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Idaho National Engineering and Environmental Laboratory Offsite Environmental Surveillance Program Report: Fourth Quarter 2002

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EXECUTIVE SUMMARY

None of the radionuclides detected in any of the samples collected during the fourth quarter of 2002 could be directly linked with INEEL activities. Levels of detected radionuclides were no different than values measured at other locations across the United States or were consistent with levels measured historically at the 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 ES-1.)

This report for the fourth quarter, 2002, 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, October 1 through December 31, 2002. All sample types (media) and the sampling schedule followed during 2002 are listed in Appendix A. Specifically, this report contains the results for the following:

- Air sampling, including air filters and charcoal cartridges, atmospheric moisture, and 10-micron particulate matter (PM_{10}) (Section 3);
- Water sampling, including collection of precipitation and drinking and surface water samples (Section 4);
- Agricultural product sampling, including milk and potatoes, and wildlife samples including waterfowl and large game animals (Section 5); and
- Environmental radiation measurements (Section 6).

Gross alpha and gross beta measurements are used as general indicators of the presence of alpha-emitting and beta-emitting radionuclides in air. Gross alpha and gross beta results were found to have no discernable statistical distribution during the fourth quarter of 2002. Because of this, these data were statistically analyzed using nonparametric methods, including the use of the median to represent central tendency. At no time during the fourth quarter were gross alpha concentrations from Boundary locations statistically higher than corresponding data sets for Distant locations, as one would expect if the INEEL were a significant source of radionuclide contamination. There were no statistical differences between gross alpha or gross beta results when grouped by location on a quarterly or monthly basis. No statistical gross alpha differences were noted in weekly analyses of Boundary and Distant locations. Gross beta concentrations measured at Boundary locations were statistically greater than those measured at Distant locations during the weeks of November 13, November 20, and December 3 and 17, 2002. Additional investigation on a weekly basis concluded that the Mud Lake sample was much higher than the other locations. The values during these weeks were still within the range of historical levels, and are attributed to resuspension of particulates from the surrounding recently harvested or fallow fields. Also, the collection week ending on December 3, 2002 was subject to a series of strong temperature inversion conditions, which act to trap radon gas and its progeny.

During the fourth quarter, no iodine-131 (^{131}I) was measured in any cartridge batch above the associated 2s or MDC values.

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). Seven samples collected from air monitoring stations located at the Experimental Field Station (EFS), FAA Tower, Howe and Howe Q/A, Idaho Falls, Monteview, and Van Buren Gate showed at least one human-made radionuclide (^{241}Am, $^{239,240}Pu$, ^{90}Sr or cesium-137 [^{137}Cs]) greater than their related 2s values. All values were within the range of those measured in the past and are likely due to resuspension of particulate fallout from past nuclear weapons testing. All results were far less than their respective DOE Derived Concentration Guide (DCG) values.

Eight atmospheric moisture samples and three duplicates were obtained during the fourth quarter of 2002. Seven samples exceeded their respective 2s values. The maximum value (3.8×10^{-12} μCi/mL of air [1.4×10^{-7} Bq/mL of air]) from these seven sample results was well below the DOE DCG for tritium in air of 1×10^{-7} μCi/mL (3.7×10^{-3} Bq/mL). .

The ESER Program operates three PM_{10} samplers, one each at Rexburg, Blackfoot, and Atomic City. Sampling of PM_{10} is informational as no analyses are conducted for contaminants. PM_{10} concentrations were well below all health standard levels for all samples. The maximum 24-hour concentration was 92.5 μg/m^3 on October 22, 2002, at Atomic City.

Storm events in the fourth quarter of 2002 produced enough precipitation for a total of eight samples and one split – three and a split from Idaho Falls, two from CFA, and three from the EFS. Tritium was detected above the 2s concentration in six samples. 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 screening values. The highest tritium concentration, 212.0 ± 58.7 pCi/L (7.9 ± 2.2 Bq/L), was measured in the split sample collected from CFA on December 12, 2002. This value 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.

Drinking water samples were collected from fourteen locations around the Snake River Plain. Samples are analyzed for gross alpha, gross beta, and tritium. Gross alpha in a single sample from Minidoka was greater than its associated 2s value. All samples exceed their 2s value for gross beta. Six samples exceeded their respective 2s value for tritium. Detections of gross alpha and gross beta are not unusual on the Snake River Plain and are attributable to dissolution of naturally occurring radionuclides into the groundwater as it flows beneath the Plain. The gross alpha detection and tritium measurement were well below the EPA MCLs of 8 pCi/L and 20,000 pCi/L, respectively. The maximum gross beta detection of 8.31 ± 1.05 pCi/l was also below the EPA screening value of 50 pCi/L.

Five surface water samples and a duplicate were collected from various locations near the discharge of the Snake River Plain Aquifer into the Snake River. None of the samples had measurable levels of gross alpha. The Twin Falls sample and duplicate were the only samples to exceed the 2s value for tritium. The maximum concentration was well below the DOE and EPA regulatory limits. All six samples had gross beta concentrations above their 2s value. The maximum concentration of gross beta detected was below the EPA screening concentration of 50 pCi/L. As discussed above for drinking water it is not unusual to detect gross activity in water discharging from groundwater.

Milk samples were collected weekly in Idaho Falls and monthly at nine other locations around the INEEL. All samples were analyzed for gamma emitting radionuclides. None of the samples had ^{137}Cs concentrations above the 2s concentration. Only one sample, from Roberts in October, had detectable ^{131}I. Strontium-90 was measured in four samples above the 2s value. There are no established limits for radionuclides in milk but, for comparison, the EPA limits set for radionuclides in water can be used. The EPA has set the limit for ^{90}Sr in drinking water at 8 pCi/L (0.3 Bq/L). The Safe Drinking Water limit is based on a 4 mrem per year maximum allowable dose and the assumption that two liters per day are consumed. The maximum ^{90}Sr concentrations detected in milk during the fourth quarter were all lower than this limit.

Potatoes were collected from a total of nine local and out-of-state locations in 2002. Samples were analyzed for gamma emitting radionuclides and ^{90}Sr. None of the samples contained measurable ^{90}Sr. Only one sample had measurable ^{137}Cs above the 2s value.

Three large game animals were sampled during the fourth quarter of 2002. All were killed as a result of vehicular collisions. These accidents all involved two mule deer (*Odocoileus hemionus*) and an elk (*Cervus elaphus*). Every effort was made to collect thyroid, liver, and muscle tissue from each animal. However, certain tissues could not be collected from all animals due to their condition at the time of collection. No ^{131}I was measured in any game sample collected during the fourth quarter of 2002. One sample of elk liver tissue contained ^{137}Cs above the 2s uncertainty.

Eleven waterfowl were collected during 2002: two each from the control locations of Mud Lake and Heise, three from the northeast Test Reactor Area (TRA) pond, and four from the TAN pond. All were analyzed for gamma emitting radionuclides with a subset analyzed for ^{90}Sr, ^{238}Pu, $^{239/240}$Pu, and ^{241}Am. Seven waterfowl had measurable levels of at least one radionuclide in edible tissue. Only curium-141 (^{141}Cm), niobium-95 (^{95}Nb) and ^{90}Sr were detected at greater than their respective 2s concentration in the edible portion of three of the waterfowl. The birds came one each from Mud Lake, the NE TRA cold pond, and INEEL TAN, respectively. The maximum potential dose from eating 225 g (8 oz) of meat from ducks collected in 2002 was estimated to be 0.004 mrem. This dose is far less than the 10 mrem per year dose set by EPA and well below the 100 mrem per year regulatory dose limit set by DOE.

Environmental dosimeter locations are divided into Boundary and Distant groupings. Exposure rates measured during the later half of 2002 were similar to those recorded in the past. The boundary exposure rates ranged from 0.28 to 0.37 mR/day. The overall average was 0.33 mR/day. The Distant set ranged from 0.30 to 0.41 mR/day. The average Distant value was also 0.33 mR/day. No statistical difference existed between Boundary and Distant locations.

Table E-1 Summary of results for the fourth quarter of 2002.

Media	Sample Type	Analysis	Results
Air	Filters	Gross alpha, gross beta	Quarterly and monthly statistical comparisons of gross alpha and gross beta data indicate no differences between INEEL, Boundary, and Distant locations. Statistical differences in gross beta results were observed in four weekly analyses between location groups. However, these differences can be attributed to natural variation in the data and to meteorological conditions (i.e., temperature inversions). 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	Quarterly composite samples had measurable levels of ^{241}Am, $^{239/240}Pu$, ^{90}Sr and/or ^{137}Cs in samples collected from seven locations exceeding their 2s values. The results were well below DOE DCGs and within historical measurements.
	Charcoal Cartridge	Iodine-131	Cartridges analyzed for the quarter had no measurable ^{131}I.
	PM10	Particulate matter	No regulatory limits were exceeded for atmospheric particulates.
Atmospheric Moisture	Liquid	Tritium	Seven of eleven atmospheric moisture samples had tritium measured in them above their respective 2s values. No sample result exceeded the DCG for tritium in air.
Precipitation	Liquid	Tritium	Six of nine samples had measurable concentrations of tritium exceeding the 2s value. No samples were above regulatory limits for tritium in drinking water.
Drinking Water	Liquid	Gross alpha, gross beta, and tritium	One sample from Minidoka had gross alpha above its respective 2s value. One sample from Fort Hall had measurable tritium above its respective 2s value. All samples had gross beta above their 2s values. All concentrations were within the range of past detections and below health based limits.
Surface Water	Liquid	Gross alpha, gross beta, and tritium	No gross alpha was measured in any sample. All six samples exceeded their 2s values for gross beta. All concentrations were below the EPA screening value. The sample and duplicate from Twin Falls also had tritium above the 2s value. All concentrations were below regulatory limits for radionuclides in drinking water.

Media	Sample Type	Analysis	Results
Milk	Liquid	Iodine-131, gamma emitting radionuclides (including ^{137}Cs)	No samples had measurable ^{137}Cs during this quarter. Iodine-131 was detected in only one sample from Roberts above the 2s value. Four samples had measurable concentrations of ^{90}Sr greater than their respective 2s values. The concentrations of both ^{131}I and ^{90}Sr were well below regulatory limits for these radionuclides in drinking water.
Potatoes	Solid	Gamma emitting radionuclides (including ^{137}Cs) and ^{90}Sr	No ^{90}Sr was measured in any of the nine samples collected. One sample had a ^{137}Cs concentration above the 2s value.
Game Animals	Tissue	Iodine-131, gamma emitting radionuclides (including ^{137}Cs)	Cesium-137 was reported above the 2s level in one liver sample taken from an elk. All concentrations were within the range of historical values for game animals.
Waterfowl	Tissue	Gamma emitting radionuclides (including ^{137}Cs), select actinides (^{238}Pu, $^{239,240}Pu$, & ^{241}Am) and ^{90}Sr	Seven of eleven waterfowl had measurable concentrations of at least one radionuclide in the edible portion of the sample (muscle, gizzard, liver). No ^{238}Pu was measured in any sample. Of the seven birds with measurable radionuclide concentrations only three (one ^{141}Cm, one ^{95}Nb, and one ^{90}Sr) results were above the 2s value. The dose of 0.006 mrem was estimated from eating the tissue containing both radionuclides.
Environmental Radiation	TLD	Ambient ionizing radiation	Values were consistent with expected exposures given the altitude and location of the TLD's. There were no statistical differences between Boundary and Distant location results.

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LIST OF ABBREVIATIONS

AEC	Atomic Energy Commission
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
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
TAN	Test Area North
TLDs	thermoluminescent dosimeters
TRA	Test Reactor Area
UI	University of Idaho
USGS	United States Geological Survey
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 both inside and outside the boundaries of DOE facilities (DOE 1988). During calendar year 2002, 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 the fourth quarter of 2002 (October1 – December 31, 2002).

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 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 12 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., of Richland WA.

In the event of non-routine occurrences, such as suspected releases of radioactive material, the ESER Program may increase the frequency of sampling and/or the number of sampling locations based on the nature of the release and wind distribution patterns. Any data found to be outside historical norms in the ESER Program is thoroughly investigated to determine if an 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 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 limitations include insufficient sample volume, torn filters, evidence of laboratory cross-contamination or quality control issues. Data that pass initial screening are further evaluated using statistical methods. Statistical tools are necessary for data evaluation particularly since environmental measurements typically involve the determination of minute concentrations, which are difficult to detect and even more difficult to distinguish from other concentrations (i.e., natural background).

The term "measurable" 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. The minimum detectable concentration (MDC) is used to assess measurement process capabilities. The MDC indicates the ability of the laboratory to detect an analyte in a sample at desired concentration levels. The ESER requires that the laboratory be able to detect radionuclides at levels normally expected in environmental samples, as observed historically in the region. These levels are typically well below regulatory limits. The MDC is instrument and analysis specific, and is established by the analytical laboratory at the beginning of each analytical run.

It is the goal of the ESER program to minimize the error of saying something is not present when it actually is, to the extent that is reasonable and practicable. This is accomplished through the use of the uncertainty term, which is reported by the analytical laboratory with the sample result. Results are presented in this report with an analytical uncertainty term, 2s, where "s" is an estimate of the population standard deviation (σ), assuming a Guassian or normal distribution. The result plus or minus ($\pm$) the uncertainty term (2s) represents the 95 confidence interval for the measurement. That is, there is 95 percent confidence that the real concentration in the sample lies somewhere between the measured concentration minus the uncertainty term and the measured concentration plus the uncertainty term. By using a 2s value as a reporting level, the error rate for saying something is not there when it is, is kept to less than 5%. However, there may be a relatively high error rate for false detections (reporting something as present when it actually is not) for results near their 2s uncertainty levels. This is because the variability around the sample result may substantially overlap the variability around a net activity of zero for samples with no radioactivity. Analyses with results in the questionable range (2s to 3s) are thus presented in this report with the understanding that the radionuclide may not actually be present in the sample. If a result exceeds three times its estimated uncertainty (3s), there is confidence that the radionuclide is present in the sample. 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).

2. 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 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 would 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.

3. 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 for the duration of the quarter at all 16 locations using low-volume air samplers. 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 the fourth quarter, 2002 are discussed below. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses and DOE Derived Concentration Guide (DCG) (DOE 1993) values is provided in Appendix B.

LOW-VOLUME AIR SAMPLING

Radioactivity associated with airborne particulates was monitored continuously by 18 low-volume air samplers (two of which are used as replicate samplers) at 16 locations during the fourth quarter of 2002 (Figure 1). 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 Arco (Boundary location) and one at Howe (Boundary location) during 2002. An average of 18,077 ft^3 (512 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.

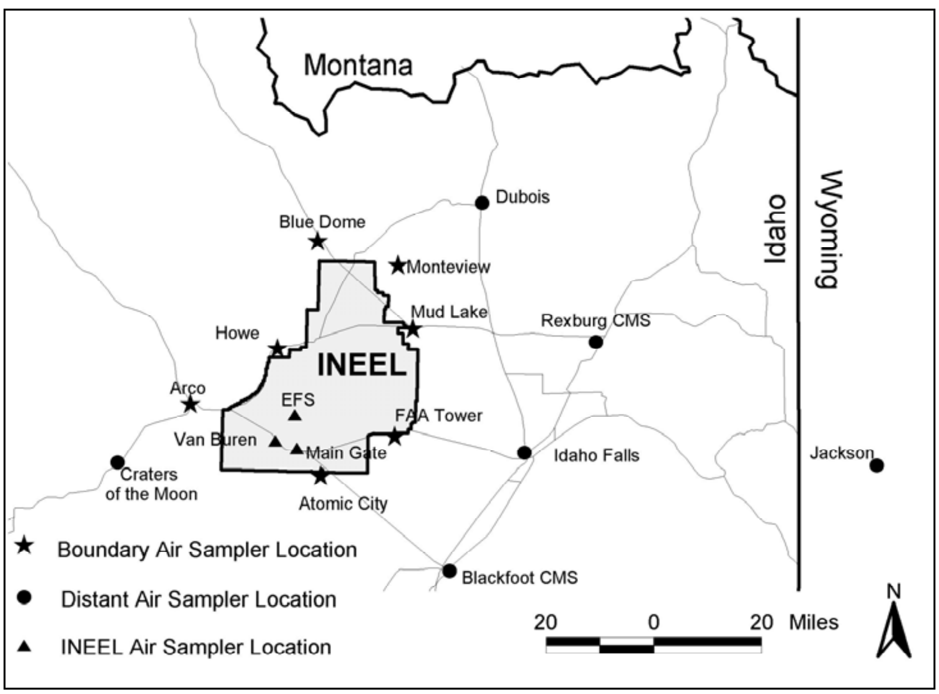

Figure 1. Low-volume air sampler locations.

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

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

Charcoal cartridges were analyzed for gamma-emitting radionuclides, specifically for iodine-131 (^{131}I). Iodine-131 is of particular interest because it is produced in relatively large quantities by nuclear fission, is readily accumulated in human and animal thyroids, and has a half-life of eight days. This means that any elevated level of ^{131}I in the environment could be from a recent release of fission products.

Gross alpha results are reported in Table C-1. Median gross alpha concentrations in air for INEEL, Boundary, and Distant locations for the fourth quarter of 2002 are shown in Figure 2. The data were tested for normality prior to statistical analyses. The data produced a distribution that was strongly right skewed. Taking the natural log of skewed data is often done to evaluate if the data may be log-normally distributed. Using this technique the data were shown to be not log-normally distributed either. Box and whisker plots are commonly used when there is no assumed distribution. Each data group in Figure 2 is presented 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. Note that outliers and extreme values are identified separately from the box and whiskers. Outliers and extreme values are atypical, infrequent, data points that are far from the middle of the data distribution. For this report, outliers are defined as values that are greater than 1.5 times the height of the box, above or below the box. Extreme values are greater than 2 times the height of the box, above or below the box. Outliers and extreme values may reflect inherent variability, may be due to errors associated with transcription or measurement, or may be related to other anomalies. A careful review of the data collected during the fourth quarter indicates that the outliers and extreme values were associated with samples from the week of December 10, 2002. Additional investigation concluded that the values were not due to mistakes in collection, analysis, or reporting procedures, but rather reflect natural variability in the measurements; in this instance the results were influenced by a period of inversions over the collection week. The outliers and extreme values lie within the range of measurements made within the past five years. Thus, rather than dismissing the outliers, they were included in the subsequent statistical analyses. Further discussion of box plots may be found in Determining Statistical Differences under Helpful Information.

Figure 2 graphically shows that the gross alpha measurements made at INEEL, Boundary, and Distant locations are similar for the fourth quarter. If the INEEL were a significant source of offsite contamination, concentrations of contaminants should be statistically greater at Boundary locations than at Distant locations. Because there is no discernable distribution of the data, the nonparametric Kruskal-Wallis test of multiple independent groups was used to test for statistical differences between 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. The p-value for each comparison is shown in Table D-1. There were no statistical differences in gross alpha concentrations between groups for the fourth quarter. The outliers and extreme values for each location group are associated with a single week (December 10, 2002) that experienced multiple atmospheric inversions during the collection week.

