Department of Environmental Quality
INL Oversight Program

ENVIRONMENTAL SURVEILLANCE PROGRAM QUARTERLY DATA REPORT

July – September, 2014

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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
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
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
NCRP	-	National Council on Radiation Protection and Measurements
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 third quarter, 2014 (**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 third 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 third quarter of 2014 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 third 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. Among the weighted means, atmospheric tritium was measured above the minimum detectable concentration (MDC) during the third quarter of 2014 at Experimental Field Station: 1.50 pCi/m^3 (MDC 1.20 pCi/m^3). There is one individual sample within the weighted mean that also exceeds MDC located at the Big Lost River Rest Area station: 1.99 pCi/m^3 (MDC 1.61 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 third quarter of 2014. Precipitation samples were analyzed for tritium and gamma-emitting radionuclides. Tritium and gamma-emitting radionuclides were below minimum detectable concentration in precipitation collected during the third quarter of 2014. Tritium and Cesium-137 analysis results are presented in **Table 5**. Reported values were either the result of a single sample or a weighted mean when more than one precipitation sample was collected during the calendar quarter.

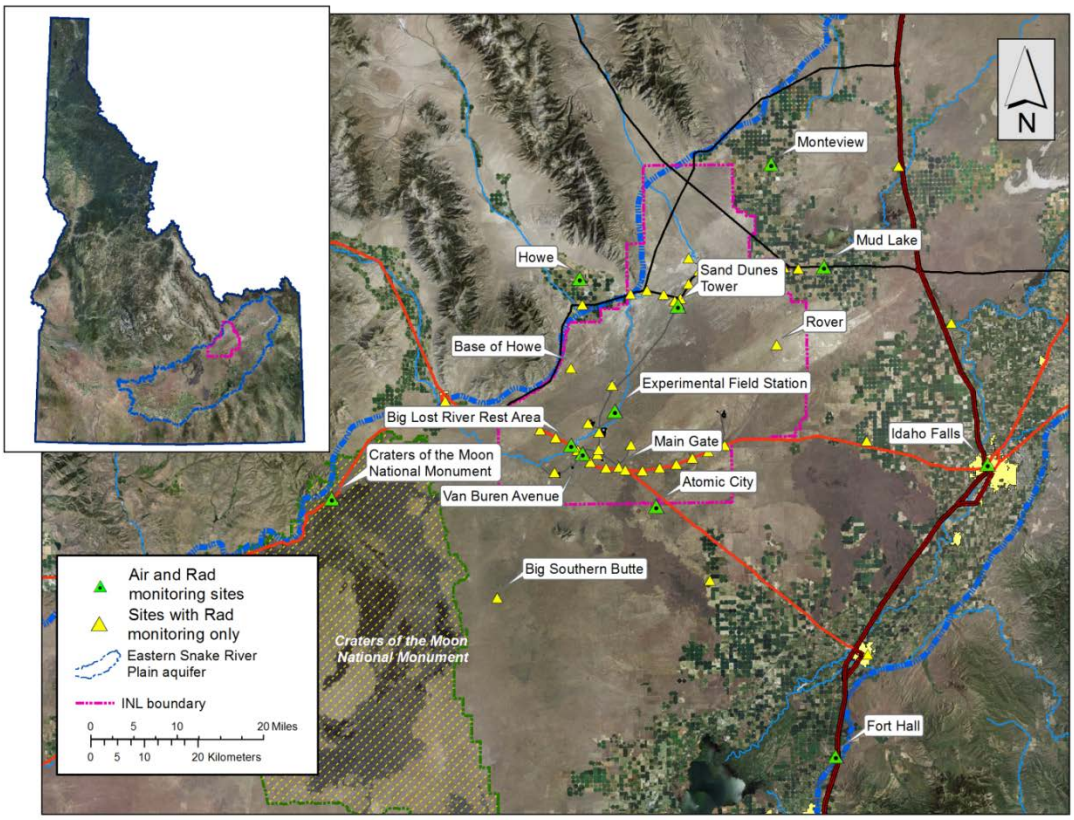

Figure 1. Air and radiation monitoring sites.

Table 1. Sampling locations and sample type.

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

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

Table 2. Range of gross alpha and gross beta concentrations for TSP filters, third quarter, 2014.

Station Location	Concentration					
	Gross Alpha			Gross Beta		
On-Site Locations						
Big Lost River Rest Area	0.8	-	2.2	18.8	-	46.5
Experimental Field Station	0.6	-	1.2	15.8	-	37.1
Sand Dunes Tower	0.3	-	1.2	11.3	-	31.0
Van Buren Avenue	0.3	-	1.5	12.7	-	34.6
Boundary Locations						
Atomic City	0.6	-	2.0	14.6	-	37.0
Howe	0.3	-	1.1	13.4	-	32.0
Monteview	0.5	-	1.5	16.3	-	38.2
Mud Lake	0.7	-	1.9	20.2	-	49.8
Distant Locations						
Craters of the Moon	0.4	-	1.3	12.8	-	30.1
Fort Hall[1]	0.4	-	1.2	13.8	-	27.7
Idaho Falls – HVP 3804	0.7	-	1.9	20.0	-	45.4
Idaho Falls – HVP 4304	0.6	-	1.7	18.6	-	40.5

[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, third quarter, 2014.

Station Location	Naturally Occurring Radionuclide Beryllium-7		Man-Made Gamma Emitting Radionuclides
	Concentration	± 2 SD	
On-site Locations			
Big Lost River Rest Area	92.5	4.8	<MDC[2]
Experimental Field Station	76.7	4.1	<MDC
Sand Dunes Tower	63.1	3.3	<MDC
Van Buren Avenue	70.3	3.7	<MDC
Boundary Locations			
Atomic City	72.3	3.9	<MDC
Howe	70.2	3.8	<MDC
Monteview	79.9	4.1	<MDC
Mud Lake	103.6	5.5	<MDC
Distant Locations			
Craters of the Moon	70.1	3.7	<MDC
Fort Hall[1]	68.1	3.6	<MDC
Idaho Falls – HVP 3804	99.4	5.4	<MDC
Idaho Falls – HVP 4304	85.0	4.4	<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, third quarter, 2014

Station Location	Tritium		
	Concentration	± 2 SD	MDC
On-site Locations			
Big Lost River Rest Area	0.67	0.66	1.09
Experimental Field Station	1.50	0.75	1.20
Sand Dunes Tower	0.45	0.77	1.24
Van Buren Avenue	0.38	0.68	1.13
Boundary Locations			
Atomic City	0.19	0.33	0.54
Howe	0.56	0.75	1.26
Mud Lake	0.52	0.82	1.33
Monteview	0.10	0.81	1.35
Distant Locations			
Craters of the Moon	-0.11	0.49	0.83
Fort Hall[1]	0.57	0.77	1.23
Idaho Falls	0.18	0.79	1.30

[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, third quarter, 2014.

Station Location	Tritium			Cesium-137		
	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
On-site Locations						
Big Lost River Rest Area	70	80	130	1.1	1.9	3.2
Boundary Locations						
Atomic City	40	80	130	0.2	1.3	2.2
Howe	60	80	130	-0.6	1.7	3.0
Monteview	70	80	130	-0.2	1.6	2.8
Mud Lake	40	80	130	0.8	1.3	2.1
Distant Locations						
Idaho Falls	30	80	130	0.0	1.5	2.6

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 monitoring stations during the third quarter of 2014 (**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 EIC's 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 third quarter 2014. **Table 8** lists the EIC monitoring results for third quarter 2014. 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, third quarter, 2014, from HPIC network.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average	± 2 SD
On-site Locations		
Base of Howe	15.8	1.2
Big Lost River Rest Area	14.9	2.8
Main Gate	14.6	1.0
Rover	16.3	1.0
Sand Dunes Tower	13.3	0.9
Boundary Locations		
Atomic City	13.5	1.0
Big Southern Butte	15.2	0.8
Howe Met Tower	12.7	1.7
Monteview	13.3	0.9
Mud Lake/Terreton	14.0	1.1
Distant Locations		
Fort Hall[1]	10.9	1.2
Idaho Falls	12.5	1.4

[1]Operated by Shoshone-Bannock Tribes.

