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Environmental Surveillance, Education,, and Research Program
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# Idaho National Laboratory Site Offsite Environmental Surveillance Program Report: Third Quarter 2010

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**Under Contract DE-NE0000300**

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# EXECUTIVE SUMMARY

None of the radionuclides detected in samples collected during the third quarter of 2010 could be directly linked with INL Site activities. Levels of detected radionuclides were no different than values measured at other locations across the United States or were consistent with levels measured historically at the INL Site. All detected radionuclide concentrations were well below guidelines set by the U.S. Department of Energy (DOE) and regulatory standards established by the U.S. Environmental Protection Agency (EPA) for protection of the public.

This report for the third quarter of 2010 contains results from the Environmental Surveillance, Education, and Research (ESER) Program's monitoring of the Department of Energy's Idaho National Laboratory (INL) Site's offsite environment, July 1 through September 30, 2010. All sample types (media) and the sampling schedule followed during 2010 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 sampling
- Surface water sampling
- Milk sampling
- Grain sampling
- Game animal sampling

**Table E-1 Summary of results for the Third Quarter of 2010.**

| Media | Sample Type | Analysis | Results |
|---|---|---|---|
| Air | Filters | Gross alpha, gross beta | No statistical differences were noted in either gross alpha or gross beta data on quarterly and monthly comparisons. No statistical differences were observed between Distant locations than Boundary locations for either gross alpha or gross beta concentrations measured during any week of the third quarter. No result exceeded the DCG for gross alpha or gross beta activity in air. |
| | | Gamma-emitting radionuclides, select actinides ($^{241}$Am, $^{238}$Pu, and $^{239,240}$ Pu), $^{90}$Sr | No man-made radionuclides were detected. |
| | Charcoal Cartridge | Iodine-131 | Iodine-131 was not reported on any charcoal cartridge batches during any week of the quarter. |
| Atmospheric Moisture | Liquid | Tritium | A total of 19 samples were collected. Seventeen of these samples had tritium results greater than the 3s uncertainty. No sample result exceeded the DCG for tritium in air. Results were consistent with historical measurements. |
| Precipitation | Liquid | Tritium | Six results for samples collected were available. 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. |
| Milk | Liquid | Iodine-131, gamma-emitting radionuclides | Thirty-four samples, including two duplicates, were collected. No Iodine-131 or other manmade gamma-emitting radionuclides were detected in any sample. |
| Grain | Vegetation | Gamma-emitting radionuclides, $^{90}$Sr | Fourteen wheat samples were collected. No manmade gamma-emitting radionuclides were found in any sample. Strontium-90 was detected in six samples at levels consistent with historical results. |
| Large Game Animals | Tissue | Gamma-emitting radionuclides | Three large game animals (all pronghorn) were sampled. No man-made radionuclides were detected in animal tissues. |

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AEC | Atomic Energy Commission |
| CFA | Central Facilities Area |
| DCG | Derived Concentration Guide |
| DOE | Department of Energy |
| DOE – ID | Department of Energy Idaho Operations Office |
| EAL | Environmental Assessment Laboratory |
| EFS | Experimental Field Station |
| EPA | Environmental Protection Agency |
| ERAMS | Environmental Radiation Ambient Monitoring System |
| ESER | Environmental Surveillance, Education,, and Research |
| ICP | Idaho Cleanup Project |
| INL | Idaho National Laboratory |
| INEL | Idaho National Engineering Laboratory |
| INEEL | Idaho National Engineering and Environmental Laboratory |
| ISU | Idaho State University |
| MDC | minimum detectable concentration |
| NRTS | National Reactor Testing Station |

## 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 2010, 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. The ESER Program is led by the S.M. Stoller Corporation in cooperation with its team members, including the University of Idaho, Idaho State University (ISU), the Wildlife Conservation Society, and Teledyne Brown Engineering. This report contains monitoring results from the ESER Program for samples collected during the third quarter of 2010 (July 1-September 30, 2010).

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
- 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 12 locations around the INL Site biennially
- environmental dosimeters from 15 locations semi-annually
- various numbers of wildlife including big game (pronghorn, mule deer, and elk) and waterfowl sampled on and near the INL Site.

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

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

($^{238}$Pu), plutonium-239/240 ($^{239/240}$Pu), and americium-241 ($^{241}$Am) were performed by Teledyne Brown Engineering, Inc. of Knoxville, Tennessee.

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.

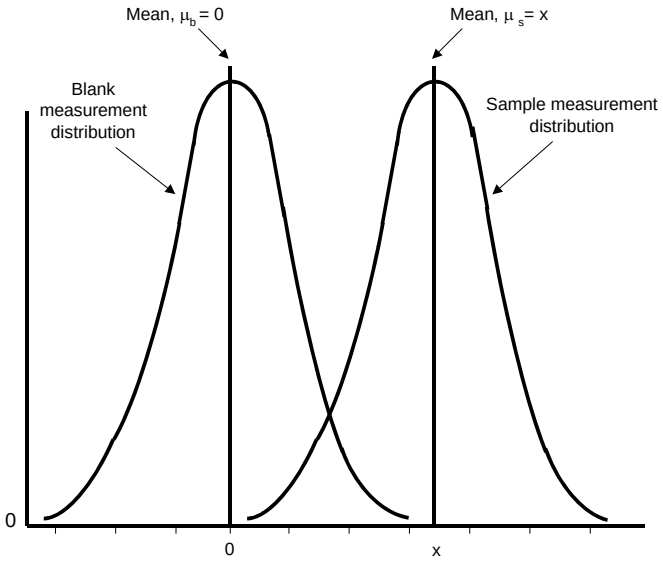
In the event of any suspected worldwide nuclear incidents, like the 1986 Chernobyl accident, the EPA may request additional sampling be performed through RadNet [previously known as the Environmental Radiation Ambient Monitoring System (ERAMS) network] (EPA 2009). The EPA established the ERAMS network in 1973 with an emphasis on identifying trends in the accumulation of long-lived radionuclides in the environment. ERAMS was renamed RadNet in 2005 to reflect a new mission. RadNet is comprised of a nationwide network of sampling stations that provide air, precipitation, drinking water, and milk samples. The ESER Program currently operates a high-volume air sampler and collects precipitation and drinking water in Idaho Falls for this national program and routinely sends samples to EPA's Eastern Environmental Radiation Facility for analyses. The RadNet data collected at Idaho Falls are not reported by the ESER Program but are available through the EPA RadNet website (http://www.epa.gov/narel/radnet/).

Once samples have been collected and analyzed, the ESER Program has the responsibility for quality control of the data and for preparing quarterly reports on results from the environmental surveillance program. The quarterly reports are then consolidated into the INL Site Environmental Report for each calendar year. These annual reports also include data collected by other INL Site contractors.

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

Results are presented in this report with an analytical uncertainty term, *s*, where "*s*" is the estimated sample standard deviation ($\sigma$), assuming a Gaussian or normal distribution. All results are reported in this document, even those that do not necessarily represent detections. The term "detected", as used for the discussion of results in this report, does not imply any degree of risk to the public or environment, but rather indicates that the radionuclide was measured at a concentration sufficient for the analytical instrument to record a value that is statistically different from background. 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.




**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 95-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 5 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 Gonzales-Stoller Surveillance, LLC, at (208) 525-9358, or visit the Program's web page (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.

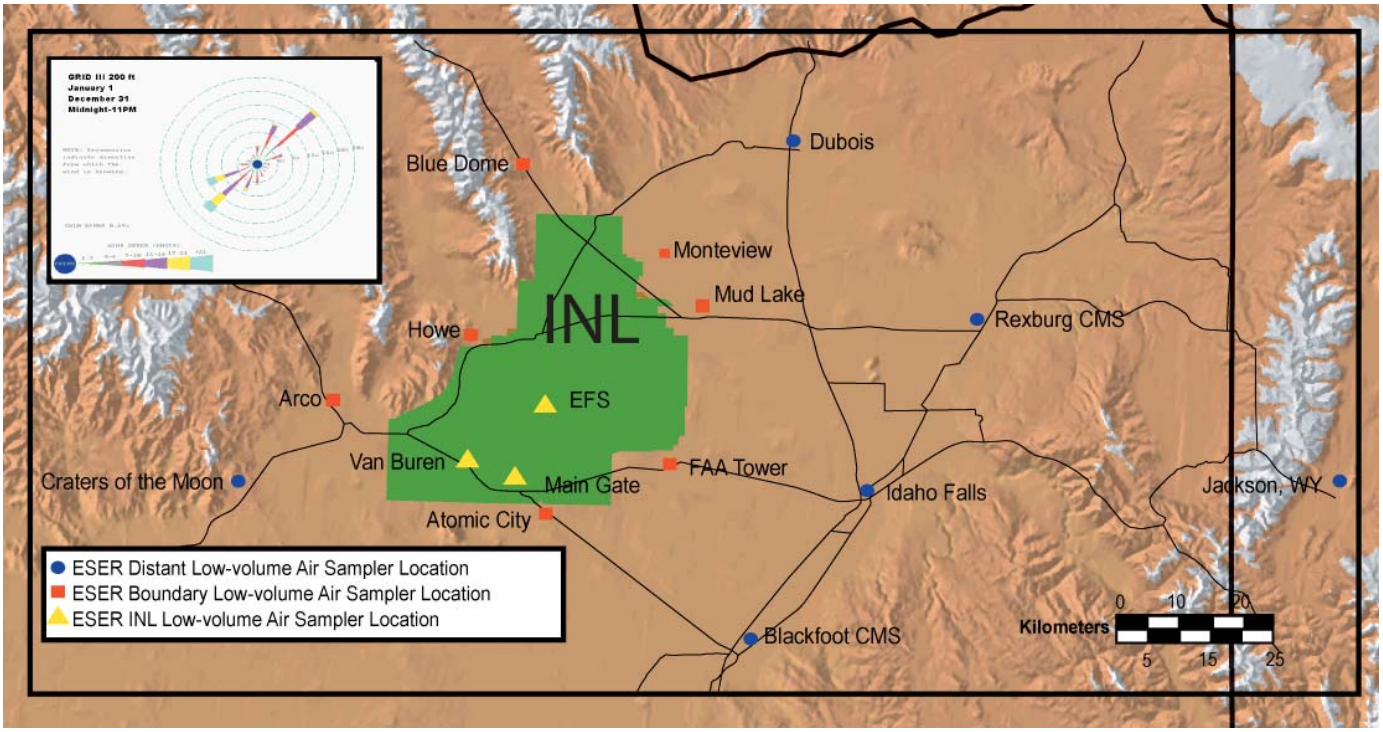
The cleanup operation, the ICP, is now a separately managed effort. The ICP is charged with safely and cost-effectively completing the majority of cleanup work from past laboratory missions by 2012.

# 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 third quarter of 2010 are discussed below. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses and DOE Derived Concentration Guide (DCG) (DOE 1993) values is provided in Appendix B.

### *LOW-VOLUME AIR SAMPLING*

Radioactivity associated with airborne particulates was monitored continuously by 18 low-volume air samplers (two of which are used as replicate samplers) at 16 locations during the third quarter of 2010 (Figure 2). Four of these samplers are located on the INL Site, seven are situated off the INL Site near the boundary, and seven have been placed at locations distant to the INL Site. Samplers are divided into INL Site, Boundary, and Distant groups to determine if there is a gradient of radionuclide concentrations, increasing towards the INL Site. Each replicate sampler is relocated every other year to a new location. During 2010, one replicate sampler was operating in Dubois (a Distant location) and one was operating at the Van Buren gate (an INL Site location). An average of 17,548 $ft^3$ (497 $m^3$) of air was sampled at each location, each week, at an average flow rate of 1.74 $ft^3$/min (0.05 $m^3$/min). Particulates in air were collected on membrane particulate filters (1.2-µm pore size). Gases passing through the filter were collected with an activated charcoal cartridge.




**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. Median gross alpha concentrations in air for INL Site, Boundary, and Distant locations for the third quarter of 2010 are shown in Figure 3. Gross alpha data are tested for normality prior to statistical analyses, and generally show no consistent discernable distribution. Box and whisker plots are commonly used when there is no assumed distribution. Each data group in Figure 3 is presented as a box and whisker plot, with a median (small red square), a box enclosing values between the 25$^{th}$ and 75$^{th}$ percentiles, and whiskers representing the non-outlier range. Outliers and extreme values are identified separately from the box and whiskers. Outliers and extreme values are atypical, infrequent data points that are far from the middle of the data distribution. For this report, outliers are defined as values that are greater than 1.5 times the height of the box, above, or below the box. Extreme values are greater than 2 times the height of the box, above or below the box. Outliers and extreme values may reflect inherent variability, may be due to errors associated with transcription or measurement, or may be related to other anomalies. A careful review of the data collected during the third quarter indicates that the outlier values were not due to mistakes in collection, analysis, or reporting procedures, but rather reflect natural variability in the measurements. Thus, rather than dismissing the outliers, they were included in the subsequent statistical analyses.

Because there is no discernable distribution of the data, the nonparametric Kruskal-Wallis test of multiple independent groups was used to test for statistical differences between INL Site, Boundary, and Distant locations. The use of nonparametric tests, such as Kruskal-Wallis, gives less weight to outlier and extreme values thus allowing a more appropriate comparison of data groups. A statistically significant difference exists between data groups if the (p) value is less than 0.05. Values greater than 0.05 translate into a 95 percent confidence that the medians are statistically the same. The p-value for each comparison is shown in Table D-1. For the quarter, there was no statistical difference noted. Figure 3 graphically shows that the gross alpha measurements made at INL Site, Boundary, and Distant locations are similar for the third quarter. If the INL Site were a significant source of offsite contamination, concentrations of contaminants could be statistically greater at Boundary locations than at Distant locations.

Comparisons of gross alpha concentrations were made for each month of the quarter (Figures 4 – 6). Again the Kruskal-Wallis test of multiple independent groups was used to determine if statistical differences exist between INL Site, Boundary, and Distant data groups. No statistical differences in gross alpha concentrations between groups were noted during any month of the quarter (Table D-1).

