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
ATR	-	Advanced Test Reactor
BEA		Battelle Energy Alliance, LLC
BLR		Big Lost River
CERCLA	-	Comprehensive Environmental Response, Compensation and Liability Act
CFA	-	Central Facilities Area
CITRC	-	Critical Infrastructure Test Range Complex
CWI	-	CH2M-WG Idaho, LLC
DEQ-INL OP	-	The State of Idaho, Department of Environmental Quality, Idaho National Laboratory Oversight Program
DOE	-	U.S. Department of Energy
EBR I & II	-	Experimental Breeder Reactors I & II
EFS	-	Experimental Field Station
EIC	-	electret ionization chamber
EML	-	Environmental Monitoring Laboratory
EPA		Environmental Protection Agency
ESER	-	Environmental Surveillance, Education and Research Program
ESP	-	Environmental Surveillance Program
ESRPA	-	Eastern Snake River Plain Aquifer
GSS	-	Gonzales-Stoller Surveillance, LLC
HPIC	-	high-pressure ion chamber
LLD	-	lower limit of detection
IBL	-	Idaho Bureau of Laboratories
ICPP	-	Idaho Chemical Processing Plant
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 1/1000th 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
pCi/g	-	picocuries per gram
pCi/L	-	picocuries per liter
pCi/m^3	-	picocuries per cubic meter
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
TDS	-	total dissolved solids
TMI	-	Three Mile Island
TRA	-	Test Reactor Area
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, Department of Environmental Quality, Idaho National Laboratory Oversight Program (DEQ-INL OP) conducts an Environmental Surveillance Program (ESP) at locations on the INL, near 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 environmental data and programs. This program also provides the citizens of Idaho with information on current and proposed DOE programs 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 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, 2013 (**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. Starting in the first quarter of 2013 a new sampler (HVP 4304) is operating side by side at Idaho Falls air station with the current sampler (HVP 3804). The new sampler (HVP 4304) is being operated to test dependability and durability under field conditions. 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 second quarter of 2013 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 by adsorption onto its porous surface.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) during the second quarter of 2013 at Experimental Field Station. While the results are above MDC they are still well below the DEQ-INL OP action level of 150 pCi/m^3. Average atmospheric tritium concentrations are presented in **Table 4**.

Precipitation samples were collected at six monitoring locations during the second quarter of 2013. Precipitation samples were analyzed for tritium and gamma-emitting radionuclides. 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. Tritium and gamma-emitting radionuclides were below minimum detectable concentration in precipitation collected during the second quarter of 2013.

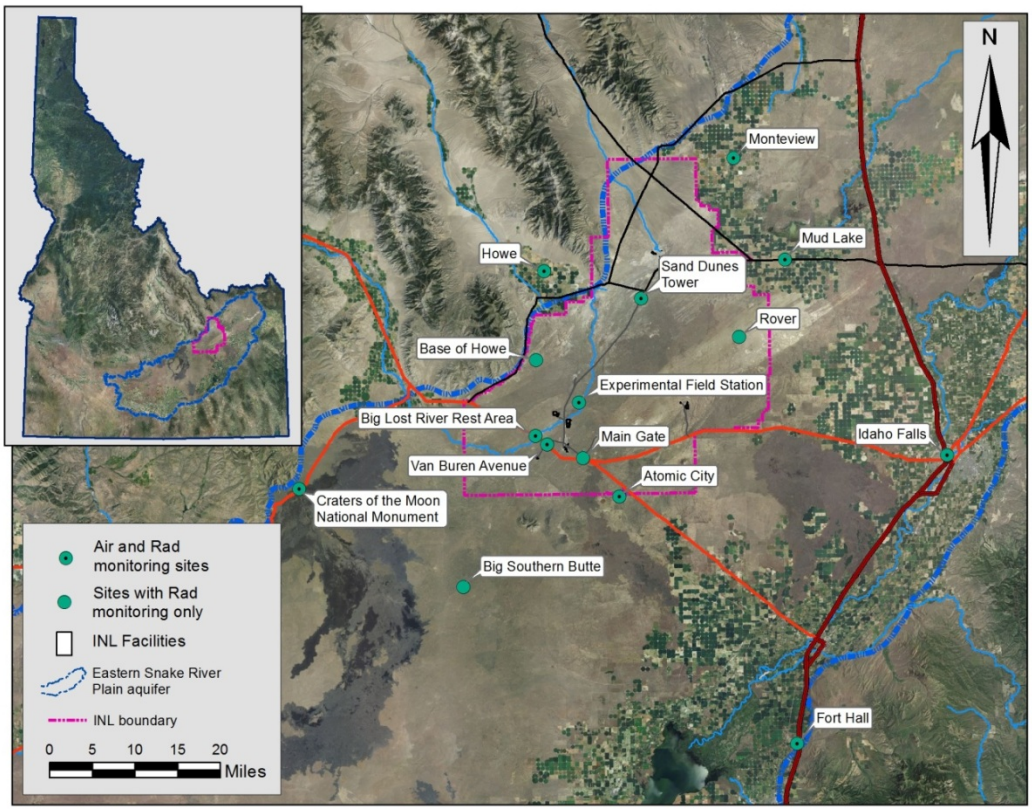

Figure 1. Air and radiation monitoring sites.

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 gross alpha and gross beta concentrations for TSP filters, second quarter, 2013.

Station Location	Concentration					
	Gross Alpha			Gross Beta		
On-Site Locations						
Big Lost River Rest Area	0.5	-	1.6	15.0	-	39.3
Experimental Field Station	0.5	-	1.0	11.9	-	32.5
Sand Dunes Tower	0.3	-	0.8	9.9	-	28.5
Van Buren Avenue	0.4	-	1.0	11.9	-	33.0
Boundary Locations						
Atomic City	0.5	-	1.2	13.2	-	31.2
Howe	0.4	-	1.5	10.5	-	30.7
Monteview	0.6	-	1.3	13.2	-	35.0
Mud Lake	0.9	-	2.3	17.4	-	35.5
Distant Locations						
Craters of the Moon	0.3	-	0.8	9.6	-	25.4
Fort Hall[1]	0.4	-	1.1	10.2	-	23.3
Idaho Falls – HVP 3804	0.8	-	1.9	17.0	-	32.1
Idaho Falls – HVP 4304	0.7	-	2.0	14.5	-	35.9

[1]Operated by Shoshone-Bannock Tribes.
Note: Concentrations are expressed in 1 x 10^{-3} pCi/m^3.

Table 3. Gamma spectroscopy analysis data for TSP filters, composite samples, second quarter, 2013.

Station Location	Naturally Occurring Radionuclide Beryllium-7		Man-Made Gamma Emitting Radionuclides
	Concentration	± 2 SD	
On-site Locations			
Big Lost River Rest Area	83.5	4.4	<MDC[2]
Experimental Field Station	66.2	3.5	<MDC
Sand Dunes Tower	64.9	3.4	<MDC
Van Buren Avenue	71.8	3.7	<MDC
Boundary Locations			
Atomic City	71.6	3.8	<MDC
Howe	66.9	3.6	<MDC
Monteview	71.2	3.9	<MDC
Mud Lake	106.8	5.4	<MDC
Distant Locations			
Craters of the Moon	56.8	3.2	<MDC
Fort Hall[1]	52.5	3.0	<MDC
Idaho Falls – HVP 3804	86.2	4.7	<MDC
Idaho Falls – HVP 4304	82.2	4.3	<MDC

[1]Operated by Shoshone-Bannock Tribes.
[2]MDC for Cs-137 typically (5-10)x10^{-5} pCi/m^3.
Note: Concentrations are reported in 1 x 10^{-3} pCi/m^3 with associated uncertainty (± 2 SD), and minimum detectable concentration (MDC).

Table 4. Tritium concentrations in air from atmospheric moisture, second quarter, 2013

Station Location	Tritium		
	Concentration	± 2 SD	MDC
On-site Locations			
Big Lost River Rest Area	0.06	0.30	0.48
Experimental Field Station	0.52	0.29	0.46
Sand Dunes Tower	0.21	0.21	0.35
Van Buren Avenue	0.31	0.26	0.43
Boundary Locations			
Atomic City	0.12	0.29	0.50
Howe	0.13	0.21	0.37
Mud Lake	0.22	0.32	0.55
Monteview	0.21	0.31	0.51
Distant Locations			
Craters of the Moon	0.09	0.27	0.45
Fort Hall[1]	0.02	0.35	0.60
Idaho Falls	0.29	0.34	0.56

[1]Operated by Shoshone-Bannock Tribes.
Note: Concentrations are reported in pCi/m^3 with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).

Table 5. Tritium and Cesium-137 concentrations from precipitation, second quarter, 2013.

Station Location	Tritium			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
On-site Locations						
Big Lost River Rest Area	60	80	140	0.0	1.4	2.6
Boundary Locations						
Atomic City	20	80	130	0.0	2.2	3.7
Howe	0	80	130	0.7	1.5	2.6
Monteview	100	90	140	2.1	2.7	4.5
Mud Lake	90	80	130	0.5	2.4	4.0
Distant Locations						
Idaho Falls	0	80	130	0.0	1.4	2.4

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

Environmental Radiation Monitoring Results

The ESP operated 14 environmental radiation stations during the second quarter of 2013 (**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 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/gamma-radiation-measurements.aspx

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.**

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 2013. **Table 8** lists the EIC monitoring results for second quarter 2013. 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
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 Met Tower	■	■
Monteview	■	■
Mud Lake/Terreton	■	■
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 OP.

Table 7. Average gamma exposure rates, second quarter, 2013, from HPIC network.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average	± 2 SD
On-site Locations		
Base of Howe	15.2	0.8
Big Lost River Rest Area	15.3	1.7
Main Gate	14.7	6.1
Rover[1]	20.0	18.1
Sand Dunes Tower[1]	18.7	17.2
Boundary Locations		
Atomic City[1]	18.5	17.0
Big Southern Butte	15.0	0.7
Howe Met Tower	11.5	6.2
Monteview	10.9	7.2
Mud Lake/Terreton	14.6	0.8
Distant Locations		
Fort Hall[2]	12.9	7.0
Idaho Falls	11.7	3.4

[1]Results for Rover, Sand Dunes Tower, and Atomic City reflect HPIC system over-response by a factor of approximately 2 from June 6 through June 30, rather than a change in actual exposure rates. Results at these locations between April 1 and June 5 were within the range of values measured at the other locations.
[2] Operated by Shoshone-Bannock Tribes.

Table 8. Electret ionization chamber (EIC) cumulative average exposure rates, second quarter, 2013.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average	± 2 SD
On-site Locations		
Base of Howe	10.0	1.3
Big Lost River Rest Area	13.1	1.3
Experimental Field Station	12.5	2.1
Main Gate	13.6	3.0
Rover	15.7	2.9
Sand Dunes Tower	13.0	2.6
Van Buren Avenue	16.4	1.9
Boundary Locations		
Atomic City	15.1	0.8
Big Southern Butte	11.9	0.4
Howe Met Tower	11.8	1.7
Monteview	11.4	3.3
Mud Lake / Terreton	10.9	2.4
Distant Locations		
Craters of the Moon	12.9	3.8
Fort Hall[1]	12.8	2.2
Idaho Falls	10.4	1.7

[1] 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 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 2013, 5 up-gradient, 18 facility, 11 boundary, 13 distant, and 1 surface water location were sampled. Of the 11 boundary locations, 5 are Westbay™ packer sampling systems, which allow water samples to be collected from discrete levels or zones within the well. These wells include USGS-103, Middle-2051, USGS-105, USGS-108 and USGS-132. Only one zone was sampled at USGS-103 and Middle-2051, while multiple zones were sampled from the other three wells. USGS-103 was sampled at a depth of 1269.4 feet below land surface (bls). Middle-2051 was sampled at a depth of 1091.1 feet bls. USGS-105 was sampled at three different

depths, including 726 feet bls, 849 feet bls, and 1069.6 feet bls. USGS-108 was also sampled at three different depths, including 662 feet bls, 890 feet bls, and 1174 feet bls. Lastly, USGS-132 was sampled at two depths, including 646.7 feet bls and 763 feet bls.

