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Idaho National Engineering and Environmental Laboratory Offsite Environmental Surveillance Program Report: First Quarter 2004

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Executive Summary

None of the radionuclides detected in any of the samples collected during the first quarter of 2004 could be directly linked with INEEL activities. Levels of detected radionuclides were no different than values measured at other locations across the United States and/or were consistent with levels measured historically at the INEEL. 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 first quarter, 2004, contains results from the Environmental Surveillance, Education and Research (ESER) Program's monitoring of the Department of Energy's Idaho National Engineering and Environmental Laboratory's (INEEL) offsite environment, January 1 through March 31, 2004. All sample types (media) and the sampling schedule followed during 2004 are listed in Appendix A. Specifically, this report contains the results for the following:

- Air sampling, including low-volume air sampling with air filters and charcoal cartridges, collection of atmospheric moisture, and sampling of particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}) (Section 3);
- Water sampling, specifically collection of precipitation (Section 4);
- Agricultural product sampling, including collection of milk and large game animals (Section 5).

Results are presented in this report with an analytical uncertainty term, s, where "s" is an estimate of the population standard deviation (σ), assuming a normal (Guassian) distribution. The following guidelines, based on Currie (1984), are used to interpret the analytical results.

- Results greater than 3s are reported as "detected".
- Results less than 2s are reported as "undetected".
- Results between 2-3s are reported as "questionable" (i.e., the radionuclide might have been detected but such detection may not be considered reliable.)

Gross alpha and gross beta measurements are used as general indicators of the presence of alpha-emitting and beta-emitting radionuclides in air. Neither quarterly nor monthly statistical analyses of gross alpha and gross beta concentrations during the first quarter showed any concentrations from Boundary locations to be statistically higher than corresponding data sets for Distant locations, as one would expect if the INEEL were a significant source of radionuclide contamination. Gross alpha concentrations were also not statistically different for weekly comparisons. Gross beta concentrations measured at Boundary locations were greater than those measured at Distant locations during the weeks of February 2, 2004. This difference was attributed to a higher measurement made at Arco. However, the result was within historical measurements and can be attributed to natural variations in air concentrations.

During the first quarter iodine-131 was not detected in any batches of charcoal cartridges.

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). No human-made radionuclides greater than their related 3s values were measured in the first quarter of 2004.

Seven atmospheric moisture samples were obtained during the first quarter of 2004; two each from Blackfoot, Idaho Falls, and Atomic City and one from Rexburg. Both samples from Atomic City exceeded their respective 3s values. The maximum value of (4.4 ± 1.3) x 10^{-13} $\mu Ci/mL_{air}$ (1.6 ± 0.5 x 10^{-8} Bq/mL_{air}) is well below the DCG for tritium in air of 1 x 10^{-7} $\mu Ci/mL$ (3.7 x 10^{-3} Bq/mL).

The ESER Program operates three PM_{10} samplers, one each at Rexburg, Blackfoot, and Atomic City for particulate sampling. 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 47.6 $\mu g/m^3$ on March 9, 2004, in Rexburg.

Sufficient precipitation occurred to allow collection of four monthly composite samples from Idaho Falls, three monthly composite samples from the Central Facilities Area (CFA) on the INEEL, and six weekly samples from the Experimental Field Station (EFS) on the INEEL. Tritium was detected in one sample from CFA at a concentration of 191.0 ± 55.7 pCi/L (7.1 ± 2.1 Bq/L). There is no DCG for tritium in precipitation, but in drinking water it is 2.0 x 10^6 pCi/L (74,074 Bq/L). The Safe Drinking Water Act sets a limit of 20,000 pCi/L (740 Bq/L) for tritium. The levels of tritium measured in first quarter precipitation samples were well below the DCG value and the Safe Drinking Water Act Limit.

Milk samples were collected weekly in Idaho Falls and monthly at eight other locations around the INEEL. All samples were analyzed for gamma emitting radionuclides. Iodine-131 (^{131}I) was not detected in any of the collected samples during the quarter. Cesium-137 was detected in the March sample from Blackfoot. The occasional detection of ^{137}Cs during initial counting is not unusual and is unsupported by recounting.

No game animals were available for sampling during the first quarter of 2004.

Quality assurance checks and samples submitted for analysis during the first quarter 2004 met most QA requirements. QA issues arose with method uncertainty and recount accuracy for ^{131}I measurements in charcoal cartridges and milk and ^{241}Am and ^{90}Sr in quarterly composites as measured by criteria established in the ESER Quality Assurance Project Plan. These issues are being resolved with the laboratory to avoid future problems.

Table E-1 Summary of results for the first quarter of 2004.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, Gross beta	Statistical comparisons of quarterly and monthly gross alpha and gross beta activities indicate no differences between INEEL, Boundary, and Distant locations. Weekly statistical differences in gross alpha showed no differences. A difference in gross beta weekly results was observed between Boundary and Distant location groups on February 4. The difference was attributed to natural variation in the data. All gross alpha and gross beta results were within historical levels and were far less than applicable DOE DCGs.
		Gamma emitting radionuclides (including ^{137}Cs), select actinides (^{238}Pu, $^{239,240}Pu$, & ^{241}Am) and ^{90}Sr	Human-made radionuclides were not detected at the 3s level in any quarterly composite sample.
	Charcoal Cartridge	Iodine-131	Iodine-131 was not detected in any batch of charcoal cartridges during the quarter.
	PM_{10}	Particulate matter	No regulatory limits were exceeded for airborne particulates.
Atmospheric Moisture	Liquid	Tritium	Two of seven atmospheric moisture samples had tritium detected in them. The samples were collected at Atomic City. No sample result exceeded the DCG for tritium in air.
Precipitation	Liquid	Tritium	One of 12 samples had a measurable concentration of tritium. The sample was collected at CFA. The result was well below regulatory limits for tritium in drinking water, which is used for comparison only.
Milk	Liquid	Iodine-131, gamma emitting radionuclides (including ^{137}Cs)	No samples had measurable ^{131}I. Cesium-137 was initially detected in the March sample from Blackfoot. Immediate recounting could not support a positive detection (i.e., the recount was below the 2s uncertainty) suggesting the initial count was a false positive.
Game Animals	Tissue	Iodine-131, gamma emitting radionuclides (including ^{137}Cs)	No game samples were available during the first quarter of 2004.

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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
INEL	Idaho National Engineering 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
mSv	millisieverts
pCi	picocurie
R	Roentgen
µSv	microseiverts

1. ESER PROGRAM DESCRIPTION

Operations at the Idaho National Engineering and Environmental Laboratory (INEEL) 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 Clean Water Act). The requirements imposed by DOE are specified in DOE Orders. These requirements include those to monitor the effects of DOE activities on and off of DOE facilities (DOE 2003). During calendar year 2004, environmental monitoring within the INEEL boundaries was primarily the responsibility of the INEEL Management and Operating (M&O) contractor, while monitoring outside the INEEL 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 Environmental, Inc. for technical support. This report contains monitoring results from the ESER Program for samples collected during this quarter.

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 INEEL;
- Assess the potential radiation dose to members of the public from INEEL 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 routinely collected include:

- air at 16 locations on and around the INEEL;
- moisture in air at four locations around the INEEL;
- surface water at five locations on the Snake River;
- drinking water at 14 locations around the INEEL;
- agricultural products, including milk at 10 dairies around the INEEL, potatoes from at least five local producers, wheat from approximately 10 local producers, lettuce from approximately nine home-owned gardens around the INEEL, and sheep from two operators which graze their sheep on the INEEL;
- soil from 13 locations around the INEEL 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 INEEL. Fish are also sampled as available (i.e., when there is flow in the Big Lost River).

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.

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 INEEL 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 that additional sampling be performed through the Environmental Radiation Ambient Monitoring System (ERAMS) network (EPA 2002). 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 precipitation sampling equipment 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 INEEL Annual Site Environmental Report for each calendar year. Annual reports also include data collected by other INEEL 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 INEEL releases, meteorological data, and worldwide events that might conceivably have an effect on the INEEL environment. First, field collection and laboratory information are reviewed to determine identifiable errors that would invalidate or limit use of the data. Examples of these 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 an 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 detected 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 (USGS 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 USGS (2003).

Laboratory measurements involve the analysis of a target sample and the analysis of a prepared laboratory blank (i.e., a sample which is identical to the sample collected in the environment, except that the radionuclide of interest is absent). Instrument signals for the target and blank vary randomly about the true signals and may overlap making it difficult to distinguish between radionuclide activities in blank and in environmental samples (Figure 1). That is, the variability around the sample result may substantially overlap the variability around a net activity of zero for samples with no radioactivity. In order to conclude that a radionuclide has been detected, it is essential to consider two fundamental aspects of the problem of detection: (1) the instrument signal for the sample must be greater than that observed for the blank before the decision can be made that the radionuclide has been detected; and (2) an estimate must be made of the minimum radionuclide concentration that will yield a sufficiently large observed signal before the correct decision can be made for detection or non-detection.

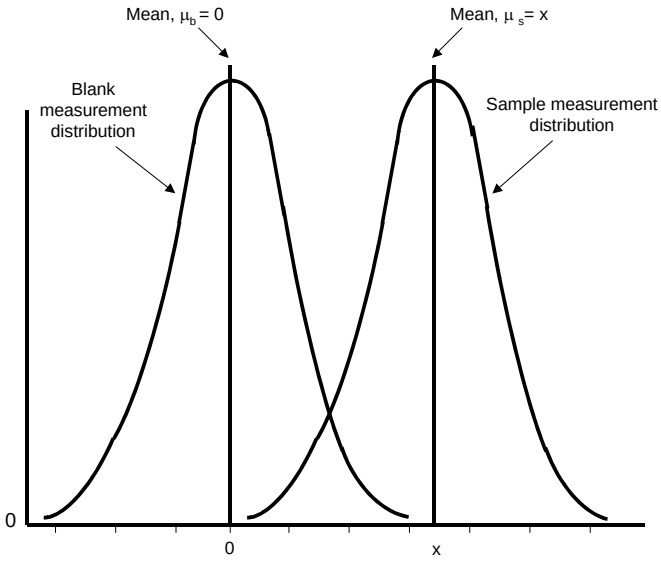

Figure 1. Example overlap of blank and sample measurement distributions.

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 estimation 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 usually 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. 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).

THE INEEL

The INEEL 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 INEEL 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 nuclear reactor at the NRTS became the first to produce useful amounts of electricity. Over time the site evolved into an assembly of 52 reactors, associated research centers, and waste handling areas. The NRTS was renamed the Idaho National Engineering Laboratory (INEL) in 1974 and the INEEL in January 1997. With renewed interest in nuclear power the DOE announced in 2002 that Argonne National Laboratory and the INEEL will be the lead laboratories for development of the next generation of power reactors. Other activities at the INEEL include environmental cleanup, subsurface research, and technology development.

2. AIR SAMPLING

The primary pathway by which radionuclides can move off the INEEL is through the air and for this reason the air pathway is the primary focus of monitoring on and around the INEEL. Samples for particulates and iodine-131 (^{131}I) gas in air were collected weekly at 16 locations using low-volume air samplers for the duration of the quarter. Moisture in the atmosphere was sampled at four locations around the INEEL 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 this quarter 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

SAMPLING DESIGN AND METHODS

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 this quarter (Figure 2). Three of these samplers are located on the INEEL, nine are situated off the INEEL near the boundary, and six have been placed at locations distant to the INEEL. Samplers are divided into INEEL, Boundary, and Distant groups to determine if there is a gradient of radionuclide concentrations, increasing towards the INEEL. Each replicate sampler is relocated every year to a new location. One replicate sampler was placed at Blackfoot (Distant location) and one at Mud Lake (Boundary location) during 2004. An average of 17,469 ft^3 (495 m^3) of air was sampled at each location, each week, at an average flow rate of 1.3 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. Filters and charcoal cartridges were changed weekly at each station during the quarter.

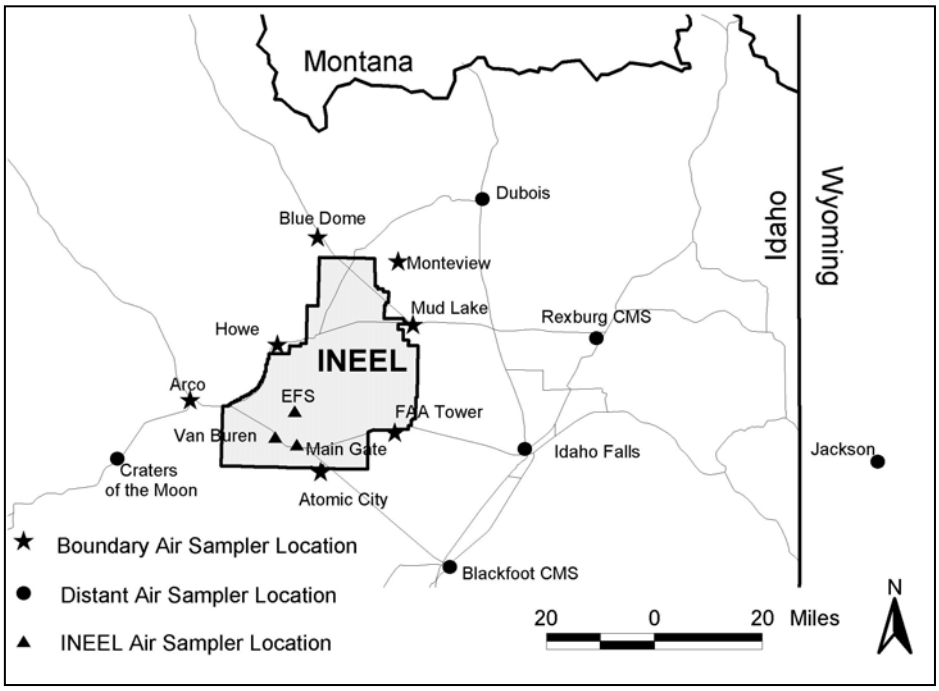

Figure 2. Low-volume air sampler locations.

LABORATORY ANALYSES

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.

Charcoal cartridges were placed in batches of ten or less and 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. If ^{131}I is detected in any batch of cartridges, the laboratory analyzes each individual cartridge in that batch to determine the source(s) of the detected ^{131}I.

The weekly particulate filters collected during the quarter for each location were composited and analyzed for gamma-emitting radionuclides. Composites were also radiochemically analyzed by location for ^{90}Sr, or ^{238}Pu, $^{239/240}$Pu, and ^{241}Am as determined by a rotating quarterly schedule.

STATISTICAL ANALYSES AND DATA PRESENTATION

Quarterly gross alpha and gross beta data typically show no discernable distribution (e.g., normal or lognormal) and are thus analyzed using nonparametric statistics. Box and whisker plots are routinely used to present the descriptive statistics of nonparametric data. Each data group is presented in this quarterly report as a box and whisker plot, with a median, a box enclosing values between the 25th and 75th percentiles, and whiskers representing the non-outlier range. Outliers and extreme values are identified separately from the box and whiskers. Outliers and extreme values are atypical, infrequent, data points that are far from the middle of the data distribution. For this report, outliers are defined as values that are greater than 1.5 times the height of the box, above or below the box. Extreme values are greater than 2 times the height of the box, above or below the box. Outliers and extreme values may reflect inherent variability, may be due to errors associated with transcription or measurement, or may be related to other anomalies. All outliers and extreme values were investigated further to identify any irregularities in collection, analysis, or reporting. If no anomaly was identified, the data were compared with historical measurements to determine if the values lie within the range of natural variation (see Historical Measurements under Helpful Information). If this was the case, the outliers and extreme values were included in the subsequent statistical analyses.

If the INEEL were a significant source of offsite contamination, concentrations of contaminants should be statistically greater at Boundary locations than at Distant locations. The nonparametric Kruskal-Wallis test of multiple independent groups was used to test for statistical differences between quarterly median gross alpha and gross beta values grouped by INEEL, Boundary, and Distant locations. This test was also used to test for statistical differences between monthly gross alpha and gross beta medians calculated for INEEL, Boundary, and Distant locations. The use of nonparametric tests, such as Kruskal-Wallis, gives less weight to outliers 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.

As an additional check, comparisons between gross alpha and gross beta 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. INEEL sample results were not included in this analysis because the onsite data, collected at only three locations, are not representative of the entire INEEL and would not aid in determining offsite impacts. A 'p' value greater than 0.05 signifies no statistical difference between weekly data groups.

More detail on the statistics used for data analyses can be found in Determining Statistical Differences under Helpful Information.

RESULTS

Gross alpha activity. All gross alpha results are reported in Table C-1. The data were tested for normality prior to statistical analyses and found to be neither normally nor log-normally distributed. A careful review of the data collected during the first quarter indicates that the outliers and extreme values were not due to mistakes in collection, analysis, or reporting procedures, but rather reflect natural variability in the measurements, as indicated by comparison with historic measurements.

