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Idaho National Laboratory Offsite Environmental Surveillance Program Report: Second Quarter 2005

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EXECUTIVE SUMMARY

None of the radionuclides detected in any of the samples collected during the second quarter of 2005 could be directly linked with INL 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. 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. (See Table E-1.)

This report for the second quarter, 2005, contains results from the Environmental Surveillance, Education and Research (ESER) Program's monitoring of the Department of Energy's Idaho National Laboratory's (INL) offsite environment, April 1 through June 30, 2005. All sample types (media) and the sampling schedule followed during 2005 are listed in Appendix A. Specifically, this report contains the results for the following:

- Air sampling, including air filters and charcoal cartridges, atmospheric moisture, and 10-micron particulate matter (PM_{10});
- Water sampling, including precipitation, surface water, and drinking water;
- Agricultural product sampling, including milk and sheep;
- Measurement of external exposure, using environmental dosimetry.

Gross alpha and gross beta measurements are used as general indicators of the presence of radionuclides. Gross alpha and gross beta results were found to have no discernable statistical distribution during the second quarter of 2005. Because of this, these data were statistically analyzed using nonparametric methods, including the use of the median to represent central tendency. At no time during the second quarter were weekly, monthly, or quarterly gross alpha or gross beta concentrations in air collected at Boundary locations statistically greater than corresponding data for Distant locations, as one would expect if the INL were a significant source of radionuclide contamination. There were no statistical differences between gross alpha or gross beta results when grouped by location on a quarterly basis. Statistical analysis by month also showed no statistical difference between locations for gross alpha or gross beta.

Weekly comparisons of gross alpha concentrations at Distant and Boundary locations showed no statistical differences during the second quarter of 2005. Gross beta results were statistically greater at Distant locations than at Boundary locations during the week of June 8, 2005.

Iodine-131 (^{131}I) was not detected in any batch of charcoal cartridges during the second quarter.

Selected quarterly composite filter samples were analyzed for gamma emitting radionuclides, strontium-90 (^{90}Sr), plutonium-238 (^{238}Pu), plutonium-239/240 ($^{239/240}Pu$), and americium-241 (^{241}Am). None of these radionuclides were detected in the second quarter.

Seventeen atmospheric moisture samples were obtained during the second quarter of 2005 and analyzed for tritium. One sample from Blackfoot, two samples from Atomic City and three samples each from Idaho Falls and Rexburg exceeded their respective 3s levels. The maximum value was well below the DOE DCG for tritium in air.

The ESER Program operates three PM_{10} samplers for particulate sampling, one each at Rexburg, Blackfoot, and Atomic City. Sampling of PM_{10} is informational as no analyses are conducted for contaminants. PM_{10} concentrations were well below all health standard levels for all samples. The maximum 24-hour particulate concentration was 33.33 $\mu g/m^3$ on May 27, 2005, at the Rexburg CMS. This is well below the EPA Air Quality Standard of 150 $\mu g/m^3$.

Sufficient precipitation occurred to allow collection of 13 samples—two from Idaho Falls, three from the Central Facilities Area (CFA) and eight weekly samples from the Experimental Field Station (EFS) on the INL. Tritium was detected above the 3s level in eight of the samples. Measured concentrations were similar at distant and INL locations, indicating that an INL origin is not likely for the detected tritium. The maximum concentration was below any comparison standards.

Fourteen drinking water samples and one duplicate were collected from selected taps throughout southeast Idaho during the second quarter 2005. Samples were analyzed for gross alpha, gross beta, and tritium (^3H). One of the samples exceeded its 3s value for gross alpha and two others exceeded for tritium. The maximum value of both was below the EPA limits established under the Safe Drinking Water Act and DOE DCGs. Eight samples exceeded the 3s value for gross beta. The maximum gross beta concentration measured, (13.5 ± 1.2) pCi/L, was from Shoshone and was below the EPA Safe Water Drinking Water Act (SDWA) screening limit of 50 pCi/L and the DOE DCG of 100 pCi/L. Levels of gross beta activity observed are not unusual given the basaltic terrain.

Six surface water samples (including one duplicate) were collected from locations throughout southeast Idaho. Samples were analyzed for gross alpha, gross beta, and tritium (^3H). None of the samples exceeded their 3s value for tritium or gross alpha. Gross beta activities were detected in five of the six samples. Results were less that SDWA screening limits and DOE DCGs and were typical of historical and regional measurements.

Milk samples were collected weekly in Idaho Falls and monthly at eight other locations around the INL. All samples were analyzed for gamma-emitting radionuclides. Iodine-131 and ^{137}Cs concentrations were not detected in any milk sample. All five samples analyzed had ^{90}Sr concentrations above the 3s value. These values were consistent with historic measurements and are similar to those reported by the Environmental Protection Agency throughout the region. Tritium was not detected in any of the four samples analyzed.

Individual sheep from three separate flocks were sampled including a control flock in Dubois from the Experimental Sheep Station, a flock from a southern INL allotment, and a flock from a northern INL allotment. Two sheep were taken from each flock. Thyroid, muscle, and liver tissue were collected and analyzed for gamma emitting radionuclides. No ^{131}I was found in any of the samples. Analysis for ^{137}Cs showed results greater than 3s in two samples from two different animals: one from the liver of a northern allotment sheep and one from the muscle sample of a southern allotment sheep. All concentrations of ^{137}Cs were similar to those found in both onsite and offsite sheep samples during recent years.

Environmental dosimeter locations are also divided into Boundary and Distant groupings. Boundary exposure rates ranged from a low of 0.27 mR/day to 0.36 mR/day. The overall Boundary average was 0.33 mR/day. The Distant group ranged from 0.29 mR/day to 0.40 mR/day, with an overall average exposure also of 0.34 mR/day. No statistical difference existed between Boundary and Distant locations. All exposure results are consistent with those measured historically.

Table E-1 Summary of results for the second quarter of 2005.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	There were no statistical differences noted for monthly or quarterly gross alpha or gross beta concentrations measured at INL, Boundary, and Distant locations. Gross beta concentrations were statistically higher at Distant locations than at Boundary locations during the week of June 8. No result exceeded the DCG for gross alpha or gross beta activity in air.
		Gamma-emitting radionuclides, select actinides, ^{90}Sr	Gamma-emitting radionuclides, ^{241}Am, $^{239/240}$Pu, and ^{90}Sr were not detected in any composite sample.
	Charcoal Cartridge	Iodine-131	No detections of ^{131}I were made during the second quarter.
	PM_{10}	Particulate matter	Forty-four valid samples were collected from three locations. No regulatory limits were exceeded.
Atmospheric Moisture	Liquid	Tritium	Seventeen atmospheric moisture samples were collected. Nine of the results were greater than the 3s uncertainty. No sample result exceeded the DCG for tritium in air.
Precipitation	Liquid	Tritium	Eight of thirteen samples had tritium results greater than the 3s uncertainty. All samples were well below regulatory limits for tritium in drinking water and were within the range of historical measurements.
Drinking Water	Liquid	Gross alpha, gross beta, tritium	Gross alpha activity was detected in one sample from Fort Hall. Gross beta activity was measured in 8 of 15 samples. The maximum was well below the EPA Safe Drinking Water Act limits. Tritium was detected in two samples at concentrations many times lower than the EPA regulatory level.
Surface Water	Liquid	Gross alpha, gross beta, tritium	No tritium or gross alpha activity was detected in any of the six samples collected. Gross beta activity was measured above the 3s values in five samples. All concentrations were below EPA and DOE limits, and ere within historical measurements.
Milk	Liquid	Iodine-131, gamma emitting radionuclides, ^{90}Sr, and tritium	Strontium-90 was detected in all five samples. All results were within historical measurements and within results reported by the EPA ERAMS program for Region 10. No other man-made radionuclides were detected in the second quarter.

Sheep	Tissue	Iodine-131, gamma emitting radionuclides	Cesium-137 was detected in two samples: one muscle sample and one liver sample. Samples came from two sheep-one collected from the Southern grazing allotment and one collected from the Northern grazing allotment.
Game Animals	Tissue	Iodine-131, gamma emitting radionuclides	No game animals were available for sampling during the second quarter.
Environmental Radiation	TLD	Ambient ionizing radiation	Values were consistent with expected exposures given the altitude and location of the TLD's. There were no statistical differences between Boundary and Distant location results.

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LIST OF ABBREVIATIONS

AEC	Atomic Energy Commission
ANL-W	Argonne National Laboratory-West
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
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISU	Idaho State University
MDC	minimum detectable concentration
M&O	Management and Operating
NRTS	National Reactor Testing Station
PM	particulate matter
PM_{10}	particulate matter less than 10 micrometers in diameter
SI	Systeme International d'Unites
TLDs	thermoluminescent dosimeters
TRA	Test Reactor Area
UI	University of Idaho
WSU	Washington State University

LIST OF UNITS

Bq	becquerel
Ci	curie
g	gram
L	liter
μCi	microcurie
mL	milliliter
mR	milliroentgens
mrem	millirem (rem = unit of dose equivalent [roentgen-equivalent-man])
mSv	millisieverts
pCi	picocurie
R	Roentgen
μSv	microsieverts

1. ESER PROGRAM DESCRIPTION

Operations at the Idaho National Laboratory (INL) 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 2004). During calendar year 2005, environmental monitoring within the INL boundaries was primarily the responsibility of the INL Management and Operating (M&O) contractor, while monitoring outside the INL 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 (UI) and Washington State University (WSU) for research, and MWH Global, Inc. and North Wind, Inc. for technical support. This report contains monitoring results from the ESER Program for samples collected during the second quarter of 2005 (April 1 – June 30, 2005).

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;
- Assess the potential radiation dose to members of the public from INL effluents, and;
- 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;
- moisture in air at four locations around the INL;
- surface water at five locations on the Snake River;
- drinking water at 14 locations around the INL;
- agricultural products, including milk at 10 dairies around the INL, potatoes from at least five local producers, wheat from approximately 10 local producers, lettuce from approximately nine home-owned gardens around the INL and two maintained by ESER at Atomic City and the EFS, and four sheep from two operators which graze their sheep on the INL;
- soil from 12 locations around the INL biennially;
- environmental dosimeters from 15 locations semi-annually; and
- various numbers of wildlife including big game (pronghorn, mule deer, and elk), waterfowl, doves, and marmots sampled on and near the INL.

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 Idaho State University (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 Severn-Trent, Inc of Richland, WA.

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 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 the Environmental Radiation Ambient Monitoring System (ERAMS) network (EPA 2003). 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 is comprised of a nationwide network of sampling stations that provide air, precipitation, surface water, 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 ERAMS data collected at Idaho Falls are not reported by the ESER Program but are available through the EPA ERAMS website (http://www.epa.gov/enviro/html/erams/).

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 Annual Site Environmental Report for each calendar year. Annual reports also include data collected by other INL 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 releases, meteorological data, and worldwide events that might conceivably have an effect on the INL environment. First, field collection and laboratory information are reviewed to determine identifiable errors that would invalidate or limit use of the data. Examples of such limitations include insufficient sample volume, torn filters, evidence of laboratory cross-contamination or quality control issues. Data that pass initial screening are further evaluated using statistical methods. Statistical tools are necessary for data evaluation particularly since environmental measurements typically involve the determination of minute concentrations, which are difficult to detect and even more difficult to distinguish from other measurements.

Results are presented in this report with an analytical uncertainty term, *s*, where "*s*" is the estimated sample standard deviation (σ), assuming a Guassian 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 (Bartholmay, 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 (2000).

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.

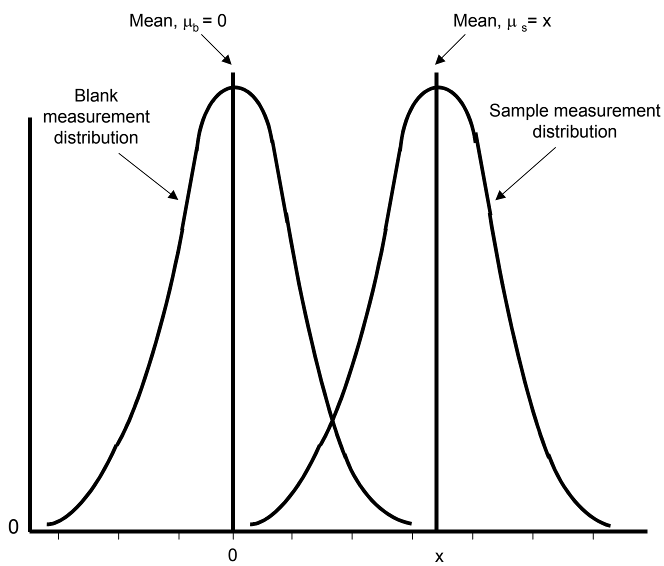


Figure 1. Example overlap of blank and sample measurement distributions.

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. A more detailed discussion about confidence in detections may be found in Confidence in Detections under Helpful Information.

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

The INL is a nuclear energy research and environmental management facility. It is owned and administered by the U.S. Department of Energy, Idaho Operations Office (DOE-ID) and occupies about 890 mi^2 (2,300 km^2) of the upper Snake River Plain in Southeastern Idaho. The history of the INL 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 Idaho National Laboratory (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, Idaho Cleanup Project (ICP) is now a separately managed effort. The ICP is charged with safely and cost-effectively completing the majority of cleanup work from past laboratory missions by 2012.

3. AIR SAMPLING

The primary pathway by which radionuclides can move off the INL is through the air and for this reason the air pathway is the primary focus of monitoring on and around the INL. 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 and analyzed for tritium. Concentrations of airborne particulates less than 10 micrometers in diameter (PM_{10}) were measured for comparison with EPA standards at three locations. Air sampling activities and results for the second quarter, 2005 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 second quarter of 2005 (Figure 2). Four of these samplers are located on the INL, nine are situated off the INL near the boundary, and five have been placed at locations distant to the INL. Samplers are divided into INL, Boundary, and Distant groups to determine if there is a gradient of radionuclide concentrations, increasing towards the INL. Each replicate sampler is relocated every year to a new location. One replicate sampler was placed at Howe (Boundary location) and one at the INL Main Gate (onsite location) during 2005. An average of 14,643 ft^3 (415 m^3) of air was sampled at each location, each week, at an average flow rate of 1.45 ft^3/min (0.04 m^3/min). Particulates in air were collected on glass fiber particulate filters (1.2-µm pore size). Gases passing through the filter were collected with an activated charcoal cartridge.

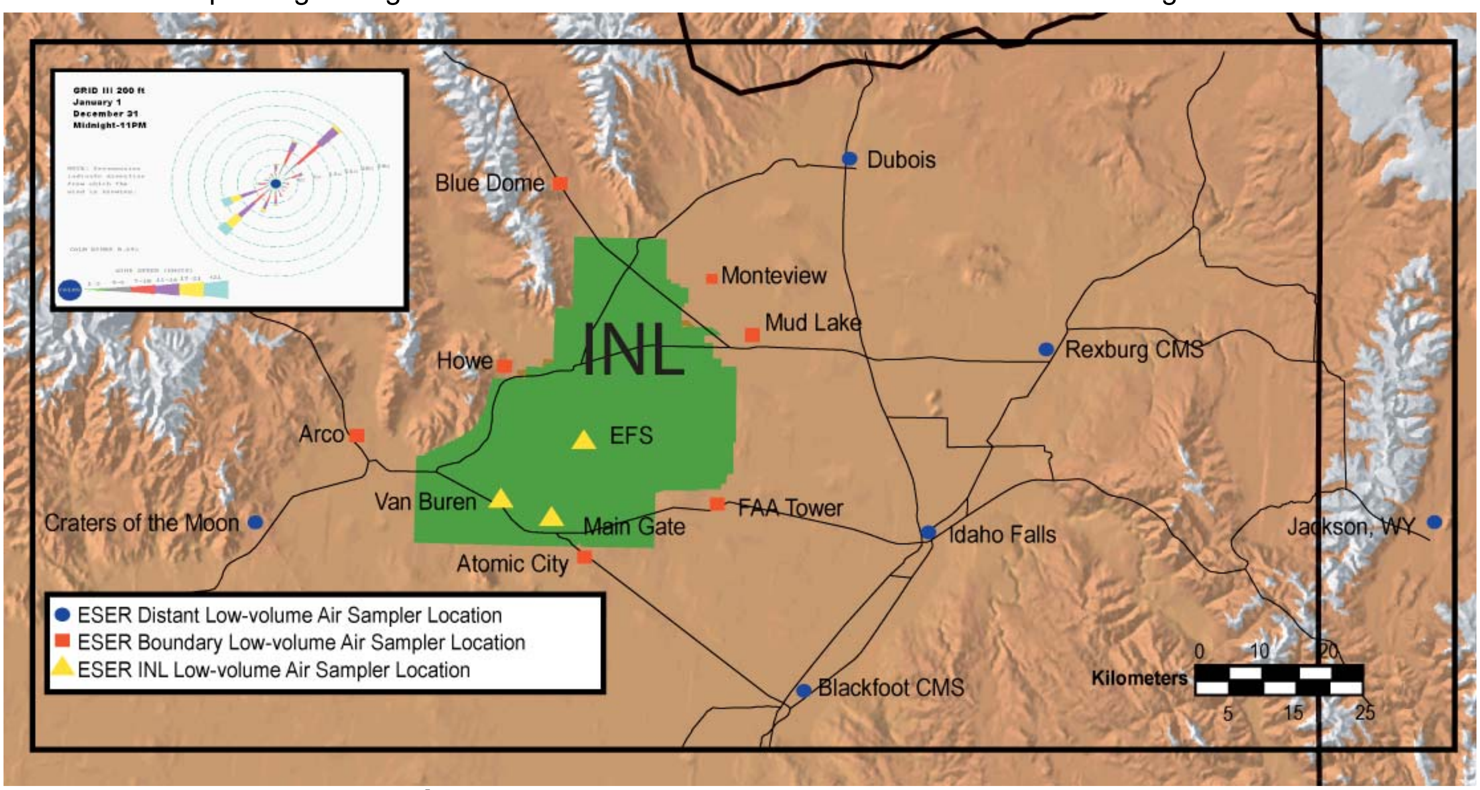


Figure 2. Low-volume air sampler locations.

Filters and charcoal cartridges were changed weekly at each station during the quarter. Each particulate filter was analyzed for gross alpha and gross beta radioactivity using thin-window gas flow proportional counting systems after waiting about four days for naturally-occurring daughter products of radon and thorium to decay. More information concerning gross alpha and beta radioactivity can be found in Gross versus Specific Analyses under Helpful Information.

The weekly particulate filters collected during the quarter for each location were composited and analyzed for gamma-emitting radionuclides. 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, Boundary, and Distant locations for the second quarter of 2005 are shown in Figure 3. The data were tested for normality prior to statistical analyses. The data showed 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 25th and 75th percentiles, and whiskers representing the non-outlier range. Note that 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 second 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 and extreme values lie within the range of measurements made within the past five years. Thus, rather than dismissing the outliers, they were included in the subsequent statistical analyses. Further discussion of box plots may be found in Determining Statistical Differences under Helpful Information.

Figure 3 graphically shows that the gross alpha measurements made at INL, Boundary, and Distant locations are similar for the second quarter. If the INL were a significant source of offsite contamination, concentrations of contaminants could be statistically greater at Boundary locations than at Distant locations. 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, 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. There were no statistical differences in gross alpha concentrations between location groups during the second quarter 2005.

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, Boundary, and Distant data groups.