Table 8. Electret ionization chamber (EIC) cumulative average exposure rates, third quarter, 2014.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average[1]	± 2 SD
On-site Locations		
Base of Howe	10.3	2.0
Big Lost River Rest Area	10.8	0.4
Experimental Field Station	14.5	3.1
Main Gate	12.4	1.8
Rover	12.0, 12.2	
Sand Dunes Tower	14.1	3.4
Van Buren Avenue	16.4	3.1
Boundary Locations		
Atomic City	12.0	3.1
Big Southern Butte	14.9	2.7
Howe Met Tower	11.4	2.4
Monteview	13.1	0.8
Mud Lake / Terreton	13.8	3.0
Distant Locations		
Craters of the Moon	13.1, 13.3	
Fort Hall[2]	11.6	1.6
Idaho Falls	9.8	1.0

[1]Results are the average of triplicate measurements with the associated variability (±2 SD), or of two measured exposure rates remaining after deletion of an outlying value, based on the historical population variability (reject if outside ±2 SD) and 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 third quarter of 2014, 1 up-gradient, 1 facility, 1 boundary, and 17 distant locations were sampled. The boundary location (USGS-103) is a Westbay™ packer sampling system which allows water samples to be collected from discrete levels or zones within the well. USGS-103 was sampled at a depth of 1269.4 feet below land surface (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 7 distant locations and was 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 at all but one location sampled during this quarter. Concentrations observed for all up-gradient, facility, boundary, and distant locations were consistent with historical trends. 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 radioactivity was not detected at any of the sampled locations. Results for gross alpha; gross beta; and man-made, gamma emitting ^{137}Cs are shown in **Table 9**.

Using the standard analytical method, ^{3}H was detected at USGS-103, located along the INL southern boundary (**Table 10**). The ^{3}H concentration of 300 pCi/L is 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. Seven sites were analyzed using the enrichment method for the current quarter; also sample analyses from seventeen sites collected during previous quarters were completed and presented during this quarter (**Table 11**). A backlog of 21 samples remains.

Samples were also analyzed for metals and the results shown in **Table 12**. All results were within their expected ranges. Common ion results are shown in **Table 13** and nutrient results are shown in **Table 14**. All results are consistent with historical values at those locations.

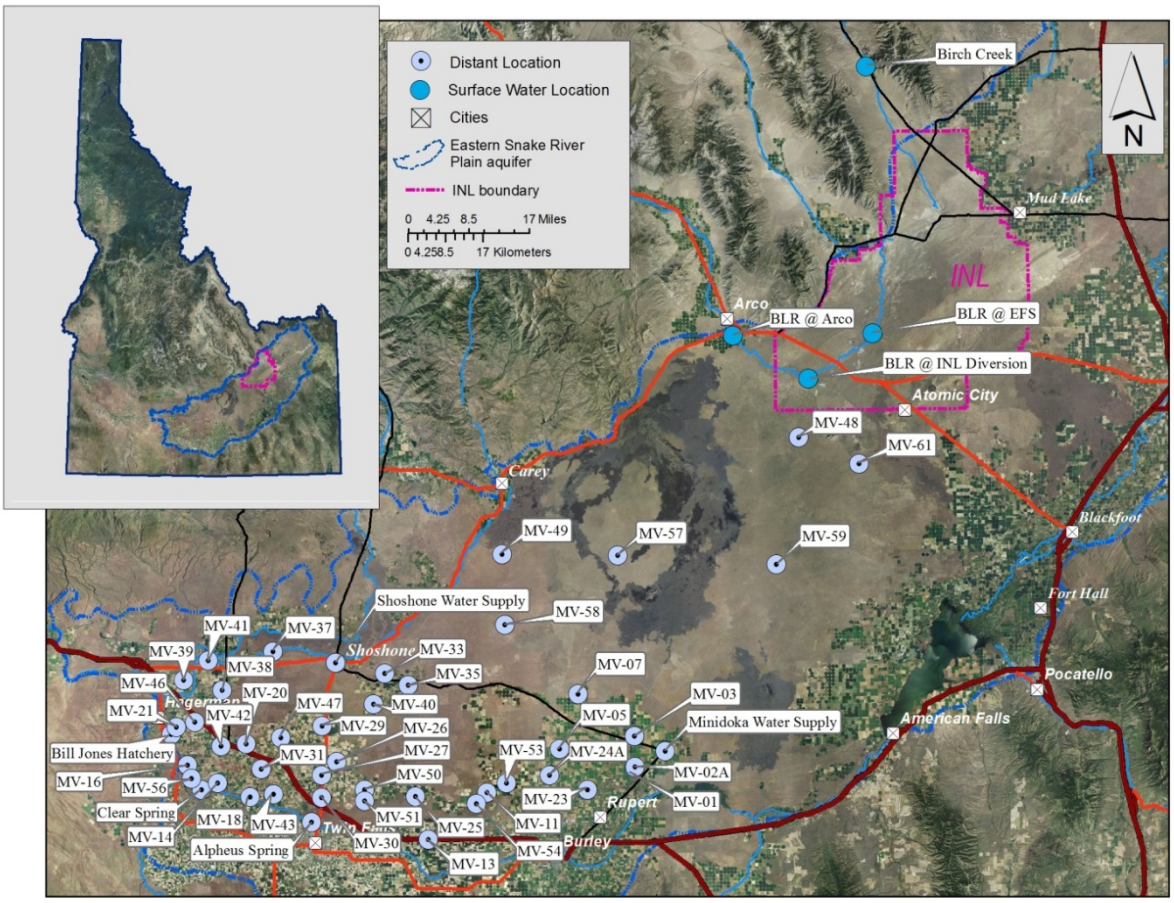

Figure 2. Distant and Surface Water monitoring locations.

