Department of Environmental Quality
Division of INL Oversight
and Radiation Control

ENVIRONMENTAL SURVEILLANCE PROGRAM QUARTERLY DATA REPORT

July - September, 2005

State of Idaho
Division of INL Oversight and Radiation Control

Boise Office	Idaho Falls Office
1410 N. Hilton	900 N. Skyline, Suite C
Boise, Idaho 83706	Idaho Falls, Idaho 83402
208/373-0498	208/528-2600

Table of Contents

Introduction…… 3
Air & Precipitation Monitoring Results…… 3
Environmental Radiation Monitoring Results…… 7
Water Monitoring & Verification Results…… 9
Terrestrial Monitoring Results…….. 23
Quality Assurance……. 25
Appendix A…… 40
Appendix B…… 44
Appendix C…… 47

Table of Acronyms

BEA - Battelle Energy Alliance, LLC
CERCLA - Comprehensive Environmental Response Compensation and Liability Act
CFA - Central Facilities Area
CWI - CH2M-WG Idaho, LLC
DEQ-INL - The State of Idaho, Division of Idaho National Laboratory Oversight and Radiation Control
DOE - U.S. Department of Energy
EIC - electret ionization chamber
EML - Environmental Monitoring Laboratory
EPA - Environmental Protection Agency
ESER - Environmental Surveillance Education and Research Program (SM Stoller)
ESP - Environmental Surveillance Program
ESRPA - Eastern Snake River Plain Aquifer
HPIC - high-pressure ion chamber
LLD - lower limit of detection
IBL - Idaho Bureau of Laboratories
INL - Idaho National Laboratory
INTEC - Idaho Nuclear Technology and Engineering Center
LSC - liquid scintillation counting
MFC - Materials and Fuels Complex
µg/L - micrograms per liter
mg/L - milligrams per liter
mR/hr - milliRoentgen per hour
µR/hr - microRoentgen per hour
MCL - maximum contaminate level
MDA - minimum detectable activity
MDC - minimum detectable concentration
NIST - National Institute of Standards and Technology
nCi/L - nanocuries per liter
NOAA - National Oceanic and Atmospheric Administration
NRF - Naval Reactors Facility
pCi/L - picocuries per liter
pCi/m^3 - picocuries per cubic meter
PM_{10} - particulate matter with aero-dynamic diameter less than or equal to 10 micrometers
PCE - perchloroethene
QAPP - Quality Assurance Program Plan
QA/QC - Quality Assurance/Quality Control
RCRA - Resource Conservation and Recovery Act
RPD - relative percent difference
RWMC - Radioactive Waste Management Complex
RTC - Reactor Technology Complex
SD - standard deviation
SMCL - secondary maximum contaminant level
TAN - Test Area North
TCE - trichloroethene
TDS - total dissolved solids
TMI - Three Mile Island
TSP - total suspended particulate
TSS - total suspended solids
USGS - U.S. Geological Survey
VOC - volatile organic compound
WLAP - Wastewater Land Application Permit

Introduction

The state of Idaho, Division of Idaho National Laboratory Oversight and Radiation Control (DEQ-INL) Environmental Surveillance Program (ESP) is conducted at locations on the INL, on the boundaries of the INL, and at distant locations to the INL in accordance with accepted monitoring procedures and management practices. This program is designed to provide the people of the state of Idaho with independently evaluated information about the impacts of the Department of Energy's (DOE) activities in Idaho.

The primary objective for DEQ-INL's ESP is to maintain an independent environmental monitoring and verification program designed to verify and supplement DOE's data and programs. This program is also used to provide the citizens of Idaho with information that has been independently evaluated to enable them to reach informed conclusions about DOE activities in Idaho and potential impacts to public health and the environment.

Results of the ESP are published using two distinct reporting formats: quarterly data reports and an annual ESP report. The annual ESP report is designed for a more broad audience and summarizes the results of the ESP for the previous four quarters. The annual report's primary emphasis is to focus on trends, ascertain the impacts of DOE operations on the environment, and confirm the validity of DOE monitoring programs. This quarterly report is designed to provide the mechanism to document the results of the ESP on a quarterly basis and provide detailed data to those who wish to "see the numbers." It is organized according to the media sampled and also provides a quality assurance assessment.

Air and Precipitation Monitoring Results

The ESP operated eight air monitoring stations on and near the INL as well as two monitoring stations distant from the INL during the third quarter, 2005 (**Figure 1**). These stations employed instrumentation for collecting airborne particulate matter, gaseous radioiodine, precipitation, and water vapor for tritium analysis (**Table 1**). The Shoshone-Bannock Tribes operated an air monitoring station located at Fort Hall. The Fort Hall station uses identical instrumentation and sampling protocol as the ten stations operated by the ESP. The DEQ-INL reports the Fort Hall station data as an additional background site.

Airborne particulate matter was sampled using a high-volume total suspended particulate (TSP) air samplers. Weekly gross alpha and gross beta particulate radioactivity results for filters from the TSP samplers are presented in **Appendix A** and summarized in **Table 2**. Gross alpha and gross beta radioactivity concentrations reported from the particulate samples were within the range of expected values for naturally occurring radioactivity observed historically.

Composites of filters collected using TSP samplers during the course of a calendar quarter were analyzed using gamma spectroscopy. Typically, gamma spectroscopy results were only reported when exceeding a minimum detectable activity (MDA) or minimum detectable concentration (MDC). Gamma spectroscopy results for the third quarter of 2005 for TSP filters are presented in **Table 3**. The only reported gamma-emitting radionuclide was beryllium-7, a naturally occurring, cosmogenic radionuclide.

No radioactive isotopes of iodine, specifically iodine-131, were detected on the weekly charcoal cartridges used to collect this nuclide during the third quarter.

Atmospheric moisture was collected by drawing air through hygroscopic media at each of the eleven monitoring stations. This moisture was stripped from the hygroscopic media and analyzed to calculate the atmospheric tritium concentration. Reported values are the result of either a single sample or a

weighted mean based upon the volume of air sampled when more than one atmospheric moisture sample was collected during the calendar quarter. Atmospheric tritium was detected at the Experimental Field Station during the third quarter of 2005. The detected tritium levels were less than 1 percent of the action levels established by DEQ-INL. The TMI-2 fuel currently stored at INTEC is the likely source for the atmospheric tritium observed at this location. Additionally, three other stations (Big Lost River Rest Area, Van Buren Avenue, and Monteview) detected tritium levels at or slightly above the MDA. The detected tritium levels at these locations were also much less than 1 percent of the action levels established by DEQ-INL and were, more than likely, false positives due to statistical variation. No additional atmospheric tritium was measured at offsite locations during the third quarter of 2005. Average atmospheric tritium concentrations are presented in **Table 4**.

Precipitation samples were collected at five monitoring locations during the third quarter of 2005. Precipitation sampling normally done at the Howe station was compromised by irrigation water entering the sample and was therefore discontinued for third quarter. Sampling for precipitation will resume for fourth quarter, 2005 at the Howe station.

Precipitation samples were analyzed for tritium and gamma-emitting radionuclides. Tritium and gamma-emitting radionuclides were below minimum detectable concentration in precipitation collected during the third quarter of 2005. Tritium and cesium-137 analysis results are presented in **Table 5**. Reported values were either the result of a single sample or a weighted mean when more than one precipitation sample was collected during the calendar quarter.

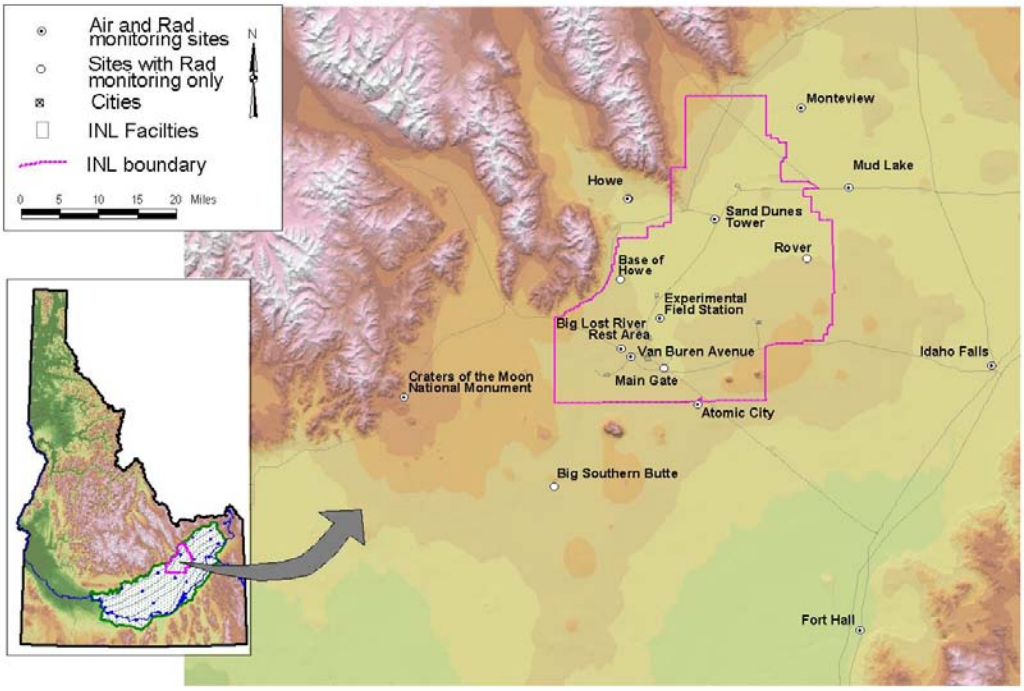

Figure 1. Air and radiation monitoring sites.

Table 1. Sampling locations and sample type.

Station Locations	Sample type[1]			
	TSP	Radioiodine	Water Vapor	Precipitation
On-site Locations				
Big Lost River Rest Area	□	□	■	■
Experimental Field Station	□	□	■	
Sand Dunes Tower	□	□	■	
Van Buren Avenue	□	□	■	
Boundary Locations				
Atomic City	□	□	■	■
Howe	□	□	■	■
Monteview	□	□	■	■
Mud Lake	□	□	■	■
Distant Locations				
Craters of the Moon	□	□	■	
Fort Hall[2]	□	□	■	
Idaho Falls	□	□	■	■

[1] □ Samples collected weekly; ■ Samples collected quarterly.
[2] TSP and radioiodine samples collected by Shoshone-Bannock Tribes.

Table 2. Range of alpha and beta concentrations for TSP filters, third quarter, 2005. Concentrations are reported in 1x 10^{-3} pCi/m^3.

Station Location	Concentration					
	Gross Alpha			Gross Beta		
On-Site Locations						
Big Lost River Rest Area	1.0	-	2.3	26.2	-	42.2
Experimental Field Station	0.6	-	2.1	26.3	-	39.1
Sand Dunes Tower	0.8	-	1.6	26.5	-	39.8
Van Buren Avenue	1.0	-	2.2	23.3	-	44.0
Boundary Locations						
Atomic City	0.9	-	2.1	28.4	-	43.1
Howe	0.6	-	1.6	20.6	-	36.3
Monteview	0.7	-	2.0	23.4	-	34.5
Mud Lake	0.9	-	2.5	24.2	-	38.4
Distant Locations						
Craters of the Moon	0.5	-	1.2	19.7	-	37.2
Fort Hall[1]	1.2	-	2.2	20.1	-	32.5
Idaho Falls	1.1	-	2.2	25.0	-	40.1

[1] Operated by Shoshone-Bannock Tribes.

Table 3. Gamma spectroscopy analysis data of TSP filters, composite sample, third quarter, 2005. Concentrations are reported in 1 x 10^{-3} pCi/m^3 with associated uncertainty (± 2 SD), minimum detectable concentration (MDC), and correspond to filter composites collected during the calendar quarter.

Station Location	Naturally Occurring Radionuclide Beryllium-7		Man-Made Gamma Emitting Radionuclides
	Concentration	± 2 SD	
On-site Locations			
Big Lost River Rest Area	129.2	6.6	<MDC
Experimental Field Station	115.3	6.2	<MDC
Sand Dunes Tower	105.7	5.5	<MDC
Van Buren Avenue	121.9	6.5	<MDC
Boundary Locations			
Atomic City	122.0	6.3	<MDC
Howe	109.9	5.7	<MDC
Monteview	105.4	5.7	<MDC
Mud Lake	100.0	5.2	<MDC
Distant Locations			
Craters of the Moon	95.7	5.0	<MDC
Fort Hall[1]	97.6	5.3	<MDC
Idaho Falls	116.8	6.0	<MDC

[1] Operated by Shoshone-Bannock Tribes.

Table 4. Tritium concentrations from atmospheric moisture, third quarter, 2005. Concentrations are reported in pCi/m^3 with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Station Location	Tritium		
	Concentration	± 2 SD	MDC
On-site Locations			
Big Lost River Rest Area	0.35	0.28	0.45
Experimental Field Station	0.61[1]	0.27	0.42
Sand Dunes Tower	0.23	0.27	0.46
Van Buren Avenue	0.40	0.27	0.41
Boundary Locations			
Atomic City	0.13	0.33	0.58
Howe	0.22	0.36	0.60
Mud Lake	0.05	0.07	0.11
Monteview	0.25	0.37	0.60
Distant Locations			
Craters of the Moon	0.00	0.23	0.40
Fort Hall	0.27	0.42	0.68
Idaho Falls	0.14	0.28	0.48

[1] The reported concentrations exceed the MDC.

