Department of Environmental Quality
INL Oversight Program

ENVIRONMENTAL SURVEILLANCE PROGRAM
QUARTERLY DATA REPORT

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Table of Contents

Table of Acronyms and Abbreviations vi
Introduction 1
Air and Precipitation Monitoring Results 2
Environmental Radiation Monitoring Results 12
Water Monitoring Results 15
Terrestrial Monitoring Results 27
Quality Assurance 28

List of Tables

Table 1. Sampling locations and sample type. 5
Table 2. Range of gross alpha and gross beta concentrations for 47-mm TSP filters, third quarter, 2025. 6
Table 3. Gamma spectroscopy analysis data for 47-mm TSP filters, composite samples, third quarter, 2025. 7
Table 4. Gamma spectrometry analysis data for 8x10-inch TSP filters, monthly composite samples, third quarter, 2025. 8
Table 5. Radiochemical separation analysis results for 8x10-inch TSP particulate filter composites collected during second quarter 2025. 9
Table 6. Iodine-131 activity in weekly charcoal filter composites, third quarter, 2025. 9
Table 7. Tritium concentrations in air from atmospheric moisture, third quarter, 2025. 10
Table 8. Tritium and Cesium-137 concentrations in precipitation, third quarter 2025. 11
Table 9. Summary of radiation detection instruments at real-time radiation monitoring stations and air monitoring stations. Air monitoring stations are underlined. 13
Table 10. Average, median, and range of gamma exposure rates, third quarter 2025, from EcoGamma measurements. 14
Table 11. Electret ionization chamber (EIC) cumulative average exposure rates at EcoGamma (real-time radiation monitoring) stations and air monitoring stations, third quarter, 2025. 15
Table 12. Locations sampled for water, third quarter, 2025. 21
Table 13. Constituent background concentration ranges and EPA drinking water standards. 22
Table 14. Gross alpha, gross beta, and man-made gamma-emitting radionuclide concentrations (pCi/L) in water samples, third quarter, 2025. 23
Table 15. Tritium concentrations (pCi/L) in water samples, third quarter, 2025. 23
Table 16. Low-level tritium concentrations (pCi/L) in water samples collected and analyzed using the electrolytic enrichment method, second and third quarter, 2025. 24
Table 17. Strontium-90 concentrations (pCi/L) in water samples, third quarter, 2025. 24
Table 18. Technetium-99 concentrations (pCi/L) in water samples, third quarter, 2025. 24
Table 19. Uranium isotope concentrations (pCi/L) in water samples, third quarter, 2025. 25
Table 20. Common ion concentrations (mg/L) in water samples, third quarter, 2025. 25
Table 21. Dissolved metals concentrations (µg/L) in water samples, third quarter, 2025. 25
Table 22. Dissolved nutrient concentrations (mg/L) in water samples, third quarter, 2025. 26
Table 23. Gamma spectrometry analysis data for milk samples, third quarter, 2025. 27
Table 24. Summary of the analyses performed, third quarter, 2025. 33
Table 25. Blank analysis results for gross alpha and beta in 47-mm particulate air (TSP), third quarter, 2025. 35
Table 26. Blank results for gamma spectrometry analysis of monthly composites of 8x10-inch TSP air filters, and quarterly composites of 47-mm TSP air filters, third quarter, 2025. 35
Table 27. Blank analysis results for radiochemical analysis of 8x10-inch TSP air filters, quarterly composite samples, from second quarter, 2025. 36
Table 28. Method blank and control sample analysis results for tritium in water vapor from air samples, third quarter, 2025. 36
Table 29. Blank analysis results (pCi/L) for radiological constituents in water, third quarter, 2025. 37
Table 30. Blank analysis results (µg/L) for metals in water, third quarter, 2025. 37
Table 31. Blank analysis results (mg/L) for common ions and nutrients in water, third quarter, 2025. 38
Table 32. Duplicate sample results for gamma emitters from monthly composited 8x10-inch TSP air filters, third quarter, 2025. 38

Table 33. Duplicate sample results for radiochemical analyses of composited 8x10 inch TSP air filters from the second quarter of 2025. 39
Table 34. Duplicate results for quarterly average EcoGamma readings (µR/hr) for the third quarter of 2025. 39
Table 35. Duplicate sample results (pCi/L) for radiological constituents in groundwater and/or surface water, third quarter, 2025..... 40
Table 36. Duplicate sample results for metals (µg/L) in groundwater, third quarter, 2025. 41
Table 37. Duplicate sample results for common ions and nutrients (mg/L) in groundwater, third quarter, 2025. 41
Table 38. ISU-EML electret ionization chamber (EIC) irradiation results (categorized as spiked samples), third quarter, 2025. 42
Table 39. Air sampling field equipment service reliability (percent operational), third quarter, 2025. 43
Table A-1. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses of 47-mm TSP filters for all locations, third quarter, 2025..... 44
Table B-1. Results for all electret ionization chamber (EIC) locations, third quarter, 2025. 48
Table C-1. Summary of the minimum detectable concentrations (MDCs) for radiological analytes and reporting detection limits (RDLs) for non-radiological analytes, together with the EPA Maximum Contaminant Levels (MCLs) and DOE Derived Concentration Standards (DCSs) for comparison. 50

