

Department of Environmental Quality  
INL Oversight Program

**ENVIRONMENTAL SURVEILLANCE PROGRAM  
QUARTERLY DATA REPORT**

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# Table of Acronyms

aCi/L	-	attocuries per liter	RPD	-	relative percent difference
BEA	-	Battelle Energy Alliance, LLC	RWMC	-	Radioactive Waste Management Complex
CERCLA	-	Comprehensive Environmental Response, Compensation and Liability Act	RTC	-	Reactor Technology Complex
CFA	-	Central Facilities Area	SD	-	standard deviation
CWI	-	CH2M-WG Idaho, LLC	SMCL	-	secondary maximum contaminant level
DEQ-INL OP	-	The State of Idaho, Department of Environmental Quality, Idaho National Laboratory Oversight Program	TAN	-	Test Area North
DOE	-	U.S. Department of Energy	TCE	-	trichloroethene
EIC	-	electret ionization chamber	TDS	-	total dissolved solids
EML	-	Environmental Monitoring Laboratory	TMI	-	Three Mile Island
EPA	-	Environmental Protection Agency	TSP	-	total suspended particulate
ESER	-	Environmental Surveillance, Education and Research Program (SM Stoller)	TSS	-	total suspended solids
ESP	-	Environmental Surveillance Program	USGS	-	U.S. Geological Survey
ESRPA	-	Eastern Snake River Plain Aquifer	VOC	-	volatile organic compound
HPIC	-	high-pressure ion chamber	WLAP	-	Wastewater Land Application Permit
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			
mrem	-	millirem or 1/1000 <sup>th</sup> of a rem			
mR	-	milliRoentgen			
mR/hr	-	milliRoentgen per hour			
µR/hr	-	microRoentgen per hour			
MCL	-	maximum contaminant 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/g	-	picocuries per gram			
pCi/L	-	picocuries per liter			
pCi/m <sup>3</sup>	-	picocuries per cubic meter			
PCE	-	perchloroethene			
QAPP	-	Quality Assurance Program Plan			
QA/QC	-	Quality Assurance/Quality Control			
RCRA	-	Resource Conservation and Recovery Act			

## Introduction

The State of Idaho, Department of Environmental Quality, Idaho National Laboratory Oversight Program's (DEQ-INL OP) 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 OP'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 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 second quarter, 2010 (**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 OP reports the Fort Hall station data as an additional distant site.

Airborne particulate matter was sampled using 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 as a range of results in **Table 2**.

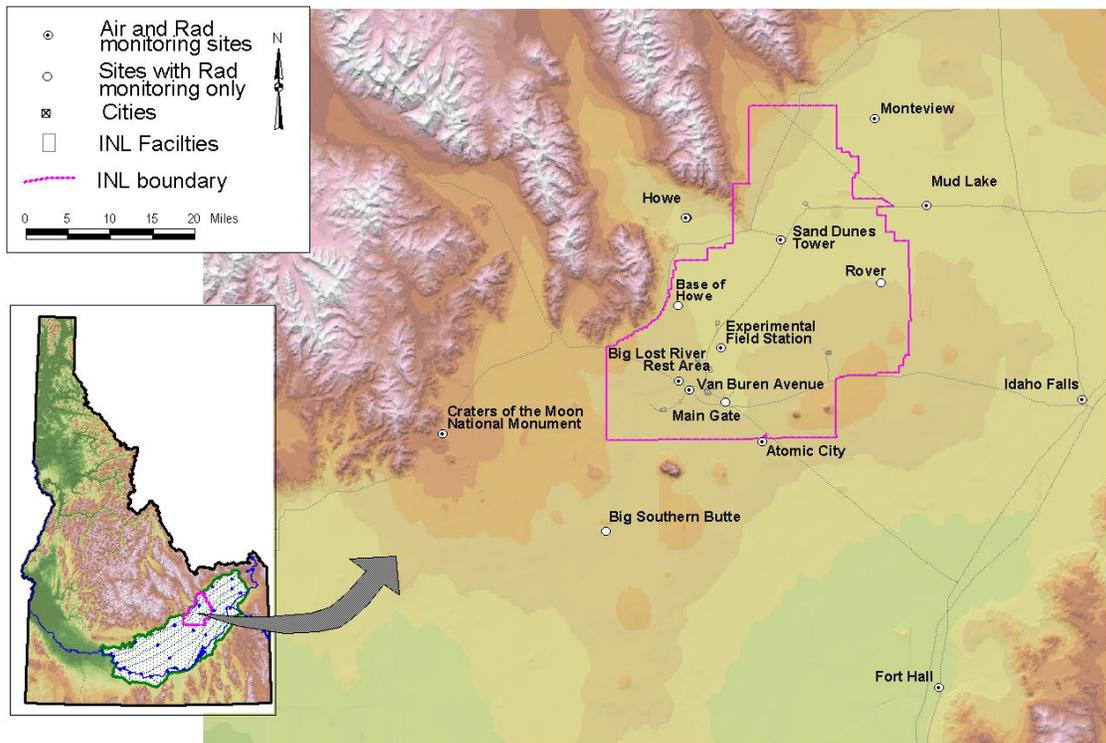
Composites of filters collected using TSP samplers during the course of a calendar quarter are analyzed using gamma spectroscopy. Typically, gamma spectroscopy results are only reported when exceeding a minimum detectable activity (MDA) or minimum detectable concentration (MDC). Gamma spectroscopy results for the first quarter of 2010 for TSP filters are presented in **Table 3**. The only reported gamma-emitting radionuclide was beryllium-7, a naturally occurring, cosmogenic radionuclide.

Radioactive iodine samples are collected weekly. Samples are collected by drawing air through a canister filled with activated charcoal using a low-volume air pump. The activated charcoal contained in the canister traps the radioiodine within its sponge-like pores. Each week, canisters are collected from all eleven air monitoring stations and analyzed together as a composite. If Iodine-131 is detected in this grouping, the canisters are individually analyzed. No radioactive isotopes of iodine, specifically Iodine-

131, were detected on the weekly charcoal cartridges used to collect this nuclide during the second quarter.

Atmospheric moisture was collected by drawing air through hygroscopic media at each of the 11 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 measured above the minimum detectable concentration (MDC) at the Experimental Field Station and Rest Area sampling sites during the second quarter of 2010. While the results for these two sampling sites are above MDC they are well below regulatory limits. Average atmospheric tritium concentrations are presented in **Table 4**.

Precipitation samples were collected at six monitoring locations during the second quarter of 2010. 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 second quarter of 2010. 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 <sup>1</sup>			
	TSP	Radioiodine	Water Vapor	Precipitation
<b>On-site Locations</b>				
Big Lost River Rest Area	☐	☐	■	■
Experimental Field Station	☐	☐	■	
Sand Dunes Tower	☐	☐	■	
Van Buren Avenue	☐	☐	■	
<b>Boundary Locations</b>				
Atomic City	☐	☐	■	■
Howe	☐	☐	■	■
Monteview	☐	☐	■	■
Mud Lake	☐	☐	■	■
<b>Distant Locations</b>				
Craters of the Moon	☐	☐	■	
Fort Hall <sup>2</sup>	☐	☐	■	
Idaho Falls	☐	☐	■	■

<sup>1</sup> ☐ Samples collected weekly; ■ Samples collected quarterly.

<sup>2</sup> TSP and radioiodine samples collected by Shoshone-Bannock Tribes.

**Table 2. Range of gross alpha and gross beta concentrations for TSP filters, second quarter, 2010.**

Station Location	Concentration					
	Gross Alpha			Gross Beta		
<b>On-Site Locations</b>						
Big Lost River Rest Area	0.5	-	1.7	17.4	-	49.5
Experimental Field Station	0.3	-	1.8	18.0	-	45.7
Sand Dunes Tower	0.4	-	1.3	15.6	-	39.8
Van Buren Avenue	0.5	-	1.7	19.5	-	44.4
<b>Boundary Locations</b>						
Atomic City	0.4	-	1.3	19.3	-	44.8
Howe	0.3	-	1.4	14.5	-	42.8
Monteview	0.5	-	1.7	17.8	-	50.8
Mud Lake	0.5	-	1.8	15.4	-	41.5
<b>Distant Locations</b>						
Craters of the Moon	0.2	-	1.2	14.1	-	39.0
Fort Hall <sup>1</sup>	0.5	-	1.7	14.2	-	33.9
Idaho Falls	0.6	-	2.0	14.5	-	51.3

<sup>1</sup> Operated by Shoshone-Bannock Tribes.

Note: Concentrations are expressed in  $1 \times 10^{-3}$  pCi/m<sup>3</sup>.

**Table 3. Gamma spectroscopy analysis data for TSP filters, composite samples, second quarter, 2010.**

Station Location	Naturally Occurring Radionuclide Beryllium-7		Man-Made Gamma Emitting Radionuclides
	Concentration	± 2 SD	
<b>On-site Locations</b>			
Big Lost River Rest Area	119.3	6.2	<MDC <sup>2</sup>
Experimental Field Station	115.2	6.1	<MDC
Sand Dunes Tower	103.0	5.4	<MDC
Van Buren Avenue	119.9	6.4	<MDC
<b>Boundary Locations</b>			
Atomic City	118.4	6.2	<MDC
Howe	111.6	6.0	<MDC
Monteview	137.2	7.3	<MDC
Mud Lake	114.2	6.0	<MDC
<b>Distant Locations</b>			
Craters of the Moon	101.9	5.4	<MDC
Fort Hall <sup>1</sup>	93.4	5.1	<MDC
Idaho Falls	133.9	7.0	<MDC

<sup>1</sup>Operated by Shoshone-Bannock Tribes.

<sup>2</sup>MDC for Cs-137 typically (5-10)x10<sup>-5</sup> pCi/m<sup>3</sup>.

Note: Concentrations are reported in 1 x 10<sup>-3</sup> pCi/m<sup>3</sup> with associated uncertainty (± 2 SD), minimum detectable concentration (MDC), and correspond to filter composites collected during the calendar quarter.

**Table 4. Tritium concentrations in air from atmospheric moisture, second quarter, 2010.**

Station Location	Tritium		
	Concentration	± 2 SD	MDC
<b>On-site Locations</b>			
Big Lost River Rest Area	0.77	0.35	0.57
Experimental Field Station	0.92	0.40	0.63
Sand Dunes Tower	0.47	0.33	0.54
Van Buren Avenue	0.52	0.37	0.59
<b>Boundary Locations</b>			
Atomic City	0.29	0.39	0.62
Howe	0.38	0.36	0.60
Mud Lake	0.27	0.40	0.67
Monteview	0.39	0.38	0.63
<b>Distant Locations</b>			
Craters of the Moon	0.16	0.29	0.47
Fort Hall <sup>1</sup>	0.17	0.44	0.72
Idaho Falls	0.36	0.36	0.58

<sup>1</sup>Operated by Shoshone-Bannock Tribes.

Note: Concentrations are reported in pCi/m<sup>3</sup> with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

**Table 5. Tritium and Cesium-137 concentrations from precipitation, second quarter, 2010.**

Station Location	Tritium			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
<b>On-site Locations</b>						
Big Lost River Rest Area	0.0	100	170	1.7	1.9	3.2
<b>Boundary Locations</b>						
Atomic City	0.0	100	170	0.0	2.0	3.5
Howe	70	100	170	2.2	2.5	3.3
Monteview	40	100	170	0.0	1.8	3.2
Mud Lake	10	100	170	0.5	1.7	2.9
<b>Distant Locations</b>						
Idaho Falls	50	100	170	2.3	2.1	3.3

Note: Concentrations are reported in pCi/L with associated uncertainty ( $\pm 2$  SD) and minimum detectable concentration (MDC).