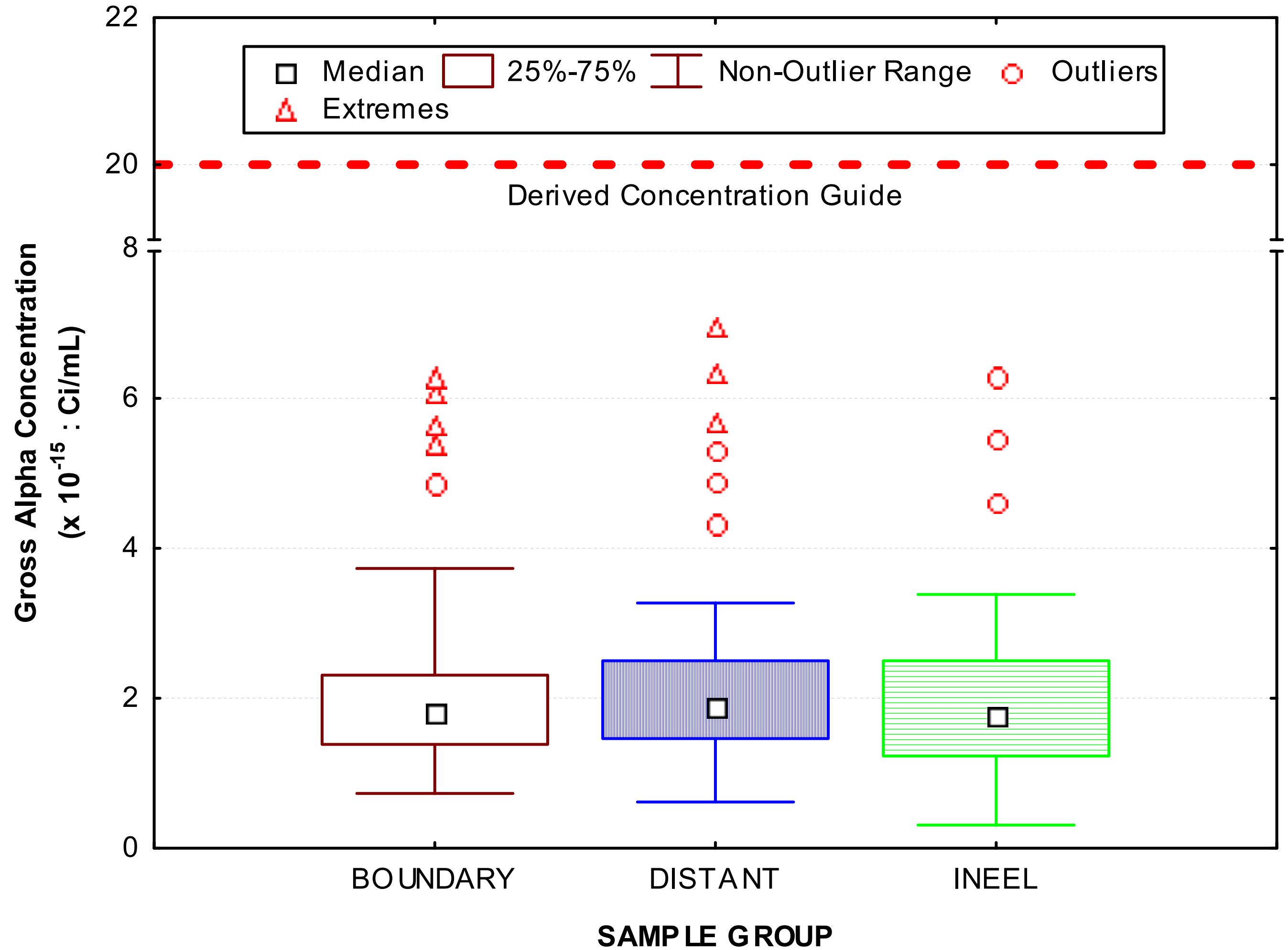

Figure 2. **Gross alpha concentrations in air at ESER Program Boundary, Distant, and INEEL locations for the fourth quarter of 2002.**

Comparisons of gross alpha concentrations were made for each month of the quarter (Figures 3 – 5). Again the Kruskal-Wallis test of multiple independent groups was used to determine if statistical differences exist between INEEL, Boundary, and Distant data groups. There were no statistical differences in gross alpha between groups for any month (Table D-1).

As a further check, comparisons between gross alpha concentrations measured at Boundary and Distant locations were made on a weekly basis. The Mann-Whitney U test was used to compare the Boundary and Distant data because it is the most powerful nonparametric alternative to the t-test for independent samples. 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. No statistical differences were noted between Boundary and Distant locations for the any week of the quarter (Table D-2). More detail on the statistical tests used can be found in Determining Statistical Differences under Helpful Information.

Gross beta results are presented in Table C-1. Gross beta concentrations in air for INEEL, Boundary, and Distant locations for the fourth quarter of 2002 are shown in Figure 6. The data were tested and also found to be neither normally nor log-normally distributed. Box and whiskers plots were used for presentation of the data. Outliers and extreme values were retained in subsequent statistical analyses because they are within the range of measurements made in the past five years, and because these values could not be attributed to mistakes in collection, analysis, or reporting procedures. As in the case of alpha activity, the quarterly data for each group appear to be similar and were determined using the Kruskal-Wallace test to be statistically the same (Table D-1). As with the gross alpha, the gross beta results showed outlier and extreme values are associated with the week of December 10, 2002.

Monthly median gross beta concentrations in air for each sampling group are shown in Figures 7 – 9. Statistical data are presented in Table D-1. There were no statistical differences in gross beta between groups for any month during the quarter (Table D-1).

Comparison of weekly Boundary and Distant data sets, using the Mann Whitney U test, indicates a difference between the two location groups for four weeks (November 13th and 20th, and December 3rd and 17th) (Table D-2). The Boundary group was statistically greater than the Distant group in all cases. Significant statistical differences were found between stations of both the Boundary or Distant location groups for the weeks evaluated. The largest differences were the result of high gross beta readings of the northern Boundary locations Howe, Howe Q/A, Monteview, and Mud Lake. These stations, especially Mud Lake, often tend to have higher results than the other stations. This is primarily related to wind born particulates derived from the surrounding agricultural fields that have been recently harvested. In addition to this potential source, the week prior to collection on December 3 was strongly influenced by inversions in this portion of the Snake River Plain.

Iodine-131 was not detected in any of the analyzed batches of charcoal cartridges above the respective 2s value. Weekly ^{131}I results for each location, including individual recount data, are listed in Table C-2 of Appendix C.

Weekly filters for the fourth quarter of 2002 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. Plutonium-238 was not detected in any sample. Samples collected from seven air monitoring stations (EFS, FAA Tower, Howe, Howe Q/A-2, Idaho Falls, Monteview, and Van Buren Avenue) showed $^{239/240}$Pu results greater than their related 2s values. The Howe, Idaho Falls, and Van Buren Gate samples also had concentrations of ^{241}Am above their 2s values. No ^{137}Cs was measured above the 2s value for any sample in the fourth quarter 2002.

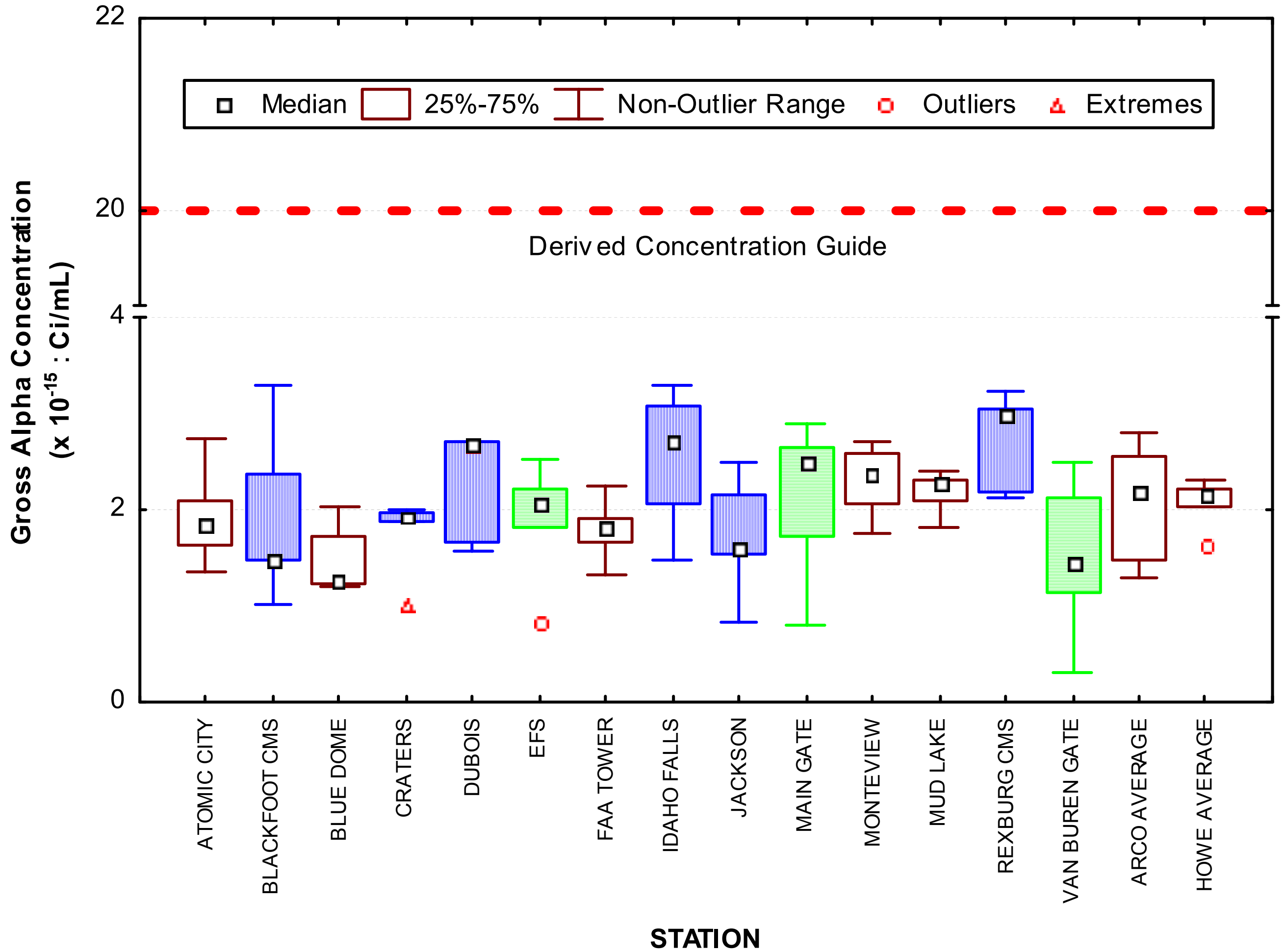

Figure 3. **October gross alpha concentrations in air at ESER Program INEEL, Boundary, and Distant locations**. Stations belonging to INEEL, Boundary, or Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 5 for each location.]

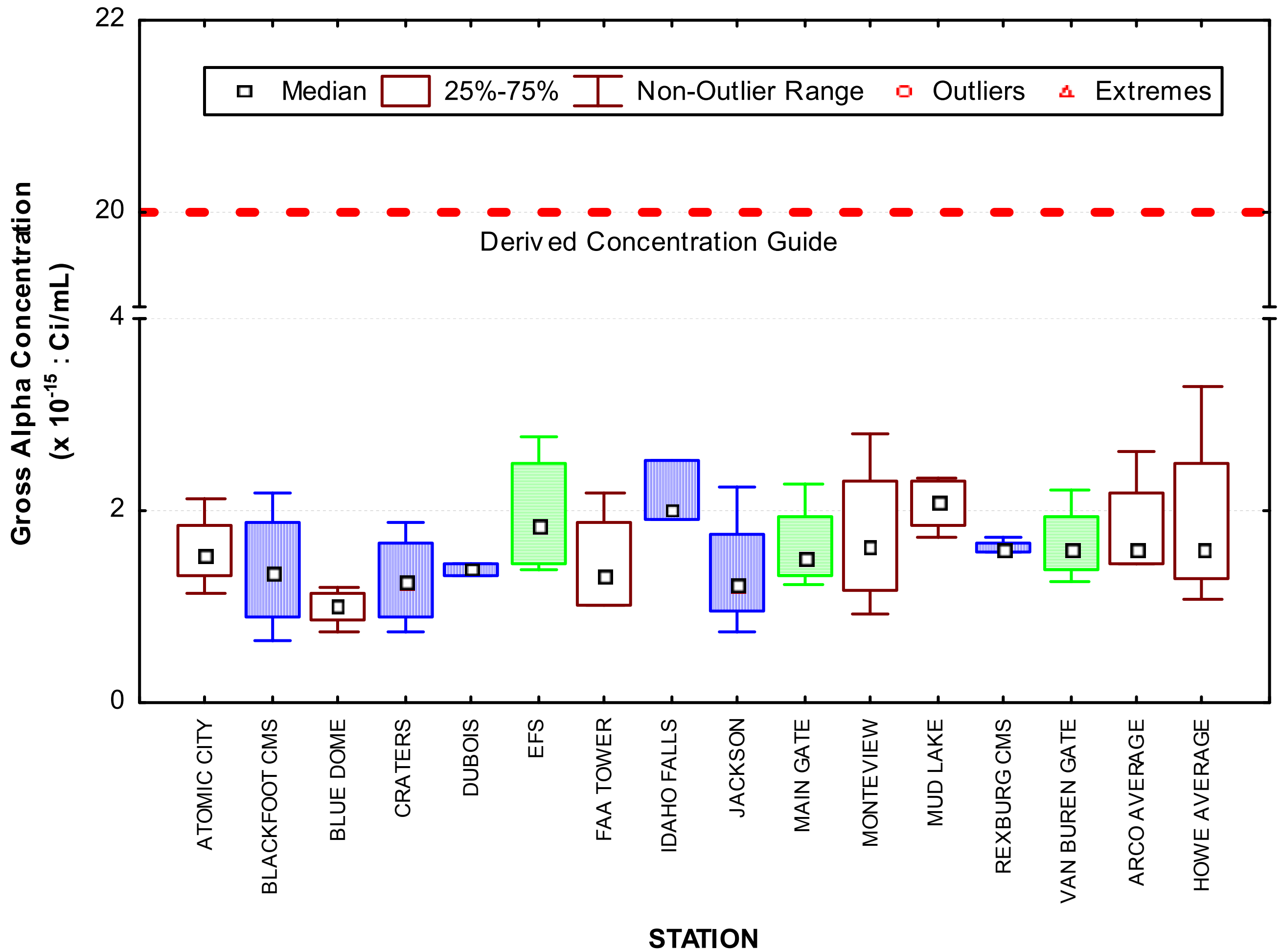

Figure 4. **November gross alpha concentrations in air at ESER Program INEEL, Boundary, and Distant locations.** Stations belonging to INEEL, Boundary, or Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 4 at each location except for Dubois and Idaho Falls where N = 3.]

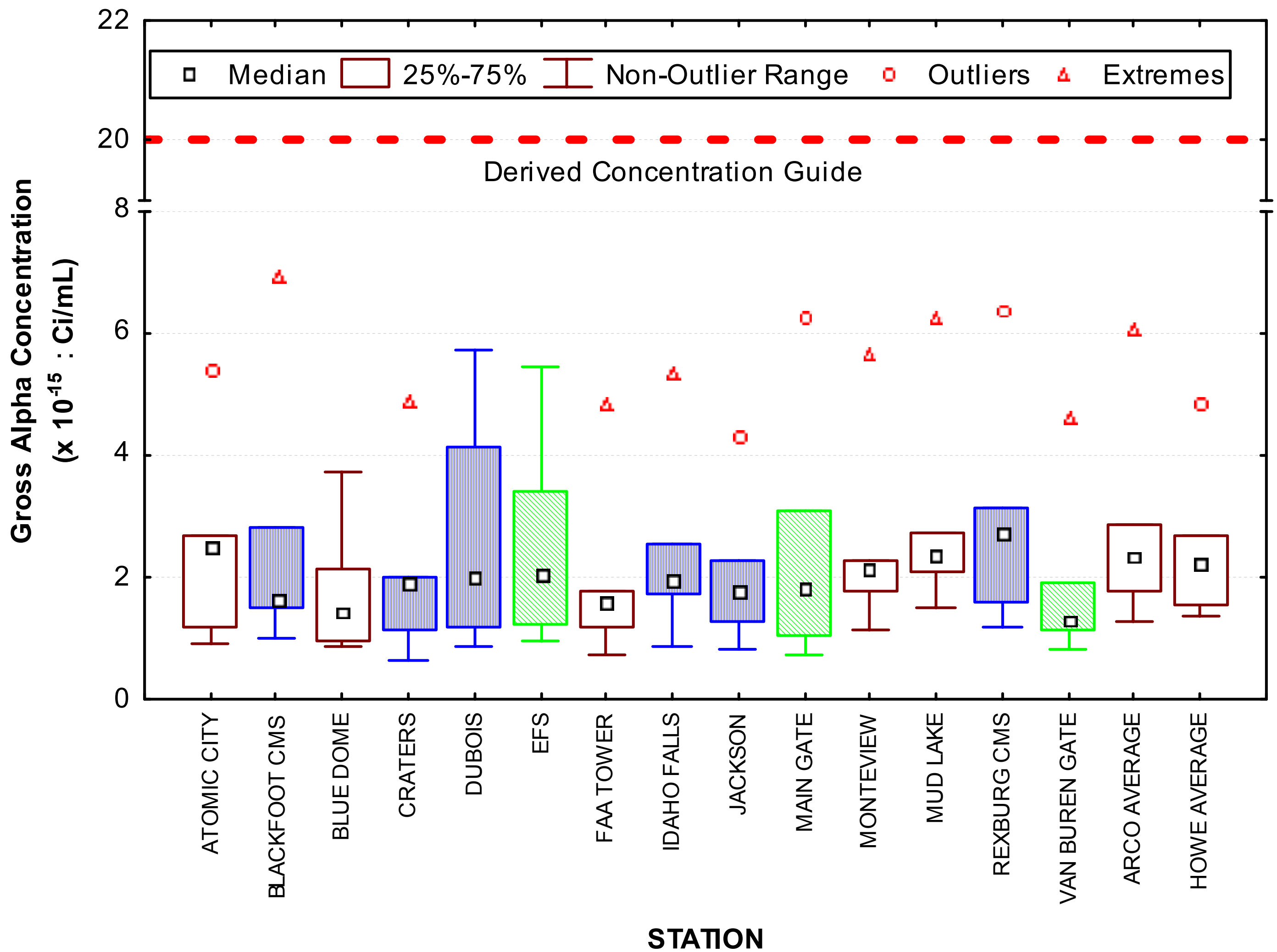

Figure 5. **December gross alpha concentrations in air at ESER Program INEEL, Boundary, and Distant locations.** Stations belonging to INEEL, Boundary, or Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 5 at each location except for Dubois, where N=4.]