List of Figures

Figure 1. Air and radiation monitoring sites. 4
Figure 2. Distant water monitoring locations. 19
Figure 3. Upgradient, facility, boundary, perched groundwater (GW), surface water and wastewater monitoring locations. Boundary locations depicted on the map correspond to low-level tritium results from samples taken during the second quarter of 2024. 20

Table of Acronyms and Abbreviations

ATR	-	Advanced Test Reactor Complex
BEA	-	Battelle Energy Alliance, LLC
BLR	-	Big Lost River
CFA	-	Central Facilities Area
CFR	-	Code of Federal Regulations
CITRC	-	Critical Infrastructure Test Range Complex
CMS	-	Community Monitoring Station
DCS	-	DOE Derived Concentration Standard
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
ESRP	-	Eastern Snake River Plain
ft bls	-	feet below land surface
HPIC	-	high-pressure ion chamber
IBL	-	Idaho Bureau of Laboratories
IBL Sub	-	Subcontract laboratory to IBL
ICPP	-	Idaho Chemical Processing Plant
IDAPA	-	Idaho Administrative Procedure Act
IEC	-	Idaho Environmental Coalition
IF	-	Idaho Falls, Idaho
INL	-	Idaho National Laboratory
INTEC	-	Idaho Nuclear Technology and Engineering Center
ISB	-	In-situ bioremediation
ISU	-	Idaho State University
ISU Sub	-	Subcontract laboratory to ISU-EML
IWP	-	MFC Industrial Waste Pipeline
MCL	-	maximum contaminant level
MDC	-	minimum detectable concentration
MDL	-	IBL method detection limit
MFC	-	Materials and Fuels Complex
µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
mm	-	millimeter
MP	-	milepost
mR	-	milliRoentgen
mrem	-	millirem or 1/1000th of a rem
µR/hr	-	microRoentgen per hour
µR/yr	-	microRoentgen per year
MV	-	Magic Valley
NCRP	-	National Council on Radiation Protection and Measurements
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
PCS	-	Idaho Primary Constituent Standard
PT Program	-	Laboratory Proficiency Testing Program
PW	-	Perched water well designation
QA/QC	-	Quality Assurance/Quality Control
rad	-	unit of absorbed radiation dose
RadNet	-	EPA network of radiation monitoring stations
RDL	-	IBL reporting detection limit
RPD	-	relative percent difference
R/rad	-	Roentgen/rad
RWMC	-	Radioactive Waste Management Complex
SD	-	Sample standard deviation
SMC	-	Specific Manufacturing Capability
SMCL	-	secondary maximum contaminant level
TAN	-	Test Area North
TRA	-	Test Reactor Area
TSP	-	total suspended particulate
USGS	-	U.S. Geological Survey
VOC	-	volatile organic compound

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 have 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. It is organized according to the media sampled and also provides a quality assurance assessment.

Changes to Qualification and Reporting of Sample Results

Starting in the first quarter of 2024, DEQ-INL OP has changed the methods used for qualifying and reporting sample results. These changes apply primarily to low-level results. The changes listed below bring DEQ-INL OP's qualification and reporting conventions more closely in line with the INL contractors' methods.

For radiological results, the minimum detectable concentration (MDC) is no longer used as the criterion above which the result is considered a positive detection. The following criteria are used instead[1,2,3]:

1. Results greater or equal to 3 SD are reported as positive detections, where SD is the sample standard deviation.
2. Results less than 3 SD are reported as non-detections (U qualifier).
3. Field sample results are reported together with the 1-SD value.

For non-radiological results, the qualification and reporting conventions followed by the sample analysis contractor, Idaho Bureau of Laboratories (IBL), are used. With each result, the IBL reports both the Method Detection Limit[4] (MDL) and the higher Reporting Detection Limit[5] (RDL).

[1] Idaho National Laboratory Site Environmental Surveillance Program Report, Third Quarter 2023, INL/RPT-24-77413, p.
[2] HANDBOOK FOR THE DEPARTMENT OF ENERGY'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP), MAPEP-HB-1, July 6,2022, p.30.
[3] An Update of Hydrologic Conditions and Distribution of Selected Constituents in Water, Eastern Snake River Aquifer and Perched Groundwater Zones, Idaho National Laboratory, Idaho, Emphasis 2019–21, U. S. Geological Survey, DOE/ID-22261, p. 29.
[4] The MDL is defined as the minimum concentration of substance that can be measured and reported with 99% confidence that an analyte concentration is greater than zero and is determined from an analysis of a sample in a given matrix containing the analyte.
[5] IBL utilizes the Practical Quantitation Limit (PQL) as the Reporting Detection Limit (RDL) for final data reports. PQL represents a practical and routinely achievable quantitation limit with a high degree of certainty (> 99.9% confidence) that the result is a positive detection.