## Environmental Radiation Monitoring Results

The ESP operated 14 environmental radiation stations during the second quarter of 2010 (**Figure 1**). To detect gamma radiation, each station is instrumented with an electret ionization chamber (EIC), and 10 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 an EIC and HPIC, both of which belong to the DEQ-INL OP. The DEQ-INL OP 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 OP and presented graphically via the worldwide web at [http://www.deq.idaho.gov/inl\\_oversight/monitoring/piconline.cfm](http://www.deq.idaho.gov/inl_oversight/monitoring/piconline.cfm)

EICs are a passive-integrating system that provides a cumulative measure of environmental gamma radiation exposure in the field. EICs are deployed, collected, and analyzed quarterly. 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. For this reason EICs are deployed at an additional 40 locations by DEQ-INL OP in a widespread network around the INL measuring external radiation. This information is tabulated in **Appendix B**. Questionable results for the second quarter 2010 will be reported as "estimates" and marked with the appropriate (J) qualifier with the data.

These two systems are used by DEQ-INL OP to measure external gamma radiation for various radiological monitoring objectives. **Table 7** lists the average radiation exposure rates measured by the HPICs for second quarter 2010. **Table 8** lists the EIC monitoring results for second quarter 2010. Overall exposure rates were within the expected historical range of values observed by DEQ-INL OP for background radiation.

**Table 6. Summary of instrumentation at radiation monitoring stations.**

Station Location	Instrument Type	
	HPIC	EIC
<b>On-site Locations</b>		
Base of Howe	■	■
Big Lost River Rest Area <sup>1</sup>		■
Experimental Field Station		■
Main Gate	■	■
Rover	■	■
Sand Dunes Tower	■	■
Van Buren Avenue		■
<b>Boundary Locations</b>		
Atomic City	■	■
Big Southern Butte	■	■
Howe Met Tower	■	■
Monteview	■	■
Mud Lake	■	■
<b>Distant Locations</b>		
Craters of the Moon		■
Fort Hall <sup>2</sup>	■	■
Idaho Falls	■	■

<sup>1</sup> HPIC Sampling at Big Lost River Rest Area was suspended due to construction and has not been re-deployed.

<sup>2</sup> HPIC operated by Shoshone-Bannock Tribes with the EIC maintained by DEQ-INL OP.

**Table 7. Average gamma exposure rates, second quarter, 2010, from HPIC network.**

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average	± 2 SD
<b>On-site Locations</b>		
Base of Howe	13.2	2.0
Big Lost River Rest Area <sup>1</sup>	NS	NS
Main Gate <sup>2</sup>	13.9	24.7
Rover <sup>3</sup>	NS	NS
Sand Dunes Tower	14.3	0.9
<b>Boundary Locations</b>		
Atomic City	13.2	1.0
Big Southern Butte	13.5	4.7
Howe Met Tower	13.2	2.0
Monteview	14.2	0.9
Mud Lake <sup>4</sup>	13.5	8.0
<b>Distant Locations</b>		
Fort Hall <sup>5</sup>	12.9	1.2
Idaho Falls	12.3	0.9

<sup>1</sup> Sampling at Big Lost River Rest Area was suspended due to construction and has not been re-deployed.

<sup>2</sup> Main Gate HPIC experienced equipment irregularity and then total failure near the end of the quarter which could not be repaired and therefore the data exhibited an abnormally high standard deviation.

<sup>3</sup> The Rover HPIC experienced equipment failure which could not be repaired for the quarter and is therefore reported as No Sample.

<sup>4</sup> Mud Lake HPIC experienced equipment irregularity resulting in several unrealistic spikes which lead to an abnormally high standard deviation.

<sup>5</sup> Operated by Shoshone-Bannock Tribes.

**Table 8. Electret ionization chamber (EIC) cumulative average exposure rates, second quarter, 2010.**

Station Location	Exposure Rate ( $\mu\text{R/hr}$ )	
	Quarterly Average	$\pm 2 \text{ SD}$
<b>On-site Locations</b>		
Base of Howe	15.5	3.1
Big Lost River Rest Area	18.1	2.3
Experimental Field Station	17.1	0.7
Main Gate	20.4	0.1
Rover <sup>1</sup>	NS	NS
Sand Dunes Tower	17.2	0.9
Van Buren Avenue	16.4	0.0
<b>Boundary Locations</b>		
Atomic City	15.5	1.8
Big Southern Butte	13.9	1.4
Howe Met Tower <sup>2</sup>	15.4 (J)	9.1 (J)
Monteview	12.4	3.3
Mud Lake	12.2	2.4
<b>Distant Locations</b>		
Craters of the Moon	13.0	2.4
Fort Hall <sup>3</sup>	16.2	0.0
Idaho Falls	12.0	1.7

<sup>1</sup> The EICs at Rover were destroyed by a wildfire on the INL and will therefore be reported as no sample

<sup>2</sup> Howe Met. Tower data did not conform to DEQ-INL OP acceptance criteria and therefore the result is reported as an estimate (J qualifier).

<sup>3</sup> Station operated by Shoshone-Bannock Tribes.

## 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 wastewater sites. Sample sites have been selected to aid in identifying INL impacts on the Eastern Snake River Plain Aquifer (ESRPA), and are categorized as up-gradient, facility, boundary, distant, surface water, and waste water (**Figure 2 and Figure 3**). Up-gradient locations are not impacted by INL operations and are considered representative of background ground water quality conditions. Facility sites are sample locations on the INL near facilities, in areas of known contamination, or wells selected to illustrate trends for specific INL contaminants or indicators of ground water quality. Boundary locations are on or near the perimeter of the INL Site and are down-gradient of potential sources of INL 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 second quarter of 2010, 3 up-gradient, 25 facility, 5 boundary, and 2 surface water locations were sampled. No distant sample sites were visited during this quarter.

Most sites sampled by DEQ-INL OP 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 OP verifies work by these agencies monitoring on behalf of DOE by comparing results from co-sampled sites.

Gross alpha and gross beta analyses are conducted as a screening tool for alpha and beta emitting radionuclides potentially released from INL operations. Quantitative gamma analyses are conducted to identify and determine concentrations of gamma emitting radionuclides. Selected sites are sampled for the man-made, alpha emitting isotopes of plutonium, uranium, americium, and neptunium; and 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 at 3 up-gradient, 14 facility, 4 boundary, and 2 surface water locations. Concentrations observed at facility locations were in areas of known contamination and consistent with historical trends. All other locations with detectable results were within the range of concentrations observed for naturally-occurring radioactivity. The EPA maximum contaminant level (MCL) for alpha particles is 15 pCi/L.

Gross beta radioactivity was detected in each of the 4 areas (up-gradient, facility, boundary, and surface water) sampled. Concentrations observed at facility locations were consistent with historical trends. Concentrations for up-gradient, boundary, distant, and surface water locations were within the range of concentrations observed for naturally-occurring radioactivity. The MCL for beta and gamma radioactivity is 4 mrem/year, equivalent to 8 pCi/l if the source is strontium-90; 900 pCi/L if technetium-99; 20,000 pCi/L if tritium; or 200 pCi/L if cesium-137. Man-made, gamma emitting cesium-137 was detected at one facility location, TAN-37. This well has had historical detectable concentrations. Results for gross alpha; gross beta; and man-made, gamma emitting radioactivity are shown in **Table 9**.

Eight sites were sampled for plutonium isotopes (**Table 10**). There were no detectable results for plutonium isotopes this quarter.

Ten sites were sampled for isotopes of uranium. All ten sample sites had detectable results for uranium-234, nine detectable results for uranium-238, and four detectable results for uranium-235 (**Table 11**). For all but two, the ratios of results observed cannot be distinguished from background concentrations, which means the uranium found in the samples is likely to be naturally occurring. Analysis results for samples from TAN-28 and TAN-29 suggest uranium-238 at greater than natural background levels. Uranium related to historic waste disposal activities at Test Area North has previously been identified. There were no detectable results for americium-241 or (**Table 12**) neptunium-237 (**Table 13**).

Nine of nineteen samples analyzed for strontium-90 had detectable results this quarter (**Table 14**). All samples were from locations in areas of known contamination. All 11 locations sampled for technetium-99 had detectable results this quarter (**Table 15**). All results were within the expected ranges of concentrations.

Using the standard analytical method, tritium was detected in sixteen of twenty-five facility samples (**Table 16**). Detections were consistent with historic concentrations for these sites. There were no detectable concentrations from other areas. Selected water samples with tritium concentrations not measurable using the standard method (typically a MDC of 130 pCi/L) are analyzed using an electrolytic enrichment method with a much lower MDC of 10 to 14 pCi/L. No samples were analyzed using the enrichment method for the current quarter; however samples from 7 sites collected during previous quarters were completed (**Table 17**). A backlog of 35 samples remains.

Samples were also analyzed for metals and the results shown in **Table 18**. All other results were within their expected ranges. Common ion results are shown in **Table 19** and nutrient results are shown in **Table 20**. All results were consistent with historical values at those locations.

Sixteen locations were sampled for Volatile Organic Compounds (VOCs) this quarter, eight locations had detectable concentrations. All locations with detectable results are in areas of known contamination at RWMC and TAN. VOCs with detectable concentrations are shown in **Table 21** and a complete list of analyses is shown in **Appendix C**. The background concentrations for VOCs should be zero. The results discussed in this section only refer to detectable concentrations.

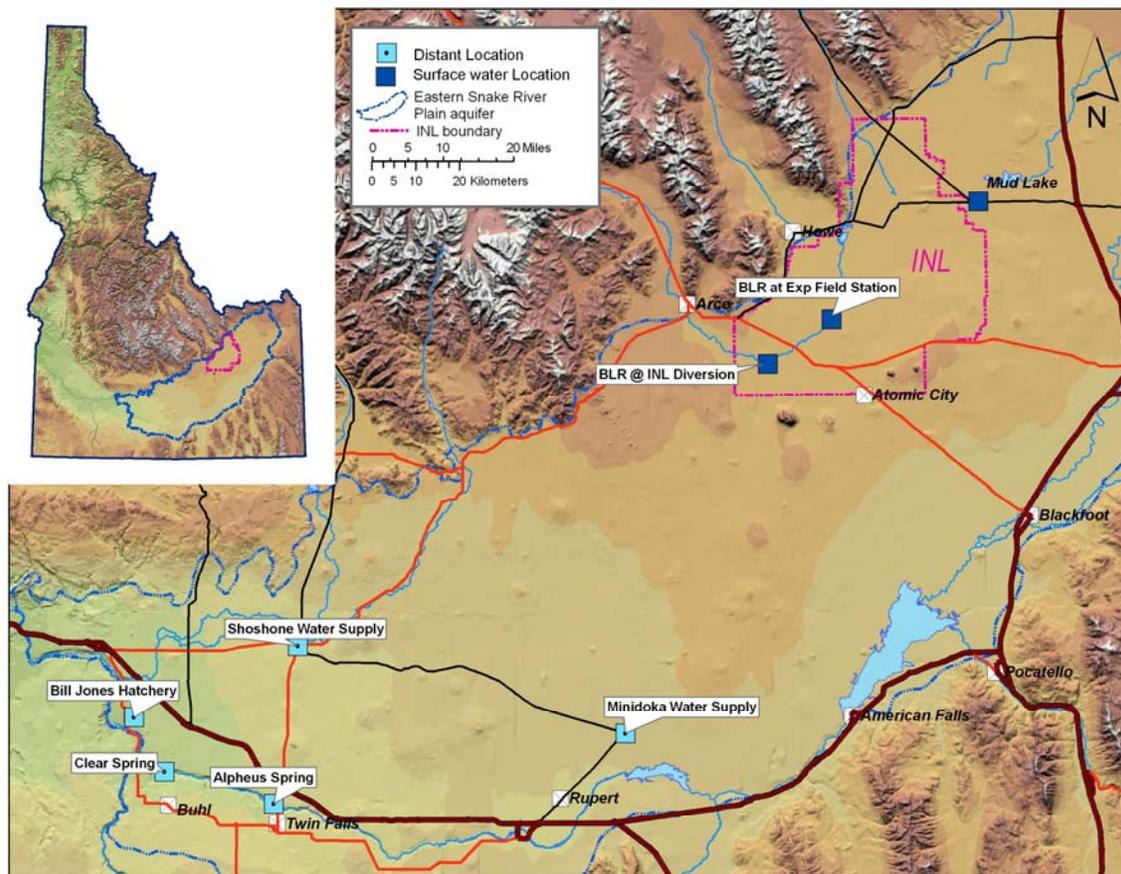


Figure 2. Distant sampling locations, second quarter, 2010.