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, and americium; 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 2 up-gradient, 4 facility, 4 boundary, and 3 distant locations. All concentrations observed at facility locations, except NRF-06, were in areas of known contamination and consistent with historical trends. The initial gross alpha level reported for NRF-06 was high for this site (20.2 ± 4.8 pCi/L) and a re-analysis of the sample was requested. The reanalyzed result is reported in **Table 9** and more closely reflects historic levels at this site. The lab reported that there was nothing to suggest that the initial result was not valid, and an investigation is ongoing. 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 5 areas sampled except for surface water (up-gradient, facility, boundary, and distant). Concentrations observed at facility locations were consistent with historical trends except for that found at NRF-06. The initial gross beta concentration reported for NRF-06 was high for this site (50.7 ± 3.9 pCi/L) and a re-analysis of the sample was requested. The reanalyzed result is reported in **Table 9** and more closely reflects historic levels at this site. The lab reported that there was nothing to suggest that the initial result was not valid, and an investigation is ongoing. Concentrations for up-gradient, boundary, and distant 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 ^{90}Sr; 900 pCi/L if ^{99}Tc; 20,000 pCi/L if ^{3}H; or 200 pCi/L if ^{137}Cs. Man-made, gamma emitting ^{137}Cs was not detected at any of the sampled locations. Results for gross alpha, gross beta, and man-made, gamma emitting radioactivity are shown in **Table 9**.

Three sites were sampled for isotopes of uranium. Two of the three sample sites had detectable results for ^{234}U, ^{235}U, and ^{238}U (**Table 10**). Analysis results for samples collected from TAN-28, and TAN-29 suggest ^{238}U at greater than natural background levels. Uranium related to historic waste disposal activities at Test Area North has previously been identified.

Three of nine samples analyzed for ^{90}Sr had detectable results this quarter (**Table 11**). All samples were within the expected ranges of concentrations from areas of known contamination. All five locations sampled for ^{99}Tc had detectable results this quarter (**Table 12**). All results were within the expected ranges of concentrations from areas of known contamination.

Using the standard analytical method, ^{3}H was detected in ten of eighteen facility samples (**Table 13**). Detections are consistent with historic concentrations for these sites. There were six detections found at

Westbay boundary locations, including, USGS-103 at level 1269.4 feet bls, USGS-105 at levels 726 feet bls and 1069.6 feet bls, USGS-108 from level 890 feet bls, and USGS-132 from levels 646.7 feet bls and 763 feet bls. These detections are consistent with historic INL waste disposal influences. 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. Twelve samples were analyzed using the enrichment method for the current quarter; however sample analyses from twenty sites collected during previous quarters were also completed and presented during this quarter (**Table 14**). A backlog of 34 samples remains.

Samples were also analyzed for metals and the results shown in **Table 15**. All results were within their expected ranges. Common ion results are shown in **Table 16** and nutrient results are shown in **Table 17**. All results were consistent with historical values at those locations.

Ten locations were sampled for Volatile Organic Compounds (VOCs) this quarter; seven of these locations had detectable concentrations for at least one analyte. All locations with detectable results are in areas of known contamination at TAN. VOC concentrations are shown in **Table 18** and a complete list of analytes is shown in **Appendix C**. The background concentrations for VOCs should be zero. The results discussed in this section only refer to detectable VOC concentrations.

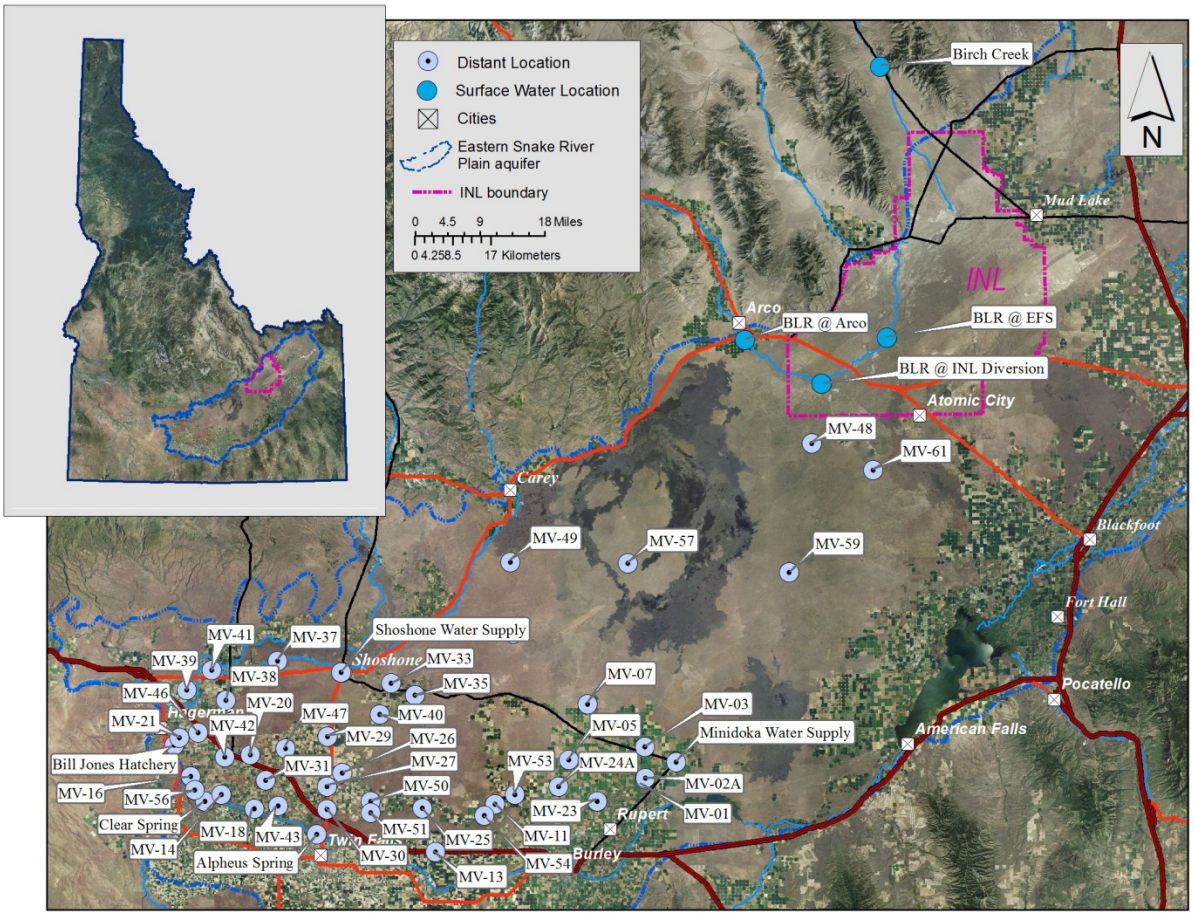

Figure 2. Distant and Surface Water monitoring locations.

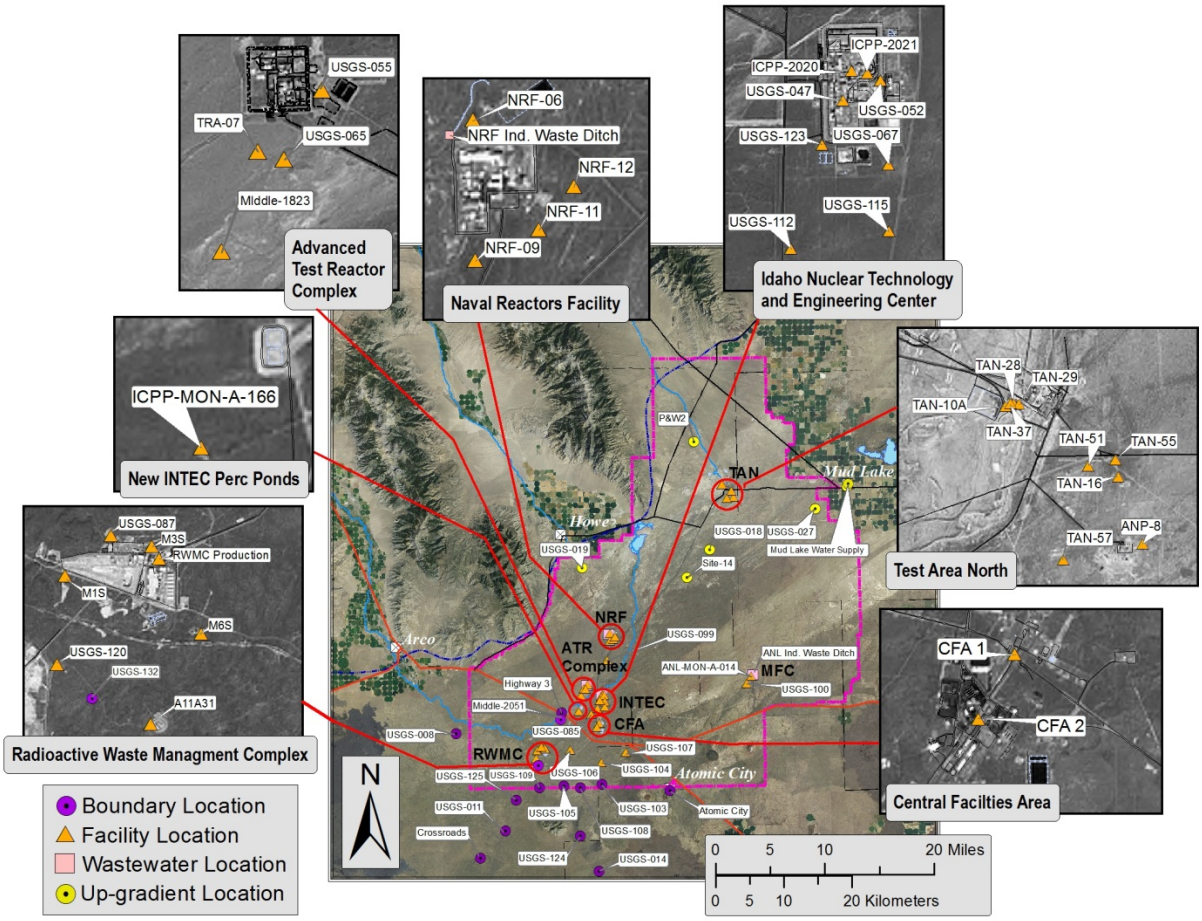

Figure 3. Upgradient, boundary, wastewater, and facility locations, second quarter 2013.

Table 9. Alpha, beta, and gamma concentrations for water samples, second quarter, 2013.

