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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 2007

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*Contributors:  
Marilyn Case, Russ Mitchell*

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By the S.M. Stoller Corporation,  
Environmental Surveillance, Education and Research Program  
Douglas K. Halford, Program Manager  
120 Technology Dr., Idaho Falls, Idaho 83402  
[www.stoller-eser.com](http://www.stoller-eser.com)

## EXECUTIVE SUMMARY

None of the radionuclides detected in any of the samples collected during the third quarter of 2007 could not 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 2007 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, 2007. All sample types (media) and the sampling schedule followed during 2007 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
- Milk sampling
- Lettuce sampling
- Wheat sampling
- Large game animal sampling

**Table E-1 Summary of results for the third quarter of 2007.**

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	No statistical differences between Boundary and Distant location gross alpha monthly and quarterly data were noted for the third quarter. A few weekly differences were noted but these do not appear to be the result of INL releases. No result exceeded the DCG for gross alpha or gross beta activity in air.
		Gamma-emitting radionuclides, select actinides ( $^{241}\text{Am}$ , $^{238}\text{Pu}$ , and $^{239,240}\text{Pu}$ ), $^{90}\text{Sr}$	Cesium-137 was not found. Americium-241, Plutonium-238 and Plutonium-239/240 were not detected in any sample. Strontium-90 was detected in one composite at a level far below the DOE DCG and within the range of historical measurements.
	Charcoal Cartridge	Iodine-131	No detections of $^{131}\text{I}$ were made during the third quarter.
Atmospheric Moisture	Liquid	Tritium	A total of 24 samples were collected. Twenty-one of these samples had tritium results greater than the 3s uncertainty. Concentrations were consistent with those reported across the region and with previous results.

Precipitation	Liquid	Tritium	Six samples were collected. All of the results were greater than the 3s uncertainty. No sample result exceeded the DCG for tritium in air.
Milk	Liquid	Iodine-131, gamma-emitting radionuclides	Thirty-six samples, including two duplicates were collected. No manmade gamma-emitting radionuclides or iodine-131 were detected in any sample.
Lettuce	Solid	Gamma-emitting radionuclides, <sup>90</sup> Sr	Six samples were collected. No man-made gamma-emitting radionuclides were detected. Strontium-90 was detected in four samples at levels consistent with historical measurements and can be attributed to residual <sup>90</sup> Sr from past nuclear weapons testing.
Wheat	Solid	Gamma-emitting radionuclides, <sup>90</sup> Sr	Eleven samples were collected. No man-made radionuclides were detected in any sample.
Game Animals	Tissue	Iodine-131, gamma emitting radionuclides	Cesium-137 was detected in the one game animal available for sampling during the third quarter. The result was well within historical measurements.

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### LIST OF ABBREVIATIONS

AEC	Atomic Energy Commission
CFA	Central Facilities Area
CMS	community monitoring station
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
PM <sub>10</sub>	particulate matter less than 10 micrometers in diameter

## **LIST OF UNITS**

Bq	becquerel
Ci	curie
g	gram
L	liter
$\mu$ Ci	microcurie
mL	milliliter
mR	milliRoentgen
pCi	picocurie



## 1. ESEER 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 2007, 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 (ESEER) Program. The ESEER 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 ESEER Program for samples collected during the third quarter of 2007 (July 1–September 30, 2007).

The surveillance portion of the ESEER 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 nine 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 ESEER Program.

The ESEER 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 (<sup>90</sup>Sr), plutonium-238

(<sup>238</sup>Pu), plutonium-239/240 (<sup>239/240</sup>Pu) and americium-241 (<sup>241</sup>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.

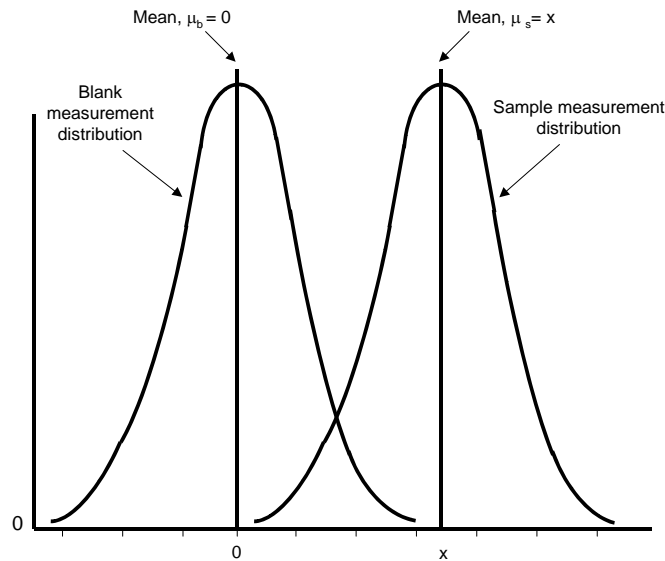
In the event of any suspected worldwide nuclear incidents, like the 1986 Chernobyl accident, the EPA may request additional sampling be performed through RadNet [previously known as the Environmental Radiation Ambient Monitoring System (ERAMS) network] (EPA 2006). The EPA established the ERAMS network 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.



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

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

Once the critical level has been defined, the minimum detectable concentration may be determined. Concentrations that equal  $3s$  represent a measurement at the detection level or minimum detectable concentration. For true concentrations of  $3s$  or greater, there is a 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  $\pm$  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 the S.M. Stoller Corporation at (208) 525-9358, or visit the Program's web page (<http://www.stoller-eser.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<sup>2</sup> (2,300 km<sup>2</sup>) 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.

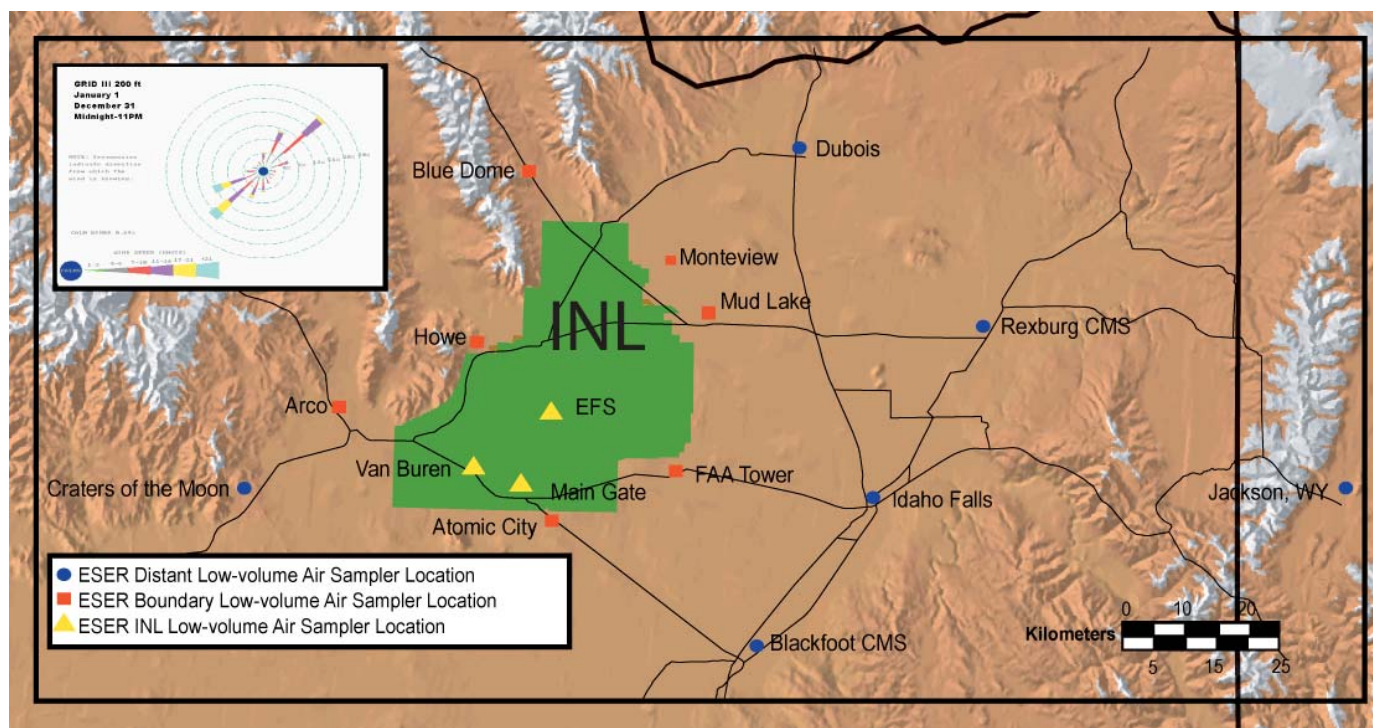


### 3. AIR SAMPLING

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 ( $^{131}\text{I}$ ) 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 2007 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 2007 (Figure 2). Four of these samplers are located on the INL Site, eight are situated off the INL Site near the boundary and six have been placed at locations distant to the INL Site. Samplers are divided into INL Site, Boundary and Distant groups to determine if there is a gradient of radionuclide concentrations, increasing towards the INL Site. Each replicate sampler is relocated every year to a new location. One replicate sampler was placed at Mud Lake (a Boundary location) and one at the Experimental Field Station (an INL Site location) during 2007. An average of 16,148 ft<sup>3</sup> (457 m<sup>3</sup>) of air was sampled at each location, each week, at an average flow rate of 1.60 ft<sup>3</sup>/min (0.05 m<sup>3</sup>/min). Particulates in air were collected on membrane particulate filters (1.2- $\mu\text{m}$  pore size). Gases passing through the filter were collected with an activated charcoal cartridge.





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  $^{90}\text{Sr}$ ,  $^{238}\text{Pu}$ ,  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  as determined by a rotating quarterly schedule.

Charcoal cartridges were analyzed for gamma-emitting radionuclides, specifically for iodine-131 ( $^{131}\text{I}$ ). 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  $^{131}\text{I}$  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 2007 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<sup>th</sup> and 75<sup>th</sup> 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. The outlier values lie within the range of measurements made within the past several years. 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. 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. However, in the third quarter the opposite case was true—gross alpha concentrations at the Distant locations were statistically greater than the Boundary 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.



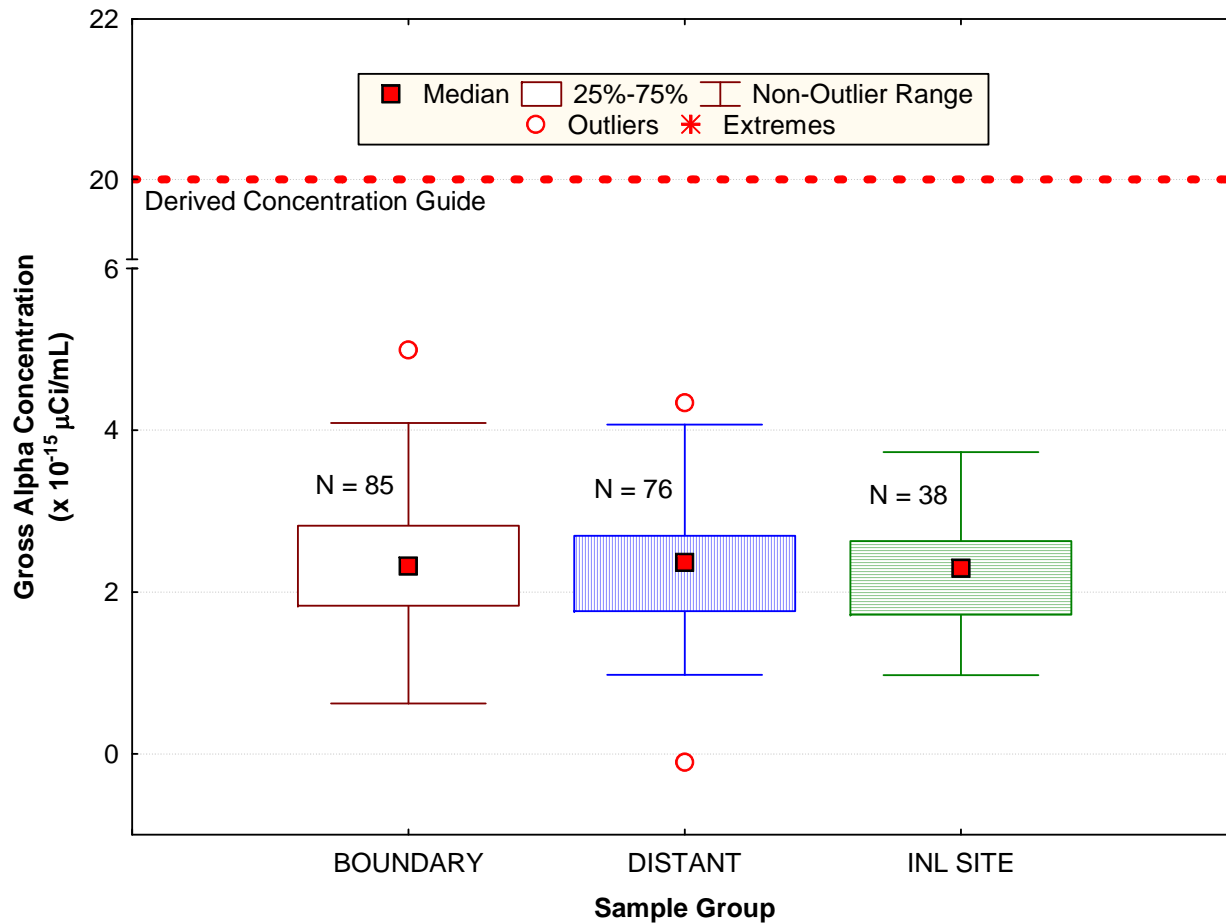


Figure 3. Gross alpha concentrations in air at ESER INL Site, Boundary and Distant locations for the third quarter of 2007.