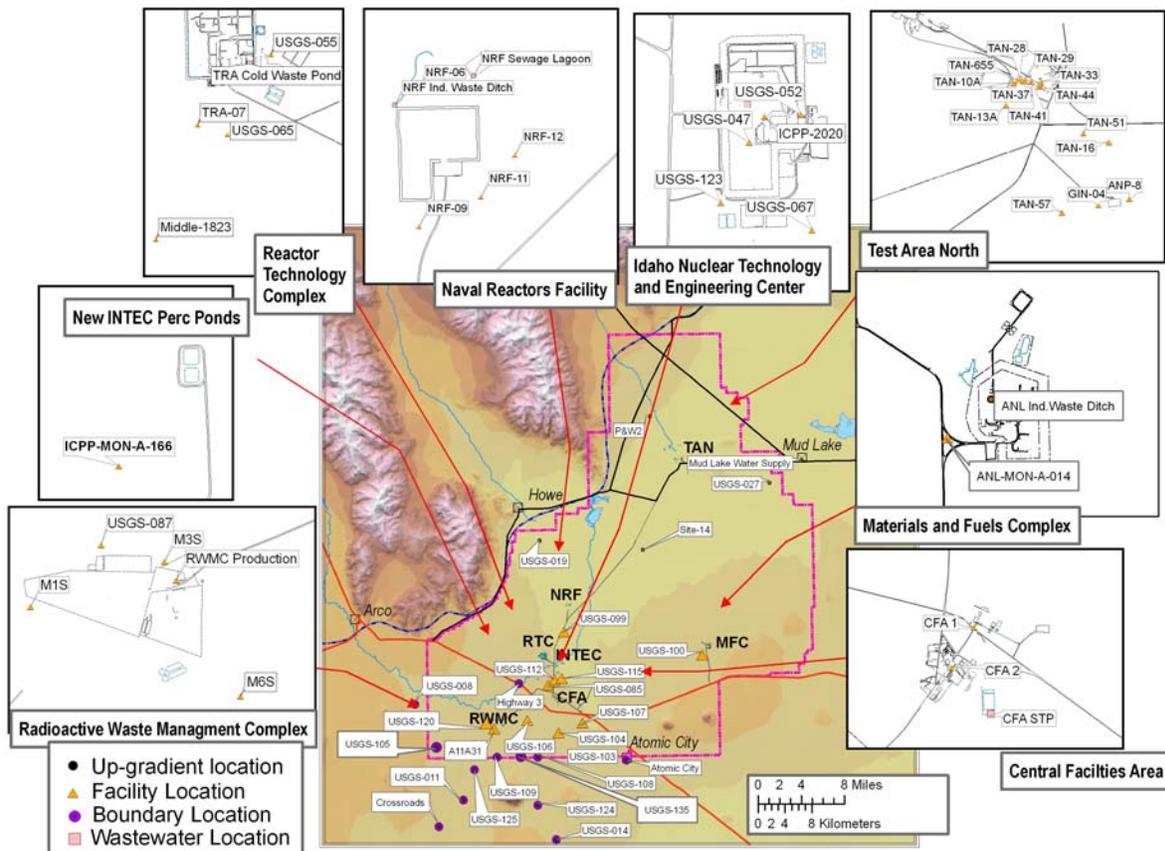


Figure 3. Up-gradient, facility, boundary and wastewater monitoring locations, second quarter 2010.

**Table 9. Alpha, beta, and gamma concentrations for water samples, second quarter, 2010.**

Sample Location	Sample Date	Gross Alpha		Gross Beta		Man-made gamma-emitting radionuclide Cesium-137					
		Concentration <sup>1,2</sup>	± 2 SD	Concentration <sup>1,2</sup>	± 2 SD	Concentration <sup>1,2</sup>	± 2 SD				
<b>Up-gradient</b>											
P&W-2	4/27/2010	2.8		1.0		0.8	U	0.8	-1.5	U	1.5
USGS-019	4/27/2010	1.5		0.9		1.0	U	0.8	-0.2	U	1.3
USGS-027	4/27/2010	5.5		1.5		6.3		1.0	-0.4	U	1.8
<b>Facility</b>											
A11A31	5/12/2010	1.4	U	1.1		3.2		0.9	-0.4	U	1.8
ANP-8	5/17/2010	1.1	U	0.9		3.4		0.8	-0.9	U	1.6
CFA 1	4/5/2010	1.7	U	1.3		7.3		1.0	-0.2	U	1.3
ICPP-2020	4/13/2010	2.8		1.2		149.1		2.9	2.0	U	2.2
ICPP-MON-A-166	4/22/2010	2.8		1.2		3.0		0.8	-0.9	U	1.3
M1S	5/12/2010	1.7		0.8		4.0		0.8	-1.0	U	1.8
M3S	5/12/2010	0.3	U	1.3		2.7		0.8	-0.3	U	1.4
M6S	5/12/2010	1.8		1.1		3.7		0.9	-1.0	U	1.8
NRF-06	5/18/2010	-1.7	U	4.8		6.5		3.8	-0.9	U	1.3
NRF-09	5/19/2010	0.3	U	1.6		3.7		0.9	0.0	U	1.7
NRF-11	5/18/2010	2.0		1.3		2.9		0.8	0.9	U	1.9
NRF-12	5/19/2010	2.8		1.4		3.0		0.9	0.7	U	1.5
TAN-16	5/17/2010	1.2	U	1.0		3.6		0.9	0.2	U	1.9
TAN-28	5/11/2010	4.2		2.4		446.6		7.6	-0.5	U	1.4
TAN-29	5/11/2010	5.6		1.8		32.8		1.5	-0.8	U	2.0
TAN-37	5/11/2010	6.1		4.3		1146.8		17.3	3.7		2.4
TAN-57	5/17/2010	1.1	U	1.1		2.7		0.8	0.6	U	1.5
USGS-047	4/13/2010	2.1		1.0		52.2		1.8	0.6	U	2.2
USGS-052	4/15/2010	2.6		1.1		175.6		3.1	1.7	U	2.0
USGS-065	4/28/2010	3.3		1.3		3.2		0.9	1.1	U	1.5
USGS-067	4/13/2010	2.8		1.3		88.6		2.3	0.0	U	1.6
USGS-085	4/12/2010	2.0		1.1		8.9		1.0	-1.2	U	2.1
USGS-087	4/28/2010	0.7	U	0.7		3.4		0.8	-0.8	U	1.7
USGS-099	5/18/2010	1.6	U	1.2		2.3		0.8	0.7	U	1.8
USGS-100	4/8/2010	-0.1	U	0.8		3.6		0.8	0.2	U	2.3

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 9 continued.**

Sample Location	Sample Date	Gross Alpha		Gross Beta		Man-made gamma-emitting radionuclide Cesium-137		
		Concentration <sup>1,2</sup>	± 2 SD	Concentration <sup>1,2</sup>	± 2 SD	Concentration <sup>1,2</sup>	± 2 SD	
<b>Boundary</b>								
Crossroads	4/26/2010	2.1	1.0	3.4	0.8	-1.4	U	1.3
USGS-008	4/26/2010	1.6	0.8	2.3	0.8	0.4	U	1.8
USGS-011	4/21/2010	2.1	0.9	2.1	0.8	0.3	U	1.8
USGS-103	6/24/2010	-1.3	U	1.1	1.9	0.8	0.3	U
USGS-124	4/21/2010	1.8	1.0	2.6	0.8	-0.2	U	1.5
<b>Surface water</b>								
BLR @ Exp Field Station	6/10/2010	3.9	1.5	5.2	0.9	-1.2	U	1.3
BLR @ INL Diversion	6/10/2010	2.4	1.3	2.1	0.8	0.6	U	1.5

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 10. Reported concentrations of plutonium isotopes in water samples, second quarter, 2010.**

Sample Location	Sample Date	Plutonium-238			Plutonium-239/240			Plutonium-241		
		Concentration <sup>1,2</sup>	± 2SD		Concentration <sup>1,2</sup>	± 2SD		Concentration <sup>1,2</sup>	± 2SD	
<b>Facility</b>										
A11A31	5/12/2010	-0.004	U	0.022	0.009	U	0.022	0.8	U	3.1
ICPP-2020	4/13/2010	0.001	U	0.012	0.001	U	0.012	0.9	U	3.7
M1S	5/12/2010	-0.009	U	0.026	0.004	U	0.026	-1.5	U	3.6
M3S	5/12/2010	-0.002	U	0.021	0.005	U	0.021	-0.8	U	2.8
M6S	5/12/2010	0.004	U	0.020	0.002	U	0.020	-1.2	U	2.8
USGS-047	4/13/2010	0.006	U	0.012	0.002	U	0.012	0	U	3.8
USGS-052	4/15/2010	0.001	U	0.011	0.006	U	0.013	1.1	U	3.5
USGS-067	4/13/2010	0.006	U	0.013	0.006	U	0.013	0.6	U	3.9

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 11. Reported concentrations of uranium isotopes in water samples, second quarter, 2010.**

Sample Location	Sample Date	Uranium-234		Uranium-235		Uranium-238		
		Concentration <sup>1,2</sup>	± 2SD	Concentration <sup>1,2</sup>	± 2SD	Concentration <sup>1,2</sup>	± 2SD	
<b>Facility</b>								
A11A31	5/12/2010	1.50	0.37	0.037	U	0.051	0.65	0.21
ICPP-2020	4/13/2010	2.05	0.46	0.055		0.056	0.81	0.24
M1S	5/12/2010	0.96	0.26	0.013	U	0.047	0.31	0.13
M3S	5/12/2010	1.50	0.37	0.052	U	0.058	0.87	0.25
M6S	5/12/2010	1.17	0.34	0.080	U	0.084	0.62	0.22
TAN-28	5/11/2010	9.80	1.80	0.33		0.15	1.68	0.39
TAN-29	5/11/2010	5.06	0.97	0.131		0.088	1.09	0.29
TAN-37	5/11/2010	0.19	0.11	0.010	U	0.050	0.033	U 0.049
USGS-047	4/13/2010	1.62	0.39	0.043		0.052	0.65	0.21
USGS-067	4/13/2010	1.60	0.41	0.042	U	0.064	0.83	0.25

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 12. Reported concentrations of americium-241 in water samples, second quarter, 2010.**

Sample Location	Sample Date	Americium-241		
		Concentration <sup>1,2</sup>		± 2SD
<b>Facility</b>				
A11A31	5/12/2010	-0.003	U	0.019
ICPP-2020	4/13/2010	0.003	U	0.011
M1S	5/12/2010	0.021 <sup>a</sup>	U	0.022
M3S	5/12/2010	0.006	U	0.020
M6S	5/12/2010	0.013	U	0.019
USGS-047	4/13/2010	-0.004	U	0.012
USGS-052	4/15/2010	0.001	U	0.012
USGS-067	4/13/2010	0.003	U	0.013

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

<sup>a</sup>Result is greater than the a-priori MDC, but does not exceed 3s. It is not considered a detection.