Sample Location	Sample Date	Gross Alpha			Gross Beta			Man-made gamma-emitting radionuclide Cesium-137		
		Concentration[1,2]		±2 SD	Concentration[1,2]		±2 SD	Concentration[1,2]		±2 SD
Up-gradient										
Mud Lake Water Supply	5/22/2013	-0.2	U	0.6	4.9		0.8	-0.4	U	1.9
P&W-2	4/16/2013	7.1		1.7	3.4		0.9	0.9	U	1.6
USGS-018	4/15/2013	2.0	U	1.4	4.7		0.9	-0.5	U	1.3
USGS-019	4/16/2013	-0.4	U	1.2	5.2		1.0	-1.2	U	1.8
USGS-027	4/16/2013	3.1		1.6	6.7		1.1	-0.4	U	1.5
Facility										
ANP-8	5/21/2013	0.8	U	0.9	3.6		0.9	-0.7	U	1.6
CFA 1	4/22/2013	1.4	UJ	1.3	7.9		1.2	-0.3	U	1.6
ICPP-MON-A-166	4/2/2013	1.3	U	0.9	6.1		0.9	-0.6	U	1.3
NRF-06	5/14/2013	-0.2	U	4.3	6.8		3.1	-0.8	U	1.3
NRF-09	5/14/2013	-0.2	UJ	1.2	4.4		1.1	-1.3	U	1.4
NRF-11	5/14/2013	-0.1	UJ	1.2	3.3		1.1	0.1	U	1.7
NRF-12	5/15/2013	0.2	UJ	1.2	2.7		1.1	1.4	U	2.4
TAN-16	5/21/2013	0.4	U	0.9	4.1		0.9	0.2	U	1.7
TAN-28	4/9/2013	13.9		3.4	468.8		7.8	-1.3	U	1.4
TAN-29	4/9/2013	4.5	U	3.3	49.9		3.3	1.0	U	1.4
TAN-37	4/9/2013	18.9		4.4	762.7		10.6	1.9	U	1.8
TAN-51	5/21/2013	1.0	U	1.0	2.5		0.9	-1.3	U	1.5
TAN-55	5/21/2013	3.4		1.4	4.6		1.0	0.3	U	2.1
USGS-065	4/17/2013	1.5	U	1.5	4.2		1.1	1.9	U	2.1
USGS-087	4/17/2013	-0.5	U	0.9	3.6		0.9	0.1	U	1.5
USGS-100	4/15/2013	-0.4	U	0.9	5.9		1.0	0.6	U	1.7
USGS-106	6/18/2013	0.3	U	0.9	2.2		0.9	0.6	U	1.8
USGS-107	6/17/2013	0.6	U	0.9	4.8		0.9	0.4	U	1.5
Boundary										
Atomic City	4/10/2013	1.6	U	1.1	4.3		1.0	2.4	U	1.6
Crossroads	4/23/2013	1.6	UJ	1.1	3.8		1.0	1.4	U	2.0
Middle-2051 (1091.1ftbls)	6/20/2013	-0.7	U	0.9	-0.9	U	0.8	0.5	U	1.9
USGS-008	4/15/2013	-0.9	U	1.2	3.9		0.9	1.7	U	1.7
USGS-011	4/10/2013	0.9	U	1.0	3.3		0.9	-0.7	U	1.5
USGS-103 (1269.4ftbls)	6/3/2013	1.5	U	1.0	4.5		0.9	0.4	U	2.0
USGS-105 (849ftbls)	6/10/2013	0.6	U	0.9	2.8		0.9	-0.2	U	2.4
USGS-105 (726ftbls)	6/11/2013	0.3	U	0.9	5.1		0.9	1.8	U	2.3
USGS-105 (1069.6 ftbls)	6/27/2013	2.4		1.1	4.2		0.9	0.3	U	2.2
USGS-108 (890ftbls)	6/5/2013	0.7	U	1.0	2.2		0.8	-0.2	U	2.4
USGS-108 (662ftbls)	6/6/2013	0.2	U	0.9	2.4		0.9	1.0	U	1.8
USGS-108 (1174ftbls)	6/26/2013	3.5		1.3	2.5		0.9	-0.4	U	2.6
USGS-109	6/18/2013	0.8	U	0.9	3.0		0.9	-0.9	U	1.9
USGS-124	4/10/2013	4.5		1.4	3.8		1.0	0.3	U	1.8
USGS-132 (646.7ftbls)	6/12/2013	0.7	U	1.0	4.2		0.9	0.4	U	1.6
USGS-132 (763ftbls)	6/19/2013	1.6		1.0	2.1		0.9	-0.2	U	2.3
Distant										
Alpheus Spring	5/20/2013	2.8		1.4	7.3		1.1	-0.2	U	2.4
Bill Jones Hatchery	5/20/2013	0.7	U	0.9	4.9		0.9	3.5	U	2.4
Clear Spring	5/20/2013	0.8	U	1.0	5.3		1.0	-0.9	U	2.2
Minidoka Water Supply	5/20/2013	-0.4	U	0.9	7.3		1.0	1.2	U	2.0
MV-03	6/24/2013	0.9	U	0.9	3.2		0.9	-0.4	U	1.2
MV-05	6/24/2013	0.1	U	1.2	5.2		1.1	1.5	U	1.7
MV-07	6/24/2013	1.8		0.9	4.9		0.9	-0.7	U	1.9
MV-13	6/24/2013	2.4	U	1.6	9.2		1.1	-0.8	U	2.3
MV-31	6/25/2013	1.3	U	1.0	5.6		0.9	0.9	U	1.4
MV-53	6/24/2013	1.3	U	1.4	8.6	J	1.1	0.5	U	1.8
MV-56	6/25/2013	0.8	U	1.2	5.2	J	1.0	-0.1	U	1.3
MV-57	6/24/2013	0.7	U	0.9	2.7	J	0.8	0.4	U	1.5
Shoshone Water Supply	5/20/2013	2.0		1.1	4.0		0.9	0.3	U	1.4
Surface water										
BLR @ Arco	6/12/2013	0.4	U	0.8	1.2	U	0.8	0.4	U	1.5

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 10. Reported concentrations of uranium isotopes in water samples, second quarter, 2013.

Sample Location	Sample Date	Uranium-234			Uranium-235			Uranium-238		
		Concentration[1,2]		±2 SD	Concentration[1,2]		±2 SD	Concentration[1,2]		±2 SD
Facility										
TAN-28	4/9/2013	9.8		1.7	0.27		0.12	1.40		0.33
TAN-29	4/9/2013	4.98		0.92	0.156		0.092	1.23		0.30
TAN-37	4/9/2013	-0.001	U	0.043	-0.001	U	0.043	0.022	U	0.043

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 11. Reported concentrations of strontium-90 in water samples, second quarter, 2013.

Sample Location	Sample Date	Strontium-90		
		Concentration[1,2]		±2 SD
Facility				
CFA 1	4/22/2013	0.08	U	0.21
NRF-06	5/14/2013	0.02	U	0.25
NRF-09	5/14/2013	-0.18	U	0.25
NRF-11	5/14/2013	-0.10	U	0.24
NRF-12	5/15/2013	0	U	0.25
TAN-28	4/9/2013	194		46
TAN-29	4/9/2013	17.9		4.3
TAN-37	4/9/2013	289		68
USGS-087	4/17/2013	0.05	U	0.20

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 12. Reported concentrations of technetium-99 in water samples, second quarter, 2013.

Sample Location	Sample Date	Technetium-99		
		Concentration[1,2]		±2 SD
Facility				
CFA 1 (dissolved)	4/22/2013	9.3		0.3
USGS-087 (dissolved)	4/17/2013	0.9		0.1
USGS-106 (dissolved)	6/18/2013	1.1		0.1
USGS-107 (dissolved)	6/17/2013	0.8		0.2
Boundary				
USGS-109 (dissolved)	6/18/2013	0.9		0.1

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 13. Tritium concentrations for water samples, second quarter, 2013.

Sample Location	Sample Date	Tritium		
		Concentration[1,2]		±2 SD
Up-gradient				
Mud Lake Water Supply	5/22/2013	10	U	100
P&W-2	4/16/2013	-10	U	80
USGS-018	4/15/2013	-10	U	80
USGS-019	4/16/2013	140		80
USGS-027	4/16/2013	20	U	80
Facility				
ANP-8	5/21/2013	50	U	110
CFA 1	4/22/2013	3880		200
ICPP-MON-A-166	4/2/2013	80	U	80
NRF-06	5/14/2013	-70	U	80
NRF-09	5/14/2013	-350	U	70
NRF-11	5/14/2013	60	U	90
NRF-12	5/15/2013	-140	U	80
TAN-16	5/21/2013	280		110
TAN-28	4/9/2013	2210		150
TAN-29	4/9/2013	1690		140
TAN-37	4/9/2013	1190		130
TAN-51	5/21/2013	320		110
TAN-55	5/21/2013	640		120
USGS-065	4/17/2013	2820		170
USGS-087	4/17/2013	660		110
USGS-100	4/15/2013	10	U	80
USGS-106	6/18/2013	450		110
USGS-107	6/17/2013	0	U	80
Boundary				
Atomic City	4/10/2013	80	U	80
Crossroads	4/23/2013	-50	U	80
Middle-2051 (1091.1ftbls)	6/20/2013	130	U	110
USGS-008	4/15/2013	-40	U	80
USGS-011	4/10/2013	50	U	80
USGS-103 (1269.4ftbls)	6/3/2013	270		80
USGS-105 (849ftbls)	6/10/2013	140	U	110
USGS-105 (726ftbls)	6/11/2013	310		110
USGS-105 (1069.6 ftbls)	6/27/2013	230		110
USGS-108 (890ftbls)	6/5/2013	130		80
USGS-108 (662ftbls)	6/6/2013	60	U	80
USGS-108 (1174ftbls)	6/26/2013	80	U	90
USGS-109	6/18/2013	120	U	80
USGS-124	4/10/2013	90	U	80
USGS-132 (646.7ftbls)	6/12/2013	260		100
USGS-132 (763ftbls)	6/19/2013	160		90

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 13. Tritium concentrations for water samples, second quarter, 2013 continued.

Sample Location	Sample Date	Tritium		
		Concentration[1,2]		±2 SD
Distant				
Alpheus Spring	5/20/2013	40	U	110
Bill Jones Hatchery	5/20/2013	30	U	110
Clear Spring	5/20/2013	-20	U	100
Minidoka Water Supply	5/20/2013	30	U	110
MV-03	6/24/2013	-10	U	80
MV-05	6/24/2013	-40	U	90
MV-07	6/24/2013	-30	U	80
MV-13	6/24/2013	50	U	80
MV-31	6/25/2013	-80	U	90
MV-53	6/24/2013	80	U	100
MV-56	6/25/2013	-160	U	80
MV-57	6/24/2013	-90	U	80
Shoshone Water Supply	5/20/2013	40	U	110
Surface water				
BLR @ Arco	6/12/2013	70	U	80

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 14. Enriched Tritium concentrations for water samples, second quarter, 2013.