Table 5. Tritium and cesium-137 concentrations from precipitation, third quarter, 2005. Concentrations are reported in pCi/L with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC). NS = no sample

Station Location	Tritium			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
On-site Locations						
Big Lost River Rest Area	80	80	130	NS[1]		
Boundary Locations						
Atomic City	50	80	130	-0.1	1.6	2.8
Howe	NS[2]	-	-	NS[2]		
Monteview	40	80	130	-0.7	1.3	2.3
Mud Lake	-10	70	130	0.1	1.3	2.2
Distant Locations						
Idaho Falls	20	80	130	0.1	1.6	2.8

[1] Insufficient precipitation for more than one sample, therefore only tritium analysis was performed.
[2] Precipitation sampling discontinued for third quarter due to irrigation water entering the sample. Sampling will resume for fourth quarter.

Environmental Radiation Monitoring Results

The ESP operated 14 environmental radiation stations during the third quarter of 2005 **(Figure 1)**. To detect gamma radiation, each station is instrumented with an electret ionization chamber (EIC), and 11 of the stations also have high-pressure ion chambers (HPIC) **(Table 6)**. The Shoshone-Bannock Tribes operate an additional environmental radiation station at Fort Hall equipped with both an EIC and HPIC. The DEQ-INL reports these results.

HPICs are instruments capable of real-time measurements, and are sensitive enough to detect small changes in gamma radiation levels. The real-time gamma radiation measurements collected by the HPICs at each location are radioed to DEQ-INL and presented graphically via the worldwide web at www.idahoop.org. EICs are a passive-integrating system that provides a cumulative measure of environmental gamma radiation exposure in the field. Typically, EICs are deployed, collected and analyzed quarterly. DEQ-INL compared the exposure rates measured by EICs and HPICs and observed that the data correlated very well from both measurement methods; although, EICs tend to over respond by approximately 20 percent, accounting for the slight differences observed between the two measurements. A complete analysis of the radiation measuring devices can be found in *A Comparison of Three Methods for Measuring Environmental Radiation*, Moser, Kristi, Idaho State University, M.S. Thesis, 2002. Each system is used by DEQ-INL to measure gamma radiation for various radiological monitoring objectives. EICs offer an inexpensive methodology to measure gamma radiation over a wide area, particularly in regions which do not have a power source. EICs can also provide valuable gamma radiation data in the event of an emergency. It is because of this reason that EICs are also deployed at 78 locations by DEQ-INL in a widespread network around the INL measuring general background radiation. This information is tabulated in **Appendix B.**

Table 7 lists the average radiation exposure rates measured by the HPICs for third quarter. Exposure rates were within the expected historical range of values observed by DEQ-INL for background radiation. **Table 8** lists the EIC monitoring results for third quarter. The EIC at Van Buren Avenue was inadvertently destroyed by contractor personnel at the INL. As a result, the gamma exposure data at this location was lost for third quarter, 2005. The EIC was subsequently replaced by DEQ-INL and expected to yield valid fourth quarter measurements.

Table 6. Summary of instrumentation at radiation monitoring stations.

Station Location	Instrument Type	
	HPIC	EIC
On-site Locations		
Base of Howe	■	■
Big Lost River Rest Area	■	■
Experimental Field Station		■
Main Gate	■	■
Rover	■	■
Sand Dunes Tower	■	■
Van Buren Avenue		■
Boundary Locations		
Atomic City	■	■
Big Southern Butte	■	■
Howe	■	■
Monteview	■	■
Mud Lake	■	■
Distant Locations		
Craters of the Moon		■
Fort Hall[1]	■	■
Idaho Falls	■	■

[1] HPIC operated by Shoshone-Bannock Tribes with the EIC maintained by DEQ-INL.

Table 7. Average gamma exposure rates for third quarter, 2005, from HPIC network. These rates are expressed in µR/hr.

	Exposure Rate	
	Quarterly Average	± 2 SD
On-site Locations		
Base of Howe	12.7	0.8
Big Lost River Rest Area	13.7	0.8
Main Gate	14.3	0.8
Rover	14.1	0.8
Sand Dunes Tower	13.1	1.5
Boundary Locations		
Atomic City	13.4	0.7
Big Southern Butte	14.3	0.8
Howe	12.8	0.7
Monteview	12.4	0.7
Mud Lake	12.4	0.7
Distant Locations		
Fort Hall[1]	12.3	0.7
Idaho Falls	11.4	0.7

[1] Operated by Shoshone-Bannock Tribes.

Table 8. Electret ionization chamber (EIC) cumulative average exposure rates for third quarter, 2005. These rates are expressed in µR/hr. NS = No Sample.

Station Location	Exposure Rate	
	Total	± 2 SD
On-site Locations		
Base of Howe	19.8	2.0
Big Lost River Rest Area	18.3	1.9
Experimental Field Station	19.8	2.0
Main Gate	21.2	2.0
Rover	22.8	2.1
Sand Dunes Tower	18.8	1.9
Van Buren Avenue	NS	
Boundary Locations		
Atomic City	17.6	1.9
Big Southern Butte	17.5	1.9
Howe	15.4	1.8
Monteview	18.3	1.9
Mud Lake	19.7	2.0
Distant Locations		
Craters of the Moon	17.6	1.9
Fort Hall	19.8	2.0
Idaho Falls	16.5	1.9

Water Monitoring

Water monitoring sites are sampled for the purposes of examining trends of INL contaminants and other general ground water quality indicators and for verifying DOE monitoring results. Sites sampled include ground water locations (wells and springs), surface water locations (streams), and selected effluent sites. Sample sites have been selected to aid in identifying INL impacts on the Eastern Snake River Plain Aquifer (ESRPA), and are categorized as on-site, boundary, and distant **(Figures 2 and 3)**. On-site locations include sample sites within the INL including wells near facilities, in areas of known contamination, or wells selected to illustrate trends for specific INL contaminants or indicators of ground water quality. Selected surface water and effluent sites on the INL are monitored as current sources of recharge or impacts to the aquifer. Boundary locations include sample sites on the perimeter of the INL that provide background water quality data, are accessible to the public, or down gradient of potential sources of contamination. Distant locations are monitored to provide trends in water quality down gradient of the INL and include wells and springs used for irrigation, public water supply, livestock, domestic, and industrial purposes. During the third quarter of 2005, the DEQ-INL sampled 17 on-site locations (including 3 effluent sites), 2 boundary locations, and 23 distant locations.

Many sites sampled by DEQ-INL are sampled with another agency or organization. Samples are collected at about the same time using the same collection equipment as the other agency or organization (co-sampled). DEQ-INL verifies work by these agencies monitoring on behalf of DOE by comparing results for co-sampled sites.

Gross alpha and gross beta analyses are conducted as a screening tool for alpha and beta emitting radionuclides potentially released due to INL operations. Selected sites are sampled for the man-made, beta emitting radionuclides, technetium-99 and strontium-90, based on historic INL contamination. In the event of suspect or unexpected levels of gross radioactivity, additional samples may also be analyzed for other specific radionuclides.

Gross alpha radioactivity was detected in 4 of 16 on-site samples and ranged from 4.4 ± 2.1 pCi/L to 22.6 ± 5.7 pCi/L. There were no detections in the boundary or distant samples. The EPA maximum contaminant level (MCL) for alpha particles is 15 pCi/L. Gross beta radioactivity was detected in all on-site samples and ranged from 2.2 ± 1.1 to 1099.1 ± 11.9 pCi/L. Gross beta was detected in both boundary samples (3 ± 1 and 4.8 ± 0.9 pCi/L) and all but two of the distant samples (1.9 ± 0.9 to 9.0 ± 1.4 pCi/L). Background concentrations of gross beta radioactivity in the ESRPA range from 0 to 8 pCi/L (Orr et al, 1991). The MCL for beta radioactivity is based on exposure to the body of 4 millirem which amounts to 8 pCi/L if the source of the radioactivity is strontium-90; 900 pCi/L if technetium-99; or 20,000 pCi/L if tritium. The concentrations of gross alpha and gross beta radioactivity were consistent with historical results and were within expected ranges. No man-made gamma emitting radionuclides were identified via gamma spectroscopic analysis. Results for gross alpha, gross beta, and man-made gamma emitting radioactivity are shown in **Table 9.**

No locations were sampled for technetium-99 this quarter.

Nine locations were sampled for strontium-90; four sites had detectable levels and ranged from 9.2 ± 2.4 to 540 ± 130 pCi/L. These locations with detectable strontium-90 are down gradient of the waste water injection well historically used at Test Area North (TAN). The concentrations are consistent with historical trends for the sites sampled. The MCL for strontium-90 is 8 pCi/L. Results for strontium-90 are found in **Table 10.**

Using the standard analytical method, tritium was detected in 6 of 14 on-site samples (180 ± 90 to 4230 ± 180 pCi/L), 2 of 23 distant samples (130 ± 80 to 160 ± 80 pCi/L), but detectable levels were not found in boundary samples (**Table 11**). Water samples with tritium concentrations not measurable using the standard method (MDC of 160 pCi/L) are analyzed using an electrolytic enrichment method with a much lower MDC of 10 to 14 pCi/L (**Table 12**). Using the electrolytic enrichment method tritium was detected in a boundary sample (21 ± 7 pCi/L) and in 17 of 20 distant samples ranging from 10 ± 6 to 29 ± 8 pCi/L. Two on-site surface water locations from second quarter are included in the table and ranged from 22 ± 7 to 24 ± 8 pCi/L. Included in the samples analyzed by electrolytic enrichment were the two distant sites that yielded tritium detections by the standard analysis method (130 ± 80 and 160 ± 80 pCi/L). Tritium results by the enrichment method returned 25 ± 7 and 28 ± 8 pCi/L for these samples, suggesting that the initial results were “false positives”. Background concentrations of tritium in the ESRPA range from 0 to 40 pCi/L (Knobel et al, 1992). Enriched tritium samples for seven locations were not analyzed in time for the third quarter report and will instead be reported in the fourth quarter.

Water samples were also analyzed for metals and the results are shown in **Table 13**. The following discussion of metals results only applies to detectable concentrations. All results are within their expected ranges, depending on sample location and extent of contamination in specific areas. Barium results ranged from 80 to170 µg/L on site, 18 to 33 µg/L for boundary, and 6 to 160 µg/L for distant locations, all were less than the MCL of 2,000 µg/L. Chromium results ranged from 6 to 30 µg/L for on-site locations, below the MCL of 100 µg/L. Concentrations above approximately 5 µg/L are indicative of INL contamination, based on historic DEQ-INL sample results. Iron results on site range from 20 to 60 µg/L, all less than the Secondary Maximum Contaminant Level (SMCL) of 300 µg/L. There was one manganese result each for on-site (4 µg/L), boundary (36 µg/L), and distant location (2 µg/L), all below

the SMCL of 50 µg/L. Zinc results from 14 to 110 µg/L on-site, 15 µg/L for boundary, and 7 to 210 µg/L for distant locations, all below the SMCL of 5,000 µg/L.

Common ions results are shown in **Table 14.** All results are within their expected ranges, depending on sample location and extent of contamination in specific areas. Results for alkalinity ranged from 133 to 212 mg/L for on-site, 94 to 137 mg/L for boundary, and 115 to 249 mg/L for distant locations. Calcium results ranged from 48 to 164 mg/L for on-site, 9.2 to 36 mg/L for boundary, and 25 to110 mg/L for distant locations. Chloride results range from 16.6 to 496 mg/L for on-site, 5.8 to 18.1 mg/L for boundary, and 6.27 to 75.9 mg/L for distant locations. Fluoride results range from 0.2 to 0.392 mg/L for on-site, 0.8 mg/L for boundary, and 0.29 to 0.78 mg/L for distant locations. Magnesium results range from 15 to 41 mg/L for on-site, 2.8 to 14 mg/L for boundary, and 11.3 to 39 mg/L for distant locations. Potassium results range from 1.8 to 6.4 mg/L for on-site, 3.4 to 5 mg/L for boundary, and 2.6 to 7.5 mg/L for distant locations. Silica results ranged from 9.84 to 44.2 mg/L for on-site and 19.7 to 45.9 mg/L for distant locations. Sodium results range from 9.5 to 190 mg/L for on-site, 17 to 31 mg/L for boundary, and 13 to 62 mg/L for distant locations. Sulfate results range from 28 to 106 mg/L on-site, 8.55 to 16.8 mg/L for boundary locations and 11 to 94.3 mg/L for distant locations. Detectable results for total dissolved solids (TDS) range from 261 to 1400 mg/L for on-site locations. Total suspended solids (TSS) results ranged from 5.2 to 29 mg/L for on-site locations.

Nutrient results are presented in **Table 15.** Ammonia results range from 0.006-1.11 mg/L on-site and from 0.005 to 0.039 mg/L for distant locations. TKN results ranged from 0.272 to 45.9 mg/l for on-site locations. Nitrite plus nitrate as nitrogen ranged from 0.012 to 1.36 mg/L for boundary locations and 0.501 to 21.7 mg/L for distant locations. Nitrogen concentrations more than 1-2 mg/L are indicative of anthropogenic (human-caused) contamination. Total phosphorus ranged from 0.025 for onsite, 0.015 to 0.038 for boundary and 0.013 to 0.069 mg/L.