1. Results greater than MDL and greater than RDL are reported as positive detections.
2. Results greater than MDL but less than RDL are reported as detected estimates (J qualifier) with greater associated uncertainty.
3. Results less than MDL are non-detections and reported as less than (RDL value).

Appendix C is a summary of the analyzing laboratories' MDCs for radiological analytes and RDLs for non-radiological analytes, together with the EPA Maximum Contaminant Levels (MCLs) and DOE Derived Concentration Standards (DCSs) for comparison. MDCs are a measure of method/instrument performance. They are not a criterion above which a result is considered a detection. DCSs and MCLs are listed only as reference values for comparison to typical MDC or RDL ranges. The MCLs are the most restrictive and do not necessarily apply to the environmental media sampled.

Air and Precipitation Monitoring Results

The ESP operated nine air monitoring stations on and near the INL as well as two monitoring stations distant from the INL during the third quarter, 2025 (**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 eleven 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 both high-volume (8x10-inch filter) and low-volume (47-mm filter) total suspended particulate (TSP) air samplers. Weekly gross alpha and gross beta particulate radioactivity results for 47-mm filters from the low-volume 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 47-mm filters collected from low-volume TSP samplers during a calendar quarter are analyzed using gamma spectrometry. Composites of 8x10-inch filters collected from high-volume TSP samplers during each calendar month are also analyzed using gamma spectrometry. Typically, gamma spectrometry results are only reported by ISU-EML when exceeding their minimum detectable concentration (MDC). Gamma spectrometry results for the third quarter of 2025 for 47-mm and 8x10-inch TSP filters are presented in **Tables 3** and **4**. For the 47-mm filter composites, there were zero reported man-made gamma-emitting radionuclide concentration greater than 3 SD. For all site locations, beryllium-7 (Be-7), a naturally occurring, cosmogenic radionuclide was reported. For the 8x10-inch filter composites, there was one cesium-137 (Cs-137) result greater than or equal to 3 SD at Experimental Field Station. The concentration and 1 SD value for cesium-137 (Cs-137) are reported for all locations since Cs-137 is the most likely of the man-made gamma emitting radionuclides to be detected unless otherwise noted. Beryllium-7 results were greater than 3 SD at all site locations.

Quarterly composites of high-volume 8x10-inch TSP filters are analyzed using radiochemical separation techniques. Results from these composite filter analyses are typically presented in the following quarter's report. The samples are analyzed for Strontium-90, Plutonium-238, Plutonium-239/240, and Americium-241. Measurable quantities of these radionuclides are expected in the environment due to historic above ground testing of nuclear weapons, and possibly from INL programs. DEQ-INL OP's action levels of 19 for Americium-241 (Am-241), 190 for Strontium-90 (Sr-90), 21 for Plutonium-238 (Pu-238), and 20 for Plutonium-239/240 (Pu-239/240) (in 1×10^{-5} pCi/m^3) are 10 percent of the compliance values listed for the specific radionuclides in 40 CFR 61, Appendix E, Table 2. Field sample concentrations which exceed these levels require further investigation.

Radiochemical separation analysis results for 8x10-inch TSP particulate filter composites collected during second quarter 2025 are presented in **Table 5.** Positive Sr-90 detections were observed at most locations besides Experimental Field Station, Howe, Craters of the Moon, and Fort Hall. There were two positive detections of Pu-239/240 at the Monteview and the Mud Lake locations. The detections had results exceeding or equal to three times the sample standard deviation. These detections were also well below DEQ-INL OP action levels.

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 twelve air monitoring stations and analyzed together as a composite using gamma spectrometry (**Table 6**). 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 of 2025.

Atmospheric moisture was collected by drawing air through hygroscopic media at each of the twelve monitoring stations. The moisture was stripped from the hygroscopic media and analyzed to calculate ~~the~~ atmospheric tritium (H-3) concentration. Sequential atmospheric tritium concentrations are presented in **Table 7.** Those equal to or exceeding three standard deviations of uncertainty were considered positive detections. There were ten detections at on-site locations, two at boundary locations, and three at distant locations (**Table 7**). The ratios of detections to stations for on-site and distant locations were 10 to 5 (2.0) and 3 to 3 (1.0) respectively. All the airborne tritium detections were below our action level of 150 pCi/m^3 which is 10% of DOE-INL's compliance standard set forth in 40 CFR 61, Appendix E, Table 2.

