'bag' and contains 50% of the data (similar to the box in a box plot). The 'fence' is formed by inflating the bag by a factor of 3. Observations outside the fence are flagged as outliers. The 'loop' (light-blue polygon) surrounds all data points that are not outliers (similar to the whiskers in a box plot). The median or 'depth median' is an estimate for the central value of a large data set.

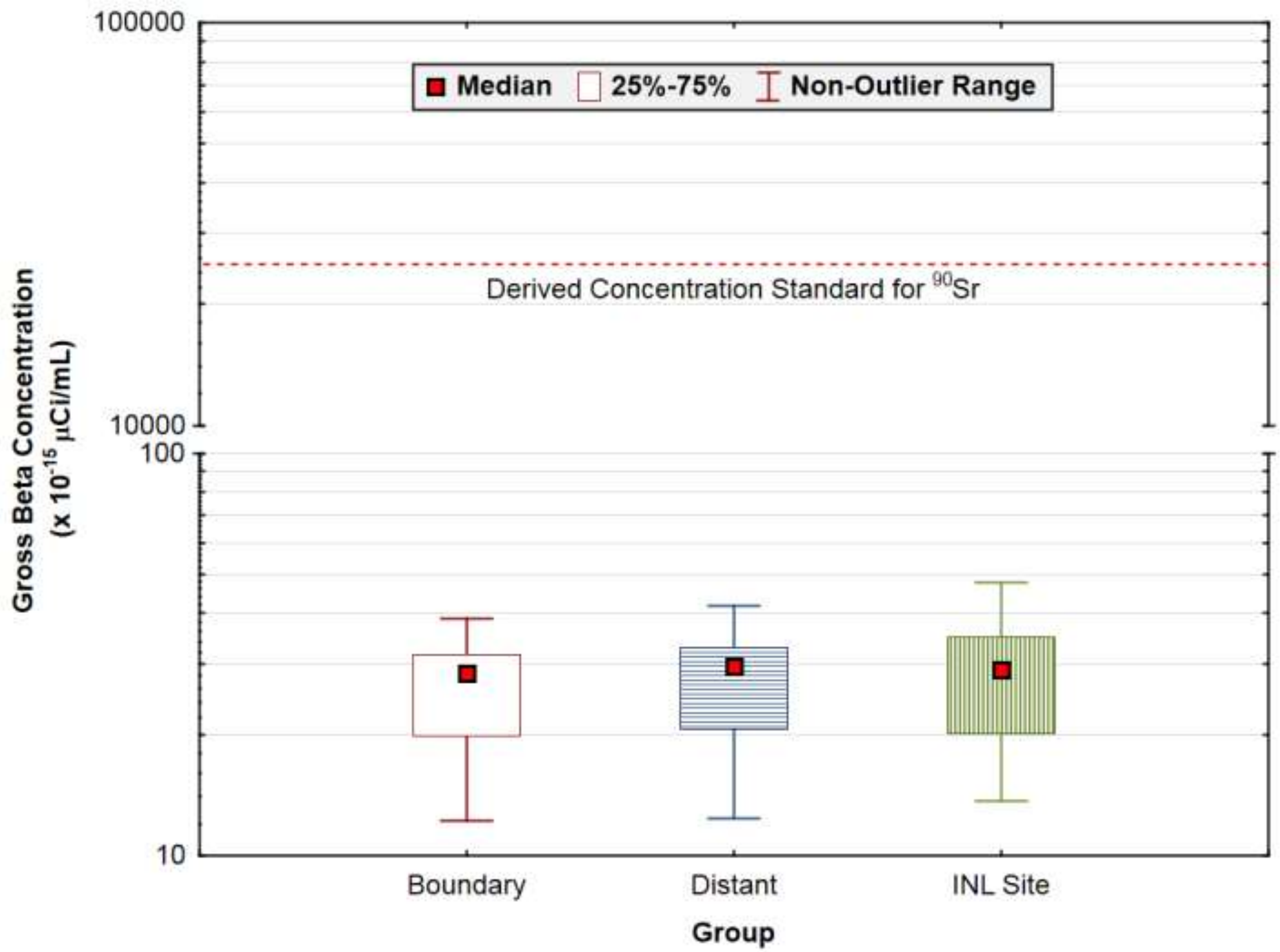

Figure 11. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the third quarter of 2017. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the 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.

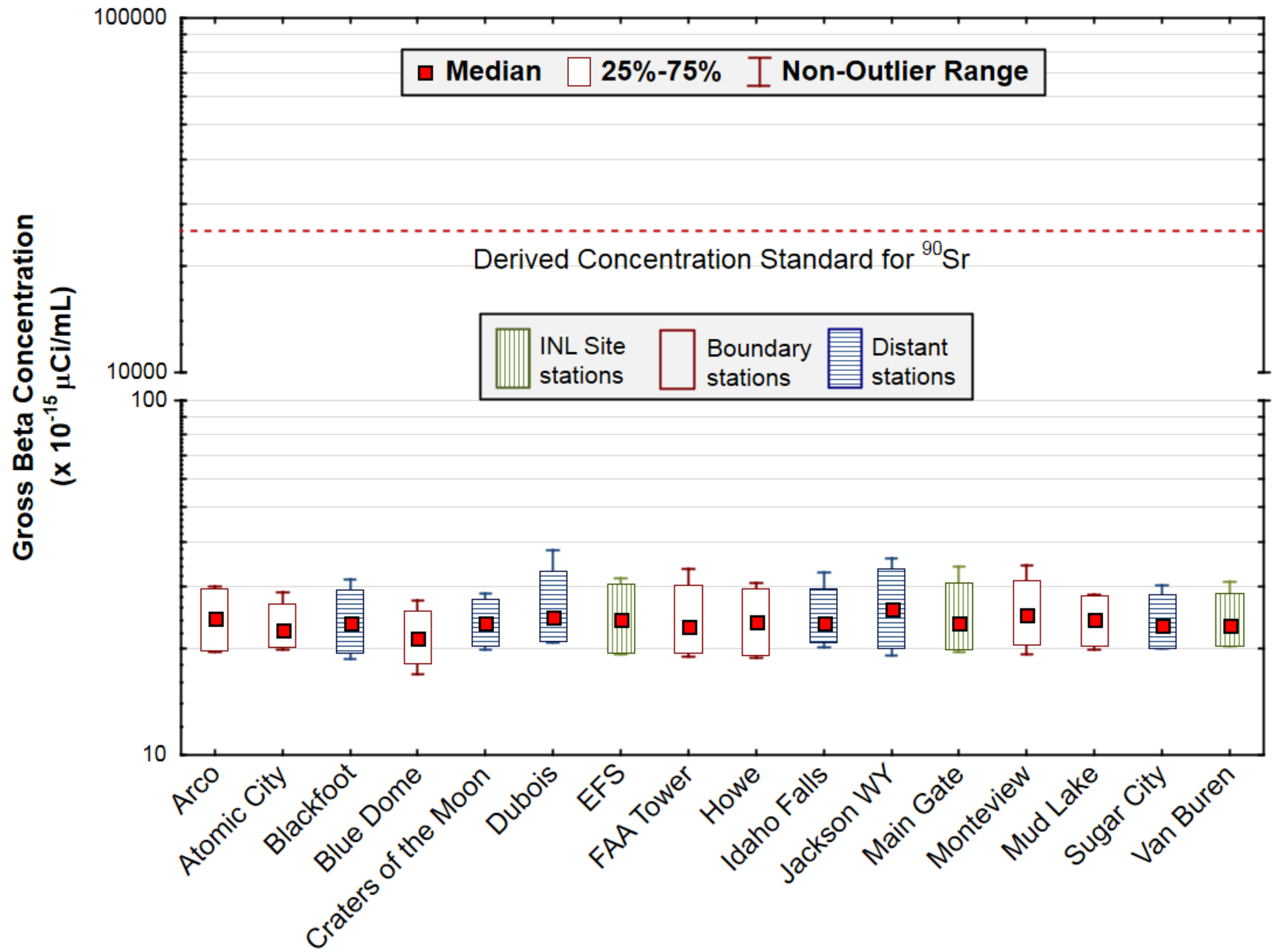

Figure 12. July Gross Beta Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 4 at each location. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. 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.

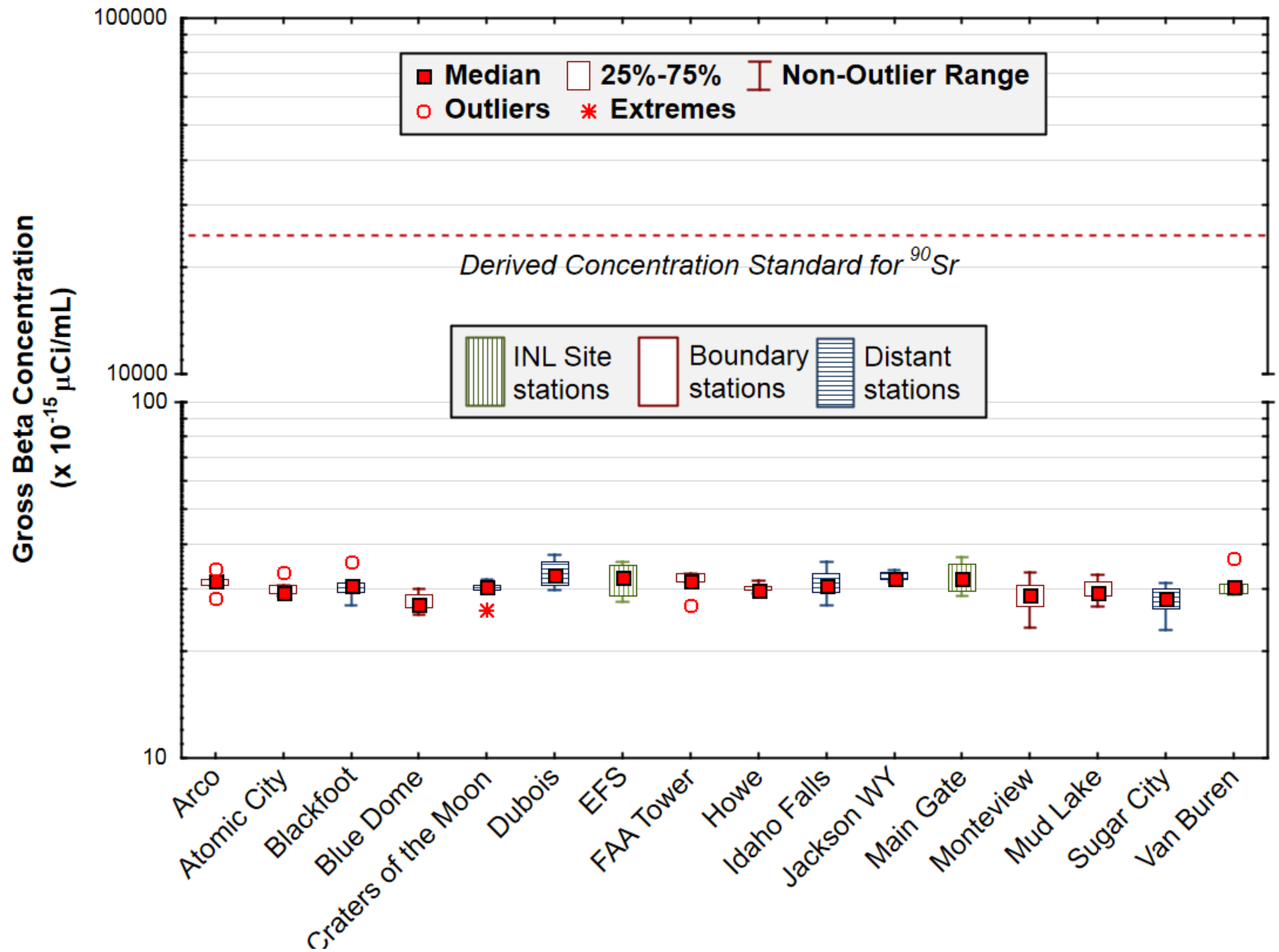

Figure 13. August Gross Beta Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 5 at each location. The Derived Concentration Standard (DCS) is the concentration of strontium-90 (^{90}Sr) in air which, if inhaled for a year, would result in a dose of 100 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.

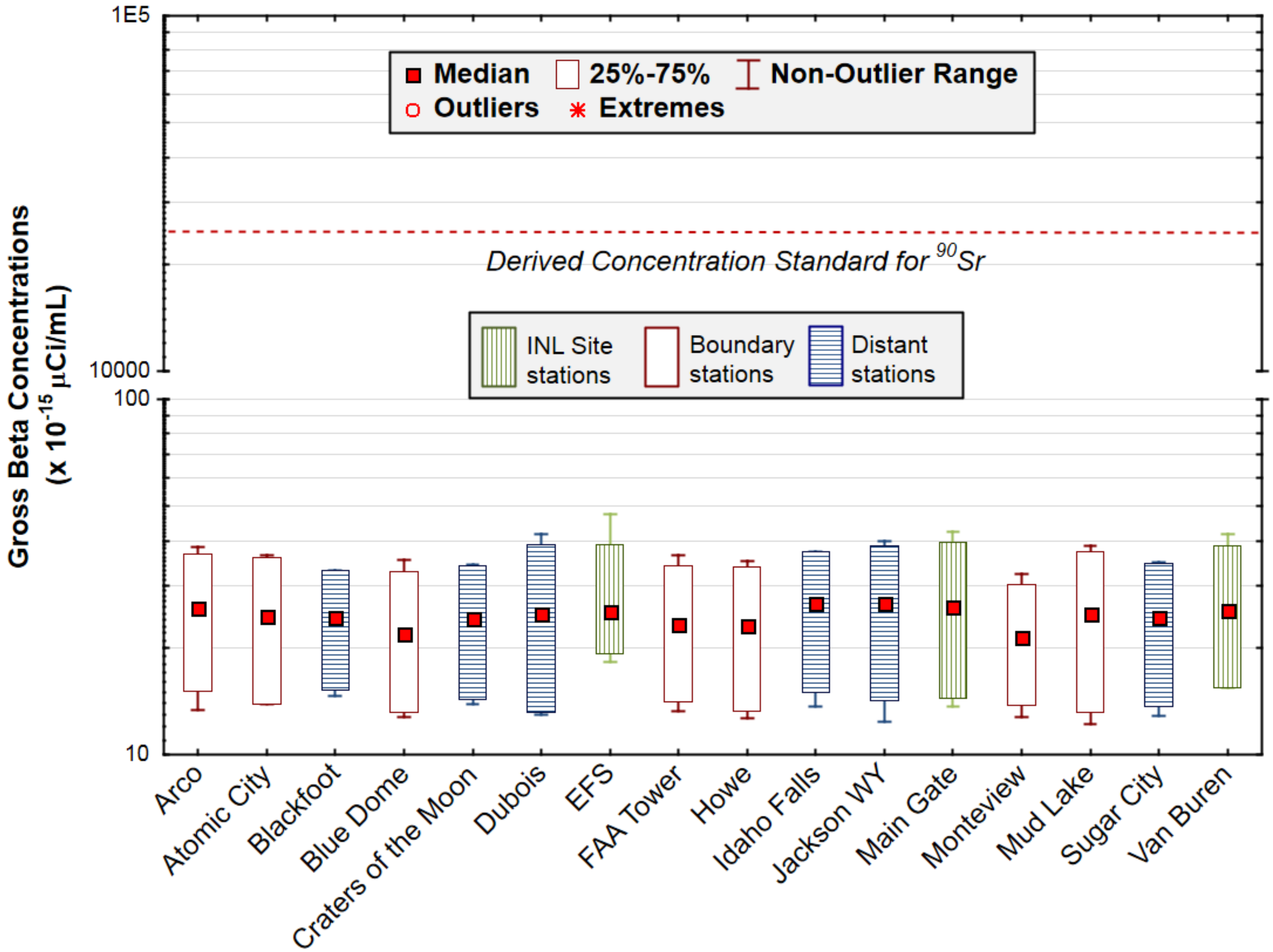

Figure 14. September Gross Beta Concentrations in Air at ESER INL Site, Boundary, and Distant Locations. Number of samples (N) = 4 at each location. The Derived Concentration Standard (DCS) is the concentration of ^{90}Sr in air which, if inhaled for a year, would result in a dose of 100 mrem/yr. Because the measurements include naturally occurring radionuclides (such ^{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.

