Gonzales Stoller Surveillance, LLC
Environmental Surveillance, Education, and Research Program
ISSN NUMBER 1089-5469

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

**January 2016**

***Contributors:***
***Russ Mitchell, Marilyn Case***

**Program conducted for the U.S. Department of Energy, Idaho Operations Office**
**Under Contract DE-NE0000300**

**By Gonzales Stoller Surveillance, LLC**
**Environmental Surveillance, Education, and Research Program**
**Douglas K. Halford, Program Manager**
**120 Technology Dr., Idaho Falls, Idaho 83401**
**www.gsseser.com**

# EXECUTIVE SUMMARY

None of the radionuclides detected in samples collected during the second 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 second 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, April 1 through June 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 and drinking/surface water
- Milk and alfalfa
- Environmental radiation measurements

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

| Media | Sample Type | Analysis | Results |
|---|---|---|---|
| Air | Filters | Gross alpha, gross beta | There were no statistical differences in gross alpha or gross beta concentrations measured at Distant, Boundary, and INL Site sampling 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 or $^{90}$Sr were detected. Plutonium-239/240 was reported in one composite just above the detection limit. |
| | Charcoal Cartridge | Iodine-131 | Iodine-131 was not detected in any of the 26 batches counted during the quarter. |
| Atmospheric Moisture | Liquid | Tritium | Fourteen of the 19 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 | Nine samples were collected. Eight 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. |
| Drinking/surface water | Liquid | Gross alpha, gross beta, tritium | Gross alpha activity was reported in one drinking water sample and one surface water sample. Gross beta was detected in all of the drinking water samples except for the control sample of bottled water and one other sample (and its duplicate), and in all of the surface water samples. Activities were consistent with natural levels of radioactivity in the aquifer. Tritium was detected in five drinking water samples, including the bottled water, and in two of the surface water samples. The results were well below the DCS for |

| | | | |
|---|---|---|---|
| | | | tritium in drinking water. |
| Milk | Liquid | Iodine-131, other gamma-emitting radionuclides, $^{90}$Sr, tritium | No Iodine-131 or other human-made gamma emitting radionuclides were detected. Strontium-90 was detected in six of eight samples analyzed including a control sample from out-of-state. All concentrations were well within the range of detections during the past few years. Tritium was also detected in seven of eight samples analyzed at a concentration similar to those found in other liquid media. |
| Alfalfa | Vegetation | Gamma-emitting radionuclides, $^{90}$Sr | No human-made gamma-emitting radionuclides or $^{90}$Sr were found in the three subsamples analyzed. |
| Environmental Dosimeters | Environmental radiation | External radioactivity | Measurements of environmental radiation were made using both thermoluminescent dosimeters (TLDs) and optically-stimulated luminescent dosimeters (OSLDs). Both dosimeter types showed a similar pattern with slightly higher measurements at Distant locations than Boundary locations. |

## 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 second quarter of 2015 (April 1-June 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 (http://www.epa.gov/narel/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 ($\sigma$), 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 second 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 second 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, 221 ft$^3$ (573 m$^3$) of air was sampled at each location, each week, at an average flow rate of 2.01 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.

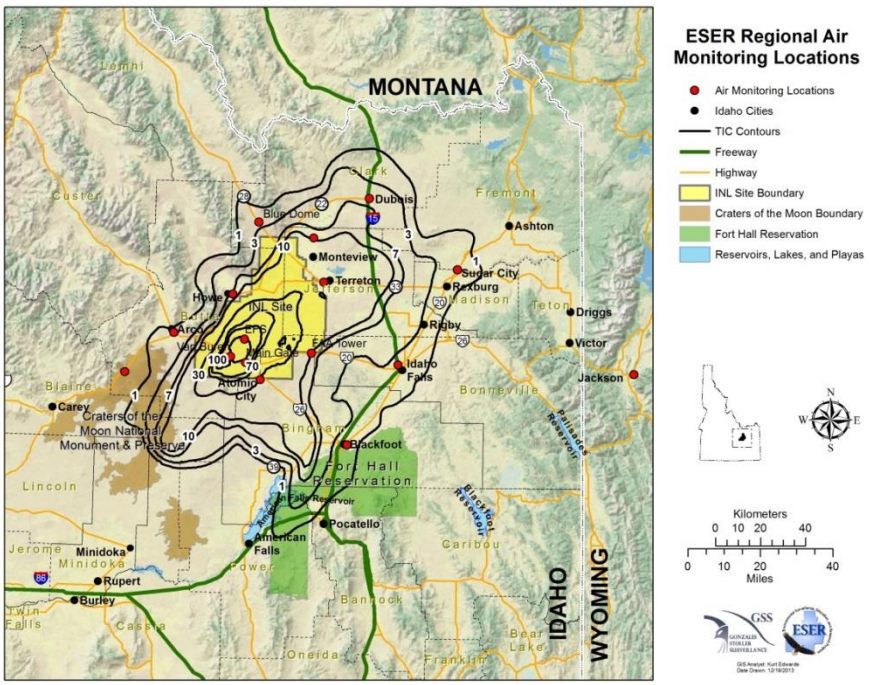


**Figure 2. Low-volume air sampler locations.**

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 use d to determine if statistical differences exist between INL Site, Boundary, and Distant data groups. No statistical differences in gross alpha concentrations between groups were noted during any month (Table D-1).

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 no weeks where a statistical difference existed between the two sample groups during the second quarter (Table D-2).

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 no statistical differences between Boundary and Distant measurements during any week of the quarter (Table D-1).

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

No $^{137}Cs$ or other human-made gamma-emitting radionuclides were found in quarterly composites. Strontium-90 and americium were not detected either. Plutonium-239/240 was

reported in the composite from the Van Buren gate. The result was just above the detection limit and was 0.02 percent of the DCS. 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 19 atmospheric moisture samples collected during the second quarter of 2015. Fourteen of the 19 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 $1.4 \times 10^{-8}$ $\mu Ci/mL_{air}$ with a maximum reported value of $15.5 \times 10^{-13}$ $\mu Ci/mL_{air}$ at Sugar City. Results are shown in Table C-4, Appendix C.