Median gross alpha concentrations in air for INEEL, Boundary, and Distant locations during the first quarter of 2004 are shown in Figure 3. Figure 3 graphically shows that the gross alpha measurements made at INEEL, Boundary, and Distant locations are similar for the first quarter. There were no statistical differences in gross alpha concentrations between location groups for the first quarter of 2004, as determined by the Kruskal-Wallis test of multiple independent groups (Table D-1).

Median gross alpha concentrations for each month of the quarter are shown by location in Figures 4– 6. Using the Kruskal-Wallis test, no statistical differences were determined between median gross alpha results grouped by location for any month of the first quarter (Table D-1).

Comparison of weekly Boundary and Distant location gross alpha data sets, using the Mann Whitney U test, show no statistical differences between and Boundary and Distant data sets during any week of the first quarter (Table D-2).

Gross beta activity. Gross beta results are presented in Table C-1. The data were tested and found to be neither normally nor log-normally distributed. Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of measurements made historically, and because these values could not be attributed to mistakes in collection, analysis, or reporting procedures.

Gross beta concentrations in air for Boundary, Distant, and INEEL locations for the first quarter of 2004 are shown in Figure 7. As in the case of gross alpha activity, the quarterly gross beta data for each group appear to be similar and were determined using the Kruskal-Wallis test to be statistically the same (Figure 6 and Table D-1).

Monthly median gross beta concentrations in air for each sampling group are shown in Figures 8 – 10. There was no statistical difference between median gross beta concentrations grouped by location for any month during the quarter (Table D-1).

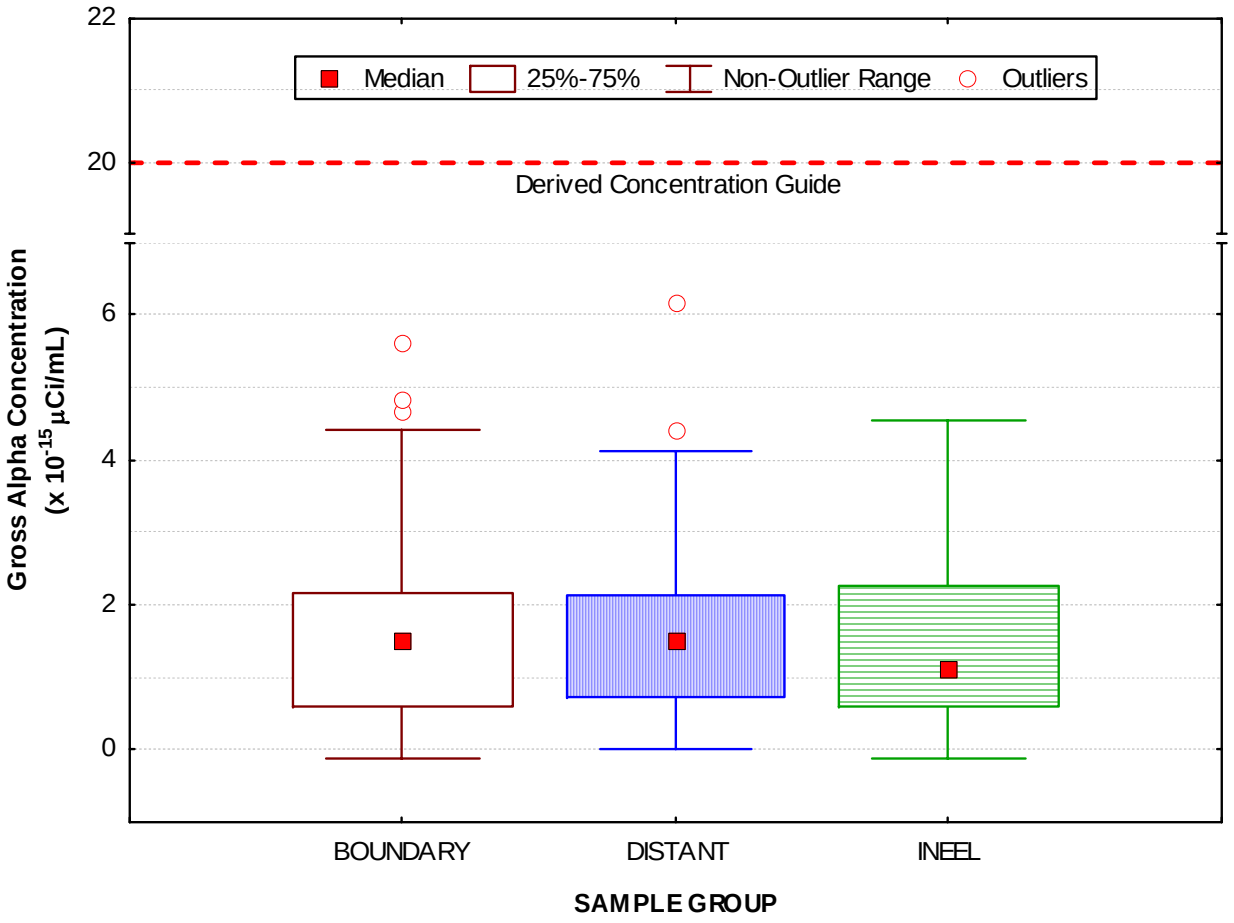

Figure 3. **Gross alpha concentrations in air at ESER Program Boundary, Distant, and INEEL locations for the first quarter of 2004.**

Comparison of weekly Boundary and Distant data sets, using the Mann Whitney U test, indicated a statistical difference between the two location groups for the week ending on February 4, 2004 (Table D-2). The Boundary group was statistically greater than the Distant group. The highest concentration was measured at the Arco location during this period. When the Arco result was removed from the data set, there was no statistical difference between Boundary and Distant location groups. The Arco result was well within historic measurements and was attributed to natural variations.

Iodine131. No ^{131}I was detected at a level greater than the associated 3s value in any of the batches of charcoal cartridges. Weekly ^{131}I results for each location, including individual recount data, are listed in Table C-2 of Appendix C.

Gamma-emitting radionuclides. Weekly filters for the first quarter of 2004 were composited by location and analyzed for gamma-emitting radionuclides, including ^{137}Cs. Composites were also analyzed for ^{90}Sr, ^{238}Pu, $^{239/240}Pu$, and ^{241}Am. No man-made radionuclides were detected above the 3s value during the quarter. All results were far less than their respective DCGs. All results for composite filter samples are shown in Table C-3, Appendix C.

ATMOSPHERIC MOISTURE SAMPLING

Atmospheric moisture is collected by pulling air through a column of absorbent material (i.e., silica gel) 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. Starting in 2004 the ESER program began an evaluation of a molecular sieve material as an absorbent material. As a result the locations with two samples yielded one sample of each material (silica gel and molecular sieve).

Seven atmospheric moisture samples were obtained during the first quarter of 2004; two each from Blackfoot, Idaho Falls, Atomic City, and one from Rexburg. Results are presented in Table C-4, Appendix C. Both samples collected at Atomic City exceeded their 3s values. The maximum sample result of $(4.4 \pm 1.3) \times 10^{-13}$ $\mu Ci/mL_{air}$ ($[1.6 \pm 0.5] \times 10^{-8}$ Bq/mL_{air}), was well below the DOE DCG for tritium in air of 1×10^{-7} $\mu Ci/mL$ (3.7×10^{-3} Bq/mL) and consistent with historical measurements.

PM10 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, 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} 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. Measurement problems nullified only two of samples from Atomic City during the quarter. The maximum 24-hour particulate concentration was 47.6 $\mu g/m^3$ on March 9, 2004, at Rexburg. The average, maximum, and minimum results of the 24-hour samples are summarized in Table 1. None of the results exceeds the maximum 24-hour air quality standard established by EPA. Results for all PM_{10} samples are listed in Table C-5, Appendix C.

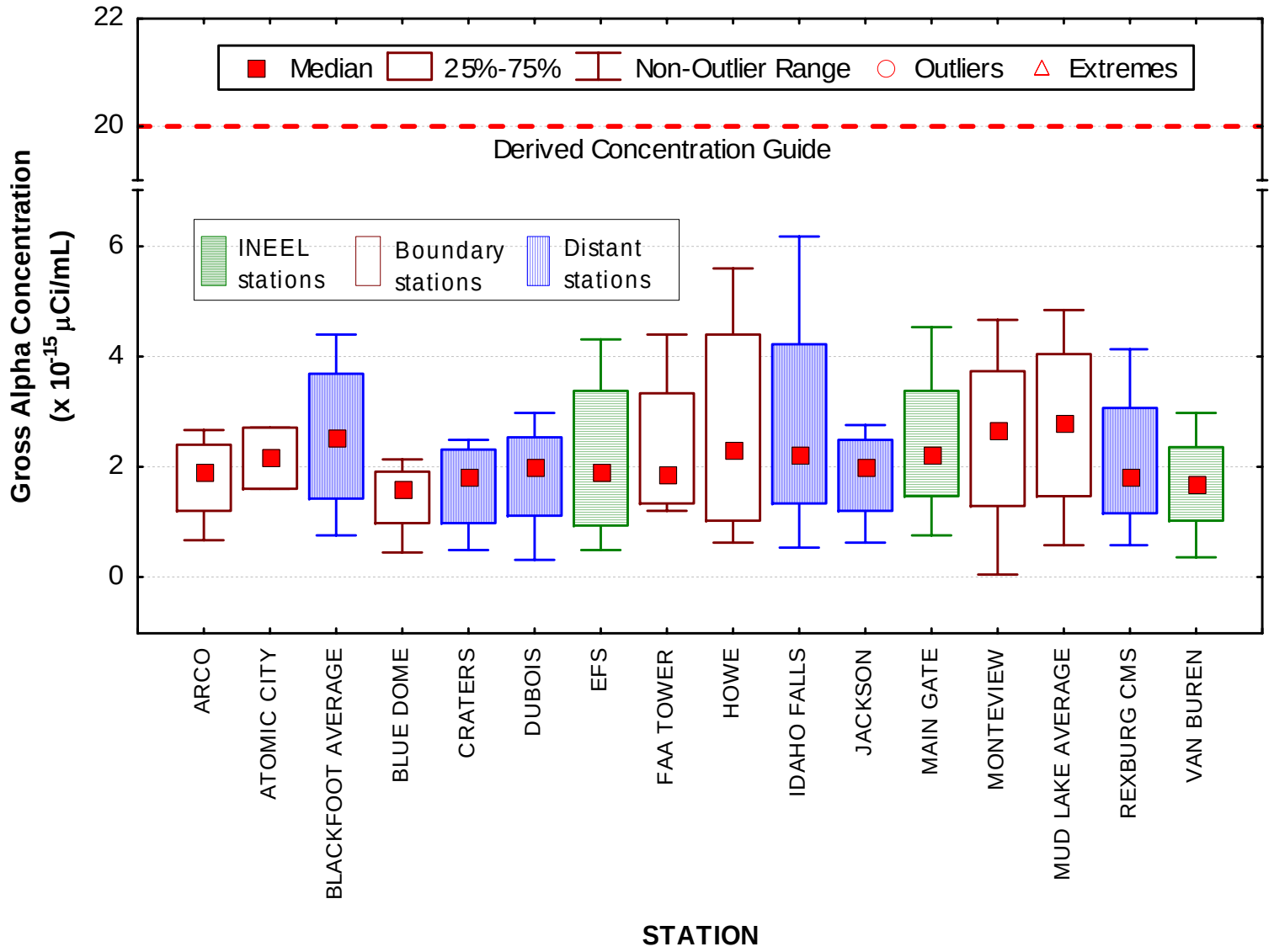

Figure 4. **January gross alpha concentrations in air at ESER Program stations**. Number of samples (N) = 4 for each location except for Blackfoot CMS and Blackfoot Q/A-1, where N = 3.

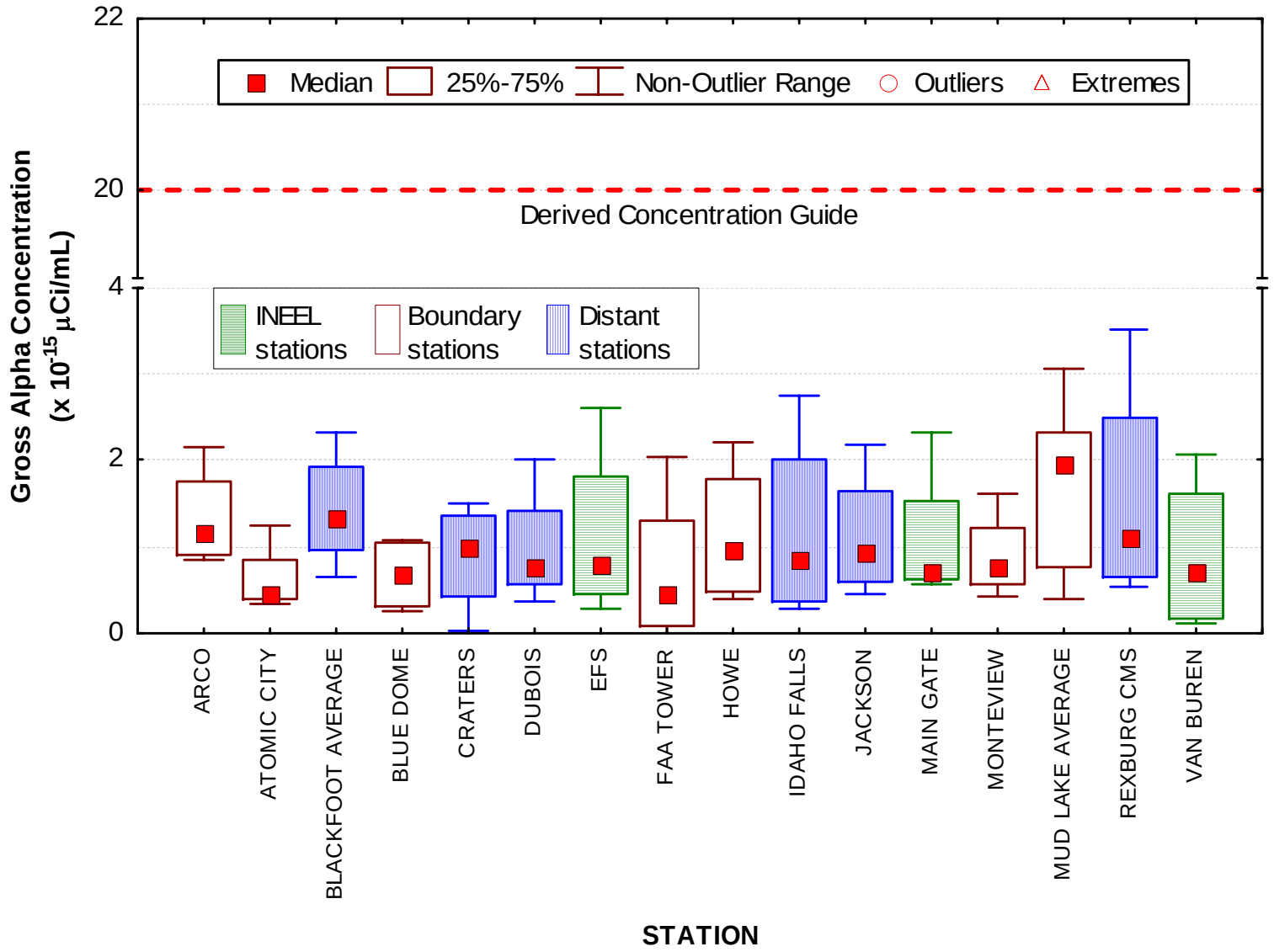

Figure 5. **February gross alpha concentrations in air at ESER Program INEEL, Boundary, and Distant locations.**
[Number of samples (N) = 4 at each location, except Dubois where N = 3.]