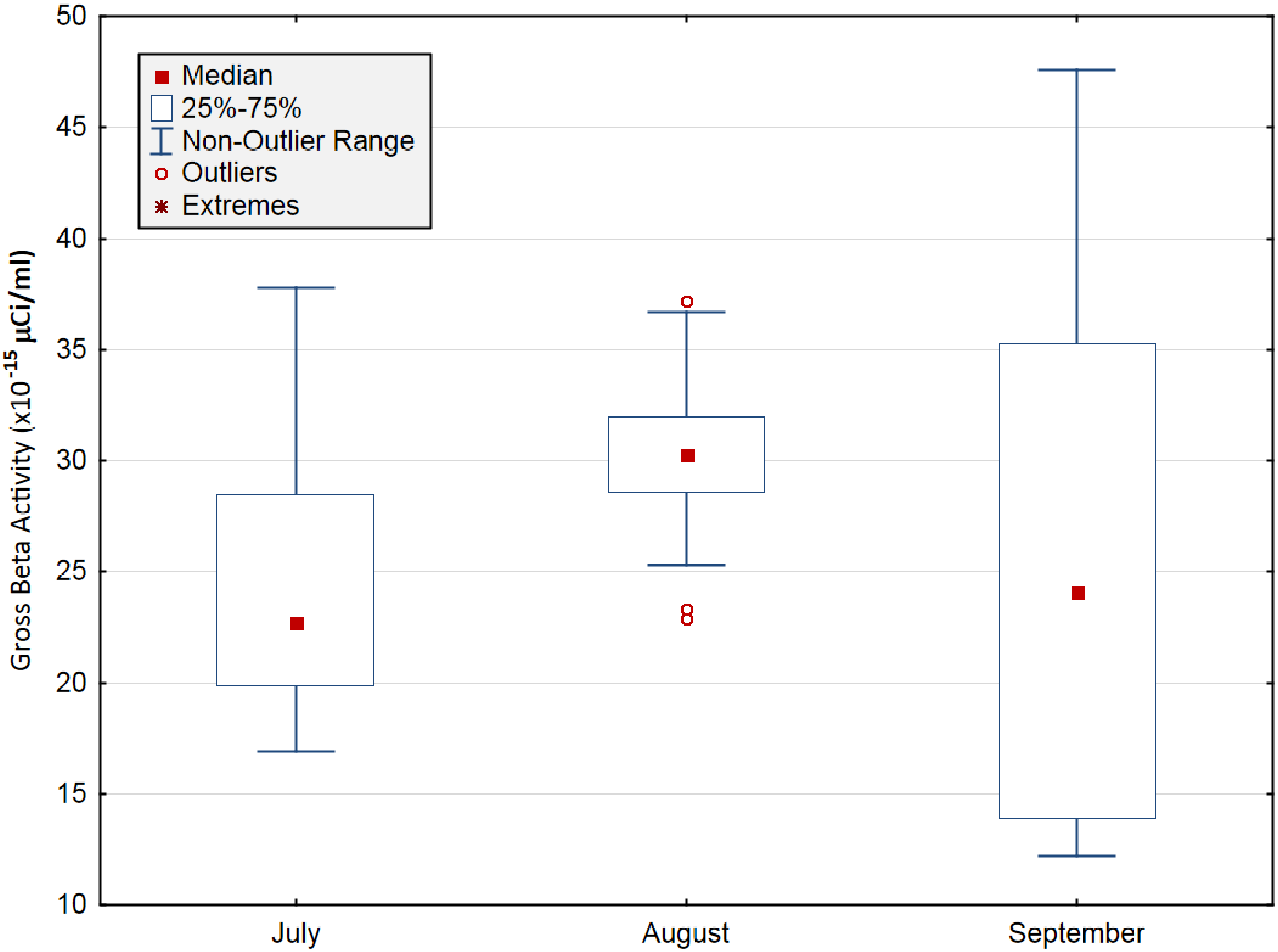

Figure 15. Gross Beta Concentrations in Air During the Months of July, August, and September of 2017.

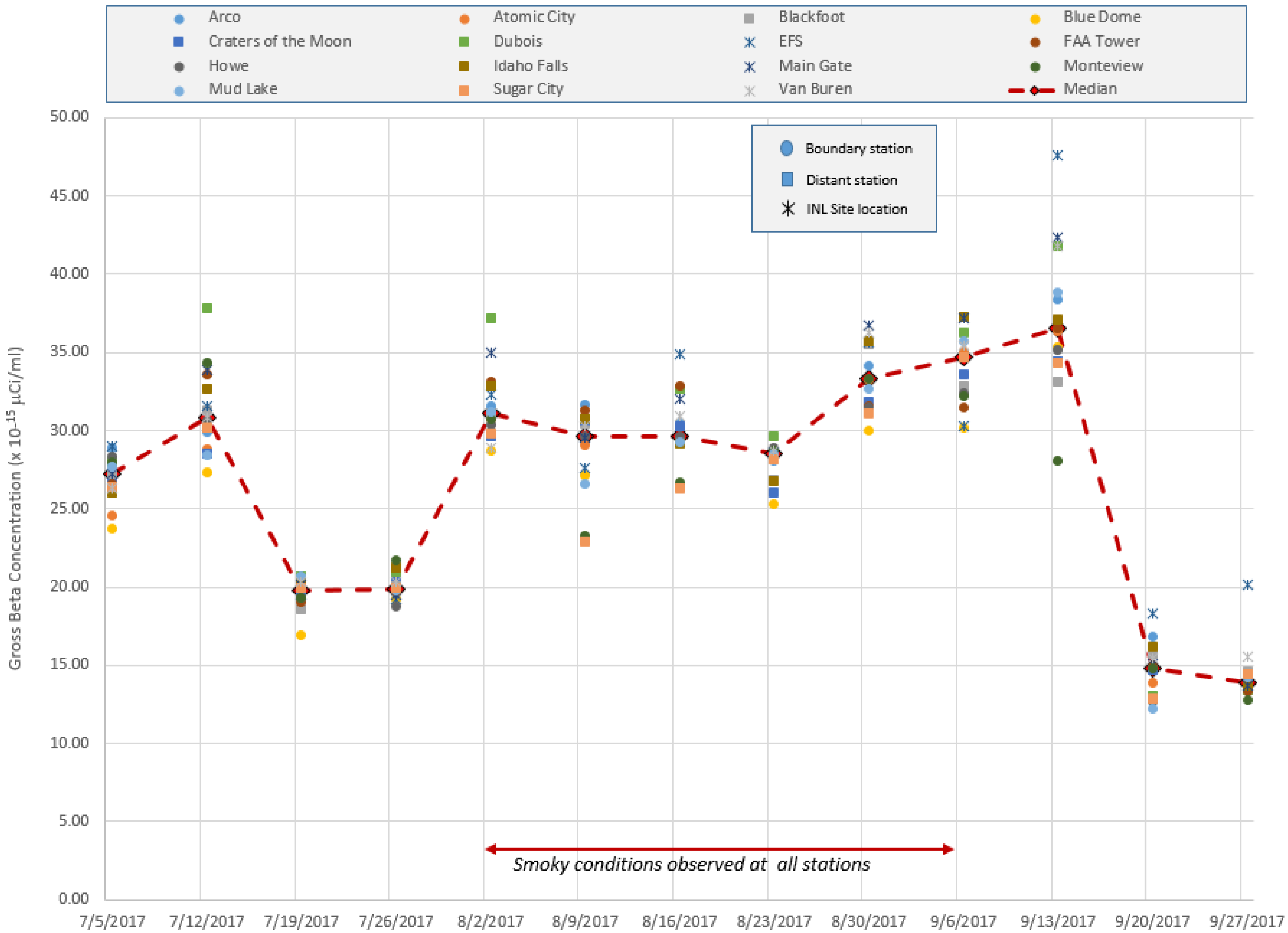

Figure 16. Weekly Gross Beta Concentrations During the Third Quarter.

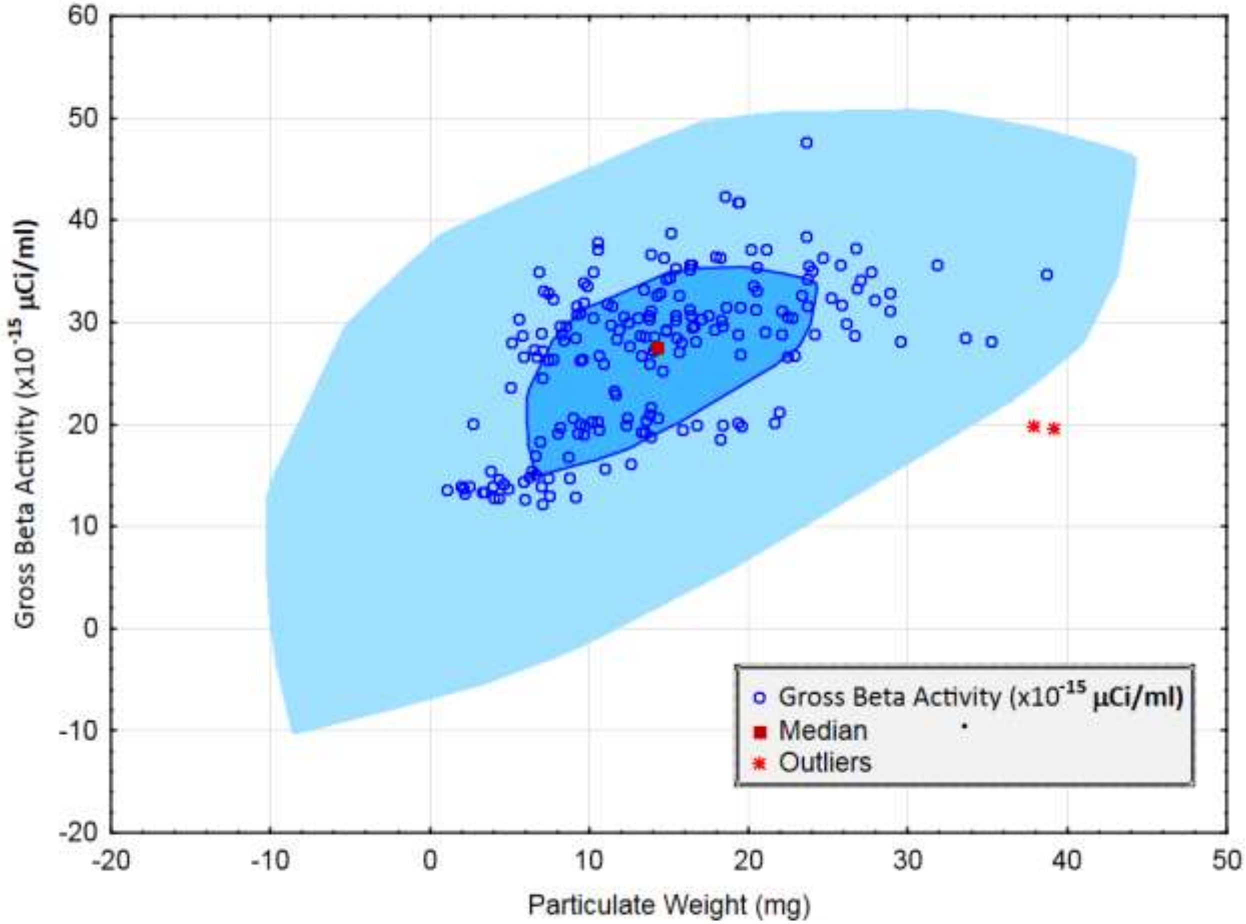

Figure 17. Bagplot of Particulate Weight versus Gross Beta Activity. The inner dark-blue polygon is called the 'bag' and contains 50% of the data (similar to the box in a box plot). The 'fence' is formed by inflating the bag by a factor of 3. Observations outside the fence are flagged as outliers. The 'loop' (light-blue polygon) surrounds all data points that are not outliers (similar to the whiskers in a box plot). The median or 'depth median' is an estimate for the central value of a large data set.

variables confirms that gross beta activity generally increases as a function of particulate concentration but that there is considerable variability and a few outliers. As with gross alpha activity, there are other variables, besides particulate concentration, influencing gross beta activity measured in air. Again, the presence of smoke in the air from regional wildfires observed at most or all stations during the period from August 2 through September 6, 2017, may be one such variable. Everhart (2010) observed that gross beta activity increased during the wildfire at Los Alamos National Laboratory in May 2000 and attributed it to the presence of radon decay products in smoke from the fire. Bismuth-210 (a beta emitter and a radon decay product) was measured in the filters during the fire. Variability of gross beta concentrations within stations was attributed in variability of radon decay products in vegetation that was burned.