Precipitation was collected at one on-site monitoring location (Big Lost River Rest Area), four boundary locations (Atomic City, Howe, Mud Lake, and Monteview) and one distant location (Idaho Falls) during the third quarter of 2025. Samples were then analyzed for tritium and man-made gamma emitting radionuclides with no detections. Precipitation analysis results for tritium and Cesium-137 are presented in **Table 8**.

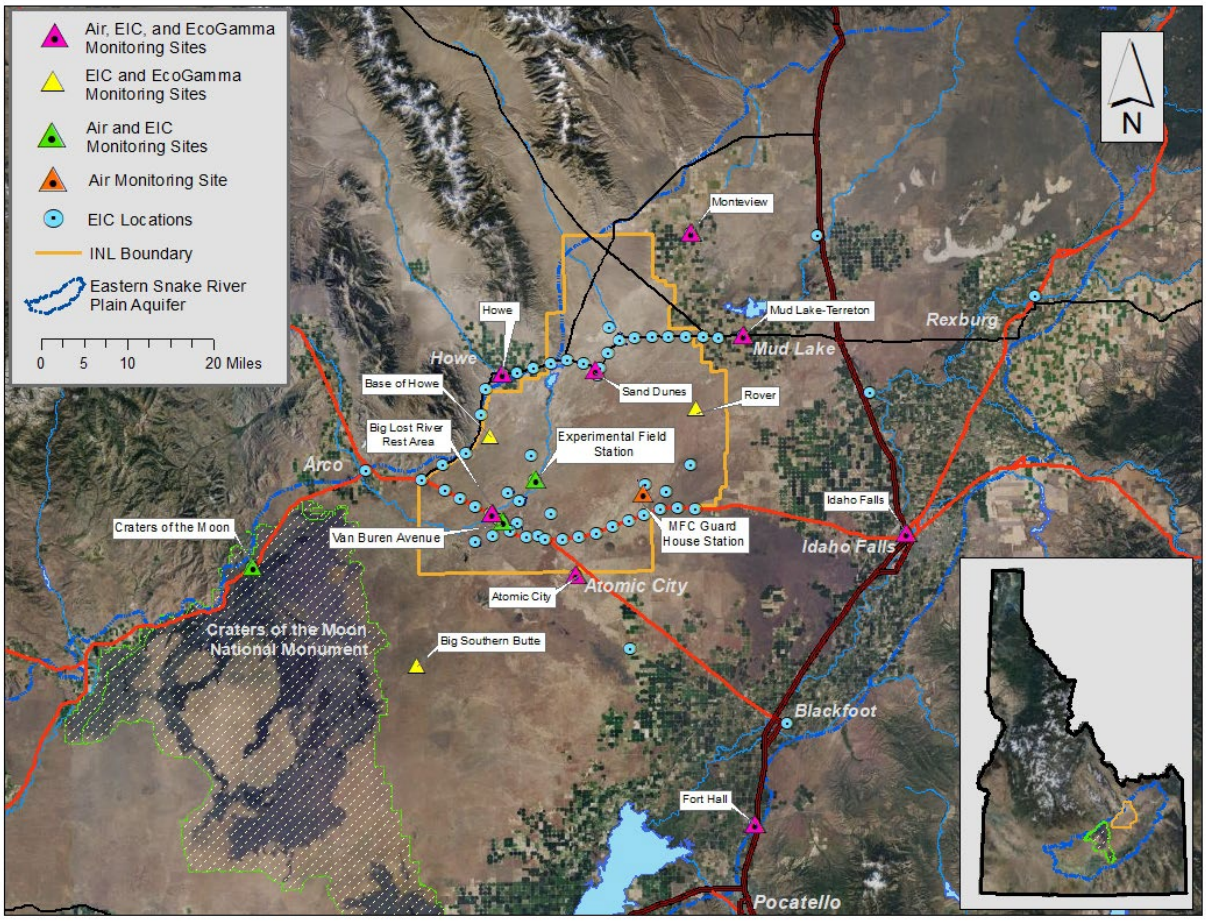


Figure 1. Air and radiation monitoring sites.

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	□	□	■	
MFC[3] Guard House	□	□	■	
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, or more frequently if sample containers reach capacity.
[2]TSP and radioiodine samples collected by Shoshone-Bannock Tribes.
[3]Materials and Fuels Complex.

Table 2. Range of gross alpha and gross beta concentrations for 47-mm TSP filters, third quarter, 2025.