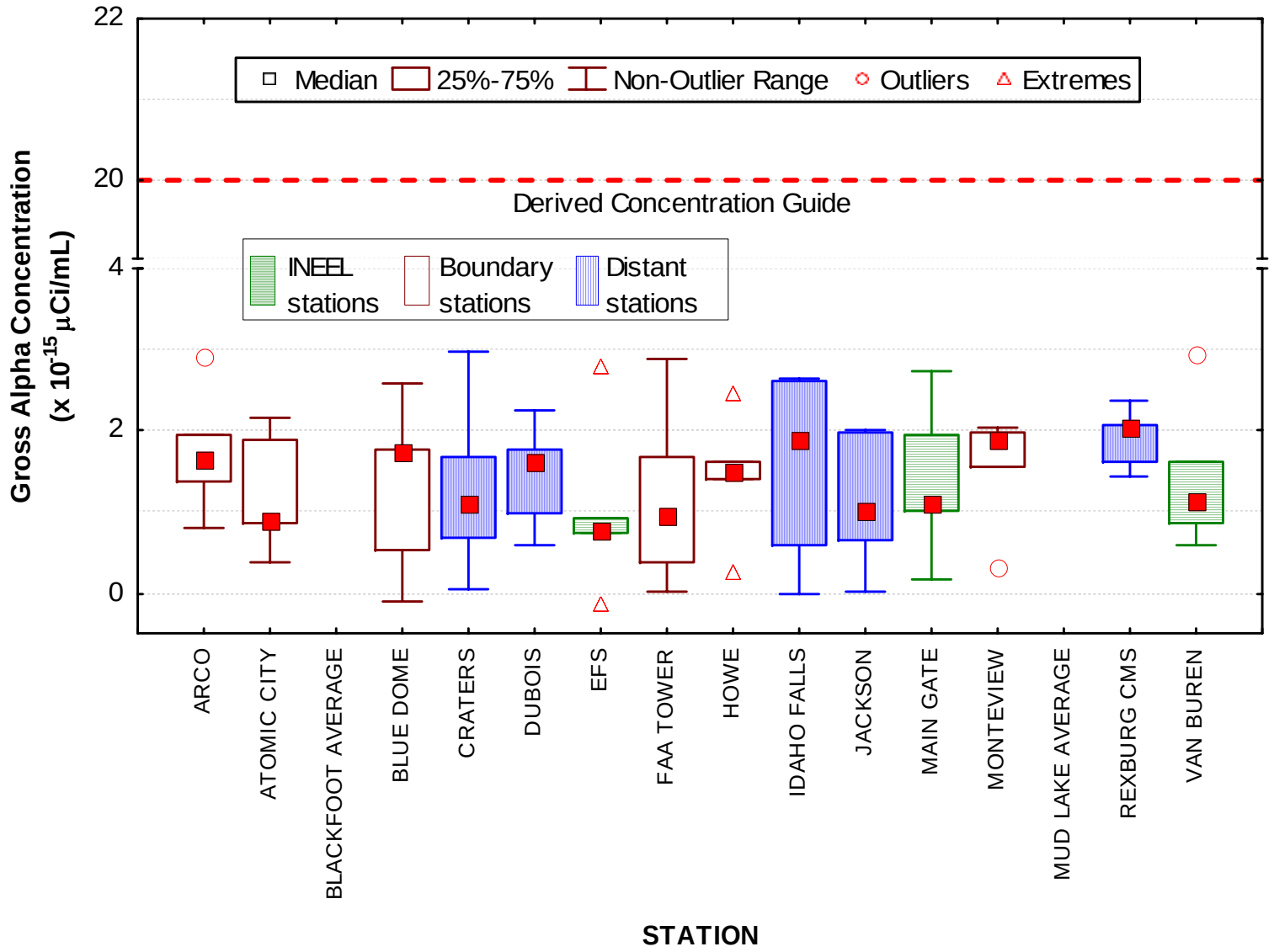

Figure 6. **March gross alpha concentrations in air at ESER Program INEEL, Boundary, and Distant locations.**
[Number of samples (N) = 5 at each location except for Blackfoot Q/A-1, where N=4.]

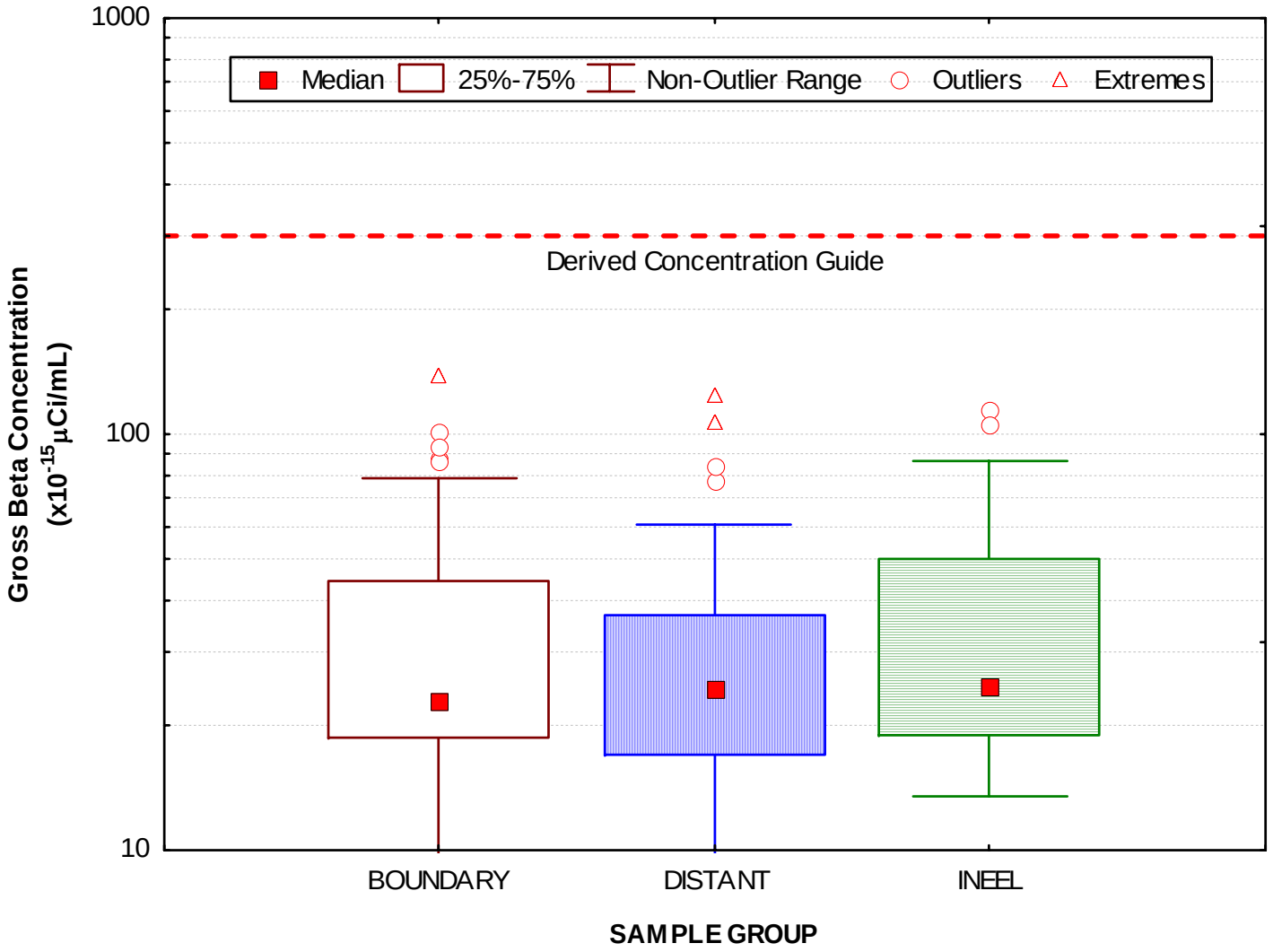

Figure 7. **Gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations for the first quarter 2004.**

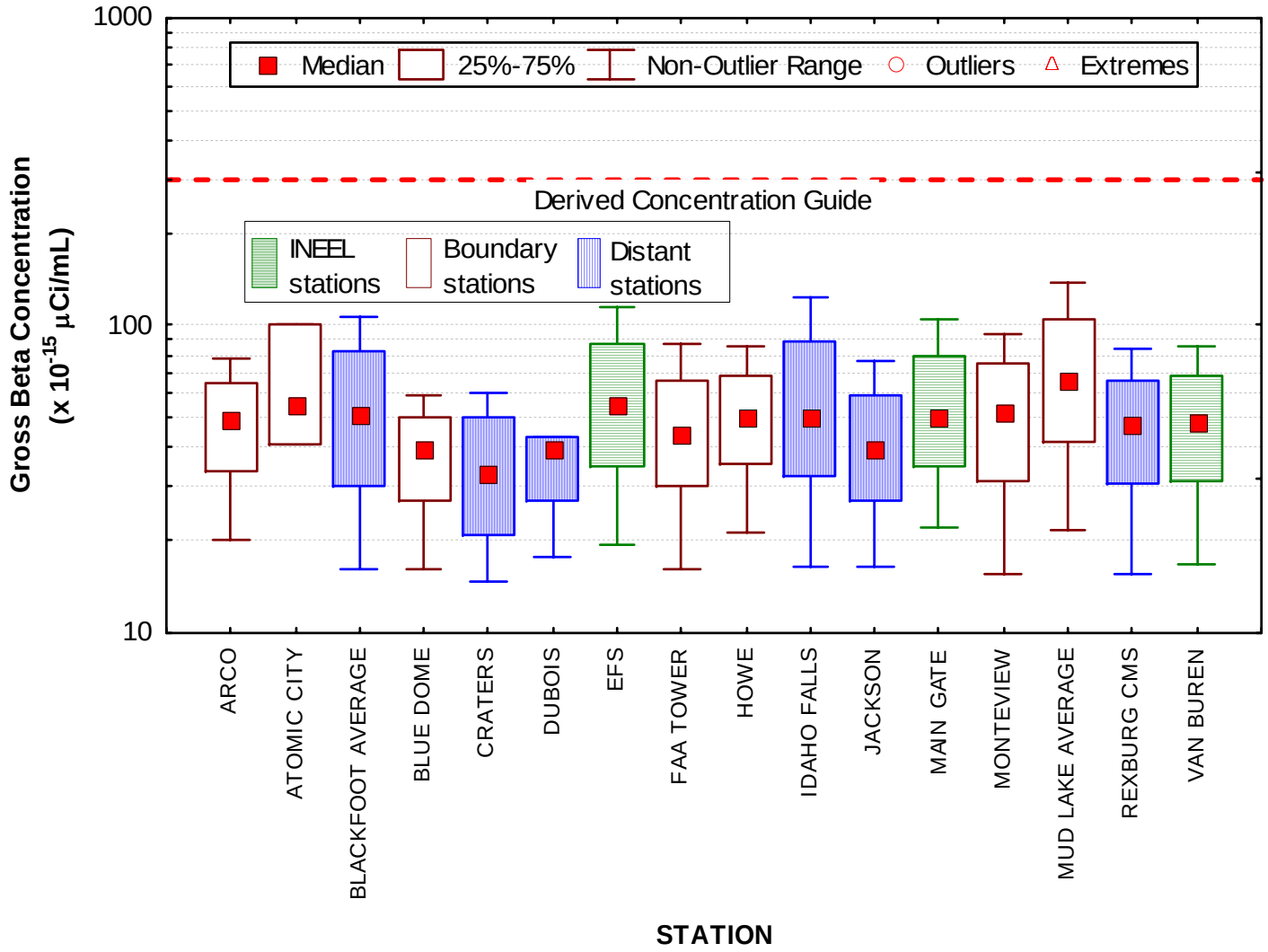

Figure 8. **January gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations.**
[Number of samples (N) = 5 for each location except for Rexburg CMS, where N = 4.]**)**

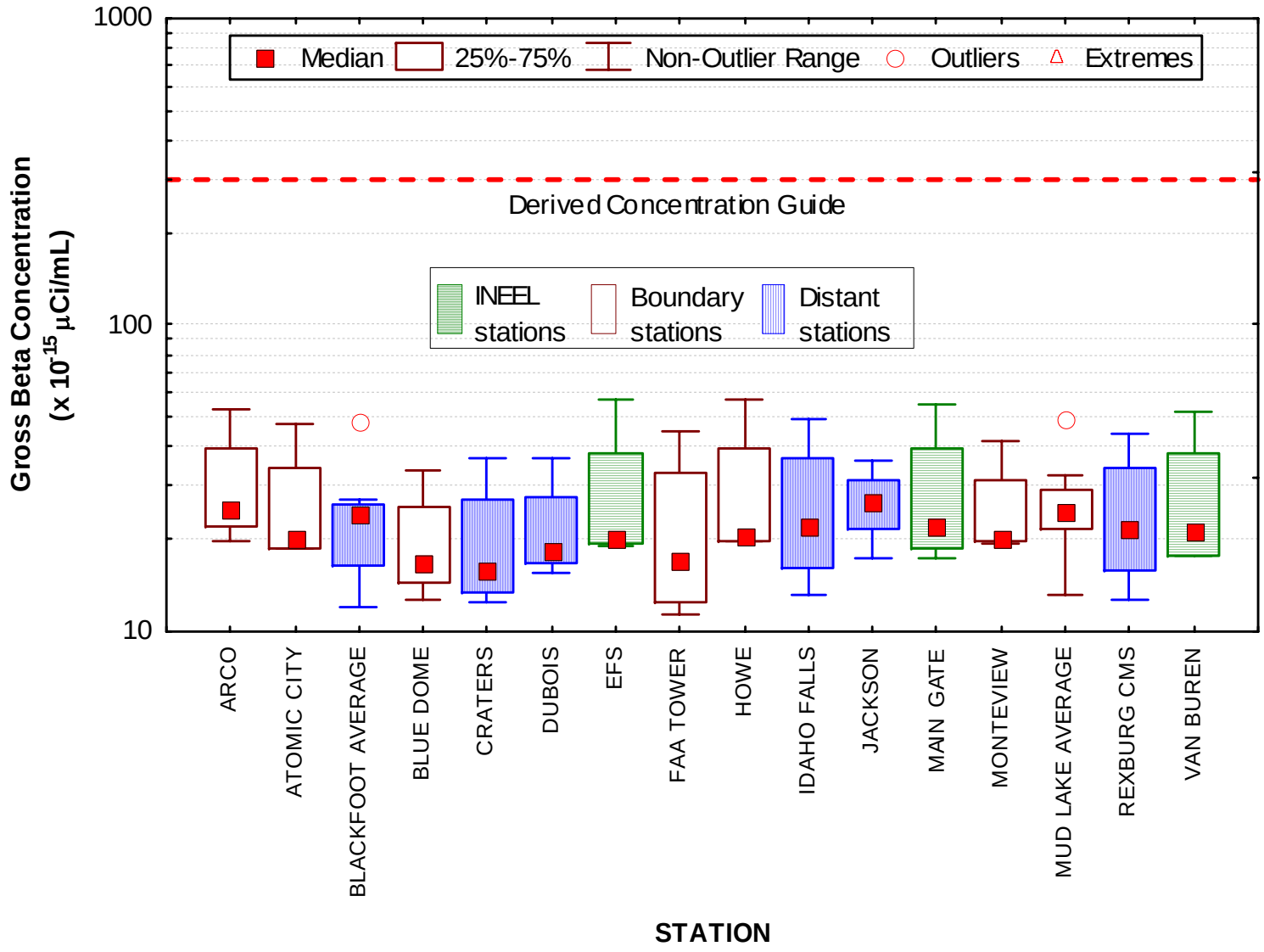

Figure 9. **February gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations. [Number of samples (N) = 4 at each location.]**

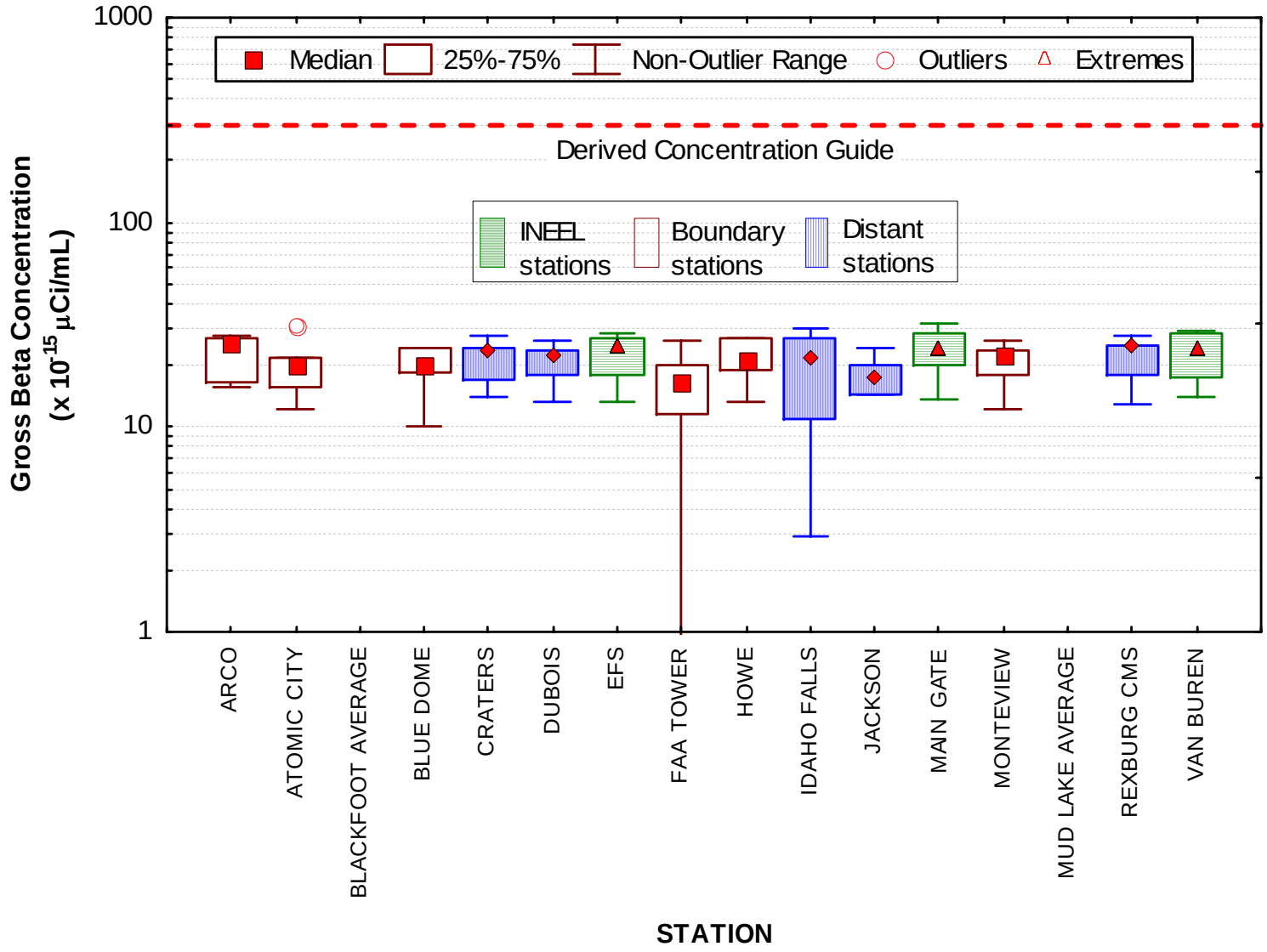

Figure 10. **March gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations.**
[Number of samples (N) = 4 at each location except for Blue Dome, where N=2, and Idaho Falls, where N=3.]