**Table 13. Reported concentrations of neptunium-237 in water samples, second quarter, 2010.**

Sample Location	Sample Date	Neptunium-237		
		Concentration <sup>1,2</sup>		± 2SD
<b>Facility</b>				
ICPP-2020	4/13/2010	0.010	U	0.054
USGS-047	4/13/2010	-0.008	U	0.045
USGS-052	4/15/2010	-0.002	U	0.042
USGS-067	4/13/2010	0.009	U	0.046

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 14. Reported concentrations of strontium-90 in water samples, second quarter, 2010.**

Sample Location	Sample Date	Strontium-90		
		Concentration <sup>1,2</sup>		± 2SD
<b>Facility</b>				
A11A31	5/12/2010	0.05	U	0.34
CFA 1	4/5/2010	0.06	U	0.27
ICPP-2020	4/13/2010	12.5		3.0
M1S	5/12/2010	0.19	U	0.33
M3S	5/12/2010	0.20	U	0.33
M6S	5/12/2010	0.73		0.40
NRF-06	5/18/2010	-0.02	U	0.34
NRF-09	5/19/2010	0.11	U	0.30
NRF-11	5/18/2010	-0.02	U	0.28
NRF-12	5/19/2010	0.10	U	0.30
TAN-28	5/11/2010	197		46
TAN-29	5/11/2010	11.7		2.9
TAN-37	5/11/2010	650		150
USGS-047	4/13/2010	20.6		4.9
USGS-052	4/15/2010	4.0		1.1
USGS-067	4/13/2010	12.0		2.9
USGS-085	4/12/2010	2.15		0.64
USGS-087	4/28/2010	0.13	U	0.29
USGS-099	5/18/2010	0.22	U	0.32

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected.

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 15. Reported concentrations of technetium-99 in water samples, second quarter, 2010.**

Sample Location	Sample Date	Technetium-99	
		Concentration <sup>1,2</sup>	± 2SD
<b>Facility</b>			
A11A31	5/12/2010	0.8	0.2
CFA 1	4/5/2010	10.1	0.4
ICPP-2020	4/13/2010	388.9	1.9
M1S	5/12/2010	0.5	0.2
M3S	5/12/2010	1.2	0.2
M6S	5/12/2010	0.5	0.2
USGS-047	4/13/2010	2.6	0.2
USGS-052	4/15/2010	359.0	1.8
USGS-067	4/13/2010	128.0	1.2
USGS-085	4/12/2010	1.4	0.2
USGS-087	4/28/2010	0.5	0.1

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 16. Tritium concentrations for water samples, second quarter, 2010.**

Sample Location	Sample Date	Tritium		
		Concentration <sup>1,2</sup>		± 2 SD
<b>Up-gradient</b>				
P&W-2	4/27/2010	0	U	90
USGS-019	4/27/2010	-70	U	90
USGS-027	4/27/2010	-80	U	90
<b>Facility</b>				
A11A31	5/12/2010	110	U	100
ANP-8	5/17/2010	120		70
CFA 1	4/5/2010	5090		180
ICPP-2020	4/13/2010	3700		160
ICPP-MON-A-166	4/22/2010	100	U	90
M1S	5/12/2010	20	U	60
M3S	5/12/2010	870		120
M6S	5/12/2010	20	U	60
NRF-06	5/18/2010	-20	U	90
NRF-09	5/19/2010	100	U	90
NRF-11	5/18/2010	-30	U	90
NRF-12	5/19/2010	-30	U	90
TAN-16	5/17/2010	310		80
TAN-28	5/11/2010	2660		140
TAN-29	5/11/2010	1690		130
TAN-37	5/11/2010	1070		120
TAN-57	5/17/2010	610		110
USGS-047	4/13/2010	780		110
USGS-052	4/15/2010	1220		120
USGS-065	4/28/2010	4540		170
USGS-067	4/13/2010	3680		160
USGS-085	4/12/2010	1710		120
USGS-087	4/28/2010	550		100
USGS-099	5/18/2010	60	U	90
USGS-100	4/8/2010	-70	U	90
<b>Boundary</b>				
Crossroads	4/26/2010	0	U	90
USGS-008	4/26/2010	30	U	90
USGS-011	4/21/2010	0	U	90
USGS-103	6/24/2010	440		100
USGS-124	4/21/2010	-40	U	90
<b>Surface water</b>				
BLR @ Exp Field Station	6/10/2010	50	U	90
BLR @ INL Diversion	6/10/2010	130	U	100

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 17. Enriched tritium concentrations for water samples from previous sampling quarters, 2010.**

Sample Location	Sample Date	Enriched Tritium	
		Concentration <sup>1,2</sup>	± 2 SD
<b>Facility</b>			
USGS-104	10/26/2009	704	19.3
<b>Boundary</b>			
USGS-120	10/26/2009	84	10
USGS-125	10/26/2009	45	7
<b>Distant</b>			
Minidoka Water Supply	11/16/2009	1	U
Shoshone Water Supply	11/16/2009	14	U
<b>Up-gradient</b>			
Mud Lake Water Supply	11/24/2009	-2	U
Birch Creek	10/27/2009	9	U

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected

<sup>2</sup> Concentrations expressed in pCi/L.

**Table 18. Reported metals concentrations in water samples, second quarter, 2010.**

Sample Location	Sample Date	Concentration <sup>1,2</sup>																			
		Arsenic	Barium	Beryllium	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Selenium	Zinc									
<b>Up-gradient</b>																					
P&W-2	4/27/2010	-	-	50	-	-	-	-	1	-	-	<1	U	<1	U	-	-	-	-	65	
USGS-019	4/27/2010	-	-	78	-	-	-	-	3	-	-	<1	U	4.1	-	-	-	-	<2	U	
USGS-027	4/27/2010	-	-	84	-	-	-	-	5	-	-	<1	U	3.2	-	-	-	-	<2	U	
<b>Facility</b>																					
A11A31 (total)	5/12/2010	2.1		36	<1	U	<1	U	13	30		2		1.4		<0.5	U	<2	U	180	
CFA 1	4/5/2010	-	-	95	-	-	-	-	10	-	-	<1	U	<1	U	-	-	-	-	2.1	
ICPP-2020 (total)	4/13/2010	<2	U	120	<1	U	<1	U	12	180		<1	U	4		<0.5	U	<2	U	3.3	
M1S (total)	4/22/2010	<2	U	52	<1	U	<1	U	5	12		<1	U	26		<0.5	U	<2	U	<2	U
M3S (total)	5/12/2010	3.1		23	<1	U	<1	U	34	100		<1	U	5		<0.5	U	2.4		4	
M6S (total)	5/12/2010	<2	U	46	<1	U	<1	U	23	10		<1	U	8.1		<0.5	U	2.6		<2	U
NRF-06 (total)	5/18/2010	3		46	<1	U	<1	U	45	12		<1	U	<1	U	<0.5	U	2.3		<2	U
NRF-09 (total)	5/19/2010	<2	U	33	<1	U	<1	U	11	1400		<1	U	<1	U	<0.5	U	2.1		<2	U
NRF-11 (total)	5/18/2010	<2	U	180	<1	U	<1	U	12	52		<1	U	5.2		<0.5	U	<2	U	<2	U
NRF-12 (total)	5/19/2010	<2	U	160	<1	U	<1	U	10	38		<1	U	<1	U	<0.5	U	<2	U	<2	U
USGS-047 (total)	4/13/2010	<2	U	160	<1	U	<1	U	8	280		<1	U	<1	U	<0.5	U	<2	U	2.6	
USGS-052 (total)	4/15/2010	<2	U	150	<1	U	<1	U	9	17		<1	U	<1	U	<0.5	U	<2	U	<2	U
USGS-065 (total)	4/28/2010	<2	U	74	<1	U	<1	U	88	<10	U	<1	U	<1	U	<0.5	U	<2	U	<2	U
USGS-067 (total)	4/13/2010	<2	U	89	<1	U	<1	U	7	67		<1	U	<1	U	<0.5	U	<2	U	6	
USGS-085	4/12/2010	-	-	52	-	-	-	-	21	<10	-	<1	U	<1	U	-	-	-	-	<2	U
USGS-087	4/28/2010	-	-	130	-	-	-	-	2	32	-	15		9.2		-	-	-	-	150	
USGS-099 (total)	5/18/2010	<2	U	90	<1	U	<1	U	5	-		3		<1	U	<0.5	U	<2	U	88	
USGS-100	4/8/2010	-	-	22	-	-	-	-	3	-	-	13		<1	U	-	-	-	-	180	

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected, . A "<" indicates a result below the Minimum Detectable Concentration. NR= analysis not requested.

<sup>2</sup> Concentrations are expressed in µg/L. Samples are filtered unless otherwise indicated.

**Table 18. Continued.**

Sample Location	Sample Date	Concentration <sup>1,2</sup>																		
		Arsenic	Barium	Beryllium	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Selenium	Zinc								
<b>Boundary</b>																				
Crossroads	4/26/2010	-	-	37	-	-	-	-	3	-	-	1	<1	U	-	-	-	-	100	
USGS-008	4/26/2010	-	-	78	-	-	-	-	3	-	-	<1	U	1.1	-	-	-	-	<2	U
USGS-011	4/21/2010	-	-	53	-	-	-	-	4	-	-	<1	U	<1	U	-	-	-	<2	U
USGS-103	6/24/2010	-	-	48	-	-	-	-	6	-	-	<1	U	<1	U	-	-	-	23	
USGS-124	4/21/2010	-	-	31	-	-	-	-	6	-	-	<1	U	8	-	-	-	-	<2	U
<b>Surface water</b>																				
BLR @ Exp Field Station	6/10/2010	-	-	83	-	-	-	-	<1	U	-	-	<1	U	2.9	-	-	-	<2	U
BLR @ INL Diversion	6/10/2010	-	-	84	-	-	-	-	<1	U	-	-	<1	U	2	-	-	-	<2	U

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected, . A "<" indicates a result below the Minimum Detectable Concentration. NR= analysis not requested.

<sup>2</sup> Concentrations are expressed in µg/L. Samples are filtered unless otherwise indicated.

**Table 19. Reported common ion concentrations in water samples, second quarter, 2010.**

Sample Location	Sample Date	Concentration <sup>1,2</sup>										
		Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Silica	Alkalinity <sup>3</sup>	TDS <sup>4</sup>	TSS <sup>5</sup>
<b>Up-gradient</b>												
P&W-2*	4/27/2010	40	15	7.1	1.2	<0.2 U	5.87	25.8	NR -	146	NR -	NR -
USGS-019*	4/27/2010	45	17	9.7	1.4	<0.2 U	12.6	22.8	NR -	164	NR -	NR -
USGS-027*	4/27/2010	51	18	28	5.9	0.524	52.5	40	NR -	150	NR -	NR -
<b>Facility</b>												
A11A31	5/12/2010	36	16	25	3.9	<0.2 U	26.6	43.4	NR -	134	NR -	NR -
CFA 1*	4/5/2010	63	19	24	3.5	<0.2 U	84.1	28.9	NR -	133	NR -	NR -
ICPP-2020	4/13/2010	64	18	25	3.3	0.239	56	44.3	NR -	145	NR -	NR -
M1S	4/22/2010	34	12	9.5	2.6	0.25	8.96	18.2	NR -	128	190	<5 U
M3S	5/12/2010	27	12	11	2.6	<0.2 U	14.3	20.8	NR -	105	NR -	- -
M6S	5/12/2010	37	18	14	3.3	<0.2 U	26.4	57.1	NR -	107	NR -	- -
NRF-06	5/18/2010	160	41	210	6.4	<0.2 U	547	107	NR -	176	1500	<5 U
NRF-09	5/19/2010	72	23	20	2.5	<0.2 U	52.9	39.8	NR -	201	390	<5 U
NRF-11	5/18/2010	70	22	20	2.5	<0.2 U	50.8	38.9	NR -	200	390	<5 U
NRF-12	5/19/2010	69	22	18	2.4	<0.2 U	43.4	37.8	NR -	204	360	<5 U
USGS-047	4/13/2010	52	14	11	2	0.232	18.9	24	NR -	160	NR -	- -
USGS-052	4/15/2010	50	14	13	2.7	0.23	23.2	25.4	NR -	152	260	<5 U
USGS-065	4/28/2010	84	19	15	3.4	<0.2 U	19.6	159	NR -	126	NR -	- -
USGS-067	4/13/2010	54	15	27	3.7	0.247	53.6	28	NR -	142	NR -	- -
USGS-085*	4/12/2010	56	15	11	2.5	0.211	15.8	40	NR -	164	NR -	- -
USGS-087*	4/28/2010	31	14	20	3.5	0.252	35.7	22.8	NR -	107	NR -	- -
USGS-099	5/18/2010	61	22	16	1.8	<0.2 U	23.9	28	NR -	220	320	<5 U
USGS-100*	4/8/2010	37	12	17	3.2	0.626	17.2	15.9	NR -	134	NR -	- -

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected. \* = samples are filtered for calcium, magnesium, sodium and potassium. A "<" indicates a result below the Minimum Detectable Concentration. NR= analysis not requested.

