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Idaho National Laboratory Site Offsite Environmental Surveillance Program Report: Third Quarter 2015

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EXECUTIVE SUMMARY

None of the radionuclides detected in samples collected during the third quarter of 2015 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 the public.

This report for the third quarter of 2015 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, 2015. All sample types (media) and the sampling schedule followed during 2015 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
- Milk, lettuce and grain
- Large game animals

Table E-1 Summary of results for the Third Quarter of 2015.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	There were a few statistical differences in gross alpha or gross beta concentrations measured at Distant, Boundary, and INL Site sampling locations. In each case, however, the Distant stations were higher than the Boundary and INL Site locations. No result exceeded the DCS for gross alpha or gross beta activity in air.
		Gamma-emitting radionuclides, ^{90}Sr, actinides (americium and plutonium)	No human-made gamma-emitting radionuclides were detected. Strontium-90 was detected on three composites at less than 0.0001 percent of the Derived Concentration Standard. Plutonium-239/240 was originally reported in all of the composites but the laboratory indicated this was due to interference by naturally-occurring Polonium-210 and the results were considered invalid.Other samples collected during the third quarter will be analyzed with the Po-210 chemically removed.
	Charcoal Cartridge	Iodine-131	Iodine-131 was not detected in any of the 26 batches counted during the quarter.
Atmospheric Moisture	Liquid	Tritium	Seventeen of the 22 sample results showed tritium concentrations greater than the 3s uncertainty during the quarter. No sample result exceeded the DCS for tritium in air.
Precipitation	Liquid	Tritium	Twelve samples were collected. Six of the results were greater than the 3s uncertainty. The concentrations were consistent with those reported across the region by the Environmental Protection Agency and with previous results.
Milk	Liquid	Iodine-131, other gamma-emitting radionuclides	No Iodine-131 or other human-made gamma emitting radionuclides were detected.

Lettuce	Vegetation	Gamma-emitting radionuclides, ^{90}Sr	No human-made gamma-emitting radionuclides were found in the nine samples analyzed. Strontium-90 was above the minimum detectable concentration in most of the locally-grown samples and a store-bought sample at levels consistent with fallout from weapons testing.
Grain	Vegetation	Gamma-emitting radionuclides, ^{90}Sr	No human-made gamma-emitting radionuclides were found in any of the ten samples collected. Strontium-90 was detected in one sample at a low concentration consistent with historical samples.
Large Game Animals	Tissue	Gamma-emitting radionuclides	No human-made gamma-emitting radionuclides were found in the muscle tissues of two game animals sampled in the third quarter.

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
GSS	Gonzales Stoller Surveillance, LLC
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

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 2015, environmental monitoring within the INL Site boundaries was primarily the responsibility of the INL and Idaho Cleanup Project (ICP) contractors, while monitoring outside the INL Site boundaries was conducted under the Environmental Surveillance, Education, and Research (ESER) Program. At the beginning of the first quarter of 2011, the ESER Program became led by a new partnership between S.M. Stoller and Jerome Gonzales Management Systems, Inc. with the support of the previous team members. This partnership is named Gonzales Stoller Surveillance, LLC (GSS).The ESER Program was led by GSS in cooperation with its team members, including the University of Idaho, Idaho State University (ISU), and ALS Environmental.

This report contains monitoring results from the ESER Program for samples collected during the third quarter of 2015 (July 1-September 30, 2015).

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 three 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
- 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 ALS Environmental of Fort Collins, Colorado.

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 2015). 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% 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%. A result that is greater than three times the total uncertainty of the measurement represents a statistically positive detection with over 99% 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%. 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 GSS at (208) 525-8250, or visit the Program's web page (http://www.gsseser.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. The history of the INL Site began during World War II when the U.S. Naval Ordnance Station was located in Pocatello, Idaho. This station, one of two such installations in the U.S., retooled large guns from U.S. Navy warships. The retooled guns were tested on the nearby, uninhabited plain, known as the Naval Proving Ground. In the years following the war, as the nation worked to develop nuclear power, the Atomic Energy Commission (AEC), predecessor to the DOE, became interested in the Naval Proving Ground and made plans for a facility to build, test, and perfect nuclear power reactors.

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

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 2015 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 2015 (Figure 2). Four of these samplers are located on the INL Site, seven are situated off the INL Site near the boundary, and seven 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 2014, one replicate sampler was moved to Idaho Falls (a Distant location) and one was moved to Main Gate (an INL Site location). An average of 20,346 ft^3 (576 m^3) of air was sampled at each location, each week, at an average flow rate of 2.02 ft^3/min (0.06 m^3/min). Particulates in air were collected on membrane particulate filters (1.2-µm pore size). Gases passing through the filter were collected with an activated charcoal cartridge.

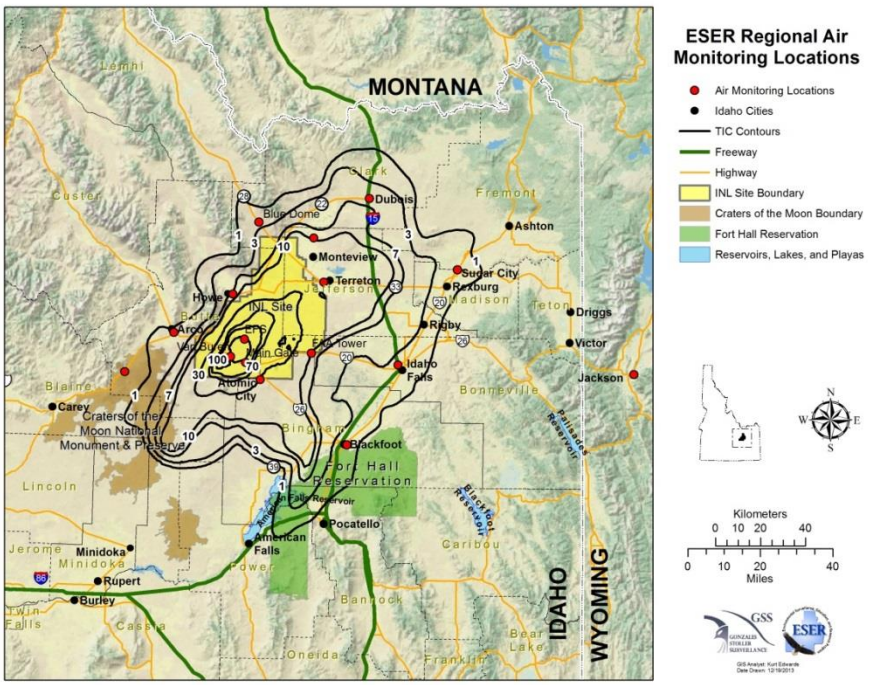

Figure 2. Low-volume air sampler locations.

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. The p-value for each comparison is shown in Table D-1. For the quarter, there was no statistical difference noted in the data, as the p-value was above 0.05.

Comparisons of gross alpha concentrations were made for each month of the quarter. Again the Kruskal-Wallis test of multiple independent groups was used to determine if statistical differences exist between INL Site, Boundary, and Distant data groups. A statistical difference in gross alpha concentrations between groups was noted during July (Table D-1). However, during this month the Distant locations showed the highest concentrations and the INL Site locations showed the lowest overall concentrations. This is the opposite of what would be expected if the data were showing an INL Site impact instead of random variations.

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 was one week, the week of July 15, where a statistical difference existed between the two sample groups during the third quarter (Table D-2). As with the monthly data, the Distant stations were higher than Boundary stations during this week and were tightly clustered.

Gross beta results are presented in Table C-1 and displayed in Figures 7 through 10. The data are tested quarterly and generally are found to be neither normally nor log-normally distributed. Box and whiskers plots were used for presentation of the data. Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of measurements made in the past five years, 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 using the Kruskal-Wallis test (Table D-1).

Comparison of weekly Boundary and Distant gross beta data sets, using the Mann Whitney U test, showed statistical differences between Boundary and Distant measurements during two weeks of the quarter (Table D-1). These were the weeks of July 15 and September 23. In both cases, the Distant group was higher than the Boundary group. The July 15 distribution was similar to that found in the gross alpha concentrations with a relatively low value

at Blue Dome and Main Gate, and a tightly clustered grouping among the Distant stations. On September 23, the distribution looks fairly random with the highest values found at Idaho Falls, Blackfoot, and Jackson.

Iodine-131 was not detected in any of the 28 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. Plutonium-238 and Americium-241 were not found either. Strontium-90 was detected on three composites. Similar concentrations were found at the INL Site location EFS, the Boundary location of Mud Lake, and the Distant location of Dubois. All of the detected levels were below 0.0001 percent of the Derived Concentration Standard.

Plutonium-239/240 was initially reported in all of the composites analyzed, including the blank. After reviewing the spectrum, the laboratory concluded there was interference from naturally-occurring Polonium-210 in the region of interest for Plutonium-239/240. The laboratory was unable to remove the effects of the interference. The set of results for Plutonium-239/240 was invalidated for this reason. Po-210 is a daughter of U-238 and is a component of wood smoke. There were two weeks in the third quarter with considerable smoke from fires outside of the area, However, there were also low concentrations measured on the blank sample. Remaining samples collected during the third quarter have been sent to the radiochemistry laboratory for analysis with instructions to chemically remove any Po-210. Results will be reported in the fourth quarter report.

All quarterly composite results are found in Appendix C, Table C-3.

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 22 atmospheric moisture samples collected during the third quarter of 2015. Seventeen of the 22 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 14.3×10^{-13} $\mu Ci/mL_{air}$ at Sugar City. Results are shown in Table C-4, Appendix C.

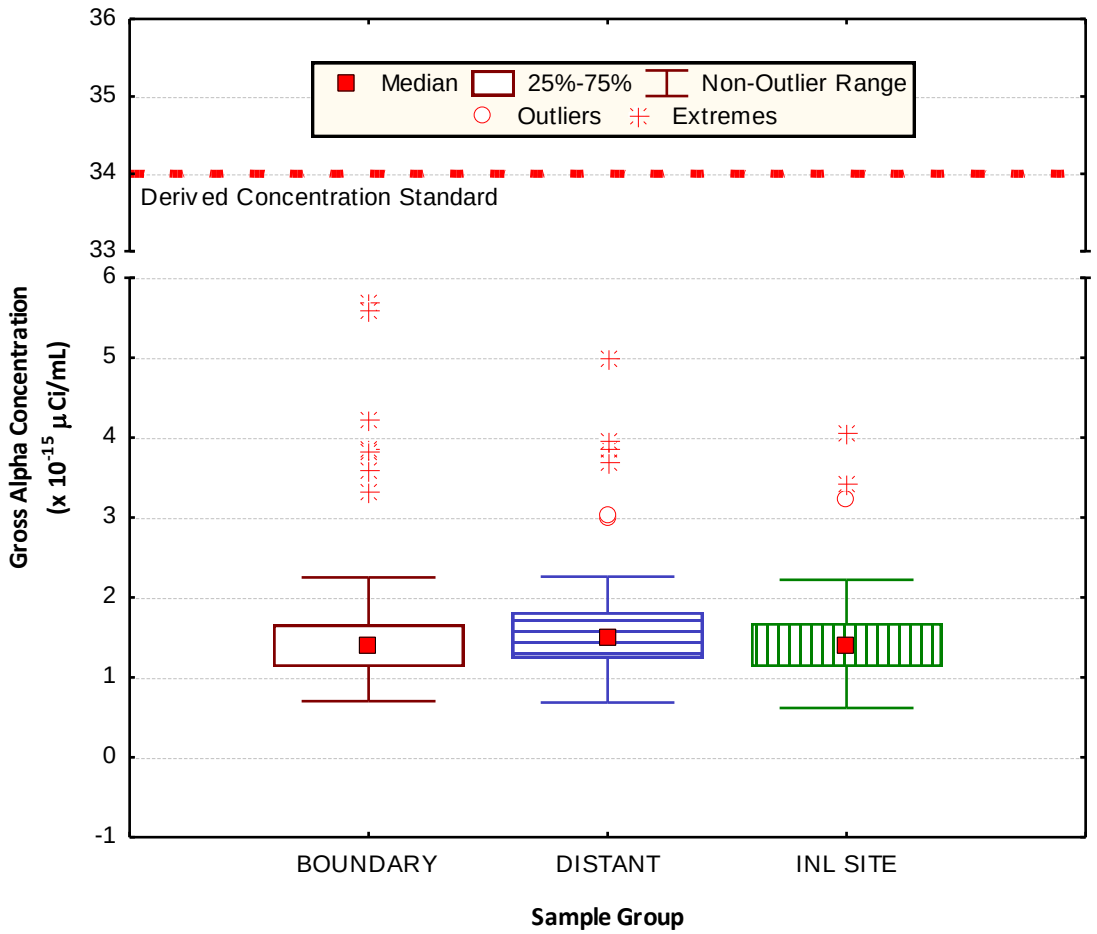

Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations for the third quarter of 2015.

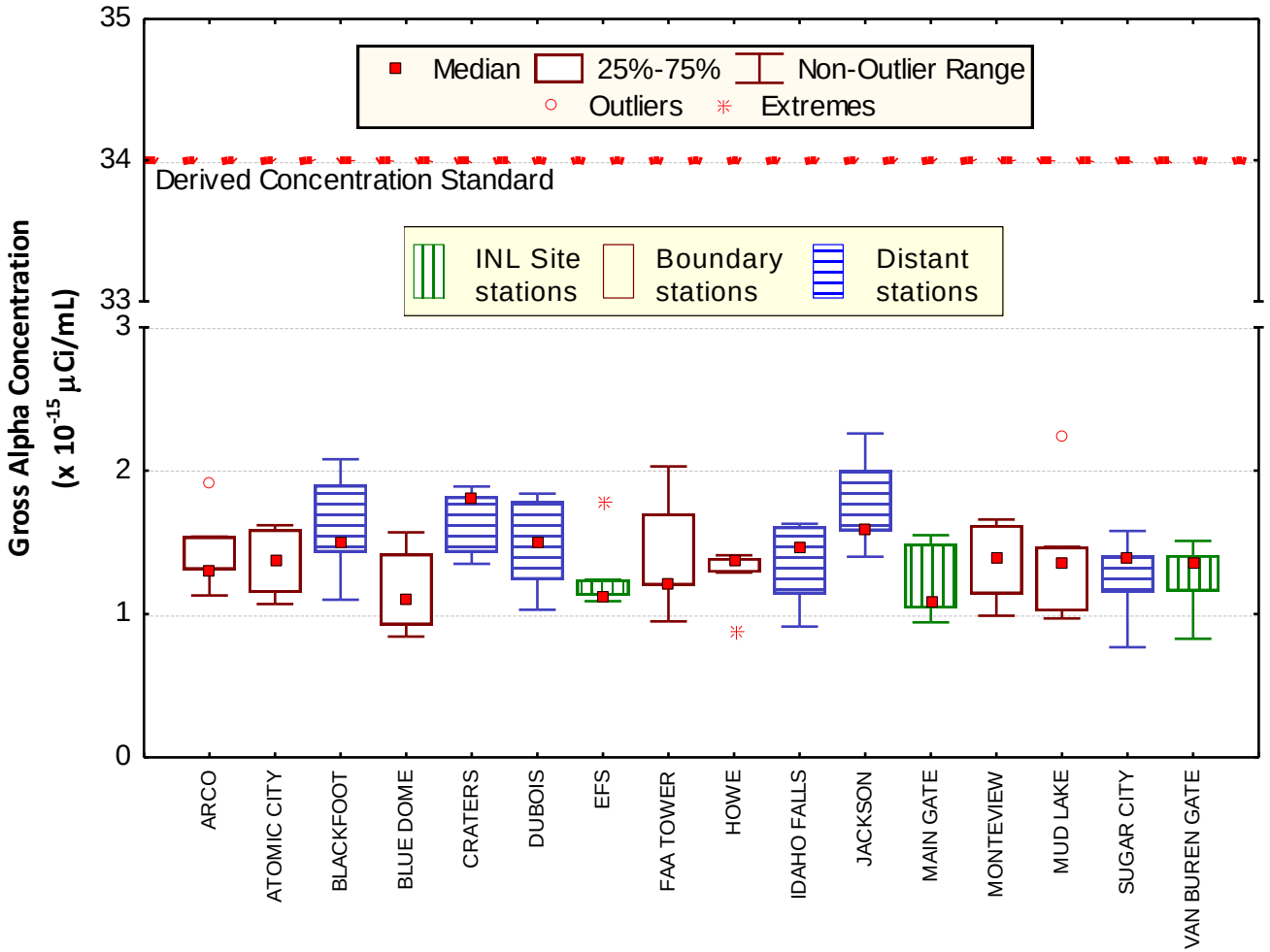

Figure 4. July gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.