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

	Concentration[a]		
Location	**Minimum**	**Maximum**	**Average**
Atomic City	0.00	26.40	5.75
Blackfoot, CMS	2.41	37.51	13.88
Rexburg, CMS	1.91	47.58	16.93

a. All concentrations are in (:g/m^3).

3. 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 INEEL. Weekly precipitation samples are collected from the Experimental Field Station (EFS) on the INEEL. Surface and/or drinking water are sampled twice each year at 19 locations around the INEEL. This occurs during the second and fourth quarters and is therefore not reported here. 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.

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 a monthly composite from Idaho Falls and CFA, and weekly from the EFS. Precipitation samples are analyzed for tritium. Storm events in the first quarter of 2004 produced enough precipitation for a total of 12 samples – three from Idaho Falls, three from CFA, and six from the EFS.

Data for all first quarter 2004 precipitation samples collected by the ESER Program are listed in Table C-6 (Appendix C). Tritium was measured above the sample's 3s value in one sample collected from CFA on February 2, 2004. The tritium concentration was 191.0 ± 55.7 pCi/L (7.1 ± 2.1 Bq/L). While there is no regulatory limit for tritium in precipitation, the DOE DCG and maximum contaminant level set by EPA for tritium in drinking water can be used as a measure of comparison. The concentration measured at CFA is many times lower than the DCG value (2×10^6 pCi/L) and the Safe Drinking Water Act limit (20,000 pCi/L) for tritium in drinking water.

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. Tritium measured in first quarter ESER samples were within the range of values measured elsewhere. 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 2002).

4. AGRICULTURAL PRODUCTS 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 INEEL 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 large game sampled during the first quarter of 2004. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses is provided in Appendix B. There no regulatory standards for radionuclide concentrations in agricultural products and wildlife tissues.

MILK SAMPLING

Milk samples were collected weekly in Idaho Falls and monthly at eight other locations around the INEEL (Figure 11) during the first quarter of 2004. All samples were analyzed for gamma emitting radionuclides. Samples are analyzed for ^{90}Sr during the second and fourth quarters.

Data for ^{131}I and ^{137}Cs in milk samples are listed in Table C-7. Iodine-131 (^{131}I) was not detected in any milk sample during this quarter. The March sample collected from Blackfoot had a ^{137}Cs concentration greater than its 3s uncertainty of 4.46 $\pm$ 1.25 pCi/L (0.17 $\pm$ 0.05 Bq/L). However, a recount of this sample did not confirm this detection. The occasional detection of ^{137}Cs during initial counting is not unusual.

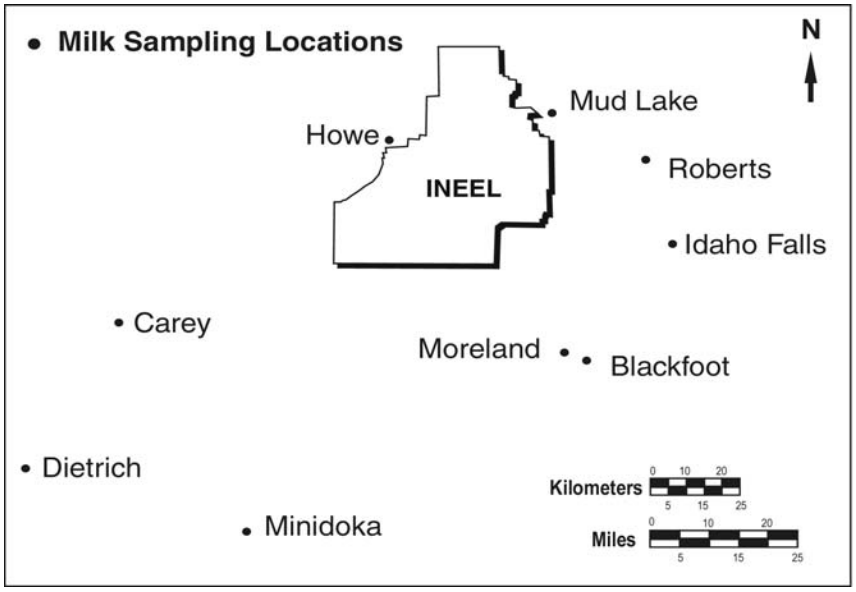

Figure 11. ESER Program milk sampling locations.

LARGE GAME ANIMAL SAMPLING

No game animals were available for sampling during the first quarter of 2004.

5. 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 January 1 to March 31, 2004.

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 established as the average maximum concentration from the past seven years of applicable data. 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. Those results that did not meet this requirement are shown in Table 2.

DATA COMPLETENESS

The Quality Assurance Project Plan (QAPP) specifies a 98 percent completeness goal for all regularly scheduled sample types (Stoller 2002). Data completeness for sample collection and delivery was 100 percent during the second quarter for all sample types with one exception: a number of precipitation samples were not collected due to lack of precipitation.

SUMMARY

In summary the quality assurance and data quality objectives for analyses were met in the fourth quarter of 2004 with the following exceptions:

- ^{131}I in charcoal cartridges;
- ^{241}Am and ^{90}Sr in quarterly composites; and
- ^{131}I in milk.

The ESER will work with the laboratories to identify where improvements can be made.

Table 2. Analytical results determined to be unacceptable.

Media		Radionuclide	Number Unacceptable[a]
Air		Gross alpha	7 / 386[b]
	filters and cartridges	Gross beta	3 / 386
		Cesium-137	81 / 371
		Iodine-131	153 / 371
		Americium-141	6 / 11
		Plutonium-238	0 / 11
		Plutonium-239/40	0 / 11
		Strontium-90	3 / 9
	moisture in air	Tritium	0 / 9
Precipitation		Tritium	0 / 17
Milk		Cesium-137	0 / 89
		Iodine-131	42 / 89

a. Format shown is number unacceptable / total number of analyses.
b. Total number of analyses varies due to different numbers of recounts for each radionuclide.

6. REFERENCES

DOE, 2003, "Environmental Management System," U.S. Department of Energy Order 450.1, January 2003.

DOE, 1998, "Radiation Protection of the Public and the Environment," U.S. Department of Energy Order 5400.1, January 1993.

Code of Federal Regulations (CFR), 1996, 40 CFR 50.6, 1996, "National Primary and Secondary Ambient Air Quality Standards for Particulate Matter," Code of Federal Regulations, Office of the Federal Register, 1996.

EPA, 2002, Environmental Radiation Ambient Monitoring System (ERAMS), Web-page: http://www.epa.gov/enviro/html/erams/

NRC, 2002, Fact Sheet on The Biological Effects of Radiation, Web page http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html. U.S. Nuclear Regulatory Commission, Washington, D.C.

Stoller, 2002, *Quality Assurance Project Plan for the INEEL Offsite Environmental Surveillance Program*, Environmental Surveillance, Education and Research Program, October, 2002.

United Nations, 2000, *Sources and Effects of Ionizing Radiation*, United Nations Scientific Committee on the Effects of Atomic Radiation, UNSCEAR 2000 Report to the General Assembly, with Scientific Annexes, United Nations, New York, 2000, Vol. 1.

APPENDIX A

SUMMARY OF SAMPLING MEDIA AND SCHEDULE

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TABLE A-1 Summary of the ESER Program's Sampling Schedule

Sample Type Analysis	Collection Frequency	LOCATIONS		
		Distant	Boundary	INEEL
AIR SAMPLING				
LOW-VOLUME AIR				
Gross Alpha, Gross Beta, ^{131}I	weekly	Blackfoot, Craters of the Moon, Idaho Falls, 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, Idaho Falls, 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	Idaho Falls	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, Blackfoot, Carey, Idaho Falls, Fort Hall, Minidoka, Roberts, Shoshone	Arco, Atomic City, Howe, Monteview, Mud Lake	None
ENVIRONMENTAL RADIATION SAMPLING				
TLDs				
Gamma Radiation	semiannual	Aberdeen, Blackfoot, Craters of the Moon, Idaho Falls, Minidoka, 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, 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	INEEL
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.	varies	INEEL roads
SHEEP				
Gamma Spec	annually	Blackfoot or Dubois, N. INEEL, S. INEEL	None	INEEL
WATERFOWL				
Gamma Spec, ^{90}Sr, Transuranics	annually	Fort Hall	None	Waste disposal ponds
Marmots				
Gamma Spec	Varies	Pocatello, 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 First Quarter 2004.

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Guide[b] (DCG)
Air (particulate filter)[e]	Gross alpha[c]	8.8×10^{-16} µCi/mL	2×10^{-14} µCi/mL
	Gross beta[d]	1.7×10^{-15} µCi/mL	3×10^{-12} µCi/mL
	Specific gamma (^{137}Cs)	1.3×10^{-12} µCi/mL	3×10^{-7} µCi/mL
	^{238}Pu	1.6×10^{-18} µCi/mL	3×10^{-14} µCi/mL
	$^{239/240}$Pu	1.1×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{241}Am	1.5×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{90}Sr	5.4×10^{-17} µCi/mL	9×10^{-12} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	1.2×10^{-15} µCi/mL	4×10^{-10} µCi/mL
Air (atmospheric moisture)[f]	^{3}H	1.1×10^{-7} µCi/mL	1×10^{-7} µCi/mL
Water (precipitation)	^{3}H	1.1×10^{-7} µCi/mL	2×10^{-3} µCi/mL[g]
Milk	^{131}I	0.5 pCi/L	--[h]
	^{137}Cs	2.9 pCi/L	--
Game Animal Tissue[i]	^{137}Cs	4.3 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% level of confidence and precision of plus or minus 100% 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 DCG for drinking water.

h No DCG established for this medium.