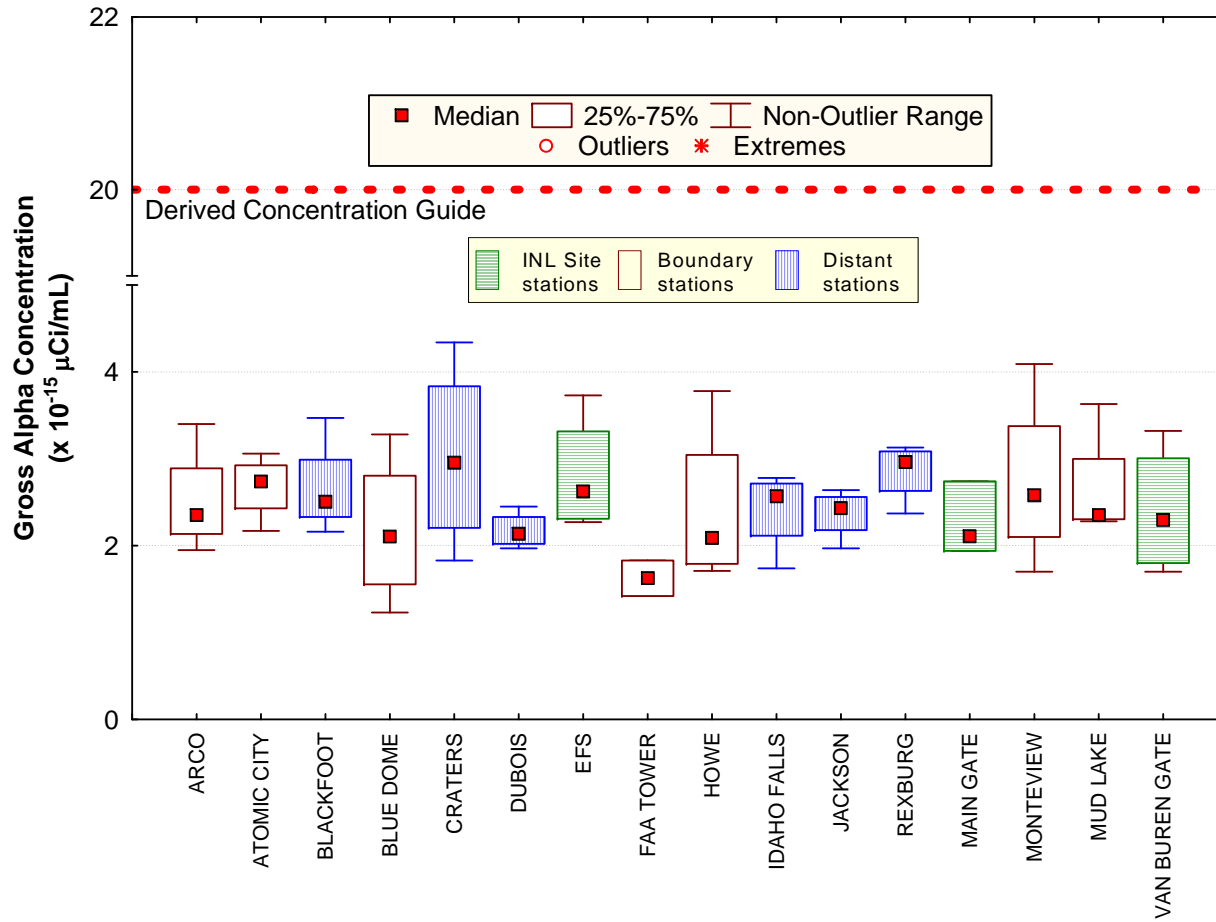
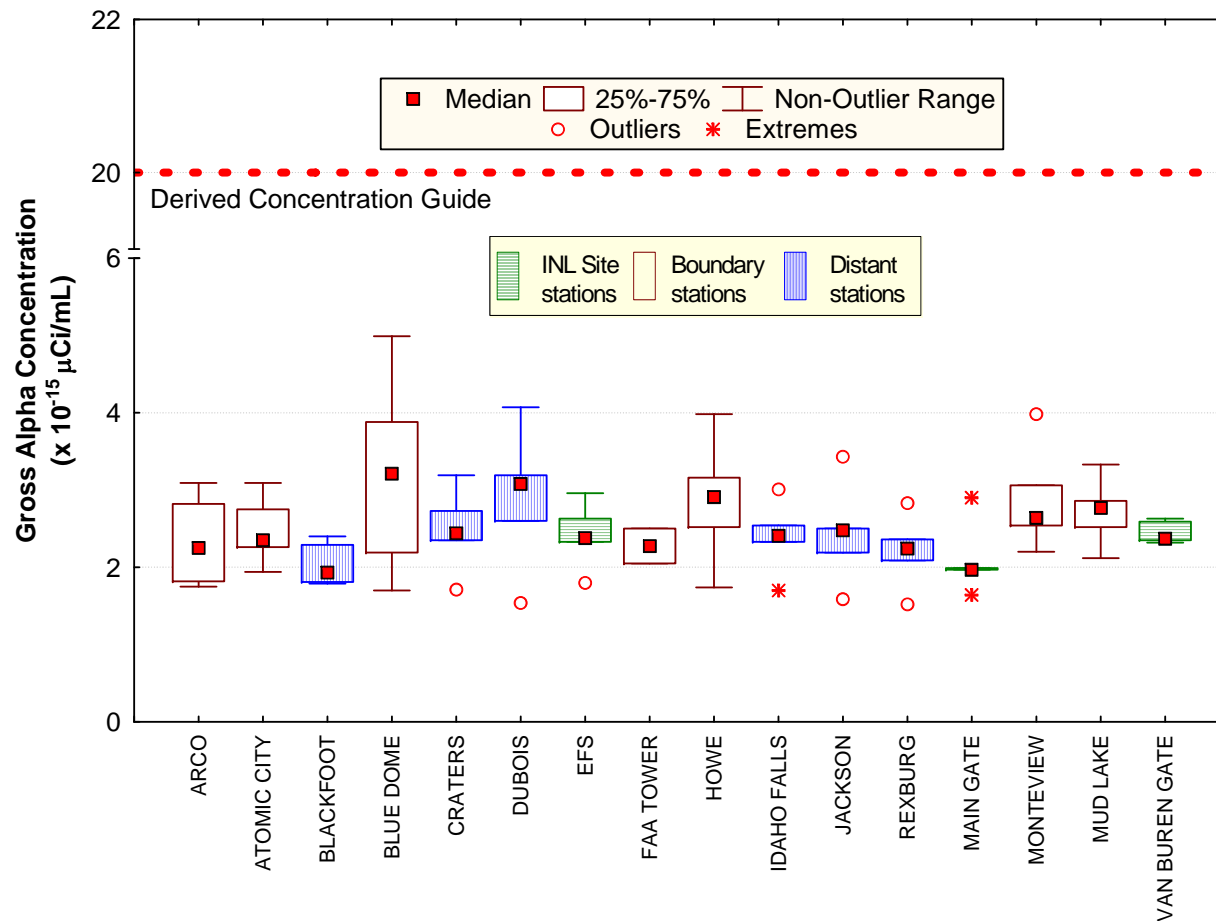


Figure 4. July gross alpha concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 4 at each location, except Atomic City (N = 3), Dubois (N = 2) and Main Gate (N = 3).



**Figure 5. August gross alpha concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 5 at each location, except Atomic City (N = 4), Blue Dome (N = 4), Dubois (N = 3), FAA Tower (N = 4) and Mud Lake (N = 4).**

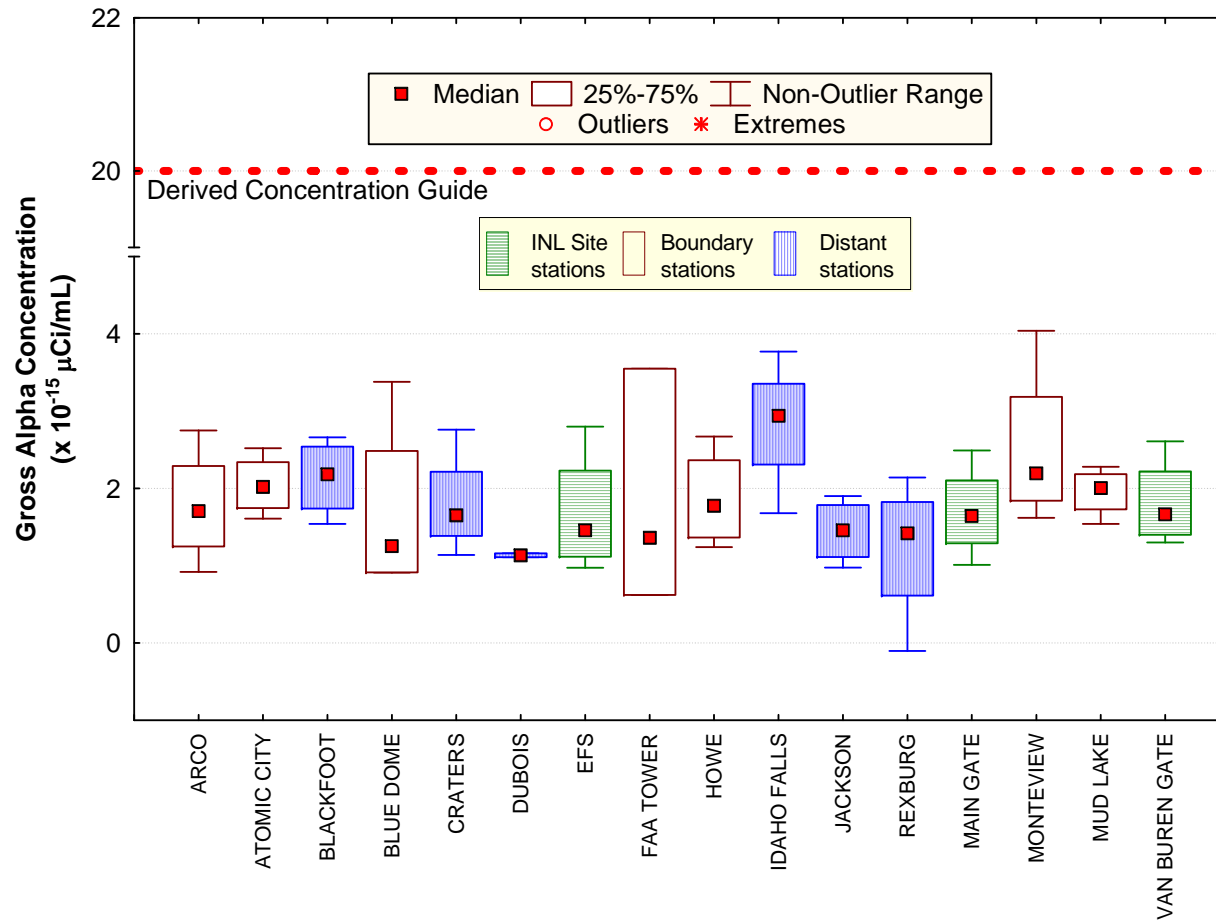


Figure 6. September gross alpha concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 4 at each location, except FAA Tower (N = 2).

No statistical differences in gross alpha concentrations between groups were noted during any month of the quarter (Table D-1).

As an additional check, comparisons between gross alpha concentrations measured at Boundary and Distant locations were made on a weekly basis. The Mann-Whitney U test was used to compare the Boundary and Distant data because it is the most powerful nonparametric alternative to the t-test for independent samples. INL Site sample results were not included in this analysis because the onsite data, collected at only three locations, are not representative of the entire INL Site and would not aid in determining offsite impacts. In the third quarter, there were two weeks (July 25 and August 29) where a statistical difference existed between the two sample groups (Table D-2). In both cases, the gross alpha concentrations measured at Boundary locations were statistically greater than those measured at Distant locations. In the other two cases, the Distant locations had statistically higher gross alpha concentrations. When comparing weekly values, one or two results can have a significant impact on the group averages. For example, during the week of July 25 the gross alpha concentration at Montevieu was somewhat higher than the other locations, resulting in a higher average for the Boundary group. During the week of August 29, an elevated value at Blue dome impacted the Boundary group mean. No particular distribution was seen in the data to indicate an INL site-related cause, and it is more likely due to random variability in the data.

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 2007 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. The quarterly data for each group appear to be similar and were determined using the Kruskal-Wallis test to be statistically the same (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. There were no statistical differences in gross beta between groups for any month during the quarter.

Comparison of weekly Boundary and Distant gross beta data sets, using the Mann Whitney U test, showed statistical differences between Boundary and Distant measurements during one week in the third quarter, the week of September 5 (Table D-2). In this case, the Distant group was statistically greater than the Boundary group. During that week higher measurements at Idaho Falls and Rexburg appeared to impact the group mean.

No  $^{131}\text{I}$  was detected in any of the charcoal cartridge batches collected during the third quarter of 2007. Weekly  $^{131}\text{I}$  results for each location are listed in Table C-2 of Appendix C. Gamma spectrographic analysis is also done with the  $^{131}\text{I}$  analysis. Cesium-137 was detected near the detection limit in 13 of the 26 measured batches of cartridges. The analytical laboratory considers these detections a result of the materials used in the charcoal filters.

Weekly filters for the third quarter of 2007 were composited by location. All samples were analyzed for gamma-emitting radionuclides, including  $^{137}\text{Cs}$  (see Table C-3, Appendix C). Cesium-137 was not detected in any third quarter composites.

Composites were also analyzed for  $^{90}\text{Sr}$ ,  $^{238}\text{Pu}$ ,  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  (see Table C-3, Appendix C.) One composite, from the INL Main Gate, had detectable  $^{90}\text{Sr}$ . The respective measured concentration of  $(43.9 \pm 14.3) \times 10^{-18} \mu\text{Ci/mL}$  is within historical measurements and substantially below the Derived Concentration Guide of  $9,000,000 \times 10^{-18} \mu\text{Ci/mL}$ .

**ATMOSPHERIC MOISTURE SAMPLING**

Twenty-four atmospheric moisture samples were obtained during the third quarter of 2007 from Atomic City, Blackfoot CMS, Idaho Falls and Rexburg CMS. 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.

Twenty-one of the 24 samples exceeded the 3s uncertainty level for tritium. All samples with detectable tritium were significantly below the DOE DCG for tritium in air of  $1 \times 10^{-7}$   $\mu\text{Ci}/\text{mL}_{\text{air}}$ , and ranged from  $(7.2 \pm 1.1) \times 10^{-13}$   $\mu\text{Ci}/\text{mL}_{\text{air}}$  at Rexburg collected in late September to  $(17.3 \pm 2.8) \times 10^{-13}$   $\mu\text{Ci}/\text{mL}_{\text{air}}$  at Idaho Falls in a sample collected early in August. All results are shown in Table C-4, Appendix C.