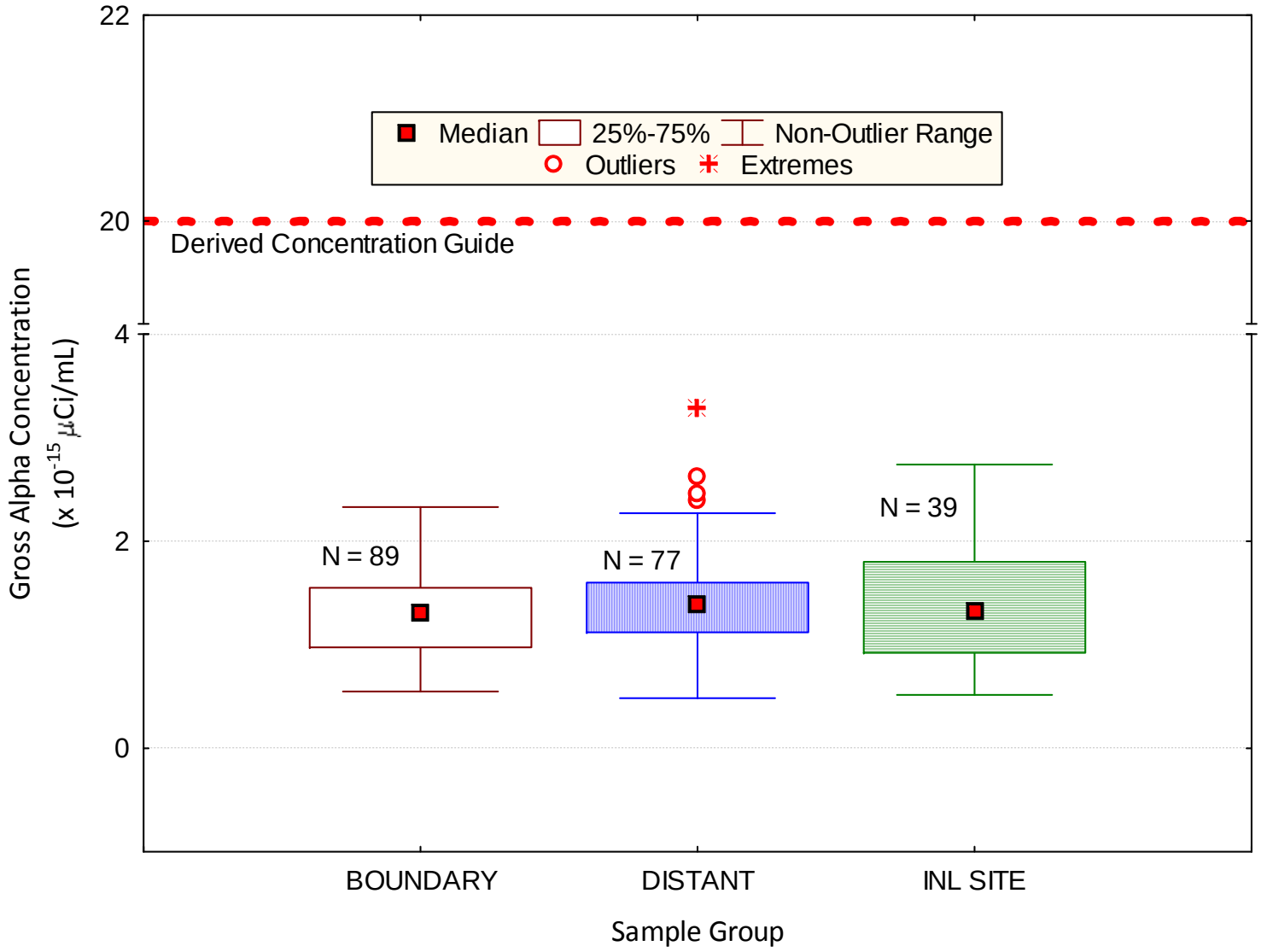



**Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary and Distant locations for the third quarter of 2010.**

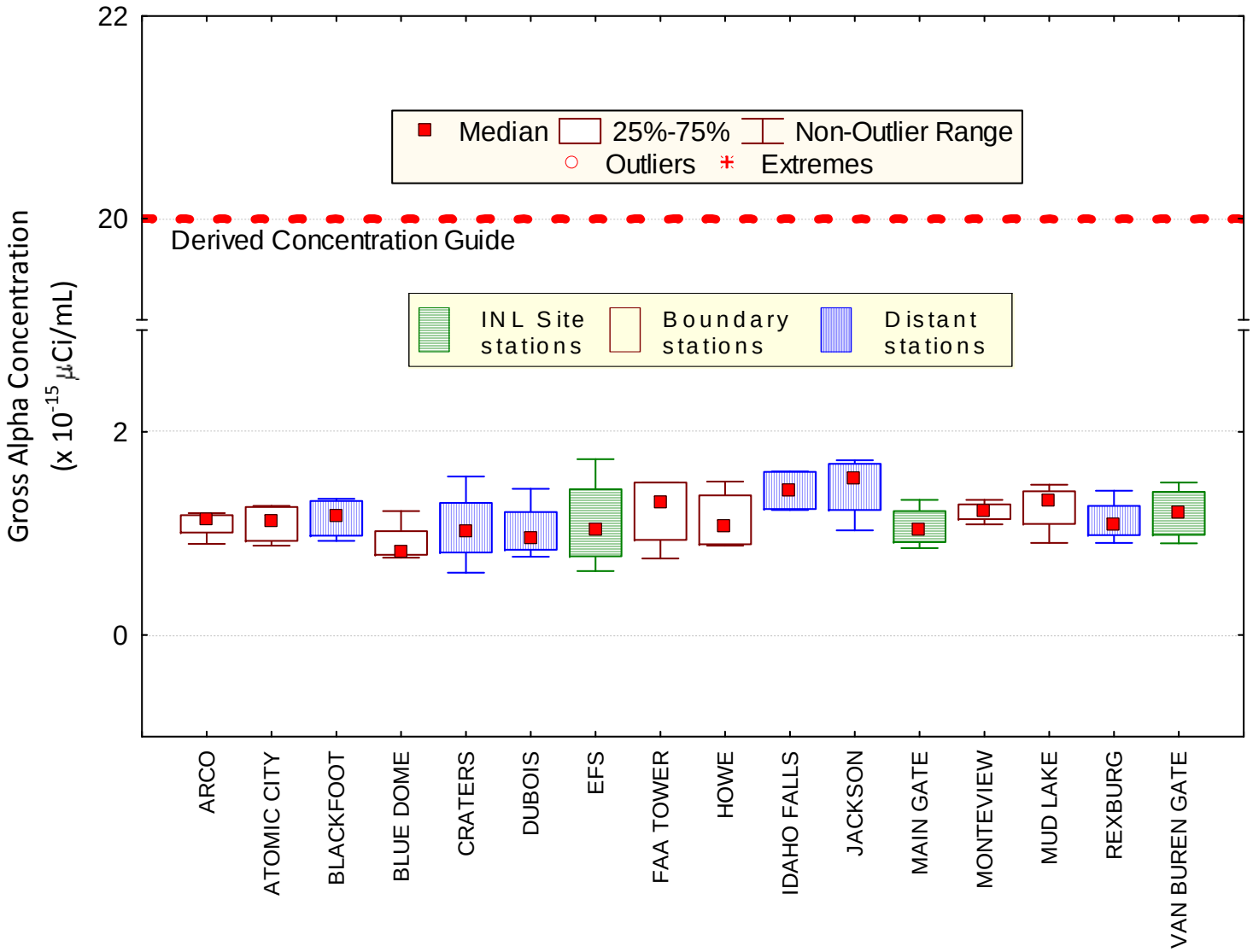



**Figure 4. July gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.**

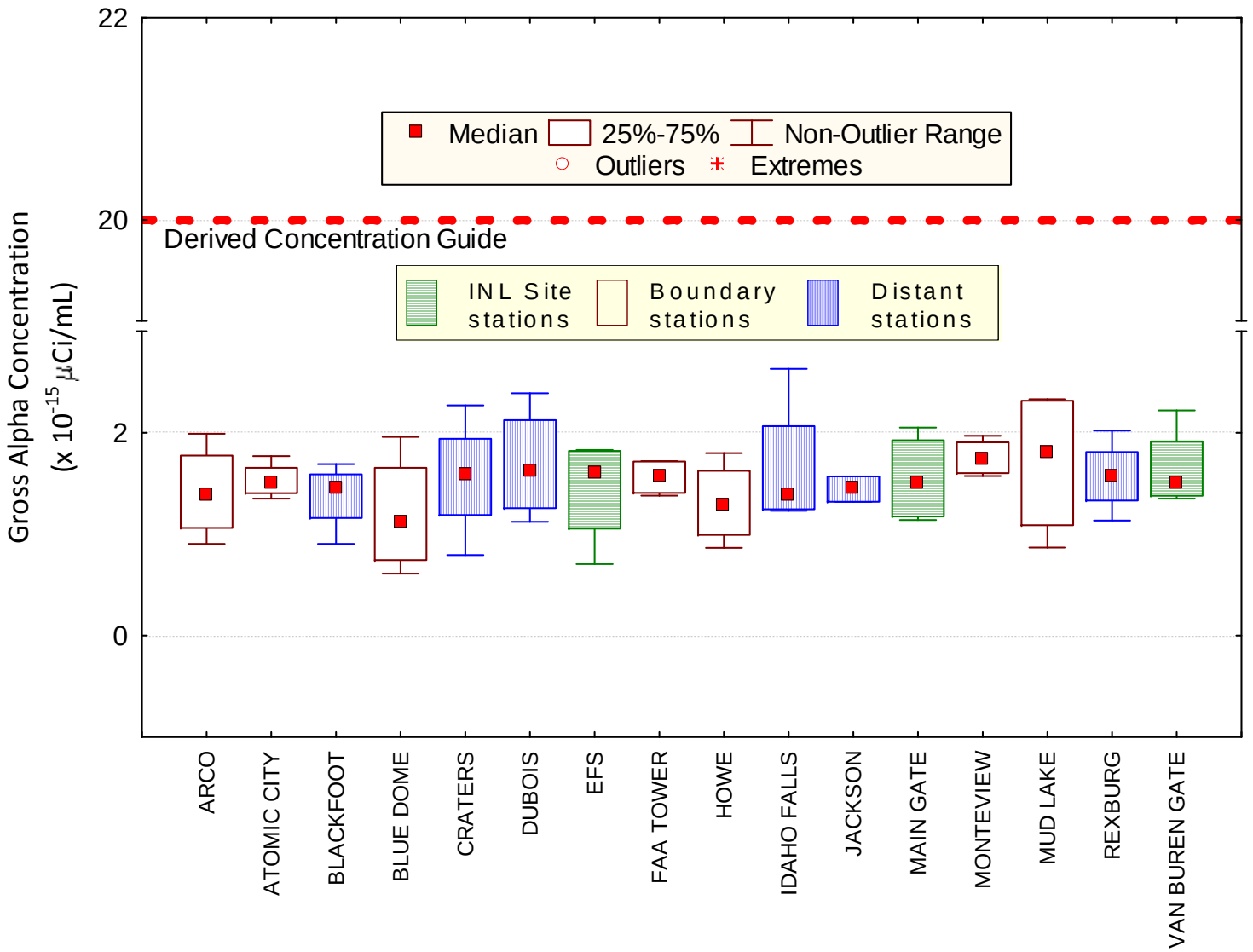



**Figure 5. August gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location, except Jackson (N = 3).**

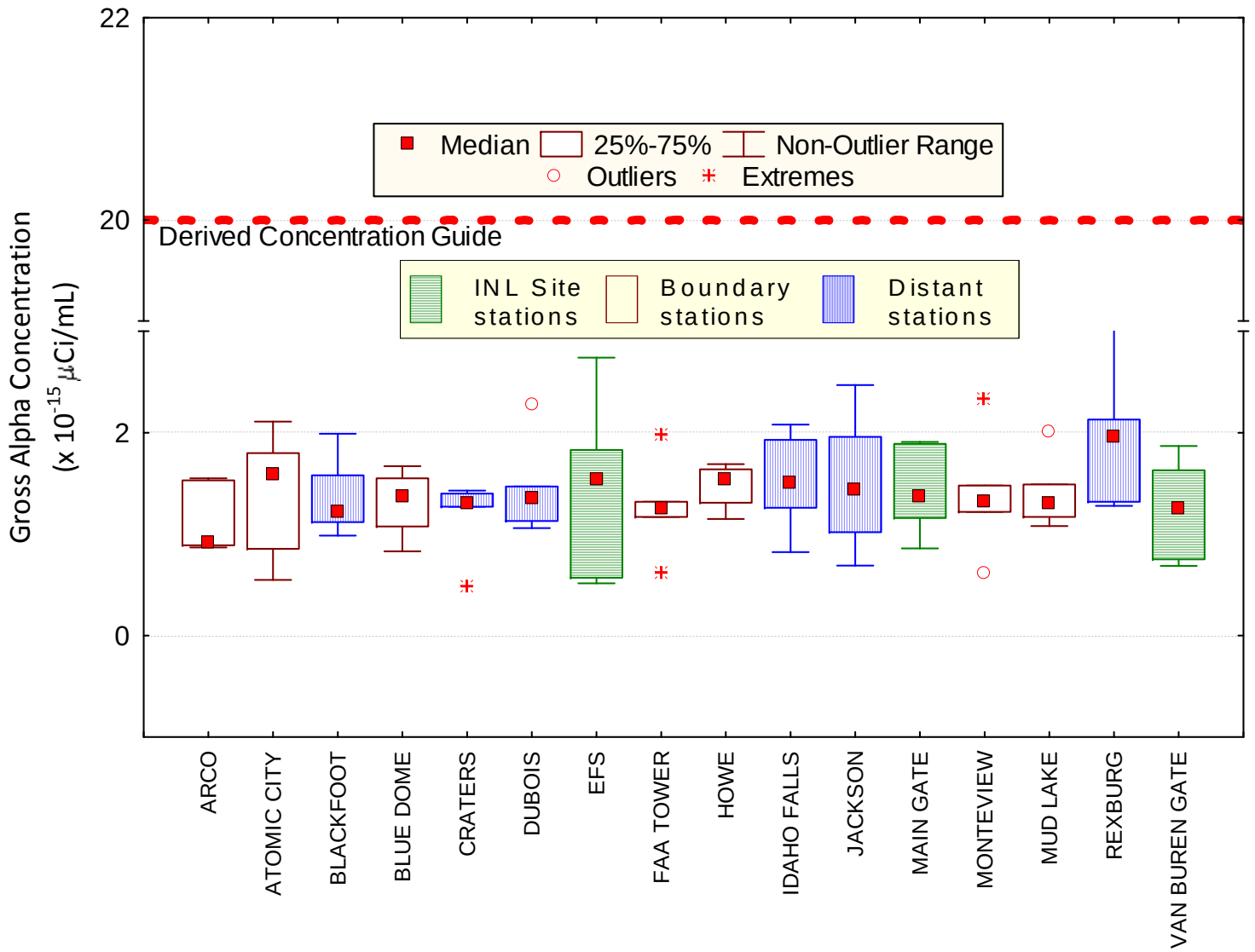



**Figure 6. September gross alpha concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Howe and Blue Dome (N = 4).**

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 third quarter, there were no weeks where a statistical difference existed between the two sample groups (Table D-2).

Gross beta results are presented in Table C-1. Gross beta concentrations in air for INL Site, Boundary, and Distant locations for the third quarter of 2010 are shown in Figure 7. 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 using the Kruskal-Wallace test (Table D-1).

Monthly median gross beta concentrations in air for each sampling group are shown in Figures 8 – 10. Statistical data are presented in Table D-1. No statistical differences were noted during any month.

Comparison of weekly Boundary and Distant gross beta data sets, using the Mann Whitney U test, showed no statistical differences between Boundary and Distant measurements during any week of the quarter (Table D-1).

Iodine-131 was not reported above the detection level on any charcoal cartridge batches analyzed during the quarter. Weekly $^{131}I$ results for each location are listed in Table C-2 of Appendix C. Gamma spectrographic analysis is also done with the $^{131}I$ analysis. Cesium-137 was not detected in any of the 26 measured batches of cartridges this quarter.

Weekly filters for the third quarter of 2010 were composited by location. All samples were analyzed for gamma-emitting radionuclides, including $^{137}Cs$. Selected composites were also analyzed for $^{90}Sr$, $^{238}Pu$, $^{239/240}Pu$, and $^{241}Am$ (see Table C-3, Appendix C). None of these radionuclides were found on any of the composites.

### *ATMOSPHERIC MOISTURE SAMPLING*

Results were available for 19 atmospheric moisture samples collected during the third quarter of 2010 from Atomic City, Blackfoot, Idaho Falls, and Rexburg. 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.

Seventeen of the 19 samples exceeded the 3s uncertainty level for tritium, with similar results to those reported previously. All samples were significantly below the DOE DCG for tritium in air of $1 \times 10^{-7}$ $\mu Ci/mL_{air}$ with a maximum reported value of $28.1 \times 10^{-13}$ $\mu Ci/mL_{air}$ at Blackfoot. All results are shown in Table C-4, Appendix C.

