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

Idaho National Laboratory Site Offsite Environmental Surveillance Program Report: Fourth Quarter 2012

May 2013

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

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EXECUTIVE SUMMARY

None of the radionuclides detected in samples collected during the fourth quarter of 2012 could be directly linked with INL Site activities, with the exception of one waterfowl sample collected from an INL Site wastewater pond. 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 fourth quarter of 2012 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, October 1 through December 31, 2012. All sample types (media) and the sampling schedule followed during 2012 are listed in Appendix A. Specifically, this report contains the results for the following:

- Air sampling, including particulate air filters, charcoal cartridges, and atmospheric moisture
- Precipitation, drinking water, and surface water sampling
- Milk, potato, and waterfowl sampling
- Environmental radiation measurements

Table E-1 Summary of results for the Fourth Quarter of 2012.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	Neither gross alpha nor gross beta concentrations were statistically different at Distant, Boundary, and INL Site locations for the quarter or during any month of the quarter. There was one week (November 28) where a statistical difference was noted in gross alpha concentrations, but it appeared due to normal variability in weekly data. 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 actinides were detected. Strontium-90 was detected at five of seven locations at similar concentrations to those found throughout the past year.
	Charcoal Cartridge	Iodine-131	No Iodine-131 was found on any fourth quarter charcoal cartridges.
Atmospheric Moisture	Liquid	Tritium	Three of the 14 results had tritium concentrations greater than the 3s uncertainty. No sample result exceeded the DCS for tritium in air. Results were consistent with historical measurements.
Precipitation	Liquid	Tritium	Fourteen samples were collected. Two 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 not reported in any samples. Gross beta was detected in all but one of the drinking water and all but one of the surface water samples. Activities were consistent with natural levels of radioactivity in the aquifer. Tritium was detected in three drinking water samples, including a sample of bottled water.
Milk	Liquid	Iodine-131, other gamma-emitting	No Iodine-131 was detected. Cesium-137 was initially reported

		radionuclides, ^{90}Sr, tritium	at the detection limit in one sample but a subsequent recount did not indicate its presence. Strontium-90 was found in four of six samples analyzed and tritium was detected in all samples analyzed. Results were consistent with previous measurements and positive detections included a sample of commercial organic milk.
Potatoes	Vegetation	Gamma-emitting radionuclides, ^{90}Sr	Nine potato samples were collected. No manmade gamma-emitting radionuclides or ^{90}Sr was found in any sample.
Large Game Animals	Tissue	Gamma-emitting radionuclides	No game animal were sampled during the quarter.
Waterfowl	Tissue	Gamma emitting radionuclides, ^{90}Sr, ^{241}Am, and plutonium	Four radionuclides were found in one of the ducks from the Advanced Test Reactor complex. Cesium-137 and cobalt-60 were also detected in the edible tissues of this duck. These were likely to have originated from wastewater ponds at the facility. Cesium-137 was found in the remainder portion of two control ducks but not in edible tissues. No human-made radionuclides were found in ducks from the Materials and Fuels Complex.
Environmental Dosimeters	Environmental radiation	External radioactivity	Measurements were made using thermoluminescent dosimeters (TLDs) and optically-stimulated luminescent dosimeters (OSLDs). Average equivalent doses were 60.4 mrem at Boundary locations and 61.7 at Distant locations using TLDs. For OSLDs, the average dose equivalents were 53.5 mrem at Boundary locations and 54.8 mrem at Distant 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
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 2003). During calendar year 2012, 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), ALS Environmental, and the Wildlife Conservation Society.

This report contains monitoring results from the ESER Program for samples collected during the fourth quarter of 2012 (October 1-December 31, 2012).

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 six dairies around the INL Site, potatoes from at least five local producers, wheat 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. Beginning with second quarter samples, 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 a new laboratory—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 2011). 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 (σ), assuming a Gaussian or normal distribution. All results are reported in this document, even those that do not necessarily represent detections. The term "detected", as used for the discussion of results in this report, does not imply any degree of risk to the public or environment, but rather indicates that the radionuclide was measured at a concentration sufficient for the analytical instrument to record a value that is

statistically different from background. The ESER has adopted guidelines developed by the United States Geological Survey (Bartholomay, et al. 2003), based on an extension of a method proposed by Currie (1984), to interpret analytical results and make decisions concerning detection. Most of the following discussion is taken from Bartholomay et al (2003).

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). Instrument signals for the target and blank vary randomly about the true signals and may overlap making it difficult to distinguish between radionuclide activities in blank and in environmental samples (Figure 1).That is, the variability around the sample result may substantially overlap the variability around a net activity of zero for samples with no radioactivity. 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.

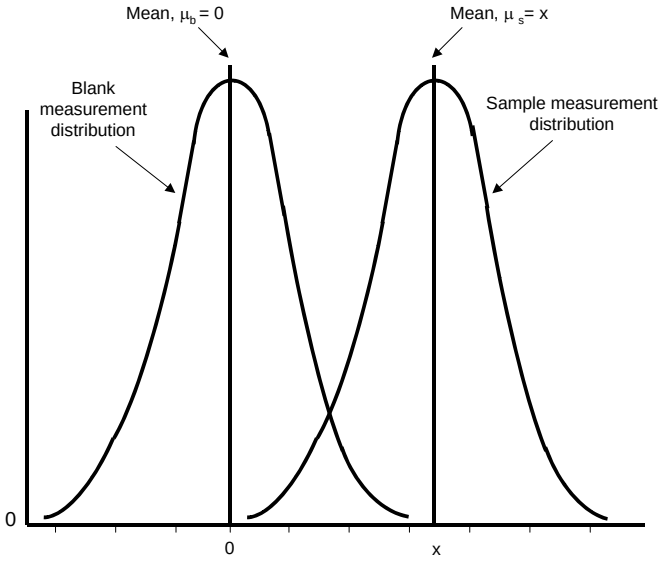

Figure 1. Example of overlap of blank and sample measurement distributions.

In the laboratory, instrument signals must exceed a critical level of 1.6s before the qualitative decision can be made as to whether the radionuclide was detected in a sample. At 1.6s there is about a 95-percent probability that the correct conclusion—not detected—will be made. Given a large number of samples, approximately 5 percent of the samples with measured concentrations greater than or equal to 1.6s, which were concluded as being detected, might not contain the radionuclide. These are referred to as false positives. For purposes of simplicity and consistency with past reporting, the ESER has rounded the 1.6s critical level estimate to 2s.

Once the critical level has been defined, the minimum detectable concentration may be determined. Concentrations that equal 3s represent a measurement at the detection level or minimum detectable concentration. For true concentrations of 3s or greater, there is a greater than 99-percent probability that the radionuclide was detected in the target sample. In a large number of samples, the conclusion—not detected—will be made in less than one percent of the samples with true concentrations at the minimum detectable concentration of 3s. These

measurements are known as false negatives. 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 detection may not be reliable. 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 typically 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 little 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 (2300 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 cleanup operation, the 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 by 2012.

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 fourth quarter of 2012 are discussed below. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses and DOE Derived Concentration Standard (DCS) (DOE 2011) 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 fourth quarter of 2012 (Figure 2). Three of these samplers are located on the INL Site, nine are situated off the INL Site near the boundary, and six 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 2012, one replicate sampler was moved to Monteview (a Boundary location) and one was moved to Arco (also a Boundary location). An average of 20,786 ft^3 (589 m^3) of air was sampled at each location, each week, at an average flow rate of 2.06 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.

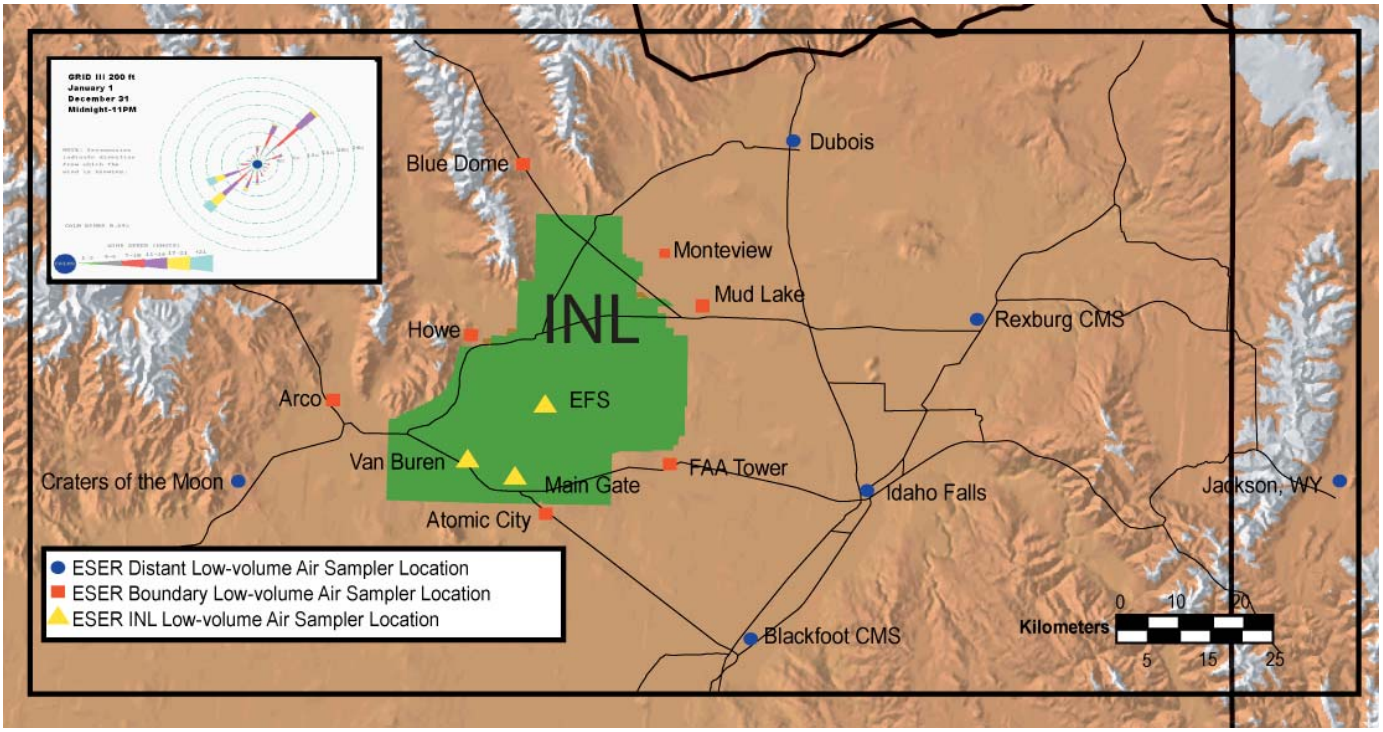

Figure 2. Low-volume air sampler locations.

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 not a statistical difference noted.

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. In the fourth quarter, there was one week, the week of November 28, where a statistical difference existed between the two sample groups (Table D-2). During this week, gross alpha concentrations were below average at all locations. The statistical difference seems to have resulted from slightly higher concentrations at some of the northern Boundary locations (Mud Lake, Monteview, and Blue Dome) and lower concentrations at some of the Distant locations (Craters of the Moon, Jackson, and Blackfoot). The INL Site locations were about in the middle of these two groups.

Gross beta results are presented in Table C-1 and displayed in Figures 7 through 10. The data were tested and 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 fourth quarter (Table D-1).

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

No ^{137}Cs, ^{238}Pu, $^{239/240}Pu$, or ^{241}Am.were detected. Strontiium-90 was detected in five of the seven composites analyzed. Similar concentrations were found at Distant, Boundary, and INL Site locations, and concentrations were similar to those detected beginning in the second half of 2011 after a more sensitive analytical method went into use. The highest concentration was found at Howe (5.49×10^{-17} μCi/mL), which represents 0.0002 percent of the Derived Concentration Standard.

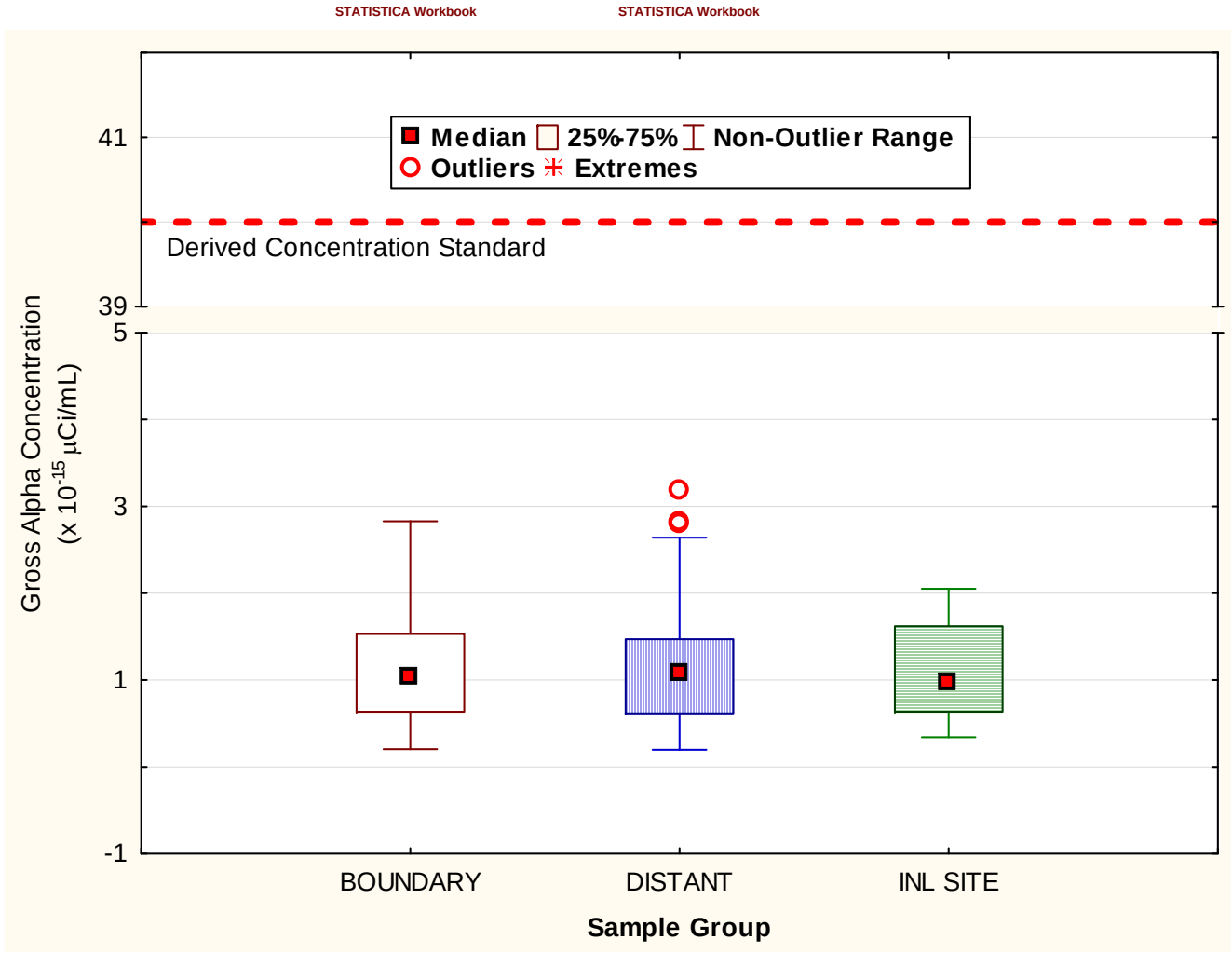

Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations for the fourth quarter of 2012.