Volatile Organic Compounds (VOCs) with detectable concentrations are shown in **Table 16.** The background concentrations for VOCs should be zero. Nine of the thirteen samples had detectable concentrations of one or more of the VOCs listed in **Appendix C**. Each of these samples was taken in areas of known contamination. Most results are consistent with historical trends. Well location TAN- 29 had substantial decreases (compared to the past two years) in each of the detectable VOC concentrations, with the exception of tetrachloroethylene and chloroform. 1,1-Dichloroethene ranged from 0.6 to 1.5 µg/L. Cis-1,2-Dichloroethene ranged from 0.33 to 122 µg/L. Trans-1,2-Dichloroethene ranged from 0.53 to 150 µg/L. Tetrachloroethylene (PERC) ranged from 0.35 to 22.5 µg/L. Toluene was detected in one sample (TAN-16) at 5.9 µg/L. Trichloroethylene ranged from 3.2 to 1200 µg/L. Vinyl chloride ranged from 4.9 to 7.3 µg/L . Chloroform ranged from 0.47 to 4.9 µg/L . 1,1-Dichloroethane ranged from to 0.59 to 0.77 µg/L.

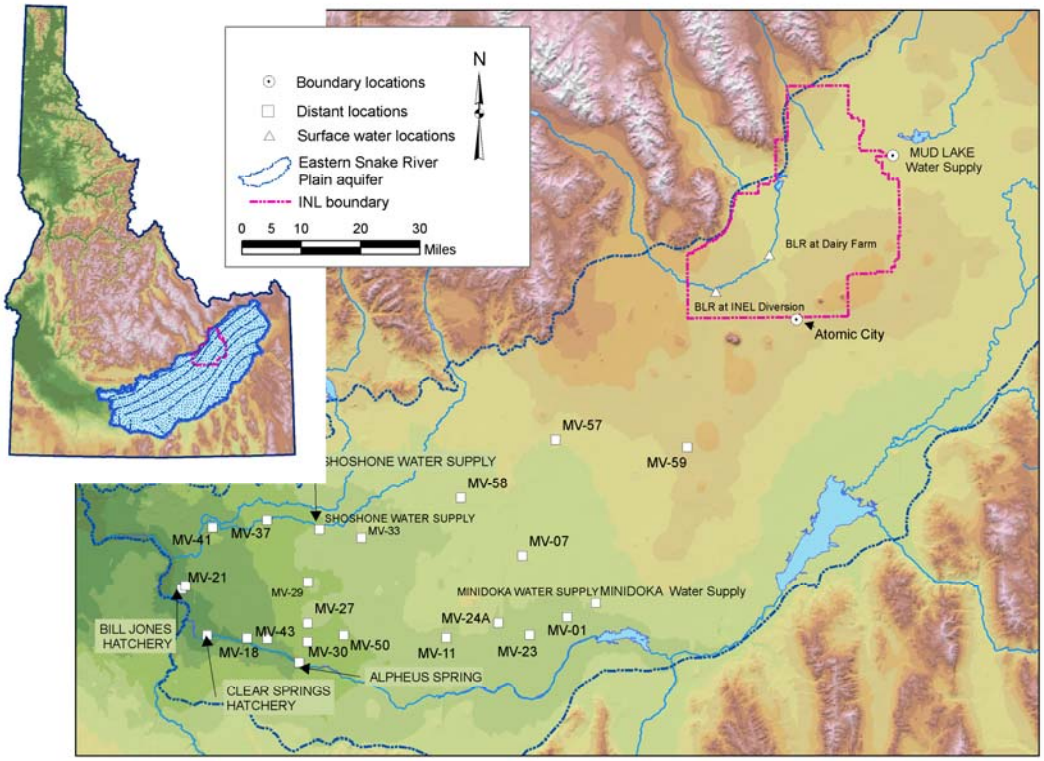

Figure 2. Boundary and distant water monitoring locations for third quarter, 2005.

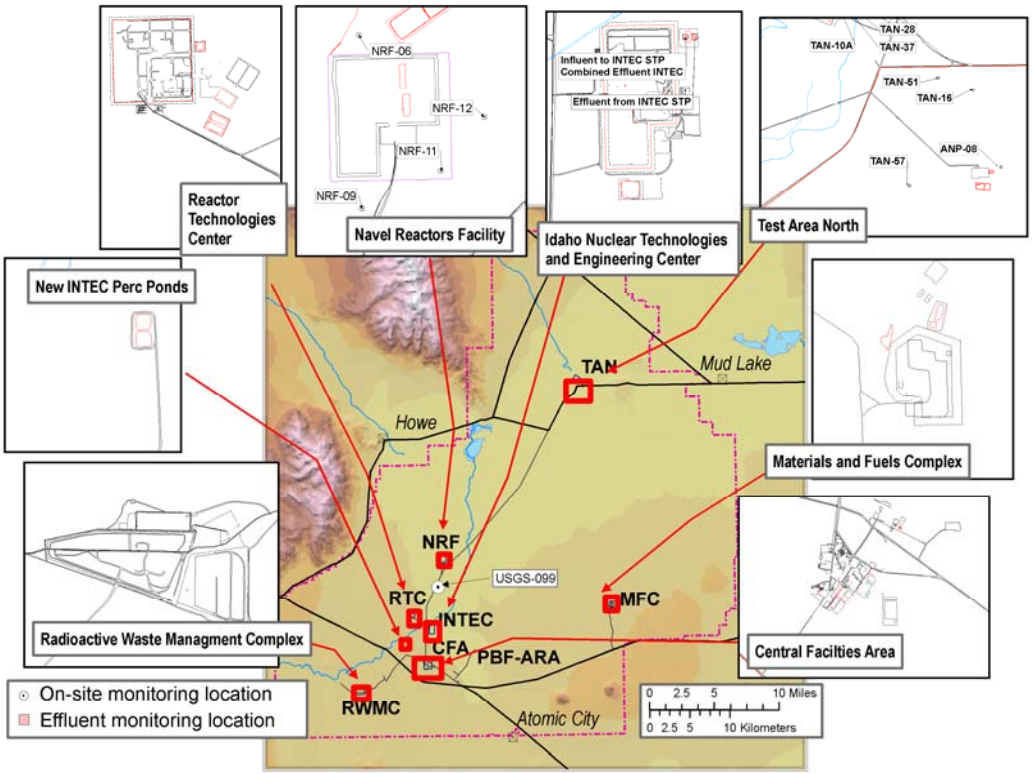

Figure 3. On-site water monitoring locations for third quarter, 2005.

Table 9. Alpha, beta, and gamma concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in pCi/L.

Sample Location	Sample Date	Gross Alpha		Gross Beta		Man-made gamma-emitting radionuclide Cesium-137
		Concentration	± 2 SD	Concentration	± 2 SD	Concentration
On-site Locations						
ANP-8	8/17/2005	-1.3 U	2.3	2.3	1.0	<MDC
NRF-06	7/19/2005	3.9 U	6.6	6.0	2.6	<MDC
NRF-09	7/19/2005	1.0 U	2.8	4.2	1.1	<MDC
NRF-11	7/18/2005	-2.0 U	2.8	2.2	1.1	<MDC
NRF-12	7/19/2005	-2.9 U	3.0	2.7	1.1	<MDC
TAN-10A	8/16/2005	11.3	4.8	220.6	5.6	<MDC
TAN-16	8/15/2005	0.7 U	1.9	3.3	1.0	<MDC
TAN-28	8/16/2005	17.2	5.5	562.1	8.6	<MDC
TAN-29	8/16/2005	2.9 U	3.0	26.1	1.6	<MDC
TAN-37	8/16/2005	22.6	5.7	1099.1	11.9	<MDC
TAN-51	8/15/2005	-2.1 U	2.1	3.0	1.0	<MDC
TAN-57	8/17/2005	-1.1 U	1.7	2.6	1.0	<MDC
USGS-099	7/18/2005	-3.4 U	3.0	2.5	1.2	<MDC
Effluent locations						
Combined Effluent INTEC	7/13/2005	2.4 U	3.0	4.2	1.1	<MDC
Effluent from INTEC STP	7/13/2005	-0.7 U	4.4	5.2	2.7	<MDC
TAN-655	9/27/2005	4.4	2.1	5.6	1.0	<MDC
Boundary Locations						
Atomic City	8/15/2005	1.0 U	2.2	3.0	1.0	<MDC
Mud Lake Water Supply	8/16/2005	-1.1 U	1.2	4.8	0.9	<MDC
Distant Locations						
Alpheus Spring	7/20/2005	-0.2 U	3.5	9.0	1.4	<MDC
Bill Jones Hatchery	8/9/2005	2.2 U	1.7	2.8	0.9	<MDC
Clear Springs Hatchery	8/9/2005	0 U	2.0	5.0	1.0	<MDC
Minidoka Water Supply	8/9/2005	1.0 U	2.1	4.4	1.0	<MDC
Shoshone Water Supply	8/9/2005	1.0 U	1.9	4.3	1.0	<MDC
MV-01	7/20/2005	1.5 U	2.8	8.0	1.3	<MDC

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. <MDC – Less than minimum detectable concentration for analysis by gamma spectroscopy.

Table 9 continued. Alpha, beta, and gamma concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in pCi/L.

Sample Location	Sample Date	Gross Alpha		Gross Beta		Man-made gamma-emitting radionuclide Cesium-137
		Concentration	± 2 SD	Concentration	± 2 SD	Concentration
MV-07	7/7/2005	1.0 U	1.9	3.2	1.0	<MDC
MV-11	7/20/2005	1.1 U	4.4	4.2	2.4	<MDC
MV-18	7/21/2005	2.1 U	3.0	5.0	1.2	<MDC
MV-21	7/21/2005	0.6 U	2.0	3.3	1.0	<MDC
MV-23	7/20/2005	1.6 U	3.0	5.2	1.2	<MDC
MV-24A	7/20/2005	-0.8 U	4.8	3.1 U	2.5	<MDC
MV-27	7/21/2005	1.4 U	3.1	5.5	1.2	<MDC
MV-29	7/21/2005	1.6 U	2.1	3.8	1.0	<MDC
MV-30	7/21/2005	3.4 U	3.2	6.5	1.2	<MDC
MV-33	7/21/2005	-0.1 U	1.8	1.9	0.9	<MDC
MV-37	7/21/2005	0.8 U	2.7	3.5	1.1	<MDC
MV-41	7/20/2005	3.8 U	3.3	4.4	2.2	<MDC
MV-43	7/20/2005	4.9 U	4.7	8.8	2.4	<MDC
MV-50	7/21/2005	-1.6 U	3.5	6.7	1.2	<MDC
MV-57	7/7/2005	1.6 U	1.7	2.6	0.9	<MDC
MV-58	8/26/2005	0 U	1.4	2.4	0.9	<MDC
MV-59	8/10/2005	0.7 U	1.9	1.0 U	1.0	<MDC

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. <MDC – Less than minimum detectable concentration for analysis by gamma spectroscopy.

Table 10. Reported concentrations[1] of strontium-90 in water samples, third quarter, 2005. Concentrations are expressed in pCi/L. Samples were not filtered.

Sample Location	Sample Date	Strontium-90	
		Concentration	± 2 SD
On-site Locations			
NRF-06	7/19/2005	-0.01 U	0.32
NRF-09	7/19/2005	0.34 U	0.33
NRF-11	7/18/2005	0.09 U	0.33
NRF-12	7/19/2005	0.18 U	0.32
TAN-10A	8/16/2005	91.0	22.0
TAN-28	8/16/2005	263.0	62.0
TAN-29	8/16/2005	9.2	2.4
TAN-37	8/16/2005	540.0	130.0
USGS-099	7/18/2005	0.21 U	0.28

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Table 11. Tritium concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in pCi/L.

Sample Location	Sample Date	Tritium	
		Concentration	± 2 SD
On-site Locations			
ANP-8	8/17/2005	80 U	80
NRF-06	7/19/2005	70 U	80
NRF-09	7/19/2005	90 U	80
NRF-11	7/18/2005	80 U	80
NRF-12	7/19/2005	40 U	80
TAN-10A	8/16/2005	220	90
TAN-16	8/15/2005	180	90
TAN-28	8/16/2005	4230	180
TAN-29	8/16/2005	1430	120
TAN-37	8/16/2005	1370	120
TAN-51	8/15/2005	920	110
TAN-57	8/17/2005	-60 U	80
USGS-099	7/18/2005	-30 U	70
Effluent locations			
TAN-655	9/27/2005	50 U	80
Boundary Locations			
Atomic City	8/15/2005	40 U	70
Mud Lake Water Supply	8/16/2005	0 U	70
Distant Locations			
Alpheus Spring	7/20/2005	-40 U	80
Bill Jones Hatchery	8/9/2005	20 U	80
Clear Springs Hatchery	8/9/2005	20 U	70
Minidoka Water Supply	8/9/2005	30 U	70
Shoshone Water Supply	8/9/2005	70 U	80
MV-01	7/20/2005	-10 U	70
MV-07	7/7/2005	-10 U	70
MV-11	7/20/2005	-60 U	70
MV-18	7/21/2005	10 U	70
MV-21	7/21/2005	-70 U	60
MV-23	7/20/2005	-20 U	70
MV-24A	7/20/2005	-50 U	70
MV-27	7/21/2005	-30 U	70
MV-29	7/21/2005	60 U	80
MV-30	7/21/2005	95 U	57
MV-33	7/21/2005	70 U	80
MV-37	7/21/2005	80 U	80
MV-41	7/20/2005	160	80
MV-43	7/20/2005	40 U	70
MV-50	7/21/2005	130	80
MV-57	7/7/2005	0 U	80
MV-58	8/26/2005	50 U	70
MV-59	8/10/2005	50 U	70

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Table 12. Enriched tritium concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in pCi/L.