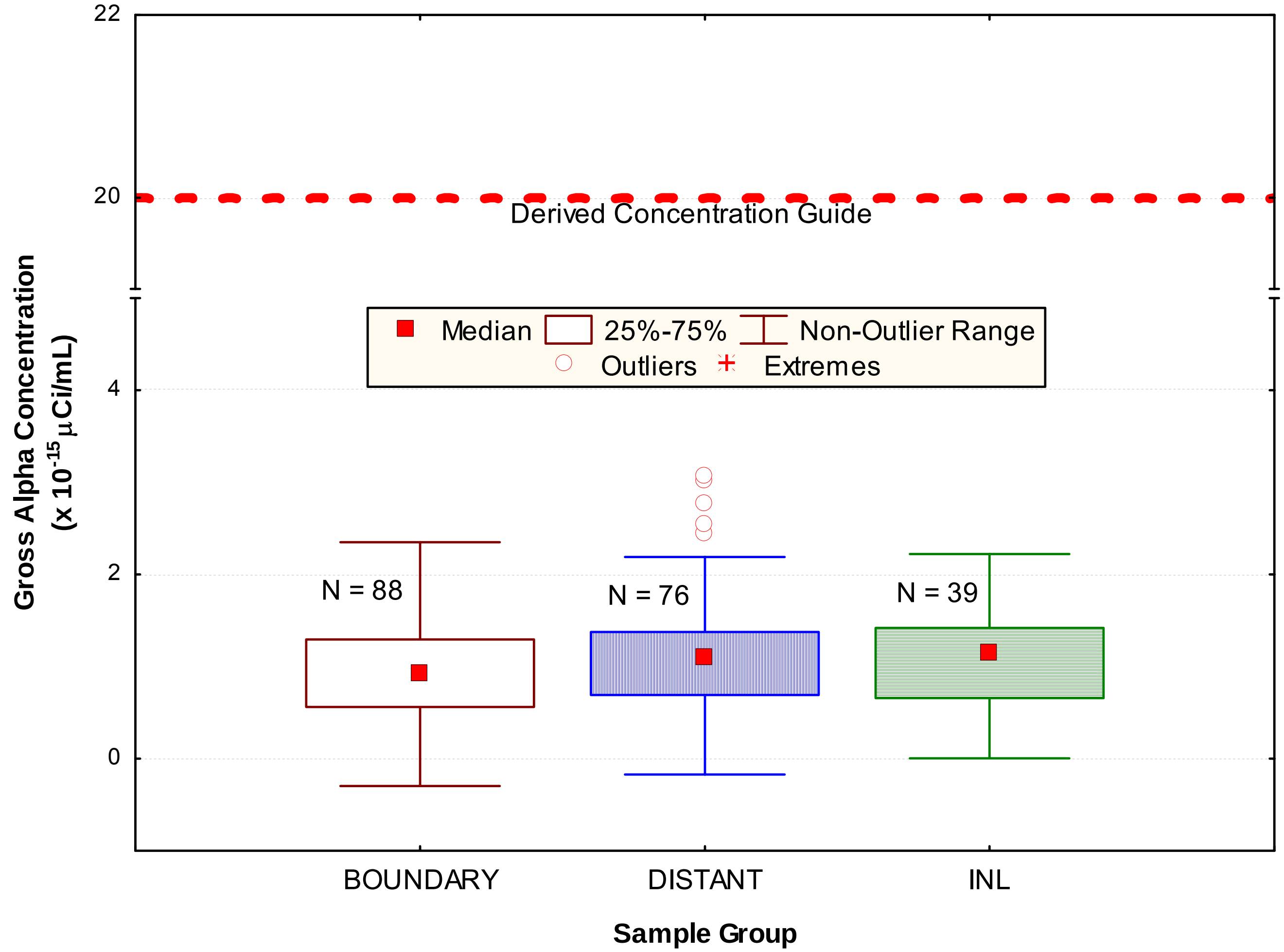


Figure 3. **Gross alpha concentrations in air at ESER Program INL, Boundary, and Distant locations for the second quarter of 2005.**

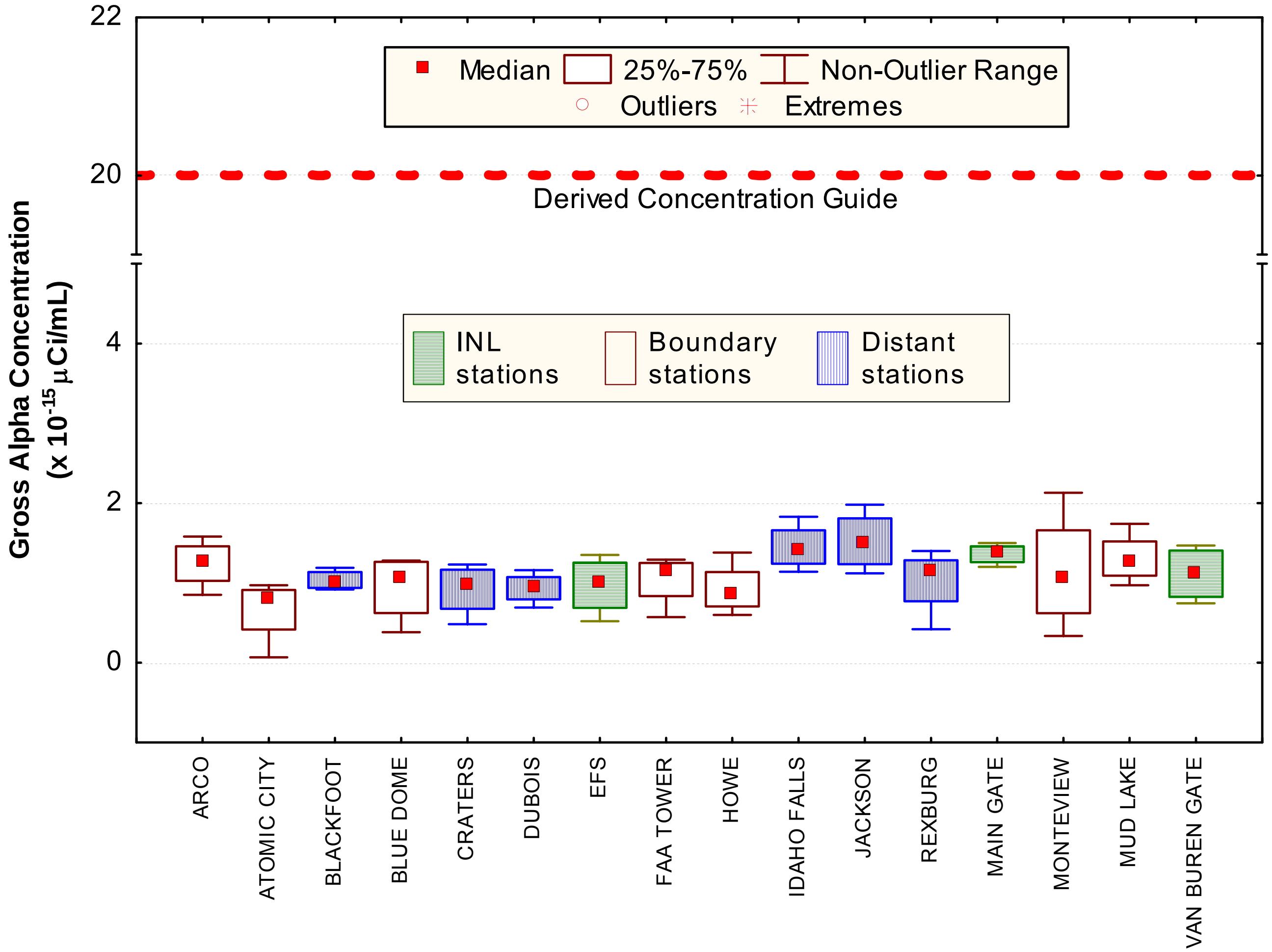


Figure 4. **April gross alpha concentrations in air at ESER Program INL, Boundary, and Distant locations.** Number of samples (N) = 4 at each location.

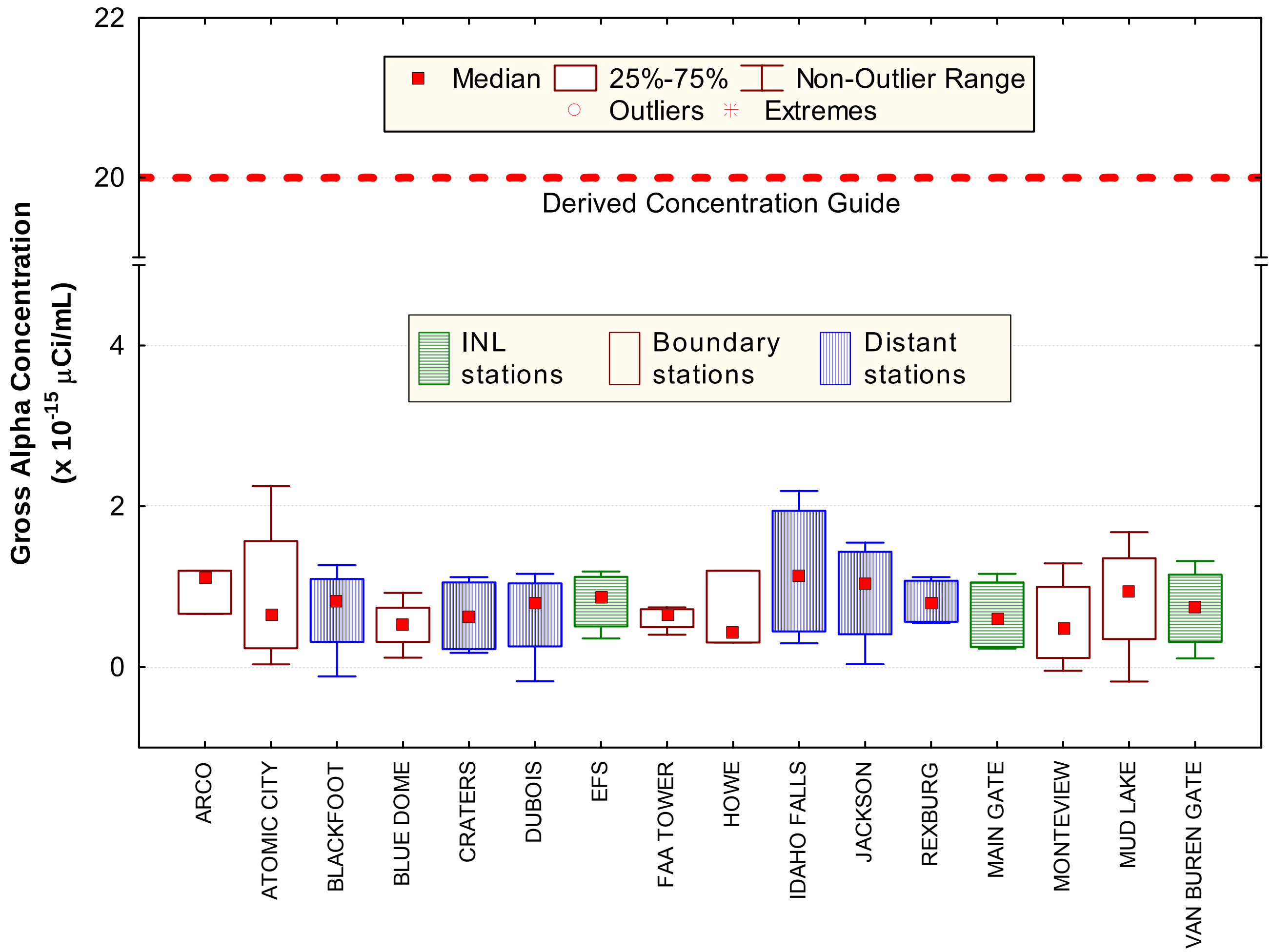


Figure 5. May gross alpha concentrations in air at ESER Program INL, Boundary, and Distant locations. Number of samples (N) = 4 at each location except for Arco and Howe where N=3.

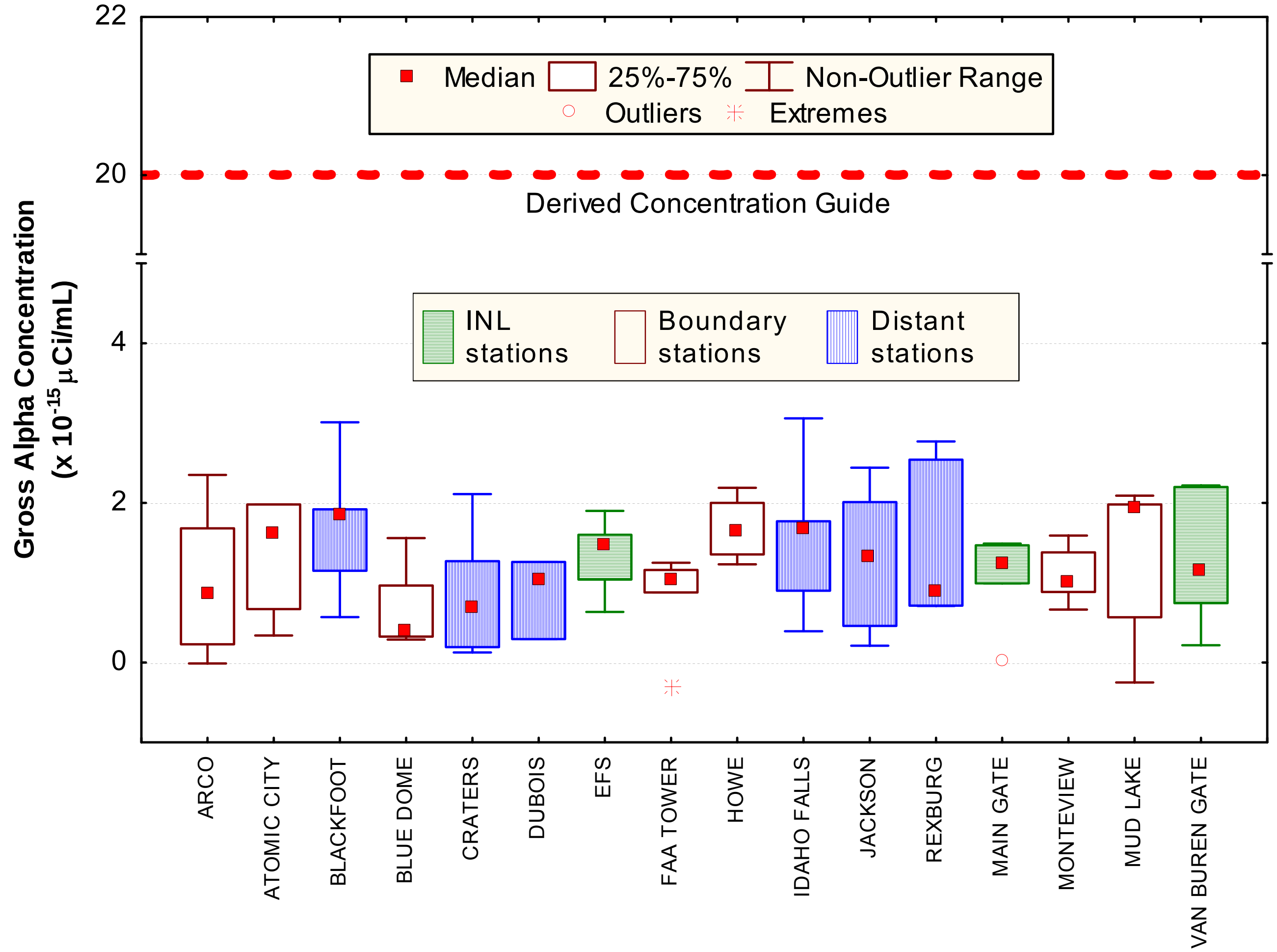


Figure 6. June gross alpha concentrations in air at ESER Program INL, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Dubois where N =3 and Howe where N = 4.

There were no statistical differences in gross alpha results between groups for any month during the second 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 sample results were not included in this analysis because the onsite data, collected at only three locations, are not representative of the entire INL and would not aid in determining offsite impacts. The gross alpha concentrations measured at Boundary locations were not statistically greater than those measured at Distant locations in any of the thirteen weeks of data evaluated (Table D-2). More detail on the statistical tests used can be found in Determining Statistical Differences under Helpful Information.

Gross beta results are presented in Table C-1. Gross beta concentrations in air for INL, Boundary, and Distant locations for the second quarter of 2005 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. As in the case of alpha activity, the quarterly data for each group appear to be similar and were determined using the Kruskal-Wallace 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 (Table D-1).

Comparison of weekly Boundary and Distant data sets, using the Mann Whitney U test, only showed a statistical difference between Boundary and Distant measurements during the week of June 8 (Table D-2). During this week, the Distant locations were statistically higher than the Boundary locations. Because the Distant locations were higher, an INL-related cause for the statistical difference is not indicated and it is more likely due to random variability in the data.

No ^{131}I was detected in any of the charcoal cartridge batches collected during the second quarter of 2005. 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 detected in 17 of the 234 measured cartridges.

Weekly filters for the second quarter of 2005 were composited by location. All samples were analyzed for gamma-emitting radionuclides, including ^{137}Cs. Composites were also analyzed for ^{90}Sr, ^{238}Pu, $^{239/240}Pu$, and ^{241}Am. None of these radionuclides occurred at detectable concentrations in any of the composites. All results for composite filter samples are shown in Table C-3, Appendix C.

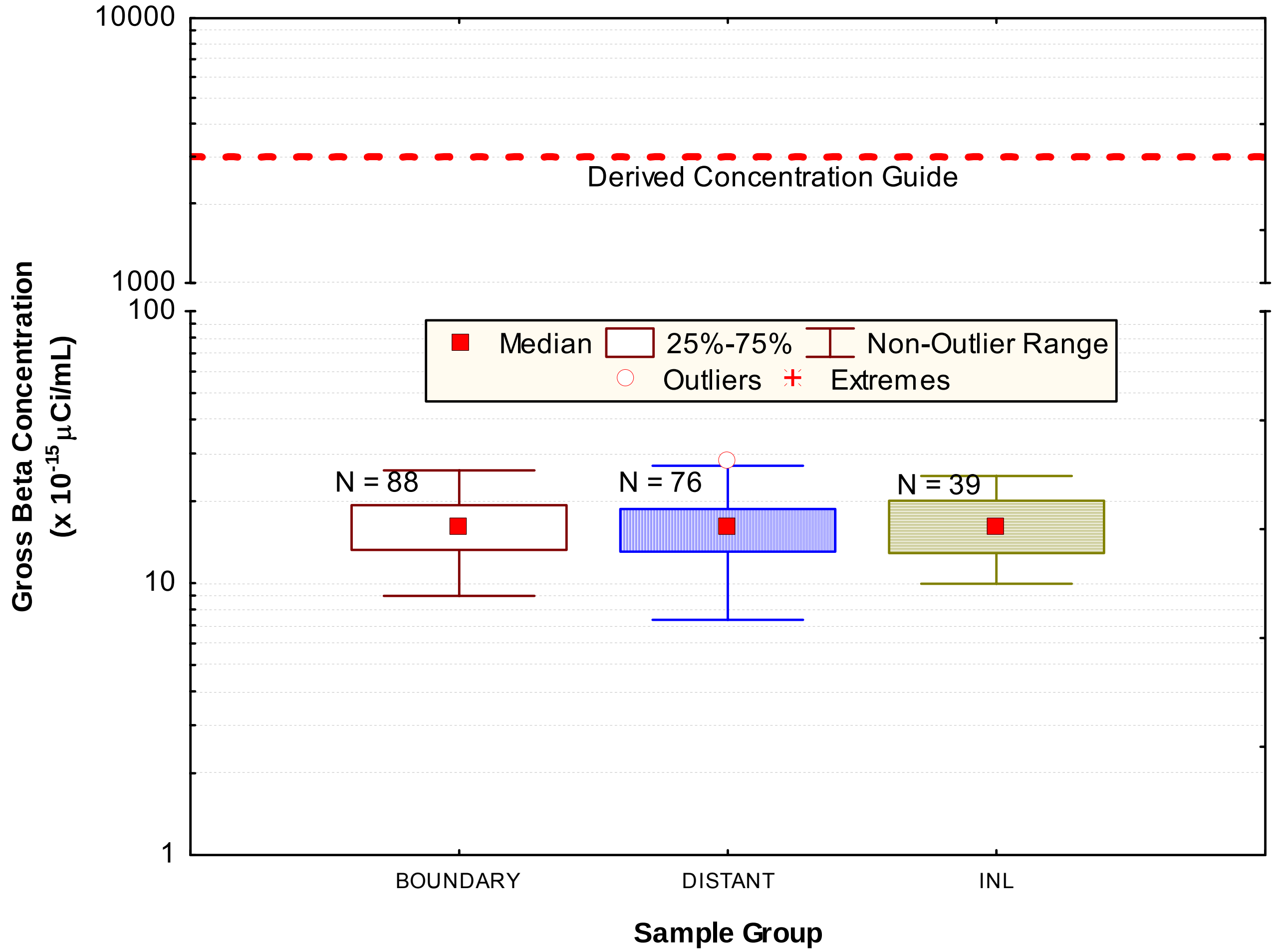


Figure 7. **Gross beta concentrations in air at ESER Program INL, Boundary, and Distant locations for the second quarter 2005.**

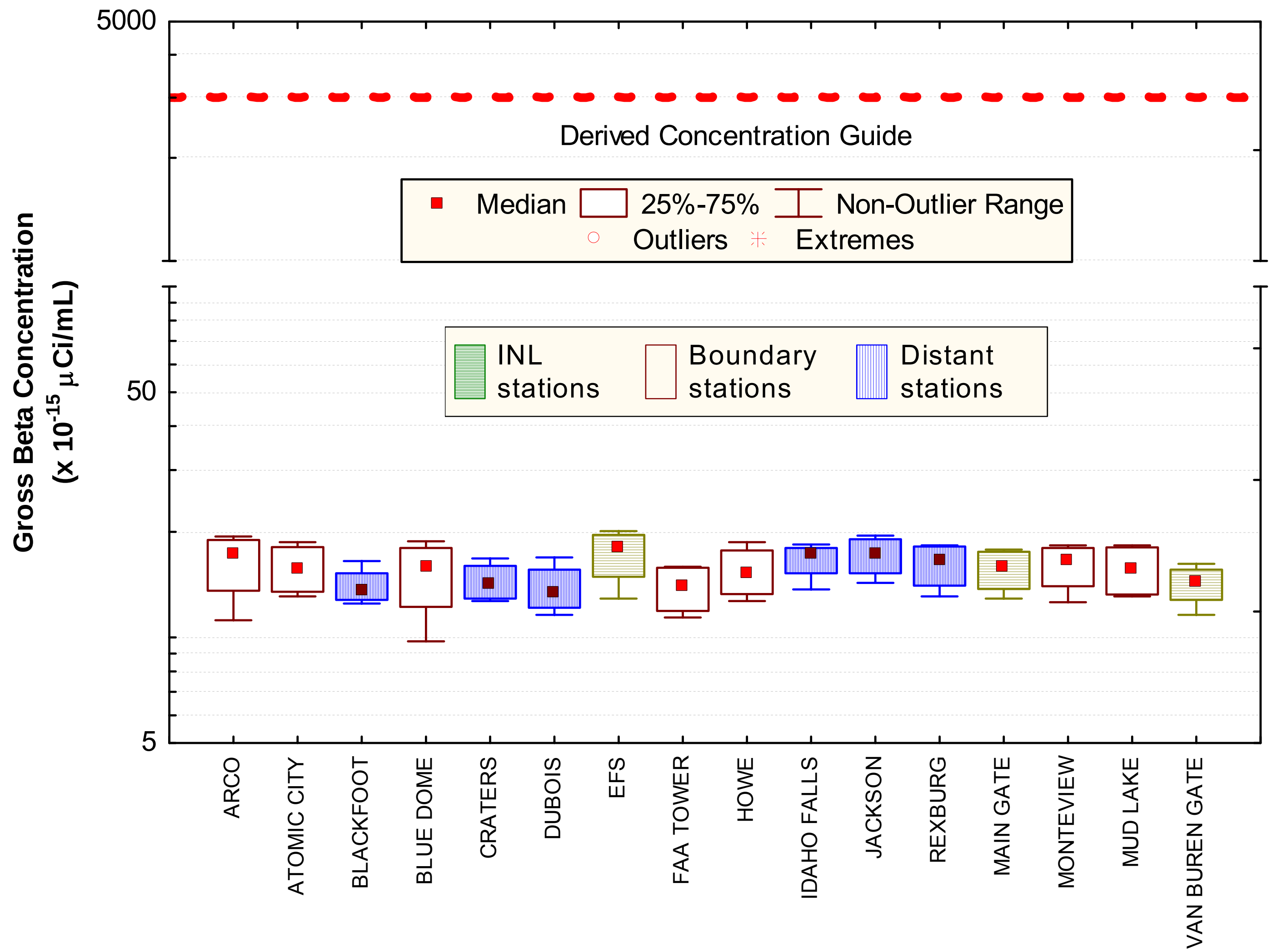


Figure 8. April gross beta concentrations in air at ESER Program INL, Boundary, and Distant locations. Number of samples (N) = 4 at each location.

