Department of Environmental Quality
INL Oversight Program

ENVIRONMENTAL SURVEILLANCE PROGRAM QUARTERLY DATA REPORT

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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
CFR	-	Code of Federal Regulations
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
ft bls	-	feet below land surface
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
IDL	-	instrument detection limit
INL	-	Idaho National Laboratory
INTEC	-	Idaho Nuclear Technology and Engineering Center
ISU	-	Idaho State University
LSC	-	liquid scintillation counting
MFC	-	Materials and Fuels Complex
µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
MP	-	milepost
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
MV	-	Magic Valley
NIST	-	National Institute of Standards and Technology
nCi/L	-	nanocuries per liter
NCRP	-	National Council on Radiation Protection and Measurements
NOAA	-	National Oceanic and Atmospheric Administration
NRF	-	Naval Reactors Facility
PBF	-	Power Burst Facility
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
SMC	-	Specific Manufacturing Capability
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, 2015 (**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 second 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**. Results are within the expected historical range.

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 2015 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. There is one individual sample within the weighted mean that exceeded MDC located at the Van Buren sampling station: 1.18 pCi/m^3 (MDC 0.90 pCi/m^3). Results are well below the DEQ-INL OP action level for atmospheric tritium of 150 pCi/m^3 (40 CFR 61). Average atmospheric tritium concentrations are presented in **Table 4**.

Precipitation samples were collected at six monitoring locations during the second quarter of 2015. Precipitation samples were analyzed for tritium and gamma-emitting radionuclides. 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 2015. Tritium and Cesium-137 analysis results are presented in **Table 5**.

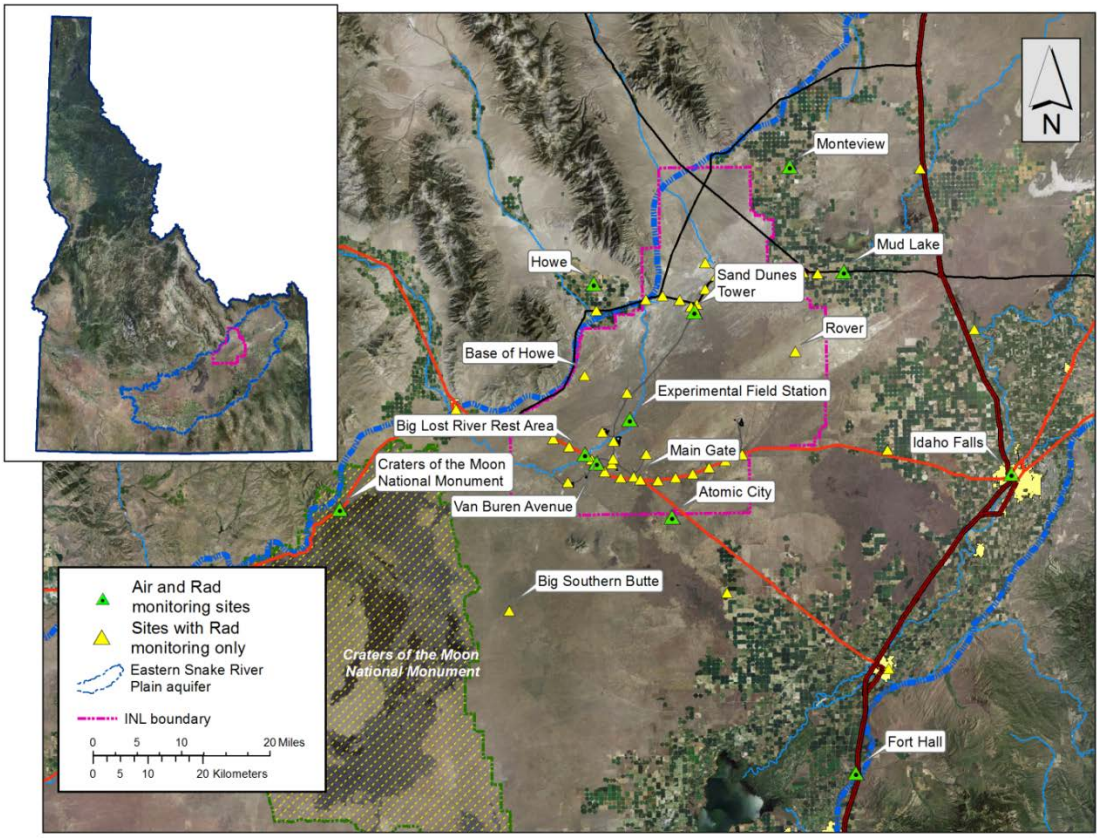

Figure 1. Air and radiation monitoring sites.

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, 2015.

Station Location	Concentration					
	Gross Alpha			Gross Beta		
On-Site Locations						
Big Lost River Rest Area	0.3	-	1.6	13.7	-	41.1
Experimental Field Station	0.5	-	1.4	11.5	-	33.2
Sand Dunes Tower	0.4	-	1.0	8.4	-	24.9
Van Buren Avenue	0.4	-	1.3	9.6	-	31.1
Boundary Locations						
Atomic City	0.4	-	1.6	10.4	-	33.4
Howe	0.3	-	1.4	9.8	-	29.1
Monteview	0.3	-	1.8	9.3	-	33.3
Mud Lake	0.4	-	2.1	12.8	-	46.4
Distant Locations						
Craters of the Moon	0.3	-	1.3	9.3	-	29.7
Fort Hall[1]	0.4	-	1.3	9.0	-	27.2
Idaho Falls – HVP 3804	0.6	-	2.0	13.1	-	40.7
Idaho Falls – HVP 4304	0.5	-	2.1	11.9	-	34.7

[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, 2015.

Station Location	Naturally Occurring Radionuclide Beryllium-7		Man-Made Gamma Emitting Radionuclides
	Concentration	± 2 SD	
On-site Locations			
Big Lost River Rest Area	95.8	5.7	<MDC[2]
Experimental Field Station	73.7	4.7	<MDC
Sand Dunes Tower	61.0	3.9	<MDC
Van Buren Avenue	73.8	4.4	<MDC
Boundary Locations			
Atomic City	79.5	4.8	<MDC
Howe	74.7	4.6	<MDC
Monteview	87.1	5.2	<MDC
Mud Lake	106.3	6.2	<MDC
Distant Locations			
Craters of the Moon	74.4	4.7	<MDC
Fort Hall[1]	66.7	4.3	<MDC
Idaho Falls – HVP 3804	97.0	5.8	<MDC
Idaho Falls – HVP 4304	81.6	5.1	<MDC

[1]Operated by Shoshone-Bannock Tribes.
[2]MDC for Cs-137 typically (0.05-0.1)x10^{-3} 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, 2015

Station Location	Tritium		
	Concentration	± 2 SD	MDC
On-site Locations			
Big Lost River Rest Area	0.40	0.41	0.67
Experimental Field Station	0.51	0.54	0.92
Sand Dunes Tower	0.35	0.46	0.76
Van Buren Avenue	0.53	0.51	0.82
Boundary Locations			
Atomic City	-0.02	0.53	0.87
Howe	0.41	0.48	0.78
Mud Lake	0.31	0.57	0.94
Monteview	0.14	0.30	0.50
Distant Locations			
Craters of the Moon	0.13	0.48	0.77
Fort Hall[1]	0.03	0.34	0.58
Idaho Falls	0.35	0.56	0.94

[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, 2015.

Station Location	Tritium			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
On-site Locations						
Big Lost River Rest Area	-30	70	130	0.6	1.4	2.3
Boundary Locations						
Atomic City	60	80	130	0.3	1.2	2.2
Howe	40	80	130	0.4	1.3	2.2
Monteview	70	80	130	1.5	1.6	2.6
Mud Lake	-10	80	130	0.0	1.2	2.2
Distant Locations						
Idaho Falls	40	80	130	0.2	1.7	2.8

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 2015 (**Figure 1**). To detect gamma radiation, each station is instrumented with triplicate electret ionization chambers (EIC), and 11 of the stations also are equipped with a high-pressure ion chamber (HPIC) (**Table 6**).

The Shoshone-Bannock Tribes operate an additional environmental radiation monitoring station at Fort Hall equipped with EICs and an 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 2015. **Table 8** lists the EIC monitoring results for second quarter 2015. 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 EICs maintained by DEQ-INL OP.

Table 7. Average gamma exposure rates, second quarter 2015, from HPIC network.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average	± 2 SD
On-site Locations		
Base of Howe	15.8	1.0
Big Lost River Rest Area	15.2	0.9
Main Gate	14.6	0.9
Rover	16.3	1.1
Sand Dunes Tower	13.3	0.9
Boundary Locations		
Atomic City	12.9	1.3
Big Southern Butte	15.2	0.8
Howe Met Tower	12.6	1.2
Monteview	13.2	1.0
Mud Lake / Terreton	14.1	1.0
Distant Locations		
Fort Hall[1]	12.3	2.0
Idaho Falls	12.7	1.8

[1]Operated by Shoshone-Bannock Tribes.

Table 8. Electret ionization chamber (EIC) cumulative average exposure rates, second quarter, 2015.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average[1]	± 2 SD
On-site Locations		
Base of Howe	17.2, 17.2	
Big Lost River Rest Area	13.4	0.4
Experimental Field Station	13.2	2.1
Main Gate	12.6, 13.7	
Rover	11.6, 15.3	
Sand Dunes Tower	16.8, 17.1	
Van Buren Avenue	14.0, 15.4	
Boundary Locations		
Atomic City	16.1, 16.8	
Big Southern Butte	13.7	2.6
Howe Met Tower	14.2	2.9
Monteview	10.2, 10.2	
Mud Lake / Terreton	12.8	2.5
Distant Locations		
Craters of the Moon	9.7, 12.0	
Fort Hall[2]	16.6, 17.3	
Idaho Falls	11.6	3.5

[1]Results are the average of triplicate exposure rate measurements with the associated sample variability (±2 SD), or the 2 measured exposure rates remaining after removal of an outlying value. One of the triplicate measurements is rejected if it is outside the average of the triplicate measurements ±2 SD of the historical population variability. Typically, the two most consistent measurements are reported, based on judgment of the data analyst.
[2]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 2015, 4 up-gradient, 18 facility, 15 boundary, and 18 distant locations were sampled. Of the 15 boundary locations, 10 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 (sampled at 1258 feet below land surface [ft bls]), USGS-108 (1172 ft bls), USGS-132 (765 ft bls), USGS-137A (747 ft bls), Middle-2051 (749 ft bls and 1091 ft bls), USGS-131A (616 ft bls and 812 ft bls) and USGS-105 (952 ft bls and 1072 ft 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 alpha emitting isotopes of plutonium (^{238}Pu, $^{239/240}$Pu), uranium (^{234}U, ^{235}U, and ^{238}U), and americium (^{241}Am); and beta emitting radionuclides technetium-99 (^{99}Tc) and strontium-90 (^{90}Sr), 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 7 facility, 4 boundary and 3 distant locations. Concentrations observed at facility locations are consistent with historical trends associated with each facility. 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 four areas sampled this quarter (up-gradient, facility, boundary, and distant) and at every sample site except one boundary location. Concentrations observed at facility locations were consistent with historical trends and elevated levels represent past INL waste disposal practices. 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 tritium (^{3}H); or 200 pCi/L if ^{137}Cs. Man-made, gamma emitting ^{137}Cs was detected at one facility location, TAN-37. This well has shown detectable concentrations in the past, most recently in April 2014. A recount was conducted by the lab which agreed statistically with the original result at 2.9 ± 1.6 pCi/L. Results for gross alpha, gross beta, and man-made, gamma emitting ^{137}Cs are shown in **Table 9**.