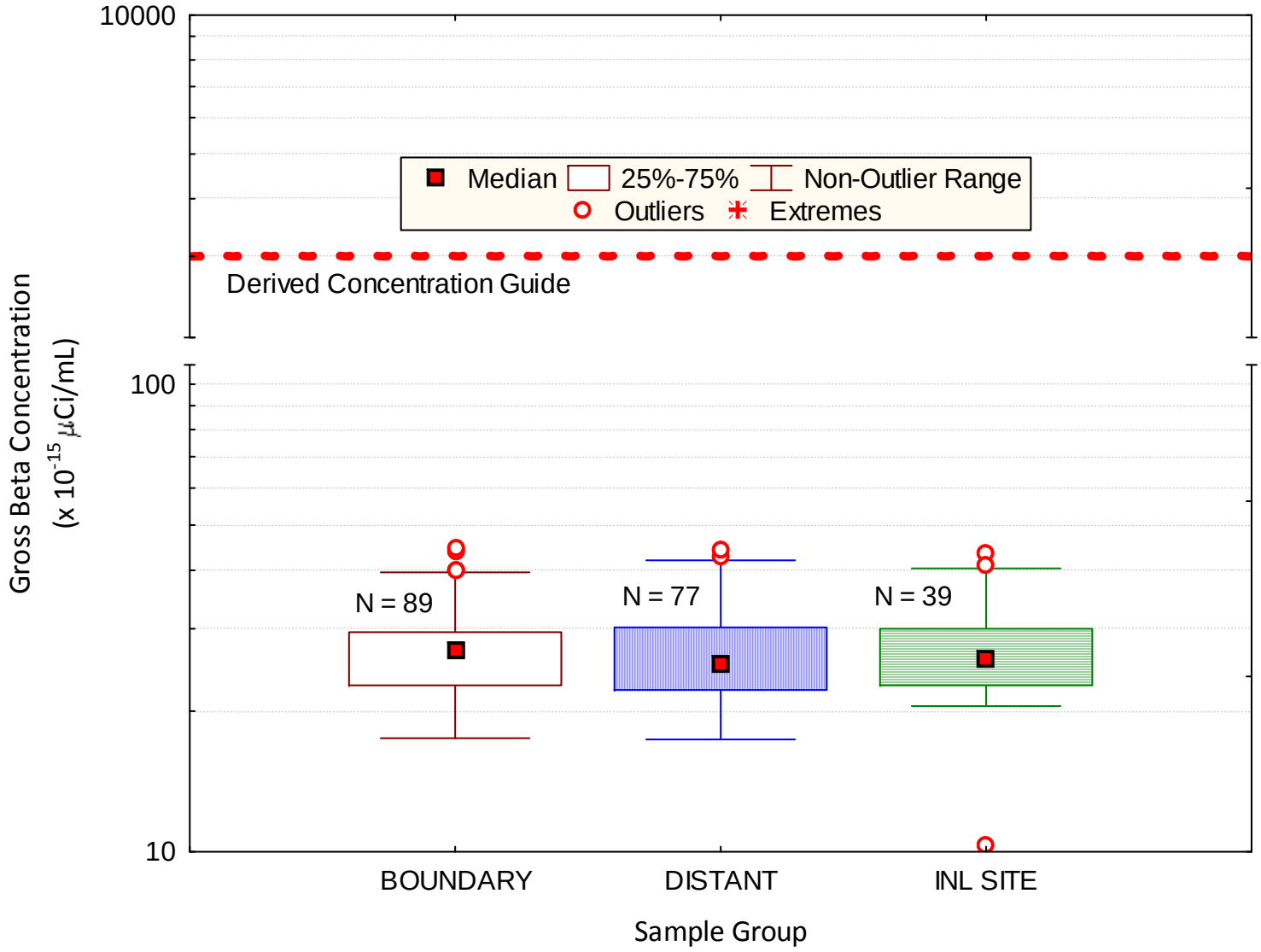



**Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations for the third quarter of 2010.**

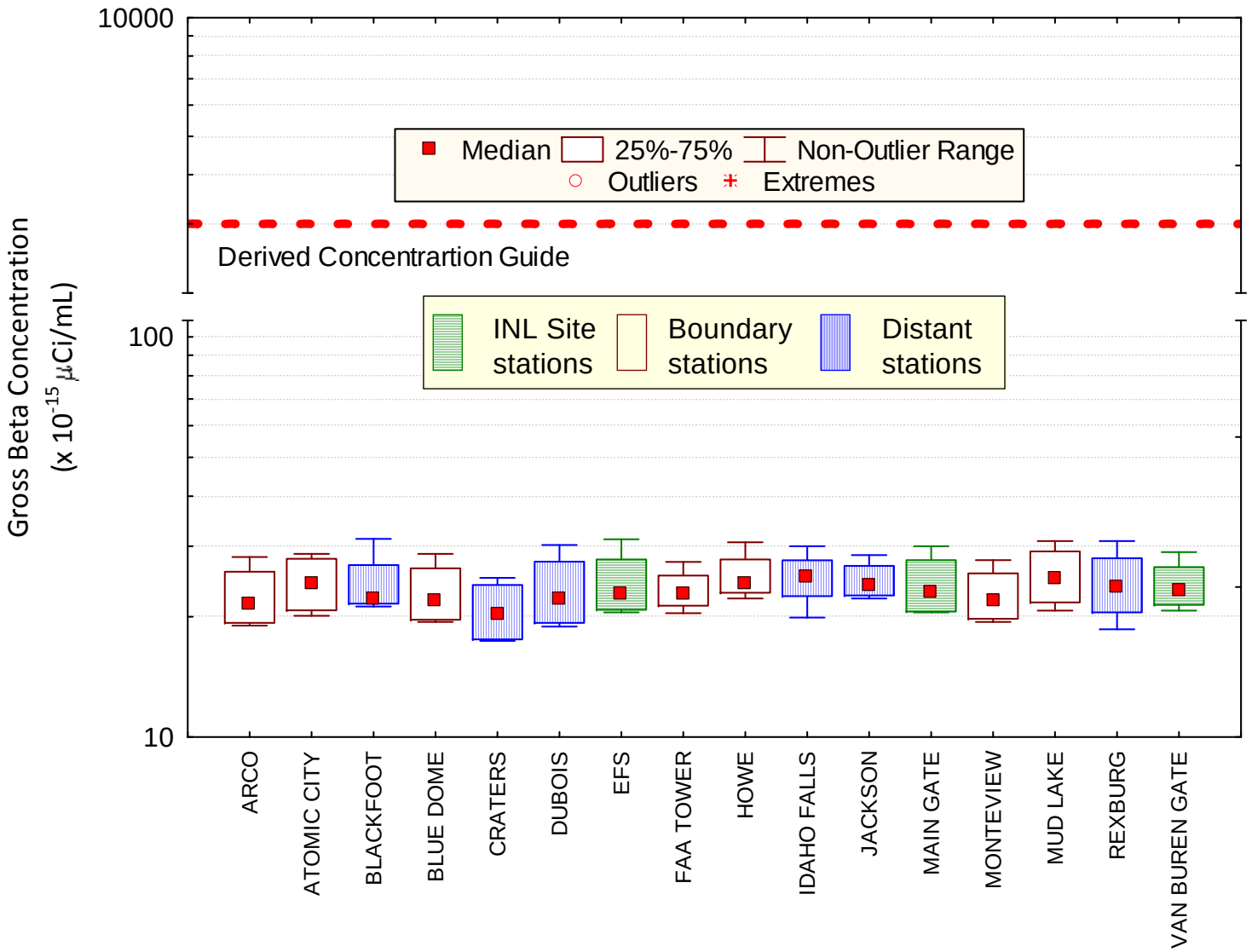



**Figure 8. July gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 4 at each location.**

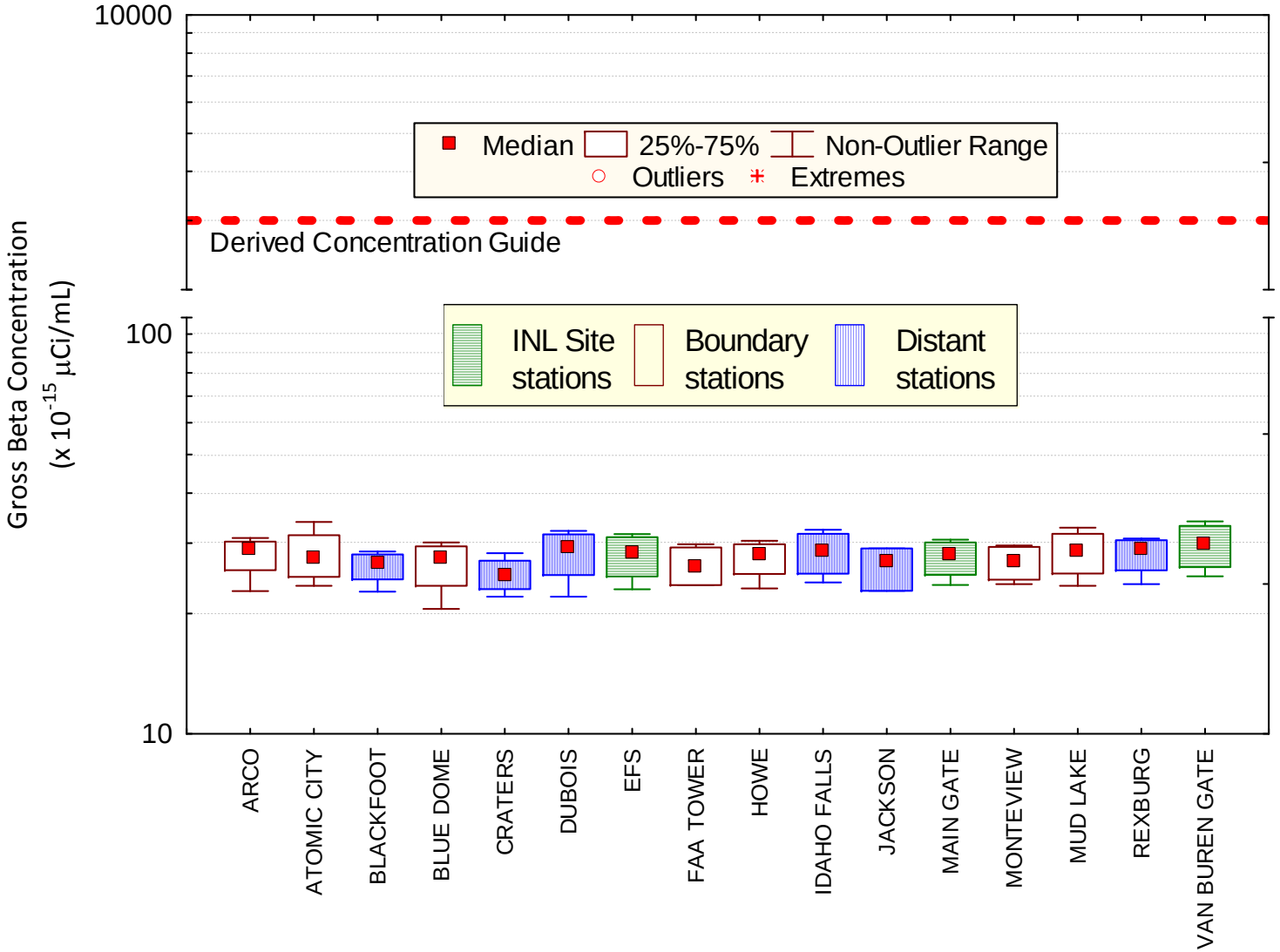



**Figure 9. August gross beta concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 4 at each location, except Jackson (N = 3).**

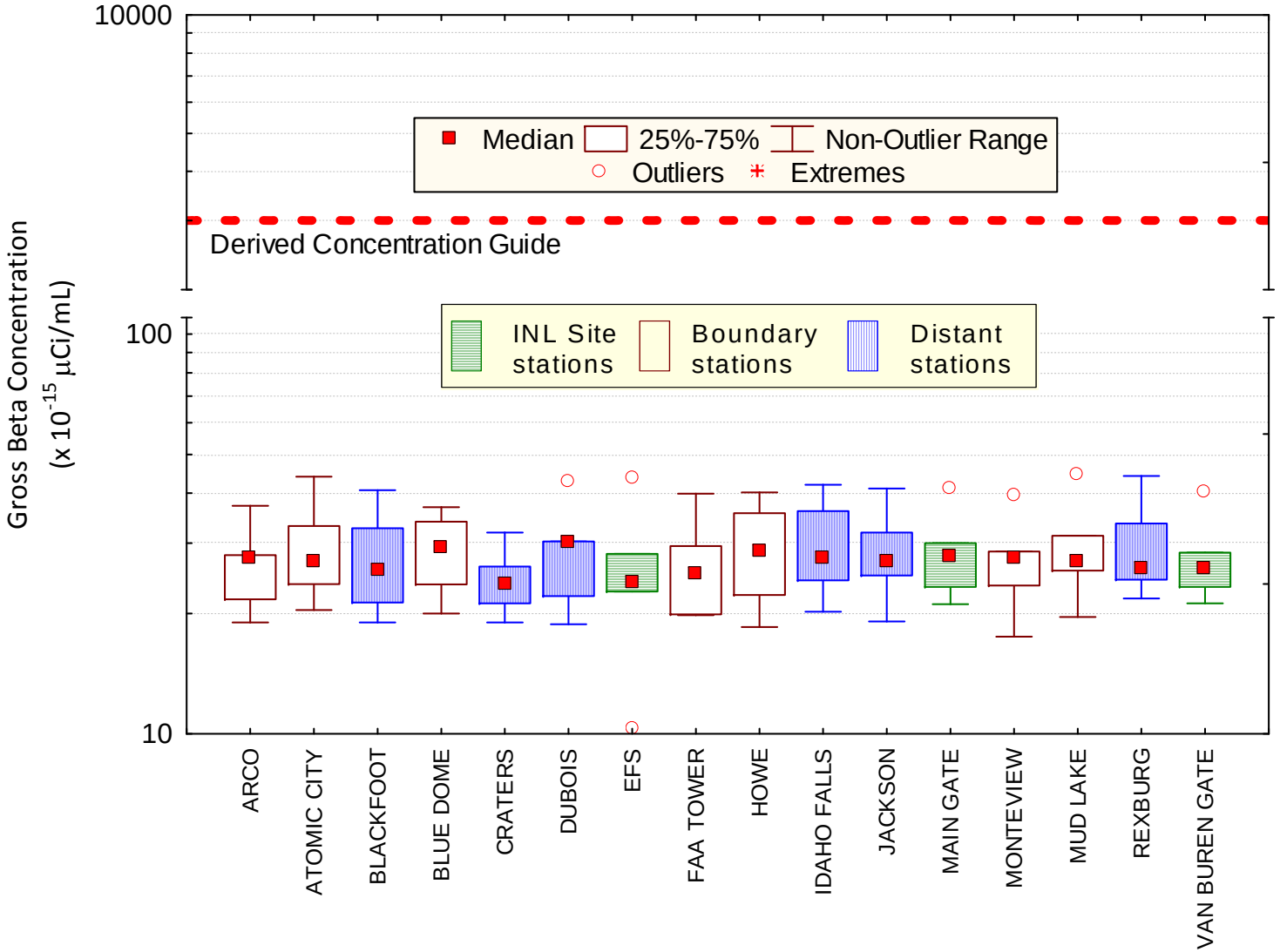



**Figure 10. September gross beta concentrations in air at ESER INL Site, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Blue Dome and Howe (N = 4).**

# 4. PRECIPITATION SAMPLING

### *PRECIPITATION SAMPLING*

Precipitation samples are gathered when sufficient precipitation occurs to allow for the collection of the minimum sample volume of approximately 50 mL. Samples are taken of monthly composites from Idaho Falls and CFA, and weekly from the EFS. Precipitation samples are analyzed for tritium. Storm events in the third quarter of 2010 produced sufficient precipitation to yield only eight samples; results were available for six of the samples.

Tritium was measured above the 3s values in two of the six samples for which results were available. 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. The EPA's RadNet program collects precipitation samples from across the United States. From 1980 to 2008, tritium measured in samples from Region 10 (which includes Idaho) averaged 117 pCi/L (EPA 2009). Data for all third quarter precipitation samples collected by the ESER Program were below this value (averaging 79 pCi/L) and are listed in Table C-5 (Appendix C).

# 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, grain and large game animal samples collected during the third quarter of 2010.

### *MILK SAMPLING*

Milk samples were collected weekly in Idaho Falls. Monthly samples were collected at six other locations around the INL Site (Figure 11) during the third quarter of 2010. In addition, commercially-available organic milk was purchased as a control sample. All samples were analyzed for gamma emitting radionuclides. No Iodine-131 or other gamma-emitting radionuclides were detected in any sample. Data for $^{131}I$ and $^{137}Cs$ in milk samples are listed in Appendix C, Table C-6.

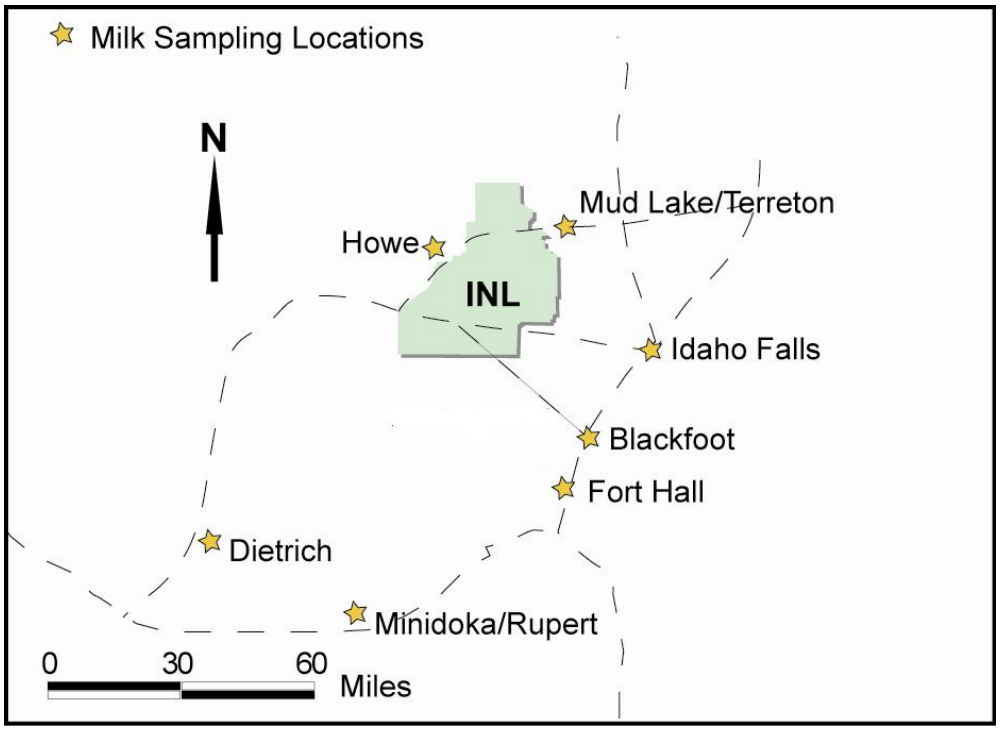



**Figure 11. ESER milk sampling locations.**

### *LETTUCE SAMPLING*

Lettuce sampling was completed during the third quarter but all final results were not available. These will be reported in the next quarterly report.

### *GRAIN SAMPLING*

Grain sampling (wheat and barley) was completed during the third quarter of 2010. A total of 13 grain samples (including one duplicate) were collected from local grain growers. In addition, a commercially-available sample was obtained from outside the local area. All samples were analyzed for gamma-emitting radionuclides and $^{90}Sr$. No manmade gamma-emitting radionuclides were detected in any grain sample. Strontium-90 was detected in six of the samples, including the control sample, within the range of historical concentrations. Data for $^{137}Cs$ and $^{90}Sr$ in all grain samples taken during the third quarter are listed in Appendix C, Table C-7.

### *LARGE GAME ANIMAL SAMPLING*

Three large game animals (all pronghorn) were available for sampling during the third quarter. Man-made radionuclides were not detected in any of the tissue samples collected. Results are presented in Appendix C, Table C-8.

# 6. QUALITY ASSURANCE

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

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

Data completeness for sample collection and delivery was 100 percent during the third quarter, with the following exceptions. There were three air samples that had volumes below the 7,000 $ft^3$ (200 $m^3$) threshold for a valid sample. Two were caused by pump failures and one by a blown fuse. Two milk samples were not collected. One was due to the cow being dry and the other was because the goats from the goat dairy were away at the fair.