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

No ^{137}Cs or other human-made gamma-emitting radionuclides were found in quarterly composites. No ^{90}Sr or was found either. Amercium-241 and Plutonium-239/240 were detected just above the 3s uncertainty level in the composite from the duplicate sampler at Blackfoot (but not in the composite from the regular sampler in Blackfoot) Amercium-241 was also found slightly above the 3s concentration at the Mud Lake sampler. In comparison to the Derived Concentration Standard, the ^{241}Am result was 0.005 percent of the DCS. Plutonium-238 was also reported in a composite from Blackfoot and Jackson Hole, also just above the detection limit. The detected value was for Blackfoot was 0.006 percent of the DCS and Jackson Hole was 0.007 percent of the DCS. A lower detection limit achieved by the current laboratory performing these analyses has resulted in a few results near the detection limit in 2016 and 2017. Results for these analyses are found in Table C-3 of Appendix C.

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 16 atmospheric moisture samples collected during the third quarter of 2017. Six of the 12 results exceeded the 3s uncertainty level for tritium, with similar results to those reported previously. 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 9.69×10^{-13} $\mu Ci/mL_{air}$ at the EFS. Results are shown in Table C-4, Appendix C.

4. PRECIPITATION AND WATER SAMPLING

PRECIPITATION SAMPLING

Precipitation samples are gathered when sufficient precipitation occurs to allow for the collection of the minimum sample volume of approximately 50 mL. Samples are taken of monthly composites from Idaho Falls, and weekly from the EFS, Howe, and Atomic City. Precipitation samples are analyzed for tritium. During the third quarter of 2017, precipitation events slowed but still yielded 14 samples.

Tritium was measured above the 3s values in four of the 14 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 and the 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 2017). 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 third quarter was 118 pCi/L in a September sample from the EFS. The overall average for most sets of tritium data in almost all media is usually about 100 pCi/L. During the third quarter, concentrations were below the average value at 65.6 pCi/L.

Death Camas by Kristin Kaser

WATER SAMPLING

The Big Lost River (BLR) continued to flow on the INL Site for one month during the third quarter. Samples were collected at five locations (plus a duplicate) in July. 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-6 of Appendix C for the month of July.

Because of the high snow accumulation in the winter of 2016-17, large volumes of water were released from the Mackay Reservoir. Over the 5-year period from when the river last ran, loose sediment from frequent winds was deposited into the empty river bed. The first set of samples from the BLR contained high amounts of sediment. Previously during the second quarter, analyses were attempted before filtration. High amounts of sediment in the water samples prevents accurate analyses for gross alpha and gross beta. The lab determined more accurate results would be obtained by filtering all the remaining BLR water samples prior to analysis. All samples from the BLR in the third quarter were filtered before analysis.

Gross alpha activity was detected in all samples. The highest reported gross alpha activity was 2.62 pCi/L in a filtered sample from the BLR Control at Birch Creek. Gross beta activity was detected in all samples but one, the BLR Control sample at Birch Creek. The highest reported gross beta value was 3.45 pCi/L in a filtered sample from BLR at the EFS. Tritium was also detected in three samples with the highest reported value of 78.7 pCi/L at NRF. Concentrations were similar to those found in atmospheric moisture and precipitation samples, indicating a natural source, and were consistent with previous years.

No manmade gamma-emitting radionuclides were detected during the third quarter.

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 third and fourth quarters. 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 agricultural products samples available during the third quarter of 2017.

MILK SAMPLING

Twenty-seven milk samples were collected weekly in Idaho Falls and Terreton. Thirteen monthly samples were collected at four additional locations around the INL Site (Figure 17) during the third quarter of 2017. The Fort Hall dairy was not in operation during the third quarter. 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 Iodine-131.

Iodine-131 was not detected in any weekly or monthly samples during the third 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-7.

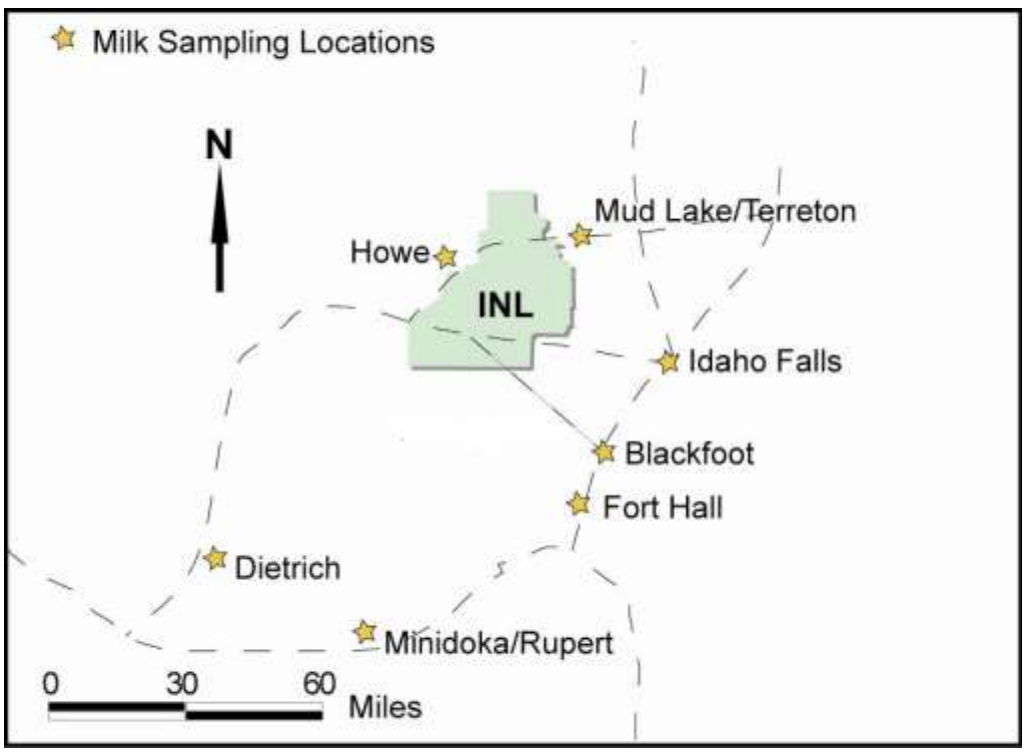

Figure 17. ESER milk sampling locations.

LETTUCE SAMPLING

Lettuce sampling was completed during the third quarter. A total of ten samples were collected, including a commercially-available sample from a grocery store. Six lettuce samples were collected from portable planters at Atomic City, EFS, the Federal Aviation Administration (FAA) Tower, Howe, Idaho Falls, and Monteview. In 2017, soil from the vicinity of the sampling locations was used in the planters. This soil was amended with potting soil as a gardener in the region would typically do when they grow their lettuce. In addition to the portable samplers, samples were obtained from gardens in Shelley and Sugar City.

No human-made gamma-emitting radionuclides were found in any of the samples. Strontium-90 was detected in all of the samples analyzed, except the sample from Shelley which was well below the detection limit. Strontium-90 is present in the environment as a residual of fallout from aboveground nuclear weapons testing, which occurred between 1945 and 1980. This is the likely source for the measured results. Data for ^{137}Cs and ^{90}Sr in all lettuce samples taken during the third quarter are listed in Appendix C, Table C-8. During the summer of 2020, a review of Appendix C, Table C-8 determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. Prior to 2010, concentrations were reported in either pCi/g or pCi/kg. In 2010, the concentration unit of pCi/kg was adopted for reporting radionuclide concentrations in soil and biota (vegetation and animals). The reasons for doing this include: 1) the use of one unit (pCi/kg) ensures consistency and comparability in reporting concentrations in various media, 2) the use of one unit (pCi/kg) minimizes mistakes (due to confusion about units) in data entry into the database, and 3) the unit of pCi/kg was selected because it is the unit associated with models that are used for dose calculations and the results tend to be whole numbers (e.g. 14 pCi/kg versus 0.014 pCi/g). The column headings have been updated to the correct units of concentration (pCi/kg and Bq/kg).

GRAIN SAMPLING

Grain sampling (wheat and barley) was completed during the third quarter of 2017. A total of ten grain samples (including one duplicate) were collected from local grain farmers. In addition, a commercially-available sample was obtained from outside the local area. All samples were analyzed for gamma-emitting radionuclides and ^{90}Sr.

No human-made gamma-emitting radionuclides were detected in any grain sample. Two of the 11 grain samples collected in 2017 contained a detectable concentration of ^{90}Sr. A lower detection limit was achieved in 2016 and the detectable results were close to this lower limit. The measured concentrations were 2.6 pCi/kg from American Falls and 2.0 pCi/kg from Moreland. The concentrations of ^{90}Sr sometimes measured in grain are generally much less than those measured in lettuce and the frequency of detections is much lower. Agricultural products such as fruits and grains are naturally lower in radionuclides than green, leafy vegetables like lettuce (Pinder 1990). Data for ^{137}Cs and ^{90}Sr in all grain samples taken during the third quarter are listed in Appendix C, Table C-9.

LARGE GAME ANIMAL SAMPLING

Muscle and thyroid tissue were collected from three game animals: a mule deer and two pronghorn. Liver tissue was also collected from two of the three game animals. No manmade gamma-emitting radionuclides were detected (Appendix C, Table C-10).

6. 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 (WAI 2016). 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 Third Quarter of 2017 (WAI 2017).

7. REFERENCES

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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	None	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, Shelley, 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 Third Quarter 2017

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Standard[b] (DCS)
Air (particulate filter)[e]	Gross alpha[c]	4.11×10^{-16} µCi/mL	3.4×10^{-14} µCi/mL
	Gross beta[d]	9.52×10^{-16} µCi/mL	2.5×10^{-11} µCi/mL
	^{137}Cs	9.50×10^{-17} µCi/mL	9.8×10^{-11} µCi/mL
	^{90}Sr	2.45×10^{-17} µCi/mL	2.5×10^{-11} µCi/mL
	^{241}Am	9.42×10^{-19} µCi/mL	4.1×10^{-14} µCi/mL
	^{238}Pu	1.34×10^{-19} µCi/mL	3.7×10^{-14} µCi/mL
	$^{239/240}Pu$	4.17×10^{-18} µCi/mL	3.4×10^{-14} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	5.06×10^{-16} µCi/mL	2.3×10^{-19} µCi/mL
Air (precipitation)	^{3}H	86.5 pCi/L	1.9×10^{-3} µCi/mL
Drinking/Surface Water	^{3}H	88.1 pCi/L	1.9×10^{-3} µCi/mL
Milk	^{131}I	0.30 pCi/L	--
	^{137}Cs	0.48 pCi/L	--
Lettuce	^{90}Sr	8.17 pCi/kg	--
Grain	^{90}Sr	2.22 pCi/kg	--
Game	^{131}I	92.0 pCi/kg	--
	^{137}Cs	3.0 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.