Three facility locations were sampled for isotopes of uranium with all showing results greater than MDC for ^{234}U, ^{235}U, and ^{238}U (**Table 10**). The ^{235}U result for TAN-37, however, is less than three standard deviations and is considered a non-detection. Analysis results for samples collected from TAN-28 and TAN-29 suggest ^{238}U and ^{234}U at greater than natural background levels. Uranium related to historic waste disposal activities at Test Area North has previously been identified. One location was sampled for plutonium isotopes (**Table 11**). There were no detectable results for plutonium isotopes this quarter. None of the sample locations were sampled for ^{241}Am this quarter.

Five of the thirteen facility locations analyzed for ^{90}Sr had detectable results this quarter, with four above the drinking water MCL of 8 pCi/L (**Table 12**). All samples were collected in areas of known contamination at or near the TAN and ATR Complex facilities. Three up-gradient and two facility locations were sampled for ^{99}Tc. Both facility locations reported values within the expected ranges of concentrations typically found at these sites. All reported values are well below the MCL of 900 pCi/L (**Table 13**). The three up-gradient locations were sampled for ^{99}Tc as part of an ongoing internal study to determine whether positive low level ^{99}Tc results are due in whole or in part to analytical interference from naturally occurring beta activity. All three up-gradient locations should have no detectable ^{99}Tc, however, all reported detectable results.

Using the standard analytical method, ^{3}H was detected at eleven of the eighteen facility locations sampled (**Table 14**). Tritium levels found are comparable to historic concentrations for these sites and are consistent with INL waste disposal influences. There were six detections found at Westbay boundary locations, including Middle-2051 at 749 ft bls, USGS-103 at 1258 ft bls, USGS-105 at 1072 ft bls, USGS-132 at 765 ft bls, and USGS-131A at both sampled depths 616 ft bls and 812 ft bls.

These detections are consistent with historic INL waste disposal influences. Selected water samples, generally 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. Seven samples were analyzed using the enrichment method for the current quarter, while sample analysis for one site collected during the previous quarter was completed and results presented during this quarter (**Table 15**). A backlog of 42 samples remains.

Samples were also analyzed for metals, common ions, and nutrients with results shown in **Tables 16, 17** and **18**. All results were within expected ranges at each location. There are five wells located at or near the TAN facility (ANP-08, TAN-16, TAN-28, TAN-29, and TAN-37) in which elevated concentrations for certain analytes are consistent with conditions created from in-situ bioremediation (ISB) efforts as part of the clean-up actions for VOCs in ground water. ISB efforts at the TAN facility were transitioned into a rebound test in July 2012 that is still ongoing. The rebound test seeks to re-establish background conditions prior to ISB activities by putting on hold, indefinitely, all clean-up actions involving bioremediation on ground water at TAN. Background conditions prior to ISB activities have not yet been re-established.

Volatile Organic Compounds (VOCs) were sampled at seven locations at or near the TAN facility, with each location reporting detectable concentrations for multiple analytes. Results are shown in **Table 19.** The background concentrations for these VOCs should be non-detectable. The results discussed in this section only refer to detectable VOC concentrations; a complete list of analytes is shown in **Appendix C**.

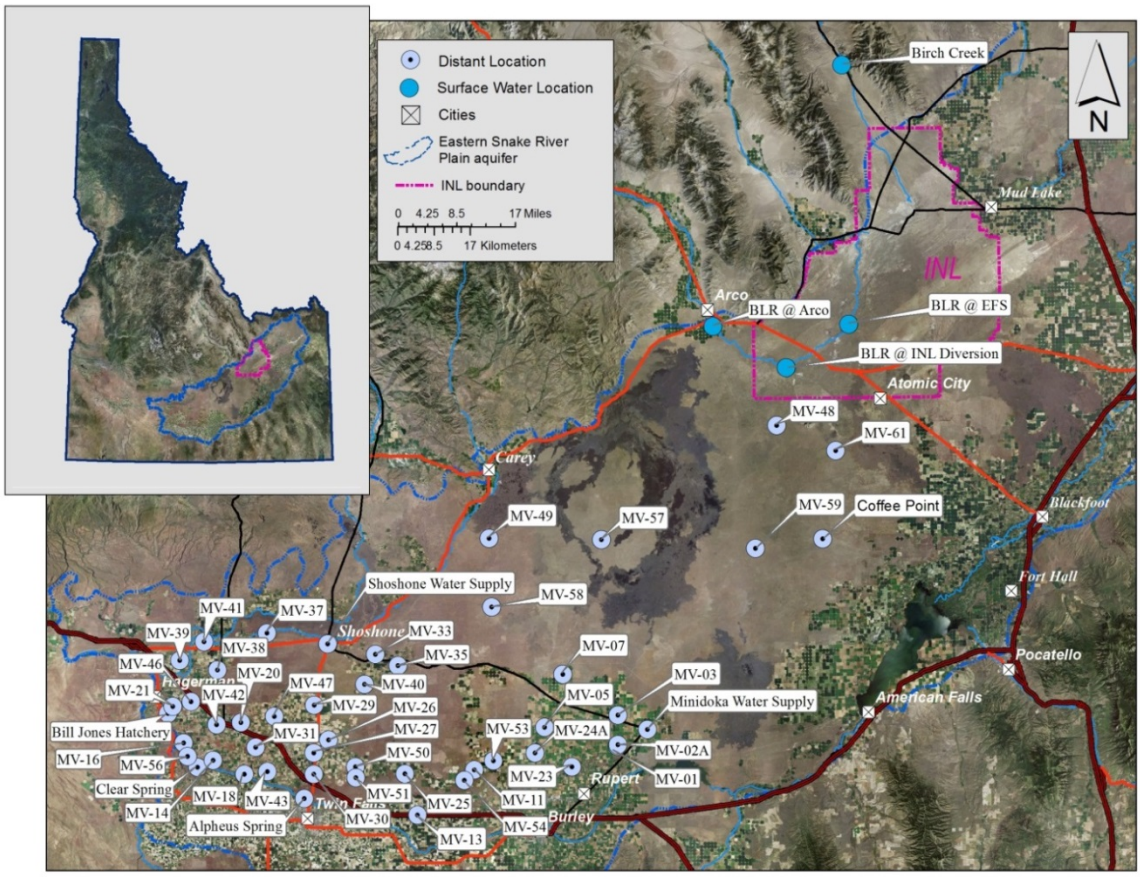

Figure 2. Distant and Surface Water monitoring locations.

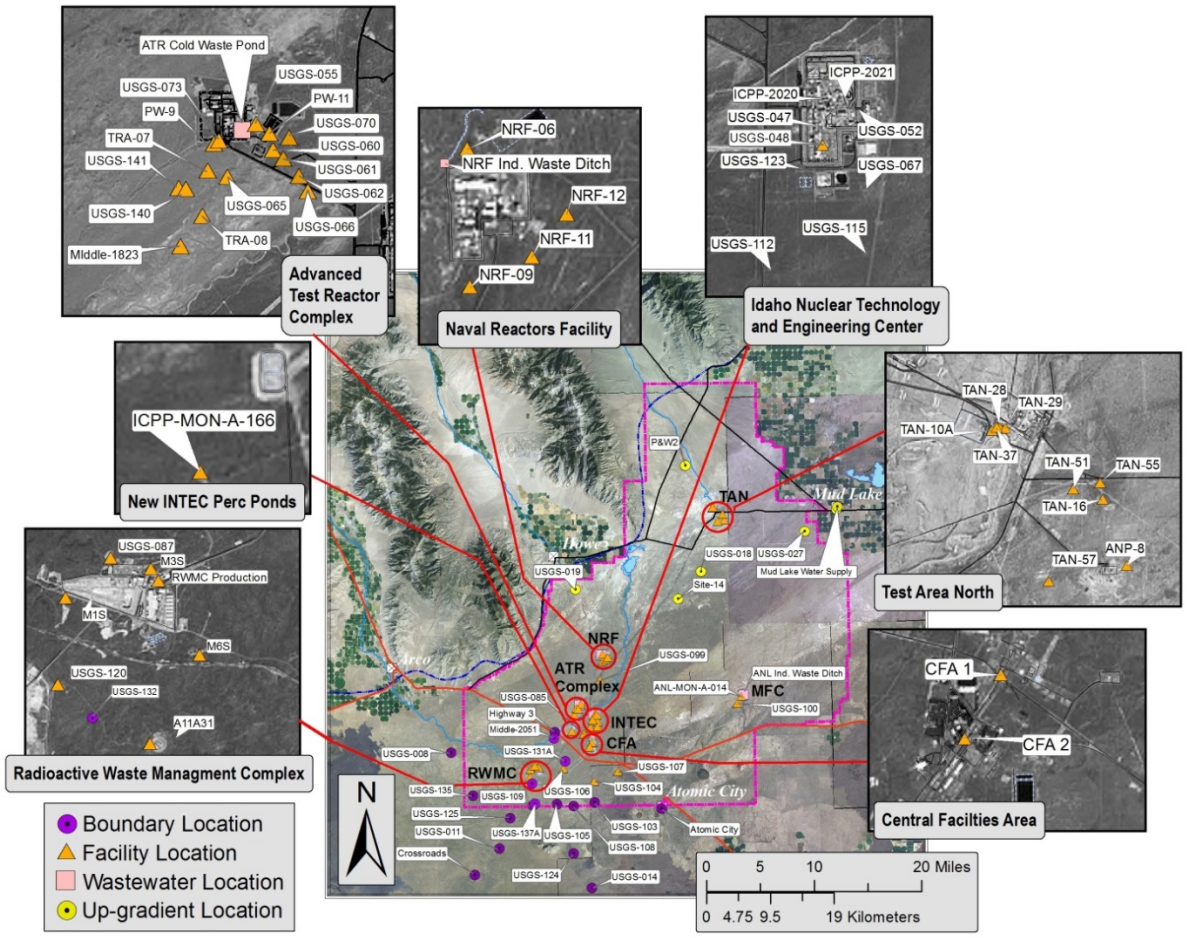

Figure 3. Upgradient, facility, boundary, and wastewater monitoring locations.