Sample Location	Sample Date	Enriched Tritium		
		Concentration[1,2]		±2 SD
Up-gradient				
Mud Lake Water Supply	11/14/2012	4	U	8
P&W-2	4/16/2013	11	U	7
Site-14	10/16/2012	2	UJ	7
USGS-018	4/15/2013	4	U	7
USGS-027	4/16/2013	4	U	7
Facility				
A11A31	11/7/2012	116	J	10
ICPP-MON-A-166	9/4/2012	102		9
ICPP-MON-A-166	4/2/2013	99		10
M1S	11/6/2012	-1	UJ	7
M6S	11/7/2012	6	U	7
USGS-100	4/15/2013	14		7
USGS-120	10/10/2012	185		10
Boundary				
Atomic City	4/10/2013	7	U	8
Highway 3	10/17/2012	63		8
USGS-008	4/15/2013	14		7
USGS-014	10/10/2012	5	U	6
USGS-124	4/10/2013	71		9
USGS-125	10/10/2012	53		8
Distant				
Alpheus Spring	8/6/2012	12		7
Alpheus Spring	11/8/2012	18	J	7
Alpheus Spring	5/20/2013	15		8
Bill Jones Hatchery	11/8/2012	2	UJ	8
Bill Jones Hatchery	5/20/2013	8	U	7
Clear Spring	8/6/2012	2	U	8
Clear Spring	11/8/2012	4	UJ	7
Clear Spring	5/20/2013	5	U	6
Minidoka Water Supply	11/8/2012	8	U	7
MV-33	8/6/2012	-1	U	7
Shoshone Water Supply	8/6/2012	12		7
Shoshone Water Supply	11/8/2012	22		8
Shoshone Water Supply	5/20/2013	19		7
Surface water				
Birch Creek	10/11/2012	5	U	6

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.

Table 15. Reported metals concentrations in water samples, second quarter, 2013.

Sample Location	Sample Date	Concentration[1,2]															
		Arsenic		Barium		Chromium		Iron		Lead		Manganese		Selenium		Zinc	
Up-gradient																	
P&W-2	4/16/2013	<5.0	U	45		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-018	4/15/2013	<5.0	U	55		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-019	4/16/2013	<5.0	U	79		<5.0	U	19		<5.0	U	2.3		<10	U	<5.0	U
USGS-027	4/16/2013	<5.0	U	81		<5.0	U	14		<5.0	U	4.7		<10	U	<5.0	U
Facility																	
CFA 1	4/22/2013	<5.0	U	91		11		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
ICPP-MON-A-166 (total)	4/2/2013	<5.0	U	50		<5.0	U	120		<5.0	U	29		<10	U	<5.0	U
NRF-06 (total)	5/14/2013	<5.0	U	130		39		10		<5.0	U	<2.0	U	<10	U	<5.0	U
NRF-09 (total)	5/14/2013	<5.0	U	140		12		50		<5.0	U	<2.0	U	<10	U	<5.0	U
NRF-11 (total)	5/14/2013	<5.0	U	140		16		64		<5.0	U	<2.0	U	<10	U	<5.0	U
NRF-12 (total)	5/15/2013	<5.0	U	130		12		300		<5.0	U	5.7		<10	U	<5.0	U
USGS-065 (total)	4/17/2013	<5.0	U	49		70		25		<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-087	4/17/2013	<5.0	U	24		5.4		<10	U	<5.0	U	4.4		<10	U	22	
USGS-100	4/15/2013	<5.0	U	35		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-106	6/18/2013	<5.0	U	50		7.6		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-107	6/17/2013	<5.0	U	60		5.2		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Boundary																	
Atomic City	4/10/2013	<5.0	U	34		<5.0	U	11		<5.0	U	<2.0	U	<10	U	44	
Crossroads	4/23/2013	<5.0	U	32		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	100	
Middle-2051 (1091.1ftbls)	6/20/2013	<5.0	U	41		6.9		<10	U	<5.0	U	8.2		<10	U	160	
USGS-008	4/15/2013	<5.0	U	77		<5.0	U	21		<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-011	4/10/2013	<5.0	U	51		<5.0	U	13		<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-103 (1269.4ftbls)	6/3/2013	<5.0	U	45		6.6		<10	U	<5.0	U	<2.0	U	<10	U	130	
USGS-105 (849ftbls)	6/10/2013	<5.0	U	38		7.8		<10	U	<5.0	U	<2.0	U	<10	U	35	
USGS-105 (726ftbls)	6/11/2013	<5.0	U	38		7.4		<10	U	<5.0	U	9.3		<10	U	12	
USGS-105 (1069.6 ftbls)	6/27/2013	<5.0	U	35		8.3		<10	U	<5.0	U	<2.0	U	<10	U	15	
USGS-108 (890ftbls)	6/5/2013	<5.0	U	43		6.8		18		<5.0	U	<2.0	U	<10	U	27	
USGS-108 (662ftbls)	6/6/2013	<5.0	U	37		<5.0	U	200		<5.0	U	10	J	<10	U	30	
USGS-108 (1174ftbls)	6/26/2013	<5.0	U	43		5.9		<10	U	<5.0	U	7.5		<10	U	15	
USGS-109	6/18/2013	<5.0	U	32		7.0		18		<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-124	4/10/2013	<5.0	U	29		5.6		26		<5.0	U	5.8		<10	U	<5.0	U
USGS-132 (646.7ftbls)	6/12/2013	<5.0	U	54		11		<10	U	<5.0	U	<2.0	U	<10	U	8.5	
USGS-132 (763ftbls)	6/19/2013	<5.0	U	43		8.8		<10	U	<5.0	U	<2.0	U	<10	U	6.5	
Distant																	
MV-03	6/24/2013	<5.0	U	22		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-05	6/24/2013	<5.0	U	62		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-07	6/24/2013	<5.0	U	22		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-13	6/24/2013	<5.0	U	90		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-31	6/25/2013	<5.0	U	54		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-53	6/24/2013	<5.0	U	100		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	110	
MV-56	6/25/2013	<5.0	U	25		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-57	6/24/2013	<5.0	U	5.4		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	5.8	
Surface water																	
BLR @ Arco	6/12/2013	<5.0	U	110		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected, "<" = a result below the Minimum Detectable Concentration (MDC), NR = analysis not requested.
[2]Concentrations are expressed in µg/L. Samples are filtered unless otherwise indicated.

Table 16. Reported common ion concentrations in water samples, second quarter, 2013.

Sample Location	Sample Date	Concentration[1,2]															
		Calcium		Magnesium		Sodium		Potassium		Fluoride		Chloride		Sulfate		Alkalinity[3]	
Up-gradient																	
P&W-2*	4/16/2013	41		16		6.9		1.3		0.200		5.32		24.9		148	
USGS-018*	4/15/2013	33		16		13		2.9		0.370		11.6		25.9		135	
USGS-019*	4/16/2013	46		18		9.8		1.4		<0.20	U	13.1		22.8		166	
USGS-027*	4/16/2013	51		18		28		5.9		0.583		48.8		39.8		156	
Facility																	
CFA 1*	4/22/2013	59		18		25		3.5		0.247		71.4		29.9		132	
ICPP-MON-A-166	4/2/2013	34		12		9.5		2.6		0.285		8.86		17.9		128	
NRF-06	5/14/2013	150		39		180		6.3		<0.20	U	485		83.9		172	
NRF-09	5/14/2013	71		22		20		2.6		<0.20	U	48.5		39.3		199	
NRF-11	5/14/2013	69		21		20		2.6		<0.20	U	46.4		37.7		199	
NRF-12	5/15/2013	68		21		18		2.5		0.201		38.7		36.2		198	
USGS-065	4/17/2013	88		19		15		3.3		<0.20	U	19.0		155		131	
USGS-087*	4/17/2013	34		14		16		3.3		0.218		25.8		25.5		120	
USGS-100*	4/15/2013	36		12		17		3.3		0.672		15.6		15.3		134	
USGS-106*	6/18/2013	45		17		8.1		2.4		0.209		15.3		23.6		155	
USGS-107*	6/17/2013	38		17		19		3.5		0.450		22.9		26.8		145	
Boundary																	
Atomic City*	4/10/2013	35		14		17		3.4		0.574		17.4		16.9		136	
Crossroads*	4/23/2013	40		15		7.9		2.3		0.276		9.64		20.9		141	
Middle-2051* (1091.1ftbls)	6/20/2013	38		18		7.8		2.5		<0.20	U	12.2		23.3		147	
USGS-008*	4/15/2013	44		15		6.9		1.8		0.213		7.45		21.6		155	
USGS-011*	4/10/2013	40		14		8.2		2.3		0.240		9.51		22.4		142	
USGS-103* (1269.4ftbls)	6/3/2013	40		16		8.9		2.5		<0.20	U	13.6		20.9		133	
USGS-105* (849ftbls)	6/10/2013	39		14		12		2.8		0.278		12.0		24.5		140	
USGS-105* (726ftbls)	6/11/2013	39		15		11		2.7		0.260		12.2		24.2		139	
USGS-105* (1069.6 ftbls)	6/27/2013	38		14		11		2.9		0.276		13.4		25.3		140	
USGS-108* (890ftbls)	6/5/2013	44		18		8.5		2.3		<0.20	U	17.1		24.4		149	
USGS-108* (662ftbls)	6/6/2013	36		15		12		2.6		0.322		16.3		23.5		130	
USGS-108* (1174ftbls)	6/26/2013	45		18		8.1		2.3		0.225		18.5		25.7		157	
USGS-109*	6/18/2013	38		15		12		2.8		0.213		13.7		26.0		138	
USGS-124*	4/10/2013	40		16		9.9		2.4		0.344		16.0		23.3		141	
USGS-132* (646.7ftbls)	6/12/2013	34		17		21		3.6		0.327		20.7		34.9		143	
USGS-132* (763ftbls)	6/19/2013	39		15		9.9		2.6		0.294		11.6		26.1		142	

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected. * = samples are filtered for calcium, magnesium, sodium and potassium. "<" = a result below the Minimum Detectable Concentration (MDC). NR = analysis not requested.
[2]Concentrations are expressed in mg/L.
[3]As $CaCO_3$

Table 16. Reported common ion concentrations in water samples, second quarter, 2013 continued.

Sample Location	Sample Date	Concentration[1,2]							
		Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Alkalinity[3]
Distant									
MV-03*	6/24/2013	36	14	19	3.2	0.760	22.2	30.8	127
MV-05*	6/24/2013	57	24	47	5.5	0.556	66.4	79.6	178
MV-07*	6/24/2013	33	14	16	3.3	0.656	14.5	32.7	125
MV-13*	6/24/2013	51	18	34	6.4	0.415	33.8	54.4	182
MV-31*	6/25/2013	54	21	32	4.8	0.531	49.9	61.2	166
MV-53*	6/24/2013	67	27	52	6.9	0.480	69.8	80.9	218
MV-56*	6/25/2013	36	16	20	3.6	0.604	24.0	37.8	132
MV-57*	6/24/2013	23	11	11	2.5	0.389	6.26	16.2	103
Surface water									
BLR @ Arco*	6/12/2013	46	12	6.9	1.2	<0.20	4.42	19.0	148

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected. * = samples are filtered for calcium, magnesium, sodium and potassium. "<" = a result below the Minimum Detectable Concentration (MDC). NR = analysis not requested.
[2]Concentrations are expressed in mg/L.
[3]As $CaCO_3$

Table 17. Reported nutrient concentrations in water samples, second quarter, 2013.