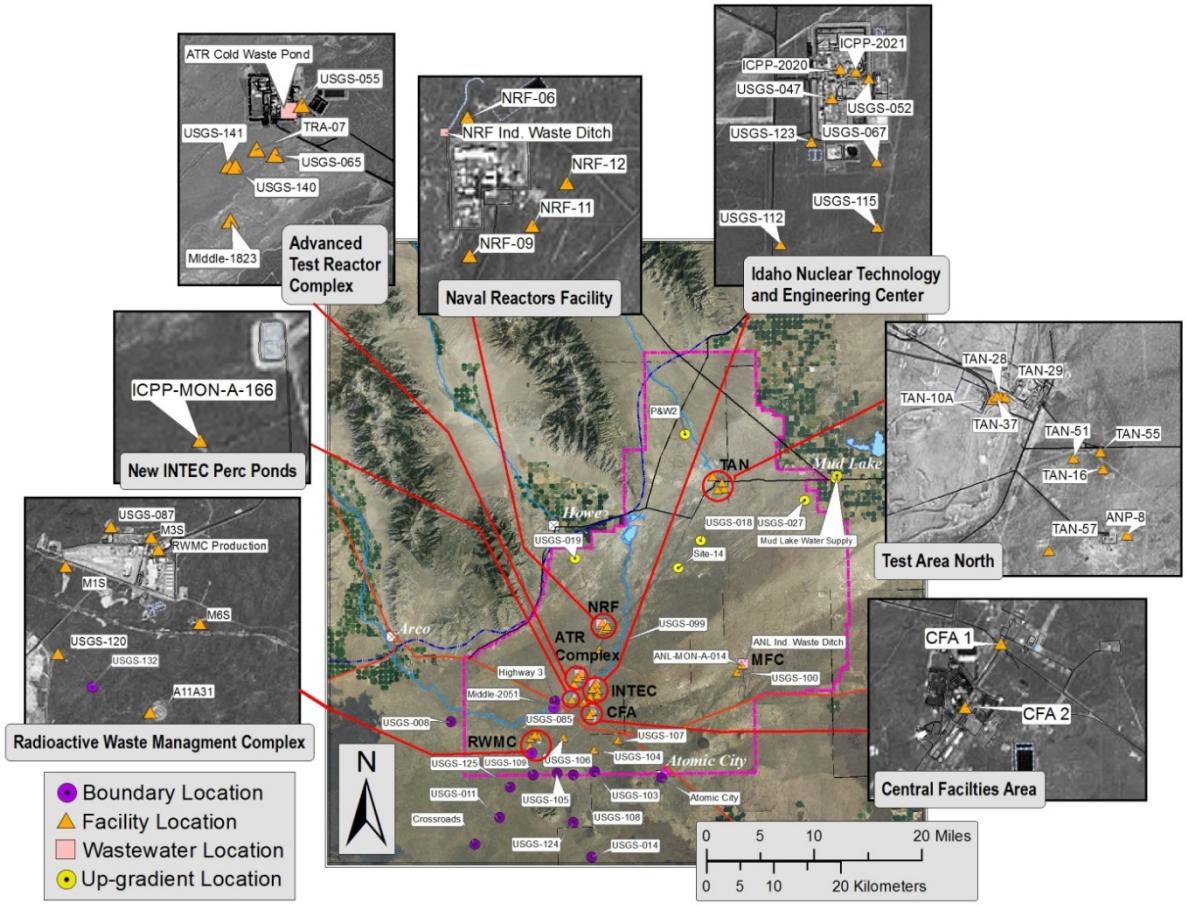

Figure 3. Upgradient, facility, boundary, and wastewater monitoring locations.

Table 9. Gross alpha, gross beta, and gamma-emitting radionuclide concentrations for water samples, third quarter, 2014.

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	8/18/2014	0.2	U	0.6	4.3		0.8	-0.3	U	1.6
Facility										
ICPP-MON-A-166	9/10/2014	0.7	U	0.8	3.5		0.9	0.6	U	1.3
Boundary										
USGS-103 (1269.4 ftbls)	7/8/2014	0.4	U	1.0	2.0		0.8	-0.5	U	1.3
Distant										
Alpheus Spring	8/13/2014	1.9	U	1.9	6.8		2.0	0.8	U	1.4
Bill Jones Hatchery	8/13/2014	0.4	U	0.8	4.2		0.9	-0.6	U	1.3
Clear Spring	8/13/2014	-0.3	U	0.9	4.0		1.0	-0.2	U	2.2
Minidoka Water Supply	8/13/2014	1.3	U	1.1	4.4		1.0	-0.3	U	0.7
MV-01	7/21/2014	2.8		1.5	8.4		1.2	0.8	U	1.5
MV-11	7/21/2014	3.7		2.3	11.4		2.3	0.7	U	2.0
MV-18	7/22/2014	2.9	U	2.0	4.2		2.0	-0.1	U	1.2
MV-21	7/22/2014	1.3	U	1.0	4.8		1.0	0.6	U	2.0
MV-23	7/21/2014	1.4	U	1.8	5.8		2.0	0.1	U	1.8
MV-24A	7/21/2014	5.7		2.4	8.1		2.2	-0.2	U	1.3
MV-27	8/20/2014	3.6		2.1	3.8		1.9	-1.0	U	1.5
MV-30	7/21/2014	1.0	U	1.8	6.8		2.0	1.7	U	2.1
MV-37	7/22/2014	2.3		1.3	4.4		1.0	-0.6	U	1.5
MV-39	8/13/2014	3.7		2.1	2.9	U	1.9	0.2	U	1.9
MV-40	8/13/2014	1.1	U	0.9	3.0		0.9	0.4	U	1.5
MV-50	7/21/2014	1.2	U	1.8	6.6		2.0	-1.6	U	1.6
Shoshone Water Supply	8/13/2014	1.9		1.2	3.6		1.0	0.2	U	1.6

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations with associated uncertainties (±2 SD) expressed in pCi/L.

Table 10. Tritium concentrations for water samples, third quarter, 2014.

Sample Location	Sample Date	Tritium		
		Concentration[1,2]		±2 SD
Up-gradient				
Mud Lake Water Supply	8/18/2014	70	U	80
Facility				
ICPP-MON-A-166	9/10/2014	50	U	110
Boundary				
USGS-103 (1269.4 ftbls)	7/8/2014	300		110
Distant				
Alpheus Spring	8/13/2014	30	U	70
Bill Jones Hatchery	8/13/2014	20	U	70
Clear Spring	8/13/2014	80	U	80
Minidoka Water Supply	8/13/2014	10	U	70
MV-01	7/21/2014	20	U	70
MV-11	7/21/2014	10	U	80
MV-18	7/22/2014	30	U	80
MV-21	7/22/2014	-60	U	70
MV-23	7/21/2014	20	U	80
MV-24A	7/21/2014	10	U	80
MV-27	8/20/2014	-10	U	70
MV-30	7/21/2014	70	U	80
MV-37	7/22/2014	10	U	80
MV-39	8/13/2014	20	U	70
MV-40	8/13/2014	-60	U	110
MV-50	7/21/2014	40	U	70
Shoshone Water Supply	8/13/2014	60	U	70

[1]Data qualifiers: U = non-detection, J = estimate, R = rejected.
[2]Concentrations with associated uncertainties (±2 SD) expressed in pCi/L.

Table 11. Enriched Tritium concentrations for water samples from current and previous sampling quarters.

Sample Location	Sample Date	Enriched Tritium		
		Concentration[1,2]		±2 SD
Up-gradient				
Mud Lake Water Supply	5/15/2014	-1	U	5
USGS-019	4/16/2013	8	U	8
Facility				
ANP-8	5/14/2014	62		8
NRF-06	5/13/2014	24		7
NRF-09	5/13/2014	27		7
NRF-11	5/13/2014	22		7
NRF-12	5/13/2014	17		7
USGS-099	5/14/2014	7	U	5
Boundary				
Crossroads	4/30/2014	13		6
Middle-2051 (1091.1 ftbls)	6/18/2014	179		11
USGS-103 (1269.4 ftbls)	7/8/2014	249		13
USGS-108 (1174.0 ftbls)	6/24/2014	77		10
USGS-132 (765.4 ftbls)	6/17/2014	226		12
Distant				
Alpheus Spring	5/12/2014	12	U	6
Bill Jones Hatchery	5/12/2014	4	U	6
Bill Jones Hatchery	8/13/2014	16		8
Clear Spring	5/12/2014	5	U	6
Minidoka Water Supply	5/12/2014	11		6
MV-01	7/21/2014	16		8
MV-11	7/21/2014	8	U	6
MV-21	7/22/2014	6	U	7
MV-23	7/21/2014	23		8
MV-24A	7/21/2014	15		7
Shoshone Water Supply	5/12/2014	10		5

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

[2]Concentrations with associated uncertainties (±2 SD) expressed in pCi/L.

Table 12. Reported metals concentrations in water samples, third quarter, 2014.

Sample Location	Sample Date	Concentration[1,2]															
		Arsenic		Barium		Chromium		Iron		Lead		Manganese		Selenium		Zinc	
Up-gradient																	
Mud Lake Water Supply	8/18/2014	9.1		20		<5.0	U	<10	U	<5.0	U	39		<10	U	<5.0	U
Facility																	
ICPP-MON-A-166	9/10/2014	<5.0	U	49		5.7		12		<5.0	U	13		<10	U	<5.0	U
Boundary																	
USGS-103 (1269.4 ftbls)	7/8/2014	<5.0	U	47		6.5		<10	U	<5.0	U	<2.0	U	<10	U	65	
Distant																	
Alpheus Spring	8/13/2014	<5.0	U	87		<5.0	U	55		<5.0	U	<2.0	U	<10	U	<5.0	U
Bill Jones Hatchery	8/13/2014	<5.0	U	22		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Clear Spring	8/13/2014	<5.0	U	38		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Minidoka Water Supply	8/13/2014	<5.0	U	37		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	39	
MV-01	7/21/2014	<5.0	U	68		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-11	7/21/2014	<5.0	U	110		<5.0	U	160		<5.0	U	<2.0	U	<10	U	<5.0	U
MV-18	7/22/2014	<5.0	U	66		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-21	7/22/2014	<5.0	U	21		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-23	7/21/2014	<5.0	U	94		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	32	
MV-24A	7/21/2014	<5.0	U	130		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	79	
MV-27	8/20/2014	<5.0	U	63		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-30	7/21/2014	<5.0	U	81		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	25	
MV-37	7/22/2014	<5.0	U	47		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	8.7	
MV-39	8/13/2014	<5.0	U	67		<5.0	U	<10	U	<5.0	U	6.8		<10	U	55	
MV-40	8/13/2014	<5.0	U	18		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
MV-50	7/21/2014	<5.0	U	64		<5.0	U	<10	U	<5.0	U	<2.0	U	<10	U	<5.0	U
Shoshone Water Supply	8/13/2014	<5.0	U	43		<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 13. Reported common ion concentrations in water samples, third quarter, 2014.