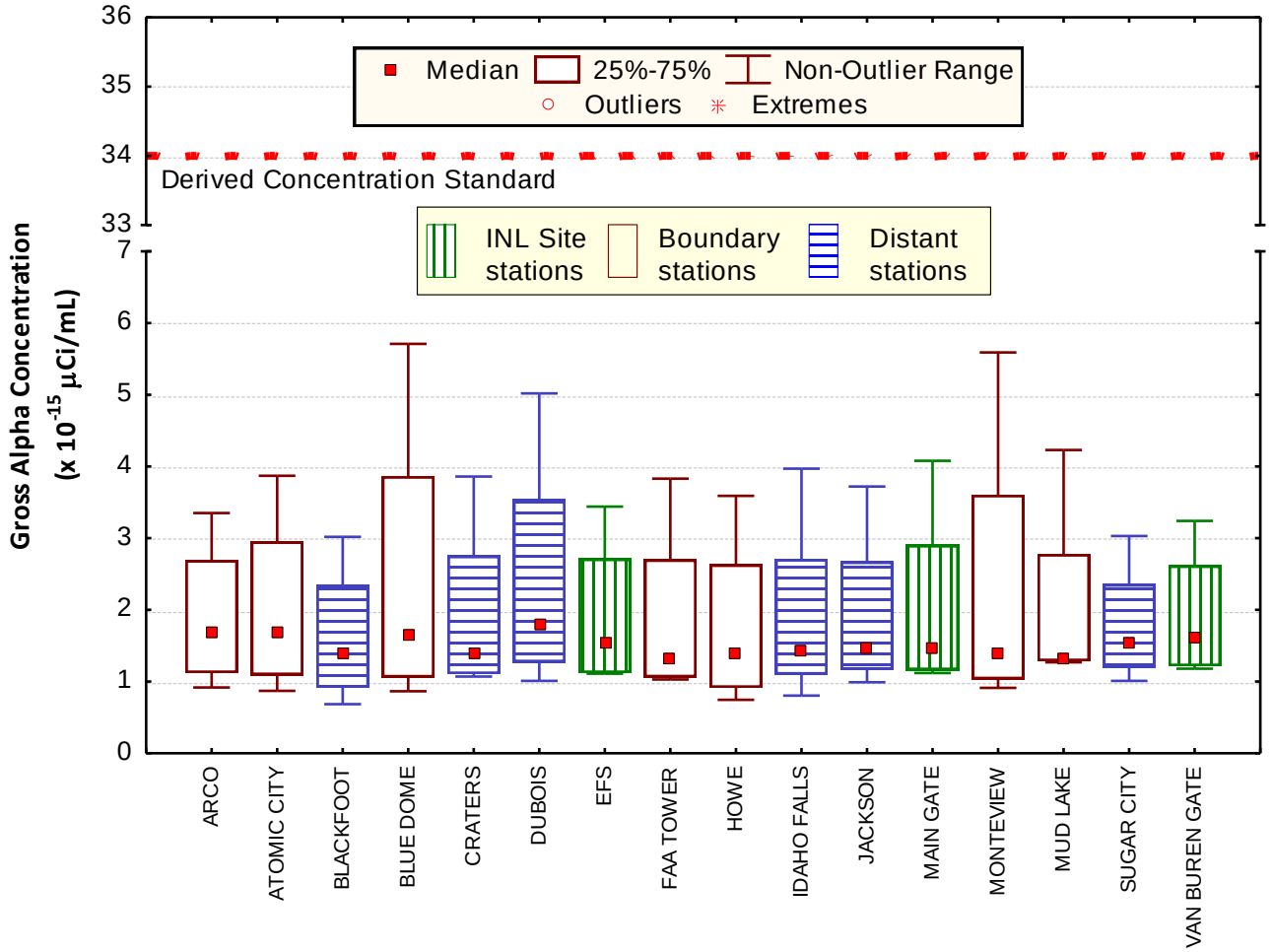

Figure 5. August gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

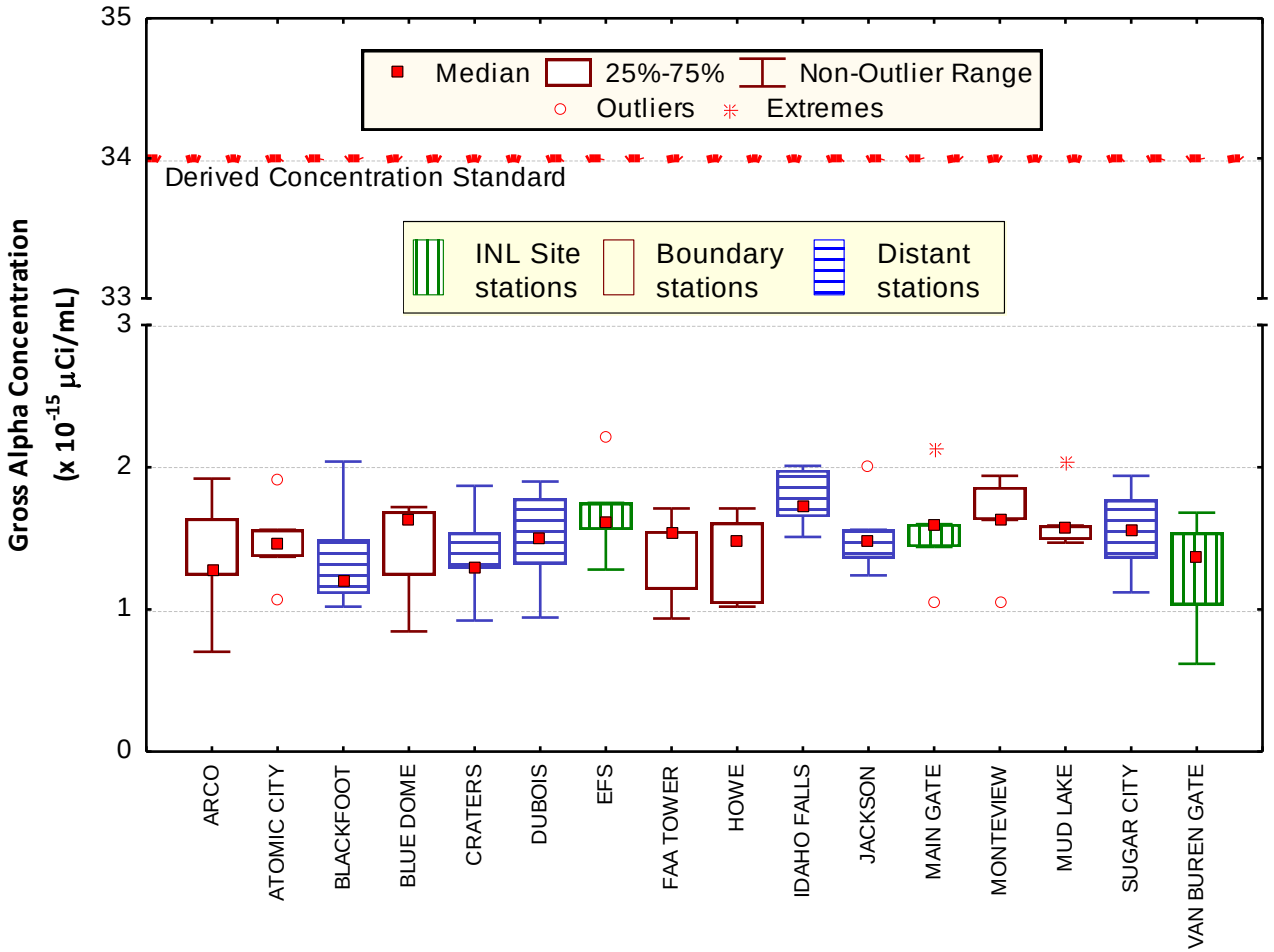

Figure 6. September gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.

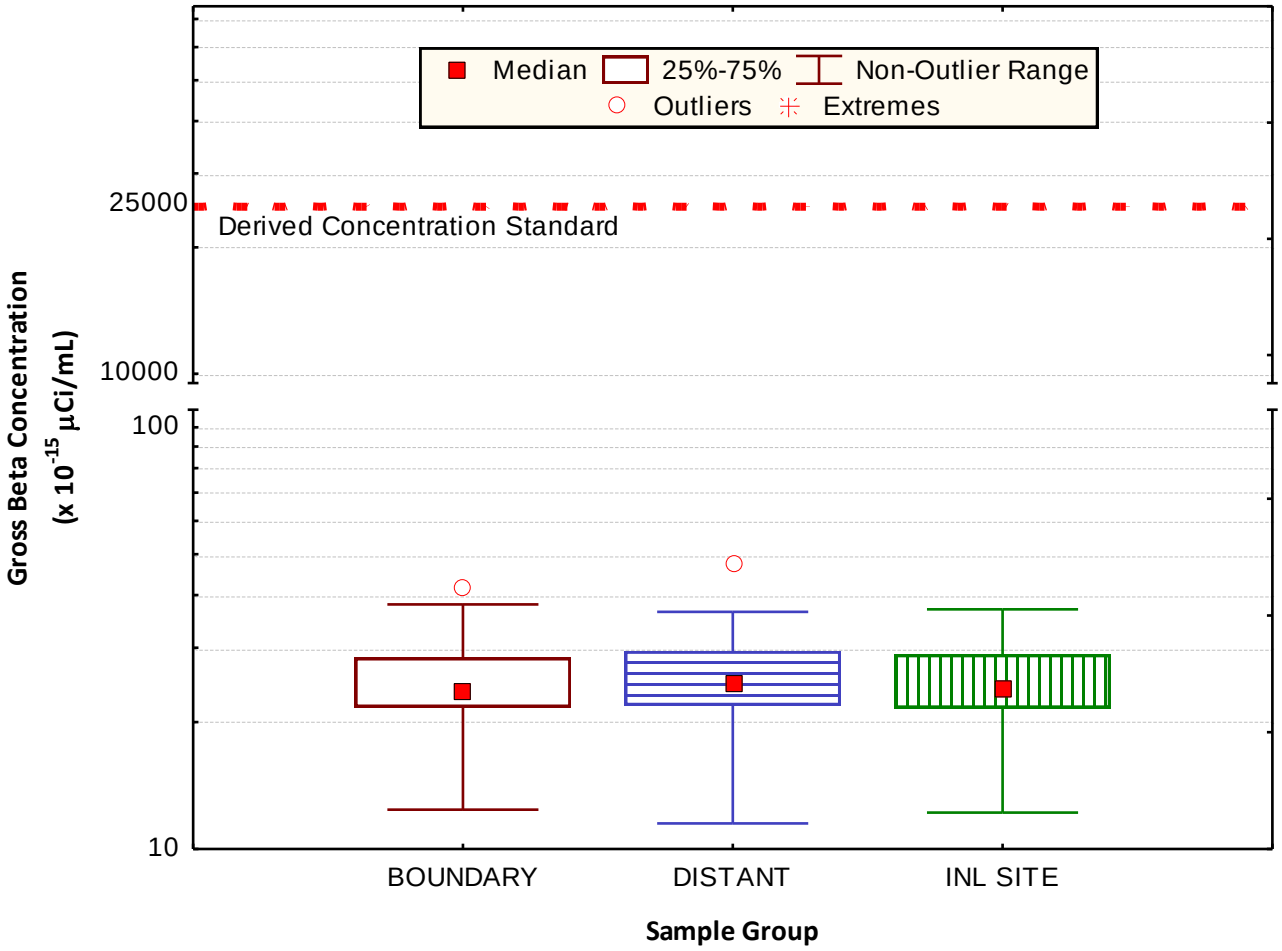

Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the third quarter of 2015.

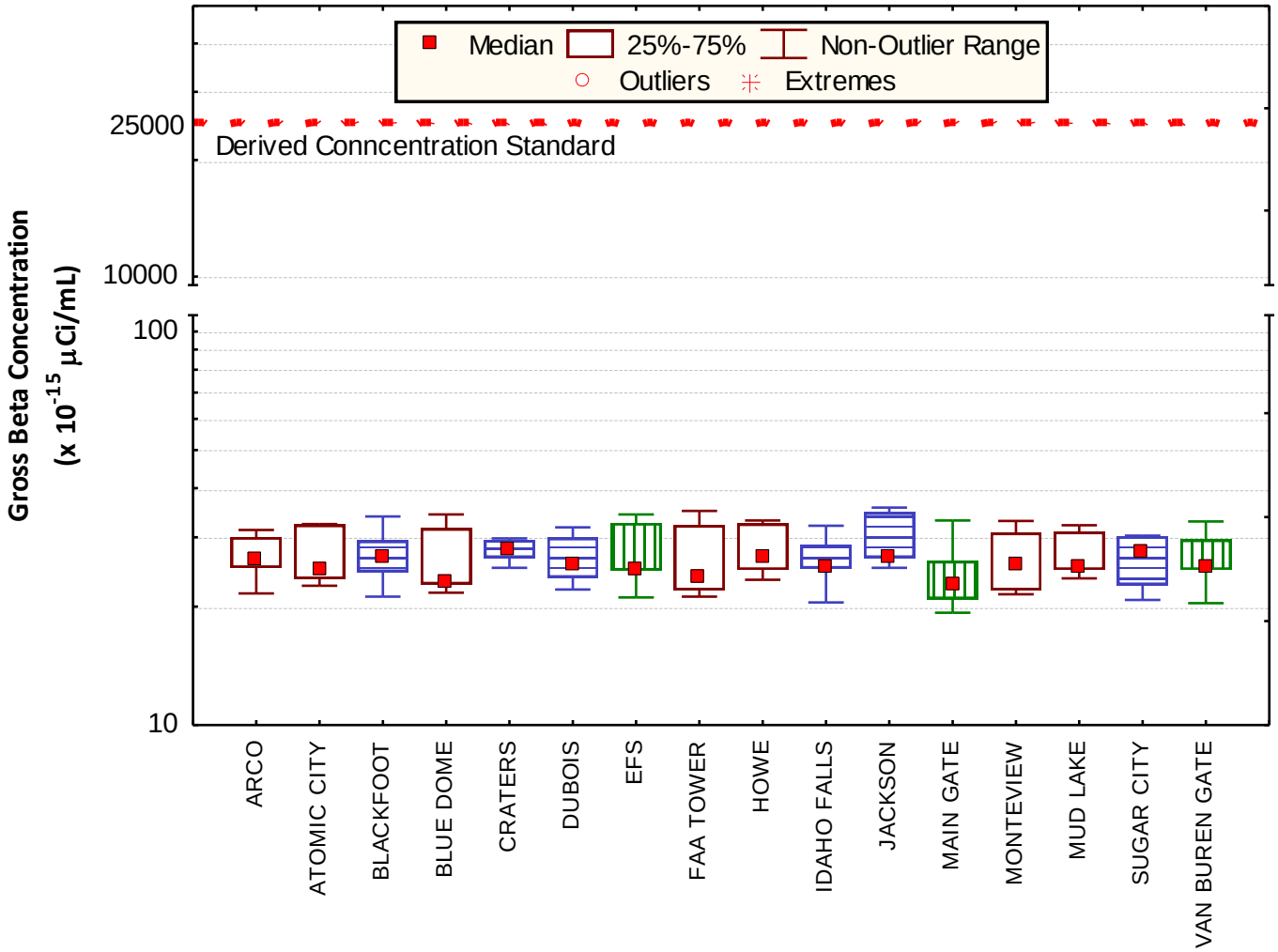

Figure 8. July gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.