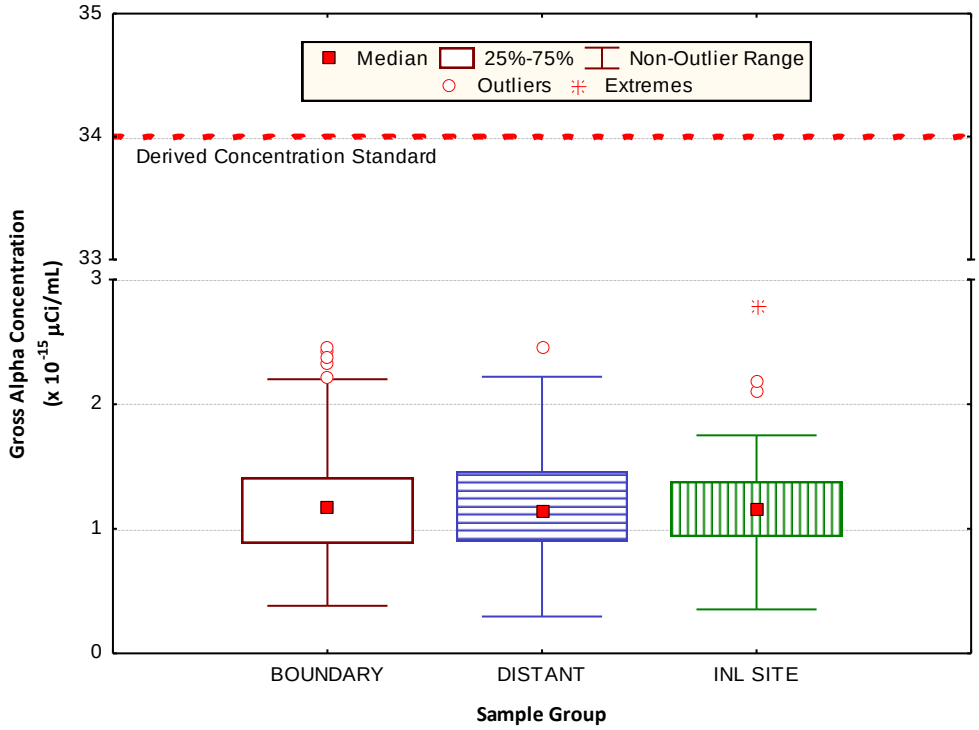


**Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations for the second quarter of 2015.**

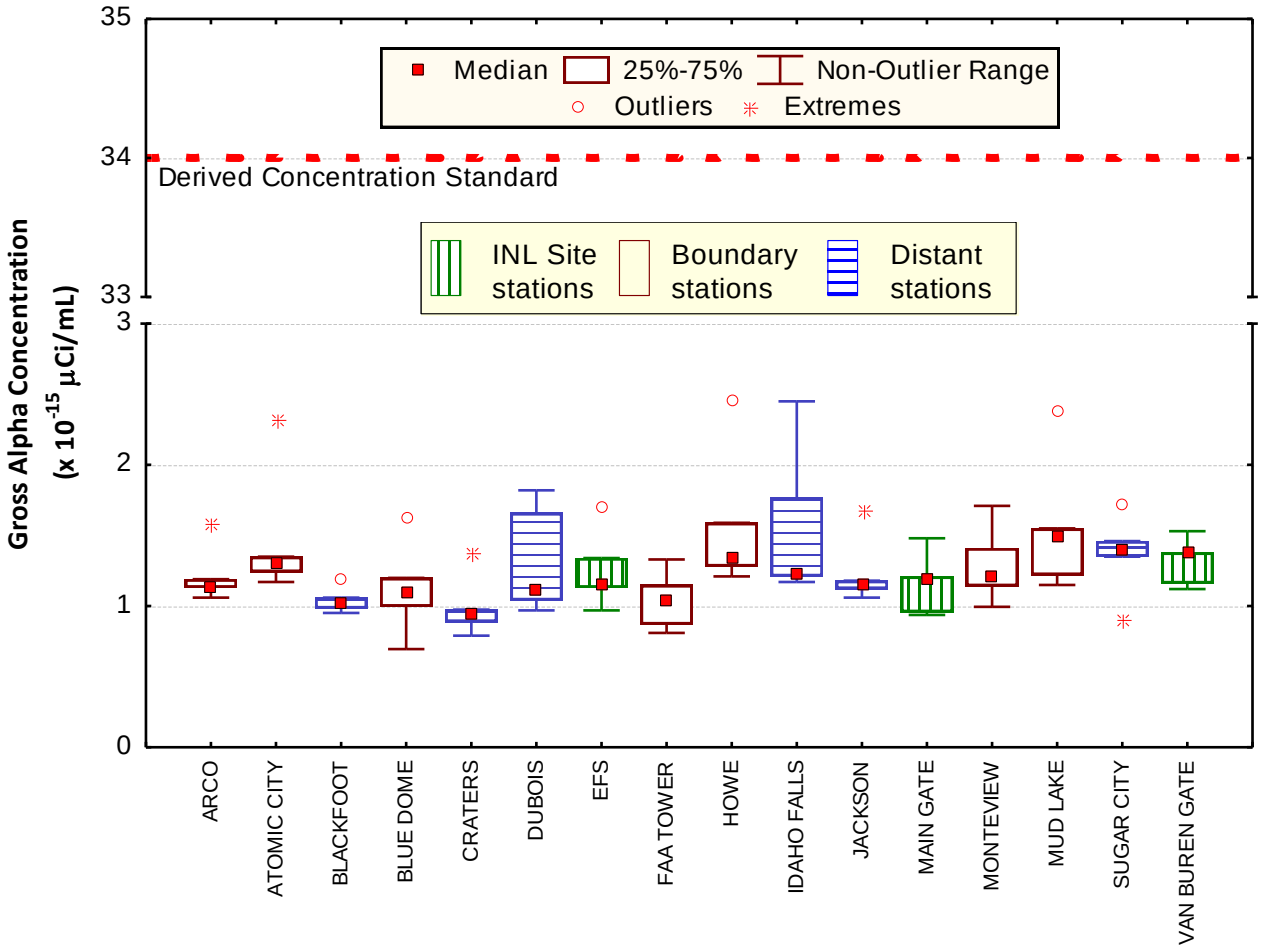


**Figure 4. April gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.**

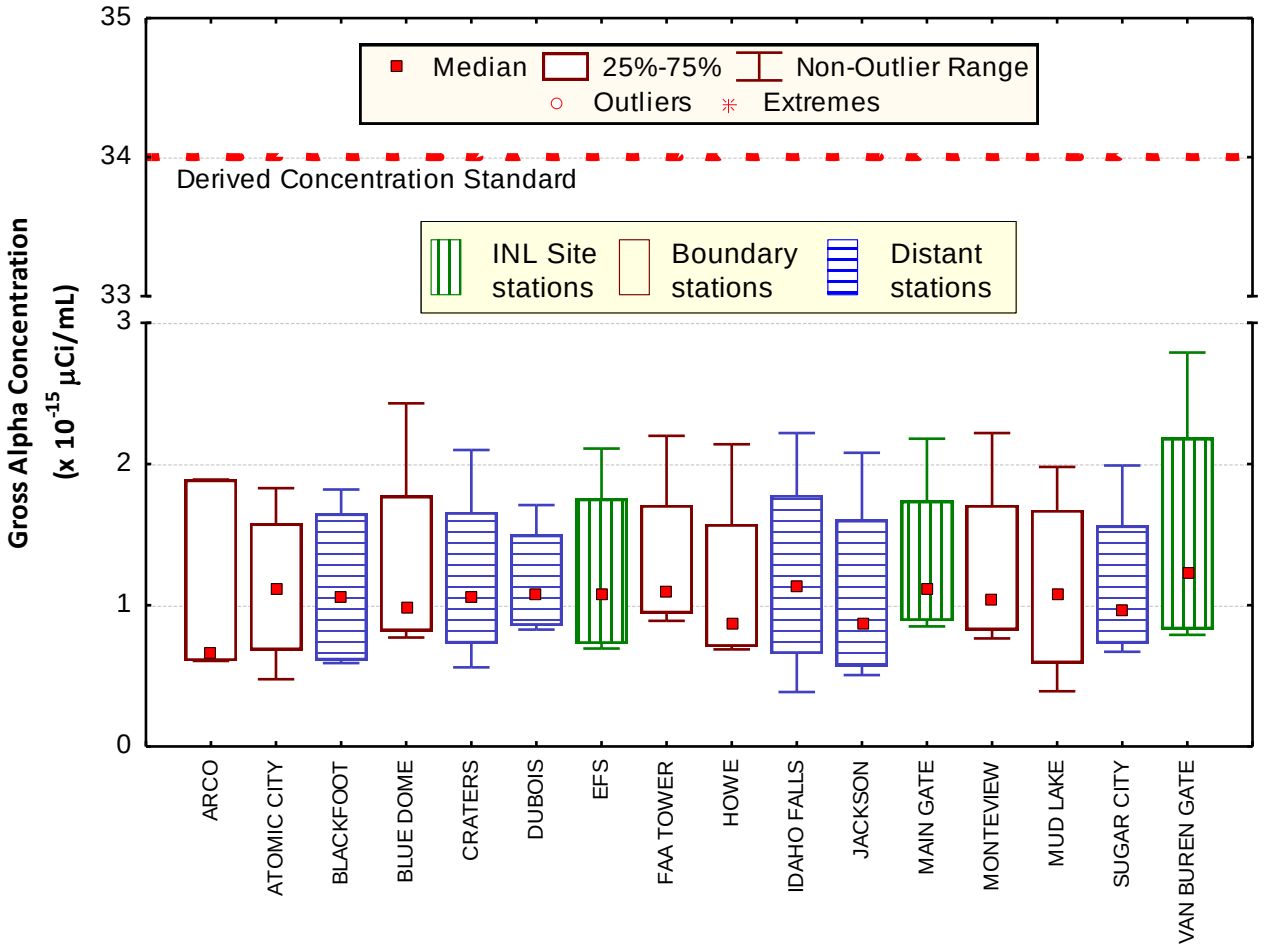


**Figure 5. May gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location, except Arco (N = 3).**

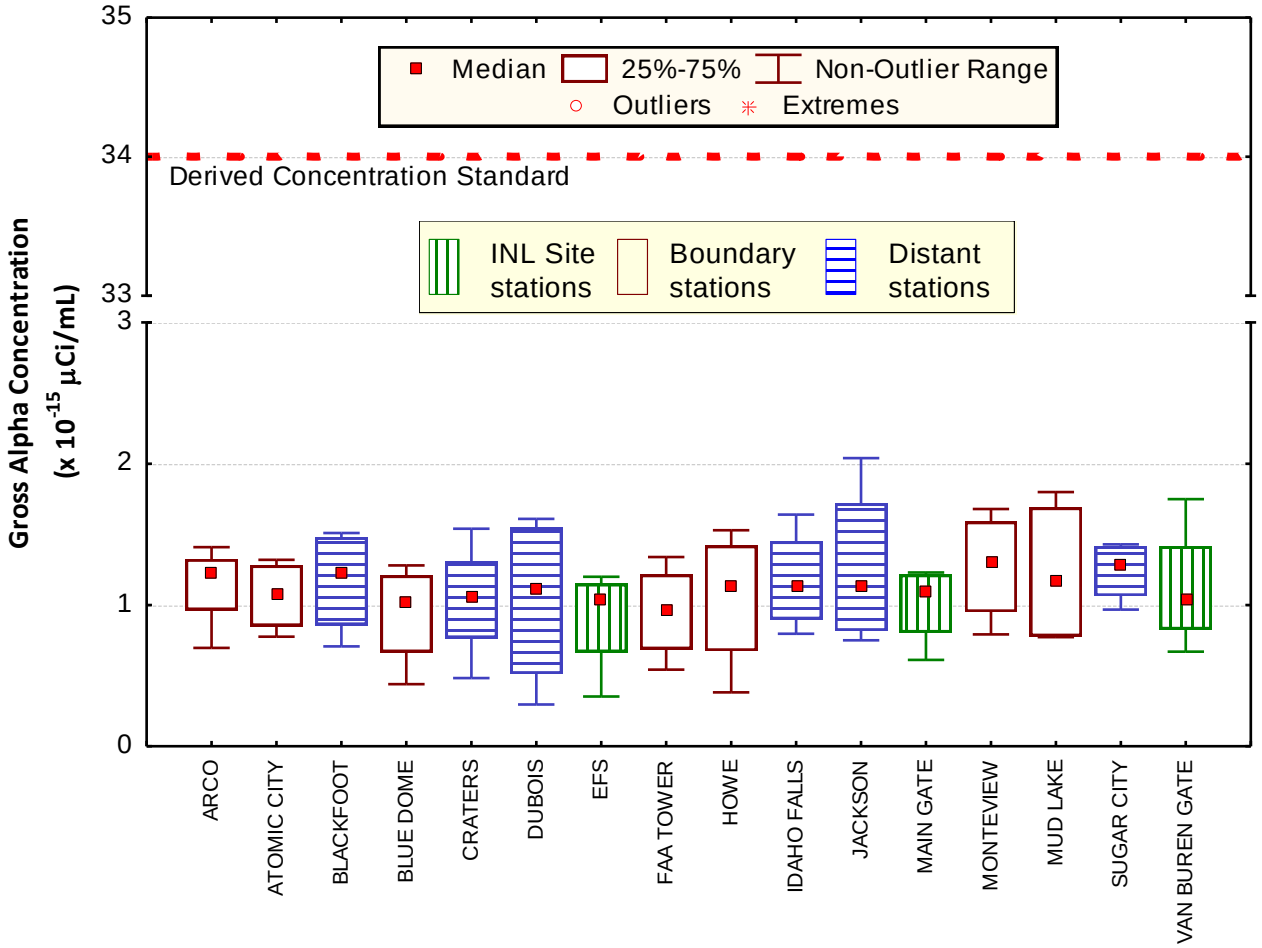


**Figure 6. June gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.**

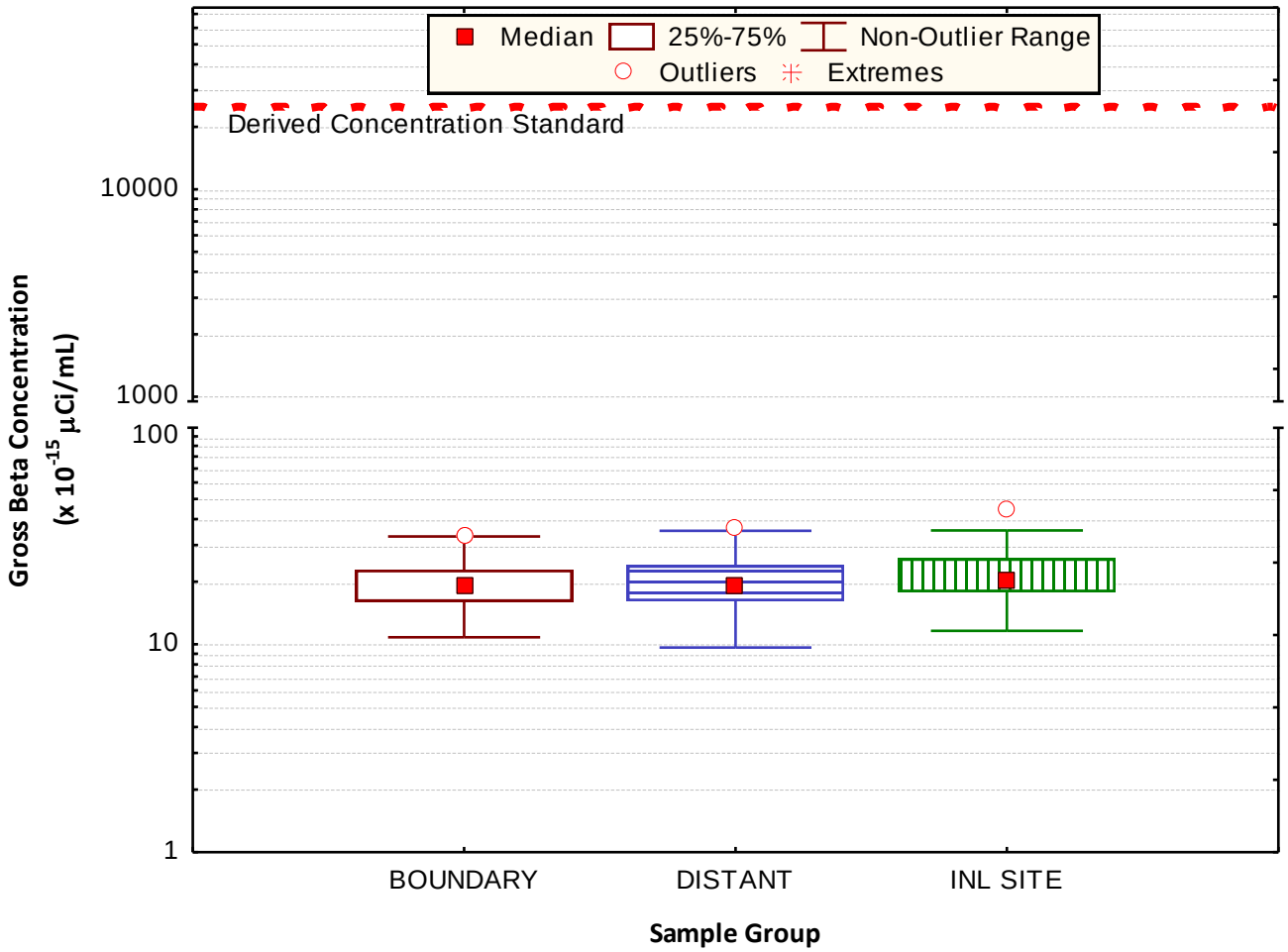


**Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the second quarter of 2015.**

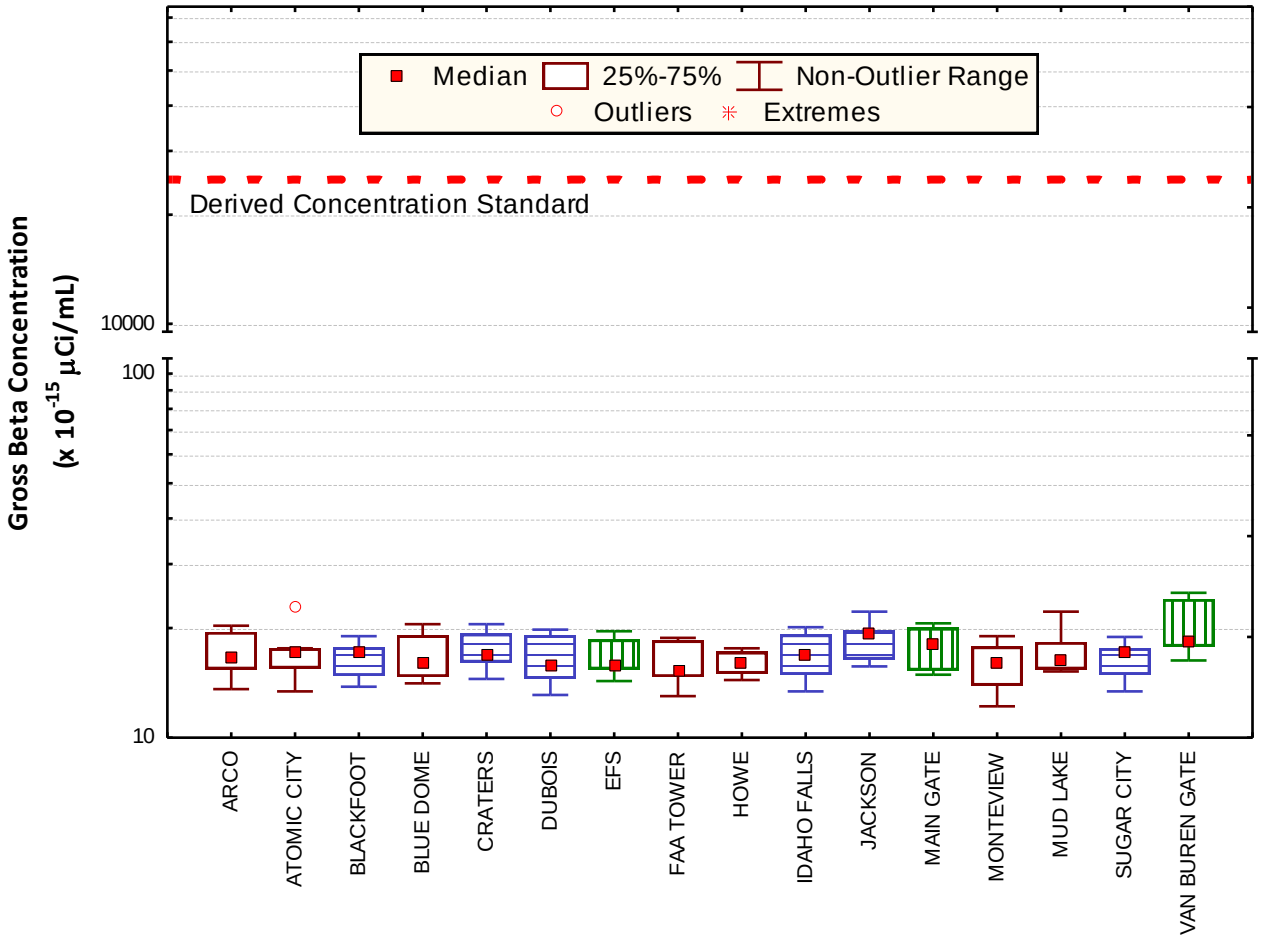


**Figure 8. April gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location.**

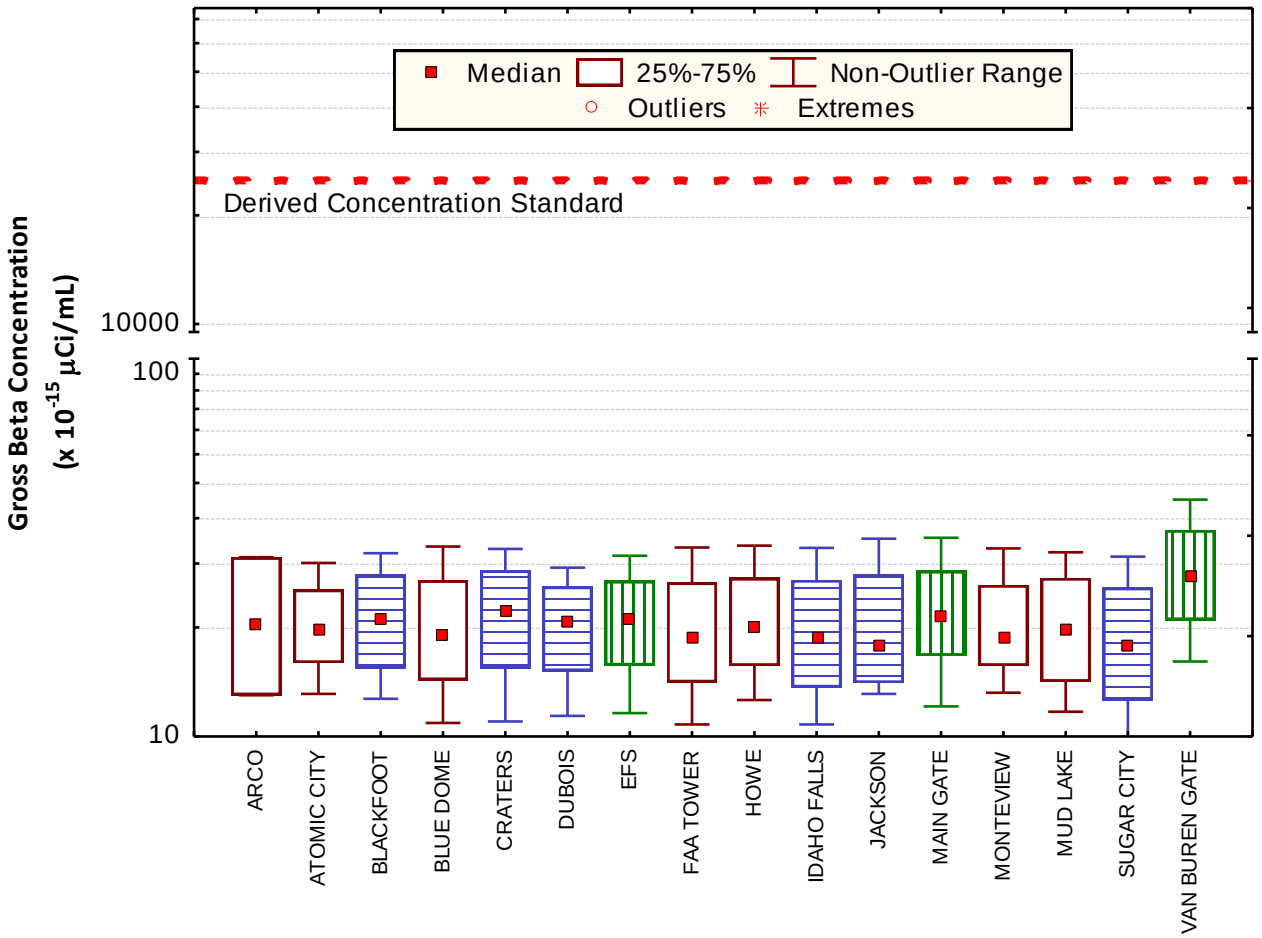


**Figure 9. May gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location, except Arco ( N = 3).**

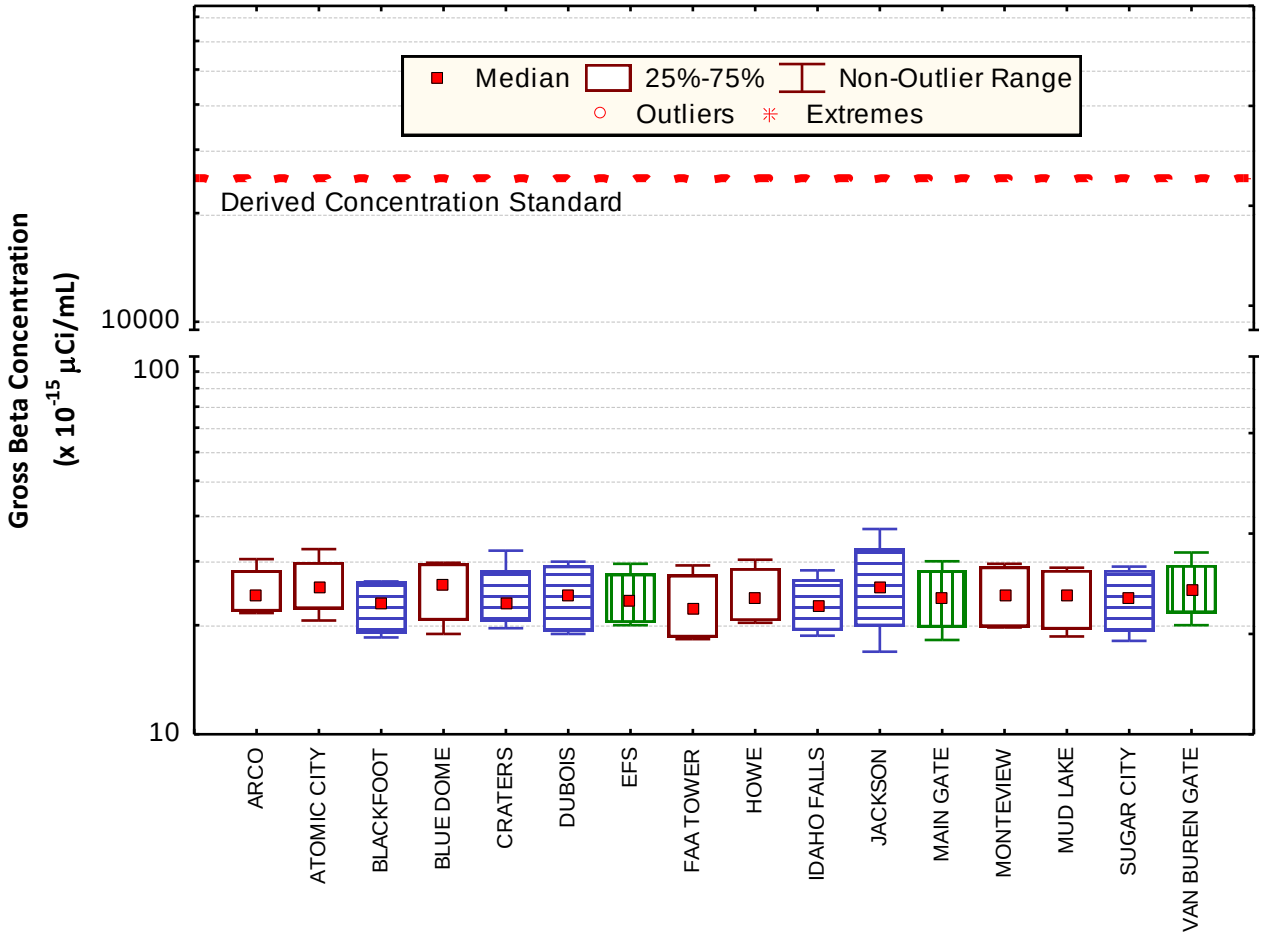


**Figure 10. June gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.**

# 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 second quarter of 2015 produced sufficient precipitation to yield nine samples.

Tritium was measured above the 3s values in eight of the nine 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 2013). Most samples have values up to about 150 pCi/L, with occasional values ranging up to about 300-400 pCi/L. The maximum value in the second quarter was 183 pCi/L in a May EFS sample.