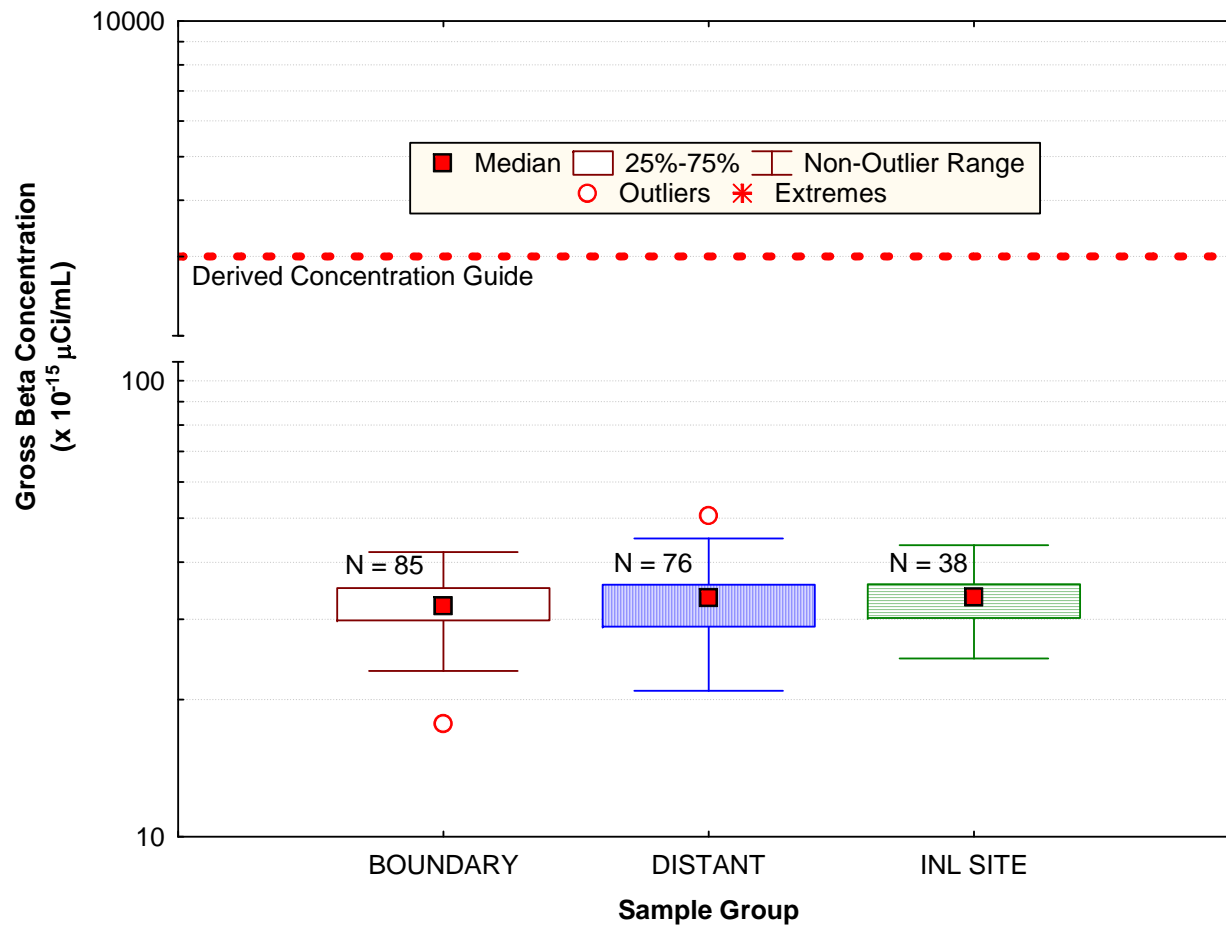
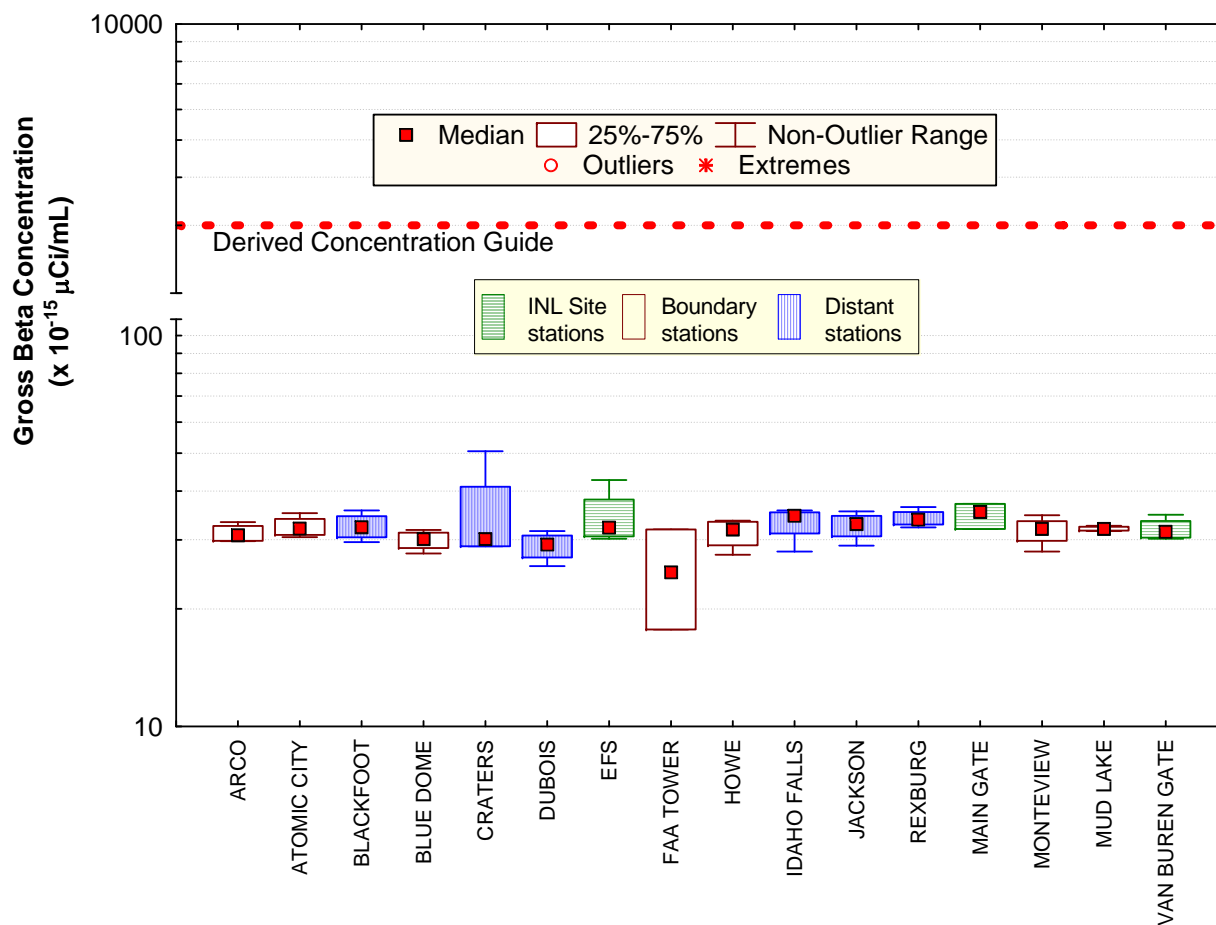
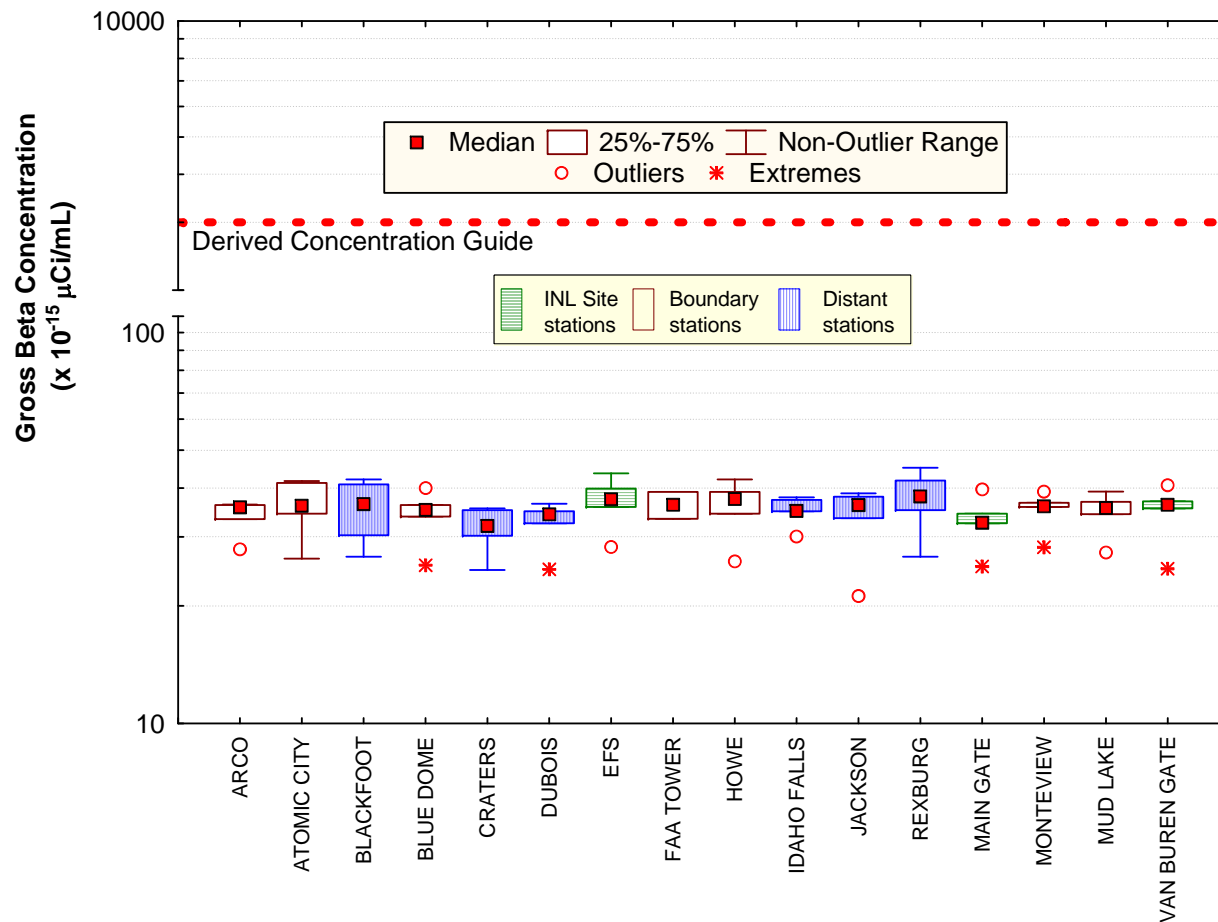


Figure 7. Gross beta concentrations in air at ESER INL Site, Boundary and Distant locations for the third quarter 2007.

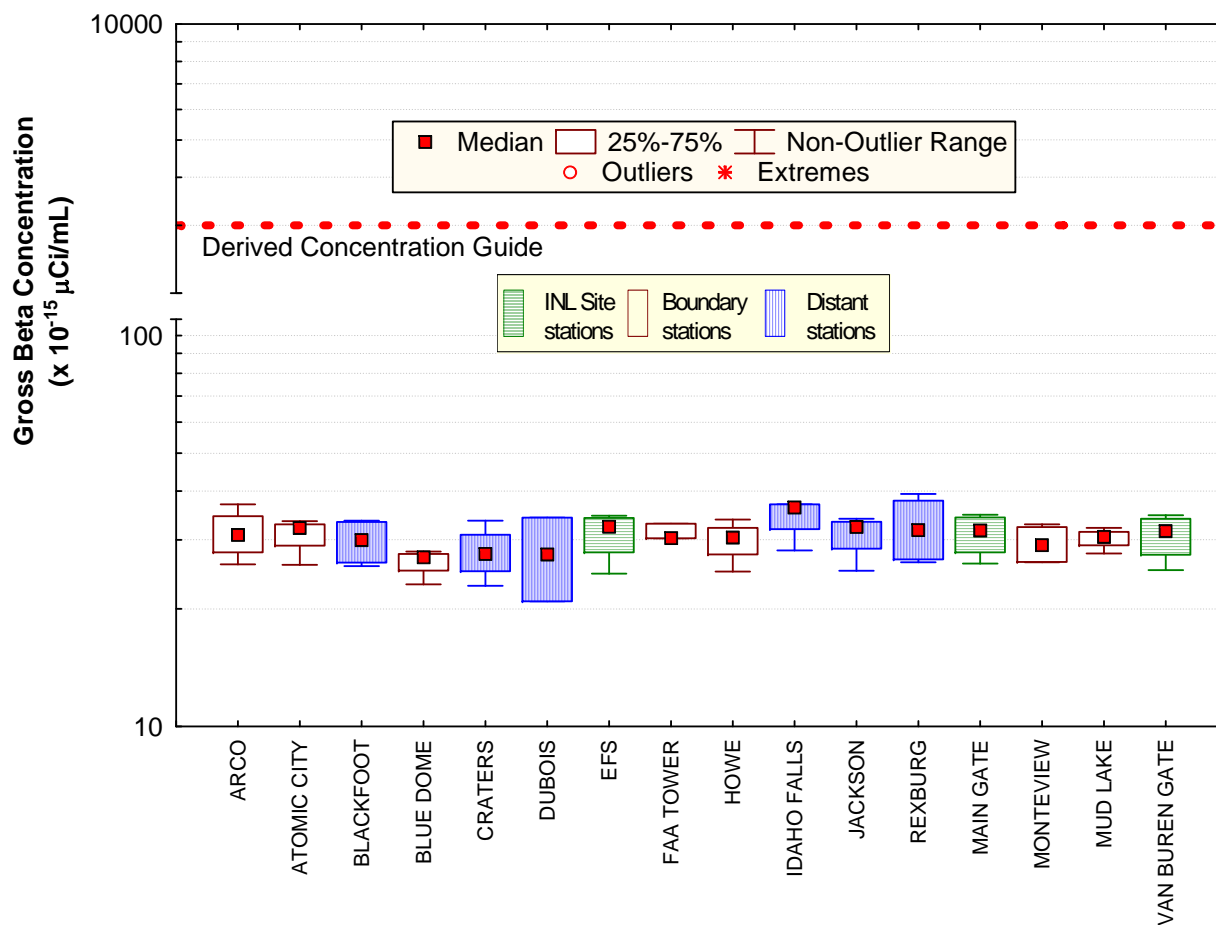


**Figure 8.** July gross beta concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 4 at each location, except Atomic City (N = 3), Dubois (N = 2) and Main Gate (N = 3).





**Figure 9.** August gross beta concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 5 at each location, except Atomic City (N = 4), Blue Dome (N = 4), Dubois (N = 3), FAA Tower (N = 4) and Mud Lake (N = 4).



**Figure 10. September gross beta concentrations in air at ESER INL Site, Boundary and Distant locations. Number of samples (N) = 4 at each location, except FAA Tower (N = 2).**

## 4. PRECIPITATION SAMPLING

Precipitation samples are gathered when sufficient precipitation occurs to allow for the collection of the minimum sample volume of approximately 20 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 2007 produced sufficient precipitation to yield six samples –three from CFA, two from EFS and one from the EFS.

Tritium was measured above the 3s value in all of the samples collected during the third quarter of 2007. 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 2005, tritium measured in samples from Region 10 (which includes Idaho) ranged from -200 to 7500 pCi/L (EPA 2006). Tritium measured in all third quarter ESER samples were within this range and were consistent with historical measurements at the INL Site, with a maximum of  $295 \pm 34$  pCi/L at CFA. Data for all third quarter 2007 precipitation samples collected by the ESER Program are listed in Table C-5 (Appendix C).



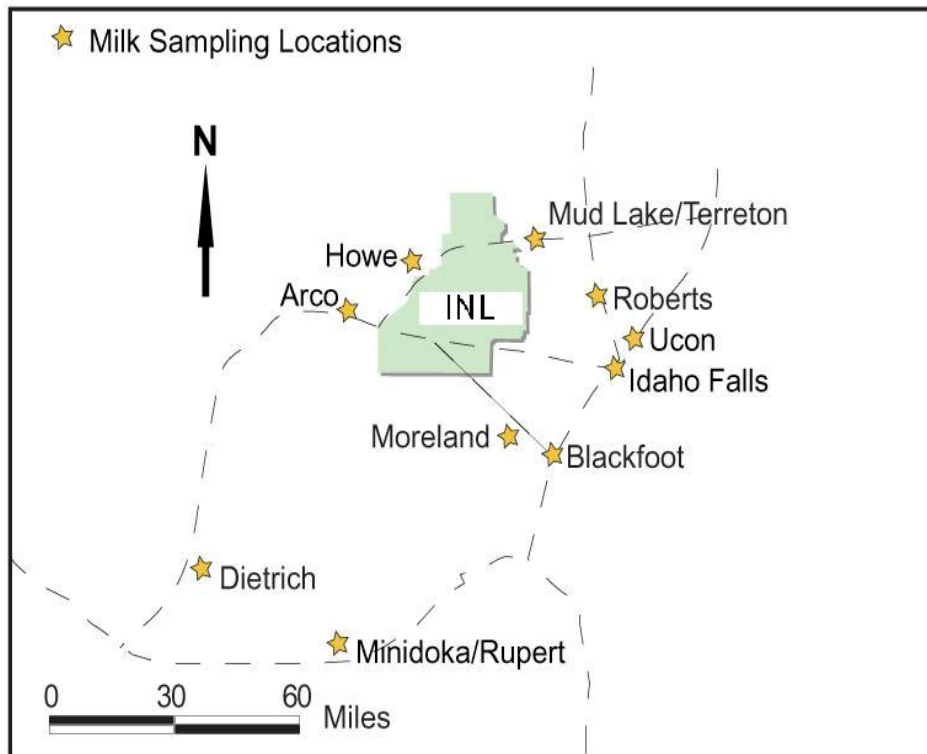
## 5. AGRICULTURAL PRODUCT AND WILDLIFE SAMPLING

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, wheat, potatoes, garden lettuce, big game, and waterfowl are sampled. Milk is sampled throughout the year and large game animals are sampled whenever large game are killed onsite from vehicle collisions. Lettuce and wheat are sampled during the third quarter, while potatoes are collected during the fourth quarter. Waterfowl are collected in either the third or fourth quarter. See Table A-1, Appendix A, for more details on agricultural product and wildlife sampling. This section discusses results from milk and large game animals sampled during the third quarter of 2007.

### **MILK SAMPLING**

Milk samples were collected weekly in Ucon and monthly at eight other locations around the INL Site (Figure 11) during the third quarter of 2007. The dairy at Roberts is no longer in operation. All samples were analyzed for gamma emitting radionuclides. During the second quarter, samples from half of the locations are analyzed for  $^{90}\text{Sr}$  and half are analyzed for tritium. In the fourth quarter the analyses are reversed, so that each location receives one analysis for  $^{90}\text{Sr}$  and tritium each year.