Sample results are compared to criteria described in the Quality Assurance Project Plan for the INL Site Offsite Environmental Surveillance Program (Stoller 2007). The following table summarizes the results of the quality assurance program for the third quarter of 2010.

| QA Sample Type | Number of Sample Results | Number of Results Meeting Criteria | Percentage Meeting Criteria |
|---|---|---|---|
| Spikes/Laboratory Control Samples | 236 | 235 | 99.6 |
| Field Duplicates | 67 | 64 | 95.5 |
| Laboratory Splits | 29 | 29 | 100 |
| Recounts | 172 | 170 | 98.8 |
| Field Blanks | 68 | 66 | 97.1 |
| Method Uncertainty | 1691 | 1684 | 99.6 |

# 7. REFERENCES

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# APPENDIX A

## *SUMMARY OF SAMPLING SCHEDULE*

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

| Sample Type Analysis | Collection Frequency | LOCATIONS | | |
|---|---|---|---|---|
| | | Distant | Boundary | INL Site |
| **AIR SAMPLING** | | | | |
| *LOW-VOLUME AIR* | | | | |
| Gross Alpha, Gross Beta, $^{131}I$ | weekly | Blackfoot, Craters of the Moon, Dubois, Idaho Falls, Jackson WY, 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 |
| **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 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 DCGs*

**Table B-1. Summary of Approximate Minimum Detectable Concentrations for Radiological Analyses Performed During Third Quarter 2010**

| Sample Type | Analysis | Approximate Minimum Detectable Concentration[a] (MDC) | Derived Concentration Guide[b] (DCG) |
|---|---|---|---|
| **Air** (particulate filter)[e] | Gross alpha[c] | $5.32 \times 10^{-16}$ µCi/mL | $2 \times 10^{-14}$ µCi/mL |
| | Gross beta[d] | $1.39 \times 10^{-15}$ µCi/mL | $3 \times 10^{-12}$ µCi/mL |
| | Specific gamma ($^{137}$Cs) | $1.69 \times 10^{-16}$ µCi/mL | $4 \times 10^{-10}$ µCi/mL |
| | $^{238}$Pu | $1.77 \times 10^{-18}$ µCi/mL | $3 \times 10^{-14}$ µCi/mL |
| | $^{239/240}$Pu | $9.93 \times 10^{-19}$ µCi/mL | $2 \times 10^{-14}$ µCi/mL |
| | $^{241}$Am | $5.02 \times 10^{-18}$ µCi/mL | $2 \times 10^{-14}$ µCi/mL |
| | $^{90}$Sr | $4.77 \times 10^{-17}$ µCi/mL | $9 \times 10^{-12}$ µCi/mL |
| **Air** (charcoal cartridge)[e] | $^{131}$I | $1.58 \times 10^{-15}$ µCi/mL | $4 \times 10^{-10}$ µCi/mL |
| **Air** (atmospheric moisture) | $^{3}$H | 98.1 pCi/$L_{water}$ | $1 \times 10^{-7}$ µCi/$mL_{air}$ |
| **Air** (precipitation) | $^{3}$H | 102.8 pCi/L | $2 \times 10^{-3}$ µCi/mL |
| **Milk** | $^{131}$I | 0.63 pCi/L | -- |
| | $^{137}$Cs | 1.17 pCi/L | -- |
| **Wheat** | $^{137}$Cs | 1.70 pCi/kg | -- |
| | $^{90}$Sr | 11.0 pCi/kg | -- |

a The MDC is an estimate of the concentration of radioactivity in a given sample type that can be identified with a 95 percent level of confidence and precision of plus or minus 100 percent under a specified set of typical laboratory measurement conditions.

b DCGs, 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 DCG for gross alpha is equivalent to the DCGs for $^{239,240}$Pu and $^{241}$Am.

d The DCG for gross beta is equivalent to the DCGs 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 | 7/7/2010 | 0.90 ± 0.17 | 3.32 ± 0.61 | Y | 19.60 ± 0.64 | 72.52 ± 2.35 | Y |
| | 7/14/2010 | 1.20 ± 0.19 | 4.44 ± 0.71 | Y | 19.00 ± 0.54 | 70.30 ± 1.98 | Y |
| | 7/21/2010 | 1.16 ± 0.24 | 4.29 ± 0.88 | Y | 23.60 ± 0.85 | 87.32 ± 3.14 | Y |
| | 7/28/2010 | 1.12 ± 0.23 | 4.14 ± 0.85 | Y | 28.20 ± 0.87 | 104.34 ± 3.23 | Y |
| | 8/4/2010 | 1.22 ± 0.19 | 4.50 ± 0.72 | Y | 22.75 ± 0.60 | 84.17 ± 2.22 | Y |
| | 8/11/2010 | 1.99 ± 0.28 | 7.36 ± 1.02 | Y | 29.60 ± 0.90 | 109.52 ± 3.34 | Y |
| | 8/18/2010 | 0.91 ± 0.24 | 3.35 ± 0.88 | Y | 28.60 ± 0.89 | 105.82 ± 3.30 | Y |
| | 8/25/2010 | 1.56 ± 0.25 | 5.77 ± 0.94 | Y | 30.90 ± 0.93 | 114.33 ± 3.44 | Y |
| | 9/1/2010 | 1.55 ± 0.26 | 5.74 ± 0.98 | Y | 27.50 ± 0.90 | 101.75 ± 3.34 | Y |
| | 9/8/2010 | 0.87 ± 0.16 | 3.22 ± 0.58 | Y | 21.70 ± 0.62 | 80.29 ± 2.30 | Y |
| | 9/15/2010 | 0.89 ± 0.19 | 3.30 ± 0.68 | Y | 19.00 ± 0.53 | 70.30 ± 1.97 | Y |
| | 9/22/2010 | 0.92 ± 0.23 | 3.41 ± 0.86 | Y | 28.00 ± 0.86 | 103.60 ± 3.18 | Y |
| | 9/29/2010 | 1.53 ± 0.26 | 5.66 ± 0.97 | Y | 37.20 ± 0.98 | 137.64 ± 3.64 | Y |
| ATOMIC CITY | 7/7/2010 | 0.88 ± 0.14 | 3.26 ± 0.53 | Y | 21.40 ± 0.57 | 79.18 ± 2.12 | Y |
| | 7/14/2010 | 0.98 ± 0.19 | 3.61 ± 0.71 | Y | 20.10 ± 0.57 | 74.37 ± 2.09 | Y |
| | 7/21/2010 | 1.27 ± 0.23 | 4.70 ± 0.87 | Y | 27.10 ± 0.86 | 100.27 ± 3.17 | Y |
| | 7/28/2010 | 1.25 ± 0.23 | 4.63 ± 0.85 | Y | 28.70 ± 0.86 | 106.19 ± 3.19 | Y |
| | 8/4/2010 | 1.46 ± 0.19 | 5.40 ± 0.72 | Y | 23.47 ± 0.58 | 86.83 ± 2.13 | Y |
| | 8/11/2010 | 1.35 ± 0.24 | 5.00 ± 0.88 | Y | 28.90 ± 0.86 | 106.93 ± 3.18 | Y |
| | 8/18/2010 | 1.54 ± 0.25 | 5.70 ± 0.94 | Y | 25.90 ± 0.83 | 95.83 ± 3.07 | Y |
| | 8/25/2010 | 1.77 ± 0.25 | 6.55 ± 0.94 | Y | 33.90 ± 0.93 | 125.43 ± 3.42 | Y |
| | 9/1/2010 | 1.80 ± 0.25 | 6.66 ± 0.92 | Y | 26.90 ± 0.81 | 99.53 ± 3.01 | Y |
| | 9/8/2010 | 0.86 ± 0.16 | 3.16 ± 0.58 | Y | 23.70 ± 0.64 | 87.69 ± 2.38 | Y |
| | 9/15/2010 | 0.55 ± 0.15 | 2.03 ± 0.56 | Y | 20.40 ± 0.50 | 75.48 ± 1.84 | Y |
| | 9/22/2010 | 1.58 ± 0.25 | 5.85 ± 0.93 | Y | 33.10 ± 0.88 | 122.47 ± 3.26 | Y |
| | 9/29/2010 | 2.11 ± 0.26 | 7.81 ± 0.97 | Y | 44.00 ± 0.96 | 162.80 ± 3.57 | Y |
| BLUE DOME | 7/7/2010 | 0.82 ± 0.16 | 3.02 ± 0.58 | Y | 19.90 ± 0.63 | 73.63 ± 2.32 | Y |
| | 7/14/2010 | 0.82 ± 0.17 | 3.05 ± 0.63 | Y | 19.40 ± 0.52 | 71.78 ± 1.92 | Y |
| | 7/21/2010 | 0.76 ± 0.22 | 2.82 ± 0.81 | Y | 24.10 ± 0.86 | 89.17 ± 3.19 | Y |
| | 7/28/2010 | 1.22 ± 0.23 | 4.51 ± 0.84 | Y | 28.70 ± 0.85 | 106.19 ± 3.16 | Y |
| | 8/4/2010 | 0.88 ± 0.16 | 3.24 ± 0.60 | Y | 20.53 ± 0.53 | 75.95 ± 1.96 | Y |
| | 8/11/2010 | 1.35 ± 0.24 | 5.00 ± 0.87 | Y | 30.10 ± 0.86 | 111.37 ± 3.19 | Y |
| | 8/18/2010 | 0.61 ± 0.20 | 2.26 ± 0.74 | Y | 26.40 ± 0.80 | 97.68 ± 2.96 | Y |
| | 8/25/2010 | 1.96 ± 0.26 | 7.25 ± 0.97 | Y | 28.80 ± 0.88 | 106.56 ± 3.26 | Y |
| | 9/1/2010 | 1.67 ± 0.36 | 6.18 ± 1.33 | Y | 31.00 ± 1.23 | 114.70 ± 4.55 | Y |
| | 9/8/2010 | 0.83 ± 0.15 | 3.08 ± 0.55 | Y | 20.00 ± 0.58 | 74.00 ± 2.16 | Y |
| a | 9/15/2010 | -0.86 ± 0.76 | -3.16 ± 2.83 | | 16.80 ± 1.84 | 62.16 ± 6.81 | Y |
| | 9/22/2010 | 1.32 ± 0.23 | 4.88 ± 0.86 | Y | 27.30 ± 0.80 | 101.01 ± 2.95 | Y |
| | 9/29/2010 | 1.43 ± 0.24 | 5.29 ± 0.88 | Y | 36.90 ± 0.92 | 136.53 ± 3.40 | Y |
| FAA TOWER | 7/7/2010 | 0.75 ± 0.15 | 2.79 ± 0.55 | Y | 22.20 ± 0.63 | 82.14 ± 2.33 | Y |
| | 7/14/2010 | 1.50 ± 0.20 | 5.55 ± 0.75 | Y | 20.40 ± 0.54 | 75.48 ± 2.01 | Y |
| | 7/21/2010 | 1.12 ± 0.23 | 4.14 ± 0.84 | Y | 23.30 ± 0.82 | 86.21 ± 3.02 | Y |
| | 7/28/2010 | 1.50 ± 0.25 | 5.55 ± 0.92 | Y | 27.40 ± 0.87 | 101.38 ± 3.22 | Y |
| | 8/4/2010 | 1.43 ± 0.21 | 5.30 ± 0.77 | Y | 23.54 ± 0.62 | 87.09 ± 2.29 | Y |
| | 8/11/2010 | 1.72 ± 0.26 | 6.36 ± 0.97 | Y | 29.80 ± 0.89 | 110.26 ± 3.31 | Y |
| | 8/18/2010 | 1.38 ± 0.25 | 5.11 ± 0.94 | Y | 23.60 ± 0.83 | 87.32 ± 3.05 | Y |
| | 8/25/2010 | 1.71 ± 0.26 | 6.33 ± 0.97 | Y | 28.70 ± 0.91 | 106.19 ± 3.37 | Y |
| | 9/1/2010 | 1.26 ± 0.28 | 4.66 ± 1.04 | Y | 25.10 ± 0.98 | 92.87 ± 3.61 | Y |
| | 9/8/2010 | 0.61 ± 0.14 | 2.25 ± 0.51 | Y | 19.90 ± 0.59 | 73.63 ± 2.19 | Y |
| | 9/15/2010 | 1.17 ± 0.19 | 4.33 ± 0.69 | Y | 19.80 ± 0.52 | 73.26 ± 1.91 | Y |
| | 9/22/2010 | 1.32 ± 0.23 | 4.88 ± 0.87 | Y | 29.50 ± 0.82 | 109.15 ± 3.05 | Y |
| | 9/29/2010 | 1.97 ± 0.26 | 7.29 ± 0.95 | Y | 39.90 ± 0.94 | 147.63 ± 3.47 | Y |
| HOWE | 7/7/2010 | 0.91 ± 0.14 | 3.35 ± 0.52 | Y | 22.20 ± 0.57 | 82.14 ± 2.10 | Y |
| | 7/14/2010 | 1.24 ± 0.28 | 4.59 ± 1.05 | Y | 23.70 ± 0.80 | 87.69 ± 2.95 | Y |

**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 |
|---|---|---|---|---|---|---|---|
| | 7/21/2010 | 0.88 ± 0.21 | 3.26 ± 0.77 | Y | 24.90 ± 0.81 | 92.13 ± 2.98 | Y |
| | 7/28/2010 | 1.51 ± 0.24 | 5.59 ± 0.90 | Y | 30.70 ± 0.88 | 113.59 ± 3.27 | Y |
| | 8/4/2010 | 1.12 ± 0.16 | 4.15 ± 0.61 | Y | 23.11 ± 0.53 | 85.53 ± 1.95 | Y |
| | 8/11/2010 | 1.80 ± 0.26 | 6.66 ± 0.96 | Y | 30.40 ± 0.88 | 112.48 ± 3.26 | Y |
| | 8/18/2010 | 0.87 ± 0.20 | 3.20 ± 0.73 | Y | 27.10 ± 0.75 | 100.27 ± 2.79 | Y |
| | 8/25/2010 | 1.45 ± 0.26 | 5.37 ± 0.95 | Y | 29.20 ± 0.94 | 108.04 ± 3.47 | Y |
| a | 9/1/2010 | 2.47 ± 0.84 | 9.14 ± 3.09 | | 27.10 ± 2.47 | 100.27 ± 9.14 | Y |
| | 9/8/2010 | 1.15 ± 0.20 | 4.26 ± 0.75 | Y | 26.00 ± 0.79 | 96.20 ± 2.92 | Y |
| | 9/15/2010 | 1.69 ± 0.18 | 6.25 ± 0.68 | Y | 18.50 ± 0.46 | 68.45 ± 1.68 | Y |
| | 9/22/2010 | 1.47 ± 0.24 | 5.44 ± 0.89 | Y | 31.10 ± 0.84 | 115.07 ± 3.12 | Y |
| | 9/29/2010 | 1.59 ± 0.22 | 5.88 ± 0.83 | Y | 40.20 ± 0.87 | 148.74 ± 3.22 | Y |
| MONTEVIEW | 7/7/2010 | 1.09 ± 0.16 | 4.03 ± 0.60 | Y | 20.10 ± 0.59 | 74.37 ± 2.18 | Y |
| | 7/14/2010 | 1.33 ± 0.22 | 4.92 ± 0.82 | Y | 19.40 ± 0.59 | 71.78 ± 2.20 | Y |
| | 7/21/2010 | 1.19 ± 0.22 | 4.40 ± 0.81 | Y | 23.60 ± 0.78 | 87.32 ± 2.89 | Y |
| | 7/28/2010 | 1.24 ± 0.23 | 4.59 ± 0.85 | Y | 27.70 ± 0.85 | 102.49 ± 3.16 | Y |
| | 8/4/2010 | 1.57 ± 0.19 | 5.82 ± 0.71 | Y | 23.70 ± 0.56 | 87.69 ± 2.08 | Y |
| | 8/11/2010 | 1.97 ± 0.29 | 7.29 ± 1.09 | Y | 29.10 ± 0.95 | 107.67 ± 3.52 | Y |
| | 8/18/2010 | 1.63 ± 0.25 | 6.03 ± 0.94 | Y | 24.90 ± 0.81 | 92.13 ± 3.00 | Y |
| | 8/25/2010 | 1.84 ± 0.26 | 6.81 ± 0.95 | Y | 29.60 ± 0.89 | 109.52 ± 3.28 | Y |
| | 9/1/2010 | 1.32 ± 0.23 | 4.88 ± 0.85 | Y | 27.40 ± 0.82 | 101.38 ± 3.05 | Y |
| | 9/8/2010 | 1.22 ± 0.20 | 4.51 ± 0.73 | Y | 23.50 ± 0.72 | 86.95 ± 2.67 | Y |
| | 9/15/2010 | 0.62 ± 0.16 | 2.30 ± 0.58 | Y | 17.50 ± 0.48 | 64.75 ± 1.77 | Y |
| | 9/22/2010 | 1.48 ± 0.27 | 5.48 ± 0.98 | Y | 28.60 ± 0.89 | 105.82 ± 3.30 | Y |
| | 9/29/2010 | 2.32 ± 0.27 | 8.58 ± 1.00 | Y | 39.60 ± 0.93 | 146.52 ± 3.45 | Y |
| MUD LAKE | 7/7/2010 | 0.91 ± 0.15 | 3.36 ± 0.54 | Y | 22.70 ± 0.59 | 83.99 ± 2.17 | Y |
| | 7/14/2010 | 1.28 ± 0.19 | 4.74 ± 0.68 | Y | 20.70 ± 0.53 | 76.59 ± 1.94 | Y |
| | 7/21/2010 | 1.35 ± 0.23 | 5.00 ± 0.86 | Y | 27.30 ± 0.84 | 101.01 ± 3.12 | Y |
| | 7/28/2010 | 1.48 ± 0.25 | 5.48 ± 0.91 | Y | 30.90 ± 0.90 | 114.33 ± 3.32 | Y |
| | 8/4/2010 | 1.31 ± 0.19 | 4.84 ± 0.69 | Y | 23.46 ± 0.57 | 86.80 ± 2.13 | Y |
| | 8/11/2010 | 2.33 ± 0.31 | 8.62 ± 1.13 | Y | 32.80 ± 0.98 | 121.36 ± 3.63 | Y |
| | 8/18/2010 | 0.87 ± 0.22 | 3.21 ± 0.83 | Y | 26.90 ± 0.84 | 99.53 ± 3.10 | Y |
| | 8/25/2010 | 2.30 ± 0.30 | 8.51 ± 1.10 | Y | 30.50 ± 0.96 | 112.85 ± 3.54 | Y |
| | 9/1/2010 | 1.49 ± 0.23 | 5.51 ± 0.86 | Y | 26.90 ± 0.81 | 99.53 ± 2.99 | Y |
| | 9/8/2010 | 1.30 ± 0.18 | 4.81 ± 0.68 | Y | 25.60 ± 0.68 | 94.72 ± 2.53 | Y |
| | 9/15/2010 | 1.08 ± 0.17 | 4.00 ± 0.63 | Y | 19.60 ± 0.49 | 72.52 ± 1.80 | Y |
| | 9/22/2010 | 1.17 ± 0.23 | 4.33 ± 0.85 | Y | 31.30 ± 0.85 | 115.81 ± 3.14 | Y |
| | 9/29/2010 | 2.00 ± 0.26 | 7.40 ± 0.95 | Y | 44.50 ± 0.97 | 164.65 ± 3.59 | Y |
| **DISTANT** | | | | | | | |
| BLACKFOOT CMS | 7/7/2010 | 1.30 ± 0.21 | 4.81 ± 0.78 | Y | 21.90 ± 0.75 | 81.03 ± 2.79 | Y |
| | 7/14/2010 | 0.93 ± 0.25 | 3.43 ± 0.91 | Y | 21.20 ± 0.72 | 78.44 ± 2.65 | Y |
| | 7/21/2010 | 1.03 ± 0.26 | 3.81 ± 0.95 | Y | 22.50 ± 0.92 | 83.25 ± 3.40 | Y |
| | 7/28/2010 | 1.34 ± 0.28 | 4.96 ± 1.04 | Y | 31.30 ± 1.04 | 115.81 ± 3.85 | Y |
| | 8/4/2010 | 1.42 ± 0.19 | 5.24 ± 0.70 | Y | 22.68 ± 0.56 | 83.92 ± 2.08 | Y |
| | 8/11/2010 | 1.49 ± 0.25 | 5.51 ± 0.94 | Y | 28.60 ± 0.88 | 105.82 ± 3.27 | Y |
| | 8/18/2010 | 0.91 ± 0.22 | 3.35 ± 0.81 | Y | 26.00 ± 0.81 | 96.20 ± 3.00 | Y |
| | 8/25/2010 | 1.69 ± 0.26 | 6.25 ± 0.97 | Y | 27.60 ± 0.90 | 102.12 ± 3.34 | Y |
| | 9/1/2010 | 1.21 ± 0.23 | 4.48 ± 0.84 | Y | 25.80 ± 0.81 | 95.46 ± 3.01 | Y |
| | 9/8/2010 | 0.99 ± 0.16 | 3.65 ± 0.58 | Y | 21.30 ± 0.60 | 78.81 ± 2.23 | Y |
| | 9/15/2010 | 1.12 ± 0.18 | 4.14 ± 0.67 | Y | 19.00 ± 0.50 | 70.30 ± 1.85 | Y |
| | 9/22/2010 | 1.58 ± 0.25 | 5.85 ± 0.94 | Y | 32.70 ± 0.89 | 120.99 ± 3.28 | Y |
| | 9/29/2010 | 1.99 ± 0.26 | 7.36 ± 0.97 | Y | 40.70 ± 0.96 | 150.59 ± 3.54 | Y |
| CRATERS OF | 7/7/2010 | 0.61 ± 0.13 | 2.27 ± 0.49 | Y | 17.40 ± 0.56 | 64.38 ± 2.05 | Y |
| THE MOON | 7/14/2010 | 1.01 ± 0.18 | 3.74 ± 0.68 | Y | 17.70 ± 0.52 | 65.49 ± 1.91 | Y |
| | 7/21/2010 | 1.04 ± 0.23 | 3.85 ± 0.83 | Y | 23.00 ± 0.82 | 85.10 ± 3.04 | Y |
| | 7/28/2010 | 1.56 ± 0.24 | 5.77 ± 0.89 | Y | 25.00 ± 0.81 | 92.50 ± 3.01 | Y |
| | 8/4/2010 | 1.58 ± 0.21 | 5.86 ± 0.76 | Y | 22.04 ± 0.58 | 81.55 ± 2.15 | Y |