Sample Location	Sample Date	Concentration[1,2]					
		Nitrite + Nitrate		Phosphorus		Ammonia	
Up-gradient							
P&W-2	4/16/2013	0.42		0.018		NR	
USGS-018	4/15/2013	0.64		0.018		NR	
USGS-019	4/16/2013	0.99		0.011		NR	
USGS-027	4/16/2013	2.6		0.017		NR	
Facility							
CFA 1	4/22/2013	2.7		0.022		NR	
ICPP-MON-A-166 (total)	4/2/2013	0.23		0.028		<0.01	U
NRF-06 (total)	5/14/2013	2.0		0.078		<0.01	U
NRF-09 (total)	5/14/2013	2.6		0.033		<0.01	U
NRF-11 (total)	5/14/2013	2.1		0.034		<0.01	U
NRF-12 (total)	5/15/2013	1.9		0.034		<0.01	U
USGS-065 (total)	4/17/2013	1.6		0.026		<0.01	U
USGS-087	4/17/2013	0.61		0.012		NR	
USGS-100	4/15/2013	2.0		0.022		NR	
USGS-106	6/18/2013	1.1		0.020		NR	
USGS-107	6/17/2013	1.3		0.020		NR	
Boundary							
Atomic City	4/10/2013	1.5		0.018		NR	
Crossroads	4/23/2013	0.75		0.022		NR	
Middle-2051 (1091.1ftbls)	6/20/2013	0.90		0.019		NR	
USGS-008	4/15/2013	0.95		0.019		NR	
USGS-011	4/10/2013	0.70		0.021		NR	
USGS-103 (1269.4ftbls)	6/3/2013	0.79		0.030		NR	
USGS-105 (849ftbls)	6/10/2013	0.71		0.022		NR	
USGS-105 (726ftbls)	6/11/2013	0.72		0.019		NR	
USGS-105 (1069.6 ftbls)	6/27/2013	0.77		0.020		NR	
USGS-108 (890ftbls)	6/5/2013	0.98		0.020		NR	
USGS-108 (662ftbls)	6/6/2013	0.76		0.018		NR	
USGS-108 (1174ftbls)	6/26/2013	1.0		0.028		NR	
USGS-109	6/18/2013	0.69		0.018		NR	
USGS-124	4/10/2013	0.84		0.019		NR	
USGS-132 (646.7ftbls)	6/12/2013	0.98		0.022		NR	
USGS-132 (763ftbls)	6/19/2013	0.76		0.025		NR	
Distant							
MV-03	6/24/2013	1.0		0.019		NR	
MV-05	6/24/2013	3.1		0.026		NR	
MV-07	6/24/2013	0.52		0.019		NR	
MV-13	6/24/2013	1.9		0.032		NR	
MV-31	6/25/2013	2.0		0.023		NR	
MV-53	6/24/2013	5.2		0.024		NR	
MV-56	6/25/2013	1.2		0.029		NR	
MV-57	6/24/2013	0.41		0.024		NR	
Surface water							
BLR @ Arco	6/12/2013	0.65		0.0059		NR	

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected, NR = analysis not requested.
[2]Concentrations expressed in mg/L. Samples are filtered unless otherwise noted.

Table 18. Reported VOC concentrations in water samples, second quarter, 2013.

Sample Location	Sample Date	Concentrations[1,2]						
		1,1-Dicholoroethene	Carbon tetrachloride	Cis-1,2-Dichloroethene	Trans-1,2-Dichlorethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl Chloride
ANP-8	5/21/13	<0.5	<0.5	<0.5	<0.5	2.3	17	<0.5
TAN-16	5/21/13	<0.5	<0.5	0.82	0.55	4.2	31	<0.5
TAN-28	4/9/13	<0.5	<0.5	80	63	7.6	670	3.1
TAN-29	4/9/13	0.63	<0.5	30	160	3.8	160	6.4
TAN-37	4/9/13	<0.5	<0.5	<0.5	150	<0.5	<0.5	<0.5
TAN-51	5/21/13	<0.5	<0.5	2.5	1.7	12	70	<0.5
TAN-55	5/21/13	<0.5	<0.5	<0.5	<0.5	1.8	18	<0.5
USGS-106	6/18/13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
USGS-107	6/17/13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
USGS-109	6/18/13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

[1]Data qualifiers: J = estimate, R = rejected, "<" = less than detection limit.
[2]Concentrations expressed in µg/L.

Terrestrial Monitoring Results

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

Soil

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 insight into 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 2013.

Milk

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 19**. Naturally occurring potassium-40 was detected in all samples within the expected range. Iodine-131 was not detected in any sample.

Table 19. Gamma spectroscopy analysis data for milk samples, second quarter, 2013.

Sample Location/Dairy	Sample Date	Naturally occurring gamma-emitting radionuclide Potassium-40		Man-made gamma-emitting radionuclide Iodine-131[1]
		Concentration[3]	± 2 SD	
Monitoring Samples				
Fort Hall	04/01/2013	1613	111	<MDC
	05/05/2013	1527	116	<MDC
	06/02/2013	1485	114	<MDC
Gooding/Glanbia	04/02/2013	1544	109	<MDC
	05/09/2013	1432	111	<MDC
	06/04/2013	1454	115	<MDC
Riverside	04/01/2013	1889	136	<MDC
	05/05/2013	1873	123	<MDC
	06/02/2013	2126	135	<MDC
Verification Samples[2]				
Dietrich	04/02/2013	1383	111	<MDC
Howe	04/02/2013	1520	108	<MDC
Terreton	05/07/2013	1552	121	<MDC
Rupert	05/07/2013	1613	111	<MDC
Idaho Falls	06/05/2013	1536	121	<MDC
Dietrich	06/04/2013	1535	109	<MDC

[1] <MDC – Less than Minimum Detectable Concentration (approximately 4 pCi/L for Iodine-131).
[2] DEQ-INL OP samples collected by the off-site INL environmental surveillance contractor.
[3] 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, in many cases, identify and address errors or inaccuracies. The DEQ-INL OP quality assurance program is designed to (1) ensure sample integrity, (2) ensure precision and accuracy in the analytical results, and (3) ensure that the environmental data are representative and complete.

This section summarizes the results of the quality assurance (QA) assessment of the data collected for the second quarter of 2013 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 2013, the DEQ-INL OP submitted 133 QC samples for various radiological and non-radiological analyses (**Table 20**).

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 2013 are presented in **Table 21**.

Blank sample results for select gamma emitters in air from composited air filters are presented in **Table 22**. Data for blank analyses used to assess data quality for tritium in water vapor in air are presented in **Table 23**. Blank analyses results for radiological and non-radiological analytes in ground and surface water are presented in **Table 24**, **Table 25**, **Table 26**, and **Table 27**.

There were seven anomalies found during the assessment of field blank water samples as measured by the analytical laboratories used by DEQ-INL OP for the second quarter of 2013. The first two anomalies included detections for gross alpha and gross beta in separate blank samples (**Table 24**). All detections for gross alpha and gross beta that were analyzed on the same day as the blank samples were flagged with a "J" and qualified as an estimate. Other anomalies include detections for Manganese in two separate blank samples (**Table 25**). All detections for Manganese that were analyzed on the same day as the blank samples were flagged with a "J" and qualified as an estimate. The last three anomalies included detectable concentrations for Total Alkalinity in three of the four blank analyses of common ions (**Table 26**). The minimum detectable concentration for alkalinity is 1.0 mg/L; two samples reported a concentration of 1.0 mg/L and one sample was measured at 2.0 mg/L. With results for alkalinity ranging from 103 to 218 mg/L (**Table 16**), significantly above the blank values of 1.0 – 2.0 mg/L, no qualifiers or flags will be attached with the alkalinity results analyzed on the same day as these blank samples.

Duplicate Samples

A laboratory's analytical precision capability or its ability to reproduce consistent results is assessed by comparing duplicate sample results. Duplicate samples are samples collected from the same location at approximately the same time and are considered to be essentially identical in composition. The difference between the original sample result and the duplicate sample result is expressed as a relative percent difference (RPD). The RPD is calculated from the following equation:

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

Where:

R_1 = First sample result.

R_2 = Second sample result.

A relative percent difference is acceptable at ± 20 percent. For non-radiological analysis, the RPD is used to compare each set of duplicate samples in which both of the results exceed five times the detection level. If one or both of the duplicate sample results are less than five times the detection level, the absolute difference between the two results is acceptable if it is less than or equal to the method detection limit.

For radiological analysis, the RPD is calculated (using the above equation) to compare each set of duplicate samples in which both of the results reported are greater than the sample-specific minimum detectable concentration (MDC). DEQ-INL OP also uses the standard radiological counting error (expressed as one standard deviation) to compare results for radiological analyses. Comparison tests that have an absolute difference in the two sample results of no more than three times the pooled error (or "3 sigma") for these measurements are considered acceptable. This is accomplished using the following equation:

$/R_1 - R_2/ \leq 3(S_1^2 + S_2^2)^{1/2}$

Where:

R_1 = First sample result.

R_2 = Second sample result.

S_1 = Counting error (one standard deviation) associated with the laboratory measurement of the first sample.

S_2 = Counting error (one standard deviation) associated with the laboratory measurement of the second sample.

Radiological duplicate sample results satisfying either the RPD or pooled error test are considered acceptable.

Duplicate results for ground and surface water are presented in **Table 28** for radiological analyses, and **Table 29**, **Table 30**, and **Table 31** for non-radiological analyses.

One of the duplicate comparisons failed DEQ-INL criteria for the second quarter of 2013. The field duplicate water sample collected at NRF-12 for gross alpha analysis failed the 3-sigma test and the RPD

test. All samples analyzed in the same batch as NRF-12 and its duplicate will be flagged with a "J" and qualified as an estimate. A field duplicate collected at USGS-011 for iron and another one collected at USGS-107 for fluoride failed comparison criteria using the RPD criteria; however, both duplicate sample results were less than five times the detection level and were acceptable with an absolute difference of less than the method detection limit. Samples that were analyzed for iron or fluoride with either of these field duplicates will not be flagged with a "J" and qualified as an estimate.

The laboratory split sample associated with the enriched tritium analyses performed on 6/4/13 failed, and the recounts and re-pipetted analyses were not satisfactory. As a result, the laboratory flagged the associated field sample results in **Table 14** as estimates (J).

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 2013, 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 32**, **Table 33**, and **Table 34**.

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 (EICs) to verify EIC response. Irradiations of EICs are conducted in a repeatable geometry to a known exposure of near 30 mR and two additional higher and lower 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% relative difference when compared to the known irradiated quantity. The irradiation results for second quarter 2013 are presented in **Table 35**. Real-time pressure correction is used to calculate the net exposure measured by these EIC control sets. All spiked samples passed the DEQ-INL OP criteria.

There were no anomalies observed from the assessment of spiked samples as measured by the analytical laboratories used by DEQ-INL OP for the second quarter of 2013.

Analytical QA/QC Assessment

Other than those listed 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 2013, 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 2013.

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 2013 met the minimum criteria of the DEQ-INL OP ESP and is summarized in **Table 20**.

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 2013 is summarized in **Table 36**.

Conclusion

All data collected for the second quarter of 2013 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 20. Summary of the analytical performance and usability of the analyses performed for the DEQ-INL OP ESP, second quarter, 2013.