<sup>2</sup> Concentrations expressed in mg/L. Samples are filtered unless otherwise noted.

<sup>3</sup> As CaCO<sub>3</sub>.

<sup>4</sup> =Total Dissolved Solids.

<sup>5</sup> = Total Suspended Solids.

**Table 19. Continued.**

Sample Location	Sample Date	Concentration <sup>1,2</sup>												
		Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Silica	Alkalinity <sup>3</sup>	TDS <sup>4</sup>	TSS <sup>5</sup>		
<b>Boundary</b>														
Crossroads*	4/26/2010	40	14	7.3	2.1	<0.2 U	9.67	21.2	NR	-	143	NR	-	NR
USGS-008*	4/26/2010	45	15	6.8	1.7	<0.2 U	8.49	22.6	NR	-	156	NR	-	NR
USGS-011*	4/21/2010	40	14	8.3	2.2	0.204	10.7	23	NR	-	140	NR	-	NR
USGS-103*	6/24/2010	39	15	8.6	2.4	<0.2 U	15.2	22.3	NR	-	140	NR	-	NR
USGS-124*	4/21/2010	39	16	9.8	2.3	0.329	16.7	23.6	NR	-	142	NR	-	NR
<b>Surface water</b>														
BLR @ Exp Field Station *	6/10/2010	38	9.1	5.2	1.6	0.206	2.76	17	NR	-	126	NR		NR
BLR @ INL Diversion*	6/10/2010	38	9.2	5.2	1.5	<0.2 U	2.82	17.1	NR	-	125	NR		NR

<sup>1</sup> Data qualifiers: U = non-detection, J = estimate, R = rejected. \* = samples are filtered for calcium, magnesium, sodium and potassium. A "<" indicates a result below the Minimum Detectable Concentration. NR= analysis not requested.

<sup>2</sup> Concentrations expressed in mg/L. Samples are filtered unless otherwise noted.

<sup>3</sup> As CaCO<sub>3</sub>

<sup>4</sup> =Total Dissolved Solids,

<sup>5</sup> = Total Suspended Solids

**Table 20. Reported nutrient concentrations in water samples, second quarter, 2010.**

Sample Location	Sample Date	Concentration <sup>1,2</sup>				
		Nitrite + Nitrate	Phosphorus	Nitrite	Total Kjeldahl Nitrogen	Ammonia
<b>Up-gradient</b>						
P&W-2	4/27/2010	0.4	0.016	NR	NR	NR
USGS-019	4/27/2010	0.9	0.0095	NR	NR	NR
USGS-027	4/27/2010	2.6	0.015	NR	NR	NR
<b>Facility</b>						
A11A31	5/12/2010	0.9	0.017	NR	NR	NR
CFA 1	4/5/2010	2.8	0.02	NR	NR	NR
ICPP-2020	4/13/2010	6.1	0.03	NR	NR	NR
M1S	4/22/2010	0.24	0.025	-	<0.1	U
M3S	5/12/2010	0.97	0.026	NR	NR	NR
M6S	5/12/2010	1.2	0.034	-	-	-
NRF-06	5/18/2010	2.0	0.098	-	0.12	<0.01
NRF-09	5/19/2010	2.5	0.032	-	<0.1	U
NRF-11	5/18/2010	2.0	0.033	-	0.15	<0.01
NRF-12	5/19/2010	1.9	0.03	-	<0.1	U
USGS-047	4/13/2010	2.3	0.036	-	-	-
USGS-052	4/15/2010	2.7	0.028	-	<0.1	U
USGS-065	4/28/2010	1.6	0.019	-	-	-
USGS-067	4/13/2010	5.5	0.029	-	-	-
USGS-085	4/12/2010	1.1	0.027	-	-	-
USGS-087	4/28/2010	0.46	0.0069	-	-	-
USGS-099	5/18/2010	1.8	0.026	-	<0.1	U
USGS-100	4/8/2010	2.0	0.014	-	-	-
<b>Boundary</b>						
Atomic City	4/26/2010	0.78	0.02	NR	NR	NR
Crossroads	4/26/2010	0.94	0.017	NR	NR	NR
USGS-008	4/21/2010	0.69	0.018	NR	NR	NR
USGS-011	6/24/2010	0.8	0.019	NR	NR	NR
USGS-103	4/21/2010	0.84	0.016	NR	NR	NR
USGS-124	4/26/2010	0.78	0.02	NR	NR	NR
<b>Surface water</b>						
BLR @ Exp Field Station	6/10/2010	0.023	0.021	NR	NR	NR
BLR @ INL Diversion	6/10/2010	0.029	0.019	NR	NR	NR

<sup>1</sup> Data qualifiers: U = non-detection , J = estimate, R = rejected, NR = analysis not requested,

<sup>2</sup> Concentrations expressed in mg/L.

**Table 21. Reported VOC concentrations in water samples, second quarter, 2010.**

Sample Location	Sample Date	Concentrations <sup>1,2</sup>						
		1,1-Dichloroethene	Carbon tetrachloride	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl chloride
<b>Boundary</b>								
A11A31	5/12/2010	<0.5	2.2	<0.5	<0.5	<0.5	1.2	<0.5
ANP-8	5/17/2010	<0.5	<0.5	<0.5	4.1	<0.5	24	<0.5
ICPP-2020	4/13/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
M1S	5/12/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
M3S	5/12/2010	<0.5	4.2	<0.5	<0.5	<0.5	1.3	<0.5
M6S	5/12/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NRF-06	5/18/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NRF-09	5/19/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NRF-11	5/18/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NRF-12	5/19/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TAN-16	5/17/2010	<0.5	<0.5	1.2	0.52	5.7	41	<0.5
TAN-28	5/11/2010	1.5	<0.5	110	73 (J)	14	1200	3.4 (J)
TAN-29	5/11/2010	1.2	<0.5	86	26 (J)	18	820	<0.5
TAN-37	5/11/2010	<0.5	<0.5	2.5	160 (J)	<0.5	20	<0.5
TAN-57	5/17/2010	0.67	<0.5	3.7	1.6	12	100	<0.5
USGS-099	5/12/2010	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

<sup>1</sup> Data qualifiers: J= estimate, R= rejected. A "<" indicates a result below the Minimum Detectable Concentration.

<sup>2</sup> Concentrations expressed in µg/L

## 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.

DEQ-INL OP monitors long-term radiological conditions via soil sampling as well as field instrumentation capable of identifying and measuring quantities of gamma-emitting radionuclides in soil. Monitoring concentrations of gamma-emitting radionuclides in surface soil provides some insight to transport, deposition, and accumulation of radioactive material in the environment as a result of INL operations as well as historical above ground testing of nuclear weapons. No in-situ gamma spectroscopic measurements were performed, nor were any soil samples physically collected during the second calendar quarter of 2010.

DEQ-INL OP monitors milk for naturally occurring potassium-40 and man-made iodine-131. DEQ-INL OP collects milk samples on a monthly basis. Results for analyses of milk samples are presented in **Table 22**. Naturally occurring potassium-40 was detected in all samples within the expected range. Iodine-131 was not detected.

**Table 22. Gamma spectroscopy analysis data for milk samples, second quarter, 2010.**

Sample Location/Dairy	Sample Date	Naturally occurring gamma-emitting radionuclide Potassium-40		Man-made gamma-emitting radionuclide Iodine-131 <sup>1</sup>
		Concentration <sup>3</sup>	± 2 SD	
<b>Monitoring Samples</b>				
Howe/Nelson-Ricks Creamery	04/05/2010	1386	109	<MDC
	05/04/2010	1438	112	<MDC
	06/01/2010	1459	103	<MDC
Mud Lake/Nelson-Ricks Creamery	04/05/2010	1402	105	<MDC
	05/03/2010	1376	96	<MDC
	05/31/2010	1767	108	<MDC
Gooding/Glanbia	04/06/2010	1521	103	<MDC
	05/04/2010	1437	98	<MDC
Riverside	06/01/2010	1420	101	<MDC
	04/13/2010	1664	109	<MDC
	05/12/2010	1922	128	<MDC
Fort Hall	06/09/2010	1760	128	<MDC
	04/06/2010	1710	124	<MDC
	05/05/2010	1478	113	<MDC
	06/02/2010	1430	101	<MDC
<b>Verification Samples<sup>2</sup></b>				
Dietrich	04/06/2010	1337	103	<MDC
Idaho Falls	04/06/2010	1497	114	<MDC
Howe	05/04/2010	1445	111	<MDC
Rupert	05/04/2010	1390	106	<MDC
Dietrich	06/01/2010	1350	114	<MDC
Terreton	06/01/2010	1440	116	<MDC

<sup>1</sup> <MDC – Less than Minimum Detectable Concentration (approximately 4 pCi/L for Iodine-131).

<sup>2</sup> DEQ-INL OP samples collected by the off-site INL environmental surveillance contractor.

<sup>3</sup> Concentrations are expressed in pCi/L.

## Quality Assurance

The measurement of any physical quantity is subject to inaccuracy from errors that may be introduced during sample collection, measurement, calibration, and the reading and reporting of results. While all of these inaccuracies cannot be quantified with certainty 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 second quarter of 2010 for the DEQ-INL OP's ESP. It also summarizes the quality control (QC) samples (spikes, blanks, and duplicates) submitted to the Idaho Bureau of Laboratories-Boise (IBL) for non-radiological 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 OP.

Analytical results for blanks, duplicates, and spikes are used to assess the precision, accuracy, and representativeness of results from analyzing laboratories. During the second quarter of 2010, the DEQ-INL OP submitted 86 QC samples for various radiological and non-radiological analyses (**Table 23**).

## Blank Samples

Blank samples consist of matrices that have negligible, acceptably low, or immeasurable 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 second quarter of 2010 are presented in **Table 24**.

Blank sample results for select gamma emitters in air from composited air filters are presented in **Table 25**. Data for blank analyses used to assess data quality for tritium in water vapor in air are presented in **Table 26**. Blank analyses results for radiological and non-radiological analytes in ground and surface water are presented in **Table 27**, **Table 28**, and **Table 29**. One blank analyses for VOCs showed no detectable quantities and is not shown in the tables.

No anomalies were observed from the assessment of field blank samples as measured by the analytical laboratories used by DEQ-INL OP for the second quarter of 2010.

## 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):

$$RPD = (R_1 - R_2) / ((R_1 + R_2) / 2) * 100$$

R<sub>1</sub> = first sample result

R<sub>2</sub> = second sample result

and is used to measure a laboratory’s ability to reproduce consistent results. A relative percent difference is acceptable at ± 20 percent. 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 30**, **Table 31**, and **Table 32**, and **Table 33** for radiological analyses, and non-radiological analyses.

No anomalies were observed from the assessment of field duplicate samples as measured by the analytical laboratories used by DEQ-INL OP for the second quarter of 2010.

## 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 OP calculates the ratio of the spike concentration determined from the laboratory measurement to the known spike concentration in the sample. This result is known as percent recovery (%R) and the acceptable range used by DEQ-INL OP is 100 ± 25 percent. Additionally, all results were qualified as “estimates (J)” if the associated quality control spike sample had a recovery of 50-74% or 126-150%, provided that each result was greater than the instrument detection limit (IDL). All

results were qualified as “rejected (R)” if the associated quality control spike sample had a recovery of <50% or >150%, provided each result was also greater than the IDL.