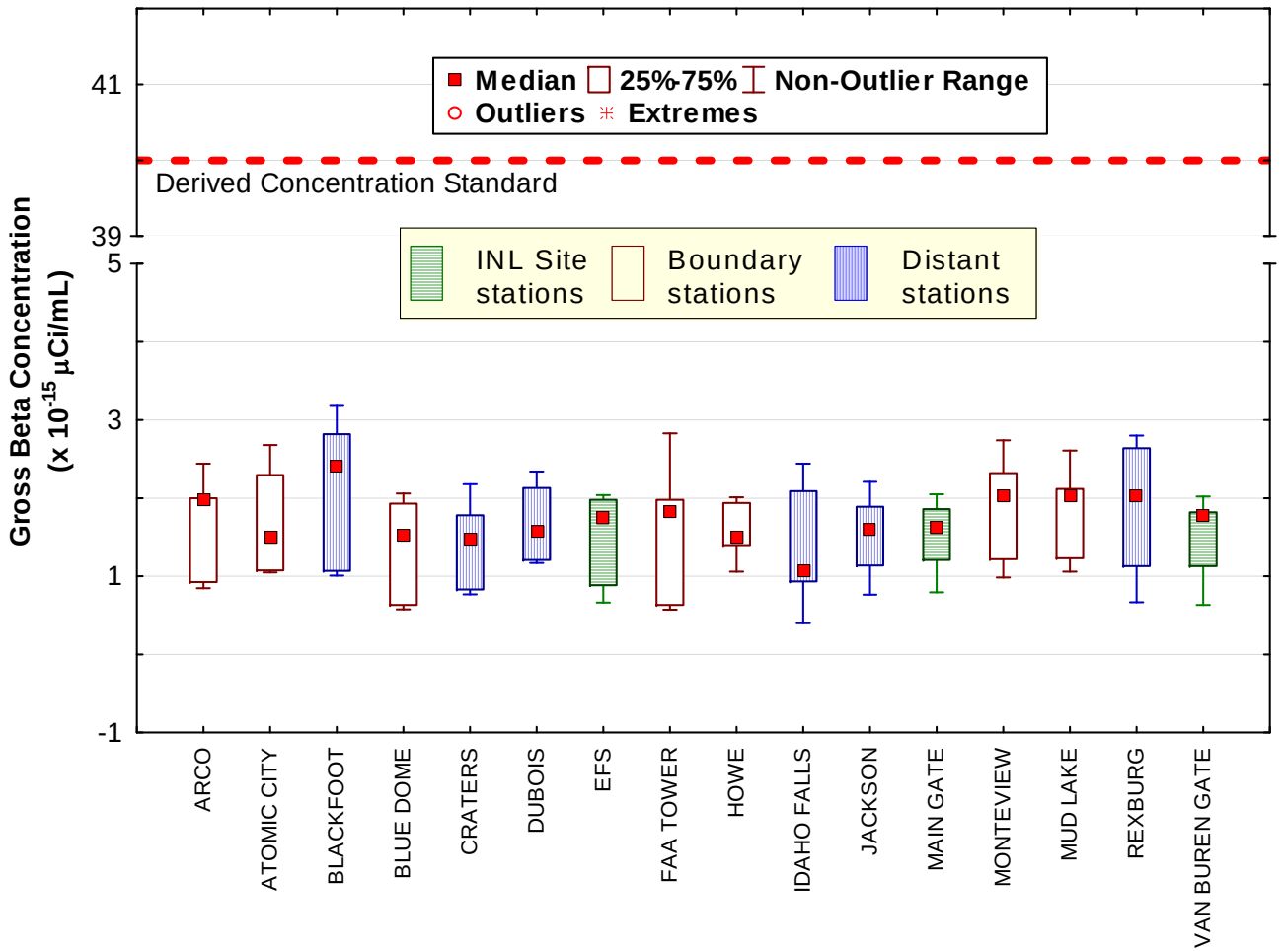

Figure 4. October gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Atomic City and Dubois (N = 4).

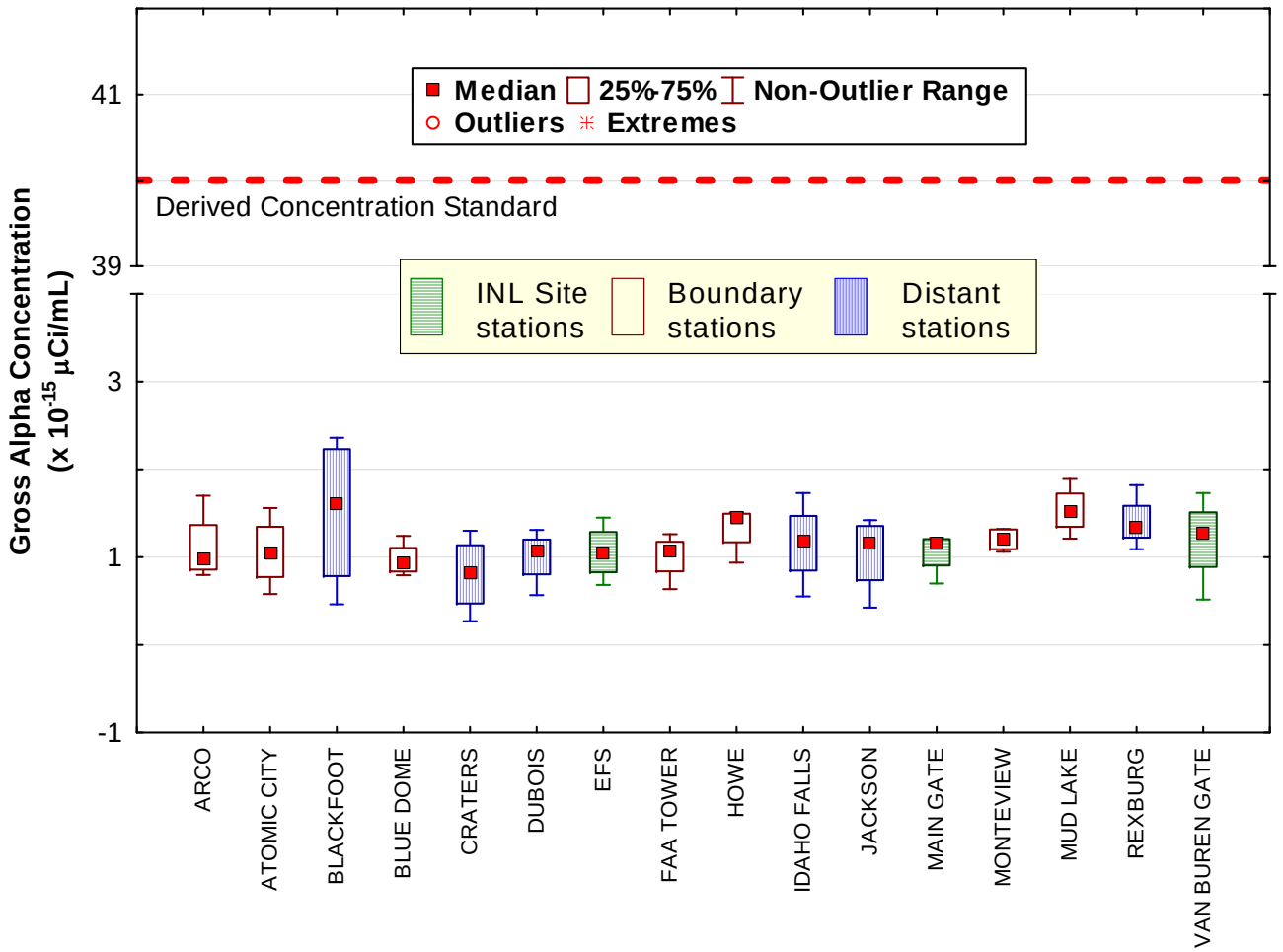

Figure 5. November gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

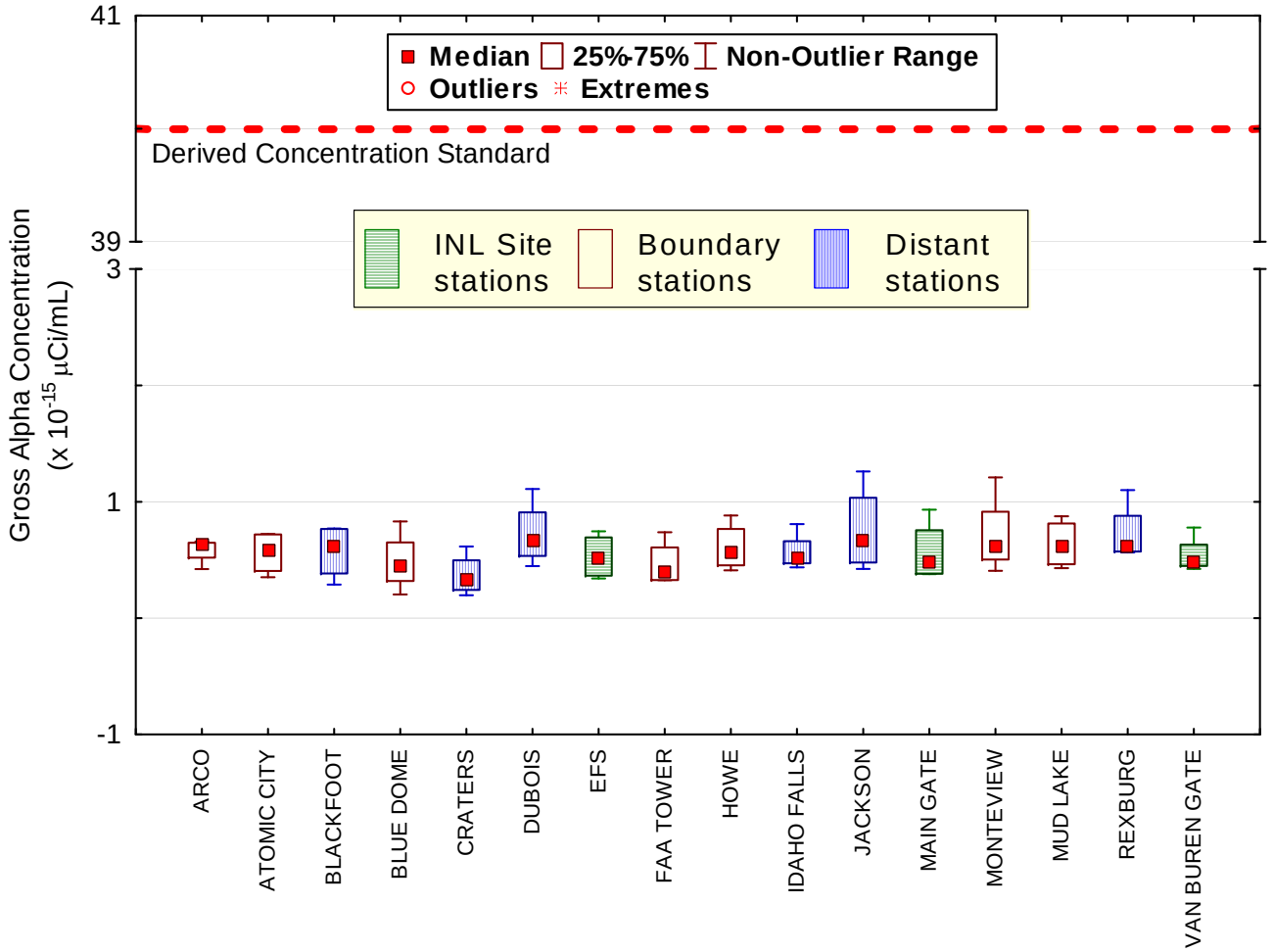

Figure 6. December gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

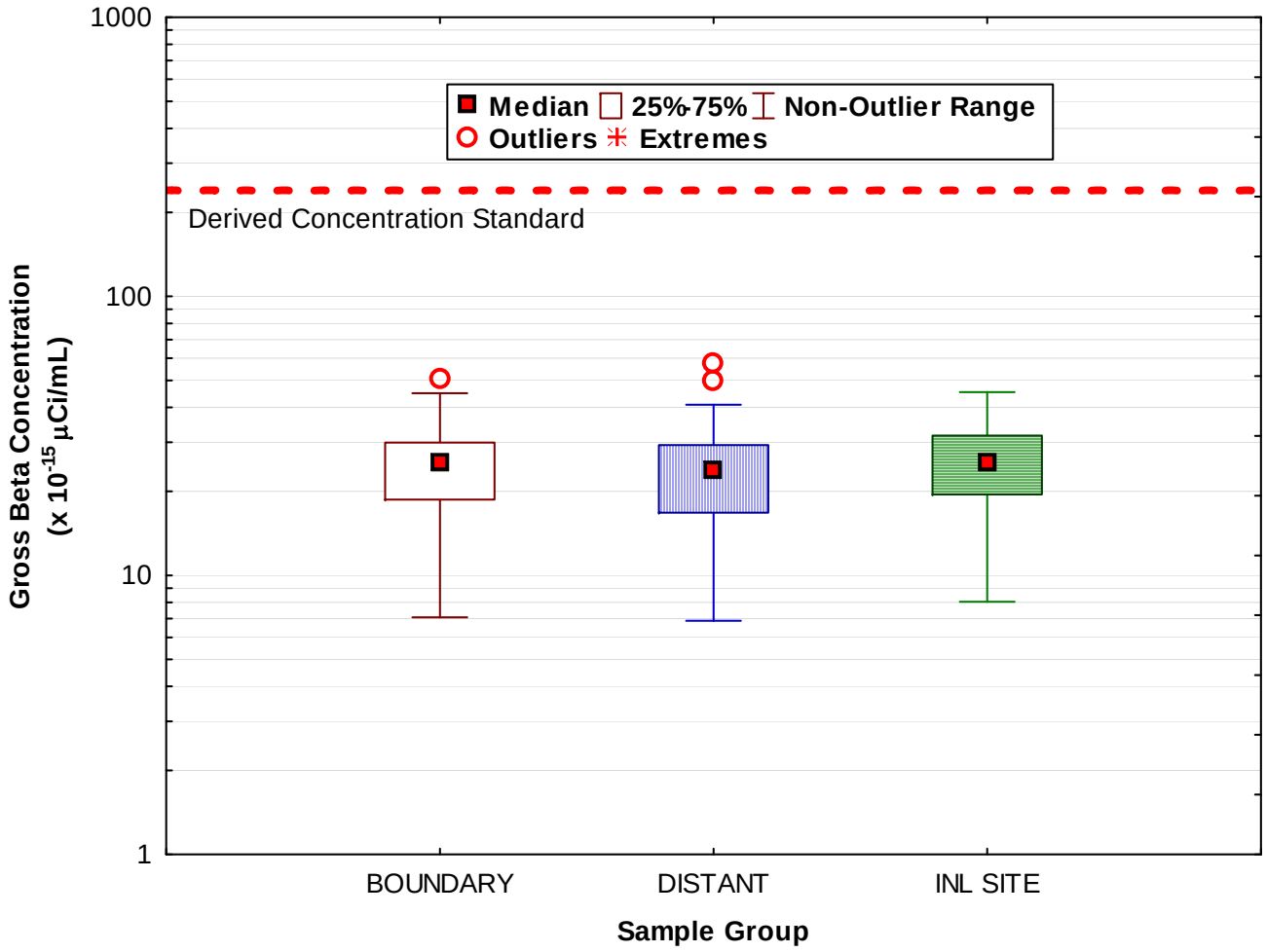

Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the fourth quarter of 2012.

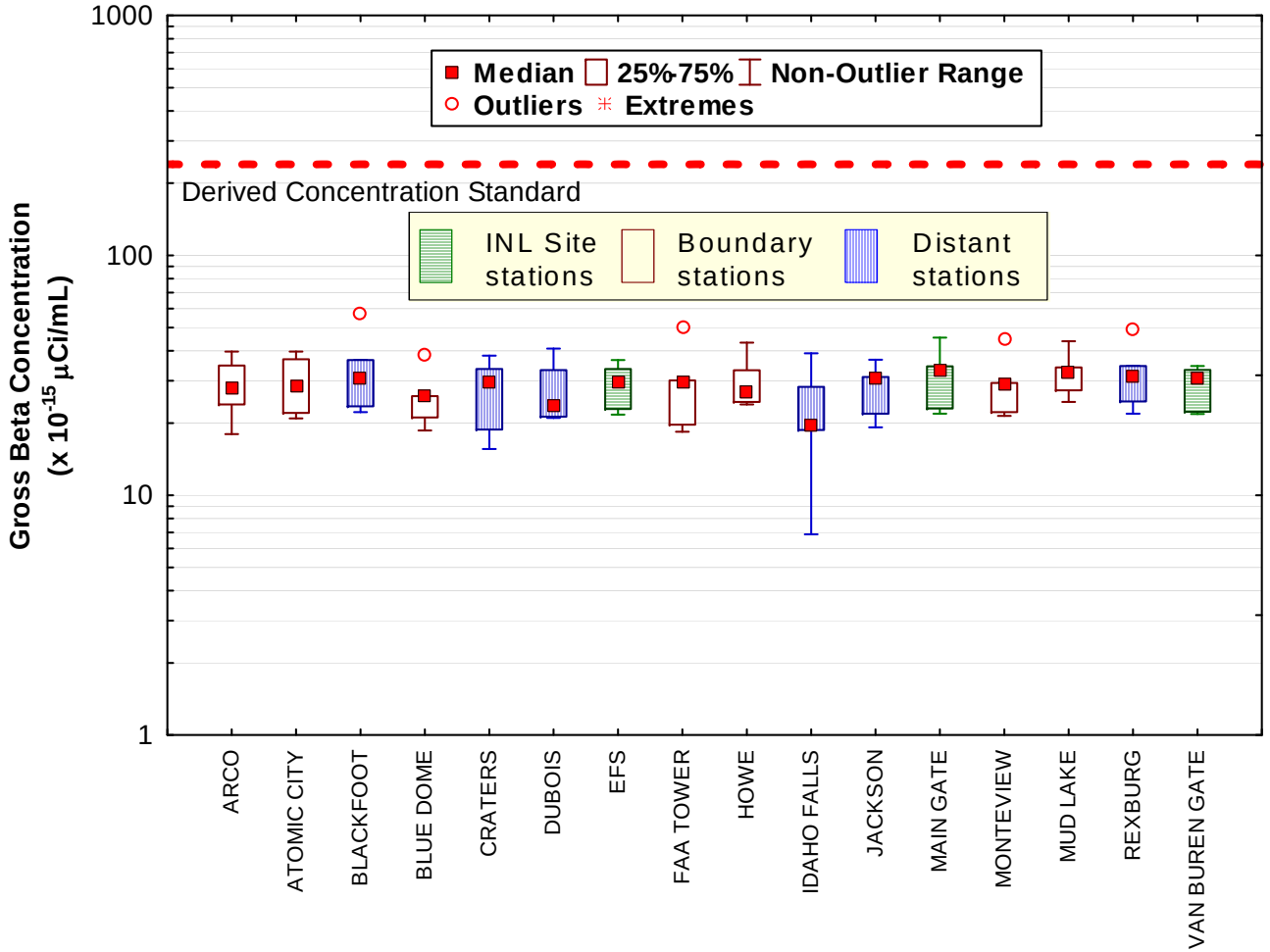

Figure 8. October gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Atomic City and Dubois (N = 4).