Table 9. Gross alpha, gross beta, and gamma-emitting radionuclide concentrations for water samples, second quarter, 2015.

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
Upgradient										
Mud Lake Water Supply	5/13/2015	-0.3	U	0.6	4.7		0.8	0.2	U	1.8
P&W-2	4/14/2015	0.5	U	0.9	1.7		0.7	0.8	U	1.6
USGS-019	4/14/2015	0.2	U	1.0	1.6		0.8	1.7	U	1.7
USGS-027	4/14/2015	1.2	U	1.2	6.4		1.1	0.6	U	1.2
Facility										
ANP-8	6/2/2015	1.5		0.8	3.5		0.8	0.0	U	1.4
CFA 1	4/20/2015	0.7	U	0.9	8.2		1.1	1.1	U	2.4
ICPP-MON-A-166	4/16/2015	-0.3	U	0.9	3.9		0.8	0.3	U	1.6
NRF-06	5/12/2015	-0.5	U	3.7	5.2		2.9	-0.2	U	1.3
NRF-09	5/12/2015	0.2	U	1.1	4.5		1.0	1.0	U	2.4
NRF-11	5/12/2015	2.8		1.5	4.0		1.0	1.0	U	2.0
NRF-12	5/12/2015	2.2		1.4	5.2		1.0	-1.0	U	1.3
TAN-16	6/2/2015	0.6	U	1.2	3.9		1.1	0.2	U	1.2
TAN-28	4/14/2015	12.2		3.4	596.9		9.4	0.1	U	1.2
TAN-29	4/14/2015	5.5		2.1	61.8		2.8	-1.1	U	1.3
TAN-37	4/14/2015	-0.5	U	3.1	683.9		10.3	4.7		1.9
TAN-51	6/1/2015	0.8	U	1.1	2.3		1.2	0.6	U	1.4
TAN-55	6/1/2015	2.0		1.2	4.8		1.0	0.6	U	1.4
USGS-065	4/2/2015	3.2		1.2	5.1		1.0	0.8	U	1.6
USGS-070	4/2/2015	-0.1	U	1.2	52.3		1.9	-0.3	U	1.2
USGS-073	4/2/2015	2.4	U	1.7	8.1		1.1	0.7	U	1.5
USGS-087	4/13/2015	-0.2	U	0.9	4.2		0.9	0.4	U	1.1
USGS-100	4/16/2015	0.7	U	0.7	4.6		0.9	0.5	U	1.8
Boundary										
Atomic City	4/15/2015	0.2	U	1.0	5.6		0.9	1.9	U	1.7
Crossroads	4/22/2015	1.2		0.8	2.9		0.8	1.7	U	1.8
Middle-2051 (1091 ftbls)	6/10/2015	0.5	U	0.9	3.6		0.9	0.3	U	1.2
Middle-2051 (749 ftbls)	6/10/2015	0.6	U	0.8	2.7		0.9	-0.9	U	1.3
USGS-008	4/13/2015	2.1		1.0	2.0		0.9	0.0	U	1.4
USGS-011	4/15/2015	0.9	U	1.1	3.4		0.9	-0.7	U	1.3
USGS-103 (1258 ftbls)	6/16/2015	0.6	U	0.7	3.0		0.8	0.6	U	1.6
USGS-105 (1072 ftbls)	6/17/2015	0.5	U	0.8	3.7		0.9	0.7	U	1.4
USGS-105 (952 ftbls)	6/17/2015	0.8	U	0.9	3.3		0.9	0.0	U	0.8
USGS-108 (1172 ftbls)	6/18/2015	-0.2	U	0.8	3.4		0.9	1.4	U	1.3
USGS-124	4/15/2015	0.2	U	1.0	2.9		0.8	0.6	U	1.2
USGS-131A (616 ftbls)	6/15/2015	1.5		0.9	3.4		0.9	0.4	U	1.0
USGS-131A (812 ftbls)	6/15/2015	0.7	U	0.9	4.1		0.9	0.4	U	1.5
USGS-132 (765 ftbls)	6/9/2015	0.4	U	0.8	1.8		0.9	-0.4	U	1.2
USGS-137A (747 ftbls)	6/22/2015	1.4		0.9	-0.8	U	0.8	0.1	U	1.1
Distant										
Alpheus Spring	5/11/2015	0.9	U	3.0	6.4		2.4	0.5	U	1.9
Bill Jones Hatchery	5/11/2015	0.4	U	0.7	3.4		0.8	1.2	U	1.5
Clear Spring	5/11/2015	0.9	U	1.2	4.9		1.0	0.1	U	1.2
Coffee Point	6/11/2015	1.0	U	0.8	1.8		0.8	0.0	U	1.4
Minidoka Water Supply	5/11/2015	1.2	U	1.2	3.5		0.9	0.5	U	1.8
MV-02A	6/29/2015	0.1	U	1.0	7.2		1.2	0.8	U	1.7
MV-14	6/30/2015	0.5	U	1.1	5.4		1.1	-0.1	U	1.5
MV-20	6/29/2015	1.0	U	1.0	2.3		0.9	1.7	U	1.4
MV-26	6/29/2015	0.8	U	0.9	3.3		0.9	0.2	U	0.8
MV-33	6/30/2015	0.9	U	0.8	2.0		0.8	0.4	U	1.3

Table 9 continued. Gross alpha, gross beta, and gamma-emitting radionuclide concentrations for water samples, second quarter, 2015.

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
MV-41	6/30/2015	5.6		2.0	4.2		1.6	-0.2	U	0.9
MV-42	6/29/2015	1.2	U	0.9	4.4		0.9	-1.1	U	1.6
MV-46	6/30/2015	1.4		0.8	3.4		0.8	-0.2	U	1.3
MV-49	6/3/2015	1.0	U	1.2	1.7		1.0	0.5	U	1.4
MV-51	6/29/2015	1.6	U	1.4	7.4		1.5	1.6	U	1.7
MV-54	6/29/2015	0.8	U	1.4	8.4		1.5	1.5	U	1.3
MV-59	6/11/2015	0.4	U	0.8	3.2		0.9	1.6	U	1.5
Shoshone Water Supply	5/11/2015	2.0		1.2	2.8		0.9	2.1	U	2.2

[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, 2015.

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	4/14/2015	9.0		1.6	0.33		0.13	1.24		0.30
TAN-29	4/14/2015	6.7		1.2	0.31		0.12	1.27		0.29
TAN-37	4/14/2015	1.22		0.29	0.071	U*	0.059	0.26		0.11

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations expressed in pCi/L.
*The result is greater than the MDC but is less than 3 SD so is therefore considered a non-detection.

Table 11. Reported concentrations of plutonium isotopes in water samples, second quarter, 2015.

Sample Location	Sample Date	Plutonium-238			Plutonium-239/240		
		Concentration[1,2]		±2 SD	Concentration[1,2]		±2 SD
Facility							
USGS-065	4/14/2015	-0.006	U	0.011	-0.004	U	0.011

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

Table 12. Reported concentrations of strontium-90 in water samples, second quarter, 2015.

Sample Location	Sample Date	Strontium-90		
		Concentration[1,2]		±2 SD
Facility				
ANP-8	6/2/2015	0.18	U	0.29
CFA 1	4/20/2015	-0.20	U	0.20
NRF-06	5/12/2015	-0.28	U	0.23
NRF-09	5/12/2015	-0.23	U	0.23
NRF-11	5/12/2015	-0.04	U	0.22
NRF-12	5/12/2015	-0.06	U	0.21
TAN-28	4/14/2015	187		44
TAN-29	4/14/2015	22.1		5.2
TAN-37	4/14/2015	262		62
USGS-065	4/2/2015	0.23	U	0.23
USGS-070	4/2/2015	20.0		4.7
USGS-073	4/2/2015	2.51		0.67
USGS-087	4/13/2015	0.03	U	0.22

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

Table 13. Reported concentrations of technetium-99 in water samples, second quarter, 2015.

Sample Location	Sample Date	Technetium-99		
		Concentration[1,2]		±2 SD
Upgradient				
P&W-2 (dissolved)	4/14/2015	0.8		0.2
USGS-019 (dissolved)	4/14/2015	0.7		0.2
USGS-027 (dissolved)	4/14/2015	1.4		0.2
Facility				
CFA-1 (dissolved)	4/20/2015	8.7		0.3
USGS-087 (dissolved)	4/13/2015	1.0		0.2

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

Table 14. Tritium concentrations for water samples, second quarter, 2015.