Station Location	Concentration					
	Gross Alpha			Gross Beta		
On-Site Locations						
Big Lost River Rest Area	**0.7**	-	**2.7**	**21.0**	-	**43.4**
Experimental Field Station	**1.0**	-	**2.3**	**20.4**	-	**39.3**
MFC Guard House[3]	**1.1**	-	**2.1**	**19.4**	-	**41.1**
Sand Dunes Tower	**0.9**	-	**2.2 J[3]**	**20.5**	-	**39.9 J[3]**
Van Buren Avenue	**1.2**	-	**2.9**	**24.8**	-	**48.3**
Boundary Locations						
Atomic City	**1.4**	-	**2.3**	**21.4**	-	**40.6**
Howe	**1.0**	-	**2.5**	**24.4**	-	**38.9 J[2]**
Monteview	**0.9**	-	**2.5**	**19.4**	-	**35.3**
Mud Lake	0.5	-	**2.3**	**18.0**	-	**36.1**
Distant Locations						
Craters of the Moon	**0.7**	-	**2.2**	**17.5**	-	**39.1**
Fort Hall[1]	**1.1**	-	**1.9 J[3]**	**20.1**	-	**36.7**
Idaho Falls	**0.7**	-	**2.2**	**20.6**	-	**33.1**

Concentrations are expressed in 1 x 10^{-3} pCi/m^3. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
[1]Operated by Shoshone-Bannock Tribes.
[2]Volume is an estimate due to mechanical failure. Results are considered to be a usable estimate (J).
[3]Volume is an estimate due to power outage. Results are considered to be a usable estimate (J).).

Table 3. Gamma spectroscopy analysis data for 47-mm TSP filters, composite samples, third quarter, 2025.

Station Location	Naturally Occurring Radionuclide Beryllium-7			Man-Made Gamma Emitting Radionuclides		
	Concentration		1 SD	Concentration[2]		1 SD[2]
On-site Locations						
Big Lost River Rest Area	**114.6**	-	3.6	-0.01	U	0.02
Experimental Field Station	**108.5**	-	4.3	0.07	U	0.05
MFC Guard House	**107.5**	-	3.5	-0.04	U	0.02
Sand Dunes Tower	**111.8**	J[3]	3.6	0.02	UJ[3]	0.05
Van Buren Avenue	**126.9**	-	4.0	-0.04	U	0.03
Boundary Locations						
Atomic City	**107.2**	-	3.4	0.00	U	0.03
Howe	**133.4**	J[4]	5.2	0.02	UJ[4]	0.04
Monteview	**103.2**	-	3.3	-0.01	U	0.03
Mud Lake	**100.1**	-	3.2	0.03	U	0.03
Distant Locations						
Craters of the Moon	**103.4**	-	3.3	-0.01	U	0.02
Fort Hall[1]	**109.1**	J[5]	4.3	0.04	UJ[5]	0.03
Idaho Falls	**100.9**	J[6]	4.0	0.03	UJ[6]	0.03

Concentrations are reported in 1 x 10^{-3} pCi/m^3 with associated uncertainty (1 SD). **Bold** concentrations are positive detections, greater than or equal to 3 SD.

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

[1]Operated by Shoshone-Bannock Tribes.

[2]Concentration and uncertainty values are for Cs-137 unless otherwise noted.

[3]Volume is an estimate for four weeks due to planned power outages. Results are considered a usable estimate (J).

[4]Volume is an estimate for seven weeks due to mechanical failure. Results are considered a usable estimate (J).

[5]Volume is less than expected for two weeks due to power outages. Results are considered a usable estimate (J).

[6]Volume is an estimate for one week due to mechanical failure. Results are considered a usable estimate (J).

Table 4. Gamma spectrometry analysis data for 8x10-inch TSP filters, monthly composite samples, third quarter, 2025.

Station Location	Month[3]	Naturally Occurring Radionuclide Beryllium-7			Man-Made Gamma Emitting Radionuclides		
		Concentration		1 SD	Concentration[2]		1 SD[2]
On-site Locations							
Big Lost River Rest Area	Jul	**149.3**	-	4.5	0.00	U	0.01
	Aug	**168.7**	-	5.6	0.03	U	0.02
	Sep	**145.2**	-	2.8	0.05	U	0.02
Experimental Field Station	Jul	**146.1**	-	4.9	0.00	U	0.01
	Aug	**151.6**	-	5.1	**0.06**	-	0.02
	Sep	**142.3**	-	2.7	0.08	U	0.03
MFC Guard House	Jul	**153.9**	-	2.8	0.02	U	0.01
	Aug	**168.5**	-	5.6	0.00	U	0.01
	Sep	**150.4**	-	4.7	0.00	U	0.01
Sand Dunes Tower	Jul	**144.6**	-	4.8	0.02	U	0.01
	Aug	**181.5**	-	3.3	0.02	U	0.02
	Sep	**143.8**	J[4]	4.5	-0.01	U	0.02
Van Buren Avenue	Jul	**141.0**	-	4.3	0.02	U	0.01
	Aug	**193.7**	-	3.5	0.02	U	0.02
	Sep	**138.4**	-	4.3	0.00	U	0.02
Boundary Locations							
Atomic City	Jul	**142.1**	-	4.7	0.04	U	0.02
	Aug	**148.1**	-	5.0	0.00	U	0.02
	Sep	**135.5**	-	2.6	0.01	U	0.02
Howe	Jul	**120.2**	-	2.2	0.02	U	0.01
	Aug	**141.4**	-	4.3	0.01	U	0.01
	Sep	**133.4**	-	2.6	0.05	U	0.03
Monteview	Jul	**136.9**	-	2.5	0.00	U	0.01
	Aug	**161.3**	-	4.9	0.00	U	0.01
	Sep	**128.8**	-	4.0	-0.01	U	0.02
Mud Lake	Jul	**136.8**	-	4.2	0.01	U	0.01
	Aug	**159.4**	-	4.9	0.00	U	0.01
	Sep	**137.5**	-	2.7	0.04	U	0.02
Distant Locations							
Craters of the Moon	Jul	**132.7**	-	4.4	0.00	U	0.01
	Aug	**157.9**	-	4.8	0.03	U	0.02
	Sep	**152.1**	-	4.7	0.01	U	0.02
Fort Hall[1]	Jul	**116.4**	-	3.6	0.00	U	0.01
	Aug	**117.6**	-	4.0	0.02	U	0.02
	Sep	**90.3**	J[4]	2.8	0.00	U	0.01
Idaho Falls	Jul	**153.7**	-	5.1	0.00	U	0.02
	Aug	**166.8**	-	5.6	0.03	U	0.02
	Sep	**132.2**	-	4.1	0.01	U	0.01