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

| Sampling Group and Location | Sampling Date | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | GROSS ALPHA Result > 3s | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | GROSS BETA Result > 3s |
|---|---|---|---|---|---|---|---|
| | 8/11/2010 | 2.27 ± 0.28 | 8.40 ± 1.02 | Y | 28.30 ± 0.85 | 104.71 ± 3.14 | Y |
| | 8/18/2010 | 0.79 ± 0.23 | 2.94 ± 0.83 | Y | 24.00 ± 0.82 | 88.80 ± 3.05 | Y |
| | 8/25/2010 | 1.61 ± 0.26 | 5.96 ± 0.95 | Y | 25.90 ± 0.88 | 95.83 ± 3.27 | Y |
| | 9/1/2010 | 1.40 ± 0.25 | 5.18 ± 0.91 | Y | 23.70 ± 0.82 | 87.69 ± 3.05 | Y |
| | 9/8/2010 | 0.48 ± 0.13 | 1.79 ± 0.49 | Y | 21.20 ± 0.62 | 78.44 ± 2.28 | Y |
| | 9/15/2010 | 1.27 ± 0.20 | 4.70 ± 0.75 | Y | 19.00 ± 0.54 | 70.30 ± 1.98 | Y |
| | 9/22/2010 | 1.43 ± 0.25 | 5.29 ± 0.91 | Y | 26.20 ± 0.82 | 96.94 ± 3.03 | Y |
| | 9/29/2010 | 1.30 ± 0.25 | 4.81 ± 0.94 | Y | 31.90 ± 0.94 | 118.03 ± 3.48 | Y |
| DUBOIS | 7/7/2010 | 0.77 ± 0.16 | 2.85 ± 0.58 | Y | 19.70 ± 0.63 | 72.89 ± 2.33 | Y |
| | 7/14/2010 | 0.98 ± 0.18 | 3.63 ± 0.68 | Y | 18.90 ± 0.53 | 69.93 ± 1.96 | Y |
| | 7/21/2010 | 1.44 ± 0.23 | 5.33 ± 0.85 | Y | 24.70 ± 0.79 | 91.39 ± 2.92 | Y |
| | 7/28/2010 | 0.91 ± 0.22 | 3.36 ± 0.83 | Y | 30.20 ± 0.91 | 111.74 ± 3.35 | Y |
| | 8/4/2010 | 1.12 ± 0.17 | 4.15 ± 0.65 | Y | 22.02 ± 0.55 | 81.49 ± 2.03 | Y |
| | 8/11/2010 | 1.86 ± 0.30 | 6.88 ± 1.10 | Y | 30.90 ± 0.99 | 114.33 ± 3.68 | Y |
| | 8/18/2010 | 1.39 ± 0.24 | 5.14 ± 0.88 | Y | 27.90 ± 0.82 | 103.23 ± 3.05 | Y |
| | 8/25/2010 | 2.39 ± 0.29 | 8.84 ± 1.07 | Y | 32.20 ± 0.95 | 119.14 ± 3.50 | Y |
| | 9/1/2010 | 1.36 ± 0.24 | 5.03 ± 0.88 | Y | 30.00 ± 0.87 | 111.00 ± 3.23 | Y |
| | 9/8/2010 | 1.06 ± 0.17 | 3.92 ± 0.63 | Y | 22.10 ± 0.64 | 81.77 ± 2.36 | Y |
| | 9/15/2010 | 1.13 ± 0.18 | 4.18 ± 0.68 | Y | 18.80 ± 0.51 | 69.56 ± 1.87 | Y |
| | 9/22/2010 | 1.47 ± 0.25 | 5.44 ± 0.93 | Y | 30.30 ± 0.86 | 112.11 ± 3.20 | Y |
| | 9/29/2010 | 2.27 ± 0.27 | 8.40 ± 1.00 | Y | 43.00 ± 0.97 | 159.10 ± 3.58 | Y |
| QA-2 | 7/7/2010 | 0.54 ± 0.15 | 1.98 ± 0.54 | Y | 21.00 ± 0.66 | 77.70 ± 2.46 | Y |
| (DUBOIS) | 7/14/2010 | 1.06 ± 0.19 | 3.92 ± 0.68 | Y | 19.00 ± 0.53 | 70.30 ± 1.96 | Y |
| | 7/21/2010 | 1.47 ± 0.24 | 5.44 ± 0.90 | Y | 23.80 ± 0.82 | 88.06 ± 3.04 | Y |
| | 7/28/2010 | 1.29 ± 0.24 | 4.77 ± 0.90 | Y | 29.10 ± 0.90 | 107.67 ± 3.34 | Y |
| | 8/4/2010 | 0.91 ± 0.17 | 3.38 ± 0.61 | Y | 21.04 ± 0.54 | 77.86 ± 2.00 | Y |
| | 8/11/2010 | 2.05 ± 0.27 | 7.59 ± 1.01 | Y | 29.70 ± 0.88 | 109.89 ± 3.25 | Y |
| | 8/18/2010 | 1.08 ± 0.24 | 4.00 ± 0.90 | Y | 25.10 ± 0.85 | 92.87 ± 3.14 | Y |
| | 8/25/2010 | 2.01 ± 0.26 | 7.44 ± 0.95 | Y | 29.30 ± 0.86 | 108.41 ± 3.17 | Y |
| | 9/1/2010 | 1.37 ± 0.25 | 5.07 ± 0.91 | Y | 26.90 ± 0.87 | 99.53 ± 3.20 | Y |
| | 9/8/2010 | 1.10 ± 0.16 | 4.07 ± 0.60 | Y | 23.40 ± 0.62 | 86.58 ± 2.29 | Y |
| | 9/15/2010 | 0.84 ± 0.17 | 3.11 ± 0.64 | Y | 17.90 ± 0.50 | 66.23 ± 1.84 | Y |
| | 9/22/2010 | 1.61 ± 0.25 | 5.96 ± 0.91 | Y | 29.40 ± 0.82 | 108.78 ± 3.05 | Y |
| | 9/29/2010 | 1.18 ± 0.23 | 4.37 ± 0.85 | Y | 39.30 ± 0.95 | 145.41 ± 3.50 | Y |
| IDAHO FALLS | 7/7/2010 | 1.61 ± 0.21 | 5.96 ± 0.78 | Y | 25.10 ± 0.73 | 92.87 ± 2.69 | Y |
| | 7/14/2010 | 1.23 ± 0.22 | 4.55 ± 0.81 | Y | 19.90 ± 0.61 | 73.63 ± 2.24 | Y |
| | 7/21/2010 | 1.25 ± 0.26 | 4.63 ± 0.94 | Y | 25.30 ± 0.91 | 93.61 ± 3.36 | Y |
| | 7/28/2010 | 1.60 ± 0.28 | 5.92 ± 1.02 | Y | 30.00 ± 0.98 | 111.00 ± 3.61 | Y |
| | 8/4/2010 | 1.26 ± 0.21 | 4.66 ± 0.77 | Y | 23.91 ± 0.64 | 88.48 ± 2.37 | Y |
| | 8/11/2010 | 1.50 ± 0.29 | 5.55 ± 1.05 | Y | 30.90 ± 1.00 | 114.33 ± 3.70 | Y |
| | 8/18/2010 | 1.23 ± 0.27 | 4.55 ± 0.99 | Y | 26.40 ± 0.92 | 97.68 ± 3.39 | Y |
| | 8/25/2010 | 2.63 ± 0.33 | 9.73 ± 1.23 | Y | 32.40 ± 1.05 | 119.88 ± 3.89 | Y |
| | 9/1/2010 | 1.26 ± 0.26 | 4.66 ± 0.97 | Y | 27.40 ± 0.94 | 101.38 ± 3.47 | Y |
| | 9/8/2010 | 1.51 ± 0.21 | 5.59 ± 0.78 | Y | 24.20 ± 0.73 | 89.54 ± 2.71 | Y |
| | 9/15/2010 | 0.82 ± 0.19 | 3.05 ± 0.71 | Y | 20.20 ± 0.57 | 74.74 ± 2.09 | Y |
| | 9/22/2010 | 1.93 ± 0.30 | 7.14 ± 1.10 | Y | 36.10 ± 1.00 | 133.57 ± 3.70 | Y |
| | 9/29/2010 | 2.08 ± 0.30 | 7.70 ± 1.11 | Y | 42.00 ± 1.07 | 155.40 ± 3.96 | Y |
| JACKSON | 7/7/2010 | 1.03 ± 0.19 | 3.81 ± 0.70 | Y | 22.20 ± 0.73 | 82.14 ± 2.70 | Y |
| | 7/14/2010 | 1.65 ± 0.25 | 6.11 ± 0.91 | Y | 23.00 ± 0.66 | 85.10 ± 2.43 | Y |
| | 7/21/2010 | 1.43 ± 0.27 | 5.29 ± 1.01 | Y | 25.10 ± 0.94 | 92.87 ± 3.47 | Y |
| | 7/28/2010 | 1.72 ± 0.30 | 6.36 ± 1.11 | Y | 28.50 ± 1.02 | 105.45 ± 3.77 | Y |
| | 8/4/2010 | 1.45 ± 0.23 | 5.37 ± 0.84 | Y | 22.80 ± 0.66 | 84.36 ± 2.42 | Y |
| a | 8/11/2010 | 2.85 ± 0.76 | 10.55 ± 2.81 | Y | 30.50 ± 2.22 | 112.85 ± 8.21 | Y |
| | 8/18/2010 | 1.32 ± 0.31 | 4.88 ± 1.13 | Y | 26.90 ± 1.02 | 99.53 ± 3.77 | Y |
| | 8/25/2010 | 1.57 ± 0.28 | 5.81 ± 1.02 | Y | 29.10 ± 0.98 | 107.67 ± 3.63 | Y |
| | 9/1/2010 | 1.43 ± 0.28 | 5.29 ± 1.04 | Y | 26.90 ± 0.97 | 99.53 ± 3.59 | Y |

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

| Sampling Group and Location | Sampling Date | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | GROSS ALPHA Result > 3s | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | GROSS BETA Result > 3s |
|---|---|---|---|---|---|---|---|
| | 9/8/2010 | 1.02 ± 0.20 | 3.77 ± 0.74 | Y | 24.90 ± 0.79 | 92.13 ± 2.91 | Y |
| | 9/15/2010 | 0.69 ± 0.18 | 2.55 ± 0.66 | Y | 19.10 ± 0.54 | 70.67 ± 1.98 | Y |
| | 9/22/2010 | 1.96 ± 0.30 | 7.25 ± 1.12 | Y | 31.90 ± 0.98 | 118.03 ± 3.63 | Y |
| | 9/29/2010 | 2.47 ± 0.32 | 9.14 ± 1.18 | Y | 41.10 ± 1.08 | 152.07 ± 4.00 | Y |
| REXBURG CMS | 7/7/2010 | 1.12 ± 0.17 | 4.14 ± 0.63 | Y | 22.40 ± 0.64 | 82.88 ± 2.35 | Y |
| | 7/14/2010 | 0.91 ± 0.19 | 3.36 ± 0.71 | Y | 18.60 ± 0.56 | 68.82 ± 2.08 | Y |
| | 7/21/2010 | 1.06 ± 0.24 | 3.92 ± 0.88 | Y | 25.10 ± 0.88 | 92.87 ± 3.27 | Y |
| | 7/28/2010 | 1.42 ± 0.24 | 5.25 ± 0.88 | Y | 30.90 ± 0.88 | 114.33 ± 3.24 | Y |
| | 8/4/2010 | 1.13 ± 0.19 | 4.19 ± 0.69 | Y | 23.70 ± 0.60 | 87.69 ± 2.21 | Y |
| | 8/11/2010 | 1.60 ± 0.26 | 5.92 ± 0.94 | Y | 30.20 ± 0.89 | 111.74 ± 3.29 | Y |
| | 8/18/2010 | 1.53 ± 0.25 | 5.66 ± 0.93 | Y | 27.60 ± 0.84 | 102.12 ± 3.10 | Y |
| | 8/25/2010 | 2.02 ± 0.26 | 7.47 ± 0.95 | Y | 30.80 ± 0.88 | 113.96 ± 3.24 | Y |
| | 9/1/2010 | 1.95 ± 0.27 | 7.22 ± 0.98 | Y | 25.90 ± 0.84 | 95.83 ± 3.10 | Y |
| | 9/8/2010 | 1.28 ± 0.18 | 4.74 ± 0.67 | Y | 24.30 ± 0.66 | 89.91 ± 2.43 | Y |
| | 9/15/2010 | 3.28 ± 0.27 | 12.14 ± 0.99 | Y | 21.80 ± 0.56 | 80.66 ± 2.08 | Y |
| | 9/22/2010 | 1.32 ± 0.25 | 4.88 ± 0.92 | Y | 33.60 ± 0.91 | 124.32 ± 3.37 | Y |
| | 9/29/2010 | 2.13 ± 0.28 | 7.88 ± 1.04 | Y | 44.20 ± 1.03 | 163.54 ± 3.81 | Y |
| **INL SITE** | | | | | | | |
| EFS | 7/7/2010 | 0.63 ± 0.16 | 2.33 ± 0.58 | Y | 20.50 ± 0.67 | 75.85 ± 2.49 | Y |
| | 7/14/2010 | 1.14 ± 0.20 | 4.22 ± 0.75 | Y | 21.10 ± 0.59 | 78.07 ± 2.17 | Y |
| | 7/21/2010 | 0.92 ± 0.20 | 3.41 ± 0.73 | Y | 24.40 ± 0.76 | 90.28 ± 2.82 | Y |
| | 7/28/2010 | 1.73 ± 0.29 | 6.40 ± 1.07 | Y | 31.20 ± 1.00 | 115.44 ± 3.70 | Y |
| | 8/4/2010 | 1.41 ± 0.21 | 5.20 ± 0.77 | Y | 23.00 ± 0.61 | 85.11 ± 2.27 | Y |
| | 8/11/2010 | 1.81 ± 0.31 | 6.70 ± 1.15 | Y | 30.50 ± 1.04 | 112.85 ± 3.85 | Y |
| | 8/18/2010 | 0.71 ± 0.23 | 2.61 ± 0.85 | Y | 26.50 ± 0.88 | 98.05 ± 3.25 | Y |
| | 8/25/2010 | 1.83 ± 0.27 | 6.77 ± 0.98 | Y | 31.60 ± 0.94 | 116.92 ± 3.46 | Y |
| | 9/1/2010 | 0.52 ± 0.15 | 1.91 ± 0.56 | Y | 10.30 ± 0.51 | 38.11 ± 1.89 | Y |
| | 9/8/2010 | 0.57 ± 0.15 | 2.11 ± 0.57 | Y | 22.70 ± 0.69 | 83.99 ± 2.56 | Y |
| | 9/15/2010 | 2.74 ± 0.25 | 10.14 ± 0.92 | Y | 23.90 ± 0.58 | 88.43 ± 2.13 | Y |
| | 9/22/2010 | 1.53 ± 0.23 | 5.66 ± 0.87 | Y | 28.20 ± 0.79 | 104.34 ± 2.92 | Y |
| | 9/29/2010 | 1.83 ± 0.27 | 6.77 ± 0.98 | Y | 43.60 ± 1.01 | 161.32 ± 3.74 | Y |
| MAIN GATE | 7/7/2010 | 0.86 ± 0.15 | 3.17 ± 0.56 | Y | 20.50 ± 0.60 | 75.85 ± 2.22 | Y |
| | 7/14/2010 | 0.97 ± 0.19 | 3.60 ± 0.70 | Y | 20.70 ± 0.57 | 76.59 ± 2.10 | Y |
| | 7/21/2010 | 1.11 ± 0.22 | 4.11 ± 0.83 | Y | 25.40 ± 0.83 | 93.98 ± 3.07 | Y |
| | 7/28/2010 | 1.33 ± 0.24 | 4.92 ± 0.88 | Y | 30.00 ± 0.88 | 111.00 ± 3.27 | Y |
| | 8/4/2010 | 1.14 ± 0.18 | 4.21 ± 0.66 | Y | 23.57 ± 0.57 | 87.22 ± 2.12 | Y |
| | 8/11/2010 | 1.80 ± 0.27 | 6.66 ± 0.98 | Y | 29.60 ± 0.89 | 109.52 ± 3.29 | Y |
| | 8/18/2010 | 1.21 ± 0.24 | 4.48 ± 0.88 | Y | 26.40 ± 0.83 | 97.68 ± 3.08 | Y |
| | 8/25/2010 | 2.05 ± 0.28 | 7.59 ± 1.03 | Y | 30.60 ± 0.94 | 113.22 ± 3.47 | Y |
| | 9/1/2010 | 1.16 ± 0.23 | 4.29 ± 0.84 | Y | 27.80 ± 0.84 | 102.86 ± 3.12 | Y |
| | 9/8/2010 | 0.86 ± 0.16 | 3.18 ± 0.58 | Y | 23.30 ± 0.64 | 86.21 ± 2.37 | Y |
| | 9/15/2010 | 1.89 ± 0.22 | 6.99 ± 0.82 | Y | 21.10 ± 0.55 | 78.07 ± 2.04 | Y |
| | 9/22/2010 | 1.37 ± 0.25 | 5.07 ± 0.91 | Y | 30.00 ± 0.86 | 111.00 ± 3.19 | Y |
| | 9/29/2010 | 1.91 ± 0.28 | 7.07 ± 1.03 | Y | 41.00 ± 1.02 | 151.70 ± 3.77 | Y |
| VAN BUREN GATE | 7/7/2010 | 0.90 ± 0.15 | 3.34 ± 0.54 | Y | 22.10 ± 0.59 | 81.77 ± 2.20 | Y |
| | 7/14/2010 | 1.32 ± 0.21 | 4.88 ± 0.79 | Y | 20.70 ± 0.59 | 76.59 ± 2.18 | Y |
| | 7/21/2010 | 1.07 ± 0.23 | 3.96 ± 0.85 | Y | 24.20 ± 0.85 | 89.54 ± 3.13 | Y |
| | 7/28/2010 | 1.50 ± 0.23 | 5.55 ± 0.84 | Y | 29.00 ± 0.81 | 107.30 ± 3.00 | Y |
| | 8/4/2010 | 1.41 ± 0.21 | 5.20 ± 0.78 | Y | 24.78 ± 0.64 | 91.67 ± 2.36 | Y |
| | 8/11/2010 | 1.61 ± 0.26 | 5.96 ± 0.97 | Y | 32.30 ± 0.93 | 119.51 ± 3.43 | Y |
| | 8/18/2010 | 1.35 ± 0.25 | 5.00 ± 0.92 | Y | 27.50 ± 0.85 | 101.75 ± 3.15 | Y |
| | 8/25/2010 | 2.22 ± 0.29 | 8.21 ± 1.08 | Y | 34.00 ± 0.99 | 125.80 ± 3.66 | Y |
| | 9/1/2010 | 1.63 ± 0.26 | 6.03 ± 0.97 | Y | 25.90 ± 0.87 | 95.83 ± 3.22 | Y |
| | 9/8/2010 | 0.75 ± 0.15 | 2.79 ± 0.55 | Y | 23.30 ± 0.64 | 86.21 ± 2.36 | Y |
| | 9/15/2010 | 0.69 ± 0.16 | 2.55 ± 0.60 | Y | 21.20 ± 0.52 | 78.44 ± 1.91 | Y |
| | 9/22/2010 | 1.26 ± 0.22 | 4.66 ± 0.82 | Y | 28.40 ± 0.78 | 105.08 ± 2.90 | Y |