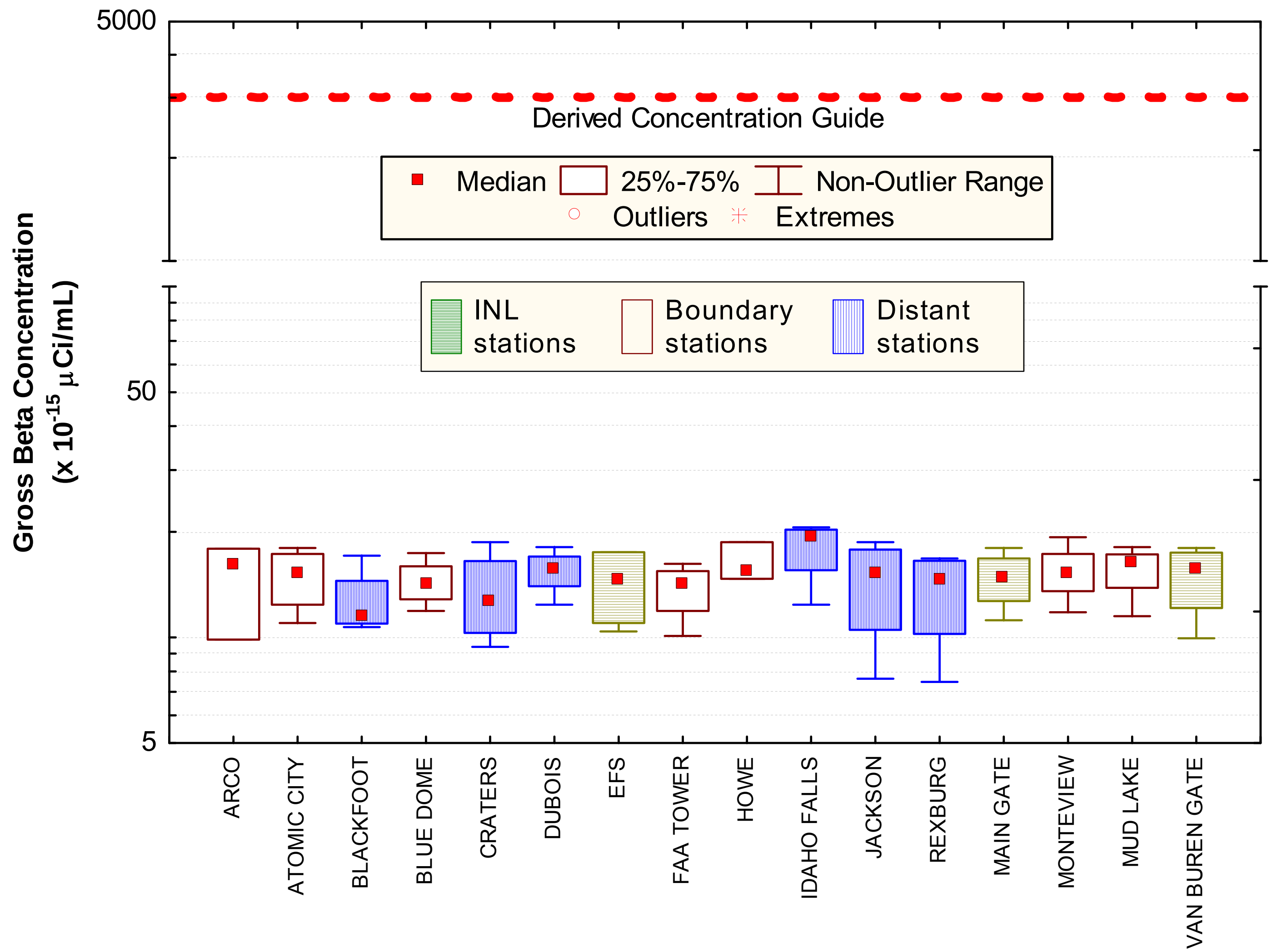


Figure 9. May gross beta concentrations in air at ESER Program INL, Boundary, and Distant locations. Number of samples (N) = 4 at each location except for Arco and Howe where N = 3.

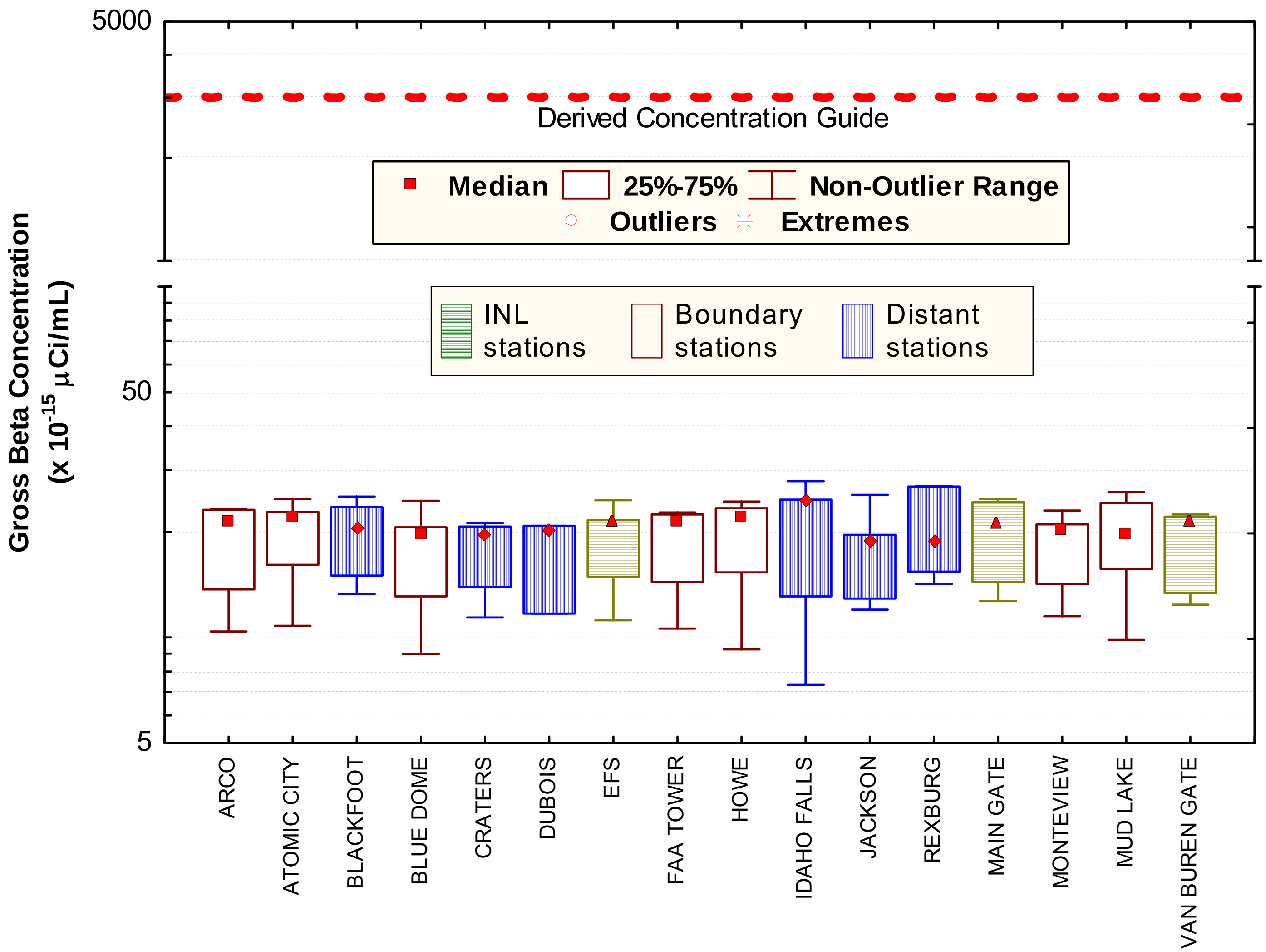


Figure 10. June gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations. Number of samples (N) = 5 at each location, except Dubois where N = 3 and Howe where N = 4.

ATMOSPHERIC MOISTURE SAMPLING

Seventeen atmospheric moisture samples were obtained during the second quarter of 2005 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.

Nine samples exceeded the 3s uncertainty level for tritium—one from Blackfoot, two from Atomic City and three each from Idaho Falls and Rexburg. All samples were well below the DOE DCG for tritium in air of 1×10^{-7} μCi/mL (3.7×10^{-3} Bq/mL), ranging from (1.5 ± 0.5) x 10^{-13} $\mu Ci/mL_{air}$ ([5.6 ± 1.8] x 10^{-9} Bq/mL) at Rexburg in April to (7.9 ± 1.5) x 10^{-13} $\mu Ci/mL_{air}$ ([29.1 ± 5.6] x 10^{-9} Bq/mL) at Atomic City in June. All results are shown in Table C-4, Appendix C.

PM_{10} AIR SAMPLING

The EPA began using a standard for concentrations of airborne particulate matter (PM) less than 10 micrometers in diameter (PM_{10}) in 1987 (40 CFR 50.6 [CFR 1996]). Particles of this size can be inhaled deep into the lungs and are considered to be responsible for most of the adverse health effects associated with airborne particulate pollution. The air quality standards for these particulates are an annual average of 50 $\mu g/m^3$, with a maximum 24-hour concentration of 150 $\mu g/m^3$.

The ESER Program operates three PM_{10} particulate samplers, one each at the Rexburg CMS and Blackfoot CMS, and one in Atomic City. Sampling of PM_{10} is informational only as no chemical analyses are conducted for contaminants. A twenty-four hour sampling period is scheduled to run once every six days. The maximum 24-hour particulate concentration was 33.33 $\mu g/m^3$ on May 27, 2005, at the Rexburg CMS. The average, maximum, and minimum results of the 24-hour samples are shown are shown in Table 1. Results for all PM_{10} samples are listed in Table C-5, Appendix C.

Table 1. Summary of 24-hour PM_{10} values.

	Concentration[a]		
Location	**Minimum**	**Maximum**	**Average**
Atomic City	0.97	27.58	9.01
Blackfoot, CMS	1.84	26.48	9.07
Rexburg, CMS	1.46	33.33	13.28

a. All concentrations are in ($\mu g/m^3$).

4. WATER SAMPLING

The ESER program samples precipitation, surface water, and drinking water. Monthly composite precipitation samples are collected from Idaho Falls and the Central Facilities Area (CFA) on the INL. Weekly precipitation samples are collected from the Experimental Field Station (EFS) on the INL. Surface and/or drinking water are sampled twice each year at 19 locations around the INL. This occurs during the second and fourth quarters. The results of the second quarter sampling are reported here.

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 second quarter of 2005 produced sufficient precipitation to yield 13 samples – two from Idaho Falls, three from CFA, and eight from the EFS.

Tritium was measured above the 3s value in eight of the samples collected during the second quarter 2005. 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 ERAMS program collects precipitation samples from across the United States. From 1978 to 2001 tritium measured in those samples ranged from -2.00 to 7.38×10^6 pCi/L (-7.4 to 2.7×10^4 Bq/L) (EPA 2003). Tritium measured in second quarter ESER samples were within this range, with a maximum of $2.02 \pm 0.32 \times 10^3$ pCi/L (7.47 ± 1.17 Bq/L) at CFA in May. Data for all second quarter 2005 precipitation samples collected by the ESER Program are listed in Table C-6 (Appendix C).

DRINKING WATER

Thirteen drinking water samples and one duplicate were collected from selected taps throughout southeast Idaho (Figure 11). Samples were analyzed for gross alpha, gross beta, and tritium (^3H).

One of the samples exceeded the 3s value for gross alpha, and two others for tritium. It is not unusual to detect these constituents in water of the Snake River Plain. They tend to be related to natural production from the basalts that make up the aquifer. The sample from Fort Hall had a gross alpha concentration of 7.84 ± 1.45 pCi/L which is below the EPA and DOE limits for tritium in drinking water of 15 pCi/L (0.56 Bq/L) and 30 pCi/L (1.11 Bq/L), respectively. Tritium concentrations ranged from 79 ± 25 pCi/L (2.91 ± 0.93 Bq/L) at Idaho Falls to 170 ± 27 pCi/L (6.30 ± 1.01 Bq/L) at Carey. Both values are well below the EPA limit of 20,000 pCi/L (740 Bq/L) and the DOE DCG of 2.0×10^6 pCi/L (74,074 Bq/L).

Of the fourteen drinking water samples collected, eight samples exceeded their 3s value for gross beta (Table 2). The EPA Safe Drinking Water Act (SDWA) limits gross beta in drinking water based on an annual exposure of 4 mrem/yr. Since data are reported from the laboratory as a concentration (i.e., pCi/L) a screening concentration of 50 pCi/L is used to meet this level (Appendix B-1). The maximum concentration of gross beta detected was from Shoshone and was lower than the SDWA screening value. Levels of gross beta observed in drinking water are not unusual given the basaltic terrain (USGS 2003). All values are similar to those recorded in previous years, and are well below the levels outlined for drinking water protection (Table B-1). All drinking water sample results may be found in Appendix C, Table C-7.

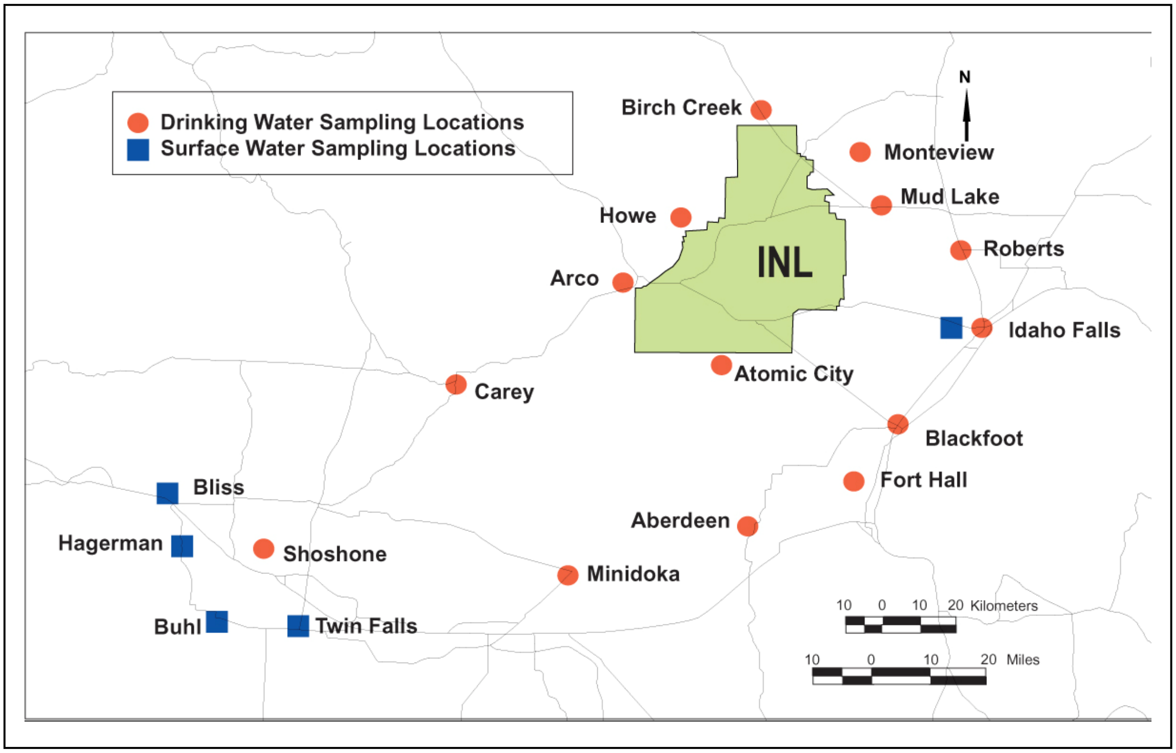


Figure 11. Drinking and Surface Water Sampling locations.

Table 2. Drinking water results greater than (>) 3s.

Location	Sample Results[a]	Limits for Comparison[a]	
	Result ± 1s	SDWA[b]	DOE DCG[c]
Gross Alpha			
Fort Hall	7.84 ± 1.45	8	30
Tritium			
Carey	170 ± 27	20,000	2 x 10^6
Idaho Falls	79 ± 25	20,000	2 x 10^6
Gross Beta			
Aberdeen	4.89 ± 1.11	50	100
Carey	3.18 ± 0.84	50	100
Fort Hall	13.00 ± 1.16	50	100
Idaho Falls	2.84 ± 0.88	50	100
Minidoka	2.63 ± 0.86	50	100
Monteview	4.68 ± 0.96	50	100
Shoshone	13.50 ± 1.15	50	100
Taber	3.53 ± 0.94	50	100

a. All values shown are in picocuries per liter (pCi/L).
b. SDWA = Safe Drinking Water Act.
c. DCG – Derived Concentration Guide.

SURFACE WATER

Five surface water samples and one duplicate sample were collected from locations throughout southeast Idaho and were analyzed for tritium, gross alpha, and gross beta. None of the samples had measurable tritium or gross alpha activity (all results were less than 3s).

Five of six surface water samples were greater than their associated 3s values for gross beta (Table 3). Even at reported levels, the gross beta values are lower than the SDWA screening value of 50 pCi/L and the DCG values (Table B-1).

Table 3. Surface water gross beta results greater than (>) 3s.

Location		Limits for Comparison[a]	
	Result ± 1s	SDWA	DOE DCG
Bliss	3.70 ± 0.92	50	100
Duplicate	5.54 ± 0.97	50	100
Buhl	3.38 ± 0.94	50	100
Hagerman	3.22 ± 0.90	50	100
Twin Falls	6.23 ± 1.05	50	100

a. All values shown are in picocuries per liter (pCi/L).

The presence of gross alpha and gross beta in surface water (particularly the springs) is typically related to dissolution of naturally occurring radionuclides (i.e., uranium, radium, potassium) by groundwater as it flows through the surrounding basalts (Twinning and Rattray 2003). Levels of gross alpha and gross beta in all samples are similar to results from recent years. All gross alpha and gross beta results can be found in Appendix C, Table C-7.

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 and Southeast Idaho. Specifically, milk, wheat, potatoes, garden lettuce, sheep, big game, waterfowl, and marmots are sampled. Milk is sampled throughout the year. Sheep are sampled during the second quarter. Lettuce and wheat are sampled during the third quarter, while potatoes and waterfowl are collected during the fourth quarter. See Table A-1, Appendix A, for more details on agricultural product and wildlife sampling. This section discusses results from milk and sheep sampled during the second quarter of 2005.

MILK SAMPLING

Milk samples were collected weekly in Idaho Falls and monthly at eight other locations around the INL (Figure 12) during the second quarter of 2005. All samples were analyzed for gamma emitting radionuclides. Samples are analyzed for ^{90}Sr and tritium during the second and fourth quarters.

Iodine-131 (^{131}I) and ^{137}Cs were not detected in any milk sample during the second quarter. Data for ^{131}I and ^{137}Cs in milk samples are listed in Appendix C, Table C-8.

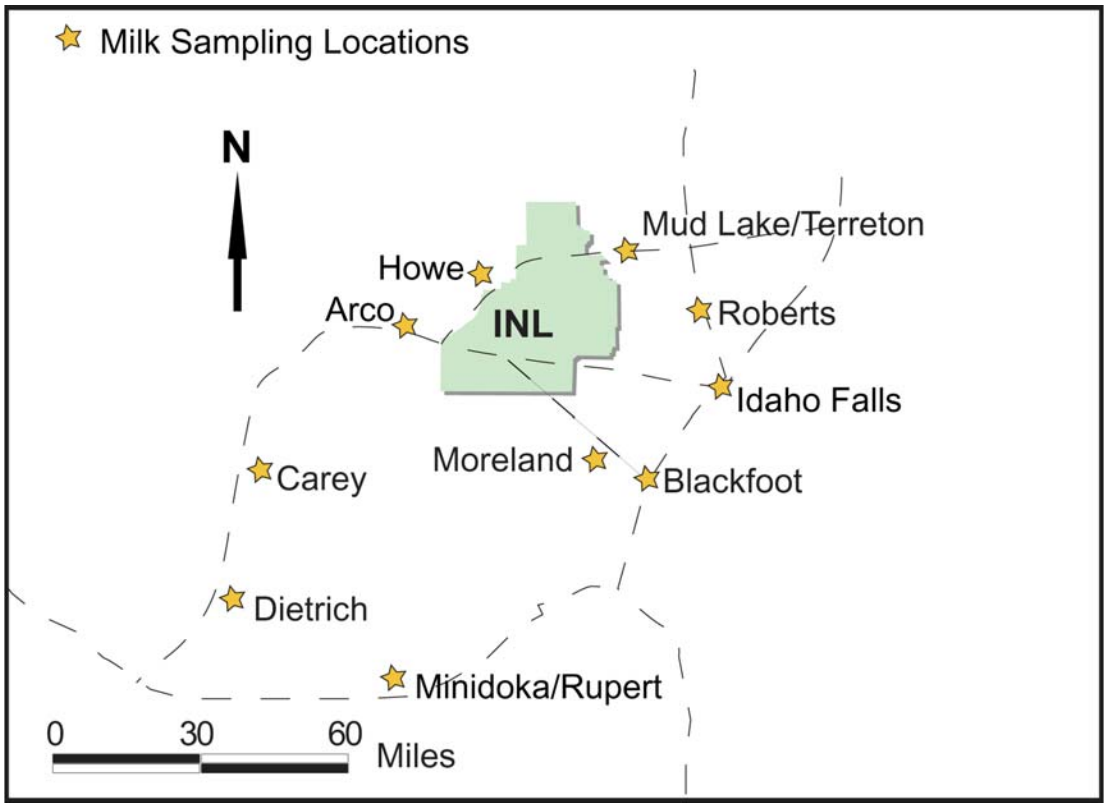


Figure 12. ESER Program milk sampling locations.

Strontium-90 was measured above the 3s uncertainty level in all five samples analyzed. Strontium-90 is related to uptake through the food chain of historical weapons derived fallout. The maximum level of ^{90}Sr in milk measured in the Carey sample collected on May 3 was below the EPA MCL of 8 pCi/L (0.30 Bq/L) and the DOE DCG of 1000 pCi/L. Data for ^{90}Sr in milk samples are listed in Appendix C, Table C-9.