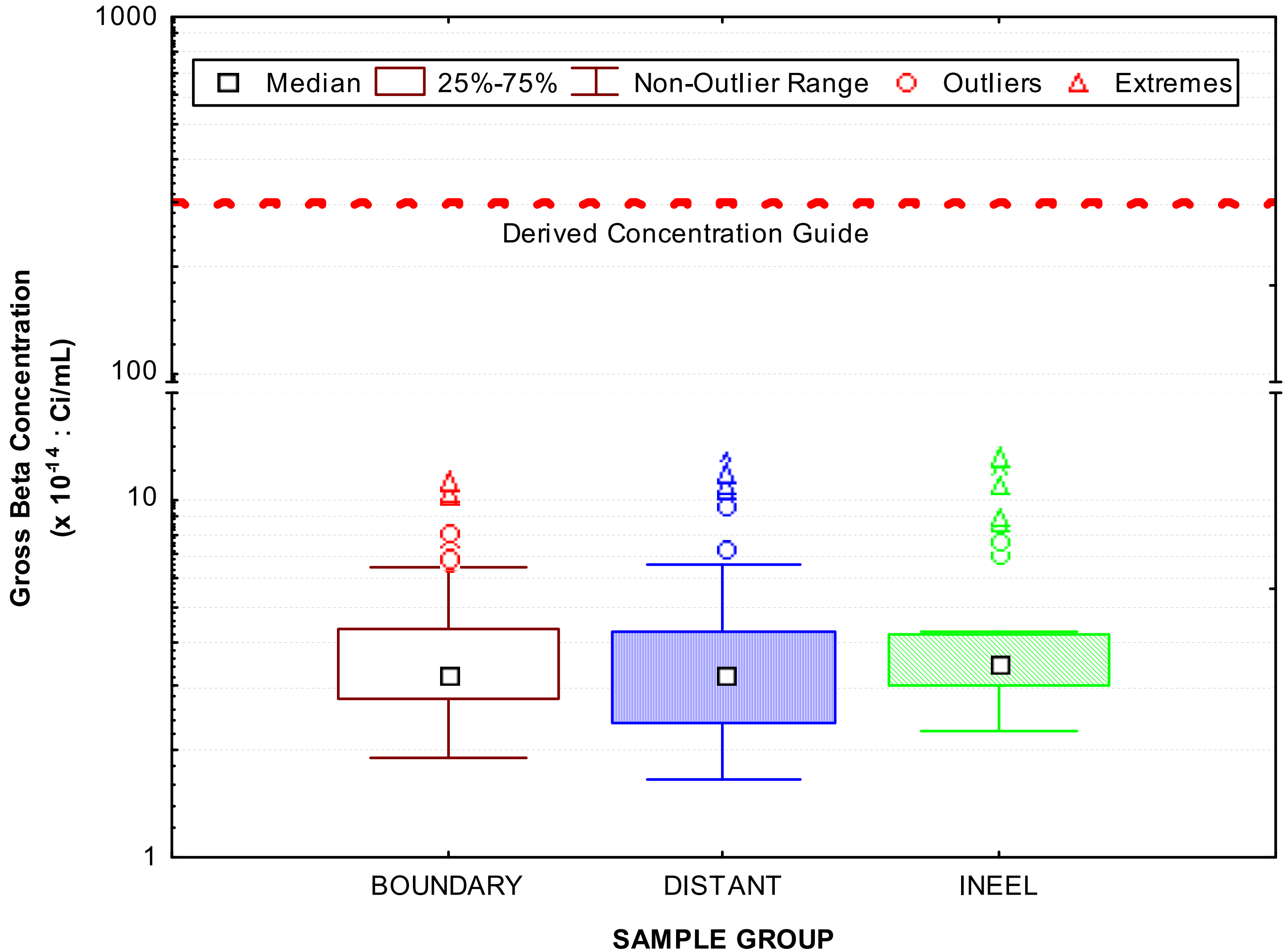

Figure 6. **Gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations for the fourth quarter 2002.**

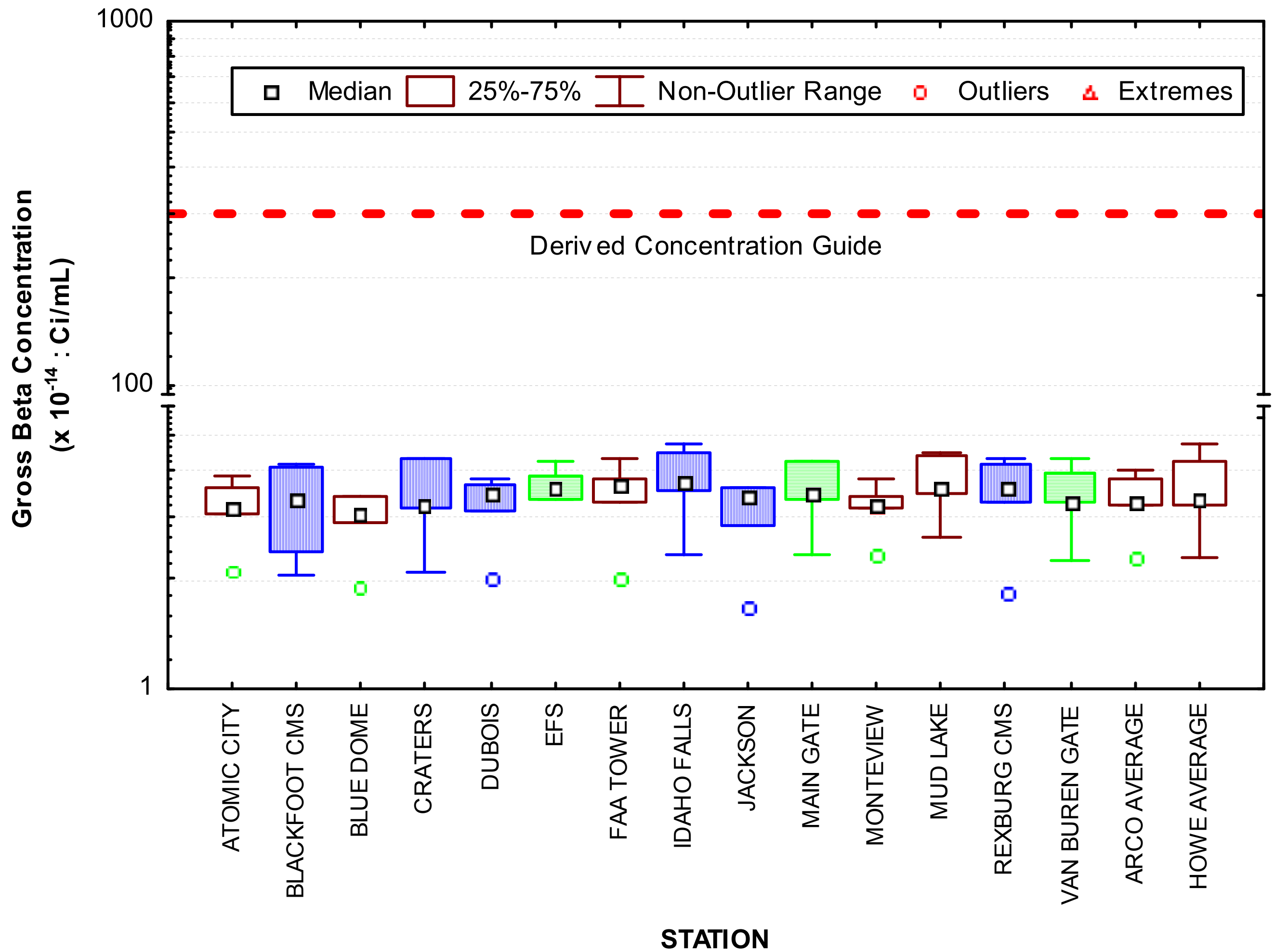

Figure 7. October gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations. Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 5 for each location except for Rexburg CMS, where N = 4.])

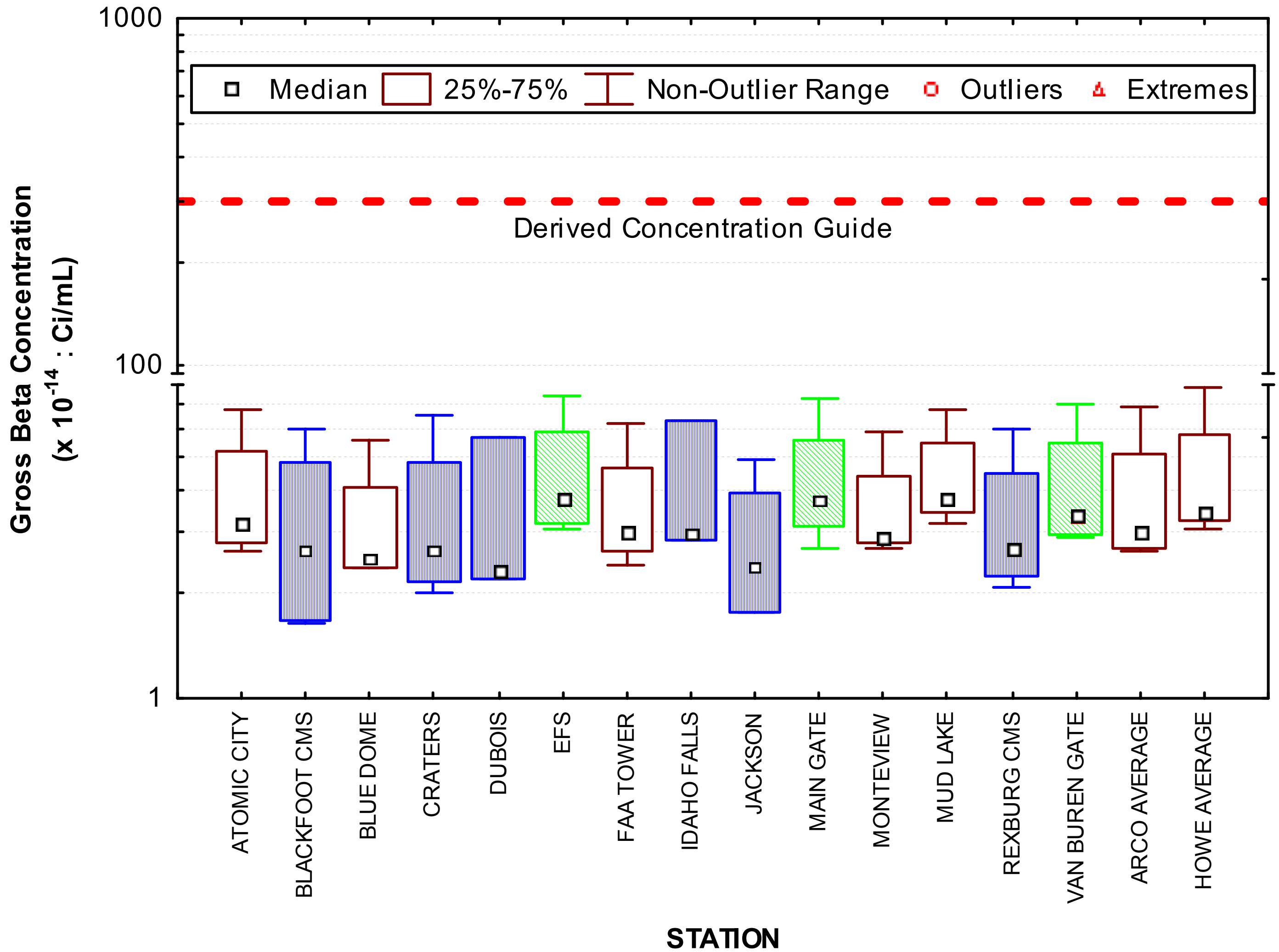

Figure 8. **November gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations.** Stations belonging to INEEL, Boundary, or Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 4 at each location.]

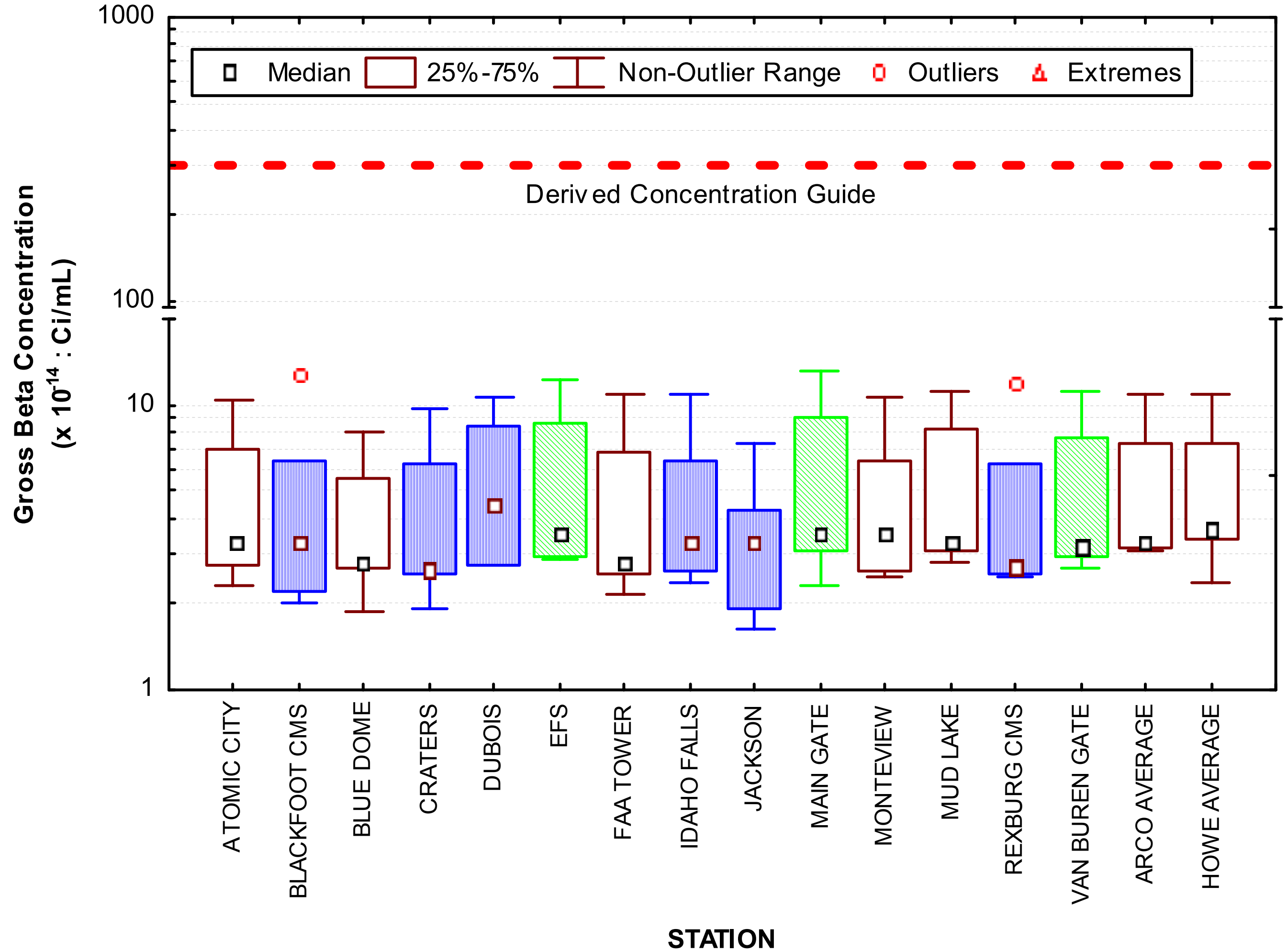

Figure 9. December gross beta concentrations in air at ESER Program INEEL, Boundary, and Distant locations. . Stations belonging to INEEL, Boundary, or Distant locations are represented by boxes that are patterned with vertical green stripes, no fill, or horizontal blue stripes, respectively. [Number of samples (N) = 4 at each location except for Blue Dome, where N=2, and Idaho Falls, where N=3.]

Strontium-90 was also measured slightly above the 2s value in the Mud Lake sample.

Figure 10 shows those concentrations of 241-Am and 239/240-Pu detected above the 2s concentrations. Occasional detection of human-made radionuclides is not unusual and represents natural variations in concentrations of radionuclides introduced by historical nuclear weapons testing. The concentrations measured during this quarter are consistent with those recorded in the past. All results were far less than their respective DCGs. All results for composite filter samples are shown in Table C-3, Appendix C.

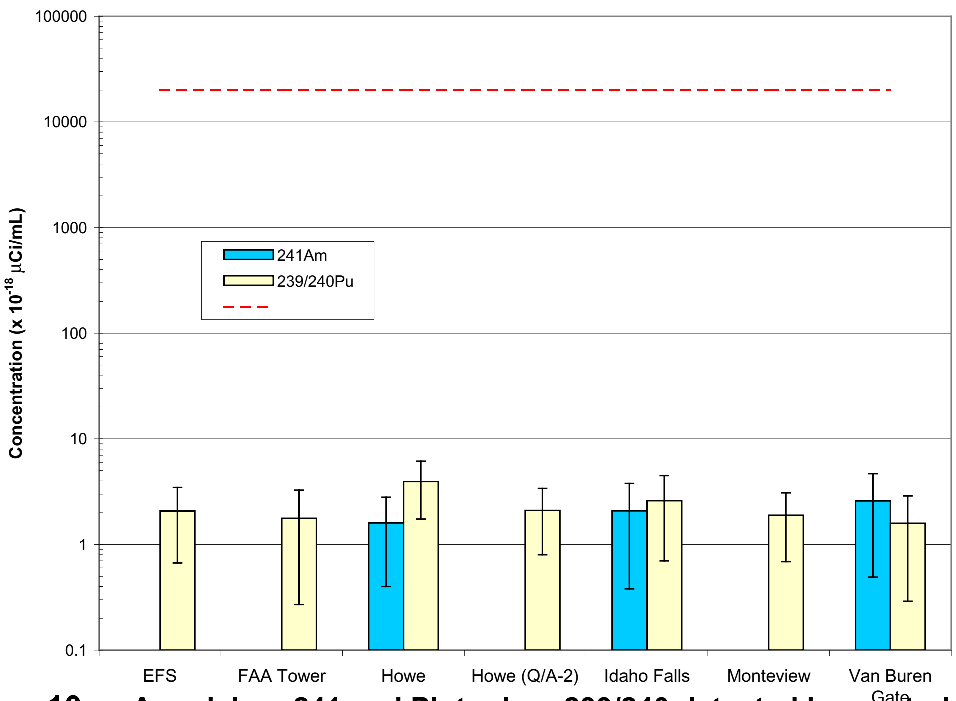

Figure 10. Americium-241 and Plutonium-239/240 detected in quarterly composite air filters (by locations).

ATMOSPHERIC MOISTURE SAMPLING

Eight atmospheric moisture samples were obtained during the fourth quarter of 2002; two from each location (Atomic City, Blackfoot, Rexburg, and Idaho Falls). Duplicates were also analyzed for one Atomic City and both Rexburg samples. 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.

The Atomic City sample and duplicate collected on October 9, and one sample from Idaho Falls collected on October 23, 2002, and the samples and duplicates collected from Rexburg on October 16 and December 12, exceeded their 2s values. The maximum value of 3.8 10^{-12} Ci/mL of air (1.4 10^{-7} Bq/mL of air) was well below the DOE DCG for tritium in air of 1 10^{-7} Ci/mL (3.7 10^{-3} Bq/mL). All results for atmospheric moisture sampling are shown in Table C-4, Appendix C.

PM_{10} AIR SAMPLING

The EPA began using a standard for concentrations of airborne particulate matter (PM) less than 10 micrometers in diameter (PM_{10}) in 1987 (40 CFR 50.6, 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 µg/m^3, with a maximum 24-hour concentration of 150 µg/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. Equipment problems invalidated a single sample from the Rexburg CMS on December 15, 2002. The maximum 24-hour concentration was 92.45 µg/m^3 on October 22, 2002, at Atomic City. 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.

Table 1. Summary of 24-hour PM10 values.

	Concentration[a]		
Location	**Minimum**	**Maximum**	**Average**
Atomic City	0.07	92.45	13.70
Blackfoot, CMS	0.89	29.06	12.65
Rexburg, CMS	1.17	56.79	20.94

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

4. WATER SAMPLING

The ESER program samples precipitation, surface water, and drinking water. Monthly composite precipitation samples are collected from Idaho Falls and the Central Facilities Area (CFA) on the 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 fourth quarter of 2002 produced enough precipitation for a total of eight samples and one split – three and a split from Idaho Falls, two from CFA, and four from the EFS.

Tritium was detected above the 2s value in six samples: one from the CFA, two from Idaho Falls and three from the EFS. 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 screening values. The highest tritium concentration of 212.0 $\pm$ 58.7 pCi/L (7.9 $\pm$ 2.2 Bq/L), was measured in the sample collected from CFA on December 12, 2002. This value is many times lower than the DCG value (2 x 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 fourth 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 $\times 10^6$ pCi/L (-7.4 to 2.7 $\times 10^4$ Bq/L) (EPA 2002). Data for all fourth quarter 2002 precipitation samples collected by the ESER Program are listed in Table C-6 (Appendix C).

DRINKING WATER

Fourteen drinking water samples and two duplicates were collected from selected taps throughout southeast Idaho (Figure 11). Samples were analyzed for gross alpha, gross beta, and tritium (^3H). A single water sample from Minidoka exceeded its respective 2s and 3s values for gross alpha.

All sixteen water samples collected exceeded their 2s value for gross beta (Table 2). The EPA Safe Drinking Water Act (SDWA) limits gross beta in drinking water based on an annual exposure of 4 mrem/yr. Since data are reported from the laboratory as a concentration (i.e., pCi/L) a screening concentration of 50 pCi/L is used to meet this level (Appendix B-1). The maximum concentration of gross beta detected above the MDC was from Fort Hall and was five times lower than the SDWA screening value.