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

| Sampling Group and Location | Sampling Date | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | | | GROSS ALPHA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | | | GROSS ALPHA Result > 3s | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL) | | | GROSS BETA Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL) | | | GROSS BETA Result > 3s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9/29/2010 | 1.87 | ± | 0.25 | 6.92 | ± | 0.94 | Y | 40.40 | ± | 0.94 | 149.48 | ± | 3.47 | Y |
| QA-1 (VAN BUREN) | 7/7/2010 | 0.91 | ± | 0.15 | 3.36 | ± | 0.54 | Y | 21.90 | ± | 0.58 | 81.03 | ± | 2.16 | Y |
| | 7/14/2010 | 0.92 | ± | 0.17 | 3.42 | ± | 0.62 | Y | 19.90 | ± | 0.51 | 73.63 | ± | 1.88 | Y |
| | 7/21/2010 | 1.26 | ± | 0.21 | 4.66 | ± | 0.77 | Y | 25.30 | ± | 0.76 | 93.61 | ± | 2.80 | Y |
| | 7/28/2010 | 1.19 | ± | 0.21 | 4.40 | ± | 0.79 | Y | 28.40 | ± | 0.81 | 105.08 | ± | 2.99 | Y |
| | 8/4/2010 | 0.85 | ± | 0.17 | 3.13 | ± | 0.63 | Y | 24.22 | ± | 0.59 | 89.62 | ± | 2.18 | Y |
| | 8/11/2010 | 2.08 | ± | 0.28 | 7.70 | ± | 1.03 | Y | 30.50 | ± | 0.90 | 112.85 | ± | 3.34 | Y |
| | 8/18/2010 | 1.20 | ± | 0.23 | 4.44 | ± | 0.85 | Y | 26.50 | ± | 0.81 | 98.05 | ± | 2.98 | Y |
| | 8/25/2010 | 2.42 | ± | 0.33 | 8.95 | ± | 1.20 | Y | 36.00 | ± | 1.09 | 133.20 | ± | 4.03 | Y |
| | 9/1/2010 | 1.33 | ± | 0.25 | 4.92 | ± | 0.93 | Y | 24.20 | ± | 0.86 | 89.54 | ± | 3.16 | Y |
| | 9/8/2010 | 0.75 | ± | 0.14 | 2.77 | ± | 0.50 | Y | 23.00 | ± | 0.58 | 85.10 | ± | 2.16 | Y |
| | 9/15/2010 | 2.89 | ± | 0.23 | 10.69 | ± | 0.85 | Y | 22.00 | ± | 0.51 | 81.40 | ± | 1.89 | Y |
| | 9/22/2010 | 1.05 | ± | 0.23 | 3.89 | ± | 0.85 | Y | 28.30 | ± | 0.84 | 104.71 | ± | 3.09 | Y |
| | 9/29/2010 | 2.06 | ± | 0.25 | 7.62 | ± | 0.92 | Y | 41.50 | ± | 0.91 | 153.55 | ± | 3.35 | Y |

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 | 07/07/2010 | 1.93 | ± | 1.29 | 7.12 | ± | 4.78 | |
| | 07/14/2010 | -1.35 | ± | 1.11 | -4.99 | ± | 4.09 | |
| | 07/21/2010 | 0.61 | ± | 1.24 | 2.26 | ± | 4.59 | |
| | 07/28/2010 | -0.15 | ± | 1.16 | -0.57 | ± | 4.29 | |
| | 08/04/2010 | -0.01 | ± | 1.29 | -0.05 | ± | 4.76 | |
| | 08/11/2010 | -0.22 | ± | 1.12 | -0.82 | ± | 4.14 | |
| | 08/18/2010 | 1.75 | ± | 1.13 | 6.47 | ± | 4.16 | |
| | 08/25/2010 | -0.02 | ± | 1.28 | -0.07 | ± | 4.75 | |
| | 09/01/2010 | 2.97 | ± | 1.32 | 11.00 | ± | 4.87 | |
| | 09/08/2010 | -1.32 | ± | 1.11 | -4.87 | ± | 4.10 | |
| | 09/15/2010 | 0.50 | ± | 1.26 | 1.86 | ± | 4.66 | |
| | 09/22/2010 | -1.17 | ± | 1.20 | -4.32 | ± | 4.43 | |
| | 09/29/2010 | 2.14 | ± | 1.31 | 7.92 | ± | 4.84 | |
| ATOMIC CITY | 07/07/2010 | 1.53 | ± | 1.03 | 5.66 | ± | 3.80 | |
| | 07/14/2010 | -1.42 | ± | 1.17 | -5.26 | ± | 4.32 | |
| | 07/21/2010 | 0.58 | ± | 1.18 | 2.14 | ± | 4.35 | |
| | 07/28/2010 | -0.15 | ± | 1.12 | -0.55 | ± | 4.16 | |
| | 08/04/2010 | -0.01 | ± | 1.17 | -0.05 | ± | 4.32 | |
| | 08/11/2010 | -0.22 | ± | 1.13 | -0.82 | ± | 4.19 | |
| | 08/18/2010 | 1.91 | ± | 1.23 | 7.08 | ± | 4.55 | |
| | 08/25/2010 | -0.02 | ± | 1.21 | -0.07 | ± | 4.48 | |
| | 09/01/2010 | 2.56 | ± | 1.13 | 9.47 | ± | 4.19 | |
| | 09/08/2010 | -1.32 | ± | 1.11 | -4.87 | ± | 4.10 | |
| | 09/15/2010 | 0.42 | ± | 1.06 | 1.57 | ± | 3.93 | |
| | 09/22/2010 | -1.10 | ± | 1.13 | -4.08 | ± | 4.19 | |
| | 09/29/2010 | 1.86 | ± | 1.13 | 6.87 | ± | 4.20 | |
| BLUE DOME | 07/07/2010 | -1.58 | ± | 1.14 | -5.83 | ± | 4.24 | |
| | 07/14/2010 | -0.09 | ± | 0.98 | -0.32 | ± | 3.62 | |
| | 07/21/2010 | -1.21 | ± | 1.17 | -4.49 | ± | 4.31 | |
| | 07/28/2010 | -2.34 | ± | 1.02 | -8.65 | ± | 3.76 | |
| | 08/04/2010 | 1.65 | ± | 1.03 | 6.12 | ± | 3.83 | |
| | 08/11/2010 | 0.58 | ± | 1.22 | 2.16 | ± | 4.50 | |
| | 08/18/2010 | 0.31 | ± | 1.06 | 1.16 | ± | 3.94 | |
| | 08/25/2010 | 1.99 | ± | 1.12 | 7.38 | ± | 4.14 | |
| | 09/01/2010 | -0.27 | ± | 1.70 | -1.00 | ± | 6.30 | |
| | 09/08/2010 | 0.13 | ± | 1.00 | 0.48 | ± | 3.69 | |
| a | 09/15/2010 | -5.51 | ± | 6.99 | -20.38 | ± | 25.88 | |
| | 09/22/2010 | 0.48 | ± | 1.01 | 1.79 | ± | 3.72 | |
| | 09/29/2010 | -0.07 | ± | 1.07 | -0.26 | ± | 3.96 | |
| FAA TOWER | 07/07/2010 | -1.47 | ± | 1.07 | -5.46 | ± | 3.96 | |
| | 07/14/2010 | -0.09 | ± | 1.01 | -0.33 | ± | 3.73 | |
| | 07/21/2010 | -1.13 | ± | 1.09 | -4.20 | ± | 4.03 | |
| | 07/28/2010 | -2.48 | ± | 1.08 | -9.16 | ± | 3.99 | |
| | 08/04/2010 | 1.96 | ± | 1.23 | 7.26 | ± | 4.54 | |
| | 08/11/2010 | 0.52 | ± | 1.08 | 1.93 | ± | 4.01 | |
| | 08/18/2010 | 0.33 | ± | 1.13 | 1.23 | ± | 4.17 | |
| | 08/25/2010 | 2.11 | ± | 1.18 | 7.80 | ± | 4.37 | |
| | 09/01/2010 | -0.21 | ± | 1.35 | -0.79 | ± | 4.99 | |
| | 09/08/2010 | 0.13 | ± | 1.02 | 0.50 | ± | 3.79 | |
| | 09/15/2010 | -0.80 | ± | 1.02 | -2.97 | ± | 3.77 | |

## 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** | | | | | | | | |
| | 09/22/2010 | 0.49 | ± | 1.01 | 1.81 | ± | 3.75 | |
| | 09/29/2010 | -0.07 | ± | 1.05 | -0.26 | ± | 3.90 | |
| HOWE | 07/07/2010 | -1.23 | ± | 0.90 | -4.57 | ± | 3.32 | |
| | 07/14/2010 | -0.16 | ± | 1.73 | -0.57 | ± | 6.41 | |
| | 07/21/2010 | -1.08 | ± | 1.03 | -3.98 | ± | 3.82 | |
| | 07/28/2010 | -2.38 | ± | 1.04 | -8.81 | ± | 3.83 | |
| | 08/04/2010 | 1.51 | ± | 0.94 | 5.57 | ± | 3.49 | |
| | 08/11/2010 | 0.49 | ± | 1.02 | 1.82 | ± | 3.79 | |
| | 08/18/2010 | 0.30 | ± | 1.02 | 1.11 | ± | 3.76 | |
| | 08/25/2010 | 2.19 | ± | 1.23 | 8.10 | ± | 4.54 | |
| a | 09/01/2010 | -0.72 | ± | 4.53 | -2.67 | ± | 16.78 | |
| | 09/08/2010 | 0.18 | ± | 1.38 | 0.67 | ± | 5.12 | |
| | 09/15/2010 | -0.68 | ± | 0.86 | -2.50 | ± | 3.17 | |
| | 09/22/2010 | 0.49 | ± | 1.02 | 1.82 | ± | 3.77 | |
| | 09/29/2010 | -0.06 | ± | 0.93 | -0.22 | ± | 3.43 | |
| MONTEVIEW | 07/07/2010 | -1.41 | ± | 1.03 | -5.23 | ± | 3.80 | |
| | 07/14/2010 | -0.11 | ± | 1.22 | -0.40 | ± | 4.50 | |
| | 07/21/2010 | -1.05 | ± | 1.01 | -3.90 | ± | 3.75 | |
| | 07/28/2010 | -2.38 | ± | 1.04 | -8.82 | ± | 3.84 | |
| | 08/04/2010 | 1.64 | ± | 1.03 | 6.06 | ± | 3.80 | |
| | 08/11/2010 | 0.51 | ± | 1.07 | 1.89 | ± | 3.94 | |
| | 08/18/2010 | 0.34 | ± | 1.14 | 1.25 | ± | 4.23 | |
| | 08/25/2010 | 1.98 | ± | 1.11 | 7.34 | ± | 4.12 | |
| | 09/01/2010 | -0.16 | ± | 1.00 | -0.59 | ± | 3.68 | |
| | 09/08/2010 | 0.17 | ± | 1.27 | 0.62 | ± | 4.72 | |
| | 09/15/2010 | -0.77 | ± | 0.98 | -2.85 | ± | 3.63 | |
| | 09/22/2010 | 0.56 | ± | 1.16 | 2.08 | ± | 4.30 | |
| | 09/29/2010 | -0.07 | ± | 1.05 | -0.25 | ± | 3.89 | |
| MUD LAKE | 07/07/2010 | -1.29 | ± | 0.94 | -4.78 | ± | 3.47 | |
| | 07/14/2010 | -0.08 | ± | 0.94 | -0.31 | ± | 3.49 | |
| | 07/21/2010 | -1.10 | ± | 1.05 | -4.06 | ± | 3.90 | |
| | 07/28/2010 | -2.43 | ± | 1.06 | -8.98 | ± | 3.91 | |
| | 08/04/2010 | 1.73 | ± | 1.08 | 6.39 | ± | 4.00 | |
| | 08/11/2010 | 0.51 | ± | 1.05 | 1.87 | ± | 3.89 | |
| | 08/18/2010 | 0.27 | ± | 0.91 | 0.99 | ± | 3.37 | |
| | 08/25/2010 | 2.20 | ± | 1.24 | 8.16 | ± | 4.57 | |
| | 09/01/2010 | -0.15 | ± | 0.97 | -0.57 | ± | 3.60 | |
| | 09/08/2010 | 0.14 | ± | 1.09 | 0.53 | ± | 4.05 | |
| | 09/15/2010 | -0.73 | ± | 0.93 | -2.72 | ± | 3.45 | |
| | 09/22/2010 | 0.49 | ± | 1.02 | 1.83 | ± | 3.79 | |
| | 09/29/2010 | -0.07 | ± | 1.04 | -0.25 | ± | 3.83 | |
| **DISTANT** | | | | | | | | |
| BLACKFOOT CMS | 07/07/2010 | 2.36 | ± | 1.59 | 8.75 | ± | 5.87 | |
| | 07/14/2010 | -2.03 | ± | 1.67 | -7.52 | ± | 6.16 | |
| | 07/21/2010 | 0.70 | ± | 1.43 | 2.60 | ± | 5.30 | |
| | 07/28/2010 | -0.19 | ± | 1.44 | -0.70 | ± | 5.32 | |
| | 08/04/2010 | -0.01 | ± | 1.14 | -0.05 | ± | 4.23 | |
| | 08/11/2010 | -0.23 | ± | 1.19 | -0.86 | ± | 4.39 | |
| | 08/18/2010 | 1.85 | ± | 1.19 | 6.85 | ± | 4.41 | |
| | 08/25/2010 | -0.02 | ± | 1.31 | -0.07 | ± | 4.84 | |