APPENDIX C

SAMPLE ANALYSIS RESULTS

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
BOUNDARY							
ARCO	07/05/17	1.58 ± 0.20	5.85 ± 0.75	Yes	28.90 ± 0.67	106.93 ± 2.49	Yes
	07/12/17	2.03 ± 0.23	7.51 ± 0.84	Yes	29.90 ± 0.72	110.63 ± 2.67	Yes
	07/19/17	1.57 ± 0.23	5.81 ± 0.84	Yes	19.60 ± 0.56	72.52 ± 2.07	Yes
	07/26/17	1.71 ± 0.24	6.33 ± 0.88	Yes	19.80 ± 0.56	73.26 ± 2.08	Yes
	08/02/17	2.10 ± 0.21	7.77 ± 0.79	Yes	31.60 ± 0.71	116.92 ± 2.63	Yes
	08/09/17	3.17 ± 0.33	11.73 ± 1.22	Yes	31.70 ± 0.89	117.29 ± 3.31	Yes
	08/16/17	2.31 ± 0.29	8.55 ± 1.07	Yes	30.50 ± 0.90	112.85 ± 3.32	Yes
	08/23/17	2.37 ± 0.22	8.77 ± 0.81	Yes	28.10 ± 0.66	103.97 ± 2.45	Yes
	08/30/17	2.23 ± 0.23	8.25 ± 0.84	Yes	34.10 ± 0.72	126.17 ± 2.66	Yes
	09/06/17	3.69 ± 0.31	13.65 ± 1.15	Yes	35.00 ± 0.85	129.50 ± 3.15	Yes
	09/13/17	4.56 ± 0.34	16.87 ± 1.26	Yes	38.40 ± 0.89	142.08 ± 3.29	Yes
	09/20/17	1.21 ± 0.23	4.48 ± 0.83	Yes	16.80 ± 0.54	62.16 ± 2.01	Yes
	09/27/17	0.88 ± 0.21	3.26 ± 0.78	Yes	13.40 ± 0.49	49.58 ± 1.82	Yes
ATOMIC CITY	07/05/17	1.38 ± 0.20	5.11 ± 0.73	Yes	24.60 ± 0.64	91.02 ± 2.38	Yes
	07/12/17	1.84 ± 0.21	6.81 ± 0.76	Yes	28.80 ± 0.67	106.56 ± 2.49	Yes
	07/19/17	1.24 ± 0.21	4.59 ± 0.77	Yes	20.40 ± 0.55	75.48 ± 2.05	Yes
	07/26/17	1.91 ± 0.24	7.07 ± 0.87	Yes	19.90 ± 0.55	73.63 ± 2.02	Yes
	08/02/17	1.95 ± 0.20	7.22 ± 0.75	Yes	30.70 ± 0.69	113.59 ± 2.56	Yes
	08/09/17	2.84 ± 0.26	10.51 ± 0.95	Yes	29.10 ± 0.71	107.67 ± 2.61	Yes
	08/16/17	2.78 ± 0.26	10.29 ± 0.96	Yes	29.30 ± 0.74	108.41 ± 2.75	Yes
	08/23/17	2.19 ± 0.21	8.10 ± 0.77	Yes	28.50 ± 0.65	105.45 ± 2.39	Yes
	08/30/17	2.44 ± 0.24	9.03 ± 0.90	Yes	33.20 ± 0.74	122.84 ± 2.75	Yes
	09/06/17	4.48 ± 0.31	16.58 ± 1.13	Yes	35.10 ± 0.77	129.87 ± 2.85	Yes
	09/13/17	3.56 ± 0.29	13.17 ± 1.06	Yes	36.40 ± 0.81	134.68 ± 2.99	Yes
	09/20/17	1.19 ± 0.22	4.40 ± 0.81	Yes	13.90 ± 0.50	51.43 ± 1.85	Yes
	09/27/17	0.77 ± 0.21	2.85 ± 0.76	Yes	13.90 ± 0.50	51.43 ± 1.84	Yes
BLUE DOME	07/05/17	1.58 ± 0.20	5.85 ± 0.73	Yes	23.70 ± 0.61	87.69 ± 2.26	Yes
	07/12/17	1.57 ± 0.20	5.81 ± 0.74	Yes	27.30 ± 0.67	101.01 ± 2.47	Yes
	07/19/17	1.71 ± 0.23	6.33 ± 0.85	Yes	16.90 ± 0.52	62.53 ± 1.94	Yes
	07/26/17	2.28 ± 0.25	8.44 ± 0.93	Yes	19.20 ± 0.54	71.04 ± 2.01	Yes
	08/02/17	2.27 ± 0.21	8.40 ± 0.78	Yes	28.70 ± 0.66	106.19 ± 2.46	Yes
	08/09/17	2.95 ± 0.26	10.92 ± 0.96	Yes	27.10 ± 0.68	100.27 ± 2.53	Yes
	08/16/17	2.72 ± 0.27	10.06 ± 1.01	Yes	26.40 ± 0.76	97.68 ± 2.81	Yes
	08/23/17	3.17 ± 0.24	11.73 ± 0.88	Yes	25.30 ± 0.61	93.61 ± 2.26	Yes
	08/30/17	2.63 ± 0.24	9.73 ± 0.88	Yes	30.00 ± 0.68	111.00 ± 2.52	Yes
	09/06/17	4.61 ± 0.31	17.06 ± 1.16	Yes	30.20 ± 0.74	111.74 ± 2.73	Yes
	09/13/17	4.27 ± 0.31	15.80 ± 1.15	Yes	35.30 ± 0.81	130.61 ± 2.99	Yes
	09/20/17	1.16 ± 0.20	4.29 ± 0.75	Yes	12.80 ± 0.46	47.36 ± 1.71	Yes
	09/27/17	0.73 ± 0.20	2.69 ± 0.73	Yes	13.60 ± 0.48	50.32 ± 1.77	Yes
FAA TOWER	07/05/17	2.12 ± 0.23	7.84 ± 0.85	Yes	26.60 ± 0.68	98.42 ± 2.50	Yes
	07/12/17	2.54 ± 0.24	9.40 ± 0.88	Yes	33.60 ± 0.73	124.32 ± 2.72	Yes
	07/19/17	1.49 ± 0.22	5.51 ± 0.81	Yes	19.00 ± 0.54	70.30 ± 2.00	Yes
	07/26/17	1.50 ± 0.23	5.55 ± 0.86	Yes	19.70 ± 0.57	72.89 ± 2.10	Yes
	08/02/17	2.21 ± 0.21	8.18 ± 0.79	Yes	33.10 ± 0.71	122.47 ± 2.63	Yes
	08/09/17	4.79 ± 0.33	17.72 ± 1.23	Yes	31.30 ± 0.77	115.81 ± 2.83	Yes
	08/16/17	4.06 ± 0.39	15.02 ± 1.45	Yes	32.90 ± 1.02	121.73 ± 3.77	Yes
	08/23/17	2.76 ± 0.23	10.21 ± 0.84	Yes	26.80 ± 0.63	99.16 ± 2.34	Yes
	08/30/17	2.60 ± 0.24	9.62 ± 0.90	Yes	31.60 ± 0.71	116.92 ± 2.63	Yes
	09/06/17	4.52 ± 0.31	16.72 ± 1.13	Yes	31.50 ± 0.74	116.55 ± 2.72	Yes
	09/13/17	4.08 ± 0.29	15.10 ± 1.07	Yes	36.50 ± 0.78	135.05 ± 2.87	Yes
	09/20/17	0.65 ± 0.19	2.40 ± 0.70	Yes	14.90 ± 0.50	55.13 ± 1.84	Yes
	09/27/17	0.57 ± 0.20	2.11 ± 0.75	No	13.30 ± 0.50	49.21 ± 1.86	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)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
HOWE	07/05/17	2.11	±	0.22	7.81	±	0.82	Yes	28.30	±	0.67	104.71	±	2.46	Yes
	07/12/17	2.46	±	0.22	9.10	±	0.82	Yes	30.60	±	0.67	113.22	±	2.46	Yes
	07/19/17	1.33	±	0.21	4.92	±	0.76	Yes	19.30	±	0.53	71.41	±	1.95	Yes
	07/26/17	1.59	±	0.22	5.88	±	0.81	Yes	18.80	±	0.52	69.56	±	1.94	Yes
	08/02/17	2.98	±	0.24	11.03	±	0.89	Yes	30.40	±	0.69	112.48	±	2.55	Yes
	08/09/17	3.69	±	0.31	13.65	±	1.16	Yes	29.60	±	0.79	109.52	±	2.91	Yes
	08/16/17	3.29	±	0.32	12.17	±	1.20	Yes	29.60	±	0.87	109.52	±	3.23	Yes
	08/23/17	3.11	±	0.24	11.51	±	0.87	Yes	28.90	±	0.64	106.93	±	2.38	Yes
	08/30/17	2.89	±	0.26	10.69	±	0.94	Yes	31.50	±	0.72	116.55	±	2.66	Yes
	09/06/17	4.83	±	0.34	17.87	±	1.25	Yes	32.40	±	0.80	119.88	±	2.97	Yes
	09/13/17	5.73	±	0.40	21.20	±	1.49	Yes	35.20	±	0.93	130.24	±	3.45	Yes
	09/20/17	0.83	±	0.18	3.07	±	0.67	Yes	12.70	±	0.44	46.99	±	1.64	Yes
	09/27/17	0.68	±	0.20	2.52	±	0.73	Yes	13.90	±	0.49	51.43	±	1.80	Yes
MONTEVIEW	07/05/17	2.18	±	0.24	8.07	±	0.90	Yes	28.00	±	0.71	103.60	±	2.64	Yes
	07/12/17	3.15	±	0.26	11.66	±	0.96	Yes	34.30	±	0.74	126.91	±	2.75	Yes
	07/19/17	1.78	±	0.25	6.59	±	0.93	Yes	19.30	±	0.59	71.41	±	2.18	Yes
	07/26/17	2.22	±	0.28	8.21	±	1.02	Yes	21.70	±	0.62	80.29	±	2.30	Yes
	08/02/17	3.22	±	0.25	11.91	±	0.94	Yes	30.70	±	0.71	113.59	±	2.62	Yes
	08/09/17	5.02	±	0.43	18.57	±	1.57	Yes	23.30	±	0.87	86.21	±	3.23	Yes
	08/16/17	3.82	±	0.34	14.13	±	1.25	Yes	26.70	±	0.84	98.79	±	3.09	Yes
	08/23/17	3.38	±	0.25	12.51	±	0.91	Yes	28.70	±	0.65	106.19	±	2.39	Yes
	08/30/17	3.09	±	0.25	11.43	±	0.92	Yes	33.30	±	0.70	123.21	±	2.58	Yes
	09/06/17	3.77	±	0.28	13.95	±	1.02	Yes	32.20	±	0.72	119.14	±	2.66	Yes
	09/13/17	4.41	±	0.35	16.32	±	1.31	Yes	28.10	±	0.84	103.97	±	3.10	Yes
	09/20/17	1.12	±	0.20	4.14	±	0.74	Yes	14.80	±	0.48	54.76	±	1.76	Yes
	09/27/17	0.78	±	0.20	2.87	±	0.75	Yes	12.80	±	0.48	47.36	±	1.77	Yes
MUD LAKE	07/05/17	1.47	±	0.20	5.44	±	0.74	Yes	27.70	±	0.67	102.49	±	2.47	Yes
	07/12/17	2.11	±	0.23	7.81	±	0.83	Yes	28.40	±	0.69	105.08	±	2.57	Yes
	07/19/17	1.71	±	0.23	6.33	±	0.85	Yes	20.70	±	0.56	76.59	±	2.08	Yes
	07/26/17	1.56	±	0.26	5.77	±	0.96	Yes	19.80	±	0.62	73.26	±	2.29	Yes
	08/02/17	2.16	±	0.21	7.99	±	0.78	Yes	31.20	±	0.70	115.44	±	2.58	Yes
	08/09/17	2.14	±	0.25	7.92	±	0.94	Yes	26.60	±	0.74	98.42	±	2.75	Yes
	08/16/17	1.79	±	0.23	6.62	±	0.85	Yes	29.30	±	0.77	108.41	±	2.85	Yes
	08/23/17	2.32	±	0.21	8.58	±	0.79	Yes	28.50	±	0.65	105.45	±	2.41	Yes
	08/30/17	2.49	±	0.25	9.21	±	0.91	Yes	32.70	±	0.74	120.99	±	2.75	Yes
	09/06/17	3.31	±	0.26	12.25	±	0.98	Yes	35.70	±	0.75	132.09	±	2.79	Yes
	09/13/17	3.96	±	0.38	14.65	±	1.40	Yes	38.80	±	1.06	143.56	±	3.92	Yes
	09/20/17	0.83	±	0.18	3.06	±	0.67	Yes	12.20	±	0.44	45.14	±	1.62	Yes
	09/27/17	0.99	±	0.22	3.64	±	0.81	Yes	14.20	±	0.51	52.54	±	1.89	Yes
DISTANT															
BLACKFOOT	07/05/17	1.13	±	0.18	4.18	±	0.68	Yes	27.20	±	0.65	100.64	±	2.42	Yes
	07/12/17	1.85	±	0.20	6.85	±	0.73	Yes	31.30	±	0.66	115.81	±	2.43	Yes
	07/19/17	1.23	±	0.21	4.55	±	0.78	Yes	18.60	±	0.54	68.82	±	2.00	Yes
	07/26/17	1.53	±	0.23	5.66	±	0.84	Yes	20.20	±	0.56	74.74	±	2.06	Yes
	08/02/17	1.73	±	0.19	6.40	±	0.70	Yes	31.10	±	0.67	115.07	±	2.49	Yes
	08/09/17	3.03	±	0.29	11.21	±	1.05	Yes	30.50	±	0.78	112.85	±	2.87	Yes
	08/16/17	2.46	±	0.27	9.10	±	0.98	Yes	29.30	±	0.80	108.41	±	2.95	Yes
	08/23/17	1.63	±	0.18	6.03	±	0.66	Yes	26.90	±	0.61	99.53	±	2.25	Yes
	08/30/17	2.30	±	0.23	8.51	±	0.84	Yes	35.50	±	0.73	131.35	±	2.70	Yes
	09/06/17	2.95	±	0.25	10.92	±	0.93	Yes	32.90	±	0.73	121.73	±	2.70	Yes
	09/13/17	2.81	±	0.26	10.40	±	0.97	Yes	33.10	±	0.79	122.47	±	2.90	Yes
	09/20/17	1.30	±	0.21	4.81	±	0.77	Yes	15.70	±	0.49	58.09	±	1.81	Yes
	09/27/17	1.31	±	0.22	4.85	±	0.81	Yes	14.60	±	0.49	54.02	±	1.81	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
QA-1	07/05/17	1.61	±	0.21	5.96	±	0.78	Yes	32.30	±	0.72	119.51	±	2.67	Yes
(BLACKFOOT)	07/12/17	1.52	±	0.20	5.62	±	0.73	Yes	29.40	±	0.68	108.78	±	2.52	Yes
	07/19/17	1.24	±	0.21	4.59	±	0.78	Yes	18.30	±	0.54	67.71	±	1.99	Yes
	07/26/17	1.20	±	0.21	4.44	±	0.77	Yes	20.30	±	0.54	75.11	±	2.00	Yes
	08/02/17	1.51	±	0.18	5.59	±	0.68	Yes	32.20	±	0.70	119.14	±	2.59	Yes
	08/09/17	2.31	±	0.26	8.55	±	0.97	Yes	26.90	±	0.75	99.53	±	2.77	Yes
	08/16/17	2.37	±	0.28	8.77	±	1.05	Yes	28.10	±	0.85	103.97	±	3.15	Yes
	08/23/17	2.05	±	0.21	7.59	±	0.77	Yes	30.30	±	0.69	112.11	±	2.53	Yes
	08/30/17	1.90	±	0.21	7.03	±	0.78	Yes	31.70	±	0.69	117.29	±	2.55	Yes
	09/06/17	2.89	±	0.25	10.69	±	0.92	Yes	32.80	±	0.72	121.36	±	2.68	Yes
	09/13/17	2.97	±	0.27	10.99	±	1.00	Yes	33.70	±	0.79	124.69	±	2.94	Yes
	09/20/17	0.79	±	0.20	2.93	±	0.74	Yes	12.60	±	0.48	46.62	±	1.79	Yes
	09/27/17	0.38	±	0.17	1.40	±	0.64	No	13.60	±	0.47	50.32	±	1.72	Yes