Six samples (Arco, Carey, Fort Hall, Moreland, Shoshone, and Tabor) exceeded the 2s value for tritium. The SDWA limits tritium in drinking water to 20,000 pCi/L (740.7 Bq/L) (Appendix B-1). The maximum concentration of tritium detected was from Arco of 136.0 ± 113.0 pCi/L (5.0 ± 4.2 Bq/L) was well below the SDWA limit. The measured levels were also within the range of natural tritium that exists in the Snake River Plain Aquifer and throughout the world. Low levels of tritium exist in the environment at all times. The major natural source of

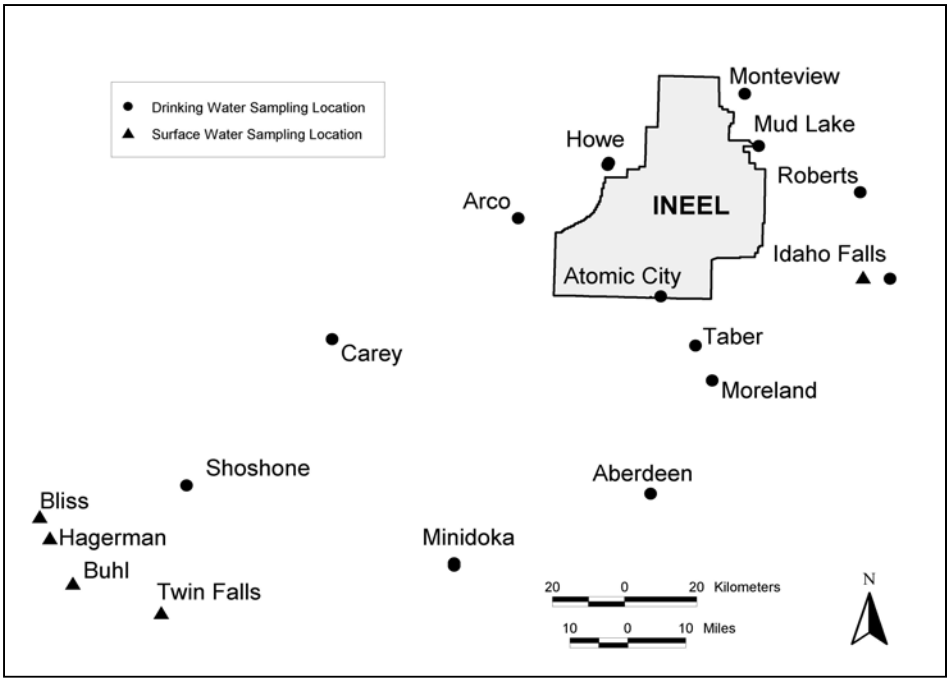

Figure 11. Drinking and Surface Water Sampling locations.

tritium is cosmic ray reactions in the upper atmosphere. From 1978 to 2001 the EPA, as part of its ERAMS, measured tritium from -9.00 x 10^1 to 1.00 x 10^3 pCi/L in drinking water samples across the United States (EPA, 2002).

Levels of gross alpha and gross beta observed in drinking water are not unusual given the basaltic terrain (USGS 1991). All values are similar to those recorded in previous years, and are well below the levels outlined for drinking water protection (Table B-1). All drinking water sample results may be found in Appendix C, Table C-7.

Table 2. Drinking water gross beta results greater than (>) 2s and MDC values.

	Sample Results[a]		Limits for Comparison[a]	
Location	**Result ± 2s**	**MDC**	**SDWA**	**DOE DCG**
Gross Alpha				
Minidoka	2.47 ± 0.76	1.83	8	30
Gross Beta				
Aberdeen	8.04 ± 1.05	2.78	50	100
Arco	2.22 ± 0.84	2.66	50	100
Atomic City	3.69 ± 0.89	2.65	50	100
Duplicate	2.59 ± 0.89	2.81	50	100
Carey	3.02 ± 0.87	2.64	50	100
Fort Hall	8.31 ± 1.05	2.78	50	100
Howe	2.19 ± 0.84	2.64	50	100
Idaho Falls	2.80 ± 0.88	2.74	50	100
Minidoka	8.15 ± 1.20	3.30	50	100
Monteview	4.33 ± 0.91	2.70	50	100
Moreland	3.69 ± 1.04	3.19	50	100
Mud Lake	4.00 ± 0.86	2.53	50	100

Location	Sample Results[a]		Limits for Comparison[a]	
	Result ± 2s	MDC	SDWA	DOE DCG
Roberts	3.10 ± 0.88	2.71	50	100
Shoshone	2.07 ± 0.81	2.54	50	100
Tabor	4.51 ± 0.96	2.80	50	100
Tritium				
Arco	136.00 ± 113.00	112.82	20,000	2×10^6
Carey	90.90 ± 61.70	117.25	20,000	2×10^6
Fort Hall	118.00 ± 107.00	107.58	20,000	2×10^6
Moreland	131.00 ± 113.00	112.82	20,000	2×10^6
Shoshone	66.70 ± 60.20	114.32	20,000	2×10^6
Tabor	117.00 ± 113.00	112.82	20,000	2×10^6

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

SURFACE WATER

Five surface water samples and one duplicate sample were collected from locations throughout southeast Idaho and analyzed for tritium, gross alpha, and gross beta. None of the samples were greater than their respective 2s values for gross alpha.

All five samples and the duplicate surface water samples were greater than their associated 2s values for gross beta (Table 3). Even at the reported levels, the gross beta values are between 7 and 27 times lower than the SDWA screening value of 50 pCi/L, and between 16 to 54 times lower than DCG values (Table B-1).

Table 3. Surface water tritium and gross beta results greater than (>) 2s and MDC.

Location	Sample Results[a]		Limits for Comparison[a]	
	Result ± 2s	MDC	SDWA	DOE DCG
Tritium				
Twin Falls (Alpheus Spring)	143 ± 106	106.7	20,000	2.0×10^6
Twin Falls (Alpheus Spring)	173.0 ± 107.0	106.7	20,000	2.0×10^6
Gross Beta				
Bliss (Bliss Boat Dock)	5.75 ± 1.01	2.92	50	100
Buhl (Clear Spring)	3.95 ± 0.95	2.79	50	100
Hagerman (Bill Jones Fish Farm)	2.25 ± 0.88	2.81	50	100
Duplicate	3.63 ± 0.93	2.90	50	100
Idaho Falls (John Hole Dock)	1.85 ± 0.86	2.88	50	100
Twin Falls (Alpheus Spring)	6.26 ± 1.03	2.78	50	100

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

The sample and duplicate from Twin Falls both exceeded the 2s value for tritium. Random tritium detections in the surface water springs are not uncommon. The maximum concentration of 173.0 ± 107.0 pCi/L (6.4 ± 4.0 Bq/L) is well below the EPA and DOE regulatory limits for tritium in drinking water.

The presence of gross alpha and gross beta in surface water (particularly the springs) is typically related to dissolution of naturally occurring radionuclides (i.e., uranium, radium, potassium) by groundwater as it flows through the surrounding basalts (USGS, 1997). Tritium in surface water is a combination of that produced naturally in the upper atmosphere and deposited by rain as well as remnants from worldwide fallout related to nuclear testing. Levels of gross alpha, gross beta, and tritium in all samples are similar to results from recent years. All gross alpha and gross beta results can be found in Appendix C, Table C-7.

5. AGRICULTURAL 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, doves, 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, potatoes, waterfowl, and large game sampled during the fourth quarter of 2002. A summary of approximate minimum detectable concentrations (MDCs) for radiological analyses is provided in Appendix B. There are 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 nine other locations around the INEEL (Figure 12) during the fourth quarter of 2002. All samples were analyzed for gamma emitting radionuclides. Samples are analyzed for ^{90}Sr during the second and fourth quarters.

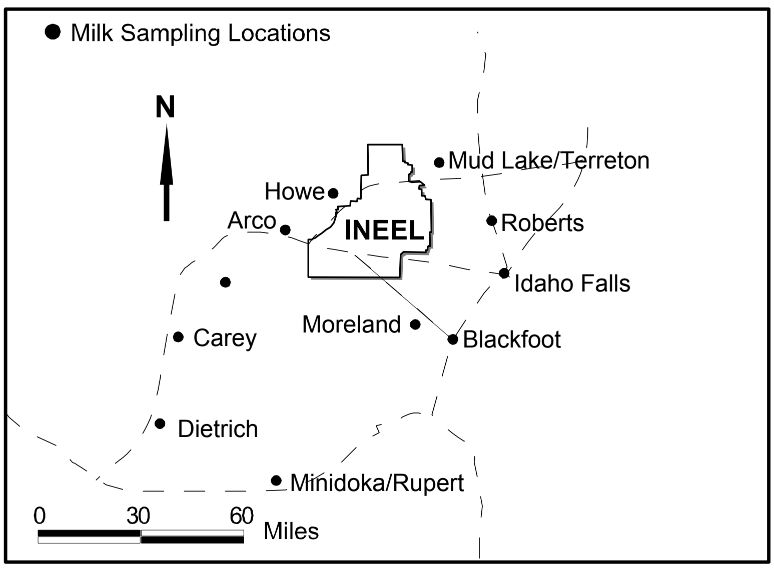

Figure 12. ESER Program milk sampling locations.

Data for ^{131}I and ^{137}Cs in milk samples are listed in Table C-8. Iodine-131 was detected in one sample, the October sample from Roberts, exceeding the 2s value. No samples had ^{137}Cs concentrations greater than their 2s uncertainty.

Strontium-90 was measured in four samples above the 2s value. The detection of ^{90}Sr in milk around the INEEL at very low concentrations is not unusual and is indistinguishable from ^{90}Sr levels expected from historical fallout events (e.g. from nuclear weapons tests and Chernobyl) (EPA 1997). There are no established limits for ^{90}Sr in milk but, for comparison, the EPA has set the limit for ^{90}Sr under the Safe Drinking Water Act at 8 pCi/L (0.3 Bq/L). This limit is based on a 4 mrem per year exposure limit and the assumption that two liters per day are consumed. The maximum concentration (0.84 ± 0.72 pCi/L [0.03 ± 0.02 Bq/L) measured in milk during the fourth quarter, 2002 is many times lower than the 8-pCi/L limit. Results are reported in Table C-9.

POTATO SAMPLING

Nine potato samples were collected from area growers and from out-of-state locations. All samples were analyzed for gamma emitting radionuclides and ^{90}Sr. No ^{90}Sr was detected in any of the samples. Cesium-137 was measured in one sample from Mud Lake above its respective 2s value. The concentration of ^{137}Cs from Mud Lake was 3.4 ± 3.3 pCi/kg (dry) (0.13 ± 0.12 Bq/kg [dry]).

Data for ^{137}Cs and ^{90}Sr in all potato samples taken during the fourth quarter are listed in Table C-10 and Table C-11 (Appendix C), respectively.

LARGE GAME ANIMAL SAMPLING

Three game animals were sampled during the fourth quarter of 2002. All were killed as a result of vehicular collisions. These accidents involved two mule deer (*Odocoileus hemionus*) and one elk (*Cervus elaphus*). Efforts were made to collect samples of thyroid, liver, and muscle tissue from each animal, but due to their condition at the time of sampling not all animals provided all samples. Cesium-137 and ^{131}I data for all big game samples are listed in Appendix C, Table C-12.

Each sample collected was analyzed for gamma emitting radionuclides. Liver and muscle tissue of all animals had detectable concentrations of naturally occurring potassium-40. Cesium-137 was measured in the liver tissue of the elk sampled on October 14, 2002 above the respective 2s value. No ^{131}I was measured in any game sample for the quarter.

The concentrations measured in the above samples are within the range of values for samples collected in the past. Likewise, the presence of ^{137}Cs is commonly associated with plant uptake of fallout from past weapons testing and nuclear accidents (i.e., Chernobyl).

WATERFOWL SAMPLING

Eleven waterfowl were collected during 2002: two each from the control locations of Mud Lake and Heise, three from the northeast Test Reactor Area (TRA) pond, and four from the TAN pond. All were analyzed for gamma emitting radionuclides with a subset analyzed for ^{90}Sr, ^{238}Pu, $^{239/240}Pu$, and ^{241}Am. Concentrations of radionuclides measured in edible tissues are shown in Table 4. Seven waterfowl had measurable levels of at least one radionuclide in edible tissue. Of the radionuclides measured at each location, Mud Lake, the TRA NE pond, and TAN, each had three. Curium-141 (^{141}Cm), niobium-95 (^{95}Nb), and ^{90}Sr were detected at concentrations greater than their 2s values in the muscle tissue of three of the waterfowl sampled. No ^{137}Cs was measured above the 2s concentration in any edible tissue. Duck hunting is not allowed on the INEEL, but a maximum potential exposure scenario to humans would be someone collecting a contaminated duck and immediately consuming all muscle, liver, heart, and gizzard tissue (average 225 g). The maximum potential dose from eating 225 g (8 oz) of meat from the most contaminated ducks collected in 2002 was estimated to be 0.004 mrem. This dose is an order of magnitude lower than last years estimated dose of 0.89 mrem. This is attributed primarily to the fact that waterfowl from the TRA Warm Waste Pond, containing low levels of radionuclides, were not taken in 2002. This dose is far less than 240 mrem we receive each year from ambient sources and the 100 mrem per year DOE regulatory dose limit. Results for all duck samples are listed in Table C-13 of Appendix C.

Table 4. Measured radionuclides in edible tissues of waterfowl.

Sample ID	Location	Radionuclide	Concentration ± 2s (pCi/kg)	Concentration ± 2s (x 10^{-2} Bq/kg)
02-WF-0013	Mud Lake	Cerium-141	1170 ± 700	43.33 ± 25.93[a]
02-WF-0029	INEEL TAN	Cerium-141	463 ± 440	17.15 ± 16.30[a]
02-WF-0029	INEEL TAN	Cesium-137	44.60 ± 31.00	1.65 ± 1.15[a]
02-WF-0001	TRA NE Cold Pond	Cobalt-60	35.40 ± 35.00	1.31 ± 1.30[a]
02-WF-0032	INEEL TAN	Niobium-95	676 ± 410	25.04 ± 15.19[a]
02-WF-0013	Mud Lake	Plutonium-239/240	2.18 ± 1.80	8.07 ± 6.67
02-WF-0022	INEEL TAN	Plutonium-239/240	1.33 ± 1.50	4.93 ± 5.56
02-WF-0013	Mud Lake	Strontium-90	7.55 ± 7.50	27.96 ± 27.78
02-WF-0001	TRA NE Cold Pond	Strontium-90	14.10 ± 8.30	52.22 ± 30.74
02-WF-0004	TRA NE Cold Pond	Strontium-90	9.80 ± 7.60	36.30 ± 28.15

a. Value is in Bq/kg.

6. ENVIRONMENTAL RADIATION

An array of thermoluminescent dosimeters (TLDs) is distributed throughout the Eastern Snake River Plain to monitor for environmental radiation (Figure 13). TLDs are changed out in May and again in November after six months in the field. The results of the November sampling (the period from May 2002 to November 2002) are discussed below.

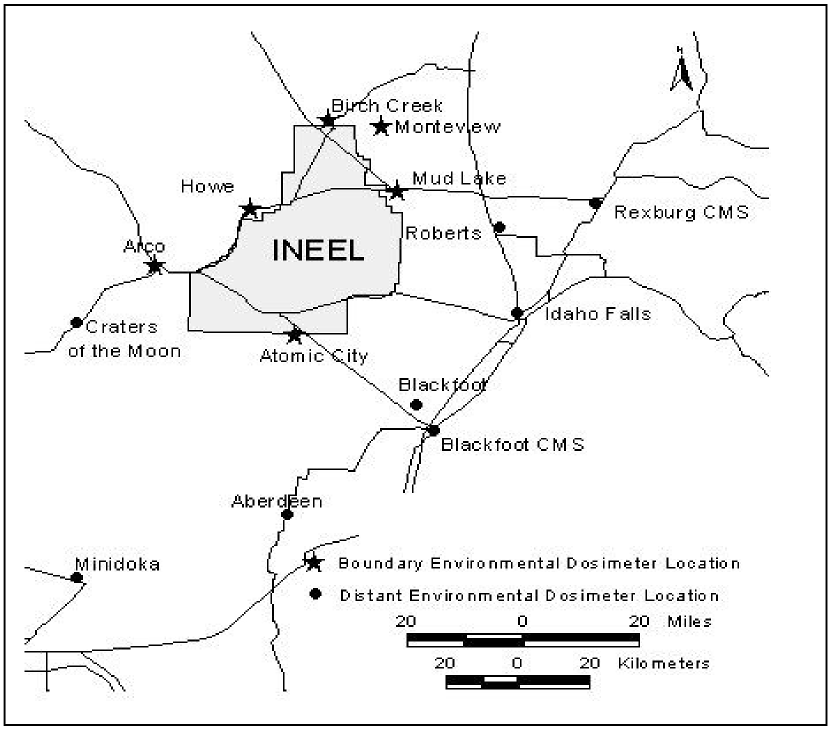

Figure 13. TLD sampling locations.

Dosimeter locations are divided into Boundary and Distant groupings. Boundary average exposure rates ranged from a low of 0.28 mR/day at Blue Dome to a high of 0.37 mR/day at Mud Lake. The overall average exposure was 0.33 mR/day. The Distant group had a low of 0.30 mR/day at Jackson, Wyoming and a high of 0.41 mR/day at Rexburg. The overall average Distant exposure was also 0.33 mR/day. There was no statistical difference between Boundary and Distant locations. Furthermore, all values are in line with past readings. Table 5 lists the range and average activity for both groups over a six-month period. All results are listed in Appendix C, Table C-14.

Table 5. TLD Exposures from May 2002 to November 2002.

	Total Exposure[a]	
Location	**Boundary**	**Distant**
Average	60.4	60.2
Maximum	67.2	75.1
Minimum	52.0	48.0

a All values shown are in milliroetgens (mR).

7. SUMMARY AND CONCLUSIONS

The use of nonparametric statistics was applied to both gross alpha and gross beta data in the analysis of variability between three location groups (INEEL, Boundary and Distant). No statistical variation was seen or gradients observed in either gross alpha or gross beta for the fourth quarter of 2002. Statistical analysis also showed no variation between location groups on a monthly basis.

Additional analysis of just the Boundary and Distant location groups on a weekly basis concluded that no statistical difference was present in gross alpha results for the quarter. Gross beta concentrations in the Boundary location group were statistically higher than the Distant group during four weeks of the quarter. Statistically significant variations occurred for the weeks of November 13, and 20, 2002 and December 3, and 17, 2002. Investigation of these differences concluded that the variations were related to higher concentrations at the northern Boundary stations, especially Mud Lake. Many of these variations are strongly influenced by multiple inversions during the collection week. Concentrations at these stations are also influenced by resuspension of fallout-derived particulates from the harvested and fallow fields around these stations.

Levels of specific radionuclides detected in composited air filters ($^{239,240}Pu$, ^{241}Am, ^{90}Sr, and ^{137}Cs) and tritium in atmospheric moisture samples were well below regulatory guidelines set by both the DOE and the EPA for protection of the public and were not different from values measured historically at other locations across the United States.

Tritium was detected in four of nine precipitation samples collected during the fourth quarter. The concentrations were consistent with measurements made by EPA at other locations across the United States and reported by the ERAMS program.

Fourteen drinking water samples and one duplicate were collected from locations around southeast Idaho in the fourth quarter 2002. Only one sample, from Minidoka, had detectable gross alpha. As in the past all fifteen samples exceeded their respective 2s uncertainty value for gross beta. The maximum concentration was well below the EPA and DOE health based limits. One sample from Fort Hall also had measurable concentrations of tritium.

Six surface water samples (five samples and one duplicate) were also collected during the fourth quarter of 2002. None of the samples contained gross alpha. As with drinking water, all six samples were higher than their 2s uncertainty value. The Twin Falls sample and duplicate also had measurable tritium. The measured concentrations were below EPA and DOE regulatory limits. The detection of gross alpha and gross beta in surface and drinking water is common on and around the Snake River Plain, and is associated with the dissolution of minerals containing naturally occurring radioactive elements (i.e., uranium and thorium). Tritium in surface water is derived from the remnants of worldwide fallout and naturally formed tritium in precipitation.

One milk sample collected during the fourth quarter had ^{131}I greater than the 2s value. This sample was considered as detected, and was below the DOE limit for ^{131}I in water. No ^{137}Cs was measured in any of the milk samples collected. Strontium-90 was detected in three samples and measured in another one. The results were indistinguishable from historical measurements.

Nine potato samples were collected from local growers and out-of-state locations, and analyzed for ^{90}Sr and ^{137}Cs. No samples contained measurable ^{90}Sr. One local sample had ^{137}Cs above the 2s uncertainty values.