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

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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			Result > 3s	GROSS BETA Result ± 1s Uncertainty ($\times 10^{-14}$ µCi/mL)			GROSS BETA Result ± 1s Uncertainty ($\times 10^{-10}$ Bq/mL)			Result > 3s
BOUNDARY																
	ARCO	01/07/2004	0.68	±	0.29	2.51	±	1.08		20.10	±	0.93	7.44	±	0.34	Y
		01/14/2004	2.15	±	0.39	7.96	±	1.43	Y	51.80	±	1.38	19.17	±	0.51	Y
		01/21/2004	2.69	±	0.45	9.95	±	1.66	Y	78.10	±	1.68	28.90	±	0.62	Y
		01/28/2004	1.74	±	0.34	6.44	±	1.26	Y	47.00	±	1.18	17.39	±	0.44	Y
		02/04/2004	1.00	±	0.30	3.70	±	1.09	Y	24.60	±	0.93	9.10	±	0.34	Y
		02/11/2004	0.84	±	0.29	3.10	±	1.07		19.60	±	0.85	7.25	±	0.31	Y
		02/18/2004	2.16	±	0.38	7.99	±	1.40	Y	52.90	±	1.30	19.57	±	0.48	Y
		02/25/2004	1.33	±	0.38	4.92	±	1.40	Y	25.60	±	1.09	9.47	±	0.40	Y
		03/03/2004	0.80	±	0.31	2.97	±	1.13		15.70	±	0.81	5.81	±	0.30	Y
		03/10/2004	1.66	±	0.33	6.14	±	1.21	Y	28.10	±	0.95	10.40	±	0.35	Y
		03/17/2004	1.37	±	0.50	5.07	±	1.84		25.80	±	1.21	9.55	±	0.45	Y
		03/24/2004	2.93	±	0.53	10.84	±	1.96	Y	27.00	±	1.23	9.99	±	0.46	Y
		03/31/2004	1.94	±	0.39	7.18	±	1.44	Y	16.60	±	0.89	6.14	±	0.33	Y
	ATOMIC CITY[a]	01/07/2004	0.45	±	1.11	1.66	±	4.11		17.10	±	2.72	6.33	±	1.01	Y
		01/14/2004	1.61	±	0.34	5.96	±	1.27	Y	55.10	±	1.37	20.39	±	0.51	Y
		01/21/2004	2.71	±	0.44	10.03	±	1.63	Y	101.00	±	1.83	37.37	±	0.68	Y
		01/28/2004	2.17	±	0.36	8.03	±	1.32	Y	40.90	±	1.10	15.13	±	0.41	Y
		02/04/2004	0.44	±	0.28	1.64	±	1.02		18.60	±	0.90	6.88	±	0.33	Y
		02/11/2004	0.35	±	0.24	1.29	±	0.90		18.70	±	0.80	6.92	±	0.30	Y
		02/18/2004	1.25	±	0.32	4.63	±	1.17	Y	47.20	±	1.21	17.46	±	0.45	Y
		02/25/2004	0.46	±	0.25	1.70	±	0.93		21.50	±	0.87	7.96	±	0.32	Y
		03/03/2004	0.39	±	0.26	1.42	±	0.95		12.30	±	0.72	4.55	±	0.26	Y
		03/10/2004	2.16	±	0.38	7.99	±	1.40	Y	20.10	±	0.91	7.44	±	0.33	Y
		03/17/2004	0.88	±	0.43	3.25	±	1.58		21.90	±	1.07	8.10	±	0.40	Y
		03/24/2004	1.90	±	0.51	7.03	±	1.89	Y	31.30	±	1.39	11.58	±	0.51	Y
		03/31/2004	0.90	±	0.28	3.34	±	1.03	Y	15.80	±	0.77	5.85	±	0.29	Y
	BLUE DOME	01/07/2004	0.45	±	0.20	1.65	±	0.74		16.00	±	0.67	5.92	±	0.25	Y
		01/14/2004	1.55	±	0.29	5.74	±	1.06	Y	37.80	±	1.02	13.99	±	0.38	Y
		01/21/2004	1.68	±	0.31	6.22	±	1.16	Y	59.10	±	1.25	21.87	±	0.46	Y
		01/28/2004	2.13	±	0.34	7.88	±	1.26	Y	40.70	±	1.06	15.06	±	0.39	Y
		02/04/2004	1.01	±	0.26	3.74	±	0.97	Y	17.30	±	0.74	6.40	±	0.27	Y
		02/11/2004	0.26	±	0.22	0.98	±	0.81		12.80	±	0.67	4.74	±	0.25	Y
		02/18/2004	1.08	±	0.27	4.00	±	1.01	Y	33.30	±	0.97	12.32	±	0.36	Y
		02/25/2004	0.35	±	0.21	1.31	±	0.79		16.30	±	0.72	6.03	±	0.27	Y
		03/03/2004	-0.10	±	0.20	-0.35	±	0.73		9.99	±	0.62	3.70	±	0.23	Y
		03/10/2004	1.78	±	0.31	6.59	±	1.15	Y	24.70	±	0.85	9.14	±	0.32	Y
		03/17/2004	0.53	±	0.34	1.97	±	1.26		20.00	±	0.91	7.40	±	0.34	Y
		03/24/2004	2.58	±	0.43	9.55	±	1.60	Y	24.30	±	1.01	8.99	±	0.37	Y
		03/31/2004	1.74	±	0.40	6.44	±	1.47	Y	18.50	±	0.97	6.85	±	0.36	Y
	FAA TOWER	01/07/2004	1.20	±	0.33	4.44	±	1.21	Y	16.20	±	0.85	5.99	±	0.31	Y
		01/14/2004	1.49	±	0.32	5.51	±	1.20	Y	45.00	±	1.24	16.65	±	0.46	Y
		01/21/2004	4.40	±	0.49	16.28	±	1.81	Y	87.50	±	1.64	32.38	±	0.61	Y
		01/28/2004	2.31	±	0.39	8.55	±	1.45	Y	44.10	±	1.21	16.32	±	0.45	Y
		02/04/2004	-0.13	±	0.19	-0.47	±	0.70		11.30	±	0.69	4.18	±	0.25	Y
		02/11/2004	0.33	±	0.28	1.20	±	1.04		13.80	±	0.82	5.11	±	0.30	Y
		02/18/2004	2.03	±	0.39	7.51	±	1.46	Y	45.00	±	1.28	16.65	±	0.47	Y
		02/25/2004	0.58	±	0.30	2.15	±	1.09		20.40	±	0.94	7.55	±	0.35	Y
		03/03/2004	0.39	±	0.30	1.45	±	1.11		11.50	±	0.79	4.26	±	0.29	Y
		03/10/2004	0.02	±	0.22	0.08	±	0.80		-0.06	±	0.46	-0.02	±	0.17	
		03/17/2004	0.96	±	0.47	3.56	±	1.74		20.20	±	1.11	7.47	±	0.41	Y
		03/24/2004	2.88	±	0.50	10.66	±	1.86	Y	26.50	±	1.17	9.81	±	0.43	Y
		03/31/2004	1.68	±	0.37	6.22	±	1.36	Y	16.80	±	0.88	6.22	±	0.33	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 ($\times 10^{-14}$ µCi/mL)			GROSS BETA Result ± 1s Uncertainty ($\times 10^{-10}$ Bq/mL)			GROSS BETA Result > 3s
	HOWE	01/07/2004	0.64	±	0.23	2.38	±	0.85		21.10	±	0.78	7.81	±	0.29	Y
		01/14/2004	3.19	±	0.39	11.80	±	1.45	Y	49.70	±	1.20	18.39	±	0.44	Y
		01/21/2004	5.61	±	0.53	20.76	±	1.94	Y	86.30	±	1.60	31.93	±	0.59	Y
		01/28/2004	1.45	±	0.32	5.37	±	1.18	Y	50.40	±	1.19	18.65	±	0.44	Y
		02/04/2004	0.55	±	0.25	2.04	±	0.91		19.60	±	0.81	7.25	±	0.30	Y
		02/11/2004	0.40	±	0.24	1.48	±	0.90		20.00	±	0.82	7.40	±	0.30	Y
		02/18/2004	2.21	±	0.35	8.18	±	1.30	Y	57.40	±	1.25	21.24	±	0.46	Y
		02/25/2004	1.36	±	0.28	5.03	±	1.05	Y	21.10	±	0.79	7.81	±	0.29	Y
		03/03/2004	0.26	±	0.23	0.97	±	0.85		13.30	±	0.69	4.92	±	0.25	Y
		03/10/2004	1.61	±	0.30	5.96	±	1.11	Y	21.20	±	0.81	7.84	±	0.30	Y
		03/17/2004	1.41	±	0.43	5.22	±	1.60	Y	27.50	±	1.10	10.18	±	0.41	Y
		03/24/2004	2.46	±	0.48	9.10	±	1.78	Y	26.90	±	1.18	9.95	±	0.44	Y
		03/31/2004	1.51	±	0.35	5.59	±	1.28	Y	19.10	±	0.90	7.07	±	0.33	Y
	MONTEVIEW	01/07/2004	0.05	±	0.18	0.20	±	0.65		15.50	±	0.69	5.74	±	0.25	Y
		01/14/2004	2.79	±	0.36	10.32	±	1.32	Y	47.40	±	1.14	17.54	±	0.42	Y
		01/21/2004	4.67	±	0.50	17.28	±	1.84	Y	93.20	±	1.67	34.48	±	0.62	Y
		01/28/2004	2.53	±	0.36	9.36	±	1.32	Y	56.60	±	1.20	20.94	±	0.44	Y
		02/04/2004	0.71	±	0.24	2.62	±	0.90		19.80	±	0.78	7.33	±	0.29	Y
		02/11/2004	0.43	±	0.23	1.57	±	0.86		20.30	±	0.79	7.51	±	0.29	Y
		02/18/2004	1.62	±	0.32	5.99	±	1.17	Y	41.90	±	1.09	15.50	±	0.40	Y
		02/25/2004	0.83	±	0.25	3.08	±	0.93	Y	19.50	±	0.77	7.22	±	0.28	Y
		03/03/2004	0.31	±	0.23	1.13	±	0.86		12.20	±	0.67	4.51	±	0.25	Y
		03/10/2004	1.55	±	0.29	5.74	±	1.08	Y	22.20	±	0.81	8.21	±	0.30	Y
		03/17/2004	1.90	±	0.45	7.03	±	1.67	Y	23.40	±	1.03	8.66	±	0.38	Y
		03/24/2004	1.99	±	0.47	7.36	±	1.74	Y	26.30	±	1.21	9.73	±	0.45	Y
		03/31/2004	2.03	±	0.35	7.51	±	1.28	Y	18.00	±	0.81	6.66	±	0.30	Y
	MUD LAKE	01/07/2004	0.60	±	0.22	2.20	±	0.83		20.70	±	0.77	7.66	±	0.28	Y
		01/14/2004	2.53	±	0.37	9.36	±	1.38	Y	73.30	±	1.45	27.12	±	0.54	Y
		01/21/2004	5.64	±	0.76	20.87	±	2.83	Y	165.00	±	2.94	61.05	±	1.09	Y
		01/28/2004	2.32	±	0.38	8.58	±	1.41	Y	64.80	±	1.37	23.98	±	0.51	Y
	b	02/04/2004	1.48	±	0.72	5.48	±	2.65		31.10	±	1.95	11.51	±	0.72	Y
		02/11/2004	0.50	±	0.28	1.83	±	1.03		22.60	±	0.92	8.36	±	0.34	Y
	c	02/18/2004	1.68	±	0.78	6.22	±	2.87		53.00	±	2.46	19.61	±	0.91	Y
		02/25/2004	1.07	±	0.30	3.96	±	1.11	Y	25.40	±	0.94	9.40	±	0.35	Y
		03/03/2004	0.22	±	0.24	0.80	±	0.89		12.80	±	0.71	4.74	±	0.26	Y
		03/10/2004	2.27	±	0.34	8.40	±	1.25	Y	25.90	±	0.87	9.58	±	0.32	Y
		03/17/2004	1.59	±	0.45	5.88	±	1.65	Y	29.60	±	1.14	10.95	±	0.42	Y
		03/24/2004	1.87	±	0.42	6.92	±	1.55	Y	34.30	±	1.21	12.69	±	0.45	Y
		03/31/2004	2.85	±	0.40	10.55	±	1.48	Y	17.80	±	0.83	6.59	±	0.31	Y
	MUD LAKE (Q/A-2)	01/07/2004	0.61	±	0.21	2.26	±	0.78		22.20	±	0.75	8.21	±	0.28	Y
		01/14/2004	2.23	±	0.34	8.25	±	1.26	Y	65.00	±	1.32	24.05	±	0.49	Y
		01/21/2004	4.07	±	0.46	15.06	±	1.71	Y	113.00	±	1.76	41.81	±	0.65	Y
		01/28/2004	4.25	±	0.45	15.73	±	1.65	Y	59.70	±	1.28	22.09	±	0.47	Y
		02/04/2004	0.77	±	0.25	2.83	±	0.93	Y	21.80	±	0.81	8.07	±	0.30	Y
		02/11/2004	0.29	±	0.23	1.07	±	0.84		21.70	±	0.82	8.03	±	0.30	Y
		02/18/2004	3.05	±	0.39	11.29	±	1.44	Y	49.70	±	1.17	18.39	±	0.43	Y
		02/25/2004	1.13	±	0.29	4.18	±	1.07	Y	23.90	±	0.88	8.84	±	0.32	Y
		03/03/2004	0.69	±	0.27	2.53	±	1.00		13.60	±	0.72	5.03	±	0.27	Y
		03/10/2004	2.07	±	0.34	7.66	±	1.26	Y	27.40	±	0.93	10.14	±	0.34	Y
		03/17/2004	2.33	±	0.48	8.62	±	1.79	Y	28.90	±	1.13	10.69	±	0.42	Y
		03/24/2004	3.32	±	0.52	12.28	±	1.94	Y	31.00	±	1.23	11.47	±	0.46	Y
		03/31/2004	1.78	±	0.33	6.59	±	1.23	Y	19.20	±	0.83	7.10	±	0.31	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 ($\times 10^{-14}$ µCi/mL)			GROSS BETA Result ± 1s Uncertainty ($\times 10^{-10}$ Bq/mL)			GROSS BETA Result > 3s
	MUD LAKE AVERAGE	01/07/2004	0.60	±	0.01	2.23	±	0.03	Y	21.45	±	0.75	7.94	±	0.28	Y
		01/14/2004	2.38	±	0.15	8.81	±	0.56	Y	69.15	±	4.15	25.59	±	1.54	Y
		01/21/2004	4.86	±	0.79	17.96	±	2.90	Y	139.00	±	26.00	51.43	±	9.62	Y
		01/28/2004	3.29	±	0.97	12.15	±	3.57	Y	62.25	±	2.55	23.03	±	0.94	Y
		02/04/2004	0.77	±	0.77	2.83	±	2.83		21.80	±	21.80	8.07	±	8.07	
		02/11/2004	0.39	±	0.10	1.45	±	0.38	Y	22.15	±	0.45	8.20	±	0.17	Y
		02/18/2004	3.05	±	3.05	11.29	±	11.29		49.70	±	49.70	18.39	±	18.39	
		02/25/2004	1.10	±	0.03	4.07	±	0.11	Y	24.65	±	0.75	9.12	±	0.28	Y
		03/03/2004	0.45	±	0.23	1.67	±	0.87		13.20	±	0.40	4.88	±	0.15	Y
		03/10/2004	2.17	±	0.10	8.03	±	0.37	Y	26.65	±	0.75	9.86	±	0.28	Y
		03/17/2004	1.96	±	0.37	7.25	±	1.37	Y	29.25	±	0.35	10.82	±	0.13	Y
		03/24/2004	2.60	±	0.73	9.60	±	2.68	Y	32.65	±	1.65	12.08	±	0.61	Y
		03/31/2004	2.32	±	0.54	8.57	±	1.98	Y	18.50	±	0.70	6.85	±	0.26	Y
DISTANT																
	BLACKFOOT CMS	01/07/2004	0.90	±	0.26	3.33	±	0.96	Y	15.60	±	0.73	5.77	±	0.27	Y
		01/14/2004	3.06	±	0.41	11.32	±	1.53	Y	55.80	±	1.35	20.65	±	0.50	Y
		01/21/2004	4.95	±	0.54	18.32	±	2.00	Y	102.00	±	1.84	37.74	±	0.68	Y
		01/28/2004	2.24	±	0.38	8.29	±	1.42	Y	46.20	±	1.22	17.09	±	0.45	Y
		02/04/2004	1.11	±	0.25	4.11	±	0.92	Y	14.10	±	0.64	5.22	±	0.24	Y
		02/11/2004	0.50	±	0.23	1.86	±	0.86		14.70	±	0.69	5.44	±	0.26	Y
		02/18/2004	2.31	±	0.36	8.55	±	1.34	Y	48.30	±	1.18	17.87	±	0.44	Y
		02/25/2004	1.00	±	0.27	3.70	±	1.01	Y	25.30	±	0.88	9.36	±	0.32	Y
		03/03/2004	0.51	±	0.23	1.87	±	0.85		11.40	±	0.62	4.22	±	0.23	Y
		03/10/2004	1.26	±	0.33	4.66	±	1.22	Y	28.40	±	1.03	10.51	±	0.38	Y
		03/17/2004	1.13	±	0.37	4.18	±	1.37	Y	21.60	±	0.93	7.99	±	0.34	Y
		03/24/2004	1.66	±	0.37	6.14	±	1.38	Y	21.40	±	0.95	7.92	±	0.35	Y
		03/31/2004	1.31	±	0.28	4.85	±	1.04	Y	17.20	±	0.74	6.36	±	0.27	Y
	BLACKFOOT CMS (Q/A-1))	01/07/2004	0.61	±	0.31	2.26	±	1.16		16.60	±	0.93	6.14	±	0.34	Y
		01/14/2004	2.85	±	0.44	10.55	±	1.61	Y	59.80	±	1.49	22.13	±	0.55	Y
		01/21/2004	3.89	±	0.59	14.39	±	2.19	Y	112.00	±	2.24	41.44	±	0.83	Y
		01/28/2004	1.96	±	0.41	7.25	±	1.52	Y	41.50	±	1.29	15.36	±	0.48	Y
		02/04/2004	0.79	±	0.29	2.94	±	1.08		15.90	±	0.83	5.88	±	0.31	Y
		02/11/2004	0.82	±	0.31	3.02	±	1.14		18.10	±	0.87	6.70	±	0.32	Y
		02/18/2004	1.56	±	0.34	5.77	±	1.26	Y	48.60	±	1.24	17.98	±	0.46	Y
		02/25/2004	1.28	±	0.31	4.74	±	1.14	Y	26.40	±	0.93	9.77	±	0.35	Y
		03/03/2004	1.09	±	0.34	4.03	±	1.27	Y	12.60	±	0.80	4.66	±	0.29	Y
		03/10/2004	2.85	±	0.38	10.55	±	1.39	Y	25.80	±	0.90	9.55	±	0.33	Y
		03/17/2004	2.38	±	0.56	8.81	±	2.07	Y	27.00	±	1.24	9.99	±	0.46	Y
		03/24/2004	2.99	±	0.60	11.06	±	2.21	Y	30.90	±	1.43	11.43	±	0.53	Y
		03/31/2004	1.35	±	0.32	5.00	±	1.17	Y	19.30	±	0.85	7.14	±	0.31	Y
	BLACKFOOT AVERAGE	01/07/2004	0.76	±	0.14	2.80	±	0.53	Y	16.10	±	0.50	5.96	±	0.19	Y
		01/14/2004	2.96	±	0.11	10.93	±	0.39	Y	57.80	±	2.00	21.39	±	0.74	Y
		01/21/2004	4.42	±	0.53	16.35	±	1.96	Y	107.00	±	5.00	39.59	±	1.85	Y
		01/28/2004	2.10	±	0.14	7.77	±	0.52	Y	43.85	±	2.35	16.22	±	0.87	Y
		02/04/2004	0.95	±	0.16	3.52	±	0.58	Y	15.00	±	0.90	5.55	±	0.33	Y
		02/11/2004	0.66	±	0.16	2.44	±	0.58	Y	16.40	±	1.70	6.07	±	0.63	Y
		02/18/2004	1.94	±	0.38	7.16	±	1.39	Y	48.45	±	0.15	17.93	±	0.06	Y
		02/25/2004	1.14	±	0.14	4.22	±	0.52	Y	25.85	±	0.55	9.56	±	0.20	Y
		03/03/2004	0.80	±	0.29	2.95	±	1.08		12.00	±	0.60	4.44	±	0.22	Y
		03/10/2004	2.06	±	0.80	7.60	±	2.94		27.10	±	1.30	10.03	±	0.48	Y
		03/17/2004	1.76	±	0.63	6.49	±	2.31		24.30	±	2.70	8.99	±	1.00	Y
		03/24/2004	2.33	±	0.67	8.60	±	2.46	Y	26.15	±	4.75	9.68	±	1.76	Y
		03/31/2004	1.33	±	0.02	4.92	±	0.07	Y	18.25	±	1.05	6.75	±	0.39	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 ($\times 10^{-14}$ µCi/mL)			GROSS BETA Result ± 1s Uncertainty ($\times 10^{-10}$ Bq/mL)			GROSS BETA Result > 3s
	CRATERS	01/07/2004	0.51	±	0.25	1.89	±	0.93		14.60	±	0.76	5.40	±	0.28	Y
		01/14/2004	2.19	±	0.38	8.10	±	1.39	Y	39.10	±	1.20	14.47	±	0.44	Y
		01/21/2004	2.49	±	0.42	9.21	±	1.54	Y	60.80	±	1.46	22.50	±	0.54	Y
		01/28/2004	1.47	±	0.34	5.44	±	1.27	Y	27.30	±	1.00	10.10	±	0.37	Y
		02/04/2004	0.79	±	0.27	2.93	±	1.01		12.40	±	0.72	4.59	±	0.27	Y
		02/11/2004	0.04	±	0.24	0.15	±	0.89		14.20	±	0.79	5.25	±	0.29	Y
		02/18/2004	1.51	±	0.34	5.59	±	1.24	Y	36.60	±	1.11	13.54	±	0.41	Y
		02/25/2004	1.19	±	0.33	4.40	±	1.21	Y	17.30	±	0.86	6.40	±	0.32	Y
		03/03/2004	0.03	±	0.25	0.12	±	0.92		14.20	±	0.79	5.25	±	0.29	Y
		03/10/2004	2.97	±	0.41	10.99	±	1.52	Y	27.80	±	0.99	10.29	±	0.37	Y
		03/17/2004	0.69	±	0.43	2.54	±	1.59		23.80	±	1.13	8.81	±	0.42	Y
		03/24/2004	1.69	±	0.48	6.25	±	1.76	Y	24.50	±	1.23	9.07	±	0.46	Y
		03/31/2004	1.11	±	0.33	4.11	±	1.21	Y	16.90	±	0.87	6.25	±	0.32	Y
	DUBOIS	01/07/2004	0.35	±	0.22	1.28	±	0.81		17.80	±	0.77	6.59	±	0.28	Y
		01/14/2004	1.88	±	0.33	6.96	±	1.21	Y	36.00	±	1.07	13.32	±	0.40	Y
		01/21/2004	2.12	±	0.38	7.84	±	1.39	Y	43.40	±	1.22	16.06	±	0.45	Y
		01/28/2004	3.00	±	0.39	11.10	±	1.46	Y	42.80	±	1.12	15.84	±	0.41	Y
		02/04/2004	0.36	±	0.22	1.34	±	0.83		18.00	±	0.77	6.66	±	0.28	Y
		02/11/2004	0.75	±	0.30	2.76	±	1.11		15.50	±	0.82	5.74	±	0.30	Y
		02/18/2004	2.02	±	0.34	7.47	±	1.27	Y	36.60	±	1.05	13.54	±	0.39	Y
		02/25/2004	0.79	±	0.27	2.91	±	1.01		18.60	±	0.82	6.88	±	0.30	Y
		03/03/2004	0.61	±	0.33	2.24	±	1.24		13.30	±	0.86	4.92	±	0.32	Y
		03/10/2004	1.78	±	0.33	6.59	±	1.23	Y	23.80	±	0.90	8.81	±	0.33	Y
		03/17/2004	0.98	±	0.41	3.64	±	1.50		22.40	±	1.02	8.29	±	0.38	Y
		03/24/2004	2.26	±	0.48	8.36	±	1.77	Y	26.20	±	1.19	9.69	±	0.44	Y
		03/31/2004	1.61	±	0.36	5.96	±	1.32	Y	17.90	±	0.89	6.62	±	0.33	Y
	IDAHO FALLS	01/07/2004	0.56	±	0.25	2.08	±	0.94		16.40	±	0.79	6.07	±	0.29	Y
		01/14/2004	2.31	±	0.37	8.55	±	1.37	Y	52.00	±	1.30	19.24	±	0.48	Y
		01/21/2004	6.16	±	0.71	22.79	±	2.61	Y	124.00	±	2.37	45.88	±	0.88	Y
		01/28/2004	2.14	±	0.41	7.92	±	1.50	Y	48.90	±	1.32	18.09	±	0.49	Y
		02/04/2004	0.28	±	0.23	1.05	±	0.83		13.20	±	0.71	4.88	±	0.26	Y
		02/11/2004	0.44	±	0.26	1.64	±	0.96		19.30	±	0.84	7.14	±	0.31	Y
		02/18/2004	2.73	±	0.41	10.10	±	1.51	Y	49.30	±	1.26	18.24	±	0.47	Y
		02/25/2004	1.28	±	0.32	4.74	±	1.17	Y	24.70	±	0.93	9.14	±	0.34	Y
	d	03/03/2004	0.00	±	0.00	0.00	±	0.00		0.00	±	0.00	0.00	±	0.00	
		03/10/2004	0.00	±	0.00	0.00	±	0.00		2.94	±	0.54	1.09	±	0.20	Y
		03/17/2004	1.17	±	0.43	4.33	±	1.61		24.20	±	1.08	8.95	±	0.40	Y
		03/24/2004	2.66	±	0.52	9.84	±	1.91	Y	30.00	±	1.27	11.10	±	0.47	Y
		03/31/2004	2.59	±	0.43	9.58	±	1.58	Y	19.00	±	0.94	7.03	±	0.35	Y
	JACKSON	01/07/2004	0.63	±	0.40	2.31	±	1.47		16.30	±	0.90	6.03	±	0.33	Y
		01/14/2004	2.24	±	0.40	8.29	±	1.47	Y	41.70	±	1.29	15.43	±	0.48	Y
		01/21/2004	2.78	±	0.54	10.29	±	2.01	Y	77.20	±	1.97	28.56	±	0.73	Y
		01/28/2004	1.81	±	0.38	6.70	±	1.40	Y	37.60	±	1.17	13.91	±	0.43	Y
		02/04/2004	0.44	±	0.27	1.63	±	1.00		17.20	±	0.86	6.36	±	0.32	Y
		02/11/2004	0.73	±	0.32	2.72	±	1.17		26.40	±	1.03	9.77	±	0.38	Y
		02/18/2004	2.17	±	0.39	8.03	±	1.45	Y	35.90	±	1.14	13.28	±	0.42	Y
		02/25/2004	1.11	±	0.32	4.11	±	1.18	Y	26.10	±	0.99	9.66	±	0.37	Y
		03/03/2004	0.67	±	0.30	2.46	±	1.11		14.50	±	0.80	5.37	±	0.30	Y
		03/10/2004	0.02	±	0.20	0.08	±	0.73		-0.18	±	0.42	-0.06	±	0.15	
		03/17/2004	1.02	±	0.45	3.77	±	1.66		17.70	±	1.02	6.55	±	0.38	Y
		03/24/2004	1.98	±	0.46	7.33	±	1.70	Y	24.70	±	1.15	9.14	±	0.43	Y
		03/31/2004	2.00	±	0.37	7.40	±	1.37	Y	20.00	±	0.90	7.40	±	0.33	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 ($\times 10^{-14}$ µCi/mL)			GROSS BETA Result ± 1s Uncertainty ($\times 10^{-10}$ Bq/mL)			GROSS BETA Result > 3s
	REXBURG CMS	01/07/2004	0.59	±	0.27	2.19	±	1.01		15.50	±	0.82	5.74	±	0.30	Y
		01/14/2004	2.00	±	0.39	7.40	±	1.43	Y	45.80	±	1.35	16.95	±	0.50	Y
		01/21/2004	4.13	±	0.51	15.28	±	1.88	Y	83.70	±	1.70	30.97	±	0.63	Y
		01/28/2004	1.71	±	0.38	6.33	±	1.42	Y	49.10	±	1.33	18.17	±	0.49	Y
		02/04/2004	0.73	±	0.27	2.70	±	0.98		12.70	±	0.71	4.70	±	0.26	Y
		02/11/2004	0.55	±	0.28	2.04	±	1.02		19.00	±	0.85	7.03	±	0.32	Y
		02/18/2004	3.52	±	0.46	13.02	±	1.70	Y	44.30	±	1.24	16.39	±	0.46	Y
		02/25/2004	1.48	±	0.34	5.48	±	1.27	Y	24.40	±	0.97	9.03	±	0.36	Y
		03/03/2004	1.45	±	0.33	5.37	±	1.21	Y	13.10	±	0.73	4.85	±	0.27	Y
		03/10/2004	2.08	±	0.34	7.70	±	1.26	Y	25.30	±	0.90	9.36	±	0.33	Y
		03/17/2004	2.37	±	0.51	8.77	±	1.87	Y	25.40	±	1.12	9.40	±	0.41	Y
		03/24/2004	2.05	±	0.48	7.59	±	1.77	Y	27.70	±	1.24	10.25	±	0.46	Y
		03/31/2004	1.63	±	0.34	6.03	±	1.24	Y	18.20	±	0.84	6.73	±	0.31	Y
INEEL													0.00		0.00	
	EFS	01/07/2004	0.49	±	0.31	1.83	±	1.15		19.30	±	0.99	7.14	±	0.37	Y
		01/14/2004	1.42	±	0.32	5.25	±	1.20	Y	60.50	±	1.39	22.39	±	0.51	Y
		01/21/2004	4.32	±	0.51	15.98	±	1.88	Y	115.00	±	1.90	42.55	±	0.70	Y
		01/28/2004	2.47	±	0.38	9.14	±	1.39	Y	50.10	±	1.20	18.54	±	0.44	Y
		02/04/2004	0.30	±	0.26	1.10	±	0.97		19.00	±	0.90	7.03	±	0.33	Y
		02/11/2004	0.58	±	0.27	2.16	±	0.99		20.00	±	0.84	7.40	±	0.31	Y
		02/18/2004	2.60	±	0.38	9.62	±	1.41	Y	56.80	±	1.28	21.02	±	0.47	Y
		02/25/2004	1.01	±	0.31	3.74	±	1.15	Y	20.20	±	0.90	7.47	±	0.33	Y
		03/03/2004	-0.13	±	0.24	-0.47	±	0.90		13.40	±	0.79	4.96	±	0.29	Y
		03/10/2004	2.80	±	0.53	10.36	±	1.95	Y	25.00	±	1.23	9.25	±	0.46	Y
		03/17/2004	0.76	±	0.44	2.80	±	1.61		27.20	±	1.18	10.06	±	0.44	Y
		03/24/2004	0.91	±	0.49	3.38	±	1.82		29.10	±	1.47	10.77	±	0.54	Y
		03/31/2004	0.74	±	0.33	2.75	±	1.20		18.10	±	0.95	6.70	±	0.35	Y
	MAIN GATE	01/07/2004	0.76	±	0.32	2.81	±	1.17		22.10	±	1.00	8.18	±	0.37	Y
		01/14/2004	2.24	±	0.42	8.29	±	1.56	Y	53.50	±	1.49	19.80	±	0.55	Y
		01/21/2004	4.56	±	0.58	16.87	±	2.13	Y	105.00	±	2.02	38.85	±	0.75	Y
		01/28/2004	2.25	±	0.37	8.33	±	1.36	Y	47.30	±	1.18	17.50	±	0.44	Y
		02/04/2004	0.56	±	0.30	2.09	±	1.11		20.20	±	0.96	7.47	±	0.35	Y
		02/11/2004	0.74	±	0.33	2.74	±	1.21		17.20	±	0.91	6.36	±	0.34	Y
		02/18/2004	2.33	±	0.43	8.62	±	1.58	Y	55.00	±	1.44	20.35	±	0.53	Y
		02/25/2004	0.69	±	0.33	2.56	±	1.23		23.70	±	1.06	8.77	±	0.39	Y
		03/03/2004	0.18	±	0.32	0.65	±	1.17		13.60	±	0.90	5.03	±	0.33	Y
		03/10/2004	1.96	±	0.38	7.25	±	1.42	Y	24.40	±	1.00	9.03	±	0.37	Y
		03/17/2004	1.11	±	0.48	4.11	±	1.79		28.40	±	1.25	10.51	±	0.46	Y
		03/24/2004	2.73	±	0.65	10.10	±	2.41	Y	32.50	±	1.61	12.03	±	0.60	Y
		03/31/2004	1.01	±	0.38	3.74	±	1.41		20.00	±	1.07	7.40	±	0.40	Y
	VAN BUREN GATE	01/07/2004	0.40	±	0.27	1.47	±	1.00		16.70	±	0.87	6.18	±	0.32	Y
		01/14/2004	1.72	±	0.33	6.36	±	1.24	Y	51.60	±	1.29	19.09	±	0.48	Y
		01/21/2004	3.00	±	0.39	11.10	±	1.44	Y	86.20	±	1.49	31.89	±	0.55	Y
		01/28/2004	1.72	±	0.34	6.36	±	1.25	Y	46.20	±	1.17	17.09	±	0.43	Y
		02/04/2004	0.12	±	0.21	0.44	±	0.77		17.70	±	0.78	6.55	±	0.29	Y
		02/11/2004	0.25	±	0.23	0.91	±	0.87		17.80	±	0.79	6.59	±	0.29	Y
		02/18/2004	2.06	±	0.35	7.62	±	1.31	Y	51.80	±	1.23	19.17	±	0.46	Y
		02/25/2004	1.16	±	0.30	4.29	±	1.09	Y	24.70	±	0.90	9.14	±	0.33	Y
		03/03/2004	0.60	±	0.27	2.22	±	1.01		13.90	±	0.74	5.14	±	0.27	Y
		03/10/2004	1.13	±	0.32	4.18	±	1.20	Y	28.40	±	1.04	10.51	±	0.38	Y
		03/17/2004	0.86	±	0.45	3.16	±	1.65		24.50	±	1.15	9.07	±	0.43	Y
		03/24/2004	2.95	±	0.51	10.92	±	1.88	Y	29.70	±	1.22	10.99	±	0.45	Y
		03/31/2004	1.63	±	0.37	6.03	±	1.36	Y	17.40	±	0.79	6.44	±	0.29	Y