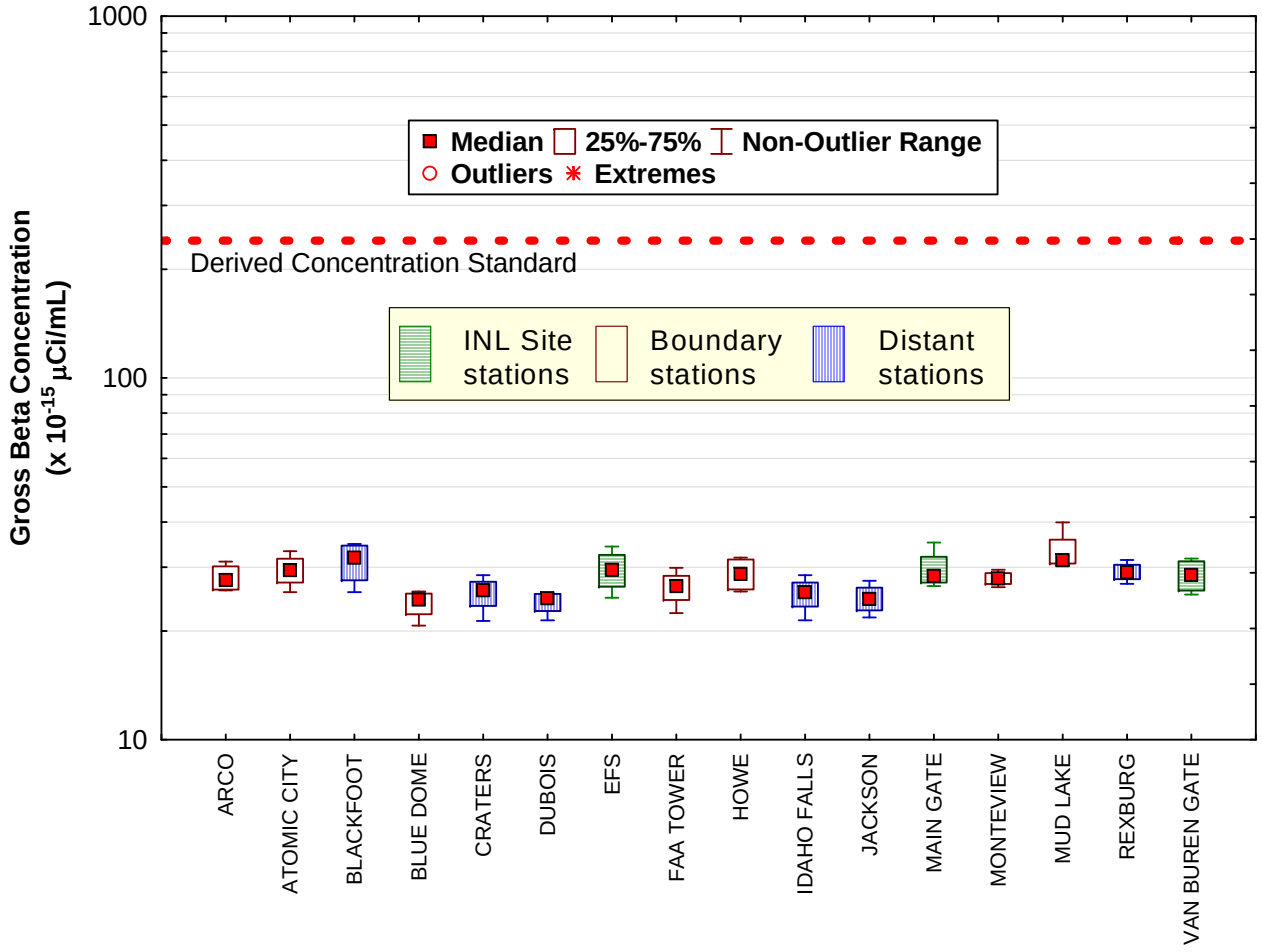

Figure 9. November gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

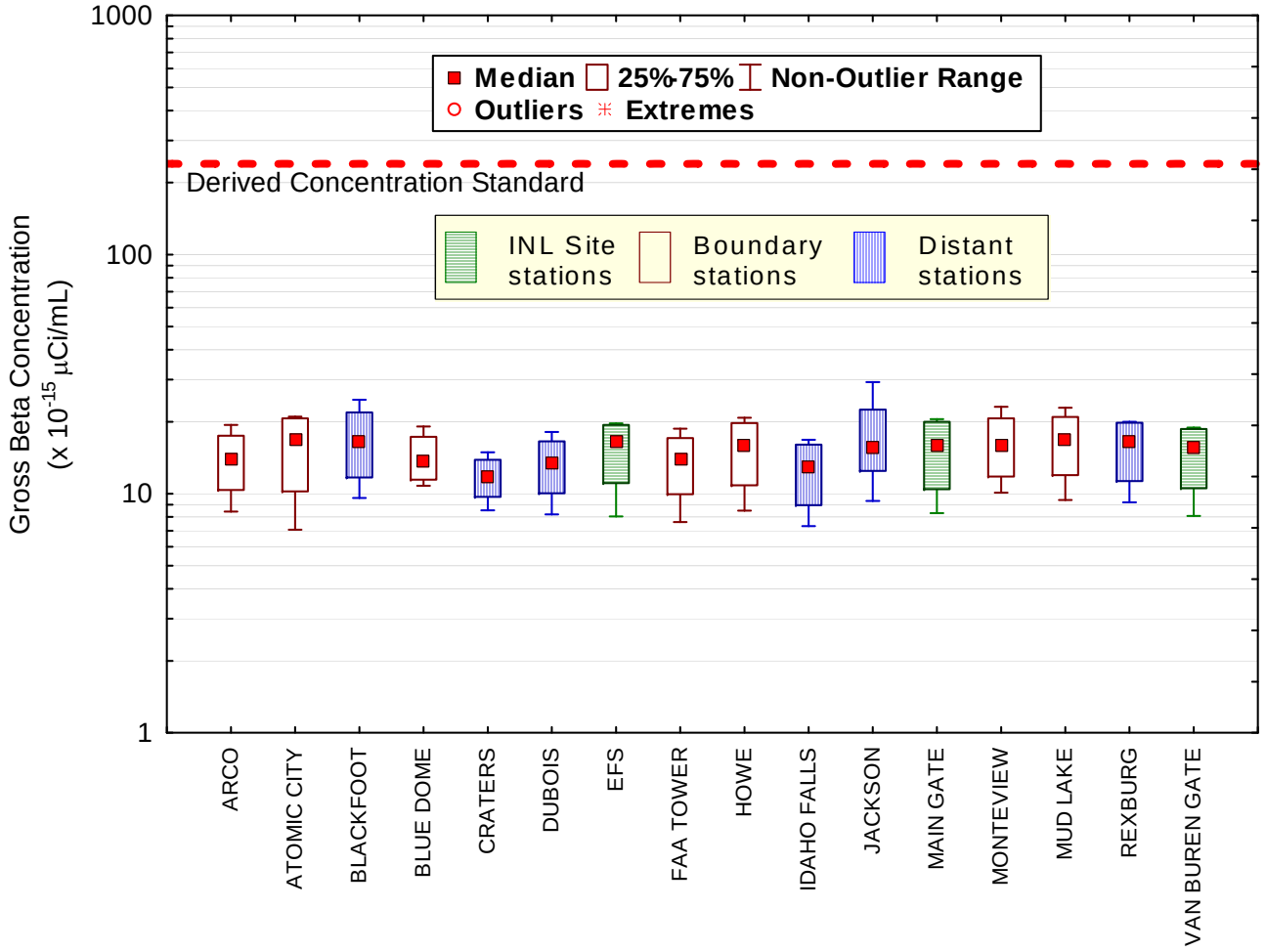

FIGURE 10. DECEMBER GROSS BETA CONCENTRATIONS IN AIR AT ESER INL SITE, BOUNDARY, AND DISTANT LOCATIONS. NUMBER OF SAMPLES (N) = 4 AT EACH LOCATION

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 14 atmospheric moisture samples collected during the fourth quarter of 2012. Three of these exceeded the 3s uncertainty level for tritium, with similar results to those reported previously. All samples were significantly below the DOE DCS for tritium in air of 1.4×10^{-8} $\mu Ci/mL_{air}$ with a maximum reported value of 7.0×10^{-13} $\mu Ci/mL_{air}$ at Rexburg. Results are shown in Table C-4, Appendix C.

4. PRECIPITATION AND WATER SAMPLING

PRECIPITATION SAMPLING

Precipitation samples are gathered when sufficient precipitation occurs to allow for the collection of the minimum sample volume of approximately 50 mL. Samples are taken of monthly composites from Idaho Falls and CFA, and weekly from the EFS. Precipitation samples are analyzed for tritium. Storm events in the fourth quarter of 2012 produced sufficient precipitation to yield 14 samples.

Tritium was measured above the 3s values in only two of the 14 samples. 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. Data for fourth quarter precipitation samples collected by the ESER Program averaged 29 pCi/L, which is well within the historical range and the range measured across the country by the EPA Radnet program (EPA 2012). These results are listed in Table C-5 (Appendix C).

. *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 plus a duplicate sample. 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 not detected in any samples. Gross beta activity was detected in all of the drinking water samples except the control sample and in all of the surface water samples, except for the sample from the Hagerman area. 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 three of the drinking water samples and the bottled water. The concentrations were similar to those found in atmospheric moisture and precipitation samples and were consistent with previous results.

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, 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. 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 fourth quarter of 2012.

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 fourth quarter of 2012. In addition, commercially-available organic milk was purchased as a control sample. All samples were analyzed for gamma emitting radionuclides. Samples from November were also analyzed for ^{90}Sr and tritium.

Iodine-131 was not detected in any weekly or monthly samples during the fourth quarter. Cesium-137 was reported in a sample from Howe at exactly the 3s detection level. A subsequent recount of the sample did not indicate the presence of ^{137}Cs. 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 four of six samples, including the control sample. The maximum concentration of 0.97 pCi/L from Terreton is well within the range of concentrations for the past five years.

Tritium was detected in all of the samples, including the control milk. All results were similar to those previously measured.

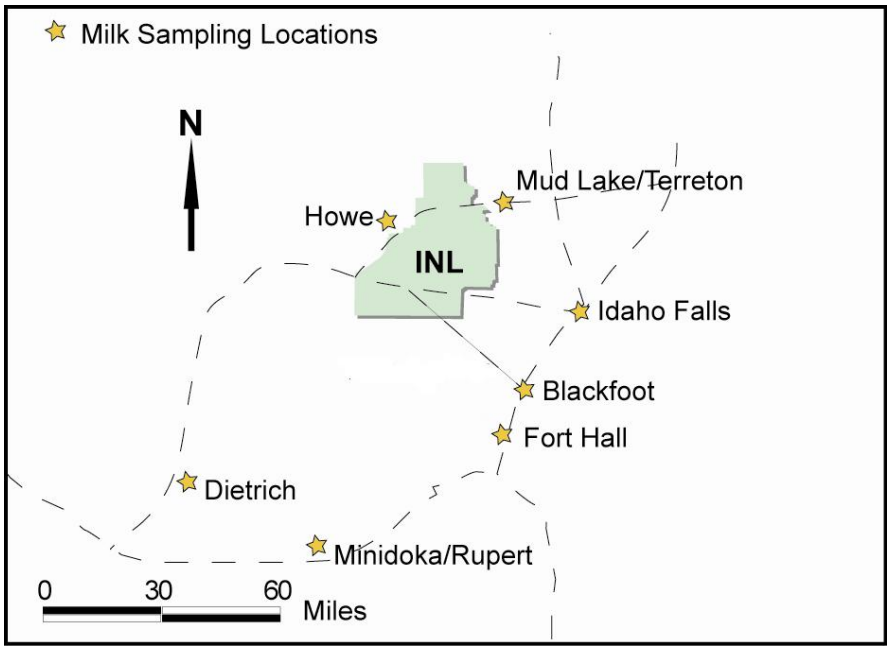

Figure 11. ESER milk sampling locations.

POTATO SAMPLING

Locally-grown potatoes from seven locations and one duplicate were analyzed for gamma-emitting radionuclides and ^{90}Sr. A control sample from a local grocery store was also analyzed. No human-made gamma-emitters or ^{90}Sr were found in any sample. Data for potato samples are listed in Appendix C, Table C-9. A review of Appendix C, Table C-9 was performed in the summer of 2020 and determined that the ^{137}Cs results were incorrect. The equation used to calculate the activity concentration was dividing the result by the wrong value. The equation was corrected to divide the sample activity by the weight of the sample. The ^{137}Cs results were updated with the correct values. No ^{137}Cs was found in any of the samples collected.

LARGE GAME ANIMAL SAMPLING

No large game animals were available for sampling during the fourth quarter.

WATERFOWL SAMPLING

Three samples from wastewater ponds located at the Advanced Test Reactor Complex (ATR Complex) and from ponds near the Materials and Fuels Complex (MFC) plus three control samples were analyzed for gamma-emitting radionuclides, ^{90}Sr, and actinides (^{241}Am, ^{238}Pu, and $^{239/240}Pu$). Each sample was divided into the following three sub-samples: 1) edible tissue (muscle, gizzard, heart, and liver), 2) external portion (feathers, feet, and head), and 3) all remaining tissue. Results are shown in Table C-10, Appendix C. During the summer of 2020, a review of Table C-10 determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. Prior to 2010, concentrations were reported in either pCi/g or pCi/kg. In 2010, the concentration unit of pCi/kg was adopted for reporting radionuclide concentrations in soil and biota (vegetation and animals). The reasons for doing this include: 1) the use of one unit (pCi/kg) ensures consistency and comparability in reporting concentrations in various media, 2) the use of one unit (pCi/kg) minimizes mistakes (due to confusion about units) in data entry into the database, and 3) the unit of pCi/kg was selected because it is the unit associated with models that are used for dose calculations and the results tend to be whole numbers (e.g. 14 pCi/kg versus 0.014 pCi/g). The column headings have been updated to the correct units of concentration (pCi/kg and Bq/kg).

No actinides were detected in any samples. Several human-made radionuclides were detected in the samples from one of the ducks collected at the ATR Complex ponds, including ^{137}Cs, cobalt-60 (^{60}Co), ^{90}Sr, and zinc-65 (^{65}Zn). Cesium-137 and ^{60}Co were also found in the edible tissue portion of this duck. Cesium-137 was found in the remainder portion of two of the control ducks but not in the edible tissues. No human-made radionuclides were detected in birds from the MFC location.

Because most of the detected human-made radionuclides were found in a duck from ATR Complex and not at other locations, it is assumed that this facility is the source of these radionuclides. The ducks were not taken directly from the two-celled hypalon-lined radioactive wastewater evaporation pond, but rather from an adjacent sewage lagoon. However, the ducks probably used the evaporation pond. Concentrations of ^{137}Cs in 2012 were somewhat higher than those in 2011 but well within the range for the previous few years; ^{60}Co was about the same as the previous year. Both ^{90}Sr and ^{65}Zn concentrations were considerably lower.

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 in May and again in November after six months in the field. A comparison of the results from the fourth quarter for the TLDs and OSLDs are presented in Appendix C, Table C-11.

Similarly to the low-volume air results, the environmental dosimeter locations are also divided into Boundary and Distant groupings. For the Boundary group, six-month dose equivalents ranged from 52.0 mrem at Blue Dome to 67.4 mrem at Mud Lake using TLDs and from 45.5 mrem at Blue Dome to 58.3 mrem at Atomic City using OSLDs. The overall Boundary dose equivalents were 60.4 mrem (TLDs) and 53.5 mrem (OSLDs). Distant dose equivalents ranged from 52.8 mrem at Dubois to 74.9 mrem at Rexburg for TLDs and from 46.3 mrem at Blackfoot to 65.9 mrem at Rexburg for OSLDs. The average dose equivalents were 61.7 mrem using TLDs and 54.8 mrem using OSLDs.

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). The following table summarizes the results of the quality assurance program for the fourth quarter of 2012.