Sample Location	Sample Date	Tritium Concentration[1,2]		±2 SD
Upgradient				
Mud Lake Water Supply	5/13/2015	-20	U	80
P&W-2	4/14/2015	-20	U	80
USGS-019	4/14/2015	-10	U	80
USGS-027	4/14/2015	20	U	80
Facility				
ANP-8	6/2/2015	70	U	110
CFA 1	4/20/2015	3430		190
ICPP-MON-A-166	4/16/2015	10	U	80
NRF-06	5/12/2015	-30	U	70
NRF-09	5/12/2015	-10	U	80
NRF-11	5/12/2015	20	U	80
NRF-12	5/12/2015	30	U	80
TAN-16	6/2/2015	160		70
TAN-28	4/14/2015	1010		120
TAN-29	4/14/2015	1420		130
TAN-37	4/14/2015	1110		120
TAN-51	6/1/2015	460		80
TAN-55	6/1/2015	640		90
USGS-065	4/2/2015	2560		170
USGS-070	4/2/2015	720		110
USGS-073	4/2/2015	680		110
USGS-087	4/13/2015	470		100
USGS-100	4/16/2015	10	U	80
Boundary				
Atomic City	4/15/2015	-60	U	80
Crossroads	4/22/2015	20	U	70
Middle-2051 (1091 ftbls)	6/10/2015	160	U	110
Middle-2051 (749 ftbls)	6/10/2015	380		120
USGS-008	4/13/2015	10	U	80
USGS-011	4/15/2015	-30	U	80
USGS-103 (1258 ftbls)	6/16/2015	220		110
USGS-105 (1072 ftbls)	6/17/2015	200		110
USGS-105 (952 ftbls)	6/17/2015	170	U	110
USGS-108 (1172 ftbls)	6/18/2015	100	U	110
USGS-124	4/15/2015	30	U	80
USGS-131A (616 ftbls)	6/15/2015	920		120
USGS-131A (812 ftbls)	6/15/2015	1150		130
USGS-132 (765 ftbls)	6/9/2015	260		110
USGS-137A (747 ftbls)	6/22/2015	150	U	110
DIstant				
Alpheus Spring	5/11/2015	50	U	80
Bill Jones Hatchery	5/11/2015	-10	U	80
Clear Spring	5/11/2015	-30	U	70
Coffee Point	6/11/2015	-70	U	60
Minidoka Water Supply	5/11/2015	70	U	80
MV-02A	6/29/2015	-30	U	60
MV-14	6/30/2015	-10	U	110
MV-20	6/29/2015	20	U	60
MV-26	6/29/2015	30	U	110
MV-33	6/30/2015	30	U	110
MV-41	6/30/2015	0	U	80
MV-42	6/29/2015	20	U	60
MV-46	6/30/2015	-40	U	110
MV-49	6/3/2015	60	U	110
MV-51	6/29/2015	50	U	110
MV-54	6/29/2015	-30	U	110
MV-59	6/11/2015	10	U	110
Shoshone Water Supply	5/11/2015	-10	U	70

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

Table 15. Tritium concentrations for water samples from current and previous sampling quarters, analyzed using the enrichment method.

Sample Location	Sample Date	Enriched Tritium		
		Concentration[1,2]		±2 SD
Upgradient				
P&W-2	4/14/2015	4	U	8
USGS-019	4/14/2015	13	U	9
Facility				
ICPP-MON-A-166	4/16/2015	73		10
USGS-067	3/9/2015	2647		35
USGS-070	4/2/2015	693		18
Boundary				
USGS-008	4/13/2015	8	U	8
USGS-011	4/15/2015	26		9
USGS-124	4/15/2015	59		10

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

Table 16. Reported metals concentrations in water samples, second quarter, 2015.

Sample Location	Sample Date	Concentration[1,2]															
		Arsenic		Barium		Chromium		Iron		Lead		Manganese		Selenium		Zinc	
Upgradient																	
P&W-2	4/14/2015	<5.0	U	45		<5.0	U	10		<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-019	4/14/2015	<5.0	U	76		<5.0	U	22		<5.0	U	7.0	J	<10	U	<5.0	U
USGS-027	4/14/2015	<5.0	U	82		5.3		18		<5.0	U	2.8	J	<10	U	<5.0	U
Facility																	
ANP-8 (total)	6/2/2015	<5.0	U	100		7.8		13000		<5.0	U	390		<10	U	180	
CFA 1	4/20/2015	<5.0	U	88		13		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
ICPP-MON-A-166	4/16/2015	<5.0	U	50		5.4		<10	U	<5.0	U	5.1	J	<10	U	<5.0	U
NRF-06 (total)	5/12/2015	<5.0	U	110		34		20		<5.0	U	<2.0	U	<10	U	<5.0	U
NRF-09 (total)	5/12/2015	<5.0	U	140		11		40		<5.0	U	2.3		<10	U	<5.0	U
NRF-11 (total)	5/12/2015	<5.0	U	140		13		40		<5.0	U	<2.0	U	<10	U	<5.0	U
NRF-12 (total)	5/12/2015	<5.0	U	140		9.8		20		<5.0	U	<2.0	U	<10	U	<5.0	U
TAN-16 (total)	6/2/2015	<5.0	U	94		5.4		20	J	<5.0	U	<2.0	U	<10	U	30	
TAN-28	4/14/2015	<5.0	U	360		<5.0	U	<10	U	<5.0	U	1100	J	<10	U	25	
TAN-29	4/14/2015	<5.0	U	260		<5.0	U	<10	U	<5.0	U	420	J	<10	U	19	
TAN-37	4/14/2015	<5.0	U	330		<5.0	U	2100		<5.0	U	920	J	<10	U	<5.0	U
USGS-065	4/2/2015	<5.0	U	47		74		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-070	4/2/2015	9.1		72		9.2		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-073	4/2/2015	<5.0	U	100		22		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-087	4/13/2015	<5.0	U	26		8.4		27		<5.0	U	6.1	J	<10	U	9.8	
USGS-100	4/16/2015	<5.0	U	35		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Boundary																	
Atomic City	4/15/2015	<5.0	U	34		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	30	
Crossroads	4/22/2015	<5.0	U	22		<5.0	U	<10	U	<5.0	U	6.5	J	<10	U	89	
Middle-2051 (1091 ftbls)	6/10/2015	<5.0	U	36		6.7		<10	U	<5.0	U	<2.0	U	<10	U	26	
Middle-2051 (749 ftbls)	6/10/2015	<5.0	U	58		6.6		<10	U	<5.0	U	<2.0	U	<10	U	15	
USGS-008	4/13/2015	<5.0	U	77		<5.0	U	29		<5.0	U	2.0	J	<10	U	<5.0	U
USGS-011	4/15/2015	<5.0	U	52		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
USGS-103 (1258 ftbls)	6/16/2015	<5.0	U	43		6.5		<10	U	<5.0	U	<2.0	U	<10	U	51	
USGS-105 (1072 ftbls)	6/17/2015	<5.0	U	34		8.5		10		<5.0	U	<2.0	U	<10	U	9.3	
USGS-105 (952 ftbls)	6/17/2015	<5.0	U	34		8.0		<10	U	<5.0	U	<2.0	U	<10	U	21	
USGS-108 (1172 ftbls)	6/18/2015	<5.0	U	41		6.5		<10	U	<5.0	U	5.9	J	<10	U	50	
USGS-124	4/15/2015	<5.0	U	29		6.2		20		<5.0	U	6.7	J	<10	U	<5.0	U
USGS-131A (616 ftbls)	6/15/2015	<5.0	U	28		11		<10	U	<5.0	U	<2.0	U	<10	U	9.1	
USGS-131A(812 ftbls)	6/15/2015	<5.0	U	51		10		<10	U	<5.0	U	<2.0	U	<10	U	13	
USGS-132 (765 ftbls)	6/9/2015	<5.0	U	41		7.9		<10	U	<5.0	U	<2.0	U	<10	U	60	
USGS-137A (747 ftbls)	6/22/2015	<5.0	U	32		7.3		<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Distant																	
Coffee Point	6/11/2015	<5.0	U	18		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	15	
MV-02A	6/29/2015	<5.0	U	62		<5.0	U	10		<5.0	U	<2.0	U	<10	U	74	
MV-14	6/30/2015	<5.0	U	46		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-20	6/29/2015	<5.0	U	22		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-26	6/29/2015	<5.0	U	27		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-33	6/30/2015	<5.0	U	13		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	130	
MV-41	6/30/2015	<5.0	U	71		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	5.2	
MV-42	6/29/2015	<5.0	U	25		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	26	
MV-46	6/30/2015	<5.0	U	16		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-49	6/3/2015	<5.0	U	62		<5.0	U	110		<5.0	U	<2.0	U	<10	U	170	
MV-51	6/29/2015	<5.0	U	63		<5.0	U	40		<5.0	U	2.8		<10	U	85	
MV-54	6/29/2015	<5.0	U	96		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	85	
MV-59	6/11/2015	<5.0	U	11		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	110	

[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 17. Reported common ion concentrations in water samples, second quarter, 2015.

Sample Location	Sample Date	Concentration[1,2]															
		Calcium		Magnesium		Sodium		Potassium		Fluoride		Chloride		Sulfate		Alkalinity[3]	
Upgradient																	
P&W-2*	4/14/2015	40		16		7.6		1.5		0.233		6.86		28.0		140	
USGS-019*	4/14/2015	45		17		9.7		1.4		0.211		12.5		23.5		162	
USGS-027*	4/14/2015	50		18		28		5.9		0.620		46.9		40.4		150	
Facility																	
ANP-8	6/2/2015	47		16		7.9		3.3		0.212		15.0		30.0		135	
CFA 1*	4/20/2015	57		18		30		3.9		0.206		89.1		33.7		124	
ICPP-MON-A-166*	4/16/2015	33		12		9.3		2.6		0.312		10.2		19.6		160	
NRF-06**	5/12/2015	130		35		150		6.0		<0.200	U	412		94.9		169	
NRF-09**	5/12/2015	69		22		20		2.7		<0.200	U	47.9		37.4		197	
NRF-11**	5/12/2015	66		21		19		2.5		<0.200	U	40.7		36.8		196	
NRF-12**	5/12/2015	64		21		17		2.5		<0.200	U	34.8		35.8		197	
TAN-16	6/2/2015	53		16		8.0		3.0		0.219		23.7		32.7		146	
TAN-28*	4/14/2015	91		34		78		5.8		<0.200	U	109		38.8		348	
TAN-29*	4/14/2015	69		21		57		5.2		<0.200	U	93.6		40.5		221	
TAN-37*	4/14/2015	60		39		140		20		0.208		114		28.3		498	
USGS-065*	4/2/2015	82		18		15		3.8		<0.200	U	19.1		158		125	
USGS-070*	4/2/2015	61		19		13		3.3		0.250		15.4		79.4		154	
USGS-073*	4/2/2015	74		17		18		2.6		0.205		39.2		46.6		186	
USGS-087*	4/13/2015	36		14		14		3.2		0.241		24.3		26.6		121	
USGS-100*	4/16/2015	36		12		17		3.2		0.738		15.9		17.2		131	
Boundary																	
Atomic City*	4/15/2015	34		13		17		3.3		0.614		16.9		17.7		134	
Crossroads*	4/22/2015	36		15		8.7		2.5		0.236		11.0		22.1		136	
Middle-2051*(1091 ftbls)	6/10/2015	38		18		7.9		2.5		<0.200	U	11.9		23.2		144	
Middle-2051* (749 ftbls)	6/10/2015	44		16		8.5		2.3		0.205		10.9		25.8		150	
USGS-008*	4/13/2015	44		15		7.0		1.8		0.225		7.65		22.7		149	
USGS-011*	4/15/2015	40		14		8.2		2.2		0.252		9.36		23.2		139	
USGS-103* (1258 ftbls)	6/16/2015	41		16		9.2		2.6		0.253		14.0		21.3		137	
USGS-105* (1072 ftbls)	6/17/2015	40		15		11		3.0		0.245		12.5		23.1		140	
USGS-105* (952 ftbls)	6/17/2015	41		16		11		2.9		0.221		12.5		22.9		143	
USGS-108* (1172 ftbls)	6/18/2015	46		19		8.3		2.4		<0.200	U	16.5		23.3		153	
USGS-124*	4/15/2015	39		16		10		2.4		0.411		15.9		24.2		137	
USGS-131A* (616 ftbls)	6/15/2015	43		15		7.9		2.6		0.229		16.3		22.0		138	
USGS-131A* (812 ftbls)	6/15/2015	51		17		9.6		2.7		<0.200	U	24.9		25.8		147	
USGS-132* (765 ftbls)	6/9/2015	40		15		9.8		2.6		0.236		11.1		25.6		139	
USGS-137A* (747 ftbls)	6/22/2015	39		15		11		2.8		0.239		11.7		23.6		146	
Distant																	
Coffee Point*	6/11/2015	30		13		14		2.9		0.610		13.6		15.9		121	
MV-02A*	6/29/2015	51		20		32		6.0		0.527		45.4		49.4		161	
MV-14*	6/30/2015	53		21		31		4.7		0.525		44.8		55.6		159	
MV-20*	6/29/2015	36		18		21		3.7		0.490		16.8		34.7		143	
MV-26*	6/29/2015	42		16		23		3.9		0.564		28.4		39.5		136	
MV-33*	6/30/2015	26		14		14		3.3		0.470		7.13		19.3		119	
MV-41*	6/30/2015	63		28		39		4.6		0.424		28.2		56.7		245	
MV-42*	6/29/2015	38		19		21		3.9		0.470		17.1		34.3		154	
MV-46*	6/30/2015	28		14		15		3.4		0.436		8.07		20.5		118	
MV-49*	6/3/2015	52		16		8.0		2.2		0.231		3.69		19.6		180	
MV-51*	6/29/2015	59		23		39		6.0		0.486		47.1		61.3		189	
MV-54*	6/29/2015	68		26		44		6.8		0.419		61.4		75.0		197	
MV-59*	6/11/2015	26		13		16		3.3		0.437		13.2		19.6		113	