CRATERS OF	07/05/17	1.47	±	0.20	5.44	±	0.74	Yes	26.60	±	0.66	98.42	±	2.44	Yes
THE MOON	07/12/17	1.61	±	0.21	5.96	±	0.78	Yes	28.50	±	0.71	105.45	±	2.64	Yes
	07/19/17	1.66	±	0.24	6.14	±	0.87	Yes	19.80	±	0.57	73.26	±	2.11	Yes
	07/26/17	1.15	±	0.22	4.26	±	0.80	Yes	20.70	±	0.57	76.59	±	2.11	Yes
	08/02/17	2.10	±	0.21	7.77	±	0.79	Yes	29.60	±	0.70	109.52	±	2.58	Yes
	08/09/17	3.14	±	0.26	11.62	±	0.97	Yes	30.60	±	0.71	113.22	±	2.62	Yes
	08/16/17	1.53	±	0.25	5.66	±	0.91	Yes	30.30	±	0.87	112.11	±	3.22	Yes
	08/23/17	2.40	±	0.22	8.88	±	0.82	Yes	26.00	±	0.64	96.20	±	2.38	Yes
	08/30/17	2.36	±	0.24	8.73	±	0.90	Yes	31.80	±	0.74	117.66	±	2.74	Yes
	09/06/17	4.88	±	0.33	18.06	±	1.24	Yes	33.60	±	0.80	124.32	±	2.96	Yes
	09/13/17	4.01	±	0.33	14.84	±	1.24	Yes	34.40	±	0.88	127.28	±	3.27	Yes
	09/20/17	1.07	±	0.20	3.96	±	0.75	Yes	14.70	±	0.49	54.39	±	1.80	Yes
	09/27/17	0.79	±	0.21	2.93	±	0.78	Yes	13.90	±	0.51	51.43	±	1.87	Yes
DUBOIS	07/05/17	1.03	±	0.21	3.81	±	0.77	Yes	28.00	±	0.75	103.60	±	2.78	Yes
	07/12/17	2.49	±	0.25	9.21	±	0.91	Yes	37.80	±	0.79	139.86	±	2.94	Yes
	07/19/17	1.62	±	0.24	5.99	±	0.90	Yes	20.70	±	0.60	76.59	±	2.22	Yes
	07/26/17	1.37	±	0.26	5.07	±	0.95	Yes	21.00	±	0.64	77.70	±	2.37	Yes
	08/02/17	2.26	±	0.22	8.36	±	0.81	Yes	37.20	±	0.76	137.64	±	2.82	Yes
	08/09/17	3.29	±	0.30	12.17	±	1.10	Yes	30.70	±	0.79	113.59	±	2.91	Yes
	08/16/17	2.83	±	0.28	10.47	±	1.04	Yes	32.70	±	0.83	120.99	±	3.08	Yes
	08/23/17	2.54	±	0.24	9.40	±	0.88	Yes	29.60	±	0.71	109.52	±	2.62	Yes
	08/30/17	2.51	±	0.24	9.29	±	0.90	Yes	35.70	±	0.76	132.09	±	2.82	Yes
	09/06/17	4.14	±	0.32	15.32	±	1.17	Yes	36.30	±	0.84	134.31	±	3.09	Yes
	09/13/17	4.88	±	0.36	18.06	±	1.32	Yes	41.80	±	0.94	154.66	±	3.47	Yes
	09/20/17	0.76	±	0.19	2.82	±	0.70	Yes	13.00	±	0.47	48.10	±	1.73	Yes
	09/27/17	0.82	±	0.21	3.02	±	0.76	Yes	13.40	±	0.49	49.58	±	1.81	Yes
IDAHO FALLS	07/05/17	1.54	±	0.21	5.70	±	0.77	Yes	26.00	±	0.67	96.20	±	2.48	Yes
	07/12/17	2.55	±	0.25	9.44	±	0.91	Yes	32.70	±	0.75	120.99	±	2.76	Yes
	07/19/17	1.69	±	0.24	6.25	±	0.90	Yes	20.20	±	0.59	74.74	±	2.17	Yes
	07/26/17	1.26	±	0.23	4.66	±	0.83	Yes	21.20	±	0.58	78.44	±	2.16	Yes
	08/02/17	2.03	±	0.21	7.51	±	0.77	Yes	32.90	±	0.72	121.73	±	2.65	Yes
	08/09/17	2.62	±	0.34	9.69	±	1.27	Yes	30.70	±	0.98	113.59	±	3.62	Yes
	08/16/17	2.66	±	0.29	9.84	±	1.07	Yes	29.20	±	0.84	108.04	±	3.11	Yes
	08/23/17	2.05	±	0.21	7.59	±	0.76	Yes	26.80	±	0.64	99.16	±	2.37	Yes
	08/30/17	2.12	±	0.22	7.84	±	0.83	Yes	35.70	±	0.74	132.09	±	2.74	Yes
	09/06/17	4.03	±	0.31	14.91	±	1.14	Yes	37.30	±	0.83	138.01	±	3.08	Yes
	09/13/17	3.84	±	0.36	14.21	±	1.32	Yes	37.10	±	0.99	137.27	±	3.65	Yes
	09/20/17	1.34	±	0.22	4.96	±	0.82	Yes	16.20	±	0.52	59.94	±	1.92	Yes
	09/27/17	0.93	±	0.21	3.44	±	0.78	Yes	13.70	±	0.49	50.69	±	1.82	Yes
JACKSON	07/05/17	1.78	±	0.16	6.59	±	0.60	Yes	35.80	±	0.57	132.46	±	2.10	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)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	07/12/17	1.68	±	0.39	6.22	±	1.45	Yes	31.00	±	1.29	114.70	±	4.77	Yes
	07/19/17	1.29	±	0.21	4.77	±	0.78	Yes	20.80	±	0.56	76.96	±	2.06	Yes
	07/26/17	1.11	±	0.21	4.11	±	0.79	Yes	19.10	±	0.55	70.67	±	2.04	Yes
	08/02/17	1.50	±	0.18	5.55	±	0.68	Yes	33.80	±	0.71	125.06	±	2.63	Yes
	08/09/17	2.30	±	0.26	8.51	±	0.97	Yes	32.10	±	0.80	118.77	±	2.97	Yes
	08/16/17	2.48	±	0.25	9.18	±	0.93	Yes	31.30	±	0.77	115.81	±	2.84	Yes
	08/23/17	2.02	±	0.21	7.47	±	0.77	Yes	33.30	±	0.71	123.21	±	2.62	Yes
	08/30/17	2.11	±	0.24	7.81	±	0.87	Yes	31.80	±	0.74	117.66	±	2.75	Yes
	09/06/17	3.03	±	0.28	11.21	±	1.02	Yes	37.50	±	0.83	138.75	±	3.07	Yes
	09/13/17	3.42	±	0.35	12.65	±	1.30	Yes	39.80	±	1.05	147.26	±	3.89	Yes
	09/20/17	1.09	±	0.21	4.03	±	0.78	Yes	15.90	±	0.51	58.83	±	1.90	Yes
	09/27/17	0.62	±	0.18	2.29	±	0.67	Yes	12.40	±	0.45	45.88	±	1.65	Yes
SUGAR CITY	07/05/17	1.19	±	0.18	4.40	±	0.67	Yes	26.40	±	0.63	97.68	±	2.32	Yes
	07/12/17	1.89	±	0.20	6.99	±	0.74	Yes	30.20	±	0.65	111.74	±	2.42	Yes
	07/19/17	1.43	±	0.21	5.29	±	0.78	Yes	20.00	±	0.53	74.00	±	1.98	Yes
	07/26/17	1.38	±	0.22	5.11	±	0.80	Yes	20.00	±	0.54	74.00	±	2.01	Yes
	08/02/17	1.40	±	0.17	5.18	±	0.64	Yes	29.80	±	0.66	110.26	±	2.45	Yes
	08/09/17	1.94	±	0.29	7.18	±	1.06	Yes	22.90	±	0.81	84.73	±	3.00	Yes
	08/16/17	1.97	±	0.26	7.29	±	0.95	Yes	26.30	±	0.80	97.31	±	2.97	Yes
	08/23/17	1.96	±	0.19	7.25	±	0.69	Yes	28.20	±	0.61	104.34	±	2.25	Yes
	08/30/17	2.11	±	0.21	7.81	±	0.79	Yes	31.10	±	0.67	115.07	±	2.49	Yes
	09/06/17	3.21	±	0.25	11.88	±	0.91	Yes	34.70	±	0.70	128.39	±	2.60	Yes
	09/13/17	2.54	±	0.24	9.40	±	0.88	Yes	34.30	±	0.75	126.91	±	2.76	Yes
	09/20/17	0.93	±	0.19	3.43	±	0.70	Yes	12.90	±	0.45	47.73	±	1.66	Yes
	09/27/17	0.89	±	0.21	3.28	±	0.76	Yes	14.40	±	0.49	53.28	±	1.82	Yes
QA-2 (SUGAR CITY)	07/05/17	1.45	±	0.20	5.37	±	0.72	Yes	28.00	±	0.66	103.60	±	2.43	Yes
	07/12/17	2.13	±	0.21	7.88	±	0.77	Yes	31.00	±	0.66	114.70	±	2.46	Yes
	07/19/17	1.30	±	0.21	4.81	±	0.76	Yes	18.40	±	0.52	68.08	±	1.92	Yes
	07/26/17	1.81	±	0.23	6.70	±	0.84	Yes	21.70	±	0.55	80.29	±	2.03	Yes
	08/02/17	1.82	±	0.20	6.73	±	0.72	Yes	30.80	±	0.68	113.96	±	2.52	Yes
	08/09/17	2.20	±	0.30	8.14	±	1.11	Yes	22.90	±	0.82	84.73	±	3.03	Yes
	08/16/17	1.99	±	0.28	7.36	±	1.04	Yes	29.40	±	0.91	108.78	±	3.35	Yes
	08/23/17	2.16	±	0.20	7.99	±	0.74	Yes	29.30	±	0.63	108.41	±	2.33	Yes
	08/30/17	2.76	±	0.25	10.21	±	0.93	Yes	32.50	±	0.73	120.25	±	2.69	Yes
	09/06/17	3.19	±	0.24	11.80	±	0.89	Yes	34.70	±	0.69	128.39	±	2.56	Yes
	09/13/17	3.68	±	0.28	13.62	±	1.03	Yes	35.40	±	0.77	130.98	±	2.84	Yes
	09/20/17	1.14	±	0.21	4.22	±	0.76	Yes	14.20	±	0.48	52.54	±	1.79	Yes
	09/27/17	0.56	±	0.19	2.09	±	0.69	Yes	13.60	±	0.47	50.32	±	1.75	Yes
INL SITE															
EFS	07/05/17	1.53	±	0.23	5.66	±	0.84	Yes	29.00	±	0.75	107.30	±	2.77	Yes
	07/12/17	1.87	±	0.23	6.92	±	0.85	Yes	31.60	±	0.77	116.92	±	2.83	Yes
	07/19/17	1.66	±	0.25	6.14	±	0.92	Yes	19.50	±	0.60	72.15	±	2.21	Yes
	07/26/17	1.41	±	0.27	5.22	±	0.99	Yes	19.20	±	0.64	71.04	±	2.38	Yes
	08/02/17	2.07	±	0.26	7.66	±	0.96	Yes	32.30	±	0.88	119.51	±	3.25	Yes
	08/09/17	2.63	±	0.30	9.73	±	1.12	Yes	27.60	±	0.83	102.12	±	3.07	Yes
	08/16/17	2.98	±	0.31	11.03	±	1.15	Yes	34.90	±	0.93	129.13	±	3.44	Yes
	08/23/17	2.40	±	0.25	8.88	±	0.91	Yes	28.60	±	0.75	105.82	±	2.76	Yes
	08/30/17	2.51	±	0.29	9.29	±	1.07	Yes	35.60	±	0.89	131.72	±	3.29	Yes
	09/06/17	2.97	±	0.36	10.99	±	1.32	Yes	30.30	±	1.00	112.11	±	3.70	Yes
	09/13/17	4.96	±	0.41	18.35	±	1.51	Yes	47.60	±	1.13	176.12	±	4.18	Yes
	09/20/17	1.67	±	0.31	6.18	±	1.15	Yes	18.30	±	0.70	67.71	±	2.58	Yes
	09/27/17	1.29	±	0.33	4.77	±	1.23	Yes	20.10	±	0.77	74.37	±	2.86	Yes
MAIN GATE	07/05/17	1.03	±	0.18	3.81	±	0.67	Yes	27.20	±	0.66	100.64	±	2.44	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)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	07/12/17	2.16	±	0.22	7.99	±	0.82	Yes	33.90	±	0.72	125.43	±	2.67	Yes
	07/19/17	1.36	±	0.22	5.03	±	0.83	Yes	20.10	±	0.57	74.37	±	2.12	Yes
	07/26/17	1.72	±	0.23	6.36	±	0.87	Yes	19.50	±	0.55	72.15	±	2.04	Yes
	08/02/17	2.09	±	0.23	7.73	±	0.84	Yes	35.00	±	0.79	129.50	±	2.90	Yes
	08/09/17	3.31	±	0.28	12.25	±	1.03	Yes	29.50	±	0.72	109.15	±	2.68	Yes
	08/16/17	2.91	±	0.28	10.77	±	1.05	Yes	32.00	±	0.83	118.40	±	3.06	Yes
	08/23/17	2.26	±	0.22	8.36	±	0.80	Yes	28.60	±	0.67	105.82	±	2.47	Yes
	08/30/17	1.93	±	0.22	7.14	±	0.80	Yes	36.70	±	0.74	135.79	±	2.75	Yes
	09/06/17	4.65	±	0.32	17.21	±	1.18	Yes	37.20	±	0.81	137.64	±	2.99	Yes
	09/13/17	3.86	±	0.29	14.28	±	1.09	Yes	42.30	±	0.85	156.51	±	3.15	Yes
	09/20/17	1.12	±	0.20	4.14	±	0.74	Yes	15.10	±	0.48	55.87	±	1.79	Yes
	09/27/17	0.72	±	0.21	2.66	±	0.77	Yes	13.70	±	0.51	50.69	±	1.88	Yes
VAN BUREN GATE	07/05/17	1.40	±	0.20	5.18	±	0.73	Yes	26.30	±	0.65	97.31	±	2.42	Yes
	07/12/17	1.72	±	0.21	6.36	±	0.77	Yes	30.80	±	0.71	113.96	±	2.63	Yes
	07/19/17	2.15	±	0.25	7.96	±	0.93	Yes	20.30	±	0.57	75.11	±	2.12	Yes
	07/26/17	2.21	±	0.26	8.18	±	0.97	Yes	20.30	±	0.58	75.11	±	2.15	Yes
	08/02/17	1.92	±	0.21	7.10	±	0.77	Yes	28.90	±	0.70	106.93	±	2.58	Yes
	08/09/17	2.89	±	0.27	10.69	±	1.00	Yes	30.30	±	0.75	112.11	±	2.76	Yes
	08/16/17	2.28	±	0.27	8.44	±	0.98	Yes	30.90	±	0.83	114.33	±	3.08	Yes
	08/23/17	2.19	±	0.22	8.10	±	0.80	Yes	28.70	±	0.68	106.19	±	2.52	Yes
	08/30/17	2.36	±	0.23	8.73	±	0.87	Yes	36.30	±	0.75	134.31	±	2.78	Yes
	09/06/17	4.20	±	0.31	15.54	±	1.15	Yes	35.40	±	0.80	130.98	±	2.97	Yes
	09/13/17	4.25	±	0.31	15.73	±	1.15	Yes	41.80	±	0.86	154.66	±	3.19	Yes
	09/20/17	1.12	±	0.21	4.14	±	0.77	Yes	15.40	±	0.50	56.98	±	1.86	Yes
	09/27/17	1.16	±	0.22	4.29	±	0.80	Yes	15.50	±	0.51	57.35	±	1.87	Yes