QA Sample Type	Number of Sample Results	Number of Results Meeting Criteria	Percentage Meeting Criteria
Spikes/Laboratory Control Samples	1953	1950	99.8
Field Duplicates	66	61	92.4
Laboratory Splits	43	43	100.0
Recounts	187	187	100.0
Blanks	90	84	93.3
Method Uncertainty	2127	2117	99.5

8. REFERENCES

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EPA, 2012, RadNet—Tracking Environmental Radiation Nationwide, Web-page: http://www.epa.gov/narel/radnet/

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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, Rexburg	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, Rexburg	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, Rexburg	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				
Gamma Radiation	semiannual	Aberdeen, Blackfoot (2), Craters of the Moon, Dubois, Idaho Falls, Jackson WY, Minidoka, Rexburg, 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, occasional samples across the U.S.	Arco, Monteview, Mud Lake, Terreton	None
GRAIN				
Gamma Spec, ^{90}Sr	annually	American Falls, Blackfoot, Carey, Hamer, Idaho Falls, Minidoka, Roberts	Arco, Monteview, Mud Lake, Taber, Terreton	None
LETTUCE				
Gamma Spec, ^{90}Sr	annually	Blackfoot, Carey, Idaho Falls	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 Fourth Quarter 2012

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Standard[b] (DCS)
Air (particulate filter)[e]	Gross alpha[c]	4.08×10^{-16} µCi/mL	4×10^{-14} µCi/mL
	Gross beta[d]	1.27×10^{-15} µCi/mL	2.4×10^{-13} µCi/mL
	^{137}Cs	1.22×10^{-16} µCi/mL	3.9×10^{-10} µCi/mL
	^{241}Am	3.90×10^{-18} µCi/mL	4.1×10^{-14} µCi/mL
	^{238}Pu	1.65×10^{-18} µCi/mL	3.7×10^{-14} µCi/mL
	$^{239/240}$Pu	1.46×10^{-18} µCi/mL	3.4×10^{-14} µCi/mL
	^{90}Sr	1.75×10^{-17} µCi/mL	2.5×10^{-11} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	4.24×10^{-16} µCi/mL	4.1×10^{-10} µCi/mL
Air (atmospheric moisture)	^{3}H	91.1 pCi/L_{water}	1.4×10^{-8} µCi/mL_{air}
Air (precipitation)	^{3}H	98.9 pCi/L	1.9×10^{-3} µCi/mL
Milk	^{131}I	0.50 pCi/L	--
	^{137}Cs	1.09 pCi/L	--
	^{90}Sr	0.49 pCi/L	--
	^{3}H	76.5 pCi/L	--
Potatoes	^{90}Sr	8.24×10^{-2} pCi/g	--

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 and precision of plus or minus 100 percent under a specified set of typical laboratory measurement conditions.

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 The DCS for gross alpha is equivalent to the DCSs for ^{241}Am.