Tritium was not detected in any milk sample analyzed.

SHEEP SAMPLING

Certain areas of the INL are open to grazing under lease agreements managed by the Bureau of Land Management (Figure 13). Every year ESER Program personnel collect samples of sheep that have grazed on these leased areas, either just before or shortly after the sheep leave the INL. This occurs during the second quarter of the year. For the calendar year 2005, sheep were collected from the selected INL allotments before they were moved off site. Three flocks were sampled, including a control flock in Dubois from the Experimental Sheep Station, a flock from a southern INL allotment, and a flock from a northern INL allotment. Two sheep were taken from each flock for tissue analysis. Thyroid, muscle, and liver tissue were collected and analyzed for gamma emitting radionuclides.

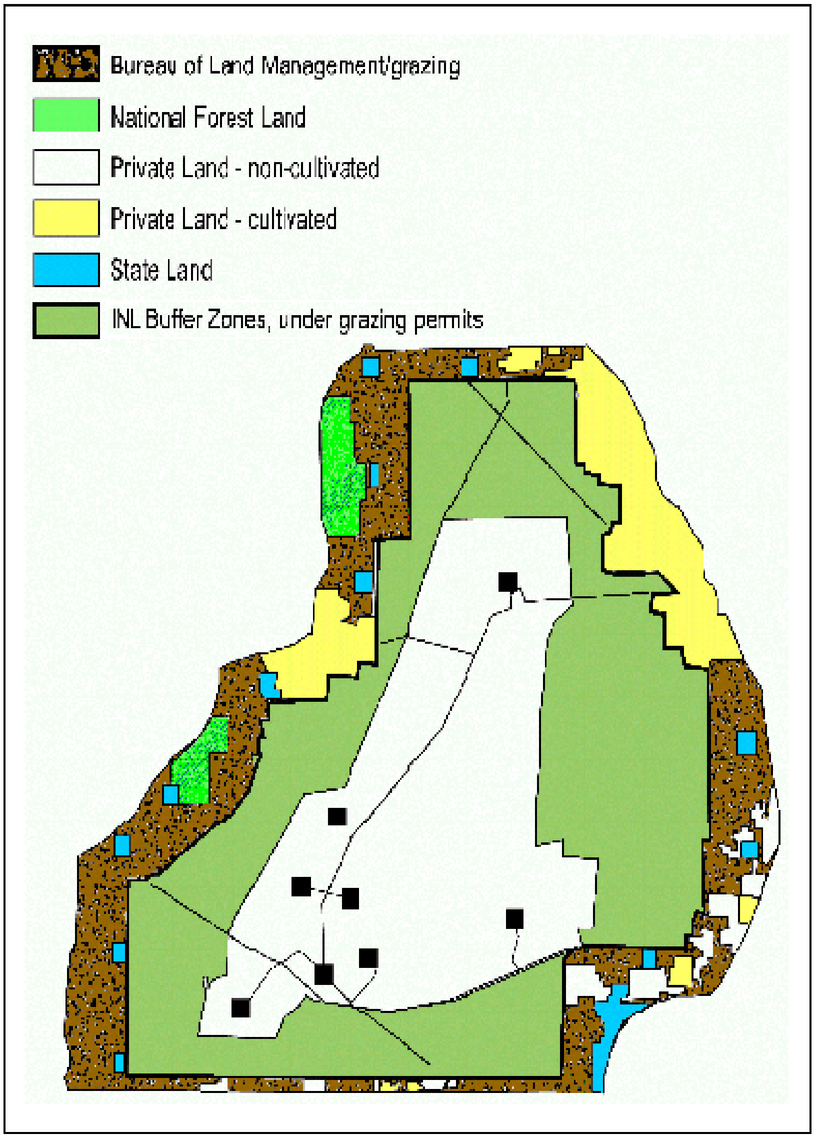


Figure 13. Grazing and land ownership on and around the INL.

Levels of ^{131}I are of particular interest in thyroids because of this organ's ability to accumulate iodine. No ^{131}I was found in thyroids from any of the animals.

Analysis for ^{137}Cs showed results greater than the 3s analytical uncertainty in two samples (one muscle and one liver) from two different sheep. One animal was collected from the Southern allotment and one from the Northern allotment. Both concentrations of ^{137}Cs were similar to those found in both onsite and offsite sheep samples during recent years. Data for all sheep samples are listed in Appendix C, Table C-10.

LARGE GAME ANIMAL SAMPLING

No large game animals were sampled during the second quarter of 2005.

6. ENVIRONMENTAL RADIATION

An array of thermoluminescent dosimeters (TLDs) is distributed throughout the Eastern Snake River Plain to monitor for environmental radiation (Figure 14). TLDs are changed out in May and again in November after six months in the field. The results of the spring sampling of TLDs exposed from November 2004 to May 2005) are discussed below.

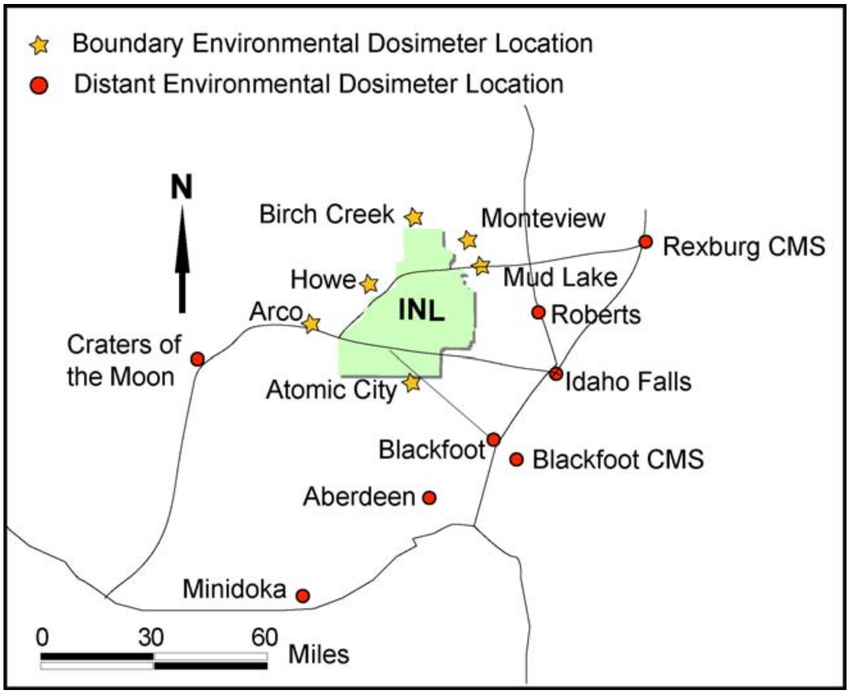


Figure 14. TLD sampling locations.

Similar to the low-volume air results the environmental dosimeter locations are also divided into Boundary and Distant groupings. Boundary average exposure rates ranged from a low of 0.27 mR/day at Monteview to a high of 0.37 mR/day at Howe. The overall Boundary average was 0.33 mR/day. The Distant group had a high of 0.40 mR/day at Craters of the Moon and a low of 0.29 mR/day at the Roberts location. The overall average Distant value was 0.34 mR/day. There was no statistical difference between Boundary and Distant locations. Furthermore, all values are consistent with past readings. Table 4 lists the range and average for both groups over a six-month period. All results are listed in Appendix C, Table C-11.

Table 4. TLD Exposures from November 2004 to May 2005.

	Total Exposure[a]	
Location	**Boundary**	**Distant**
Average	59.8	61.9
Maximum	67.3	72.6
Minimum	50.2	53.5

a All values shown are in milliRoentgens (mR).

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 and laboratory control samples;
4. data precision, using split samples, duplicate samples, and recounts; and
5. presence of contamination in samples, using blanks.

The following discussion briefly summarizes the results of the quality assurance program for the period from April 1 to June 30, 2005.

METHOD UNCERTAINTY

The Quality Assurance Project Plan (QAPP) establishes data quality and method quality objectives for the ESER surveillance program (Stoller 2002). Since the primary concern is with detection, the lower bound for the method uncertainty is set at zero. The upper bound is defined by the ESER program as the maximum concentration in the non-outlier range of data from the past seven years. Each individual result is checked for acceptance on the basis of the result, whether it is below the lower limit (i.e., a negative value), greater than the upper limit, or between the lower and upper limit (the most common occurrence). The calculated method uncertainty is then compared to the 1s measured uncertainty. A sample is deemed acceptable when the measured 1s uncertainty is less than the calculated uncertainty. The upper bound values are currently being evaluated and revised. Preliminary results indicate that more calculated method uncertainties for detected results were acceptable.

DATA COMPLETENESS

The Quality Assurance Project Plan (QAPP) specifies a 98 percent completeness goal for all regularly scheduled sample types (Stoller 2004). Data completeness for sample collection and delivery was 100 percent during the second quarter for all sample types with these exceptions: a number of precipitation samples were not collected due to lack of precipitation and one (2 percent) of the scheduled PM_{10} samples did not run when the timer did not trip.

Five air samples were determined to invalid due to insufficient volume collected because of equipment failure or electrical work (one from Arco and two each from Dubois and Howe). The completeness of air filter data is thus considered to be 98.1 percent.

DATA ACCURACY

Accuracy is a measure of the degree to which a measured value agrees with the "true" value for a given parameter; accuracy includes elements of both bias and precision.

Spike Samples Submitted with Field Samples

During the second quarter of 2005, spikes (samples prepared with known amounts of radionuclides) of the following types were obtained and submitted:

- Quarterly composite spike analyzed for gamma-emitting radionuclides by the EAL.
- Low-volume charcoal cartridge analyzed for Barium-133 by the EAL.
- Drinking water spike analyzed for tritium by the EAL.

- Milk spike analyzed for gamma-emitting radionuclides by the EAL.
- Strontium-90 quarterly composite spike analyzed by Severn-Trent.

A total of 16 values for comparison were generated by the analysis of the spike samples. All results were within the criteria during the second quarter except for Cobalt-60 in milk and Barium-133 in the charcoal cartridge.

The Quality Assessment Program was discontinued following the March 2004 distribution. Performance evaluation samples are now prepared through the Mixed Analyte Performance Evaluation Program (MAPEP), administered by the Department of Energy's Radiological and Environmental Sciences Laboratory. DOE has mandated that all laboratories performing analyses in support of the Office of Environmental Management shall participate in MAPEP. The program distributes samples of air, water, vegetation and soil for analysis in approximately January and June. Both radiological and nonradiological constituents are included in the program.

Both the Idaho State University EAL and Severn-Trent participated in the program in May 2005. Results are tabulated below for those analyses performed by each laboratory for the ESER program. (A = Acceptable, W = Acceptable with warning, N = Not acceptable)

IDAHO STATE UNIVERSITY ENVIRONMENTAL ASSESSMENT LABORATORY					
Matrix: Air (Bq)					
Analyte	EAL Result	MAPEP Result	Bias (percent)	Acceptable Range	Evaluation
Cesium-134	2.9	3.51	-17.4	2.46-4.56	A
Cesium-137	2.0	2.26	-11.5	1.58-2.94	A
Cobalt-57	4.5	4.92	-8.5	3.44-6.40	A
Cobalt-60	2.8	3.03	-7.6	2.12-3.94	A
Manganese-54	3.0	3.33	-9.9	2.33-4.33	A
Zinc-65	2.9	3.14	-7.6	2.20-4.08	A
Gross alpha	0.09	0.232	-61.2	0.000-0.464	A
Gross beta	0.32	0.297	7.7	0.148-0.446	A
Matrix: Water (Bq/L)					
Cesium-134	108.9	127	-14.3	88.9-165.1	A
Cesium-137	317.2	332	-4.5	232.4-431.6	A
Cobalt-57	223.3	227	-1.6	158.9-295.1	A

Cobalt-60	252.4	251	0.6	175.7-326.3	A
Manganese-54	326.9	331	-1.2	231.7-430.3	A
Zinc-65	532.1	496	7.3	347.2-644.8	A
Gross alpha	0.11	0.525	-79.0	0.000-1.050	A
Gross beta	2.00	1.67	19.8	0.835-2.505	A
Matrix: Soil (Bq/kg)					
Cesium-134	609.6	759	-19.7	531.3-986.7	A
Cesium-137	265.8	315	-15.6	220.5-409.5	A
Cobalt-57	206.9	242	-14.5	169.4-314.6	A
Cobalt-60	190.7	212	-10.0	148.4-275.6	A
Manganese-54	442.0	485	-8.9	339.5-630.5	A
Potassium-40	515.6	604	-14.6	422.8-785.2	A
Zinc-65	737.7	810	-8.9	567.0-1053.0	A

SEVERN-TRENT LABORATORY					
Matrix: Air (Bq)					
Analyte	S/T Result	MAPEP Result	Bias (percent)	Acceptable Range	Evaluation
Americium-241	0.109	0.102	6.9	0.07-0.13	A
Plutonium-238	0.201	0.195	3.1	0.14-0.25	A
Plutonium-239/240	0.17	0.165	3.0	0.12-0.21	A
Strontium-90	1.36	1.35	0.7	0.94-1.75	A
Matrix: Water (Bq/L)					
Americium-241	1.60	1.72	-7.0	1.20-2.24	A
Plutonium-238	0.024	0.018	[a]		A

Plutonium-239/240	2.50	2.4	4.2	1.68-3.12	A
Strontium-90	0.0[b]				W
Matrix: Soil (Bq/kg)					
Americium-241	106	109	-2.8	76.3-141.7	A
Plutonium-238	0.67	0.48	[a]		A
Plutonium-239/240	90.2	89.5	0.8	62.65-116.35	A
Strontium-90	631	640	-1.4	448-832	A
Matrix: Vegetation (Bq)					
Americium-241	0.234	0.145	61.4	0.10-0.19	N
Plutonium-238	0.36	0.224	60.7	0.16-0.29	N
Plutonium-239/240	0.0[b]	0.0006			W
Strontium-90	2.1	1.65	27.3	1.15-2.14	W
a. Result was a statistical nondetect.					
b. Reported zero uncertainty.					

Internal Laboratory Spikes

The Idaho State University Environmental Assessment Laboratory uses NIST standards to prepare spiked water samples and uses commercially prepared calibration standards as NIST-traceable spiked samples. ISU considers a performance to be acceptable if results pass either the ±20 percent test specified by the ESER program or the three-sigma test described in the data precision section. A variety of checks are made each quarter on different geometries.

During the second quarter of 2005, 19 analyses were conducted on NIST-traceable standards for gamma-emitting radionuclides. Geometries tested included low-volume air filter composites, single charcoal cartridge screening, 10-charcoal cartridge screening, 500 ml 1.0 g/cc samples, and one-liter 1.0 g/cc samples. A total of 115 analytical results were generated. All of the results were within the ±20 percent range.

Water samples spiked with tritium received 14 analyses during the quarterly reporting period. All were well within the ±20 percent criterion, and in fact all were within 7 percent of the known value. Gross beta spikes analyzed in the first quarter were within 20 percent of the expected values; two of four gross alpha spikes were within 20 percent and all were within three standard deviations. An internal tritium milk spike was within approximately 2 percent of the known value.

Severn-Trent analyzes a laboratory control sample (LCS) with each batch of samples submitted by the ESER. During the second quarter this consisted of strontium-90 and actinides in air and strontium-90 in milk.

Media	Analyte	QAPjP Accuracy	LCS Result	Within Criterion?
Air	Strontium-90	±10 percent	+13.3 percent	No
Air	Americium-241	±10 percent	-12.4 percent	No
Air	Plutonium-239/240	±10 percent	+3.9 percent	Yes
Milk	Strontium-90	±25 percent	+2.2 percent	Yes

DATA PRECISION

Data precision is a measure of the variability associated with a measurement system. Precision is measured using duplicate samples, split samples, and recounts. Data precision is measured using duplicate samples, split samples, and recounts. The Quality Assurance Project Plan specifies that sample results should agree within ±20 percent or 3σ, whichever is greater. For environmental samples at levels that are within the normal range found by the ESER, the 3 standard deviation criterion is the one that applies in nearly all cases. The standard deviation criterion is considered to be met if the values of the duplicate samples differ by less than the root mean square of three standard deviations of each sample result. Mathematically, this is expressed as:

$$|X-Y| < 3\,(\mathrm{sqrt}(\sigma_x^2 + \sigma_y^2)),$$ where:

X is the result of the regular sample

Y is the result of the duplicate sample

σ_x is the uncertainty of the regular sample

σ_y is the uncertainty of the duplicate sample

Another measure of duplicate sample results is the relative percent difference. This value is the difference in the two results divided by the mean of the two results. The following sections of this report first check the sample results using the 3 standard deviation criterion. If this criterion is not met, the results are then listed for the relative percent difference.

Field Duplicate Samples

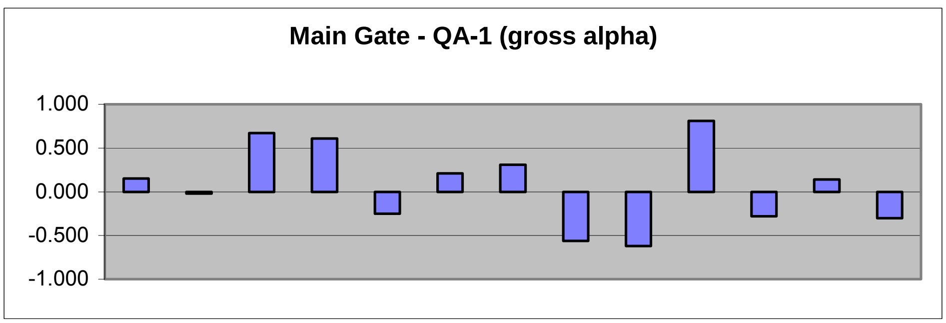
Duplicate milk samples were collected from Moreland on April 5, Dietrich on June 7, and Howe on June 7 and analyzed for gamma-emitting radionuclides. All results were within the 3σ criteria.

Duplicate water samples were collected from Arco (drinking water) and Bliss (surface water) and analyzed for gross alpha, gross beta, and tritium. All results were within the 3σ criteria.

Duplicate air samplers are operated at two locations adjacent to regular air samplers. In the first quarter of 2005 these samplers, designated as QA-1 and QA-2, were in operation at the INL Main Gate and Howe, respectively. Particulate filters receive the standard analysis for gross alpha and gross beta; charcoal cartridges are analyzed specifically for iodine-131. All gross alpha and gross beta results for the co-located samplers met the acceptability criteria. Charcoal cartridge results are difficult to present because cartridges are counted in batches of ten.

Composite air samples from the two QA samplers were submitted for analysis at the end of the second quarter for gamma spectrometry at the EAL and for ^{90}Sr at Severn-Trent. All analyses were within the 3s criterion.

A comparison of duplicate results can also show bias in the sampling system. For example, if one set of results is consistently lower or higher than the other one might suspect that this bias was due to a leak in the system or variations in the calibration of the flow meter. Figures 15 and 16 show the difference in results (Main sampler - QA duplicate sampler) over time. The figures show that the bias is small and not consistent in one direction, indicating that there is no obvious bias in the duplicate sampling systems in these cases.



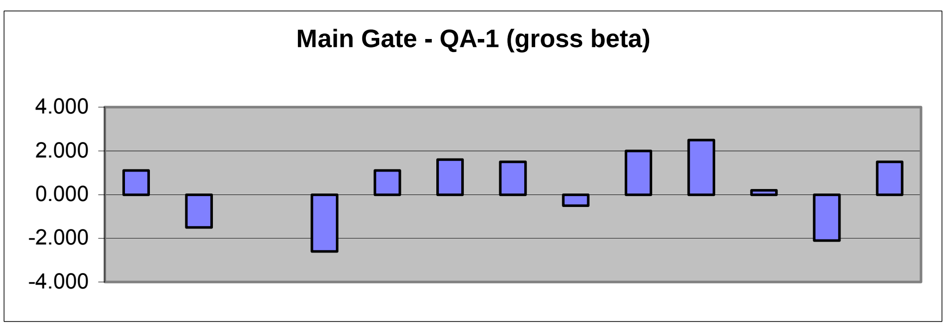
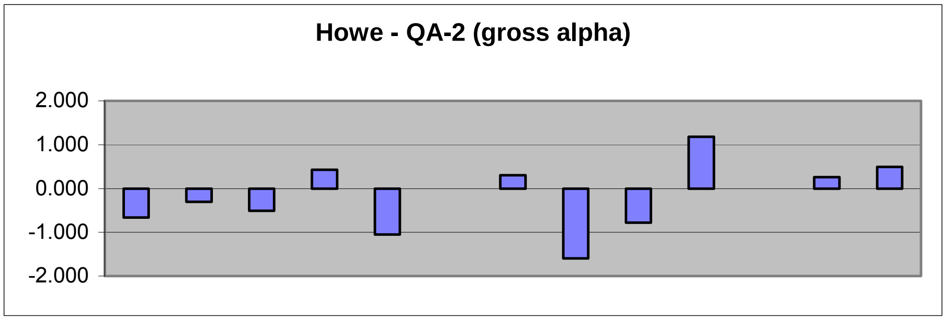


Figure 15. Difference in QA-1/Main Gate gross alpha and gross beta activities.



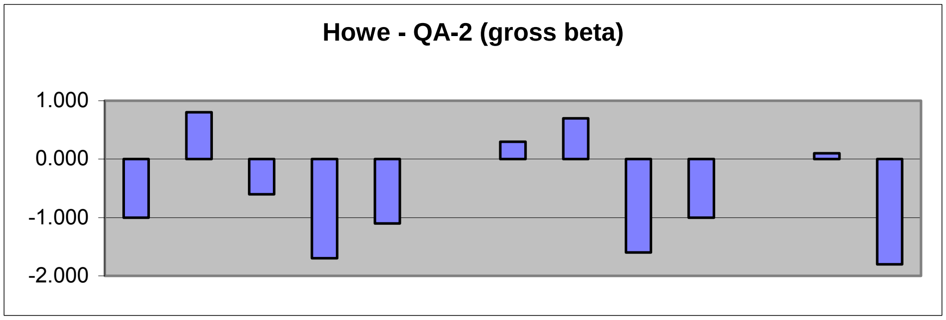


Figure 16. Difference in QA-2/Howe gross alpha and gross beta activities.