a. Invalid sample result shown in red

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	07/05/17	-0.73	±	0.92	-2.69	±	3.40	No
	07/12/17	0.12	±	0.98	0.45	±	3.63	No
	07/19/17	-0.79	±	0.93	-2.93	±	3.44	No
	07/26/17	-0.19	±	0.91	-0.68	±	3.38	No
	08/02/17	0.51	±	0.98	1.89	±	3.64	No
	08/09/17	0.35	±	1.42	1.28	±	5.25	No
	08/16/17	2.46	±	1.55	9.10	±	5.74	No
	08/23/17	-0.37	±	0.92	-1.37	±	3.39	No
	08/30/17	-1.00	±	0.95	-3.69	±	3.50	No
	09/06/17	0.22	±	1.23	0.83	±	4.55	No
	09/13/17	2.43	±	1.27	8.99	±	4.70	No
	09/20/17	0.23	±	0.98	0.84	±	3.61	No
	09/27/17	0.55	±	0.97	2.02	±	3.57	No
ATOMIC CITY	07/05/17	-0.75	±	0.95	-2.78	±	3.52	No
	07/12/17	0.11	±	0.89	0.41	±	3.29	No
	07/19/17	-0.76	±	0.89	-2.80	±	3.29	No
	07/26/17	-0.18	±	0.87	-0.65	±	3.20	No
	08/02/17	0.50	±	0.96	1.84	±	3.54	No
	08/09/17	0.25	±	1.01	0.91	±	3.74	No
	08/16/17	1.84	±	1.16	6.81	±	4.29	No
	08/23/17	-0.35	±	0.87	-1.30	±	3.20	No
	08/30/17	-1.07	±	1.01	-3.96	±	3.74	No
	09/06/17	0.19	±	1.03	0.69	±	3.81	No
	09/13/17	2.14	±	1.12	7.92	±	4.14	No
	09/20/17	0.22	±	0.95	0.83	±	3.53	No
	09/27/17	0.55	±	0.97	2.02	±	3.58	No
BLUE DOME	07/05/17	0.99	±	0.84	3.64	±	3.12	No
	07/12/17	-0.27	±	0.83	-0.98	±	3.07	No
	07/19/17	-0.96	±	0.86	-3.54	±	3.16	No
	07/26/17	0.23	±	0.83	0.85	±	3.06	No
	08/02/17	-0.20	±	0.83	-0.73	±	3.09	No
	08/09/17	-0.13	±	0.92	-0.50	±	3.39	No
	08/16/17	-0.02	±	1.10	-0.07	±	4.07	No
	08/23/17	0.17	±	0.79	0.64	±	2.93	No
	08/30/17	-0.87	±	0.85	-3.20	±	3.14	No
	09/06/17	-0.99	±	0.98	-3.68	±	3.62	No
	09/13/17	-0.64	±	0.99	-2.35	±	3.66	No
	09/20/17	0.12	±	0.80	0.45	±	2.96	No
	09/27/17	2.00	±	2.54	7.40	±	9.40	No
FAA TOWER	07/05/17	1.08	±	0.92	4.00	±	3.40	No
	07/12/17	-0.27	±	0.84	-0.99	±	3.10	No
	07/19/17	-0.94	±	0.84	-3.47	±	3.10	No
	07/26/17	0.25	±	0.88	0.91	±	3.26	No
	08/02/17	-0.20	±	0.85	-0.75	±	3.14	No
	08/09/17	-0.15	±	1.00	-0.54	±	3.70	No
	08/16/17	-0.03	±	1.54	-0.10	±	5.70	No
	08/23/17	0.18	±	0.81	0.66	±	3.00	No
	08/30/17	-0.90	±	0.88	-3.33	±	3.27	No
	09/06/17	-0.96	±	0.94	-3.54	±	3.48	No
	09/13/17	-0.58	±	0.90	-2.14	±	3.33	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
	09/20/17	0.13	±	0.83	0.47	±	3.09	No
	09/27/17	2.18	±	2.77	8.07	±	10.25	No
HOWE	07/05/17	1.01	±	0.86	3.74	±	3.19	No
	07/12/17	-0.24	±	0.76	-0.90	±	2.81	No
	07/19/17	-0.89	±	0.80	-3.30	±	2.95	No
	07/26/17	0.22	±	0.80	0.83	±	2.95	No
	08/02/17	-0.20	±	0.85	-0.74	±	3.13	No
	08/09/17	-0.16	±	1.09	-0.59	±	4.03	No
	08/16/17	-0.02	±	1.28	-0.08	±	4.74	No
	08/23/17	0.17	±	0.79	0.64	±	2.92	No
	08/30/17	-0.92	±	0.90	-3.39	±	3.32	No
	09/06/17	-1.10	±	1.08	-4.07	±	4.00	No
	09/13/17	-0.81	±	1.25	-2.99	±	4.63	No
	09/20/17	0.12	±	0.76	0.43	±	2.82	No
	09/27/17	2.02	±	2.56	7.47	±	9.47	No
MONTEVIEW	07/05/17	1.14	±	0.97	4.22	±	3.60	No
	07/12/17	-0.27	±	0.84	-1.00	±	3.12	No
	07/19/17	-1.06	±	0.95	-3.92	±	3.52	No
	07/26/17	0.27	±	0.96	1.00	±	3.56	No
	08/02/17	-0.21	±	0.88	-0.78	±	3.27	No
	08/09/17	-0.22	±	1.50	-0.81	±	5.55	No
	08/16/17	-0.02	±	1.27	-0.08	±	4.70	No
	08/23/17	0.18	±	0.80	0.65	±	2.97	No
	08/30/17	-0.83	±	0.82	-3.09	±	3.03	No
	09/06/17	-0.91	±	0.90	-3.37	±	3.32	No
	09/13/17	-0.78	±	1.22	-2.90	±	4.51	No
	09/20/17	0.12	±	0.78	0.44	±	2.87	No
	09/27/17	2.06	±	2.62	7.62	±	9.69	No
MUD LAKE	07/05/17	1.03	±	0.88	3.81	±	3.26	No
	07/12/17	-0.28	±	0.86	-1.02	±	3.19	No
	07/19/17	-0.95	±	0.85	-3.50	±	3.13	No
	07/26/17	0.28	±	1.01	1.05	±	3.74	No
	08/02/17	-0.20	±	0.85	-0.75	±	3.16	No
	08/09/17	-0.16	±	1.08	-0.58	±	4.00	No
	08/16/17	-0.02	±	1.05	-0.07	±	3.89	No
	08/23/17	0.18	±	0.82	0.67	±	3.02	No
	08/30/17	-0.94	±	0.93	-3.49	±	3.42	No
	09/06/17	-0.92	±	0.90	-3.40	±	3.34	No
	09/13/17	-0.94	±	1.46	-3.48	±	5.40	No
	09/20/17	0.12	±	0.76	0.43	±	2.83	No
	09/27/17	2.14	±	2.72	7.92	±	10.06	No
DISTANT								
BLACKFOOT	07/05/17	-0.72	±	0.91	-2.68	±	3.38	No
	07/12/17	0.10	±	0.81	0.37	±	2.99	No
	07/19/17	-0.77	±	0.91	-2.86	±	3.36	No
	07/26/17	-0.18	±	0.89	-0.67	±	3.29	No
	08/02/17	0.47	±	0.90	1.73	±	3.34	No
	08/09/17	0.28	±	1.15	1.04	±	4.26	No
	08/16/17	2.07	±	1.31	7.66	±	4.85	No
	08/23/17	-0.33	±	0.82	-1.23	±	3.03	No
	08/30/17	-0.99	±	0.94	-3.66	±	3.47	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
	09/06/17	0.18	±	0.99	0.67	±	3.66	No
	09/13/17	2.19	±	1.15	8.10	±	4.26	No
	09/20/17	0.20	±	0.86	0.74	±	3.17	No
	09/27/17	0.51	±	0.91	1.89	±	3.35	No
QA-1	07/05/17	-0.76	±	0.96	-2.80	±	3.54	No
(BLACKFOOT)	07/12/17	0.11	±	0.90	0.41	±	3.33	No
	07/19/17	-0.78	±	0.91	-2.87	±	3.37	No
	07/26/17	-0.17	±	0.85	-0.64	±	3.14	No
	08/02/17	0.49	±	0.94	1.80	±	3.48	No
	08/09/17	0.29	±	1.19	1.07	±	4.40	No
	08/16/17	2.37	±	1.49	8.77	±	5.51	No
	08/23/17	-0.37	±	0.92	-1.38	±	3.41	No
	08/30/17	-0.98	±	0.93	-3.61	±	3.43	No
	09/06/17	0.18	±	0.98	0.65	±	3.61	No
	09/13/17	2.20	±	1.15	8.14	±	4.26	No
	09/20/17	0.22	±	0.96	0.83	±	3.53	No
	09/27/17	0.50	±	0.88	1.84	±	3.27	No
CRATERS	07/05/17	-0.74	±	0.94	-2.75	±	3.48	No
	07/12/17	0.12	±	0.99	0.46	±	3.67	No
	07/19/17	-0.81	±	0.95	-2.99	±	3.51	No
	07/26/17	-0.19	±	0.91	-0.68	±	3.38	No
	08/02/17	0.52	±	0.99	1.91	±	3.67	No
	08/09/17	0.24	±	0.98	0.88	±	3.63	No
	08/16/17	2.35	±	1.48	8.70	±	5.48	No
	08/23/17	-0.37	±	0.92	-1.38	±	3.41	No
	08/30/17	-1.10	±	1.04	-4.07	±	3.85	No
	09/06/17	0.21	±	1.13	0.76	±	4.18	No
	09/13/17	2.59	±	1.36	9.58	±	5.03	No
	09/20/17	0.21	±	0.89	0.77	±	3.28	No
	09/27/17	0.56	±	0.99	2.06	±	3.66	No
DUBOIS	07/05/17	1.24	±	1.06	4.59	±	3.92	No
	07/12/17	-0.28	±	0.89	-1.05	±	3.27	No
	07/19/17	-1.05	±	0.94	-3.89	±	3.49	No
	07/26/17	0.29	±	1.03	1.07	±	3.81	No
	08/02/17	-0.21	±	0.88	-0.77	±	3.24	No
	08/09/17	-0.16	±	1.07	-0.58	±	3.96	No
	08/16/17	-0.02	±	1.11	-0.07	±	4.11	No
	08/23/17	0.20	±	0.92	0.75	±	3.42	No
	08/30/17	-0.92	±	0.91	-3.42	±	3.36	No
	09/06/17	-1.08	±	1.06	-4.00	±	3.92	No
	09/13/17	-0.73	±	1.13	-2.69	±	4.18	No
	09/20/17	0.12	±	0.81	0.46	±	3.00	No
	09/27/17	2.07	±	2.62	7.66	±	9.69	No
IDAHO FALLS	07/05/17	1.08	±	0.92	4.00	±	3.41	No
	07/12/17	-0.28	±	0.88	-1.04	±	3.25	No
	07/19/17	-1.03	±	0.92	-3.81	±	3.40	No
	07/26/17	0.25	±	0.88	0.91	±	3.26	No
	08/02/17	-0.21	±	0.86	-0.76	±	3.19	No
	08/09/17	-0.23	±	1.54	-0.84	±	5.70	No
	08/16/17	-0.02	±	1.21	-0.08	±	4.48	No
	08/23/17	0.18	±	0.83	0.68	±	3.09	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
	08/30/17	-0.88	±	0.86	-3.26	±	3.19	No
	09/06/17	-1.06	±	1.04	-3.92	±	3.85	No
	09/13/17	-0.86	±	1.34	-3.19	±	4.96	No
	09/20/17	0.13	±	0.85	0.48	±	3.13	No
	09/27/17	2.06	±	2.61	7.62	±	9.66	No
JACKSON	07/05/17	0.27	±	0.58	1.00	±	2.14	No
	07/12/17	0.30	±	2.41	1.11	±	8.92	No
	07/19/17	-0.76	±	0.89	-2.82	±	3.30	No
	07/26/17	-0.19	±	0.91	-0.68	±	3.37	No
	08/02/17	0.48	±	0.93	1.79	±	3.45	No
	08/09/17	0.29	±	1.18	1.06	±	4.37	No
	08/16/17	1.86	±	1.17	6.88	±	4.33	No
	08/23/17	-0.37	±	0.91	-1.37	±	3.37	No
	08/30/17	-1.10	±	1.05	-4.07	±	3.89	No
	09/06/17	0.21	±	1.12	0.76	±	4.14	No
	09/13/17	3.12	±	1.64	11.54	±	6.07	No
	09/20/17	0.22	±	0.92	0.80	±	3.40	No
	09/27/17	0.49	±	0.87	1.82	±	3.23	No
SUGAR CITY	07/05/17	0.96	±	0.82	3.53	±	3.02	No
	07/12/17	-0.24	±	0.74	-0.88	±	2.75	No
	07/19/17	-0.89	±	0.79	-3.29	±	2.94	No
	07/26/17	0.23	±	0.81	0.84	±	3.01	No
	08/02/17	-0.19	±	0.81	-0.71	±	2.99	No
	08/09/17	-0.20	±	1.37	-0.74	±	5.07	No
	08/16/17	-0.02	±	1.21	-0.08	±	4.48	No
	08/23/17	0.16	±	0.73	0.60	±	2.70	No
	08/30/17	-0.83	±	0.81	-3.06	±	3.00	No
	09/06/17	-0.83	±	0.82	-3.08	±	3.03	No
	09/13/17	-0.57	±	0.89	-2.11	±	3.27	No
	09/20/17	0.12	±	0.77	0.43	±	2.84	No
	09/27/17	2.02	±	2.56	7.47	±	9.47	No
QA-2 (SUGAR CITY)	07/05/17	0.99	±	0.85	3.67	±	3.14	No
	07/12/17	-0.24	±	0.75	-0.89	±	2.78	No
	07/19/17	-0.90	±	0.80	-3.32	±	2.97	No
	07/26/17	0.22	±	0.78	0.81	±	2.88	No
	08/02/17	-0.20	±	0.83	-0.73	±	3.06	No
	08/09/17	-0.20	±	1.38	-0.75	±	5.11	No
	08/16/17	-0.02	±	1.37	-0.09	±	5.07	No
	08/23/17	0.17	±	0.76	0.62	±	2.81	No
	08/30/17	-0.91	±	0.90	-3.38	±	3.32	No
	09/06/17	-0.80	±	0.79	-2.97	±	2.93	No
	09/13/17	-0.58	±	0.91	-2.16	±	3.35	No
	09/20/17	0.12	±	0.82	0.46	±	3.02	No
	09/27/17	1.97	±	2.50	7.29	±	9.25	No
INL SITE								
EFS	07/05/17	-0.87	±	1.10	-3.22	±	4.07	No
	07/12/17	0.13	±	1.04	0.48	±	3.85	No
	07/19/17	-0.88	±	1.03	-3.26	±	3.81	No
	07/26/17	-0.23	±	1.16	-0.87	±	4.29	No
	08/02/17	0.72	±	1.39	2.66	±	5.14	No
	08/09/17	0.34	±	1.39	1.24	±	5.14	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
	08/16/17	2.38	±	1.50	8.81	±	5.55	No
	08/23/17	-0.45	±	1.11	-1.67	±	4.11	No
	08/30/17	-1.39	±	1.32	-5.14	±	4.88	No
	09/06/17	0.32	±	1.78	1.20	±	6.59	No
	09/13/17	3.14	±	1.64	11.62	±	6.07	No
	09/20/17	0.32	±	1.37	1.19	±	5.07	No
	09/27/17	0.88	±	1.56	3.26	±	5.77	No
MAIN GATE	07/05/17	-0.74	±	0.93	-2.72	±	3.44	No
	07/12/17	0.11	±	0.89	0.41	±	3.30	No
	07/19/17	-0.81	±	0.95	-2.99	±	3.51	No
	07/26/17	-0.18	±	0.89	-0.67	±	3.30	No
	08/02/17	0.56	±	1.08	2.08	±	4.00	No
	08/09/17	0.25	±	1.04	0.94	±	3.85	No
	08/16/17	2.08	±	1.31	7.70	±	4.85	No
	08/23/17	-0.37	±	0.92	-1.37	±	3.39	No
	08/30/17	-1.00	±	0.95	-3.69	±	3.50	No
	09/06/17	0.20	±	1.07	0.72	±	3.96	No
	09/13/17	2.10	±	1.10	7.77	±	4.07	No
	09/20/17	0.20	±	0.87	0.75	±	3.20	No
	09/27/17	0.57	±	1.00	2.09	±	3.70	No
VAN BUREN GATE	07/05/17	-0.74	±	0.94	-2.74	±	3.46	No
	07/12/17	0.12	±	0.93	0.43	±	3.46	No
	07/19/17	-0.80	±	0.94	-2.96	±	3.47	No
	07/26/17	-0.19	±	0.95	-0.71	±	3.50	No
	08/02/17	0.53	±	1.01	1.95	±	3.74	No
	08/09/17	0.26	±	1.08	0.97	±	4.00	No
	08/16/17	2.15	±	1.36	7.96	±	5.03	No
	08/23/17	-0.38	±	0.95	-1.42	±	3.50	No
	08/30/17	-1.02	±	0.97	-3.77	±	3.59	No
	09/06/17	0.20	±	1.10	0.74	±	4.07	No
	09/13/17	2.17	±	1.14	8.03	±	4.22	No
	09/20/17	0.21	±	0.91	0.79	±	3.37	No
	09/27/17	0.52	±	0.93	1.93	±	3.42	No