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

Table 18. Reported nutrient concentrations in water samples, second quarter, 2015.

Sample Location	Sample Date	Concentration[1,2]			
		Nitrite + Nitrate		Phosphorus	
Upgradient					
P&W-2	4/14/2015	0.47		0.018	
USGS-019	4/14/2015	0.93		0.0097	
USGS-027	4/14/2015	2.6		0.017	
Facility					
ANP-8	6/2/2015	0.81		0.025	
CFA 1	4/20/2015	2.9		0.024	
ICPP-MON-A-166	4/16/2015	0.27		0.410	
NRF-06	5/12/2015	2.0		0.069	
NRF-09	5/12/2015	2.6		0.030	
NRF-11	5/12/2015	2.1		0.027	
NRF-12	5/12/2015	2.1		0.029	
TAN-16	6/2/2015	1.2		0.021	
TAN-28	4/14/2015	0.35		0.096	
TAN-29	4/14/2015	0.43		0.046	
TAN-37	4/14/2015	0.06		1.10	
USGS-065	4/2/2015	1.5		0.025	
USGS-070	4/2/2015	1.4		0.290	
USGS-073	4/2/2015	3.1		0.034	
USGS-087	4/13/2015	0.67		0.013	
USGS-100	4/16/2015	2.1		0.019	
Boundary					
Atomic City	4/15/2015	1.6		0.018	
Crossroads	4/22/2015	0.68		0.019	
Middle-2051 (1091 ftbls)	6/10/2015	0.93		0.017	
Middle-2051 (749 ftbls)	6/10/2015	0.86		0.021	
USGS-008	4/13/2015	0.96		0.018	
USGS-011	4/15/2015	0.72		0.022	
USGS-103 (1258 ftbls)	6/16/2015	0.80		0.020	
USGS-105 (1072 ftbls)	6/17/2015	0.79		0.018	
USGS-105 (952 ftbls)	6/17/2015	0.82		0.020	
USGS-108 (1172 ftbls)	6/18/2015	1.0		0.024	
USGS-124	4/15/2015	0.84		0.018	
USGS-131A (616 ftbls)	6/15/2015	0.93		0.022	
USGS-131A (812 ftbls)	6/15/2015	1.3		0.018	
USGS-132 (765 ftbls)	6/9/2015	0.75		0.018	
USGS-137A (747 ftbls)	6/22/2015	0.69		0.018	
Distant					
Coffee Point	6/11/2015	0.94		0.015	
MV-02A	6/29/2015	1.2		0.017	
MV-14	6/30/2015	2.2		0.028	
MV-20	6/29/2015	2.0		0.025	
MV-26	6/29/2015	1.0		0.018	
MV-33	6/30/2015	0.56		0.018	
MV-41	6/30/2015	2.6		0.072	
MV-42	6/29/2015	2.1		0.031	
MV-46	6/30/2015	0.67		0.018	
MV-49	6/3/2015	1.5		0.042	
MV-51	6/29/2015	2.4		0.043	
MV-54	6/29/2015	4.7		0.025	
MV-59	6/11/2015	0.76		0.013	

[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 19. Reported VOC concentrations in water samples, second quarter, 2015.

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	6/2/2015	<0.5	<0.5	<0.5	<0.5	2.8	22	<0.5
TAN-16	6/2/2015	<0.5	<0.5	0.69	<0.5	4.9	40	<0.5
TAN-28	4/14/2015	0.57	<0.5	36	67	2.1	340	3.9
TAN-29	4/14/2015	0.91	<0.5	80	58	11	450	10
TAN-37	4/14/2015	<0.5	<0.5	1.2	100	<0.5	3.3	1.1
TAN-51	6/1/2015	<0.5	<0.5	2.1	0.80	13	90	<0.5
TAN-55	6/1/2015	<0.5	<0.5	1.9	0.69	9.1	79	<0.5

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

Terrestrial Monitoring Results

The DEQ-INL OP conducts terrestrial (soil and milk) monitoring to characterize deposition and migration of contaminants, and provide independent verification of DOE's terrestrial monitoring programs. Physical soil sampling and *in-situ* gamma spectrometry are used to characterize actual deposition and accumulation of radioactive contaminants in soils. Milk samples are collected to evaluate the potential for ingestion of radioactivity by the population around the INL. No *in-situ* gamma spectroscopic measurements were performed, nor were any soil samples physically collected during the second calendar quarter of 2015.

Milk

DEQ-INL OP monitors milk for the naturally occurring radionuclide potassium-40 (^{40}K) and man-made iodine-131 (^{131}I). Milk samples are collected on a monthly basis. Results for analyses of milk samples are presented in **Table 20**. ^{40}K was detected in all samples within the expected range of concentrations. ^{131}I was not detected. Based on measurements of radionuclides in milk, there were no discernable impacts to the off-site environment from INL operations.

Table 20. Gamma spectroscopy analysis data for milk samples, second quarter, 2015.

Sample Location/Dairy	Sample Date	Naturally occurring Potassium-40		Man-made Iodine-131[1]
		Concentration[3]	± 2 SD	
Monitoring Samples				
Ft. Hall	4/06/2015	1420	104	<MDC
	5/04/2015	1453	102	<MDC
	6/08/2015	1438	118	<MDC
Gooding/Glanbia	4/20/2015	1429	110	<MDC
	5/04/2015	1464	103	<MDC
Riverside	4/06/2015	1766	128	<MDC
	5/04/2015	1817	129	<MDC
	6/07/2015	1982	138	<MDC
Verification Samples[2]				
Howe	4/08/2015	1425	100	<MDC
Rupert	4/07/2015	1541	122	<MDC
Terreton	5/05/2015	1378	98	<MDC
Dietrich	5/05/2015	1308	106	<MDC
Rupert	6/02/2015	1710	111	<MDC
Idaho Falls	6/02/2015	1518	123	<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 2015 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 2015, the DEQ-INL OP submitted 101 QC samples for various radiological and non-radiological analyses (**Table 21**).

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 an analysis will yield a "zero" result when no contaminant is present, or a sufficiently low result to serve as an acceptable measure of "background." Blank samples are used to monitor for bias 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 2015 are presented in **Table 22**. There were two weekly air filter blank results that exceeded the MDC during the second quarter. The first is gross alpha for the filter collected on 5/21/2015 – result 0.3 x 10^{-3} pCi/m^3 (MDC 0.2 x 10^{-3} pCi/m^3); the second is gross beta for the filter collected on 6/18/2015 – result 0.8 x 10^{-3} pCi/m^3 (MDC 0.7 x 10^{-3} pCi/m^3). Because both blank results minimally exceeded the MDC they are considered to have an insignificant effect on the results for the field air filters collected on these dates. All of the gross alpha and gross beta results for this quarter fall within the range of results historically observed.

Blank sample results for select gamma emitters in air from composited air filters are presented in **Table 23**. Data for blank analyses used to assess data quality for tritium in water vapor in air are presented in **Table 24**. Blank analyses results for radiological and non-radiological analytes in ground and surface water are presented in **Table 25, Table 26, Table 27,** and **Table 28**.

Two field blank water samples failed acceptance criteria for manganese during the second quarter of 2015, with concentrations of 33 and 13 µg/L (**Table 26**). There were thirty-seven sites that were sampled on the same day as both blank samples. Of the thirty-seven sites, eleven reported detectable concentrations for manganese. These eleven sample results are flagged with a "J" and qualified as estimates based on the manganese detections in both blank samples.

Duplicate Samples

A laboratory's analytical precision capability, i.e., its ability to reproduce 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 duplicate sample results is expressed as the relative percent difference (RPD), 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 of up to ± 20 percent is acceptable. 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 duplicate samples if both duplicate results are greater than the sample-specific minimum detectable concentration (MDC). DEQ-INL OP also considers duplicate sample results with an absolute difference of no more than three times the pooled error (or "3 sigma") to be in acceptable agreement. 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 = Uncertainty (one standard deviation) associated with the laboratory measurement of the first sample.

S_2 = Uncertainty (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 29** for radiological analyses, and **Table 30**, **Table 31,** and **Table 32** for non-radiological analyses.