Sample Location	Sample Date	Concentration[1,2]															
		Calcium		Magnesium		Sodium		Potassium		Fluoride		Chloride		Sulfate		Alkalinity[3]		Iodide	
Up-gradient																			
Mud Lake Water Supply*	8/18/2014	9.1		2.8		31		5.0		0.704		5.17		8.68		90		<0.1	U
Facility																			
ICPP-MON-A-166*	9/10/2014	34		12		9.6		2.7		0.210		9.8		19.4		120		NR	
Boundary																			
USGS-103* (1269.4 ftbls)	7/8/2014	41		16		9.1		2.6		0.233		14.5		23.0		137		NR	
Distant																			
Alpheus Spring*	8/13/2014	57		20		35		6.7		0.492		46.6		60.4		180		NR	
Bill Jones Hatchery*	8/13/2014	32		16		17		3.6		0.542		12.1		27.9		135		<0.1	U
Clear Spring*	8/13/2014	46		19		26		4.3		0.678		37.9		50.2		147		NR	
Minidoka Water Supply*	8/13/2014	47		16		21		3.6		0.727		33.8		44.2		136		<0.1	U
MV-01*	7/21/2014	48		19		34		6.8		0.546		41.6		46.4		170		<0.1	U
MV-11*	7/21/2014	75		30		48		7.0		0.281		68.0		81.4		208		NR	
MV-18*	7/22/2014	61		25		37		5.5		0.479		51.5		65.1		191		NR	
MV-21*	7/22/2014	30		16		17		3.6		0.311		11.1		25.7		128		<0.1	U
MV-23*	7/21/2014	71		21		33		6.0		0.259		32.4		62.4		196		NR	
MV-24A*	7/21/2014	77		33		44		7.0		0.305		57.6		79.7		233		NR	
MV-27*	8/20/2014	60		23		37		5.4		0.549		57.2		72.1		176		<0.1	U
MV-30*	7/21/2014	62		24		38		6.3		0.294		48.5		63.8		198		NR	
MV-37*	7/22/2014	48		17		20		3.7		0.342		14.3		28.8		176		NR	
MV-39*	8/13/2014	64		25		36		4.5		0.467		28.7		61.5		233		NR	
MV-40*	8/13/2014	30		15		15		3.4		0.543		11.2		25.6		126		<0.1	U
MV-50*	7/21/2014	59		22		38		5.5		0.480		52.7		65.4		167		NR	
Shoshone Water Supply*	8/13/2014	44		15		15		3.2		0.370		7.54		20.1		170		NR	

[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 14. Reported nutrient concentrations in water samples, third quarter, 2014.

Sample Location	Sample Date	Concentration[1,2]					
		Nitrite + Nitrate		Phosphorus		Total Kjeldahl Nitrogen	
Up-gradient							
Mud Lake Water Supply	8/18/2014	<0.01	U	0.044		NR	
Facility							
ICPP-MON-A-166	9/10/2014	0.3		0.031		NR	
Boundary							
USGS-103 (1269.4 ftbls)	7/8/2014	0.79		0.021		NR	
Distant							
Alpheus Spring	8/13/2014	2.1		0.027		NR	
Bill Jones Hatchery	8/13/2014	1.1		0.022		NR	
Clear Spring	8/13/2014	1.8		0.033		NR	
Minidoka Water Supply	8/13/2014	1.1		0.019		NR	
MV-01	7/21/2014	0.97		0.026		NR	
MV-11	7/21/2014	5.3		0.027		NR	
MV-18	7/22/2014	3.1		0.033		NR	
MV-21	7/22/2014	1.4		0.026		NR	
MV-23	7/21/2014	4.6		0.046		NR	
MV-24A	7/21/2014	5.6		0.032		NR	
MV-27	8/20/2014	2.2		0.024		NR	
MV-30	7/21/2014	2.9		0.035		NR	
MV-37	7/22/2014	1.8		0.069		NR	
MV-39	8/13/2014	2.7		0.052		NR	
MV-40	8/13/2014	0.8		0.025		NR	
MV-50	7/21/2014	2.3		0.032		NR	
Shoshone Water Supply	8/13/2014	1.3		0.034		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.

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. 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 soil measurements were performed during the third calendar quarter of 2014.

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 15**. ^{40}K was detected in all samples within the expected range of concentration. ^{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 15. Gamma spectroscopy analysis data for milk samples, third quarter, 2014.

Sample Location/Dairy	Sample Date	Naturally occurring Potassium-40		Man-made Iodine-131[1]
		Concentration[3]	± 2 SD	
Monitoring Samples				
Gooding/Glanbia	7/09/2014	1740	109	<MDC
Riverside	7/16/2014	2123	128	<MDC
	8/03/2014	1941	130	<MDC
	9/01/2014	1807	127	<MDC
Verification Samples[2]				
Howe	7/01/2014	1775	107	<MDC
Dietrich	7/01/2014	1617	114	<MDC
Terreton	8/05/2014	1703	105	<MDC
Rupert	8/05/2014	1708	120	<MDC
Dietrich	9/02/2014	1684	106	<MDC
Idaho Falls	9/02/2014	1674	119	<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 with associated uncertainties (±2 SD) are expressed in pCi/L.

Soil

DEQ-INL OP monitors long-term radiological conditions via physical soil sampling as well as field instrumentation capable of identifying and measuring *in-situ* concentrations of gamma-emitting radionuclides in soil. Monitoring concentrations of gamma-emitting radionuclides in surface soil provides some insight to transport, deposition, and accumulation of radioactive material in the environment as a result of INL operations as well as historical above ground testing of nuclear weapons. Fourteen physical soil samples were collected and prepared in the field at seven locations (**Figure 4**) during the third calendar quarter of 2014. ^{137}Cs was the only man made gamma-emitting radionuclide detected. Analysis results for ^{137}Cs concentrations for physical soil samples are shown in **Table 16.**

Table 16. Gamma spectroscopic analysis results (^{137}Cs) for physical soil sampling, third quarter 2014.

Location	Sample Type[1]	Sample Depth (cm)	Date Collected	Concentration[2]	±2 SD	MDC
Monteview	Puck	0 to 5	7/08/2014	0.31	0.05	0.07
Monteview	Puck	5 to 10	7/08/2014	0.16	0.04	0.07
Mud Lake	Puck	0 to 5	7/08/2014	0.19	0.04	0.08
Mud Lake	Puck	5 to 10	7/08/2014	0.21	0.05	0.10
St. Anthony	Puck	0 to 5	7/08/2014	0.55	0.07	0.10
St. Anthony	Puck	5 to 10	7/08/2014	0.38	0.06	0.09
Butte City	Puck	0 to 5	7/15/2014	0.59	0.07	0.10
Butte City	Puck	5 to 10	7/15/2014	0.11	0.04	0.07
Carey	Puck	0 to 5	7/15/2014	0.32	0.06	0.10
Carey	Puck	5 to 10	7/15/2014	0.08 U[3]	0.04	0.09
Frenchman's Cabin	Puck	0 to 5	7/15/2014	0.26	0.05	0.07
Frenchman's Cabin	Puck	5 to 10	7/15/2014	0.05 U[3]	0.03	0.06
Crystal Ice Caves	Puck	0 to 5	7/22/2014	0.38	0.06	0.09
Crystal Ice Caves	Puck	5 to 10	7/22/2014	0.07	0.03	0.07

[1]Soil samples were collected in a "puck" (a cylindrical plastic container with a diameter of 6.5 cm and a height of 2.2 cm) and prepared in the field for gamma spectroscopic analysis at ISU.
[2]Concentrations with associated uncertainties (±2 SD) and minimum detectable concentrations (MDC) reported in pCi/g.
[3]U = Non-detection.