Sample Location	Sample Date	Tritium	
		Concentration	± 2 SD
On-site Locations			
Surface water			
BLR at INL Diversion	6/2/2005	24 8	11
BLR at Dairy Farm	6/2/2005	22 7	11
Boundary Locations			
Atomic City	8/15/2005	21	7
Distant Locations			
Alpheus Spring	7/20/2005	21	7
Bill Jones Hatchery	8/9/2005	13	7
Clear Springs Hatchery	8/9/2005	12	8
MV-01	7/20/2005	29	8
MV-07	7/7/2005	-5 U	7
MV-11	7/20/2005	36	8
MV-18	7/21/2005	19	8
MV-21	7/21/2005	14	7
MV-23	7/20/2005	28	8
MV-24A	7/20/2005	31	7
MV-27	7/21/2005	28	7
MV-29	7/21/2005	2 U	5
MV-30	7/21/2005	27	8
MV-37	7/21/2005	28	6
MV-33	7/21/2005	10	6
MV-41	7/20/2005	28	8
MV-43	7/20/2005	21	7
MV-50	7/21/2005	25	7
MV-57	7/7/2005	-1 U	7

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Table 13. Reported metals concentrations[1] in water samples, third quarter, 2005. Concentrations are expressed in µg/L. Samples are dissolved (filtered) unless otherwise indicated. NR = analysis not requested.

Sample Location	Sample Date	Concentration										
		Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Iron	Manganese	Mercury	Selenium	Zinc
On site Locations												
NRF-06 (total)	7/19/2005	5	170	<1 U	<1 U	30	<5 U	50	<2 U	<0.5 U	<10 U	<5 U
NRF-09 (total)	7/19/2005	<5 U	150	<1 U	<1 U	10	<5 U	20	<2 U	<0.5 U	<10 U	<5 U
NRF-11 (total	7/18/2005	<5 U	160	<1 U	<1 U	15	<5 U	40	<2 U	<0.5 U	<10 U	<5 U
NRF-12 (total)	7/19/2005	<5 U	150	<1 U	<1 U	13	<5 U	30	<2 U	<0.5 U	<10 U	<5 U
USGS-099 (total)	7/18/2005	<5 U	120	<1 U	<1 U	6	<5 U	<10 U	<2 U	<0.5 U	<10 U	110
Effluent locations												
Combined Effluent INTEC (total)	7/13/2005	<5 U	80	<1 U	<1 U	6	<5 U	30	<2 U	<0.5 U	<10 U	<5 U
TAN-655 (total)	9/27/2005	<5 U	92	<1 U	<1 U	<5 U	<5 U	60	4	<0.5 U	<10 U	14
Boundary Locations												
Atomic City	8/15/2005	NR	33	NR	NR	<5 U	<5 U	NR	<2 U	NR	NR	15
Mud Lake Water Supply	8/16/2005	NR	18	NR	NR	<5 U	<5 U	NR	36	NR	NR	<5 U
Distant Locations										NR		
Alpheus Spring	7/20/2005	<5 U	88	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
Bill Jones Hatchery	8/9/2005	NR	19	NR	NR	<5 U	<5 U	NR	<2 U	NR	NR	<5 U
Clear Springs Hatchery	8/9/2005	NR	34	NR	NR	<5 U	<5 U	NR	<2 U	NR	NR	<5 U
Minidoka Water Supply	8/9/2005	NR	33	NR	NR	<5 U	<5 U	NR	<2 U	NR	NR	10
Shoshone Water Supply	8/9/2005	NR	39	NR	NR	<5 U	<5 U	NR	<2 U	NR	NR	7
MV-01	7/20/2005	<5 U	70	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-07	7/7/2005	<5 U	23	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-11	7/20/2005	<5 U	117	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-18	7/21/2005	<5 U	66	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-21	7/21/2005	<5 U	21	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. A "<" indicates a result below the Minimum Detectable Concentration.

Table 13 continued. Reported metals concentrations[1] in water samples, third quarter, 2005. Concentrations are expressed in µg/L. Samples are dissolved (filtered) unless otherwise indicated. NR = analysis not requested.

Sample Location	Sample Date	Concentration										
		Arsenic	Barium	Beryllium	Cadmium	Chromium	Lead	Iron	Manganese	Mercury	Selenium	Zinc
MV-23	7/20/2005	<5 U	104	NR	<1 U	<5 U	<5 U	<10 U	2	NR	<10 U	130
MV-24A	7/20/2005	<5 U	160	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	24
MV-27	7/21/2005	<5 U	65	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-29	7/21/2005	<5 U	21	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-30	7/21/2005	<5 U	80	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-33	7/21/2005	<5 U	15	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	210
MV-37	7/21/2005	<5 U	48	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	70
MV-41	7/20/2005	<5 U	77	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-43	7/20/2005	<5 U	150	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-50	7/21/2005	<5 U	68	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	<5 U
MV-57	7/7/2005	<5 U	6	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	10
MV-58	8/26/2005	<5 U	18	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	45
MV-59	8/10/2005	<5 U	10	NR	<1 U	<5 U	<5 U	<10 U	<2 U	NR	<10 U	180

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. A "<" indicates a result below the Minimum Detectable Concentration.

Table 14. Reported common ions concentrations[1] for the water samples, third quarter, 2005. Concentrations are expressed in mg/L. Samples are dissolved (filtered) unless otherwise indicated. NR = Analysis not requested.

Sample Location	Sample Date	Concentration										
		Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity[2]	Silica	TDS[2]	TSS[3]
On-site												
NRF-06 (total)	7/19/2005	164	41	6.4	190	496	0.21	106	173	24.1	1400	<1 U
NRF-09 (total)	7/19/2005	76	22	2.6	18	44.1	0.2	38.9	201	9.84	360	<1 U
NRF-11 (total)	7/18/2005	76	22	2.6	18	42.9	0.2	38.6	198	29.8	350	<1 U
NRF-12 (total)	7/19/2005	73	21	2.5	17	39.1	0.27	37.5	212	20.6	320	<1 U
USGS-099 (total)	7/18/2005	68	22	1.8	15	24.4	0.22	28	197	22.3	340	<1 U
Effluent Locations												
Combined Effluent INTEC (total)	7/13/2005	48	15	2.8	84	128	0.32	46	133	33.3	<0 R	<1 U
Effluent from INTEC STP (total)	7/13/2005	NR	NR	NR	NR	103	0.28	36	194	44.2	<0 U	29
TAN-655 (total)	9/27/2005	57	15	3.8	9.5	16.6	0.392	31.5	151	19	261	5.2
Boundary												
Atomic City	8/15/2005	36	14	3.4	17	18.1	0.8	16.8	137	NR	NR	NR
Mud Lake Water Supply	8/16/2005	9.2	2.8	5	31	5.8	0.8	8.55	94	NR	NR	NR
Distant											NR	NR
Alpheus Spring	7/20/2005	59	20	6.6	34	44.5	0.61	58.1	182	38.8	NR	NR
Bill Jones Hatchery	8/9/2005	31	16	3.6	16	11.3	0.63	24	140	NR	NR	NR
Clear Springs Hatchery	8/9/2005	47	19	4.2	25	36	0.76	48.1	153	NR	NR	NR
Minidoka Water Supply	8/9/2005	48	16	3.6	20	32.9	0.83	40.6	138	NR	NR	NR
Shoshone Water Supply	8/9/2005	45	15	3.1	15	7.04	0.46	16.7	168	NR	NR	NR

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. A "<" indicates a result below the Minimum Detectable Concentration.
[2] As $CaCo_3$.
[3] Dissolved nitrate + nitrite as N.
[4] Dissolved phosphorus as P.

Table 14 continued. Reported common ions concentrations[1] for the water samples, third quarter, 2005. Concentrations are expressed in mg/L. Samples are dissolved (filtered) unless otherwise indicated. NR = Analysis not requested.

Sample Location	Sample Date	Concentration										
		Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity[2]	Silica	TDS[2]	TSS[3]
MV-01	7/20/2005	51	19	6.9	35	45	0.78	48.8	172	37.8	NR	NR
MV-07	7/7/2005	35	14	3.4	17	13.9	0.83	30.7	124	31	NR	NR
MV-11	7/20/2005	73	27	7.2	49	65.5	0.55	77.7	218	37.7	NR	NR
MV-18	7/21/2005	62	24	5.4	35	52.3	0.68	64.9	190	37.8	NR	NR
MV-21	7/21/2005	30	15	3.4	16	10.6	0.63	22.9	131	33.3	NR	NR
MV-23	7/20/2005	75	21	5.7	27	34.9	0.29	58.2	212	32.4	NR	NR
MV-24A	7/20/2005	76	33	7.5	62	75.9	0.51	94.3	240	19.7	NR	NR
MV-27	7/21/2005	63	23	5.3	36	56.7	0.64	67.9	177	34.4	NR	NR
MV-29	7/21/2005	31	14	3.3	16	15.4	0.78	28.2	122	35.4	NR	NR
MV-30	7/21/2005	64	23	5.9	37	49.8	0.6	64.5	194	41.4	NR	NR
MV-33	7/21/2005	27	14	3.2	13	7.92	0.66	19	124	34.9	NR	NR
MV-37	7/21/2005	51	16	3.6	19	14.7	0.46	29.1	181	31.5	NR	NR
MV-41	7/20/2005	61	27	4.4	41	29.3	0.64	60.1	249	40.1	NR	NR
MV-43	7/20/2005	110	39	6.5	45	62.9	0.62	83.1	307	45.9	NR	NR
MV-50	7/21/2005	64	23	5.5	38	58.4	0.61	70.2	183	34.9	NR	NR
MV-58	8/26/2005	25	11.3	2.8	11	7.78	0.62	16	117	28.9	NR	NR
MV-57	7/7/2005	25	12	2.6	16	6.27	0.37	11	104	28	NR	NR
MV-59	8/10/2005	26	13	3.3	16	13.3	0.65	18.3	115	35	NR	NR

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. A "<" indicates a result below the Minimum Detectable Concentration.
[2] As $CaCo_3$.
[3] Dissolved nitrate + nitrite as N.
[4] Dissolved phosphorus as P.

Table 15. Reported total nutrient concentrations[1] in water samples, third quarter, 2005. Concentrations are expressed in mg/L. Samples were not filtered. NR = Analysis not requested.

Sample Location	Sample Date	Concentration				
		Nitrite + Nitrate	Ammonia	TKN	Nitrite	Phosphorous
On-Site						
NRF-06	7/19/2005	1.97	<0.005 U	<0.05 U	<0.005 U	0.08
NRF-09	7/19/2005	2.13	<0.005 U	<0.05 U	<0.005 U	0.029
NRF-11	7/18/2005	1.81	0.006	<0.05 U	<0.005 U	0.03
NRF-12	7/19/2005	1.77	<0.005 U	<0.05 U	<0.005 U	0.029
USGS-099	7/18/2005	1.85	0.006	<0.05 U	<0.005 U	0.025
Effluent Locations						
Combined Effluent INTEC	7/13/2005	0.872	NR	0.272	NR	0.057
Effluent from INTEC STP	7/13/2005	0.019	NR	9.3	NR	2.73
Influent to INTEC STP	7/13/2005	0.012	NR	45.9	NR	5.89
TAN-655	9/27/2005	2.81	1.11	1.99	NR	NR
Boundary						
Atomic City	8/15/2005	1.36	NR	NR	NR	0.015
Mud Lake Water Supply	8/16/2005	0.044	NR	NR	NR	0.038
Distant						
Alpheus Spring	7/20/2005	2.09	0.006	NR	NR	0.021
Bill Jones Hatchery	8/9/2005	0.94	NR	NR	NR	0.018
Clear Springs Hatchery	8/9/2005	1.54	NR	NR	NR	0.023
Minidoka Water Supply	8/9/2005	1.06	NR	NR	NR	0.015
Shoshone Water Supply	8/9/2005	1.36	NR	NR	NR	0.031
MV-01	7/20/2005	1.09	<0.005 U	NR	NR	0.018
MV-07	7/7/2005	0.501	<0.005 U	NR	NR	0.013
MV-11	7/20/2005	5.19	0.005	NR	NR	0.021
MV-18	7/21/2005	2.42	0.005	NR	NR	0.024
MV-21	7/21/2005	0.956	0.008	NR	NR	0.019
MV-23	7/20/2005	4.22	<0.005 U	NR	NR	0.045
MV-24A	7/20/2005	7.29	<0.005 U	NR	NR	0.03
MV-27	7/21/2005	2.16	0.012	NR	NR	0.021
MV-29	7/21/2005	0.554	0.015	NR	NR	0.017
MV-30	7/21/2005	2.68	0.007	NR	NR	0.025
MV-33	7/21/2005	0.572	<0.005 U	NR	NR	0.019
MV-37	7/21/2005	1.55	<0.005 U	NR	NR	0.058
MV-41	7/20/2005	2.13	<0.005 U	NR	NR	0.069
MV-43	7/20/2005	21.7	<0.005 U	NR	NR	0.027
MV-50	7/21/2005	2.19	0.039	NR	NR	0.026
MV-57	7/7/2005	0.432	<0.005 U	NR	NR	0.017
MV-58	8/26/2005	384 R	<0.005 R	NR	NR	0.023 J
MV-59	8/10/2005	0.824	0.006	NR	NR	0.014

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. A "<" indicates a result below the Minimum Detectable Concentration.