Red text denotes invalid sample.

a 01/07/2004 Atomic City invalid due to equipment failure associated with snow filling the enclosure.
b 02/04/2004 Mud Lake invalid due to a blown fuse.
c 02/18/2004 Mud Lake invalid due to a blown fuse.
d 03/03/2004 Idaho Falls invalid due to equipment failure resulting in a lost filter.

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

Location	Sampling Group	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
BOUNDARY									
	ARCO	01/07/2004	-0.17	±	3.05	-0.62	±	11.28	
		01/14/2004	1.50	±	3.52	5.55	±	13.01	
		01/21/2004	1.56	±	3.24	5.78	±	11.98	
		01/28/2004	0.59	±	1.45	2.18	±	5.36	
		02/04/2004	1.20	±	2.88	4.44	±	10.67	
		02/11/2004	-0.74	±	2.43	-2.73	±	8.98	
		02/18/2004	0.54	±	2.39	2.00	±	8.84	
		02/25/2004	0.84	±	1.93	3.09	±	7.14	
		03/03/2004	5.75	±	2.84	21.27	±	10.52	
		03/10/2004	2.79	±	2.31	10.33	±	8.55	
		03/17/2004	1.59	±	2.52	5.87	±	9.34	
		03/24/2004	-0.07	±	1.73	-0.26	±	6.41	
		03/31/2004	-2.42	±	2.26	-8.95	±	8.34	
	ATOMIC CITY[a]	01/07/2004	-0.81	±	14.70	-2.99	±	54.40	
		01/14/2004	1.41	±	3.30	5.21	±	12.21	
		01/21/2004	1.46	±	3.03	5.40	±	11.20	
		01/28/2004	0.58	±	1.43	2.16	±	5.29	
		02/04/2004	1.36	±	3.26	5.02	±	12.07	
		02/11/2004	-0.70	±	2.29	-2.57	±	8.47	
		02/18/2004	0.52	±	2.30	1.92	±	8.51	
		02/25/2004	0.64	±	1.48	2.37	±	5.47	
		03/03/2004	5.37	±	2.66	19.87	±	9.83	
		03/10/2004	2.97	±	2.46	11.00	±	9.10	
		03/17/2004	2.36	±	2.44	8.72	±	9.03	
		03/24/2004	-0.08	±	1.93	-0.29	±	7.14	
		03/31/2004	-2.01	±	1.87	-7.44	±	6.93	
	BLUE DOME	01/07/2004	-3.14	±	1.20	-11.62	±	4.43	
		01/14/2004	0.76	±	1.66	2.83	±	6.14	
		01/21/2004	-2.08	±	1.40	-7.70	±	5.19	
		01/28/2004	2.57	±	2.05	9.50	±	7.58	
		02/04/2004	-0.74	±	1.54	-2.73	±	5.71	
		02/11/2004	-1.77	±	2.01	-6.55	±	7.43	
		02/18/2004	1.84	±	1.41	6.79	±	5.22	
		02/25/2004	-0.60	±	1.16	-2.21	±	4.29	
		03/03/2004	-2.39	±	1.61	-8.85	±	5.97	
		03/10/2004	-0.14	±	1.77	-0.51	±	6.55	
		03/17/2004	0.46	±	1.29	1.72	±	4.76	
		03/24/2004	-1.15	±	1.28	-4.26	±	4.75	
		03/31/2004	1.30	±	1.66	4.80	±	6.13	

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

Location	Sampling Group	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
	FAA TOWER	01/07/2004	-4.52	±	1.72	-16.73	±	6.38	
		01/14/2004	0.94	±	2.03	3.46	±	7.51	
		01/21/2004	-2.44	±	1.65	-9.04	±	6.09	
		01/28/2004	3.08	±	2.46	11.38	±	9.09	
		02/04/2004	-0.84	±	1.75	-3.10	±	6.48	
		02/11/2004	-2.31	±	2.62	-8.54	±	9.68	
		02/18/2004	2.39	±	1.84	8.85	±	6.80	
		02/25/2004	-0.81	±	1.56	-2.98	±	5.78	
		03/03/2004	-3.16	±	2.13	-11.68	±	7.87	
		03/10/2004	-0.18	±	2.31	-0.67	±	8.55	
		03/17/2004	1.28	±	1.61	4.75	±	5.97	
		03/24/2004	-1.37	±	1.53	-5.07	±	5.65	
		03/31/2004	1.18	±	1.51	4.38	±	5.60	
		01/07/2004	-3.36	±	1.28	-12.43	±	4.74	
	HOWE	01/14/2004	0.81	±	1.76	3.01	±	6.52	
		01/21/2004	-2.35	±	1.58	-8.69	±	5.85	
		01/28/2004	2.68	±	2.14	9.92	±	7.92	
		02/04/2004	-0.79	±	1.65	-2.93	±	6.12	
		02/11/2004	-1.86	±	2.11	-6.88	±	7.79	
		02/18/2004	1.87	±	1.44	6.92	±	5.32	
		02/25/2004	-0.59	±	1.15	-2.20	±	4.26	
		03/03/2004	-2.41	±	1.63	-8.93	±	6.02	
		03/10/2004	-0.14	±	1.75	-0.51	±	6.47	
		03/17/2004	1.06	±	1.34	3.93	±	4.94	
		03/24/2004	-1.38	±	1.54	-5.10	±	5.68	
		03/31/2004	1.12	±	1.44	4.16	±	5.31	
	MONTEVIEW	01/07/2004	-3.31	±	1.26	-12.23	±	4.67	
		01/14/2004	0.76	±	1.66	2.83	±	6.14	
		01/21/2004	-2.39	±	1.61	-8.84	±	5.95	
		01/28/2004	2.48	±	1.98	9.17	±	7.33	
		02/04/2004	-0.74	±	1.54	-2.73	±	5.70	
		02/11/2004	-1.73	±	1.96	-6.41	±	7.27	
		02/18/2004	1.89	±	1.45	6.99	±	5.37	
		02/25/2004	-0.60	±	1.16	-2.21	±	4.28	
		03/03/2004	-2.41	±	1.63	-8.93	±	6.02	
		03/10/2004	-0.14	±	1.75	-0.51	±	6.47	
		03/17/2004	0.51	±	1.41	1.88	±	5.22	
		03/24/2004	-1.45	±	1.62	-5.38	±	5.99	
		03/31/2004	0.99	±	1.26	3.66	±	4.68	