### *WATER SAMPLING*

Drinking water samples were collected at eight locations, plus a duplicate. A control sample of bottled water was also prepared. Surface water samples were collected at three Thousand Springs locations. All samples were analyzed for gross alpha, gross beta, and tritium. Results are listed in Table C-6 of Appendix C.

Gross alpha activity was detected in one of the drinking water samples (Shoshone) and one of the surface water samples (Bill Jones Fish Farm near Hagerman) at levels slightly above the minimum detectable concentration. Gross beta activity was detected in all of the drinking water samples except the sample and duplicate sample from Howe and the control sample, and in all of the surface water samples. All concentrations were generally similar to previous results from drinking and surface water sampling. Natural levels of radioactive decay products of thorium and uranium exist in the Snake River Plain Aquifer and are the likely source of the measured concentrations.

Tritium was also detected in five of the drinking water samples (including the bottled water) and two of the three surface water samples. The concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous results. The maximum value was 96 pCi/L at Alpheus Spring near Twin Falls. The results are well below the DCS of $1.9 \times 10^6$ pCi/L for tritium in drinking water.

# 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 second 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 second 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 second quarter. No other human-made gamma-emitting radionuclides were found either. Data for $^{131}I$ and $^{137}Cs$ in milk samples are listed in Appendix C, Table C-7.

Results for $^{90}Sr$ and tritium are listed in Appendix C, Table C-8. Strontium-90 was detected in six of the eight samples, including the control sample. The maximum concentration of 0.41 pCi/L from Idaho Falls and the control location is toward the lower end of the range of maximum concentrations for the past several years. The presence of $^{90}Sr$ at similar levels in samples from near the INL Site and distant from the INL Site (as well as the organic milk from Colorado), does not indicate an INL Site impact of the results. There is no DCS for $^{90}Sr$ in milk; however, for comparison the results were well below the drinking water DCS of $1.1 \times 10^3$ pCi/L.

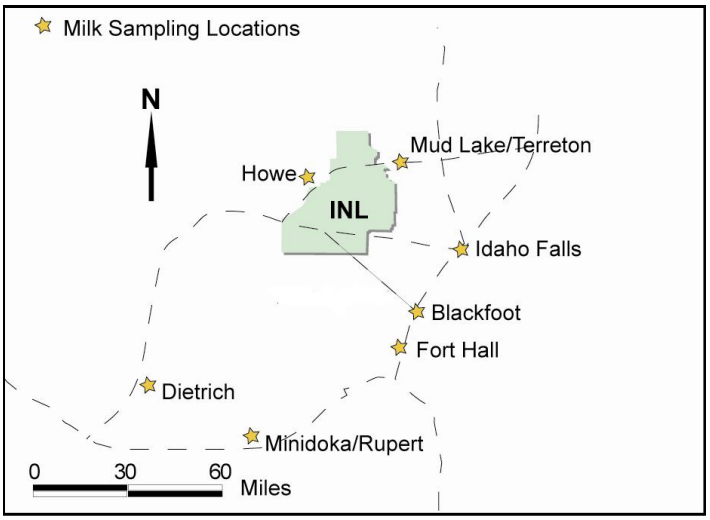


Figure 11. ESER milk sampling locations

During the summer of 2020, a review of Appendix C, Table C-8 determined the tritium activity concentration and uncertainty values for the milk sample collected at Fort Hall were incorrect. The activity concentration and uncertainty values were updated with the correct values. Tritium was detected in seven of eight samples analyzed, with a maximum value of 144 pCi/L from Dietrich. All results were similar to those previously measured and similar to those found in other liquid media like precipitation. There is no DCS for tritium in milk, but the results were well below the DCS for tritium in drinking water ($1.9 \times 10^6$ pCi/L).

### *ALFALFA SAMPLING*

A sample of alfalfa was obtained from a grower in the Mud Lake area. The sample was then divided into three subsamples and analyzed for gamma-emitting radionuclides and $^{90}Sr$. Data for $^{137}Cs$ and $^{90}Sr$ in alfalfa samples are listed in Appendix C, Table C-9.

No human-made gamma-emitting radionuclides or $^{90}Sr$ were found in any of the subsamples this year. During each of the first four years alfalfa has been collected, $^{90}Sr$ was found in one of three subsamples, always in the 70-150 pCi/kg range.

### *LARGE GAME ANIMAL SAMPLING*

No large game animals were sampled in the second quarter.

# 6. ENVIRONMENTAL RADIATION

An array of thermoluminescent dosimeters (TLDs) is distributed throughout the Eastern Snake River Plain to monitor for environmental radiation. In November 2011 the ESER Program also placed optically stimulated luminescent dosimeters (OSLDs) in the same locations as the TLDs to run a side-by-side comparison of the two dosimeter technologies. Two OSLDs are in place at each location. TLDs and OSLDs are changed out at the beginning of May and again at the beginning of November after six months in the field.

Results from the second quarter TLDs are presented in Appendix C, Table C-10.

Similar to the low-volume air results the environmental dosimeter locations are also divided into Boundary and Distant groupings. For the Boundary group, six-month exposures ranged from 52.5 milliRotengens (mR) at Blue Dome to 66.1 mR at Mud Lake. The overall Boundary exposure was 60.0 mR. Distant exposures ranged from 54.8 mR at Dubois to 75.7 mR for the TLD at Sugar City. The average Distant exposure was 62.1 mR.

OSLD results from the second quarter followed a similar pattern to the TLDs (Appendix C, Table C-11). OSLDs are presented in dose units of millirem (mrem). Boundary OSLD values ranged from 46.48 mrem at Blue Dome to 62.59 mrem at Mud Lake, with an overall average of 55.31 mrem. Distant results varied from 45.75 mrem at Dubois to 69.70 mrem at Sugar City. The Distant average was 56.36 mrem.

# 7. QUALITY ASSURANCE

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

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

Sample results are compared to criteria described in the Quality Assurance Project Plan for the INL Site Offsite Environmental Surveillance Program (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 Second Quarter of 2015 (GSS 2015).

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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 Second Quarter 2015**

| Sample Type | Analysis | Approximate Minimum Detectable Concentration[a] (MDC) | Derived Concentration Standard[b] (DCS) |
|---|---|---|---|
| **Air** (particulate filter)[e] | Gross alpha[c] | $3.65 \times 10^{-16}$ µCi/mL | $3.4 \times 10^{-14}$ µCi/mL |
| | Gross beta[d] | $9.51 \times 10^{-16}$ µCi/mL | $2.5 \times 10^{-11}$ µCi/mL |
| | $^{137}$Cs | $6.42 \times 10^{-17}$ µCi/mL | $3.9 \times 10^{-10}$ µCi/mL |
| | $^{90}$Sr | $1.82 \times 10^{-17}$ µCi/mL | $2.5 \times 10^{-11}$ µCi/mL |
| | $^{238}$Pu | $4.15 \times 10^{-18}$ µCi/mL | $3.7 \times 10^{-14}$ µCi/mL |
| | $^{239/240}$Pu | $3.83 \times 10^{-18}$ µCi/mL | $3.4 \times 10^{-14}$ µCi/mL |
| | $^{241}$Am | $4.84 \times 10^{-18}$ µCi/mL | $1.8 \times 10^{-12}$ µCi/mL |
| **Air** (charcoal cartridge)[e] | $^{131}$I | $8.48 \times 10^{-16}$ µCi/mL | $2.3 \times 10^{-19}$ µCi/mL |
| **Air** (atmospheric moisture) | $^{3}$H | 80.0 $pCi/L_{water}$ | $2.1 \times 10^{-7}$ $\mu Ci/mL_{air}$ |
| **Air** (precipitation) | $^{3}$H | 79.7 pCi/L | $1.9 \times 10^{-3}$ µCi/mL |
| **Milk** | $^{131}$I | 0.61 pCi/L | -- |
| | $^{137}$Cs | 0.70 pCi/L | -- |
| | $^{3}$H | 74.8 pCi/L | -- |
| | $^{90}$Sr | 0.20 pCi/L | -- |