d The DCS for gross beta is equivalent to the DCSs for ^{228}Ra

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	10/3/2012	2.44 ± 0.23	9.03 ± 0.84	Yes	39.70 ± 0.77	146.89 ± 2.85	Yes
	10/10/2012	1.98 ± 0.19	7.33 ± 0.71	Yes	34.70 ± 0.69	128.39 ± 2.55	Yes
	10/17/2012	2.00 ± 0.20	7.40 ± 0.75	Yes	28.10 ± 0.66	103.97 ± 2.46	Yes
	10/24/2012	0.85 ± 0.15	3.13 ± 0.56	Yes	23.90 ± 0.61	88.43 ± 2.26	Yes
	10/31/2012	0.93 ± 0.13	3.43 ± 0.49	Yes	18.00 ± 0.49	66.60 ± 1.82	Yes
	11/7/2012	0.92 ± 0.15	3.40 ± 0.54	Yes	25.90 ± 0.60	95.83 ± 2.22	Yes
	11/14/2012	1.03 ± 0.16	3.81 ± 0.57	Yes	29.20 ± 0.64	108.04 ± 2.36	Yes
	11/21/2012	1.70 ± 0.19	6.29 ± 0.69	Yes	31.10 ± 0.65	115.07 ± 2.42	Yes
	11/28/2012	0.80 ± 0.17	2.95 ± 0.61	Yes	26.10 ± 0.60	96.57 ± 2.22	Yes
	12/5/2012	0.62 ± 0.15	2.29 ± 0.54	Yes	15.60 ± 0.51	57.72 ± 1.87	Yes
	12/12/2012	0.64 ± 0.13	2.36 ± 0.48	Yes	8.42 ± 0.33	31.15 ± 1.23	Yes
	12/19/2012	0.66 ± 0.13	2.44 ± 0.46	Yes	12.30 ± 0.36	45.51 ± 1.31	Yes
	12/26/2012	0.42 ± 0.12	1.56 ± 0.43	Yes	19.40 ± 0.52	71.78 ± 1.91	Yes
QA-1 (ARCO)	10/3/2012	2.00 ± 0.20	7.40 ± 0.72	Yes	38.40 ± 0.71	142.08 ± 2.62	Yes
	10/10/2012	2.24 ± 0.20	8.29 ± 0.75	Yes	34.90 ± 0.69	129.13 ± 2.55	Yes
	10/17/2012	1.33 ± 0.16	4.92 ± 0.59	Yes	25.80 ± 0.59	95.46 ± 2.19	Yes
	10/24/2012	1.03 ± 0.15	3.81 ± 0.56	Yes	21.10 ± 0.56	78.07 ± 2.05	Yes
	10/31/2012	0.55 ± 0.12	2.02 ± 0.46	Yes	22.60 ± 0.59	83.62 ± 2.17	Yes
	11/7/2012	0.82 ± 0.13	3.04 ± 0.49	Yes	26.50 ± 0.58	98.05 ± 2.13	Yes
	11/14/2012	1.34 ± 0.16	4.96 ± 0.58	Yes	27.20 ± 0.58	100.64 ± 2.13	Yes
	11/21/2012	1.43 ± 0.17	5.29 ± 0.61	Yes	29.50 ± 0.60	109.15 ± 2.22	Yes
	11/28/2012	0.56 ± 0.14	2.07 ± 0.52	Yes	22.30 ± 0.52	82.51 ± 1.94	Yes
	12/5/2012	0.50 ± 0.13	1.84 ± 0.46	Yes	16.10 ± 0.47	59.57 ± 1.74	Yes
	12/12/2012	0.28 ± 0.10	1.03 ± 0.38	No	7.51 ± 0.30	27.79 ± 1.11	Yes
	12/19/2012	0.64 ± 0.12	2.35 ± 0.44	Yes	12.50 ± 0.34	46.25 ± 1.27	Yes
	12/26/2012	0.71 ± 0.13	2.62 ± 0.46	Yes	18.80 ± 0.49	69.56 ± 1.83	Yes
ATOMIC CITY	10/3/2012	2.68 ± 0.24	9.92 ± 0.87	Yes	39.70 ± 0.78	146.89 ± 2.87	Yes
	10/10/2012	1.91 ± 0.20	7.07 ± 0.75	Yes	34.10 ± 0.73	126.17 ± 2.69	Yes
a	10/17/2012	±	±	No	±	±	No
	10/24/2012	1.05 ± 0.17	3.89 ± 0.63	Yes	23.20 ± 0.64	85.84 ± 2.36	Yes
	10/31/2012	1.10 ± 0.16	4.07 ± 0.58	Yes	20.90 ± 0.58	77.33 ± 2.14	Yes
	11/7/2012	0.97 ± 0.16	3.57 ± 0.60	Yes	33.20 ± 0.71	122.84 ± 2.63	Yes
	11/14/2012	1.13 ± 0.17	4.18 ± 0.61	Yes	28.80 ± 0.66	106.56 ± 2.43	Yes
	11/21/2012	1.56 ± 0.20	5.77 ± 0.73	Yes	30.10 ± 0.70	111.37 ± 2.59	Yes
	11/28/2012	0.58 ± 0.16	2.14 ± 0.61	Yes	25.60 ± 0.62	94.72 ± 2.29	Yes
	12/5/2012	0.46 ± 0.15	1.70 ± 0.54	Yes	20.30 ± 0.59	75.11 ± 2.18	Yes
	12/12/2012	0.35 ± 0.12	1.30 ± 0.43	Yes	7.07 ± 0.32	26.16 ± 1.17	Yes
	12/19/2012	0.72 ± 0.14	2.68 ± 0.53	Yes	13.40 ± 0.40	49.58 ± 1.48	Yes
	12/26/2012	0.72 ± 0.14	2.65 ± 0.52	Yes	21.00 ± 0.57	77.70 ± 2.09	Yes
BLUE DOME	10/3/2012	2.06 ± 0.20	7.62 ± 0.75	Yes	38.50 ± 0.73	142.45 ± 2.70	Yes
	10/10/2012	1.93 ± 0.18	7.14 ± 0.68	Yes	25.90 ± 0.59	95.83 ± 2.18	Yes
	10/17/2012	1.53 ± 0.17	5.66 ± 0.63	Yes	25.80 ± 0.59	95.46 ± 2.19	Yes
	10/24/2012	0.64 ± 0.13	2.35 ± 0.47	Yes	21.10 ± 0.54	78.07 ± 1.99	Yes
	10/31/2012	0.58 ± 0.12	2.13 ± 0.43	Yes	18.60 ± 0.51	68.82 ± 1.88	Yes
	11/7/2012	0.79 ± 0.13	2.93 ± 0.50	Yes	25.00 ± 0.57	92.50 ± 2.12	Yes
	11/14/2012	1.24 ± 0.16	4.59 ± 0.58	Yes	23.80 ± 0.56	88.06 ± 2.08	Yes
	11/21/2012	0.88 ± 0.14	3.25 ± 0.53	Yes	25.70 ± 0.58	95.09 ± 2.14	Yes
	11/28/2012	0.97 ± 0.16	3.59 ± 0.60	Yes	20.70 ± 0.52	76.59 ± 1.92	Yes
	12/5/2012	0.83 ± 0.15	3.08 ± 0.54	Yes	19.10 ± 0.52	70.67 ± 1.92	Yes
	12/12/2012	0.47 ± 0.13	1.74 ± 0.48	Yes	10.80 ± 0.39	39.96 ± 1.43	Yes
	12/19/2012	0.44 ± 0.11	1.61 ± 0.41	Yes	12.10 ± 0.34	44.77 ± 1.27	Yes
	12/26/2012	0.20 ± 0.10	0.75 ± 0.36	No	15.50 ± 0.47	57.35 ± 1.73	Yes
FAA TOWER	10/3/2012	2.83 ± 0.25	10.47 ± 0.91	Yes	50.40 ± 0.87	186.48 ± 3.23	Yes
	10/10/2012	1.98 ± 0.20	7.33 ± 0.73	Yes	30.10 ± 0.67	111.37 ± 2.49	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
	10/17/2012	1.84 ± 0.20	6.81 ± 0.74	Yes	29.90 ± 0.69	110.63 ± 2.56	Yes
	10/24/2012	0.63 ± 0.15	2.35 ± 0.56	Yes	19.70 ± 0.61	72.89 ± 2.27	Yes
	10/31/2012	0.57 ± 0.13	2.12 ± 0.47	Yes	18.40 ± 0.55	68.08 ± 2.03	Yes
	11/7/2012	1.09 ± 0.17	4.03 ± 0.62	Yes	29.90 ± 0.69	110.63 ± 2.55	Yes
	11/14/2012	1.26 ± 0.17	4.66 ± 0.62	Yes	26.90 ± 0.62	99.53 ± 2.31	Yes
	11/21/2012	1.04 ± 0.17	3.85 ± 0.61	Yes	26.30 ± 0.63	97.31 ± 2.34	Yes
	11/28/2012	0.63 ± 0.16	2.35 ± 0.60	Yes	22.40 ± 0.58	82.88 ± 2.15	Yes
	12/5/2012	0.74 ± 0.15	2.73 ± 0.57	Yes	18.70 ± 0.54	69.19 ± 2.01	Yes
	12/12/2012	0.33 ± 0.12	1.22 ± 0.43	No	7.61 ± 0.33	28.16 ± 1.22	Yes
	12/19/2012	0.48 ± 0.12	1.76 ± 0.45	Yes	12.30 ± 0.37	45.51 ± 1.37	Yes
	12/26/2012	0.33 ± 0.11	1.21 ± 0.41	No	15.50 ± 0.49	57.35 ± 1.81	Yes
HOWE	10/3/2012	1.94 ± 0.21	7.18 ± 0.79	Yes	43.30 ± 0.82	160.21 ± 3.02	Yes
	10/10/2012	2.01 ± 0.21	7.44 ± 0.76	Yes	33.20 ± 0.72	122.84 ± 2.67	Yes
	10/17/2012	1.51 ± 0.19	5.59 ± 0.70	Yes	26.80 ± 0.68	99.16 ± 2.51	Yes
	10/24/2012	1.40 ± 0.19	5.18 ± 0.70	Yes	24.50 ± 0.66	90.65 ± 2.43	Yes
	10/31/2012	1.06 ± 0.16	3.92 ± 0.59	Yes	23.90 ± 0.63	88.43 ± 2.34	Yes
	11/7/2012	1.40 ± 0.19	5.18 ± 0.70	Yes	31.10 ± 0.72	115.07 ± 2.66	Yes
	11/14/2012	1.48 ± 0.18	5.48 ± 0.67	Yes	26.40 ± 0.63	97.68 ± 2.34	Yes
	11/21/2012	1.51 ± 0.20	5.59 ± 0.73	Yes	31.90 ± 0.71	118.03 ± 2.64	Yes
	11/28/2012	0.94 ± 0.19	3.47 ± 0.68	Yes	25.70 ± 0.63	95.09 ± 2.34	Yes
	12/5/2012	0.88 ± 0.17	3.27 ± 0.64	Yes	20.80 ± 0.61	76.96 ± 2.25	Yes
	12/12/2012	0.50 ± 0.14	1.84 ± 0.51	Yes	8.50 ± 0.37	31.45 ± 1.36	Yes
	12/19/2012	0.41 ± 0.13	1.52 ± 0.47	Yes	13.20 ± 0.40	48.84 ± 1.49	Yes
	12/26/2012	0.65 ± 0.14	2.40 ± 0.50	Yes	18.70 ± 0.54	69.19 ± 2.01	Yes
MONTEVIEW	10/3/2012	2.74 ± 0.25	10.14 ± 0.92	Yes	45.00 ± 0.85	166.50 ± 3.14	Yes
	10/10/2012	2.32 ± 0.22	8.58 ± 0.82	Yes	29.10 ± 0.70	107.67 ± 2.59	Yes
	10/17/2012	2.04 ± 0.21	7.55 ± 0.78	Yes	29.40 ± 0.70	108.78 ± 2.59	Yes
	10/24/2012	1.22 ± 0.17	4.51 ± 0.63	Yes	21.40 ± 0.59	79.18 ± 2.20	Yes
	10/31/2012	0.99 ± 0.16	3.65 ± 0.58	Yes	22.20 ± 0.61	82.14 ± 2.27	Yes
	11/7/2012	1.31 ± 0.17	4.85 ± 0.64	Yes	28.30 ± 0.66	104.71 ± 2.44	Yes
	11/14/2012	1.06 ± 0.16	3.92 ± 0.61	Yes	27.50 ± 0.65	101.75 ± 2.40	Yes
	11/21/2012	1.32 ± 0.19	4.88 ± 0.68	Yes	29.50 ± 0.68	109.15 ± 2.53	Yes
	11/28/2012	1.12 ± 0.19	4.14 ± 0.72	Yes	26.40 ± 0.64	97.68 ± 2.38	Yes
	12/5/2012	1.21 ± 0.19	4.48 ± 0.70	Yes	23.10 ± 0.64	85.47 ± 2.35	Yes
	12/12/2012	0.41 ± 0.13	1.51 ± 0.48	Yes	10.10 ± 0.38	37.37 ± 1.41	Yes
	12/19/2012	0.60 ± 0.13	2.21 ± 0.50	Yes	13.50 ± 0.40	49.95 ± 1.47	Yes
	12/26/2012	0.62 ± 0.14	2.29 ± 0.51	Yes	18.20 ± 0.55	67.34 ± 2.03	Yes
QA-2	10/3/2012	1.67 ± 0.20	6.18 ± 0.75	Yes	32.70 ± 0.73	120.99 ± 2.70	Yes
(MONTEVIEW)	10/10/2012	2.07 ± 0.21	7.66 ± 0.78	Yes	29.80 ± 0.70	110.26 ± 2.60	Yes
	10/17/2012	1.85 ± 0.21	6.85 ± 0.76	Yes	29.90 ± 0.71	110.63 ± 2.62	Yes
	10/24/2012	0.85 ± 0.15	3.15 ± 0.56	Yes	21.30 ± 0.59	78.81 ± 2.18	Yes
	10/31/2012	1.01 ± 0.16	3.74 ± 0.57	Yes	23.30 ± 0.62	86.21 ± 2.28	Yes
	11/7/2012	1.44 ± 0.19	5.33 ± 0.69	Yes	30.30 ± 0.70	112.11 ± 2.60	Yes
	11/14/2012	1.35 ± 0.18	5.00 ± 0.65	Yes	27.30 ± 0.65	101.01 ± 2.40	Yes
	11/21/2012	1.61 ± 0.20	5.96 ± 0.74	Yes	30.70 ± 0.71	113.59 ± 2.62	Yes
	11/28/2012	0.72 ± 0.17	2.66 ± 0.64	Yes	25.10 ± 0.62	92.87 ± 2.29	Yes
	12/5/2012	1.21 ± 0.19	4.48 ± 0.70	Yes	23.70 ± 0.64	87.69 ± 2.36	Yes
	12/12/2012	0.27 ± 0.12	1.00 ± 0.45	No	9.97 ± 0.38	36.89 ± 1.41	Yes
	12/19/2012	0.59 ± 0.14	2.17 ± 0.51	Yes	13.20 ± 0.40	48.84 ± 1.49	Yes
	12/26/2012	0.33 ± 0.12	1.22 ± 0.46	No	19.00 ± 0.56	70.30 ± 2.08	Yes
MUD LAKE	10/3/2012	2.12 ± 0.23	7.84 ± 0.84	Yes	43.90 ± 0.84	162.43 ± 3.12	Yes
	10/10/2012	2.61 ± 0.24	9.66 ± 0.88	Yes	32.70 ± 0.75	120.99 ± 2.78	Yes
	10/17/2012	2.02 ± 0.22	7.47 ± 0.81	Yes	34.10 ± 0.77	126.17 ± 2.83	Yes
	10/24/2012	1.06 ± 0.17	3.92 ± 0.64	Yes	24.50 ± 0.67	90.65 ± 2.46	Yes
	10/31/2012	1.23 ± 0.18	4.55 ± 0.65	Yes	27.40 ± 0.70	101.38 ± 2.57	Yes
	11/7/2012	1.89 ± 0.21	6.99 ± 0.79	Yes	39.90 ± 0.81	147.63 ± 2.99	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
	11/14/2012	1.56 ± 0.19	5.77 ± 0.72	Yes	30.30 ± 0.70	112.11 ± 2.60	Yes
	11/21/2012	1.48 ± 0.20	5.48 ± 0.74	Yes	31.60 ± 0.73	116.92 ± 2.69	Yes
	11/28/2012	1.21 ± 0.21	4.48 ± 0.78	Yes	31.10 ± 0.72	115.07 ± 2.67	Yes
	12/5/2012	0.88 ± 0.17	3.24 ± 0.61	Yes	19.00 ± 0.57	70.30 ± 2.09	Yes
	12/12/2012	0.43 ± 0.14	1.59 ± 0.53	Yes	9.41 ± 0.40	34.82 ± 1.49	Yes
	12/19/2012	0.50 ± 0.14	1.84 ± 0.50	Yes	14.50 ± 0.42	53.65 ± 1.57	Yes
	12/26/2012	0.75 ± 0.16	2.78 ± 0.58	Yes	22.90 ± 0.64	84.73 ± 2.36	Yes
DISTANT							
BLACKFOOT CMS	10/3/2012	3.18 ± 0.33	11.77 ± 1.23	Yes	57.40 ± 1.17	212.38 ± 4.33	Yes
	10/10/2012	2.82 ± 0.31	10.43 ± 1.13	Yes	36.60 ± 0.98	135.42 ± 3.63	Yes
	10/17/2012	2.40 ± 0.29	8.88 ± 1.07	Yes	30.50 ± 0.91	112.85 ± 3.37	Yes
	10/24/2012	1.07 ± 0.22	3.96 ± 0.80	Yes	23.50 ± 0.80	86.95 ± 2.94	Yes
	10/31/2012	1.01 ± 0.22	3.74 ± 0.80	Yes	22.20 ± 0.83	82.14 ± 3.08	Yes
	11/7/2012	1.11 ± 0.24	4.11 ± 0.88	Yes	29.60 ± 0.94	109.52 ± 3.49	Yes
	11/14/2012	2.36 ± 0.30	8.73 ± 1.11	Yes	34.80 ± 0.98	128.76 ± 3.63	Yes
	11/21/2012	2.10 ± 0.30	7.77 ± 1.10	Yes	34.10 ± 0.97	126.17 ± 3.60	Yes
	11/28/2012	0.46 ± 0.22	1.71 ± 0.83	No	25.60 ± 0.79	94.72 ± 2.93	Yes
	12/5/2012	0.76 ± 0.21	2.82 ± 0.78	Yes	24.70 ± 0.78	91.39 ± 2.89	Yes
	12/12/2012	0.29 ± 0.16	1.07 ± 0.59	No	9.60 ± 0.46	35.52 ± 1.70	Yes
	12/19/2012	0.48 ± 0.16	1.78 ± 0.58	Yes	13.80 ± 0.47	51.06 ± 1.72	Yes
	12/26/2012	0.77 ± 0.18	2.85 ± 0.67	Yes	19.00 ± 0.67	70.30 ± 2.49	Yes
CRATERS OF	10/3/2012	1.78 ± 0.21	6.59 ± 0.76	Yes	38.20 ± 0.77	141.34 ± 2.84	Yes
THE MOON	10/10/2012	2.18 ± 0.21	8.07 ± 0.77	Yes	33.60 ± 0.70	124.32 ± 2.60	Yes
	10/17/2012	1.47 ± 0.19	5.44 ± 0.68	Yes	29.90 ± 0.69	110.63 ± 2.56	Yes
	10/24/2012	0.83 ± 0.15	3.07 ± 0.57	Yes	18.80 ± 0.58	69.56 ± 2.13	Yes
	10/31/2012	0.77 ± 0.14	2.85 ± 0.51	Yes	15.60 ± 0.52	57.72 ± 1.94	Yes
	11/7/2012	0.67 ± 0.14	2.49 ± 0.52	Yes	25.60 ± 0.63	94.72 ± 2.33	Yes
	11/14/2012	0.97 ± 0.16	3.59 ± 0.57	Yes	26.20 ± 0.62	96.94 ± 2.30	Yes
	11/21/2012	1.30 ± 0.18	4.81 ± 0.66	Yes	28.50 ± 0.66	105.45 ± 2.42	Yes
	11/28/2012	0.27 ± 0.15	1.00 ± 0.54	No	21.30 ± 0.57	78.81 ± 2.11	Yes
	12/5/2012	0.20 ± 0.12	0.73 ± 0.44	No	12.80 ± 0.47	47.36 ± 1.73	Yes
	12/12/2012	0.29 ± 0.12	1.07 ± 0.43	No	8.52 ± 0.35	31.52 ± 1.28	Yes
	12/19/2012	0.62 ± 0.13	2.28 ± 0.47	Yes	10.90 ± 0.35	40.33 ± 1.29	Yes
	12/26/2012	0.38 ± 0.12	1.41 ± 0.43	Yes	14.90 ± 0.49	55.13 ± 1.80	Yes
DUBOIS	10/3/2012	2.34 ± 0.23	8.66 ± 0.86	Yes	40.90 ± 0.81	151.33 ± 3.00	Yes
	10/10/2012	1.92 ± 0.20	7.10 ± 0.72	Yes	25.60 ± 0.63	94.72 ± 2.33	Yes
a	10/17/2012	±	±	No	±	±	No
	10/24/2012	1.25 ± 0.18	4.63 ± 0.68	Yes	21.00 ± 0.63	77.70 ± 2.34	Yes
	10/31/2012	1.17 ± 0.16	4.33 ± 0.60	Yes	21.50 ± 0.60	79.55 ± 2.20	Yes
	11/7/2012	1.09 ± 0.16	4.03 ± 0.59	Yes	24.00 ± 0.61	88.80 ± 2.25	Yes
	11/14/2012	1.04 ± 0.16	3.85 ± 0.59	Yes	25.20 ± 0.62	93.24 ± 2.28	Yes
	11/21/2012	1.31 ± 0.18	4.85 ± 0.68	Yes	25.40 ± 0.65	93.98 ± 2.39	Yes
	11/28/2012	0.57 ± 0.16	2.09 ± 0.57	Yes	21.40 ± 0.56	79.18 ± 2.05	Yes
	12/5/2012	1.11 ± 0.19	4.11 ± 0.70	Yes	18.10 ± 0.59	66.97 ± 2.19	Yes
	12/12/2012	0.62 ± 0.14	2.31 ± 0.51	Yes	8.20 ± 0.35	30.34 ± 1.29	Yes
	12/19/2012	0.45 ± 0.12	1.65 ± 0.46	Yes	11.90 ± 0.37	44.03 ± 1.38	Yes
	12/26/2012	0.71 ± 0.13	2.62 ± 0.50	Yes	15.00 ± 0.49	55.50 ± 1.79	Yes
IDAHO FALLS	10/3/2012	2.09 ± 0.21	7.73 ± 0.78	Yes	39.10 ± 0.75	144.67 ± 2.78	Yes
	10/10/2012	2.44 ± 0.22	9.03 ± 0.80	Yes	28.30 ± 0.66	104.71 ± 2.43	Yes
	10/17/2012	0.40 ± 0.11	1.48 ± 0.41	Yes	6.87 ± 0.38	25.42 ± 1.41	Yes
	10/24/2012	1.08 ± 0.15	4.00 ± 0.55	Yes	18.70 ± 0.52	69.19 ± 1.92	Yes
	10/31/2012	0.94 ± 0.14	3.46 ± 0.52	Yes	19.70 ± 0.54	72.89 ± 1.99	Yes
	11/7/2012	1.73 ± 0.18	6.40 ± 0.67	Yes	25.30 ± 0.60	93.61 ± 2.23	Yes
	11/14/2012	1.21 ± 0.16	4.48 ± 0.60	Yes	28.50 ± 0.63	105.45 ± 2.31	Yes
	11/21/2012	1.14 ± 0.16	4.22 ± 0.60	Yes	25.90 ± 0.60	95.83 ± 2.21	Yes
	11/28/2012	0.55 ± 0.15	2.05 ± 0.54	Yes	21.40 ± 0.53	79.18 ± 1.96	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
	12/5/2012	0.81 ± 0.15	2.99 ± 0.55	Yes	16.80 ± 0.50	62.16 ± 1.86	Yes
	12/12/2012	0.51 ± 0.12	1.90 ± 0.44	Yes	7.32 ± 0.31	27.08 ± 1.16	Yes
	12/19/2012	0.44 ± 0.11	1.61 ± 0.41	Yes	10.60 ± 0.33	39.22 ± 1.22	Yes
	12/26/2012	0.51 ± 0.12	1.88 ± 0.43	Yes	15.30 ± 0.47	56.61 ± 1.73	Yes
JACKSON	10/3/2012	2.21 ± 0.20	8.18 ± 0.74	Yes	36.70 ± 0.68	135.79 ± 2.53	Yes
	10/10/2012	1.60 ± 0.18	5.92 ± 0.66	Yes	31.10 ± 0.66	115.07 ± 2.45	Yes
	10/17/2012	1.89 ± 0.19	6.99 ± 0.71	Yes	30.80 ± 0.66	113.96 ± 2.45	Yes
	10/24/2012	1.14 ± 0.15	4.22 ± 0.56	Yes	21.90 ± 0.55	81.03 ± 2.03	Yes
	10/31/2012	0.77 ± 0.12	2.83 ± 0.46	Yes	19.20 ± 0.51	71.04 ± 1.87	Yes
	11/7/2012	1.05 ± 0.15	3.89 ± 0.55	Yes	23.80 ± 0.57	88.06 ± 2.11	Yes
	11/14/2012	1.29 ± 0.16	4.77 ± 0.58	Yes	25.20 ± 0.57	93.24 ± 2.10	Yes
	11/21/2012	1.42 ± 0.17	5.25 ± 0.63	Yes	27.50 ± 0.60	101.75 ± 2.22	Yes
	11/28/2012	0.43 ± 0.14	1.57 ± 0.51	Yes	21.80 ± 0.53	80.66 ± 1.97	Yes
	12/5/2012	0.53 ± 0.13	1.97 ± 0.49	Yes	15.70 ± 0.48	58.09 ± 1.78	Yes
	12/12/2012	0.42 ± 0.12	1.57 ± 0.44	Yes	9.33 ± 0.35	34.52 ± 1.28	Yes
	12/19/2012	0.81 ± 0.13	3.00 ± 0.49	Yes	15.60 ± 0.39	57.72 ± 1.45	Yes
	12/26/2012	1.26 ± 0.17	4.66 ± 0.63	Yes	29.30 ± 0.66	108.41 ± 2.44	Yes
REXBURG CMS	10/3/2012	2.80 ± 0.25	10.36 ± 0.93	Yes	49.70 ± 0.88	183.89 ± 3.27	Yes
	10/10/2012	2.64 ± 0.23	9.77 ± 0.85	Yes	34.60 ± 0.73	128.02 ± 2.72	Yes
	10/17/2012	2.04 ± 0.21	7.55 ± 0.79	Yes	31.40 ± 0.72	116.18 ± 2.67	Yes
	10/24/2012	1.13 ± 0.16	4.18 ± 0.59	Yes	24.60 ± 0.60	91.02 ± 2.23	Yes
	10/31/2012	0.67 ± 0.14	2.47 ± 0.53	Yes	21.90 ± 0.63	81.03 ± 2.33	Yes
	11/7/2012	1.35 ± 0.19	5.00 ± 0.71	Yes	29.50 ± 0.73	109.15 ± 2.70	Yes
	11/14/2012	1.82 ± 0.21	6.73 ± 0.79	Yes	31.40 ± 0.74	116.18 ± 2.75	Yes
	11/21/2012	1.35 ± 0.19	5.00 ± 0.70	Yes	28.60 ± 0.69	105.82 ± 2.54	Yes
	11/28/2012	1.09 ± 0.20	4.03 ± 0.74	Yes	27.00 ± 0.67	99.90 ± 2.49	Yes
	12/5/2012	1.10 ± 0.20	4.07 ± 0.73	Yes	20.00 ± 0.64	74.00 ± 2.35	Yes
	12/12/2012	0.56 ± 0.15	2.09 ± 0.54	Yes	9.21 ± 0.39	34.08 ± 1.45	Yes
	12/19/2012	0.66 ± 0.15	2.43 ± 0.55	Yes	13.40 ± 0.42	49.58 ± 1.57	Yes
	12/26/2012	0.58 ± 0.15	2.15 ± 0.54	Yes	19.60 ± 0.60	72.52 ± 2.21	Yes
INL SITE							
EFS	10/3/2012	1.98 ± 0.21	7.33 ± 0.78	Yes	36.60 ± 0.75	135.42 ± 2.76	Yes
	10/10/2012	2.04 ± 0.20	7.55 ± 0.73	Yes	33.60 ± 0.69	124.32 ± 2.55	Yes
	10/17/2012	1.74 ± 0.19	6.44 ± 0.69	Yes	29.60 ± 0.66	109.52 ± 2.44	Yes
	10/24/2012	0.89 ± 0.16	3.28 ± 0.58	Yes	22.90 ± 0.62	84.73 ± 2.29	Yes
	10/31/2012	0.66 ± 0.13	2.45 ± 0.47	Yes	21.70 ± 0.57	80.29 ± 2.11	Yes
	11/7/2012	1.12 ± 0.17	4.14 ± 0.61	Yes	34.20 ± 0.71	126.54 ± 2.63	Yes
	11/14/2012	1.45 ± 0.17	5.37 ± 0.64	Yes	28.30 ± 0.63	104.71 ± 2.32	Yes
	11/21/2012	0.97 ± 0.16	3.59 ± 0.59	Yes	30.70 ± 0.66	113.59 ± 2.45	Yes
	11/28/2012	0.68 ± 0.16	2.53 ± 0.58	Yes	24.70 ± 0.58	91.39 ± 2.15	Yes
	12/5/2012	0.75 ± 0.15	2.76 ± 0.54	Yes	19.70 ± 0.53	72.89 ± 1.96	Yes
	12/12/2012	0.64 ± 0.13	2.37 ± 0.48	Yes	8.04 ± 0.33	29.75 ± 1.22	Yes
	12/19/2012	0.34 ± 0.11	1.26 ± 0.42	Yes	14.10 ± 0.39	52.17 ± 1.44	Yes
	12/26/2012	0.39 ± 0.12	1.44 ± 0.43	Yes	19.10 ± 0.53	70.67 ± 1.95	Yes
MAIN GATE	10/3/2012	1.62 ± 0.20	5.99 ± 0.74	Yes	45.40 ± 0.83	167.98 ± 3.06	Yes
	10/10/2012	1.86 ± 0.20	6.88 ± 0.73	Yes	34.50 ± 0.72	127.65 ± 2.66	Yes
	10/17/2012	2.05 ± 0.21	7.59 ± 0.79	Yes	33.30 ± 0.74	123.21 ± 2.74	Yes
	10/24/2012	0.80 ± 0.16	2.94 ± 0.58	Yes	21.90 ± 0.63	81.03 ± 2.32	Yes
	10/31/2012	1.21 ± 0.17	4.48 ± 0.61	Yes	23.00 ± 0.62	85.10 ± 2.28	Yes
	11/7/2012	1.11 ± 0.17	4.11 ± 0.62	Yes	35.10 ± 0.72	129.87 ± 2.68	Yes
	11/14/2012	1.19 ± 0.17	4.40 ± 0.63	Yes	29.00 ± 0.66	107.30 ± 2.46	Yes
	11/21/2012	1.22 ± 0.18	4.51 ± 0.67	Yes	26.60 ± 0.66	98.42 ± 2.43	Yes
	11/28/2012	0.70 ± 0.17	2.59 ± 0.64	Yes	27.80 ± 0.65	102.86 ± 2.39	Yes
	12/5/2012	0.93 ± 0.17	3.45 ± 0.63	Yes	19.50 ± 0.58	72.15 ± 2.15	Yes
	12/12/2012	0.38 ± 0.13	1.42 ± 0.46	Yes	8.29 ± 0.35	30.67 ± 1.30	Yes
	12/19/2012	0.38 ± 0.12	1.40 ± 0.44	Yes	12.60 ± 0.38	46.62 ± 1.41	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
	12/26/2012	0.58 ± 0.13	2.15 ± 0.49	Yes	20.50 ± 0.56	75.85 ± 2.09	Yes
VAN BUREN GATE	10/3/2012	1.78 ± 0.20	6.59 ± 0.73	Yes	33.30 ± 0.70	123.21 ± 2.58	Yes
	10/10/2012	2.02 ± 0.20	7.47 ± 0.73	Yes	34.60 ± 0.70	128.02 ± 2.57	Yes
	10/17/2012	1.82 ± 0.19	6.73 ± 0.71	Yes	30.60 ± 0.68	113.22 ± 2.50	Yes
	10/24/2012	1.13 ± 0.17	4.18 ± 0.62	Yes	21.80 ± 0.60	80.66 ± 2.23	Yes
	10/31/2012	0.63 ± 0.13	2.35 ± 0.47	Yes	22.30 ± 0.58	82.51 ± 2.13	Yes
	11/7/2012	1.29 ± 0.17	4.77 ± 0.61	Yes	31.70 ± 0.66	117.29 ± 2.45	Yes
	11/14/2012	1.73 ± 0.18	6.40 ± 0.66	Yes	26.50 ± 0.60	98.05 ± 2.21	Yes
	11/21/2012	1.26 ± 0.17	4.66 ± 0.64	Yes	30.60 ± 0.66	113.22 ± 2.46	Yes
	11/28/2012	0.52 ± 0.15	1.91 ± 0.56	Yes	25.20 ± 0.59	93.24 ± 2.18	Yes
	12/5/2012	0.78 ± 0.15	2.88 ± 0.56	Yes	18.90 ± 0.54	69.93 ± 1.98	Yes
	12/12/2012	0.42 ± 0.12	1.57 ± 0.44	Yes	8.07 ± 0.33	29.86 ± 1.22	Yes
	12/19/2012	0.49 ± 0.12	1.80 ± 0.44	Yes	13.00 ± 0.37	48.10 ± 1.37	Yes
	12/26/2012	0.47 ± 0.12	1.75 ± 0.44	Yes	18.40 ± 0.52	68.08 ± 1.91	Yes