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

Location	Sampling Group		Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
	MUD LAKE		01/07/2004	-3.28	±	1.25	-12.13	±	4.63	
			01/14/2004	0.83	±	1.80	3.07	±	6.65	
			01/21/2004	-4.20	±	2.83	-15.56	±	10.47	
			01/28/2004	2.82	±	2.25	10.43	±	8.33	
		b.	02/04/2004	-2.43	±	5.08	-8.98	±	18.78	
			02/11/2004	-2.11	±	2.39	-7.81	±	8.85	
		c.	02/18/2004	6.53	±	5.02	24.17	±	18.57	
			02/25/2004	-0.70	±	1.35	-2.57	±	4.99	
			03/03/2004	-2.59	±	1.74	-9.57	±	6.45	
			03/10/2004	-0.15	±	1.87	-0.54	±	6.90	
			03/17/2004	1.07	±	1.34	3.94	±	4.96	
			03/24/2004	-1.24	±	1.38	-4.59	±	5.12	
			03/31/2004	1.04	±	1.33	3.85	±	4.92	
	MUD LAKE (Q/A-2)		01/07/2004	-3.02	±	1.15	-11.16	±	4.26	
			01/14/2004	0.78	±	1.69	2.87	±	6.24	
			01/21/2004	-2.23	±	1.50	-8.27	±	5.57	
			01/28/2004	2.64	±	2.11	9.79	±	7.82	
			02/04/2004	-0.74	±	1.55	-2.74	±	5.73	
			02/11/2004	-1.77	±	2.00	-6.54	±	7.42	
			02/18/2004	1.87	±	1.44	6.91	±	5.31	
			02/25/2004	-0.65	±	1.25	-2.39	±	4.63	
			03/03/2004	-2.54	±	1.71	-9.41	±	6.34	
			03/10/2004	-0.15	±	1.86	-0.54	±	6.88	
			03/17/2004	0.52	±	1.44	1.92	±	5.33	
			03/24/2004	-1.35	±	1.51	-5.00	±	5.58	
			03/31/2004	0.99	±	1.26	3.65	±	4.66	
	MUD LAKE AVERAGE		01/07/2004	-3.14	±	1.69	-11.63	±	6.27	
			01/14/2004	0.80	±	2.46	2.97	±	9.10	
			01/21/2004	-2.92	±	2.78	-10.80	±	10.28	
			01/28/2004	2.73	±	3.08	10.10	±	11.40	
			02/04/2004	-0.74	±	1.55	-2.74	±	5.73	
			02/11/2004	-1.92	±	3.08	-7.12	±	11.41	
			02/18/2004	1.87	±	1.44	6.91	±	5.31	
			02/25/2004	-0.67	±	1.84	-2.48	±	6.80	
			03/03/2004	-2.56	±	2.45	-9.49	±	9.05	
			03/10/2004	-0.15	±	2.63	-0.54	±	9.74	
			03/17/2004	0.79	±	1.97	2.93	±	7.28	
			03/24/2004	-1.29	±	2.04	-4.79	±	7.55	
			03/31/2004	1.01	±	1.83	3.75	±	6.77	

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

Location	Sampling Group	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
DISTANT									
	BLACKFOOT	01/07/2004	-0.13	±	2.41	-0.49	±	8.93	
		01/14/2004	1.35	±	3.16	4.99	±	11.71	
		01/21/2004	1.45	±	3.00	5.36	±	11.12	
		01/28/2004	0.64	±	1.56	2.36	±	5.79	
		02/04/2004	0.94	±	2.26	3.47	±	8.35	
		02/11/2004	-0.63	±	2.08	-2.34	±	7.70	
		02/18/2004	0.49	±	2.15	1.80	±	7.97	
		02/25/2004	0.58	±	1.34	2.14	±	4.95	
		03/03/2004	4.49	±	2.22	16.60	±	8.21	
		03/10/2004	2.49	±	2.06	9.22	±	7.63	
		03/17/2004	1.15	±	1.83	4.26	±	6.78	
		03/24/2004	-0.05	±	1.32	-0.20	±	4.90	
		03/31/2004	-1.76	±	1.64	-6.52	±	6.07	
	BLACKFOOT (Q/A-1)	01/07/2004	-0.19	±	3.44	-0.70	±	12.72	
		01/14/2004	1.53	±	3.60	5.67	±	13.31	
		01/21/2004	1.95	±	4.05	7.22	±	14.98	
		01/28/2004	0.75	±	1.85	2.79	±	6.85	
		02/04/2004	1.31	±	3.15	4.84	±	11.64	
		02/11/2004	-0.81	±	2.65	-2.98	±	9.80	
		02/18/2004	0.53	±	2.36	1.98	±	8.74	
		02/25/2004	0.63	±	1.45	2.32	±	5.37	
		03/03/2004	6.22	±	3.08	23.02	±	11.39	
		03/10/2004	3.21	±	2.66	11.89	±	9.84	
		03/17/2004	2.65	±	2.74	9.80	±	10.14	
		03/24/2004	-0.08	±	2.04	-0.31	±	7.56	
		03/31/2004	-2.06	±	1.92	-7.61	±	7.09	
	BLACKFOOT AVERAGE	01/07/2004	-0.16	±	4.01	-0.58	±	14.84	
		01/14/2004	1.44	±	4.76	5.31	±	17.61	
		01/21/2004	1.66	±	4.88	6.15	±	18.05	
		01/28/2004	0.69	±	2.40	2.56	±	8.88	
		02/04/2004	1.09	±	3.72	4.04	±	13.75	
		02/11/2004	-0.71	±	3.30	-2.62	±	12.20	
		02/18/2004	0.51	±	3.19	1.88	±	11.79	
		02/25/2004	0.60	±	1.97	2.23	±	7.28	
		03/03/2004	5.21	±	3.65	19.29	±	13.49	
		03/10/2004	2.81	±	3.28	10.39	±	12.15	
		03/17/2004	1.78	±	3.13	6.58	±	11.58	
		03/24/2004	-0.07	±	2.27	-0.24	±	8.41	
		03/31/2004	-1.90	±	2.50	-7.02	±	9.25	

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

Location	Sampling Group		Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
	CRATERS		01/07/2004	-0.15	±	2.71	-0.55	±	10.03	
			01/14/2004	1.46	±	3.42	5.39	±	12.64	
			01/21/2004	1.48	±	3.07	5.48	±	11.37	
			01/28/2004	0.66	±	1.63	2.45	±	6.01	
			02/04/2004	1.20	±	2.90	4.46	±	10.72	
			02/11/2004	-0.79	±	2.59	-2.91	±	9.57	
			02/18/2004	0.55	±	2.42	2.02	±	8.94	
			02/25/2004	0.72	±	1.67	2.67	±	6.17	
			03/03/2004	5.81	±	2.87	21.50	±	10.64	
			03/10/2004	2.97	±	2.46	10.99	±	9.09	
			03/17/2004	1.49	±	2.37	5.52	±	8.78	
			03/24/2004	-0.08	±	1.84	-0.28	±	6.81	
			03/31/2004	-2.33	±	2.18	-8.64	±	8.05	
	DUBOIS		01/07/2004	-3.66	±	1.40	-13.56	±	5.17	
			01/14/2004	0.86	±	1.86	3.17	±	6.88	
			01/21/2004	-2.57	±	1.73	-9.51	±	6.40	
			01/28/2004	2.71	±	2.16	10.01	±	8.00	
			02/04/2004	-0.77	±	1.60	-2.84	±	5.93	
			02/11/2004	-2.17	±	2.46	-8.04	±	9.11	
			02/18/2004	1.98	±	1.52	7.31	±	5.62	
			02/25/2004	-0.68	±	1.32	-2.52	±	4.88	
			03/03/2004	-3.37	±	2.27	-12.45	±	8.40	
			03/10/2004	-0.14	±	1.72	-0.50	±	6.37	
			03/17/2004	1.06	±	1.34	3.94	±	4.96	
			03/24/2004	-1.41	±	1.58	-5.23	±	5.83	
			03/31/2004	1.15	±	1.47	4.25	±	5.42	
	IDAHO FALLS		01/07/2004	-3.99	±	1.52	-14.75	±	5.63	
			01/14/2004	0.91	±	1.96	3.35	±	7.26	
			01/21/2004	-3.60	±	2.42	-13.32	±	8.96	
			01/28/2004	3.32	±	2.65	12.28	±	9.81	
			02/04/2004	-0.82	±	1.71	-3.03	±	6.33	
			02/11/2004	-1.98	±	2.25	-7.34	±	8.32	
			02/18/2004	2.15	±	1.65	7.96	±	6.12	
			02/25/2004	-0.70	±	1.36	-2.60	±	5.04	
		d.	03/03/2004	24.42	±	-16.46	90.34	±	-60.91	
			03/10/2004	-0.15	±	1.96	-0.57	±	7.25	
			03/17/2004	1.11	±	1.40	4.12	±	5.19	
			03/24/2004	-1.47	±	1.63	-5.42	±	6.05	
			03/31/2004	1.20	±	1.54	4.46	±	5.69	

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

Location	Sampling Group	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
	JACKSON	01/07/2004	-0.15	±	2.69	-0.55	±	9.97	
		01/14/2004	1.56	±	3.65	5.76	±	13.51	
		01/21/2004	2.10	±	4.35	7.76	±	16.09	
		01/28/2004	0.69	±	1.70	2.57	±	6.29	
		02/04/2004	1.32	±	3.18	4.90	±	11.78	
		02/11/2004	-0.83	±	2.74	-3.09	±	10.15	
		02/18/2004	0.59	±	2.59	2.16	±	9.58	
		02/25/2004	0.70	±	1.61	2.58	±	5.96	
		03/03/2004	5.88	±	2.91	21.75	±	10.76	
		03/10/2004	2.86	±	2.37	10.60	±	8.77	
		03/17/2004	1.49	±	2.37	5.52	±	8.77	
		03/24/2004	-0.07	±	1.65	-0.25	±	6.12	
		03/31/2004	-2.21	±	2.06	-8.19	±	7.63	
	REXBURG CMS	01/07/2004	-4.36	±	1.66	-16.15	±	6.16	
		01/14/2004	1.07	±	2.33	3.97	±	8.61	
		01/21/2004	-2.73	±	1.84	-10.09	±	6.79	
		01/28/2004	3.35	±	2.67	12.39	±	9.89	
		02/04/2004	-0.84	±	1.75	-3.09	±	6.46	
		02/11/2004	-2.06	±	2.34	-7.63	±	8.65	
		02/18/2004	2.28	±	1.75	8.43	±	6.47	
		02/25/2004	-0.75	±	1.46	-2.79	±	5.41	
		03/03/2004	-2.64	±	1.78	-9.77	±	6.59	
		03/10/2004	-0.16	±	1.98	-0.58	±	7.32	
		03/17/2004	0.55	±	1.53	2.04	±	5.66	
		03/24/2004	-1.47	±	1.63	-5.43	±	6.05	
		03/31/2004	1.04	±	1.33	3.86	±	4.93	
INEEL									
	EFS	01/07/2004	-0.19	±	3.48	-0.71	±	12.88	
		01/14/2004	1.34	±	3.14	4.95	±	11.61	
		01/21/2004	1.39	±	2.89	5.16	±	10.70	
		01/28/2004	0.58	±	1.42	2.14	±	5.26	
		02/04/2004	1.35	±	3.24	4.98	±	11.97	
		02/11/2004	-0.72	±	2.37	-2.67	±	8.78	
		02/18/2004	0.49	±	2.17	1.82	±	8.04	
		02/25/2004	0.70	±	1.63	2.61	±	6.02	
		03/03/2004	6.00	±	2.97	22.20	±	10.98	
		03/10/2004	2.98	±	2.47	11.04	±	9.14	
		03/17/2004	2.45	±	2.53	9.06	±	9.37	
		03/24/2004	-0.09	±	2.20	-0.33	±	8.13	
		03/31/2004	-2.56	±	2.39	-9.47	±	8.83	

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

Location	Sampling Group	Sampling Date	Result ± 1s Uncertainty			Result ± 1s Uncertainty x 10^{-11} Bq/mL			Result > 3s
	MAIN GATE	01/07/2004	-0.18	±	3.23	-0.66	±	11.95	
		01/14/2004	1.68	±	3.94	6.21	±	14.57	
		01/21/2004	1.70	±	3.53	6.30	±	13.07	
		01/28/2004	0.59	±	1.45	2.18	±	5.36	
		02/04/2004	1.44	±	3.47	5.34	±	12.85	
		02/11/2004	-0.89	±	2.93	-3.30	±	10.85	
		02/18/2004	0.63	±	2.77	2.32	±	10.27	
		02/25/2004	0.84	±	1.94	3.10	±	7.16	
		03/03/2004	7.15	±	3.54	26.46	±	13.09	
		03/10/2004	4.28	±	3.54	15.84	±	13.10	
		03/17/2004	1.59	±	2.52	5.87	±	9.34	
		03/24/2004	-0.10	±	2.38	-0.36	±	8.81	
		03/31/2004	-2.91	±	2.71	-10.76	±	10.03	
	VAN BUREN	01/07/2004	-0.17	±	3.09	-0.63	±	11.43	
		01/14/2004	1.32	±	3.10	4.89	±	11.46	
		01/21/2004	1.14	±	2.37	4.23	±	8.78	
		01/28/2004	0.59	±	1.45	2.19	±	5.38	
		02/04/2004	1.12	±	2.71	4.16	±	10.01	
		02/11/2004	-0.70	±	2.29	-2.57	±	8.47	
		02/18/2004	0.50	±	2.19	1.83	±	8.10	
		02/25/2004	0.62	±	1.42	2.28	±	5.27	
		03/03/2004	5.35	±	2.65	19.79	±	9.79	
		03/10/2004	2.60	±	2.15	9.63	±	7.97	
		03/17/2004	1.51	±	2.40	5.58	±	8.88	
		03/24/2004	-0.07	±	1.61	-0.24	±	5.97	
		03/31/2004	-1.95	±	1.82	-7.23	±	6.74	

Red text denotes invalid sample.

a 01/07/2004 Atomic City invalid due to equipment failure associated with snow filling the enclosure.
b 02/04/2004 Mud Lake invalid due to a blown fuse.
c 02/18/2004 Mud Lake invalid due to a blown fuse.
d 03/03/2004 Idaho Falls invalid due to equipment failure resulting in a lost filter.