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 | 4/1/2015 | 1.06 ± 0.16 | 3.92 ± 0.60 | Yes | 15.40 ± 0.52 | 56.98 ± 1.94 | Yes |
| | 4/8/2015 | 1.19 ± 0.17 | 4.40 ± 0.62 | Yes | 16.70 ± 0.53 | 61.79 ± 1.95 | Yes |
| | 4/15/2015 | 1.14 ± 0.17 | 4.22 ± 0.62 | Yes | 20.30 ± 0.58 | 75.11 ± 2.15 | Yes |
| | 4/22/2015 | 1.13 ± 0.20 | 4.18 ± 0.72 | Yes | 13.60 ± 0.51 | 50.32 ± 1.87 | Yes |
| | 4/29/2015 | 1.58 ± 0.19 | 5.85 ± 0.70 | Yes | 19.50 ± 0.58 | 72.15 ± 2.14 | Yes |
| | 5/6/2015 | 1.89 ± 0.21 | 6.99 ± 0.79 | Yes | 31.20 ± 0.69 | 115.44 ± 2.54 | Yes |
| a | 5/13/2015 | ± | ± | No | ± | ± | No |
| | 5/20/2015 | 0.66 ± 0.14 | 2.43 ± 0.51 | Yes | 13.00 ± 0.48 | 48.10 ± 1.77 | Yes |
| | 5/27/2015 | 0.61 ± 0.15 | 2.24 ± 0.55 | Yes | 20.40 ± 0.59 | 75.48 ± 2.19 | Yes |
| | 6/3/2015 | 1.23 ± 0.17 | 4.55 ± 0.63 | Yes | 21.60 ± 0.58 | 79.92 ± 2.16 | Yes |
| | 6/10/2015 | 1.41 ± 0.19 | 5.22 ± 0.68 | Yes | 30.40 ± 0.67 | 112.48 ± 2.48 | Yes |
| | 6/17/2015 | 0.70 ± 0.19 | 2.58 ± 0.70 | Yes | 22.00 ± 0.69 | 81.40 ± 2.55 | Yes |
| | 6/24/2015 | 1.24 ± 0.18 | 4.59 ± 0.66 | Yes | 26.20 ± 0.63 | 96.94 ± 2.33 | Yes |
| ATOMIC CITY | 4/1/2015 | 1.35 ± 0.17 | 5.00 ± 0.63 | Yes | 15.50 ± 0.51 | 57.35 ± 1.89 | Yes |
| | 4/8/2015 | 1.17 ± 0.17 | 4.33 ± 0.61 | Yes | 17.20 ± 0.53 | 63.64 ± 1.96 | Yes |
| | 4/15/2015 | 1.30 ± 0.18 | 4.81 ± 0.65 | Yes | 17.60 ± 0.56 | 65.12 ± 2.06 | Yes |
| | 4/22/2015 | 1.24 ± 0.20 | 4.59 ± 0.73 | Yes | 13.40 ± 0.49 | 49.58 ± 1.82 | Yes |
| | 4/29/2015 | 2.33 ± 0.31 | 8.62 ± 1.15 | Yes | 22.80 ± 0.88 | 84.36 ± 3.26 | Yes |
| | 5/6/2015 | 1.83 ± 0.21 | 6.77 ± 0.77 | Yes | 30.10 ± 0.67 | 111.37 ± 2.47 | Yes |
| | 5/13/2015 | 1.33 ± 0.17 | 4.92 ± 0.64 | Yes | 20.70 ± 0.57 | 76.59 ± 2.11 | Yes |
| | 5/20/2015 | 0.48 ± 0.13 | 1.76 ± 0.48 | Yes | 13.10 ± 0.49 | 48.47 ± 1.82 | Yes |
| | 5/27/2015 | 0.89 ± 0.17 | 3.29 ± 0.61 | Yes | 18.80 ± 0.58 | 69.56 ± 2.13 | Yes |
| | 6/3/2015 | 0.93 ± 0.16 | 3.43 ± 0.60 | Yes | 20.60 ± 0.60 | 76.22 ± 2.21 | Yes |
| | 6/10/2015 | 1.32 ± 0.19 | 4.88 ± 0.71 | Yes | 32.40 ± 0.72 | 119.88 ± 2.66 | Yes |
| | 6/17/2015 | 0.78 ± 0.19 | 2.87 ± 0.72 | Yes | 23.70 ± 0.70 | 87.69 ± 2.60 | Yes |
| | 6/24/2015 | 1.24 ± 0.18 | 4.59 ± 0.66 | Yes | 27.20 ± 0.64 | 100.64 ± 2.38 | Yes |
| BLUE DOME | 4/1/2015 | 0.70 ± 0.14 | 2.57 ± 0.53 | Yes | 14.70 ± 0.52 | 54.39 ± 1.91 | Yes |
| | 4/8/2015 | 1.00 ± 0.16 | 3.69 ± 0.60 | Yes | 16.10 ± 0.53 | 59.57 ± 1.96 | Yes |
| | 4/15/2015 | 1.10 ± 0.17 | 4.07 ± 0.62 | Yes | 20.50 ± 0.59 | 75.85 ± 2.18 | Yes |
| | 4/22/2015 | 1.63 ± 0.23 | 6.03 ± 0.85 | Yes | 14.10 ± 0.54 | 52.17 ± 2.01 | Yes |
| | 4/29/2015 | 1.20 ± 0.18 | 4.44 ± 0.65 | Yes | 19.10 ± 0.58 | 70.67 ± 2.16 | Yes |
| | 5/6/2015 | 2.43 ± 0.24 | 8.99 ± 0.88 | Yes | 33.40 ± 0.72 | 123.58 ± 2.65 | Yes |
| | 5/13/2015 | 1.12 ± 0.17 | 4.14 ± 0.63 | Yes | 20.50 ± 0.58 | 75.85 ± 2.16 | Yes |
| | 5/20/2015 | 0.77 ± 0.15 | 2.86 ± 0.56 | Yes | 10.90 ± 0.48 | 40.33 ± 1.76 | Yes |
| | 5/27/2015 | 0.86 ± 0.17 | 3.19 ± 0.61 | Yes | 17.70 ± 0.57 | 65.49 ± 2.11 | Yes |
| | 6/3/2015 | 0.89 ± 0.16 | 3.30 ± 0.60 | Yes | 18.90 ± 0.59 | 69.93 ± 2.18 | Yes |
| | 6/10/2015 | 1.14 ± 0.18 | 4.22 ± 0.68 | Yes | 29.40 ± 0.70 | 108.78 ± 2.57 | Yes |
| | 6/17/2015 | 0.44 ± 0.20 | 1.63 ± 0.73 | No | 22.30 ± 0.74 | 82.51 ± 2.75 | Yes |
| | 6/24/2015 | 1.28 ± 0.19 | 4.74 ± 0.71 | Yes | 29.70 ± 0.70 | 109.89 ± 2.58 | Yes |
| FAA TOWER | 4/1/2015 | 0.81 ± 0.15 | 3.00 ± 0.54 | Yes | 15.20 ± 0.51 | 56.24 ± 1.90 | Yes |
| | 4/8/2015 | 0.87 ± 0.15 | 3.22 ± 0.56 | Yes | 14.70 ± 0.50 | 54.39 ± 1.85 | Yes |
| | 4/15/2015 | 1.04 ± 0.16 | 3.85 ± 0.58 | Yes | 18.80 ± 0.55 | 69.56 ± 2.02 | Yes |
| | 4/22/2015 | 1.33 ± 0.20 | 4.92 ± 0.74 | Yes | 13.00 ± 0.49 | 48.10 ± 1.82 | Yes |
| | 4/29/2015 | 1.15 ± 0.16 | 4.26 ± 0.61 | Yes | 18.50 ± 0.55 | 68.45 ± 2.02 | Yes |
| | 5/6/2015 | 2.20 ± 0.22 | 8.14 ± 0.82 | Yes | 33.20 ± 0.69 | 122.84 ± 2.56 | Yes |
| | 5/13/2015 | 1.22 ± 0.17 | 4.51 ± 0.62 | Yes | 20.00 ± 0.56 | 74.00 ± 2.07 | Yes |
| | 5/20/2015 | 0.89 ± 0.15 | 3.29 ± 0.56 | Yes | 10.80 ± 0.46 | 39.96 ± 1.71 | Yes |
| | 5/27/2015 | 1.00 ± 0.17 | 3.68 ± 0.63 | Yes | 17.40 ± 0.56 | 64.38 ± 2.06 | Yes |
| | 6/3/2015 | 0.83 ± 0.16 | 3.08 ± 0.57 | Yes | 18.30 ± 0.57 | 67.71 ± 2.09 | Yes |
| | 6/10/2015 | 1.09 ± 0.18 | 4.03 ± 0.65 | Yes | 29.20 ± 0.68 | 108.04 ± 2.50 | Yes |
| | 6/17/2015 | 0.54 ± 0.18 | 2.01 ± 0.68 | No | 18.70 ± 0.66 | 69.19 ± 2.45 | Yes |
| | 6/24/2015 | 1.34 ± 0.18 | 4.96 ± 0.68 | Yes | 25.80 ± 0.63 | 95.46 ± 2.33 | Yes |
| HOWE | 4/1/2015 | 1.59 ± 0.18 | 5.88 ± 0.66 | Yes | 14.40 ± 0.50 | 53.28 ± 1.84 | 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 |
|---|---|---|---|---|---|---|---|
| | 4/8/2015 | 1.35 ± 0.18 | 5.00 ± 0.65 | Yes | 16.10 ± 0.53 | 59.57 ± 1.94 | Yes |
| | 4/15/2015 | 1.21 ± 0.16 | 4.48 ± 0.60 | Yes | 17.20 ± 0.53 | 63.64 ± 1.95 | Yes |
| | 4/22/2015 | 2.45 ± 0.23 | 9.07 ± 0.87 | Yes | 15.00 ± 0.50 | 55.50 ± 1.84 | Yes |
| | 4/29/2015 | 1.28 ± 0.16 | 4.74 ± 0.60 | Yes | 17.60 ± 0.52 | 65.12 ± 1.92 | Yes |
| | 5/6/2015 | 2.14 ± 0.22 | 7.92 ± 0.82 | Yes | 33.60 ± 0.70 | 124.32 ± 2.59 | Yes |
| | 5/13/2015 | 1.01 ± 0.16 | 3.74 ± 0.60 | Yes | 21.10 ± 0.58 | 78.07 ± 2.15 | Yes |
| | 5/20/2015 | 0.72 ± 0.15 | 2.68 ± 0.55 | Yes | 12.60 ± 0.50 | 46.62 ± 1.85 | Yes |
| | 5/27/2015 | 0.69 ± 0.15 | 2.55 ± 0.56 | Yes | 18.70 ± 0.57 | 69.19 ± 2.11 | Yes |
| | 6/3/2015 | 0.97 ± 0.17 | 3.58 ± 0.61 | Yes | 20.30 ± 0.59 | 75.11 ± 2.20 | Yes |
| | 6/10/2015 | 1.31 ± 0.18 | 4.85 ± 0.67 | Yes | 30.30 ± 0.67 | 112.11 ± 2.47 | Yes |
| | 6/17/2015 | 0.38 ± 0.18 | 1.41 ± 0.66 | No | 20.80 ± 0.69 | 76.96 ± 2.53 | Yes |
| | 6/24/2015 | 1.53 ± 0.18 | 5.66 ± 0.68 | Yes | 27.10 ± 0.62 | 100.27 ± 2.29 | Yes |
| MONTEVIEW | 4/1/2015 | 1.00 ± 0.16 | 3.68 ± 0.58 | Yes | 13.90 ± 0.51 | 51.43 ± 1.87 | Yes |
| | 4/8/2015 | 1.41 ± 0.18 | 5.22 ± 0.67 | Yes | 16.00 ± 0.53 | 59.20 ± 1.98 | Yes |
| | 4/15/2015 | 1.21 ± 0.16 | 4.48 ± 0.59 | Yes | 19.00 ± 0.53 | 70.30 ± 1.96 | Yes |
| | 4/22/2015 | 1.14 ± 0.18 | 4.22 ± 0.67 | Yes | 12.20 ± 0.46 | 45.14 ± 1.69 | Yes |
| | 4/29/2015 | 1.71 ± 0.18 | 6.33 ± 0.67 | Yes | 17.80 ± 0.52 | 65.86 ± 1.92 | Yes |
| | 5/6/2015 | 2.22 ± 0.22 | 8.21 ± 0.80 | Yes | 33.00 ± 0.67 | 122.10 ± 2.49 | Yes |
| | 5/13/2015 | 1.20 ± 0.16 | 4.44 ± 0.60 | Yes | 19.30 ± 0.53 | 71.41 ± 1.98 | Yes |
| | 5/20/2015 | 0.88 ± 0.15 | 3.27 ± 0.56 | Yes | 13.20 ± 0.49 | 48.84 ± 1.82 | Yes |
| | 5/27/2015 | 0.77 ± 0.15 | 2.83 ± 0.56 | Yes | 18.10 ± 0.55 | 66.97 ± 2.02 | Yes |
| | 6/3/2015 | 1.11 ± 0.17 | 4.11 ± 0.62 | Yes | 19.80 ± 0.58 | 73.26 ± 2.13 | Yes |
| | 6/10/2015 | 1.68 ± 0.20 | 6.22 ± 0.74 | Yes | 29.50 ± 0.67 | 109.15 ± 2.48 | Yes |
| | 6/17/2015 | 0.79 ± 0.19 | 2.93 ± 0.71 | Yes | 19.70 ± 0.67 | 72.89 ± 2.46 | Yes |
| | 6/24/2015 | 1.50 ± 0.19 | 5.55 ± 0.70 | Yes | 28.50 ± 0.65 | 105.45 ± 2.41 | Yes |
| MUD LAKE | 4/1/2015 | 1.22 ± 0.17 | 4.51 ± 0.63 | Yes | 15.40 ± 0.53 | 56.98 ± 1.95 | Yes |
| | 4/8/2015 | 1.15 ± 0.17 | 4.26 ± 0.62 | Yes | 16.30 ± 0.53 | 60.31 ± 1.96 | Yes |
| | 4/15/2015 | 1.50 ± 0.18 | 5.55 ± 0.66 | Yes | 18.30 ± 0.54 | 67.71 ± 2.01 | Yes |
| | 4/22/2015 | 2.38 ± 0.24 | 8.81 ± 0.90 | Yes | 15.20 ± 0.52 | 56.24 ± 1.94 | Yes |
| | 4/29/2015 | 1.55 ± 0.18 | 5.74 ± 0.67 | Yes | 22.20 ± 0.58 | 82.14 ± 2.16 | Yes |
| | 5/6/2015 | 1.98 ± 0.21 | 7.33 ± 0.79 | Yes | 32.20 ± 0.69 | 119.14 ± 2.54 | Yes |
| | 5/13/2015 | 1.37 ± 0.18 | 5.07 ± 0.65 | Yes | 22.50 ± 0.58 | 83.25 ± 2.16 | Yes |
| | 5/20/2015 | 0.39 ± 0.12 | 1.45 ± 0.45 | Yes | 11.70 ± 0.46 | 43.29 ± 1.72 | Yes |
| | 5/27/2015 | 0.79 ± 0.15 | 2.92 ± 0.56 | Yes | 16.60 ± 0.52 | 61.42 ± 1.93 | Yes |
| | 6/3/2015 | 0.77 ± 0.15 | 2.86 ± 0.54 | Yes | 18.60 ± 0.55 | 68.82 ± 2.03 | Yes |
| | 6/10/2015 | 1.80 ± 0.20 | 6.66 ± 0.75 | Yes | 28.80 ± 0.66 | 106.56 ± 2.45 | Yes |
| | 6/17/2015 | 0.78 ± 0.19 | 2.90 ± 0.72 | Yes | 20.30 ± 0.68 | 75.11 ± 2.51 | Yes |
| | 6/24/2015 | 1.58 ± 0.20 | 5.85 ± 0.72 | Yes | 27.90 ± 0.65 | 103.23 ± 2.42 | Yes |
| **DISTANT** | | | | | | | |
| BLACKFOOT | 4/1/2015 | 1.06 ± 0.16 | 3.92 ± 0.60 | Yes | 14.80 ± 0.52 | 54.76 ± 1.92 | Yes |
| | 4/8/2015 | 1.03 ± 0.16 | 3.81 ± 0.59 | Yes | 17.70 ± 0.54 | 65.49 ± 1.99 | Yes |
| | 4/15/2015 | 0.95 ± 0.15 | 3.52 ± 0.57 | Yes | 17.20 ± 0.53 | 63.64 ± 1.97 | Yes |
| | 4/22/2015 | 0.98 ± 0.19 | 3.64 ± 0.70 | Yes | 13.80 ± 0.51 | 51.06 ± 1.87 | Yes |
| | 4/29/2015 | 1.20 ± 0.17 | 4.44 ± 0.63 | Yes | 19.00 ± 0.57 | 70.30 ± 2.09 | Yes |
| | 5/6/2015 | 1.82 ± 0.21 | 6.73 ± 0.79 | Yes | 32.00 ± 0.70 | 118.40 ± 2.58 | Yes |
| | 5/13/2015 | 1.48 ± 0.19 | 5.48 ± 0.70 | Yes | 24.00 ± 0.63 | 88.80 ± 2.33 | Yes |
| | 5/20/2015 | 0.63 ± 0.14 | 2.32 ± 0.53 | Yes | 12.70 ± 0.50 | 46.99 ± 1.86 | Yes |
| | 5/27/2015 | 0.59 ± 0.15 | 2.19 ± 0.54 | Yes | 18.20 ± 0.57 | 67.34 ± 2.09 | Yes |
| | 6/3/2015 | 1.01 ± 0.16 | 3.74 ± 0.61 | Yes | 19.40 ± 0.58 | 71.78 ± 2.14 | Yes |
| | 6/10/2015 | 1.51 ± 0.18 | 5.59 ± 0.67 | Yes | 26.40 ± 0.61 | 97.68 ± 2.25 | Yes |
| | 6/17/2015 | 0.71 ± 0.18 | 2.62 ± 0.68 | Yes | 18.50 ± 0.64 | 68.45 ± 2.36 | Yes |
| | 6/24/2015 | 1.45 ± 0.18 | 5.37 ± 0.66 | Yes | 26.20 ± 0.61 | 96.94 ± 2.24 | Yes |
| CRATERS OF | 4/1/2015 | 0.79 ± 0.15 | 2.93 ± 0.54 | Yes | 16.10 ± 0.53 | 59.57 ± 1.95 | Yes |
| THE MOON | 4/8/2015 | 0.89 ± 0.15 | 3.28 ± 0.56 | Yes | 17.00 ± 0.53 | 62.90 ± 1.95 | Yes |
| | 4/15/2015 | 0.98 ± 0.16 | 3.61 ± 0.57 | Yes | 20.50 ± 0.57 | 75.85 ± 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 ($\times 10^{-15}$ 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 |
|---|---|---|---|---|---|---|---|
| | 4/22/2015 | 0.95 ± 0.19 | 3.52 ± 0.69 | Yes | 14.50 ± 0.51 | 53.65 ± 1.89 | Yes |
| | 4/29/2015 | 1.38 ± 0.18 | 5.11 ± 0.66 | Yes | 19.30 ± 0.57 | 71.41 ± 2.11 | Yes |
| | 5/6/2015 | 2.10 ± 0.22 | 7.77 ± 0.82 | Yes | 32.90 ± 0.70 | 121.73 ± 2.59 | Yes |
| | 5/13/2015 | 1.22 ± 0.18 | 4.51 ± 0.65 | Yes | 24.50 ± 0.63 | 90.65 ± 2.32 | Yes |
| | 5/20/2015 | 0.56 ± 0.13 | 2.07 ± 0.49 | Yes | 11.00 ± 0.46 | 40.70 ± 1.69 | Yes |
| | 5/27/2015 | 0.90 ± 0.16 | 3.32 ± 0.60 | Yes | 19.90 ± 0.58 | 73.63 ± 2.14 | Yes |
| | 6/3/2015 | 1.05 ± 0.16 | 3.89 ± 0.60 | Yes | 21.20 ± 0.58 | 78.44 ± 2.15 | Yes |
| | 6/10/2015 | 1.54 ± 0.19 | 5.70 ± 0.72 | Yes | 32.10 ± 0.70 | 118.77 ± 2.58 | Yes |
| | 6/17/2015 | 0.48 ± 0.18 | 1.79 ± 0.67 | No | 19.60 ± 0.67 | 72.52 ± 2.48 | Yes |
| | 6/24/2015 | 1.08 ± 0.17 | 4.00 ± 0.63 | Yes | 24.40 ± 0.62 | 90.28 ± 2.28 | Yes |
| DUBOIS | 4/1/2015 | 0.97 ± 0.15 | 3.59 ± 0.57 | Yes | 14.50 ± 0.50 | 53.65 ± 1.86 | Yes |
| | 4/8/2015 | 1.04 ± 0.16 | 3.85 ± 0.57 | Yes | 15.70 ± 0.50 | 58.09 ± 1.85 | Yes |
| | 4/15/2015 | 1.11 ± 0.16 | 4.11 ± 0.60 | Yes | 19.10 ± 0.56 | 70.67 ± 2.06 | Yes |
| | 4/22/2015 | 1.82 ± 0.22 | 6.73 ± 0.81 | Yes | 13.10 ± 0.49 | 48.47 ± 1.82 | Yes |
| | 4/29/2015 | 1.66 ± 0.18 | 6.14 ± 0.68 | Yes | 19.80 ± 0.55 | 73.26 ± 2.05 | Yes |
| | 5/6/2015 | 1.71 ± 0.21 | 6.33 ± 0.78 | Yes | 29.20 ± 0.68 | 108.04 ± 2.53 | Yes |
| | 5/13/2015 | 1.29 ± 0.17 | 4.77 ± 0.63 | Yes | 22.60 ± 0.58 | 83.62 ± 2.13 | Yes |
| | 5/20/2015 | 0.83 ± 0.14 | 3.06 ± 0.53 | Yes | 11.40 ± 0.45 | 42.18 ± 1.68 | Yes |
| | 5/27/2015 | 0.88 ± 0.16 | 3.27 ± 0.59 | Yes | 18.90 ± 0.56 | 69.93 ± 2.07 | Yes |
| | 6/3/2015 | 0.73 ± 0.14 | 2.70 ± 0.53 | Yes | 18.90 ± 0.55 | 69.93 ± 2.03 | Yes |
| | 6/10/2015 | 1.49 ± 0.19 | 5.51 ± 0.71 | Yes | 29.90 ± 0.68 | 110.63 ± 2.51 | Yes |
| | 6/17/2015 | 0.30 ± 0.18 | 1.10 ± 0.66 | No | 19.60 ± 0.69 | 72.52 ± 2.55 | Yes |
| | 6/24/2015 | 1.61 ± 0.19 | 5.96 ± 0.72 | Yes | 28.40 ± 0.65 | 105.08 ± 2.40 | Yes |
| IDAHO FALLS | 4/1/2015 | 1.17 ± 0.16 | 4.33 ± 0.59 | Yes | 13.40 ± 0.48 | 49.58 ± 1.78 | Yes |
| | 4/8/2015 | 1.21 ± 0.17 | 4.48 ± 0.61 | Yes | 16.80 ± 0.52 | 62.16 ± 1.92 | Yes |
| | 4/15/2015 | 1.23 ± 0.17 | 4.55 ± 0.63 | Yes | 19.20 ± 0.57 | 71.04 ± 2.09 | Yes |
| | 4/22/2015 | 2.45 ± 0.24 | 9.07 ± 0.89 | Yes | 14.90 ± 0.51 | 55.13 ± 1.88 | Yes |
| | 4/29/2015 | 1.77 ± 0.19 | 6.55 ± 0.72 | Yes | 20.10 ± 0.57 | 74.37 ± 2.12 | Yes |
| | 5/6/2015 | 2.22 ± 0.22 | 8.21 ± 0.82 | Yes | 33.10 ± 0.69 | 122.47 ± 2.56 | Yes |
| | 5/13/2015 | 1.34 ± 0.18 | 4.96 ± 0.66 | Yes | 20.90 ± 0.59 | 77.33 ± 2.16 | Yes |
| | 5/20/2015 | 0.39 ± 0.12 | 1.43 ± 0.46 | Yes | 10.80 ± 0.46 | 39.96 ± 1.71 | Yes |
| | 5/27/2015 | 0.93 ± 0.16 | 3.43 ± 0.61 | Yes | 16.50 ± 0.54 | 61.05 ± 2.01 | Yes |
| | 6/3/2015 | 1.00 ± 0.16 | 3.70 ± 0.61 | Yes | 18.70 ± 0.57 | 69.19 ± 2.12 | Yes |
| | 6/10/2015 | 1.26 ± 0.18 | 4.66 ± 0.67 | Yes | 25.20 ± 0.63 | 93.24 ± 2.34 | Yes |