The average ^{137}Cs value from physical soil sampling was 0.26 picocuries per gram (pCi/g) with a minimum value of 0.05 pCi/g and a maximum of 0.59 pCi/g, well below the DEQ-INL OP action level of 6.8 pCi/g for ^{137}Cs (NCRP Report 129). Based upon terrestrial radiological measurements of soil and milk, there were no discernable impacts to the off-site environment from INL operations. Long-term accumulation of radionuclides observed by soil monitoring was consistent with historical measurements and was in the range of concentrations expected as a result of historic above-ground testing of nuclear weapons.

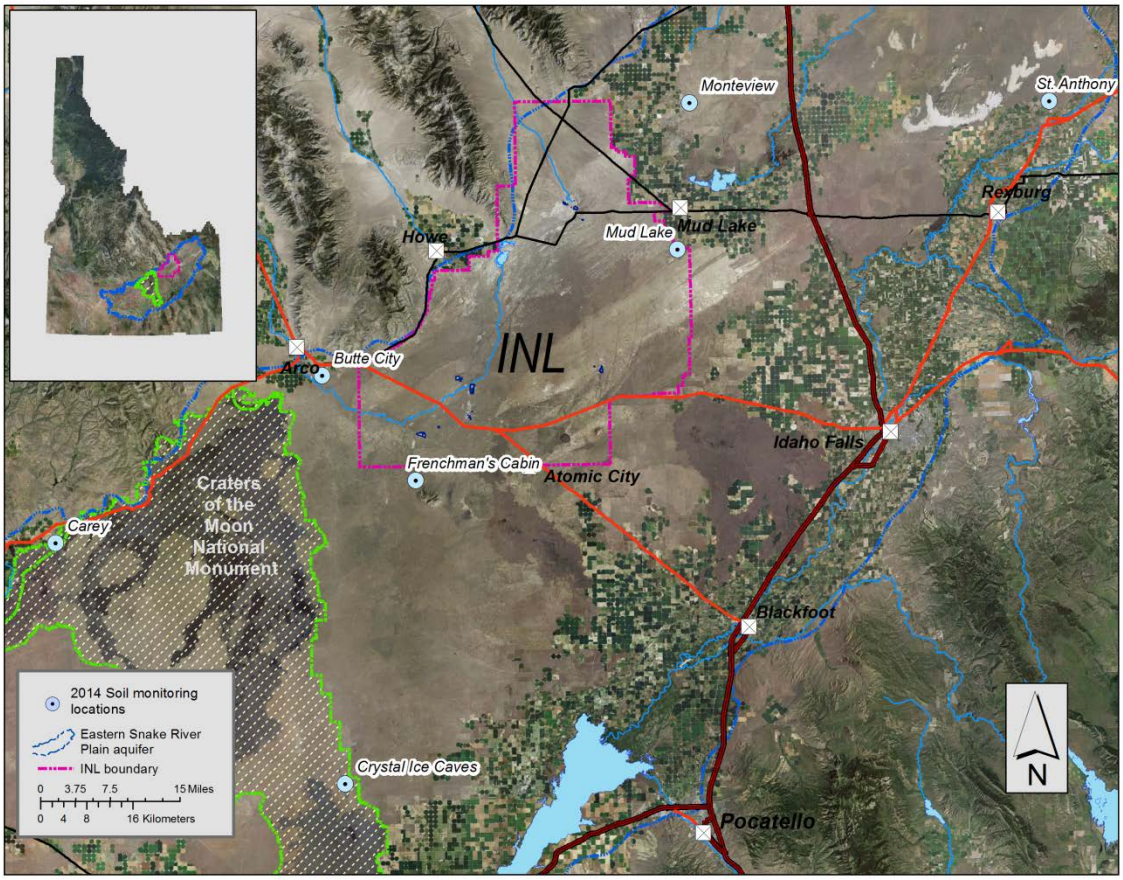

Figure 4. Physical soil monitoring sites, third quarter 2014.

Quality Assurance

The measurement of any physical quantity is subject to inaccuracy from errors that may be introduced during sample collection, storage, shipment, 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 third quarter of 2014 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 third quarter of 2014, the DEQ-INL OP submitted 85 QC samples for various radiological and non-radiological analyses (**Table 17**).

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 third quarter of 2014 are presented in **Table 18**. Blank sample results for select gamma emitters in air from composited air filters are presented in **Table 19**. Blank analyses results used to assess data quality for tritium in water vapor in air are presented in **Table 20**. Blank analyses results for radiological and non-radiological analytes in ground and surface water are presented in **Table 21**, **Table 22**, and **Table 23**. No anomalies were observed from the assessment of field blank samples as measured by the analytical laboratories used by DEQ-INL OP for the third quarter of 2014.

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 that have 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 24** for radiological analyses, and **Table 25**, and **Table 26** for non-radiological analyses. Duplicate results for radiological analyses of physical soil samples are presented in **Table 27**.

All duplicate comparisons passed DEQ-INL criteria for the third quarter of 2014.

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 third quarter 2014, no field matrices were spiked to assess the influence of the sample media on laboratory performance and there were no spiked samples created using de-ionized water and submitted to analytical laboratories for analyses to assess ground water analyte recovery rates.

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 has a percent recovery of 100 ± 25% when compared to the known irradiated quantity. The irradiation results for third quarter 2014 are presented in **Table 28**. 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 third quarter of 2014.

Analytical QA/QC Assessment

No issues involving sample chain of custody, sample holding times, and the analysis of blank, duplicate, and spiked samples were observed during the third quarter of 2014, 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 third quarter of 2014.
Data usability is the measure of data that is not rejected compared to the amount that was expected to be obtained. The overall data usability rate for the third quarter of 2014 met the minimum criteria of the DEQ-INL OP ESP and is summarized in **Table 17**.

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Preventative Maintenance and Equipment Reliability

All equipment was calibrated and checked according to pre-described periodicity. During the third quarter of 2014, the radioiodine pump at the Experimental Field Station sampling station was replaced along with a TSP blower motor at the Atomic City sampling location. Service reliability for air sampling equipment for the third quarter of 2014 is summarized in **Table 29**.

Conclusion

All data collected for the third quarter of 2014 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 17. Summary of the analytical performance and usability of the analyses performed for the DEQ-INL OP ESP, third quarter, 2014.

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	6	ISU-EML
		Gross beta	156	13	0	0	6	ISU-EML
		Gamma emitters	12	1	0	0	0	ISU-EML
		Radiochemical	0	0	0	0	0	ISU Sub
Water Vapor	Desiccant column	Tritium	50	4	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	20	3	2	0	0	ISU-EML
		Gross beta	20	3	2	0	0	ISU-EML
		Gamma emitters	20	3	2	0	0	ISU-EML
		Tritium	20	3	2	0	0	ISU-EML
		Enriched tritium	24	3	3	0	0	ISU-EML
		Technetium-99	0	0	0	0	0	ISU-EML
		Radiochemical	0	0	0	0	0	ISU Sub
		Metals	20	3	2	0	0	IBL
		Common Ions	20	3	2	0	0	IBL
		Nutrients	20	3	2	0	0	IBL
		Volatile Organics	0	0	0	0	0	IBL
Terrestrial								
Milk	Grab or composite	Gamma emitters	10	0	0	0	0	ISU-EML
Soil	*in situ*	Gamma emitters	0	0	0	0	0	DEQ-INL OP
	Grab – "puck"	Gamma emitters	14	0	4	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 Analyses			**654**	**55**	**21**	**9**	**12**	
Total of QC Analyses (blanks, duplicates, and spikes)			**85**					
Percentage of QC analyses of total Test analyses[3]			**13.0%**					
Percentage of usable data[4]			**98.2%**					

[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 18. Blank analysis results for gross alpha and beta in particulate air (TSP), third quarter, 2014.