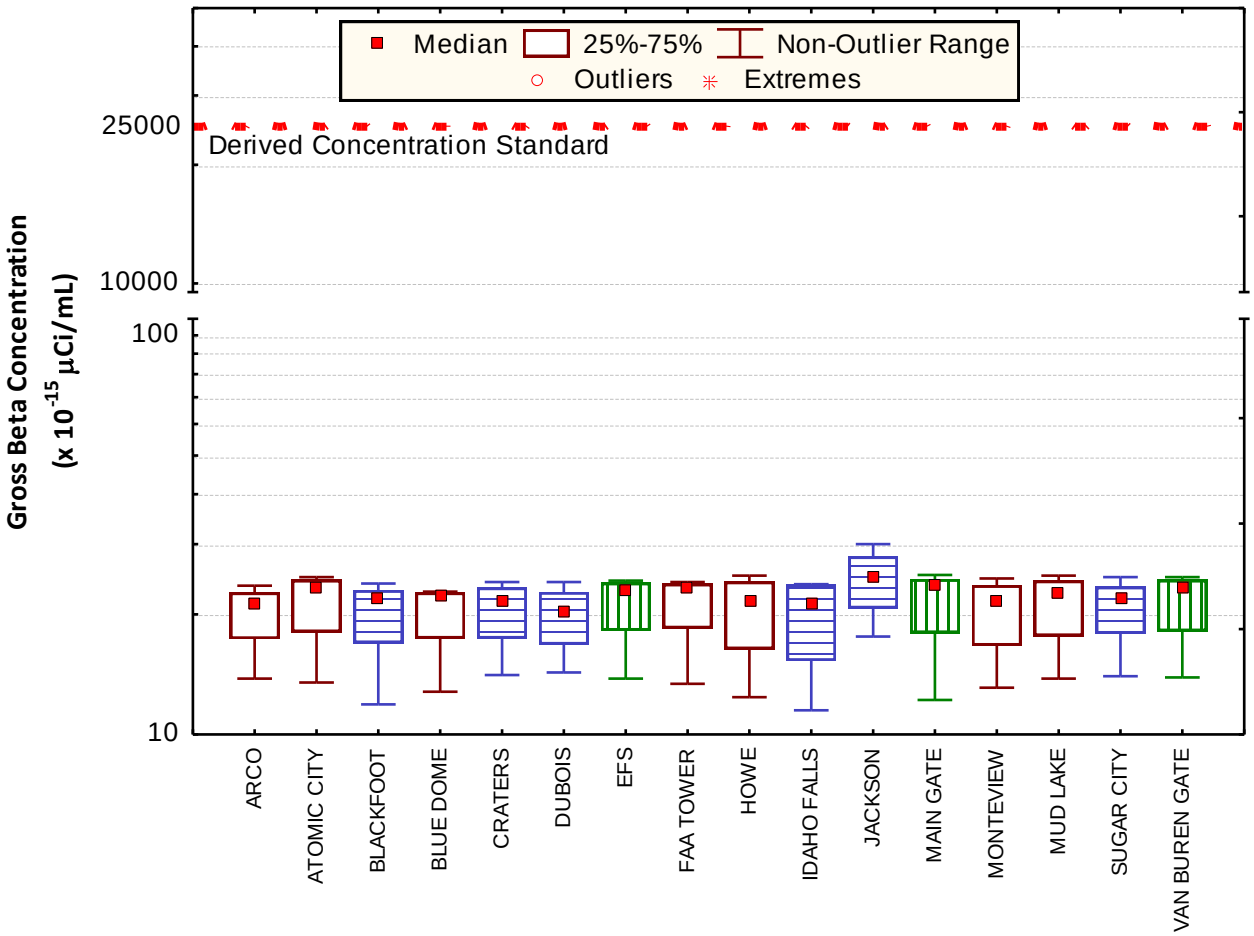

Figure 9. August gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

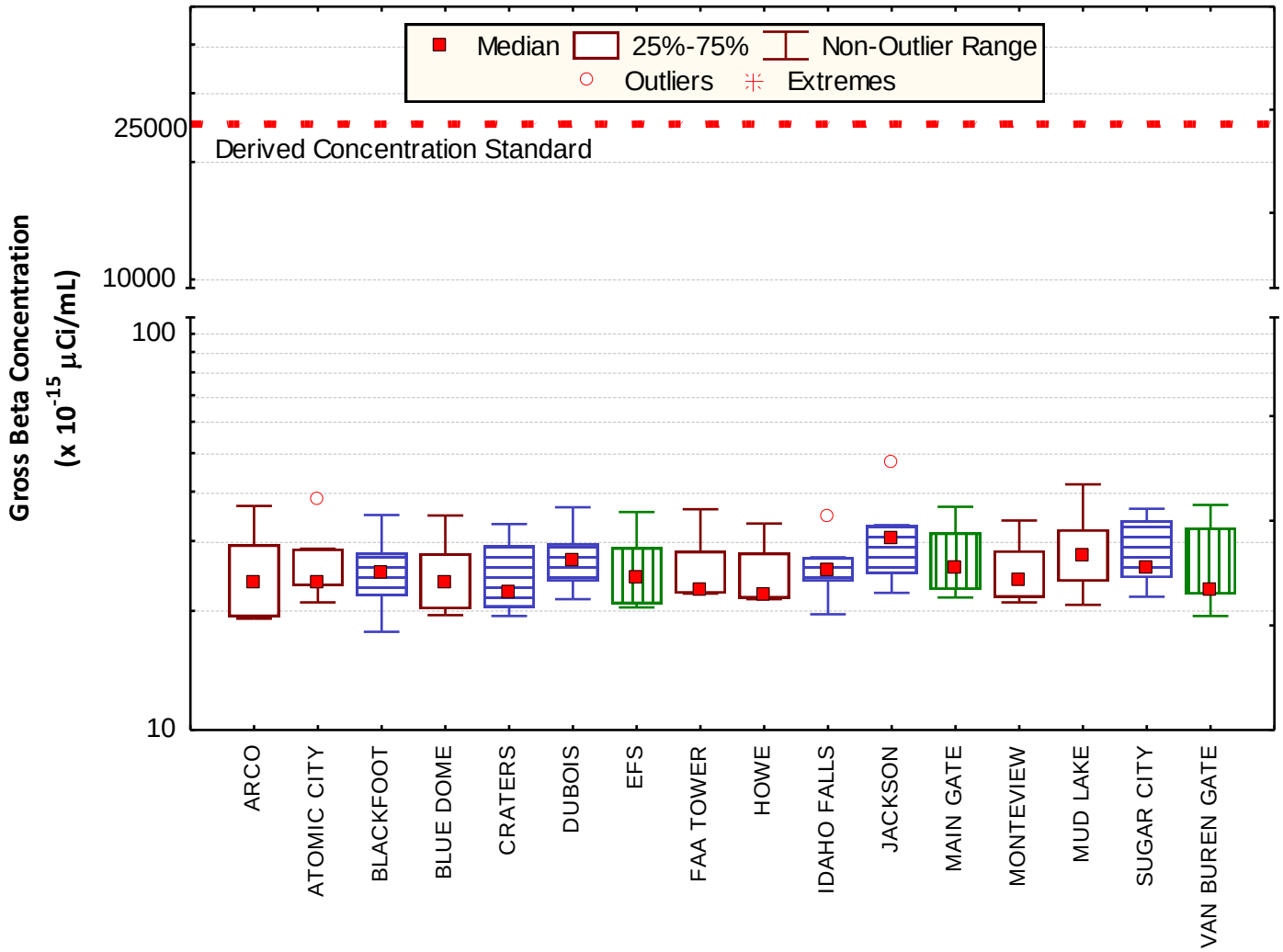

Figure 10. September gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.

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 CFA, and weekly from the EFS. Precipitation samples are analyzed for tritium. Storm events in the third quarter of 2015 produced sufficient precipitation to yield 12 samples.

Tritium was measured above the 3s values in half (6) of the 12 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 2015). 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 192 pCi/L in a July EFS sample.

5. AGRICULTURAL PRODUCT, WILDLIFE, AND SOIL SAMPLING

Another potential pathway for contaminants to reach humans is through the food chain. The ESER Program samples multiple agricultural products and game animals from around the INL Site and Southeast Idaho. Specifically, milk, alfalfa, grain, potatoes, lettuce, large game animals, and waterfowl are sampled. Milk is sampled throughout the year and large game animals are sampled whenever large game animals are killed onsite from vehicle collisions. Alfalfa is collected during the second quarter, lettuce and grain are sampled during the third quarter, while potatoes are collected during the fourth quarter. Waterfowl are collected in either the third or fourth quarter. See Table A-1, Appendix A, for more details on agricultural product and wildlife sampling. This section discusses results from milk and agricultural products samples available during the third quarter of 2015.

MILK SAMPLING

Milk samples were collected weekly in Idaho Falls. Monthly samples were collected at six other locations around the INL Site (Figure 11) during the third quarter of 2015. In addition, 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-6.

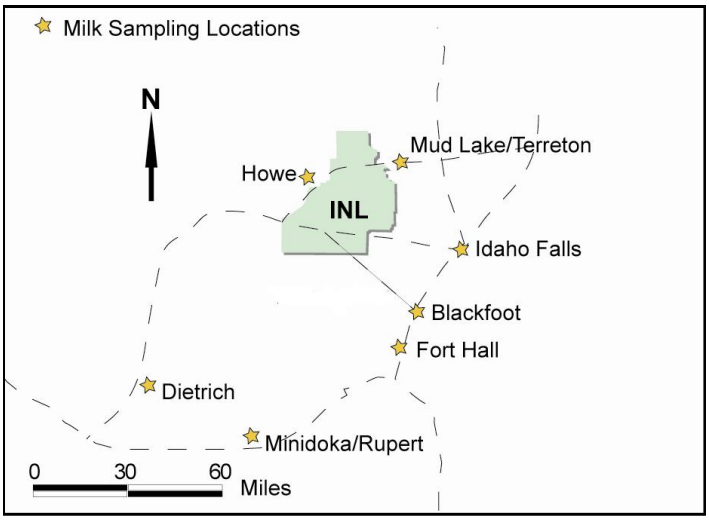

Figure 11. ESER milk sampling locations

LETTUCE SAMPLING

Lettuce sampling was completed during the third quarter. A total of nine samples were collected, including a commercially-available sample from a grocery store. No human-made gamma-emitting radionuclides were found in any of the samples. Strontium-90 was detected in eight of the samples analyzed, including the grocery store sample. 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. The sample from FAA Tower (located at the eastern boundary of the INL Site) had a ^{90}Sr concentration that was near the upper range of those seen during the past several years. This

sample was grown in a portable lettuce sampler using soil from the vicinity of the sampling location with no added potting soil (i.e., native soil). Gardeners in the region typically amend the native soil with additives such as peat moss, manure, potting soil, etc. Other portable lettuce samplers had amended soil in them. We will investigate the potential impacts of using all native versus amended soils further in 2016. Data for ^{137}Cs and ^{90}Sr in all lettuce samples taken during the third quarter are listed in Appendix C, Table C-7. During the summer of 2020, a review of Appendix C, Table C-7 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 2015. A total of nine grain samples (including one duplicate) were collected from local grain growers. 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. Strontium-90 was detected in one sample (barley from Roberts) at just above the minimum detectable concentration. As discussed in the lettuce results section, ^{90}Sr exists in the environment (specifically soil) from nuclear weapons testing fallout. This radionuclide is only occasionally detected in grain samples, however, whereas it is frequently found in lettuce. This is because grains are less efficient at removing radionuclides from the soil than leafy vegetables such as lettuce. Data for ^{137}Cs and ^{90}Sr in all grain samples taken during the third quarter are listed in Appendix C, Table C-8.

LARGE GAME ANIMAL SAMPLING

Muscle samples were taken from two game animals during the third quarter. One was a mule deer and the other was an elk. No human-made gamma-emitting radionuclides were detected in either of the samples. Data for ^{137}Cs and ^{131}I in game samples are listed in Appendix C, Table C-9.

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 (GSS 2012). 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 2015 (GSS 2016).