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	155	13	0	0	4	ISU-EML
		Gross beta	155	13	0	0	4	ISU-EML
		Gamma emitters	12	1	0	0	0	ISU-EML
		Radiochemical	0	0	0	0	0	ISU Sub
Water Vapor	Desiccant column	Tritium	37	1	0	0	0	ISU-EML
Gaseous	Charcoal filter	Iodine-131	13	0	0	0	0	ISU-EML
Precipitation	Poly bottle	Tritium	6	0	0	0	0	ISU-EML
		Gamma emitters	6	0	0	0	0	ISU-EML
Water								
Groundwater & Surface Water	Grab or composite	Gross alpha	53	4	7	0	0	ISU-EML
		Gross beta	53	4	7	0	0	ISU-EML
		Gamma emitters	53	4	7	0	0	ISU-EML
		Tritium	53	4	7	0	0	ISU-EML
		Enriched tritium	32	6	5	0	0	ISU-EML
		Technetium-99	5	0	1	0	0	ISU-EML
		Radiochemical	12	0	3	0	0	ISU Sub
		Metals	40	4	5	2	0	IBL
		Common Ions	40	4	5	2	0	IBL
		Nutrients	40	4	5	2	0	IBL
		Volatile Organics	10	1	2	1	0	IBL
Terrestrial								
Milk	Grab or composite	Gamma emitters	15	0	0	0	0	ISU-EML
Soil	*in situ*	Gamma emitters	0	0	0	0	0	DEQ-INL OP
	Grab – "puck"	Gamma emitters	0	0	0	0	0	ISU-EML
Radiation								
Ambient	EICs	Gamma Radiation	55	0	0	9	0	DEQ-INL OP
	HPICs	Gamma Radiation	12	NA	NA	NA	NA	DEQ-INL OP
Total Test Analyses			**857**	**63**	**54**	**16**	**8**	
Total of QC Analyses (blanks, duplicates, and spikes)			**133**					
Percentage of QC analyses of total Test analyses[3]			**15.5%**					
Percentage of usable data[4]			**99.1%**					

[1] Combined Laboratory and DEQ-INL OP 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 OP = Analyzed by INL Oversight Program, Idaho Department of Environmental Quality.
[3] 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.
[4] Data usability rate [total analyses – rejected data]/[total analyses] of 90 percent or higher is acceptable for the DEQ-INL OP ESP.

Table 21. Blank analysis results for gross alpha and beta in particulate air (TSP), second quarter, 2013.

Collection Period		Corrected volume (m^3)[1]	Gross alpha			Gross beta		
Start	Stop		Value	Uncertainty (± 2 SD)	MDC	Value	Uncertainty (± 2 SD)	MDC
03/28/2013	04/04/2013	2026	0.0	0.1	0.2	-0.1	0.4	0.7
04/04/2013	04/11/2013	2026	0.1	0.1	0.3	0.1	0.5	1.0
04/11/2013	04/18/2013	2026	0.0	0.1	0.2	-0.5	0.5	0.8
04/18/2013	04/25/2013	2026	0.0	0.1	0.2	-0.3	0.5	0.8
04/25/2013	05/02/2013	2026	0.0	0.1	0.2	-0.2	0.4	0.8
05/02/2013	05/09/2013	2026	-0.1	0.1	0.2	0.0	0.5	0.8
05/09/2013	05/16/2013	2026	-0.1	0.1	0.2	-0.2	0.4	0.8
05/16/2013	05/23/2013	2026	0.1	0.1	0.2	0.0	0.5	0.8
05/23/2013	05/30/2013	2026	0.1	0.1	0.1	-0.1	0.5	0.8
05/30/2013	06/06/2013	2026	0.0	0.1	0.2	0.1	0.4	0.7
06/06/2013	06/13/2013	2026	0.0	0.1	0.2	0.2	0.5	0.8
06/13/2013	06/20/2013	2026	0.0	0.1	0.2	0.1	0.4	0.7
06/20/2013	06/27/2013	2026	0.0	0.1	0.2	0.0	0.4	0.7

Note: Concentrations and associated uncertainties (± 2 SD) and minimum detectable concentration (MDC) are expressed in 1 x 10^{-3} pCi/m^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 22. Blank analysis results for gamma spectroscopy for TSP particulate air filters, second quarter, 2013.

Analysis Date	Beryllium-7			Ruthenium-106/Rhodium-106			Antimony-125		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
07/24/2013	-9	23	41	-3	18	32	-4	5	9

Analysis Date	Cesium-134			Cesium-137		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC
07/24/2013	0	2	4	-2	3	6

Note: Concentrations are expressed in 1 x 10^{-3} pCi/m^3 with associated uncertainty (± 2 SD) and minimum detectable concentration (MDC).
[1] These concentrations are from blank filters collected weekly, composited, and analyzed for the calendar quarter. A composite volume equal to the sum of the weekly 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 23. Blank analysis results for tritium in water vapor from air samples, second quarter, 2013.

Sample Number	Start Date	Collection Date	Analysis Date	Tritium		
				Concentration	± 2 SD	MDC
OP132ZTR01	06/10/2013	06/12/2013	07/23/2013	-0.01	0.08	0.14

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

Table 24. Radiological blank analysis in ground and surface water for samples for the second quarter, 2013.

Sample Number	Sample Date	Concentration[1]	± 2 SD	MDC	Within Blank Criteria?
Gross Alpha					
131W105	4/23/2013	1.1	0.4	0.6	No
131W023	4/2/2013	-0.4	0.4	0.8	Yes
131W128	6/3/2013	0.0	0.2	0.4	Yes
131W455	6/25/2013	-0.4	0.3	0.6	Yes
Gross Beta					
131W105	4/23/2013	-0.7	0.6	1.1	Yes
131W023	4/2/2013	0.2	0.6	1.0	Yes
131W128	6/3/2013	0.6	0.6	0.9	Yes
131W455	6/25/2013	1.8	0.6	1.0	No
Cesium-137					
131W105	4/23/2013	0.8	1.7	2.8	Yes
131W023	4/2/2013	1.3	3.1	5.1	Yes
131W128	6/3/2013	-2.0	2.1	3.9	Yes
131W455	6/25/2013	0.4	1.3	2.3	Yes
Tritium					
131W106	4/23/2013	-130	80	150	Yes
131W024	4/2/2013	10	80	130	Yes
131W129	6/3/2013	50	70	120	Yes
131W456	6/25/2013	-10	90	150	Yes
Enriched Tritium					
121W618	10/3/2012	23	7	11	Yes*
131W106	4/23/2013	29	7	11	Yes*
121W631	11/7/2012	22	8	13	Yes*
131W002	3/5/2013	16	8	13	Yes*
131W024	4/2/2013	26	8	12	Yes*
121W623	11/8/2012	21	7	11	Yes*

[1] Concentrations are expressed in pCi/L with associated uncertainty (± 2 SD) and minimum detectable concentrations (MDC).
* Note: Reflects typical concentrations found in DI water.

Table 25. Blank analysis results (µg/L) for metals in ground and surface water for the second quarter, 2013.

Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
131W108	4/23/2013	<5	<2	<5	<10	<5	20	<10	<5
131W026	4/2/2013	<5	<2	<5	<10	<5	<2	<10	<5
131W131	6/3/2013	<5	<2	<5	<10	<5	25	<10	<5
131W458	6/25/2013	<5	<2	<5	<10	<5	<2	<10	<5

Table 26. Blank analysis results (mg/L) for common ions and nutrients in ground and surface water for the second quarter, 2013.

Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
131W109,108,107	4/23/2013	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	1	<0.01	<0.005
131W027,026,025	4/2/2013	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	2	<0.01	<0.005
131W132,131,130	6/3/2013	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	1	<0.01	<0.005
131W459,458,457	6/25/2013	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	<1	<0.01	<0.005

Table 27. Blank analysis results (µg/L) for VOCs in ground and surface water for the second quarter, 2013.

Sample Number	Sample Date	1,1-Dichloroethene	Carbon tetrachloride	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl chloride
131W028	4/9/2013	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 28. Duplicate radiological analysis results in pCi/L for ground and surface water, second quarter, 2013.

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?[1]
Gross Alpha									
USGS-018	131W206	2.0	1.4	131W211	1.1	1.4	0.9	3.0	Yes
NRF-12	131W283	0.2	1.2	131W289	3.3	1.6	3.1	3.0	No
TAN-37	131W181	18.9	4.4	131W186	14.4	4.1	4.5	9.0	Yes
USGS-107	131W359	0.6	0.9	131W366	1.1	0.9	0.5	1.9	Yes
USGS-011	131W196	0.9	1.0	131W201	1.9	1.1	1.0	2.2	Yes
Bill Jones Hatchery	131W250	0.7	0.9	131W252	0.3	0.8	0.4	1.8	Yes
MV-07	131W400	1.8	0.9	131W430	3.4	1.2	1.6	2.3	Yes
Gross Beta									
USGS-018	131W206	4.7	0.9	131W211	5.3	1.0	0.6	2.0	Yes
NRF-12	131W283	2.7	1.1	131W289	2.8	1.1	0.1	2.3	Yes
TAN-37	131W181	762.7	10.6	131W186	708.5	10.3	54.2	22.2	Yes[2]
USGS-107	131W359	4.8	0.9	131W366	4.0	0.9	0.8	1.9	Yes
USGS-011	131W196	3.3	0.9	131W201	1.7	0.9	1.6	1.9	Yes
Bill Jones Hatchery	131W250	4.9	0.9	131W252	4.0	0.9	0.9	1.9	Yes
MV-07	131W400	4.9	0.9	131W430	3.5	0.9	1.4	1.9	Yes
Gamma Spectroscopy Cesium-137									
USGS-018	131W206	-0.5	1.3	131W211	0.9	1.7	1.4	3.2	Yes
NRF-12	131W283	1.4	2.4	131W289	-0.1	2.3	1.5	5.0	Yes
TAN-37	131W181	1.9	1.8	131W186	2.7	2.1	0.8	4.1	Yes
USGS-107	131W359	0.4	1.5	131W366	0.2	1.9	0.2	3.6	Yes
USGS-011	131W196	-0.7	1.5	131W201	-0.1	1.9	0.6	3.6	Yes
Bill Jones Hatchery	131W250	3.5	2.4	131W252	0.6	1.5	2.9	4.2	Yes
MV-07	131W400	-0.7	1.9	131W430	-0.1	1.3	0.6	3.5	Yes
Tritium									
USGS-018	131W207	-10	80	131W212	-20	80	10	170	Yes
NRF-12	131W285	-140	80	131W291	-120	80	20	170	Yes
TAN-37	131W183	1190	130	131W188	1190	130	0	276	Yes
USGS-107	131W361	0	80	131W368	10	80	10	170	Yes
USGS-011	131W197	50	80	131W202	50	70	0	159	Yes
Bill Jones Hatchery	131W251	30	110	131W253	-10	100	40	223	Yes
MV-07	131W401	-30	80	131W431	-60	80	30	170	Yes
Enriched Tritium									
Site-14	121W668	6	7	121W725	2	7	4	15	Yes
USGS-018	131W207	4	7	131W212	7	7	3	15	Yes
M1S	121W759	-1	7	121W770	0	8	1	16	Yes
USGS-125	121W720	53	8	121W738	62	8	9	17	Yes
Bill Jones Hatchery	131W251	8	7	131W253	8	7	0	15	Yes
Strontium-90									
NRF-12	131W284	0	0.25	131W290	0.08	0.26	0.08	0.54	Yes
TAN-37	131W182	289	68	131W187	287	67	2	143	Yes
Technetium-99									
USGS-107	131W360	0.8	0.2	131W367	0.9	0.1	0.1	0.34	Yes
Uranium-234									
TAN-37	131W184	-0.001	0.043	131W189	0.029	0.057	0.03	0.11	Yes
Uranium-235									
TAN-37	131W184	-0.001	0.043	131W189	-0.018	0.046	0.02	0.09	Yes
Uranium-238									
TAN-37	131W184	0.022	0.043	131W189	0.059	0.059	0.04	0.11	Yes

[1] $/R_1-R_2/ \leq 3(S_1^2+S_2^2)^{1/2}$

[2] Compared using RPD criteria.

Table 29. Duplicate results for metals (µg/L) in ground water and/or surface water for the second quarter, 2013.