Lab Split Samples

The EAL splits and analyzes a number of milk, precipitation, and atmospheric moisture samples each quarter. The laboratory tests each result using both the ±20 percent criterion and the 3s criterion, although it considers the former test meaningless for analyses producing fewer than 15 total counts and questionable even where counts are on the order of 100. The latter criterion is applied in nearly all cases at the levels seen in environmental samples analyzed for the ESER program. Results of the EAL split sample analyses met the criteria for acceptance during the second quarter 2005.

Sample Recounts

The ISU EAL recounts a number of samples of each media type. The lab tests each recount using both the 20 percent criterion and the 3σ criterion, subject to the limitations described in the previous section.

A summary of the recount results for the second quarter is presented below.

- 56 low-volume air filters were recounted for alpha activity. All were within the 3σ criterion.
- 6 water samples were recounted for alpha activity; one was recounted twice. All results were within the 3σ criterion.
- 56 low-volume air filters were recounted for beta activity. One was outside the 3σ criterion but within the 20 percent criterion.
- 6 water samples were recounted for beta activity; one was recounted twice. All results were within the 3σ criterion.
- 19 milk samples were recounted for potassium-40; one was recounted twice. All were within the 3σ criterion.

- Two individual charcoal cartridges and 7 groups of charcoal cartridges were recounted for iodine-131. All results were within the 3σ criterion.
- 15 lovol composites were recounted for beryllium-7. All were within the 3σ criterion.
- 1 water sample was recounted for tritium activity. The result was within the 3σ criterion.
- 3 precipitation samples were recounted for tritium. All results were within the 3σ criterion.

BLANKS

Field blanks

The ESER program submits field blanks along with the regular samples to test for the introduction of contamination during the process of field collection, laboratory preparation, and laboratory analysis. The current program includes the use of two field blanks, designated as Blank A and Blank B, that each accompanies one of the air filter routes. Quarterly composites of the blanks are also submitted. After gamma spectrometry analysis, one of the blanks is analyzed for Sr-90 and the other for transuranics.

The Quality Assurance Project Plan does not specify requirements for blank performance, but ideally the result should be within ±2σ of zero and preferably within ±1σ of zero on most analyses. It would be expected, based on counting statistics for a sample that was truly a blank (i.e., the true value of the analyte was zero), that 68.3 percent of analyses would fall within one standard deviation, 95.5 percent would fall within two standard deviations, and 99.7 percent would fall within three standard deviations. With a single exception in a gross beta analysis, all results were within the 3σ significance level.

Reagent Blanks

The Environmental Assessment Laboratory prepares and analyzes reagent blanks to help determine if the analysis will yield a zero result when no activity is present. ISU considers the result within specification if the concentration is less than the minimum detectable concentration (MDC) for the analysis. One such blank was analyzed for tritium in the second quarter for milk. The blank was below the MDC for the analysis and less than two standard deviations. A water blank analyzed for gross alpha and gross beta was also below the MDA for the analysis and within two standard deviations for both parameters.

Severn-Trent analyzes a blank with each set of results. Second quarter blanks were less than three standard deviations of zero for strontium-90, plutonium-238, plutonium-239/240 and americium-241 in air and for strontium-90 in milk.

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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
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	4 to 13 weeks	Blackfoot, Idaho Falls, Rexburg	Atomic City	None
PRECIPITATION				
Tritium	monthly	Idaho Falls	None	CFA
Tritium	weekly	None	None	EFS
PM-10				
Particulate Mass	every 6th day	Rexburg, Blackfoot	Atomic City	None
WATER SAMPLING				
SURFACE WATER				
Gross Alpha, Gross Beta, ^{3}H	semi-annually	Twin Falls, Buhl, Hagerman, Idaho Falls, Bliss	None	None
DRINKING WATER				
Gross Alpha, Gross Beta, ^{3}H	semi-annually	Aberdeen, Carey, Idaho Falls, Fort Hall, Minidoka, Moreland, Roberts, Shoshone, Tabor	Arco, Atomic City, Howe, Monteview, Mud Lake	None
ENVIRONMENTAL RADIATION SAMPLING				
TLDs				
Gamma Radiation	semiannual	Aberdeen, Blackfoot, Craters of the Moon, Idaho Falls, Minidoka, Jackson WY, Rexburg, Roberts	Arco, Atomic City, Howe, Monteview, Mud Lake, Birch Creek	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	None

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

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INL
FOODSTUFF SAMPLING				
MILK				
Gamma Spec (^{131}I)	weekly	Idaho Falls	None	None
Gamma Spec (^{131}I)	monthly	Blackfoot, Carey, Dietrich, Minidoka, Roberts, Moreland	Howe, Terreton, Arco	None
Tritium, ^{90}Sr	Semi-annually	Blackfoot, Carey, Dietrich, Idaho Falls, Minidoka, Roberts, Moreland	Howe, Terreton, Arco	None
POTATOES				
Gamma Spec, ^{90}Sr	annually	Blackfoot, Idaho Falls, Rupert, occasional samples across the U.S.	Arco, Mud Lake	None
WHEAT				
Gamma Spec, ^{90}Sr	annually	Am. Falls, Blackfoot, Dietrich, Idaho Falls, Minidoka, Carey	Arco, Monteview, Mud Lake, Tabor, Terreton	None
LETTUCE				
Gamma Spec, ^{90}Sr	annually	Blackfoot, Carey, Idaho Falls, Pocatello	Arco, Atomic City, Howe, Mud Lake	None
BIG GAME				
Gamma Spec	varies	Occasional samples across the U.S.	Public Highways	INL roads
SHEEP				
Gamma Spec	annually	Blackfoot or Dubois,	None	N. INL (Circular Butte), S. INL (Tractor Flats)
WATERFOWL				
Gamma Spec, ^{90}Sr, Transurancis	annually	Varies among: Heise, Fort Hall, Mud Lake and Market Lake	None	Waste disposal ponds
Marmots				
Gamma Spec	varies	Pocatello Zoo, Tie Canyon	None	RWMC

APPENDIX B

SUMMARY OF MDC'S AND DCG'S

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Table B-1. Summary of Approximate Minimum Detectable Concentrations for Radiological Analyses Performed During Second Quarter 2005

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Guide[b] (DCG)
Air (particulate filter)[e]	Gross alpha[c]	8.27×10^{-16} µCi/mL	2×10^{-14} µCi/mL
	Gross beta[d]	1.65×10^{-15} µCi/mL	3×10^{-12} µCi/mL
	Specific gamma (^{137}Cs)	x 10^{-15} µCi/mL	4×10^{-10} µCi/mL
	^{238}Pu	2.65×10^{-18} µCi/mL	3×10^{-14} µCi/mL
	$^{239/240}$Pu	2.43×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{241}Am	2.39×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{90}Sr	8.25×10^{-17} µCi/mL	9×10^{-12} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	9.72×10^{-16} µCi/mL	4×10^{-10} µCi/mL
Air (atmospheric moisture)[f]	^{3}H	x 10^{-7} µCi/mL_{water}	1×10^{-7} µCi/mL_{air}
Air (precipitation)	^{3}H	1.08×10^{-7} µCi/mL	2×10^{-3} µCi/mL
Drinking Water	Gross Alpha	1.29 pCi/L	30 pCi/L
	Gross Beta	2.54 pCi/L	100 pCi/L
	^{3}H	102.54 pCi/L	2×10^{6} pCi/L
Surface Water	Gross Alpha	1.29 pCi/L	30 pCi/L
	Gross Beta	2.73 pCi/L	100 pCi/L
	^{3}H	95.85 pCi/L	2×10^{6} pCi/L
Milk	^{131}I	0.68 pCi/L	--
	^{137}Cs	3.30 pCi/L	--
	^{90}Sr	0.96 pCi/L	--
Potatoes	^{137}Cs	2.08 pCi/kg	--
	^{90}Sr	288.0 pCi/kg	--
Game Animal Tissue[g]	^{137}Cs	39.65 pCi/kg	--
	^{131}I	39.65 pCi/kg	--

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Guide[b] (DCG)
Sheep	^{137}Cs	23.72 µCi/kg	--
	^{131}I	23.62 µCi/kg	--
Waterfowl	^{141}Cm	48.6 pCi/kg	--
	^{137}Cs	25.1 pCi/kg	--
	^{60}Co	3.00 pCi/kg	--
	^{95}Nb	38.6 pCi/kg	--
	$^{239/240}Pu$	5.07 pCi/kg	--
	^{90}Sr	14.2 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 570 m^3/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^3, 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 Result ± 1s Uncertainty (x 10^{-15} µCi/mL)	GROSS ALPHA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)	GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)	GROSS BETA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)	GROSS BETA Result > 3s
BOUNDARY							
ARCO	04/06/2005	0.85 ± 0.36	3.15 ± 1.32		16.00 ± 0.96	5.92 ± 0.36	Y
	04/13/2005	1.58 ± 0.42	5.85 ± 1.57	Y	18.50 ± 1.03	6.85 ± 0.38	Y
	04/20/2005	1.34 ± 0.44	4.96 ± 1.61	Y	11.20 ± 1.05	4.14 ± 0.39	Y
	04/27/2005	1.20 ± 0.43	4.44 ± 1.58		19.40 ± 1.17	7.18 ± 0.43	Y
	05/04/2005	1.20 ± 0.43	4.44 ± 1.61		17.90 ± 1.15	6.62 ± 0.43	Y
	05/11/2005	1.10 ± 0.42	4.07 ± 1.54		9.86 ± 1.00	3.65 ± 0.37	Y
a	05/18/2005	-1.85 ± 1.22	-6.85 ± 4.51		3.77 ± 2.69	1.39 ± 1.00	
	05/25/2005	0.67 ± 0.36	2.46 ± 1.33		16.20 ± 1.04	5.99 ± 0.38	Y
	06/01/2005	2.35 ± 0.86	8.70 ± 3.19		21.40 ± 1.90	7.92 ± 0.70	Y
	06/08/2005	0.23 ± 0.37	0.85 ± 1.38		10.40 ± 0.97	3.85 ± 0.36	Y
	06/15/2005	-0.01 ± 0.46	-0.04 ± 1.71		13.70 ± 1.12	5.07 ± 0.41	Y
	06/22/2005	1.68 ± 0.47	6.22 ± 1.74	Y	23.20 ± 1.29	8.58 ± 0.48	Y
	06/29/2005	0.86 ± 0.46	3.18 ± 1.69		23.10 ± 1.24	8.55 ± 0.46	Y
ATOMIC CITY	04/06/2005	0.85 ± 0.34	3.15 ± 1.25		13.90 ± 0.88	5.14 ± 0.33	Y
	04/13/2005	0.07 ± 0.04	0.25 ± 0.15		17.50 ± 1.12	6.48 ± 0.41	Y
	04/20/2005	0.97 ± 0.40	3.59 ± 1.47		13.10 ± 1.04	4.85 ± 0.38	Y
	04/27/2005	0.77 ± 0.40	2.83 ± 1.49		18.70 ± 1.18	6.92 ± 0.44	Y
	05/04/2005	2.25 ± 0.49	8.33 ± 1.82	Y	18.00 ± 1.14	6.66 ± 0.42	Y
	05/11/2005	0.43 ± 0.35	1.61 ± 1.30		11.00 ± 0.97	4.07 ± 0.36	Y
	05/18/2005	0.04 ± 0.35	0.13 ± 1.30		13.80 ± 0.93	5.11 ± 0.34	Y
	05/25/2005	0.89 ± 0.37	3.28 ± 1.36		16.60 ± 1.03	6.14 ± 0.38	Y
	06/01/2005	1.98 ± 0.47	7.33 ± 1.75	Y	22.10 ± 1.12	8.18 ± 0.41	Y
	06/08/2005	0.67 ± 0.40	2.48 ± 1.47		10.80 ± 0.97	4.00 ± 0.36	Y
	06/15/2005	0.34 ± 0.43	1.25 ± 1.58		16.10 ± 1.05	5.96 ± 0.39	Y
	06/22/2005	1.98 ± 0.44	7.33 ± 1.62	Y	22.80 ± 1.15	8.44 ± 0.43	Y
	06/29/2005	1.61 ± 0.49	5.96 ± 1.80	Y	24.80 ± 1.23	9.18 ± 0.46	Y
BLUE DOME	04/06/2005	0.86 ± 0.37	3.40 ± 1.38		14.70 ± 0.97	5.44 ± 0.36	Y
	04/13/2005	1.25 ± 0.43	4.00 ± 1.60		18.80 ± 1.09	6.96 ± 0.40	Y
	04/20/2005	0.38 ± 0.34	4.40 ± 1.26		9.75 ± 0.96	3.61 ± 0.35	Y
	04/27/2005	1.28 ± 0.42	3.54 ± 1.54	Y	17.20 ± 1.10	6.36 ± 0.41	Y
	05/04/2005	0.56 ± 0.38	3.43 ± 1.39		17.40 ± 1.11	6.44 ± 0.41	Y
	05/11/2005	0.12 ± 0.34	2.74 ± 1.26		11.90 ± 1.02	4.40 ± 0.38	Y
	05/18/2005	0.51 ± 0.41	-0.42 ± 1.52		13.80 ± 0.99	5.11 ± 0.37	Y
	05/25/2005	0.93 ± 0.40	4.70 ± 1.49		14.50 ± 1.08	5.37 ± 0.40	Y
	06/01/2005	1.56 ± 0.46	6.85 ± 1.68	Y	20.60 ± 1.11	7.62 ± 0.41	Y
	06/08/2005	0.33 ± 0.41	4.26 ± 1.50		8.98 ± 1.00	3.32 ± 0.37	Y
	06/15/2005	0.29 ± 0.44	2.10 ± 1.61		13.10 ± 1.02	4.85 ± 0.38	Y
	06/22/2005	0.96 ± 0.39	7.10 ± 1.46		24.50 ± 1.23	9.07 ± 0.46	Y
	06/29/2005	0.40 ± 0.40	11.14 ± 1.47		19.60 ± 1.12	7.25 ± 0.41	Y
FAA TOWER	04/06/2005	1.10 ± 0.37	1.38 ± 1.38		11.40 ± 0.88	4.22 ± 0.33	Y
	04/13/2005	1.29 ± 0.42	1.56 ± 1.56	Y	15.70 ± 1.02	5.81 ± 0.38	Y
	04/20/2005	0.57 ± 0.34	1.25 ± 1.25		12.40 ± 0.96	4.59 ± 0.35	Y
	04/27/2005	1.21 ± 0.42	1.55 ± 1.55		15.90 ± 1.10	5.88 ± 0.41	Y
	05/04/2005	0.74 ± 0.34	1.27 ± 1.27		16.20 ± 0.97	5.99 ± 0.36	Y
	05/11/2005	0.59 ± 0.38	1.40 ± 1.40		10.10 ± 1.00	3.74 ± 0.37	Y
	05/18/2005	0.40 ± 0.44	1.62 ± 1.62		13.70 ± 1.05	5.07 ± 0.39	Y
	05/25/2005	0.70 ± 0.39	1.43 ± 1.43		14.70 ± 1.08	5.44 ± 0.40	Y
	06/01/2005	1.16 ± 0.44	1.62 ± 1.62		21.40 ± 1.14	7.92 ± 0.42	Y
	06/08/2005	-0.30 ± 0.36	1.32 ± 1.32		10.60 ± 1.02	3.92 ± 0.38	Y
	06/15/2005	0.88 ± 0.49	1.80 ± 1.80		14.40 ± 1.08	5.33 ± 0.40	Y
	06/22/2005	1.25 ± 0.43	1.60 ± 1.60		22.40 ± 1.25	8.29 ± 0.46	Y
	06/29/2005	1.04 ± 0.45	1.67 ± 1.67		22.70 ± 1.20	8.40 ± 0.44	Y

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS ALPHA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			GROSS ALPHA Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS BETA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			GROSS BETA Result > 3s
HOWE	04/06/2005	0.81	±	0.34	3.00	±	1.25		13.90	±	0.89	5.14	±	0.33	Y
	04/13/2005	0.89	±	0.43	3.29	±	1.59		18.70	±	1.14	6.92	±	0.42	Y
	04/20/2005	0.60	±	0.33	2.21	±	1.23		12.70	±	0.94	4.70	±	0.35	Y
	04/27/2005	1.38	±	0.42	5.11	±	1.55	Y	16.70	±	1.09	6.18	±	0.40	Y
	05/04/2005	1.20	±	0.38	4.44	±	1.39	Y	18.70	±	1.02	6.92	±	0.38	Y
b	05/11/2005	2.56	±	1.67	9.47	±	6.18		10.20	±	3.78	3.77	±	1.40	
	05/18/2005	0.44	±	0.35	1.64	±	1.31		14.70	±	0.90	5.44	±	0.33	Y
	05/25/2005	0.31	±	0.33	1.14	±	1.22		15.40	±	1.03	5.70	±	0.38	Y
	06/01/2005	1.48	±	0.42	5.48	±	1.55	Y	22.30	±	1.07	8.25	±	0.40	Y
	06/08/2005	1.23	±	0.57	4.55	±	2.12		9.25	±	1.25	3.42	±	0.46	Y
b	06/15/2005	-6.31	±	6.35	-23.35	±	23.50		5.75	±	12.80	2.13	±	4.74	
	06/22/2005	1.81	±	0.44	6.70	±	1.64	Y	24.40	±	1.22	9.03	±	0.45	Y
	06/29/2005	2.19	±	0.46	8.10	±	1.68	Y	21.40	±	1.05	7.92	±	0.39	Y
QA-2	04/06/2005	1.47	±	0.48	5.44	±	1.77	Y	14.90	±	1.13	5.51	±	0.42	Y
	04/13/2005	1.19	±	0.49	4.40	±	1.79		17.90	±	1.21	6.62	±	0.45	Y
	04/20/2005	1.11	±	0.49	4.11	±	1.81		13.30	±	1.25	4.92	±	0.46	Y
	04/27/2005	0.95	±	0.38	3.50	±	1.42		18.40	±	1.09	6.81	±	0.40	Y
	05/04/2005	2.25	±	0.55	8.33	±	2.05	Y	19.80	±	1.31	7.33	±	0.48	Y
	05/11/2005	0.38	±	0.34	1.41	±	1.26		10.40	±	0.95	3.85	±	0.35	Y
	05/18/2005	0.14	±	0.45	0.53	±	1.68		14.40	±	1.13	5.33	±	0.42	Y
	05/25/2005	1.91	±	0.47	7.07	±	1.75	Y	14.70	±	1.10	5.44	±	0.41	Y
	06/01/2005	2.26	±	0.53	8.36	±	1.95	Y	23.90	±	1.23	8.84	±	0.46	Y
	06/08/2005	0.05	±	0.41	0.17	±	1.53		10.30	±	1.09	3.81	±	0.40	Y
	06/15/2005	0.50	±	0.53	1.86	±	1.98		13.30	±	1.19	4.92	±	0.44	Y
	06/22/2005	1.55	±	0.43	5.74	±	1.59	Y	24.30	±	1.22	8.99	±	0.45	Y
	06/29/2005	1.70	±	0.56	6.29	±	2.05	Y	23.20	±	1.35	8.58	±	0.50	Y
MONTEVIEW	04/06/2005	1.19	±	0.41	4.40	±	1.52		15.40	±	1.02	5.70	±	0.38	Y
	04/13/2005	0.91	±	0.48	3.36	±	1.77		18.30	±	1.24	6.77	±	0.46	Y
	04/20/2005	0.33	±	0.37	1.24	±	1.36		12.60	±	1.08	4.66	±	0.40	Y
	04/27/2005	2.13	±	0.48	7.88	±	1.78	Y	17.70	±	1.14	6.55	±	0.42	Y
	05/04/2005	1.29	±	0.44	4.77	±	1.62		19.30	±	1.16	7.14	±	0.43	Y
	05/11/2005	-0.04	±	0.33	-0.16	±	1.24		11.80	±	1.04	4.37	±	0.38	Y
	05/18/2005	0.27	±	0.38	1.00	±	1.42		15.30	±	0.99	5.66	±	0.36	Y
	05/25/2005	0.71	±	0.42	2.62	±	1.54		15.30	±	1.17	5.66	±	0.43	Y
	06/01/2005	1.38	±	0.44	5.11	±	1.63	Y	21.00	±	1.11	7.77	±	0.41	Y
	06/08/2005	0.66	±	0.48	2.46	±	1.77		11.50	±	1.16	4.26	±	0.43	Y
	06/15/2005	1.01	±	0.47	3.74	±	1.72		14.20	±	1.02	5.25	±	0.38	Y
	06/22/2005	1.59	±	0.47	5.88	±	1.72	Y	23.00	±	1.29	8.51	±	0.48	Y
	06/29/2005	0.88	±	0.36	3.27	±	1.35		20.20	±	0.99	7.47	±	0.36	Y
MUD LAKE	04/06/2005	0.97	±	0.36	3.60	±	1.34		13.10	±	0.90	4.85	±	0.33	Y
	04/13/2005	1.30	±	0.44	4.81	±	1.64		17.80	±	1.10	6.59	±	0.41	Y
	04/20/2005	1.21	±	0.41	4.48	±	1.50		13.40	±	1.03	4.96	±	0.38	Y
	04/27/2005	1.74	±	0.45	6.44	±	1.67	Y	18.30	±	1.13	6.77	±	0.42	Y
	05/04/2005	1.03	±	0.37	3.81	±	1.37		18.10	±	1.02	6.70	±	0.38	Y
	05/11/2005	0.88	±	0.37	3.24	±	1.38		11.50	±	0.96	4.26	±	0.36	Y
	05/18/2005	-0.18	±	0.38	-0.65	±	1.42		16.40	±	1.06	6.07	±	0.39	Y
	05/25/2005	1.68	±	0.45	6.22	±	1.67	Y	16.20	±	1.11	5.99	±	0.41	Y
	06/01/2005	1.98	±	0.46	7.33	±	1.70	Y	19.60	±	1.05	7.25	±	0.39	Y
	06/08/2005	0.57	±	0.44	2.09	±	1.63		9.84	±	1.06	3.64	±	0.39	Y
	06/15/2005	-0.25	±	0.38	-0.92	±	1.41		15.70	±	1.02	5.81	±	0.38	Y
	06/22/2005	2.09	±	0.45	7.73	±	1.67	Y	24.20	±	1.19	8.95	±	0.44	Y
	06/29/2005	1.94	±	0.47	7.18	±	1.75	Y	26.00	±	1.18	9.62	±	0.44	Y
DISTANT															
BLACKFOOT CMS	04/06/2005	0.92	±	0.37	3.40	±	1.36		12.50	±	0.92	4.63	±	0.34	Y
	04/13/2005	1.08	±	0.39	4.00	±	1.43		16.50	±	0.98	6.11	±	0.36	Y