## 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** | | | | | | | | |
| | 09/01/2010 | 2.62 | ± | 1.16 | 9.69 | ± | 4.29 | |
| | 09/08/2010 | -1.27 | ± | 1.07 | -4.71 | ± | 3.96 | |
| | 09/15/2010 | 0.45 | ± | 1.13 | 1.67 | ± | 4.19 | |
| | 09/22/2010 | -1.12 | ± | 1.15 | -4.14 | ± | 4.24 | |
| | 09/29/2010 | 1.93 | ± | 1.18 | 7.16 | ± | 4.37 | |
| CRATERS | 07/07/2010 | 1.67 | ± | 1.12 | 6.18 | ± | 4.15 | |
| | 07/14/2010 | -1.33 | ± | 1.09 | -4.94 | ± | 4.05 | |
| | 07/21/2010 | 0.59 | ± | 1.20 | 2.18 | ± | 4.44 | |
| | 07/28/2010 | -0.15 | ± | 1.10 | -0.54 | ± | 4.09 | |
| | 08/04/2010 | -0.01 | ± | 1.24 | -0.05 | ± | 4.59 | |
| | 08/11/2010 | -0.22 | ± | 1.13 | -0.82 | ± | 4.19 | |
| | 08/18/2010 | 1.97 | ± | 1.27 | 7.28 | ± | 4.68 | |
| | 08/25/2010 | -0.02 | ± | 1.30 | -0.07 | ± | 4.83 | |
| | 09/01/2010 | 2.79 | ± | 1.23 | 10.33 | ± | 4.57 | |
| | 09/08/2010 | -1.32 | ± | 1.11 | -4.89 | ± | 4.12 | |
| | 09/15/2010 | 0.51 | ± | 1.27 | 1.87 | ± | 4.69 | |
| | 09/22/2010 | -1.12 | ± | 1.15 | -4.16 | ± | 4.26 | |
| | 09/29/2010 | 2.18 | ± | 1.33 | 8.08 | ± | 4.94 | |
| DUBOIS | 07/07/2010 | -1.59 | ± | 1.16 | -5.89 | ± | 4.28 | |
| | 07/14/2010 | -0.09 | ± | 1.03 | -0.34 | ± | 3.80 | |
| | 07/21/2010 | -1.05 | ± | 1.01 | -3.88 | ± | 3.73 | |
| | 07/28/2010 | -2.49 | ± | 1.08 | -9.22 | ± | 4.01 | |
| | 08/04/2010 | 1.68 | ± | 1.05 | 6.20 | ± | 3.88 | |
| | 08/11/2010 | 0.61 | ± | 1.26 | 2.24 | ± | 4.67 | |
| | 08/18/2010 | 0.30 | ± | 1.03 | 1.13 | ± | 3.81 | |
| | 08/25/2010 | 2.09 | ± | 1.17 | 7.75 | ± | 4.34 | |
| | 09/01/2010 | -0.16 | ± | 1.03 | -0.61 | ± | 3.82 | |
| | 09/08/2010 | 0.14 | ± | 1.08 | 0.53 | ± | 4.01 | |
| | 09/15/2010 | -0.80 | ± | 1.02 | -2.98 | ± | 3.78 | |
| | 09/22/2010 | 0.52 | ± | 1.07 | 1.91 | ± | 3.97 | |
| | 09/29/2010 | -0.07 | ± | 1.06 | -0.26 | ± | 3.91 | |
| QA-2 | 07/07/2010 | -1.67 | ± | 1.21 | -6.17 | ± | 4.49 | |
| | 07/14/2010 | -0.09 | ± | 1.02 | -0.34 | ± | 3.77 | |
| | 07/21/2010 | -1.13 | ± | 1.09 | -4.20 | ± | 4.03 | |
| | 07/28/2010 | -2.53 | ± | 1.10 | -9.35 | ± | 4.07 | |
| | 08/04/2010 | 1.69 | ± | 1.06 | 6.26 | ± | 3.92 | |
| | 08/11/2010 | 0.51 | ± | 1.07 | 1.89 | ± | 3.94 | |
| | 08/18/2010 | 0.32 | ± | 1.08 | 1.18 | ± | 3.99 | |
| | 08/25/2010 | 1.89 | ± | 1.06 | 7.00 | ± | 3.92 | |
| | 09/01/2010 | -0.17 | ± | 1.09 | -0.64 | ± | 4.02 | |
| | 09/08/2010 | 0.13 | ± | 0.99 | 0.48 | ± | 3.65 | |
| | 09/15/2010 | -0.81 | ± | 1.03 | -3.01 | ± | 3.82 | |
| | 09/22/2010 | 0.49 | ± | 1.01 | 1.80 | ± | 3.74 | |
| | 09/29/2010 | -0.07 | ± | 1.08 | -0.26 | ± | 4.00 | |
| IDAHO FALLS | 07/07/2010 | -1.72 | ± | 1.25 | -6.38 | ± | 4.64 | |
| | 07/14/2010 | -0.11 | ± | 1.23 | -0.41 | ± | 4.56 | |
| | 07/21/2010 | -1.28 | ± | 1.23 | -4.73 | ± | 4.55 | |
| | 07/28/2010 | -2.80 | ± | 1.22 | -10.36 | ± | 4.51 | |
| | 08/04/2010 | 2.05 | ± | 1.28 | 7.60 | ± | 4.75 | |
| | 08/11/2010 | 0.62 | ± | 1.28 | 2.28 | ± | 4.75 | |

## 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** | | | | | | | | |
| | 08/18/2010 | 0.37 | ± | 1.25 | 1.36 | ± | 4.61 | |
| | 08/25/2010 | 2.46 | ± | 1.38 | 9.09 | ± | 5.09 | |
| | 09/01/2010 | -0.19 | ± | 1.22 | -0.71 | ± | 4.50 | |
| | 09/08/2010 | 0.17 | ± | 1.28 | 0.62 | ± | 4.72 | |
| | 09/15/2010 | -0.93 | ± | 1.18 | -3.42 | ± | 4.35 | |
| | 09/22/2010 | 0.59 | ± | 1.23 | 2.19 | ± | 4.55 | |
| | 09/29/2010 | -0.08 | ± | 1.27 | -0.31 | ± | 4.71 | |
| JACKSON | 07/07/2010 | 2.24 | ± | 1.50 | 8.27 | ± | 5.55 | |
| | 07/14/2010 | -1.67 | ± | 1.37 | -6.16 | ± | 5.06 | |
| | 07/21/2010 | 0.69 | ± | 1.40 | 2.55 | ± | 5.18 | |
| | 07/28/2010 | -0.19 | ± | 1.45 | -0.71 | ± | 5.35 | |
| | 08/04/2010 | -0.02 | ± | 1.49 | -0.06 | ± | 5.51 | |
| a | 08/11/2010 | -0.83 | ± | 4.22 | -3.07 | ± | 15.60 | |
| | 08/18/2010 | 2.49 | ± | 1.60 | 9.20 | ± | 5.92 | |
| | 08/25/2010 | -0.02 | ± | 1.45 | -0.08 | ± | 5.35 | |
| | 09/01/2010 | 3.35 | ± | 1.48 | 12.41 | ± | 5.49 | |
| | 09/08/2010 | -1.78 | ± | 1.50 | -6.58 | ± | 5.55 | |
| | 09/15/2010 | 0.51 | ± | 1.27 | 1.88 | ± | 4.70 | |
| | 09/22/2010 | -1.33 | ± | 1.37 | -4.94 | ± | 5.06 | |
| | 09/29/2010 | 2.35 | ± | 1.43 | 8.68 | ± | 5.30 | |
| REXBURG CMS | 07/07/2010 | -1.49 | ± | 1.08 | -5.51 | ± | 4.01 | |
| | 07/14/2010 | -0.10 | ± | 1.14 | -0.38 | ± | 4.23 | |
| | 07/21/2010 | -1.23 | ± | 1.18 | -4.56 | ± | 4.38 | |
| | 07/28/2010 | -2.34 | ± | 1.02 | -8.66 | ± | 3.77 | |
| | 08/04/2010 | 1.84 | ± | 1.15 | 6.79 | ± | 4.25 | |
| | 08/11/2010 | 0.60 | ± | 1.25 | 2.22 | ± | 4.62 | |
| | 08/18/2010 | 0.31 | ± | 1.07 | 1.16 | ± | 3.94 | |
| | 08/25/2010 | 1.91 | ± | 1.07 | 7.05 | ± | 3.95 | |
| | 09/01/2010 | -0.17 | ± | 1.05 | -0.62 | ± | 3.90 | |
| | 09/08/2010 | 0.14 | ± | 1.07 | 0.52 | ± | 3.94 | |
| | 09/15/2010 | -0.86 | ± | 1.09 | -3.17 | ± | 4.03 | |
| | 09/22/2010 | 0.53 | ± | 1.10 | 1.96 | ± | 4.07 | |
| | 09/29/2010 | -0.08 | ± | 1.15 | -0.28 | ± | 4.27 | |
| **INL SITE** | | | | | | | | |
| EFS | 07/07/2010 | 2.07 | ± | 1.39 | 7.66 | ± | 5.14 | |
| | 07/14/2010 | -1.46 | ± | 1.20 | -5.41 | ± | 4.44 | |
| | 07/21/2010 | 0.51 | ± | 1.04 | 1.89 | ± | 3.84 | |
| | 07/28/2010 | -0.18 | ± | 1.36 | -0.66 | ± | 5.02 | |
| | 08/04/2010 | -0.01 | ± | 1.32 | -0.05 | ± | 4.90 | |
| | 08/11/2010 | -0.23 | ± | 1.19 | -0.87 | ± | 4.41 | |
| | 08/18/2010 | 2.00 | ± | 1.29 | 7.40 | ± | 4.76 | |
| | 08/25/2010 | -0.02 | ± | 1.28 | -0.07 | ± | 4.74 | |
| | 09/01/2010 | 2.02 | ± | 0.90 | 7.49 | ± | 3.31 | |
| | 09/08/2010 | -1.53 | ± | 1.29 | -5.65 | ± | 4.76 | |
| | 09/15/2010 | 0.48 | ± | 1.21 | 1.79 | ± | 4.49 | |
| | 09/22/2010 | -1.02 | ± | 1.04 | -3.77 | ± | 3.86 | |
| | 09/29/2010 | 2.01 | ± | 1.23 | 7.44 | ± | 4.55 | |
| MAIN GATE | 07/07/2010 | 1.71 | ± | 1.14 | 6.31 | ± | 4.23 | |
| | 07/14/2010 | -1.41 | ± | 1.16 | -5.21 | ± | 4.27 | |
| | 07/21/2010 | 0.57 | ± | 1.16 | 2.10 | ± | 4.28 | |

## 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** | | | | | | | | |
| | 07/28/2010 | -0.15 | ± | 1.14 | -0.56 | ± | 4.22 | |
| | 08/04/2010 | -0.01 | ± | 1.16 | -0.05 | ± | 4.29 | |
| | 08/11/2010 | -0.29 | ± | 1.48 | -1.08 | ± | 5.46 | |
| | 08/18/2010 | 1.84 | ± | 1.19 | 6.82 | ± | 4.39 | |
| | 08/25/2010 | -0.02 | ± | 1.31 | -0.07 | ± | 4.84 | |
| | 09/01/2010 | 2.66 | ± | 1.18 | 9.85 | ± | 4.36 | |
| | 09/08/2010 | -1.32 | ± | 1.11 | -4.88 | ± | 4.11 | |
| | 09/15/2010 | 0.49 | ± | 1.24 | 1.82 | ± | 4.57 | |
| | 09/22/2010 | -1.13 | ± | 1.16 | -4.18 | ± | 4.28 | |
| | 09/29/2010 | 2.13 | ± | 1.30 | 7.89 | ± | 4.82 | |
| VAN BUREN GATE | 07/07/2010 | 1.59 | ± | 1.07 | 5.90 | ± | 3.96 | |
| | 07/14/2010 | -1.50 | ± | 1.23 | -5.55 | ± | 4.55 | |
| | 07/21/2010 | 0.60 | ± | 1.22 | 2.22 | ± | 4.53 | |
| | 07/28/2010 | -0.13 | ± | 1.01 | -0.49 | ± | 3.74 | |
| | 08/04/2010 | -0.01 | ± | 1.34 | -0.05 | ± | 4.97 | |
| | 08/11/2010 | -0.23 | ± | 1.19 | -0.86 | ± | 4.39 | |
| | 08/18/2010 | 1.87 | ± | 1.20 | 6.92 | ± | 4.45 | |
| | 08/25/2010 | -0.02 | ± | 1.34 | -0.08 | ± | 4.96 | |
| | 09/01/2010 | 2.89 | ± | 1.28 | 10.70 | ± | 4.73 | |
| | 09/08/2010 | -1.31 | ± | 1.11 | -4.86 | ± | 4.09 | |
| | 09/15/2010 | 0.44 | ± | 1.11 | 1.64 | ± | 4.11 | |
| | 09/22/2010 | -1.00 | ± | 1.03 | -3.70 | ± | 3.79 | |
| | 09/29/2010 | 1.88 | ± | 1.15 | 6.97 | ± | 4.26 | |
| QA-1 | 07/07/2010 | 1.56 | ± | 1.04 | 5.76 | ± | 3.87 | |
| | 07/14/2010 | -1.19 | ± | 0.98 | -4.42 | ± | 3.62 | |
| | 07/21/2010 | 0.49 | ± | 1.01 | 1.83 | ± | 3.72 | |
| | 07/28/2010 | -0.13 | ± | 1.02 | -0.50 | ± | 3.77 | |
| | 08/04/2010 | -0.01 | ± | 1.20 | -0.05 | ± | 4.42 | |
| | 08/11/2010 | -0.23 | ± | 1.19 | -0.86 | ± | 4.39 | |
| | 08/18/2010 | 1.75 | ± | 1.13 | 6.47 | ± | 4.16 | |
| | 08/25/2010 | -0.02 | ± | 1.51 | -0.09 | ± | 5.60 | |
| | 09/01/2010 | 2.92 | ± | 1.29 | 10.80 | ± | 4.78 | |
| | 09/08/2010 | -1.14 | ± | 0.96 | -4.20 | ± | 3.54 | |
| | 09/15/2010 | 0.42 | ± | 1.04 | 1.54 | ± | 3.86 | |
| | 09/22/2010 | -1.11 | ± | 1.14 | -4.12 | ± | 4.22 | |
| | 09/29/2010 | 1.74 | ± | 1.06 | 6.45 | ± | 3.94 | |

a. Invalid Sample Result

**TABLE C-3. Quarterly Americium-241, Cesium-137, Plutonium-238, Plutonium-239/240, and Strontium-90 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 | 9/29/2010 | CESIUM-137 | -10.58 | ± | 95.99 | -39.16 | ± | 355.17 | |
| ATOMIC CITY | 9/29/2010 | AMERICIUM-241 | -0.97 | ± | 1.37 | -3.59 | ± | 5.07 | |
| | | CESIUM-137 | -329.13 | ± | 152.72 | -1217.80 | ± | 565.05 | |
| | | PLUTONIUM-238 | 0.60 | ± | 0.42 | 2.22 | ± | 1.55 | |
| | | PLUTONIUM-239/240 | 0.90 | ± | 0.43 | 3.33 | ± | 1.59 | |
| BLUE DOME | 9/29/2010 | CESIUM-137 | -70.59 | ± | 175.14 | -261.17 | ± | 648.03 | |
| FAA TOWER | 9/29/2010 | CESIUM-137 | 66.80 | ± | 167.07 | 247.18 | ± | 618.16 | |
| | | STRONTIUM-90 | -9.52 | ± | 11.85 | -35.22 | ± | 43.85 | |
| HOWE | 9/29/2010 | CESIUM-137 | -85.01 | ± | 166.37 | -314.54 | ± | 615.57 | |
| MONTEVIEW | 9/29/2010 | AMERICIUM-241 | -0.64 | ± | 1.11 | -2.37 | ± | 4.11 | |
| | | CESIUM-137 | -171.23 | ± | 160.00 | -633.57 | ± | 591.99 | |
| | | PLUTONIUM-238 | 0.69 | ± | 0.61 | 2.55 | ± | 2.26 | |
| | | PLUTONIUM-239/240 | -0.23 | ± | 0.23 | -0.85 | ± | 0.85 | |
| MUD LAKE | 9/29/2010 | CESIUM-137 | 232.83 | ± | 146.90 | 861.47 | ± | 543.52 | |
| | | STRONTIUM-90 | -16.30 | ± | 15.30 | -60.31 | ± | 56.61 | |
| **DISTANT** | | | | | | | | | |
| BLACKFOOT | 9/29/2010 | AMERICIUM-241 | -2.70 | ± | 2.33 | -9.99 | ± | 8.62 | |
| | | CESIUM-137 | -19.11 | ± | 111.36 | -70.73 | ± | 412.01 | |
| | | PLUTONIUM-238 | 0.56 | ± | 0.97 | 2.07 | ± | 3.59 | |
| | | PLUTONIUM-239/240 | 2.24 | ± | 1.14 | 8.29 | ± | 4.22 | |
| CRATERS | 9/29/2010 | CESIUM-137 | -175.23 | ± | 110.08 | -648.37 | ± | 407.30 | |
| DUBOIS | 9/29/2010 | CESIUM-137 | -129.02 | ± | 158.36 | -477.37 | ± | 585.92 | |
| | | STRONTIUM-90 | 12.70 | ± | 15.00 | 46.99 | ± | 55.50 | |
| DUBOIS (QA-2) | 9/29/2010 | CESIUM-137 | -301.39 | ± | 134.06 | -1115.15 | ± | 496.02 | |
| | | STRONTIUM-90 | -10.80 | ± | 16.30 | -39.96 | ± | 60.31 | |
| IDAHO FALLS | 9/29/2010 | CESIUM-137 | -65.73 | ± | 163.47 | -243.21 | ± | 604.83 | |
| | | STRONTIUM-90 | -3.99 | ± | 16.80 | -14.76 | ± | 62.16 | |
| JACKSON | 9/29/2010 | CESIUM-137 | 94.73 | ± | 115.52 | 350.49 | ± | 427.42 | |
| REXBURG CMS | 9/29/2010 | AMERICIUM-241 | 0.57 | ± | 2.04 | 2.11 | ± | 7.55 | |
| | | CESIUM-137 | 8.33 | ± | 175.21 | 30.81 | ± | 648.28 | |
| | | PLUTONIUM-238 | -0.17 | ± | 0.30 | -0.63 | ± | 1.11 | |
| | | PLUTONIUM-239/240 | 0.35 | ± | 0.25 | 1.30 | ± | 0.93 | |

**TABLE C-3. Quarterly Americium-241, Cesium-137, Plutonium-238, Plutonium-239/240, and Strontium-90 Concentrations in Composite Air Filters.**

| Sampling Group and Location | Sampling Date | Analyte | Result ± 1s Uncertainty (x $10^{-18}$ µCi/mL) | | | Result ± 1s Uncertainty (x $10^{-13}$ Bq/mL) | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|---|
| **INL SITE** | | | | | | | | | |
| EFS | 9/29/2010 | CESIUM-137 | -43.75 | ± | 92.77 | -161.87 | ± | 343.25 | |
| | | STRONTIUM-90 | 5.30 | ± | 11.80 | 19.61 | ± | 43.66 | |
| MAIN GATE | 9/29/2010 | CESIUM-137 | 65.27 | ± | 107.10 | 241.49 | ± | 396.28 | |
| | | STRONTIUM-90 | -8.39 | ± | 14.05 | -31.04 | ± | 51.99 | |
| VAN BUREN GATE | 9/29/2010 | AMERICIUM-241 | -0.52 | ± | 0.52 | -1.92 | ± | 1.92 | |
| | | CESIUM-137 | 237.31 | ± | 133.30 | 878.05 | ± | 493.22 | |
| | | PLUTONIUM-238 | 0.33 | ± | 0.62 | 1.22 | ± | 2.29 | |
| | | PLUTONIUM-239/240 | 0.33 | ± | 0.33 | 1.22 | ± | 1.22 | |
| VAN BUREN GATE (QA-1) | 9/29/2010 | AMERICIUM-241 | 0.41 | ± | 0.70 | 0.00 | ± | 0.00 | |
| | | CESIUM-137 | -328.18 | ± | 146.49 | 0.00 | ± | 0.00 | |
| | | PLUTONIUM-238 | 0.22 | ± | 0.22 | 0.81 | ± | 0.81 | |
| | | PLUTONIUM-239/240 | -0.43 | ± | 0.53 | -1.59 | ± | 1.96 | |