No Iodine-131 or other manmade gamma-emitting radionuclides were detected in any sample. Data for  $^{131}\text{I}$  and  $^{137}\text{Cs}$  in milk samples are listed in Appendix C, Table C-6.



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

### **LETTUCE SAMPLING**

In 2004 the ESER Program tested two prototype self-contained lettuce planters at the sampling locations in Atomic City and at the EFS on the INL. These locations were relatively remote and had no access to water, requiring that a self-watering system be developed. This prototype method allows for the placement and collection of lettuce at areas previously unavailable to the public (i.e., on the INL). The planters are set out in the spring with the lettuce grown from seed. This new method also allows for the accumulation of deposited radionuclides on the plant surface throughout the growth cycle.

Six lettuce samples were collected from prototype planters. Each sample was analyzed for gamma-emitting radionuclides and  $^{90}\text{Sr}$ . No gamma results were measured above the 3s uncertainty value. Strontium-90 was reported in all samples except at EFS and the Federal Aviation Administration (FAA) Tower. The quantities detected are consistent with those found in previous years, which are attributed to uptake of soil with residual  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  from nuclear weapons testing that took place between 1945 and 1980.

Data for  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  in all lettuce samples taken during the third quarter are listed in Table C-7 (Appendix C).

### **WHEAT SAMPLING**

A total of 11 wheat samples (including one duplicate) were collected from local grain growers. All samples were analyzed for gamma-emitting radionuclides and  $^{90}\text{Sr}$ . Strontium-90 was not positively detected in any wheat sample. Data for  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$  in all wheat samples taken during the third quarter are listed in Appendix C, Table C-8.

### **LARGE GAME ANIMAL SAMPLING**

Muscle tissue was collected from one large game animal sampled during the third quarter of 2007. Cesium-137 was detected at a level within historical measurements. Strontium-90 was detected in any sample. The data for  $^{137}\text{Cs}$  and  $^{131}\text{I}$  are listed in Appendix C, Table C-9.

## 6. QUALITY ASSURANCE

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

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

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

<b>QA Sample Type</b>	<b>Number of Sample Results</b>	<b>Number of Results Meeting Criteria</b>	<b>Percentage Meeting Criteria</b>
Spikes/Laboratory Control Samples	202	201	99.5
Field Duplicates	70	66	94.3
Laboratory Splits	24	24	100
Recounts	143	143	100
Blanks	68	68	100
Method Uncertainty	1789	1734	96.9





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## 7. REFERENCES

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- Stoller, 2007, *Quality Assurance Project Plan for the INL Site Offsite Environmental Surveillance Program*, Environmental Surveillance, Education and Research Program, February, 2007.



**APPENDIX A**  
***SUMMARY OF SAMPLING SCHEDULE***

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

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INL Site
<b>AIR SAMPLING</b>				
<i>LOW-VOLUME AIR</i>				
Gross Alpha, Gross Beta, <sup>131</sup> I	weekly	Blackfoot, Craters of the Moon, Dubois, Idaho Falls, Jackson WY, Rexburg	Arco, Atomic City, FAA Tower, Howe, Montevieu, 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, Montevieu, Mud Lake, Blue Dome	Main Gate, EFS, Van Buren
<sup>90</sup> Sr, Transuranics	quarterly	Rotating schedule	Rotating schedule	Rotating schedule
<i>ATMOSPHERIC MOISTURE</i>				
Tritium	4 to 13 weeks	Blackfoot, Idaho Falls, Rexburg	Atomic City	None
<i>PRECIPITATION</i>				
Tritium	monthly	Idaho Falls	None	CFA
Tritium	weekly	None	None	EFS
<b>ENVIRONMENTAL RADIATION SAMPLING</b>				
<i>TLDs</i>				
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, Montevieu, Mud Lake	None
<b>SOIL SAMPLING</b>				
<i>SOIL</i>				
Gamma Spec, <sup>90</sup> Sr, Transuranics	biennially	Carey, Crystal Ice Caves (Aberdeen), Blackfoot, St. Anthony	Butte City, Montevieu, Atomic City, FAA Tower, Howe, Mud Lake (2), Birch Creek	None

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

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INL Site
<b>FOODSTUFF SAMPLING</b>				
<i>MILK</i>				
Gamma Spec ( <sup>131</sup> I)	weekly	Ucon	None	None
Gamma Spec ( <sup>131</sup> I)	monthly	Blackfoot, Dietrich, Idaho Falls, Minidoka, Moreland, Roberts	Howe, Terreton	None
Tritium, <sup>90</sup> Sr	Semi-annually	Blackfoot, Dietrich, Idaho Falls, Minidoka, Moreland, Roberts	Howe, Terreton	None
<i>POTATOES</i>				
Gamma Spec, <sup>90</sup> Sr	annually	Aberdeen, Blackfoot, Fort Hall, Idaho Falls, Rupert, Taber, occasional samples across the U.S.	Arco, Monteview, Mud Lake, Terreton	None
<i>WHEAT</i>				
Gamma Spec, <sup>90</sup> Sr	annually	American Falls, Blackfoot, Dietrich, Idaho Falls, Minidoka, Carey	Arco, Monteview, Mud Lake, Taber, Terreton	None
<i>LETTUCE</i>				
Gamma Spec, <sup>90</sup> Sr	annually	Blackfoot, Carey, Idaho Falls, Pocatello	Arco, Atomic City, FAA Tower, Howe, Monteview	EFS
<i>BIG GAME</i>				
Gamma Spec	varies	Occasional samples across the U.S.	Public Highways	INL Site roads
<i>WATERFOWL</i>				
Gamma Spec, <sup>90</sup> Sr, Transuranics	annually	Varies among: Heise, Firth, Fort Hall, Mud Lake, Market Lake, and American Falls	None	Wastewater disposal ponds

**APPENDIX B**  
***SUMMARY OF MDCs AND DCGs***

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**Table B-1. Summary of Approximate Minimum Detectable Concentrations for Radiological Analyses Performed During Third Quarter 2007**

Sample Type	Analysis	Approximate Minimum Detectable Concentration <sup>a</sup> (MDC)	Derived Concentration Guide <sup>b</sup> (DCG)
Air (particulate filter) <sup>e</sup>	Gross alpha <sup>c</sup>	$5.06 \times 10^{-16}$ $\mu\text{Ci/mL}$	$2 \times 10^{-14}$ $\mu\text{Ci/mL}$
	Gross beta <sup>d</sup>	$1.41 \times 10^{-15}$ $\mu\text{Ci/mL}$	$3 \times 10^{-12}$ $\mu\text{Ci/mL}$
	Specific gamma ( <sup>137</sup> Cs)	$1.99 \times 10^{-16}$ $\mu\text{Ci/mL}$	$4 \times 10^{-10}$ $\mu\text{Ci/mL}$
	<sup>238</sup> Pu	$3.33 \times 10^{-18}$ $\mu\text{Ci/mL}$	$3 \times 10^{-14}$ $\mu\text{Ci/mL}$
	<sup>239/240</sup> Pu	$9.97 \times 10^{-18}$ $\mu\text{Ci/mL}$	$2 \times 10^{-14}$ $\mu\text{Ci/mL}$
	<sup>241</sup> Am	$8.15 \times 10^{-19}$ $\mu\text{Ci/mL}$	$2 \times 10^{-14}$ $\mu\text{Ci/mL}$
	<sup>90</sup> Sr	$4.81 \times 10^{-17}$ $\mu\text{Ci/mL}$	$9 \times 10^{-12}$ $\mu\text{Ci/mL}$
Air (charcoal cartridge) <sup>e</sup>	<sup>131</sup> I	$5.46 \times 10^{-16}$ $\mu\text{Ci/mL}$	$4 \times 10^{-10}$ $\mu\text{Ci/mL}$
Air (atmospheric moisture) <sup>f</sup>	<sup>3</sup> H	100.5 pCi/L <sub>water</sub>	$1 \times 10^{-7}$ $\mu\text{Ci/mL}_{\text{air}}$
Air (precipitation)	<sup>3</sup> H	100.5 pCi/L	$2 \times 10^{-3}$ $\mu\text{Ci/mL}$
Milk	<sup>131</sup> I	0.73 pCi/L	--
	<sup>137</sup> Cs	1.13 pCi/L	--
	<sup>3</sup> H	100.5 pCi/L	--
	<sup>90</sup> Sr	0.16 pCi/L	--
Lettuce	<sup>137</sup> Cs	65.6 pCi/kg	--
	<sup>90</sup> Sr	0.046 pCi/g	--
Wheat	<sup>137</sup> Cs	1.59 pCi/kg	--
	<sup>90</sup> Sr	0.011 pCi/g	--
Game Animal Tissue <sup>g</sup>	<sup>137</sup> Cs	0.96 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 <sup>239,240</sup>Pu and <sup>241</sup>Am.

d The DCG for gross beta is equivalent to the DCGs for <sup>228</sup>Ra

e The approximate MDC is based on an average filtered air volume (pressure corrected) of 445 m<sup>3</sup>/week.

f The approximate MDC is expressed for tritium (as tritiated water) in air, and is based on an average filtered air volume of 39 m<sup>3</sup>, assuming an average sampling period of eight weeks.

g The approximate MDC assumes a sample size of 500 g.



**APPENDIX C**  
***SAMPLE ANALYSIS RESULTS***

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

Sampling Group and Location	Sampling Date	GROSS ALPHA					GROSS BETA				
		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s
ARCO	07/03/2007	1.95 ± 0.37	7.22 ± 1.37	Y	29.80 ± 1.19	110.26 ± 4.40	Y				
	07/11/2007	2.32 ± 0.33	8.58 ± 1.22	Y	33.30 ± 1.05	123.21 ± 3.89	Y				
	07/18/2007	2.38 ± 0.29	8.81 ± 1.07	Y	29.90 ± 0.93	110.63 ± 3.45	Y				
	07/25/2007	3.40 ± 0.37	12.58 ± 1.37	Y	31.80 ± 1.00	117.66 ± 3.70	Y				
	08/01/2007	1.82 ± 0.33	6.73 ± 1.23	Y	35.70 ± 1.14	132.09 ± 4.22	Y				
	08/08/2007	2.82 ± 0.36	10.43 ± 1.34	Y	36.20 ± 1.14	133.94 ± 4.22	Y				
	08/15/2007	2.25 ± 0.30	8.33 ± 1.09	Y	33.30 ± 0.99	123.21 ± 3.65	Y				
	08/22/2007	1.75 ± 0.35	6.48 ± 1.28	Y	27.90 ± 1.08	103.23 ± 4.00	Y				
	08/29/2007	3.09 ± 0.48	11.43 ± 1.78	Y	36.30 ± 1.35	134.31 ± 5.00	Y				
	09/05/2007	1.58 ± 0.38	5.85 ± 1.42	Y	32.00 ± 1.21	118.40 ± 4.48	Y				
	09/12/2007	1.83 ± 0.34	6.77 ± 1.24	Y	29.80 ± 1.05	110.26 ± 3.89	Y				
	09/19/2007	2.75 ± 0.46	10.18 ± 1.71	Y	37.00 ± 1.35	136.90 ± 5.00	Y				
	09/26/2007	0.92 ± 0.22	3.40 ± 0.80	Y	26.00 ± 0.86	96.20 ± 3.19	Y				
	ATOMIC CITY	07/03/2007	2.17 ± 0.46	8.03 ± 1.69	Y	31.30 ± 1.43	115.81 ± 5.29	Y			
07/11/2007		2.79 ± 0.35	10.32 ± 1.31	Y	32.80 ± 1.05	121.36 ± 3.89	Y				
07/18/2007		2.69 ± 0.35	9.95 ± 1.30	Y	35.10 ± 1.16	129.87 ± 4.29	Y				
07/25/2007		3.06 ± 0.34	11.32 ± 1.27	Y	30.50 ± 0.96	112.85 ± 3.54	Y				
08/01/2007		2.75 ± 0.49	10.18 ± 1.80	Y	41.70 ± 1.54	154.29 ± 5.70	Y				
08/08/2007		3.09 ± 0.35	11.43 ± 1.29	Y	41.20 ± 1.10	152.44 ± 4.07	Y				
08/15/2007		1.94 ± 0.35	7.18 ± 1.28	Y	34.40 ± 1.25	127.28 ± 4.63	Y				
08/22/2007		2.26 ± 0.47	8.36 ± 1.73	Y	26.40 ± 1.33	97.68 ± 4.92	Y				
08/29/2007		2.35 ± 0.46	8.70 ± 1.70	Y	36.10 ± 1.38	133.57 ± 5.11	Y				
09/05/2007		1.61 ± 0.41	5.96 ± 1.52	Y	33.50 ± 1.30	123.95 ± 4.81	Y				
09/12/2007		2.16 ± 0.41	7.99 ± 1.52	Y	32.30 ± 1.25	119.51 ± 4.63	Y				
09/19/2007		2.52 ± 0.44	9.32 ± 1.61	Y	32.10 ± 1.25	118.77 ± 4.63	Y				
09/26/2007		1.88 ± 0.28	6.96 ± 1.03	Y	25.90 ± 0.90	95.83 ± 3.32	Y				
BLUE DOME		07/03/2007	1.23 ± 0.32	4.55 ± 1.18	Y	31.80 ± 1.17	117.66 ± 4.33	Y			
	07/11/2007	1.88 ± 0.29	6.96 ± 1.08	Y	29.50 ± 0.96	109.15 ± 3.53	Y				
	07/18/2007	2.33 ± 0.29	8.62 ± 1.06	Y	30.80 ± 0.94	113.96 ± 3.47	Y				
	07/25/2007	3.28 ± 0.35	12.14 ± 1.28	Y	27.70 ± 0.91	102.49 ± 3.35	Y				
	08/01/2007	3.21 ± 0.43	11.88 ± 1.61	Y	40.00 ± 1.30	148.00 ± 4.81	Y				
	08/08/2007	2.19 ± 0.29	8.10 ± 1.07	Y	36.20 ± 1.00	133.94 ± 3.68	Y				
	08/15/2007	3.88 ± 0.35	14.36 ± 1.30	Y	35.20 ± 0.96	130.24 ± 3.56	Y				
	08/22/2007	1.70 ± 0.36	6.29 ± 1.34	Y	25.40 ± 1.11	93.98 ± 4.11	Y				
	08/29/2007	4.99 ± 0.55	18.46 ± 2.03	Y	33.80 ± 1.30	125.06 ± 4.81	Y				
	09/05/2007	0.92 ± 0.27	3.39 ± 0.99	Y	28.00 ± 0.94	103.60 ± 3.48	Y				
	09/12/2007	1.59 ± 0.37	5.88 ± 1.35	Y	27.00 ± 1.14	99.90 ± 4.22	Y				
	09/19/2007	3.38 ± 0.47	12.51 ± 1.72	Y	27.20 ± 1.16	100.64 ± 4.29	Y				
	09/26/2007	0.91 ± 0.25	3.37 ± 0.91	Y	23.10 ± 0.93	85.47 ± 3.42	Y				
	FAA TOWER	07/03/2007	1.42 ± 0.35	5.25 ± 1.29	Y	31.90 ± 1.23	118.03 ± 4.55	Y			
07/11/2007		0.00 ± 0.00	0.00 ± 0.00		0.00 ± 0.00	0.00 ± 0.00					
07/18/2007		1.83 ± 0.23	6.77 ± 0.83	Y	17.70 ± 0.67	65.49 ± 2.46	Y				
07/25/2007		1.95 ± 0.80	7.22 ± 2.95		31.70 ± 2.63	117.29 ± 9.73	Y				
08/01/2007		0.00 ± 0.00	0.00 ± 0.00		0.00 ± 0.00	0.00 ± 0.00					
08/08/2007		2.05 ± 0.33	7.59 ± 1.22	Y	39.10 ± 1.20	144.67 ± 4.44	Y				
08/15/2007		2.50 ± 0.35	9.25 ± 1.28	Y	33.40 ± 1.13	123.58 ± 4.18	Y				
08/22/2007		5.16 ± 2.35	19.09 ± 8.70		36.50 ± 6.01	135.05 ± 22.24	Y				
08/29/2007		1.96 ± 0.83	7.25 ± 3.06		29.90 ± 2.29	110.63 ± 8.47	Y				
09/05/2007		0.62 ± 0.30	2.31 ± 1.09		30.30 ± 1.09	112.11 ± 4.03	Y				
09/12/2007		1.36 ± 0.33	5.03 ± 1.24	Y	30.30 ± 1.12	112.11 ± 4.14	Y				
09/19/2007		3.55 ± 0.53	13.14 ± 1.97	Y	33.00 ± 1.39	122.10 ± 5.14	Y				
09/26/2007		1.72 ± 0.63	6.36 ± 2.33		30.60 ± 2.11	113.22 ± 7.81	Y				
HOWE		07/03/2007	1.71 ± 0.36	6.33 ± 1.34	Y	30.60 ± 1.21	113.22 ± 4.48	Y			