During second quarter 2010, 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 were used to assess ground water analyte recovery rates and the results are presented in **Table 34**, **Table 35**, and **Table 36**.

VOC analyses, specifically trans-1,2-dichloroethene and vinyl chloride for spiked samples submitted for analysis 5/11-12 and analyzed 5/25/10 exceeded recovery limits of 125%, at 130.7% and 138.9%. All results for trans-1,2-dichloroethene and vinyl chloride analyzed with the specific spiked sample, and which exceeded the MDC were qualified as estimates. Qualified with a “J”-flag are trans-1,2-dichloroethene results from TAN-28, TAN-29, and TAN-37, and the vinyl chloride result for TAN-28.

DEQ-INL OP also prepares additional “spike-like” quality control samples to assess ambient radiation measurement bias. Once per quarter, DEQ-INL OP 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 two additional exposures, ranging from 15 to 60 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 second quarter 2010 are presented in **Table 37**. Real-time pressure correction is used to calculate the net exposure measured by these EIC control sets.

One EIC failed the 25% criteria by over responding by 35%. The other two EIC's in the irradiation can during the experiment showed excellent agreement as shown in **Table 37**. The failed EIC was probably the result of human error. No actual field data were affected or subsequently qualified as a result of this.

Other than the previously mentioned EIC and VOC spikes, there were no anomalies observed from the assessment of spiked samples as measured by DEQ-INL OP or the analytical laboratories used by DEQ-INL OP for the second quarter of 2010.

### **Analytical QA/QC Assessment**

Other than those discussed above, no issues involving sample chain of custody, sample holding times, and the analysis of blank, duplicate, and spiked samples were observed during the second quarter of 2010, which significantly affected data quality. Methodologies and data reports issued by the contracting laboratories generally conformed to the requirements of DEQ-INL OP during the second quarter of 2010.

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 second quarter of 2010 met the minimum criteria of the DEQ-INL OP ESP and is summarized in **Table 23**.

### **Preventative Maintenance and Equipment Reliability**

All equipment was calibrated and checked according to pre-described periodicity. Service reliability for air sampling equipment for the second quarter of 2010 is summarized in **Table 38**.

### **Conclusion**

All data collected for the second quarter of 2010, have been assigned the applicable qualifiers to designate the appropriate use of the data. In addition, all data has been verified and deemed complete meeting the requirements and data quality objectives established by DEQ-INL OP.

**Table 23. Summary of the analytical performance and usability of the analyses performed for the DEQ-INL OP ESP, second quarter, 2010.**

Media Sampled	Collection Device	Analyte	Test Analyses	Blank Analyses	Duplicate Analyses	Spike Analyses	Data Rejected <sup>1</sup>	Analyzing Lab <sup>2</sup>
<b>AIR</b>								
<b>Particulate</b>	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
<b>Water Vapor</b>	Desiccant column	Tritium	47	1	0	0	0	ISU-EML
<b>Gaseous</b>	Charcoal filter	Iodine-131	13	0	0	0	0	ISU-EML
<b>Precipitation</b>	Poly bottle	Tritium	6	0	0	0	0	ISU-EML
		Gamma emitters	6	0	0	0	0	ISU-EML
<b>WATER</b>								
<b>Groundwater &amp; Surface Water</b>	Grab or composite	Gross alpha	35	1	2	0	0	ISU-EML
		Gross beta	35	1	2	0	0	ISU-EML
		Gamma emitters	35	1	2	0	0	ISU-EML
		Tritium	35	1	2	0	0	ISU-EML
		Enriched tritium	7	0	0	0	0	ISU-EML
		Technetium-99	11	1	1	0	0	ISU-EML
		Radiochemical	85	8	8	0	0	ISU Sub
		Metals	28	1	2	2	0	IBL
		Common Ions	28	1	2	2	0	IBL
		Nutrients	29	1	2	2	0	IBL
		Volatile Organics	16	1	1	2	0	IBL
<b>TERRESTRIAL</b>								
<b>Milk</b>	Grab or composite	Gamma emitters	21	0	0	0	0	ISU-EML
<b>Soil</b>	<i>in situ</i>	Gamma emitters	0	0	0	0	0	DEQ-INL OP
	Grab – “puck”	Gamma emitters	0	0	0	0	0	ISU-EML
<b>RADIATION</b>								
<b>Ambient</b>	EICs	Gamma Radiation	54	0	0	9	0	DEQ-INL OP
	HPICs	Gamma Radiation	11	NA	NA	NA	NA	DEQ-INL OP
<b>Total Analyses</b>			<b>799</b>	<b>45</b>	<b>24</b>	<b>17</b>	<b>0</b>	
<b>Total of QC Analyses (blanks, duplicates, and spikes)</b>			<b>86</b>					
<b>Percentage of QC analyses of Total Test analyses<sup>3</sup></b>			<b>11%</b>					
<b>Percentage of usable data<sup>4</sup></b>			<b>100%</b>					

<sup>1</sup> Combined Laboratory and DEQ-INL OP rejection criteria (data was rejected for any reason).

<sup>2</sup> 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 OP = Analyzed by INL Oversight Program, Idaho Department of Environmental Quality.

<sup>3</sup> Analyzing quality control samples at a rate of approximately 5 to 10 percent of the total number of test analyses performed for the year is deemed appropriate for the DEQ-INL OP ESP.

<sup>4</sup> Data usability rate [total analyses – rejected data]/[total analyses] of 90 percent or higher is acceptable for the DEQ-INL OP ESP.

**Table 24. Blank analysis results for gross alpha and beta in particulate air (TSP), second quarter, 2010.**

Collection Period		Corrected volume (m <sup>3</sup> ) <sup>1</sup>	Gross alpha		Gross beta	
Start	Stop		Value	Uncertainty (± 2 SD)	Value	Uncertainty (± 2 SD)
4/01/10	4/08/10	1411	-0.1	0.2	-0.9	0.6
4/08/10	4/15/10	1411	-0.1	0.1	0.1	0.6
4/15/10	4/22/10	1411	-0.1	0.1	0.2	0.6
4/22/10	4/29/10	1411	-0.1	0.1	-0.3	0.6
4/29/10	5/06/10	1411	-0.1	0.1	0.2	0.6
5/06/10	5/13/10	1411	0.1	0.1	-0.3	0.6
5/13/10	5/20/10	1411	-0.1	0.2	0.0	0.6
5/20/10	5/27/10	1411	-0.1	0.1	-0.4	0.6
5/27/10	6/03/10	1411	-0.1	0.1	-0.6	0.6
6/03/10	6/10/10	1411	-0.1	0.1	-0.8	0.6
6/10/10	6/17/10	1411	0.0	0.1	0.7	0.6
6/17/10	6/24/10	1411	0.0	0.1	0.1	0.6
6/24/10	7/01/10	1411	-0.1	0.1	-0.5	0.6

Note: Concentrations and associated uncertainties (±2 SD) are expressed in 1 x 10<sup>-3</sup> pCi/m<sup>3</sup>.

<sup>1</sup> 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 25. Blank analysis results for gamma spectroscopy for TSP particulate air filters, second quarter, 2010.**

Analysis Date	Beryllium-7			Ruthenium-106/ Rhodium-106			Antimony-125		
	Concentration <sup>1</sup>	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
7/26/10	20	47	79	-7	30	53	-21	9	16
Analysis Date	Cesium-134			Cesium-137					
	Concentration <sup>1</sup>	± 2 SD	MDC	Concentration	± 2 SD	MDC			
7/26/10	1	4	6	0	5	8			

Note: Concentrations are expressed in 1 x 10<sup>-5</sup> pCi/m<sup>3</sup> with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

<sup>1</sup> These concentrations are from blank filters collected weekly, composited, and analyzed for the calendar quarter. A composite volume equal to the sum of the average volumes collected through each valid field filter was used to compute “air concentrations” for the blank for meaningful comparison to sample results. No air was actually passed through the blank filters.

**Table 26. Blank analysis results for tritium in water vapor from air samples, second quarter, 2010.**

Sample Number	Start Date	Collect Date	Analysis Date	Tritium		
				Concentration	± 2 SD	MDC
OP102ZTR01	5/18/10	5/19/10	7/14/10	0.03	0.09	0.15

Note: Concentrations are expressed in nCi/L with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

**Table 27. Radiological blank analysis in ground and surface water for samples for the second quarter, 2010.**

Sample Number	Sample Date	Concentration	± 2 SD	MDC	Within Blank Criteria?
<b>Gross Alpha</b>					
101W201	5/19/210	-0.1	0.2	0.4	Yes
<b>Gross Beta</b>					
101W201	5/19/210	0.1	0.6	1.0	Yes
<b>Cesium-137</b>					
101W201	5/19/210	-0.9	1.9	3.4	Yes
<b>Tritium</b>					
101W203	5/19/210	20	60	110	Yes
<b>Strontium-90</b>					
101W204	5/19/210	0.03	0.35	0.82	Yes
<b>Technetium-99</b>					
101W202	5/19/210	0.0	0.1	0.2	Yes
<b>Plutonium-238</b>					
101W204	5/19/210	-0.002	0.020	0.029	Yes
<b>Plutonium-239/240</b>					
101W204	5/19/210	0.000	0.020	0.015	Yes
<b>Plutonium-241</b>					
101W204	5/19/210	-0.1	2.9	4.8	Yes
<b>Americium-241</b>					
101W204	5/19/210	0.019	0.023	0.036	Yes
<b>Uranium-234</b>					
101W205	5/19/210	0.033	0.042	0.066	Yes
<b>Uranium-235</b>					
101W205	5/19/210	0.005	0.044	0.077	Yes
<b>Uranium-238</b>					
101W205	5/19/210	-0.013	0.038	0.081	Yes

Note: Concentrations are expressed in pCi/L with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

**Table 28. Blank analysis results (µg/L) for metals in ground and surface water for the second quarter, 2010.**

Sample Number	Sample Date	Arsenic	Barium	Beryllium	Cadmium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
101W207	5/19/2010	<2	<1	<1	<1	<1	<10	<1	<1	<2	<2

**Table 29. Blank analysis results (mg/L) for common ions and nutrients in ground and surface water for the second quarter, 2010.**

Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
101W206,207,208	4/8/2010	<0.10	<0.10	<0.10	<0.10	<0.20	<0.40	<0.80	<1.0	<0.010	<0.0050

**Table 30. Duplicate radiological analysis results in pCi/L for ground and surface water, second quarter, 2010.**

Analysis/ Sample Location	Original Sample Number	Concentration	±2 SD	Duplicate Sample Number	Concentration	±2 SD	$ R_1-R_2 $	$3(s_1^2+s_2^2)^{1/2}$	Within Criteria? <sup>1</sup>
<b>Gross Alpha</b>									
USGS-027	101W081	5.5	1.5	101W128	5.5	1.5	0	3.2	yes
M3S	101W183	0.3	1.3	101W215	1.5	1.0	1.2	2.5	yes
<b>Gross Beta</b>									
USGS-027	101W081	6.3	1.0	101W128	6.0	0.9	0.5	2.6	yes
M3S	101W183	2.7	0.8	101W215	3.0	0.8	1.5	1.9	yes
<b>Gamma Spectroscopy Cesium-137</b>									
USGS-027	101W081	-0.4	1.8	101W128	-0.2	1.7	0.2	3.7	yes
M3S	101W183	-0.3	1.4	101W215	0.1	1.6	0.4	3.2	yes
<b>Tritium</b>									
USGS-027	101W082	-80	90	101W129	-20	90	60	190	yes
M3S	101W185	870	120	101W217	940	100	70	234	yes
<b>Strontium-90</b>									
M3S	101W186	0.2	0.33	101W218	0.13	0.36	0.07	0.73	yes
<b>Technetium-99</b>									
M3S	101W184	1.2	0.2	101W216	1.3	0.2	0.1	0.42	yes
<b>Plutonium-238</b>									
M3S	101W186	-0.002	0.021	101W218	0	0.021	0.002	0.044	yes
<b>Plutonium-239/240</b>									
M3S	101W186	0.005	0.021	101W218	0.001	0.021	0.004	0.045	yes
<b>Plutonium-241</b>									
M3S	101W186	-0.8	2.8	101W218	-0.9	2.9	0.1	6.0	yes
<b>Uranium-234</b>									
M3S	101W187	1.50	0.37	101W219	1.37	0.41	0.13	0.83	yes
<b>Uranium-235</b>									
M3S	101W187	0.052	0.058	101W219	0.160	0.084	0.108	0.15	yes
<b>Uranium-238</b>									
M3S	101W187	0.87	0.25	101W219	0.84	0.30	0.03	0.59	yes
<b>Americium-241</b>									
M3S	101W186	0.006	0.020	101W218	0.011	0.021	0.005	0.044	yes