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	Blackfoot, Idaho Falls, Sugar City	Atomic City	None
PRECIPITATION				
Tritium	monthly	Idaho Falls	None	CFA
Tritium	weekly	None	None	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, Crystal Ice Caves (Aberdeen), 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	None	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	Blackfoot, Idaho Falls, Rupert, Shelley, Hamer, occasional samples across the U.S.	Arco, Monteview, Mud Lake, Terreton	None
ALFALFA				
Gamma Spec, ^{90}Sr	annually	None	Mud Lake	None
GRAIN				
Gamma Spec, ^{90}Sr	annually	American Falls, Blackfoot, Carey, Idaho Falls, Minidoka, Roberts	Arco, Monteview, Mud Lake, Taber, Terreton	None
LETTUCE				
Gamma Spec, ^{90}Sr	annually	Blackfoot, Carey, Idaho Falls, Sugar City	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 2015

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Standard[b] (DCS)
Air (particulate filter)[e]	Gross alpha[c]	3.87×10^{-16} µCi/mL	3.4×10^{-14} µCi/mL
	Gross beta[d]	9.21×10^{-16} µCi/mL	2.5×10^{-11} µCi/mL
	^{137}Cs	5.84×10^{-17} µCi/mL	3.9×10^{-10} µCi/mL
	^{90}Sr	1.55×10^{-17} µCi/mL	2.5×10^{-11} µCi/mL
	^{238}Pu	4.22×10^{-18} µCi/mL	3.7×10^{-14} µCi/mL
	$^{239/240}$Pu	3.29×10^{-18} µCi/mL	3.4×10^{-14} µCi/mL
	^{241}Am	4.50×10^{-18} µCi/mL	1.8×10^{-12} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	3.09×10^{-16} µCi/mL	2.3×10^{-19} µCi/mL
Air (atmospheric moisture)	^{3}H	76.9 pCi/L_{water}	2.1×10^{-7} $\mu Ci/mL_{air}$
Air (precipitation)	^{3}H	76.7 pCi/L	1.9×10^{-3} µCi/mL
Milk	^{131}I	0.55 pCi/L	--
	^{137}Cs	0.85 pCi/L	--
Lettuce	^{137}Cs	74.8 pCi/kg	--
	^{90}Sr	8.87 pCi/kg	--
Wheat	^{137}Cs	15.7 pCi/kg	--
	^{90}Sr	6.82 PcI/KG	--
Muscle Tissue	^{137}Cs	2.71 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 ($\times 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
BOUNDARY							
ARCO	7/1/2015	1.31 ± 0.19	4.85 ± 0.68	Yes	31.30 ± 0.69	115.81 ± 2.55	Yes
	7/8/2015	1.92 ± 0.21	7.10 ± 0.76	Yes	30.00 ± 0.67	111.00 ± 2.49	Yes
	7/15/2015	1.54 ± 0.19	5.70 ± 0.69	Yes	25.10 ± 0.62	92.87 ± 2.29	Yes
	7/22/2015	1.31 ± 0.18	4.85 ± 0.66	Yes	26.30 ± 0.63	97.31 ± 2.33	Yes
	7/29/2015	1.13 ± 0.16	4.18 ± 0.60	Yes	21.60 ± 0.58	79.92 ± 2.13	Yes
	8/5/2015	0.92 ± 0.21	3.40 ± 0.76	Yes	21.80 ± 0.59	80.66 ± 2.17	Yes
	8/12/2015	1.32 ± 0.18	4.88 ± 0.68	Yes	20.90 ± 0.59	77.33 ± 2.19	Yes
	8/19/2015	2.04 ± 0.20	7.55 ± 0.73	Yes	13.80 ± 0.44	51.06 ± 1.61	Yes
	8/26/2015	3.35 ± 0.30	12.40 ± 1.11	Yes	23.60 ± 0.73	87.32 ± 2.68	Yes
	9/2/2015	1.24 ± 0.17	4.59 ± 0.63	Yes	23.50 ± 0.59	86.95 ± 2.17	Yes
	9/9/2015	1.28 ± 0.16	4.74 ± 0.60	Yes	19.30 ± 0.54	71.41 ± 1.99	Yes
	9/16/2015	1.92 ± 0.20	7.10 ± 0.72	Yes	29.40 ± 0.65	108.78 ± 2.39	Yes
	9/23/2015	0.70 ± 0.13	2.60 ± 0.50	Yes	19.10 ± 0.53	70.67 ± 1.95	Yes
	9/30/2015	1.64 ± 0.18	6.07 ± 0.68	Yes	36.80 ± 0.70	136.16 ± 2.58	Yes
ATOMIC CITY	7/1/2015	1.59 ± 0.20	5.88 ± 0.72	Yes	32.40 ± 0.69	119.88 ± 2.56	Yes
	7/8/2015	1.62 ± 0.19	5.99 ± 0.72	Yes	32.30 ± 0.69	119.51 ± 2.56	Yes
	7/15/2015	1.15 ± 0.17	4.26 ± 0.63	Yes	24.80 ± 0.62	91.76 ± 2.31	Yes
	7/22/2015	1.07 ± 0.17	3.96 ± 0.61	Yes	22.60 ± 0.59	83.62 ± 2.19	Yes
	7/29/2015	1.38 ± 0.18	5.11 ± 0.65	Yes	23.50 ± 0.60	86.95 ± 2.21	Yes
	8/5/2015	0.87 ± 0.20	3.22 ± 0.75	Yes	24.00 ± 0.60	88.80 ± 2.23	Yes
	8/12/2015	1.31 ± 0.18	4.85 ± 0.66	Yes	24.80 ± 0.62	91.76 ± 2.28	Yes
	8/19/2015	2.04 ± 0.20	7.55 ± 0.74	Yes	13.50 ± 0.44	49.95 ± 1.62	Yes
	8/26/2015	3.87 ± 0.32	14.32 ± 1.17	Yes	22.60 ± 0.71	83.62 ± 2.64	Yes
	9/2/2015	1.46 ± 0.18	5.40 ± 0.67	Yes	23.40 ± 0.60	86.58 ± 2.22	Yes
	9/9/2015	1.37 ± 0.17	5.07 ± 0.61	Yes	21.00 ± 0.56	77.70 ± 2.05	Yes
	9/16/2015	1.92 ± 0.20	7.10 ± 0.73	Yes	28.70 ± 0.65	106.19 ± 2.40	Yes
	9/23/2015	1.08 ± 0.16	4.00 ± 0.58	Yes	23.10 ± 0.58	85.47 ± 2.13	Yes
	9/30/2015	1.56 ± 0.19	5.77 ± 0.69	Yes	38.00 ± 0.73	140.60 ± 2.69	Yes
BLUE DOME	7/1/2015	1.42 ± 0.21	5.25 ± 0.79	Yes	34.30 ± 0.79	126.91 ± 2.93	Yes
	7/8/2015	1.57 ± 0.19	5.81 ± 0.71	Yes	31.60 ± 0.69	116.92 ± 2.54	Yes
	7/15/2015	0.84 ± 0.15	3.12 ± 0.57	Yes	21.70 ± 0.59	80.29 ± 2.16	Yes
	7/22/2015	1.10 ± 0.17	4.07 ± 0.62	Yes	22.80 ± 0.59	84.36 ± 2.19	Yes
	7/29/2015	0.92 ± 0.15	3.42 ± 0.57	Yes	23.10 ± 0.59	85.47 ± 2.19	Yes
	8/5/2015	0.87 ± 0.21	3.20 ± 0.76	Yes	22.80 ± 0.60	84.36 ± 2.21	Yes
	8/12/2015	1.25 ± 0.18	4.63 ± 0.65	Yes	22.60 ± 0.60	83.62 ± 2.22	Yes
	8/19/2015	2.02 ± 0.20	7.47 ± 0.75	Yes	12.80 ± 0.44	47.36 ± 1.63	Yes
	8/26/2015	5.71 ± 0.41	21.13 ± 1.51	Yes	22.00 ± 0.79	81.40 ± 2.93	Yes
	9/2/2015	1.69 ± 0.21	6.25 ± 0.78	Yes	23.40 ± 0.66	86.58 ± 2.42	Yes
	9/9/2015	1.24 ± 0.15	4.59 ± 0.57	Yes	19.50 ± 0.52	72.15 ± 1.91	Yes
	9/16/2015	1.72 ± 0.19	6.36 ± 0.69	Yes	27.90 ± 0.63	103.23 ± 2.33	Yes
	9/23/2015	0.85 ± 0.14	3.13 ± 0.53	Yes	20.20 ± 0.55	74.74 ± 2.02	Yes
	9/30/2015	1.63 ± 0.18	6.03 ± 0.68	Yes	34.80 ± 0.69	128.76 ± 2.54	Yes
FAA TOWER	7/1/2015	2.03 ± 0.23	7.51 ± 0.83	Yes	35.00 ± 0.75	129.50 ± 2.79	Yes
	7/8/2015	1.70 ± 0.20	6.29 ± 0.75	Yes	32.20 ± 0.71	119.14 ± 2.62	Yes
	7/15/2015	1.22 ± 0.18	4.51 ± 0.67	Yes	23.90 ± 0.63	88.43 ± 2.33	Yes
	7/22/2015	1.20 ± 0.18	4.44 ± 0.67	Yes	22.00 ± 0.61	81.40 ± 2.26	Yes
	7/29/2015	0.95 ± 0.16	3.51 ± 0.58	Yes	21.20 ± 0.59	78.44 ± 2.18	Yes
	8/5/2015	1.03 ± 0.22	3.81 ± 0.80	Yes	23.60 ± 0.62	87.32 ± 2.29	Yes
	8/12/2015	1.09 ± 0.17	4.03 ± 0.64	Yes	23.50 ± 0.61	86.95 ± 2.27	Yes
	8/19/2015	1.58 ± 0.18	5.85 ± 0.66	Yes	13.40 ± 0.43	49.58 ± 1.59	Yes
	8/26/2015	3.83 ± 0.31	14.17 ± 1.14	Yes	24.10 ± 0.72	89.17 ± 2.65	Yes
	9/2/2015	1.14 ± 0.16	4.22 ± 0.61	Yes	22.10 ± 0.57	81.77 ± 2.12	Yes
	9/9/2015	1.55 ± 0.18	5.74 ± 0.67	Yes	22.10 ± 0.59	81.77 ± 2.18	Yes

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
	9/16/2015	1.71 ± 0.19	6.33 ± 0.69	Yes	28.30 ± 0.63	104.71 ± 2.34	Yes
	9/23/2015	0.94 ± 0.16	3.46 ± 0.58	Yes	22.50 ± 0.59	83.25 ± 2.19	Yes
	9/30/2015	1.53 ± 0.18	5.66 ± 0.66	Yes	36.10 ± 0.69	133.57 ± 2.55	Yes
HOWE	7/1/2015	1.41 ± 0.19	5.22 ± 0.71	Yes	32.50 ± 0.71	120.25 ± 2.61	Yes
	7/8/2015	1.37 ± 0.18	5.07 ± 0.67	Yes	33.10 ± 0.69	122.47 ± 2.56	Yes
	7/15/2015	1.39 ± 0.18	5.14 ± 0.68	Yes	26.60 ± 0.64	98.42 ± 2.37	Yes
	7/22/2015	0.89 ± 0.16	3.29 ± 0.58	Yes	24.80 ± 0.60	91.76 ± 2.23	Yes
	7/29/2015	1.29 ± 0.17	4.77 ± 0.63	Yes	23.40 ± 0.59	86.58 ± 2.19	Yes
	8/5/2015	0.75 ± 0.19	2.76 ± 0.69	Yes	20.30 ± 0.55	75.11 ± 2.02	Yes
	8/12/2015	1.08 ± 0.17	4.00 ± 0.61	Yes	25.00 ± 0.61	92.50 ± 2.25	Yes
	8/19/2015	1.68 ± 0.18	6.22 ± 0.67	Yes	12.40 ± 0.42	45.88 ± 1.54	Yes
	8/26/2015	3.59 ± 0.29	13.28 ± 1.06	Yes	23.30 ± 0.67	86.21 ± 2.49	Yes
	9/2/2015	1.04 ± 0.16	3.85 ± 0.57	Yes	21.90 ± 0.56	81.03 ± 2.06	Yes
	9/9/2015	1.71 ± 0.18	6.33 ± 0.67	Yes	21.40 ± 0.56	79.18 ± 2.07	Yes
	9/16/2015	1.49 ± 0.18	5.51 ± 0.66	Yes	28.00 ± 0.63	103.60 ± 2.33	Yes
	9/23/2015	1.02 ± 0.16	3.77 ± 0.60	Yes	21.50 ± 0.59	79.55 ± 2.19	Yes
	9/30/2015	1.61 ± 0.18	5.96 ± 0.67	Yes	33.20 ± 0.67	122.84 ± 2.47	Yes
MONTEVIEW	7/1/2015	1.62 ± 0.21	5.99 ± 0.76	Yes	33.00 ± 0.73	122.10 ± 2.69	Yes
	7/8/2015	1.66 ± 0.19	6.14 ± 0.70	Yes	30.80 ± 0.66	113.96 ± 2.44	Yes
	7/15/2015	1.39 ± 0.18	5.14 ± 0.66	Yes	25.50 ± 0.62	94.35 ± 2.28	Yes
	7/22/2015	1.14 ± 0.16	4.22 ± 0.60	Yes	22.00 ± 0.56	81.40 ± 2.08	Yes
	7/29/2015	0.99 ± 0.15	3.66 ± 0.56	Yes	21.50 ± 0.56	79.55 ± 2.08	Yes
	8/5/2015	0.91 ± 0.20	3.38 ± 0.73	Yes	20.30 ± 0.55	75.11 ± 2.05	Yes
	8/12/2015	1.15 ± 0.17	4.26 ± 0.61	Yes	22.70 ± 0.58	83.99 ± 2.13	Yes
	8/19/2015	1.62 ± 0.18	5.99 ± 0.67	Yes	13.10 ± 0.43	48.47 ± 1.58	Yes
	8/26/2015	5.59 ± 0.48	20.68 ± 1.79	Yes	24.60 ± 1.00	91.02 ± 3.70	Yes
	9/2/2015	1.63 ± 0.18	6.03 ± 0.68	Yes	23.90 ± 0.59	88.43 ± 2.16	Yes
	9/9/2015	1.63 ± 0.19	6.03 ± 0.69	Yes	21.00 ± 0.59	77.70 ± 2.17	Yes
	9/16/2015	1.86 ± 0.20	6.88 ± 0.74	Yes	28.40 ± 0.66	105.08 ± 2.43	Yes
	9/23/2015	1.06 ± 0.17	3.92 ± 0.61	Yes	21.60 ± 0.60	79.92 ± 2.21	Yes
	9/30/2015	1.94 ± 0.20	7.18 ± 0.72	Yes	33.80 ± 0.68	125.06 ± 2.50	Yes
MUD LAKE	7/1/2015	2.25 ± 0.22	8.33 ± 0.83	Yes	32.20 ± 0.70	119.14 ± 2.59	Yes
	7/8/2015	1.47 ± 0.19	5.44 ± 0.70	Yes	31.00 ± 0.69	114.70 ± 2.56	Yes
	7/15/2015	1.02 ± 0.17	3.77 ± 0.61	Yes	25.20 ± 0.62	93.24 ± 2.31	Yes
	7/22/2015	0.97 ± 0.16	3.59 ± 0.61	Yes	24.80 ± 0.62	91.76 ± 2.29	Yes
	7/29/2015	1.35 ± 0.19	5.00 ± 0.72	Yes	23.60 ± 0.67	87.32 ± 2.46	Yes
	8/5/2015	1.33 ± 0.21	4.92 ± 0.78	Yes	23.60 ± 0.58	87.32 ± 2.15	Yes
	8/12/2015	1.27 ± 0.17	4.70 ± 0.63	Yes	21.50 ± 0.57	79.55 ± 2.09	Yes
	8/19/2015	1.30 ± 0.16	4.81 ± 0.60	Yes	13.80 ± 0.42	51.06 ± 1.55	Yes
	8/26/2015	4.23 ± 0.36	15.65 ± 1.34	Yes	25.00 ± 0.82	92.50 ± 3.05	Yes
	9/2/2015	1.49 ± 0.19	5.51 ± 0.69	Yes	27.40 ± 0.65	101.38 ± 2.39	Yes
	9/9/2015	1.47 ± 0.18	5.44 ± 0.66	Yes	20.70 ± 0.58	76.59 ± 2.14	Yes
	9/16/2015	1.58 ± 0.19	5.85 ± 0.71	Yes	32.10 ± 0.70	118.77 ± 2.58	Yes
	9/23/2015	1.59 ± 0.19	5.88 ± 0.70	Yes	23.70 ± 0.61	87.69 ± 2.26	Yes
	9/30/2015	2.04 ± 0.21	7.55 ± 0.77	Yes	41.70 ± 0.77	154.29 ± 2.83	Yes
DISTANT							
BLACKFOOT	7/1/2015	1.90 ± 0.20	7.03 ± 0.74	Yes	33.90 ± 0.68	125.43 ± 2.51	Yes
	7/8/2015	2.08 ± 0.20	7.70 ± 0.75	Yes	29.40 ± 0.64	108.78 ± 2.37	Yes
	7/15/2015	1.51 ± 0.19	5.59 ± 0.70	Yes	26.90 ± 0.65	99.53 ± 2.39	Yes
	7/22/2015	1.43 ± 0.19	5.29 ± 0.69	Yes	24.50 ± 0.62	90.65 ± 2.30	Yes
	7/29/2015	1.10 ± 0.15	4.07 ± 0.56	Yes	21.20 ± 0.54	78.44 ± 2.00	Yes
	8/5/2015	0.69 ± 0.19	2.53 ± 0.70	Yes	23.90 ± 0.59	88.43 ± 2.18	Yes
	8/12/2015	1.15 ± 0.17	4.26 ± 0.61	Yes	22.10 ± 0.57	81.77 ± 2.11	Yes
	8/19/2015	1.67 ± 0.19	6.18 ± 0.70	Yes	11.90 ± 0.43	44.03 ± 1.58	Yes
	8/26/2015	3.02 ± 0.31	11.17 ± 1.13	Yes	22.00 ± 0.75	81.40 ± 2.79	Yes