Table 16. Volatile organic compound (VOC) concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in µg/L.

Sample Site/Analyte	Result	DL	MCL
ANP-8			
cis-1,2-Dichloroethene	0.33	0.1	70
Tetrachloroethylene (PERC)	4.6	0.5	5
Trichloroethylene	22.6	0.07	5
NRF-06			
Tetrachloroethylene (PERC)	0.35	0.5	5
TAN-10A			
cis-1,2-Dichloroethene	0.37	0.1	70
trans-1,2-Dichloroethene	4.2	0.13	100
Tetrachloroethylene (PERC)	2.0	0.5	5
Trichloroethylene	9.3	0.07	5
TAN-16			
cis-1,2-Dichloroethene	1.1	0.1	70
trans-1,2-Dichloroethene	0.53	0.13	100
Tetrachloroethylene (PERC)	6.5	0.5	5
Toluene	5.9	0.11	1000
Trichloroethylene	42.0	0.07	5
TAN-28			
1,1-Dichloroethene	1.5	0.49	7
cis-1,2-Dichloroethene	122.0	0.1	70
trans-1,2-Dichloroethene	96.0	0.13	100
Tetrachloroethylene (PERC)	16.0	0.5	5
Trichloroethylene	1200.0	0.07	5
Vinyl chloride	7.3	0.5	2
Chloroform	0.48	0.25	NA
1,1-Dichloroethane	0.59	0.5	NA
TAN-29			
1,1-Dichloroethene	0.6	0.49	7
cis-1,2-Dichloroethene	43.0	0.1	70
trans-1,2-Dichloroethene	11.4	0.13	100
Tetrachloroethylene (PERC)	22.5	0.5	5
Trichloroethylene	470.0	0.07	5
Chloroform	0.47	0.25	NA

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. DL – Detection Limit. NA – Not Applicable.

Table 16 continued. Volatile organic compound (VOC) concentrations[1] for water samples, third quarter, 2005. Concentrations are expressed in µg/L.

Sample Site/Analyte	Result	DL	MCL
TAN-37			
cis-1,2-Dichloroethene	30.2	0.1	70
trans-1,2-Dichloroethene	150.0	0.13	100
Tetrachloroethylene (PERC)	1.1	0.5	5
Trichloroethylene	122.0	0.07	5
Vinyl chloride	4.9	0.5	2
Chloroform	4.9	0.25	NA
TAN-51			
1,1-Dichloroethene	0.74	0.49	7
cis-1,2-Dichloroethene	3.8	0.1	70
trans-1,2-Dichloroethene	1.4	0.13	100
Tetrachloroethylene (PERC)	28.0	0.5	5
Trichloroethylene	180.0	0.07	5
1,1-Dichloroethane	0.77	0.5	NA
TAN-57			
Tetrachloroethylene (PERC)	1.6	0.5	5
Trichloroethylene	3.2	0.07	5

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected. DL – Detection Limit. NA – Not Applicable.

Terrestrial Monitoring Results

The ESP conducts terrestrial (soil and milk) monitoring and verification to provide an indication as to the long-term deposition and migration of contaminants in the environment, and to provide independent verification of DOE's analytical measurement of terrestrial variables.

Results for analyses of milk samples, which are collected monthly, are presented in **Table 17**. Naturally occurring potassium-40 was detected in all samples within the expected range. Iodine-131, a man-made radionuclide, was not detected.

DEQ-INL monitors long-term radiological conditions using measurement devices capable of identifying and measuring quantities of gamma-emitting radionuclides in soil. Monitoring concentrations of gamma-emitting radionuclides in surface soil provides insight to the transport, deposition, and accumulation of radioactive material in the environment as a result of INL operations and the historic atmospheric testing of nuclear weapons.

Concentrations of man-made radionuclides were monitored at 11 HPIC monitoring stations maintained by DEQ-INL. Additional monitoring locations included the HPIC monitoring stations maintained by INL, ESER, and Shoshone-Bannock Tribes. DEQ-INL routinely monitors concentrations of man-made and naturally occurring radionuclides in soil via *in-situ* gamma spectroscopy on an annual basis. No man made radionuclides were identified other than cesium-137 which was found in concentrations consistent with historical, above ground testing of nuclear weapons. **(Table 18)**

Table 17. Gamma spectroscopy analysis data for milk samples, second quarter, 2005. Concentrations are expressed in pCi/L.

Sample Location/Dairy	Sample Date	Naturally occurring gamma-emitting radionuclide Potassium-40 (pCi/L)		Man-made gamma-emitting radionuclide Iodine-131[1]
		Concentration	± 2 SD	
Monitoring Samples				
Howe/Nelson-Ricks Creamery	07/11/05	1446	117	<MDC
	08/09/05	1431	111	<MDC
	09/06/05	1370	108	<MDC
Mud Lake/Nelson-Ricks Creamery	07/11/05	1407	110	<MDC
	08/09/05	1437	115	<MDC
	09/06/05	1555	121	<MDC
Rupert-Minidoka/Kraft	07/12/05	1513	115	<MDC
	08/09/05	1383	113	<MDC
	09/07/05	1469	100	<MDC
Gooding/Glanbia	07/12/05	1388	102	<MDC
	08/09/05	1476	103	<MDC
	09/07/05	1383	95	<MDC
Verification Samples[2]				
Blackfoot	07/05/05	1424	104	<MDC
Dietrich	09/06/05	1454	115	<MDC
Idaho Falls	08/02/05	1457	102	<MDC
Rupert	08/02/05	1476	117	<MDC
Terreton	07/05/05	1500	114	<MDC
Terreton	09/06/05	1440	112	<MDC

[1] <MDC – Less than Minimum Detectable Concentration (approximately 4 pCi/L for Iodine-131).
[2] DEQ-INL samples collected by the off-site INL environmental surveillance contractor.

Table 18. In-Situ gamma spectroscopic analysis results for soil monitoring conducted during the third quarter, 2005 assuming distribution of radionuclides in the top 0 to 5-cm of soil. Concentrations are expressed in pCi g^{-1} ± 2-sigma counting uncertainty propagated with an estimated 10 percent systematic sampling uncertainty.

Location	Date Acquired	Cesium-137	MDC	Potassium-40	MDC
Atomic City Monitoring Station	8/3/05	0.39 ± 0.10	0.09	18 ± 3.6	1.3
South Gate HPIC Monitoring Station	8/3/05	0.71 ± 0.16	0.11	21 ± 4.4	1.5
Central Facilities Area HPIC[1]	8/3/05	0.75 ± 0.17	0.12	24 ± 4.9	1.6
Experimental Field Station HPIC[1]	8/4/05	0.60 ± 0.14	0.11	21 ± 4.4	1.5
Big Lost River Rest Area on Highway 20/26	8/4/05	0.58 ± 0.13	0.11	21 ± 4.3	1.5
Big Southern Butte Monitoring Station	8/4/05	0.43 ± 0.11	0.10	20 ± 4.1	1.4
Blackfoot Mountain View Middle School[2]	8/8/05	0.23 ± 0.07	0.08	15 ± 3.0	1.2
Fort Hall Community Monitoring Station[3]	8/8/05	0.29 ± 0.08	0.10	21 ± 4.3	1.5
Idaho Falls Community Monitoring Station	8/9/05	0.16 ± 0.05	0.07	12 ± 2.4	1.1
Howe Meteorological Tower	8/10/05	0.48 ± 0.11	0.10	17 ± 3.4	1.3
Sand Dunes Monitoring Station	8/10/05	0.39 ± 0.10	0.10	19 ± 3.8	1.4
Rexburg Madison Middle School[2]	8/10/05	0.08 ± 0.06	0.09	25 ± 5.0	1.6
Monteview Monitoring Station	8/10/05	0.30 ± 0.08	0.08	17 ± 3.6	1.4
Terreton Community Monitoring Station	8/10/05	0.10 ± 0.05	0.08	21 ± 4.2	1.5
Rover Meteorological Tower	8/15/05	0.43 ± 0.11	0.10	21 ± 4.2	1.5
Base of Howe Meteorological Tower	8/15/05	0.45 ± 0.11	0.10	18 ± 3.7	1.4

[1] HPIC station operated by CWI.
[2] HPIC station operated by ESER.
[3] HPIC station operated by Shoshone-Bannock Tribes.

Quality Assurance

The measurement of any physical quantity is subject to uncertainty from errors that may be introduced during sample collection, measurement, calibration, and the reading and reporting of results. While the sum of these inaccuracies cannot be quantified for each analytical result, a quality assurance program can evaluate the overall quality of a data set and possibly identify and address errors or inaccuracies.

This section summarizes the results of the quality assurance (QA) assessment of the data collected for the third quarter of 2005 for the DEQ-INL's ESP. It also summarizes the quality control (QC) samples (spikes, blanks, and duplicates) submitted to the Idaho Bureau of Laboratories-Boise (IBL) for nonradiological analyses and to Idaho State University's Environmental Monitoring Laboratory (ISU-EML) for radiological analyses during the quarter. All analyses and QC measures at the analytical laboratories used by the ESP are performed in accordance with approved written procedures maintained by each respective analytical laboratory. Sample collection is performed in accordance with written procedures maintained by the DEQ-INL.

Analytical results for blanks, duplicates, and spikes are used to assess the precision, accuracy, and representativeness of results from analyzing laboratories. During the third quarter of 2005, the DEQ-INL submitted 87 QC samples for various radiological and nonradiological analyses (**Table 19**).

Blank Samples

Blank samples consist of matrices that have negligible, acceptably low, or unmeasurable amounts of the analyte(s) of interest in them. They are designed to determine if analyses will provide a "zero" result when no contaminant is expected to be present or an acceptable measure of "background," and therefore monitor any bias that may have been introduced during sample collection, storage, shipment, and analysis. Blank sample results submitted for gross alpha and gross beta screening in air for the third quarter of 2005 are presented in **Table 20**. Blank sample results for select gamma emitters in air from composited air filters are presented in **Table 21**. Data for blank analyses used to assess data quality for tritium in water vapor in air are presented in **Table 22**. Blank sample results for metals in groundwater can be found in **Table 23**. Blank analyses results for cesium-137, potassium-40, tritium, enriched tritium, gross alpha, and gross beta in ground and surface water media are presented in **Table 24.** Nutrient and common ion blank results in groundwater are listed in **Table 25.**

One blank showed detectable levels of total nitrogen and total phosphorus but were $\leq$5x the detection limit. Additionally, no other samples were analyzed in the same batch as this blank and therefore no data qualifications were applied.

No other anomalies were observed from the assessment of field blank samples as measured by the analytical laboratories used by DEQ-INL for the third quarter of 2005.

Duplicate Samples

Duplicate samples are collected in a manner such that the samples are thought to be essentially identical in composition and are used to assess analytical precision. The difference between the original sample and the duplicate sample is expressed as a relative percent difference (RPD) and is used to measure a laboratory's ability to reproduce consistent results. For radiological analyses, the standard deviation of the differences can be used as an indicator of the overall precision of the data set. Duplicate results for ground and surface water are presented in **Table 26** for radiological analyses and **Tables 27, 28,** and **29** for non-radiological analyses.

One analyte, a duplicate measurement of fluoride, failed the relative percent difference criteria used to assess analytical performance at 25%. No additional action was taken to qualify the data set since all other data was in control. This parameter will continued to be closely followed since the laboratory has difficulty with repeat analysis for this compound when concentrations are at or near the detection limit.

No additional anomalies were observed from the assessment of field duplicate samples as measured by the analytical laboratories used by DEQ-INL for the third quarter of 2005.

Spiked Samples

Spiked samples are samples to which known concentrations of specific analytes have been added in order to assess the bias a laboratory may have in accurately measuring these analytes. To determine agreement after laboratory analysis, DEQ-INL calculates the difference between the known concentration in the sample and the measured concentration by the laboratory. This result is known as percent recovery (%R) and the acceptable range used by DEQ-INL is 100 ± 25 percent. During third quarter 2005, no field matrices were spiked to assess the influence of the sample media on laboratory performance. However, several spiked samples were created using de-ionized water and submitted to analytical laboratories for analyses. These non-radiological constituents used to assess groundwater analyte recovery rates are presented in **Tables 30, 31 & 32.**

During second quarter of 2005, the laboratory analysis results for spiked volatile organic compounds failed the recovery criteria. A follow-up laboratory assessment was conducted during the third quarter of 2005 with a new set of spiked samples set to the original laboratory as well as a second sample sent to a commercial laboratory for confirmation. Both labs performed well on the follow-up analyses of a spiked volatile organic compound sample **(Table 32)**. No additional action will be required.