<sup>1</sup>  $|R_1-R_2| \leq 3(s_1^2+s_2^2)^{1/2}$

**Table 31. Duplicate results for metals (µg/L) in ground water and/or surface water for the second quarter, 2010.**

Sample Location	Sample Number	Sample Date	Arsenic	Barium	Cadmium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
USGS-027 (dissolved)	101W084	4/27/2010	NR	84	NR	5	NR	<1	3.2	NR	<2
USGS-027 (dissolved)	101W131	4/27/2010	NR	84	NR	5	NR	<1	3.2	NR	<2
RPD			--	0	--	0	--	0	0	--	0
M3S (total)	101W189	5/12/2010	<2	46	<1	13	10	<1	<1	<2	<2
M3S (total)	101W221	5/12/2010	<2	46	<1	12	12	<1	<1	<2	<2
RPD			0	0	0	8.0	-18.2	0	0	0	0

Relative Percent Difference = (R1-R2) / ((R1+ R2)/2)\*100. NR= not requested.

**Table 32. Duplicate results for common ions and nutrients (mg/L) in ground water and/or surface water for second quarter, 2010.**

Sample Location	Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
USGS-027	101W083,084, 085	4/27/2010	51	18	28	5.9	0.524	52.5	40	150	2.6	0.015
USGS-027	101W130,131,132	4/27/2010	52	19	28	5.9	0.514	52.4	39.9	152	2.5	0.015
RPD			-1.9	-5.4	0	0.0	1.9	0.2	0.3	-1.3	3.9	0.0
M3S	101W188,189, 190	5/12/2010	43	15	8.3	2.6	<0.2	15.3	25.9	142	0.85	0.021
M3S	101W220,221,222	5/12/2010	43	15	8.4	2.6	<0.2	15.2	25.8	143	0.91	0.021
RPD			0	0	-1.2	0	0	0.7	0.4	-0.7	-6.8	0

Relative Percent Difference = (R1-R2) / ((R1+ R2)/2)\*100

**Table 33. Duplicate results for VOCs (in µg/L) in groundwater and/or surface water second quarter, 2010.**

Sample Location	Sample Date	Sample Number	Concentrations <sup>1,2</sup>							
			1,1-Dichloroethene	Carbon tetrachloride	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl chloride	
M3S	5/12/2010	101W193	<0.5	4.4	<0.5	<0.5	<0.5	<0.5	1.3	<0.5
M3S	5/12/2010	101W223	<0.5	4.2	<0.5	<0.5	<0.5	<0.5	1.4	<0.5
RPD			0	4.7	0	0	0	0	-7.4	0

Relative Percent Difference = (R1-R2) / ((R1+ R2)/2)\*100

**Table 34. De-ionized water spike results (in µg/L) and percent recovery for metals in ground and surface water for the second quarter, 2010.**

Spike Sample Number	Sample Date	Barium			Chromium			Lead			Manganese			Zinc		
		spike	result	%R <sup>1</sup>	spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R
101W134	4/13/2010	56.1	59	105.2	8.68	7.8	89.9	5.96	6.3	105.7	6.01	5.8	96.5	44	40	90.9
101W211	5/12/2010	60.6	65	107.3	8.68	8.8	101.4	6.71	7	104.3	6.76	6.9	102.1	47.6	43	90.3

<sup>1</sup>A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

**Table 35. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in ground and surface water for the second quarter, 2010.**

Spike Sample Number	Sample Date	Calcium			Magnesium			Sodium			Potassium			Fluoride		
		spike	result	%R <sup>1</sup>	spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R
101W134,133	4/13/2010	10.1	9.9	98.0	4.02	3.9	97.0	9.04	9.1	100.7	1.32	1.3	98.5	1	0.839	83.9
101W211,210	5/12/2010	10.9	11	100.9	4.34	4.2	96.8	9.76	9.8	100.4	1.48	1.4	94.6	0.279	0.285	102.2

<sup>1</sup>A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

**Table 35. continued. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in ground and surface water for the second quarter, 2010.**

Spike Sample Number	Sample Date	Chloride			Sulfate			Total Alkalinity as CaCO <sub>3</sub>			Total Nitrogen			Total Phosphorus		
		spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R
101W133,135	4/13/2010	40.9	38.6	<b>94.4</b>	9.40	8.89	<b>94.6</b>	43.9	45	<b>102.5</b>	3.78	3.8	<b>100.5</b>	0.015	0.015	<b>100.0</b>
101W210,212	5/12/2010	5.2	5.19	<b>99.8</b>	2.85	2.42	<b>84.9</b>	11.1	9	<b>81.1</b>	1.77	1.9	<b>107.3</b>	0.0284	0.029	<b>102.1</b>

<sup>1</sup>A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

**Table 36. De-ionized water spike results (in µg/L) and percent recovery for VOCs in ground and surface water for the second quarter, 2010.**

Spike Sample Number	Sample Date	Carbon Tetrachloride			Styrene			Tetrachloroethylene			Trichloroethylene			Vinyl Chloride		
		spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R
101W136	4/13/2010	6.35	6.9	<b>108.7</b>	9.23	9.3	<b>100.8</b>	12.5	12	<b>96.0</b>	11.2	12	<b>107.1</b>	7.6	8.5	<b>111.8</b>
Spike Sample Number	Sample Date	Cis-1,2-Dichloroethene			Trans-1,2-Dichloroethene			Tetrachloroethylene			Trichloroethylene			Vinyl Chloride		
		spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R	spike	result	%R
101W213	5/12/2010	10.4	10	<b>96.2</b>	15.3	20	<b>130.7</b>	8.49	8.4	<b>98.9</b>	10.4	10	<b>96.2</b>	18	25	<b>138.9</b>

<sup>1</sup>A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

Highlighted values exceed recovery limits. VOC results processed at the same time as the spiked sample analysis exceeding recovery limits will be flagged as estimated values ("J").

**Table 37. Electret ionization chamber irradiation results (categorized as spiked samples), second quarter, 2010.**

Electret #	Exposure Received		Net Measured Exposure <sup>1</sup>		%R
	(mR)	Uncertainty (mR)	(mR)	Uncertainty (mR)	
Spike 1	40	2.0	38.0	1.3	94.9
Spike 1	40	2.0	39.9	1.3	99.8
Spike 1	40	2.0	40.0	1.3	100.2
Spike 2	30	1.5	30.7	1.3	102.5
Spike 2	30	1.5	28.8	1.3	96.3
Spike 2	30	1.5	29.0	1.4	96.9
Spike 3	25	1.3	25.7	1.3	102.6
Spike 3	25	1.3	25.2	1.3	100.6
Spike 3	25	1.3	33.8	1.3	135.2

Note: A percent recovery (%R) of 100 ± 25 is considered acceptable.

<sup>1</sup> Net measured exposure estimate includes a correction for atmospheric pressure.

**Table 38. Air sampling field equipment service reliability (percent operational), second quarter, 2010.**

Station Locations	Sample Type			
	TSP	Radioiodine	Atmospheric Moisture	Precipitation
<b>Onsite Locations</b>				
Big Lost River Rest Area	100 %	100 %	100 %	100 %
Experimental Field Station	100 %	100 %	100 %	NC <sup>1</sup>
Sand Dunes Tower	100 %	100 %	100 %	NC <sup>1</sup>
Van Buren Avenue	100 %	100 %	100 %	NC <sup>1</sup>
<b>Boundary Locations</b>				
Atomic City	100 %	100 %	100 %	100 %
Howe	100 %	100 %	100 %	100 %
Montevieu	100 %	100 %	100 %	100 %
Mud Lake	100 %	100 %	100 %	100 %
<b>Distant Locations</b>				
Craters of the Moon	100 %	100 %	100 %	NC <sup>1</sup>
Idaho Falls	100 %	100 %	100 %	100 %

Note: The values in this table were calculated by dividing the number of weeks the equipment was in operation by the number of weeks in the quarter.

<sup>1</sup>NC = sample not collected at this location.

## Appendix A

**Table A-1. Weekly concentrations (in  $1 \times 10^{-3}$  pCi/m<sup>3</sup>) for gross alpha and gross beta analyses for TSP filters for all locations, second quarter, 2010.**

Sample location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
<b>On-Site Locations</b>						
<b>Rest Area</b>						
	4/01/10	4/08/10	0.5	0.2	18.9	1.2
	4/08/10	4/15/10	1.3	0.3	28.4	1.4
	4/15/10	4/22/10	1.2	0.3	43.0	1.7
	4/22/10	4/29/10	0.8	0.3	27.8	1.4
	4/29/10	5/06/10	0.6	0.2	17.4	1.1
	5/06/10	5/13/10	1.1	0.3	26.8	1.4
	5/13/10	5/20/10	1.1	0.3	40.3	1.6
	5/20/10	5/27/10	0.6	0.2	22.8	1.3
	5/27/10	6/03/10	0.8	0.3	22.4	1.4
	6/03/10	6/10/10	0.6	0.2	33.9	1.5
	6/10/10	6/17/10	0.7	0.2	25.2	1.3
	6/17/10	6/24/10	1.4	0.3	35.0	1.5
	6/24/10	7/01/10	1.7	0.3	49.5	1.8
<b>Experimental Field Station</b>						
	4/01/10	4/08/10	0.5	0.2	18.4	1.2
	4/08/10	4/15/10	1.2	0.3	26.5	1.4
	4/15/10	4/22/10	1.3	0.3	43.2	1.7
	4/22/10	4/29/10	0.9	0.3	25.5	1.3
	4/29/10	5/06/10	0.5	0.2	18.0	1.2
	5/06/10	5/13/10	1.0	0.3	23.8	1.3
	5/13/10	5/20/10	0.9	0.3	38.9	1.6
	5/20/10	5/27/10	0.7	0.2	21.7	1.3
	5/27/10	6/03/10	0.3	0.2	19.7	1.2
	6/03/10	6/10/10	0.7	0.3	28.5	1.4
	6/10/10	6/17/10	0.8	0.3	22.1	1.2
	6/17/10	6/24/10	0.8	0.3	30.8	1.4
	6/24/10	7/01/10	1.8	0.4	45.7	1.7

**Table A-1 continued. Weekly concentrations (in  $1 \times 10^{-3}$  pCi/m<sup>3</sup>) for gross alpha and gross beta analyses for TSP filters for all locations, second quarter, 2010.**