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

Sampling Group and Location	Sampling Date	GROSS ALPHA						GROSS BETA					
		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s		
	07/11/2007	1.87	± 0.27	6.92	± 0.99		Y	33.20	± 0.92	122.84		± 3.39	Y
	07/18/2007	2.31	± 0.28	8.55	± 1.02	Y	33.60	± 0.93	124.32	± 3.45	Y		
	07/25/2007	3.78	± 0.36	13.99	± 1.31	Y	27.50	± 0.88	101.75	± 3.24	Y		
	08/01/2007	2.91	± 0.40	10.77	± 1.48	Y	42.10	± 1.27	155.77	± 4.70	Y		
	08/08/2007	3.16	± 0.33	11.69	± 1.22	Y	39.10	± 1.01	144.67	± 3.74	Y		
	08/15/2007	2.52	± 0.33	9.32	± 1.23	Y	34.40	± 1.08	127.28	± 4.00	Y		
	08/22/2007	1.74	± 0.34	6.44	± 1.24	Y	26.00	± 1.03	96.20	± 3.81	Y		
	08/29/2007	3.98	± 0.45	14.73	± 1.65	Y	37.50	± 1.18	138.75	± 4.37	Y		
	09/05/2007	1.49	± 0.30	5.51	± 1.09	Y	30.20	± 0.96	111.74	± 3.56	Y		
	09/12/2007	2.06	± 0.33	7.62	± 1.21	Y	30.60	± 1.01	113.22	± 3.74	Y		
	09/19/2007	2.67	± 0.39	9.88	± 1.44	Y	33.80	± 1.13	125.06	± 4.18	Y		
	09/26/2007	1.24	± 0.27	4.59	± 1.00	Y	24.90	± 0.97	92.13	± 3.58	Y		
MONTEVIEW	07/03/2007	1.70	± 0.40	6.29	± 1.47	Y	28.00	± 1.28	103.60	± 4.74	Y		
	07/11/2007	2.66	± 0.32	9.84	± 1.18	Y	32.30	± 0.97	119.51	± 3.58	Y		
	07/18/2007	2.50	± 0.28	9.25	± 1.02	Y	31.70	± 0.88	117.29	± 3.27	Y		
	07/25/2007	4.09	± 0.38	15.13	± 1.40	Y	34.70	± 0.98	128.39	± 3.64	Y		
	08/01/2007	3.06	± 0.38	11.32	± 1.39	Y	35.90	± 1.11	132.83	± 4.11	Y		
	08/08/2007	2.54	± 0.30	9.40	± 1.12	Y	36.70	± 0.99	135.79	± 3.66	Y		
	08/15/2007	3.98	± 0.36	14.73	± 1.31	Y	35.80	± 0.97	132.46	± 3.57	Y		
	08/22/2007	2.20	± 0.35	8.14	± 1.28	Y	28.20	± 1.02	104.34	± 3.77	Y		
	08/29/2007	2.64	± 0.52	9.77	± 1.94	Y	39.20	± 1.55	145.04	± 5.74	Y		
	09/05/2007	1.62	± 0.31	5.99	± 1.13	Y	31.80	± 0.99	117.66	± 3.67	Y		
	09/12/2007	2.33	± 0.38	8.62	± 1.42	Y	26.40	± 1.08	97.68	± 4.00	Y		
	09/19/2007	4.04	± 0.56	14.95	± 2.05	Y	32.90	± 1.40	121.73	± 5.18	Y		
	09/26/2007	2.06	± 0.33	7.62	± 1.22	Y	26.30	± 1.03	97.31	± 3.81	Y		
MUD LAKE	07/03/2007	2.28	± 0.40	8.44	± 1.49	Y	32.20	± 1.26	119.14	± 4.66	Y		
	07/11/2007	2.37	± 0.29	8.77	± 1.08	Y	31.80	± 0.91	117.66	± 3.38	Y		
	07/18/2007	2.33	± 0.28	8.62	± 1.03	Y	32.60	± 0.92	120.62	± 3.42	Y		
	07/25/2007	3.63	± 0.37	13.43	± 1.37	Y	31.60	± 0.97	116.92	± 3.60	Y		
	08/01/2007	2.52	± 0.38	9.32	± 1.39	Y	39.20	± 1.22	145.04	± 4.51	Y		
	08/08/2007	2.77	± 0.31	10.25	± 1.13	Y	36.90	± 0.96	136.53	± 3.57	Y		
	08/15/2007	2.86	± 0.36	10.58	± 1.32	Y	34.30	± 1.11	126.91	± 4.11	Y		
	08/22/2007	2.12	± 0.38	7.84	± 1.42	Y	27.40	± 1.13	101.38	± 4.18	Y		
	08/29/2007	3.33	± 0.46	12.32	± 1.70	Y	35.60	± 1.26	131.72	± 4.66	Y		
	09/05/2007	1.92	± 0.32	7.10	± 1.18	Y	32.20	± 1.00	119.14	± 3.70	Y		
	09/12/2007	2.09	± 0.43	7.73	± 1.58	Y	30.40	± 1.28	112.48	± 4.74	Y		
	09/19/2007	2.28	± 0.34	8.44	± 1.27	Y	30.70	± 1.01	113.59	± 3.74	Y		
	09/26/2007	1.54	± 0.28	5.70	± 1.03	Y	27.70	± 0.97	102.49	± 3.59	Y		
QA-2	07/03/2007	1.66	± 0.35	6.14	± 1.28	Y	31.80	± 1.18	117.66	± 4.37	Y		
	07/11/2007	2.35	± 0.34	8.70	± 1.27	Y	34.60	± 1.10	128.02	± 4.07	Y		
	07/18/2007	2.59	± 0.28	9.58	± 1.05	Y	32.00	± 0.89	118.40	± 3.30	Y		
	07/25/2007	2.57	± 0.35	9.51	± 1.31	Y	23.50	± 0.97	86.95	± 3.57	Y		
	08/01/2007	2.98	± 0.40	11.03	± 1.48	Y	40.20	± 1.23	148.74	± 4.55	Y		
	08/08/2007	2.68	± 0.32	9.92	± 1.18	Y	36.70	± 1.03	135.79	± 3.81	Y		
	08/15/2007	2.54	± 0.31	9.40	± 1.13	Y	35.30	± 0.99	130.61	± 3.68	Y		
	08/22/2007	1.55	± 0.38	5.74	± 1.42	Y	27.70	± 1.22	102.49	± 4.51	Y		
	08/29/2007	2.74	± 0.39	10.14	± 1.42	Y	36.40	± 1.14	134.68	± 4.22	Y		
	09/05/2007	1.57	± 0.37	5.81	± 1.38	Y	35.40	± 1.23	130.98	± 4.55	Y		
	09/12/2007	1.54	± 0.35	5.70	± 1.29	Y	30.60	± 1.14	113.22	± 4.22	Y		
	09/19/2007	2.57	± 0.42	9.51	± 1.55	Y	35.80	± 1.24	132.46	± 4.59	Y		
	09/26/2007	1.54	± 0.31	5.70	± 1.13	Y	26.30	± 1.04	97.31	± 3.85	Y		
<b>DISTANT</b>													
BLACKFOOT CMS	07/03/2007	2.16	± 0.34	7.99	± 1.26	Y	29.60	± 1.06	109.52	± 3.92	Y		
	07/11/2007	2.50	± 0.30	9.25	± 1.12	Y	33.30	± 0.95	123.21	± 3.50	Y		
	07/18/2007	3.47	± 0.32	12.84	± 1.17	Y	35.70	± 0.92	132.09	± 3.40	Y		

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

Sampling Group and Location	Sampling Date	GROSS ALPHA						GROSS BETA					
		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result > 3s		
	07/25/2007	2.51	± 0.31	9.29	± 1.14	Y	31.30	± 0.93	115.81	± 3.44	Y		
	08/01/2007	2.40	± 0.35	8.88	± 1.30	Y	40.90	± 1.17	151.33	± 4.33	Y		
	08/08/2007	2.29	± 0.27	8.47	± 1.01	Y	42.10	± 0.97	155.77	± 3.60	Y		
	08/15/2007	1.93	± 0.25	7.14	± 0.93	Y	30.30	± 0.86	112.11	± 3.17	Y		
	08/22/2007	1.81	± 0.30	6.70	± 1.10	Y	26.70	± 0.92	98.79	± 3.39	Y		
	08/29/2007	1.79	± 0.30	6.62	± 1.12	Y	36.40	± 1.02	134.68	± 3.77	Y		
	09/05/2007	2.66	± 0.35	9.84	± 1.29	Y	33.60	± 1.01	124.32	± 3.74	Y		
	09/12/2007	2.42	± 0.45	8.95	± 1.65	Y	25.70	± 1.23	95.09	± 4.55	Y		
	09/19/2007	1.94	± 0.34	7.18	± 1.25	Y	33.10	± 1.07	122.47	± 3.96	Y		
	09/26/2007	1.54	± 0.25	5.70	± 0.92	Y	26.80	± 0.86	99.16	± 3.18	Y		
CRATERS OF THE MOON	07/03/2007	2.58	± 0.39	9.55	± 1.45	Y	28.90	± 1.15	106.93	± 4.26	Y		
	07/11/2007	1.83	± 0.35	6.77	± 1.29	Y	28.90	± 1.12	106.93	± 4.14	Y		
	07/18/2007	4.34	± 0.54	16.06	± 1.98	Y	50.60	± 1.68	187.22	± 6.22	Y		
	07/25/2007	3.33	± 0.35	12.32	± 1.30	Y	31.40	± 0.95	116.18	± 3.52	Y		
	08/01/2007	1.71	± 0.27	6.33	± 0.99	Y	30.20	± 0.90	111.74	± 3.33	Y		
	08/08/2007	2.35	± 0.34	8.70	± 1.25	Y	35.50	± 1.13	131.35	± 4.18	Y		
	08/15/2007	2.44	± 0.32	9.03	± 1.19	Y	32.00	± 1.03	118.40	± 3.81	Y		
	08/22/2007	3.19	± 0.51	11.80	± 1.88	Y	24.70	± 1.29	91.39	± 4.77	Y		
	08/29/2007	2.73	± 0.48	10.10	± 1.76	Y	35.10	± 1.36	129.87	± 5.03	Y		
	09/05/2007	1.63	± 0.38	6.03	± 1.41	Y	28.30	± 1.16	104.71	± 4.29	Y		
	09/12/2007	1.67	± 0.33	6.18	± 1.21	Y	27.00	± 1.02	99.90	± 3.77	Y		
	09/19/2007	2.76	± 0.51	10.21	± 1.88	Y	33.60	± 1.43	124.32	± 5.29	Y		
	09/26/2007	1.14	± 0.24	4.22	± 0.90	Y	22.90	± 0.87	84.73	± 3.20	Y		
DUBOIS	07/03/2007	2.07	± 0.45	7.66	± 1.65	Y	31.60	± 1.41	116.92	± 5.22	Y		
	07/11/2007	1.97	± 0.29	7.29	± 1.05	Y	30.00	± 0.92	111.00	± 3.41	Y		
	07/18/2007	2.21	± 0.25	8.18	± 0.94	Y	28.40	± 0.82	105.08	± 3.02	Y		
	07/25/2007	2.45	± 0.26	9.07	± 0.95	Y	25.70	± 0.73	95.09	± 2.69	Y		
	08/01/2007	2.60	± 0.48	9.62	± 1.76	Y	34.90	± 1.45	129.13	± 5.37	Y		
	08/08/2007	3.19	± 0.36	11.80	± 1.31	Y	36.50	± 1.07	135.05	± 3.96	Y		
	08/15/2007	4.07	± 0.44	15.06	± 1.64	Y	34.30	± 1.20	126.91	± 4.44	Y		
	08/22/2007	1.54	± 0.28	5.70	± 1.05	Y	24.80	± 0.90	91.76	± 3.32	Y		
	08/29/2007	3.08	± 0.45	11.40	± 1.66	Y	32.50	± 1.22	120.25	± 4.51	Y		
	09/05/2007	1.11	± 0.30	4.11	± 1.10	Y	34.20	± 1.06	126.54	± 3.92	Y		
a	09/12/2007	3.09	± 1.47	11.43	± 5.44		25.90	± 3.77	95.83	± 13.95	Y		
a	09/19/2007	0.00	± 0.00	0.00	± 0.00		0.00	± 0.00	0.00	± 0.00			
	09/26/2007	1.16	± 0.34	4.29	± 1.27	Y	20.90	± 1.17	77.33	± 4.33	Y		
IDAHO FALLS	07/03/2007	1.74	± 0.36	6.44	± 1.33	Y	34.30	± 1.24	126.91	± 4.59	Y		
	07/11/2007	2.49	± 0.34	9.21	± 1.25	Y	34.90	± 1.07	129.13	± 3.96	Y		
	07/18/2007	2.65	± 0.30	9.81	± 1.12	Y	35.70	± 0.99	132.09	± 3.64	Y		
	07/25/2007	2.78	± 0.32	10.29	± 1.19	Y	28.00	± 0.90	103.60	± 3.32	Y		
	08/01/2007	2.41	± 0.43	8.92	± 1.59	Y	37.90	± 1.37	140.23	± 5.07	Y		
	08/08/2007	1.70	± 0.26	6.29	± 0.97	Y	37.30	± 1.00	138.01	± 3.69	Y		
	08/15/2007	2.54	± 0.34	9.40	± 1.25	Y	34.90	± 1.10	129.13	± 4.07	Y		
	08/22/2007	3.01	± 0.48	11.14	± 1.78	Y	30.10	± 1.32	111.37	± 4.88	Y		
	08/29/2007	2.33	± 0.37	8.62	± 1.36	Y	35.00	± 1.12	129.50	± 4.14	Y		
	09/05/2007	3.77	± 0.42	13.95	± 1.57	Y	37.00	± 1.13	136.90	± 4.18	Y		
	09/12/2007	2.94	± 0.47	10.88	± 1.75	Y	37.00	± 1.38	136.90	± 5.11	Y		
	09/19/2007	2.94	± 0.41	10.88	± 1.52	Y	35.70	± 1.18	132.09	± 4.37	Y		
	09/26/2007	1.68	± 0.37	6.22	± 1.37	Y	28.20	± 1.25	104.34	± 4.63	Y		
JACKSON	07/03/2007	1.97	± 0.36	7.29	± 1.33	Y	33.60	± 1.19	124.32	± 4.40	Y		
	07/11/2007	2.48	± 0.37	9.18	± 1.38	Y	35.50	± 1.18	131.35	± 4.37	Y		
	07/18/2007	2.39	± 0.31	8.84	± 1.13	Y	32.30	± 1.01	119.51	± 3.74	Y		
	07/25/2007	2.64	± 0.31	9.77	± 1.14	Y	29.00	± 0.89	107.30	± 3.30	Y		
	08/01/2007	2.19	± 0.36	8.10	± 1.33	Y	36.20	± 1.18	133.94	± 4.37	Y		
	08/08/2007	2.50	± 0.31	9.25	± 1.14	Y	38.80	± 1.04	143.56	± 3.85	Y		