TABLE C-3: Quarterly Americium-241, Cesium-137, Plutonium-238, Plutonium-239/40, Strontium-90 Concentrations in Composited Air Filters

Sample Group and Location	Collect Date	Analyte	Result ± 1s Uncertainty x 10^{-18} µCi/mL			Result ± 1s Uncertainty x 10^{-14} Bq/mL			Result > 3s
BOUNDARY									
ARCO	04/15/2004	AMERICIUM-241	-5.62	±	-56.20	-20.79	±	-207.94	
	04/15/2004	CESIUM-137	-7.75	±	12.30	-28.68	±	45.51	
	04/15/2004	PLUTONIUM-238	-10.40	±	-104.00	-38.48	±	-384.80	
	04/15/2004	PLUTONIUM-239/40	10.30	±	103.00	38.11	±	381.10	
ATOMIC CITY									
	04/15/2004	AMERICIUM-241	5.74	±	57.40	21.24	±	212.38	
	04/15/2004	CESIUM-137	8.15	±	9.25	30.16	±	34.23	
	04/15/2004	PLUTONIUM-238	0.00	±	0.00	0.00	±	0.00	
	04/15/2004	PLUTONIUM-239/40	-5.59	±	-55.90	-20.68	±	-206.83	
BLUE DOME									
	04/15/2004	AMERICIUM-241	9.06	±	90.60	33.52	±	335.22	
	04/15/2004	CESIUM-137	0.43	±	21.80	1.59	±	80.66	
	04/15/2004	PLUTONIUM-238	2.41	±	24.10	8.92	±	89.17	
	04/15/2004	PLUTONIUM-239/40	4.80	±	48.00	17.76	±	177.60	
FAA TOWER									
	04/15/2004	CESIUM-137	-14.30	±	14.00	-52.91	±	51.80	
	04/15/2004	STRONTIUM-90	2.28	±	1.70	8.44	±	6.29	
HOWE									
	04/15/2004	CESIUM-137	-0.19	±	7.55	-0.71	±	27.94	
	04/15/2004	STRONTIUM-90	2.04	±	1.00	7.55	±	3.70	
MONTEVIEW									
	04/15/2004	CESIUM-137	17.90	±	10.00	66.23	±	37.00	
	04/15/2004	STRONTIUM-90	2.43	±	1.20	8.99	±	4.44	
MUD LAKE									
	04/15/2004	AMERICIUM-241	8.99	±	89.90	33.26	±	332.63	
	04/15/2004	CESIUM-137	7.94	±	12.30	29.38	±	45.51	
	04/15/2004	PLUTONIUM-238	0.00	±	-0.01	0.00	±	-0.03	
	04/15/2004	PLUTONIUM-239/40	3.46	±	34.60	12.80	±	128.02	
MUD LAKE (Q/A-2)									
	04/15/2004	AMERICIUM-241	19.10	±	191.00	70.67	±	706.70	
	04/15/2004	CESIUM-137	-5.79	±	10.40	-21.42	±	38.48	
	04/15/2004	PLUTONIUM-238	-13.80	±	-138.00	-51.06	±	-510.60	
	04/15/2004	PLUTONIUM-239/40	9.15	±	91.50	33.86	±	338.55	

TABLE C-3: Quarterly Americium-241, Cesium-137, Plutonium-238, Plutonium-239/40, Strontium-90 Concentrations in Composited Air Filters

Sample Group and Location	Collect Date	Analyte	Result ± 1s Uncertainty x 10^{-18} µCi/mL			Result ± 1s Uncertainty x 10^{-14} Bq/mL			Result > 3s
BOUNDARY									
DISTANT									
BLACKFOOT CMS									
	04/15/2004	AMERICIUM-241	5.37	±	53.70	19.87	±	198.69	
	04/15/2004	CESIUM-137	5.80	±	7.19	21.46	±	26.60	
	04/15/2004	PLUTONIUM-238	0.00	±	0.00	0.00	±	0.00	
	04/15/2004	PLUTONIUM-239/40	16.00	±	160.00	59.20	±	592.00	
BLACKFOOT (Q/A-1)									
	04/15/2004	AMERICIUM-241	6.28	±	62.80	23.24	±	232.36	
	04/15/2004	CESIUM-137	-5.33	±	9.65	-19.72	±	35.71	
	04/15/2004	PLUTONIUM-238	0.00	±	0.00	0.00	±	0.00	
	04/15/2004	PLUTONIUM-239/40	16.10	±	161.00	59.57	±	595.70	
CRATERS									
	04/15/2004	CESIUM-137	6.47	±	12.60	23.94	±	46.62	
	04/15/2004	STRONTIUM-90	3.66	±	1.30	13.54	±	4.81	
DUBOIS									
	04/15/2004	AMERICIUM-241	14.30	±	143.00	52.91	±	529.10	
	04/15/2004	CESIUM-137	-2.59	±	11.60	-9.58	±	42.92	
	04/15/2004	PLUTONIUM-238	-5.91	±	-59.10	-21.87	±	-218.67	
	04/15/2004	PLUTONIUM-239/40	8.84	±	88.40	32.71	±	327.08	
IDAHO FALLS									
	04/15/2004	CESIUM-137	35.00	±	12.90	129.50	±	47.73	
	04/15/2004	STRONTIUM-90	2.92	±	1.30	10.80	±	4.81	
JACKSON									
	04/15/2004	AMERICIUM-241	8.64	±	86.40	31.97	±	319.68	
	04/15/2004	CESIUM-137	13.00	±	12.80	48.10	±	47.36	
	04/15/2004	PLUTONIUM-238	-3.17	±	-31.70	-11.73	±	-117.29	
	04/15/2004	PLUTONIUM-239/40	19.00	±	190.00	70.30	±	703.00	
REXBURG CMS									
	04/15/2004	CESIUM-137	4.42	±	8.98	16.35	±	33.23	
	04/15/2004	STRONTIUM-90	2.89	±	1.30	10.69	±	4.81	

TABLE C-3: Quarterly Americium-241, Cesium-137, Plutonium-238, Plutonium-239/40, Strontium-90 Concentrations in Composited Air Filters

Sample Group and Location	Collect Date	Analyte	Result ± 1s Uncertainty x 10^{-18} µCi/mL			Result ± 1s Uncertainty x 10^{-14} Bq/mL			Result > 3s
BOUNDARY									
INEEL									
EFS									
	04/15/2004	CESIUM-137	-26.40	±	26.20	6.44	±	96.94	
	04/15/2004	STRONTIUM-90	1.74	±	1.70	38.11	±	6.29	
MAIN GATE									
	04/15/2004	AMERICIUM-241	10.30	±	103.00	-66.23	±	381.10	
	04/15/2004	CESIUM-137	-17.90	±	14.90	11.62	±	55.13	
	04/15/2004	PLUTONIUM-238	3.14	±	31.40	81.03	±	116.18	
	04/15/2004	PLUTONIUM-239/40	21.90	±	219.00	-73.63	±	810.30	
VAN BUREN									
	04/15/2004	CESIUM-137	-19.90	±	23.80	5.18	±	88.06	
	04/15/2004	STRONTIUM-90	1.40	±	1.20	0.00	±	4.44	

TABLE C-4: Tritium Concentrations in Atmospheric Moisture.

Location	Start Date	Collect Date	Result ± 1s Uncertainty x 10^{-13} µCi/mL			Result ± 1s Uncertainty x 10^{-9} Bq/mL			Collection Medium	Result > 3s
ATOMIC CITY										
	01/28/2004	03/17/2004	2.13	±	0.65	7.90	±	2.42	Molecular Sieve	Y
	01/21/2004	03/17/2004	4.36	±	1.27	16.14	±	4.70	Silica Gel	Y
BLACKFOOT										
	01/28/2004	03/17/2004	0.84	±	0.68	3.12	±	2.51	Molecular Sieve	
	02/11/2004	03/25/2004	1.03	±	2.05	3.79	±	7.60	Silica Gel	
IDAHO FALLS										
	01/13/2004	03/08/2004	1.56	±	0.60	5.77	±	2.23	Molecular Sieve	
	01/20/2004	03/11/2004	0.68	±	1.35	2.50	±	5.01	Silica Gel	
REXBURG										
	01/16/2004	03/22/2004	0.55	±	1.10	2.05	±	4.09	Silica Gel	

TABLE C-5: PM_{10} Concentrations at Atomic City, Blackfoot CMS and Rexburg CMS.

Location	Sampling Date	Concentration ($\mu g/m_3$)
ATOMIC CITY		
	01/03/2004	1.68
	01/09/2004	0.00
	01/15/2004	26.40
	01/21/2004	5.03
	01/27/2004	2.48
	02/02/2004	4.77
	02/08/2004	3.45
	02/14/2004	3.51
	02/20/2004	1.72
	02/26/2004	1.17
	03/03/2004	2.04
	03/09/2004	10.02
	03/15/2004	2.90
	03/21/2004	10.91
	03/27/2004	4.43
BLACKFOOT CMS		
	01/03/2004	9.84
	01/09/2004	20.88
	01/15/2004	37.51
	01/21/2004	7.95
	01/27/2004	21.42
	02/02/2004	7.31
	02/08/2004	3.42
	02/14/2004	26.79
	02/20/2004	8.43
	02/26/2004	2.41
	03/03/2004	8.51
	03/09/2004	19.83
	03/15/2004	10.85
	03/21/2004	19.99
	03/27/2004	3.01
REXBURG CMS		
	01/03/2004	11.76
	01/09/2004	18.14
	01/15/2004	38.41
	01/21/2004	14.03
	01/27/2004	7.29
	02/02/2004	10.34
	02/08/2004	3.88
	02/14/2004	31.72
	02/20/2004	32.21
	02/26/2004	2.17
	03/03/2004	11.31
	03/09/2004	47.58
	03/15/2004	7.77
	03/21/2004	15.47
	03/27/2004	1.91

TABLE C-6: Tritium Concentrations in Precipitation.

Location	Start Date	End Date	Concentration Result ± 1s Uncertainty (pCi/L)			Concentration Result ± 1s Uncertainty (Bq/L)			Result > 3s
CFA									
	12/29/2003	2/2/2004	191.00	±	55.70	7.07	±	2.06	Y
	2/2/2004	2/29/2004	155.00	±	58.20	5.74	±	2.15	
	12/29/2003	2/2/2004	98.50	±	58.50	3.64		2.16	
EFS									
	12/31/2003	1/7/2004	33.10	±	25.00	1.22	±	0.93	
	1/7/2004	1/14/2004	33.40	±	25.00	1.24	±	0.93	
	1/28/2004	2/4/2004	-6.41	±	24.00	-0.24	±	0.89	
	2/4/2004	2/11/2004	146.00	±	56.30	5.40	±	2.08	
	2/11/2004	2/18/2004	124.00	±	56.20	4.59	±	2.08	
	2/25/2004	3/3/2004	58.70	±	25.40	2.17	±	0.94	
IDAHO FALLS									
	2/5/2004	2/29/2004	3.83	±	24.10	0.14	±	0.89	
	2/5/2004	2/29/2004	-0.75	±	24.00	-0.03	±	0.89	
	1/15/2004	2/5/2004	166.00	±	55.60	6.14	±	2.06	

TABLE C-7: Cesium-137 and Iodine-131 Concentrations in Milk.

Location	Sampling Date	Iodine-131 Result ± 1s Uncertainty (pCi/L)			Iodine-131 Result ± 1s Uncertainty (Bq/L)			Cesium-137 Result ± 1s Uncertainty (pCi/L)			Cesium-137 Result ± 1s Uncertainty (Bq/L)		
BLACKFOOT													
	01/05/2004	2.13	±	1.80	0.079	±	0.067	1.30	±	1.32	0.048	±	0.049
	02/03/2004	-1.60	±	1.57	-0.059	±	0.058	0.34	±	1.43	0.013	±	0.053
	03/02/2004	-2.14	±	1.94	-0.079	±	0.072	4.46	±	1.25	0.165	±	0.046
CAREY													
	01/05/2004	-1.63	±	1.06	-0.060	±	0.039	0.78	±	0.96	0.029	±	0.036
	02/03/2004	-1.24	±	0.73	-0.046	±	0.027	0.34	±	0.99	0.013	±	0.037
	03/02/2004	0.30	±	1.73	0.011	±	0.064	0.14	±	2.13	0.005	±	0.079
DIETRICH													
	01/05/2004	-0.08	±	0.79	-0.003	±	0.029	1.45	±	0.96	0.054	±	0.036
	02/03/2004	1.94	±	1.73	0.072	±	0.064	3.01	±	2.91	0.111	±	0.108
	03/02/2004	-0.74	±	0.78	-0.028	±	0.029	-1.60	±	0.94	-0.059	±	0.035
HOWE													
	01/05/2004	1.52	±	1.41	0.056	±	0.052	-2.55	±	2.18	-0.094	±	0.081
	02/03/2004	1.03	±	1.51	0.038	±	0.056	-2.37	±	2.18	-0.088	±	0.081
	03/02/2004	-1.18	±	2.13	-0.044	±	0.079	2.07	±	1.37	0.077	±	0.051
IDAHO FALLS													
	01/05/2004	-3.35	±	2.18	-0.124	±	0.081	-1.16	±	2.96	-0.043	±	0.110
	01/14/2004	0.12	±	1.27	0.004	±	0.047	-1.29	±	2.15	-0.048	±	0.080
	01/21/2004	-0.01	±	1.26	0.000	±	0.047	-1.95	±	2.18	-0.072	±	0.081
	01/28/2004	1.14	±	1.19	0.042	±	0.044	-1.55	±	2.2	-0.057	±	0.081
	02/03/2004	1.88	±	1.37	0.070	±	0.051	-2.63	±	2.2	-0.097	±	0.081
	02/11/2004	-1.66	±	1.20	-0.061	±	0.044	-0.68	±	2.20	-0.025	±	0.081
	02/18/2004	-1.12	±	1.27	-0.041	±	0.047	-2.37	±	2.18	-0.088	±	0.081
	02/25/2004	0.12	±	1.60	0.004	±	0.059	2.10	±	2.15	0.078	±	0.080
	03/02/2004	-0.61	±	1.04	-0.023	±	0.039	0.12	±	0.90	0.004	±	0.033
	03/10/2004	-3.45	±	1.92	-0.128	±	0.071	-2.19	±	2.95	-0.081	±	0.109
	03/17/2004	0.51	±	1.01	0.019	±	0.037	0.30	±	0.82	0.011	±	0.030
	03/24/2004	-0.57	±	0.96	-0.021	±	0.035	0.00	±	0.87	0.000	±	0.032
	03/31/2004	2.50	±	0.95	0.093	±	0.035	-0.18	±	0.86	-0.007	±	0.032

TABLE C-7: Cesium-137 and Iodine-131 Concentrations in Milk.

Location	Sampling Date	Iodine-131 Result ± 1s Uncertainty (pCi/L)	Iodine-131 Result ± 1s Uncertainty (Bq/L)	Cesium-137 Result ± 1s Uncertainty (pCi/L)	Cesium-137 Result ± 1s Uncertainty (Bq/L)
MORELAND					
	01/05/2004	-0.96 ± 0.81	-0.036 ± 0.030	5.77 ± 2.82	0.214 ± 0.104
	02/03/2004	-0.09 ± 0.95	-0.003 ± 0.035	-0.46 ± 0.97	-0.017 ± 0.036
	03/02/2004	-1.10 ± 0.97	-0.041 ± 0.036	1.86 ± 0.88	0.069 ± 0.032
ROBERTS				±	
	01/06/2004	2.04 ± 2.14	0.076 ± 0.079	-2.39 ± 2.17	-0.089 ± 0.080
	02/03/2004	0.81 ± 1.23	0.030 ± 0.046	0.00 ± 2.14	0.000 ± 0.079
	03/02/2004	2.89 ± 2.05	0.107 ± 0.076	-2.38 ± 2.19	-0.088 ± 0.081
RUPERT					
	01/05/2004	-0.16 ± 0.79	-0.006 ± 0.029	0.96 ± 0.98	0.036 ± 0.036
	02/03/2004	-0.02 ± 1.02	-0.001 ± 0.038	0.38 ± 0.97	0.014 ± 0.036
Duplicate	03/02/2004	-4.19 ± 1.77	-0.155 ± 0.066	1.41 ± 1.41	0.052 ± 0.052
	03/02/2004	1.09 ± 1.80	0.040 ± 0.067	-2.05 ± 1.41	-0.076 ± 0.052
TERRETON					
	01/05/2004	-0.40 ± 1.67	-0.015 ± 0.062	0.86 ± 1.41	0.032 ± 0.052
	02/03/2004	0.00 ± 1.67	0.000 ± 0.062	-1.57 ± 1.43	-0.058 ± 0.053
Duplicate	03/02/2004	0.83 ± 0.86	0.031 ± 0.032	0.29 ± 0.92	0.011 ± 0.034
	03/02/2004	-1.43 ± 2.25	-0.053 ± 0.083	1.44 ± 3.06	0.053 ±

APPENDIX D

STATISTICAL ANALYSIS RESULTS

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TABLE D-1 Kruskal-Wallis[a] statistical results between INEEL, Boundary, and Distant LV air sample groups by quarter and by month.

Parameter	p[b]
Gross Alpha	
Quarter	0.76
January	0.99
February	0.67
March	1.00
Gross Beta	
Quarter	0.35
January	0.87
February	0.89
March	1.00

a. See the Determining Statistical Differences of the Helpful Information section for details on the Kruskal-Wallis test.

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

TABLE D-2 Statistical difference in weekly LV air sample gross alpha concentrations measured at Boundary and Distant locations.

Mann-Whitney U Test[a]		
Parameter	**Week**	**p[b]**
GROSS ALPHA		
	January 7th	0.63
	January 14th	0.69
	January 21st	0.78
	January 28th	0.39
	February 4th	0.57
	February 11th	0.20
	February 18th	0.95
	February 25th	0.27
	March 3rd	0.29
	March 10th	0.86
	March 17th	0.86
	March 24th	0.27
	March 31st	0.86
GROSS BETA		
	January 7th	0.30
	January 14th	0.39
	January 21st	0.48
	January 28th	0.20
	February 4th	0.05
	February 11th	0.78
	February 18th	0.38
	February 25th	0.55
	March 3rd	0.17
	March 10th	1.00
	March 17th	1.00
	March 24th	0.72
	March 31st	0.27

a. See the Determining Statistical Differences of the Helpful Information section for details on the Mann Whitney U test.

b. A 'p' value greater than 0.05 signifies no statistical difference between data groups. Red text indicates dates with significant statistically differences.