| | 6/17/2015 | 0.80 ± 0.20 | 2.95 ± 0.75 | Yes | 20.00 ± 0.70 | 74.00 ± 2.58 | Yes |
| | 6/24/2015 | 1.64 ± 0.20 | 6.07 ± 0.74 | Yes | 28.30 ± 0.66 | 104.71 ± 2.45 | Yes |
| QA-2 | 4/1/2015 | 0.92 ± 0.15 | 3.42 ± 0.55 | Yes | 14.80 ± 0.50 | 54.76 ± 1.84 | Yes |
| (IDAHO FALLS) | 4/8/2015 | 0.95 ± 0.15 | 3.50 ± 0.57 | Yes | 16.80 ± 0.52 | 62.16 ± 1.92 | Yes |
| | 4/15/2015 | 1.23 ± 0.17 | 4.55 ± 0.63 | Yes | 18.60 ± 0.56 | 68.82 ± 2.06 | Yes |
| | 4/22/2015 | 2.12 ± 0.24 | 7.84 ± 0.87 | Yes | 14.60 ± 0.52 | 54.02 ± 1.92 | Yes |
| | 4/29/2015 | 1.42 ± 0.18 | 5.25 ± 0.67 | Yes | 19.10 ± 0.57 | 70.67 ± 2.09 | Yes |
| | 5/6/2015 | 2.17 ± 0.22 | 8.03 ± 0.82 | Yes | 31.60 ± 0.69 | 116.92 ± 2.53 | Yes |
| | 5/13/2015 | 1.21 ± 0.18 | 4.48 ± 0.65 | Yes | 23.60 ± 0.62 | 87.32 ± 2.30 | Yes |
| | 5/20/2015 | 0.61 ± 0.15 | 2.24 ± 0.54 | Yes | 13.30 ± 0.52 | 49.21 ± 1.92 | Yes |
| | 5/27/2015 | 0.62 ± 0.15 | 2.29 ± 0.56 | Yes | 17.10 ± 0.56 | 63.27 ± 2.06 | Yes |
| | 6/3/2015 | 1.17 ± 0.18 | 4.33 ± 0.65 | Yes | 19.30 ± 0.59 | 71.41 ± 2.17 | Yes |
| | 6/10/2015 | 0.94 ± 0.16 | 3.47 ± 0.61 | Yes | 25.10 ± 0.63 | 92.87 ± 2.32 | Yes |
| | 6/17/2015 | 0.75 ± 0.20 | 2.76 ± 0.73 | Yes | 20.40 ± 0.69 | 75.48 ± 2.56 | Yes |
| | 6/24/2015 | 1.52 ± 0.20 | 5.62 ± 0.72 | Yes | 26.50 ± 0.65 | 98.05 ± 2.39 | Yes |
| JACKSON | 4/1/2015 | 1.06 ± 0.16 | 3.92 ± 0.59 | Yes | 16.40 ± 0.53 | 60.68 ± 1.96 | Yes |
| | 4/8/2015 | 1.16 ± 0.19 | 4.29 ± 0.68 | Yes | 19.40 ± 0.61 | 71.78 ± 2.27 | Yes |
| | 4/15/2015 | 1.12 ± 0.15 | 4.14 ± 0.57 | Yes | 19.70 ± 0.53 | 72.89 ± 1.96 | Yes |
| | 4/22/2015 | 1.18 ± 0.20 | 4.37 ± 0.75 | Yes | 15.70 ± 0.54 | 58.09 ± 2.01 | Yes |
| | 4/29/2015 | 1.69 ± 0.20 | 6.25 ± 0.75 | Yes | 22.20 ± 0.63 | 82.14 ± 2.33 | Yes |
| | 5/6/2015 | 2.08 ± 0.22 | 7.70 ± 0.83 | Yes | 35.10 ± 0.72 | 129.87 ± 2.68 | 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 |
|---|---|---|---|---|---|---|---|
| | 5/13/2015 | 1.13 ± 0.18 | 4.18 ± 0.65 | Yes | 20.90 ± 0.61 | 77.33 ± 2.25 | Yes |
| | 5/20/2015 | 0.51 ± 0.13 | 1.87 ± 0.49 | Yes | 13.10 ± 0.49 | 48.47 ± 1.82 | Yes |
| | 5/27/2015 | 0.62 ± 0.15 | 2.30 ± 0.54 | Yes | 15.00 ± 0.52 | 55.50 ± 1.92 | Yes |
| | 6/3/2015 | 0.75 ± 0.15 | 2.78 ± 0.54 | Yes | 16.90 ± 0.54 | 62.53 ± 1.99 | Yes |
| | 6/10/2015 | 1.40 ± 0.19 | 5.18 ± 0.70 | Yes | 28.30 ± 0.67 | 104.71 ± 2.46 | Yes |
| | 6/17/2015 | 0.89 ± 0.21 | 3.27 ± 0.77 | Yes | 22.80 ± 0.73 | 84.36 ± 2.70 | Yes |
| | 6/24/2015 | 2.04 ± 0.23 | 7.55 ± 0.85 | Yes | 36.80 ± 0.78 | 136.16 ± 2.87 | Yes |
| SUGAR CITY | 4/1/2015 | 0.90 ± 0.15 | 3.34 ± 0.54 | Yes | 14.90 ± 0.50 | 55.13 ± 1.84 | Yes |
| | 4/8/2015 | 1.35 ± 0.17 | 5.00 ± 0.63 | Yes | 17.60 ± 0.53 | 65.12 ± 1.94 | Yes |
| | 4/15/2015 | 1.46 ± 0.18 | 5.40 ± 0.65 | Yes | 18.90 ± 0.55 | 69.93 ± 2.02 | Yes |
| | 4/22/2015 | 1.72 ± 0.21 | 6.36 ± 0.77 | Yes | 13.40 ± 0.48 | 49.58 ± 1.76 | Yes |
| | 4/29/2015 | 1.40 ± 0.16 | 5.18 ± 0.60 | Yes | 17.30 ± 0.50 | 64.01 ± 1.84 | Yes |
| | 5/6/2015 | 1.99 ± 0.20 | 7.36 ± 0.74 | Yes | 31.30 ± 0.64 | 115.81 ± 2.36 | Yes |
| | 5/13/2015 | 1.14 ± 0.16 | 4.22 ± 0.59 | Yes | 20.10 ± 0.55 | 74.37 ± 2.02 | Yes |
| | 5/20/2015 | 0.67 ± 0.14 | 2.48 ± 0.50 | Yes | 9.65 ± 0.43 | 35.71 ± 1.59 | Yes |
| | 5/27/2015 | 0.79 ± 0.15 | 2.91 ± 0.56 | Yes | 15.50 ± 0.51 | 57.35 ± 1.88 | Yes |
| | 6/3/2015 | 1.16 ± 0.16 | 4.29 ± 0.61 | Yes | 18.10 ± 0.54 | 66.97 ± 2.00 | Yes |
| | 6/10/2015 | 1.43 ± 0.18 | 5.29 ± 0.68 | Yes | 27.70 ± 0.64 | 102.49 ± 2.38 | Yes |
| | 6/17/2015 | 0.97 ± 0.19 | 3.58 ± 0.71 | Yes | 20.20 ± 0.64 | 74.74 ± 2.38 | Yes |
| | 6/24/2015 | 1.40 ± 0.18 | 5.18 ± 0.66 | Yes | 29.00 ± 0.63 | 107.30 ± 2.34 | Yes |
| **INL SITE** | | | | | | | |
| EFS | 4/1/2015 | 0.97 ± 0.16 | 3.59 ± 0.58 | Yes | 15.80 ± 0.53 | 58.46 ± 1.94 | Yes |
| | 4/8/2015 | 1.16 ± 0.16 | 4.29 ± 0.60 | Yes | 15.40 ± 0.50 | 56.98 ± 1.84 | Yes |
| | 4/15/2015 | 1.34 ± 0.17 | 4.96 ± 0.63 | Yes | 19.60 ± 0.56 | 72.52 ± 2.06 | Yes |
| | 4/22/2015 | 1.70 ± 0.22 | 6.29 ± 0.80 | Yes | 14.30 ± 0.51 | 52.91 ± 1.88 | Yes |
| | 4/29/2015 | 1.13 ± 0.16 | 4.18 ± 0.61 | Yes | 18.60 ± 0.55 | 68.82 ± 2.04 | Yes |
| | 5/6/2015 | 2.11 ± 0.22 | 7.81 ± 0.80 | Yes | 31.50 ± 0.67 | 116.55 ± 2.49 | Yes |
| | 5/13/2015 | 1.40 ± 0.18 | 5.18 ± 0.66 | Yes | 22.20 ± 0.59 | 82.14 ± 2.17 | Yes |
| | 5/20/2015 | 0.69 ± 0.14 | 2.57 ± 0.53 | Yes | 11.60 ± 0.48 | 42.92 ± 1.76 | Yes |
| | 5/27/2015 | 0.76 ± 0.16 | 2.81 ± 0.58 | Yes | 19.80 ± 0.58 | 73.26 ± 2.15 | Yes |
| | 6/3/2015 | 0.98 ± 0.20 | 3.63 ± 0.73 | Yes | 20.60 ± 0.70 | 76.22 ± 2.60 | Yes |
| | 6/10/2015 | 1.20 ± 0.18 | 4.44 ± 0.67 | Yes | 29.50 ± 0.68 | 109.15 ± 2.50 | Yes |
| | 6/17/2015 | 0.35 ± 0.19 | 1.31 ± 0.68 | No | 20.00 ± 0.70 | 74.00 ± 2.60 | Yes |
| | 6/24/2015 | 1.10 ± 0.17 | 4.07 ± 0.63 | Yes | 25.90 ± 0.63 | 95.83 ± 2.32 | Yes |
| MAIN GATE | 4/1/2015 | 0.96 ± 0.16 | 3.54 ± 0.59 | Yes | 14.90 ± 0.53 | 55.13 ± 1.95 | Yes |
| | 4/8/2015 | 0.94 ± 0.15 | 3.47 ± 0.56 | Yes | 18.10 ± 0.53 | 66.97 ± 1.94 | Yes |
| | 4/15/2015 | 1.20 ± 0.16 | 4.44 ± 0.61 | Yes | 20.00 ± 0.56 | 74.00 ± 2.06 | Yes |
| | 4/22/2015 | 1.21 ± 0.20 | 4.48 ± 0.73 | Yes | 15.30 ± 0.52 | 56.61 ± 1.93 | Yes |
| | 4/29/2015 | 1.48 ± 0.18 | 5.48 ± 0.68 | Yes | 20.60 ± 0.58 | 76.22 ± 2.16 | Yes |
| | 5/6/2015 | 2.18 ± 0.22 | 8.07 ± 0.80 | Yes | 35.30 ± 0.70 | 130.61 ± 2.58 | Yes |
| | 5/13/2015 | 1.30 ± 0.17 | 4.81 ± 0.61 | Yes | 21.90 ± 0.56 | 81.03 ± 2.06 | Yes |
| | 5/20/2015 | 0.85 ± 0.14 | 3.15 ± 0.52 | Yes | 12.10 ± 0.45 | 44.77 ± 1.65 | Yes |
| | 5/27/2015 | 0.93 ± 0.17 | 3.44 ± 0.61 | Yes | 21.30 ± 0.60 | 78.81 ± 2.22 | Yes |
| | 6/3/2015 | 1.00 ± 0.16 | 3.70 ± 0.57 | Yes | 21.20 ± 0.56 | 78.44 ± 2.09 | Yes |
| | 6/10/2015 | 1.23 ± 0.18 | 4.55 ± 0.65 | Yes | 30.00 ± 0.66 | 111.00 ± 2.46 | Yes |
| | 6/17/2015 | 0.61 ± 0.18 | 2.26 ± 0.66 | Yes | 18.20 ± 0.63 | 67.34 ± 2.33 | Yes |
| | 6/24/2015 | 1.20 ± 0.17 | 4.44 ± 0.63 | Yes | 26.60 ± 0.61 | 98.42 ± 2.27 | Yes |
| QA-1 | 4/1/2015 | 1.15 ± 0.16 | 4.26 ± 0.61 | Yes | 16.30 ± 0.53 | 60.31 ± 1.95 | Yes |
| (MAIN GATE) | 4/8/2015 | 1.22 ± 0.17 | 4.51 ± 0.61 | Yes | 16.20 ± 0.52 | 59.94 ± 1.91 | Yes |
| | 4/15/2015 | -0.25 ± 0.07 | -0.92 ± 0.25 | No | 18.90 ± 0.53 | 69.93 ± 1.98 | Yes |
| | 4/22/2015 | 1.36 ± 0.20 | 5.03 ± 0.73 | Yes | 13.70 ± 0.49 | 50.69 ± 1.79 | Yes |
| | 4/29/2015 | 1.10 ± 0.16 | 4.07 ± 0.57 | Yes | 16.50 ± 0.51 | 61.05 ± 1.87 | Yes |
| | 5/6/2015 | 1.80 ± 0.20 | 6.66 ± 0.74 | Yes | 32.00 ± 0.66 | 118.40 ± 2.45 | Yes |
| | 5/13/2015 | 1.09 ± 0.16 | 4.03 ± 0.59 | Yes | 21.00 ± 0.56 | 77.70 ± 2.07 | 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 |
|---|---|---|---|---|---|---|---|
| | 5/20/2015 | 0.51 ± 0.12 | 1.89 ± 0.46 | Yes | 11.80 ± 0.45 | 43.66 ± 1.65 | Yes |
| | 5/27/2015 | 0.84 ± 0.16 | 3.10 ± 0.58 | Yes | 18.30 ± 0.55 | 67.71 ± 2.04 | Yes |
| | 6/3/2015 | 0.87 ± 0.15 | 3.23 ± 0.56 | Yes | 17.30 ± 0.54 | 64.01 ± 1.99 | Yes |
| | 6/10/2015 | 1.42 ± 0.18 | 5.25 ± 0.67 | Yes | 28.70 ± 0.65 | 106.19 ± 2.39 | Yes |
| | 6/17/2015 | 0.63 ± 0.18 | 2.34 ± 0.68 | Yes | 18.70 ± 0.65 | 69.19 ± 2.40 | Yes |
| | 6/24/2015 | 0.88 ± 0.16 | 3.25 ± 0.59 | Yes | 24.00 ± 0.60 | 88.80 ± 2.23 | Yes |
| VAN BUREN GATE | 4/1/2015 | 1.12 ± 0.16 | 4.14 ± 0.60 | Yes | 17.80 ± 0.54 | 65.86 ± 2.00 | Yes |
| | 4/8/2015 | 1.16 ± 0.17 | 4.29 ± 0.62 | Yes | 18.40 ± 0.55 | 68.08 ± 2.05 | Yes |
| | 4/15/2015 | 1.38 ± 0.18 | 5.11 ± 0.66 | Yes | 24.00 ± 0.62 | 88.80 ± 2.28 | Yes |
| | 4/22/2015 | 1.38 ± 0.22 | 5.11 ± 0.82 | Yes | 16.30 ± 0.57 | 60.31 ± 2.12 | Yes |
| | 4/29/2015 | 1.53 ± 0.20 | 5.66 ± 0.75 | Yes | 25.00 ± 0.68 | 92.50 ± 2.53 | Yes |
| | 5/6/2015 | 2.79 ± 0.29 | 10.32 ± 1.07 | Yes | 45.00 ± 0.93 | 166.50 ± 3.43 | Yes |
| | 5/13/2015 | 1.58 ± 0.21 | 5.85 ± 0.77 | Yes | 29.10 ± 0.72 | 107.67 ± 2.66 | Yes |
| | 5/20/2015 | 0.79 ± 0.18 | 2.93 ± 0.65 | Yes | 16.10 ± 0.62 | 59.57 ± 2.29 | Yes |
| | 5/27/2015 | 0.87 ± 0.17 | 3.21 ± 0.62 | Yes | 25.80 ± 0.66 | 95.46 ± 2.43 | Yes |
| | 6/3/2015 | 1.08 ± 0.16 | 4.00 ± 0.59 | Yes | 20.00 ± 0.56 | 74.00 ± 2.06 | Yes |
| | 6/10/2015 | 1.75 ± 0.20 | 6.48 ± 0.72 | Yes | 31.70 ± 0.67 | 117.29 ± 2.47 | Yes |
| | 6/17/2015 | 0.67 ± 0.18 | 2.48 ± 0.68 | Yes | 23.20 ± 0.68 | 85.84 ± 2.53 | Yes |
| | 6/24/2015 | 0.98 ± 0.16 | 3.64 ± 0.59 | Yes | 26.80 ± 0.61 | 99.16 ± 2.26 | 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 | 04/01/2015 | -0.12 | ± | 1.94 | -0.45 | ± | 7.19 | No |
| | 04/08/2015 | -1.73 | ± | 1.92 | -6.40 | ± | 7.09 | No |
| | 04/15/2015 | -1.18 | ± | 1.98 | -4.36 | ± | 7.33 | No |
| | 04/22/2015 | 0.40 | ± | 1.95 | 1.50 | ± | 7.23 | No |
| | 04/29/2015 | 2.41 | ± | 2.07 | 8.93 | ± | 7.67 | No |
| | 05/06/2015 | 1.75 | ± | 2.00 | 6.46 | ± | 7.41 | No |
| a | 05/13/2015 | | ± | | | ± | | No |
| | 05/20/2015 | 0.60 | ± | 1.87 | 2.22 | ± | 6.92 | No |
| | 05/27/2015 | -0.42 | ± | 2.01 | -1.56 | ± | 7.42 | No |
| | 06/03/2015 | -0.29 | ± | 1.90 | -1.06 | ± | 7.03 | No |
| | 06/10/2015 | -0.09 | ± | 2.07 | -0.32 | ± | 7.67 | No |
| | 06/17/2015 | 0.85 | ± | 1.94 | 3.13 | ± | 7.16 | No |
| | 06/24/2015 | 0.94 | ± | 1.95 | 3.48 | ± | 7.23 | No |
| ATOMIC CITY | 04/01/2015 | -0.12 | ± | 1.86 | -0.43 | ± | 6.88 | No |
| | 04/08/2015 | -1.71 | ± | 1.90 | -6.34 | ± | 7.02 | No |
| | 04/15/2015 | -1.20 | ± | 2.02 | -4.44 | ± | 7.46 | No |
| | 04/22/2015 | 0.39 | ± | 1.90 | 1.45 | ± | 7.01 | No |
| | 04/29/2015 | 4.28 | ± | 3.68 | 15.84 | ± | 13.61 | No |
| | 05/06/2015 | 1.70 | ± | 1.95 | 6.30 | ± | 7.23 | No |
| | 05/13/2015 | -1.98 | ± | 1.93 | -7.32 | ± | 7.13 | No |
| | 05/20/2015 | 0.62 | ± | 1.94 | 2.31 | ± | 7.18 | No |
| | 05/27/2015 | -0.43 | ± | 2.03 | -1.58 | ± | 7.52 | No |
| | 06/03/2015 | -0.31 | ± | 2.03 | -1.14 | ± | 7.52 | No |
| | 06/10/2015 | -0.09 | ± | 2.24 | -0.34 | ± | 8.29 | No |
| | 06/17/2015 | 0.84 | ± | 1.93 | 3.12 | ± | 7.16 | No |
| | 06/24/2015 | 0.94 | ± | 1.96 | 3.49 | ± | 7.25 | No |
| BLUE DOME | 04/01/2015 | -0.66 | ± | 1.81 | -2.44 | ± | 6.68 | No |
| | 04/08/2015 | -0.93 | ± | 1.83 | -3.43 | ± | 6.77 | No |
| | 04/15/2015 | 1.20 | ± | 1.87 | 4.44 | ± | 6.92 | No |
| | 04/22/2015 | 0.48 | ± | 1.95 | 1.79 | ± | 7.22 | No |
| | 04/29/2015 | -1.87 | ± | 1.93 | -6.92 | ± | 7.13 | No |
| | 05/06/2015 | -1.24 | ± | 1.88 | -4.59 | ± | 6.96 | No |
| | 05/13/2015 | 1.78 | ± | 1.89 | 6.59 | ± | 6.99 | No |
| | 05/20/2015 | 0.64 | ± | 1.86 | 2.38 | ± | 6.88 | No |
| | 05/27/2015 | 1.33 | ± | 1.97 | 4.92 | ± | 7.29 | No |
| | 06/03/2015 | -1.38 | ± | 1.99 | -5.12 | ± | 7.36 | No |
| | 06/10/2015 | 0.12 | ± | 2.08 | 0.45 | ± | 7.70 | No |
| | 06/17/2015 | 0.82 | ± | 2.00 | 3.05 | ± | 7.38 | No |
| | 06/24/2015 | -1.93 | ± | 1.98 | -7.13 | ± | 7.34 | No |
| FAA TOWER | 04/01/2015 | -0.64 | ± | 1.76 | -2.38 | ± | 6.51 | No |
| | 04/08/2015 | -0.89 | ± | 1.75 | -3.29 | ± | 6.49 | No |
| | 04/15/2015 | 1.12 | ± | 1.74 | 4.13 | ± | 6.43 | No |
| | 04/22/2015 | 0.44 | ± | 1.76 | 1.61 | ± | 6.52 | No |
| | 04/29/2015 | -1.72 | ± | 1.77 | -6.37 | ± | 6.56 | No |
| | 05/06/2015 | -1.17 | ± | 1.78 | -4.33 | ± | 6.57 | No |
| | 05/13/2015 | 1.68 | ± | 1.78 | 6.22 | ± | 6.59 | No |
| | 05/20/2015 | 0.61 | ± | 1.77 | 2.27 | ± | 6.55 | No |
| | 05/27/2015 | 1.30 | ± | 1.92 | 4.81 | ± | 7.12 | No |
| | 06/03/2015 | -1.32 | ± | 1.90 | -4.88 | ± | 7.01 | 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 |
|---|---|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | | | |
| | 06/10/2015 | 0.12 | ± | 2.00 | 0.43 | ± | 7.40 | No |
| | 06/17/2015 | 0.75 | ± | 1.82 | 2.77 | ± | 6.72 | No |
| | 06/24/2015 | -1.79 | ± | 1.84 | -6.63 | ± | 6.82 | No |
| HOWE | 04/01/2015 | -0.62 | ± | 1.70 | -2.30 | ± | 6.28 | No |
| | 04/08/2015 | -0.91 | ± | 1.80 | -3.37 | ± | 6.65 | No |
| | 04/15/2015 | 1.11 | ± | 1.73 | 4.11 | ± | 6.41 | No |
| | 04/22/2015 | 0.41 | ± | 1.64 | 1.51 | ± | 6.08 | No |
| | 04/29/2015 | -1.62 | ± | 1.67 | -6.01 | ± | 6.19 | No |
| | 05/06/2015 | -1.19 | ± | 1.80 | -4.40 | ± | 6.66 | No |
| | 05/13/2015 | 1.74 | ± | 1.85 | 6.44 | ± | 6.83 | No |
| | 05/20/2015 | 0.64 | ± | 1.86 | 2.38 | ± | 6.89 | No |
| | 05/27/2015 | 1.29 | ± | 1.91 | 4.77 | ± | 7.06 | No |
| | 06/03/2015 | -1.34 | ± | 1.93 | -4.97 | ± | 7.14 | No |
| | 06/10/2015 | 0.11 | ± | 1.90 | 0.41 | ± | 7.02 | No |
| | 06/17/2015 | 0.75 | ± | 1.82 | 2.78 | ± | 6.74 | No |
| | 06/24/2015 | -1.68 | ± | 1.72 | -6.20 | ± | 6.38 | No |
| MONTEVIEW | 04/01/2015 | -0.66 | ± | 1.79 | -2.43 | ± | 6.63 | No |
| | 04/08/2015 | -0.94 | ± | 1.85 | -3.47 | ± | 6.84 | No |
| | 04/15/2015 | 1.05 | ± | 1.64 | 3.90 | ± | 6.07 | No |