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
<b>Sand Dunes</b>	4/01/10	4/08/10	0.5	0.2	17.2	1.2
	4/08/10	4/15/10	0.8	0.3	22.8	1.3
	4/15/10	4/22/10	1.3	0.3	39.6	1.6
	4/22/10	4/29/10	0.6	0.2	22.3	1.3
	4/29/10	5/06/10	0.4	0.2	15.6	1.1
	5/06/10	5/13/10	0.6	0.2	21.2	1.3
	5/13/10	5/20/10	1.0	0.3	35.0	1.5
	5/20/10	5/27/10	0.5	0.2	19.9	1.2
	5/27/10	6/03/10	0.4	0.2	17.3	1.2
	6/03/10	6/10/10	0.6	0.2	23.8	1.3
	6/10/10	6/17/10	0.4	0.2	21.7	1.2
	6/17/10	6/24/10	0.7	0.2	28.2	1.4
6/24/10	7/01/10	1.2	0.3	39.8	1.6	
<b>Van Buren</b>	4/01/10	4/08/10	0.5	0.2	20.5	1.2
	4/08/10	4/15/10	1.3	0.3	29.6	1.4
	4/15/10	4/22/10	1.6	0.3	44.4	1.7
	4/22/10	4/29/10	0.8	0.2	31.3	1.4
	4/29/10	5/06/10	0.5	0.2	19.5	1.2
	5/06/10	5/13/10	0.9	0.3	26.9	1.4
	5/13/10	5/20/10	1.1	0.3	38.3	1.6
	5/20/10	5/27/10	0.7	0.2	24.2	1.3
	5/27/10	6/03/10	0.6	0.2	19.7	1.2
	6/03/10	6/10/10	0.7	0.2	28.8	1.4
	6/10/10	6/17/10	0.6	0.2	24.6	1.3
	6/17/10	6/24/10	1.0	0.3	31.8	1.4
6/24/10	7/01/10	1.7	0.3	40.9	1.6	
<b>Boundary Locations Atomic City</b>	4/01/10	4/08/10	0.6	0.2	19.3	1.2
	4/08/10	4/15/10	0.8	0.3	25.8	1.4
	4/15/10	4/22/10	1.2	0.3	41.9	1.7
	4/22/10	4/29/10	0.5	0.2	29.3	1.4
	4/29/10	5/06/10	0.4	0.2	19.5	1.2
	5/06/10	5/13/10	0.6	0.2	25.6	1.4
	5/13/10	5/20/10	0.8	0.3	36.9	1.6
	5/20/10	5/27/10	0.8	0.3	24.3	1.3
	5/27/10	6/03/10	0.6	0.3	19.9	1.2
	6/03/10	6/10/10	0.5	0.2	28.6	1.4
	6/10/10	6/17/10	0.6	0.2	23.8	1.3
	6/17/10	6/24/10	1.0	0.3	31.3	1.5
	6/24/10	7/01/10	1.3	0.3	44.8	1.7

**Table A-1 continued. Weekly concentrations (in  $1 \times 10^{-3}$  pCi/m<sup>3</sup>) for gross alpha and gross beta analyses for TSP filters for all locations, second quarter, 2010.**

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
<b>Howe</b>	4/01/10	4/08/10	0.3	0.2	16.8	1.2
	4/08/10	4/15/10	1.2	0.3	23.4	1.3
	4/15/10	4/22/10	1.4	0.3	37.5	1.6
	4/22/10	4/29/10	0.9	0.3	28.6	1.4
	4/29/10	5/06/10	0.8	0.3	14.5	1.1
	5/06/10	5/13/10	0.8	0.3	22.7	1.3
	5/13/10	5/20/10	0.7	0.3	35.5	1.5
	5/20/10	5/27/10	0.7	0.2	22.8	1.3
	5/27/10	6/03/10	0.4	0.2	16.3	1.1
	6/03/10	6/10/10	0.5	0.2	26.7	1.4
	6/10/10	6/17/10	0.5	0.2	24.8	1.3
	6/17/10	6/24/10	1.1	0.3	29.9	1.4
	6/24/10	7/01/10	1.1	0.3	42.8	1.7
<b>Montevieu</b>	4/01/10	4/08/10	0.8	0.3	24.0	1.3
	4/08/10	4/15/10	1.4	0.3	36.0	1.6
	4/15/10	4/22/10	1.7	0.3	50.8	1.8
	4/22/10	4/29/10	0.8	0.3	27.9	1.4
	4/29/10	5/06/10	0.5	0.2	17.8	1.2
	5/06/10	5/13/10	1.1	0.3	23.2	1.3
	5/13/10	5/20/10	1.1	0.3	43.3	1.7
	5/20/10	5/27/10	1.0	0.3	27.1	1.4
	5/27/10	6/03/10	0.7	0.3	23.1	1.3
	6/03/10	6/10/10	0.7	0.3	30.4	1.5
	6/10/10	6/17/10	0.7	0.3	29.5	1.4
	6/17/10	6/24/10	1.2	0.3	34.4	1.5
	6/24/10	7/01/10	1.7	0.3	50.2	1.8
<b>Mud Lake</b>	4/01/10	4/08/10	0.9	0.3	17.4	1.2
	4/08/10	4/15/10	1.3	0.3	26.2	1.4
	4/15/10	4/22/10	1.8	0.4	41.5	1.7
	4/22/10	4/29/10	0.8	0.2	27.1	1.4
	4/29/10	5/06/10	1.1	0.3	15.4	1.1
	5/06/10	5/13/10	0.9	0.3	21.3	1.3
	5/13/10	5/20/10	1.2	0.3	37.8	1.6
	5/20/10	5/27/10	0.7	0.2	23.3	1.3
	5/27/10	6/03/10	0.5	0.2	18.1	1.2
	6/03/10	6/10/10	1.0	0.3	26.1	1.4
	6/10/10	6/17/10	0.7	0.3	22.4	1.3
	6/17/10	6/24/10	0.8	0.3	30.4	1.4
	6/24/10	7/01/10	1.4	0.3	40.6	1.7

**Table A-1 continued. Weekly concentrations (in  $1 \times 10^{-3}$  pCi/m<sup>3</sup>) for gross alpha and gross beta analyses for TSP filters for all locations, second quarter, 2010.**

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
<b>Distant Locations</b>						
<b>Craters</b>						
	4/01/10	4/08/10	0.4	0.2	16.0	1.1
	4/08/10	4/15/10	0.8	0.3	24.3	1.3
	4/15/10	4/22/10	1.1	0.3	36.3	1.6
	4/22/10	4/29/10	0.5	0.2	22.2	1.3
	4/29/10	5/06/10	0.6	0.2	14.1	1.1
	5/06/10	5/13/10	0.7	0.2	19.7	1.2
	5/13/10	5/20/10	0.8	0.3	33.4	1.5
	5/20/10	5/27/10	0.5	0.2	18.8	1.2
	5/27/10	6/03/10	0.2	0.2	15.0	1.1
	6/03/10	6/10/10	0.5	0.2	26.0	1.4
	6/10/10	6/17/10	0.4	0.2	23.1	1.3
	6/17/10	6/24/10	0.7	0.2	26.7	1.4
	6/24/10	7/01/10	1.2	0.3	39.0	1.6
<b>Fort Hall'</b>						
	4/01/10	4/08/10	0.5	0.2	14.7	1.1
	4/08/10	4/15/10	1.0	0.3	21.3	1.3
	4/15/10	4/22/10	1.3	0.3	32.3	1.5
	4/22/10	4/29/10	0.8	0.3	22.5	1.3
	4/29/10	5/06/10	0.6	0.2	14.2	1.1
	5/06/10	5/13/10	1.1	0.3	18.5	1.2
	5/13/10	5/20/10	1.0	0.3	27.3	1.4
	5/20/10	5/27/10	0.9	0.3	19.7	1.2
	5/27/10	6/03/10	0.6	0.2	16.9	1.1
	6/03/10	6/10/10	0.7	0.3	23.1	1.3
	6/10/10	6/17/10	1.0	0.3	18.2	1.2
	6/17/10	6/24/10	1.7	0.3	24.4	1.3
	6/24/10	7/01/10	1.6	0.3	33.9	1.5
<b>Idaho Falls</b>						
	4/01/10	4/08/10	0.7	0.3	21.3	1.3
	4/08/10	4/15/10	1.2	0.3	26.8	1.4
	4/15/10	4/22/10	2.0	0.4	44.7	1.7
	4/22/10	4/29/10	1.3	0.3	26.2	1.4
	4/29/10	5/06/10	0.7	0.2	14.5	1.1
	5/06/10	5/13/10	0.9	0.3	26.3	1.4
	5/13/10	5/20/10	1.5	0.3	46.2	1.7
	5/20/10	5/27/10	0.8	0.3	28.1	1.4
	5/27/10	6/03/10	0.6	0.3	26.6	1.4
	6/03/10	6/10/10	1.2	0.3	36.1	1.6
	6/10/10	6/17/10	0.7	0.3	23.3	1.3
	6/17/10	6/24/10	1.3	0.3	34.9	1.6
	6/24/10	7/01/10	1.9	0.4	51.3	1.8

<sup>1</sup>Operated by Shoshone-Bannock Tribes.

## Appendix B

**Table B-1. Results for all electret locations, second quarter, 2010.**

Sample Location	Net Corrected Exposure Rate ( $\mu\text{R/h}$ )	$\pm 2 \text{ SD}$ ( $\mu\text{R/h}$ )
Arco	14.1	1.2
Craters	13.0	2.4
Rest Area	18.1	2.3
Van Buren	16.4	0.0
EFS	17.1	0.7
Main Gate	20.4	0.1
Atomic City	15.5	1.8
Taber	15.7	2.7
Blackfoot	15.9	3.6
Ft. Hall	16.2	0.0
Idaho Falls	12.0	1.7
Mud Lake/ Terreton	12.2	2.4
Monteview	12.4	3.3
Sand Dunes	17.2	0.9
Howe Met. Tower	15.4	(J) 9.1
MP276 -20	14.8	2.4
MP274 -20	13.4	1.6
MP272 -20	15.1	2.3
MP270 -20	13.9	0.6
MP268 -20	16.7	1.9
MP266 -20	13.3	3.6
MP264 -20	13.7	3.3
MP270 -20/26	17.0	0.2
MP268 -20/26	16.6	1.8
MP266 -20/26	17.5	(J) 8.5
MP263 -20/26	16.2	2.9
MP261 -20/26	12.4	0.7
MP259 -20/26	20.2	3.8
MFC (EBR II)	17.9	2.4
EBR I	15.9	(J) 8.7
RWMC	13.6	1.4
CFA	19.9	3.5
CITRC (PBF)	17.5	1.9

**Table B-1 continued. Results for all electret locations, second quarter, 2010.**

Sample Location	Net Corrected Exposure Rate ( $\mu\text{R/h}$ )	$\pm 2$ SD ( $\mu\text{R/h}$ )
INTEC (ICPPI)	17.8	2.5
ATR (TRA)	33.4	0.6
NRF	15.7	3.7
TAN	12.2	2.9
Mud Lake Bank of Commerce	15.4 (J)	7.9
MP43-33	15.2	0.2
MP41-33	15.9	3.9
MP39-33	17.5	1.8
MP37-33	15.9	0.4
MP35-33	11.7	1.5
MP33-33	17.7	2.9
MP31-33	14.1 (J)	4.1
MP29-33	16.4	2.9
MP27-33	16.4	2.8
MP25-33	14.7 (J)	5.1
MP23-33	17.1	1.2
Base of Howe	15.5	3.1
Rover <sup>1</sup>	NS	NS
Hamer	18.9	2.6
Sugar City	18.0 (J)	9.1
Roberts	12.0	1.6
Big Southern Butte	13.9	1.4

<sup>1</sup>The EICs at Rover were destroyed by a wildfire on the INL and will, therefore, be reported as no sample (NS).  
 Note: The reported result is the mean of the results from three individual electrets placed at each location. The "J" qualifier (estimate) indicates that the individual results did not meet DEQ-INL OP agreement criteria.

## Appendix C

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

Analyte	Minimum detectable concentrations (MDC) (expressed in µg/L)
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

**Table C.1 continued. List of volatile organic compounds (VOCs) analyzed for water samples. Minimum detectable concentrations (MDC) are expressed in µg/L.**

Analyte	Minimum detectable concentrations (MDC) (expressed in µg/L)
4-Chlorotoluene	0.5
1,2-Dibromo-3-chloropropane (DBCP)	1.0
1,2-Dibromoethane (EDB)	0.5
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