a. Invalid sample result shown in red.

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	09/27/17	CESIUM-137	-115.00	±	100.00	-425.50	±	370.00	No
ATOMIC CITY	09/27/17	CESIUM-137	-36.70	±	78.90	-135.79	±	291.93	No
	09/27/17	STRONTIUM-90	-5.28	±	6.45	-19.55	±	23.88	No
BLUE DOME	09/27/17	CESIUM-137	-43.20	±	103.00	-159.84	±	381.10	No
FAA TOWER	09/27/17	CESIUM-137	112.00	±	115.00	414.40	±	425.50	No
HOWE	09/27/17	CESIUM-137	174.00	±	89.80	643.80	±	332.26	No
	09/27/17	STRONTIUM-90	-8.94	±	6.79	-33.07	±	25.13	No
MONTEVIEW	09/27/17	CESIUM-137	-112.00	±	90.30	-414.40	±	334.11	No
	09/27/17	STRONTIUM-90	-17.50	±	7.46	-64.76	±	27.60	No
MUD LAKE	09/27/17	AMERICIUM-241	1.92	±	0.50	7.09	±	1.84	**Yes**
	09/27/17	CESIUM-137	81.40	±	115.00	301.18	±	425.50	No
	09/27/17	PLUTONIUM-238	0.74	±	0.61	2.75	±	2.27	No
	09/27/17	PLUTONIUM-239/240	0.15	±	0.15	0.55	±	0.55	No
DISTANT									
BLACKFOOT	09/27/17	AMERICIUM-241	0.94	±	0.34	3.49	±	1.26	No
	09/27/17	CESIUM-137	244.00	±	104.00	902.80	±	384.80	No
	09/27/17	PLUTONIUM-238	2.11	±	0.59	7.82	±	2.19	**Yes**
	09/27/17	PLUTONIUM-239/240	0.49	±	0.28	1.81	±	1.04	No
QA-1 (BLACKFOOT)	09/27/17	AMERICIUM-241	1.34	±	0.42	4.98	±	1.54	**Yes**
	09/27/17	CESIUM-137	53.30	±	114.00	197.21	±	421.80	No
	09/27/17	PLUTONIUM-238	0.83	±	0.34	3.08	±	1.26	No
	09/27/17	PLUTONIUM-239/240	1.80	±	0.50	6.68	±	1.86	**Yes**
CRATERS	09/27/17	CESIUM-137	37.50	±	113.00	138.75	±	418.10	No
DUBOIS	09/27/17	CESIUM-137	37.20	±	93.80	137.64	±	347.06	No
IDAHO FALLS	09/27/17	AMERICIUM-241	0.98	±	0.46	3.62	±	1.71	No
	09/27/17	CESIUM-137	160.00	±	140.00	592.00	±	518.00	No
	09/27/17	PLUTONIUM-238	0.92	±	0.38	3.42	±	1.40	No
	09/27/17	PLUTONIUM-239/240	0.92	±	0.38	3.42	±	1.40	No
JACKSON	09/27/17	AMERICIUM-241	1.08	±	0.37	3.98	±	1.36	No
	09/27/17	CESIUM-137	-39.80	±	108.00	-147.26	±	399.60	No
	09/27/17	PLUTONIUM-238	2.51	±	0.65	9.29	±	2.42	**Yes**
	09/27/17	PLUTONIUM-239/240	0.33	±	0.47	1.24	±	1.75	No
SUGAR CITY	09/27/17	CESIUM-137	166.00	±	88.10	614.20	±	325.97	No
	09/27/17	STRONTIUM-90	0.63	±	6.70	2.34	±	24.81	No

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

QA-2 (SUGAR CITY)	09/27/17	CESIUM-137	26.60	±	116.00	98.42	±	429.20	No
	09/27/17	STRONTIUM-90	7.51	±	7.08	27.78	±	26.21	No
INL SITE									
EFS	09/27/17	CESIUM-137	249.00	±	154.00	921.30	±	569.80	No
	09/27/17	STRONTIUM-90	-8.08	±	8.81	-29.91	±	32.61	No
MAIN GATE	09/27/17	AMERICIUM-241	0.54	±	0.45	2.00	±	1.65	No
	09/27/17	CESIUM-137	-65.60	±	88.50	-242.72	±	327.45	No
	09/27/17	PLUTONIUM-238	1.10	±	0.42	4.07	±	1.54	No
	09/27/17	PLUTONIUM-239/240	0.63	±	0.31	2.33	±	1.17	No
VAN BUREN GATE	09/27/17	CESIUM-137	-38.30	±	107.00	-141.71	±	395.90	No
	09/27/17	STRONTIUM-90	-3.04	±	6.37	-11.26	±	23.56	No

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	06/14/17	07/05/17	15.80	±	2.07	58.46	±	7.66	**Yes**
ATOMIC CITY	07/05/17	07/19/17	3.97	±	1.74	14.69	±	6.44	No
ATOMIC CITY	07/19/17	08/09/17	4.39	±	1.71	16.24	±	6.33	No
ATOMIC CITY	08/09/17	08/30/17	5.06	±	1.56	18.72	±	5.77	**Yes**
HOWE	06/28/17	07/12/17	3.39	±	1.07	12.54	±	3.96	**Yes**
HOWE	07/12/17	07/26/17	0.24	±	0.79	0.87	±	2.92	No
HOWE	07/26/17	08/09/17	5.31	±	0.90	19.65	±	3.32	**Yes**
HOWE	08/09/17	08/30/17	2.44	±	1.01	9.03	±	3.74	No
DISTANT									
IDAHO FALLS	06/28/17	07/26/17	3.13	±	1.20	11.58	±	4.44	No
IDAHO FALLS	07/26/17	08/09/17	6.32	±	2.19	23.38	±	8.10	No
IDAHO FALLS	08/09/17	08/23/17	7.53	±	1.98	27.86	±	7.33	**Yes**
IDAHO FALLS	08/23/17	09/06/17	6.96	±	2.11	25.75	±	7.81	**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	07/19/17	07/25/17	52.70	±	24.10	1.95	±	0.89	No
ATOMIC CITY	09/13/17	09/20/17	95.77	±	24.10	3.54	±	0.89	**Yes**
ATOMIC CITY	09/20/17	09/27/17	47.23	±	23.48	1.75	±	0.87	No
HOWE	06/28/17	07/05/17	87.60	±	23.50	3.24	±	0.87	**Yes**
HOWE	07/05/17	07/12/17	116.00	±	23.90	4.29	±	0.88	**Yes**
HOWE	07/19/17	07/26/17	17.80	±	23.10	0.66	±	0.85	No
HOWE	08/30/17	09/06/17	55.00	±	23.96	2.04	±	0.89	No
HOWE	09/06/17	09/13/17	65.18	±	23.88	2.41	±	0.88	No
HOWE	09/13/17	09/20/17	66.29	±	24.10	2.45	±	0.89	No
HOWE	09/20/17	09/27/17	54.45	±	23.95	2.01	±	0.89	No
DISTANT									
IDAHO FALLS	06/30/17	07/31/17	2.32	±	23.40	0.09	±	0.87	No
IDAHO FALLS	08/31/17	09/30/17	69.40	±	23.68	2.57	±	0.88	No
INL SITE									
EFS	09/13/17	09/20/17	117.99	±	24.31	4.37	±	0.90	**Yes**
EFS	09/20/17	09/27/17	70.98	±	23.96	2.63	±	0.89	No

Table C-6. 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	07/14/17	GROSS ALPHA (Filtered)	1.48	±	0.39	0.05	±	0.01	**Yes**
	07/14/17	GROSS BETA (Filtered)	1.56	±	0.44	0.06	±	0.02	**Yes**
	07/14/17	TRITIUM	63.70	±	23.00	2.36	±	0.85	No
BLR at INTEC	07/14/17	GROSS ALPHA (Filtered)	1.55	±	0.41	0.01	±	0.02	**Yes**
	07/14/17	GROSS BETA (Filtered)	1.30	±	0.42	0.02	±	0.02	**Yes**
	07/14/17	TRITIUM	70.90	±	23.00	2.63	±	0.85	**Yes**
BLR at INTEC (Duplicate)	07/14/17	GROSS ALPHA (Filtered)	1.56	±	0.40	0.06	±	0.01	**Yes**
	07/14/17	GROSS BETA (Filtered)	2.07	±	0.45	0.08	±	0.02	**Yes**
	07/14/17	TRITIUM	46.30	±	22.90	1.71	±	0.85	No
BLR at EFS	07/14/17	GROSS ALPHA (Filtered)	2.24	±	0.45	0.08	±	0.02	**Yes**
	07/14/17	GROSS BETA (Filtered)	2.54	±	0.45	0.09	±	0.02	**Yes**
	07/14/17	TRITIUM	68.70	±	23.00	2.54	±	0.85	No
BLR at NRF	07/14/17	GROSS ALPHA (Filtered)	1.64	±	0.42	0.06	±	0.02	**Yes**
	07/14/17	GROSS BETA (Filtered)	1.69	±	0.44	0.06	±	0.02	**Yes**
	07/14/17	TRITIUM	78.70	±	23.10	2.91	±	0.86	**Yes**
BLR at Sinks	07/14/17	GROSS ALPHA (Filtered)	1.57	±	0.44	0.06	±	0.02	**Yes**
	07/14/17	GROSS BETA (Filtered)	3.45	±	0.46	0.13	±	0.02	**Yes**
	07/14/17	TRITIUM	57.60	±	23.00	2.13	±	0.85	No
BLR Control (Birch Creek)	07/19/17	GROSS ALPHA (Filtered)	2.62	±	0.49	0.10	±	0.02	**Yes**
	07/19/17	GROSS BETA (Filtered)	0.94	±	0.45	0.03	±	0.02	No
	07/19/17	TRITIUM	71.60	±	23.10	2.65	±	0.86	**Yes**