Sample Location	Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
USGS-018	131W209	4/15/2013	<5	55	<5	<10	<5	<2	<10	<5
USGS-018	131W214	4/15/2013	<5	56	<5	<10	<5	<2	<10	<5
RPD			**0**	**-2**	**0**	**0**	**0**	**0**	**0**	**0**
NRF-12	131W287	5/15/2013	<5	130	12	300	<5	5.7	<10	<5
NRF-12	131W293	5/15/2013	<5	130	13	270	<5	5.3	<10	<5
RPD			**0**	**0**	**-8.0**	**11**	**0**	**7**	**0**	**0**
USGS-107	131W363	6/17/2013	<5	60	5.2	<10	<5	<2	<10	<5
USGS-107	131W370	6/17/2013	<5	59	5.0	<10	<5	<2	<10	<5
RPD			**0**	**2**	**3.9**	**0**	**0**	**0**	**0**	**0**
USGS-011	131W199	4/10/2013	<5	51	<5	13	<5	<2	<10	<5
USGS-011	131W204	4/10/2013	<5	51	<5	10	<5	<2	<10	<5
RPD			**0**	**0**	**0**	**26**[1]	**0**	**0**	**0**	**0**
MV-07	131W403	6/24/2013	<5	22	<5	<10	<5	<2	<10	<5
MV-07	131W433	6/24/2013	<5	22	<5	<10	<5	<2	<10	<5
RPD			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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

[1]Both results were less than five times the detection limit; their absolute difference is acceptable (≤ the method detection limit of 10µg/L).

Table 30. Duplicate results for common ions and nutrients (mg/L) in ground water and/or surface water for second quarter, 2013.

Sample Location	Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
USGS-018	131W209,208	4/15/2013	33	16	13	2.9	0.370	11.6	25.9	135	0.64	0.018
USGS-018	131W214,213	4/15/2013	33	16	13	3.0	0.364	11.6	25.8	136	0.64	0.019
RPD			**0**	**0**	**0**	**-3.4**	**1.6**	**0**	**0.4**	**-0.7**	**0**	**-5.4**
NRF-12	131W287,286	5/15/2013	68	21	18	2.5	0.201	38.7	36.2	198	1.9	0.034
NRF-12	131W293,292	5/15/2013	68	21	17	2.5	0.200	38.8	36.1	197	1.9	0.033
RPD			**0**	**0**	**5.7**	**0**	**0.5**	**-0.3**	**0.3**	**0.5**	**0**	**3**
USGS-107	131W363,362	6/17/2013	38	17	19	3.5	0.450	22.9	26.8	145	1.3	0.020
USGS-107	131W370,369	6/17/2013	38	17	18	3.5	0.341	23.1	26.8	145	1.3	0.020
RPD			**0**	**0**	**5.4**	**0**	**27.6**[1]	**-0.9**	**0**	**0**	**0**	**0**
USGS-011	131W199,198	4/10/2013	40	14	8.2	2.3	0.240	9.51	22.4	142	0.70	0.021
USGS-011	131W204,203	4/10/2013	41	14	8.3	2.3	0.225	9.49	22.4	143	0.71	0.020
RPD			**-2**	**0**	**-1.2**	**0**	**6.5**	**0.2**	**0**	**-0.7**	**-1.4**	**5**
MV-07	131W403,402	6/24/2013	33	14	16	3.3	0.656	14.5	32.7	125	0.52	0.019
MV-07	131W433,432	6/24/2013	33	14	16	3.3	0.674	14.5	32.6	122	0.52	0.019
RPD			**0**	**0**	**0**	**0**	**-2.7**	**0**	**0.3**	**2.4**	**0**	**0**

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

[1]Both results were less than five times the detection limit; their absolute difference is acceptable (≤ the method detection limit of 0.20 mg/L).

Table 31. Duplicate results for VOCs (in µg/L) in groundwater and/or surface water, second quarter, 2013.

Sample Location	Sample Date	Sample Number	Concentrations						
			1,1-Dichloroethene	Carbon tetrachloride	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl chloride
TAN-37	4/9/2013	131W185	<0.5	<0.5	<0.5	150	<0.5	0.50	<0.5
TAN-37	4/9/2013	131W190	<0.5	<0.5	<0.5	150	<0.5	0.51	<0.5
RPD			**0**	**0**	**0**	**0**	**0**	**-2.0**	**0**
USGS-107	6/17/2013	131W365	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
USGS-107	6/17/2013	131W372	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD			**0**	**0**	**0**	**0**	**0**	**0**	**0**

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

Table 32. De-ionized water spike results (in µg/L) and percent recovery for metals in groundwater and/or surface water, second quarter, 2013.

Spike Sample Number	Sample Date	Barium			Chromium			Lead			Manganese			Zinc		
		Spike	Result	%R[1]	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R
131W126	4/16/2013	121	120	**99.2**	17.4	17	**97.7**	6.21	6.3	**101.4**	6.26	6.4	**102.2**	95.2	98	**102.9**
131W114	5/16/2013	198	190	**96.0**	28.3	29	**102.5**	14.2	14	**98.6**	14.3	15	**104.9**	155	140	**90.3**

[1] A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

Table 33. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in groundwater and/or surface water, second quarter, 2013.

Spike Sample Number	Sample Date	Calcium			Magnesium			Sodium			Potassium			Fluoride		
		Spike	Result	%R[1]	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R
131W126,125	4/16/2013	21.9	22	**100.5**	8.69	8.5	**97.8**	19.5	20	**102.6**	1.37	1.4	**102.2**	3.09	2.87	**92.9**
131W114,113	5/16/2013	35.7	36	**100.8**	14.2	14	**98.6**	31.8	32	**100.6**	3.14	3.1	**98.7**	2.13	1.98	**93.0**

[1] A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

Table 33. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in groundwater and/or surface water, second quarter, 2013 continued.

Spike Sample Number	Sample Date	Chloride			Sulfate			Total Alkalinity as $CaCO_3$			Total Nitrogen			Total Phosphorus		
		Spike	Result	%R[1]	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R
131W127,125	4/16/2013	60.4	58.1	**96.2**	5.57	5.15	**92.5**	109	108	**99.1**	2.51	2.5	**99.6**	0.0147	0.012	**81.6**
131W115,113	5/16/2013	104	102	**98.1**	34.8	32.2	**92.5**	41.2	41	**99.5**	1.5	1.5	**100.0**	0.0241	0.022	**91.3**

[1] A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

Table 34. De-ionized water spike results (in µg/L) and percent recovery for VOCs in groundwater and/or surface water, second quarter, 2013.

Spike Sample Number	Sample Date	Carbon Tetrachloride			Styrene			Tetrachloroethylene			Trichloroethylene			Vinyl Chloride		
		Spike	Result	%R[1]	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R
131W116	5/16/2013	3.53	3	**85.0**	5.28	4.1	**77.7**	4.48	3.4	**75.9**	5.04	4.3	**85.3**	5.4	5	**92.6**

[1] A percent recovery of 100 ± 25 is considered acceptable and is recorded as %R.

Table 35. Electret ionization chamber irradiation results (categorized as spiked samples) for second quarter, 2013.

Electret #	Exposure Received		Net Measured Exposure[1]		%R
	(mR)	Uncertainty (±1 SD, mR)	(mR)	Uncertainty (±1 SD, mR)	
Spike 1	42.0	2.1	42.0	1.3	100.0%
Spike 1	42.0	2.1	40.6	1.3	97.0%
Spike 1	42.0	2.1	43.6	1.3	103.9%
Spike 2	30.0	1.5	27.9	1.4	93.0%
Spike 2	30.0	1.5	31.2	1.3	104.1%
Spike 2	30.0	1.5	30.8	1.3	102.5%
Spike 3	22.0	1.1	20.2	1.4	91.8%
Spike 3	22.0	1.1	18.9	1.4	86.1%
Spike 3	22.0	1.1	20.1	1.4	91.5%

Note: A percent recovery (%R) of 100 ± 25 is considered acceptable.
[1] Net measured exposure estimate includes a correction for atmospheric pressure.

Table 36. Air sampling field equipment service reliability (percent operational), second quarter, 2013.

Station Locations	Sample Type			
	TSP	Radioiodine	Atmospheric Moisture	Precipitation
Onsite Locations				
Big Lost River Rest Area	100%	100%	100%	100%
Experimental Field Station	100%	100%	100%	NC[1]
Sand Dunes Tower	100%	100%	100%	NC[1]
Van Buren Avenue	100%	100%	100%	NC[1]
Boundary Locations				
Atomic City	100%	100%	100%	100%
Howe	100%	100%	100%	100%
Monteview	100%	100%	100%	100%
Mud Lake	100%	100%	100%	100%
Distant Locations				
Craters of the Moon	100%	100%	100%	NC[1]
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.
[1] NC = Sample not collected at this location.

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, second quarter, 2013.

Sample location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
On-site Locations						
Rest Area	03/28/13	04/04/13	1.0	0.2	29.6	1.2
	04/04/13	04/11/13	1.0	0.2	17.5	1.0
	04/11/13	04/18/13	0.8	0.2	17.1	1.0
	04/18/13	04/25/13	0.7	0.2	23.1	1.1
	04/25/13	05/02/13	1.2	0.2	29.5	1.2
	05/02/13	05/09/13	1.4	0.3	31.5	1.2
	05/09/13	05/16/13	1.6	0.3	39.3	1.3
	05/16/13	05/23/13	0.7	0.2	17.3	1.0
	05/23/13	05/30/13	0.7	0.2	20.5	1.0
	05/30/13	06/06/13	0.6	0.2	21.6	1.0
	06/06/13	06/13/13	1.0	0.2	25.9	1.1
	06/13/13	06/20/13	0.7	0.2	26.5	1.1
	06/20/13	06/27/13	0.5	0.2	15.0	0.9
Experimental Field Station	03/28/13	04/04/13	0.9	0.2	22.0	1.1
	04/04/13	04/11/13	0.7	0.2	11.9	0.9
	04/11/13	04/18/13	0.5	0.2	12.5	0.9
	04/18/13	04/25/13	0.8	0.2	17.5	1.0
	04/25/13	05/02/13	1.0	0.2	23.0	1.1
	05/02/13	05/09/13	0.8	0.2	25.1	1.1
	05/09/13	05/16/13	1.0	0.2	32.5	1.3
	05/16/13	05/23/13	0.6	0.2	13.2	0.9
	05/23/13	05/30/13	0.7	0.2	16.8	1.0
	05/30/13	06/06/13	0.6	0.2	17.5	1.0
	06/06/13	06/13/13	0.6	0.2	21.6	1.1
	06/13/13	06/20/13	0.6	0.2	26.2	1.2
	06/20/13	06/27/13	0.6	0.2	13.2	0.9