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

Sampling Group and Location	Sampling Date	GROSS ALPHA				GROSS BETA			
		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)	
	08/15/2007	3.43 ± 0.37	12.69 ± 1.35	Y	33.50 ± 1.04	123.95 ± 3.85	Y		
	08/22/2007	1.59 ± 0.34	5.88 ± 1.27	Y	21.20 ± 1.00	78.44 ± 3.70	Y		
	08/29/2007	2.48 ± 0.39	9.18 ± 1.45	Y	38.00 ± 1.20	140.60 ± 4.44	Y		
	09/05/2007	0.98 ± 0.36	3.61 ± 1.32		32.80 ± 1.24	121.36 ± 4.59	Y		
	09/12/2007	1.67 ± 0.36	6.18 ± 1.32	Y	32.00 ± 1.16	118.40 ± 4.29	Y		
	09/19/2007	1.90 ± 0.38	7.03 ± 1.39	Y	34.00 ± 1.18	125.80 ± 4.37	Y		
	09/26/2007	1.25 ± 0.27	4.63 ± 0.99	Y	25.00 ± 0.96	92.50 ± 3.54	Y		
REXBURG CMS	07/03/2007	2.89 ± 0.44	10.69 ± 1.63	Y	36.40 ± 1.34	134.68 ± 4.96	Y		
	07/11/2007	2.37 ± 0.34	8.77 ± 1.26	Y	33.40 ± 1.07	123.58 ± 3.96	Y		
	07/18/2007	3.04 ± 0.30	11.25 ± 1.10	Y	34.30 ± 0.90	126.91 ± 3.33	Y		
	07/25/2007	3.13 ± 0.41	11.58 ± 1.50	Y	32.30 ± 1.15	119.51 ± 4.26	Y		
	08/01/2007	2.83 ± 0.43	10.47 ± 1.60	Y	41.80 ± 1.37	154.66 ± 5.07	Y		
	08/08/2007	2.09 ± 0.28	7.73 ± 1.04	Y	45.10 ± 1.06	166.87 ± 3.92	Y		
	08/15/2007	2.36 ± 0.35	8.73 ± 1.28	Y	35.10 ± 1.17	129.87 ± 4.33	Y		
	08/22/2007	1.52 ± 0.33	5.62 ± 1.22	Y	26.70 ± 1.05	98.79 ± 3.89	Y		
	08/29/2007	2.24 ± 0.47	8.29 ± 1.75	Y	38.10 ± 1.45	140.97 ± 5.37	Y		
	09/05/2007	1.51 ± 0.36	5.59 ± 1.32	Y	36.30 ± 1.21	134.31 ± 4.48	Y		
	09/12/2007	1.33 ± 0.39	4.92 ± 1.43	Y	27.20 ± 1.23	100.64 ± 4.55	Y		
	09/19/2007	-0.10 ± 0.37	-0.38 ± 1.35		393.00 ± 3.25	1454.10 ± 12.03	Y		
	09/26/2007	2.14 ± 0.30	7.92 ± 1.11	Y	26.30 ± 0.92	97.31 ± 3.41	Y		
<b>INL SITE</b>									
EFS	07/03/2007	2.35 ± 0.39	8.70 ± 1.46	Y	30.20 ± 1.20	111.74 ± 4.44	Y		
	07/11/2007	2.90 ± 0.44	10.73 ± 1.63	Y	42.70 ± 1.41	157.99 ± 5.22	Y		
	07/18/2007	2.27 ± 0.31	8.40 ± 1.13	Y	33.40 ± 1.05	123.58 ± 3.89	Y		
	07/25/2007	3.73 ± 0.37	13.80 ± 1.37	Y	31.10 ± 0.96	115.07 ± 3.55	Y		
	08/01/2007	2.96 ± 0.51	10.95 ± 1.89	Y	43.60 ± 1.60	161.32 ± 5.92	Y		
	08/08/2007	2.33 ± 0.35	8.62 ± 1.30	Y	39.90 ± 1.23	147.63 ± 4.55	Y		
	08/15/2007	2.38 ± 0.33	8.81 ± 1.21	Y	35.80 ± 1.10	132.46 ± 4.07	Y		
	08/22/2007	1.80 ± 0.44	6.66 ± 1.63	Y	28.30 ± 1.35	104.71 ± 5.00	Y		
	08/29/2007	2.63 ± 0.43	9.73 ± 1.58	Y	37.40 ± 1.28	138.38 ± 4.74	Y		
	09/05/2007	1.66 ± 0.37	6.14 ± 1.36	Y	33.70 ± 1.18	124.69 ± 4.37	Y		
	09/12/2007	0.97 ± 0.31	3.60 ± 1.14	Y	31.20 ± 1.12	115.44 ± 4.14	Y		
	09/19/2007	2.80 ± 0.51	10.36 ± 1.87	Y	34.60 ± 1.43	128.02 ± 5.29	Y		
	09/26/2007	1.26 ± 0.26	4.66 ± 0.95	Y	24.60 ± 0.92	91.02 ± 3.39	Y		
QA-1 a	07/03/2007	6.20 ± 4.34	22.94 ± 16.06		55.00 ± 12.20	203.50 ± 45.14	Y		
	07/11/2007	2.20 ± 0.30	8.14 ± 1.11	Y	31.70 ± 0.96	117.29 ± 3.55	Y		
	07/18/2007	1.94 ± 0.29	7.18 ± 1.07	Y	31.90 ± 1.04	118.03 ± 3.85	Y		
	07/25/2007	2.94 ± 0.31	10.88 ± 1.15	Y	28.90 ± 0.86	106.93 ± 3.18	Y		
	08/01/2007	3.14 ± 0.38	11.62 ± 1.39	Y	45.30 ± 1.19	167.61 ± 4.40	Y		
	08/08/2007	2.69 ± 0.32	9.95 ± 1.19	Y	37.30 ± 1.04	138.01 ± 3.85	Y		
	08/15/2007	2.97 ± 0.36	10.99 ± 1.33	Y	38.20 ± 1.14	141.34 ± 4.22	Y		
	08/22/2007	1.53 ± 0.27	5.66 ± 1.01	Y	21.60 ± 0.83	79.92 ± 3.05	Y		
	08/29/2007	1.85 ± 0.38	6.85 ± 1.39	Y	36.20 ± 1.22	133.94 ± 4.51	Y		
	09/05/2007	1.12 ± 0.33	4.14 ± 1.20	Y	29.80 ± 1.09	110.26 ± 4.03	Y		
	09/12/2007	1.42 ± 0.30	5.25 ± 1.10	Y	28.90 ± 0.99	106.93 ± 3.66	Y		
	09/19/2007	2.73 ± 0.39	10.10 ± 1.45	Y	31.80 ± 1.11	117.66 ± 4.11	Y		
	09/26/2007	1.86 ± 0.31	6.88 ± 1.15	Y	25.10 ± 0.99	92.87 ± 3.67	Y		
MAIN GATE	07/03/2007	2.74 ± 0.44	10.14 ± 1.62	Y	32.00 ± 1.30	118.40 ± 4.81	Y		
	07/11/2007	2.11 ± 0.35	7.81 ± 1.31	Y	35.40 ± 1.17	130.98 ± 4.33	Y		
	07/18/2007	1.94 ± 0.29	7.18 ± 1.05	Y	37.10 ± 1.07	137.27 ± 3.96	Y		
a	07/25/2007	3.84 ± 0.51	14.21 ± 1.90	Y	29.60 ± 1.33	109.52 ± 4.92	Y		
	08/01/2007	2.90 ± 0.47	10.73 ± 1.73	Y	39.70 ± 1.44	146.89 ± 5.33	Y		
	08/08/2007	1.97 ± 0.30	7.29 ± 1.09	Y	32.50 ± 1.02	120.25 ± 3.77	Y		
	08/15/2007	1.97 ± 0.25	7.29 ± 0.93	Y	32.60 ± 0.88	120.62 ± 3.24	Y		
	08/22/2007	1.99 ± 0.41	7.36 ± 1.51	Y	25.20 ± 1.18	93.24 ± 4.37	Y		



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

Sampling Group and Location	Sampling Date	GROSS ALPHA				GROSS BETA			
		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)	
	08/29/2007	1.64 ± 0.40	6.07 ± 1.48	Y	34.40 ± 1.29	127.28 ± 4.77	Y		
	09/05/2007	1.01 ± 0.36	3.74 ± 1.34		34.80 ± 1.27	128.76 ± 4.70	Y		
	09/12/2007	1.57 ± 0.34	5.81 ± 1.26	Y	29.70 ± 1.10	109.89 ± 4.07	Y		
	09/19/2007	2.49 ± 0.40	9.21 ± 1.47	Y	33.70 ± 1.17	124.69 ± 4.33	Y		
	09/26/2007	1.72 ± 0.33	6.36 ± 1.20	Y	26.10 ± 1.07	96.57 ± 3.96	Y		
VAN BUREN GATE	07/03/2007	1.70 ± 0.35	6.29 ± 1.28	Y	30.20 ± 1.16	111.74 ± 4.29	Y		
	07/11/2007	1.90 ± 0.29	7.03 ± 1.09	Y	32.30 ± 0.99	119.51 ± 3.64	Y		
	07/18/2007	2.69 ± 0.32	9.95 ± 1.20	Y	34.80 ± 1.05	128.76 ± 3.89	Y		
	07/25/2007	3.32 ± 0.33	12.28 ± 1.22	Y	30.60 ± 0.89	113.22 ± 3.29	Y		
	08/01/2007	2.59 ± 0.42	9.58 ± 1.54	Y	37.00 ± 1.30	136.90 ± 4.81	Y		
	08/08/2007	2.32 ± 0.34	8.58 ± 1.27	Y	40.70 ± 1.21	150.59 ± 4.48	Y		
	08/15/2007	2.63 ± 0.33	9.73 ± 1.20	Y	36.30 ± 1.06	134.31 ± 3.92	Y		
	08/22/2007	2.37 ± 0.42	8.77 ± 1.55	Y	24.90 ± 1.16	92.13 ± 4.29	Y		
	08/29/2007	2.35 ± 0.44	8.70 ± 1.62	Y	35.50 ± 1.32	131.35 ± 4.88	Y		
	09/05/2007	1.50 ± 0.36	5.55 ± 1.34	Y	33.30 ± 1.19	123.21 ± 4.40	Y		
	09/12/2007	1.30 ± 0.33	4.81 ± 1.24	Y	29.90 ± 1.12	110.63 ± 4.14	Y		
	09/19/2007	2.61 ± 0.42	9.66 ± 1.57	Y	34.70 ± 1.24	128.39 ± 4.59	Y		
	09/26/2007	1.83 ± 0.30	6.77 ± 1.11	Y	25.10 ± 0.96	92.87 ± 3.54	Y		
a. Invalid Sample Result									

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)	
<b>BOUNDARY</b>					
ARCO	07/03/2007	3.29	± 2.22	12.19	± 8.20
	07/11/2007	-1.06	± 1.89	-3.91	± 6.98
	07/18/2007	-0.14	± 2.05	-0.50	± 7.60
	07/25/2007	1.25	± 3.02	4.64	± 11.17
	08/01/2007	0.19	± 2.98	0.69	± 11.03
	08/08/2007	3.41	± 4.05	12.60	± 14.98
	08/15/2007	4.69	± 2.91	17.37	± 10.78
	08/22/2007	5.02	± 4.47	18.59	± 16.56
	08/29/2007	-4.05	± 3.62	-15.00	± 13.40
	09/05/2007	-4.73	± 3.84	-17.50	± 14.20
	09/12/2007	2.56	± 3.06	9.47	± 11.32
	09/19/2007	5.15	± 3.57	19.07	± 13.21
	09/26/2007	-1.66	± 2.28	-6.14	± 8.42
ATOMIC CITY	07/03/2007	4.23	± 2.85	15.65	± 10.53
	07/11/2007	-1.13	± 2.02	-4.17	± 7.46
	07/18/2007	-0.17	± 2.64	-0.65	± 9.77
	07/25/2007	1.19	± 2.88	4.42	± 10.64
	08/01/2007	0.24	± 3.93	0.91	± 14.54
	08/08/2007	2.93	± 3.49	10.85	± 12.90
	08/15/2007	6.78	± 4.21	25.09	± 15.58
	08/22/2007	2.90	± 2.59	10.75	± 9.57
	08/29/2007	-4.21	± 3.76	-15.57	± 13.91
	09/05/2007	-5.15	± 4.18	-19.07	± 15.48
	09/12/2007	3.20	± 3.83	11.84	± 14.16
	09/19/2007	4.91	± 3.40	18.18	± 12.59
	09/26/2007	-1.77	± 2.43	-6.55	± 8.98
BLUE DOME	07/03/2007	-2.14	± 3.25	-7.92	± 12.02
	07/11/2007	-0.55	± 1.40	-2.05	± 5.16
	07/18/2007	-2.48	± 1.55	-9.18	± 5.72
	07/25/2007	-2.23	± 1.52	-8.25	± 5.64
	08/01/2007	0.44	± 1.70	1.64	± 6.27
	08/08/2007	-0.31	± 1.83	-1.14	± 6.75
	08/15/2007	2.10	± 1.53	7.78	± 5.68
	08/22/2007	-1.31	± 1.69	-4.85	± 6.24
	08/29/2007	0.11	± 2.23	0.41	± 8.26
	09/05/2007	1.84	± 1.41	6.80	± 5.22
	09/12/2007	0.30	± 2.02	1.10	± 7.46
	09/19/2007	0.16	± 1.83	0.61	± 6.75
	09/26/2007	0.04	± 1.56	0.16	± 5.78
FAA TOWER	07/03/2007	-2.31	± 3.50	-8.53	± 12.94
	a 07/11/2007	-1.15	± 2.90	-4.25	± 10.73
	07/18/2007	-2.00	± 1.24	-7.38	± 4.60
	a 07/25/2007	-10.04	± 6.86	-37.14	± 25.38
	a 08/01/2007	0.00	± 0.00	0.00	± 0.00
	08/08/2007	-0.40	± 2.38	-1.49	± 8.80
	08/15/2007	2.84	± 2.07	10.52	± 7.67
	a 08/22/2007	-10.44	± 13.44	-38.61	± 49.71
	a 08/29/2007	0.26	± 5.25	0.97	± 19.41