| | 04/22/2015 | 0.40 | ± | 1.64 | 1.50 | ± | 6.05 | No |
| | 04/29/2015 | -1.62 | ± | 1.67 | -5.99 | ± | 6.17 | No |
| | 05/06/2015 | -1.12 | ± | 1.70 | -4.15 | ± | 6.29 | No |
| | 05/13/2015 | 1.60 | ± | 1.70 | 5.93 | ± | 6.28 | No |
| | 05/20/2015 | 0.61 | ± | 1.77 | 2.26 | ± | 6.54 | No |
| | 05/27/2015 | 1.23 | ± | 1.82 | 4.55 | ± | 6.73 | No |
| | 06/03/2015 | -1.29 | ± | 1.86 | -4.79 | ± | 6.88 | No |
| | 06/10/2015 | 0.11 | ± | 1.95 | 0.42 | ± | 7.21 | No |
| | 06/17/2015 | 0.74 | ± | 1.79 | 2.73 | ± | 6.62 | No |
| | 06/24/2015 | -1.77 | ± | 1.82 | -6.53 | ± | 6.72 | No |
| MUD LAKE | 04/01/2015 | -0.66 | ± | 1.81 | -2.45 | ± | 6.70 | No |
| | 04/08/2015 | -0.92 | ± | 1.81 | -3.39 | ± | 6.69 | No |
| | 04/15/2015 | 1.13 | ± | 1.76 | 4.18 | ± | 6.51 | No |
| | 04/22/2015 | 0.44 | ± | 1.77 | 1.62 | ± | 6.56 | No |
| | 04/29/2015 | -1.70 | ± | 1.75 | -6.29 | ± | 6.48 | No |
| | 05/06/2015 | -1.18 | ± | 1.79 | -4.38 | ± | 6.64 | No |
| | 05/13/2015 | 1.68 | ± | 1.78 | 6.20 | ± | 6.57 | No |
| | 05/20/2015 | 0.60 | ± | 1.73 | 2.21 | ± | 6.39 | No |
| | 05/27/2015 | 1.20 | ± | 1.78 | 4.44 | ± | 6.57 | No |
| | 06/03/2015 | -1.24 | ± | 1.79 | -4.61 | ± | 6.61 | No |
| | 06/10/2015 | 0.11 | ± | 1.93 | 0.42 | ± | 7.15 | No |
| | 06/17/2015 | 0.75 | ± | 1.81 | 2.77 | ± | 6.71 | No |
| | 06/24/2015 | -1.80 | ± | 1.85 | -6.65 | ± | 6.84 | No |
| **DISTANT** | | | | | | | | |
| BLACKFOOT | 04/01/2015 | -0.12 | ± | 1.96 | -0.45 | ± | 7.25 | No |
| | 04/08/2015 | -1.72 | ± | 1.91 | -6.38 | ± | 7.06 | No |
| | 04/15/2015 | -1.14 | ± | 1.91 | -4.21 | ± | 7.08 | No |
| | 04/22/2015 | 0.40 | ± | 1.94 | 1.49 | ± | 7.19 | No |
| | 04/29/2015 | 2.37 | ± | 2.04 | 8.77 | ± | 7.53 | No |
| | 05/06/2015 | 1.77 | ± | 2.02 | 6.53 | ± | 7.49 | No |
| | 05/13/2015 | -2.10 | ± | 2.05 | -7.79 | ± | 7.59 | 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 |
|---|---|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | | | |
| | 05/20/2015 | 0.66 | ± | 2.04 | 2.43 | ± | 7.54 | No |
| | 05/27/2015 | -0.42 | ± | 2.00 | -1.56 | ± | 7.41 | No |
| | 06/03/2015 | -0.30 | ± | 2.01 | -1.12 | ± | 7.42 | No |
| | 06/10/2015 | -0.08 | ± | 1.95 | -0.30 | ± | 7.22 | No |
| | 06/17/2015 | 0.81 | ± | 1.86 | 3.00 | ± | 6.87 | No |
| | 06/24/2015 | 0.87 | ± | 1.81 | 3.23 | ± | 6.71 | No |
| CRATERS | 04/01/2015 | -0.12 | ± | 1.92 | -0.44 | ± | 7.12 | No |
| | 04/08/2015 | -1.71 | ± | 1.89 | -6.32 | ± | 7.00 | No |
| | 04/15/2015 | -1.13 | ± | 1.90 | -4.17 | ± | 7.02 | No |
| | 04/22/2015 | 0.40 | ± | 1.93 | 1.48 | ± | 7.15 | No |
| | 04/29/2015 | 2.37 | ± | 2.04 | 8.78 | ± | 7.55 | No |
| | 05/06/2015 | 1.73 | ± | 1.98 | 6.40 | ± | 7.34 | No |
| | 05/13/2015 | -2.07 | ± | 2.01 | -7.64 | ± | 7.44 | No |
| | 05/20/2015 | 0.61 | ± | 1.90 | 2.26 | ± | 7.03 | No |
| | 05/27/2015 | -0.41 | ± | 1.97 | -1.53 | ± | 7.30 | No |
| | 06/03/2015 | -0.29 | ± | 1.91 | -1.07 | ± | 7.08 | No |
| | 06/10/2015 | -0.09 | ± | 2.14 | -0.33 | ± | 7.90 | No |
| | 06/17/2015 | 0.85 | ± | 1.94 | 3.14 | ± | 7.20 | No |
| | 06/24/2015 | 0.95 | ± | 1.97 | 3.51 | ± | 7.29 | No |
| DUBOIS | 04/01/2015 | -0.63 | ± | 1.73 | -2.35 | ± | 6.41 | No |
| | 04/08/2015 | -0.86 | ± | 1.69 | -3.17 | ± | 6.25 | No |
| | 04/15/2015 | 1.14 | ± | 1.78 | 4.22 | ± | 6.58 | No |
| | 04/22/2015 | 0.43 | ± | 1.74 | 1.60 | ± | 6.46 | No |
| | 04/29/2015 | -1.68 | ± | 1.73 | -6.22 | ± | 6.40 | No |
| | 05/06/2015 | -1.27 | ± | 1.92 | -4.69 | ± | 7.11 | No |
| | 05/13/2015 | 1.64 | ± | 1.74 | 6.06 | ± | 6.43 | No |
| | 05/20/2015 | 0.59 | ± | 1.70 | 2.17 | ± | 6.27 | No |
| | 05/27/2015 | 1.24 | ± | 1.84 | 4.60 | ± | 6.81 | No |
| | 06/03/2015 | -1.23 | ± | 1.77 | -4.56 | ± | 6.55 | No |
| | 06/10/2015 | 0.11 | ± | 1.97 | 0.42 | ± | 7.28 | No |
| | 06/17/2015 | 0.78 | ± | 1.89 | 2.88 | ± | 6.98 | No |
| | 06/24/2015 | -1.75 | ± | 1.81 | -6.49 | ± | 6.68 | No |
| IDAHO FALLS | 04/01/2015 | -0.62 | ± | 1.69 | -2.29 | ± | 6.26 | No |
| | 04/08/2015 | -0.87 | ± | 1.71 | -3.21 | ± | 6.34 | No |
| | 04/15/2015 | 1.17 | ± | 1.82 | 4.32 | ± | 6.73 | No |
| | 04/22/2015 | 0.42 | ± | 1.71 | 1.56 | ± | 6.32 | No |
| | 04/29/2015 | -1.76 | ± | 1.81 | -6.51 | ± | 6.70 | No |
| | 05/06/2015 | -1.17 | ± | 1.78 | -4.34 | ± | 6.57 | No |
| | 05/13/2015 | 1.77 | ± | 1.87 | 6.53 | ± | 6.93 | No |
| | 05/20/2015 | 0.62 | ± | 1.79 | 2.30 | ± | 6.63 | No |
| | 05/27/2015 | 1.29 | ± | 1.91 | 4.77 | ± | 7.06 | No |
| | 06/03/2015 | -1.33 | ± | 1.90 | -4.90 | ± | 7.04 | No |
| | 06/10/2015 | 0.12 | ± | 1.98 | 0.43 | ± | 7.32 | No |
| | 06/17/2015 | 0.78 | ± | 1.90 | 2.90 | ± | 7.02 | No |
| | 06/24/2015 | -1.83 | ± | 1.88 | -6.75 | ± | 6.95 | No |
| QA-2 (IDAHO FALLS) | 04/01/2015 | -0.62 | ± | 1.69 | -2.29 | ± | 6.25 | No |
| | 04/08/2015 | -0.87 | ± | 1.71 | -3.21 | ± | 6.34 | No |
| | 04/15/2015 | 1.16 | ± | 1.81 | 4.29 | ± | 6.68 | No |
| | 04/22/2015 | 0.44 | ± | 1.79 | 1.64 | ± | 6.63 | No |
| | 04/29/2015 | -1.78 | ± | 1.83 | -6.59 | ± | 6.79 | 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 |
|---|---|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | | | |
| | 05/06/2015 | -1.20 | ± | 1.81 | -4.43 | ± | 6.71 | No |
| | 05/13/2015 | 1.80 | ± | 1.90 | 6.64 | ± | 7.04 | No |
| | 05/20/2015 | 0.66 | ± | 1.92 | 2.46 | ± | 7.11 | No |
| | 05/27/2015 | 1.32 | ± | 1.95 | 4.87 | ± | 7.22 | No |
| | 06/03/2015 | -1.35 | ± | 1.94 | -5.00 | ± | 7.18 | No |
| | 06/10/2015 | 0.11 | ± | 1.96 | 0.42 | ± | 7.25 | No |
| | 06/17/2015 | 0.77 | ± | 1.87 | 2.85 | ± | 6.91 | No |
| | 06/24/2015 | -1.84 | ± | 1.89 | -6.80 | ± | 7.00 | No |
| JACKSON | 04/01/2015 | -0.12 | ± | 1.91 | -0.44 | ± | 7.08 | No |
| | 04/08/2015 | -2.02 | ± | 2.24 | -7.49 | ± | 8.29 | No |
| | 04/15/2015 | -1.03 | ± | 1.73 | -3.80 | ± | 6.39 | No |
| | 04/22/2015 | 0.42 | ± | 2.03 | 1.56 | ± | 7.51 | No |
| | 04/29/2015 | 2.56 | ± | 2.20 | 9.48 | ± | 8.15 | No |
| | 05/06/2015 | 1.75 | ± | 2.01 | 6.49 | ± | 7.44 | No |
| | 05/13/2015 | -2.18 | ± | 2.13 | -8.08 | ± | 7.87 | No |
| | 05/20/2015 | 0.62 | ± | 1.93 | 2.30 | ± | 7.16 | No |
| | 05/27/2015 | -0.41 | ± | 1.96 | -1.53 | ± | 7.26 | No |
| | 06/03/2015 | -0.29 | ± | 1.95 | -1.09 | ± | 7.20 | No |
| | 06/10/2015 | -0.09 | ± | 2.16 | -0.33 | ± | 8.00 | No |
| | 06/17/2015 | 0.90 | ± | 2.07 | 3.34 | ± | 7.64 | No |
| | 06/24/2015 | 1.04 | ± | 2.17 | 3.86 | ± | 8.03 | No |
| SUGAR CITY | 04/01/2015 | -0.62 | ± | 1.68 | -2.28 | ± | 6.22 | No |
| | 04/08/2015 | -0.86 | ± | 1.70 | -3.18 | ± | 6.28 | No |
| | 04/15/2015 | 1.12 | ± | 1.74 | 4.13 | ± | 6.43 | No |
| | 04/22/2015 | 0.41 | ± | 1.66 | 1.52 | ± | 6.13 | No |
| | 04/29/2015 | -1.54 | ± | 1.58 | -5.69 | ± | 5.86 | No |
| | 05/06/2015 | -1.07 | ± | 1.62 | -3.94 | ± | 5.98 | No |
| | 05/13/2015 | 1.62 | ± | 1.72 | 6.00 | ± | 6.36 | No |
| | 05/20/2015 | 0.58 | ± | 1.69 | 2.16 | ± | 6.24 | No |
| | 05/27/2015 | 1.21 | ± | 1.79 | 4.46 | ± | 6.61 | No |
| | 06/03/2015 | -1.23 | ± | 1.77 | -4.55 | ± | 6.54 | No |
| | 06/10/2015 | 0.11 | ± | 1.90 | 0.41 | ± | 7.03 | No |
| | 06/17/2015 | 0.69 | ± | 1.68 | 2.57 | ± | 6.23 | No |
| | 06/24/2015 | -1.66 | ± | 1.71 | -6.13 | ± | 6.31 | No |
| **INL SITE** | | | | | | | | |
| EFS | 04/01/2015 | -0.12 | ± | 1.93 | -0.44 | ± | 7.15 | No |
| | 04/08/2015 | -1.66 | ± | 1.84 | -6.14 | ± | 6.80 | No |
| | 04/15/2015 | -1.12 | ± | 1.88 | -4.13 | ± | 6.95 | No |
| | 04/22/2015 | 0.40 | ± | 1.92 | 1.47 | ± | 7.11 | No |
| | 04/29/2015 | 2.30 | ± | 1.97 | 8.50 | ± | 7.31 | No |
| | 05/06/2015 | 1.68 | ± | 1.92 | 6.20 | ± | 7.10 | No |
| | 05/13/2015 | -1.98 | ± | 1.93 | -7.32 | ± | 7.13 | No |
| | 05/20/2015 | 0.63 | ± | 1.97 | 2.35 | ± | 7.29 | No |
| | 05/27/2015 | -0.42 | ± | 1.99 | -1.55 | ± | 7.38 | No |
| | 06/03/2015 | -0.40 | ± | 2.66 | -1.48 | ± | 9.83 | No |
| | 06/10/2015 | -0.09 | ± | 2.15 | -0.33 | ± | 7.97 | No |
| | 06/17/2015 | 0.91 | ± | 2.07 | 3.35 | ± | 7.68 | No |
| | 06/24/2015 | 0.94 | ± | 1.95 | 3.47 | ± | 7.20 | No |
| MAIN GATE | 04/01/2015 | -0.12 | ± | 2.01 | -0.46 | ± | 7.44 | No |
| | 04/08/2015 | -1.64 | ± | 1.81 | -6.06 | ± | 6.71 | 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 |
|---|---|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | | | |
| | 04/15/2015 | -1.11 | ± | 1.87 | -4.11 | ± | 6.91 | No |
| | 04/22/2015 | 0.40 | ± | 1.93 | 1.48 | ± | 7.13 | No |
| | 04/29/2015 | 2.37 | ± | 2.03 | 8.76 | ± | 7.53 | No |
| | 05/06/2015 | 1.62 | ± | 1.86 | 6.00 | ± | 6.88 | No |
| | 05/13/2015 | -1.83 | ± | 1.79 | -6.78 | ± | 6.61 | No |
| | 05/20/2015 | 0.56 | ± | 1.73 | 2.06 | ± | 6.41 | No |
| | 05/27/2015 | -0.42 | ± | 1.99 | -1.55 | ± | 7.38 | No |
| | 06/03/2015 | -0.27 | ± | 1.81 | -1.01 | ± | 6.71 | No |
| | 06/10/2015 | -0.09 | ± | 2.07 | -0.32 | ± | 7.64 | No |
| | 06/17/2015 | 0.80 | ± | 1.84 | 2.98 | ± | 6.82 | No |
| | 06/24/2015 | 0.88 | ± | 1.84 | 3.27 | ± | 6.80 | No |
| QA-1 | 04/01/2015 | -0.12 | ± | 1.90 | -0.44 | ± | 7.03 | No |
| (MAIN GATE) | 04/08/2015 | -1.70 | ± | 1.88 | -6.29 | ± | 6.96 | No |
| | 04/15/2015 | -1.08 | ± | 1.82 | -3.99 | ± | 6.72 | No |
| | 04/22/2015 | 0.38 | ± | 1.83 | 1.40 | ± | 6.77 | No |
| | 04/29/2015 | 2.16 | ± | 1.85 | 7.98 | ± | 6.86 | No |
| | 05/06/2015 | 1.61 | ± | 1.84 | 5.96 | ± | 6.83 | No |
| | 05/13/2015 | -1.90 | ± | 1.85 | -7.03 | ± | 6.85 | No |
| | 05/20/2015 | 0.57 | ± | 1.77 | 2.11 | ± | 6.56 | No |
| | 05/27/2015 | -0.40 | ± | 1.93 | -1.50 | ± | 7.13 | No |
| | 06/03/2015 | -0.29 | ± | 1.91 | -1.07 | ± | 7.07 | No |
| | 06/10/2015 | -0.08 | ± | 2.03 | -0.31 | ± | 7.52 | No |
| | 06/17/2015 | 0.83 | ± | 1.90 | 3.07 | ± | 7.03 | No |
| | 06/24/2015 | 0.93 | ± | 1.93 | 3.43 | ± | 7.13 | No |
| VAN BUREN GATE | 04/01/2015 | -0.12 | ± | 1.88 | -0.43 | ± | 6.96 | No |
| | 04/08/2015 | -1.76 | ± | 1.95 | -6.52 | ± | 7.22 | No |
| | 04/15/2015 | -1.15 | ± | 1.94 | -4.27 | ± | 7.19 | No |
| | 04/22/2015 | 0.45 | ± | 2.15 | 1.65 | ± | 7.95 | No |
| | 04/29/2015 | 2.71 | ± | 2.33 | 10.04 | ± | 8.63 | No |
| | 05/06/2015 | 2.24 | ± | 2.57 | 8.28 | ± | 9.49 | No |
| | 05/13/2015 | -2.32 | ± | 2.26 | -8.59 | ± | 8.36 | No |
| | 05/20/2015 | 0.79 | ± | 2.46 | 2.93 | ± | 9.10 | No |
| | 05/27/2015 | -0.43 | ± | 2.05 | -1.59 | ± | 7.57 | No |
| | 06/03/2015 | -0.28 | ± | 1.85 | -1.03 | ± | 6.84 | No |
| | 06/10/2015 | -0.08 | ± | 1.99 | -0.30 | ± | 7.37 | No |
| | 06/17/2015 | 0.82 | ± | 1.87 | 3.02 | ± | 6.92 | No |
| | 06/24/2015 | 0.87 | ± | 1.81 | 3.23 | ± | 6.71 | 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 | 6/24/2015 | CESIUM-137 | -63.60 | ± | 92.70 | -235.32 | ± | 342.99 | No |
| ATOMIC CITY | 6/24/2015 | CESIUM-137 | -111.00 | ± | 115.00 | -410.70 | ± | 425.50 | No |
| | | STRONTIUM-90 | 11.80 | ± | 5.98 | 43.66 | ± | 22.13 | No |
| BLUE DOME | 6/24/2015 | CESIUM-137 | 153.00 | ± | 136.00 | 566.10 | ± | 503.20 | No |
| FAA TOWER | 6/24/2015 | CESIUM-137 | 69.00 | ± | 88.90 | 255.30 | ± | 328.93 | No |
| | | STRONTIUM-90 | -1.83 | ± | 5.69 | -6.77 | ± | 21.05 | No |
| HOWE | 6/24/2015 | AMERICIUM-241 | 0.03 | ± | 0.98 | 0.11 | ± | 3.61 | No |
| | | CESIUM-137 | 6.73 | ± | 126.00 | 24.90 | ± | 466.20 | No |
| | | PLUTONIUM-238 | 0.34 | ± | 1.02 | 1.25 | ± | 3.77 | No |
| | | PLUTONIUM-239/240 | 2.70 | ± | 1.09 | 9.99 | ± | 4.03 | No |
| MONTEVIEW | 6/24/2015 | AMERICIUM-241 | 0.16 | ± | 0.99 | 0.57 | ± | 3.68 | No |
| | | CESIUM-137 | -164.00 | ± | 128.00 | -606.80 | ± | 473.60 | No |
| | | PLUTONIUM-238 | 1.19 | ± | 0.74 | 4.40 | ± | 2.72 | No |
| | | PLUTONIUM-239/240 | 1.48 | ± | 0.99 | 5.48 | ± | 3.67 | No |
| MUD LAKE | 6/24/2015 | AMERICIUM-241 | -0.13 | ± | 1.11 | -0.48 | ± | 4.11 | No |
| | | CESIUM-137 | -19.80 | ± | 72.70 | -73.26 | ± | 268.99 | No |
| | | PLUTONIUM-238 | 0.70 | ± | 1.10 | 2.58 | ± | 4.07 | No |
| | | PLUTONIUM-239/240 | 4.50 | ± | 1.55 | 16.65 | ± | 5.74 | No |
| **DISTANT** | | | | | | | | | |
| BLACKFOOT | 6/24/2015 | CESIUM-137 | 124.00 | ± | 134.00 | 458.80 | ± | 495.80 | No |
| CRATERS | 6/24/2015 | CESIUM-137 | -48.20 | ± | 86.40 | -178.34 | ± | 319.68 | No |
| DUBOIS | 6/24/2015 | AMERICIUM-241 | -0.45 | ± | 0.81 | -1.65 | ± | 3.00 | No |
| | | CESIUM-137 | -93.70 | ± | 105.00 | -346.69 | ± | 388.50 | No |
| | | PLUTONIUM-238 | 1.10 | ± | 0.97 | 4.07 | ± | 3.60 | No |
| | | PLUTONIUM-239/240 | 2.56 | ± | 1.33 | 9.47 | ± | 4.92 | No |
| IDAHO FALLS | 6/24/2015 | CESIUM-137 | 116.00 | ± | 86.50 | 429.20 | ± | 320.05 | No |
| | | STRONTIUM-90 | 7.13 | ± | 5.43 | 26.38 | ± | 20.09 | No |
| QA-2 (IDAHO FALLS) | 6/24/2015 | CESIUM-137 | -168.00 | ± | 106.00 | -621.60 | ± | 392.20 | No |
| | | STRONTIUM-90 | 4.04 | ± | 5.85 | 14.95 | ± | 21.65 | No |