Collection Period		Corrected volume (m^3)[1]	Gross alpha		Gross beta	
Start	Stop		Value	Uncertainty (± 2 SD)	Value	Uncertainty (± 2 SD)
07/03/14	07/10/14	2004	0.0	0.1	0.0	0.4
07/10/14	07/17/14	2004	0.0	0.1	0.0	0.4
07/17/14	07/24/14	2004	0.0	0.1	-0.2	0.4
07/24/14	07/31/14	2004	-0.1	0.1	0.3	0.4
07/31/14	08/07/14	2004	0.0	0.1	0.2	0.5
08/07/14	08/14/14	2004	0.1	0.1	0.2	0.5
08/14/14	08/21/14	2004	0.0	0.1	0.0	0.4
08/21/14	08/29/14	2004	-0.1	0.1	-0.2	0.4
08/29/14	09/04/14	2004	0.1	0.1	0.4	0.4
09/04/14	09/11/14	2004	0.1	0.1	0.0	0.5
09/11/14	09/18/14	2004	-0.1	0.1	0.0	0.4
09/18/14	09/25/14	2004	0.0	0.1	0.0	0.4
09/25/14	10/02/14	2004	0.0	0.1	0.5	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 19. Blank analysis results for gamma spectroscopy for TSP particulate air filters, third quarter, 2014.

Analysis Date	Beryllium-7			Ruthenium-106/Rhodium-106			Antimony-125		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/23/14	5	31	52	2	32	54	-1	7	13

Analysis Date	Cesium-134			Cesium-137		
	Concentration[1]	± 2 SD	MDC	Concentration	± 2 SD	MDC
10/23/14	5	6	10	0	4	6

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 20. Blank analysis results for tritium in water vapor from air samples, third quarter, 2014.

Sample Number	Start Date	Collection Date	Analysis Date	Tritium		
				Concentration	± 2 SD	MDC
OP143ZTR01	08/04/14	08/05/14	09/29/14	-0.05	0.11	0.18
OP143ZTR02	08/11/14	08/13/14	09/09/14	-0.14	0.10	0.18
OP143ZTR03	09/09/14	09/10/14	10/20/14	0.01	0.08	0.13
OP143ZTR04	09/11/14	09/17/14	10/20/14	-0.02	0.08	0.13

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

Table 21. Radiological blank analysis results in groundwater and/or surface water, third quarter, 2014.

Sample Number	Sample Date	Concentration[1]	± 2 SD	MDC	Within Blank Criteria?
Gross Alpha					
141W512	9/10/2014	-0.2	0.6	1.1	Yes
141W323	7/10/2014	0.1	0.7	1.3	Yes
141W411	8/13/2014	0.0	0.6	1.1	Yes
Gross Beta					
141W512	9/10/2014	0.0	0.7	1.2	Yes
141W323	7/10/2014	-0.2	0.6	1.1	Yes
141W411	8/13/2014	0.0	0.7	1.2	Yes
Cesium-137					
141W512	9/10/2014	1.1	1.7	2.8	Yes
141W323	7/10/2014	0.0	1.4	2.4	Yes
141W411	8/13/2014	-0.3	1.4	2.5	Yes
Tritium					
141W513	9/10/2014	0	110	180	Yes
141W324	7/10/2014	90	100	170	Yes
141W413	8/13/2014	70	80	130	Yes
Enriched Tritium					
141W318	6/26/2014	16	8	13	Yes*
141W324	7/10/2014	20	9	14	Yes*
141W230	5/15/2014	20	6	9	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 22. Blank analysis results (µg/L) for metals in groundwater and/or surface water, third quarter, 2014.

Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
141W515	9/10/2014	<5.0	<2.0	<5.0	<10	<5.0	<2.0	<10	<5.0
141W326	7/10/2014	<5.0	<2.0	<5.0	<10	<5.0	<2.0	<10	<5.0
141W415	8/13/2014	<5.0	<2.0	<5.0	<10	<5.0	<2.0	<10	<5.0

Table 23. Blank analysis results (mg/L) for common ions and nutrients in groundwater and/or surface water, third quarter, 2014.

Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
141W516,515,514	9/10/2014	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	<1.0	<0.01	<0.005
141W327,326,325	7/10/2014	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	<1.0	<0.01	<0.005
141W416,415,414	8/13/2014	<0.1	<0.1	<0.1	<0.1	<0.2	<0.4	<0.8	<1.0	<0.01	<0.005

Table 24. Duplicate radiological analysis results in pCi/L for groundwater and/or surface water, third quarter, 2014.

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									
MV-21	141W405	1.3	1.0	141W387	0.7	0.9	0.6	2.0	Yes
MV-27	141W369	3.6	2.1	141W453	0.3	1.6	3.3	4.0	Yes
Gross Beta									
MV-21	141W405	4.8	1.0	141W387	4.6	0.9	0.2	2.0	Yes
MV-27	141W369	3.8	1.9	141W453	3.6	1.9	0.2	4.0	Yes
Gamma Spectroscopy Cesium-137									
MV-21	141W405	0.6	2.0	141W387	-0.1	1.5	0.7	3.8	Yes
MV-27	141W369	-1.0	1.5	141W453	2.1	1.7	3.1	3.4	Yes
Tritium									
MV-21	141W407	-60	70	141W389	20	80	80	159	Yes
MV-27	141W371	-10	70	141W455	80	110	90	196	Yes
Enriched Tritium									
NRF-09	141W265	27	7	141W271	23	6	4	14	Yes
Bill Jones Hatchery	141W238	4	6	141W240	6	6	2	13	Yes
MV-21	141W407	6	7	141W389	12	8	6	16	Yes

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

Table 25. Duplicate results for metals (µg/L) in groundwater and/or surface water, third quarter, 2014.

Sample Location	Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
MV-21	141W409	7/22/2014	<5.0	21	<5.0	<10	<5.0	<2.0	<10	<5.0
MV-21	141W391	7/22/2014	<5.0	21	<5.0	<10	<5.0	<2.0	<10	<5.0
RPD			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
MV-27	141W373	8/20/2014	<5.0	63	<5.0	<10	<5.0	<2.0	<10	<5.0
MV-27	141W457	8/20/2014	<5.0	62	<5.0	<10	<5.0	<2.0	<10	<5.0
RPD			**0.0**	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

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

Table 26. Duplicate results for common ions and nutrients (mg/L) in groundwater and/or surface water, third quarter, 2014.

Sample Location	Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Fluoride	Chloride	Sulfate	Total Alkalinity	Total Nitrogen	Total Phosphorus
MV-21	141W410,409,408	7/22/2014	30	16	17	3.6	0.311	11.1	25.7	128	1.4	0.026
MV-21	141W392,391,390	7/22/2014	30	16	16	3.6	0.314	11.2	25.8	128	1.4	0.024
RPD			**0.0**	**0.0**	**6.0**	**0.0**	**-1.0**	**-0.9**	**-0.4**	**0.0**	**0.0**	**8.0**
MV-27	141W374,373,372	8/20/2014	60	23	37	5.4	0.549	57.2	72.1	176	2.2	0.024
MV-27	141W458,457,456	8/20/2014	60	23	37	5.3	0.556	57.4	72.6	176	2.2	0.024
RPD			**0.0**	**0.0**	**0.0**	**2.0**	**-1.3**	**-0.3**	**-0.7**	**0.0**	**0.0**	**0.0**

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

Table 27. Duplicate analyses of gamma emitting radionuclides in soil, third quarter, 2014.

Sample Location	Sample Date	Original Result Cs-137 (pCi/g)[1]	QA Result Cs-137 (pCi/g)[1]	Cs-137 RPD (%)	Cs-137 less than 3 sigma test	Cs-137 meets either criterion?
Monteview 0-5cm	07/08/15	0.31 ± 0.05	0.31 ± 0.05	0.0	In Spec	Yes
Monteview 5-10cm	07/08/15	0.16 ± 0.04	0.18 ± 0.04	11.8	In Spec	Yes
Frenchman's Cabin 0-5cm	07/15/14	0.26 ± 0.05	0.29 ± 0.05	10.9	In Spec	Yes
Frenchman's Cabin 5-10cm	07/15/14	0.05 ± 0.03	0.04 ± 0.03	NA[1]	In Spec	Yes

Note: Concentrations are expressed in pCi/g with associated uncertainty (± 2 SD).