a. Invalid Sample Result

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	10/03/2012	-0.08	±	1.10	-0.30	±	4.08	No
	10/10/2012	-0.43	±	1.11	-1.60	±	4.09	No
	10/17/2012	-2.82	±	1.95	-10.45	±	7.20	No
	10/24/2012	-0.05	±	1.11	-0.18	±	4.11	No
	10/31/2012	0.55	±	0.97	2.05	±	3.60	No
	11/07/2012	0.21	±	1.05	0.76	±	3.87	No
	11/14/2012	-1.28	±	1.05	-4.72	±	3.90	No
	11/21/2012	1.03	±	1.06	3.81	±	3.92	No
	11/28/2012	-0.58	±	1.08	-2.15	±	3.99	No
	12/05/2012	-0.47	±	1.05	-1.75	±	3.87	No
	12/12/2012	-0.06	±	0.93	-0.21	±	3.45	No
	12/19/2012	-1.31	±	1.89	-4.85	±	6.99	No
	12/26/2012	-1.03	±	0.99	-3.80	±	3.66	No
QA-1	10/03/2012	-0.07	±	0.98	-0.26	±	3.61	No
(ARCO)	10/10/2012	-0.43	±	1.10	-1.59	±	4.07	No
	10/17/2012	-2.47	±	1.70	-9.14	±	6.30	No
	10/24/2012	-0.04	±	1.03	-0.16	±	3.80	No
	10/31/2012	0.64	±	1.12	2.36	±	4.15	No
	11/07/2012	0.19	±	0.96	0.70	±	3.54	No
	11/14/2012	-1.13	±	0.93	-4.17	±	3.45	No
	11/21/2012	0.93	±	0.95	3.43	±	3.53	No
	11/28/2012	-0.51	±	0.96	-1.90	±	3.53	No
	12/05/2012	-0.41	±	0.91	-1.53	±	3.38	No
	12/12/2012	-0.05	±	0.85	-0.19	±	3.15	No
	12/19/2012	-1.21	±	1.75	-4.50	±	6.48	No
	12/26/2012	-0.97	±	0.93	-3.59	±	3.46	No
ATOMIC CITY	10/03/2012	-0.08	±	1.12	-0.30	±	4.13	No
	10/10/2012	-0.48	±	1.23	-1.78	±	4.55	No
a	10/17/2012		±			±		No
	10/24/2012	-0.05	±	1.22	-0.19	±	4.50	No
	10/31/2012	0.66	±	1.15	2.43	±	4.27	No
	11/07/2012	0.23	±	1.17	0.85	±	4.33	No
	11/14/2012	-1.36	±	1.12	-5.03	±	4.16	No
	11/21/2012	1.19	±	1.22	4.39	±	4.52	No
	11/28/2012	-0.62	±	1.15	-2.30	±	4.27	No
	12/05/2012	-0.51	±	1.14	-1.90	±	4.21	No
	12/12/2012	-0.06	±	0.96	-0.21	±	3.54	No
	12/19/2012	-1.51	±	2.18	-5.59	±	8.06	No
	12/26/2012	-1.13	±	1.09	-4.18	±	4.03	No
BLUE DOME	10/03/2012	-0.88	±	0.98	-3.26	±	3.64	No
	10/10/2012	0.08	±	0.94	0.31	±	3.49	No
	10/17/2012	-0.35	±	1.50	-1.29	±	5.53	No
	10/24/2012	-0.34	±	0.87	-1.26	±	3.23	No
	10/31/2012	-1.48	±	0.93	-5.47	±	3.45	No
	11/07/2012	0.15	±	0.91	0.56	±	3.36	No
	11/14/2012	-0.60	±	0.89	-2.21	±	3.31	No
	11/21/2012	-0.21	±	0.87	-0.79	±	3.24	No
	11/28/2012	-0.50	±	0.91	-1.85	±	3.36	No
	12/05/2012	0.54	±	0.89	2.00	±	3.28	No
	12/12/2012	0.35	±	0.87	1.29	±	3.23	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								
	12/19/2012	-1.74	±	0.98	-6.44	±	3.63	No
	12/26/2012	-0.13	±	0.88	-0.50	±	3.26	No
FAA TOWER	10/03/2012	-0.98	±	1.10	-3.62	±	4.05	No
	10/10/2012	0.10	±	1.06	0.35	±	3.92	No
	10/17/2012	-0.41	±	1.76	-1.52	±	6.53	No
	10/24/2012	-0.44	±	1.14	-1.63	±	4.20	No
	10/31/2012	-1.70	±	1.07	-6.27	±	3.95	No
	11/07/2012	0.18	±	1.09	0.67	±	4.02	No
	11/14/2012	-0.66	±	0.99	-2.44	±	3.65	No
	11/21/2012	-0.25	±	1.00	-0.91	±	3.71	No
	11/28/2012	-0.57	±	1.04	-2.11	±	3.84	No
	12/05/2012	0.59	±	0.97	2.20	±	3.60	No
	12/12/2012	0.38	±	0.95	1.40	±	3.52	No
	12/19/2012	-1.95	±	1.10	-7.23	±	4.08	No
	12/26/2012	-0.15	±	0.95	-0.54	±	3.52	No
HOWE	10/03/2012	-0.98	±	1.10	-3.63	±	4.06	No
	10/10/2012	0.10	±	1.12	0.37	±	4.13	No
	10/17/2012	-0.43	±	1.84	-1.59	±	6.82	No
	10/24/2012	-0.43	±	1.10	-1.58	±	4.08	No
	10/31/2012	-1.81	±	1.14	-6.68	±	4.21	No
	11/07/2012	0.19	±	1.14	0.71	±	4.23	No
	11/14/2012	-0.68	±	1.02	-2.53	±	3.78	No
	11/21/2012	-0.26	±	1.07	-0.97	±	3.96	No
	11/28/2012	-0.60	±	1.09	-2.22	±	4.04	No
	12/05/2012	0.67	±	1.10	2.47	±	4.06	No
	12/12/2012	0.42	±	1.05	1.55	±	3.90	No
	12/19/2012	-2.17	±	1.22	-8.02	±	4.52	No
	12/26/2012	-0.15	±	1.00	-0.56	±	3.68	No
MONTEVIEW	10/03/2012	-1.02	±	1.14	-3.76	±	4.21	No
	10/10/2012	0.10	±	1.17	0.39	±	4.31	No
	10/17/2012	-0.42	±	1.82	-1.57	±	6.72	No
	10/24/2012	-0.40	±	1.02	-1.46	±	3.77	No
	10/31/2012	-1.80	±	1.14	-6.68	±	4.21	No
	11/07/2012	0.18	±	1.05	0.65	±	3.89	No
	11/14/2012	-0.69	±	1.04	-2.57	±	3.85	No
	11/21/2012	-0.26	±	1.06	-0.96	±	3.91	No
	11/28/2012	-0.61	±	1.10	-2.24	±	4.08	No
	12/05/2012	0.67	±	1.09	2.47	±	4.04	No
	12/12/2012	0.41	±	1.02	1.51	±	3.79	No
	12/19/2012	-2.07	±	1.16	-7.64	±	4.31	No
	12/26/2012	-0.16	±	1.03	-0.58	±	3.82	No
QA-2 (MONTEVIEW)	10/03/2012	-0.99	±	1.11	-3.68	±	4.12	No
	10/10/2012	0.10	±	1.15	0.38	±	4.27	No
	10/17/2012	-0.43	±	1.83	-1.58	±	6.77	No
	10/24/2012	-0.39	±	1.01	-1.45	±	3.74	No
	10/31/2012	-1.75	±	1.10	-6.49	±	4.09	No
	11/07/2012	0.19	±	1.12	0.69	±	4.13	No
	11/14/2012	-0.69	±	1.04	-2.57	±	3.84	No
	11/21/2012	-0.27	±	1.08	-0.98	±	4.01	No
	11/28/2012	-0.59	±	1.07	-2.18	±	3.97	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								
	12/05/2012	0.66	±	1.08	2.44	±	4.01	No
	12/12/2012	0.41	±	1.03	1.51	±	3.80	No
	12/19/2012	-2.15	±	1.21	-7.96	±	4.49	No
	12/26/2012	-0.16	±	1.05	-0.59	±	3.87	No
MUD LAKE	10/03/2012	-1.03	±	1.15	-3.81	±	4.26	No
	10/10/2012	0.11	±	1.20	0.40	±	4.46	No
	10/17/2012	-0.45	±	1.91	-1.65	±	7.08	No
	10/24/2012	-0.44	±	1.13	-1.62	±	4.16	No
	10/31/2012	-1.92	±	1.21	-7.12	±	4.48	No
	11/07/2012	0.19	±	1.16	0.72	±	4.28	No
	11/14/2012	-0.78	±	1.17	-2.90	±	4.34	No
	11/21/2012	-0.27	±	1.11	-1.01	±	4.11	No
	11/28/2012	-0.66	±	1.20	-2.43	±	4.42	No
	12/05/2012	0.63	±	1.03	2.31	±	3.80	No
	12/12/2012	0.46	±	1.15	1.70	±	4.26	No
	12/19/2012	-2.20	±	1.24	-8.12	±	4.58	No
	12/26/2012	-0.17	±	1.14	-0.64	±	4.22	No
DISTANT								
BLACKFOOT CMS	10/03/2012	-0.13	±	1.75	-0.47	±	6.46	No
	10/10/2012	-0.76	±	1.95	-2.82	±	7.21	No
	10/17/2012	-4.54	±	3.13	-16.79	±	11.57	No
	10/24/2012	-0.07	±	1.72	-0.27	±	6.38	No
	10/31/2012	1.13	±	1.99	4.20	±	7.37	No
	11/07/2012	0.40	±	2.03	1.48	±	7.51	No
	11/14/2012	-2.34	±	1.93	-8.64	±	7.14	No
	11/21/2012	1.91	±	1.96	7.05	±	7.26	No
	11/28/2012	-0.94	±	1.75	-3.49	±	6.48	No
	12/05/2012	-0.72	±	1.60	-2.67	±	5.91	No
	12/12/2012	-0.09	±	1.43	-0.31	±	5.30	No
	12/19/2012	-1.95	±	2.81	-7.21	±	10.39	No
	12/26/2012	-1.60	±	1.54	-5.91	±	5.69	No
CRATERS	10/03/2012	-0.08	±	1.14	-0.31	±	4.20	No
	10/10/2012	-0.46	±	1.17	-1.70	±	4.34	No
	10/17/2012	-2.91	±	2.01	-10.78	±	7.43	No
	10/24/2012	-0.05	±	1.18	-0.19	±	4.36	No
	10/31/2012	0.67	±	1.18	2.48	±	4.35	No
	11/07/2012	0.23	±	1.15	0.84	±	4.24	No
	11/14/2012	-1.32	±	1.09	-4.87	±	4.02	No
	11/21/2012	1.10	±	1.13	4.08	±	4.20	No
	11/28/2012	-0.62	±	1.14	-2.28	±	4.23	No
	12/05/2012	-0.47	±	1.03	-1.73	±	3.83	No
	12/12/2012	-0.06	±	1.00	-0.22	±	3.69	No
	12/19/2012	-1.40	±	2.01	-5.16	±	7.44	No
	12/26/2012	-1.11	±	1.07	-4.10	±	3.95	No
DUBOIS	10/03/2012	-1.01	±	1.13	-3.74	±	4.18	No
	10/10/2012	0.10	±	1.07	0.35	±	3.95	No
a	10/17/2012		±			±		No
	10/24/2012	-0.44	±	1.14	-1.64	±	4.24	No
	10/31/2012	-1.74	±	1.10	-6.45	±	4.06	No
	11/07/2012	0.17	±	1.02	0.63	±	3.79	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								
	11/14/2012	-0.68	±	1.01	-2.50	±	3.74	No
	11/21/2012	-0.26	±	1.06	-0.97	±	3.94	No
	11/28/2012	-0.55	±	1.00	-2.02	±	3.69	No
	12/05/2012	0.69	±	1.13	2.56	±	4.20	No
	12/12/2012	0.39	±	0.99	1.46	±	3.66	No
	12/19/2012	-2.03	±	1.15	-7.53	±	4.25	No
	12/26/2012	-0.15	±	0.95	-0.54	±	3.52	No
IDAHO FALLS	10/03/2012	-0.91	±	1.02	-3.38	±	3.79	No
	10/10/2012	0.10	±	1.06	0.35	±	3.94	No
	10/17/2012	-0.37	±	1.59	-1.37	±	5.89	No
	10/24/2012	-0.34	±	0.89	-1.28	±	3.29	No
	10/31/2012	-1.56	±	0.98	-5.78	±	3.64	No
	11/07/2012	0.16	±	0.97	0.60	±	3.60	No
	11/14/2012	-0.63	±	0.95	-2.35	±	3.51	No
	11/21/2012	-0.23	±	0.92	-0.83	±	3.40	No
	11/28/2012	-0.51	±	0.92	-1.87	±	3.41	No
	12/05/2012	0.56	±	0.91	2.06	±	3.38	No
	12/12/2012	0.35	±	0.89	1.31	±	3.29	No
	12/19/2012	-1.77	±	1.00	-6.57	±	3.70	No
	12/26/2012	-0.14	±	0.88	-0.50	±	3.27	No
JACKSON	10/03/2012	-0.07	±	0.95	-0.26	±	3.52	No
	10/10/2012	-0.44	±	1.12	-1.62	±	4.13	No
	10/17/2012	-2.64	±	1.82	-9.76	±	6.73	No
	10/24/2012	-0.04	±	0.98	-0.16	±	3.63	No
	10/31/2012	0.56	±	0.98	2.06	±	3.61	No
	11/07/2012	0.20	±	1.01	0.74	±	3.75	No
	11/14/2012	-1.16	±	0.96	-4.28	±	3.54	No
	11/21/2012	0.76	±	1.52	2.80	±	5.62	No
	11/28/2012	-0.54	±	1.00	-1.99	±	3.70	No
	12/05/2012	-0.43	±	0.96	-1.61	±	3.55	No
	12/12/2012	-0.06	±	0.94	-0.21	±	3.49	No
	12/19/2012	-1.29	±	1.85	-4.76	±	6.86	No
	12/26/2012	-1.16	±	1.11	-4.28	±	4.12	No
REXBURG CMS	10/03/2012	-1.01	±	1.13	-3.74	±	4.18	No
	10/10/2012	0.10	±	1.11	0.37	±	4.12	No
	10/17/2012	-0.43	±	1.83	-1.58	±	6.78	No
	10/24/2012	-0.37	±	0.95	-1.36	±	3.50	No
	10/31/2012	-1.89	±	1.19	-7.01	±	4.41	No
	11/07/2012	0.20	±	1.21	0.75	±	4.49	No
	11/14/2012	-0.79	±	1.19	-2.93	±	4.39	No
	11/21/2012	-0.27	±	1.09	-0.99	±	4.03	No
	11/28/2012	-0.64	±	1.17	-2.38	±	4.33	No
	12/05/2012	0.73	±	1.20	2.71	±	4.45	No
	12/12/2012	0.44	±	1.11	1.64	±	4.10	No
	12/19/2012	-2.33	±	1.31	-8.61	±	4.85	No
	12/26/2012	-0.17	±	1.13	-0.64	±	4.18	No
INL SITE								
EFS	10/03/2012	-0.08	±	1.11	-0.30	±	4.12	No
	10/10/2012	-0.44	±	1.13	-1.64	±	4.20	No
	10/17/2012	-2.70	±	1.86	-9.98	±	6.87	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								
	10/24/2012	-0.05	±	1.16	-0.18	±	4.31	No
	10/31/2012	0.62	±	1.09	2.30	±	4.04	No
	11/07/2012	0.23	±	1.15	0.84	±	4.24	No
	11/14/2012	-1.26	±	1.04	-4.68	±	3.86	No
	11/21/2012	1.06	±	1.10	3.94	±	4.05	No
	11/28/2012	-0.57	±	1.07	-2.12	±	3.94	No
	12/05/2012	-0.44	±	0.97	-1.63	±	3.61	No
	12/12/2012	-0.06	±	0.95	-0.21	±	3.51	No
	12/19/2012	-1.39	±	2.00	-5.13	±	7.39	No
	12/26/2012	-1.07	±	1.03	-3.95	±	3.80	No
MAIN GATE	10/03/2012	-0.08	±	1.13	-0.31	±	4.20	No
	10/10/2012	-0.47	±	1.20	-1.73	±	4.43	No
	10/17/2012	-3.02	±	2.08	-11.18	±	7.70	No
	10/24/2012	-0.05	±	1.22	-0.19	±	4.53	No
	10/31/2012	0.68	±	1.19	2.51	±	4.41	No
	11/07/2012	0.23	±	1.16	0.85	±	4.29	No
	11/14/2012	-1.38	±	1.14	-5.09	±	4.20	No
	11/21/2012	1.17	±	1.21	4.34	±	4.46	No
	11/28/2012	-0.63	±	1.17	-2.34	±	4.34	No
	12/05/2012	-0.52	±	1.14	-1.91	±	4.23	No
	12/12/2012	-0.06	±	1.03	-0.23	±	3.80	No
	12/19/2012	-1.46	±	2.10	-5.39	±	7.77	No
	12/26/2012	-1.14	±	1.10	-4.23	±	4.07	No
VAN BUREN GATE	10/03/2012	-0.08	±	1.07	-0.29	±	3.94	No
	10/10/2012	-0.44	±	1.13	-1.63	±	4.16	No
	10/17/2012	-2.75	±	1.90	-10.18	±	7.02	No
	10/24/2012	-0.05	±	1.15	-0.18	±	4.25	No
	10/31/2012	0.62	±	1.10	2.31	±	4.06	No
	11/07/2012	0.21	±	1.07	0.78	±	3.97	No
	11/14/2012	-1.22	±	1.00	-4.50	±	3.71	No
	11/21/2012	1.07	±	1.10	3.97	±	4.08	No
	11/28/2012	-0.58	±	1.07	-2.14	±	3.98	No
	12/05/2012	-0.46	±	1.02	-1.71	±	3.77	No
	12/12/2012	-0.06	±	0.95	-0.21	±	3.50	No
	12/19/2012	-1.36	±	1.96	-5.03	±	7.26	No
	12/26/2012	-1.06	±	1.02	-3.92	±	3.78	No