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
	9/2/2015	1.02 ± 0.15	3.77 ± 0.56	Yes	21.80 ± 0.55	80.66 ± 2.02	Yes
	9/9/2015	1.20 ± 0.15	4.44 ± 0.56	Yes	17.70 ± 0.49	65.49 ± 1.82	Yes
	9/16/2015	1.49 ± 0.17	5.51 ± 0.64	Yes	28.00 ± 0.62	103.60 ± 2.28	Yes
	9/23/2015	1.11 ± 0.16	4.11 ± 0.58	Yes	24.90 ± 0.59	92.13 ± 2.18	Yes
	9/30/2015	2.04 ± 0.20	7.55 ± 0.72	Yes	34.90 ± 0.67	129.13 ± 2.48	Yes
CRATERS OF	7/1/2015	1.82 ± 0.34	6.73 ± 1.24	Yes	29.50 ± 1.07	109.15 ± 3.96	Yes
THE MOON	7/8/2015	1.81 ± 0.20	6.70 ± 0.75	Yes	29.80 ± 0.67	110.26 ± 2.49	Yes
	7/15/2015	1.43 ± 0.18	5.29 ± 0.68	Yes	26.60 ± 0.64	98.42 ± 2.35	Yes
	7/22/2015	1.35 ± 0.18	5.00 ± 0.67	Yes	25.10 ± 0.62	92.87 ± 2.31	Yes
	7/29/2015	1.89 ± 0.33	6.99 ± 1.23	Yes	27.90 ± 1.08	103.23 ± 4.00	Yes
	8/5/2015	1.14 ± 0.22	4.22 ± 0.81	Yes	24.10 ± 0.62	89.17 ± 2.28	Yes
	8/12/2015	1.07 ± 0.17	3.96 ± 0.64	Yes	20.70 ± 0.59	76.59 ± 2.20	Yes
	8/19/2015	1.65 ± 0.18	6.11 ± 0.68	Yes	14.10 ± 0.44	52.17 ± 1.63	Yes
	8/26/2015	3.86 ± 0.32	14.28 ± 1.17	Yes	22.60 ± 0.71	83.62 ± 2.64	Yes
	9/2/2015	1.54 ± 0.19	5.70 ± 0.69	Yes	22.30 ± 0.59	82.51 ± 2.19	Yes
	9/9/2015	1.30 ± 0.16	4.81 ± 0.59	Yes	19.40 ± 0.53	71.78 ± 1.96	Yes
	9/16/2015	1.87 ± 0.20	6.92 ± 0.75	Yes	29.30 ± 0.67	108.41 ± 2.49	Yes
	9/23/2015	0.92 ± 0.15	3.41 ± 0.56	Yes	20.40 ± 0.56	75.48 ± 2.05	Yes
	9/30/2015	1.29 ± 0.17	4.77 ± 0.63	Yes	33.10 ± 0.67	122.47 ± 2.49	Yes
DUBOIS	7/1/2015	1.79 ± 0.20	6.62 ± 0.75	Yes	31.80 ± 0.69	117.66 ± 2.56	Yes
	7/8/2015	1.84 ± 0.20	6.81 ± 0.75	Yes	29.90 ± 0.68	110.63 ± 2.50	Yes
	7/15/2015	1.51 ± 0.19	5.59 ± 0.69	Yes	25.70 ± 0.63	95.09 ± 2.33	Yes
	7/22/2015	1.24 ± 0.18	4.59 ± 0.65	Yes	23.70 ± 0.61	87.69 ± 2.25	Yes
	7/29/2015	1.03 ± 0.16	3.81 ± 0.59	Yes	22.10 ± 0.58	81.77 ± 2.16	Yes
	8/5/2015	1.01 ± 0.21	3.74 ± 0.78	Yes	19.30 ± 0.56	71.41 ± 2.09	Yes
	8/12/2015	1.53 ± 0.19	5.66 ± 0.71	Yes	21.40 ± 0.59	79.18 ± 2.20	Yes
	8/19/2015	2.07 ± 0.20	7.66 ± 0.74	Yes	14.30 ± 0.45	52.91 ± 1.67	Yes
	8/26/2015	5.02 ± 0.37	18.57 ± 1.36	Yes	24.10 ± 0.77	89.17 ± 2.85	Yes
	9/2/2015	1.32 ± 0.18	4.88 ± 0.65	Yes	26.60 ± 0.63	98.42 ± 2.33	Yes
	9/9/2015	1.50 ± 0.18	5.55 ± 0.65	Yes	21.40 ± 0.58	79.18 ± 2.13	Yes
	9/16/2015	1.90 ± 0.20	7.03 ± 0.73	Yes	29.60 ± 0.66	109.52 ± 2.44	Yes
	9/23/2015	0.94 ± 0.16	3.49 ± 0.58	Yes	23.70 ± 0.61	87.69 ± 2.26	Yes
	9/30/2015	1.78 ± 0.19	6.59 ± 0.71	Yes	36.50 ± 0.71	135.05 ± 2.62	Yes
IDAHO FALLS	7/1/2015	1.63 ± 0.21	6.03 ± 0.77	Yes	32.10 ± 0.73	118.77 ± 2.70	Yes
	7/8/2015	1.61 ± 0.20	5.96 ± 0.72	Yes	28.60 ± 0.67	105.82 ± 2.47	Yes
	7/15/2015	1.47 ± 0.20	5.44 ± 0.73	Yes	25.20 ± 0.66	93.24 ± 2.45	Yes
	7/22/2015	0.91 ± 0.17	3.38 ± 0.62	Yes	25.00 ± 0.65	92.50 ± 2.39	Yes
	7/29/2015	1.14 ± 0.15	4.22 ± 0.56	Yes	20.50 ± 0.53	75.85 ± 1.94	Yes
	8/5/2015	0.81 ± 0.19	2.98 ± 0.72	Yes	19.10 ± 0.54	70.67 ± 2.01	Yes
	8/12/2015	1.39 ± 0.18	5.14 ± 0.67	Yes	23.80 ± 0.60	88.06 ± 2.22	Yes
	8/19/2015	1.45 ± 0.18	5.37 ± 0.65	Yes	11.50 ± 0.41	42.55 ± 1.52	Yes
	8/26/2015	3.97 ± 0.35	14.69 ± 1.30	Yes	23.70 ± 0.80	87.69 ± 2.97	Yes
	9/2/2015	1.51 ± 0.18	5.59 ± 0.65	Yes	23.70 ± 0.58	87.69 ± 2.14	Yes
	9/9/2015	1.65 ± 0.18	6.11 ± 0.65	Yes	19.60 ± 0.54	72.52 ± 1.99	Yes
	9/16/2015	1.98 ± 0.20	7.33 ± 0.72	Yes	27.30 ± 0.62	101.01 ± 2.29	Yes
	9/23/2015	1.73 ± 0.19	6.40 ± 0.71	Yes	25.30 ± 0.62	93.61 ± 2.31	Yes
	9/30/2015	2.01 ± 0.21	7.44 ± 0.77	Yes	34.50 ± 0.71	127.65 ± 2.64	Yes
QA-2	7/1/2015	1.52 ± 0.20	5.62 ± 0.74	Yes	34.10 ± 0.73	126.17 ± 2.72	Yes
(IDAHO FALLS)	7/8/2015	1.61 ± 0.20	5.96 ± 0.75	Yes	31.40 ± 0.72	116.18 ± 2.65	Yes
	7/15/2015	1.36 ± 0.18	5.03 ± 0.67	Yes	27.70 ± 0.64	102.49 ± 2.38	Yes
	7/22/2015	1.18 ± 0.17	4.37 ± 0.63	Yes	23.90 ± 0.59	88.43 ± 2.20	Yes
	7/29/2015	0.85 ± 0.15	3.13 ± 0.55	Yes	21.80 ± 0.57	80.66 ± 2.12	Yes
	8/5/2015	0.80 ± 0.20	2.96 ± 0.73	Yes	23.20 ± 0.59	85.84 ± 2.19	Yes
	8/12/2015	1.40 ± 0.18	5.18 ± 0.68	Yes	26.40 ± 0.63	97.68 ± 2.33	Yes
	8/19/2015	1.80 ± 0.20	6.66 ± 0.73	Yes	12.80 ± 0.44	47.36 ± 1.64	Yes

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
	8/26/2015	4.72 ± 0.37	17.46 ± 1.37	Yes	27.20 ± 0.83	100.64 ± 3.07	Yes
	9/2/2015	1.38 ± 0.18	5.11 ± 0.65	Yes	24.80 ± 0.61	91.76 ± 2.24	Yes
	9/9/2015	1.37 ± 0.17	5.07 ± 0.63	Yes	22.40 ± 0.58	82.88 ± 2.15	Yes
	9/16/2015	1.80 ± 0.19	6.66 ± 0.72	Yes	31.30 ± 0.67	115.81 ± 2.48	Yes
	9/23/2015	1.13 ± 0.17	4.18 ± 0.62	Yes	26.70 ± 0.64	98.79 ± 2.37	Yes
	9/30/2015	2.04 ± 0.22	7.55 ± 0.81	Yes	36.80 ± 0.77	136.16 ± 2.84	Yes
JACKSON	7/1/2015	2.26 ± 0.24	8.36 ± 0.88	Yes	35.70 ± 0.77	132.09 ± 2.85	Yes
	7/8/2015	2.00 ± 0.22	7.40 ± 0.83	Yes	34.70 ± 0.76	128.39 ± 2.80	Yes
	7/15/2015	1.58 ± 0.20	5.85 ± 0.73	Yes	26.90 ± 0.66	99.53 ± 2.45	Yes
	7/22/2015	1.40 ± 0.19	5.18 ± 0.70	Yes	25.10 ± 0.64	92.87 ± 2.36	Yes
	7/29/2015	1.59 ± 0.19	5.88 ± 0.71	Yes	26.60 ± 0.65	98.42 ± 2.40	Yes
	8/5/2015	0.99 ± 0.22	3.67 ± 0.80	Yes	23.80 ± 0.62	88.06 ± 2.31	Yes
	8/12/2015	1.34 ± 0.19	4.96 ± 0.69	Yes	25.90 ± 0.65	95.83 ± 2.39	Yes
	8/19/2015	1.63 ± 0.19	6.03 ± 0.72	Yes	17.60 ± 0.50	65.12 ± 1.86	Yes
	8/26/2015	3.72 ± 0.38	13.76 ± 1.39	Yes	30.00 ± 0.96	111.00 ± 3.56	Yes
	9/2/2015	1.56 ± 0.20	5.77 ± 0.74	Yes	30.40 ± 0.71	112.48 ± 2.62	Yes
	9/9/2015	1.36 ± 0.18	5.03 ± 0.66	Yes	22.20 ± 0.61	82.14 ± 2.25	Yes
	9/16/2015	1.48 ± 0.19	5.48 ± 0.70	Yes	32.90 ± 0.71	121.73 ± 2.62	Yes
	9/23/2015	1.24 ± 0.17	4.59 ± 0.64	Yes	24.80 ± 0.62	91.76 ± 2.29	Yes
	9/30/2015	2.00 ± 0.21	7.40 ± 0.79	Yes	47.40 ± 0.83	175.38 ± 3.09	Yes
SUGAR CITY	7/1/2015	1.41 ± 0.18	5.22 ± 0.66	Yes	30.20 ± 0.64	111.74 ± 2.38	Yes
	7/8/2015	1.58 ± 0.19	5.85 ± 0.70	Yes	30.30 ± 0.66	112.11 ± 2.46	Yes
	7/15/2015	1.40 ± 0.19	5.18 ± 0.70	Yes	27.70 ± 0.67	102.49 ± 2.49	Yes
	7/22/2015	0.77 ± 0.13	2.85 ± 0.48	Yes	22.70 ± 0.51	83.99 ± 1.90	Yes
	7/29/2015	1.15 ± 0.14	4.26 ± 0.53	Yes	20.80 ± 0.49	76.96 ± 1.83	Yes
	8/5/2015	1.01 ± 0.17	3.74 ± 0.64	Yes	22.10 ± 0.51	81.77 ± 1.87	Yes
	8/12/2015	1.37 ± 0.18	5.07 ± 0.65	Yes	24.80 ± 0.60	91.76 ± 2.21	Yes
	8/19/2015	1.69 ± 0.18	6.25 ± 0.67	Yes	14.00 ± 0.43	51.80 ± 1.59	Yes
	8/26/2015	3.03 ± 0.26	11.21 ± 0.96	Yes	21.80 ± 0.63	80.66 ± 2.34	Yes
	9/2/2015	1.56 ± 0.18	5.77 ± 0.68	Yes	25.50 ± 0.61	94.35 ± 2.26	Yes
	9/9/2015	1.36 ± 0.18	5.03 ± 0.65	Yes	21.70 ± 0.59	80.29 ± 2.19	Yes
	9/16/2015	1.94 ± 0.23	7.18 ± 0.83	Yes	33.80 ± 0.78	125.06 ± 2.89	Yes
	9/23/2015	1.12 ± 0.18	4.14 ± 0.65	Yes	24.20 ± 0.65	89.54 ± 2.39	Yes
	9/30/2015	1.77 ± 0.18	6.55 ± 0.68	Yes	36.20 ± 0.68	133.94 ± 2.50	Yes
INL SITE							
EFS	7/1/2015	1.13 ± 0.18	4.18 ± 0.67	Yes	34.30 ± 0.73	126.91 ± 2.70	Yes
	7/8/2015	1.79 ± 0.21	6.62 ± 0.77	Yes	32.60 ± 0.72	120.62 ± 2.65	Yes
	7/15/2015	1.13 ± 0.17	4.18 ± 0.64	Yes	24.90 ± 0.64	92.13 ± 2.35	Yes
	7/22/2015	1.09 ± 0.18	4.03 ± 0.65	Yes	24.70 ± 0.64	91.39 ± 2.35	Yes
	7/29/2015	1.24 ± 0.17	4.59 ± 0.63	Yes	21.10 ± 0.58	78.07 ± 2.13	Yes
	8/5/2015	1.13 ± 0.23	4.18 ± 0.84	Yes	24.30 ± 0.64	89.91 ± 2.36	Yes
	8/12/2015	1.11 ± 0.17	4.11 ± 0.64	Yes	22.60 ± 0.60	83.62 ± 2.22	Yes
	8/19/2015	1.99 ± 0.19	7.36 ± 0.72	Yes	13.80 ± 0.43	51.06 ± 1.61	Yes
	8/26/2015	3.44 ± 0.29	12.73 ± 1.08	Yes	23.70 ± 0.70	87.69 ± 2.60	Yes
	9/2/2015	1.62 ± 0.18	5.99 ± 0.67	Yes	24.20 ± 0.58	89.54 ± 2.14	Yes
	9/9/2015	1.56 ± 0.17	5.77 ± 0.63	Yes	20.80 ± 0.54	76.96 ± 2.01	Yes
	9/16/2015	2.22 ± 0.20	8.21 ± 0.75	Yes	28.90 ± 0.63	106.93 ± 2.34	Yes
	9/23/2015	1.28 ± 0.16	4.74 ± 0.58	Yes	20.40 ± 0.53	75.48 ± 1.95	Yes
	9/30/2015	1.75 ± 0.18	6.48 ± 0.68	Yes	35.50 ± 0.67	131.35 ± 2.49	Yes
MAIN GATE	7/1/2015	1.55 ± 0.19	5.74 ± 0.70	Yes	33.10 ± 0.68	122.47 ± 2.52	Yes
	7/8/2015	1.49 ± 0.16	5.51 ± 0.57	Yes	26.10 ± 0.53	96.57 ± 1.96	Yes
	7/15/2015	1.04 ± 0.13	3.85 ± 0.49	Yes	19.30 ± 0.46	71.41 ± 1.71	Yes
	7/22/2015	0.94 ± 0.13	3.49 ± 0.50	Yes	20.90 ± 0.49	77.33 ± 1.80	Yes
	7/29/2015	1.09 ± 0.16	4.03 ± 0.60	Yes	22.60 ± 0.59	83.62 ± 2.18	Yes