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS ALPHA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS BETA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	04/20/2005	1.19	±	0.39	4.40	±	1.43	Y	13.10	±	0.98	4.85	±	0.36	Y
	04/27/2005	0.96	±	0.35	3.54	±	1.28		14.00	±	0.93	5.18	±	0.34	Y
	05/04/2005	0.93	±	0.35	3.43	±	1.28		11.20	±	0.88	4.14	±	0.32	Y
	05/11/2005	0.74	±	0.34	2.74	±	1.26		11.90	±	0.91	4.40	±	0.34	Y
	05/18/2005	-0.11	±	0.34	-0.42	±	1.25		10.70	±	0.87	3.96	±	0.32	Y
	05/25/2005	1.27	±	0.38	4.70	±	1.41	Y	17.10	±	1.01	6.33	±	0.37	Y
	06/01/2005	1.85	±	0.47	6.85	±	1.72	Y	20.40	±	1.10	7.55	±	0.41	Y
	06/08/2005	1.15	±	0.40	4.26	±	1.49		13.30	±	0.95	4.92	±	0.35	Y
	06/15/2005	0.57	±	0.45	2.10	±	1.67		15.00	±	1.05	5.55	±	0.39	Y
	06/22/2005	1.92	±	0.43	7.10	±	1.59	Y	25.20	±	1.18	9.32	±	0.44	Y
	06/29/2005	3.01	±	0.55	11.14	±	2.03	Y	23.50	±	1.19	8.70	±	0.44	Y
CRATERS OF	04/06/2005	1.10	±	0.47	4.07	±	1.75		13.10	±	1.13	4.85	±	0.42	Y
THE MOON	04/13/2005	1.23	±	0.51	4.55	±	1.90		16.80	±	1.25	6.22	±	0.46	Y
	04/20/2005	0.48	±	0.40	1.79	±	1.47		12.70	±	1.13	4.70	±	0.42	Y
	04/27/2005	0.87	±	0.43	3.20	±	1.57		15.20	±	1.17	5.62	±	0.43	Y
	05/04/2005	1.12	±	0.56	4.14	±	2.09		18.70	±	1.50	6.92	±	0.56	Y
	05/11/2005	0.27	±	0.36	1.00	±	1.34		9.40	±	1.01	3.48	±	0.37	Y
	05/18/2005	0.18	±	0.45	0.66	±	1.67		11.20	±	1.07	4.14	±	0.40	Y
	05/25/2005	0.99	±	0.41	3.66	±	1.51		14.30	±	1.08	5.29	±	0.40	Y
	06/01/2005	2.11	±	0.59	7.81	±	2.19	Y	21.20	±	1.35	7.84	±	0.50	Y
	06/08/2005	0.19	±	0.40	0.71	±	1.49		11.40	±	1.06	4.22	±	0.39	Y
	06/15/2005	0.13	±	0.65	0.47	±	2.42		13.90	±	1.48	5.14	±	0.55	Y
	06/22/2005	1.27	±	0.47	4.70	±	1.75		19.70	±	1.32	7.29	±	0.49	Y
	06/29/2005	0.69	±	0.55	2.56	±	2.04		20.70	±	1.44	7.66	±	0.53	Y
DUBOIS	04/06/2005	0.69	±	0.33	2.56	±	1.22		12.70	±	0.87	4.70	±	0.32	Y
	04/13/2005	0.99	±	0.52	3.65	±	1.92		14.30	±	1.26	5.29	±	0.47	Y
	04/20/2005	1.16	±	0.38	4.29	±	1.42	Y	11.60	±	0.95	4.29	±	0.35	Y
	04/27/2005	0.90	±	0.41	3.32	±	1.51		16.90	±	1.14	6.25	±	0.42	Y
	05/04/2005	1.16	±	0.40	4.29	±	1.47		18.10	±	1.07	6.70	±	0.40	Y
	05/11/2005	0.93	±	0.38	3.43	±	1.41		12.40	±	0.99	4.59	±	0.36	Y
	05/18/2005	-0.17	±	0.35	-0.64	±	1.30		15.90	±	0.99	5.88	±	0.37	Y
	05/25/2005	0.69	±	0.37	2.56	±	1.37		15.60	±	1.05	5.77	±	0.39	Y
	06/01/2005	1.02	±	0.38	3.77	±	1.41		20.80	±	1.02	7.70	±	0.38	Y
	06/08/2005	0.29	±	0.40	1.08	±	1.49		11.70	±	1.05	4.33	±	0.39	Y
c	06/15/2005	-2.54	±	15.60	-9.40	±	57.72		-18.90	±	29.10	-6.99	±	10.77	
	06/22/2005	1.26	±	0.40	4.66	±	1.49	Y	20.10	±	1.15	7.44	±	0.43	Y
c	06/29/2005	0.00	±	0.00	0.00	±	0.00		0.00	±	0.00	0.00	±	0.00	
IDAHO FALLS	04/06/2005	1.83	±	0.50	6.77	±	1.84	Y	13.70	±	1.09	5.07	±	0.40	Y
	04/13/2005	1.14	±	0.46	4.22	±	1.71		16.80	±	1.15	6.22	±	0.43	Y
	04/20/2005	1.49	±	0.45	5.51	±	1.66	Y	17.60	±	1.16	6.51	±	0.43	Y
	04/27/2005	1.34	±	0.45	4.96	±	1.67		18.40	±	1.20	6.81	±	0.44	Y
	05/04/2005	1.70	±	0.48	6.29	±	1.76	Y	18.70	±	1.19	6.92	±	0.44	Y
	05/11/2005	0.59	±	0.40	2.19	±	1.46		12.40	±	1.08	4.59	±	0.40	Y
	05/18/2005	0.30	±	0.51	1.10	±	1.89		20.60	±	1.33	7.62	±	0.49	Y
	05/25/2005	2.19	±	0.56	8.10	±	2.08	Y	20.00	±	1.36	7.40	±	0.50	Y
	06/01/2005	1.77	±	0.50	6.55	±	1.84	Y	24.70	±	1.24	9.14	±	0.46	Y
	06/08/2005	0.90	±	0.53	3.33	±	1.94		13.10	±	1.26	4.85	±	0.47	Y
	06/15/2005	0.39	±	0.23	1.45	±	0.86		7.33	±	0.53	2.71	±	0.19	Y
	06/22/2005	3.06	±	0.57	11.32	±	2.10	Y	27.90	±	1.40	10.32	±	0.52	Y
	06/29/2005	1.67	±	0.54	6.18	±	1.98	Y	24.50	±	1.33	9.07	±	0.49	Y
JACKSON	04/06/2005	1.35	±	0.40	5.00	±	1.46	Y	14.30	±	0.94	5.29	±	0.35	Y
	04/13/2005	1.64	±	0.44	6.07	±	1.62	Y	19.50	±	1.07	7.22	±	0.40	Y
	04/20/2005	1.12	±	0.39	4.14	±	1.44		16.20	±	1.05	5.99	±	0.39	Y
	04/27/2005	1.98	±	0.45	7.33	±	1.65	Y	18.60	±	1.09	6.88	±	0.40	Y
	05/04/2005	1.55	±	0.42	5.74	±	1.57	Y	16.90	±	1.06	6.25	±	0.39	Y

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

		GROSS ALPHA			GROSS BETA		
Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)	Result ± 1s Uncertainty (x 10^{-11} Bq/mL)	Result > 3s	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)	Result ± 1s Uncertainty (x 10^{-11} Bq/mL)	Result > 3s
	05/11/2005	0.78 ± 0.37	2.89 ± 1.37		7.63 ± 0.90	2.82 ± 0.33	Y
	05/18/2005	0.04 ± 0.35	0.14 ± 1.28		13.40 ± 0.91	4.96 ± 0.34	Y
	05/25/2005	1.32 ± 0.46	4.88 ± 1.69		18.70 ± 1.22	6.92 ± 0.45	Y
	06/01/2005	1.31 ± 0.44	4.85 ± 1.61	Y	18.80 ± 1.08	6.96 ± 0.40	Y
	06/08/2005	0.21 ± 0.38	0.78 ± 1.39		12.00 ± 1.00	4.44 ± 0.37	Y
	06/15/2005	0.46 ± 0.46	1.70 ± 1.68		12.90 ± 1.04	4.77 ± 0.38	Y
	06/22/2005	2.01 ± 0.45	7.44 ± 1.67	Y	19.60 ± 1.14	7.25 ± 0.42	Y
	06/29/2005	2.44 ± 0.52	9.03 ± 1.92	Y	25.50 ± 1.22	9.44 ± 0.45	Y
REXBURG CMS	04/06/2005	0.42 ± 0.35	1.55 ± 1.28		13.10 ± 0.96	4.85 ± 0.35	Y
	04/13/2005	1.12 ± 0.42	4.14 ± 1.54		18.30 ± 1.07	6.77 ± 0.40	Y
	04/20/2005	1.17 ± 0.39	4.33 ± 1.43	Y	15.00 ± 1.01	5.55 ± 0.37	Y
	04/27/2005	1.40 ± 0.42	5.18 ± 1.54	Y	18.00 ± 1.10	6.66 ± 0.41	Y
	05/04/2005	1.03 ± 0.43	3.81 ± 1.60		16.80 ± 1.16	6.22 ± 0.43	Y
	05/11/2005	0.55 ± 0.34	2.04 ± 1.27		7.47 ± 0.87	2.76 ± 0.32	Y
	05/18/2005	0.58 ± 0.42	2.14 ± 1.56		13.00 ± 0.99	4.81 ± 0.37	Y
	05/25/2005	1.12 ± 0.42	4.14 ± 1.54		16.30 ± 1.11	6.03 ± 0.41	Y
	06/01/2005	0.87 ± 0.42	3.23 ± 1.55		18.70 ± 1.10	6.92 ± 0.41	Y
	06/08/2005	0.71 ± 0.42	2.64 ± 1.54		14.20 ± 1.05	5.25 ± 0.39	Y
	06/15/2005	0.71 ± 0.48	2.63 ± 1.78		15.40 ± 1.10	5.70 ± 0.41	Y
	06/22/2005	2.54 ± 0.53	9.40 ± 1.97	Y	27.00 ± 1.37	9.99 ± 0.51	Y
	06/29/2005	2.77 ± 0.55	10.25 ± 2.02	Y	26.90 ± 1.26	9.95 ± 0.47	Y
INEEL							
EFS	04/06/2005	0.52 ± 0.43	1.93 ± 1.60		16.90 ± 1.21	6.25 ± 0.45	Y
	04/13/2005	0.85 ± 0.39	3.16 ± 1.43		19.10 ± 1.05	7.07 ± 0.39	Y
	04/20/2005	1.16 ± 0.45	4.29 ± 1.65		12.90 ± 1.13	4.77 ± 0.42	Y
	04/27/2005	1.35 ± 0.42	5.00 ± 1.56	Y	20.10 ± 1.15	7.44 ± 0.43	Y
	05/04/2005	1.06 ± 0.43	3.92 ± 1.59		17.50 ± 1.16	6.48 ± 0.43	Y
	05/11/2005	0.66 ± 0.49	2.43 ± 1.80		10.40 ± 1.26	3.85 ± 0.47	Y
	05/18/2005	0.36 ± 0.47	1.32 ± 1.74		11.60 ± 1.09	4.29 ± 0.40	Y
	05/25/2005	1.19 ± 0.47	4.40 ± 1.75		17.50 ± 1.26	6.48 ± 0.47	Y
	06/01/2005	1.60 ± 0.51	5.92 ± 1.90	Y	21.40 ± 1.25	7.92 ± 0.46	Y
	06/08/2005	0.63 ± 0.46	2.35 ± 1.70		11.20 ± 1.11	4.14 ± 0.41	Y
	06/15/2005	1.04 ± 0.52	3.85 ± 1.93		14.90 ± 1.13	5.51 ± 0.42	Y
	06/22/2005	1.47 ± 0.46	5.44 ± 1.68	Y	21.60 ± 1.26	7.99 ± 0.47	Y
	06/29/2005	1.90 ± 0.65	7.03 ± 2.40		24.60 ± 1.55	9.10 ± 0.57	Y
MAIN GATE	04/06/2005	1.20 ± 0.46	4.44 ± 1.68		14.60 ± 1.11	5.40 ± 0.41	Y
	04/13/2005	1.32 ± 0.49	4.88 ± 1.82		17.30 ± 1.20	6.40 ± 0.44	Y
	04/20/2005	1.42 ± 0.47	5.25 ± 1.72	Y	12.90 ± 1.14	4.77 ± 0.42	Y
	04/27/2005	1.50 ± 0.48	5.55 ± 1.78	Y	17.80 ± 1.24	6.59 ± 0.46	Y
	05/04/2005	0.95 ± 0.46	3.50 ± 1.72		18.00 ± 1.27	6.66 ± 0.47	Y
	05/11/2005	0.23 ± 0.40	0.85 ± 1.47		11.20 ± 1.14	4.14 ± 0.42	Y
	05/18/2005	0.27 ± 0.54	1.00 ± 1.99		14.20 ± 1.28	5.25 ± 0.47	Y
	05/25/2005	1.16 ± 0.48	4.29 ± 1.76		15.60 ± 1.24	5.77 ± 0.46	Y
	06/01/2005	1.49 ± 0.54	5.51 ± 1.98		24.30 ± 1.35	8.99 ± 0.50	Y
	06/08/2005	0.99 ± 0.54	3.67 ± 2.00		12.70 ± 1.27	4.70 ± 0.47	Y
	06/15/2005	0.00 ± 0.53	0.01 ± 1.96		14.40 ± 1.26	5.33 ± 0.47	Y
	06/22/2005	1.47 ± 0.41	5.44 ± 1.52	Y	21.20 ± 1.14	7.84 ± 0.42	Y
	06/29/2005	1.25 ± 0.53	4.63 ± 1.97		24.80 ± 1.38	9.18 ± 0.51	Y
(Q/A-1)	04/06/2005	1.05 ± 0.52	3.89 ± 1.94		13.50 ± 1.27	5.00 ± 0.47	Y
	04/13/2005	1.34 ± 0.49	4.96 ± 1.80		18.80 ± 1.21	6.96 ± 0.45	Y
	04/20/2005	0.75 ± 0.45	2.78 ± 1.68		12.90 ± 1.22	4.77 ± 0.45	Y
	04/27/2005	0.89 ± 0.46	3.30 ± 1.70		20.40 ± 1.33	7.55 ± 0.49	Y
	05/04/2005	1.20 ± 0.56	4.44 ± 2.07		16.90 ± 1.45	6.25 ± 0.54	Y
	05/11/2005	0.02 ± 0.47	0.07 ± 1.73		9.57 ± 1.32	3.54 ± 0.49	Y
	05/18/2005	-0.04 ± 0.63	-0.16 ± 2.32		12.70 ± 1.47	4.70 ± 0.54	Y

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

Sampling Group and Location	Sampling Date	GROSS ALPHA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS ALPHA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s	GROSS BETA Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			GROSS BETA Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
	05/25/2005	1.72	±	0.51	6.36	±	1.88	Y	16.10	±	1.24	5.96	±	0.46	Y
	06/01/2005	2.11	±	0.55	7.81	±	2.04	Y	22.30	±	1.28	8.25	±	0.47	Y
	06/08/2005	0.18	±	0.56	0.66	±	2.05		10.20	±	1.38	3.77	±	0.51	Y
	06/15/2005	0.28	±	0.57	1.05	±	2.11		14.20	±	1.30	5.25	±	0.48	Y
	06/22/2005	1.33	±	0.51	4.92	±	1.87		23.30	±	1.45	8.62	±	0.54	Y
	06/29/2005	1.55	±	0.59	5.74	±	2.19		23.30	±	1.45	8.62	±	0.54	Y
VAN BUREN GATE	04/06/2005	1.34	±	0.47	4.96	±	1.73		14.00	±	1.11	5.18	±	0.41	Y
	04/13/2005	1.47	±	0.39	5.44	±	1.44	Y	15.00	±	0.91	5.55	±	0.34	Y
	04/20/2005	0.74	±	0.39	2.75	±	1.45		11.60	±	1.05	4.29	±	0.39	Y
	04/27/2005	0.91	±	0.50	3.35	±	1.84		16.20	±	1.35	5.99	±	0.50	Y
	05/04/2005	0.98	±	0.45	3.63	±	1.67		16.90	±	1.22	6.25	±	0.45	Y
	05/11/2005	0.11	±	0.37	0.40	±	1.38		9.95	±	1.08	3.68	±	0.40	Y
	05/18/2005	0.52	±	0.49	1.93	±	1.82		14.30	±	1.16	5.29	±	0.43	Y
	05/25/2005	1.32	±	0.47	4.88	±	1.74		18.00	±	1.24	6.66	±	0.46	Y
	06/01/2005	0.74	±	0.42	2.75	±	1.55		22.10	±	1.17	8.18	±	0.43	Y
	06/08/2005	2.20	±	0.48	8.14	±	1.76	Y	12.40	±	0.98	4.59	±	0.36	Y
	06/15/2005	0.22	±	0.48	0.81	±	1.76		13.40	±	1.11	4.96	±	0.41	Y
	06/22/2005	1.15	±	0.46	4.26	±	1.68		21.40	±	1.32	7.92	±	0.49	Y
	06/29/2005	2.22	±	0.54	8.21	±	2.00	Y	22.40	±	1.25	8.29	±	0.46	Y

Red text denotes invalid sample:

a. Arco 5/18 Pump Failure

b. Howe 5/11 and 6/15 Blown Fuse

c. Dubois 6/15 and 6/29 Electrical Repairs

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
ARCO	04/06/2005	1.77	±	1.80	6.55	±	6.66	
	04/13/2005	0.18	±	1.85	0.68	±	6.83	
	04/20/2005	-1.17	±	2.23	-4.32	±	8.26	
	04/27/2005	2.81	±	2.53	10.39	±	9.37	
	05/04/2005	-3.60	±	2.67	-13.32	±	9.89	
	05/11/2005	2.28	±	1.48	8.42	±	5.48	
a	05/18/2005	-7.95	±	7.25	-29.40	±	26.84	
	05/25/2005	-1.15	±	2.01	-4.26	±	7.44	
	06/01/2005	0.90	±	4.41	3.33	±	16.31	
	06/08/2005	-0.72	±	2.86	-2.68	±	10.58	
	06/15/2005	2.65	±	2.43	9.81	±	8.98	
	06/22/2005	-1.73	±	1.59	-6.39	±	5.88	
	06/29/2005	1.50	±	2.21	5.56	±	8.18	
ATOMIC CITY	04/06/2005	1.65	±	1.68	6.11	±	6.22	
	04/13/2005	0.21	±	2.15	0.79	±	7.95	
	04/20/2005	-1.11	±	2.13	-4.13	±	7.88	
	04/27/2005	2.86	±	2.58	10.59	±	9.55	
	05/04/2005	-3.55	±	2.64	-13.14	±	9.75	
	05/11/2005	2.14	±	1.39	7.91	±	5.15	
	05/18/2005	-1.99	±	1.81	-7.35	±	6.71	
	05/25/2005	-1.12	±	1.95	-4.14	±	7.23	
	06/01/2005	0.43	±	2.13	1.60	±	7.86	
	06/08/2005	-0.71	±	2.80	-2.62	±	10.38	
	06/15/2005	2.33	±	2.13	8.61	±	7.88	
	06/22/2005	-1.49	±	1.37	-5.52	±	5.08	
	06/29/2005	1.44	±	2.12	5.33	±	7.84	
BLUE DOME	04/06/2005	2.94	±	2.56	10.87	±	9.47	
	04/13/2005	0.87	±	1.48	3.23	±	5.46	
	04/20/2005	0.91	±	1.45	3.37	±	5.35	
	04/27/2005	-1.07	±	1.55	-3.98	±	5.74	
	05/04/2005	0.93	±	1.64	3.45	±	6.06	
	05/11/2005	-0.46	±	2.32	-1.69	±	8.58	
	05/18/2005	0.89	±	1.28	3.29	±	4.74	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
	05/25/2005	0.91	±	1.45	3.37	±	5.38	
	06/01/2005	-1.73	±	1.45	-6.40	±	5.36	
	06/08/2005	1.53	±	2.06	5.64	±	7.61	
	06/15/2005	1.78	±	1.32	6.60	±	4.88	
	06/22/2005	1.02	±	2.27	3.77	±	8.39	
	06/29/2005	-1.54	±	1.32	-5.70	±	4.89	
FAA TOWER	04/06/2005	2.80	±	2.44	10.37	±	9.04	
	04/13/2005	0.84	±	1.43	3.12	±	5.29	
	04/20/2005	0.85	±	1.35	3.15	±	4.99	
	04/27/2005	-1.10	±	1.58	-4.06	±	5.86	
	05/04/2005	0.80	±	1.40	2.95	±	5.19	
	05/11/2005	-0.46	±	2.35	-1.71	±	8.69	
	05/18/2005	0.97	±	1.39	3.59	±	5.16	
	05/25/2005	0.91	±	1.45	3.37	±	5.38	
	06/01/2005	-1.76	±	1.48	-6.52	±	5.46	
	06/08/2005	1.50	±	2.03	5.56	±	7.50	
	06/15/2005	1.86	±	1.37	6.87	±	5.08	
	06/22/2005	1.09	±	2.43	4.03	±	8.97	
	06/29/2005	-1.59	±	1.36	-5.89	±	5.05	
HOWE	04/06/2005	2.63	±	2.30	9.75	±	8.49	
	04/13/2005	0.93	±	1.58	3.45	±	5.84	
	04/20/2005	0.83	±	1.31	3.07	±	4.86	
	04/27/2005	-1.06	±	1.53	-3.93	±	5.67	
	05/04/2005	0.81	±	1.41	2.98	±	5.23	
b	05/11/2005	-2.09	±	10.59	-7.73	±	39.20	
	05/18/2005	0.76	±	1.09	2.81	±	4.04	
	05/25/2005	0.83	±	1.33	3.08	±	4.92	
	06/01/2005	-1.57	±	1.32	-5.81	±	4.87	
	06/08/2005	1.97	±	2.65	7.28	±	9.81	
b	06/15/2005	29.43	±	21.76	108.89	±	80.51	
	06/22/2005	1.01	±	2.25	3.73	±	8.31	
	06/29/2005	-1.35	±	1.15	-4.98	±	4.27	
HOWE (Q/A-2)	04/06/2005	3.58	±	3.12	13.23	±	11.53	
	04/13/2005	1.02	±	1.73	3.78	±	6.40	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
	04/20/2005	1.18	±	1.87	4.36	±	6.91	
	04/27/2005	-1.04	±	1.50	-3.83	±	5.53	
	05/04/2005	1.11	±	1.96	4.12	±	7.24	
	05/11/2005	-0.43	±	2.19	-1.60	±	8.11	
	05/18/2005	1.05	±	1.50	3.87	±	5.57	
	05/25/2005	0.93	±	1.48	3.42	±	5.47	
	06/01/2005	-1.88	±	1.58	-6.96	±	5.83	
	06/08/2005	1.63	±	2.20	6.03	±	8.13	
	06/15/2005	2.16	±	1.59	7.98	±	5.90	
	06/22/2005	1.02	±	2.26	3.76	±	8.38	
	06/29/2005	-1.87	±	1.60	-6.90	±	5.91	
MONTEVIEW	04/06/2005	3.09	±	2.69	11.44	±	9.97	
	04/13/2005	1.05	±	1.78	3.90	±	6.60	
	04/20/2005	0.99	±	1.57	3.67	±	5.82	
	04/27/2005	-1.11	±	1.60	-4.10	±	5.93	
	05/04/2005	0.96	±	1.68	3.54	±	6.21	
	05/11/2005	-0.47	±	2.38	-1.73	±	8.80	
	05/18/2005	0.85	±	1.23	3.16	±	4.55	
	05/25/2005	0.99	±	1.58	3.67	±	5.86	
	06/01/2005	-1.71	±	1.43	-6.32	±	5.29	
	06/08/2005	1.72	±	2.32	6.38	±	8.60	
	06/15/2005	1.73	±	1.28	6.42	±	4.75	
	06/22/2005	1.12	±	2.50	4.16	±	9.26	
	06/29/2005	-1.27	±	1.08	-4.68	±	4.01	
MUD LAKE	04/06/2005	2.77	±	2.42	10.26	±	8.94	
	04/13/2005	0.89	±	1.51	3.31	±	5.60	
	04/20/2005	0.92	±	1.45	3.40	±	5.38	
	04/27/2005	-1.09	±	1.57	-4.03	±	5.82	
	05/04/2005	0.81	±	1.43	3.02	±	5.29	
	05/11/2005	-0.43	±	2.17	-1.58	±	8.01	
	05/18/2005	0.92	±	1.33	3.41	±	4.91	
	05/25/2005	0.90	±	1.44	3.35	±	5.34	
	06/01/2005	-1.64	±	1.37	-6.06	±	5.07	
	06/08/2005	1.60	±	2.16	5.92	±	7.98	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
	06/15/2005	1.68	±	1.24	6.22	±	4.60	
	06/22/2005	0.97	±	2.17	3.60	±	8.02	
	06/29/2005	-1.46	±	1.25	-5.41	±	4.63	
DISTANT								
BLACKFOOT CMS	04/06/2005	1.82	±	1.85	6.74	±	6.85	
	04/13/2005	0.18	±	1.81	0.67	±	6.69	
	04/20/2005	-1.03	±	1.96	-3.80	±	7.25	
	04/27/2005	2.29	±	2.07	8.49	±	7.65	
	05/04/2005	-2.93	±	2.18	-10.85	±	8.05	
	05/11/2005	1.91	±	1.24	7.07	±	4.60	
	05/18/2005	-1.98	±	1.81	-7.33	±	6.70	
	05/25/2005	-1.07	±	1.87	-3.97	±	6.94	
	06/01/2005	0.43	±	2.13	1.61	±	7.87	
	06/08/2005	-0.66	±	2.61	-2.44	±	9.65	
	06/15/2005	2.38	±	2.18	8.82	±	8.07	
	06/22/2005	-1.47	±	1.35	-5.44	±	5.00	
	06/29/2005	1.40	±	2.06	5.19	±	7.63	
CRATERS	04/06/2005	2.38	±	2.42	8.80	±	8.95	
	04/13/2005	0.25	±	2.51	0.92	±	9.28	
	04/20/2005	-1.24	±	2.38	-4.60	±	8.79	
	04/27/2005	3.03	±	2.73	11.21	±	10.11	
	05/04/2005	-5.04	±	3.74	-18.66	±	13.85	
	05/11/2005	2.32	±	1.51	8.57	±	5.58	
	05/18/2005	-2.53	±	2.31	-9.36	±	8.54	
	05/25/2005	-1.26	±	2.19	-4.65	±	8.11	
	06/01/2005	0.57	±	2.82	2.13	±	10.43	
	06/08/2005	-0.79	±	3.12	-2.92	±	11.53	
	06/15/2005	3.74	±	3.42	13.84	±	12.66	
	06/22/2005	-1.90	±	1.75	-7.05	±	6.48	
	06/29/2005	1.92	±	2.82	7.10	±	10.44	
DUBOIS	04/06/2005	2.66	±	2.32	9.84	±	8.57	
	04/13/2005	1.15	±	1.95	4.26	±	7.22	
	04/20/2005	0.86	±	1.37	3.20	±	5.07	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)			Result ± 1s Uncertainty (x 10^{-11} Bq/mL)			Result > 3s
BOUNDARY								
	04/27/2005	-1.13	±	1.63	-4.19	±	6.05	
	05/04/2005	0.87	±	1.52	3.21	±	5.63	
	05/11/2005	-0.43	±	2.18	-1.59	±	8.08	
	05/18/2005	0.85	±	1.22	3.14	±	4.51	
	05/25/2005	0.86	±	1.37	3.18	±	5.07	
	06/01/2005	-1.52	±	1.27	-5.63	±	4.71	
	06/08/2005	1.52	±	2.04	5.61	±	7.56	
c	06/15/2005	68.67	±	50.77	254.07	±	187.87	
	06/22/2005	1.00	±	2.23	3.70	±	8.24	
c	06/29/2005	0.00	±	0.00	0.00	±	0.00	
IDAHO FALLS	04/06/2005	3.51	±	3.06	13.00	±	11.33	
	04/13/2005	0.97	±	1.64	3.59	±	6.08	
	04/20/2005	0.98	±	1.55	3.63	±	5.75	
	04/27/2005	-1.17	±	1.70	-4.34	±	6.27	
	05/04/2005	0.99	±	1.74	3.68	±	6.45	
	05/11/2005	-0.48	±	2.45	-1.79	±	9.07	
	05/18/2005	1.15	±	1.65	4.26	±	6.12	
	05/25/2005	1.11	±	1.77	4.09	±	6.53	
	06/01/2005	-1.87	±	1.56	-6.90	±	5.78	
	06/08/2005	1.84	±	2.48	6.82	±	9.19	
	06/15/2005	0.89	±	0.66	3.30	±	2.44	
	06/22/2005	1.16	±	2.59	4.30	±	9.58	
	06/29/2005	-1.79	±	1.53	-6.63	±	5.68	
JACKSON	04/06/2005	1.80	±	1.83	6.66	±	6.78	
	04/13/2005	0.19	±	1.91	0.70	±	7.08	
	04/20/2005	-1.04	±	1.99	-3.86	±	7.37	
	04/27/2005	2.56	±	2.31	9.47	±	8.54	
	05/04/2005	-3.27	±	2.43	-12.11	±	8.99	
	05/11/2005	2.12	±	1.38	7.86	±	5.11	
	05/18/2005	-1.96	±	1.79	-7.24	±	6.61	
	05/25/2005	-1.34	±	2.35	-4.98	±	8.69	
	06/01/2005	0.44	±	2.14	1.62	±	7.93	
	06/08/2005	-0.73	±	2.87	-2.69	±	10.62	
	06/15/2005	2.46	±	2.25	9.10	±	8.33	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($\times 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($\times 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
	06/22/2005	-1.56	±	1.43	-5.77	±	5.31	
	06/29/2005	1.40	±	2.05	5.17	±	7.60	
REXBURG CMS	04/06/2005	3.01	±	2.62	11.14	±	9.71	
	04/13/2005	0.85	±	1.44	3.15	±	5.34	
	04/20/2005	0.87	±	1.37	3.21	±	5.08	
	04/27/2005	-1.05	±	1.51	-3.87	±	5.59	
	05/04/2005	1.00	±	1.75	3.69	±	6.48	
	05/11/2005	-0.42	±	2.12	-1.55	±	7.86	
	05/18/2005	0.90	±	1.30	3.34	±	4.81	
	05/25/2005	0.90	±	1.44	3.34	±	5.33	
	06/01/2005	-1.77	±	1.48	-6.55	±	5.49	
	06/08/2005	1.44	±	1.95	5.35	±	7.21	
	06/15/2005	1.86	±	1.38	6.90	±	5.10	
	06/22/2005	1.14	±	2.55	4.23	±	9.43	
	06/29/2005	-1.58	±	1.36	-5.86	±	5.02	
INEEL								
EFS	04/06/2005	2.39	±	2.43	8.83	±	8.98	
	04/13/2005	0.19	±	1.89	0.70	±	6.98	
	04/20/2005	-1.24	±	2.37	-4.59	±	8.78	
	04/27/2005	2.68	±	2.41	9.91	±	8.93	
	05/04/2005	-3.68	±	2.73	-13.60	±	10.09	
	05/11/2005	2.97	±	1.93	10.98	±	7.15	
	05/18/2005	-2.57	±	2.34	-9.49	±	8.67	
	05/25/2005	-1.44	±	2.52	-5.33	±	9.31	
	06/01/2005	0.51	±	2.51	1.89	±	9.28	
	06/08/2005	-0.84	±	3.33	-3.11	±	12.30	
	06/15/2005	2.65	±	2.42	9.79	±	8.96	
	06/22/2005	-1.73	±	1.59	-6.41	±	5.89	
	06/29/2005	2.00	±	2.94	7.40	±	10.88	
MAIN GATE	04/06/2005	2.23	±	2.27	8.25	±	8.39	
	04/13/2005	0.23	±	2.35	0.86	±	8.68	
	04/20/2005	-1.25	±	2.39	-4.62	±	8.83	
	04/27/2005	3.11	±	2.80	11.50	±	10.37	
	05/04/2005	-4.11	±	3.05	-15.22	±	11.29	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty ($x 10^{-15}$ µCi/mL)			Result ± 1s Uncertainty ($x 10^{-11}$ Bq/mL)			Result > 3s
BOUNDARY								
	05/11/2005	2.59	±	1.68	9.57	±	6.23	
	05/18/2005	-3.00	±	2.74	-11.11	±	10.14	
	05/25/2005	-1.46	±	2.55	-5.41	±	9.45	
	06/01/2005	0.55	±	2.67	2.02	±	9.90	
	06/08/2005	-0.96	±	3.78	-3.54	±	14.00	
	06/15/2005	3.05	±	2.79	11.29	±	10.33	
	06/22/2005	-1.52	±	1.40	-5.63	±	5.18	
	06/29/2005	1.70	±	2.50	6.29	±	9.25	
BLACKFOOT CMS (Q/A-1)	04/06/2005	2.73	±	2.77	10.09	±	10.27	
	04/13/2005	0.23	±	2.30	0.85	±	8.50	
	04/20/2005	-1.37	±	2.62	-5.07	±	9.69	
	04/27/2005	3.28	±	2.96	12.14	±	10.95	
	05/04/2005	-4.96	±	3.68	-18.35	±	13.62	
	05/11/2005	3.20	±	2.08	11.84	±	7.71	
	05/18/2005	-3.64	±	3.33	-13.48	±	12.31	
	05/25/2005	-1.44	±	2.52	-5.34	±	9.32	
	06/01/2005	0.52	±	2.55	1.92	±	9.42	
	06/08/2005	-1.10	±	4.36	-4.08	±	16.14	
	06/15/2005	3.18	±	2.91	11.77	±	10.77	
	06/22/2005	-2.03	±	1.87	-7.50	±	6.90	
	06/29/2005	1.86	±	2.74	6.90	±	10.14	
VAN BUREN GATE	04/06/2005	2.25	±	2.29	8.32	±	8.47	
	04/13/2005	0.17	±	1.70	0.62	±	6.27	
	04/20/2005	-1.16	±	2.22	-4.29	±	8.20	
	04/27/2005	3.62	±	3.26	13.38	±	12.06	
	05/04/2005	-3.97	±	2.94	-14.68	±	10.89	
	05/11/2005	2.49	±	1.62	9.22	±	6.00	
	05/18/2005	-2.63	±	2.40	-9.72	±	8.88	
	05/25/2005	-1.39	±	2.43	-5.16	±	9.00	
	06/01/2005	0.46	±	2.25	1.70	±	8.32	
	06/08/2005	-0.69	±	2.74	-2.56	±	10.13	
	06/15/2005	2.66	±	2.43	9.84	±	9.00	
	06/22/2005	-1.85	±	1.70	-6.83	±	6.28	
	06/29/2005	1.53	±	2.25	5.66	±	8.32	

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

Sampling Group and Location	Sampling Date	Result ± 1s Uncertainty (x 10^{-15} µCi/mL)	Result ± 1s Uncertainty (x 10^{-11} Bq/mL)	Result > 3s
BOUNDARY				

Red text denotes invalid sample:

a. Arco 5/18 Pump Failure

b. Howe 5/11 and 6/15 Blown Fuse

c. Dubois 6/15 and 6/29 Electrical Repairs

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
BOUNDARY									
ARCO	6/30/2005	AMERICIUM-241	-0.39	±	0.67	-1.43	±	2.48	
		CESIUM-137	237.00	±	280.00	876.90	±	1036.00	
		PLUTONIUM-238	0.00	±	0.48	0.00	±	1.78	
		PLUTONIUM-239/40	2.03	±	0.84	7.51	±	3.11	
ATOMIC CITY	6/30/2005	AMERICIUM-241	0.31	±	0.31	1.13	±	1.15	
		CESIUM-137	-85.70	±	84.30	-317.09	±	311.91	
		PLUTONIUM-238	-0.26	±	0.44	-0.94	±	1.63	
		PLUTONIUM-239/40	0.25	±	0.44	0.94	±	1.63	
BLUE DOME	6/30/2005	AMERICIUM-241	-0.65	±	0.65	-2.42	±	2.41	
		CESIUM-137	-108.00	±	123.00	-399.60	±	455.10	
		PLUTONIUM-238	-0.21	±	0.15	-0.78	±	0.56	
		PLUTONIUM-239/40	0.32	±	0.40	1.17	±	1.48	
FAA TOWER	6/30/2005	CESIUM-137	-174.00	±	126.00	-643.80	±	466.20	
		STRONTIUM-90	14.10	±	15.00	52.17	±	55.50	
HOWE	6/30/2005	CESIUM-137	179.00	±	99.50	662.30	±	368.15	
		STRONTIUM-90	-5.27	±	13.00	-19.50	±	48.10	
HOWE (QA-2)	6/30/2005	CESIUM-137	138.00	±	98.80	510.60	±	365.56	
		STRONTIUM-90	0.76	±	14.00	2.81	±	51.80	
MONTEVIEW	6/30/2005	CESIUM-137	117.00	±	127.00	432.90	±	469.90	
		STRONTIUM-90	5.31	±	16.00	19.65	±	59.20	
MUD LAKE	6/30/2005	AMERICIUM-241	0.70	±	0.50	2.58	±	1.85	
		CESIUM-137	-67.40	±	114.00	-249.38	±	421.80	
		PLUTONIUM-238	0.27	±	0.27	1.01	±	1.00	
		PLUTONIUM-239/40	0.55	±	0.39	2.02	±	1.44	
DISTANT									
BLACKFOOT	6/30/2005	AMERICIUM-241	0.33	±	0.74	1.22	±	2.74	
		CESIUM-137	-20.20	±	222.00	-74.74	±	821.40	

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
		PLUTONIUM-238	-0.59	±	0.42	-2.18	±	1.55	
		PLUTONIUM-239/40	0.59	±	0.42	2.18	±	1.55	
CRATERS	6/30/2005	CESIUM-137	-262.00	±	295.00	-969.40	±	1091.50	
		STRONTIUM-90	-50.00	±	18.00	-185.00	±	66.60	
DUBOIS	6/30/2005	AMERICIUM-241	1.16	±	0.86	4.29	±	3.18	
		CESIUM-137	-162.00	±	279.00	-599.40	±	1032.30	
		PLUTONIUM-238	0.06	±	0.36	0.23	±	1.33	
		PLUTONIUM-239/40	0.37	±	0.47	1.38	±	1.74	
IDAHO FALLS	6/30/2005	CESIUM-137	9.15	±	251.00	33.86	±	928.70	
		STRONTIUM-90	40.90	±	15.00	151.33	±	55.50	
JACKSON	6/30/2005	AMERICIUM-241	0.00	±	0.43	0.00	±	1.59	
		CESIUM-137	22.90	±	110.00	84.73	±	407.00	
		PLUTONIUM-238	0.56	±	0.40	2.08	±	1.48	
		PLUTONIUM-239/40	-0.28	±	0.49	-1.04	±	1.81	
REXBURG CMS	6/30/2005	CESIUM-137	145.00	±	94.30	536.50	±	348.91	
		STRONTIUM-90	50.00	±	23.00	185.00	±	85.10	
INL									
EFS	6/30/2005	CESIUM-137	279.00	±	133.00	1032.30	±	492.10	
		STRONTIUM-90	-22.00	±	18.00	-81.40	±	66.60	
MAIN GATE	6/30/2005	AMERICIUM-241	0.71	±	0.50	2.62	±	1.85	
		CESIUM-137	86.20	±	294.00	318.94	±	1087.80	
		PLUTONIUM-238	0.66	±	0.47	2.45	±	1.74	
		PLUTONIUM-239/40	0.33	±	0.33	1.22	±	1.22	
MAIN GATE (QA-1)	6/30/2005	AMERICIUM-241	0.39	±	0.90	1.46	±	3.33	
		CESIUM-137	-93.10	±	154.00	-344.47	±	569.80	
		PLUTONIUM-238	0.35	±	0.36	1.31	±	1.31	
		PLUTONIUM-239/40	0.35	±	0.36	1.30	±	1.31	
VAN BUREN GATE	6/30/2005	CESIUM-137	11.90	±	101.00	44.03	±	373.70	
		STRONTIUM-90	11.40	±	13.00	42.18	±	48.10	

TABLE C-4. Tritium Concentrations in Atmospheric Moisture.

Sampling Group and Location	Start Date	Sampling Date	Result ± 1s Uncertainty ($x 10^{-13}$ µCi/mL_{air})			Result ± 1s Uncertainty ($x 10^{-9}$ Bq/mL_{air})			Collection Medium	Result > 3s
BOUNDARY										
ATOMIC CITY	03/31/2005	04/26/2005	5.09	±	1.21	18.84	±	4.48	Molecular Sieve	Y
ATOMIC CITY	04/26/2005	05/18/2005	1.98	±	1.67	7.33	±	6.19	Molecular Sieve	
ATOMIC CITY	05/18/2005	06/08/2005	7.86	±	1.52	29.09	±	5.62	Molecular Sieve	Y
ATOMIC CITY	06/08/2005	06/28/2005	3.44	±	1.44	12.74	±	5.31	Molecular Sieve	
DISTANT										
BLACKFOOT	03/15/2005	04/11/2005	3.52	±	1.27	13.01	±	4.69	Molecular Sieve	
BLACKFOOT	04/11/2005	05/16/2005	2.03	±	1.12	7.53	±	4.13	Molecular Sieve	
BLACKFOOT	05/16/2005	06/08/2005	4.61	±	1.31	17.04	±	4.86	Molecular Sieve	Y
BLACKFOOT	06/08/2005	06/28/2005	3.12	±	1.47	11.56	±	5.44	Molecular Sieve	
IDAHO FALLS	03/24/2005	04/18/2005	7.26	±	1.35	26.86	±	5.00	Molecular Sieve	Y
IDAHO FALLS	04/18/2005	05/11/2005	2.22	±	1.59	8.21	±	5.86	Molecular Sieve	
IDAHO FALLS	05/11/2005	05/31/2005	4.48	±	1.41	16.56	±	5.21	Molecular Sieve	Y
IDAHO FALLS	05/31/2005	06/13/2005	1.86	±	1.91	6.89	±	7.06	Molecular Sieve	
IDAHO FALLS	06/13/2005	06/24/2005	6.26	±	2.07	23.17	±	7.67	Molecular Sieve	Y
REXBURG CMS	02/15/2005	04/14/2005	1.50	±	0.49	5.56	±	1.81	Molecular Sieve	Y
REXBURG CMS	04/14/2005	05/09/2005	4.75	±	1.54	17.56	±	5.69	Molecular Sieve	Y
REXBURG CMS	05/09/2005	06/09/2005	5.62	±	1.07	20.81	±	3.95	Molecular Sieve	Y
REXBURG CMS	06/09/2005	06/28/2005	0.94	±	1.52	3.49	±	5.61	Molecular Sieve	

TABLE C-5. PM-10 Concentrations at Atomic City, Blackfoot CMS and Rexburg CMS

Location	Sampling Date	Concentration (μg/m^3)	Comments
ATOMIC CITY	4/3/2005	5.04	
	4/9/2005	6.49	
	4/15/2005	17.53	
	4/21/2005	0.68	
	4/27/2005	8.36	
	5/3/2005	7.15	
	5/9/2005	2.87	
	5/15/2005	5.13	
	5/21/2005	1.74	
	5/27/2005	8.62	
	6/2/2005	4.36	
	6/8/2005	0.97	
	6/14/2005	17.62	
	6/20/2005	27.58	
	6/26/2005	12.61	
BLACKFOOT	4/3/2005	5.64	
	4/9/2005	2.19	
	4/15/2005	12.05	
	4/21/2005	3.14	
	4/27/2005	12.53	
	5/3/2005	N/A	Timer improperly set. Invalid sample.
	5/9/2005	2.06	
	5/15/2005	6.37	
	5/21/2005	4.07	
	5/27/2005	13.05	
	6/2/2005	5.16	
	6/8/2005	1.84	
	6/14/2005	15.26	
	6/20/2005	26.48	
	6/26/2005	17.10	
REXBURG	4/3/2005	4.30	
	4/9/2005	18.33	
	4/15/2005	25.51	
	4/21/2005	4.67	
	4/27/2005	10.88	
	5/3/2005	19.91	
	5/9/2005	3.31	
	5/15/2005	9.75	
	5/21/2005	8.77	
	5/27/2005	33.33	
	6/2/2005	4.19	
	6/8/2005	1.46	
	6/14/2005	8.43	
	6/20/2005	30.33	
	6/26/2005	16.04	