a. Invalid Sample Result

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 ($\times 10^{-13}$ Bq/mL)			Result > 3s
BOUNDARY									
ARCO	12/26/2012	CESIUM-137	24.20	±	85.20	89.54	±	315.24	No
		STRONTIUM-90	15.19	±	6.43	56.21	±	23.78	No
ARCO (QA-1)	12/26/2012	CESIUM-137	64.30	±	135.00	237.91	±	499.50	No
		STRONTIUM-90	29.15	±	6.31	107.85	±	23.35	**Yes**
ATOMIC CITY	12/26/2012	CESIUM-137	-28.40	±	122.00	-105.08	±	451.40	No
BLUE DOME	12/26/2012	AMERICIUM-241	0.41	±	1.33	1.51	±	4.91	No
		CESIUM-137	-90.80	±	114.00	-335.96	±	421.80	No
		PLUTONIUM-238	0.46	±	0.65	1.71	±	2.42	No
		PLUTONIUM-239/240	1.97	±	0.76	7.30	±	2.82	No
FAA TOWER	12/26/2012	CESIUM-137	-92.30	±	94.90	-341.51	±	351.13	No
HOWE	12/26/2012	CESIUM-137	-50.20	±	150.00	-185.74	±	555.00	No
		STRONTIUM-90	54.85	±	9.85	202.96	±	36.45	**Yes**
MONTEVIEW	12/26/2012	AMERICIUM-241	1.76	±	1.51	6.50	±	5.60	No
		CESIUM-137	-67.90	±	145.00	-251.23	±	536.50	No
		PLUTONIUM-238	1.76	±	0.94	6.50	±	3.46	No
		PLUTONIUM-239/240	1.46	±	0.72	5.40	±	2.68	No
MONTEVIEW (QA-2)	12/26/2012	AMERICIUM-241	1.50	±	1.31	5.57	±	4.86	No
		CESIUM-137	-130.00	±	121.00	-481.00	±	447.70	No
		PLUTONIUM-238	3.16	±	1.32	11.69	±	4.87	No
		PLUTONIUM-239/240	2.10	±	1.30	7.77	±	4.81	No
MUD LAKE	12/26/2012	CESIUM-137	147.00	±	143.00	543.90	±	529.10	No
		STRONTIUM-90	24.48	±	7.62	90.57	±	28.18	**Yes**
DISTANT									
BLACKFOOT	12/26/2012	AMERICIUM-241	-2.06	±	1.97	-7.61	±	7.29	No
		CESIUM-137	24.40	±	176.00	90.28	±	651.20	No
		PLUTONIUM-238	4.47	±	1.61	16.55	±	5.96	No
		PLUTONIUM-239/240	3.65	±	1.25	13.50	±	4.62	No
CRATERS	12/26/2012	CESIUM-137	-197.00	±	93.90	-728.90	±	347.43	No
DUBOIS	12/26/2012	CESIUM-137	119.00	±	133.00	440.30	±	492.10	No
IDAHO FALLS	12/26/2012	CESIUM-137	41.30	±	117.00	152.81	±	432.90	No
		STRONTIUM-90	6.31	±	6.65	23.34	±	24.60	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 ($\times 10^{-13}$ Bq/mL)			Result > 3s
JACKSON	12/26/2012	AMERICIUM-241	0.23	±	1.10	0.87	±	4.08	No
		CESIUM-137	-49.20	±	104.00	-182.04	±	384.80	No
		PLUTONIUM-238	1.69	±	0.73	6.24	±	2.72	No
		PLUTONIUM-239/240	0.72	±	0.64	2.67	±	2.36	No
REXBURG CMS	12/26/2012	CESIUM-137	-88.00	±	142.00	-325.60	±	525.40	No
INL SITE									
EFS	12/26/2012	CESIUM-137	-202.00	±	155.00	-747.40	±	573.50	No
		STRONTIUM-90	43.69	±	8.42	161.64	±	31.14	**Yes**
MAIN GATE	12/26/2012	AMERICIUM-241	0.34	±	1.54	1.25	±	5.71	No
		CESIUM-137	-143.00	±	96.70	-529.10	±	357.79	No
		PLUTONIUM-238	1.21	±	0.73	4.46	±	2.70	No
		PLUTONIUM-239/240	0.96	±	0.68	3.56	±	2.53	No
VAN BUREN GATE	12/26/2012	CESIUM-137	-170.00	±	136.00	-629.00	±	503.20	No
		STRONTIUM-90	23.49	±	6.84	86.92	±	25.31	**Yes**

TABLE C-4. Tritium Concentrations in Atmospheric Moisture.

Sampling Group and Location	Start Date	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-13}$ $\mu Ci/mL_{air}$)			Result ± 1s Uncertainty ($\times 10^{-9}$ Bq/mL_{air})			Collection Medium	Result > 3s
BOUNDARY										
ATOMIC CITY	09/26/2012	10/31/2012	1.92	±	0.96	7.11	±	3.54	Molecular Sieve	No
ATOMIC CITY	10/31/2012	11/28/2012	0.36	±	1.14	1.34	±	4.22	Molecular Sieve	No
DISTANT										
BLACKFOOT	09/12/2012	10/03/2012	0.00	±	1.93	-0.01	±	7.15	Molecular Sieve	No
BLACKFOOT	10/03/2012	10/24/2012	1.06	±	1.12	3.93	±	4.14	Molecular Sieve	No
BLACKFOOT	10/24/2012	11/14/2012	5.60	±	1.23	20.70	±	4.56	Molecular Sieve	**Yes**
BLACKFOOT	11/14/2012	12/05/2012	2.20	±	1.35	8.14	±	4.98	Molecular Sieve	No
IDAHO FALLS	09/12/2012	10/08/2012	-0.38	±	0.64	-1.40	±	2.37	Molecular Sieve	No
IDAHO FALLS	10/08/2012	10/31/2012	0.90	±	0.34	3.34	±	1.25	Molecular Sieve	No
IDAHO FALLS	10/31/2012	11/28/2012	1.10	±	0.35	4.06	±	1.28	Molecular Sieve	**Yes**
IDAHO FALLS	11/28/2012	12/26/2012	-0.29	±	0.26	-1.06	±	0.97	Molecular Sieve	No
REXBURG	09/05/2012	10/03/2012	-1.30	±	2.21	-4.83	±	8.19	Molecular Sieve	No
REXBURG	10/03/2012	10/31/2012	1.47	±	1.11	5.45	±	4.10	Molecular Sieve	No
REXBURG	10/31/2012	11/28/2012	6.96	±	1.25	25.73	±	4.61	Molecular Sieve	**Yes**
REXBURG	11/28/2012	12/26/2012	-1.21	±	1.01	-4.46	±	3.73	Molecular Sieve	No

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	9/3/2012	10/1/2012	-25.00	±	41.30	-0.93	±	1.53	No
	10/1/2012	11/2/2012	42.50	±	21.30	1.57	±	0.79	No
	11/2/2012	12/3/2012	-34.80	±	22.60	-1.29	±	0.84	No
CFA	9/4/2012	10/1/2012	38.40	±	21.10	1.42	±	0.78	No
	10/1/2012	11/1/2012	9.41	±	21.20	0.35	±	0.78	No
	11/1/2012	12/3/2012	-21.70	±	22.20	-0.80	±	0.82	No
EFS	10/10/2012	10/17/2012	34.30	±	21.50	1.27	±	0.80	No
	10/17/2012	10/24/2012	1.63	±	21.10	0.06	±	0.78	No
	11/7/2012	11/14/2012	39.40	±	23.50	1.46	±	0.87	No
	11/14/2012	11/21/2012	-49.40	±	22.00	-1.83	±	0.81	No
	11/21/2012	11/28/2012	249.00	±	25.50	9.21	±	0.94	**Yes**
	11/28/2012	12/5/2012	80.40	±	23.60	2.97	±	0.87	**Yes**
	12/12/2012	12/19/2012	39.40	±	22.20	1.46	±	0.82	No
	12/19/2012	12/26/2012	2.59	±	22.10	0.10	±	0.82	No

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	11/8/2012	GROSS ALPHA	0.58	±	0.50	0.02	±	0.02	No
		GROSS BETA	6.55	±	0.65	0.24	±	0.02	**Yes**
		TRITIUM	54.30	±	22.30	2.01	±	0.83	No
Alpheus Spring (duplicate)	11/8/2012	GROSS ALPHA	0.69	±	0.53	0.03	±	0.02	No
		GROSS BETA	6.72	±	0.66	0.25	±	0.02	**Yes**
		TRITIUM	35.30	±	22.10	1.31	±	0.82	No
Bill Jones Fish Farm	11/8/2012	GROSS ALPHA	-0.51	±	0.32	-0.02	±	0.01	No
		GROSS BETA	0.48	±	0.54	0.02	±	0.02	No
		TRITIUM	23.60	±	22.30	0.87	±	0.83	No
Clear Springs	11/8/2012	GROSS ALPHA	0.93	±	0.47	0.03	±	0.02	No
		GROSS BETA	5.47	±	0.61	0.20	±	0.02	**Yes**
		TRITIUM	49.20	±	22.60	1.82	±	0.84	No
DRINKING WATER									
Atomic City	11/14/2012	GROSS ALPHA	0.46	±	0.40	0.02	±	0.01	No
		GROSS BETA	3.66	±	0.61	0.14	±	0.02	**Yes**
		TRITIUM	41.23	±	21.42	1.53	±	0.79	No
Control	11/15/2012	GROSS ALPHA	-0.23	±	0.19	-0.01	±	0.01	No
		GROSS BETA	0.36	±	0.48	0.01	±	0.02	No
		TRITIUM	115.53	±	22.18	4.28	±	0.82	**Yes**
Craters of the Moon	11/14/2012	GROSS ALPHA	0.99	±	0.46	0.04	±	0.02	No
		GROSS BETA	2.52	±	0.59	0.09	±	0.02	**Yes**
		TRITIUM	77.66	±	21.88	2.88	±	0.81	**Yes**
Howe	11/14/2012	GROSS ALPHA	0.91	±	0.47	0.03	±	0.02	No
		GROSS BETA	1.75	±	0.57	0.06	±	0.02	**Yes**
		TRITIUM	44.21	±	21.47	1.64	±	0.80	No
Idaho Falls	11/15/2012	GROSS ALPHA	0.08	±	0.54	0.00	±	0.02	No
		GROSS BETA	4.29	±	0.64	0.16	±	0.02	**Yes**
		TRITIUM	112.22	±	22.61	4.16	±	0.84	**Yes**
Minidoka	11/8/2012	GROSS ALPHA	-0.23	±	0.42	-0.01	±	0.02	No
		GROSS BETA	3.96	±	0.60	0.15	±	0.02	**Yes**
		TRITIUM	15.88	±	21.19	0.59	±	0.78	No
Mud Lake	11/14/2012	GROSS ALPHA	0.29	±	0.35	0.01	±	0.01	No
		GROSS BETA	6.57	±	0.68	0.24	±	0.03	**Yes**
		TRITIUM	18.93	±	21.23	0.70	±	0.79	No
Rest Area	11/14/2012	GROSS ALPHA	1.02	±	0.46	0.04	±	0.02	No
		GROSS BETA	1.96	±	0.57	0.07	±	0.02	**Yes**
		TRITIUM	103.82	±	22.29	3.85	±	0.83	**Yes**
Shoshone	11/8/2012	GROSS ALPHA	0.65	±	0.45	0.02	±	0.02	No
		GROSS BETA	3.28	±	0.57	0.12	±	0.02	**Yes**
		TRITIUM	-50.32	±	21.69	-1.86	±	0.80	No