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, second quarter, 2013.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Sand Dunes	03/28/13	04/04/13	0.6	0.2	20.8	1.0
	04/04/13	04/11/13	0.7	0.2	11.7	0.8
	04/11/13	04/18/13	0.7	0.2	12.4	0.8
	04/18/13	04/25/13	0.5	0.2	15.6	0.9
	04/25/13	05/02/13	0.8	0.2	20.1	1.0
	05/02/13	05/09/13	0.7	0.2	23.0	1.0
	05/09/13	05/16/13	0.8	0.2	28.5	1.1
	05/16/13	05/23/13	0.3	0.1	12.0	0.8
	05/23/13	05/30/13	0.4	0.1	15.5	0.9
	05/30/13	06/06/13	0.6	0.2	14.5	0.8
	06/06/13	06/13/13	0.5	0.2	18.5	0.9
	06/13/13	06/20/13	0.5	0.2	17.7	0.9
	06/20/13	06/27/13	0.4	0.2	9.9	0.7
Van Buren	03/28/13	04/04/13	0.7	0.2	21.2	1.0
	04/04/13	04/11/13	0.9	0.2	12.0	0.8
	04/11/13	04/18/13	0.7	0.2	12.3	0.9
	04/18/13	04/25/13	0.8	0.2	17.3	1.0
	04/25/13	05/02/13	0.9	0.2	24.0	1.1
	05/02/13	05/09/13	0.7	0.2	24.1	1.1
	05/09/13	05/16/13	1.0	0.2	33.0	1.2
	05/16/13	05/23/13	0.4	0.1	14.2	0.9
	05/23/13	05/30/13	0.7	0.2	16.6	0.9
	05/30/13	06/06/13	0.4	0.2	16.1	0.9
	06/06/13	06/13/13	0.8	0.2	21.9	1.0
	06/13/13	06/20/13	0.7	0.2	20.9	1.0
	06/20/13	06/27/13	0.5	0.2	11.9	0.8
Boundary Locations						
Atomic City	03/28/13	04/04/13	0.6	0.2	20.8	1.0
	04/04/13	04/11/13	0.8	0.2	13.3	0.9
	04/11/13	04/18/13	0.6	0.2	13.2	0.9
	04/18/13	04/25/13	0.7	0.2	18.3	1.0
	04/25/13	05/02/13	1.2	0.2	21.9	1.0
	05/02/13	05/09/13	0.9	0.2	26.9	1.1
	05/09/13	05/16/13	0.9	0.2	31.2	1.2
	05/16/13	05/23/13	0.5	0.2	14.0	0.9
	05/23/13	05/30/13	0.7	0.2	18.7	1.0
	05/30/13	06/06/13	0.6	0.2	18.1	0.9
	06/06/13	06/13/13	0.7	0.2	21.9	1.0
	06/13/13	06/20/13	0.7	0.2	23.4	1.0
	06/20/13	06/27/13	0.5	0.2	13.6	0.8

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, second quarter, 2013.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Howe	03/28/13	04/04/13	0.6	0.2	20.4	1.2
	04/04/13	04/11/13	1.1	0.3	13.0	0.9
	04/11/13	04/18/13	1.1	0.2	14.3	0.9
	04/18/13	04/25/13	1.1	0.2	17.4	1.0
	04/25/13	05/02/13	1.5	0.3	20.4	1.0
	05/02/13	05/09/13	1.0	0.2	23.0	1.1
	05/09/13	05/16/13	1.1	0.3	30.7	1.2
	05/16/13	05/23/13	0.6	0.2	12.7	0.9
	05/23/13	05/30/13	0.7	0.2	15.4	0.9
	05/30/13	06/06/13	0.4	0.2	15.1	0.9
	06/06/13	06/13/13	0.7	0.2	20.0	1.0
	06/13/13	06/20/13	0.8	0.2	20.1	1.0
	06/20/13	06/27/13	0.6	0.2	10.5	0.8
Monteview	03/28/13	04/04/13	1.2	0.2	27.4	1.2
	04/04/13	04/11/13	0.8	0.2	15.3	0.9
	04/11/13	04/18/13	0.8	0.2	14.0	0.9
	04/18/13	04/25/13	0.7	0.2	20.2	1.0
	04/25/13	05/02/13	1.3	0.3	26.0	1.1
	05/02/13	05/09/13	0.9	0.2	26.0	1.1
	05/09/13	05/16/13	1.1	0.3	35.0	1.3
	05/16/13	05/23/13	0.6	0.2	13.2	0.9
	05/23/13	05/30/13	0.8	0.2	19.4	1.0
	05/30/13	06/06/13	0.6	0.2	18.3	1.0
	06/06/13	06/13/13	1.1	0.2	23.2	1.1
	06/13/13	06/20/13	1.0	0.2	25.6	1.1
	06/20/13	06/27/13	0.6	0.2	14.0	0.9
Mud Lake	03/28/13	04/04/13	1.6	0.3	33.4	1.2
	04/04/13	04/11/13	2.1	0.3	21.2	1.1
	04/11/13	04/18/13	1.6	0.3	19.8	1.0
	04/18/13	04/25/13	1.3	0.3	25.7	1.1
	04/25/13	05/02/13	2.3	0.3	30.5	1.2
	05/02/13	05/09/13	1.7	0.3	35.1	1.2
	05/09/13	05/16/13	1.4	0.3	35.5	1.3
	05/16/13	05/23/13	1.0	0.2	20.8	1.0
	05/23/13	05/30/13	1.1	0.2	28.4	1.2
	05/30/13	06/06/13	0.9	0.2	21.8	1.0
	06/06/13	06/13/13	1.2	0.2	33.9	1.2
	06/13/13	06/20/13	1.1	0.2	31.8	1.2
	06/20/13	06/27/13	0.9	0.2	17.4	0.9

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, second quarter, 2013.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Distant Locations						
Craters	03/28/13	04/04/13	0.4	0.2	17.3	1.0
	04/04/13	04/11/13	0.4	0.2	9.7	0.8
	04/11/13	04/18/13	0.3	0.1	9.9	0.8
	04/18/13	04/25/13	0.6	0.2	15.3	1.0
	04/25/13	05/02/13	0.8	0.2	19.5	1.0
	05/02/13	05/09/13	0.6	0.2	23.6	1.1
	05/09/13	05/16/13	0.7	0.2	25.4	1.2
	05/16/13	05/23/13	0.5	0.2	12.4	0.9
	05/23/13	05/30/13	0.5	0.2	13.4	0.9
	05/30/13	06/06/13	0.4	0.2	14.2	0.9
	06/06/13	06/13/13	0.7	0.2	17.5	1.0
	06/13/13	06/20/13	0.6	0.2	18.1	1.0
	06/20/13	06/27/13	0.3	0.2	9.6	0.8
Fort Hall[1]	03/28/13	04/04/13	0.9	0.2	16.5	0.9
	04/04/13	04/11/13	0.9	0.2	11.0	0.8
	04/11/13	04/18/13	NS[3]	NS[3]	NS[3]	NS[3]
	04/18/13	04/25/13	0.6	0.2	13.2	0.9
	04/25/13	05/02/13	1.0	0.2	15.7	0.9
	05/02/13	05/09/13	0.7	0.2	19.4	1.0
	05/09/13	05/16/13	1.0	0.2	23.3	1.1
	05/16/13	05/23/13	0.5	0.2	11.3	0.8
	05/23/13	05/30/13	0.4	0.1	13.1	0.9
	05/30/13	06/06/13	0.5	0.2	13.3	0.8
	06/06/13	06/13/13	1.1	0.2	15.8	0.9
	06/13/13	06/20/13	0.9	0.2	17.3	0.9
	06/20/13	06/27/13	0.6	0.2	10.2	0.8
Idaho Falls						
HVP 3804	03/28/13	04/04/13	1.1	0.2	26.6	1.1
	04/04/13	04/11/13	1.4	0.3	18.1	1.0
	04/11/13	04/18/13	1.3	0.3	18.4	1.0
	04/18/13	04/25/13	1.1	0.2	21.9	1.1
	04/25/13	05/02/13	1.9	0.3	29.4	1.2
	05/02/13	05/09/13	1.2	0.2	32.1	1.2
	05/09/13	05/16/13	R[2]	R[2]	R[2]	R[2]
	05/16/13	05/23/13	R[2]	R[2]	R[2]	R[2]
	05/23/13	05/30/13	0.9	0.2	24.2	1.1
	05/30/13	06/06/13	0.8	0.2	24.6	1.2
	06/06/13	06/13/13	1.2	0.2	27.1	1.0
	06/13/13	06/20/13	1.3	0.3	30.8	1.2
	06/20/13	06/27/13	0.9	0.2	17.0	1.0

[1] Operated by Shoshone Bannock-Tribes
[2] R – Results rejected due to insufficient sample volume caused by a power outage at the station.
[3] NS – No sample, sampler did not operate during this period.

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, second quarter, 2013.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	± 2 SD	Concentration	± 2 SD
Idaho Falls - HVP 4304[2]	03/28/13	04/04/13	1.1	0.2	29.3	1.2
	04/04/13	04/11/13	1.3	0.3	17.8	1.0
	04/11/13	04/18/13	1.1	0.2	14.5	0.9
	04/18/13	04/25/13	0.9	0.2	21.6	1.0
	04/25/13	05/02/13	2.0	0.3	28.5	1.2
	05/02/13	05/09/13	1.3	0.3	35.9	1.3
	05/09/13	05/16/13	R[1]	R[1]	R[1]	R[1]
	05/16/13	05/23/13	R[1]	R[1]	R[1]	R[1]
	05/23/13	05/30/13	0.9	0.2	21.1	1.0
	05/30/13	06/06/13	0.7	0.2	20.5	1.1
	06/06/13	06/13/13	1.2	0.2	23.5	1.1
	06/13/13	06/20/13	1.0	0.2	24.4	1.1
	06/20/13	06/27/13	0.9	0.2	17.7	0.9

[1]R – Results rejected due to insufficient sample volume caused by a power outage at the station.
[2]HVP 4304 – This is a new sampler model being operated side by side with sampler HVP 3804 to test the dependability and durability in field conditions.

Appendix B

Table B-1. Results for all electret locations, second quarter, 2013.

Sample Location	Net Corrected Exposure Rate (µR/hr)		± 2 SD (µR/hr)
Arco	16.0		2.1
Craters	12.9		3.8
Rest Area	13.1		1.3
Van Buren	16.4		1.9
EFS	12.5		2.1
Main Gate	13.6		3.0
Atomic City	15.1		0.8
Taber	13.5		0.7
Blackfoot	14.0	(J)[2]	4.1
Ft. Hall[1]	12.8		2.2
Idaho Falls	10.4		1.7
Mud Lake/Terreton	10.9		2.4
Monteview	11.4		3.3
Sand Dunes	13.0		2.6
Howe Met. Tower	11.8		1.7
MP276 -20	11.0		1.6
MP274 -20	13.8		2.2
MP272 -20	11.6		1.8
MP270 -20	13.0		2.6
MP268 -20	12.6		2.9
MP266 -20	13.6		3.7
MP264 -20	12.4		1.0
MP270 -20/26	13.4		3.4
MP268 -20/26	13.4		2.1
MP266 -20/26	14.4		3.4
MP263 -20/26	13.2		2.8
MP261 -20/26	15.6		2.2
MP259 -20/26	14.2		2.1
MFC (EBR II)	12.8		3.5
EBR I	12.9		3.1
RWMC	12.4		2.9
CFA	12.8		3.8
CITRC (PBF)	13.8		0.8

[1]Station operated by Shoshone-Bannock Tribes.
[2]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.

Table B-1 continued. Results for all electret locations, second quarter, 2013.

Sample Location	Net Corrected Exposure Rate (µR/hr)		± 2 SD (µR/hr)
INTEC	17.0	(J)[2]	4.1
ATR (TRA)	10.2		0.4
NRF	14.0		3.9
TAN	9.4		0.9
Mud Lake Bank of Commerce	14.0		2.1
MP43-33	14.0		3.5
MP41-33	16.4		2.2
MP39-33	11.7		1.9
MP37-33	12.2		0.6
MP35-33	14.3		0.8
MP33-33	13.7		0.8
MP31-33	12.8		0.9
MP29-33	13.2		2.8
MP27-33	13.9		1.6
MP25-33	13.3		3.8
MP23-33	9.1		2.2
Base of Howe	10.0		1.3
Rover	15.7		2.9
Hamer	15.1		2.4
Sugar City	16.8		1.9
Roberts	16.0		2.8
Big Southern Butte	11.9		0.4

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