The analytical laboratory also failed the recovery criteria for spiked phosphorus samples on two separate occasions. Since these recovery values were >125% but <150% recovery, all 3 associated sample results were qualified as estimates (J) in the data set.

DEQ-INL also prepares additional "spike-like" quality control samples to assess ambient radiation measurement bias. Once per quarter, DEQ-INL irradiates a number of electret ionization chambers (EIC) to verify EIC response. Irradiations of EICs are conducted in a repeatable geometry to a known exposure of 30 mR and a "blind" exposure ranging from 20 to 50 mR. EIC responses are compared directly with the exposure received from the NIST traceable cesium-137 source provided by ISU-EML. EIC response is considered acceptable if each measurement agrees within 25 percent of the known irradiated quantity. The irradiation results for third quarter 2005 are presented in **Table 33.**

No additional anomalies other than those listed above were observed from the assessment of spiked samples as measured by DEQ-INL or the analytical laboratories used by DEQ-INL for the third quarter of 2005.

Analytical QA/QC Assessment

No issues involving sample chain of custody, sample holding times, the analysis of blank, and duplicate samples were observed during the third quarter of 2005 which significantly affected data quality. One DEQ-INL issue involving the improper sample preservation of a ground water sample led to the rejection of the nitrite + nitrate and ammonia analysis results for this sample as well as labeling the phosphorous result as an estimate. Methodologies and data reports issued by the contracting laboratories generally conformed to the requirements of DEQ-INL during the third quarter of 2005. One total dissolved solid sample result for an effluent sample collected at the INL was rejected by the laboratory for failure of internal QC parameters.

Data usability is the measure of data that is not rejected compared to the amount that was expected to be obtained. The overall data usability rate for the third quarter of 2005 met the minimum criteria of the DEQ-INL ESP and is summarized is **Table 19.**

Preventative Maintenance and Equipment Reliability

All equipment was calibrated and checked according to pre-described periodicity. Service reliability for air sampling equipment for the third quarter of 2005 is summarized in **Table 34**. Air sampling equipment requiring repair included:

- Total Suspended Particulate (TSP) air sample blower motor at the Atomic City monitoring station failed and was replaced.
- Sample pump failed for the atmospheric moisture sampler at Mud Lake. The radioiodine sample pump was modified to collect atmospheric moisture in addition to radioiodine.
- An electrical breaker inadvertently was tripped at the Howe station, thus preventing sampling for a three week period.
- PM_{10} samplers were officially discontinued during third quarter of 2005 with the failure of the last sampler at Mud Lake. This unit will not be replaced.
- The flow meter (i.e., "rotometer") for the radio-iodine sampler at Van Buren Avenue was replaced the first week of the third quarter of 2005.
- HPICs were source checked in August and each detector was within ± 4 percent of expected response. No further action necessary.

Conclusion

All data collected for the third quarter of 2005 have been assigned the applicable qualifiers to designate the appropriate use of the data. In addition, all data has been verified and deemed complete with the exception of three samples outstanding, meeting the requirements and data quality objectives established by DEQ-INL.

Table 19. Summary of the analytical performance and usability of the analyses performed for the DEQ-INL ESP for third quarter, 2005.

Media Sampled	Collection Device	Analyte	Test Analyses	Blank Analyses	Duplicate Analyses	Spike Analyses	Data Rejected[1]	Analyzing Lab[2]
AIR								
Particulate	4 inch filter	Gross alpha	143	13	0	0	0	ISU-EML
		Gross beta	143	13	0	0	0	ISU-EML
		Gamma emitters	11	1	0	0	0	ISU-EML
		Radiochemical	0	0	0	0	0	ISU Sub
Particulate	Desiccant column	Tritium	54	4	0	0	0	ISU-EML
Gaseous	Charcoal filter	Iodine-131	13	0	0	0	0	ISU-EML
Precipitation	Poly bottle	Tritium	5	0	0	0	0	ISU-EML
		Gamma emitters	4	0	0	0	0	ISU-EML
WATER								
Groundwater & Surface Water	Grab or composite	Gross alpha	41	2	3	0	0	ISU-EML
		Gross beta	41	2	3	0	0	ISU-EML
		Gamma emitters	41	2	3	0	0	ISU-EML
		Tritium	39	2	3	0	0	ISU-EML
		Enriched tritium[3]	22	2	1	0	0	ISU-EML
		Technetium-99	0	0	0	0	0	ISU-EML
		Radiochemical	9	0	0	0	0	ISU Sub
		Metals	32	2	2	2	0	IBL
		Common Ions	33	2	2	2	1	IBL
		Nutrients	34	2	2	2	2	IBL
		Volatile Organics	13	0	1	2	0	IBL Sub
TERRESTRIAL								
Milk	Grab or composite	Gamma emitters	18	0	0	0	0	ISU-EML
Soil	*in situ*	Gamma emitters	16	0	0	0	0	DEQ-INL
	Grab – "puck"	Gamma emitters	0	0	0	0	0	ISU-EML
RADIATION								
Ambient	EICs	Gamma Radiation	93	4	0	8	0	DEQ-INL
	HPICs	Gamma Radiation	NA	NA	NA	NA	NA	DEQ-INL
Total Analyses			805	51	20	16	3	
Total of QC Analyses (blanks, duplicates, and spikes)						87		
Percentage of QC analyses of total analyses[4]						10.8		
Percentage of usable data[5]						99.63		

1 Combined Laboratory and DEQ-INL rejection criteria (data was rejected for any reason).
2 ISU-EML = Idaho State University – Environmental Monitoring Laboratory; ISU Sub = Subcontract laboratory to ISU-EML; IBL = Idaho Bureau of Laboratories, Boise; IBL Sub = Subcontract laboratory to IBL; DEQ-INL = Analyzed by INEEL Oversight and Radiation Control, Idaho Department of Environmental Quality.
3 Three enriched tritium analyses (including one blank) were delayed from the 2nd quarter and are combined with the 3rd quarter results.
4 Analyzing quality control samples at a rate of approximately 5 to 10 percent of the total number of analyses performed for the year is deemed appropriate for the DEQ-INL ESP.
5 Data usability rate [total analyses – rejected data]/[total analyses] of 90 percent or higher is acceptable for the DEQ-INL ESP.

Table 20. Blank analysis results for gross alpha and beta in particulate air (TSP) for the third quarter, 2005. Concentrations[1] and associated uncertainties (2 SD) are expressed in 1 x 10^{-3} pCi/m^3.

Collection Period		Corrected volume (m^3) [1]	Gross alpha		Gross beta	
Start	Stop		Value	Uncertainty (± 2 SD)	Value	Uncertainty (± 2 SD)
06/30/05	07/07/05	1708	0.0	0.2	0.3	0.3
07/07/05	07/14/05	1708	-0.2	0.2	-0.2	0.3
07/14/05	07/21/05	1708	0.0	0.2	-0.5	0.3
07/21/05	07/28/05	1708	0.1	0.2	-0.5	0.3
07/28/05	08/04/05	1708	-0.2	0.2	-0.2	0.3
08/04/05	08/11/05	1708	0.2	0.2	-0.2	0.3
08/11/05	08/18/05	1708	-0.2	0.2	0.0	0.3
08/18/05	08/25/05	1708	0.0	0.2	-0.5	0.3
08/25/05	09/01/05	1708	-0.2	0.2	-0.9	0.3
09/01/05	09/08/05	1708	0.5	0.3	0.0	0.4
09/08/05	09/15/05	1708	-0.2	0.2	-0.4	0.3
09/15/05	09/22/05	1708	-0.3	0.2	-0.2	0.3
09/22/05	09/29/05	1708	-0.2	0.2	-0.5	0.3

[1] A volume equal to the average of the volumes collected through each valid field filter was used to compute "concentrations" for the blank for meaningful comparison to sample results. No air was passed through the blank filters.

Table 21. Blank analysis results for gamma spectroscopy for TSP particulate air filters for the third quarter, 2005. Concentrations[1] are expressed in 1 x 10^{-5} pCi/m^3 with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Analysis Date	Beryllium-7			Ruthenium-106/ Rhodium-106			Antimony-125		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/19/05	2	37	62	-8	46	78	5	12	21

[1] These concentrations are from blank filters collected weekly, composited, and analyzed for the calendar quarter. A volume equal to the average of the volumes collected through each valid field filter was used to compute "concentrations" for the blank for meaningful comparison to sample results. No air was passed through the blank filters.

Table 21 continued. Blank analysis results for gamma spectroscopy for TSP particulate air filters for the third quarter, 2005. Concentrations[1] are expressed in 1x10^{-5} pCi/m^3 with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Analysis Date	Cesium-134			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/19/05	1	4	6	0	3	6

[1] These concentrations are from blank filters collected weekly, composited, and analyzed for the calendar quarter. A volume equal to the average of the volumes collected through each valid field filter was used to compute "concentrations" for the blank for meaningful comparison to sample results. No air was passed through the blank filters.

Table 22. Blank analysis results for tritium water vapor from air samples for the third quarter, 2005. Concentrations are expressed in pCi/L with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Sample Number	Start Date	Collect Date	Analysis Date	Tritium		
				Concentration	± 2 SD	MDC
OP053ZTR01	08/01/05	08/01/05	08/11/05	0.02	0.08	0.13
OP053ZTR02	08/01/05	08/02/05	08/11/05	0.02	0.07	0.13
OP053ZTR03	08/29/05	08/30/05	09/12/05	-0.01	0.07	0.12
OP053ZTR04	08/29/05	08/30/05	09/12/05	-0.01	0.07	0.12

Table 23. Blank analysis results (in mg/L) for metals in ground and surface water for the third quarter, 2005. NR = Analysis not requested.

Sample Number	Sample Date	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper
053W052	08/14/05	NR	NR	NR	<0.002	NR	NR	<0.005	NR	NR
05MW142	07/22/05	NR	NR	<0.005	<0.002	NR	<0.001	<0.005	NR	NR

Table 23, continued. Blank analysis results (in mg/L) for metals in ground and surface water for the third quarter, 2005. NR = Analysis not requested.

Sample Number	Sample Date	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
053W052	08/14/05	NR	<0.005	<0.002	NR	NR	NR	NR	NR	<0.005
05MW142	07/22/05	<0.01	<0.005	<0.002	NR	NR	<0.01	NR	NR	<0.005

Table 24. Blank analysis results for cesium-137, potassium-40, tritium, enriched tritium, gross alpha, and gross beta in ground and surface water samples for the third quarter, 2005. Concentrations are expressed in pCi/L with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Sample Number	Cesium-137			Potassium-40			Tritium			Enriched Tritium			Gross Alpha			Gross Beta		
	Concentration	±2 SD	MDC	Concentration	±2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
053W049	1.1	1.6	2.7	3	40	69	NR	-	-	NR	-	-	0.2	0.6	0.9	1.0	0.8	1.3
053W050	NR	-	-	NR	-	-	40	70	120	NC[1]	-	-	NR	-	-	NR	-	-
05MV139	-0.1	1.6	2.7	-35	38	66	NR	-	-	NR	-	-	-1.0	0.6	1.2	-0.2	0.8	1.3
05MV140	NR	-	-	NR	-	-	40	80	140	40	8	12	NR	-	-	NR	-	-
05W119	NR	-	-	NR	-	-	50[2]	70	120	31[3]	8	11	NR	-	-	NR	-	-

[1] NC = analysis not completed. The result will be reported with the 4th quarter, 2005 data.
[2] Previously reported in the 2nd quarter 2005 report.
[3] This result was not completed for the 2nd quarter report and is reported with the 3rd quarter data.

Table 25. Blank analysis results (in mg/L) for common ion and nutrients in ground and surface water for the third quarter, 2005.

Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity as CaCO3	Total Nitrogen	Total Phosphorus
053W051, 052, & 053	08/14/05	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<2	<1	0.026	0.007
05MV141, 142, & 143	07/22/05	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<2	<1	<0.005	<0.005

Table 26. Duplicate radiological analysis results (in pCi/L) for ground and surface water, third quarter, 2005.