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)	GROSS BETA Result > 3s
	8/5/2015	1.20 ± 0.23	4.44 ± 0.84	Yes	25.10 ± 0.64	92.87 ± 2.38	Yes
	8/12/2015	1.12 ± 0.17	4.14 ± 0.63	Yes	23.90 ± 0.61	88.43 ± 2.25	Yes
	8/19/2015	1.73 ± 0.18	6.40 ± 0.67	Yes	12.20 ± 0.41	45.14 ± 1.50	Yes
	8/26/2015	4.08 ± 0.34	15.10 ± 1.27	Yes	23.70 ± 0.78	87.69 ± 2.87	Yes
	9/2/2015	1.59 ± 0.18	5.88 ± 0.67	Yes	25.50 ± 0.59	94.35 ± 2.19	Yes
	9/9/2015	1.44 ± 0.17	5.33 ± 0.62	Yes	21.60 ± 0.56	79.92 ± 2.06	Yes
	9/16/2015	2.14 ± 0.20	7.92 ± 0.75	Yes	31.50 ± 0.66	116.55 ± 2.45	Yes
	9/23/2015	1.05 ± 0.15	3.89 ± 0.57	Yes	22.60 ± 0.57	83.62 ± 2.09	Yes
	9/30/2015	1.60 ± 0.18	5.92 ± 0.67	Yes	36.60 ± 0.69	135.42 ± 2.55	Yes
QA-1	7/1/2015	1.37 ± 0.18	5.07 ± 0.67	Yes	32.60 ± 0.68	120.62 ± 2.51	Yes
(MAIN GATE)	7/8/2015	1.62 ± 0.19	5.99 ± 0.71	Yes	28.10 ± 0.65	103.97 ± 2.40	Yes
	7/15/2015	1.53 ± 0.18	5.66 ± 0.68	Yes	24.40 ± 0.60	90.28 ± 2.23	Yes
	7/22/2015	1.06 ± 0.16	3.92 ± 0.59	Yes	20.30 ± 0.55	75.11 ± 2.04	Yes
	7/29/2015	1.05 ± 0.16	3.89 ± 0.58	Yes	21.20 ± 0.57	78.44 ± 2.11	Yes
	8/5/2015	1.10 ± 0.21	4.07 ± 0.78	Yes	23.70 ± 0.60	87.69 ± 2.22	Yes
	8/12/2015	0.92 ± 0.16	3.42 ± 0.58	Yes	22.50 ± 0.58	83.25 ± 2.16	Yes
	8/19/2015	2.28 ± 0.21	8.44 ± 0.77	Yes	14.00 ± 0.44	51.80 ± 1.64	Yes
	8/26/2015	3.74 ± 0.30	13.84 ± 1.12	Yes	22.50 ± 0.69	83.25 ± 2.55	Yes
	9/2/2015	1.38 ± 0.17	5.11 ± 0.63	Yes	23.90 ± 0.58	88.43 ± 2.13	Yes
	9/9/2015	1.23 ± 0.16	4.55 ± 0.59	Yes	19.60 ± 0.54	72.52 ± 2.01	Yes
	9/16/2015	1.52 ± 0.18	5.62 ± 0.65	Yes	28.80 ± 0.62	106.56 ± 2.31	Yes
	9/23/2015	0.91 ± 0.15	3.38 ± 0.55	Yes	23.10 ± 0.58	85.47 ± 2.14	Yes
	9/30/2015	1.72 ± 0.18	6.36 ± 0.67	Yes	36.90 ± 0.68	136.53 ± 2.53	Yes
VAN BUREN GATE	7/1/2015	1.51 ± 0.18	5.59 ± 0.68	Yes	32.90 ± 0.67	121.73 ± 2.48	Yes
	7/8/2015	1.41 ± 0.18	5.22 ± 0.65	Yes	29.60 ± 0.65	109.52 ± 2.39	Yes
	7/15/2015	1.35 ± 0.17	5.00 ± 0.64	Yes	25.20 ± 0.60	93.24 ± 2.23	Yes
	7/22/2015	0.83 ± 0.15	3.06 ± 0.56	Yes	24.80 ± 0.60	91.76 ± 2.23	Yes
	7/29/2015	1.16 ± 0.16	4.29 ± 0.59	Yes	20.40 ± 0.55	75.48 ± 2.04	Yes
	8/5/2015	1.18 ± 0.22	4.37 ± 0.81	Yes	24.80 ± 0.62	91.76 ± 2.29	Yes
	8/12/2015	1.25 ± 0.17	4.63 ± 0.63	Yes	22.40 ± 0.58	82.88 ± 2.13	Yes
	8/19/2015	2.00 ± 0.19	7.40 ± 0.70	Yes	13.90 ± 0.42	51.43 ± 1.56	Yes
	8/26/2015	3.24 ± 0.28	11.99 ± 1.02	Yes	24.00 ± 0.68	88.80 ± 2.52	Yes
	9/2/2015	1.37 ± 0.17	5.07 ± 0.64	Yes	22.00 ± 0.57	81.40 ± 2.09	Yes
	9/9/2015	1.03 ± 0.14	3.81 ± 0.53	Yes	19.40 ± 0.52	71.78 ± 1.91	Yes
	9/16/2015	1.54 ± 0.18	5.70 ± 0.67	Yes	32.40 ± 0.67	119.88 ± 2.49	Yes
	9/23/2015	0.62 ± 0.13	2.29 ± 0.48	Yes	22.50 ± 0.56	83.25 ± 2.08	Yes
	9/30/2015	1.68 ± 0.18	6.22 ± 0.68	Yes	37.00 ± 0.69	136.90 ± 2.56	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 ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
ARCO	07/01/2015	-1.30	±	1.99	-4.79	±	7.38	No
	07/08/2015	0.58	±	1.93	2.14	±	7.15	No
	07/15/2015	2.36	±	1.97	8.74	±	7.30	No
	07/22/2015	1.11	±	1.18	4.11	±	4.37	No
	07/29/2015	-0.03	±	1.19	-0.11	±	4.41	No
	08/05/2015	-3.88	±	1.24	-14.36	±	4.59	No
	08/12/2015	1.46	±	1.21	5.41	±	4.47	No
	08/19/2015	-0.45	±	1.15	-1.68	±	4.26	No
	08/26/2015	-0.14	±	1.51	-0.53	±	5.59	No
	09/02/2015	-1.06	±	1.11	-3.92	±	4.12	No
	09/09/2015	0.51	±	1.10	1.90	±	4.05	No
	09/16/2015	-0.01	±	1.05	-0.03	±	3.90	No
	09/23/2015	-0.65	±	1.09	-2.40	±	4.05	No
	09/30/2015	1.70	±	1.16	6.28	±	4.28	No
ATOMIC CITY	07/01/2015	-1.27	±	1.96	-4.70	±	7.23	No
	07/08/2015	0.58	±	1.93	2.13	±	7.14	No
	07/15/2015	2.42	±	2.02	8.96	±	7.48	No
	07/22/2015	1.11	±	1.18	4.10	±	4.36	No
	07/29/2015	-0.03	±	1.19	-0.11	±	4.41	No
	08/05/2015	-3.84	±	1.23	-14.21	±	4.54	No
	08/12/2015	1.40	±	1.16	5.18	±	4.29	No
	08/19/2015	-0.46	±	1.18	-1.72	±	4.36	No
	08/26/2015	-0.14	±	1.51	-0.53	±	5.58	No
	09/02/2015	-1.10	±	1.15	-4.06	±	4.26	No
	09/09/2015	0.51	±	1.09	1.88	±	4.02	No
	09/16/2015	-0.01	±	1.08	-0.03	±	4.00	No
	09/23/2015	-0.66	±	1.11	-2.45	±	4.12	No
	09/30/2015	1.79	±	1.22	6.63	±	4.51	No
BLUE DOME	07/01/2015	-1.89	±	2.19	-6.99	±	8.09	No
	07/08/2015	-0.26	±	1.80	-0.95	±	6.65	No
	07/15/2015	-0.48	±	1.75	-1.78	±	6.48	No
	07/22/2015	0.74	±	1.06	2.73	±	3.92	No
	07/29/2015	-0.24	±	1.00	-0.90	±	3.70	No
	08/05/2015	0.29	±	1.04	1.06	±	3.85	No
	08/12/2015	-0.16	±	1.04	-0.58	±	3.83	No
	08/19/2015	1.36	±	1.17	5.04	±	4.32	No
	08/26/2015	1.88	±	1.85	6.97	±	6.85	No
	09/02/2015	1.02	±	1.25	3.77	±	4.61	No
	09/09/2015	-0.46	±	0.40	-1.69	±	1.47	No
	09/16/2015	-0.15	±	0.96	-0.56	±	3.55	No
	09/23/2015	0.48	±	1.03	1.79	±	3.81	No
	09/30/2015	-0.04	±	1.01	-0.16	±	3.75	No
FAA TOWER	07/01/2015	-1.70	±	1.97	-6.31	±	7.31	No
	07/08/2015	-0.27	±	1.86	-0.98	±	6.89	No
	07/15/2015	-0.51	±	1.86	-1.89	±	6.89	No
	07/22/2015	0.80	±	1.15	2.96	±	4.25	No
	07/29/2015	-0.25	±	1.05	-0.94	±	3.89	No
	08/05/2015	0.29	±	1.08	1.09	±	3.98	No
	08/12/2015	-0.16	±	1.05	-0.59	±	3.89	No
	08/19/2015	1.28	±	1.10	4.72	±	4.05	No
	08/26/2015	1.53	±	1.50	5.66	±	5.57	No

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
	09/02/2015	0.84	±	1.03	3.12	±	3.82	No
	09/09/2015	-0.52	±	0.46	-1.94	±	1.69	No
	09/16/2015	-0.15	±	0.96	-0.56	±	3.55	No
	09/23/2015	0.51	±	1.09	1.90	±	4.04	No
	09/30/2015	-0.04	±	0.99	-0.16	±	3.66	No
HOWE	07/01/2015	-1.61	±	1.86	-5.95	±	6.89	No
	07/08/2015	-0.25	±	1.76	-0.93	±	6.49	No
	07/15/2015	-0.49	±	1.77	-1.80	±	6.56	No
	07/22/2015	0.72	±	1.04	2.67	±	3.84	No
	07/29/2015	-0.24	±	1.00	-0.89	±	3.69	No
	08/05/2015	0.26	±	0.97	0.98	±	3.57	No
	08/12/2015	-0.15	±	0.99	-0.55	±	3.68	No
	08/19/2015	1.27	±	1.09	4.68	±	4.02	No
	08/26/2015	1.41	±	1.39	5.23	±	5.14	No
	09/02/2015	0.81	±	0.99	3.00	±	3.68	No
	09/09/2015	-0.49	±	0.43	-1.81	±	1.58	No
	09/16/2015	-0.15	±	0.96	-0.56	±	3.57	No
	09/23/2015	0.53	±	1.13	1.96	±	4.19	No
	09/30/2015	-0.04	±	1.00	-0.16	±	3.70	No
MONTEVIEW	07/01/2015	-1.68	±	1.95	-6.22	±	7.21	No
	07/08/2015	-0.24	±	1.71	-0.90	±	6.32	No
	07/15/2015	-0.47	±	1.70	-1.73	±	6.30	No
	07/22/2015	0.69	±	1.00	2.56	±	3.69	No
	07/29/2015	-0.23	±	0.97	-0.87	±	3.57	No
	08/05/2015	0.27	±	0.99	1.00	±	3.65	No
	08/12/2015	-0.15	±	0.97	-0.54	±	3.60	No
	08/19/2015	1.28	±	1.10	4.75	±	4.07	No
	08/26/2015	2.56	±	2.51	9.47	±	9.30	No
	09/02/2015	0.83	±	1.01	3.07	±	3.75	No
	09/09/2015	-0.54	±	0.47	-1.98	±	1.73	No
	09/16/2015	-0.16	±	1.02	-0.60	±	3.79	No
	09/23/2015	0.53	±	1.14	1.98	±	4.22	No
	09/30/2015	-0.04	±	1.00	-0.16	±	3.71	No
MUD LAKE	07/01/2015	-1.60	±	1.85	-5.91	±	6.84	No
	07/08/2015	-0.26	±	1.84	-0.97	±	6.81	No
	07/15/2015	-0.48	±	1.76	-1.79	±	6.52	No
	07/22/2015	0.75	±	1.08	2.78	±	4.01	No
	07/29/2015	-0.29	±	1.20	-1.08	±	4.44	No
	08/05/2015	0.27	±	0.97	0.98	±	3.58	No
	08/12/2015	-0.15	±	0.97	-0.54	±	3.60	No
	08/19/2015	1.21	±	1.04	4.48	±	3.85	No
	08/26/2015	1.88	±	1.85	6.96	±	6.84	No
	09/02/2015	0.89	±	1.10	3.31	±	4.05	No
	09/09/2015	-0.53	±	0.46	-1.96	±	1.70	No
	09/16/2015	-0.16	±	1.04	-0.61	±	3.85	No
	09/23/2015	0.52	±	1.11	1.93	±	4.10	No
	09/30/2015	-0.05	±	1.06	-0.17	±	3.93	No
DISTANT								
BLACKFOOT	07/01/2015	-1.19	±	1.83	-4.39	±	6.75	No
	07/08/2015	0.54	±	1.81	2.00	±	6.68	No
	07/15/2015	2.43	±	2.03	8.99	±	7.51	No
	07/22/2015	1.14	±	1.21	4.21	±	4.48	No