Concentrations are reported in 1 x 10^{-3} pCi/m^3 with associated uncertainty (1 SD). **Bold** concentrations are positive detections, greater than or equal to 3 SD.

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

[1] Operated by Shoshone-Bannock Tribes.

[2] Concentration and SD values are for Cs-137 unless otherwise noted.

[3] Four filters/composite for August and September, five filters/composite for July unless otherwise noted.

[4] Volume is an estimate due to power outages occurring during the month of September. Results are considered a usable estimate.

Table 5. Radiochemical separation analysis results for 8x10-inch TSP particulate filter composites collected during second quarter 2025.

Station Location	^{90}Sr			^{238}Pu			$^{239/240}Pu$			^{241}Am		
	Value[1]		1 SD	Value[1]		1 SD	Value[1]		1 SD	Value[1]		1 SD
On-Site Locations												
BLR[4] Rest Area	**0.81**	-	0.18	0.02	U	0.03	0.02	U	0.02	0.04	U	0.02
EFS[3]	0.41	U	0.15	0.03	U	0.02	0.05	U	0.02	0.04	U	0.04
MFC Guard House	**0.50**	-	0.15	0.04	U	0.02	0.08	U	0.03	0.07	U	0.04
Sand Dunes Tower	**1.05**	-	0.17	0.02	U	0.02	0.04	U	0.02	0.03	U	0.02
Van Buren Avenue	**1.40**	-	0.26	0.02	U	0.02	0.05	U	0.02	0.05	U	0.03
Boundary Locations												
Atomic City	**2.08**	-	0.26	0.03	U	0.03	0.05	U	0.02	-0.01	U	0.01
Howe	0.21	U	0.14	0.02	U	0.02	0.05	U	0.02	-0.01	U	0.01
Monteview	**0.93**	-	0.22	0.01	U	0.01	**0.08**	-	0.02	0.02	U	0.02
Mud Lake	**0.81**	-	0.19	0.05	U	0.02	0.03	U	0.02	0.05	U	0.02
Distant Locations												
Craters of the Moon	0.18	U	0.17	0.01	U	0.01	0.02	U	0.01	0.03	U	0.04
Fort Hall[2]	0.25	U	0.12	0.02	U	0.02	0.03	U	0.02	0.01	U	0.01
Idaho Falls	**0.76**	-	0.19	0.00	U	0.01	**0.03**	-	0.01	0.00	U	0.01

Note: Concentrations are reported in 1 x 10^{-5} pCi/m^3 with associated uncertainty (1 SD) and correspond to filter composites collected during the calendar quarter.
Bold concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
[1] Measurable quantities of these radionuclides are expected in the environment due to historic above-ground testing of nuclear weapons, and possibly from INL programs. DEQ-INL OP's action levels of 19 for americium-241, 190 for strontium-90, 21 for plutonium-238, and 20 for plutonium-239/240 (in 1 x 10^{-5} pCi/m^3) are 10 percent of the compliance values listed for the specific radionuclide in 40 CFR 61, Appendix E, Table 2.
[2] Operated by Shoshone-Bannock Tribes.
[3] EFS - Experimental Field Station.
[4] BLR – Big Lost River.

Table 6. Iodine-131 activity in weekly charcoal filter composites, third quarter, 2025.