[1] RPD not applicable: both results are < MDC.

Table 28. Electret ionization chamber irradiation results (categorized as spiked samples), third quarter, 2014.

Electret #	Exposure Received		Net Measured Exposure[1]		%R
	(mR)	Uncertainty (±1 SD, mR)	(mR)	Uncertainty (±1 SD, mR)	
SGP613	38.0	1.90	33.5	1.3	88%
SGP545	38.0	1.90	33.1	1.3	87%
SGP594	38.0	1.90	35.8	1.3	94%
SGO593	30.0	1.50	28.0	1.3	93%
SGP593	30.0	1.50	27.7	1.4	92%
SGP637	30.0	1.50	28.1	1.3	94%
SGP597	25.0	1.25	22.4	1.3	89%
SGP662	25.0	1.25	21.2	1.3	85%
SGP673	25.0	1.25	22.8	1.3	91%

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

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

Table 29. Air sampling field equipment service reliability (percent operational), third quarter, 2014.

Station Locations	Sample Type			
	TSP	Radioiodine	Atmospheric Moisture	Precipitation
Onsite Locations				
Big Lost River Rest Area	100%	100%	100%	100%
Experimental Field Station	100%	92%	100%	NC[1]
Sand Dunes Tower	100%	100%	100%	NC[1]
Van Buren Avenue	100%	100%	100%	NC[1]
Boundary Locations				
Atomic City	85%	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, third quarter, 2014.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
On-Site Locations						
Rest Area	07/03/14	07/10/14	1.2	0.2	36.3	1.3
	07/10/14	07/17/14	1.1	0.2	40.3	1.3
	07/17/14	07/24/14	2.2	0.3	27.0	1.2
	07/24/14	07/31/14	1.9	0.3	35.6	1.3
	07/31/14	08/07/14	1.1	0.2	35.8	1.3
	08/07/14	08/14/14	1.0	0.2	34.9	1.3
	08/14/14	08/21/14	1.2	0.2	34.5	1.2
	08/21/14	08/29/14	1.1	0.2	30.3	1.1
	08/29/14	09/04/14	1.0	0.2	27.7	1.3
	09/04/14	09/11/14	1.0	0.2	32.9	1.2
	09/11/14	09/18/14	1.4	0.3	46.5	1.4
	09/18/14	09/25/14	1.5	0.3	36.3	1.3
	09/25/14	10/02/14	0.8	0.3	18.8	1.2
Experimental Field Station	07/03/14	07/10/14	1.0	0.2	30.9	1.2
	07/10/14	07/17/14	1.2	0.3	34.0	1.3
	07/17/14	07/24/14	1.0	0.2	24.3	1.1
	07/24/14	07/31/14	1.1	0.2	28.9	1.2
	07/31/14	08/07/14	0.7	0.2	27.2	1.2
	08/07/14	08/14/14	0.9	0.2	27.9	1.2
	08/14/14	08/21/14	0.8	0.2	28.0	1.2
	08/21/14	08/29/14	0.6	0.2	25.6	1.0
	08/29/14	09/04/14	1.0	0.3	22.5	1.2
	09/04/14	09/11/14	0.9	0.2	26.7	1.3
	09/11/14	09/18/14	1.1	0.3	37.1	1.3
	09/18/14	09/25/14	R[1]	R[1]	R[1]	R[1]
	09/25/14	10/02/14	0.6	0.2	15.8	1.1
Sand Dunes	07/03/14	07/10/14	0.8	0.2	24.7	1.0
	07/10/14	07/17/14	0.8	0.2	29.5	1.1
	07/17/14	07/24/14	1.2	0.2	20.5	1.0
	07/24/14	07/31/14	0.8	0.2	27.0	1.1
	07/31/14	08/07/14	0.6	0.2	21.9	1.0
	08/07/14	08/14/14	0.5	0.2	21.8	1.0
	08/14/14	08/21/14	0.7	0.2	22.2	1.0
	08/21/14	08/29/14	0.6	0.2	20.4	0.9
	08/29/14	09/04/14	0.6	0.2	17.8	1.0
	09/04/14	09/11/14	0.6	0.2	21.2	1.0
	09/11/14	09/18/14	0.9	0.2	31.0	1.1
	09/18/14	09/25/14	0.7	0.2	23.1	1.0
	09/25/14	10/02/14	0.3	0.2	11.3	0.8

[1]R – Results rejected due to insufficient sample volume caused by a power outage at the station.

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2014.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Van Buren	07/03/14	07/10/14	1.0	0.2	27.1	1.1
	07/10/14	07/17/14	1.1	0.2	33.0	1.2
	07/17/14	07/24/14	1.5	0.3	21.5	1.0
	07/24/14	07/31/14	1.1	0.2	27.5	1.1
	07/31/14	08/07/14	0.6	0.2	23.2	1.0
	08/07/14	08/14/14	0.7	0.2	27.1	1.1
	08/14/14	08/21/14	0.6	0.2	24.7	1.1
	08/21/14	08/29/14	0.7	0.2	21.4	0.9
	08/29/14	09/04/14	0.8	0.2	19.7	1.1
	09/04/14	09/11/14	0.5	0.2	23.6	1.1
	09/11/14	09/18/14	1.0	0.2	34.6	1.2
	09/18/14	09/25/14	1.1	0.2	27.0	1.1
	09/25/14	10/02/14	0.3	0.1	12.7	0.8
Boundary Locations						
Atomic City	07/03/14	07/10/14	1.4	0.3	29.5	1.1
	07/10/14	07/17/14	1.4	0.3	34.9	1.2
	07/17/14	07/24/14	2.0	0.3	22.8	1.0
	07/24/14	07/31/14	1.2	0.2	30.6	1.2
	07/31/14	08/07/14	0.8	0.2	27.6	1.1
	08/07/14	08/14/14	0.9	0.2	27.8	1.1
	08/14/14	08/21/14	1.0	0.2	28.0	1.1
	08/21/14	08/29/14	0.7	0.2	25.7	1.0
	08/29/14	09/04/14	R[1]	R[1]	R[1]	R[1]
	09/04/14	09/11/14	R[1]	R[1]	R[1]	R[1]
	09/11/14	09/18/14	1.3	0.3	37.0	1.3
	09/18/14	09/25/14	1.1	0.2	28.6	1.1
	09/25/14	10/02/14	0.6	0.2	14.6	0.9
Howe	07/03/14	07/10/14	R[2]	R[2]	R[2]	R[2]
	07/10/14	07/17/14	1.1	0.2	32.0	1.2
	07/17/14	07/24/14	0.9	0.3	20.0	1.2
	07/24/14	07/31/14	0.8	0.2	26.5	1.1
	07/31/14	08/07/14	0.8	0.3	24.8	1.1
	08/07/14	08/14/14	0.9	0.2	26.3	1.1
	08/14/14	08/21/14	0.9	0.2	28.0	1.3
	08/21/14	08/29/14	0.6	0.3	23.2	1.0
	08/29/14	09/04/14	0.6	0.2	21.0	1.2
	09/04/14	09/11/14	0.7	0.2	23.6	1.1
	09/11/14	09/18/14	1.1	0.3	31.8	1.2
	09/18/14	09/25/14	1.1	0.2	28.1	1.2
	09/25/14	10/02/14	0.3	0.2	13.4	0.9

[1]R – Results rejected due to insufficient sample volume caused by equipment failure.
[2]R – Results rejected due to insufficient sample volume caused by a power outage at the station.