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

Location	Sampling Date	Iodine-131 Result ± 1s Uncertainty (pCi†/L)	Iodine-131 Result ± 1s Uncertainty (Bq‡/L)	Result > 3s	Cesium-137 Result ± 1s Uncertainty (pCi/L)	Cesium-137 Result ± 1s Uncertainty (Bq/L)	Result > 3s
BLACKFOOT							
	10/02/12	0.68 ± 1.80	0.025 ± 0.067	No	3.09 ± 1.39	0.114 ± 0.051	No
CONTROL							
	10/02/12	-0.94 ± 1.82	-0.035 ± 0.067	No	-0.63 ± 1.35	-0.023 ± 0.050	No
	11/06/12	-0.78 ± 1.32	-0.029 ± 0.049	No	-0.35 ± 1.37	-0.013 ± 0.051	No
	12/04/12	1.24 ± 0.99	0.046 ± 0.037	No	1.32 ± 0.76	0.049 ± 0.028	No
DIETRICH							
	10/02/12	0.05 ± 0.84	0.002 ± 0.031	No	0.63 ± 0.86	0.023 ± 0.032	No
	11/06/12	0.49 ± 0.86	0.018 ± 0.032	No	-0.42 ± 0.86	-0.016 ± 0.032	No
	12/04/12	0.02 ± 1.17	0.001 ± 0.043	No	-0.69 ± 1.47	-0.025 ± 0.054	No
HOWE							
	10/02/12	-0.59 ± 1.00	-0.022 ± 0.037	No	2.34 ± 0.78	0.087 ± 0.029	**Yes**
	11/06/12	0.49 ± 1.19	0.018 ± 0.044	No	-1.09 ± 1.38	-0.040 ± 0.051	No
	12/04/12	0.10 ± 0.87	0.004 ± 0.032	No	1.47 ± 0.86	0.054 ± 0.032	No
IDAHO FALLS							
	10/02/12	0.20 ± 0.90	0.007 ± 0.033	No	0.15 ± 0.78	0.006 ± 0.029	No
Duplicate	10/02/12	1.09 ± 1.22	0.040 ± 0.045	No	-0.91 ± 1.45	-0.034 ± 0.054	No
	10/09/12	-0.58 ± 1.18	-0.022 ± 0.044	No	-0.31 ± 1.39	-0.011 ± 0.051	No
	10/16/12	-0.84 ± 0.91	-0.031 ± 0.034	No	-0.40 ± 0.74	-0.015 ± 0.028	No
	10/23/12	-0.91 ± 1.16	-0.034 ± 0.043	No	0.92 ± 1.39	0.034 ± 0.051	No
	10/30/12	-0.49 ± 0.89	-0.018 ± 0.033	No	-0.48 ± 0.75	-0.018 ± 0.028	No
	11/06/12	2.19 ± 1.66	0.081 ± 0.061	No	0.29 ± 1.43	0.011 ± 0.053	No
	11/13/12	0.42 ± 1.16	0.016 ± 0.043	No	-0.39 ± 1.42	-0.015 ± 0.053	No
	11/20/12	-1.84 ± 1.14	-0.068 ± 0.042	No	-0.96 ± 1.43	-0.036 ± 0.053	No
	11/27/12	0.05 ± 0.94	0.002 ± 0.035	No	0.85 ± 0.78	0.031 ± 0.029	No
	12/04/12	1.06 ± 0.92	0.039 ± 0.034	No	0.96 ± 0.79	0.036 ± 0.029	No
	12/11/12	0.11 ± 0.94	0.004 ± 0.035	No	1.68 ± 0.80	0.062 ± 0.029	No
	12/18/12	-0.01 ± 0.93	0.000 ± 0.034	No	-0.12 ± 0.79	-0.004 ± 0.029	No
	12/26/12	0.43 ± 1.05	0.016 ± 0.039	No	-0.08 ± 1.34	-0.003 ± 0.050	No
RUPERT							
	10/02/12	-0.19 ± 1.64	-0.007 ± 0.061	No	-0.36 ± 1.44	-0.013 ± 0.053	No
	11/06/12	-0.36 ± 0.95	-0.013 ± 0.035	No	-0.99 ± 0.78	-0.037 ± 0.029	No
	12/04/12	0.45 ± 1.67	0.017 ± 0.062	No	1.80 ± 1.35	0.067 ± 0.050	No
TERRETON							
	10/02/12	-1.49 ± 1.35	-0.055 ± 0.050	No	1.46 ± 1.34	0.054 ± 0.050	No
	11/06/12	-1.12 ± 0.94	-0.041 ± 0.035	No	0.93 ± 0.87	0.034 ± 0.032	No
	12/04/12	1.86 ± 0.85	0.069 ± 0.031	No	0.07 ± 1.39	0.003 ± 0.051	No

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

Location	Sampling Date	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
Strontium-90								
CONTROL	11/06/12	0.63	±	0.13	0.023	±	0.005	**Yes**
DIETRICH	11/06/12	0.79	±	0.15	0.029	±	0.005	**Yes**
HOWE	11/06/12	0.22	±	0.10	0.008	±	0.004	No
IDAHO FALLS	11/06/12	0.32	±	0.12	0.012	±	0.004	No
RUPERT	11/06/12	0.51	±	0.13	0.019	±	0.005	**Yes**
TERRETON	11/06/12	0.97	±	0.26	0.036	±	0.010	**Yes**
Tritium								
		Concentration ± 1s			**Concentration ± 1s**			**Result > 3s**
CONTROL	11/06/12	120.00	±	22.30	4.444	±	0.826	**Yes**
DIETRICH	11/06/12	94.60	±	21.40	3.504	±	0.793	**Yes**
HOWE	11/06/12	79.70	±	21.20	2.952	±	0.785	**Yes**
IDAHO FALLS	11/06/12	127.00	±	21.80	4.704	±	0.807	**Yes**
RUPERT	11/06/12	74.90	±	21.20	2.774	±	0.785	**Yes**
TERRETON	11/06/12	80.70	±	21.30	2.989	±	0.789	**Yes**

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

Location	Sampling Date	Cesium-137 Result[a] ± 1s Uncertainty pCi/kg			Cesium-137 Result[a] ± 1s Uncertainty Bq/kg			Result > 3s
ARCO	9/12/2012	-3.68	±	1.58	-0.14	±	0.06	No
BLACKFOOT	9/26/2012	-1.06	±	1.13	-0.04	±	0.04	No
CONTROL	10/4/2012	-3.59	±	1.59	-0.13	±	0.06	No
IDAHO FALLS	10/4/2012	0.17	±	2.02	0.01	±	0.07	No
MONTEVIEW	10/4/2012	-3.11	±	1.64	-0.12	±	0.06	No
RUPERT	10/2/2012	-2.20	±	1.54	-0.08	±	0.06	No
RUPERT (DUPLICATE)	10/2/2012	-2.69	±	1.54	-0.10	±	0.06	No
SHELLEY	9/6/2012	-0.13	±	2.09	0.00	±	0.08	No
TERRETON	10/2/2012	2.08	±	2.10	0.08	±	0.08	No
		Strontium-90						
		Result ± 1s Uncertainty pCi/kg			**Result ± 1s Uncertainty Bq/kg**			**Result > 3s**
ARCO	9/12/2012	-15.40	±	16.10	-0.57	±	0.60	No
BLACKFOOT	9/26/2012	4.41	±	17.10	0.16	±	0.63	No
CONTROL	10/4/2012	24.50	±	18.20	0.91	±	0.67	No
IDAHO FALLS	10/4/2012	2.20	±	17.70	0.08	±	0.66	No
MONTEVIEW	10/4/2012	7.53	±	17.30	0.28	±	0.64	No
RUPERT	10/2/2012	7.01	±	16.10	0.26	±	0.60	No
RUPERT (DUPLICATE)	10/2/2012	-5.40	±	15.60	-0.20	±	0.58	No
SHELLEY	9/6/2012	2.65	±	16.30	0.10	±	0.60	No
TERRETON	10/2/2012	-12.20	±	16.30	-0.45	±	0.60	No

[a] A review of the table, performed in the summer of 2020, identified that the values listed for the ^{137}Cs results were incorrect. The ^{137}Cs results were updated with the correct values. The ^{137}Cs uncertainty values, along with the ^{90}Sr result and uncertainty values, were determined to be correct and did not require an update. For further discussion, see Potato Sampling in Section 5.

Table C-10. Actinide, Gamma-emitting Radionuclide, and Strontium-90 Concentrations in Edible Tissues of Waterfowl

Location	Sampling Date	Analyte	Result ± Uncertainty(1s) pCi/kg[a]			Result ± Uncertainty(1s) (x 10^{-2}) Bq/kg[a]			Result > 3s
ATR Complex	9/7/2012								
		AMERICIUM-241	1.85	±	1.35	6.85	±	5.00	No
		CESIUM-137	3.30	±	2.97	12.22	±	11.00	No
		CHROMIUM-51	-8.07	±	51.50	-29.89	±	190.74	No
		COBALT-60	1.00	±	2.21	3.70	±	8.19	No
		PLUTONIUM-238	1.64	±	0.81	6.07	±	3.00	No
		PLUTONIUM-239/240	1.28	±	0.72	4.74	±	2.68	No
		STRONTIUM-90	-16.60	±	13.30	-61.48	±	49.26	No
		ZINC-65	-4.41	±	6.93	-16.33	±	25.67	No
ATR Complex	9/7/2012								
		AMERICIUM-241	1.35	±	1.51	5.00	±	5.59	No
		CESIUM-137	-2.12	±	9.93	-7.85	±	36.78	No
		CHROMIUM-51	-239.00	±	228.00	-885.19	±	844.44	No
		COBALT-60	5.66	±	7.41	20.96	±	27.44	No
		PLUTONIUM-238	1.51	±	0.85	5.59	±	3.15	No
		PLUTONIUM-239/240	3.01	±	1.21	11.15	±	4.48	No
		STRONTIUM-90	10.20	±	17.10	37.78	±	63.33	No
		ZINC-65	-22.90	±	21.60	-84.81	±	80.00	No
ATR Complex	9/8/2012								
		AMERICIUM-241	-0.27	±	1.30	-1.01	±	4.81	No
		CESIUM-137	780.00	±	52.50	2888.89	±	194.44	**Yes**
		CHROMIUM-51	-34.10	±	300.00	-126.30	±	1111.11	No
		COBALT-60	48.20	±	9.53	178.52	±	35.30	**Yes**
		PLUTONIUM-238	0.63	±	0.75	2.32	±	2.79	No
		PLUTONIUM-239/240	1.31	±	0.83	4.85	±	3.08	No
		STRONTIUM-90	-3.93	±	16.50	-14.56	±	61.11	No
		ZINC-65	61.50	±	26.50	227.78	±	98.15	No
MFC	9/8/2012								
		AMERICIUM-241	1.32	±	1.49	4.89	±	5.52	No
		CESIUM-137	-3.44	±	6.18	-12.74	±	22.89	No
		CHROMIUM-51	47.30	±	125.00	175.19	±	462.96	No
		COBALT-60	1.31	±	4.59	4.85	±	17.00	No
		PLUTONIUM-238	0.94	±	0.87	3.47	±	3.20	No
		PLUTONIUM-239/240	1.70	±	0.96	6.30	±	3.54	No
		STRONTIUM-90	7.34	±	16.90	27.19	±	62.59	No
		ZINC-65	4.29	±	10.60	15.89	±	39.26	No

[a] During the summer of 2020, a review of the table determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. The column headings have been updated to the correct units of concentration [pCi/kg and (x10^{-2}) Bq/kg]. For further discussion see Waterfowl Sampling in Section 5.

Table C-10. Actinide, Gamma-emitting Radionuclide, and Strontium-90 Concentrations in Edible Tissues of Waterfowl

Location	Sampling Date	Analyte	Result ± Uncertainty(1s) pCi/kg[a]			Result ± Uncertainty(1s) (x 10^{-2}) Bq/kg[a]			Result > 3s
MFC	9/8/2012								
		AMERICIUM-241	0.88	±	1.29	3.25	±	4.78	No
		CESIUM-137	-12.70	±	7.60	-47.04	±	28.15	No
		CHROMIUM-51	-16.50	±	167.00	-61.11	±	618.52	No
		COBALT-60	6.99	±	5.61	25.89	±	20.78	No
		PLUTONIUM-238	0.44	±	0.63	1.61	±	2.33	No
		PLUTONIUM-239/240	1.11	±	0.71	4.11	±	2.61	No
		STRONTIUM-90	-3.75	±	14.50	-13.89	±	53.70	No
		ZINC-65	-35.70	±	14.40	-132.22	±	53.33	No
MFC	9/8/2012								
		AMERICIUM-241	0.65	±	1.18	2.39	±	4.37	No
		CESIUM-137	-3.03	±	6.54	-11.22	±	24.22	No
		CHROMIUM-51	-96.00	±	155.00	-355.56	±	574.07	No
		COBALT-60	5.13	±	5.00	19.00	±	18.52	No
		PLUTONIUM-238	1.46	±	0.92	5.41	±	3.42	No
		PLUTONIUM-239/240	-0.32	±	0.82	-1.18	±	3.02	No
		STRONTIUM-90	-2.47	±	12.90	-9.15	±	47.78	No
		ZINC-65	-39.60	±	13.40	-146.67	±	49.63	No
Control	10/13/2012								
		AMERICIUM-241	0.36	±	1.18	1.34	±	4.37	No
		CESIUM-137	-5.03	±	3.69	-18.63	±	13.67	No
		CHROMIUM-51	17.00	±	47.50	62.96	±	175.93	No
		COBALT-60	-0.79	±	2.65	-2.92	±	9.81	No
		PLUTONIUM-238	2.00	±	0.96	7.41	±	3.55	No
		PLUTONIUM-239/240	2.26	±	0.94	8.37	±	3.48	No
		STRONTIUM-90	-8.06	±	13.00	-29.85	±	48.15	No
		ZINC-65	-0.41	±	6.11	-1.50	±	22.63	No
Control	10/20/2012								
		AMERICIUM-241	0.49	±	1.10	1.82	±	4.07	No
		CESIUM-137	10.60	±	4.86	39.26	±	18.00	No
		CHROMIUM-51	17.80	±	40.50	65.93	±	150.00	No
		COBALT-60	-0.24	±	3.28	-0.88	±	12.15	No
		PLUTONIUM-238	1.32	±	0.74	4.89	±	2.75	No
		PLUTONIUM-239/240	0.59	±	0.67	2.19	±	2.46	No
		STRONTIUM-90	-19.80	±	13.40	-73.33	±	49.63	No
		ZINC-65	-3.63	±	7.24	-13.44	±	26.81	No

[a] During the summer of 2020, a review of the table determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. The column headings have been updated to the correct units of concentration [pCi/kg and (x10^{-2}) Bq/kg]. For further discussion see Waterfowl Sampling in Section 5.

Table C-10. Actinide, Gamma-emitting Radionuclide, and Strontium-90 Concentrations in Edible Tissues of Waterfowl

Location	Sampling Date	Analyte	Result ± Uncertainty(1s) pCi/kg[a]			Result ± Uncertainty(1s) (x 10^{-2}) Bq/kg[a]			Result > 3s
Control	11/11/2012								
		AMERICIUM-241	1.14	±	1.33	4.22	±	4.93	No
		CESIUM-137	8.88	±	3.05	32.89	±	11.30	No
		CHROMIUM-51	9.16	±	22.60	33.93	±	83.70	No
		COBALT-60	1.99	±	2.03	7.37	±	7.52	No
		PLUTONIUM-238	0.37	±	0.75	1.39	±	2.77	No
		PLUTONIUM-239/240	1.45	±	0.83	5.37	±	3.09	No
		STRONTIUM-90	-20.40	±	12.20	-75.56	±	45.19	No
		ZINC-65	-3.89	±	5.57	-14.41	±	20.63	No

[a] During the summer of 2020, a review of the table determined the activity concentration values reported for the media were correct, however, the unit of concentration listed in the column headings were incorrect. The column headings have been updated to the correct units of concentration [pCi/kg and (x10^{-2}) Bq/kg]. For further discussion see Waterfowl Sampling in Section 5.

Table C-11. Comparison of Environmental Radiation Measurements using TLDs and OSLDs.

Location	TLD Measurement ± 2s Uncertainty mrem	OSLD Measurement ± 2s Uncertainty mrem
BOUNDARY		
ARCO	62.9 ± 12.4	54.6 ± 5.5
ATOMIC CITY	66.0 ± 13.0	58.3 ± 5.8
BIRCH CREEK	55.3 ± 10.8	52.6 ± 5.3
BLUE DOME	52.0 ± 10.2	45.5 ± 4.6
HOWE	58.3 ± 11.4	50.2 ± 5.1
MONTEVIEW	60.6 ± 11.8	56.9 ± 5.7
MUD LAKE	67.4 ± 13.2	56.5 ± 5.7
Average	**60.4**	**Average** **53.5**
DISTANT		
ABERDEEN	63.4 ± 12.5	57.1 ± 5.8
BLACKFOOT	59.7 ± 11.7	53.0 ± 5.3
BLACKFOOT CMS	53.9 ± 10.6	46.3 ± 4.6
CRATERS	61.6 ± 12.1	54.3 ± 5.4
DUBOIS	52.8 ± 10.4	46.5 ± 4.7
IDAHO FALLS	63.8 ± 12.5	57.9 ± 5.8
MINIDOKA	56.4 ± 11.0	47.1 ± 4.7
REXBURG	74.9 ± 14.6	65.9 ± 6.6
ROBERTS	68.7 ± 13.5	64.7 ± 6.5
Average	**61.7**	**Average** **54.8**
OUT-OF-STATE		
JACKSON	48.6 ± 9.5	39.2 ± 3.9

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	0.87
October	0.64
November	0.93
December	0.68
Gross Beta	
Quarter	0.50
October	0.81
November	0.07
December	0.85

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

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		
	October 3	1.00
	October 10	0.47
	October 17	0.93
	October 24	0.32
	October 31	0.78
	November 7	0.94
	November 14	0.78
	November 21	0.78
	November 28	0.02
	December 5	0.78
	December 12	1.00
	December 19	0.72
	December 26	0.39
Gross Beta		
	October 3	0.57
	October 10	0.89
	October 17	0.41
	October 24	0.39
	October 31	0.72
	November 7	0.06
	November 14	1.00
	November 21	0.32
	November 28	0.22
	December 5	0.32
	December 12	0.89
	December 19	0.62
	December 26	0.47

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