Analysis/ Sample Location	Original Sample Number	Analysis Date	Concentration	± 2 SD	Duplicate Sample Number	Analysis Date	Concentration	± 2 SD	$/R_1-R_2/$	$3(s_1^2+s_1^2)^{1/2}$	Within Criteria?[1]
Gross Alpha											
Clear Spring	053W016	09/16/05	0.0	2.0	053W036	09/16/05	0.8	1.9	0.8	8.3	Yes
MV-21	05MV034	08/17/05	0.6	2.0	05MV016	08/15/05	0.7	2.0	0.1	8.5	Yes
ANP-8	05VG203	09/08/05	-1.3	2.3	05VG229	09/14/05	-0.6	2.0	0.7	9.1	Yes
Gross Beta											
Clear Spring	053W016	09/16/05	5.0	1.0	053W036	09/16/05	3.3	0.9	1.7	4.0	Yes
MV-21	05MV034	08/17/05	3.3	1.0	05MV016	08/15/05	3.5	1.0	0.2	4.2	Yes
ANP-8	05VG203	09/08/05	2.3	1.0	05VG229	09/14/05	2.5	1.0	0.2	4.2	Yes
Gamma Spectroscopy Cesium-137											
Clear Spring	053W016	09/02/05	-0.9	1.6	053W036	09/16/05	0.3	1.5	1.2	6.6	Yes
MV-21	05MV034	08/03/05	1.1	1.8	05MV016	07/28/05	0.5	1.4	0.6	6.8	Yes
ANP-8	05VG203	08/29/05	0.4	1.8	05VG229	09/01/05	0.4	1.4	0.0	6.8	Yes
Gamma Spectroscopy Potassium-40											
Clear Spring	053W016	09/02/05	-13	39	053W036	09/12/05	11	48	24	185.5	Yes
MV-21	05MV034	08/03/05	6	48	05MV016	07/28/05	-3	48	9	203.6	Yes
ANP-8	05VG203	08/29/05	47	50	05VG229	09/01/05	-4	47	51	205.9	Yes
Tritium											
Clear Spring	053W017	09/16/05	20	70	053W037	09/16/05	30	70	10	297.0	Yes
MV-21	05MV035	09/09/05	-70	60	05MV017	09/09/05	-10	70	60	276.6	Yes
ANP-8	05VG204	08/25/05	80	80	05VG230	08/25/05	40	80	40	339.4	Yes
Enriched Tritium											
MV-21	05MV035	10/11/05	14	7	05MV017	10/11/05	17	7	3	29.7	Yes

1. $/R_1-R_2/ \leq 3(s_1^2+s_1^2)^{1/2}$

Table 27. Duplicate results (in µg/L) for metals in ground and/or surface water for the third quarter, 2005. Relative percent difference (RPD) is acceptable at < 20 percent. Data are presented in the table in the format of "original result/duplicate result (RPD)." NR = Analysis not requested.

Sample Location	Sample Number	Duplicate Sample Number	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper
Clear Spring	053W019	053W038	NR	NR	NR	34/34 (0)	NR	NR	<5/<5 (0)	NR	NR
MV-21	05MV037	05MV019	NR	NR	NR	21/21 (0)	NR	<1/<1 (0)	<5/<5 (0)	NR	NR

Table 27, continued. Duplicate results (in µg/L) for metals in ground and/or surface water for the third quarter, 2005. Relative percent difference (RPD) is acceptable at < 20 percent. Data are presented in the table in the format of "original result/duplicate result (RPD)." NR = Analysis not requested.

Sample Location	Sample Number	Duplicate Sample Number	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
Clear Spring	053W019	053W038	NR	<5/<5 (0)	<2/<2 (0)	NR	NR	NR	NR	NR	<5/<5 (0)
MV-21	05MV037	05MV019	<10/<10 (0)	<5/<5 (0)	<2/<2 (0)	NR	NR	<10/<10 (0)	NR	NR	<5/<5 (0)

Table 28. Duplicate results (in mg/L) for common ions and nutrients in ground and/or surface water for the third quarter, 2005. Relative percent difference (RPD) is acceptable at < 20 percent. Data are presented in the table in the format of "original result/duplicate result (RPD)."

Sample Location	Sample Number	Duplicate Sample Number	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity as CaCO3	Total Nitrogen	Total Phosphorus
Clear Spring	053W018, 019, & 020	053W038, 039, & 040	47/47 (0)	19/19 (0)	25/25 (0)	4.2/4.2 (0)	0.76/0.75 (1)	36/35.5 (1)	48.1/47 (2)	153/149 (2)	1.54/1.54 (0)	0.023/0.022 (4)
MV-21	05MV036, 037, & 038	05MV018, 019, & 020	30/30 (0)	15/15/ (0)	16/16 (0)	3.4/3.5 (0)	0.63/0.49 (25)[1]	10.5/10.6 (1)	22.9/22.8 (0.5)	131/133 (2)	0.956/0.948 (0.8)	0.019/0.02 (5)

[1.] Since the result(s) was less than five times the MDL (0.1 mg/L), the duplicate result for this analyte was acceptable at ± MDL.

Table 29. Duplicate results (in µg/L) for select VOCs in ground and surface water for the third quarter, 2005. Relative percent difference (RPD) is acceptable at < 20 percent. Data are presented in the table in the format of "original result/duplicate result (RPD)."

Sample Location	Sample Number	Duplicate Sample Number	cis-1,2-Dichloroethene	Tetrachloroethylene	Trichloroethylene	All Other Compounds (Method)
ANP-8	05VG205	05VG231	<0.1/0.33[1]	4.6/5.3 (14)	22.6/22.6 (0)	< MDL /<MDL

[1.] Duplicate analysis not performed because one value was less than the MDL (0.1 µg/L).

Table 30. De-ionized water spike results (in µg/L) for metals in ground and surface water for the third quarter, 2005. A percent recovery of 100 ± 25 is considered acceptable and is recorded in parentheses (%R).

Spike Sample Number	Sample Date	Barium	Chromium	Lead	Manganese	Zinc
		Reference Spike Concentration				
		42.4	49.0	2.1	5.05	134
052W044	08/17/05	42 (99)	50 (102)	<5 (100)	5 (99)	140 (104)
		Reference Spike Concentration				
		52.5	60.5	2.6	6.3	166
05MV146	08/11/05	52 (99)	60 (99)	<5 (100)	6 (95)	170 (102)

Table 31. De-ionized water spike results (in mg/L) for common ions and nutrients in ground and surface water for the third quarter, 2005. A percent recovery of 100 ± 25 is considered acceptable and is recorded in parentheses (%R). All results associated with the QC samples are qualified as "estimates (J)" at a recovery of 50-74% or 126-150% if each result is greater than IDL. All results associated with the QC samples are qualified as "rejected (R)" at a recovery of <50% or >150% if each result is greater than IDL.

Spike Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity as CaCO3	Total Nitrogen	Total Phosphorus
		Reference Spike Concentration									
		15.4	**7.9**	**15.4**	**2.96**	**0.990**	**49.3**	**8.30**	**32.5**	**3.02**	**0.0209**
05MV145, 146, & 147	08/11/05	16 (104)	7.8 (99)	15 (97)	3 (99)	1.03 (104)	49.2 (100)	8.19 (99)	33 (102)	3.1 (103)	0.027 (129)
		Reference Spike Concentration									
		12.4	**6.35**	**12.5**	**2.39**	**0.795**	**28.0**	**19.8**	**18.9**	**1.55**	**0.0158**
053W043, 044, & 045	08/17/05	12 (97)	6.4 (101)	12 (96)	2.4 (100)	0.83 (104)	27.5 (98)	18.8 (95)	20 (106)	1.59 (103)	0.023 (146)

Table 32. De-ionized water spike results (in µg/L) for select VOCs in ground and surface water for the third quarter, 2005. A percent recovery of 100 ± 25 is considered acceptable and is recorded in parentheses (%R).

Spike Sample Number	Sample Date	Methylene Chloride	Styrene	Tetrachloroethylene	1,1,1-Trichloroethane	Chloroform
		Reference Spike Concentration				
		10.9	**17.5**	**8.65**	**14.7**	**17.2**
05VG227[1]	08/17/05	13.2 (121)	18.4 (105)	8.05 (93)	17.5 (119)	18.8 (109)
05VG228[2]	08/17/05	12.8 (117)	16.7 (95)	9.4 (109)	15.7 (107)	18 (105)

[1] Analyzed by Idaho Bureau of Laboratories.
[2] Analyzed by Alchem Laboratories.

Table 33. Electret ionization chamber irradiation results (categorized as spiked samples) for third quarter, 2005. A percent recovery (%R) of 100 ± 25 is considered acceptable.

Electret #	Exposure Received		Gross Measured Exposure		Background[1]		Net Exposure[2]		%R
	(mR)	Uncertainty (mR)	(mR)	Uncertainty (mR)	(mR)	Uncertainty (mR)	(mR)	Uncertainty[3] (mR)	
S1	27.0	1.35	32.8	1.42	1.0	0.71	31.7	1.59	118%
S2	27.0	1.35	29.1	1.42	1.0	0.71	28.1	1.59	104%
S3	27.0	1.35	29.2	1.42	1.0	0.71	28.1	1.59	104%
S4	27.0	1.35	27.5	1.41	1.0	0.71	26.5	1.58	98%
S5	30.0	1.50	33.3	1.42	1.0	0.71	32.3	1.59	108%
S6	30.0	1.50	34.6	1.42	1.0	0.71	33.6	1.59	112%
S7	30.0	1.50	32.8	1.42	1.0	0.71	31.7	1.59	106%
S8	30.0	1.50	33.4	1.42	1.0	0.71	32.4	1.59	108%

[1] Four EICs were used for control measurements (counted as blanks) and were not irradiated. Background exposure ± 1 SD, as measured by the control group, was 1.0 ± 0.71 mR.
[2] [Gross Measured Exposure] – [Background].
[3] Total propagated error.

Table 34. Air sampling field equipment service reliability (percent operational) for third quarter 2005. These values were calculated by dividing the number of weeks the equipment was in operation by the number of weeks in the quarter.

Station Locations	Sample Type[1]			
	TSP	Radioiodine	Atmospheric Moisture	Precipitation
Onsite Locations				
Big Lost River Rest Area	100%	100%	100%	100%
Experimental Field Station	100%	100%	100%	NC
Sand Dunes Tower	100%	100%	100%	NC
Van Buren Avenue	100%	100%	100%	NC
Boundary Locations				
Atomic City	100%	100%	100%	100%
Howe	93%	100%	100%	NC[2]
Monteview	100%	100%	100%	100%
Mud Lake	100%	100%	77%	100%
Distant Locations				
Craters of the Moon	100%	100%	100%	NC
Idaho Falls	100%	100%	100%	100%

[1] NC = sample not collected at this location.
[2] Sample not collected because of agricultural irrigation interference.

Appendix A

Table A-1. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2005.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Big Lost River Rest Area	06/30/05	07/07/05	1.6	0.3	31.3	1.3
	07/07/05	07/14/05	1.0	0.3	31.9	1.3
	07/14/05	07/21/05	1.4	0.3	32.2	1.3
	07/21/05	07/28/05	1.4	0.3	31.6	1.3
	07/28/05	08/04/05	1.0	0.3	35.1	1.3
	08/04/05	08/11/05	1.6	0.3	40.5	1.4
	08/11/05	08/18/05	1.2	0.3	30.4	1.2
	08/18/05	08/25/05	1.2	0.3	40.0	1.4
	08/25/05	09/01/05	1.5	0.3	40.2	1.4
	09/01/05	09/08/05	2.3	0.4	42.5	1.5
	09/08/05	09/15/05	1.1	0.3	26.2	1.2
	09/15/05	09/22/05	1.2	0.3	38.5	1.4
	09/22/05	09/29/05	1.0	0.3	40.0	1.4
Experimental Field Station	06/30/05	07/07/05	2.1	0.4	26.7	1.2
	07/07/05	07/14/05	1.8	0.4	26.3	1.2
	07/14/05	07/21/05	1.8	0.3	29.4	1.2
	07/21/05	07/28/05	1.6	0.3	32.3	1.3
	07/28/05	08/04/05	0.8	0.4	31.7	1.6
	08/04/05	08/11/05	1.7	0.3	37.4	1.4
	08/11/05	08/18/05	1.4	0.4	29.8	1.3
	08/18/05	08/25/05	1.4	0.3	39.1	1.4
	08/25/05	09/01/05	1.6	0.4	31.6	1.3
	09/01/05	09/08/05	1.9	0.4	37.6	1.4
	09/08/05	09/15/05	0.6	0.3	27.4	1.2
	09/15/05	09/22/05	1.2	0.4	34.4	1.4
	09/22/05	09/29/05	1.8	0.4	37.3	1.4

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2005.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Sand Dunes Tower	06/30/05	07/07/05	1.1	0.3	26.7	1.1
	07/07/05	07/14/05	0.8	0.3	27.7	1.1
	07/14/05	07/21/05	1.1	0.3	27.8	1.1
	07/21/05	07/28/05	1.2	0.3	33.0	1.2
	07/28/05	08/04/05	1.0	0.3	30.3	1.4
	08/04/05	08/11/05	1.1	0.3	37.4	1.3
	08/11/05	08/18/05	1.1	0.3	30.9	1.2
	08/18/05	08/25/05	1.5	0.3	38.2	1.4
	08/25/05	09/01/05	1.6	0.4	30.6	1.4
	09/01/05	09/08/05	1.2	0.3	39.8	1.4
	09/08/05	09/15/05	1.1	0.3	26.5	1.2
	09/15/05	09/22/05	0.9	0.3	33.2	1.3
	09/22/05	09/29/05	0.9	0.3	35.5	1.3
Van Buren Avenue	06/30/05	07/07/05	1.7	0.3	34.4	1.3
	07/07/05	07/14/05	1.7	0.4	36.6	1.4
	07/14/05	07/21/05	1.6	0.3	37.9	1.4
	07/21/05	07/28/05	1.4	0.3	39.8	1.5
	07/28/05	08/04/05	1.0	0.3	35.1	1.3
	08/04/05	08/11/05	1.5	0.3	42.4	1.5
	08/11/05	08/18/05	1.1	0.3	33.7	1.3
	08/18/05	08/25/05	1.8	0.3	39.5	1.4
	08/25/05	09/01/05	1.2	0.3	31.4	1.3
	09/01/05	09/08/05	1.8	0.4	44.0	1.5
	09/08/05	09/15/05	1.5	0.4	23.3	1.1
	09/15/05	09/22/05	2.2	0.4	33.1	1.3
	09/22/05	09/29/05	1.3	0.3	37.7	1.4
Atomic City	06/30/05	07/07/05	1.8	0.4	36.4	1.4
	07/07/05	07/14/05	1.1	0.3	36.2	1.4
	07/14/05	07/21/05	1.8	0.4	35.0	1.4
	07/21/05	07/28/05	1.5	0.3	37.2	1.4
	07/28/05	08/04/05	1.1	0.3	35.5	1.4
	08/04/05	08/11/05	1.8	0.3	42.4	1.5
	08/11/05	08/18/05	1.5	0.4	30.2	1.2
	08/18/05	08/25/05	2.1	0.4	36.8	1.4
	08/25/05	09/01/05	1.7	0.4	33.5	1.3
	09/01/05	09/08/05	2.1	0.5	43.1	1.8
	09/08/05	09/15/05	0.9	0.3	28.4	1.2
	09/15/05	09/22/05	1.1	0.3	35.9	1.4
	09/22/05	09/29/05	1.6	0.4	39.2	1.4