TABLE C-6. 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	3/7/2005	4/4/2005	6.43	±	24.80	0.24	±	0.92	
	4/28/2005	5/31/2005	185.00	±	31.30	6.85	±	1.16	Y
CFA	3/1/2005	4/1/2005	-36.00	±	24.20	-1.33	±	0.90	
	4/1/2005	5/2/2005	202.00	±	31.50	7.47	±	1.17	Y
	5/2/2005	6/1/2005	161.00	±	31.00	5.96	±	1.15	Y
EFS	3/30/2005	4/6/2005	-19.60	±	24.10	-0.73	±	0.89	
	4/13/2005	4/20/2005	92.00	±	24.90	3.40	±	0.92	Y
	4/27/2005	5/4/2005	74.70	±	29.90	2.76	±	1.11	
	5/4/2005	5/11/2005	62.20	±	29.80	2.30	±	1.10	
	5/11/2005	5/18/2005	90.50	±	30.10	3.35	±	1.11	Y
	5/18/2005	5/25/2005	138.00	±	30.60	5.11	±	1.13	Y
	5/25/2005	6/1/2005	104.00	±	29.80	3.85	±	1.10	Y
	6/1/2005	6/8/2005	169.00	±	30.50	6.25	±	1.13	Y

TABLE C-7. Gross Alpha, Gross Beta, and Tritium Concentrations in Surface and Drinking Water

Sampling Type and Location	Analyte	Sampling Date	Concentration Result ± 1s Uncertainty (pCi/L)			Concentration Result ± 1s Uncertainty (Bq/L)			Result > 3s
DRINKING WATER									
ARCO									
	GROSS ALPHA	05/10/2005	-0.99	±	0.91	-0.04	±	0.03	
	GROSS BETA	05/10/2005	0.58	±	0.87	0.02	±	0.03	
	TRITIUM	05/10/2005	24.60	±	31.50	0.91	±	1.17	
ARCO									
DUPLICATE	GROSS ALPHA	05/10/2005	-0.98	±	0.88	-0.04	±	0.03	
	GROSS BETA	05/10/2005	1.11	±	0.88	0.04	±	0.03	
	TRITIUM	05/10/2005	-33.00	±	30.90	-1.22	±	1.14	
ATOMIC CITY									
	GROSS ALPHA	05/16/2005	-0.86	±	0.89	-0.03	±	0.03	
	GROSS BETA	05/16/2005	1.41	±	0.89	0.05	±	0.03	
	TRITIUM	05/16/2005	54.40	±	30.00	2.01	±	1.11	
CAREY									
	GROSS ALPHA	05/10/2005	0.15	±	0.62	0.01	±	0.02	
	GROSS BETA	05/10/2005	3.18	±	0.84	0.12	±	0.03	Y
	TRITIUM	05/10/2005	170.00	±	27.20	6.30	±	1.01	Y
FORT HALL									
	GROSS ALPHA	05/16/2005	7.84	±	1.45	0.29	±	0.05	Y
	GROSS BETA	05/16/2005	13.00	±	1.16	0.48	±	0.04	Y
	TRITIUM	05/16/2005	23.10	±	23.80	0.86	±	0.88	
HOWE									
	GROSS ALPHA	05/10/2005	0.61	±	0.68	0.02	±	0.03	
	GROSS BETA	05/10/2005	2.31	±	0.82	0.09	±	0.03	
	TRITIUM	05/10/2005	65.10	±	24.80	2.41	±	0.92	
IDAHO FALLS									
	GROSS ALPHA	05/12/2005	-1.90	±	0.78	-0.07	±	0.03	
	GROSS BETA	05/12/2005	2.84	±	0.88	0.11	±	0.03	Y
	TRITIUM	05/12/2005	78.60	±	25.10	2.91	±	0.93	Y
MINIDOKA									
	GROSS ALPHA	05/10/2005	-0.43	±	0.83	-0.02	±	0.03	
	GROSS BETA	05/10/2005	2.63	±	0.86	0.10	±	0.03	Y
	TRITIUM	05/10/2005	17.30	±	23.50	0.64	±	0.87	
MONTEVIEW									

TABLE C-7. Gross Alpha, Gross Beta, and Tritium Concentrations in Surface and Drinking Water

Sampling Type and Location	Analyte	Sampling Date	Concentration Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
	GROSS ALPHA	05/10/2005	-0.98	±	0.98	-0.04	±	0.04	
	GROSS BETA	05/10/2005	4.68	±	0.96	0.17	±	0.04	Y
	TRITIUM	05/10/2005	30.80	±	23.90	1.14	±	0.89	
MORELAND									
	GROSS ALPHA	05/16/2005	-2.73	±	1.50	-0.10	±	0.06	
	GROSS BETA	05/16/2005	3.20	±	1.10	0.12	±	0.04	
	TRITIUM	05/16/2005	78.90	±	30.10	2.92	±	1.11	
MUD LAKE									
	GROSS ALPHA	05/17/2005	-1.51	±	0.70	-0.06	±	0.03	
	GROSS BETA	05/17/2005	2.52	±	0.91	0.09	±	0.03	
	TRITIUM	05/17/2005	15.30	±	29.40	0.57	±	1.09	
ROBERTS									
	GROSS ALPHA	05/10/2005	-4.06	±	1.02	-0.15	±	0.04	
	GROSS BETA	05/10/2005	1.26	±	0.97	0.05	±	0.04	
	TRITIUM	05/10/2005	36.40	±	29.60	1.35	±	1.10	
SHOSHONE									
	GROSS ALPHA	05/10/2005	1.25	±	0.88	0.05	±	0.03	
	GROSS BETA	05/10/2005	13.50	±	1.15	0.50	±	0.04	Y
	TRITIUM	05/10/2005	41.90	±	24.60	1.55	±	0.91	
TABER									
	GROSS ALPHA	05/16/2005	-0.34	±	0.88	-0.01	±	0.03	
	GROSS BETA	05/16/2005	3.53	±	0.94	0.13	±	0.03	Y
	TRITIUM	05/16/2005	13.40	±	23.90	0.50	±	0.89	
SURFACE WATER									
BLISS									
	GROSS ALPHA	5/10/2005	-1.41	±	0.66	-0.05	±	0.02	
	GROSS BETA	5/10/2005	3.70	±	0.92	0.14	±	0.03	Y
	TRITIUM	5/10/2005	3.23	±	23.70	0.12	±	0.88	
BLISS		5/10/2005							
DUPLICATE	GROSS ALPHA	5/10/2005	-0.09	±	0.81	0.00	±	0.03	
	GROSS BETA	5/10/2005	5.54	±	0.97	0.21	±	0.04	Y
	TRITIUM	5/10/2005	-3.60	±	23.50	-0.13	±	0.87	
BUHL									
	GROSS ALPHA	05/10/2005	-0.60	±	0.73	-0.02	±	0.03	

TABLE C-7. Gross Alpha, Gross Beta, and Tritium Concentrations in Surface and Drinking Water

Sampling Type and Location	Analyte	Sampling Date	Concentration Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
	GROSS BETA	05/10/2005	3.38	±	0.94	0.13	±	0.03	Y
	TRITIUM	05/10/2005	7.26	±	23.20	0.27	±	0.86	
HAGERMAN									
	GROSS ALPHA	05/10/2005	0.55	±	0.70	0.02	±	0.03	
	GROSS BETA	05/10/2005	3.22	±	0.90	0.12	±	0.03	Y
	TRITIUM	05/10/2005	53.90	±	25.00	2.00	±	0.93	
IDAHO FALLS									
	GROSS ALPHA	05/12/2005	1.53	±	0.70	0.06	±	0.03	
	GROSS BETA	05/12/2005	2.15	±	0.86	0.08	±	0.03	
	TRITIUM	05/12/2005	76.10	±	30.30	2.82	±	1.12	
TWIN FALLS									
	GROSS ALPHA	05/10/2005	1.83	±	1.06	0.07	±	0.04	
	GROSS BETA	05/10/2005	6.23	±	1.05	0.23	±	0.04	Y
	TRITIUM	05/10/2005	52.10	±	30.10	1.93	±	1.11	

TABLE C-8. 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							
	04/05/2005	-0.70 ± 2.22	-0.026 ± 0.082		2.96 ± 2.72	0.110 ± 0.101	
	05/03/2005	-0.17 ± 1.58	-0.006 ± 0.059		-0.18 ± 1.16	-0.007 ± 0.043	
	06/07/2005	-1.64 ± 1.72	-0.061 ± 0.064		-0.11 ± 1.08	-0.004 ± 0.040	
CAREY							
	04/05/2005	3.81 ± 1.62	0.141 ± 0.060		-1.15 ± 1.08	-0.043 ± 0.040	
	05/03/2005	-3.08 ± 2.10	-0.114 ± 0.078		4.47 ± 2.72	0.166 ± 0.101	
	06/07/2005	-0.28 ± 1.20	-0.010 ± 0.044		1.97 ± 0.92	0.073 ± 0.034	
DIETRICH					±		
	04/05/2005	2.05 ± 0.91	0.076 ± 0.034		1.85 ± 0.80	0.069 ± 0.029	
	05/03/2005	1.53 ± 1.02	0.057 ± 0.038		1.81 ± 0.92	0.067 ± 0.034	
	06/07/2005	0.05 ± 1.55	0.002 ± 0.057		-0.09 ± 1.08	-0.003 ± 0.040	
Duplicate	06/07/2005	-0.75 ± 1.03	-0.028 ± 0.038		-1.17 ± 0.94	-0.043 ± 0.035	
HOWE							
	04/05/2005	0.49 ± 1.18	0.018 ± 0.044		0.26 ± 0.92	0.010 ± 0.034	
	05/03/2005	-0.47 ± 1.00	-0.017 ± 0.037		-0.05 ± 0.82	-0.002 ± 0.030	
	06/07/2005	-1.10 ± 2.31	-0.041 ± 0.086		2.37 ± 2.72	0.088 ± 0.101	
Duplicate	06/07/2005	3.04 ± 1.71	0.113 ± 0.063		0.85 ± 1.05	0.032 ± 0.039	
IDAHO FALLS							
	04/05/2005	0.88 ± 1.03	0.032 ± 0.038		0.81 ± 0.84	0.030 ± 0.031	
	04/13/2005	-0.19 ± 0.99	-0.007 ± 0.037		1.20 ± 0.89	0.044 ± 0.033	
	04/20/2005	0.04 ± 1.92	0.001 ± 0.071		3.69 ± 2.74	0.137 ± 0.101	
	04/27/2005	-0.59 ± 1.07	-0.022 ± 0.040		-0.218 ± 0.918	-0.008 ± 0.034	
	05/03/2005	0.82 ± 1.20	0.030 ± 0.044		-0.248 ± 0.908	-0.009 ± 0.034	
	05/11/2005	1.51 ± 1.06	0.056 ± 0.039		-2.27 ± 0.89	-0.084 ± 0.033	
	05/18/2005	-0.07 ± 0.99	-0.002 ± 0.037		0.30 ± 0.92	0.011 ± 0.034	
	05/25/2005	-2.10 ± 1.11	-0.078 ± 0.041		1.03 ± 0.91	0.038 ± 0.034	
	06/07/2005	-0.20 ± 1.00	-0.007 ± 0.037		-0.19 ± 0.91	-0.007 ± 0.034	
	06/15/2005	-1.14 ± 1.87	-0.042 ± 0.069		1.09 ± 1.05	0.040 ± 0.039	
	06/22/2005	-1.08 ± 1.10	-0.040 ± 0.041		-0.35 ± 0.88	-0.013 ± 0.033	
	06/29/2005	-1.11 ± 1.12	-0.041 ± 0.041		-2.39 ± 0.92	-0.089 ± 0.034	
MORELAND							

TABLE C-8. 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
	04/05/2005	1.41	±	0.84	0.052	±	0.031		-2.08	±	0.86	-0.077	±	0.032	
Duplicate	04/05/2005	1.04	±	1.01	0.039	±	0.037		1.12	±	0.88	0.041	±	0.032	
	05/03/2005	1.43	±	0.85	0.053	±	0.031		0.90	±	0.87	0.033	±	0.032	
	06/07/2005	2.13	±	0.84	0.079	±	0.031		1.48	±	0.82	0.055	±	0.030	
ROBERTS															
	04/05/2005	0.90	±	1.09	0.033	±	0.040		-0.16	±	0.87	-0.006	±	0.032	
	05/03/2005	0.27	±	1.11	0.010	±	0.041		-0.32	±	0.89	-0.012	±	0.033	
	06/07/2005	1.26	±	1.02	0.047	±	0.038		0.20	±	0.82	0.007	±	0.030	
RUPERT															
	04/05/2005	1.49	±	1.54	0.055	±	0.057		1.15	±	1.11	0.043	±	0.041	
	05/03/2005	-0.90	±	0.90	-0.033	±	0.033		-0.06	±	0.84	-0.002	±	0.031	
	06/07/2005	4.71	±	1.96	0.174	±	0.073		-1.19	±	2.74	-0.044	±	0.101	
TERRETON															
	04/05/2005	-4.15	±	2.38	-0.154	±	0.088		5.15	±	2.75	0.191	±	0.102	
	05/03/2005	-3.09	±	1.80	-0.114	±	0.067		0.39	±	1.13	0.014	±	0.042	
	06/07/2005	0.52	±	1.08	0.019	±	0.040		0.87	±	0.82	0.032	±	0.030	

TABLE C-9. Bi-Annual Strontium-90 and Tritium Concentrations in Milk.

Location	Sampling Date	Result ± 1s Uncertainty (pCi/L)			Result ± 1s Uncertainty (Bq/L)			Result > 3s
Strontium-90								
BLACKFOOT	05/03/2005	0.88	±	0.20	0.033	±	0.007	Y
CAREY	05/03/2005	1.17	±	0.19	0.043	±	0.007	Y
IDAHO FALLS	05/03/2005	0.78	±	0.19	0.029	±	0.007	Y
MORELAND	05/03/2005	0.82	±	0.20	0.030	±	0.007	Y
TERRETON	05/03/2005	0.60	±	0.17	0.022	±	0.006	Y
Tritium								
		Concentration ± 1s (pCi/L)			**Concentration ± 1s (Bq/L)**			**Result > 3s**
DIETRICH	05/03/2005	52.20	±	24.60	1.933	±	0.911	
HOWE	05/03/2005	29.00	±	24.10	1.074	±	0.893	
ROBERTS	05/03/2005	68.30	±	25.00	2.530	±	0.926	
RUPERT	05/03/2005	39.00	±	24.30	1.444	±	0.900	

TABLE C-10. Cesium-137 and Iodine-131 Concentrations in Sheep.

	Tissue	Analyte	Sampling Date	Result ± 1s Uncertainty (pCi/kg wet weight)			Result ± 1s Uncertainty (x 10^{-2} Bq/kg wet weight)			Result > 3s
INEEL NORTH										
Animal #1	LIVER	CESIUM-137	04/29/2005	3.40	±	1.43	12.59	±	5.30	
		IODINE-131	04/29/2005	-7.53	±	3.86	-27.89	±	14.30	
	MUSCLE	CESIUM-137	04/29/2005	2.21	±	1.38	8.19	±	5.11	
		IODINE-131	04/29/2005	2.15	±	2.53	7.96	±	9.37	
	THYROID	CESIUM-137	04/29/2005	91.60	±	51.90	339.26	±	192.22	
		IODINE-131	04/29/2005	51.10	±	96.30	189.26	±	356.67	
Animal # 2	LIVER	CESIUM-137	04/29/2005	5.45	±	1.55	20.19	±	5.74	Y
		IODINE-131	04/29/2005	-1.83	±	1.89	-6.78	±	7.00	
	MUSCLE	CESIUM-137	04/29/2005	-2.83	±	4.90	-10.48	±	18.15	
		IODINE-131	04/29/2005	2.41	±	3.24	8.93	±	12.00	
	THYROID	CESIUM-137	04/29/2005	-130.00	±	107.00	-481.48	±	396.30	
		IODINE-131	04/29/2005	242.00	±	131.00	896.30	±	485.19	
INEEL SOUTH										
Animal # 1	LIVER	CESIUM-137	05/13/2005	-13.00	±	12.00	-48.15	±	44.44	
		IODINE-131	05/13/2005	7.57	±	7.27	28.04	±	26.93	
	MUSCLE	CESIUM-137	05/13/2005	4.90	±	1.38	18.15	±	5.11	Y
		IODINE-131	05/13/2005	-0.71	±	1.55	-2.61	±	5.74	
	THYROID	CESIUM-137	05/13/2005	-14.10	±	93.30	-52.22	±	345.56	
		IODINE-131	05/13/2005	129.00	±	101.00	477.78	±	374.07	
Animal # 2	LIVER	CESIUM-137	05/13/2005	2.63	±	1.12	9.74	±	4.15	
		IODINE-131	05/13/2005	1.35	±	1.99	5.00	±	7.37	
	MUSCLE	CESIUM-137	05/13/2005	2.00	±	1.05	7.41	±	3.89	
		IODINE-131	05/13/2005	1.03	±	1.26	3.81	±	4.67	
	THYROID	CESIUM-137	05/13/2005	290.00	±	109.00	1074.07	±	403.70	
		IODINE-131	05/13/2005	-95.60	±	178.00	-354.07	±	659.26	
DUBOIS										
Animal # 1	LIVER	CESIUM-137	05/05/2005	-7.83	±	3.97	-29.00	±	14.70	
		IODINE-131	05/05/2005	1.83	±	2.49	6.78	±	9.22	
	MUSCLE	CESIUM-137	05/05/2005	-0.84	±	0.96	-3.10	±	3.57	
		IODINE-131	05/05/2005	0.15	±	1.18	0.57	±	4.37	
	THYROID	CESIUM-137	05/05/2005	-93.10	±	109.00	-344.81	±	403.70	
		IODINE-131	05/05/2005	-154.00	±	113.00	-570.37	±	418.52	
Animal # 2	LIVER	CESIUM-137	05/05/2005	-0.80	±	1.36	-2.95	±	5.04	
		IODINE-131	05/05/2005	2.94	±	1.84	10.89	±	6.81	

TABLE C-10. Cesium-137 and Iodine-131 Concentrations in Sheep.

MUSCLE	CESIUM-137	05/05/2005	-12.20	±	5.04	-45.19	±	18.67
	IODINE-131	05/05/2005	-0.29	±	3.49	-1.06	±	12.93
THYROID	CESIUM-137	05/05/2005	-6.39	±	50.10	-23.67	±	185.56
	IODINE-131	05/05/2005	29.60	±	56.50	109.63	±	209.26

TABLE C-11. Environmental Radiation Results.

Location	Start Date	End Date	Radiation Measurement ± 1s Uncertainty mR			Exposure mR/day
BOUNDARY						
ARCO	11/02/2004	05/04/2005	56.50	±	11.10	0.31
ATOMIC CITY	11/02/2004	05/04/2005	59.50	±	11.70	0.33
BIRCH CREEK	11/01/2004	05/04/2005	57.20	±	11.20	0.31
BLUE DOME	11/01/2004	05/04/2005	61.50	±	12.10	0.33
HOWE	11/02/2004	05/04/2005	67.30	±	13.20	0.37
MONTEVIEW	11/01/2004	05/04/2005	50.20	±	9.80	0.27
MUD LAKE	11/01/2004	05/04/2005	66.20	±	13.00	0.36
					Boundary Average	**0.33**
DISTANT						
ABERDEEN	11/02/2004	05/03/2005	55.50	±	10.90	0.30
BLACKFOOT	11/02/2004	05/03/2005	68.60	±	13.40	0.38
BLACKFOOT CMS	11/02/2004	05/03/2005	58.10	±	11.40	0.32
CRATERS	11/02/2004	05/04/2005	72.60	±	14.30	0.40
DUBOIS	11/01/2004	05/04/2005	60.20	±	11.80	0.33
IDAHO FALLS	11/01/2004	05/04/2005	57.50	±	11.30	0.31
MINIDOKA	11/02/2004	05/03/2005	58.10	±	11.40	0.32
REXBURG	11/01/2004	05/04/2005	72.60	±	14.30	0.39
ROBERTS	11/01/2004	05/03/2005	53.50	±	10.50	0.29
					Distant Average	**0.34**
OUT-OF-STATE						
JACKSON			56.10	±	11.00	0.31

APPENDIX D

STATISTICAL ANALYSIS RESULTS

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

Parameter	p[b]
Gross Alpha	
Quarter	0.49
April	0.10
May	0.99
June	0.82
Gross Beta	
Quarter	0.95
April	0.65
May	0.89
June	1.00

a. See the Determining Statistical Differences of the Helpful Information section for details on the Kruskal-Wallace test and a description of each test statistic.

b. 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	Week	Mann-Whitney U test[a] p[b]
Gross Alpha		
	April 6th	0.72
	April 13th	0.89
	April 20th	0.25
	April 27th	0.67
	May 4th	0.83
	May 11th	0.52
	May 18th	0.63
	May 25th	0.09
	June 1st	0.39
	June 8th	0.89
	June 15th	0.58
	June 22nd	0.25
	June 29th	0.12
Gross Beta		
	April 6th	0.15
	April 13th	0.28
	April 20th	0.09
	April 27th	0.48
	May 4th	0.62
	May 11th	0.94
	May 18th	0.26
	May 25th	0.15
	June 1st	0.25
	June 8th	0.004
	June 15th	0.36
	June 22nd	1.00
	June 29th	0.22

a. See the Determining Statistical Differences of the Helpful Information section for details on the Mann-Whitney U test and a description of each test statistic.

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