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

| Sampling Group and Location | Sampling Date | Analyte | Result ± 1s Uncertainty ($\times 10^{-18}$ µCi/mL) | | | Result ± 1s Uncertainty ($\times 10^{-14}$ Bq/mL) | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|---|
| JACKSON | 6/24/2015 | AMERICIUM-241 | 0.21 | ± | 1.29 | 0.78 | ± | 4.77 | No |
| | | CESIUM-137 | 73.70 | ± | 74.80 | 272.69 | ± | 276.76 | No |
| | | PLUTONIUM-238 | -0.40 | ± | 1.34 | -1.49 | ± | 4.96 | No |
| | | PLUTONIUM-239/240 | 2.01 | ± | 1.22 | 7.44 | ± | 4.51 | No |
| SUGAR CITY | 6/24/2015 | CESIUM-137 | -40.60 | ± | 118.00 | -150.22 | ± | 436.60 | No |
| **INL SITE** | | | | | | | | | |
| EFS | 6/24/2015 | AMERICIUM-241 | -1.43 | ± | 0.84 | -5.29 | ± | 3.12 | No |
| | | CESIUM-137 | 31.10 | ± | 92.20 | 115.07 | ± | 341.14 | No |
| | | PLUTONIUM-238 | 0.00 | ± | 1.12 | 0.00 | ± | 4.14 | No |
| | | PLUTONIUM-239/240 | 2.12 | ± | 1.43 | 7.84 | ± | 5.29 | No |
| MAIN GATE | 6/24/2015 | CESIUM-137 | 181.00 | ± | 123.00 | 669.70 | ± | 455.10 | No |
| | | STRONTIUM-90 | -1.28 | ± | 5.44 | -4.74 | ± | 20.13 | No |
| QA-1 (MAIN GATE) | 6/24/2015 | CESIUM-137 | -52.40 | ± | 126.00 | -193.88 | ± | 466.20 | No |
| | | STRONTIUM-90 | -1.65 | ± | 4.98 | -6.11 | ± | 18.43 | No |
| VAN BUREN GATE | 6/24/2015 | AMERICIUM-241 | -1.16 | ± | 1.11 | -4.29 | ± | 4.11 | No |
| | | CESIUM-137 | 9.17 | ± | 106.00 | 33.93 | ± | 392.20 | No |
| | | PLUTONIUM-238 | 0.78 | ± | 0.96 | 2.90 | ± | 3.56 | No |
| | | PLUTONIUM-239/240 | 5.86 | ± | 1.68 | 21.68 | ± | 6.22 | **Yes** |

## 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 | 02/18/15 | 04/01/15 | 0.96 | ± | 0.39 | 3.54 | ± | 1.44 | No |
| ATOMIC CITY | 04/01/15 | 05/06/15 | 2.77 | ± | 1.73 | 10.27 | ± | 6.40 | No |
| ATOMIC CITY | 05/06/15 | 05/27/15 | 4.40 | ± | 0.83 | 16.29 | ± | 3.08 | **Yes** |
| ATOMIC CITY | 05/27/15 | 06/17/15 | 4.66 | ± | 0.84 | 17.23 | ± | 3.12 | **Yes** |
| **DISTANT** | | | | | | | | | |
| BLACKFOOT | 03/18/15 | 04/22/15 | 3.12 | ± | 0.74 | 11.55 | ± | 2.73 | **Yes** |
| BLACKFOOT | 04/22/15 | 05/13/15 | 5.13 | ± | 1.02 | 18.98 | ± | 3.78 | **Yes** |
| BLACKFOOT | 05/13/15 | 05/28/15 | 12.09 | ± | 1.67 | 44.74 | ± | 6.19 | **Yes** |
| BLACKFOOT | 05/28/15 | 06/10/15 | 10.50 | ± | 1.79 | 38.85 | ± | 6.62 | **Yes** |
| BLACKFOOT | 06/10/15 | 06/24/15 | 7.82 | ± | 1.44 | 28.94 | ± | 5.31 | **Yes** |
| IDAHO FALLS | 02/25/15 | 04/02/15 | 1.32 | ± | 0.63 | 4.87 | ± | 2.34 | No |
| IDAHO FALLS | 04/02/15 | 04/29/15 | 4.37 | ± | 0.80 | 16.18 | ± | 2.96 | **Yes** |
| IDAHO FALLS | 04/29/15 | 05/20/15 | 5.05 | ± | 0.93 | 18.67 | ± | 3.43 | **Yes** |
| IDAHO FALLS | 05/20/14 | 06/03/15 | 8.41 | ± | 1.74 | 31.13 | ± | 6.45 | **Yes** |
| IDAHO FALLS | 06/03/15 | 06/17/15 | 9.63 | ± | 1.70 | 35.65 | ± | 6.30 | **Yes** |
| SUGAR CITY | 02/18/15 | 04/01/15 | 1.10 | ± | 0.48 | 4.09 | ± | 1.78 | No |
| SUGAR CITY | 04/01/15 | 04/29/15 | 2.64 | ± | 0.99 | 9.78 | ± | 3.66 | No |
| SUGAR CITY | 04/29/15 | 05/20/15 | 6.76 | ± | 1.67 | 25.02 | ± | 6.18 | **Yes** |
| SUGAR CITY | 05/20/15 | 06/02/15 | 9.85 | ± | 2.31 | 36.46 | ± | 8.53 | **Yes** |
| SUGAR CITY | 06/02/15 | 06/17/15 | 15.51 | ± | 2.36 | 57.39 | ± | 8.74 | **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 | 03/31/15 | 04/30/15 | 108.00 | ± | 22.60 | 4.00 | ± | 0.84 | **Yes** |
| | 04/30/15 | 05/29/15 | 40.00 | ± | 21.70 | 1.48 | ± | 0.80 | No |
| | 05/29/15 | 06/30/15 | 134.00 | ± | 23.10 | 4.96 | ± | 0.85 | **Yes** |
| CFA | 04/01/15 | 05/01/15 | 127.00 | ± | 22.90 | 4.70 | ± | 0.85 | **Yes** |
| | 05/01/15 | 06/01/15 | 122.00 | ± | 22.70 | 4.51 | ± | 0.84 | **Yes** |
| EFS | 04/08/15 | 04/15/15 | 164.00 | ± | 23.30 | 6.07 | ± | 0.86 | **Yes** |
| | 05/06/15 | 05/13/15 | 183.00 | ± | 23.30 | 6.77 | ± | 0.86 | **Yes** |
| | 05/13/15 | 05/20/15 | 118.00 | ± | 22.40 | 4.37 | ± | 0.83 | **Yes** |
| | 05/20/15 | 05/27/15 | 135.00 | ± | 22.90 | 5.00 | ± | 0.85 | **Yes** |

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

| Location | Sampling Date | Analyte | Result ± 1s Uncertainty (pCi/L) | | | Result ± 1s Uncertainty (Bq/L) | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|---|
| **SURFACE WATER** | | | | | | | | | |
| Alpheus Spring | 5/11/2015 | GROSS ALPHA | 1.04 | ± | 0.73 | 0.04 | ± | 0.03 | No |
| | | GROSS BETA | 6.33 | ± | 0.62 | 0.23 | ± | 0.02 | **Yes** |
| | | TRITIUM | 96.40 | ± | 22.10 | 3.57 | ± | 0.82 | **Yes** |
| Bill Jones Fish Farm | 5/11/2015 | GROSS ALPHA | 1.80 | ± | 0.56 | 0.07 | ± | 0.02 | **Yes** |
| | | GROSS BETA | 2.73 | ± | 0.51 | 0.10 | ± | 0.02 | **Yes** |
| | | TRITIUM | 72.70 | ± | 21.80 | 2.69 | ± | 0.81 | **Yes** |
| Clear Springs | 5/11/2015 | GROSS ALPHA | 1.39 | ± | 0.65 | 0.05 | ± | 0.02 | No |
| | | GROSS BETA | 3.85 | ± | 0.55 | 0.14 | ± | 0.02 | **Yes** |
| | | TRITIUM | 64.20 | ± | 21.90 | 2.38 | ± | 0.81 | No |
| **DRINKING WATER** | | | | | | | | | |
| Atomic City | 5/13/2015 | GROSS ALPHA | 0.92 | ± | 0.58 | 0.03 | ± | 0.02 | No |
| | | GROSS BETA | 3.44 | ± | 0.51 | 0.13 | ± | 0.02 | **Yes** |
| | | TRITIUM | 95.10 | ± | 22.30 | 3.52 | ± | 0.83 | **Yes** |
| Control | 5/14/2015 | GROSS ALPHA | 0.20 | ± | 0.20 | 0.01 | ± | 0.01 | No |
| | | GROSS BETA | -0.07 | ± | 0.41 | 0.00 | ± | 0.02 | No |
| | | TRITIUM | 82.10 | ± | 22.10 | 3.04 | ± | 0.82 | **Yes** |
| Craters of the Moon | 5/13/2015 | GROSS ALPHA | 0.82 | ± | 0.55 | 0.03 | ± | 0.02 | No |
| | | GROSS BETA | 4.53 | ± | 0.47 | 0.17 | ± | 0.02 | **Yes** |
| | | TRITIUM | 80.70 | ± | 22.10 | 2.99 | ± | 0.82 | **Yes** |
| Howe | 5/13/2015 | GROSS ALPHA | 1.12 | ± | 0.54 | 0.04 | ± | 0.02 | No |
| | | GROSS BETA | 0.83 | ± | 0.46 | 0.03 | ± | 0.02 | No |
| | | TRITIUM | 20.90 | ± | 21.60 | 0.77 | ± | 0.80 | No |
| Howe (Duplicate) | 5/13/2015 | GROSS ALPHA | 1.54 | ± | 0.56 | 0.06 | ± | 0.02 | No |
| | | GROSS BETA | 1.30 | ± | 0.48 | 0.05 | ± | 0.02 | No |
| | | TRITIUM | 44.70 | ± | 21.80 | 1.66 | ± | 0.81 | No |
| Idaho Falls | 5/14/2015 | GROSS ALPHA | 1.10 | ± | 0.64 | 0.04 | ± | 0.02 | No |
| | | GROSS BETA | 3.13 | ± | 0.53 | 0.12 | ± | 0.02 | **Yes** |
| | | TRITIUM | 51.90 | ± | 22.00 | 1.92 | ± | 0.81 | No |
| Minidoka | 5/11/2015 | GROSS ALPHA | 2.76 | ± | 0.68 | 0.10 | ± | 0.03 | **Yes** |
| | | GROSS BETA | 4.17 | ± | 0.54 | 0.15 | ± | 0.02 | **Yes** |
| | | TRITIUM | 53.20 | ± | 22.10 | 1.97 | ± | 0.82 | No |
| Mud Lake | 5/13/2015 | GROSS ALPHA | 0.54 | ± | 0.45 | 0.02 | ± | 0.02 | No |