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)			Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		
<b>BOUNDARY</b>							
	09/05/2007	2.21	±	1.70	8.18	±	6.28
	09/12/2007	0.27	±	1.86	1.01	±	6.88
	09/19/2007	0.20	±	2.17	0.72	±	8.02
<b>a</b>	<b>09/26/2007</b>	<b>0.13</b>	<b>±</b>	<b>4.51</b>	<b>0.46</b>	<b>±</b>	<b>16.68</b>
HOWE	07/03/2007	-2.31	±	3.51	-8.55	±	12.98
	07/11/2007	-0.53	±	1.34	-1.97	±	4.97
	07/18/2007	-2.31	±	1.44	-8.55	±	5.33
	07/25/2007	-2.11	±	1.44	-7.82	±	5.34
	08/01/2007	0.41	±	1.57	1.52	±	5.82
	08/08/2007	-0.30	±	1.77	-1.11	±	6.56
	08/15/2007	2.61	±	1.90	9.65	±	7.03
	08/22/2007	-1.16	±	1.49	-4.29	±	5.53
	08/29/2007	0.09	±	1.81	0.33	±	6.71
	09/05/2007	1.82	±	1.39	6.72	±	5.16
	09/12/2007	0.23	±	1.57	0.85	±	5.80
	09/19/2007	0.14	±	1.55	0.52	±	5.75
	09/26/2007	0.04	±	1.60	0.16	±	5.93
MONTEVIEW	07/03/2007	-2.64	±	4.00	-9.76	±	14.80
	07/11/2007	-0.62	±	1.57	-2.30	±	5.81
	07/18/2007	-2.20	±	1.37	-8.13	±	5.07
	07/25/2007	-2.20	±	1.50	-8.14	±	5.56
	08/01/2007	0.37	±	1.40	1.36	±	5.18
	08/08/2007	-0.30	±	1.79	-1.12	±	6.61
	08/15/2007	2.09	±	1.52	7.74	±	5.64
	08/22/2007	-1.10	±	1.42	-4.08	±	5.26
	08/29/2007	0.14	±	2.72	0.50	±	10.06
	09/05/2007	1.85	±	1.42	6.84	±	5.25
	09/12/2007	0.28	±	1.88	1.02	±	6.95
	09/19/2007	0.20	±	2.18	0.73	±	8.07
	09/26/2007	0.05	±	1.73	0.18	±	6.39
MUD LAKE	07/03/2007	-2.39	±	3.62	-8.83	±	13.40
	07/11/2007	-0.46	±	1.17	-1.71	±	4.32
	07/18/2007	-2.32	±	1.45	-8.59	±	5.36
	07/25/2007	-2.31	±	1.58	-8.54	±	5.83
	08/01/2007	0.40	±	1.54	1.49	±	5.70
	08/08/2007	-0.29	±	1.70	-1.07	±	6.30
	08/15/2007	2.72	±	1.98	10.07	±	7.34
	08/22/2007	-1.45	±	1.87	-5.36	±	6.90
	08/29/2007	0.10	±	2.08	0.38	±	7.71
	09/05/2007	1.86	±	1.43	6.90	±	5.29
	09/12/2007	0.33	±	2.27	1.24	±	8.40
	09/19/2007	0.12	±	1.38	0.46	±	5.11
	09/26/2007	0.04	±	1.52	0.16	±	5.61
QA-2	07/03/2007	-2.18	±	3.31	-8.06	±	12.24
	07/11/2007	-0.48	±	1.20	-1.76	±	4.44
	07/18/2007	-2.21	±	1.38	-8.20	±	5.11
	07/25/2007	-2.73	±	1.87	-10.11	±	6.91
	08/01/2007	0.41	±	1.55	1.50	±	5.74

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)			Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		
<b>BOUNDARY</b>							
	08/08/2007	-0.32	±	1.91	-1.19	±	7.05
	08/15/2007	2.24	±	1.63	8.27	±	6.03
	08/22/2007	-1.19	±	1.53	-4.41	±	5.67
	08/29/2007	0.09	±	1.74	0.32	±	6.46
	09/05/2007	2.45	±	1.88	9.07	±	6.96
	09/12/2007	0.28	±	1.90	1.04	±	7.04
	09/19/2007	0.16	±	1.74	0.58	±	6.45
	09/26/2007	0.05	±	1.75	0.18	±	6.48
<b>DISTANT</b>							
BLACKFOOT CMS	07/03/2007	2.79	±	1.87	10.31	±	6.93
	07/11/2007	-0.98	±	1.74	-3.61	±	6.45
	07/18/2007	-0.12	±	1.78	-0.43	±	6.58
	07/25/2007	1.12	±	2.70	4.14	±	9.98
	08/01/2007	0.16	±	2.58	0.59	±	9.54
	08/08/2007	2.33	±	2.77	8.63	±	10.25
	08/15/2007	3.96	±	2.46	14.65	±	9.10
	08/22/2007	2.77	±	2.47	10.27	±	9.14
	08/29/2007	-2.58	±	2.31	-9.55	±	8.53
	09/05/2007	-3.43	±	2.78	-12.68	±	10.29
	09/12/2007	3.48	±	4.17	12.89	±	15.41
	09/19/2007	3.78	±	2.62	14.00	±	9.70
	09/26/2007	-1.62	±	2.22	-6.00	±	8.22
CRATERS	07/03/2007	3.18	±	2.14	11.78	±	7.92
	07/11/2007	-1.09	±	1.94	-4.02	±	7.18
	07/18/2007	-0.16	±	2.49	-0.61	±	9.21
	07/25/2007	1.16	±	2.80	4.30	±	10.35
	08/01/2007	0.17	±	2.68	0.62	±	9.92
	08/08/2007	3.39	±	4.02	12.53	±	14.89
	08/15/2007	5.19	±	3.22	19.20	±	11.92
	08/22/2007	5.08	±	4.52	18.79	±	16.74
	08/29/2007	-4.18	±	3.73	-15.47	±	13.82
	09/05/2007	-4.69	±	3.81	-17.35	±	14.08
	09/12/2007	2.58	±	3.08	9.55	±	11.41
	09/19/2007	5.87	±	4.06	21.70	±	15.04
	09/26/2007	-1.80	±	2.46	-6.65	±	9.11
DUBOIS	07/03/2007	-2.87	±	4.35	-10.60	±	16.09
	07/11/2007	-0.47	±	1.19	-1.75	±	4.41
	07/18/2007	-2.07	±	1.29	-7.67	±	4.78
	07/25/2007	-1.63	±	1.12	-6.05	±	4.13
	08/01/2007	0.56	±	2.15	2.08	±	7.96
	08/08/2007	-0.34	±	2.03	-1.27	±	7.51
	08/15/2007	3.10	±	2.26	11.48	±	8.37
	08/22/2007	-0.97	±	1.24	-3.57	±	4.60
	08/29/2007	0.10	±	2.08	0.39	±	7.71
	09/05/2007	1.98	±	1.52	7.32	±	5.61
a	09/12/2007	1.44	±	9.80	5.35	±	36.25
a	09/19/2007	0.00	±	0.00	0.00	±	0.00
	09/26/2007	0.06	±	2.31	0.24	±	8.53

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)		Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)	
<b>BOUNDARY</b>					
IDAHO FALLS	07/03/2007	-2.25	± 3.41	-8.32	± 12.63
	07/11/2007	-0.47	± 1.19	-1.75	± 4.41
	07/18/2007	-2.44	± 1.52	-9.01	± 5.62
	07/25/2007	-2.19	± 1.50	-8.10	± 5.54
	08/01/2007	0.50	± 1.90	1.84	± 7.02
	08/08/2007	-0.30	± 1.80	-1.13	± 6.66
	08/15/2007	2.68	± 1.96	9.93	± 7.24
	08/22/2007	-1.57	± 2.02	-5.79	± 7.46
	08/29/2007	0.09	± 1.74	0.32	± 6.45
	09/05/2007	2.08	± 1.59	7.68	± 5.89
	09/12/2007	0.34	± 2.29	1.25	± 8.49
	09/19/2007	0.15	± 1.61	0.54	± 5.97
	09/26/2007	0.06	± 2.22	0.23	± 8.20
JACKSON	07/03/2007	3.11	± 2.09	11.51	± 7.74
	07/11/2007	-1.03	± 1.83	-3.80	± 6.79
	07/18/2007	-0.15	± 2.25	-0.55	± 8.31
	07/25/2007	1.10	± 2.64	4.06	± 9.78
	08/01/2007	0.17	± 2.81	0.65	± 10.38
	08/08/2007	2.76	± 3.28	10.22	± 12.14
	08/15/2007	5.09	± 3.16	18.84	± 11.70
	08/22/2007	3.76	± 3.35	13.90	± 12.38
	08/29/2007	-3.28	± 2.93	-12.14	± 10.85
	09/05/2007	-4.80	± 3.90	-17.76	± 14.42
	09/12/2007	2.88	± 3.45	10.66	± 12.75
	09/19/2007	4.39	± 3.04	16.25	± 11.26
	09/26/2007	-2.00	± 2.75	-7.41	± 10.16
REXBURG CMS	07/03/2007	-2.45	± 3.72	-9.06	± 13.75
	07/11/2007	-0.49	± 1.25	-1.83	± 4.62
	07/18/2007	-2.14	± 1.34	-7.92	± 4.94
	07/25/2007	-2.99	± 2.04	-11.05	± 7.55
	08/01/2007	0.47	± 1.79	1.73	± 6.61
	08/08/2007	-0.28	± 1.66	-1.04	± 6.14
	08/15/2007	2.95	± 2.15	10.90	± 7.95
	08/22/2007	-0.92	± 1.18	-3.40	± 4.37
	08/29/2007	0.12	± 2.50	0.46	± 9.26
	09/05/2007	2.34	± 1.79	8.64	± 6.63
	09/12/2007	0.33	± 2.26	1.24	± 8.38
	09/19/2007	0.13	± 1.47	0.49	± 5.44
	09/26/2007	0.04	± 1.44	0.15	± 5.33
<b>INL SITE</b>					
EFS	07/03/2007	3.33	± 2.24	12.30	± 8.28
	07/11/2007	-1.26	± 2.26	-4.67	± 8.34
	07/18/2007	-0.15	± 2.32	-0.57	± 8.57
	07/25/2007	1.18	± 2.85	4.38	± 10.55
	08/01/2007	0.26	± 4.10	0.94	± 15.16
	08/08/2007	3.61	± 4.29	13.36	± 15.88
	08/15/2007	5.34	± 3.32	19.77	± 12.28
	08/22/2007	4.28	± 3.81	15.84	± 14.11

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

Sampling Group and Location		Sampling Date	Result ± 1s Uncertainty (x 10 <sup>-15</sup> µCi/mL)			Result ± 1s Uncertainty (x 10 <sup>-11</sup> Bq/mL)		
<b>BOUNDARY</b>								
		08/29/2007	-3.64	±	3.25	-13.48	±	12.04
		09/05/2007	-4.40	±	3.57	-16.28	±	13.21
		09/12/2007	2.75	±	3.29	10.19	±	12.18
		09/19/2007	5.78	±	4.01	21.40	±	14.82
		09/26/2007	-1.89	±	2.59	-6.99	±	9.58
QA-1	a	07/03/2007	54.16	±	36.43	200.41	±	134.79
		07/11/2007	-1.00	±	1.79	-3.71	±	6.63
		07/18/2007	-0.16	±	2.35	-0.58	±	8.71
		07/25/2007	1.03	±	2.49	3.83	±	9.22
		08/01/2007	0.15	±	2.48	0.57	±	9.18
		08/08/2007	2.84	±	3.38	10.52	±	12.50
		08/15/2007	5.41	±	3.36	20.02	±	12.43
		08/22/2007	2.78	±	2.48	10.28	±	9.16
		08/29/2007	-3.47	±	3.10	-12.82	±	11.46
		09/05/2007	-4.19	±	3.40	-15.50	±	12.58
		09/12/2007	2.37	±	2.84	8.78	±	10.50
		09/19/2007	4.09	±	2.83	15.12	±	10.48
		09/26/2007	-2.12	±	2.90	-7.83	±	10.74
<b>MAIN GATE</b>								
		07/03/2007	3.63	±	2.44	13.42	±	9.02
		07/11/2007	-1.42	±	2.54	-5.25	±	9.38
		07/18/2007	-0.15	±	2.25	-0.55	±	8.34
a		07/25/2007	2.04	±	4.92	7.56	±	18.21
		08/01/2007	0.23	±	3.65	0.84	±	13.49
		08/08/2007	3.03	±	3.60	11.21	±	13.32
		08/15/2007	3.89	±	2.42	14.41	±	8.95
		08/22/2007	5.04	±	4.49	18.64	±	16.61
		08/29/2007	-3.89	±	3.47	-14.38	±	12.85
		09/05/2007	-4.84	±	3.93	-17.92	±	14.54
		09/12/2007	2.75	±	3.29	10.19	±	12.18
		09/19/2007	4.31	±	2.99	15.96	±	11.06
		09/26/2007	-2.32	±	3.18	-8.59	±	11.77
<b>VAN BUREN GATE</b>								
		07/03/2007	3.14	±	2.11	11.62	±	7.82
		07/11/2007	-1.21	±	2.17	-4.49	±	8.02
		07/18/2007	-0.15	±	2.28	-0.56	±	8.42
		07/25/2007	1.05	±	2.54	3.90	±	9.39
		08/01/2007	0.20	±	3.22	0.74	±	11.93
		08/08/2007	3.46	±	4.12	12.82	±	15.23
		08/15/2007	4.98	±	3.09	18.42	±	11.44
		08/22/2007	3.67	±	3.27	13.59	±	12.11
		08/29/2007	-3.94	±	3.52	-14.59	±	13.04
		09/05/2007	-4.46	±	3.62	-16.50	±	13.39
		09/12/2007	2.84	±	3.39	10.51	±	12.56
		09/19/2007	4.63	±	3.21	17.12	±	11.86
		09/26/2007	-1.99	±	2.73	-7.38	±	10.11

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 (x 10 <sup>-18</sup> µCi/mL)			Result ± 1s Uncertainty (x 10 <sup>-13</sup> Bq/mL)			Result > 3s
<b>BOUNDARY</b>									
ARCO	9/29/2007	CESIUM-137	81.00	±	172.00	299.70	±	636.40	
ATOMIC CITY	9/29/2007	AMERICIUM-241	3.15	±	1.31	11.67	±	4.84	
		CESIUM-137	56.90	±	248.00	210.53	±	917.60	
		PLUTONIUM-238	4.69	±	1.82	17.36	±	6.72	
		PLUTONIUM-239/40	0.67	±	0.67	2.48	±	2.49	
BLUE DOME	9/29/2007	CESIUM-137	-98.90	±	395.00	-365.93	±	1461.50	
FAA TOWER	9/29/2007	CESIUM-137	-126.00	±	299.00	-466.20	±	1106.30	
		STRONTIUM-90	-7.00	±	21.40	-25.90	±	79.18	
		CESIUM-137	-7.84	±	160.00	-29.01	±	592.00	
MONTEVIEW	9/29/2007	AMERICIUM-241	0.83	±	0.42	3.08	±	1.56	
		CESIUM-137	-113.00	±	392.00	-418.10	±	1450.40	
		PLUTONIUM-238	31.07	±	12.38	114.96	±	45.79	
		PLUTONIUM-239/40	3.88	±	6.77	14.37	±	25.03	
MUD LAKE	9/29/2007	CESIUM-137	-81.40	±	160.00	-301.18	±	592.00	
		STRONTIUM-90	42.40	±	19.90	156.88	±	73.63	
MUD LAKE (QA-2)	9/29/2007	CESIUM-137	-344.00	±	406.00	-1272.80	±	1502.20	
		STRONTIUM-90	-0.79	±	12.00	-2.94	±	44.40	
<b>DISTANT</b>									
BLACKFOOT	9/29/2007	AMERICIUM-241	0.96	±	0.40	3.56	±	1.48	
		CESIUM-137	-95.30	±	165.00	-352.61	±	610.50	
		PLUTONIUM-238	19.26	±	14.69	71.26	±	54.35	
		PLUTONIUM-239/40	0.00	±	0.00	0.00	±	0.00	
CRATERS	9/29/2007	CESIUM-137	35.90	±	195.00	132.83	±	721.50	
DUBOIS	9/29/2007	CESIUM-137	551.00	±	221.00	2038.70	±	817.70	
IDAHO FALLS	9/29/2007	CESIUM-137	-268.00	±	427.00	-991.60	±	1579.90	
		STRONTIUM-90	9.43	±	15.90	34.89	±	58.83	
JACKSON	9/29/2007	CESIUM-137	-95.50	±	216.00	-353.35	±	799.20	
REXBURG CMS	9/29/2007	AMERICIUM-241	2.33	±	1.03	8.64	±	3.80	
		CESIUM-137	126.00	±	181.00	466.20	±	669.70	
		PLUTONIUM-238	2.75	±	1.15	10.16	±	4.25	
		PLUTONIUM-239/40	1.37	±	1.03	5.08	±	3.81	