Start Date	Collection Date	Iodine-131 activity (pCi/composite)		
		Activity		1 SD
06/26/25	07/03/25	0.17	U	0.91
07/03/25	07/10/25	1.42	U	0.92
07/10/25	07/17/25	0.24	U	0.87
07/17/25	07/24/25	0.46	U	0.93
07/24/25	07/31/25	-0.19	U	1.05
07/31/25	08/07/25	-1.67	U	1.15
08/07/25	08/14/25	0.07	U	0.91
08/21/25	08/21/25	-0.97	U	0.98
08/21/25	08/28/25	0.26	U	0.84
08/28/25	09/04/25	-0.35	U	1.26
09/04/25	09/11/25	-0.14	U	0.87
09/11/25	09/18/25	0.18	U	1.08
09/18/25	09/25/25	-0.48	U	1.16

Activities are reported in pCi/composite with associated uncertainty (1 SD). **Bold activities** are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

Table 7. Tritium concentrations in air from atmospheric moisture, third quarter, 2025.

Station Location	Start Date	Collection Date	Tritium		
			Concentration		1 SD
On-site Locations					
Big Lost River Rest Area	06-26-2025	07-24-2025	**0.60**	-	0.15
Big Lost River Rest Area	07-24-2025	08-28-2025	0.29	U	0.10
Big Lost River Rest Area	08-28-2025	09-25-2025	0.11	U	0.11
Experimental Field Station	06-26-2025	07-24-2025	**1.40**	-	0.16
Experimental Field Station	07-24-2025	08-28-2025	**0.98**	-	0.09
Experimental Field Station	08-28-2025	09-18-2025	**0.50**	-	0.11
MFC[2] Entrance	06-26-2025	07-24-2025	**0.43**	-	0.11
MFC Entrance	07-24-2025	08-28-2025	**0.38**	-	0.08
MFC Entrance	08-28-2025	09-18-2025	0.06	U	0.11
Sand Dunes Tower	06-26-2025	07-17-2025	0.06	UJ[3]	0.11
Sand Dunes Tower	07-17-2025	08-14-2025	0.05	U	0.15
Sand Dunes Tower	08-14-2025	09-04-2025	0.06	U	0.12
Sand Dunes Tower	09-04-2025	09-25-2025	**0.66**	-	0.12
Van Buren Avenue	06-26-2025	07-31-2025	**0.37**	-	0.12
Van Buren Avenue	07-31-2025	08-28-2025	**0.65**	-	0.11
Van Buren Avenue	08-28-2025	09-18-2025	**0.33**	-	0.11
Boundary Locations					
Atomic City	06-26-2025	07-24-2025	**0.44**	-	0.11
Atomic City	07-24-2025	08-28-2025	0.10	U	0.10
Atomic City	08-28-2025	09-25-2025	0.23	U	0.11
Howe	06-26-2025	07-17-2025	0.31	UJ[3]	0.19
Howe	07-17-2025	08-14-2025	0.05	U	0.15
Howe	08-14-2025	08-28-2025	-0.14	U	0.14
Howe	08-28-2025	09-18-2025	0.19	U	0.13
Mud Lake	06-26-2025	07-17-2025	-0.23	UJ[3]	0.15
Mud Lake	07-17-2025	08-07-2025	0.07	U	0.14
Mud Lake	08-07-2025	08-28-2025	0.31	U	0.16
Mud Lake	08-28-2025	09-11-2025	0.16	U	0.24
Mud Lake	09-11-2025	09-25-2025	**0.58**	-	0.13
Monteview	06-26-2025	07-17-2025	0.07	UJ[3]	0.14
Monteview	07-17-2025	08-07-2025	-0.07	U	0.13
Monteview	08-07-2025	08-28-2025	0.07	U	0.14
Monteview	08-28-2025	09-11-2025	0.08	U	0.15
Monteview	09-11-2025	09-25-2025	-0.36	U	0.12
Distant Locations					
Craters of the Moon	06-26-2025	07-17-2025	0.05	UJ[3]	0.10
Craters of the Moon	07-17-2025	08-14-2025	-0.05	U	0.09
Craters of the Moon	08-14-2025	09-04-2025	0.05	U	0.11
Craters of the Moon	09-04-2025	09-25-2025	**0.31**	-	0.10
Fort Hall[1]	06-26-2025	07-24-2025	0.15	U	0.10
Fort Hall	07-24-2025	08-14-2025	0.06	U	0.17
Fort Hall	08-14-2025	09-04-2025	-0.07	U	0.14

Station Location	Start Date	Collection Date	Tritium		
			Concentration		1 SD
Fort Hall	09-04-2025	09-18-2025	0.34	U	0.14
Idaho Falls	06-26-2025	07-24-2025	**0.24**	-	0.08
Idaho Falls	07-24-2025	08-07-2025	-0.24	U	0.12
Idaho Falls	08-07-2025	08-28-2025	0.06	U	0.13
Idaho Falls	08-28-2025	09-18-2025	**0.48**	-	0.11

Note: Concentrations are reported in pCi/m[3] with associated uncertainty (1 SD). **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: J = estimate, R = rejected, U=undetected.
[1] Station operated by Shoshone-Bannock Tribes.
[2] Materials and Fuels Complex.
[3] Result is an estimate due to a QC issue at the lab.