One duplicate water sample comparison for iron failed DEQ-INL OP criteria for the second quarter of 2015. There were sixteen samples analyzed for iron within the same batch as the failed QC sample, including two more duplicate sample sets that each passed comparison criteria. Of the sixteen samples, fourteen reported non-detects for iron, with all sample results agreeing with historical data. Only the failed duplicate result is flagged with a "J" and qualified as an estimate.

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 2015, 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 33, Table 34,** and **Table 35**. All spiked samples passed DEQ-INL OP percent recovery criteria.

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 triplicate EICs are conducted in a repeatable geometry to a known exposure of near 30 mR and two additional groups of 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 the average triplicate measurement has a percent recovery of 100 ± 25% when compared to the known irradiated quantity. The irradiation results for second quarter 2015 are presented in **Table 36**. Real-time pressure correction is used to calculate the net exposure measured by these EIC control sets. All EIC spiked samples passed the DEQ-INL OP criteria.

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 2015, 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 2015.

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 2015 met the minimum criteria of the DEQ-INL OP ESP and is summarized in **Table 21**.

Preventative Maintenance and Equipment Reliability

All equipment was calibrated and checked according to prescribed periodicity. During the second quarter of 2015 the radioiodine pump at Craters of the Moon was replaced. Service reliability for air sampling equipment for the second quarter of 2015 is summarized in **Table 37**.

Conclusion

All data collected for the second quarter of 2015 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 21. Summary of the analytical performance and usability of the analyses performed for the DEQ-INL OP ESP, second quarter, 2015.

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	156	13	0	0	0	ISU-EML
		Gross beta	156	13	0	0	0	ISU-EML
		Gamma emitters	12	1	0	0	0	ISU-EML
		Radiochemical	0	0	0	0	0	ISU Sub
Water Vapor	Desiccant column	Tritium	38	2	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	55	3	5	0	0	ISU-EML
		Gross beta	55	3	5	0	0	ISU-EML
		Gamma emitters	55	3	5	0	0	ISU-EML
		Tritium	55	3	5	0	0	ISU-EML
		Enriched tritium	8	0	2	0	0	ISU-EML
		Technetium-99	5	0	0	0	0	ISU-EML
		Radiochemical	17	0	1	0	0	ISU Sub
		Metals	47	2	4	2	0	IBL
		Common Ions	47	2	4	2	0	IBL
		Nutrients	47	2	4	2	0	IBL
		Volatile Organics	7	2	1	1	0	IBL
Terrestrial								
Milk	Grab or composite	Gamma emitters	14	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	0	DEQ-INL OP
Total Test Analyses			**866**	**49**	**36**	**16**	**0**	
Total of QC Analyses (blanks, duplicates, and spikes)			**101**					
Percentage of QC analyses of total Test analyses[3]			**11.7%**					
Percentage of usable data[4]			**100%**					

[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 22. Blank analysis results for gross alpha and beta in TSP particulate air filters, second quarter, 2015.

Collection Period		Corrected volume (m^3)[1]	Gross alpha		Gross beta	
Start	Stop		Value	Uncertainty (± 2 SD)	Value	Uncertainty (± 2 SD)
04/02/15	04/09/15	1985	0.1	0.1	0.2	0.5
04/09/15	04/16/15	1985	0.0	0.1	-0.4	0.6
04/16/15	04/22/15	1985	0.0	0.1	0.0	0.5
04/22/15	04/30/15	1985	0.1	0.1	-0.4	0.5
04/30/15	05/07/15	1985	0.1	0.1	0.3	0.5
05/07/15	05/14/15	1985	-0.1	0.1	-0.1	0.5
05/14/15	05/21/15	1985	0.3	0.1	0.0	0.4
05/21/15	05/28/15	1985	0.0	0.1	0.1	0.4
05/28/15	06/04/15	1985	0.0	0.1	0.1	0.5
06/04/15	06/11/15	1985	0.2	0.1	0.4	0.5
06/11/15	06/18/15	1985	0.0	0.1	0.8	0.5
06/18/15	06/25/15	1985	0.0	0.1	0.1	0.5
06/25/15	07/02/15	1985	-0.1	0.1	0.4	0.5

Note: Concentrations and associated uncertainties (± 2 SD) 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 23. Blank analysis results for gamma spectroscopy for TSP particulate air filters, composite samples, second quarter, 2015.

Analysis Date	Beryllium-7			Ruthenium-106/Rhodium-106			Antimony-125		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/21/2015	-31	65	117	45	42	55	1	4	7

Analysis Date	Cesium-134			Cesium-137		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/21/2015	1	2	4	0	2	3

Note: Concentrations are expressed in 1 x 10^{-5}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 24. Blank analysis results for tritium in water vapor from air samples, second quarter, 2015.

Sample Number	Start Date	Collection Date	Analysis Date	Tritium		
				Concentration	± 2 SD	MDC
OP152ZTR01	5/19/2015	6/03/2015	6/15/2015	-0.01	0.07	0.13
OP152ZTR02	6/09/2015	6/10/2015	6/15/2015	0.00	0.07	0.13

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

Table 25. Radiological blank analysis results in groundwater and/or surface water, second quarter, 2015.

Sample Number	Sample Date	Concentration[1]	± 2 SD	MDC	Within Blank Criteria?
Gross Alpha					
151W104	4/20/2015	0.4	0.3	0.4	Yes
151W467	6/16/2015	0.0	0.3	0.5	Yes
151W116	5/13/2015	-0.2	0.3	0.6	Yes
Gross Beta					
151W104	4/20/2015	-0.4	0.5	0.9	Yes
151W467	6/16/2015	0.0	0.5	0.9	Yes
151W116	5/13/2015	0.4	0.6	1.0	Yes
Cesium-137					
151W104	4/20/2015	-0.8	1.4	2.5	Yes
151W467	6/16/2015	1.3	1.4	2.3	Yes
151W116	5/13/2015	0.7	1.7	2.9	Yes
Tritium					
151W105	4/20/2015	-40	80	140	Yes
151W468	6/16/2015	20	60	100	Yes
151W117	5/13/2015	10	80	140	Yes

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

Table 26. Blank analysis results (µg/L) for metals in groundwater and/or surface water, second quarter, 2015.

Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
151W107	4/20/2015	<5	<2	<5	<10	<5	33	<10	<5
151W470	6/16/2015	<5	<2	<5	<10	<5	13	<10	<5

Table 27. Blank analysis results (mg/L) for common ions and nutrients in groundwater and/or surface water, second quarter, 2015.

Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
151W108,107,106	4/20/2015	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	1	<0.01	<0.005
151W471,470,469	6/16/2015	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	<1	<0.01	<0.005

Table 28. Blank analysis results (µg/L) for VOCs in groundwater and/or surface water, second quarter, 2015.

Sample Number	Sample Date	1,1-Dichloroethene	Carbon tetrachloride	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloroethylene (PERC)	Trichloroethylene	Vinyl chloride
151W109	4/16/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
151W320	6/2/2015	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 29. Duplicate radiological analysis results in pCi/L for groundwater and/or surface water, second quarter, 2015.

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									
NRF-06	151W342	-0.5	3.7	151W348	0.2	3.7	0.7	7.8	Yes
TAN-16	151W390	0.6	1.2	151W396	0.3	0.9	0.3	2.3	Yes
USGS-008	151W248	2.1	1.0	151W253	0.9	0.9	1.2	2.0	Yes
MV-59	151W414	0.4	0.8	151W420	0.5	0.5	0.1	1.4	Yes
MV-42	151W494	1.2	0.9	151W524	1.6	0.9	0.4	1.9	Yes
Gross Beta									
NRF-06	151W342	5.2	2.9	151W348	5.3	2.9	0.1	6.2	Yes
TAN-16	151W390	3.9	1.1	151W396	3.3	1.0	0.6	2.2	Yes
USGS-008	151W248	2.0	0.9	151W253	2.8	0.9	0.8	1.9	Yes
MV-59	151W414	3.2	0.9	151W420	2.4	0.7	0.8	1.7	Yes
MV-42	151W494	4.4	0.9	151W524	4.4	0.9	0.0	1.9	Yes
Gamma Spectroscopy Cesium-137									
NRF-06	151W342	-0.2	1.3	151W348	1.1	1.9	1.3	3.5	Yes
TAN-16	151W390	0.2	1.2	151W396	1.0	1.4	0.8	2.8	Yes
USGS-008	151W248	0.0	1.4	151W253	0.9	1.9	0.9	3.5	Yes
MV-59	151W414	1.6	1.5	151W420	0.9	1.2	0.7	2.9	Yes
MV-42	151W494	-1.1	1.6	151W524	0.1	2.1	1.2	4.0	Yes
Tritium									
NRF-06	151W344	-30	70	151W350	50	80	80	159	Yes
TAN-16	151W391	160	70	151W397	200	70	40	148	Yes
USGS-008	151W249	10	80	151W254	-30	80	40	170	Yes
MV-59	151W416	10	110	151W422	30	110	20	233	Yes
MV-42	151W496	20	60	151W526	-40	110	60	188	Yes
Enriched Tritium									
USGS-067	151W062	2647	35	151W072	2516	35	131	74	Yes[2]
USGS-008	151W249	8	8	151W254	20	9	12	18	Yes
Strontium-90									
NRF-06	151W343	-0.28	0.23	151W349	-0.06	0.21	0.22	0.47	Yes

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

[2] Compared using RPD criteria.

Table 30. Duplicate results for metals (µg/L) in groundwater, second quarter, 2015.

Sample Location	Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
NRF-06 (total)	151W346	5/12/2015	<5.0	110	34	20	<5.0	<2.0	<10	<5.0
NRF-06 (total)	151W352	5/12/2015	<5.0	110	35	20	<5.0	<2.0	<10	<5.0
RPD			**0**	**0**	**-3**	**0**	**0**	**0**	**0**	**0**
TAN-16 (total)	151W393	6/2/2015	<5.0	94	5.4	20	<5.0	<2.0	<10	30
TAN-16 (total)	151W399	6/2/2015	<5.0	94	5.7	40	<5.0	<2.0	<10	32
RPD			**0**	**0**	**-5**	**-67**	**0**	**0**	**0**	**-6**
USGS-008 (dissolved)	151W251	4/13/2015	<5.0	77	<5.0	29	<5.0	2.0	<10	<5.0
USGS-008 (dissolved)	151W256	4/13/2015	<5.0	76	<5.0	23	<5.0	2.0	<10	<5.0
RPD			**0**	**1**	**0**	**23**[1]	**0**	**0**	**0**	**0**
MV-59 (dissolved)	151W418	6/11/2015	<5.0	11	<5.0	<10	<5.0	<2.0	<10	110
MV-59 (dissolved)	151W424	6/11/2015	<5.0	11	<5.0	<10	<5.0	<2.0	<10	110
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 10 µg/L).