## TABLE C-4. Tritium Concentrations in Atmospheric Moisture.

| Sampling Group and Location | Start Date | Sampling Date | Result ± 1s Uncertainty ($\times 10^{-13}$ µCi/mL$_{air}$) | | | Result ± 1s Uncertainty ($\times 10^{-9}$ Bq/mL$_{air}$) | | | Collection Medium | Result > 3s |
|---|---|---|---|---|---|---|---|---|---|---|
| **BOUNDARY** | | | | | | | | | | |
| ATOMIC CITY | 06/30/2010 | 07/21/2010 | 8.65 | ± | 2.45 | 32.01 | ± | 9.08 | Molecular Sieve | Y |
| ATOMIC CITY | 07/21/2010 | 08/04/2010 | 13.44 | ± | 3.14 | 49.72 | ± | 11.61 | Molecular Sieve | Y |
| ATOMIC CITY | 08/04/2010 | 08/18/2010 | 10.57 | ± | 2.93 | 39.09 | ± | 10.82 | Molecular Sieve | Y |
| ATOMIC CITY | 08/18/2010 | 09/15/2010 | 9.27 | ± | 2.11 | 34.28 | ± | 7.79 | Molecular Sieve | Y |
| **DISTANT** | | | | | | | | | | |
| BLACKFOOT | 06/30/2010 | 07/14/2010 | 13.10 | ± | 2.81 | 48.47 | ± | 10.41 | Molecular Sieve | Y |
| BLACKFOOT | 07/14/2010 | 07/28/2010 | 28.10 | ± | 2.96 | 103.97 | ± | 10.97 | Molecular Sieve | Y |
| BLACKFOOT | 07/28/2010 | 08/11/2010 | 7.85 | ± | 2.12 | 29.04 | ± | 7.84 | Molecular Sieve | Y |
| BLACKFOOT | 08/11/2010 | 08/25/2010 | 4.41 | ± | 1.82 | 16.31 | ± | 6.75 | Molecular Sieve | |
| BLACKFOOT | 08/25/2010 | 09/08/2010 | 11.25 | ± | 1.82 | 41.64 | ± | 6.74 | Molecular Sieve | Y |
| IDAHO FALLS | 06/30/2010 | 07/14/2010 | 12.57 | ± | 2.54 | 46.51 | ± | 9.40 | Molecular Sieve | Y |
| IDAHO FALLS | 07/14/2010 | 07/28/2010 | 8.96 | ± | 4.07 | 33.17 | ± | 15.08 | Molecular Sieve | |
| IDAHO FALLS | 07/28/2010 | 08/09/2010 | 12.68 | ± | 2.98 | 46.92 | ± | 11.04 | Molecular Sieve | Y |
| IDAHO FALLS | 08/09/2010 | 08/24/2010 | 8.62 | ± | 2.29 | 31.90 | ± | 8.46 | Molecular Sieve | Y |
| IDAHO FALLS | 08/24/2010 | 09/08/2010 | 12.59 | ± | 2.06 | 46.60 | ± | 7.61 | Molecular Sieve | Y |
| REXBURG | 06/30/2010 | 07/14/2010 | 17.85 | ± | 3.25 | 66.05 | ± | 12.02 | Molecular Sieve | Y |
| REXBURG | 07/14/2010 | 07/28/2010 | 17.08 | ± | 3.83 | 63.19 | ± | 14.17 | Molecular Sieve | Y |
| REXBURG | 07/28/2010 | 08/11/2010 | 13.37 | ± | 4.01 | 49.48 | ± | 14.84 | Molecular Sieve | Y |
| REXBURG | 08/11/2010 | 08/25/2010 | 9.87 | ± | 2.98 | 36.51 | ± | 11.03 | Molecular Sieve | Y |
| REXBURG | 08/25/2010 | 09/08/2010 | 11.90 | ± | 2.71 | 44.03 | ± | 10.04 | Molecular Sieve | Y |

## 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 | 6/1/2010 | 7/1/2010 | 74.64 | ± | 32.17 | 2.76 | ± | 1.19 | |
| | 7/1/2010 | 8/2/2010 | 115.64 | ± | 33.46 | 4.28 | ± | 1.24 | Y |
| | 8/3/2010 | 9/1/2010 | 73.75 | ± | 33.22 | 2.73 | ± | 1.23 | |
| CFA | 6/1/2010 | 7/1/2010 | 46.84 | ± | 32.36 | 1.73 | ± | 1.20 | |
| | 8/2/2010 | 9/2/2010 | 54.34 | ± | 33.44 | 2.01 | ± | 1.24 | |
| EFS | 8/25/2010 | 9/1/2010 | 109.12 | ± | 33.89 | 4.04 | ± | 1.25 | Y |

## Table C-6. 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 | | | | | | | |
| | 07/07/10 | -1.44 ± 1.97 | -0.053 ± 0.073 | | -0.60 ± 0.90 | -0.022 ± 0.033 | |
| Duplicate | 07/07/10 | 4.12 ± 2.89 | 0.153 ± 0.107 | | 0.47 ± 1.41 | 0.018 ± 0.052 | |
| | 08/09/10 | -0.62 ± 1.16 | -0.023 ± 0.043 | | 1.04 ± 0.86 | 0.039 ± 0.032 | |
| CONTROL | | | | | | | |
| | 07/06/10 | 1.58 ± 2.14 | 0.059 ± 0.079 | | 1.53 ± 1.53 | 0.057 ± 0.057 | |
| | 08/03/10 | -0.65 ± 1.33 | -0.024 ± 0.049 | | -0.59 ± 0.87 | -0.022 ± 0.032 | |
| | 09/07/10 | -0.08 ± 2.05 | -0.003 ± 0.076 | | 2.05 ± 1.46 | 0.076 ± 0.054 | |
| DIETRICH | | | | | | | |
| | 07/06/10 | 0.26 ± 1.74 | 0.010 ± 0.064 | | 0.85 ± 1.60 | 0.031 ± 0.059 | |
| | 08/03/10 | -0.46 ± 1.76 | -0.017 ± 0.065 | | -1.08 ± 1.38 | -0.040 ± 0.051 | |
| | 09/07/10 | -0.47 ± 1.13 | -0.017 ± 0.042 | | 0.26 ± 0.90 | 0.010 ± 0.033 | |
| FORT HALL | | | | | | | |
| | 07/06/10 | -1.27 ± 1.16 | -0.047 ± 0.043 | | 0.73 ± 0.83 | 0.027 ± 0.031 | |
| | 08/03/10 | 0.36 ± 1.26 | 0.013 ± 0.047 | | 0.20 ± 0.88 | 0.007 ± 0.033 | |
| HOWE | | | | | | | |
| | 07/06/10 | 0.20 ± 1.84 | 0.007 ± 0.068 | | -0.66 ± 1.57 | -0.024 ± 0.058 | |
| | 08/03/10 | -1.62 ± 1.87 | -0.060 ± 0.069 | | 0.78 ± 1.43 | 0.029 ± 0.053 | |
| | 09/07/10 | 1.47 ± 0.98 | 0.054 ± 0.036 | | 0.61 ± 0.77 | 0.022 ± 0.028 | |
| IDAHO FALLS | | | | | | | |
| | 07/06/10 | -1.50 ± 1.01 | -0.056 ± 0.037 | | 1.38 ± 0.84 | 0.051 ± 0.031 | |
| | 07/13/10 | -0.07 ± 0.91 | -0.003 ± 0.034 | | 1.66 ± 0.76 | 0.061 ± 0.028 | |
| | 07/20/10 | 2.32 ± 0.82 | 0.086 ± 0.030 | | -0.03 ± 0.79 | -0.001 ± 0.029 | |
| | 07/27/10 | 0.30 ± 0.84 | 0.011 ± 0.031 | | 0.47 ± 0.76 | 0.017 ± 0.028 | |
| | 08/03/10 | 1.33 ± 0.90 | 0.049 ± 0.033 | | 0.86 ± 0.75 | 0.032 ± 0.028 | |
| Duplicate | 08/03/10 | -0.83 ± 1.17 | -0.031 ± 0.043 | | -0.23 ± 0.88 | -0.009 ± 0.033 | |
| | 08/10/10 | 0.97 ± 0.88 | 0.036 ± 0.033 | | 0.28 ± 0.76 | 0.010 ± 0.028 | |
| | 08/17/10 | -0.57 ± 0.88 | -0.021 ± 0.033 | | 0.86 ± 0.75 | 0.032 ± 0.028 | |
| | 08/24/10 | 0.26 ± 0.92 | 0.010 ± 0.034 | | -0.96 ± 0.76 | -0.036 ± 0.028 | |
| | 08/31/10 | -0.18 ± 0.92 | -0.007 ± 0.034 | | 1.19 ± 0.74 | 0.044 ± 0.027 | |
| | 09/07/10 | -1.35 ± 0.91 | -0.050 ± 0.034 | | 0.07 ± 0.75 | 0.002 ± 0.028 | |
| | 09/14/10 | -0.80 ± 0.92 | -0.029 ± 0.034 | | 0.31 ± 0.75 | 0.012 ± 0.028 | |
| | 09/21/10 | -1.06 ± 0.90 | -0.039 ± 0.033 | | 0.89 ± 0.75 | 0.033 ± 0.028 | |
| | 09/28/10 | 2.60 ± 1.47 | 0.096 ± 0.054 | | -0.40 ± 1.36 | -0.015 ± 0.050 | |
| RUPERT | | | | | | | |
| | 07/06/10 | 0.90 ± 1.82 | 0.033 ± 0.067 | | -0.07 ± 1.50 | -0.003 ± 0.056 | |
| | 08/03/10 | -0.28 ± 1.00 | -0.010 ± 0.037 | | -1.13 ± 0.79 | -0.042 ± 0.029 | |
| | 09/07/10 | -2.60 ± 1.75 | -0.096 ± 0.065 | | 1.42 ± 1.45 | 0.053 ± 0.054 | |
| TERRETON | | | | | | | |
| | 07/06/10 | -0.35 ± 2.01 | -0.013 ± 0.074 | | 1.81 ± 1.51 | 0.067 ± 0.056 | |
| | 08/03/10 | -1.47 ± 1.10 | -0.054 ± 0.041 | | 0.64 ± 0.77 | 0.024 ± 0.029 | |
| | 09/07/10 | -1.78 ± 1.25 | -0.066 ± 0.046 | | 0.19 ± 0.91 | 0.007 ± 0.034 | |

## Table C-7. Cesium-137 and Strontium-90 Concentrations in Wheat

| Location | Sampling Date | Cesium-137 Result ± 1s Uncertainty pCi/kg | | | Cesium-137 Result ± 1s Uncertainty Bq/kg | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|
| AMERICAN FALLS | 08/26/10 | -1.12 | ± | 1.25 | -0.04 | ± | 0.05 | |
| AMERICAN FALLS (DUP) | 08/26/10 | -1.88 | ± | 1.87 | -0.07 | ± | 0.07 | |
| ARCO | 09/07/10 | 0.76 | ± | 2.14 | 0.03 | ± | 0.08 | |
| CAREY | 09/07/10 | 0.36 | ± | 1.12 | 0.01 | ± | 0.04 | |
| CONTROL | 09/13/10 | -0.54 | ± | 1.30 | -0.02 | ± | 0.05 | |
| HOWE | 08/18/10 | 0.34 | ± | 2.34 | 0.01 | ± | 0.09 | |
| IDAHO FALLS | 08/26/10 | -2.22 | ± | 2.23 | -0.08 | ± | 0.08 | |
| MONTEVIEW | 09/08/10 | 1.33 | ± | 1.25 | 0.05 | ± | 0.05 | |
| MORELAND | 08/26/10 | 3.50 | ± | 1.65 | 0.13 | ± | 0.06 | |
| MUD LAKE | 09/01/10 | 1.00 | ± | 1.18 | 0.04 | ± | 0.04 | |
| ROBERTS | 09/08/10 | 1.85 | ± | 3.56 | 0.07 | ± | 0.13 | |
| RUPERT | 08/26/10 | -0.49 | ± | 1.15 | -0.02 | ± | 0.04 | |
| TABER | 08/18/10 | -0.06 | ± | 1.70 | 0.00 | ± | 0.06 | |
| TERRETON | 08/25/10 | -4.30 | ± | 11.69 | -0.16 | ± | 0.43 | |
| | | **Strontium-90** | | | | | | |
| | | **Result ± 1s Uncertainty pCi/kg** | | | **Result ± 1s Uncertainty Bq/kg** | | | **Result > 3s** |
| AMERICAN FALLS | 08/26/10 | 17.50 | ± | 4.12 | 0.65 | ± | 0.15 | Y |
| AMERICAN FALLS (DUP) | 08/26/10 | 10.70 | ± | 3.27 | 0.40 | ± | 0.12 | Y |
| ARCO | 09/07/10 | 9.99 | ± | 3.66 | 0.37 | ± | 0.14 | |
| CAREY | 09/07/10 | -0.22 | ± | 3.11 | -0.01 | ± | 0.12 | |
| CONTROL | 09/13/10 | 19.70 | ± | 4.42 | 0.73 | ± | 0.16 | Y |
| HOWE | 08/18/10 | 18.30 | ± | 3.90 | 0.68 | ± | 0.14 | Y |
| IDAHO FALLS | 08/26/10 | 0.11 | ± | 3.25 | 0.00 | ± | 0.12 | |
| MONTEVIEW | 09/08/10 | 8.29 | ± | 3.93 | 0.31 | ± | 0.15 | |
| MORELAND | 08/26/10 | 11.20 | ± | 3.12 | 0.41 | ± | 0.12 | Y |
| MUD LAKE | 09/01/10 | 19.90 | ± | 3.56 | 0.74 | ± | 0.13 | Y |
| ROBERTS | 09/08/10 | 11.10 | ± | 3.93 | 0.41 | ± | 0.15 | |
| RUPERT | 08/26/10 | 1.71 | ± | 2.56 | 0.06 | ± | 0.09 | |
| TABER | 08/18/10 | 8.96 | ± | 3.28 | 0.33 | ± | 0.12 | |
| TERRETON | 08/25/10 | 7.09 | ± | 3.12 | 0.26 | ± | 0.12 | |

**Table C-8. Cesium-137 and Iodine-131 Concentrations in Large Game Animals**

| Species | Collection Date | Tissue | Analyte | Result ± 1s Uncertainty (pCi/kg wet weight) | | | Result ± 1s Uncertainty (x $10^{-2}$ Bq/kg wet weight) | | | Result > 3s |
|---|---|---|---|---|---|---|---|---|---|---|
| PRONGHORN | 9/14/2010 | Liver | $^{131}I$ | 4.17 | ± | 3.72 | 15.43 | ± | 13.77 | |
| | | | $^{137}Cs$ | 2.80 | ± | 1.40 | 10.35 | ± | 5.18 | |
| PRONGHORN | 9/14/2010 | Muscle | $^{131}I$ | 0.27 | ± | 3.29 | 1.00 | ± | 12.16 | |
| | | | $^{137}Cs$ | 3.22 | ± | 1.36 | 11.93 | ± | 5.05 | |
| PRONGHORN | 9/23/2010 | Liver | $^{131}I$ | -2.93 | ± | 3.91 | -10.84 | ± | 14.45 | |
| | | | $^{137}Cs$ | -0.75 | ± | 1.93 | -2.78 | ± | 7.13 | |
| PRONGHORN | 9/23/2010 | Muscle | $^{131}I$ | -1.62 | ± | 2.39 | -6.01 | ± | 8.85 | |
| | | | $^{137}Cs$ | 2.98 | ± | 1.28 | 11.01 | ± | 4.75 | |
| PRONGHORN | 9/27/2010 | Muscle | $^{131}I$ | -0.70 | ± | 1.89 | -2.60 | ± | 6.98 | |
| | | | $^{137}Cs$ | 2.53 | ± | 1.20 | 9.35 | ± | 4.45 | |
| PRONGHORN | 9/27/2010 | Thyroid | $^{131}I$ | -89.80 | ± | 195.00 | -332.26 | ± | 721.50 | |
| | | | $^{137}Cs$ | -98.80 | ± | 141.00 | -365.56 | ± | 521.70 | |

# APPENDIX D

## *STATISTICAL ANALYSIS RESULTS*

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

| Parameter | P[a] |
|---|---|
| **Gross Alpha** | |
| Quarter | 0.47 |
| July | 0.53 |
| August | 0.95 |
| September | 0.68 |
| **Gross Beta** | |
| Quarter | 0.93 |
| July | 0.93 |
| August | 0.57 |
| September | 0.98 |

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** | | |
| | July 7 | 0.32 |
| | July 14 | 0.48 |
| | July 21 | 0.57 |
| | July 28 | 0.25 |
| | August 4 | 0.78 |
| | August 11 | 0.81 |
| | August 18 | 0.83 |
| | August 25 | 0.48 |
| | September 1 | 0.38 |
| | September 8 | 0.57 |
| | September 15 | 0.42 |
| | September 22 | 0.12 |
| | September 29 | 0.32 |
| **Gross Beta** | | |
| | July 7 | 0.78 |
| | July 14 | 0.39 |
| | July 21 | 0.78 |
| | July 28 | 0.43 |
| | August 4 | 0.67 |
| | August 11 | 0.94 |
| | August 18 | 0.67 |
| | August 25 | 0.29 |
| | September 1 | 0.38 |
| | September 8 | 0.94 |
| | September 15 | 0.63 |
| | September 22 | 0.20 |
| | September 29 | 0.48 |

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