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for TSP filters for all locations, third quarter, 2014.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Monteview	07/03/14	07/10/14	1.1	0.2	29.6	1.2
	07/10/14	07/17/14	1.3	0.3	33.3	1.2
	07/17/14	07/24/14	1.3	0.2	23.9	1.1
	07/24/14	07/31/14	0.9	0.2	30.5	1.2
	07/31/14	08/07/14	0.9	0.2	27.8	1.1
	08/07/14	08/14/14	0.8	0.2	25.5	1.1
	08/14/14	08/21/14	1.0	0.2	29.0	1.2
	08/21/14	08/29/14	0.7	0.2	22.9	1.0
	08/29/14	09/04/14	0.7	0.2	21.9	1.2
	09/04/14	09/11/14	1.0	0.2	23.2	1.1
	09/11/14	09/18/14	1.5	0.3	38.2	1.3
	09/18/14	09/25/14	1.1	0.2	29.8	1.2
	09/25/14	10/02/14	0.5	0.2	16.3	0.9
Mud Lake	07/03/14	07/10/14	1.6	0.3	39.8	1.3
	07/10/14	07/17/14	1.8	0.3	47.3	1.4
	07/17/14	07/24/14	1.5	0.3	26.8	1.1
	07/24/14	07/31/14	1.7	0.3	42.3	1.4
	07/31/14	08/07/14	1.3	0.3	37.8	1.3
	08/07/14	08/14/14	1.6	0.3	41.4	1.7
	08/14/14	08/21/14	1.1	0.2	37.8	1.3
	08/21/14	08/29/14	1.0	0.2	31.1	1.1
	08/29/14	09/04/14	1.1	0.3	33.4	1.3
	09/04/14	09/11/14	1.1	0.2	32.9	1.3
	09/11/14	09/18/14	1.9	0.3	49.8	1.5
	09/18/14	09/25/14	1.5	0.3	41.6	1.4
	09/25/14	10/02/14	0.7	0.2	20.2	1.0
Distant Locations						
Craters of the Moon	07/03/14	07/10/14	0.8	0.2	22.5	1.1
	07/10/14	07/17/14	1.0	0.2	30.1	1.2
	07/17/14	07/24/14	1.3	0.3	19.6	1.0
	07/24/14	07/31/14	0.5	0.2	26.3	1.1
	07/31/14	08/07/14	0.6	0.2	24.0	1.1
	08/07/14	08/14/14	0.8	0.2	22.4	1.1
	08/14/14	08/21/14	0.7	0.2	23.7	1.1
	08/21/14	08/29/14	0.4	0.2	20.2	0.9
	08/29/14	09/04/14	0.5	0.2	19.5	1.1
	09/04/14	09/11/14	0.5	0.2	21.2	1.1
	09/11/14	09/18/14	0.9	0.2	27.8	1.2
	09/18/14	09/25/14	0.6	0.2	20.1	1.0
	09/25/14	10/02/14	0.4	0.2	12.8	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, third quarter, 2014.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	±2 SD	Concentration	±2 SD
Fort Hall[1]	07/03/14	07/10/14	0.9	0.2	21.0	1.0
	07/10/14	07/17/14	1.0	0.2	24.1	1.1
	07/17/14	07/24/14	1.2	0.2	17.4	1.0
	07/24/14	07/31/14	0.8	0.2	20.0	1.0
	07/31/14	08/07/14	0.8	0.2	18.8	1.0
	08/07/14	08/14/14	0.5	0.2	18.9	1.0
	08/14/14	08/21/14	0.8	0.2	23.2	1.0
	08/21/14	08/29/14	0.4	0.2	21.6	1.0
	08/29/14	09/04/14	0.9	0.2	22.3	1.0
	09/04/14	09/11/14	0.7	0.2	20.4	1.0
	09/11/14	09/18/14	1.0	0.2	27.7	1.1
	09/18/14	09/25/14	0.9	0.2	22.4	1.0
	09/25/14	10/02/14	0.4	0.2	13.8	0.9
Idaho Falls - HVP 3804	07/03/14	07/10/14	1.5	0.3	35.7	1.3
	07/10/14	07/17/14	1.3	0.3	39.4	1.4
	07/17/14	07/24/14	1.9	0.3	30.2	1.3
	07/24/14	07/31/14	1.4	0.3	35.9	1.3
	07/31/14	08/07/14	0.8	0.2	34.0	1.3
	08/07/14	08/14/14	1.0	0.2	32.3	1.3
	08/14/14	08/21/14	1.0	0.2	33.6	1.3
	08/21/14	08/29/14	R[3]	R[3]	R[3]	R[3]
	08/29/14	09/04/14	1.3	0.3	30.3	1.4
	09/04/14	09/11/14	1.4	0.3	31.3	1.3
	09/11/14	09/18/14	1.5	0.3	45.4	1.5
	09/18/14	09/25/14	1.5	0.4	35.0	2.0
	09/25/14	10/02/14	0.7	0.2	20.0	1.0
Idaho Falls - HVP 4304[2]	07/03/14	07/10/14	1.0	0.2	30.9	1.2
	07/10/14	07/17/14	1.3	0.3	36.1	1.3
	07/17/14	07/24/14	1.7	0.3	25.4	1.2
	07/24/14	07/31/14	1.3	0.3	32.9	1.2
	07/31/14	08/07/14	0.8	0.2	29.4	1.2
	08/07/14	08/14/14	0.9	0.2	30.0	1.2
	08/14/14	08/21/14	1.0	0.2	30.0	1.2
	08/21/14	08/29/14	R[3]	R[3]	R[3]	R[3]
	08/29/14	09/04/14	1.0	0.3	28.3	1.3
	09/04/14	09/11/14	1.0	0.2	28.1	1.1
	09/11/14	09/18/14	1.3	0.3	40.5	1.3
	09/18/14	09/25/14	1.3	0.4	33.8	1.8
	09/25/14	10/02/14	0.6	0.2	18.6	1.0

[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.

[3] R – Results rejected due to insufficient sample volume caused by a power outage at the station.

Table B.1. Results for all electret locations, third quarter, 2014.

Sample Location	Net Corrected Exposure Rate (µR/hr)[1]	± 2 SD (µR/hr)
Arco	11.3	1.2
Craters of the Moon	13.1, 13.3	
Rest Area	10.8	0.4
Van Buren Avenue	16.4	3.1
Experimental Field Station	14.5	3.1
Main Gate	12.4	1.8
Atomic City	12.0	3.1
Taber	13.0	2.8
Blackfoot	11.3	2.8
Ft. Hall [2]	11.6	1.6
Idaho Falls	9.8	1.0
Mud Lake/ Terreton	13.8	3.0
Monteview	13.1	0.8
Sand Dunes	14.1	3.4
Howe Met. Tower	11.4	2.4
MP276 -20	13.6	2.6
MP274 -20	9.2, 9.4	
MP272 -20	10.2	3.3
MP270 -20	13.2	3.2
MP268 -20	12.9	2.7
MP266 -20	11.4	2.4
MP264 -20	12.3	1.0
MP270 -20/26	13.1	3.4
MP268 -20/26	12.7	2.0
MP266 -20/26	13.1	3.4
MP263 -20/26	11.4	1.5
MP261 -20/26	11.4	3.4
MP259 -20/26	17.2	2.7
MFC (EBR II)	13.4, 15.5	
EBR I	11.6	3.7
RWMC	16.7, 17.2	
CFA	14.2, 18.5	
CITRC (PBF)	14.5	2.4
INTEC	16.6	1.7
ATR (TRA)	14.6	2.1
NRF	11.9	2.3
TAN/SMC	12.1	0.3
Mud Lake Bank of Commerce	12.5	3.3
MP43-33	13.6	3.2
MP41-33	14.4	2.3
MP39-33	10.6	1.3
MP37-33	10.8	2.7
MP35-33	10.7	1.9
MP33-33	12.8, 14.4	
MP31-33	10.6	1.3
MP29-33	11.7	3.5

Table B.1 continued. Results for all electret locations, third quarter, 2014.

Sample Location	Net Corrected Exposure Rate (µR/hr)[1]	± 2 SD (µR/hr)
MP27-33	12.3	0.4
MP25-33	13.4, 14.2	
MP23-33	9.7, 10.3	
Base of Howe	10.3	2.0
Rover	12.0, 12.2	
Hamer	11.9, 13.7	
Sugar City	15.0	2.5
Roberts	13.5	3.0
Big Southern Butte	14.9	2.7

[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.