Results of analyses of game animal tissues indicated measurable concentrations of ^{137}Cs were found in the liver tissue of an elk. All concentrations are consistent with past tissue and thyroid concentrations.

Of eleven waterfowl sampled during the fourth quarter of 2002, seven had measurable concentrations of at least one radionuclide. One sample from Mud Lake had detectable ^{141}Cm, one sample from the NE TRA cold pond had detectable ^{95}Nb, and one sample from TAN had detectable ^{90}Sr in the edible portion of the bird. The estimated dose from consuming the maximum concentration of both radionuclides is 0.006 mrem, far below the 240 mrem we receive from natural background radiation.

Exposure rates, as measured using environmental TLDs from May through November, indicate no statistical difference between Boundary and Distant locations. All measured values were consistent with past readings.

In conclusion, no radionuclides in any of the samples taken during the fourth quarter of 2002 could be directly linked with INEEL activities. Although many samples contained measurable amounts of various radionuclides, only 29 of the 142 plus samples contained concentrations that are considered as detected. Concentrations in all of the samples collected and analyzed during the fourth quarter, 2002 were similar to levels measured in the past in the INEEL environment or in other locations in the United States and were well below regulatory standards for public health.

8. REFERENCES

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APPENDIX A

SUMMARY OF SAMPLING MEDIA & 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, Jackson WY, Rexburg	Arco, Atomic City, FAA Tower, Howe, Monteview, Mud Lake, Blue Dome	Main Gate, EFS, Van Buren
Gamma Spec	quarterly	Blackfoot, Craters of the Moon, Idaho Falls, Jackson WY, Rexburg	Arco, Atomic City, FAA Tower, Howe, Monteview, Mud Lake, Blue Dome	Main Gate, EFS, Van Buren
^{90}Sr, Transuranics	quarterly	Rotating schedule	Rotating schedule	Rotating schedule
ATMOSPHERIC MOISTURE				
Tritium	4 to 13 weeks	Blackfoot, Idaho Falls, Rexburg	Atomic City	None
PRECIPITATION				
Tritium	monthly	Idaho Falls	None	CFA
Tritium	weekly	None	None	EFS
PM-10				
Particulate Mass	every 6th day	Rexburg, Blackfoot	Atomic City	None
WATER SAMPLING				
SURFACE WATER				
Gross Alpha, Gross Beta, ^{3}H	semi-annually	Twin Falls, Buhl, Hagerman, Idaho Falls, Bliss	None	None
DRINKING WATER				
Gross Alpha, Gross Beta, ^{3}H	semi-annually	Aberdeen, Carey, Idaho Falls, Fort Hall, Minidoka, Moreland, Roberts, Shoshone, Tabor	Arco, Atomic City, Howe, Monteview, Mud Lake	None
ENVIRONMENTAL RADIATION SAMPLING				
TLDs				
Gamma Radiation	semiannual	Aberdeen, Blackfoot, Craters of the Moon, Idaho Falls, Minidoka, Jackson WY, Rexburg, Roberts	Arco, Atomic City, Howe, Monteview, Mud Lake, Reno Ranch	None
SOIL SAMPLING				
SOIL				
Gamma Spec, ^{90}Sr, Transuranics	biennially	Carey, Crystal Ice Caves (Aberdeen), Blackfoot, St. Anthony	Butte City, Monteview, Atomic City, FAA Tower, Howe, Mud Lake (2), Reno Ranch	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.	Public Highways	INEEL roads
SHEEP				
Gamma Spec	annually	Blackfoot or Dubois,	None	N. INEEL (Circular Butte), S. INEEL (Tractor Flats)
WATERFOWL				
Gamma Spec, ^{90}Sr, Transuranics	annually	Varies among: Heise, Fort Hall, Mud Lake and Market Lake	None	Waste disposal ponds
FISH				
Gamma Spec	annually or as available	None	None	Big Lost River

APPENDIX B

SUMMARY OF MDC's, DCG's, AND SDWA LIMITS

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Table B-1. Summary of Approximate Minimum Detectable Concentrations for Radiological Analyses Performed During Fourth quarter 2002

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Guide[b] (DCG)
Air (particulate filter)[e]	Gross alpha[c]	1.07×10^{-15} µCi/mL	2×10^{-14} µCi/mL
	Gross beta[d]	1.97×10^{-15} µCi/mL	3×10^{-12} µCi/mL
	Specific gamma (^{137}Cs)	1.61×10^{-16} µCi/mL	4×10^{-10} µCi/mL
	^{238}Pu	1.64×10^{-18} µCi/mL	3×10^{-14} µCi/mL
	$^{239/240}Pu$	1.10×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{241}Am	2.10×10^{-18} µCi/mL	2×10^{-14} µCi/mL
	^{90}Sr	6.16×10^{-17} µCi/mL	9×10^{-12} µCi/mL
Air (charcoal cartridge)[e]	^{131}I	1.70×10^{-15} µCi/mL	4×10^{-10} µCi/mL
Air (atmospheric moisture)[f]	^{3}H	1.06×10^{-7} µCi/mL$_{water}$	1×10^{-7} µCi/mL$_{air}$
Air (precipitation)	^{3}H	1.14×10^{-7} µCi/mL	2×10^{-3} µCi/mL
Drinking Water	Gross Alpha	1.32 pCi/L	30 pCi/L
	Gross Beta	2.29 pCi/L	100 pCi/L
	^{3}H	1.07 pCi/L	2×10^{6} pCi/L
Surface Water	Gross Alpha	1.27 pCi/L	30 pCi/L
	Gross Beta	2.85 pCi/L	100 pCi/L
	^{3}H	1.07 pCi/L	2×10^{6} pCi/L
Milk	^{131}I	0.65 pCi/L	--
	^{137}Cs	3.25 pCi/L	--
	^{90}Sr	0.69 pCi/L	--
Potatoes	^{137}Cs	2.08 pCi/kg	--
	^{90}Sr	288.0 pCi/kg	--
Game Animal Tissue[g]	^{137}Cs	2.68 pCi/kg	--

Sample Type	Analysis	Approximate Minimum Detectable Concentration[a] (MDC)	Derived Concentration Guide[b] (DCG)
Waterfowl	^{141}Cm	48.6 pCi/kg	--
	^{137}Cs	25.1 pCi/kg	--
	^{60}Co	3.00 pCi/kg	--
	^{95}Nb	38.6 pCi/kg	--
	$^{239/240}$Pu	5.07 pCi/kg	--
	^{90}Sr	14.2 pCi/kg	--

a The MDC is an estimate of the concentration of radioactivity in a given sample type that can be identified with a 95% 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 The approximate MDC assumes a sample size of 500 g.

APPENDIX C

SAMPLE ANALYSIS RESULTS

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

Sample Group & Location	Sampling Date	GROSS ALPHA Result ± Uncertainty(2s) ($x10^{-15}$ μCi/mL)			GROSS ALPHA Result ± Uncertainty(2s) ($x10^{-10}$ Bq/mL)			GROSS BETA Result ± Uncertainty(2s) ($x10^{-14}$ μCi/mL)			GROSS BETA Result ± Uncertainty(2s) ($x10^{-10}$ Bq/ml)		
BOUNDARY													
ARCO													
	10/2/2002	1.92	±	1.95	0.71	±	0.72	3.10	±	0.08	11.48	±	0.30
	10/9/2002	1.57	±	1.69	0.58	±	0.63	2.31	±	0.07	8.54	±	0.25
	10/16/2002	2.15	±	2.22	0.80	±	0.82	3.20	±	0.09	11.83	±	0.33
	10/23/2002	2.59	±	2.51	0.96	±	0.93	3.94	±	0.09	14.57	±	0.33
	10/30/2002	1.56	±	2.47	0.58	±	0.91	3.89	±	0.08	14.38	±	0.29
	11/6/2002	2.06	±	0.70	0.76	±	0.26	6.97	±	0.28	25.79	±	1.04
	11/13/2002	0.99	±	0.51	0.36	±	0.19	2.66	±	0.18	9.84	±	0.68
	11/20/2002	1.33	±	0.57	0.49	±	0.21	2.65	±	0.18	9.82	±	0.67
	11/26/2002	1.80	±	0.77	0.67	±	0.28	3.00	±	0.22	11.11	±	0.81
	12/3/2002	2.83	±	0.76	1.05	±	0.28	7.24	±	0.28	26.79	±	1.04
	12/10/2002	6.44	±	1.12	2.38	±	0.41	10.56	±	0.37	39.08	±	1.37
	12/17/2002	2.11	±	0.93	0.78	±	0.34	2.97	±	0.22	10.97	±	0.81
	12/23/2002	2.43	±	0.73	0.90	±	0.27	2.71	±	0.20	10.01	±	0.73
	12/31/2002	1.57	±	0.75	0.58	±	0.28	3.06	±	0.20	11.31	±	0.74
ARCO (Q/A-1)													
	10/2/2002	2.43	±	0.76	0.90	±	0.28	3.32	±	0.22	12.28	±	0.81
	10/9/2002	1.83	±	0.69	0.68	±	0.26	2.29	±	0.19	8.47	±	0.69
	10/16/2002	2.99	±	1.01	1.11	±	0.37	3.28	±	0.26	12.14	±	0.98
	10/23/2002	3.04	±	1.01	1.12	±	0.37	4.13	±	0.29	15.28	±	1.05
	10/30/2002	1.41	±	0.72	0.52	±	0.26	3.68	±	0.25	13.62	±	0.94
	11/6/2002	3.15	±	0.85	1.17	±	0.31	6.77	±	0.29	25.05	±	1.09
	11/13/2002	1.89	±	0.66	0.70	±	0.24	2.90	±	0.20	10.73	±	0.74
	11/20/2002	1.56	±	0.64	0.58	±	0.24	2.66	±	0.19	9.82	±	0.71

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
ARCO (Q/A-1) cont…	11/26/2002	1.72	±	0.83	0.64	±	0.31	3.53	±	0.25	13.06	±	0.93
	12/3/2002	2.88	±	0.86	1.07	±	0.32	7.32	±	0.31	27.09	±	1.15
	12/10/2002	5.73	±	1.11	2.12	±	0.41	11.23	±	0.39	41.57	±	1.45
	12/17/2002	1.48	±	0.97	0.55	±	0.36	3.29	±	0.25	12.18	±	0.91
	12/23/2002	2.20	±	0.74	0.82	±	0.27	3.42	±	0.23	12.64	±	0.85
	12/31/2002	0.94	±	0.80	0.35	±	0.30	3.38	±	0.23	12.51	±	0.85
ATOMIC CITY													
	10/2/2002	1.36	±	2.06	0.50	±	0.76	3.02	±	0.06	11.19	±	0.21
	10/9/2002	1.84	±	1.74	0.68	±	0.64	2.08	±	0.17	7.70	±	0.64
	10/16/2002	2.08	±	2.24	0.77	±	0.83	3.15	±	0.08	11.66	±	0.28
	10/23/2002	2.73	±	2.44	1.01	±	0.90	3.87	±	0.08	14.33	±	0.30
	10/30/2002	1.62	±	2.12	0.60	±	0.78	3.58	±	0.08	13.25	±	0.28
	11/6/2002	2.12	±	0.68	0.78	±	0.25	6.76	±	0.27	25.01	±	1.00
	11/13/2002	1.53	±	0.56	0.57	±	0.21	2.67	±	0.18	9.88	±	0.65
	11/20/2002	1.14	±	0.55	0.42	±	0.20	2.92	±	0.19	10.79	±	0.69
	11/26/2002	1.58	±	0.72	0.58	±	0.27	3.50	±	0.23	12.95	±	0.84
	12/3/2002	2.66	±	0.75	0.99	±	0.28	6.95	±	0.28	25.71	±	1.02
	12/10/2002	5.40	±	0.96	2.00	±	0.35	10.33	±	0.34	38.23	±	1.25
	12/17/2002	0.89	±	0.81	0.33	±	0.30	2.31	±	0.20	8.55	±	0.74
	12/23/2002	2.50	±	0.74	0.92	±	0.27	2.72	±	0.20	10.08	±	0.73
	12/31/2002	1.20	±	0.70	0.45	±	0.26	3.25	±	0.20	12.01	±	0.74
BLUE DOME													
	10/2/2002	2.04	±	2.37	0.76	±	0.88	3.40	±	0.07	12.57	±	0.28
	10/9/2002	1.28	±	1.61	0.47	±	0.60	1.91	±	0.06	7.07	±	0.23
	10/16/2002	1.73	±	2.01	0.64	±	0.74	3.02	±	0.07	11.16	±	0.26
	10/23/2002	1.23	±	2.15	0.46	±	0.80	2.88	±	0.09	10.65	±	0.34
	10/30/2002	1.21	±	2.37	0.45	±	0.88	3.39	±	0.08	12.53	±	0.28
	11/6/2002	1.07	±	0.68	0.40	±	0.25	5.52	±	0.29	20.42	±	1.05
	11/13/2002	1.20	±	0.54	0.44	±	0.20	2.39	±	0.18	8.84	±	0.65

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
BLUE DOME cont…	11/20/2002	0.96	±	0.52	0.35	±	0.19	2.37	±	0.17	8.75	±	0.64
	11/26/2002	0.74	±	0.66	0.28	±	0.24	2.61	±	0.21	9.64	±	0.78
	12/3/2002	1.39	±	0.71	0.51	±	0.26	5.59	±	0.28	20.68	±	1.03
	12/10/2002	3.73	±	0.82	1.38	±	0.30	7.96	±	0.30	29.44	±	1.10
	12/17/2002	0.97	±	0.77	0.36	±	0.29	2.77	±	0.20	10.23	±	0.75
	12/23/2002	2.14	±	0.62	0.79	±	0.23	1.90	±	0.15	7.03	±	0.56
	12/31/2002	0.86	±	0.62	0.32	±	0.23	2.69	±	0.18	9.94	±	0.66
FAA TOWER													
	10/2/2002	1.90	±	2.39	0.70	±	0.89	3.24	±	0.08	11.99	±	0.29
	10/9/2002	1.32	±	1.93	0.49	±	0.71	2.03	±	0.05	7.52	±	0.20
	10/16/2002	2.25	±	2.67	0.83	±	0.99	3.63	±	0.09	13.44	±	0.31
	10/23/2002	1.82	±	2.73	0.67	±	1.01	4.35	±	0.09	16.08	±	0.32
	10/30/2002	1.65	±	2.47	0.61	±	0.92	3.80	±	0.07	14.05	±	0.25
	11/6/2002	2.18	±	0.81	0.81	±	0.30	6.15	±	0.30	22.76	±	1.11
	11/13/2002	1.02	±	0.60	0.38	±	0.22	2.41	±	0.20	8.92	±	0.74
	11/20/2002	1.58	±	0.73	0.58	±	0.27	2.92	±	0.22	10.81	±	0.82
	11/26/2002	1.04	±	0.81	0.38	±	0.30	3.12	±	0.25	11.54	±	0.94
	12/3/2002	1.57	±	0.77	0.58	±	0.29	6.79	±	0.32	25.11	±	1.16
	12/10/2002	4.85	±	1.08	1.80	±	0.40	11.00	±	0.40	40.69	±	1.49
	12/17/2002	0.75	±	1.02	0.28	±	0.38	2.19	±	0.24	8.09	±	0.87
	12/23/2002	1.76	±	0.71	0.65	±	0.26	2.53	±	0.22	9.35	±	0.80
	12/31/2002	1.20	±	0.89	0.44	±	0.33	2.75	±	0.23	10.19	±	0.83
HOWE													
	10/2/2002	2.34	±	2.35	0.87	±	0.87	3.25	±	0.08	12.04	±	0.29
	10/9/2002	1.93	±	1.83	0.71	±	0.68	2.31	±	0.06	8.53	±	0.21
	10/16/2002	2.24	±	2.27	0.83	±	0.84	3.47	±	0.07	12.83	±	0.24
	10/23/2002	2.58	±	2.66	0.95	±	0.99	3.91	±	0.07	14.47	±	0.25
	10/30/2002	2.40	±	2.64	0.89	±	0.98	4.31	±	0.07	15.94	±	0.25
	11/6/2002	3.23	±	1.02	1.20	±	0.38	7.78	±	0.36	28.79	±	1.34

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
HOWE cont….	11/13/2002	1.52	±	0.64	0.56	±	0.24	3.06	±	0.21	11.32	±	0.78
	11/20/2002	1.32	±	0.57	0.49	±	0.21	2.99	±	0.19	11.05	±	0.70
	11/26/2002	0.84	±	0.68	0.31	±	0.25	3.24	±	0.23	11.97	±	0.86
	12/3/2002	2.93	±	0.75	1.09	±	0.28	7.38	±	0.28	27.32	±	1.02
	12/10/2002	5.17	±	1.07	1.91	±	0.39	11.00	±	0.39	40.69	±	1.44
	12/17/2002	2.55	±	0.95	0.94	±	0.35	3.57	±	0.23	13.21	±	0.85
	12/23/2002	1.56	±	0.57	0.58	±	0.21	2.44	±	0.18	9.04	±	0.66
	12/31/2002	1.39	±	0.71	0.51	±	0.26	3.37	±	0.20	12.45	±	0.74
HOWE (Q/A-2)													
	10/2/2002	1.95	±	0.79	0.72	±	0.29	3.18	±	0.23	11.77	±	0.87
	10/9/2002	1.33	±	0.58	0.49	±	0.22	2.33	±	0.18	8.62	±	0.65
	10/16/2002	2.22	±	0.68	0.82	±	0.25	3.23	±	0.20	11.95	±	0.73
	10/23/2002	2.07	±	1.02	0.77	±	0.38	5.62	±	0.35	20.79	±	1.30
	10/30/2002	1.68	±	0.60	0.62	±	0.22	4.10	±	0.22	15.17	±	0.80
	11/6/2002	3.37	±	0.89	1.25	±	0.33	8.04	±	0.32	29.75	±	1.20
	11/13/2002	1.45	±	0.55	0.54	±	0.20	3.07	±	0.19	11.36	±	0.69
	11/20/2002	2.10	±	0.75	0.78	±	0.28	4.04	±	0.24	14.96	±	0.88
	11/26/2002	1.33	±	0.67	0.49	±	0.25	3.58	±	0.22	13.23	±	0.82
	12/3/2002	2.45	±	0.72	0.91	±	0.27	7.31	±	0.28	27.05	±	1.03
	12/10/2002	4.57	±	0.88	1.69	±	0.33	10.66	±	0.34	39.45	±	1.24
	12/17/2002	1.95	±	0.92	0.72	±	0.34	3.66	±	0.24	13.56	±	0.87
	12/23/2002	1.50	±	0.56	0.55	±	0.21	2.31	±	0.17	8.56	±	0.64
	12/31/2002	1.37	±	0.70	0.51	±	0.26	3.34	±	0.20	12.34	±	0.74
MONTEVIEW													
	10/2/2002	2.37	±	2.10	0.88	±	0.78	3.13	±	0.08	11.58	±	0.31
	10/9/2002	1.77	±	1.76	0.65	±	0.65	2.35	±	0.07	8.68	±	0.25
	10/16/2002	2.58	±	2.08	0.95	±	0.77	3.20	±	0.08	11.83	±	0.28
	10/23/2002	2.05	±	2.21	0.76	±	0.82	3.40	±	0.09	12.59	±	0.34
	10/30/2002	2.72	±	2.07	1.01	±	0.76	3.79	±	0.08	14.01	±	0.30
	11/6/2002	2.79	±	0.69	1.03	±	0.26	5.87	±	0.24	21.72	±	0.89