Table 31. Duplicate results for common ions and nutrients (mg/L) in groundwater and/or surface water, second quarter, 2015.

Sample Location	Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
NRF-06	151W347,346,345	5/12/2015	130	35	150	6.0	<0.2	412	94.9	169	2.0	0.069
NRF-06	151W353,352,351	5/12/2015	130	35	150	6.1	<0.2	434	84.0	169	2.0	0.069
RPD			**0**	**0**	**0**	**-1.7**	**0**	**-5.2**	**12**	**0**	**0**	**0**
TAN-16	151W394,393,392	6/2/2015	53	16	8.0	3.0	0.219	23.7	32.7	146	1.2	0.021
TAN-16	151W400,399,398	6/2/2015	54	16	8.1	3.0	0.213	23.6	32.3	143	1.2	0.021
RPD			**-1.9**	**0**	**-1.2**	**0**	**2.8**	**0.4**	**1.2**	**2.1**	**0**	**0**
USGS-008	151W252,251,250	4/13/2015	44	15	7.0	1.8	0.225	7.65	22.7	149	0.96	0.018
USGS-008	151W257,256,255	4/13/2015	44	15	7.0	1.8	0.227	7.65	22.8	149	0.96	0.021
RPD			**0**	**0**	**0**	**0**	**-0.9**	**0**	**-0.4**	**0**	**0**	**-15**
MV-59	151W419,418,417	6/11/2015	26	13	16	3.3	0.437	13.2	19.6	113	0.76	0.013
MV-59	151W425,424,423	6/11/2015	26	13	16	3.3	0.436	13.2	19.6	114	0.76	0.016
RPD			**0**	**0**	**0**	**0**	**0.2**	**0**	**0**	**-0.9**	**0**	**-21**[1]

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 0.005 mg/L).

Table 32. Duplicate results for VOCs (µg/L) in groundwater, second quarter, 2015.

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-16	6/2/2015	151W395	<0.5	<0.5	0.69	0.25	4.9	40	<0.5
TAN-16	6/2/2015	151W401	<0.5	<0.5	0.65	0.22	5.1	42	<0.5
RPD			**0**	**0**	**2.8**	**13**	**-4.0**	**-4.9**	**0**

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

Table 33. De-ionized water spike results (in µg/L) and percent recovery for metals in groundwater and/or surface water, second quarter, 2015.

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
151W113	4/15/2015	61.7	63	**102**	15.0	15.0	**100**	7.74	8.3	**107**	8.31	9.1	**109**	30.2	30	**99**
151W125	6/9/2015	40.3	38	**94**	11.2	11.0	**98**	5.79	5.8	**100**	6.21	6.6	**106**	22.6	22	**97**

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

Table 34. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in groundwater and/or surface water, second quarter, 2015.

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
151W113,112	4/15/2015	19.1	19.0	**99**	4.85	4.8	**99**	9.94	9.9	**100**	1.99	2.0	**100**	1.35	1.57	**116**
151W125,124	6/9/2015	12.5	13.0	**104**	3.17	3.2	**101**	6.49	6.6	**102**	1.30	1.3	**100**	1.70	1.64	**96**

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

Table 34. continued. De-ionized water spike results (in mg/L) and percent recovery for common ions and nutrients in groundwater and/or surface water, second quarter, 2015.

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
151W113,112	4/15/2015	39.3	38.9	**99**	17.6	17.6	**100**	141	135	**96**	1.39	1.4	**101**	0.018	0.017	**94**
151W125,124	6/9/2015	48.4	47.9	**99**	17.5	17.0	**97**	35.5	35	**99**	2.02	2.0	**99**	0.024	0.022	**92**

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

Table 35. De-ionized water spike results (in µg/L) and percent recovery for VOCs in groundwater and/or surface water, second quarter, 2015.

Spike Sample Number	Sample Date	Styrene			Tetrachloroethylene			Trichloroethylene			Carbon Tetrachloride			Vinyl Chloride		
		Spike	Result	%R[1]	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R	Spike	Result	%R
151W115	4/15/2015	10.6	8.4	**79**	8.97	8.2	**91**	10.1	11.0	**109**	7.06	6.5	**92**	10.8	11.0	**102**

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

Table 36. Electret ionization chamber irradiation results (categorized as spiked samples), second quarter, 2015.

Electret #	Exposure Received		Net Measured Exposure[1]		%R
	(mR)	Uncertainty (±1 SD, mR)	(mR)	Uncertainty (±1 SD, mR)	
SG0601	40.0	2.0	35.5	1.3	89
SGP605	40.0	2.0	35.0	1.3	87
SG0599	40.0	2.0	35.2	1.3	88
				avg %R:	**88**
SG0587	30.0	1.5	27.0	1.3	90
SGP585	30.0	1.5	25.4	1.3	85
SGP669	30.0	1.5	26.0	1.3	86
				avg %R:	**87**
SGP587	20.0	1.0	17.2	1.3	86
SG0589	20.0	1.0	18.6	1.3	93
SGO560	20.0	1.0	18.8	1.2	94
				avg %R:	**91**

Note: The average percent recovery (%R) of 100 ± 25 is considered acceptable

[1] Net measured exposure estimate includes a correction for atmospheric pressure.

Table 37. Air sampling field equipment service reliability (percent operational), second quarter, 2015.

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%	92%	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, 2015.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
On-Site Locations						
Big Lost River Rest Area	04/02/15	04/09/15	1.2	0.3	22.6	1.1
	04/09/15	04/16/15	0.7	0.2	19.8	1.1
	04/16/15	04/22/15	1.0	0.3	27.9	1.3
	04/22/15	04/30/15	1.2	0.2	24.8	1.0
	04/30/15	05/07/15	1.5	0.3	41.1	1.4
	05/07/15	05/14/15	1.1	0.3	29.1	1.2
	05/14/15	05/21/15	0.3	0.1	13.7	0.9
	05/21/15	05/28/15	0.8	0.2	23.8	1.1
	05/28/15	06/04/15	0.8	0.2	26.9	1.1
	06/04/15	06/11/15	1.2	0.3	38.4	1.3
	06/11/15	06/18/15	1.2	0.3	35.0	1.3
	06/18/15	06/25/15	1.1	0.3	33.3	1.3
	06/25/15	07/02/15	1.6	0.3	40.9	1.4
Experimental Field Station	04/02/15	04/09/15	0.8	0.2	18.3	1.0
	04/09/15	04/16/15	0.5	0.2	15.2	1.0
	04/16/15	04/22/15	1.0	0.3	22.0	1.2
	04/22/15	04/30/15	1.0	0.2	20.2	1.0
	04/30/15	05/07/15	1.4	0.3	33.2	1.3
	05/07/15	05/14/15	0.8	0.2	23.5	1.1
	05/14/15	05/21/15	0.5	0.2	11.5	0.8
	05/21/15	05/28/15	0.6	0.2	18.9	1.1
	05/28/15	06/04/15	0.7	0.3	19.6	1.2
	06/04/15	06/11/15	1.0	0.2	29.4	1.2
	06/11/15	06/18/15	0.9	0.3	26.1	1.2
	06/18/15	06/25/15	1.1	0.3	24.1	1.1
	06/25/15	07/02/15	1.1	0.3	30.4	1.2
Sand Dunes Tower	04/02/15	04/09/15	0.7	0.2	14.4	0.9
	04/09/15	04/16/15	0.5	0.2	13.6	0.9
	04/16/15	04/22/15	0.5	0.2	14.9	1.0
	04/22/15	04/30/15	0.6	0.2	14.7	0.8
	04/30/15	05/07/15	1.0	0.2	24.9	1.1
	05/07/15	05/14/15	0.5	0.2	19.4	1.0
	05/14/15	05/21/15	0.4	0.1	8.4	0.7
	05/21/15	05/28/15	0.6	0.2	14.5	0.8
	05/28/15	06/04/15	0.4	0.2	14.0	0.8
	06/04/15	06/11/15	0.6	0.2	22.3	1.0
	06/11/15	06/18/15	0.5	0.2	20.1	1.0
	06/18/15	06/25/15	0.7	0.2	20.0	1.0
	06/25/15	07/02/15	0.9	0.2	24.1	1.0

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, 2015.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Van Buren Avenue	04/02/15	04/09/15	0.8	0.2	16.3	0.9
	04/09/15	04/16/15	0.5	0.2	15.9	1.0
	04/16/15	04/22/15	0.6	0.2	19.8	1.1
	04/22/15	04/30/15	0.7	0.2	16.3	0.9
	04/30/15	05/07/15	1.3	0.2	31.1	1.2
	05/07/15	05/14/15	0.7	0.2	21.1	1.0
	05/14/15	05/21/15	0.4	0.2	9.6	0.8
	05/21/15	05/28/15	0.6	0.2	16.6	0.9
	05/28/15	06/04/15	0.5	0.2	17.6	1.0
	06/04/15	06/11/15	0.8	0.2	25.8	1.1
	06/11/15	06/18/15	0.8	0.2	26.7	1.1
	06/18/15	06/25/15	0.8	0.2	22.6	1.1
	06/25/15	07/02/15	1.0	0.2	29.6	1.2
Boundary Locations						
Atomic City	04/02/15	04/09/15	1.0	0.2	18.5	1.0
	04/09/15	04/16/15	1.2	0.4	25.9	1.6
	04/16/15	04/22/15	1.2	0.3	22.0	1.2
	04/22/15	04/30/15	0.8	0.2	19.3	0.9
	04/30/15	05/07/15	1.6	0.3	33.4	1.2
	05/07/15	05/14/15	0.9	0.2	24.0	1.1
	05/14/15	05/21/15	0.5	0.2	10.4	0.8
	05/21/15	05/28/15	0.4	0.2	19.5	1.0
	05/28/15	06/04/15	0.8	0.2	19.5	1.0
	06/04/15	06/11/15	0.9	0.2	28.6	1.1
	06/11/15	06/18/15	0.8	0.2	28.5	1.1
	06/18/15	06/25/15	0.8	0.2	26.1	1.1
	06/25/15	07/02/15	1.2	0.3	32.7	1.2
Howe	04/02/15	04/09/15	0.9	0.2	15.6	1.0
	04/09/15	04/16/15	1.4	0.3	16.8	1.0
	04/16/15	04/22/15	0.7	0.3	17.6	1.1
	04/22/15	04/30/15	0.9	0.2	17.9	0.9
	04/30/15	05/07/15	1.4	0.3	29.1	1.2
	05/07/15	05/14/15	0.7	0.2	19.8	1.0
	05/14/15	05/21/15	0.5	0.2	9.8	0.8
	05/21/15	05/28/15	0.3	0.2	16.7	1.0
	05/28/15	06/04/15	0.4	0.2	18.5	1.0
	06/04/15	06/11/15	0.8	0.2	28.5	1.2
	06/11/15	06/18/15	0.6	0.2	26.2	1.1
	06/18/15	06/25/15	0.8	0.2	25.0	1.1
	06/25/15	07/02/15	0.9	0.2	29.0	1.2