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2005.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Howe	06/30/05	07/07/05	0.7	0.8	20.6	2.1
	07/07/05	07/14/05	1.1	0.3	27.9	1.2
	07/14/05	07/21/05	1.1	0.3	27.0	1.2
	07/21/05	07/28/05	1.3	0.3	30.2	1.3
	07/28/05	08/04/05	1.0	0.3	31.7	1.3
	08/04/05	08/11/05	0.9	0.3	36.3	1.4
	08/11/05	08/18/05	1.6	0.4	30.5	1.3
	08/18/05	08/25/05	1.2	0.3	33.7	1.3
	08/25/05	09/01/05	1.2	0.3	25.3	1.2
	09/01/05	09/08/05	1.6	0.3	30.8	1.3
	09/08/05	09/15/05	0.9	0.4	23.0	1.4
	09/15/05	09/22/05	0.6	0.3	28.6	1.2
	09/22/05	09/29/05	1.1	0.3	32.6	1.3
Monteview	06/30/05	07/07/05	1.1	0.3	25.4	1.1
	07/07/05	07/14/05	1.2	0.3	25.5	1.1
	07/14/05	07/21/05	1.3	0.3	24.2	1.1
	07/21/05	07/28/05	2.0	0.4	31.9	1.3
	07/28/05	08/04/05	1.2	0.3	30.6	1.2
	08/04/05	08/11/05	1.2	0.3	32.7	1.3
	08/11/05	08/18/05	1.3	0.4	26.2	1.4
	08/18/05	08/25/05	2.0	0.3	32.8	1.3
	08/25/05	09/01/05	1.7	0.4	25.6	1.2
	09/01/05	09/08/05	1.8	0.3	34.5	1.3
	09/08/05	09/15/05	1.0	0.3	23.4	1.1
	09/15/05	09/22/05	0.7	0.3	28.1	1.2
	09/22/05	09/29/05	1.4	0.3	33.7	1.3
Mud Lake	06/30/05	07/07/05	1.4	0.3	28.2	1.2
	07/07/05	07/14/05	1.4	0.3	26.4	1.1
	07/14/05	07/21/05	1.9	0.4	26.0	1.2
	07/21/05	07/28/05	1.2	0.3	30.0	1.2
	07/28/05	08/04/05	1.2	0.3	28.7	1.2
	08/04/05	08/11/05	2.5	0.7	35.6	2.4
	08/11/05	08/18/05	0.9	0.3	26.7	1.1
	08/18/05	08/25/05	1.4	0.3	32.8	1.3
	08/25/05	09/01/05	1.9	0.4	27.8	1.2
	09/01/05	09/08/05	1.8	0.3	38.4	1.4
	09/08/05	09/15/05	0.9	0.4	24.2	1.3
	09/15/05	09/22/05	1.0	0.3	30.2	1.2
	09/22/05	09/29/05	1.1	0.3	35.0	1.3

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2005.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Distant Locations						
Craters of the Moon	06/30/05	07/07/05	1.1	0.3	25.0	1.2
	07/07/05	07/14/05	0.6	0.3	27.7	1.2
	07/14/05	07/21/05	1.1	0.4	29.1	1.6
	07/21/05	07/28/05	1.1	0.3	31.2	1.3
	07/28/05	08/04/05	0.9	0.3	26.2	1.2
	08/04/05	08/11/05	1.2	0.3	37.2	1.4
	08/11/05	08/18/05	0.9	0.3	25.3	1.1
	08/18/05	08/25/05	0.9	0.3	34.2	1.3
	08/25/05	09/01/05	1.2	0.3	26.9	1.2
	09/01/05	09/08/05	1.2	0.3	33.4	1.3
	09/08/05	09/15/05	0.5	0.3	19.7	1.0
	09/15/05	09/22/05	0.5	0.3	28.4	1.2
	09/22/05	09/29/05	0.7	0.3	30.2	1.2
Fort Hall[1]	06/30/05	07/07/05	1.4	0.3	23.9	1.1
	07/07/05	07/14/05	2.1	0.4	23.4	1.1
	07/14/05	07/21/05	2.2	0.4	24.9	1.1
	07/21/05	07/28/05	1.9	0.3	27.4	1.2
	07/28/05	08/04/05	1.3	0.3	26.0	1.1
	08/04/05	08/11/05	2.0	0.3	32.5	1.3
	08/11/05	08/18/05	1.4	0.4	20.3	1.0
	08/18/05	08/25/05	1.7	0.3	28.2	1.2
	08/25/05	09/01/05	1.7	0.4	24.0	1.1
	09/01/05	09/08/05	2.0	0.4	27.7	1.2
	09/08/05	09/15/05	1.2	0.4	20.1	1.1
	09/15/05	09/22/05	1.8	0.4	26.3	1.2
	09/22/05	09/29/05	1.5	0.3	27.7	1.2
Idaho Falls	06/30/05	07/07/05	1.9	0.3	26.5	1.1
	07/07/05	07/14/05	1.4	0.4	28.4	1.5
	07/14/05	07/21/05	2.2	0.4	29.7	1.3
	07/21/05	07/28/05	1.6	0.3	32.2	1.3
	07/28/05	08/04/05	1.1	0.3	33.3	1.3
	08/04/05	08/11/05	1.5	0.3	40.1	1.4
	08/11/05	08/18/05	1.4	0.3	27.6	1.1
	08/18/05	08/25/05	1.5	0.3	36.8	1.3
	08/25/05	09/01/05	1.5	0.3	30.1	1.3
	09/01/05	09/08/05	2.0	0.3	35.7	1.3
	09/08/05	09/15/05	1.3	0.3	25.0	1.1
	09/15/05	09/22/05	1.1	0.3	27.5	1.1
	09/22/05	09/29/05	1.8	0.4	36.1	1.6

[1] Operated by Shoshone-Bannock Tribes.
[2] No sample due to equipment failure.

Appendix B

Table B-1. Results[1] for additional electret locations, third quarter, 2005.

Sample Location	Net Corrected Exposure (uR/h)	± 2 SD (uR/h)
Dubois	20.5	2.0
Hamer	21.4	2.0
Sugar City	23.4	2.1
Blue Dome	16.3	1.9
TAN	18.3	1.9
ICPP I	20.1	2.0
NRF	18.0	1.9
EBR II	22.3	2.1
TRA	23.1	2.1
Grid 3	21.8	2.1
PBF	17.3	1.9
CFA	23.0	2.1
RWMC	18.7	1.9
Roberts	21.0	2.0
Kettle Butte	17.6	1.9
Blackfoot	17.4	1.9
Taber	18.3	1.9
Aberdeen	24.4	2.3
Minidoka	18.0	2.0
Arco	20.9	2.0
Richfield	23.9	2.2
EBR I	17.1	1.9
Reno Ranch	17.8	1.9
Rover Rd. 2.9mi	17.8	1.9
Rover Rd. 4.9mi	22.0	2.0
Rover Rd. 6.3mi	19.0	1.9
Rover Rd. 6.8mi	21.0	2.0
Rover Rd. 8.8mi	19.3	2.0
Rover Rd. 10.8mi	21.6	2.0
Rover Rd. 15.4mi	19.1	1.9
Rover Rd. 17.4mi	20.8	2.0
MP1 - 22/33	18.6	1.9
MP3 - 22/33	17.9	1.9
MP5 - 22/33	16.7	1.9
MP7 - 22/33	16.8	1.9

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Table B-1 continued. Results[1] for additional electret locations, third quarter, 2005.

Sample Location	Net Corrected Exposure (uR/h)	± 2 SD (uR/h)
MP9 - 22/33	17.8	1.9
MP23 - 33	17.2	1.9
MP25 - 33	18.2	1.9
MP27 - 33	20.6	2.0
MP29 - 33	19.7	2.0
MP31 - 33	17.5	1.9
MP33 - 33	20.4	2.0
MP35 - 33	18.8	1.9
MP37 - 33	15.5	1.8
MP39 - 33	22.3	2.1
MP41 - 33	20.4	2.0
MP43 - 33	17.7	1.9
Mud Lake - Bank of Commerce	21.3	2.0
MP1 - Lincoln Blvd	20.4	2.0
MP5 - Lincoln Blvd	20.8	2.0
MP7 - Lincoln Blvd	19.8	2.0
MP9 - Lincoln Blvd	22.8	2.6
MP11 - Lincoln Blvd	22.4	2.1
MP13 - Lincoln Blvd	19.7	2.0
MP15 - Lincoln Blvd	19.7	2.0
MP17 - Lincoln Blvd	20.9	2.0
MP19 - Lincoln Blvd	19.5	2.0
MP21 - Lincoln Blvd	19.3	2.0
MP264 - 20	16.4	1.9
MP266 - 20	16.7	1.9
MP268 - 20	18.4	1.9
MP270 - 20	18.3	1.9
MP272 - 20	16.8	1.9
MP274 - 20	16.2	1.9
MP276 - 20	17.5	1.9
MP270 - 20/26	19.6	2.0
MP268 - 20/26	19.7	2.0
MP266 - 20/26	19.2	2.0
MP263 - 20/26	17.6	1.9
MP261 - 20/26	17.7	1.9
MP259 - 20/26	16.9	1.9
Howe Fence-line 1.4mi	14.9	1.8

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Table B-1 continued. Results[1] for additional electret locations, third quarter, 2005.

Sample Location	Net Corrected Exposure (uR/h)	± 2 SD (uR/h)
Howe Fence-line 2.3mi	16.0	1.8
Howe Fence-line 4.2mi	18.6	1.9
Howe Fence-line 6.5mi	18.6	1.9
Howe Fence-line 8.6mi	20.3	2.0
Howe Fence-line 9.7mi	18.1	1.9
Howe Met. Tower	18.3	1.9

[1] Data qualifiers: U = non-detection, J = estimate, R = rejected.

Appendix C

Table C-1. List of volatile organic compounds (VOCs) analyzed for water verification samples, third quarter, 2005. Minimum detectable concentrations (MDC) are expressed in µg/L.

Analyte	MDC
Benzene	0.5
Carbon tetrachloride	0.5
Chlorobenzene	0.5
1,4-Dichlorobenzene	0.5
1,2-Dichlorobenzene	0.5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	0.5
cis-1,2-Dichloroethene	0.5
trans-1,2-Dichloroethene	0.5
1,2-Dichloropropane	0.5
Ethylbenzene	0.5
Methylene Chloride	0.5
Styrene	0.5
Tetrachloroethylene (PERC)	0.5
Toluene	0.5
1,2,4-Trichlorobenzene	0.5
1,1,1-Trichloroethane	0.5
1,1,2-Trichloroethane	0.5
Trichloroethylene	0.5
Vinyl chloride	0.5
Xylenes (total)	0.5
Bromodichloromethane	0.5
Dibromochloromethane	0.5
Bromoform	0.5
Chloroform	0.5
Bromobenzene	0.5
Bromochloromethane	0.5
Bromomethane	0.5
n-Butylbenzene	0.5
sec-Butylbenzene	0.5
tert-Butylbenzene	0.5
Chloroethane	0.5
Chloromethane	0.5
2-Chlorotoluene	0.5
4-Chlorotoluene	0.5
1,2-Dibromo-3-chloropropane (DBCP)	1.0
1,2-Dibromoethane (EDB)	0.5

Table C-1 continued. List of volatile organic compounds (VOCs) analyzed for water verification samples, third quarter, 2005. Minimum detectable concentrations (MDC) are expressed in µg/L.

Analyte	MDC
Dibromomethane	0.5
1,3-Dichlorobenzene	0.5
Dichlorodifluoromethane	0.5
1,1-Dichloroethane	0.5
1,3-Dichloropropane	0.5
2,2-Dichloropropane	0.5
1,1-Dichloropropene	0.5
cis-1,3-Dichloropropene	0.5
trans-1,3-Dichloropropene	0.5
Hexachlorobutadiene	0.5
Isopropylbenzene	0.5
p-Isopropyltoluene	0.5
Methyl Tert Butyl Ether (MTBE)	1.0
Naphthalene	1.0
n-Propylbenzene	0.5
1,1,1,2-Tetrachloroethane	0.5
1,1,2,2-Tetrachloroethane	0.5
1,2,3-Trichlorobenzene	1.25
Trichlorofluoromethane	0.5
1,2,3-Trichloropropane	0.5
1,2,4-Trimethylbenzene	0.5
1,3,5-Trimethylbenzene	0.5