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) ($x10^{-15}$ μCi/mL)			Result ± Uncertainty(2s) ($x10^{-10}$ Bq/mL)			Result ± Uncertainty(2s) ($x10^{-14}$ μCi/mL)			Result ± Uncertainty(2s) ($x10^{-10}$ Bq/ml)		
MONTEVIEW cont…	11/13/2002	1.81	±	0.59	0.67	±	0.22	2.91	±	0.18	10.77	±	0.68
	11/20/2002	1.44	±	0.57	0.53	±	0.21	2.90	±	0.18	10.73	±	0.68
	11/26/2002	0.91	±	0.59	0.34	±	0.22	2.70	±	0.19	9.99	±	0.72
	12/3/2002	2.29	±	0.68	0.85	±	0.25	6.43	±	0.26	23.80	±	0.95
	12/10/2002	5.67	±	0.98	2.10	±	0.36	10.54	±	0.34	38.98	±	1.26
	12/17/2002	1.75	±	0.86	0.65	±	0.32	3.58	±	0.23	13.24	±	0.83
	12/23/2002	2.15	±	0.66	0.79	±	0.24	2.47	±	0.18	9.14	±	0.66
	12/31/2002	1.16	±	0.64	0.43	±	0.24	2.61	±	0.17	9.64	±	0.64
MUD LAKE													
	10/2/2002	1.81	±	2.35	0.67	±	0.87	3.44	±	0.09	12.74	±	0.34
	10/9/2002	2.08	±	1.84	0.77	±	0.68	2.61	±	0.08	9.64	±	0.28
	10/16/2002	2.39	±	2.30	0.88	±	0.85	3.55	±	0.09	13.13	±	0.34
	10/23/2002	2.32	±	2.83	0.86	±	1.05	4.37	±	0.10	16.17	±	0.38
	10/30/2002	2.28	±	2.56	0.84	±	0.95	4.45	±	0.08	16.45	±	0.30
	11/6/2002	1.93	±	0.75	0.71	±	0.28	6.81	±	0.30	25.20	±	1.12
	11/13/2002	2.33	±	0.67	0.86	±	0.25	3.22	±	0.20	11.91	±	0.74
	11/20/2002	2.29	±	0.71	0.85	±	0.26	3.61	±	0.21	13.34	±	0.79
	11/26/2002	1.74	±	0.85	0.64	±	0.32	4.00	±	0.27	14.81	±	0.99
	12/3/2002	2.37	±	0.70	0.88	±	0.26	8.18	±	0.29	30.25	±	1.06
	12/10/2002	6.27	±	1.15	2.32	±	0.43	11.26	±	0.39	41.66	±	1.46
	12/17/2002	2.09	±	0.98	0.77	±	0.36	3.29	±	0.24	12.16	±	0.87
	12/23/2002	2.71	±	0.84	1.00	±	0.31	2.81	±	0.22	10.39	±	0.81
	12/31/2002	1.52	±	0.73	0.56	±	0.27	3.05	±	0.20	11.29	±	0.72
DISTANT													
BLACKFOOT, CMS													
	10/2/2002	1.47	±	0.58	0.54	±	0.21	2.37	±	0.17	8.77	±	0.64
	10/9/2002	1.01	±	0.58	0.37	±	0.22	2.06	±	0.18	7.64	±	0.66
	10/16/2002	1.46	±	0.75	0.54	±	0.28	3.31	±	0.24	12.25	±	0.89
	10/23/2002	3.29	±	2.64	1.22	±	0.98	4.15	±	0.08	15.33	±	0.28
	10/30/2002	2.37	±	2.39	0.88	±	0.88	4.05	±	0.07	15.00	±	0.24

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
BLACKFOOT, CMS cont…	11/6/2002	1.60	±	0.69	0.59	±	0.26	5.96	±	0.28	22.05	±	1.03
	11/13/2002	0.66	±	0.43	0.24	±	0.16	1.64	±	0.14	6.07	±	0.53
	11/20/2002	1.10	±	0.59	0.41	±	0.22	1.74	±	0.17	6.44	±	0.61
	11/26/2002	2.18	±	0.84	0.81	±	0.31	3.57	±	0.24	13.21	±	0.90
	12/3/2002	2.84	±	0.88	1.05	±	0.33	6.31	±	0.30	23.33	±	1.11
	12/10/2002	6.97	±	1.22	2.58	±	0.45	12.94	±	0.43	47.87	±	1.57
	12/17/2002	1.02	±	0.89	0.38	±	0.33	2.03	±	0.20	7.52	±	0.75
	12/23/2002	1.63	±	0.62	0.60	±	0.23	2.22	±	0.18	8.20	±	0.67
	12/31/2002	1.50	±	0.85	0.56	±	0.32	3.27	±	0.23	12.12	±	0.84
CRATERS OF THE MOON													
	10/2/2002	2.01	±	2.39	0.74	±	0.89	3.22	±	0.06	11.90	±	0.23
	10/9/2002	1.03	±	2.01	0.38	±	0.74	2.09	±	0.07	7.72	±	0.25
	10/16/2002	1.92	±	2.59	0.71	±	0.96	3.15	±	0.07	11.67	±	0.27
	10/23/2002	1.98	±	2.86	0.73	±	1.06	4.28	±	0.09	15.82	±	0.31
	10/30/2002	1.88	±	2.71	0.70	±	1.00	4.32	±	0.06	15.98	±	0.23
	11/6/2002	1.88	±	0.82	0.70	±	0.30	6.60	±	0.32	24.42	±	1.19
	11/13/2002	1.47	±	0.68	0.54	±	0.25	2.01	±	0.19	7.44	±	0.71
	11/20/2002	1.04	±	0.68	0.38	±	0.25	2.31	±	0.21	8.54	±	0.77
	11/26/2002	0.73	±	0.79	0.27	±	0.29	2.97	±	0.26	10.99	±	0.94
	12/3/2002	1.91	±	0.86	0.71	±	0.32	6.25	±	0.32	23.11	±	1.18
	12/10/2002	4.89	±	1.08	1.81	±	0.40	9.64	±	0.38	35.65	±	1.41
	12/17/2002	1.12	±	1.11	0.42	±	0.41	1.91	±	0.24	7.07	±	0.87
	12/23/2002	1.98	±	0.69	0.73	±	0.25	2.54	±	0.20	9.40	±	0.73
	12/31/2002	0.62	±	0.81	0.23	±	0.30	2.62	±	0.22	9.69	±	0.81
DUBOIS													
	10/2/2002	2.69	±	2.61	1.00	±	0.96	3.65	±	0.07	13.51	±	0.28
	10/9/2002	1.58	±	1.74	0.58	±	0.64	2.02	±	0.06	7.49	±	0.23
	10/16/2002	2.72	±	2.30	1.01	±	0.85	3.07	±	0.08	11.37	±	0.28
	10/23/2002	2.71	±	2.61	1.00	±	0.96	3.44	±	0.07	12.73	±	0.27
	10/30/2002	1.68	±	2.56	0.62	±	0.95	3.81	±	0.07	14.11	±	0.24

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
DUBOIS cont…	11/6/2002	1.40	±	0.74	0.52	±	0.27	5.61	±	0.30	20.76	±	1.09
	11/13/2002	1.65	±	1.77	0.61	±	0.65	5.39	±	0.59	19.94	±	2.19
	11/20/2002	1.31	±	0.62	0.48	±	0.23	2.34	±	0.19	8.64	±	0.68
	11/26/2002	1.46	±	0.77	0.54	±	0.29	2.22	±	0.21	8.21	±	0.77
	12/3/2002	1.49	±	0.67	0.55	±	0.25	6.03	±	0.27	22.32	±	1.01
	12/10/2002	5.72	±	1.11	2.12	±	0.41	10.73	±	0.38	39.70	±	1.42
	12/17/2002	21.30	±	38.79	7.88	±	14.35	3.85	±	5.90	14.24	±	21.82
	12/23/2002	2.51	±	0.84	0.93	±	0.31	2.73	±	0.22	10.09	±	0.83
	12/31/2002	0.84	±	0.80	0.31	±	0.30	2.74	±	0.22	10.15	±	0.80
IDAHO FALLS													
	10/2/2002	3.07	±	2.39	1.14	±	0.89	3.69	±	0.09	13.65	±	0.34
	10/9/2002	1.47	±	1.91	0.54	±	0.71	2.34	±	0.06	8.66	±	0.24
	10/16/2002	2.07	±	2.55	0.77	±	0.94	3.54	±	0.09	13.09	±	0.32
	10/23/2002	2.72	±	3.08	1.01	±	1.14	4.51	±	0.10	16.69	±	0.35
	10/30/2002	3.30	±	2.75	1.22	±	1.02	4.71	±	0.08	17.41	±	0.28
	11/6/2002	2.52	±	0.85	0.93	±	0.32	6.31	±	0.31	23.35	±	1.13
	11/13/2002	2.96	±	1.65	1.10	±	0.61	6.35	±	0.53	23.50	±	1.98
	11/20/2002	1.99	±	0.79	0.74	±	0.29	2.87	±	0.22	10.62	±	0.83
	11/26/2002	1.91	±	0.92	0.71	±	0.34	2.98	±	0.25	11.03	±	0.93
	12/3/2002	2.56	±	0.87	0.95	±	0.32	6.39	±	0.31	23.66	±	1.14
	12/10/2002	5.34	±	1.18	1.98	±	0.44	11.00	±	0.42	40.69	±	1.57
	12/17/2002	1.96	±	1.11	0.73	±	0.41	2.60	±	0.24	9.62	±	0.89
	12/23/2002	1.73	±	0.69	0.64	±	0.25	2.40	±	0.20	8.88	±	0.75
	12/31/2002	0.84	±	0.87	0.31	±	0.32	3.25	±	0.24	12.03	±	0.90
REXBURG, CMS													
	10/2/2002	3.25	±	2.43	1.20	±	0.90	3.57	±	0.08	13.20	±	0.29
	10/9/2002	2.13	±	1.82	0.79	±	0.67	1.85	±	0.07	6.83	±	0.25
	10/16/2002	2.99	±	2.41	1.11	±	0.89	3.29	±	0.09	12.16	±	0.34
	10/23/2002	3.04	±	2.90	1.12	±	1.07	4.30	±	0.08	15.90	±	0.30

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
REXBURG, CMS	10/30/2002	2.18	±	2.65	0.81	±	0.98	4.19	±	0.07	15.49	±	0.27
cont…	11/6/2002	1.57	±	0.75	0.58	±	0.28	5.96	±	0.30	22.05	±	1.10
	11/13/2002	1.63	±	0.63	0.60	±	0.23	2.09	±	0.18	7.73	±	0.65
	11/20/2002	1.72	±	0.70	0.64	±	0.26	2.43	±	0.20	8.99	±	0.72
	11/26/2002	1.58	±	0.78	0.58	±	0.29	2.98	±	0.23	11.02	±	0.84
	12/3/2002	3.14	±	0.96	1.16	±	0.36	6.19	±	0.31	22.89	±	1.15
	12/10/2002	6.35	±	1.19	2.35	±	0.44	11.90	±	0.42	44.02	±	1.54
	12/17/2002	1.61	±	0.91	0.60	±	0.34	2.51	±	0.21	9.30	±	0.77
	12/23/2002	2.73	±	0.84	1.01	±	0.31	2.58	±	0.21	9.54	±	0.77
	12/31/2002	1.17	±	0.84	0.43	±	0.31	2.69	±	0.22	9.95	±	0.80
INEEL													
EFS													
	10/2/2002	2.21	±	2.16	0.82	±	0.80	3.35	±	0.01	12.41	±	0.03
	10/9/2002	2.06	±	1.86	0.76	±	0.69	2.36	±	0.06	8.74	±	0.22
	10/16/2002	2.53	±	2.39	0.94	±	0.88	3.56	±	0.08	13.18	±	0.31
	10/23/2002	1.80	±	2.82	0.67	±	1.04	4.21	±	0.09	15.58	±	0.34
	10/30/2002	0.82	±	2.55	0.30	±	0.94	3.89	±	0.06	14.38	±	0.23
	11/6/2002	2.77	±	0.90	1.02	±	0.33	7.47	±	0.33	27.64	±	1.23
	11/13/2002	2.20	±	0.69	0.81	±	0.25	3.05	±	0.20	11.29	±	0.75
	11/20/2002	1.38	±	0.65	0.51	±	0.24	3.37	±	0.22	12.48	±	0.81
	11/26/2002	1.49	±	0.77	0.55	±	0.28	4.21	±	0.26	15.57	±	0.96
	12/3/2002	3.39	±	0.88	1.26	±	0.33	8.72	±	0.33	32.27	±	1.20
	12/10/2002	5.47	±	1.03	2.02	±	0.38	12.37	±	0.39	45.75	±	1.43
	12/17/2002	0.95	±	0.89	0.35	±	0.33	2.94	±	0.23	10.87	±	0.85
	12/23/2002	2.05	±	0.69	0.76	±	0.26	2.87	±	0.21	10.63	±	0.77
	12/31/2002	1.22	±	0.77	0.45	±	0.29	3.47	±	0.22	12.84	±	0.82

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) (x10^{-15} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/mL)			Result ± Uncertainty(2s) (x10^{-14} μCi/mL)			Result ± Uncertainty(2s) (x10^{-10} Bq/ml)		
MAIN GATE													
	10/2/2002	2.65	±	2.22	0.98	±	0.82	3.46	±	0.08	12.80	±	0.28
	10/9/2002	0.80	±	1.84	0.30	±	0.68	2.35	±	0.07	8.68	±	0.26
	10/16/2002	2.88	±	2.28	1.07	±	0.84	3.33	±	0.08	12.33	±	0.31
	10/23/2002	2.51	±	2.64	0.93	±	0.98	4.19	±	0.10	15.52	±	0.36
	10/30/2002	1.73	±	2.38	0.64	±	0.88	4.23	±	0.07	15.66	±	0.27
	11/6/2002	2.29	±	0.75	0.85	±	0.28	7.32	±	0.30	27.08	±	1.10
	11/13/2002	1.42	±	0.59	0.53	±	0.22	2.71	±	0.19	10.03	±	0.70
	11/20/2002	1.59	±	0.64	0.59	±	0.24	3.60	±	0.22	13.30	±	0.79
	11/26/2002	1.24	±	0.73	0.46	±	0.27	3.83	±	0.25	14.16	±	0.91
	12/3/2002	3.08	±	0.85	1.14	±	0.31	9.02	±	0.33	33.37	±	1.22
	12/10/2002	6.28	±	1.09	2.32	±	0.40	13.08	±	0.40	48.40	±	1.47
	12/17/2002	0.74	±	0.84	0.27	±	0.31	2.35	±	0.21	8.69	±	0.77
	12/23/2002	1.83	±	0.66	0.68	±	0.25	3.06	±	0.21	11.32	±	0.79
	12/31/2002	1.04	±	0.74	0.38	±	0.28	3.46	±	0.22	12.82	±	0.81
VAN BUREN													
	10/2/2002	3.11	±	0.22	1.15	±	0.08	3.25	±	0.06	12.03	±	0.24
	10/9/2002	1.13	±	1.83	0.42	±	0.68	2.27	±	0.06	8.40	±	0.22
	10/16/2002	2.51	±	2.30	0.93	±	0.85	3.26	±	0.08	12.07	±	0.28
	10/23/2002	2.13	±	2.88	0.79	±	1.07	4.31	±	0.09	15.94	±	0.32
	10/30/2002	1.45	±	2.31	0.54	±	0.85	3.93	±	0.07	14.52	±	0.26
	11/6/2002	2.22	±	0.74	0.82	±	0.27	7.04	±	0.29	26.05	±	1.08
	11/13/2002	1.27	±	0.58	0.47	±	0.21	3.02	±	0.20	11.17	±	0.74
	11/20/2002	1.68	±	0.66	0.62	±	0.24	2.91	±	0.20	10.77	±	0.74
	11/26/2002	1.52	±	0.74	0.56	±	0.27	3.79	±	0.24	14.02	±	0.89
	12/3/2002	1.29	±	0.65	0.48	±	0.24	7.76	±	0.30	28.72	±	1.11
	12/10/2002	4.64	±	0.92	1.72	±	0.34	11.04	±	0.35	40.84	±	1.30
	12/17/2002	1.13	±	0.87	0.42	±	0.32	2.66	±	0.22	9.86	±	0.80
	12/23/2002	1.90	±	0.65	0.70	±	0.24	2.92	±	0.20	10.79	±	0.75
	12/31/2002	0.84	±	0.70	0.31	±	0.26	3.16	±	0.21	11.67	±	0.77

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

Sample Group & Location	*Sampling Date*	*Result ± Uncertainty(2s) x 10^{-6} μCi*			*Result ± Uncertainty(2s) X 10^{-2} Bq*		
BOUNDARY							
ARCO							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
ARCO (Q/A-1)							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
ATOMIC CITY							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) x 10^{-6} μCi			Result ± Uncertainty(2s) X 10^{-2} Bq		
BLUE DOME							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
FAA TOWER							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
HOWE							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) x 10^{-6} μCi			Result ± Uncertainty(2s) X 10^{-2} Bq		
HOWE (Q/A-2)							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
MONTEVIEW							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
MUD LAKE							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) x 10^{-6} μCi			Result ± Uncertainty(2s) X 10^{-2} Bq		
DISTANT							
BLACKFOOT, CMS							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	-0.30	±	2.68	-1.11	±	9.92
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
CRATERS OF THE MOON							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
DUBOIS							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92

Sample Group & Location	Sampling Date	Result ± Uncertainty(2s) x 10^{-6} μCi			Result ± Uncertainty(2s) X 10^{-2} Bq		
IDAHO FALLS							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.29
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
REXBURG, CMS							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
INEEL							
EFS							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92

Sample Group & Location	***Sampling Date***	***Result ± Uncertainty(2s) x 10^{-6} μCi***			***Result ± Uncertainty(2s) X 10^{-2} Bq***		
MAIN GATE							
	10/2/2002	-0.64	±	2.86	-2.36	±	10.58
	10/9/2002	-1.13	±	2.52	-4.18	±	9.32
	10/16/2002	0.19	±	2.18	0.71	±	8.07
	10/23/2002	-0.23	±	2.18	-0.85	±	8.07
	10/30/2002	1.56	±	3.72	5.77	±	13.76
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/6/2002	0.08	±	3.44	0.28	±	12.73
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/13/2002	-0.52	±	2.28	-1.93	±	8.44
	11/20/2002	-0.10	±	2.54	-0.36	±	9.40
	11/26/2002	0.13	±	2.56	0.48	±	9.47
	12/3/2002	-1.19	±	3.16	-4.40	±	11.69
	12/10/2002	-0.95	±	2.84	-3.50	±	10.51
	12/17/2002	-0.06	±	1.43	-0.22	±	5.31
	12/23/2002	0.07	±	2.46	0.26	±	9.10
	12/31/2002	-0.51	±	2.14	-1.87	±	7.92
VAN BUREN							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/26/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	1.66	±	2.90	6.14	±	10.73
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84
OUT OF STATE							
JACKSON, WYOMING							
	10/2/2002	0.32	±	3.86	1.20	±	14.28
	10/9/2002	-2.24	±	2.12	-8.29	±	7.84
	10/16/2002	1.69	±	2.34	6.25	±	8.66
	10/23/2002	0.93	±	3.02	3.44	±	11.17
	10/30/2002	0.34	±	3.02	1.27	±	11.17
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/6/2002	1.20	±	3.34	4.44	±	12.36
	11/13/2002	1.09	±	2.62	4.03	±	9.69
	11/20/2002	0.18	±	2.82	0.66	±	10.43
	11/27/2002	-2.33	±	2.80	-8.62	±	10.36
	12/3/2002	2.10	±	3.36	7.77	±	12.43
	12/10/2002	0.40	±	3.12	1.48	±	11.54
	12/17/2002	1.14	±	2.54	4.22	±	9.40
	12/23/2002	0.71	±	1.78	2.61	±	6.59
	12/31/2002	-0.75	±	2.66	-2.76	±	9.84