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
	07/29/2015	-0.03	±	1.08	-0.10	±	4.01	No
	08/05/2015	-3.70	±	1.18	-13.70	±	4.37	No
	08/12/2015	1.32	±	1.09	4.88	±	4.04	No
	08/19/2015	-0.48	±	1.21	-1.77	±	4.49	No
	08/26/2015	-0.16	±	1.68	-0.59	±	6.21	No
	09/02/2015	-0.99	±	1.04	-3.66	±	3.84	No
	09/09/2015	0.47	±	1.00	1.73	±	3.71	No
	09/16/2015	-0.01	±	1.01	-0.03	±	3.73	No
	09/23/2015	-0.65	±	1.10	-2.41	±	4.07	No
	09/30/2015	1.65	±	1.13	6.12	±	4.17	No
CRATERS	07/01/2015	-2.81	±	4.33	-10.41	±	16.03	No
	07/08/2015	0.58	±	1.95	2.16	±	7.23	No
	07/15/2015	2.38	±	1.99	8.81	±	7.36	No
	07/22/2015	1.12	±	1.19	4.16	±	4.42	No
	07/29/2015	-0.07	±	2.78	-0.26	±	10.29	No
	08/05/2015	-3.93	±	1.26	-14.56	±	4.65	No
	08/12/2015	1.48	±	1.23	5.49	±	4.55	No
	08/19/2015	-0.46	±	1.16	-1.70	±	4.31	No
	08/26/2015	-0.14	±	1.50	-0.53	±	5.57	No
	09/02/2015	-1.11	±	1.17	-4.12	±	4.32	No
	09/09/2015	0.49	±	1.06	1.83	±	3.91	No
	09/16/2015	-0.01	±	1.13	-0.03	±	4.20	No
	09/23/2015	-0.68	±	1.14	-2.50	±	4.22	No
	09/30/2015	1.74	±	1.18	6.43	±	4.38	No
DUBOIS	07/01/2015	-1.57	±	1.82	-5.82	±	6.74	No
	07/08/2015	-0.26	±	1.81	-0.96	±	6.69	No
	07/15/2015	-0.48	±	1.76	-1.79	±	6.52	No
	07/22/2015	0.75	±	1.09	2.79	±	4.02	No
	07/29/2015	-0.24	±	1.01	-0.90	±	3.73	No
	08/05/2015	0.29	±	1.05	1.07	±	3.90	No
	08/12/2015	-0.16	±	1.06	-0.59	±	3.92	No
	08/19/2015	1.32	±	1.14	4.90	±	4.20	No
	08/26/2015	1.71	±	1.68	6.33	±	6.22	No
	09/02/2015	0.87	±	1.07	3.22	±	3.95	No
	09/09/2015	-0.51	±	0.45	-1.90	±	1.65	No
	09/16/2015	-0.16	±	1.00	-0.58	±	3.70	No
	09/23/2015	0.52	±	1.11	1.93	±	4.10	No
	09/30/2015	-0.04	±	1.03	-0.16	±	3.82	No
IDAHO FALLS	07/01/2015	-1.72	±	1.99	-6.35	±	7.36	No
	07/08/2015	-0.26	±	1.84	-0.97	±	6.81	No
	07/15/2015	-0.53	±	1.94	-1.97	±	7.19	No
	07/22/2015	0.83	±	1.20	3.08	±	4.43	No
	07/29/2015	-0.22	±	0.89	-0.80	±	3.29	No
	08/05/2015	0.27	±	1.00	1.01	±	3.70	No
	08/12/2015	-0.15	±	1.00	-0.56	±	3.70	No
	08/19/2015	1.31	±	1.12	4.85	±	4.16	No
	08/26/2015	1.87	±	1.84	6.92	±	6.80	No
	09/02/2015	0.82	±	1.00	3.03	±	3.71	No
	09/09/2015	-0.48	±	0.42	-1.79	±	1.56	No
	09/16/2015	-0.15	±	0.95	-0.55	±	3.51	No
	09/23/2015	0.51	±	1.10	1.90	±	4.06	No
	09/30/2015	-0.05	±	1.09	-0.17	±	4.04	No

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
QA-2	07/01/2015	-1.67	±	1.93	-6.16	±	7.14	No
(IDAHO FALLS)	07/08/2015	-0.28	±	1.93	-1.02	±	7.15	No
	07/15/2015	-0.48	±	1.74	-1.76	±	6.43	No
	07/22/2015	0.72	±	1.03	2.66	±	3.82	No
	07/29/2015	-0.24	±	0.99	-0.89	±	3.66	No
	08/05/2015	0.28	±	1.01	1.03	±	3.75	No
	08/12/2015	-0.15	±	1.01	-0.56	±	3.74	No
	08/19/2015	1.38	±	1.18	5.09	±	4.37	No
	08/26/2015	1.81	±	1.77	6.68	±	6.57	No
	09/02/2015	0.86	±	1.05	3.17	±	3.88	No
	09/09/2015	-0.51	±	0.44	-1.87	±	1.63	No
	09/16/2015	-0.16	±	0.99	-0.58	±	3.65	No
	09/23/2015	0.52	±	1.11	1.93	±	4.11	No
	09/30/2015	-0.05	±	1.18	-0.19	±	4.38	No
JACKSON	07/01/2015	-1.43	±	2.20	-5.29	±	8.15	No
	07/08/2015	0.64	±	2.14	2.37	±	7.92	No
	07/15/2015	2.53	±	2.11	9.35	±	7.81	No
	07/22/2015	1.17	±	1.24	4.32	±	4.59	No
	07/29/2015	-0.34	±	1.26	-1.25	±	4.65	No
	08/05/2015	-4.07	±	1.30	-15.06	±	4.81	No
	08/12/2015	1.47	±	1.21	5.42	±	4.49	No
	08/19/2015	-0.50	±	1.27	-1.85	±	4.69	No
	08/26/2015	-0.20	±	2.06	-0.72	±	7.64	No
	09/02/2015	-1.22	±	1.28	-4.50	±	4.72	No
	09/09/2015	0.57	±	1.22	2.11	±	4.52	No
	09/16/2015	-0.01	±	1.14	-0.03	±	4.22	No
	09/23/2015	-0.71	±	1.20	-2.63	±	4.43	No
	09/30/2015	1.91	±	1.30	7.08	±	4.83	No
SUGAR CITY	07/01/2015	-1.44	±	1.67	-5.33	±	6.18	No
	07/08/2015	-0.25	±	1.75	-0.92	±	6.46	No
	07/15/2015	-0.51	±	1.87	-1.90	±	6.93	No
	07/22/2015	0.83	±	1.19	3.07	±	4.42	No
	07/29/2015	-0.19	±	0.79	-0.71	±	2.93	No
	08/05/2015	0.22	±	0.80	0.81	±	2.96	No
	08/12/2015	-0.15	±	0.97	-0.54	±	3.58	No
	08/19/2015	1.25	±	1.07	4.62	±	3.96	No
	08/26/2015	1.34	±	1.32	4.95	±	4.87	No
	09/02/2015	0.85	±	1.04	3.15	±	3.86	No
	09/09/2015	-0.53	±	0.46	-1.97	±	1.72	No
	09/16/2015	-0.19	±	1.21	-0.71	±	4.48	No
	09/23/2015	0.57	±	1.20	2.09	±	4.46	No
	09/30/2015	-0.04	±	0.95	-0.15	±	3.52	No
INL SITE								
EFS	07/01/2015	-1.35	±	2.07	-4.98	±	7.67	No
	07/08/2015	0.61	±	2.03	2.25	±	7.51	No
	07/15/2015	2.50	±	2.08	9.23	±	7.71	No
	07/22/2015	1.17	±	1.25	4.34	±	4.62	No
	07/29/2015	-0.03	±	1.20	-0.11	±	4.44	No
	08/05/2015	-4.17	±	1.33	-15.44	±	4.93	No
	08/12/2015	1.43	±	1.18	5.27	±	4.37	No
	08/19/2015	-0.45	±	1.15	-1.67	±	4.24	No
	08/26/2015	-0.14	±	1.43	-0.50	±	5.30	No

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
	09/02/2015	-1.01	±	1.06	-3.75	±	3.93	No
	09/09/2015	0.49	±	1.05	1.83	±	3.90	No
	09/16/2015	-0.01	±	1.03	-0.03	±	3.82	No
	09/23/2015	-0.62	±	1.04	-2.29	±	3.86	No
	09/30/2015	1.65	±	1.12	6.09	±	4.15	No
MAIN GATE	07/01/2015	-1.44	±	2.21	-5.31	±	8.18	No
	07/08/2015	0.70	±	2.35	2.60	±	8.68	No
	07/15/2015	3.16	±	2.63	11.68	±	9.75	No
	07/22/2015	1.30	±	1.39	4.82	±	5.13	No
	07/29/2015	-0.03	±	1.19	-0.11	±	4.41	No
	08/05/2015	-4.12	±	1.32	-15.26	±	4.87	No
	08/12/2015	1.40	±	1.16	5.17	±	4.28	No
	08/19/2015	-0.44	±	1.11	-1.62	±	4.10	No
	08/26/2015	-0.16	±	1.67	-0.59	±	6.19	No
	09/02/2015	-1.02	±	1.07	-3.77	±	3.95	No
	09/09/2015	0.50	±	1.08	1.86	±	3.98	No
	09/16/2015	-0.01	±	1.04	-0.03	±	3.86	No
	09/23/2015	-0.65	±	1.09	-2.40	±	4.04	No
	09/30/2015	1.67	±	1.14	6.18	±	4.21	No
QA-1	07/01/2015	-1.23	±	1.89	-4.53	±	6.98	No
(MAIN GATE)	07/08/2015	0.57	±	1.90	2.11	±	7.05	No
	07/15/2015	2.31	±	1.93	8.55	±	7.14	No
	07/22/2015	1.05	±	1.12	3.90	±	4.15	No
	07/29/2015	-0.03	±	1.18	-0.11	±	4.38	No
	08/05/2015	-3.80	±	1.21	-14.07	±	4.49	No
	08/12/2015	1.36	±	1.13	5.04	±	4.17	No
	08/19/2015	-0.46	±	1.18	-1.72	±	4.35	No
	08/26/2015	-0.14	±	1.43	-0.50	±	5.28	No
	09/02/2015	-1.01	±	1.06	-3.74	±	3.93	No
	09/09/2015	0.51	±	1.10	1.90	±	4.05	No
	09/16/2015	-0.01	±	1.01	-0.03	±	3.74	No
	09/23/2015	-0.67	±	1.12	-2.46	±	4.15	No
	09/30/2015	1.64	±	1.11	6.05	±	4.12	No
VAN BUREN GATE	07/01/2015	-1.19	±	1.83	-4.40	±	6.77	No
	07/08/2015	0.55	±	1.82	2.02	±	6.75	No
	07/15/2015	2.27	±	1.89	8.40	±	7.01	No
	07/22/2015	1.08	±	1.14	3.98	±	4.23	No
	07/29/2015	-0.03	±	1.14	-0.11	±	4.24	No
	08/05/2015	-3.91	±	1.25	-14.46	±	4.62	No
	08/12/2015	1.34	±	1.11	4.96	±	4.10	No
	08/19/2015	-0.43	±	1.09	-1.59	±	4.03	No
	08/26/2015	-0.13	±	1.35	-0.47	±	4.98	No
	09/02/2015	-1.04	±	1.09	-3.86	±	4.05	No
	09/09/2015	0.47	±	1.01	1.76	±	3.75	No
	09/16/2015	-0.01	±	1.06	-0.03	±	3.91	No
	09/23/2015	-0.65	±	1.09	-2.40	±	4.04	No
	09/30/2015	1.67	±	1.14	6.18	±	4.21	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 ($\times 10^{-18}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-14}$ Bq/mL)			Result > 3s
BOUNDARY									
ARCO	9/30/2015	CESIUM-137	173.00	±	78.80	640.10	±	291.56	No
ATOMIC CITY	9/30/2015	AMERICIUM-241	0.64	±	0.95	2.35	±	3.50	No
		CESIUM-137	14.50	±	80.00	53.65	±	296.00	No
		PLUTONIUM-238	-2.52	±	1.79	-9.32	±	6.62	No
BLUE DOME	9/30/2015	CESIUM-137	-14.90	±	81.60	-55.13	±	301.92	No
FAA TOWER	9/30/2015	AMERICIUM-241	0.11	±	0.98	0.42	±	3.63	No
		CESIUM-137	-56.40	±	83.10	-208.68	±	307.47	No
		PLUTONIUM-238	1.09	±	1.55	4.03	±	5.74	No
HOWE	9/30/2015	CESIUM-137	28.10	±	112.00	103.97	±	414.40	No
		STRONTIUM-90	12.90	±	4.80	47.73	±	17.76	No
MONTEVIEW	9/30/2015	CESIUM-137	161.00	±	82.00	595.70	±	303.40	No
		STRONTIUM-90	14.30	±	4.87	52.91	±	18.02	No
MUD LAKE	9/30/2015	CESIUM-137	-56.80	±	86.30	-210.16	±	319.31	No
		STRONTIUM-90	14.80	±	4.89	54.76	±	18.09	**Yes**
DISTANT									
BLACKFOOT	9/30/2015	CESIUM-137	130.00	±	101.00	481.00	±	373.70	No
CRATERS	9/30/2015	CESIUM-137	207.00	±	134.00	765.90	±	495.80	No
DUBOIS	9/30/2015	CESIUM-137	114.00	±	80.50	421.80	±	297.85	No
		STRONTIUM-90	23.60	±	5.66	87.32	±	20.94	**Yes**
IDAHO FALLS	9/30/2015	AMERICIUM-241	0.72	±	1.18	2.67	±	4.37	No
		CESIUM-137	69.50	±	83.30	257.15	±	308.21	No
		PLUTONIUM-238	2.10	±	0.81	7.77	±	3.01	No
QA-2 (IDAHO FALLS)	9/30/2015	AMERICIUM-241	-0.05	±	0.90	-0.20	±	3.32	No
		CESIUM-137	0.75	±	1.19	2.79	±	4.40	No
		PLUTONIUM-238	23.00	±	3.50	85.10	±	12.95	**Yes**