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 <sup>-18</sup> µCi/mL)			Result ± 1s Uncertainty (x 10 <sup>-13</sup> Bq/mL)			Result > 3s
<b>INL SITE</b>									
EFS	9/29/2007	AMERICIUM-241	1.48	±	0.67	5.47	±	2.48	
		CESIUM-137	-471.00	±	453.00	-1742.70	±	1676.10	
		PLUTONIUM-238	3.35	±	1.61	12.40	±	5.95	
		PLUTONIUM-239/40	3.91	±	1.52	14.46	±	5.63	
EFS (QA-1)	9/29/2007	AMERICIUM-241	2.11	±	0.88	7.80	±	3.24	
		CESIUM-137	94.20	±	172.00	348.54	±	636.40	
		PLUTONIUM-238	0.64	±	0.46	2.37	±	1.69	
		PLUTONIUM-239/40	0.32	±	0.55	1.18	±	2.05	
MAIN GATE	9/29/2007	CESIUM-137	-116.00	±	229.00	-429.20	±	847.30	
		STRONTIUM-90	43.90	±	14.30	162.43	±	52.91	Y
VAN BUREN GATE	9/29/2007	CESIUM-137	235.00	±	215.00	869.50	±	795.50	
		STRONTIUM-90	23.00	±	11.40	85.10	±	42.18	



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

Sampling Group and Location	Start Date	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty			Collection Medium	Result > 3s
			(x 10 <sup>-13</sup> µCi/mL <sub>air</sub> )			(x 10 <sup>-9</sup> Bq/mL <sub>air</sub> )				
<b>BOUNDARY</b>										
ATOMIC CITY	06/13/2007	07/03/2007	9.23	±	1.46	34.13	±	5.39	Molecular Sieve	Y
ATOMIC CITY	07/03/2007	07/19/2007	9.53	±	2.15	35.25	±	7.94	Molecular Sieve	Y
ATOMIC CITY	07/19/2007	08/02/2007	14.16	±	2.47	52.39	±	9.15	Molecular Sieve	Y
ATOMIC CITY	08/02/2007	08/15/2007	10.02	±	2.10	37.09	±	7.79	Molecular Sieve	Y
ATOMIC CITY	08/15/2007	09/05/2007	14.92	±	1.98	55.21	±	7.33	Molecular Sieve	Y
ATOMIC CITY	09/05/2007	09/26/2007	8.49	±	1.72	31.43	±	6.35	Molecular Sieve	Y
<b>DISTANT</b>										
BLACKFOOT	06/28/2007	07/18/2007	10.39	±	1.86	38.43	±	6.89	Molecular Sieve	Y
BLACKFOOT	07/18/2007	08/01/2007	12.51	±	2.54	46.29	±	9.41	Molecular Sieve	Y
BLACKFOOT	08/01/2007	08/15/2007	9.95	±	2.48	36.81	±	9.19	Molecular Sieve	Y
BLACKFOOT	08/15/2007	08/29/2007	4.90	±	2.55	18.13	±	9.43	Molecular Sieve	
BLACKFOOT	08/29/2007	09/12/2007	12.66	±	2.57	46.85	±	9.52	Molecular Sieve	Y
IDAHO FALLS	06/27/2007	07/11/2007	9.66	±	2.46	35.75	±	9.09	Molecular Sieve	Y
IDAHO FALLS	07/11/2007	07/25/2007	11.01	±	2.55	40.74	±	9.45	Molecular Sieve	Y
IDAHO FALLS	07/25/2007	08/03/2007	14.38	±	3.66	53.19	±	13.54	Molecular Sieve	Y
IDAHO FALLS	08/03/2007	08/15/2007	17.33	±	2.84	64.11	±	10.49	Molecular Sieve	Y
IDAHO FALLS	08/15/2007	08/29/2007	9.77	±	2.49	36.15	±	9.21	Molecular Sieve	Y
IDAHO FALLS	08/29/2007	09/13/2007	12.69	±	2.70	46.94	±	10.00	Molecular Sieve	Y
IDAHO FALLS	09/13/2007	09/27/2007	12.10	±	2.55	44.78	±	9.42	Molecular Sieve	Y
REXBURG CMS	06/27/2007	07/11/2007	8.19	±	2.45	30.31	±	9.06	Molecular Sieve	Y
REXBURG CMS	07/11/2007	07/25/2007	12.32	±	2.67	45.59	±	9.89	Molecular Sieve	Y
REXBURG CMS	07/25/2007	08/08/2007	4.93	±	1.93	18.26	±	7.15	Molecular Sieve	
REXBURG CMS	08/08/2007	08/22/2007	9.68	±	2.73	35.82	±	10.10	Molecular Sieve	Y
REXBURG CMS	08/22/2007	09/05/2007	6.09	±	2.63	22.52	±	9.74	Molecular Sieve	
REXBURG CMS	09/05/2007	09/26/2007	7.24	±	1.90	26.81	±	7.03	Molecular Sieve	Y

**TABLE C-5. Monthly and Weekly Tritium Concentrations in Precipitation.**

Location	Start Date	End Date	Result $\pm$ 1s Uncertainty			Result $\pm$ 1s Uncertainty			Result > 3s
			(pCi/L)			(Bq/L)			
Idaho Falls	7/2/2007	8/2/2007	164.00	$\pm$	31.30	6.07	$\pm$	1.16	Y
CFA	6/1/2007	7/2/2007	295.00	$\pm$	33.80	10.92	$\pm$	1.25	Y
	7/2/2007	8/1/2007	182.00	$\pm$	31.60	6.73	$\pm$	1.17	Y
	8/1/2007	9/4/2007	138.00	$\pm$	32.50	5.11	$\pm$	1.20	Y
EFS	8/29/2007	9/5/2007	207.00	$\pm$	34.20	7.66	$\pm$	1.27	Y
	9/12/2007	9/19/2007	165.00	$\pm$	33.40	6.11	$\pm$	1.24	Y

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

Location	Sampling Date	Iodine-131				Cesium-137				
		Result ± 1s Uncertainty (pCi <sup>†</sup> /L)		Result ± 1s Uncertainty (Bq <sup>†</sup> /L)		Result ± 1s Uncertainty (pCi/L)		Result ± 1s Uncertainty (Bq/L)		Result > 3s
BLACKFOOT										
	07/03/2007	-0.76 ± 1.53	-0.028 ± 0.057		-0.09 ± 1.28	-0.003 ± 0.047				
	08/07/2007	1.91 ± 1.11	0.071 ± 0.041		-0.39 ± 0.94	-0.015 ± 0.035				
	09/04/2007	2.33 ± 1.46	0.086 ± 0.054		0.06 ± 1.25	0.002 ± 0.046				
DIETRICH										
	07/03/2007	1.85 ± 1.05	0.069 ± 0.039		-0.37 ± 1.11	-0.014 ± 0.041				
	08/07/2007	-0.30 ± 1.28	-0.011 ± 0.047		-0.14 ± 0.90	-0.005 ± 0.033				
	09/04/2007	-0.14 ± 1.09	-0.005 ± 0.040		0.45 ± 0.93	0.017 ± 0.034				
HOWE										
	07/03/2007	-5.70 ± 2.95	-0.211 ± 0.109		-2.15 ± 3.01	-0.080 ± 0.111				
	08/07/2007	-1.97 ± 1.19	-0.073 ± 0.044		0.43 ± 0.92	0.016 ± 0.034				
	09/04/2007	-1.08 ± 1.23	-0.040 ± 0.046		0.09 ± 0.90	0.003 ± 0.033				
Duplicate	09/04/2007	-0.36 ± 2.66	-0.013 ± 0.099		1.02 ± 2.57	0.038 ± 0.095				
IDAHO FALLS										
	07/03/2007	-1.15 ± 2.65	-0.043 ± 0.098		-3.85 ± 3.04	-0.143 ± 0.113				
	08/07/2007	-1.18 ± 2.53	-0.044 ± 0.094		1.07 ± 2.66	0.040 ± 0.099				
	09/04/2007	-0.31 ± 1.92	-0.011 ± 0.071		-1.44 ± 1.42	-0.053 ± 0.053				
MORELAND										
	07/03/2007	-1.63 ± 1.71	-0.060 ± 0.063		1.62 ± 1.22	0.060 ± 0.045				
	08/07/2007	-0.47 ± 1.71	-0.018 ± 0.063		0.62 ± 1.39	0.023 ± 0.051				
	09/04/2007	-0.78 ± 1.72	-0.029 ± 0.064		1.16 ± 1.34	0.043 ± 0.050				
RUPERT										
	07/03/2007	0.41 ± 0.90	0.015 ± 0.033		0.08 ± 1.05	0.003 ± 0.039				
	08/07/2007	1.36 ± 0.81	0.050 ± 0.030		0.52 ± 0.80	0.019 ± 0.030				
	09/04/2007	0.08 ± 0.82	0.003 ± 0.030		1.36 ± 0.81	0.050 ± 0.030				
Duplicate	09/04/2007	-0.63 ± 1.31	-0.023 ± 0.049		1.68 ± 0.93	0.062 ± 0.034				

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

TERRETON												
07/03/2007	1.48	±	2.01	0.055	±	0.074	-0.22	±	1.40	-0.008	±	0.052
08/07/2007	-1.91	±	2.14	-0.071	±	0.079	-0.20	±	1.42	-0.008	±	0.053
09/04/2007	0.23	±	1.43	0.008	±	0.053	0.40	±	0.90	0.015	±	0.033
UCON												
07/03/2007	1.13	±	0.83	0.042	±	0.031	1.18	±	1.03	0.044	±	0.038
07/10/2007	1.19	±	1.05	0.044	±	0.039	-1.75	±	1.12	-0.065	±	0.041
07/17/2007	0.19	±	1.08	0.007	±	0.040	2.61	±	0.93	0.097	±	0.034
07/24/2007	0.08	±	1.09	0.003	±	0.040	1.02	±	0.92	0.038	±	0.034
07/31/2007	-3.93	±	14.40	-0.146	±	0.533	2.25	±	0.92	0.083	±	0.034
08/07/2007	-0.64	±	0.74	-0.024	±	0.028	0.46	±	0.79	0.017	±	0.029
08/14/2007	0.65	±	1.07	0.024	±	0.040	0.70	±	0.90	0.026	±	0.033
08/21/2007	-0.19	±	1.06	-0.007	±	0.039	-0.69	±	0.91	-0.025	±	0.034
08/28/2007	0.39	±	1.09	0.014	±	0.040	1.83	±	0.89	0.068	±	0.033
09/04/2007	-0.74	±	0.73	-0.028	±	0.027	0.93	±	0.80	0.034	±	0.030
09/11/2007	0.82	±	1.08	0.030	±	0.040	0.52	±	0.90	0.019	±	0.033
09/18/2007	-1.00	±	1.06	-0.037	±	0.039	0.91	±	0.92	0.034	±	0.034
09/25/2007	-0.48	±	1.08	-0.018	±	0.040	1.42	±	0.90	0.053	±	0.033

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

		Cesium-137						
Location	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty			Result > 3s
		pCi/g			(x 10 <sup>-2</sup> Bq/g)			
ATOMIC CITY	07/09/2007	0.07	±	0.05	0.26	±	0.18	
BLACKFOOT	07/19/2007	-0.04	±	0.05	-0.16	±	0.18	
EFS	07/09/2007	0.15	±	0.08	0.55	±	0.30	
FAA TOWER	07/09/2007	-0.02	±	0.08	-0.06	±	0.29	
IDAHO FALLS	07/09/2007	-0.07	±	0.09	-0.26	±	0.33	
MONTEVIEW	07/09/2007	0.11	±	0.07	0.42	±	0.27	
		Strontium-90						
Location	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty			Result > 3s
		pCi/g			(x 10 <sup>-2</sup> Bq/g)			
ATOMIC CITY	07/09/2007	0.026	±	0.004	0.10	±	0.01	Y
BLACKFOOT	07/19/2007	0.017	±	0.004	0.06	±	0.01	Y
EFS	07/09/2007	0.039	±	0.044	0.15	±	0.16	
FAA TOWER	07/09/2007	0.052	±	0.028	0.19	±	0.10	
IDAHO FALLS	07/09/2007	0.096	±	0.008	0.35	±	0.03	Y
MONTEVIEW	07/09/2007	0.064	±	0.003	0.24	±	0.01	Y

**Table C-8. Cesium-137 and Strontium-90 Concentrations in Wheat**

		<b>Cesium-137</b>					
<b>Sampling Date</b>	<b>Location</b>	<b>Result ± 1s Uncertainty</b>			<b>Result ± 1s Uncertainty</b>		
		<b>pCi/kg</b>			<b>Bq/kg</b>		
							<b>Result &gt; 3s</b>
08/24/07	AMERICAN FALLS	-0.51	±	1.50	-0.02	±	0.06
09/19/07	ARCO	1.03	±	1.91	0.04	±	0.07
08/22/07	BLACKFOOT	1.17	±	1.51	0.04	±	0.06
08/29/07	CAREY	1.44	±	1.99	0.05	±	0.07
08/22/07	HOWE	5.24	±	7.05	0.19	±	0.26
08/21/07	IDAHO FALLS	0.34	±	1.99	0.01	±	0.07
08/21/07	IDAHO FALLS (DUP)	0.39	±	2.30	0.01	±	0.09
08/24/07	MINIDOKA	-1.53	±	2.29	-0.06	±	0.08
08/22/07	MUD LAKE	4.21	±	2.13	0.16	±	0.08
08/24/07	RUPERT	4.97	±	4.90	0.18	±	0.18
08/23/07	TABER	-0.59	±	4.60	-0.02	±	0.17
		<b>Strontium-90</b>					
		<b>Result ± 1s Uncertainty</b>			<b>Result ± 1s Uncertainty</b>		
		<b>pCi/kg</b>			<b>Bq/kg</b>		
							<b>Result &gt; 3s</b>
08/24/07	AMERICAN FALLS	1.27	±	2.77	0.05	±	0.10
09/19/07	ARCO	-0.74	±	2.95	-0.03	±	0.11
08/22/07	BLACKFOOT	3.79	±	2.51	0.14	±	0.09
08/29/07	CAREY	7.36	±	2.51	0.27	±	0.09
08/22/07	HOWE	5.18	±	5.45	0.19	±	0.20
08/21/07	IDAHO FALLS	2.03	±	3.62	0.08	±	0.13
08/21/07	IDAHO FALLS (DUP)	9.03	±	3.36	0.33	±	0.12
08/24/07	MINIDOKA	-1.31	±	2.75	-0.05	±	0.10
08/22/07	MUD LAKE	7.96	±	4.89	0.29	±	0.18
08/24/07	RUPERT	4.50	±	2.74	0.17	±	0.10
08/23/07	TABER	-1.60	±	2.46	-0.06	±	0.09

**Table C-9. Cesium-137 and Iodine-131 Concentrations in Large Game Animals**

Species	Collection Date	Tissue	Analyte	Result ± 1s Uncertainty			Result ± 1s Uncertainty			Result > 3s
				(pCi/kg wet weight)			(x 10 <sup>-2</sup> Bq/kg wet weight)			
PRONGHORN	8/29/2007	Muscle	<sup>131</sup> I	4.97	±	3.76	18.39	±	13.91	Y
			<sup>137</sup> Cs	7.32	±	1.49	27.08	±	5.51	

**APPENDIX D**  
***STATISTICAL ANALYSIS RESULTS***



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

<b>Parameter</b>	<b>P<sup>a</sup></b>
<b>Gross Alpha</b>	
Quarter	0.53
July	0.62
August	0.14
September	0.73
<b>Gross Beta</b>	
Quarter	0.40
July	0.19
August	0.75
September	0.46
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.**

Parameter	Mann-Whitney U test	
	Week	P <sup>a</sup>
<b>Gross Alpha</b>		
	July 3	0.09
	July 11	0.94
	July 18	0.09
	July 25	0.02
	August 1	0.11
	August 8	0.32
	August 15	0.89
	August 22	0.63
	August 29	0.04
	September 5	0.39
	September 12	0.94
	September 19	0.12
	September 26	0.69
<b>Gross Beta</b>		
	July 3	0.39
	July 11	0.30
	July 18	0.12
	July 25	0.63
	August 1	0.42
	August 8	0.67
	August 15	0.35
	August 22	0.34
	August 29	0.79
	September 5	0.05
	September 12	0.87
	September 19	0.06
	September 26	0.94
a. A 'p' value greater than 0.05 signifies no statistical difference between data groups.		