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

Sample Group & Location	*Sampling Date*	*Analyte*	*Result ± Uncertainty(2s)* x 10^{-18} μCi/mL			*Result ± Uncertainty(2s)* x 10^{-13} Bq/mL		
BOUNDARY								
ARCO								
	12/31/2002	CESIUM-137	-1550.00	±	924.00	-573.50	±	341.88
	12/31/2002	STRONTIUM-90	33.90	±	38.00	12.54	±	14.06
ARCO (Q/A-1)								ARCO (Q/A-1)
	12/31/2002	CESIUM-137	-1530.00	±	1070.00	-566.10	±	395.90
	12/31/2002	STRONTIUM-90	15.90	±	33.00	5.88	±	12.21
ATOMIC CITY								
	12/31/2002	CESIUM-137	152.00	±	189.00	56.24	±	69.93
	12/31/2002	STRONTIUM-90	25.10	±	31.00	9.29	±	11.47
BLUE DOME								
	12/31/2002	CESIUM-137	-8.29	±	156.00	-3.07	±	57.72
	12/31/2002	STRONTIUM-90	27.40	±	31.00	10.14	±	11.47
FAA TOWER								
	12/31/2002	AMERICIUM-241	1.05	±	1.90	0.39	±	0.70
	12/31/2002	CESIUM-137	-2240.00	±	1170.00	-828.80	±	432.90
	12/31/2002	PLUTONIUM-238	0.00	±	0.72	0.00	±	0.27
	12/31/2002	PLUTONIUM-239/40	1.77	±	1.50	0.65	±	0.56
HOWE								
	12/31/2002	AMERICIUM-241	1.60	±	1.20	0.59	±	0.44
	12/31/2002	CESIUM-137	10.40	±	217.00	3.85	±	80.29
	12/31/2002	PLUTONIUM-238	0.00	±	0.64	0.00	±	0.24
	12/31/2002	PLUTONIUM-239/40	3.94	±	2.20	1.46	±	0.81
HOWE (Q/A-2)								
	12/31/2002	AMERICIUM-241	0.90	±	1.60	0.33	±	0.59
	12/31/2002	CESIUM-137	-104.00	±	196.00	-38.48	±	72.52
	12/31/2002	PLUTONIUM-238	0.00	±	0.47	0.00	±	0.17
	12/31/2002	PLUTONIUM-239/40	2.10	±	1.30	0.78	±	0.48

Sample Group & Location	Sampling Date	Analyte	Result ± Uncertainty(2s) x 10^{-18} µCi/mL			Result ± Uncertainty(2s) x 10^{-13} Bq/mL		
MONTEVIEW								
	12/31/2002	AMERICIUM-241	1.02	±	1.30	0.38	±	0.48
	12/31/2002	CESIUM-137	-1360.00	±	866.00	-503.20	±	320.42
	12/31/2002	PLUTONIUM-238	-0.38	±	0.54	-0.14	±	0.20
	12/31/2002	PLUTONIUM-239/40	1.89	±	1.20	0.70	±	0.44
MUD LAKE								
	12/31/2002	CESIUM-137	-1740.00	±	977.00	-643.80	±	361.49
	12/31/2002	STRONTIUM-90	30.60	±	30.00	11.32	±	11.10
DISTANT								
BLACKFOOT, CMS								
	12/31/2002	CESIUM-137	154.00	±	211.00	56.98	±	78.07
	12/31/2002	STRONTIUM-90	24.60	±	30.00	9.10	±	11.10
CRATERS OF THE MOON								
	12/31/2002	AMERICIUM-241	0.77	±	1.90	0.29	±	0.70
	12/31/2002	CESIUM-137	-56.90	±	246.00	-21.05	±	91.02
	12/31/2002	PLUTONIUM-238	-0.67	±	1.30	-0.25	±	0.48
	12/31/2002	PLUTONIUM-239/40	1.34	±	1.70	0.50	±	0.63
DUBOIS								
	12/31/2002	CESIUM-137	198.00	±	272.00	73.26	±	100.64
	12/31/2002	STRONTIUM-90	28.10	±	38.00	10.40	±	14.06
IDAHO FALLS								
	12/31/2002	AMERICIUM-241	2.08	±	1.70	0.77	±	0.63
	12/31/2002	CESIUM-137	57.20	±	198.00	21.16	±	73.26
	12/31/2002	PLUTONIUM-238	0.00	±	0.92	0.00	±	0.34
	12/31/2002	PLUTONIUM-239/40	2.60	±	1.90	0.96	±	0.70
REXBURG, CMS								
	12/31/2002	AMERICIUM-241	1.25	±	1.30	0.46	±	0.48
	12/31/2002	CESIUM-137	106.00	±	188.00	39.22	±	69.56
	12/31/2002	PLUTONIUM-238	0.00	±	1.10	0.00	±	0.41
	12/31/2002	PLUTONIUM-239/40	1.05	±	1.10	0.39	±	0.41

Sample Group & Location	Sampling Date	Analyte	Result ± Uncertainty(2s) x 10^{-18} μCi/mL			Result ± Uncertainty(2s) x 10^{-13} Bq/mL		
INEEL								
EFS								
	12/31/2002	AMERICIUM-241	0.59	±	1.40	0.22	±	0.52
	12/31/2002	CESIUM-137	-16.30	±	163.00	-6.03	±	60.31
	12/31/2002	PLUTONIUM-238	0.23	±	0.46	0.09	±	0.17
	12/31/2002	PLUTONIUM-239/40	2.07	±	1.40	0.77	±	0.52
MAIN GATE								
	12/31/2002	CESIUM-137	-1630.00	±	980.00	-603.10	±	362.60
	12/31/2002	STRONTIUM-90	23.20	±	36.00	8.58	±	13.32
VAN BUREN								
	12/31/2002	AMERICIUM-241	2.59	±	2.10	0.96	±	0.78
	12/31/2002	CESIUM-137	145.00	±	169.00	53.65	±	62.53
	12/31/2002	PLUTONIUM-238	-0.40	±	0.57	-0.15	±	0.21
	12/31/2002	PLUTONIUM-239/40	1.59	±	1.30	0.59	±	0.48
OUT OF STATE								
JACKSON, WYOMING								
	12/31/2002	CESIUM-137	-156.00	±	218.00	-57.72	±	80.66
	12/31/2002	STRONTIUM-90	22.90	±	39.00	8.47	±	14.43

TABLE C-4: Tritium Concentrations in Atmospheric Moisture

Location	Start Date	Collect Date	Result ± Uncertainty(2s) (x 10^{-13} μCi/mL $_{Air}$)			Result ± Uncertainty(2s) (x 10^{-8} Bq /mL $_{Air}$)			Media Type Collection Medium
ATOMIC CITY	9/19/2002	10/9/2002	37.99	±	22.27	14.06	±	8.24	SILICA GEL
	10/9/2002	11/20/2002	0.63	±	1.34	0.23	±	0.50	SILICA GEL
BLACKFOOT	9/18/2002	10/9/2002	1.73	±	2.53	0.64	±	0.94	SILICA GEL
	10/9/2002	11/26/2002	0.74	±	1.31	0.27	±	0.48	SILICA GEL
IDAHO FALLS	9/25/2002	10/23/2002	6.43	±	2.40	2.38	±	0.89	SILICA GEL
	10/23/2002	12/10/2002	1.28	±	1.74	0.47	±	0.64	SILICA GEL
REXBURG, CMS	9/18/2002	10/16/2002	2.36	±	2.23	0.87	±	0.83	SILICA GEL
	10/16/2002	12/10/2002	2.05	±	1.64	0.76	±	0.61	SILICA GEL

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

Location	*Sampling Date*	*Concentration (μg/m3)*	*Comments*
ATOMIC CITY			
	10/4/2002	9.30	
	10/10/2002	20.60	
	10/16/2002	27.90	
	10/22/2002	92.50	
	10/28/2002	10.30	
	11/3/2002	5.20	
	11/9/2002	0.10	
	11/15/2002	5.10	
	11/21/2002	4.20	
	11/27/2002	5.30	
	12/3/2002	3.90	
	12/9/2002	3.80	
	12/15/2002	8.20	
	12/21/2002	2.10	
	12/27/2002	7.10	
BLACKFOOT, CMS			
	10/4/2002	3.10	
	10/10/2002	22.30	
	10/16/2002	29.10	
	10/22/2002	18.90	
	10/28/2002	7.50	
	11/3/2002	11.10	
	11/9/2002	0.90	
	11/15/2002	12.80	
	11/21/2002	13.10	
	11/27/2002	9.50	
	12/3/2002	22.80	
	12/9/2002	15.60	
	12/15/2002	4.70	
	12/21/2002	8.70	
	12/27/2002	9.80	

Location	Sampling Date	Concentration (μg/m3)	Comments
REXBURG, CMS			
	10/4/2002	1.20	
	10/10/2002	38.30	
	10/16/2002	56.80	
	10/22/2002	3.70	
	10/28/2002	13.80	
	11/3/2002	20.00	
	11/9/2002	1.40	
	11/15/2002	18.80	
	11/21/2002	32.70	
	11/27/2002	28.10	
	12/3/2002	36.50	
	12/9/2002	31.10	
	12/15/2002		Invalid Sample
	12/21/2002	5.90	
	12/27/2002	4.90	

TABLE C-6: Weekly & Monthly Tritium Concentrations in Precipitation

Location		Start Date	End Date	Result (pCi /L)	Uncertainty(2s) (pCi /L)		Result (Bq /L)	± Uncertainty(2s) (Bq /L)	
CFA									
	*	9/30/2002	11/1/2002	0.00	±	0.00	0.00	±	0.00
		11/1/2002	12/2/2002	212.00	±	58.70	7.85	±	2.17
EFS									
		11/6/2002	11/13/2002	-16.30	±	63.00	-0.60	±	2.33
		11/20/2002	11/26/2002	140.00	±	64.90	5.19	±	2.40
		12/10/2002	12/17/2002	127.00	±	57.60	4.70	±	2.13
		12/23/2002	12/31/2002	69.90	±	56.30	2.59	±	2.09
IDAHO FALLS									
		9/30/2002	11/4/2002	46.70	±	62.40	1.73	±	2.31
		11/4/2002	12/4/2002	68.60	±	64.10	2.54	±	2.37
		12/4/2002	12/31/2002	120.00	±	57.90	4.44	±	2.14

*** Invalid Sample V (There is less than 20 ml of sample collected)**

TABLE C-7: Bi-Annual Gross Alpha, Gross Beta & Tritium Concentrations in Drinking and Surface Water

Sample Type and Location	*Sampling Date*	*Quality Control Type*	*Analyte*	*Result ± Uncertainty(2s) pCi/L*			*Result ± Uncertainty(2s) Bq/L*		
DRINKING WATER									
ABERDEEN									
	11/5/2002	N/A	GROSS ALPHA	0.31	±	0.93	0.01	±	0.03
	11/5/2002	N/A	GROSS BETA	8.04	±	2.09	0.30	±	0.08
	11/5/2002	N/A	TRITIUM	35.20	±	61.00	1.30	±	2.26
ARCO									
	11/11/2002	N/A	GROSS ALPHA	0.51	±	0.81	0.02	±	0.03
	11/11/2002	N/A	GROSS BETA	2.22	±	1.69	0.08	±	0.06
	11/11/2002	N/A	TRITIUM	136.00	±	113.00	5.04	±	4.19
ATOMIC CITY									
	11/6/2002	N/A	GROSS ALPHA	0.41	±	0.79	0.02	±	0.03
	11/6/2002	DUPLICATE	GROSS ALPHA	0.19	±	0.73	0.01	±	0.03
	11/6/2002	N/A	GROSS BETA	3.69	±	1.77	0.14	±	0.07
	11/6/2002	DUPLICATE	GROSS BETA	2.59	±	1.79	0.10	±	0.07
	11/6/2002	N/A	TRITIUM	101.00	±	107.00	3.74	±	3.96
	11/6/2002	DUPLICATE	TRITIUM	49.80	±	60.00	1.84	±	2.22
CAREY									
	11/5/2002	N/A	GROSS ALPHA	0.78	±	0.84	0.03	±	0.03
	11/5/2002	N/A	GROSS BETA	3.02	±	1.73	0.11	±	0.06
	11/5/2002	N/A	TRITIUM	90.90	±	61.70	3.37	±	2.29
FORT HALL									
	11/13/2002	N/A	GROSS ALPHA	0.31	±	0.92	0.01	±	0.03
	11/13/2002	N/A	GROSS BETA	8.31	±	2.10	0.31	±	0.08
	11/13/2002	N/A	TRITIUM	118.00	±	107.00	4.37	±	3.96

Sample Type and Location	Sampling Date	Quality Control Type	Analyte	Result ± Uncertainty(2s) pCi/L			Result ± Uncertainty(2s) Bq/L		
HOWE									
	11/6/2002	N/A	GROSS ALPHA	0.28	±	0.75	0.01	±	0.03
	11/6/2002	N/A	GROSS BETA	2.19	±	1.68	0.08	±	0.06
	11/6/2002	N/A	TRITIUM	-107.00	±	121.00	-3.96	±	4.48
IDAHO FALLS									
	11/7/2002	N/A	GROSS ALPHA	0.14	±	0.83	0.01	±	0.03
	11/7/2002	N/A	GROSS BETA	2.80	±	1.77	0.10	±	0.07
	11/7/2002	N/A	TRITIUM	22.20	±	60.80	0.82	±	2.25
MINIDOKA									
	11/4/2002	N/A	GROSS ALPHA	-0.45	±	0.66	-0.02	±	0.02
	11/4/2002	N/A	GROSS BETA	4.33	±	1.83	0.16	±	0.07
	11/4/2002	N/A	TRITIUM	46.70	±	60.00	1.73	±	2.22
MONTEVIEW									
	11/11/2002	N/A	GROSS ALPHA	2.47	±	1.51	0.09	±	0.06
	11/11/2002	N/A	GROSS BETA	8.15	±	2.40	0.30	±	0.09
	11/11/2002	N/A	TRITIUM	0.00	±	0.00	0.00	±	0.00
MORELAND									
	11/5/2002	N/A	GROSS ALPHA	0.16	±	1.07	0.01	±	0.04
	11/5/2002	N/A	GROSS BETA	3.69	±	2.07	0.14	±	0.08
	11/5/2002	N/A	TRITIUM	131.00	±	113.00	4.85	±	4.18
MUDLAKE									
	11/6/2002	N/A	GROSS ALPHA	0.02	±	0.55	0.00	±	0.02
	11/6/2002	N/A	GROSS BETA	4.00	±	1.72	0.15	±	0.06
	11/6/2002	N/A	TRITIUM	-115.00	±	121.00	-4.26	±	4.48
ROBERTS									
	11/6/2002	N/A	GROSS ALPHA	0.13	±	0.80	0.00	±	0.03
	11/6/2002	N/A	GROSS BETA	3.10	±	1.77	0.11	±	0.07
	11/6/2002	N/A	TRITIUM	0.90	±	60.60	0.03	±	2.24

Sample Type and Location	Sampling Date	Quality Control Type	Analyte	Result ± Uncertainty(2s) pCi/L			Result ± Uncertainty(2s) Bq/L		
SHOSHONE									
	11/4/2002	N/A	GROSS ALPHA	0.40	±	0.64	0.01	±	0.02
	11/4/2002	N/A	GROSS BETA	2.07	±	1.61	0.08	±	0.06
	11/4/2002	N/A	TRITIUM	66.70	±	60.20	2.47	±	2.23
TABER									
	11/11/2002	N/A	GROSS ALPHA	0.57	±	0.98	0.02	±	0.04
	11/11/2002	N/A	GROSS BETA	4.51	±	1.91	0.17	±	0.07
	11/11/2002	N/A	TRITIUM	117.00	±	113.00	4.33	±	4.18
SURFACE WATER									
BLISS									
	11/4/2002	N/A	GROSS ALPHA	0.45	±	0.91	0.02	±	0.03
	11/4/2002	N/A	GROSS BETA	5.75	±	2.02	0.21	±	0.07
	11/4/2002	N/A	TRITIUM	20.30	±	116.00	0.75	±	4.29
BUHL									
	11/4/2002	N/A	GROSS ALPHA	0.03	±	0.79	0.00	±	0.03
	11/4/2002	N/A	GROSS BETA	3.95	±	1.90	0.15	±	0.07
	11/4/2002	N/A	TRITIUM	41.40	±	120.00	1.53	±	4.44
HAGERMAN									
	11/4/2002	N/A	GROSS ALPHA	0.19	±	0.71	0.01	±	0.03
	11/4/2002	DUPLICATE	GROSS ALPHA	0.39	±	0.78	0.01	±	0.03
	11/4/2002	N/A	GROSS BETA	2.25	±	1.76	0.08	±	0.07
	11/4/2002	DUPLICATE	GROSS BETA	3.63	±	1.85	0.13	±	0.07
	11/4/2002	N/A	TRITIUM	-45.30	±	120.00	-1.68	±	4.44
	11/4/2002	DUPLICATE	TRITIUM	-138.00	±	121.00	-5.11	±	4.48
IDAHO FALLS									
	11/7/2002	N/A	GROSS ALPHA	-0.21	±	0.62	-0.01	±	0.02
	11/7/2002	N/A	GROSS BETA	1.85	±	1.72	0.07	±	0.06
	11/7/2002	N/A	TRITIUM	-38.90	±	-38.90	-1.44	±	4.44

Sample Type and Location	*Sampling Date*	*Quality Control Type*	*Analyte*	*Result ± Uncertainty(2s) pCi/L*			*Result ± Uncertainty(2s) Bq/L*		
TWIN FALLS									
	11/4/2002	N/A	GROSS ALPHA	0.24	±	0.89	0.01	±	0.03
	11/4/2002	N/A	GROSS BETA	6.26	±	2.06	0.23	±	0.08
	11/4/2002	N/A	TRITIUM	173.00	±	107.00	6.41	±	3.96
	11/4/2002	N/A	TRITIUM	143.00	±	106.00	5.30	±	3.93

TABLE C-8: Weekly & Monthly Iodine-131 & Cesium-137 Concentrations in Milk

Location	Analyte	Sampling Date	Results ± Uncertainty(2s) pCi/L			Results ± Uncertainty(2s) x 10^{-2} Bq/L		
ARCO								
	CESIUM-137	10/1/2002	0.52	±	2.88	1.92	±	10.67
	IODINE-131	10/1/2002	0.41	±	3.44	1.50	±	12.74
BLACKFOOT								
	CESIUM-137	10/1/2002	-2.49	±	7.30	-9.22	±	27.04
	IODINE-131	10/1/2002	2.10	±	8.30	7.78	±	30.74
	IODINE-131	11/5/2002	2.07	±	3.96	7.67	±	14.67
	CESIUM-137	12/2/2002	-15.40	±	8.56	-57.04	±	31.70
	IODINE-131	12/2/2002	1.34	±	4.72	4.96	±	17.48
CAREY								
	CESIUM-137	10/1/2002	0.91	±	1.51	3.36	±	5.59
	IODINE-131	10/1/2002	0.14	±	2.56	0.52	±	9.48
	CESIUM-137	11/5/2002	-0.20	±	1.51	-0.73	±	5.59
	IODINE-131	11/5/2002	-0.69	±	1.75	-2.55	±	6.48
	CESIUM-137	12/2/2002	4.71	±	7.90	17.44	±	29.26
	IODINE-131	12/2/2002	-3.35	±	6.22	-12.41	±	23.04
DIETRICH								
	CESIUM-137	10/1/2002	0.20	±	1.49	0.75	±	5.52
	IODINE-131	10/1/2002	-2.75	±	2.18	-10.19	±	8.07
	CESIUM-137	11/5/2002	-0.84	±	2.88	-3.10	±	10.67
	IODINE-131	11/5/2002	-3.23	±	3.96	-11.96	±	14.67
	CESIUM-137	12/2/2002	1.16	±	7.70	4.30	±	28.52
	IODINE-131	12/2/2002	-1.06	±	5.34	-3.93	±	19.78
HOWE								
	CESIUM-137	10/1/2002	1.23	±	7.36	4.56	±	27.26
	IODINE-131	10/1/2002	1.71	±	6.50	6.33	±	24.07
	CESIUM-137	11/5/2002	-0.14	±	1.56	-0.51	±	5.78
	IODINE-131	11/5/2002	-0.36	±	2.24	-1.35	±	8.30
	CESIUM-137	12/2/2002	3.82	±	7.76	14.15	±	28.74
	IODINE-131	12/2/2002	-0.72	±	4.88	-2.66	±	18.07
IDAHO FALLS								
	CESIUM-137	10/2/2002	0.58	±	7.34	2.15	±	27.19
	IODINE-131	10/2/2002	-0.84	±	8.62	-3.11	±	31.93
	CESIUM-137	10/9/2002	0.44	±	7.42	1.61	±	27.48
	IODINE-131	10/9/2002	-2.66	±	5.70	-9.85	±	21.11
	CESIUM-137	10/16/2002	0.08	±	2.86	0.29	±	10.59
	IODINE-131	10/16/2002	0.76	±	2.84	2.81	±	10.52
	CESIUM-137	10/23/2002	-1.94	±	7.42	-7.19	±	27.48
	IODINE-131	10/23/2002	-2.29	±	6.04	-8.48	±	22.37