Table C-7. Weekly and Monthly Iodine-131 and Cesium-137 Concentrations in Milk

Location	Sampling Date	Iodine-131 Result ± 1s Uncertainty (pCi†/L)	Iodine-131 Result ± 1s Uncertainty (Bq‡/L)	Iodine-131 Result > 3s	Cesium-137 Result ± 1s Uncertainty (pCi/L)	Cesium-137 Result ± 1s Uncertainty (Bq/L)	Cesium-137 Result > 3s
BLACKFOOT	07/03/17	0.92 ± 1.76	0.03 ± 0.07	No	0.92 ± 1.46	0.03 ± 0.05	No
DUPLICATE	07/03/17	-2.53 ± 1.90	-0.09 ± 0.07	No	2.23 ± 1.43	0.08 ± 0.05	No
	08/07/17	-3.35 ± 1.79	-0.12 ± 0.07	No	0.06 ± 0.87	0.00 ± 0.03	No
	09/18/17	-2.22 ± 1.78	-0.08 ± 0.07	No	-0.60 ± 0.91	-0.02 ± 0.03	No
CONTROL	07/03/17	1.18 ± 2.31	0.04 ± 0.09	No	0.66 ± 1.35	0.02 ± 0.05	No
	08/01/17	-1.72 ± 2.00	-0.06 ± 0.07	No	-1.18 ± 1.35	-0.04 ± 0.05	No
	09/11/17	-1.00 ± 1.42	-0.04 ± 0.05	No	-0.85 ± 1.10	-0.03 ± 0.04	No
DIETRICH	07/03/17	-3.26 ± 2.05	-0.12 ± 0.08	No	-2.70 ± 1.53	-0.10 ± 0.06	No
	08/01/17	-2.25 ± 1.69	-0.08 ± 0.06	No	-0.43 ± 1.33	-0.02 ± 0.05	No
	09/11/17	-1.11 ± 1.78	-0.04 ± 0.07	No	-0.76 ± 1.47	-0.03 ± 0.05	No
HOWE	07/03/17	-1.95 ± 1.75	-0.07 ± 0.06	No	-1.23 ± 0.89	-0.05 ± 0.03	No
	08/01/17	-1.09 ± 1.71	-0.04 ± 0.06	No	0.65 ± 0.89	0.02 ± 0.03	No
	09/12/17	1.07 ± 1.69	0.04 ± 0.06	No	2.27 ± 1.43	0.08 ± 0.05	No
IDAHO FALLS	07/04/17	-0.31 ± 1.75	-0.01 ± 0.06	No	-0.95 ± 1.36	-0.04 ± 0.05	No
	07/11/17	2.04 ± 1.49	0.08 ± 0.06	No	1.16 ± 1.44	0.04 ± 0.05	No
	07/18/17	0.83 ± 1.56	0.03 ± 0.06	No	0.73 ± 0.85	0.03 ± 0.03	No
	07/25/17	1.31 ± 1.55	0.05 ± 0.06	No	2.17 ± 1.48	0.08 ± 0.05	No
	08/01/17	0.43 ± 1.47	0.02 ± 0.05	No	-0.30 ± 1.46	-0.01 ± 0.05	No
	08/08/17	-1.61 ± 1.58	-0.06 ± 0.06	No	-0.32 ± 1.40	-0.01 ± 0.05	No
	08/15/17	-0.43 ± 1.59	-0.02 ± 0.06	No	0.70 ± 1.48	0.03 ± 0.05	No
	08/22/17	-1.32 ± 1.58	-0.05 ± 0.06	No	0.21 ± 0.84	0.01 ± 0.03	No
	08/29/17	-1.15 ± 1.56	-0.04 ± 0.06	No	0.35 ± 0.84	0.01 ± 0.03	No
	09/05/17	-0.42 ± 1.51	-0.02 ± 0.06	No	0.43 ± 1.49	0.02 ± 0.06	No
	09/12/17	1.25 ± 1.09	0.05 ± 0.04	No	0.23 ± 0.81	0.01 ± 0.03	No
	09/19/17	-0.40 ± 0.96	-0.01 ± 0.04	No	0.15 ± 0.77	0.01 ± 0.03	No
	09/26/17	0.77 ± 0.97	0.03 ± 0.04	No	0.89 ± 0.83	0.03 ± 0.03	No
MINIDOKA	07/03/17	-0.19 ± 1.78	-0.01 ± 0.07	No	1.34 ± 1.46	0.05 ± 0.05	No
	08/01/17	1.37 ± 1.73	0.05 ± 0.06	No	-0.98 ± 1.52	-0.04 ± 0.06	No
	09/11/17	-1.30 ± 1.73	-0.05 ± 0.06	No	0.64 ± 0.85	0.02 ± 0.03	No
TERRETON	07/03/17	-3.54 ± 2.10	-0.13 ± 0.08	No	0.50 ± 0.89	0.02 ± 0.03	No
	07/12/17	-0.49 ± 1.42	-0.02 ± 0.05	No	0.27 ± 0.87	0.01 ± 0.03	No
	07/19/17	2.10 ± 1.40	0.08 ± 0.05	No	-0.56 ± 1.44	-0.02 ± 0.05	No
	07/26/17	0.49 ± 1.51	0.02 ± 0.06	No	0.52 ± 1.35	0.02 ± 0.05	No
	08/01/17	-0.58 ± 1.81	-0.02 ± 0.07	No	1.23 ± 1.35	0.05 ± 0.05	No
	08/09/17	0.66 ± 1.48	0.02 ± 0.05	No	1.89 ± 1.38	0.07 ± 0.05	No
	08/16/17	-0.04 ± 1.40	0.00 ± 0.05	No	0.47 ± 0.89	0.02 ± 0.03	No
	08/23/17	-2.19 ± 1.72	-0.08 ± 0.06	No	-0.27 ± 0.85	-0.01 ± 0.03	No
	08/30/17	1.74 ± 1.57	0.06 ± 0.06	No	0.66 ± 1.34	0.02 ± 0.05	No
	09/06/17	-0.46 ± 1.40	-0.02 ± 0.05	No	-0.47 ± 0.85	-0.02 ± 0.03	No
	09/12/17	0.47 ± 1.13	0.02 ± 0.04	No	0.96 ± 0.83	0.04 ± 0.03	No
DUPLICATE	09/12/17	-2.17 ± 1.74	-0.08 ± 0.06	No	0.82 ± 0.86	0.03 ± 0.03	No
	09/20/17	0.05 ± 1.09	0.00 ± 0.04	No	0.12 ± 1.08	0.00 ± 0.04	No

Table C-7. Weekly and Monthly Iodine-131 and Cesium-137 Concentrations in Milk

09/27/17	1.16	±	1.47	0.04	±	0.05	No	0.01	±	1.45	0.00	±	0.05	No

Tabel C-8. Cesium-137 and Strontium-90 Concentrations in Lettuce

Location	Sampling Date	Cesium-137 Result ± 1s Uncertainty pCi/kg			Cesium-137 Result ± 1s Uncertainty (x 10^{-2} Bq/kg)			Result > 3s
ATOMIC CITY	08/16/17	-45.50	±	67.10	-168.52	±	248.52	No
CONTROL	08/30/17	6.54	±	36.30	24.22	±	134.44	No
EFS	08/16/17	116.00	±	83.70	429.63	±	310.00	No
FAA TOWER	08/16/17	-51.50	±	82.30	-190.74	±	304.81	No
HOWE	08/16/17	34.20	±	87.40	126.67	±	323.70	No
IDAHO FALLS	09/15/17	46.50	±	52.10	172.22	±	192.96	No
MONTEVIEW	08/16/17	-33.90	±	82.60	-125.56	±	305.93	No
MONTEVIEW (DUPLICATE)	08/16/17	-102.00	±	61.40	-377.78	±	227.41	No
SHELLEY	09/06/17	-6.13	±	42.80	-22.70	±	158.52	No
SUGAR CITY	08/23/17	96.60	±	81.10	357.78	±	300.37	No
		Strontium-90						
		Result ± 1s Uncertainty pCi/kg			**Result ± 1s Uncertainty (x 10^{-2} Bq/kg)**			**Result > 3s**
ATOMIC CITY	08/16/17	112.00	±	3.96	414.81	±	14.67	Yes
CONTROL	08/30/17	16.50	±	1.61	61.11	±	5.96	Yes
EFS	08/16/17	111.00	±	4.02	411.11	±	14.89	Yes
FAA TOWER	08/16/17	104.00	±	4.36	385.19	±	16.15	Yes
HOWE	08/16/17	27.30	±	2.47	101.11	±	9.15	Yes
IDAHO FALLS	09/15/17	46.30	±	3.68	171.48	±	13.63	Yes
MONTEVIEW	08/16/17	21.50	±	3.10	79.63	±	11.48	Yes
MONTEVIEW (DUPLICATE)	08/16/17	26.85	±	3.43	99.43	±	12.71	Yes
SHELLEY	09/06/17	-1.18	±	4.61	-4.37	±	17.07	No
SUGAR CITY	08/23/17	34.50	±	3.17	127.78	±	11.74	Yes

NOTE: During the summer of 2020, a review of the table determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. The column headings have been updated to the correct units of concentration (pCi/kg and Bq/kg). For further discussion see Lettuce Sampling in Section 5.

Table C-9. Cesium-137 and Strontium-90 Concentrations in Grain

Location	Sampling Date	Cesium-137 Result ± 1s Uncertainty pCi/kg			Result ± 1s Uncertainty Bq/kg			Result > 3s
AMERICAN FALLS	08/14/17	-1.31	±	2.52	-0.05	±	0.09	No
ARCO	09/06/17	-2.63	±	2.87	-0.10	±	0.11	No
ARCO (DUPLICATE)	09/06/17	-0.13	±	2.83	0.00	±	0.10	No
HOWE	08/16/17	0.89	±	1.84	0.03	±	0.07	No
IDAHO FALLS	08/08/17	0.65	±	1.13	0.02	±	0.04	No
CONTROL	09/18/17	-3.83	±	2.51	-0.14	±	0.09	No
MONTEVIEW	08/09/17	3.29	±	2.01	0.12	±	0.07	No
MORELAND	08/14/17	0.51	±	1.10	0.02	±	0.04	No
ROBERTS	08/16/17	0.19	±	1.82	0.01	±	0.07	No
RUPERT	08/14/17	-0.75	±	1.50	-0.03	±	0.06	No
TERRETON	09/06/17	-1.45	±	1.31	-0.05	±	0.05	No
		Strontium-90						
		Result ± 1s Uncertainty pCi/kg			**Result ± 1s Uncertainty Bq/kg**			**Result > 3s**
AMERICAN FALLS	08/14/17	2.55	±	0.62	0.09	±	0.02	Yes
ARCO	09/06/17	1.87	±	0.68	0.07	±	0.03	No
ARCO (DUPLICATE)	09/06/17	1.24	±	0.66	0.05	±	0.02	No
HOWE	08/16/17	1.32	±	0.71	0.05	±	0.03	No
IDAHO FALLS	08/08/17	0.78	±	1.10	0.03	±	0.04	No
CONTROL	09/18/17	1.42	±	0.58	0.05	±	0.02	No
MONTEVIEW	08/09/17	1.40	±	0.71	0.05	±	0.03	No
MORELAND	08/14/17	2.01	±	0.58	0.07	±	0.02	Yes
ROBERTS	08/16/17	2.05	±	0.72	0.08	±	0.03	No
RUPERT	08/14/17	1.31	±	0.55	0.05	±	0.02	No
TERRETON	09/06/17	1.21	±	0.58	0.04	±	0.02	No

Table C-10. Gamma-emitting Radionuclides in Large Game Animals

Species	Collection Date	Tissue	Analyte	Result ± 1s Uncertainty (pCi/kg wet weight)			Result ± 1s Uncertainty (x 10^{-2} Bq/kg wet weight)			Result > 3s
MULE DEER	07/12/17	Liver	^{131}I	-4.07	±	13.30	-15.06	±	49.21	No
	07/12/17		^{137}Cs	-6.23	±	8.20	-23.05	±	30.34	No
MULE DEER	07/12/17	Muscle	^{131}I	1.17	±	4.73	4.33	±	17.50	No
	07/12/17		^{137}Cs	-2.57	±	2.42	-9.51	±	8.95	No
MULE DEER	07/12/17	Thyroid	^{131}I	-736.00	±	591.00	-2723.20	±	2186.70	No
	07/12/17		^{137}Cs	371.00	±	318.00	1372.70	±	1176.60	No
PRONGHORN	09/19/17	Liver	^{131}I	2.15	±	4.71	7.96	±	17.43	No
	09/19/17		^{137}Cs	-3.42	±	3.27	-12.65	±	12.10	No
PRONGHORN	09/19/17	Muscle	^{131}I	1.98	±	2.31	7.33	±	8.55	No
	09/19/17		^{137}Cs	3.33	±	1.61	12.32	±	5.96	No
PRONGHORN	09/19/17	Thyroid	^{131}I	-81.60	±	291.00	-301.92	±	1076.70	No
	09/19/17		^{137}Cs	-506.00	±	289.00	-1872.20	±	1069.30	No
PRONGHORN	09/27/17	Muscle	^{131}I	0.08	±	1.13	0.30	±	4.18	No
	09/27/17		^{137}Cs	1.00	±	1.03	3.70	±	3.81	No
PRONGHORN	09/27/17	Thyroid	^{131}I	-61.00	±	168.00	-225.70	±	621.60	No
	09/27/17		^{137}Cs	9.02	±	184.00	33.37	±	680.80	No

APPENDIX D

STATISTICAL ANALYSIS RESULTS

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

Parameter	P[a]
Gross Alpha	
Quarter	0.06
July	0.02
August	0.00
September	0.66
Gross Beta	
Quarter	0.29
July	0.62
August	0.16
September	0.25

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. Statistical difference in weekly gross alpha and gross beta concentrations measured at Boundary and Distant locations.

Parameter	Mann-Whitney U test	
	Week	**P[a]**
Gross Alpha		
	July 5	0.02
	July 12	0.61
	July 19	0.43
	July 26	0.00
	August 2	0.04
	August 9	0.22
	August 16	0.17
	August 23	0.03
	August 30	0.02
	September 6	0.28
	September 13	0.10
	September 20	0.72
	September 27	0.22
Gross Beta		
	July 5	0.62
	July 12	0.35
	July 19	0.25
	July 26	0.17
	August 2	0.52
	August 9	0.43
	August 16	0.94
	August 23	1.00
	August 30	0.35
	September 6	0.10
	September 13	0.94
	September 20	0.35
	September 27	0.56

a. A 'p' value greater than 0.05 signifies no statistical difference between data groups (i.e., Boundary and Distant locations). Any values below 0.05 are indicated in red.