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | GROSS BETA | 4.34 | ± | 0.51 | 0.16 | ± | 0.02 | **Yes** |
| | | TRITIUM | 54.90 | ± | 21.90 | 2.03 | ± | 0.81 | No |
| Rest Area | 5/13/2015 | GROSS ALPHA | 0.70 | ± | 0.53 | 0.03 | ± | 0.02 | No |
| | | GROSS BETA | 1.93 | ± | 0.50 | 0.07 | ± | 0.02 | **Yes** |
| | | TRITIUM | 87.30 | ± | 22.30 | 3.23 | ± | 0.83 | **Yes** |
| Shoshone | 5/11/2015 | GROSS ALPHA | 1.56 | ± | 0.59 | 0.06 | ± | 0.02 | No |
| | | GROSS BETA | 3.90 | ± | 0.53 | 0.14 | ± | 0.02 | **Yes** |
| | | TRITIUM | 78.80 | ± | 22.20 | 2.92 | ± | 0.82 | **Yes** |

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

| | | Iodine-131 | | | | | | | Cesium-137 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Sampling Date | Result ± 1s Uncertainty (pCi†/L) | | | Result ± 1s Uncertainty (Bq‡/L) | | | Result > 3s | Result ± 1s Uncertainty (pCi/L) | | | Result ± 1s Uncertainty (Bq/L) | | | Result > 3s |
| BLACKFOOT | 04/06/15 | 0.87 | ± | 1.23 | 0.032 | ± | 0.046 | No | 1.71 | ± | 0.95 | 0.063 | ± | 0.035 | No |
| Duplicate | 04/06/15 | 0.19 | ± | 1.18 | 0.007 | ± | 0.044 | No | 0.40 | ± | 0.67 | 0.015 | ± | 0.025 | No |
| | 05/04/15 | 1.50 | ± | 1.41 | 0.056 | ± | 0.052 | No | 0.92 | ± | 0.94 | 0.034 | ± | 0.035 | No |
| | 06/07/15 | 1.93 | ± | 1.42 | 0.071 | ± | 0.053 | No | 2.01 | ± | 91.07 | 0.074 | ± | 3.373 | No |
| CONTROL | 04/07/15 | -1.76 | ± | 1.32 | -0.065 | ± | 0.049 | No | 0.23 | ± | 0.87 | 0.008 | ± | 0.032 | No |
| | 05/05/15 | 1.48 | ± | 2.85 | 0.055 | ± | 0.106 | No | -0.38 | ± | 1.86 | -0.014 | ± | 0.069 | No |
| | 06/02/15 | -0.04 | ± | 1.30 | -0.001 | ± | 0.048 | No | 0.53 | ± | 0.89 | 0.019 | ± | 0.033 | No |
| DIETRICH | 04/07/15 | 0.55 | ± | 3.04 | 0.020 | ± | 0.113 | No | -1.50 | ± | 1.98 | -0.056 | ± | 0.073 | No |
| | 05/05/15 | -1.41 | ± | 2.32 | -0.052 | ± | 0.086 | No | -0.86 | ± | 1.94 | -0.032 | ± | 0.072 | No |
| | 06/02/15 | -2.81 | ± | 2.35 | -0.104 | ± | 0.087 | No | -0.32 | ± | 1.92 | -0.012 | ± | 0.071 | No |
| FORT HALL | 04/06/15 | 0.50 | ± | 2.66 | 0.019 | ± | 0.098 | No | -1.00 | ± | 1.89 | -0.037 | ± | 0.070 | No |
| | 05/04/15 | -1.63 | ± | 1.37 | -0.060 | ± | 0.051 | No | -1.91 | ± | 0.93 | -0.071 | ± | 0.035 | No |
| | 06/07/15 | -3.30 | ± | 3.11 | -0.122 | ± | 0.115 | No | -3.08 | ± | 1.94 | -0.114 | ± | 0.072 | No |
| HOWE | 04/07/15 | -0.39 | ± | 2.36 | -0.014 | ± | 0.087 | No | -0.47 | ± | 1.86 | -0.018 | ± | 0.069 | No |
| | 05/05/15 | 0.46 | ± | 2.57 | 0.017 | ± | 0.095 | No | -1.04 | ± | 1.88 | -0.039 | ± | 0.070 | No |
| | 06/02/15 | 2.44 | ± | 1.25 | 0.090 | ± | 0.046 | No | -0.02 | ± | 0.64 | -0.001 | ± | 0.024 | No |
| Duplicate | 06/02/15 | -0.70 | ± | 1.20 | -0.026 | ± | 0.044 | No | 0.46 | ± | 0.87 | 0.017 | ± | 0.032 | No |
| IDAHO FALLS | 04/07/15 | -1.75 | ± | 1.22 | -0.065 | ± | 0.045 | No | 0.60 | ± | 0.65 | 0.022 | ± | 0.024 | No |
| | 04/14/15 | 0.29 | ± | 1.07 | 0.011 | ± | 0.040 | No | 0.66 | ± | 0.68 | 0.024 | ± | 0.025 | No |
| | 04/21/15 | -1.60 | ± | 1.16 | -0.059 | ± | 0.043 | No | 0.95 | ± | 0.67 | 0.035 | ± | 0.025 | No |
| | 04/28/15 | 1.17 | ± | 1.11 | 0.043 | ± | 0.041 | No | 0.29 | ± | 0.64 | 0.011 | ± | 0.024 | No |
| | 05/05/15 | -0.70 | ± | 1.08 | -0.026 | ± | 0.040 | No | 0.24 | ± | 0.63 | 0.009 | ± | 0.023 | No |
| | 05/12/15 | -1.15 | ± | 2.33 | -0.043 | ± | 0.086 | No | -1.90 | ± | 2.04 | -0.070 | ± | 0.076 | No |
| | 05/19/15 | -0.45 | ± | 1.10 | -0.016 | ± | 0.041 | No | -0.97 | ± | 0.66 | -0.036 | ± | 0.025 | No |
| | 05/26/15 | -0.13 | ± | 1.10 | -0.005 | ± | 0.041 | No | -0.10 | ± | 0.64 | -0.004 | ± | 0.024 | No |
| | 06/02/15 | 1.24 | ± | 1.10 | 0.046 | ± | 0.041 | No | 1.59 | ± | 0.68 | 0.059 | ± | 0.025 | No |
| | 06/09/15 | -0.30 | ± | 1.20 | -0.011 | ± | 0.044 | No | -0.98 | ± | 0.67 | -0.036 | ± | 0.025 | No |
| | 06/16/15 | 0.51 | ± | 1.05 | 0.019 | ± | 0.039 | No | 0.94 | ± | 0.68 | 0.035 | ± | 0.025 | No |
| | 06/23/15 | 0.94 | ± | 1.11 | 0.035 | ± | 0.041 | No | 0.93 | ± | 0.68 | 0.034 | ± | 0.025 | No |
| | 06/30/15 | -0.49 | ± | 1.10 | -0.018 | ± | 0.041 | No | -0.04 | ± | 0.64 | -0.001 | ± | 0.024 | No |
| RUPERT | 04/07/15 | -1.59 | ± | 1.25 | -0.059 | ± | 0.046 | No | -0.47 | ± | 0.88 | -0.018 | ± | 0.032 | No |
| | 05/05/15 | -1.38 | ± | 2.44 | -0.051 | ± | 0.090 | No | 2.04 | ± | 1.93 | 0.076 | ± | 0.071 | No |
| | 06/02/15 | 0.12 | ± | 2.41 | 0.004 | ± | 0.089 | No | 0.85 | ± | 1.89 | 0.032 | ± | 0.070 | No |
| TERRETON | 04/07/15 | 0.88 | ± | 1.19 | 0.032 | ± | 0.044 | No | 0.67 | ± | 0.64 | 0.025 | ± | 0.024 | No |
| | 05/05/15 | -0.95 | ± | 1.18 | -0.035 | ± | 0.044 | No | 1.20 | ± | 0.69 | 0.044 | ± | 0.025 | No |
| | 06/02/15 | -1.29 | ± | 2.62 | -0.048 | ± | 0.097 | No | 1.37 | ± | 1.88 | 0.051 | ± | 0.070 | No |

## Table C-8. Strontium-90 and Tritium Concentrations in Milk

| Location | Sampling Date | Strontium-90 Result ± 1s Uncertainty | | | Strontium-90 Result ± 1s Uncertainty | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|
| BLACKFOOT | 05/04/15 | 0.11 | ± | 0.06 | 0.004 | ± | 0.002 | No |
| CONTROL | 05/05/15 | 0.41 | ± | 0.08 | 0.015 | ± | 0.003 | **Yes** |
| DIETRICH | 05/05/15 | 0.24 | ± | 0.07 | 0.009 | ± | 0.002 | **Yes** |
| FORT HALL | 05/04/15 | 0.27 | ± | 0.07 | 0.010 | ± | 0.003 | **Yes** |
| HOWE | 05/05/15 | 0.15 | ± | 0.07 | 0.006 | ± | 0.003 | No |
| IDAHO FALLS | 05/05/15 | 0.41 | ± | 0.07 | 0.015 | ± | 0.003 | **Yes** |
| RUPERT | 05/05/15 | 0.28 | ± | 0.06 | 0.010 | ± | 0.002 | **Yes** |
| TERRETON | 05/05/15 | 0.31 | ± | 0.08 | 0.011 | ± | 0.003 | **Yes** |
| | | **Tritium** | | | | | | |
| | | **Concentration ± 1s (pCi/L)** | | | **Concentration ± 1s (Bq/L)** | | | **Result > 3s** |
| BLACKFOOT | 05/04/15 | 128.97 | ± | 22.75 | 4.777 | ± | 0.843 | **Yes** |
| CONTROL | 05/05/15 | 68.84 | ± | 22.65 | 2.550 | ± | 0.839 | **Yes** |
| DIETRICH | 05/05/15 | 144.00 | ± | 22.80 | 5.333 | ± | 0.844 | **Yes** |
| FORT HALL[a] | 05/04/15 | 125.00 | ± | 22.70 | 4.630 | ± | 0.841 | **Yes** |
| HOWE | 05/05/15 | 119.00 | ± | 22.60 | 4.407 | ± | 0.837 | **Yes** |
| IDAHO FALLS | 05/05/15 | 108.00 | ± | 22.30 | 4.000 | ± | 0.826 | **Yes** |
| RUPERT | 05/05/15 | 130.00 | ± | 22.60 | 4.815 | ± | 0.837 | **Yes** |
| TERRETON | 05/05/15 | 59.60 | ± | 22.50 | 2.207 | ± | 0.833 | No |

[a] A review of the table, performed during the summer of 2020, identified the values listed for the result and uncertainty were incorrect. The result and uncertainty values were updated with the correct values.

## Table C-9. Gamma-emitting Radionuclides and Strontium-90 in Alfalfa

| Location | Sampling Date | Cesium-137 Result ± 1s Uncertainty pCi/kg | | | Cesium-137 Result ± 1s Uncertainty Bq/kg | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|
| MUD LAKE | 06/23/15 | -10.70 | ± | 62.00 | -0.40 | ± | 2.30 | No |
| MUD LAKE | 06/23/15 | -48.10 | ± | 92.30 | -1.78 | ± | 3.42 | No |
| MUD LAKE | 06/23/15 | -36.40 | ± | 89.50 | -1.35 | ± | 3.31 | No |
| | | **Strontium-90** | | | | | | |
| MUD LAKE | 06/23/15 | 4.36 | ± | 11.40 | 0.16 | ± | 0.42 | No |
| MUD LAKE | 06/23/15 | 2.23 | ± | 9.38 | 0.08 | ± | 0.35 | No |
| MUD LAKE | 06/23/15 | -0.85 | ± | 12.70 | -0.03 | ± | 0.47 | No |

## Table C-10. Environmental Radiation Measurements Using TLDs

| Location | Start Date | End Date | Radiation Measurement ± 2s Uncertainty mR | | | Exposure mR/day |
|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | |
| ARCO | 11/5/2014 | 5/6/2015 | 60.80 | ± | 11.90 | 0.33 |
| ATOMIC CITY | 11/5/2014 | 5/6/2015 | 64.40 | ± | 12.60 | 0.35 |
| BIRCH CREEK | 11/5/2014 | 5/6/2015 | 55.50 | ± | 10.90 | 0.30 |
| BLUE DOME | 11/5/2014 | 5/6/2015 | 52.50 | ± | 5.15 | 0.29 |
| HOWE | 11/5/2014 | 5/6/2015 | 61.20 | ± | 6.00 | 0.34 |
| MONTEVIEW | 11/5/2014 | 5/6/2015 | 59.20 | ± | 5.80 | 0.33 |
| MUD LAKE | 11/5/2014 | 5/6/2015 | 66.10 | ± | 6.50 | 0.36 |
| | | | | | **Boundary Average** | **0.33** |
| **DISTANT** | | | | | | |
| ABERDEEN | 11/4/2014 | 5/5/2015 | 64.40 | ± | 12.60 | 0.35 |
| BLACKFOOT | 11/5/2014 | 5/6/2015 | 64.40 | ± | 12.60 | 0.35 |
| CRATERS | 11/5/2014 | 5/6/2015 | 60.50 | ± | 11.90 | 0.33 |
| DUBOIS | 11/5/2014 | 5/6/2015 | 54.80 | ± | 10.76 | 0.30 |
| IDAHO FALLS | 11/5/2014 | 5/6/2015 | 61.50 | ± | 12.10 | 0.34 |
| MINIDOKA | 11/4/2014 | 5/5/2015 | 56.40 | ± | 11.10 | 0.31 |
| MOUNTAIN VIEW | 11/5/2014 | 5/6/2015 | 56.00 | ± | 11.00 | 0.31 |
| ROBERTS | 11/4/2014 | 5/5/2015 | 65.30 | ± | 12.80 | 0.36 |
| SUGAR CITY | 11/5/2014 | 5/6/2015 | 75.70 | ± | 14.80 | 0.42 |
| | | | | | **Distant Average** | **0.34** |
| **OUT-OF-STATE** | | | | | | |
| JACKSON | 11/3/2014 | 5/4/2015 | 50.70 | ± | 9.94 | 0.28 |

## Table C-11. Environmental Radiation Measurements Using OSLDs

| Location | Start Date | End Date | Radiation Measurement ± 2s Uncertainty mrem | | | Exposure mrem/day |
|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | |
| ARCO | 11/5/2014 | 5/6/2015 | 57.51 | ± | 5.75 | 0.32 |
| ATOMIC CITY | 11/5/2014 | 5/6/2015 | 60.73 | ± | 6.07 | 0.33 |
| BIRCH CREEK | 11/5/2014 | 5/6/2015 | 51.96 | ± | 5.20 | 0.29 |
| BLUE DOME | 11/5/2014 | 5/6/2015 | 46.48 | ± | 4.65 | 0.26 |
| HOWE | 11/5/2014 | 5/6/2015 | 54.67 | ± | 5.47 | 0.30 |
| MONTEVIEW | 11/5/2014 | 5/6/2015 | 53.25 | ± | 5.33 | 0.29 |
| MUD LAKE | 11/5/2014 | 5/6/2015 | 62.59 | ± | 6.26 | 0.34 |
| | | | | | **Boundary Average** | **0.30** |
| **DISTANT** | | | | | | |
| ABERDEEN | 11/4/2014 | 5/5/2015 | 61.07 | ± | 6.11 | 0.34 |
| BLACKFOOT | 11/5/2014 | 5/6/2015 | 58.23 | ± | 5.82 | 0.32 |
| CRATERS | 11/5/2014 | 5/6/2015 | 56.59 | ± | 5.66 | 0.31 |
| DUBOIS | 11/5/2014 | 5/6/2015 | 45.75 | ± | 4.58 | 0.25 |
| IDAHO FALLS | 11/5/2014 | 5/6/2015 | 55.35 | ± | 5.53 | 0.30 |
| MINIDOKA | 11/4/2014 | 5/5/2015 | 49.82 | ± | 4.98 | 0.27 |
| MOUNTAIN VIEW | 11/5/2014 | 5/6/2015 | 53.05 | ± | 5.30 | 0.29 |
| ROBERTS | 11/4/2014 | 5/5/2015 | 57.66 | ± | 5.77 | 0.32 |
| SUGAR CITY | 11/5/2014 | 5/6/2015 | 69.70 | ± | 6.97 | 0.38 |
| | | | | | **Distant Average** | **0.31** |
| **OUT-OF-STATE** | | | | | | |
| JACKSON | 11/3/2014 | 5/4/2015 | 46.50 | ± | 4.60 | 0.26 |

# APPENDIX D

## *STATISTICAL ANALYSIS RESULTS*

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

| Parameter | P[a] |
|---|---|
| **Gross Alpha** | |
| Quarter | 0.97 |
| April | 0.57 |
| May | 0.64 |
| June | 0.54 |
| **Gross Beta** | |
| Quarter | 0.31 |
| April | 0.24 |
| May | 0.48 |
| June | 0.66 |

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** | | |
| | April 1 | 0.48 |
| | April 8 | 0.75 |
| | April 15 | 0.39 |
| | April 22 | 0.72 |
| | April 29 | 0.72 |
| | May 6 | 0.35 |
| | May 13 | 0.47 |
| | May 20 | 0.32 |
| | May 27 | 1.00 |
| | June 3 | 1.00 |
| | June 10 | 0.48 |
| | June 17 | 0.39 |
| | June 24 | 0.25 |
| **Gross Beta** | | |
| | April 1 | 0.89 |
| | April 8 | 0.12 |
| | April 15 | 0.48 |
| | April 22 | 0.52 |
| | April 29 | 0.83 |
| | May 6 | 0.67 |
| | May 13 | 0.11 |
| | May 20 | 0.32 |
| | May 27 | 0.48 |
| | June 3 | 0.28 |
| | June 10 | 0.12 |
| | June 17 | 0.20 |
| | June 24 | 0.62 |

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