Location	Analyte	Sampling Date	Results ± Uncertainty(2s) pCi/L			Results ± Uncertainty(2s) $x\ 10^{-2}$ Bq/L		
	CESIUM-137	10/30/2002	5.55	±	7.78	20.56	±	28.81
	IODINE-131	10/30/2002	-4.03	±	5.58	-14.93	±	20.67
	CESIUM-137	11/5/2002	-0.67	±	2.78	-2.47	±	10.30
	IODINE-131	11/5/2002	-0.34	±	3.10	-1.26	±	11.48
	CESIUM-137	11/13/2002	4.97	±	7.82	18.41	±	28.96
	IODINE-131	11/13/2002	-5.94	±	5.16	-22.00	±	19.11
	CESIUM-137	11/20/2002	-0.71	±	7.88	-2.61	±	29.19
	IODINE-131	11/20/2002	4.38	±	5.18	16.22	±	19.19
	CESIUM-137	11/26/2002	0.44	±	1.54	1.63	±	5.70
	IODINE-131	11/26/2002	-1.48	±	2.46	-5.48	±	9.11
	CESIUM-137	12/3/2002	1.20	±	1.58	4.44	±	5.85
	IODINE-131	12/3/2002	-0.32	±	1.92	-1.17	±	7.10
	CESIUM-137	12/10/2002	1.15	±	1.52	4.26	±	5.64
	IODINE-131	12/10/2002	-0.45	±	2.08	-1.67	±	7.70
	CESIUM-137	12/17/2002	5.57	±	7.74	20.63	±	28.67
	IODINE-131	12/17/2002	1.74	±	4.50	6.44	±	16.67
	CESIUM-137	12/23/2002	0.86	±	1.57	3.20	±	5.81
	IODINE-131	12/23/2002	-1.18	±	2.10	-4.37	±	7.78
MORELAND								
	CESIUM-137	10/1/2002	-2.66	±	7.22	-9.85	±	26.74
	IODINE-131	10/1/2002	2.50	±	6.84	9.26	±	25.33
	CESIUM-137	11/5/2002	0.81	±	1.56	2.99	±	5.78
	IODINE-131	11/5/2002	-0.98	±	2.72	-3.63	±	10.07
	CESIUM-137	12/2/2002	-0.71	±	2.88	-2.62	±	10.67
	IODINE-131	12/2/2002	-2.26	±	3.28	-8.37	±	12.15
ROBERTS								
	CESIUM-137	10/1/2002	-0.90	±	2.88	-3.31	±	10.67
	IODINE-131	10/1/2002	5.26	±	3.02	19.48	±	11.19
	CESIUM-137	11/5/2002	-1.44	±	6.12	-5.33	±	22.67
	IODINE-131	11/5/2002	-11.10	±	8.02	-41.11	±	29.70
	CESIUM-137	12/2/2002	0.75	±	1.53	2.77	±	5.68
	IODINE-131	12/2/2002	0.49	±	2.02	1.81	±	7.48
RUPERT								
	CESIUM-137	10/1/2002	0.66	±	2.84	2.44	±	10.52
	IODINE-131	10/1/2002	-0.36	±	3.74	-1.35	±	13.85
	CESIUM-137	11/5/2002	3.11	±	7.86	11.52	±	29.11
	IODINE-131	11/5/2002	-1.65	±	5.62	-6.11	±	20.81
	CESIUM-137	12/2/2002	-0.46	±	2.74	-1.71	±	10.15
	IODINE-131	12/2/2002	-1.70	±	3.88	-6.30	±	14.37

Location	*Analyte*	*Sampling Date*	*Results ± Uncertainty(2s) pCi/L*			*Results ± Uncertainty(2s) x 10^{-2} Bq/L*		
TERRETON								
	CESIUM-137	10/1/2002	-0.11	±	7.42	-0.39	±	27.48
	IODINE-131	10/1/2002	-3.86	±	6.28	-14.30	±	23.26
	CESIUM-137	11/5/2002	2.49	±	6.16	9.22	±	22.81
	IODINE-131	11/5/2002	-5.53	±	11.00	-20.48	±	40.74
	CESIUM-137	12/2/2002	-0.12	±	1.57	-0.43	±	5.82
	IODINE-131	12/2/2002	0.28	±	2.26	1.03	±	8.37

TABLE C-9: Bi-annual Strontium-90 Concentrations in Milk

Location	*Sampling Date*	*Result ± Uncertainty(2s) pCi/L*			*Result ± Uncertainty(2s) Bq/L*		
DIETRICH							
	11/5/2002	0.71	±	0.46	0.03	±	0.02
	11/5/2002	0.83	±	0.44	0.03	±	0.02
HOWE							
	11/5/2002	0.39	±	0.42	0.01	±	0.02
MORELAND							
	11/5/2002	0.60	±	0.42	0.02	±	0.02
ROBERTS							
	11/5/2002	0.84	±	0.42	0.03	±	0.02

TABLE C-10: CESIUM-137 CONCENTRATIONS IN POTATOES

Sample Type	Sampling Date	Location	Result pCi/kg	±	Uncertainty (2s)	Result bq/kg	±	Uncertainty bq/kg
POTATOES								
	10/1/2002	RUPERT	0.14	±	2.93	0.01	±	0.11
	10/14/2002	AMMON	2.89	±	3.50	0.11	±	0.13
	10/9/2002	ARCO	-20.56	±	11.05	-0.76	±	0.41
	10/4/2002	HOWE	-19.76	±	11.21	-0.73	±	0.42
	10/4/2002	MONTEVIEW	2.58	±	2.79	0.10	±	0.10
	10/2/2002	MUD LAKE	3.37	±	3.29	0.12	±	0.12
	11/1/2002	NEW JERSEY	0.25	±	3.15	0.01	±	0.12
	10/1/2002	TABER	2.29	±	2.93	0.08	±	0.11
	10/14/2002	TABER	1.70	±	2.74	0.06	±	0.10

TABLE C-11: Strontium-90 Concentrations in Potatoes

Sample Type	*Sampling Date*	*Location*	*Result pCi/kg*	*±*	*Uncertainty (2s)*	*Result bq/kg*	*±*	*Uncertainty bq/kg*
POTATOES								
	10/1/2002	RUPERT	0.28	±	4.30	7.54	±	116.00
	10/14/2002	AMMON	0.68	±	6.44	18.40	±	174.00
	10/9/2002	ARCO	3.74	±	6.59	101.00	±	178.00
	10/4/2002	HOWE	0.96	±	4.15	25.90	±	112.00
	10/4/2002	MONTEVIEW	-2.57	±	5.70	-69.50	±	154.00
	10/2/2002	MUD LAKE	0.43	±	5.11	11.50	±	138.00
	11/1/2002	NEW JERSEY	-1.10	±	5.48	-29.70	±	148.00
	10/1/2002	TABER	0.74	±	3.56	20.10	±	96.00
	10/14/2002	TABER	5.33	±	7.33	144.00	±	198.00

Table C-12: Cesium-137 and Iodine-131 Concentrations in Game Animals

Species	Tissue	Analyte	Sampling Date	Results ± Uncertainty(2s) (pCi/kg wet weight)			Results ± Uncertainty(2s) (Bq/kg wet weight)		
ELK									
	MUSCLE	CESIUM-137	10/14/2002	-4.73	±	9.19	-0.18	±	0.34
	MUSCLE	IODINE-131	10/14/2002	-5.16	±	7.37	-0.19	±	0.27
	LIVER	CESIUM-137	10/14/2002	3.46	±	2.56	0.13	±	0.09
	LIVER	IODINE-131	10/14/2002	1.58	±	3.79	0.06	±	0.14
	THYROID	CESIUM-137	10/14/2002	437.31	±	895.52	16.20	±	33.17
	THYROID	IODINE-131	10/14/2002	122.00	±	663.00	4.52	±	24.56
MULE DEER									
	MUSCLE	CESIUM-137	10/21/2002	-17.17	±	9.78	-0.64	±	0.36
	MUSCLE	IODINE-131	10/21/2002	-32.66	±	60.73	-1.21	±	2.25
	LIVER	CESIUM-137	10/21/2002	-39.43	±	25.98	-1.46	±	0.96
	LIVER	IODINE-131	10/21/2002	-92.40	±	168.38	-3.42	±	6.24
	NO THYROID								
MULE DEER									
	MUSCLE	CESIUM-137	12/10/2002	0.81	±	2.34	0.03	±	0.09
	MUSCLE	IODINE-131	12/10/2002	-0.78	±	3.34	-0.03	±	0.12
	LIVER	CESIUM-137	12/10/2002	0.64	±	2.41	0.02	±	0.09
	LIVER	IODINE-131	12/10/2002	-0.82	±	3.20	-0.03	±	0.12
	THYROID	CESIUM-137	12/10/2002	-1981.82	±	1298.18	-73.40	±	48.08
	THYROID	IODINE-131	12/10/2002	483.64	±	785.45	17.91	±	29.09

TABLE C-13: Radionuclides in Edible Portion of Waterfowl

Species Sample Type	*Sampling Date*	*Analyte*	*Result*	*±*	*Uncertainty(2s)*	*Result*	*±*	*Uncertainty(2s)*
			pCi/kg			*Bq/kg*		
HEISE								
Sample #1	10/21/2002	AMERICIUM-241	0.68	±	1.40	0.03	±	0.05
	10/21/2002	PLUTONIUM-238	0.58	±	2.00	0.02	±	0.07
	10/21/2002	PLUTONIUM-239/40	0.43	±	4.10	0.02	±	0.15
	10/21/2002	COBALT-60	32.40	±	36.00	1.20	±	1.33
	10/21/2002	CERIUM-141	178.00	±	510.00	6.59	±	18.87
	10/21/2002	NIOBIUM-95	374.00	±	460.00	13.84	±	17.02
	10/21/2002	STRONTIUM-90	2.43	±	7.20	0.09	±	0.27
Sample #2								
	10/21/2002	AMERICIUM-241	0.69	±	1.80	0.03	±	0.07
	10/21/2002	PLUTONIUM-238	0.00	±	1.00	0.00	±	0.04
	10/21/2002	PLUTONIUM-239/40	0.00	±	1.00	0.00	±	0.04
	10/21/2002	CERIUM-141	-238.00	±	650.00	-8.81	±	24.05
	10/21/2002	COBALT-60	-31.30	±	32.00	-1.16	±	1.18
	10/21/2002	NIOBIUM-95	89.90	±	440.00	3.33	±	16.28
	10/21/2002	STRONTIUM-90	3.11	±	6.70	0.12	±	0.25
INEEL TAN								
Sample #3								
	11/1/2002	AMERICIUM-241	0.96	±	1.10	0.04	±	0.04
	11/1/2002	PLUTONIUM-238	0.00	±	1.10	0.00	±	0.04
	11/1/2002	PLUTONIUM-239/40	1.33	±	1.50	0.05	±	0.06
	11/1/2002	CERIUM-141	-199.00	±	420.00	-7.36	±	15.54
	11/1/2002	COBALT-60	32.70	±	35.00	1.21	±	1.30
	11/1/2002	NIOBIUM-95	44.40	±	360.00	1.64	±	13.32
	11/1/2002	STRONTIUM-90	4.09	±	7.40	0.15	±	0.27

Species Sample Type	Sampling Date	Analyte	ult ± Uncertainty(2s) pCi/kg			Result ± Uncertainty(2s) Bq/kg		
Sample #4								
	11/1/2002	AMERICIUM-241	1.01	±	1.40	0.04	±	0.05
	11/1/2002	PLUTONIUM-238	0.00	±	1.00	0.00	±	0.04
	11/1/2002	PLUTONIUM-239/40	0.82	±	1.20	0.03	±	0.04
	11/1/2002	CERIUM-141	248.00	±	320.00	9.18	±	11.84
	11/1/2002	COBALT-60	1.14	±	25.00	0.04	±	0.93
	11/1/2002	NIOBIUM-95	31.80	±	260.00	260.00	±	9.62
	11/1/2002	STRONTIUM-90	3.41	±	9.10	0.13	±	0.34
Sample #5								
	11/1/2002	AMERICIUM-241	1.06	±	1.20	0.04	±	0.04
	11/1/2002	PLUTONIUM-238	0.00	±	1.20	0.00	±	0.04
	11/1/2002	PLUTONIUM-239/40	0.00	±	1.20	0.00	±	0.04
	11/1/2002	CERIUM-141	463.00	±	463.00	17.13	±	16.28
	11/1/2002	COBALT-60	9.00	±	36.00	0.33	±	1.33
	11/1/2002	NIOBIUM-95	364.00	±	390.00	13.47	±	14.43
	11/1/2002	STRONTIUM-90	3.30	±	9.30	0.12	±	0.34
Sample #6								
	11/1/2002	AMERICIUM-241	1.39	±	1.70	0.05	±	0.06
	11/1/2002	PLUTONIUM-238	0.00	±	0.95	0.00	±	0.04
	11/1/2002	PLUTONIUM-239/40	1.73	±	1.80	0.06	±	0.07
	11/1/2002	CERIUM-141	265.00	±	530.00	9.81	±	19.61
	11/1/2002	COBALT-60	8.46	±	34.00	0.31	±	1.26
	11/1/2002	NIOBIUM-95	676.00	±	410.00	25.01	±	15.17
	11/1/2002	STRONTIUM-90	3.36	±	9.40	0.12	±	0.35

Species Sample Type	Sampling Date	Analyte	ılt ± Uncertainty(2s) pCi/kg			Result ± Uncertainty(2s) Bq/kg		
MUD LAKE								
Sample #7								
	10/20/2002	AMERICIUM-241	0.40	±	0.80	0.01	±	0.03
	10/20/2002	PLUTONIUM-238	-0.24	±	0.49	-0.01	±	0.02
	10/20/2002	PLUTONIUM-239/40	0.49	±	0.97	0.02	±	0.04
	10/20/2002	CERIUM-141	-69.20	±	360.00	-2.56	±	13.32
	10/20/2002	COBALT-60	-5.21	±	21.00	-0.19	±	0.78
	10/20/2002	NIOBIUM-95	79.20	±	300.00	2.93	±	2.93
	10/20/2002	STRONTIUM-90	5.68	±	7.50	0.21	±	0.28
Sample #8								
	10/20/2002	AMERICIUM-241	0.84	±	1.70	0.03	±	0.06
	10/20/2002	PLUTONIUM-238	-0.37	±	0.52	-0.01	±	0.02
	10/20/2002	PLUTONIUM-239/40	2.18	±	1.80	0.08	±	0.07
	10/20/2002	CERIUM-141	1170.00	±	700.00	43.29	±	25.90
	10/20/2002	COBALT-60	7.15	±	34.00	0.26	±	1.26
	10/20/2002	NIOBIUM-95	246.00	±	460.00	9.10	±	9.10
	10/20/2002	STRONTIUM-90	7.55	±	7.50	0.28	±	0.28
TRA NE COLD POND								
Sample #9								
	10/11/2002	AMERICIUM-241	0.48	±	0.96	0.02	±	0.04
	10/11/2002	PLUTONIUM-238	-0.47	±	0.55	-0.02	±	0.02
	10/11/2002	PLUTONIUM-239/40	0.78	±	1.10	0.03	±	0.04
	10/11/2002	CERIUM-141	444.00	±	870.00	16.43	±	32.19
	10/11/2002	COBALT-60	35.40	±	35.00	1.31	±	1.30
	10/11/2002	NIOBIUM-95	44.30	±	530.00	1.64	±	19.61
	10/11/2002	STRONTIUM-90	14.10	±	8.30	0.52	±	0.31

Species Sample Type	Sampling Date	Analyte	ult ± Uncertainty(2s) pCi/kg			Result ± Uncertainty(2s) Bq/kg		
Sample #10								
	10/11/2002	AMERICIUM-241	0.42	±	0.83	0.02	±	0.03
	10/11/2002	PLUTONIUM-238	0.41	±	0.81	0.01	±	0.03
	10/11/2002	PLUTONIUM-239/40	0.40	±	0.81	0.01	±	0.03
	10/11/2002	CERIUM-141	15.60	±	450.00	0.58	±	0.58
	10/11/2002	COBALT-60	-1.07	±	23.00	-0.04	±	0.85
	10/11/2002	NIOBIUM-95	62.50	±	380.00	380.00	±	14.06
	10/11/2002	STRONTIUM-90	9.80	±	7.60	0.36	±	0.28
Sample #11	10/11/2002	AMERICIUM-241	1.60	±	1.90	0.06	±	0.07
	10/11/2002	PLUTONIUM-238	0.34	±	0.68	0.01	±	0.03
	10/11/2002	PLUTONIUM-239/40	-0.17	±	0.34	-0.01	±	0.01
	10/11/2002	CERIUM-141	0.58	±	620.00	11.58	±	22.94
	10/11/2002	COBALT-60	20.00	±	36.00	0.74	±	1.33
	10/11/2002	NIOBIUM-95	354.00	±	530.00	13.10	±	13.10
	10/11/2002	STRONTIUM-90	0.69	±	7.90	0.03	±	0.29

TABLE C-14: Environmental Radiation Results

Sample Group & Location	*Start Date*	*End Date*	*Radiation Measurement*	*±*	*Uncertainty(2s) (mR)*
BOUNDARY					
ARCO	5/1/2002	11/12/2002	65.30	±	12.80
ATOMIC CITY	5/1/2002	11/12/2002	65.50	±	12.80
BIRCH CREEK	5/1/2002	11/12/2002	54.10	±	10.60
BLUE DOME	5/1/2002	11/12/2002	52.00	±	10.20
HOWE	5/1/2002	11/12/2002	59.40	±	11.60
MONTEVIEW	5/1/2002	11/12/2002	59.00	±	11.60
MUD LAKE	5/1/2002	11/12/2002	67.20	±	13.20
DISTANT					
REXBURG, CMS	5/1/2002	10/31/2002	75.10	±	14.70
ABERDEEN	5/1/2002	11/12/2002	66.30	±	13.00
BLACKFOOT	5/1/2002	11/12/2002	63.10	±	12.40
BLACKFOOT, CMS	5/1/2002	11/12/2002	55.50	±	10.90
DUBOIS	5/1/2002	11/12/2002	52.60	±	10.30
IDAHO FALLS	5/1/2002	11/12/2002	63.20	±	12.40
MINIDOKA	5/1/2002	11/12/2002	55.90	±	11.00
ROBERTS	5/1/2002	11/12/2002	0.00	±	0.00
OUT OF STATE					
JACKSON, WYOMING	5/2/2002	11/12/2002	48.00	±	9.40

APPENDIX D

STATISTICAL ANALYSIS RESULTS

Table D-1. Kruskal-Wallace[a] statistical results between INEEL, Boundary, and Distant location groups by quarter and by month.

Parameter	p[b]
Gross Alpha	
Quarter	0.81
October	0.14
November	0.15
December	0.97
Gross Beta	
Quarter	0.09
October	0.58
November	0.57
December	0.99

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

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

Table D-2. Statistical difference in weekly gross alpha concentrations measured at Boundary and Distant locations.

Mann-Whitney U Test[a]		
Parameter	**Week**	**p[b]**
Gross Alpha		
	October 2nd	0.20
	October 9th	0.25
	October 16th	0.48
	October 23rd	0.15
	October 30th	0.32
	November 6th	0.20
	November 13th	0.45
	November 20th	0.67
	November 26th	0.83
	December 3rd	0.89
	December 10th	0.48
	December 17th	0.69
	December 23rd	1.00
	December 31st	0.25
Gross Beta		
	October 2nd	0.18
	October 9th	0.15
	October 16th	0.48
	October 23rd	1.00
	October 30th	0.20
	November 6th	0.15
	November 13th	0.01
	November 20th	0.01
	November 26th	1.00
	December 3rd	0.02
	December 10th	0.78
	December 17th	0.03
	December 23rd	0.57
	December 31st	1.00

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

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