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 ($\times 10^{-18}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-14}$ Bq/mL)			Result > 3s
JACKSON	9/30/2015	CESIUM-137	146.00	±	98.20	540.20	±	363.34	No
		STRONTIUM-90	12.30	±	5.61	45.51	±	20.76	No
SUGAR CITY	9/30/2015	CESIUM-137	-129.00	±	68.10	-477.30	±	251.97	No
INL SITE									
EFS	9/30/2015	CESIUM-137	71.20	±	82.30	263.44	±	304.51	No
		STRONTIUM-90	20.50	±	5.23	75.85	±	19.35	**Yes**
MAIN GATE	9/30/2015	AMERICIUM-241	0.77	±	1.25	2.85	±	4.63	No
		CESIUM-137	58.70	±	54.80	217.19	±	202.76	No
		PLUTONIUM-238	0.70	±	1.00	2.60	±	3.68	No
QA-1 (MAIN GATE)	9/30/2015	AMERICIUM-241	-1.26	±	0.82	-4.66	±	3.05	No
		CESIUM-137	0.73	±	0.90	2.71	±	3.33	No
		PLUTONIUM-238	26.70	±	3.83	98.79	±	14.17	**Yes**
VAN BUREN GATE	9/30/2015	CESIUM-137	6.00	±	110.00	22.20	±	407.00	No
		STRONTIUM-90	13.30	±	4.75	49.21	±	17.58	No

TABLE C-4. Tritium Concentrations in Atmospheric Moisture

Sampling Group and Location	Start Date	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-13}$ µCi/mL$_{air}$)			Result ± 1s Uncertainty ($\times 10^{-9}$ Bq/mL$_{air}$)			Result > 3s
BOUNDARY									
ATOMIC CITY	06/17/15	07/08/15	4.17	±	0.89	15.41	±	3.27	**Yes**
ATOMIC CITY	07/08/15	07/29/15	2.08	±	0.91	7.71	±	3.37	No
ATOMIC CITY	07/29/15	08/19/15	2.85	±	0.87	10.54	±	3.23	**Yes**
ATOMIC CITY	08/19/15	09/16/15	1.14	±	0.62	4.23	±	2.30	No
DISTANT									
BLACKFOOT	06/24/15	07/08/15	2.03	±	2.05	7.51	±	7.60	No
BLACKFOOT	07/08/15	07/22/15	10.33	±	1.72	38.22	±	6.38	**Yes**
BLACKFOOT	07/22/15	08/05/15	5.69	±	1.60	21.07	±	5.92	**Yes**
BLACKFOOT	08/05/15	08/19/15	4.99	±	1.93	18.46	±	7.13	No
BLACKFOOT	08/19/15	09/09/15	3.93	±	1.22	14.55	±	4.52	**Yes**
BLACKFOOT	09/09/15	09/30/15	5.15	±	1.12	19.06	±	4.15	**Yes**
IDAHO FALLS	06/17/15	07/01/15	4.84	±	1.60	17.91	±	5.94	**Yes**
IDAHO FALLS	07/01/15	07/15/15	7.34	±	1.81	27.17	±	6.70	**Yes**
IDAHO FALLS	07/15/15	07/29/15	5.27	±	1.64	19.49	±	6.06	**Yes**
IDAHO FALLS	07/29/15	08/12/15	7.03	±	1.69	26.00	±	6.24	**Yes**
IDAHO FALLS	08/12/15	09/02/15	4.32	±	1.23	15.97	±	4.57	**Yes**
IDAHO FALLS	09/02/15	09/22/15	4.06	±	1.15	15.02	±	4.26	**Yes**
SUGAR CITY	06/17/15	07/01/15	14.34	±	2.48	53.05	±	9.17	**Yes**
SUGAR CITY	07/01/15	07/15/15	11.69	±	2.74	43.27	±	10.13	**Yes**
SUGAR CITY	07/15/15	07/29/15	6.11	±	2.48	22.59	±	9.19	No
SUGAR CITY	07/29/15	08/12/15	8.74	±	2.62	32.35	±	9.69	**Yes**
SUGAR CITY	08/12/15	09/02/15	7.46	±	1.80	27.60	±	6.67	**Yes**
SUGAR CITY	09/02/15	09/23/15	8.82	±	1.84	32.64	±	6.80	**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
IDAHO FALLS	06/30/15	07/31/15	74.60	±	22.20	2.76	±	0.82	**Yes**
	07/31/15	08/31/15	76.70	±	23.10	2.84	±	0.85	**Yes**
	08/31/15	09/30/15	34.40	±	22.70	1.27	±	0.84	No
CFA	07/01/15	08/03/15	61.50	±	22.70	2.28	±	0.84	No
	08/03/15	08/30/15	43.70	±	22.70	1.62	±	0.84	No
	08/30/15	09/28/15	59.80	±	23.10	2.21	±	0.85	No
EFS	06/24/15	07/01/15	162.00	±	23.10	5.99	±	0.85	**Yes**
	07/01/15	07/08/15	101.00	±	22.30	3.74	±	0.83	**Yes**
	07/08/15	07/15/15	192.00	±	23.70	7.10	±	0.88	**Yes**
	07/22/15	07/29/15	111.00	±	22.40	4.11	±	0.83	**Yes**
	07/29/15	08/05/15	51.20	±	21.60	1.89	±	0.80	No
	09/09/15	09/16/15	63.50	±	23.00	2.35	±	0.85	No

Table C-6. Weekly and Monthly Iodine-131 and Cesium-137 Concentrations in Milk

		Iodine-131							Cesium-137						
Location	Sampling Date	Result ± 1s Uncertainty (pCi[†]/L)			Result ± 1s Uncertainty (Bq[‡]/L)			Result > 3s	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
BLACKFOOT	07/05/15	0.18	±	1.27	0.007	±	0.047	No	1.30	±	0.94	0.048	±	0.035	No
	08/03/15	-0.26	±	1.21	-0.010	±	0.045	No	1.59	±	0.84	0.059	±	0.031	No
	09/21/15	-0.72	±	2.22	-0.027	±	0.082	No	-0.43	±	1.25	-0.016	±	0.046	No
CONTROL	07/07/15	1.19	±	2.86	0.044	±	0.106	No	0.68	±	1.92	0.025	±	0.071	No
	08/04/15	-2.42	±	2.23	-0.090	±	0.083	No	1.05	±	1.29	0.039	±	0.048	No
	09/01/15	-0.39	±	2.19	-0.014	±	0.081	No	1.95	±	1.31	0.072	±	0.049	No
DIETRICH	07/07/15	1.21	±	1.22	0.045	±	0.045	No	-0.13	±	0.88	-0.005	±	0.033	No
	08/04/15	-1.06	±	1.93	-0.039	±	0.071	No	-0.36	±	1.95	-0.013	±	0.072	No
	09/01/15	1.16	±	1.97	0.043	±	0.073	No	-0.03	±	1.91	-0.001	±	0.071	No
FORT HALL	07/05/15	-0.56	±	1.28	-0.021	±	0.047	No	-0.05	±	0.62	-0.002	±	0.023	No
Duplicate	07/06/15	-1.51	±	2.68	-0.056	±	0.099	No	0.95	±	1.89	0.035	±	0.070	No
	08/02/15	-1.92	±	2.55	-0.071	±	0.094	No	0.05	±	1.84	0.002	±	0.068	No
HOWE	07/07/15	-2.49	±	2.92	-0.092	±	0.108	No	0.62	±	1.89	0.023	±	0.070	No
	08/04/15	2.98	±	1.50	0.110	±	0.056	No	-0.80	±	0.88	-0.030	±	0.033	No
	09/01/15	-0.70	±	1.17	-0.026	±	0.043	No	1.87	±	0.82	0.069	±	0.030	No
IDAHO FALLS	07/07/15	1.61	±	1.22	0.060	±	0.045	No	0.85	±	0.67	0.031	±	0.025	No
	07/14/15	1.46	±	1.13	0.054	±	0.042	No	0.32	±	0.61	0.012	±	0.023	No
	07/21/15	1.29	±	1.96	0.048	±	0.073	No	0.05	±	1.87	0.002	±	0.069	No
	07/28/15	-0.05	±	1.06	-0.002	±	0.039	No	-1.43	±	0.82	-0.053	±	0.030	No
	08/04/15	-0.42	±	1.06	-0.016	±	0.039	No	-0.60	±	0.79	-0.022	±	0.029	No
	08/11/15	-0.13	±	1.06	-0.005	±	0.039	No	0.03	±	0.74	0.001	±	0.027	No
	08/18/15	1.09	±	1.08	0.040	±	0.040	No	-0.67	±	0.80	-0.025	±	0.030	No
	08/25/15	-0.84	±	1.08	-0.031	±	0.040	No	-0.22	±	0.77	-0.008	±	0.028	No
	09/01/15	1.21	±	1.10	0.045	±	0.041	No	0.57	±	0.78	0.021	±	0.029	No
	09/08/15	-0.25	±	1.29	-0.009	±	0.048	No	0.12	±	0.88	0.005	±	0.032	No
	09/15/15	-0.02	±	1.27	-0.001	±	0.047	No	-0.25	±	0.83	-0.009	±	0.031	No
	09/22/15	-1.26	±	1.91	-0.047	±	0.071	No	-1.76	±	1.33	-0.065	±	0.049	No
	09/29/15	-1.15	±	1.13	-0.043	±	0.042	No	0.95	±	0.81	0.035	±	0.030	No
RUPERT	07/07/15	-1.88	±	2.66	-0.070	±	0.099	No	0.47	±	1.90	0.018	±	0.070	No
	08/04/15	-0.79	±	1.91	-0.029	±	0.071	No	1.36	±	1.32	0.050	±	0.049	No
	09/01/15	1.87	±	1.85	0.069	±	0.069	No	-1.34	±	1.32	-0.050	±	0.049	No
TERRETON	07/07/15	-1.44	±	1.35	-0.053	±	0.050	No	0.05	±	0.85	0.002	±	0.031	No
	08/04/15	-0.60	±	2.32	-0.022	±	0.086	No	0.57	±	1.96	0.021	±	0.073	No
	09/01/15	1.31	±	2.16	0.049	±	0.080	No	-2.11	±	2.08	-0.078	±	0.077	No
Duplicate	09/01/15	0.87	±	1.40	0.032	±	0.052	No	1.36	±	0.90	0.050	±	0.033	No

Table C-7. 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
ARCO	7/29/2015	-5.00	±	42.23	-18.52	±	156.39	No
ATOMIC CITY	7/22/2015	105.17	±	63.00	389.53	±	233.33	No
ATOMIC CITY-Duplicate	7/22/2015	-34.07	±	50.92	-126.18	±	188.58	No
BLACKFOOT	8/16/2015	-7.44	±	39.26	-27.57	±	145.41	No
CONTROL	8/17/2015	47.74	±	43.56	176.83	±	161.34	No
EFS	7/29/2015	-1.77	±	33.49	-6.54	±	124.04	No
FAA TOWER	8/5/2015	31.89	±	33.88	118.12	±	125.49	No
IDAHO FALLS	8/5/2015	-7.43	±	58.61	-27.50	±	217.07	No
MONTEVIEW	8/12/2015	7.61	±	47.38	28.17	±	175.48	No
		Strontium-90						
		Result ± 1s Uncertainty pCi/kg			**Result ± 1s Uncertainty (x 10^{-2} Bq/kg)**			**Result > 3s**
ARCO	7/29/2015	47.60	±	6.41	176.30	±	23.74	**Yes**
ATOMIC CITY	7/22/2015	46.30	±	7.01	171.48	±	25.96	**Yes**
ATOMIC CITY-Duplicate	7/22/2015	53.50	±	7.08	198.15	±	26.22	**Yes**
BLACKFOOT	8/16/2015	3.76	±	1.92	13.93	±	7.11	No
CONTROL	8/17/2015	19.60	±	3.40	72.59	±	12.59	**Yes**
EFS	7/29/2015	46.40	±	6.12	171.85	±	22.67	**Yes**
FAA TOWER	8/5/2015	372.00	±	44.00	1377.78	±	162.96	**Yes**
IDAHO FALLS	8/5/2015	20.60	±	4.14	76.30	±	15.33	**Yes**
MONTEVIEW	8/12/2015	43.30	±	5.75	160.37	±	21.30	**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-8. Gamma-emitting Radionuclides and Strontium-90 in Grain

Location	Sampling Date	Cesium-137 Result ± 1s Uncertainty pCi/kg			Cesium-137 Result ± 1s Uncertainty Bq/kg			Result > 3s
AMERICAN FALLS	08/04/15	1.65	±	1.64	0.06	±	0.06	No
ARCO	09/23/15	2.67	±	1.39	0.10	±	0.05	No
CONTROL	09/10/15	1.94	±	1.17	0.07	±	0.04	No
HOWE	09/01/15	1.34	±	2.15	0.05	±	0.08	No
IDAHO FALLS	08/11/15	3.20	±	2.58	0.12	±	0.10	No
MORELAND	08/19/15	-0.24	±	1.13	-0.01	±	0.04	No
ROBERTS	09/08/15	1.96	±	2.28	0.07	±	0.08	No
RUPERT	08/04/15	1.61	±	1.83	0.06	±	0.07	No
TERRETON	08/19/15	0.46	±	1.19	0.02	±	0.04	No
TERRETON-Duplicate	08/19/15	3.48	±	1.23	0.13	±	0.05	No
		Strontium-90						
		Result ± 1s Uncertainty pCi/kg			**Result ± 1s Uncertainty Bq/kg**			**Result > 3s**
AMERICAN FALLS	08/04/15	2.47	±	1.71	0.09	±	0.06	No
ARCO	09/23/15	-2.11	±	1.80	-0.08	±	0.07	No
CONTROL	09/10/15	4.49	±	2.58	0.17	±	0.10	No
HOWE	09/01/15	2.26	±	1.92	0.08	±	0.07	No
IDAHO FALLS	08/11/15	3.08	±	1.83	0.11	±	0.07	No
MORELAND	08/19/15	-0.86	±	1.95	-0.03	±	0.07	No
ROBERTS	09/08/15	8.27	±	2.00	0.31	±	0.07	**Yes**
RUPERT	08/04/15	2.93	±	1.48	0.11	±	0.05	No
TERRETON	08/19/15	1.01	±	1.26	0.04	±	0.05	No
TERRETON-Duplicate	08/19/15	1.93	±	1.18	0.07	±	0.04	No

Table C-9. 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	8/12/2015	Muscle	^{131}I	9.17	±	6.67	33.94	±	24.67	No
	8/12/2015		^{137}Cs	1.15	±	2.00	4.25	±	7.41	No
ELK	9/16/2015	Muscle	^{131}I	13.11	±	6.91	48.50	±	25.58	No
	9/16/2015		^{137}Cs	3.01	±	1.55	11.14	±	5.72	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	0.30
July	0.02
August	0.95
September	0.93
Gross Beta	
Quarter	0.62
July	0.63
August	0.56
September	0.73

a. A 'p' value greater than 0.05 signifies no statistical difference between data groups. 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.

		Mann-Whitney U test
Parameter	**Week**	**P[a]**
Gross Alpha		
	July 1	0.28
	July 8	0.12
	July 15	0.02
	July 22	0.32
	July 29	0.32
	August 5	0.89
	August 12	0.17
	August 19	1.00
	August 26	0.32
	September 2	0.78
	September 9	0.48
	September 16	0.62
	September 23	0.20
	September 30	0.28
Gross Beta		
	July 1	0.32
	July 8	0.06
	July 15	0.02
	July 22	0.25
	July 29	0.62
	August 5	0.89
	August 12	0.94
	August 19	0.32
	August 26	0.62
	September 2	0.48
	September 9	0.94
	September 16	0.43
	September 23	0.03
	September 30	0.89

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