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, 2015.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Monteview	04/02/15	04/09/15	1.1	0.2	16.7	1.0
	04/09/15	04/16/15	0.7	0.2	16.0	1.0
	04/16/15	04/22/15	0.7	0.3	22.1	1.2
	04/22/15	04/30/15	1.5	0.3	21.1	1.0
	04/30/15	05/07/15	1.3	0.3	29.5	1.2
	05/07/15	05/14/15	1.0	0.2	22.0	1.1
	05/14/15	05/21/15	0.3	0.1	9.3	0.8
	05/21/15	05/28/15	0.5	0.2	16.5	0.9
	05/28/15	06/04/15	0.6	0.2	19.6	1.0
	06/04/15	06/11/15	1.0	0.2	29.2	1.2
	06/11/15	06/18/15	0.7	0.2	28.4	1.2
	06/18/15	06/25/15	1.1	0.3	26.2	1.1
	06/25/15	07/02/15	1.8	0.3	33.3	1.3
Mud Lake	04/02/15	04/09/15	1.4	0.3	23.7	1.1
	04/09/15	04/16/15	1.3	0.3	23.5	1.1
	04/16/15	04/22/15	1.0	0.3	25.4	1.3
	04/22/15	04/30/15	1.6	0.3	27.8	1.1
	04/30/15	05/07/15	2.1	0.3	46.4	1.5
	05/07/15	05/14/15	1.0	0.3	28.7	1.2
	05/14/15	05/21/15	0.4	0.2	12.8	0.8
	05/21/15	05/28/15	0.9	0.2	23.6	1.1
	05/28/15	06/04/15	0.9	0.2	25.9	1.1
	06/04/15	06/11/15	1.4	0.3	38.1	1.3
	06/11/15	06/18/15	1.3	0.3	36.3	1.3
	06/18/15	06/25/15	1.5	0.3	35.4	1.3
	06/25/15	07/02/15	1.8	0.3	44.1	1.5
Distant Locations						
Craters of the Moon	04/02/15	04/09/15	0.5	0.2	14.8	0.9
	04/09/15	04/16/15	0.5	0.2	14.8	1.0
	04/16/15	04/22/15	0.5	0.2	19.0	1.2
	04/22/15	04/30/15	0.7	0.2	15.9	0.9
	04/30/15	05/07/15	1.3	0.3	29.7	1.3
	05/07/15	05/14/15	0.7	0.2	20.0	1.0
	05/14/15	05/21/15	0.3	0.1	9.3	0.8
	05/21/15	05/28/15	0.3	0.2	16.9	1.0
	05/28/15	06/04/15	0.5	0.2	17.0	1.0
	06/04/15	06/11/15	0.9	0.2	26.1	1.2
	06/11/15	06/18/15	0.5	0.2	22.0	1.1
	06/18/15	06/25/15	0.7	0.2	20.0	1.0
	06/25/15	07/02/15	0.9	0.2	26.1	1.2

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, 2015.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Fort Hall[1]	04/02/15	04/09/15	0.9	0.2	15.7	0.9
	04/09/15	04/16/15	0.6	0.2	13.0	0.9
	04/16/15	04/22/15	0.6	0.2	16.5	1.1
	04/22/15	04/30/15	1.0	0.2	15.7	0.9
	04/30/15	05/07/15	1.1	0.2	23.6	1.1
	05/07/15	05/14/15	0.8	0.2	19.1	1.0
	05/14/15	05/21/15	0.4	0.2	9.0	0.7
	05/21/15	05/28/15	0.4	0.2	13.7	0.9
	05/28/15	06/04/15	0.7	0.2	16.1	0.9
	06/04/15	06/11/15	0.9	0.2	21.4	1.0
	06/11/15	06/18/15	0.8	0.2	23.2	1.1
	06/18/15	06/25/15	1.3	0.3	22.9	1.1
	06/25/15	07/02/15	1.2	0.3	27.2	1.1
Idaho Falls - HVP 3804	04/02/15	04/09/15	1.3	0.3	24.3	1.2
	04/09/15	04/16/15	1.0	0.3	19.4	1.1
	04/16/15	04/22/15	1.0	0.3	27.0	1.3
	04/22/15	04/30/15	1.9	0.4	24.4	1.4
	04/30/15	05/07/15	2.0	0.3	38.3	1.4
	05/07/15	05/14/15	1.1	0.3	29.2	1.2
	05/14/15	05/21/15	0.6	0.2	13.1	0.9
	05/21/15	05/28/15	0.6	0.2	21.4	1.1
	05/28/15	06/04/15	0.6	0.2	23.2	1.1
	06/04/15	06/11/15	1.1	0.3	32.1	1.3
	06/11/15	06/18/15	1.3	0.3	31.9	1.2
	06/18/15	06/25/15	1.5	0.5	40.7	2.1
	06/25/15	07/02/15	1.2	0.3	38.4	1.4
Idaho Falls - HVP 4304[2]	04/02/15	04/09/15	1.2	0.3	22.2	1.1
	04/09/15	04/16/15	1.1	0.3	16.1	1.0
	04/16/15	04/22/15	0.7	0.3	23.4	1.2
	04/22/15	04/30/15	1.5	0.3	23.2	1.3
	04/30/15	05/07/15	1.3	0.3	34.7	1.3
	05/07/15	05/14/15	1.0	0.2	28.2	1.2
	05/14/15	05/21/15	0.5	0.2	11.9	0.8
	05/21/15	05/28/15	0.5	0.2	19.9	1.0
	05/28/15	06/04/15	0.7	0.2	21.5	1.0
	06/04/15	06/11/15	0.9	0.2	27.7	1.2
	06/11/15	06/18/15	1.0	0.3	32.0	1.2
	06/18/15	06/25/15	2.1	0.5	33.3	1.9
	06/25/15	07/02/15	1.4	0.3	33.6	1.3

[1] Operated by Shoshone Bannock-Tribes.

[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, 2015.

Sample Location	Net Corrected Exposure Rate (µR/hr)[1]	± 2 SD (µR/hr)
Arco	12.6	3.3
Craters of the Moon	9.7, 12.0	
Big Lost River Rest Area	13.4	0.4
Van Buren Avenue	14.0, 15.4	
Experimental Field Station	13.2	2.1
Main Gate	12.6, 13.7	
Atomic City	16.1, 16.8	
Taber	11.8, 13.8	
Blackfoot	12.8	1.3
Ft. Hall[2]	16.6, 17.3	
Idaho Falls	11.6	3.5
Mud Lake/ Terreton	12.8	2.5
Monteview	10.2, 10.2	
Sand Dunes Tower	16.8, 17.1	
Howe Met. Tower	14.2	2.9
MP276 -20	12.5	2.4
MP274 -20	10.7	1.8
MP272 -20	10.4, 12.0	
MP270 -20	10.1, 10.2	
MP268 -20	10.7	3.3
MP266 -20	11.8	3.0
MP264 -20	10.9	1.0
MP270 -20/26	13.0, 13.8	
MP268 -20/26	13.2, 15.4	
MP266 -20/26	15.2	2.3
MP263 -20/26	14.4, 16.3	
MP261 -20/26	8.7, 10.1	
MP259 -20/26	10.7	0.6
MFC (EBR II)	11.7	3.0
EBR I	9.4	2.5
RWMC	11.9	2.8
CFA	10.2, 11.9	
CITRC (PBF)	15.6, 16.5	
INTEC	15.7	2.6
ATR (TRA)	15.2	1.9
NRF	15.7	0.8
TAN/SMC	10.8	2.4
Mud Lake Bank of Commerce	17.2, 20.3	
MP43-33	10.9, 11.6	
MP41-33	14.9, 15.6	
MP39-33	13.7	3.3
MP 37-33	11.0	0.8
MP35-33	9.0	0.8
MP33-33	13.1	3.3
MP31-33	15.4	3.4
MP29-33	15.8	3.5
MP27-33	12.8, 15.0	
MP25-33	10.6	2.1

Table B-1 continued. Results for all electret locations, second quarter, 2015.

Sample Location	Net Corrected Exposure Rate (µR/hr)[1]	± 2 SD (µR/hr)
MP23-33	8.0	1.2
Base of Howe	17.2, 17.2	
Rover	11.6, 15.3	
Hamer	17.0, 17.9	
Sugar City	17.0, 19.4	
Roberts	13.9	2.6
Big Southern Butte	13.7	2.6

[1]Results are the average of triplicate exposure rate measurements with the associated sample variability (±2 SD), or the 2 measured exposure rates remaining after removal of an outlying value. One of the triplicate measurements is rejected if it is outside the average of the triplicate measurements ±2 SD of the historical population variability. Typically, the two most consistent measurements are reported, based on judgment of the data analyst.
[2]Station operated by Shoshone-Bannock Tribes.

Appendix C

Table C-1. List of volatile organic compounds (VOCs) analyzed for water samples.

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	1.0
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.

Analyte	Minimum detectable concentrations (MDC) (expressed in µg/L)
4-Chlorotoluene	0.5
1,2-Dibromo-3-chloropropane (DBCP)	0.5
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	1.0
Hexachlorobutadiene	0.5
Isopropylbenzene	0.5
p-Isopropyltoluene	0.5
Methyl Tert Butyl Ether (MTBE)	0.5
Naphthalene	0.5
n-Propylbenzene	0.5
1,1,1,2-Tetrachloroethane	0.5
1,1,2,2-Tetrachloroethane	0.5
1,2,3-Trichlorobenzene	0.5
Trichlorofluoromethane	0.5
1,2,3-Trichloropropane	0.5
1,2,4-Trimethylbenzene	1.0
1,3,5-Trimethylbenzene	0.5