Table 8. Tritium and Cesium-137 concentrations in precipitation, third quarter 2025.

Station Location	Start Date	Stop Date	Tritium			Cs-137		
			Concentration		1 SD	Concentration		1 SD
On-site Locations								
Big Lost River Rest Area	06/26/2025	09/25/2025	70	U	30	1.5	U	0.7
Boundary Locations								
Atomic City	06/26/2025	09/25/2025	50	U	30	-0.1	U	0.7
Howe	06/26/2025	09/25/2025	40	U	30	0.5	U	0.6
Mud Lake	06/26/2025	09/25/2025	0	U	30	0.1	U	0.8
Monteview	06/26/2025	09/25/2025	50	U	30	1.5	U	0.9
Distant Locations								
Idaho Falls	06/26/2025	09/25/2025	40	U	30	0.4	U	0.5

Concentrations are reported in pCi/L with associated uncertainty (1 SD). **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: J = estimate, R = rejected, U=undetected.

Environmental Radiation Monitoring Results

The DEQ-INL OP operated 11 real-time environmental radiation monitoring stations during the third quarter of 2025 (**Figure 1**). To detect gamma radiation, each station is equipped with an EcoGamma gamma radiation monitor featuring both low- and high-range Geiger–Müller detectors, along with triplicate electret ionization chambers (EICs). (**Table 9**).

The Shoshone-Bannock Tribes operate an air monitoring station at Fort Hall, which is also equipped with an EcoGamma and EICs—both owned and operated by the DEQ-INL OP. The DEQ-INL OP reports these results as a distant site.

The EcoGammas provide real-time measurements and are sensitive enough to detect small changes in gamma radiation levels. The EcoGamma data from each location are transmitted to the DEQ-INL OP and are presented graphically on the DEQ website: https://www.deq.idaho.gov/idaho-national-laboratory-oversight/inl-oversight-program/gamma-radiation-measurements. Historically, DEQ-INL OP used high-pressure ion chambers (HPICs) for real-time gamma radiation monitoring. The transition from HPICs to EcoGammas at all monitoring stations was completed in the first quarter of 2022. Slight differences between EcoGamma and historical HPIC data are expected.

EICs are passive-integrating devices that provide cumulative measurements of environmental gamma radiation exposure. They are deployed, collected, and analyzed quarterly. EICs offer an economical method for monitoring gamma radiation across wide areas, particularly in regions without a power supply. They can also deliver critical gamma radiation data during emergencies. For these reasons, DEQ-INL OP has deployed EICs at 68 locations in a broad network around the INL (**Figure 1**) to measure external radiation. During the third quarter of 2025, a new EIC monitoring location was added at the MFC Guard House. These data are presented in **Appendix B.**

DEQ-INL OP uses both EcoGammas and EICs to monitor external gamma radiation for a variety of radiological objectives. **Table 10** presents the average, median, and range of radiation exposure rates measured by EcoGammas during the third quarter of 2025. **Table 11** presents the EIC monitoring results for the same period. Overall, exposure rates remained within the historical background radiation range observed by DEQ-INL OP.

Table 9. Summary of radiation detection instruments at real-time radiation monitoring stations and air monitoring stations. Air monitoring stations are underlined.

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

[1]MFC – Materials and Fuels Complex. MFC Guard House is a new monitoring location. Air monitoring data collection began here during the week of 5/16 - 5/23/24. EIC data collection began during the third quarter of 2025.

Table 10. Average, median, and range of gamma exposure rates, third quarter 2025, from EcoGamma measurements.

Station Location	Exposure Rate (µR/hr)			
	Quarterly Average*	1 SD	Median	Range**
On-site Locations				
Base of Howe[1]	13.8	0.6	13.7	10.5 – 21.1
Big Lost River Rest Area	14.6	0.6	14.6	11.2 – 20.3
Rover[2]	14.8	0.6	14.8	10.7 – 20.9
Sand Dunes Tower[3]	14.0	0.6	14.0	9.6 – 18.5
Boundary Locations				
Atomic City[4]	13.8	0.6	13.7	10.4 – 21.1
Howe Met. Tower	13.2	0.6	13.1	9.5 – 21.3
Monteview[5]	13.3	0.7	13.3	9.8 – 23.8
Mud Lake / Terreton[6]	12.9	0.7	12.9	8.1 – 22.5
Distant Locations				
Big Southern Butte	14.6	0.6	14.6	10.4 – 19.8
Fort Hall[7]	14.0	1.3	14.4	10.3 – 19.7
Idaho Falls[8]	11.5	0.6	11.5	8.4 – 16.3

*EcoGammas are sensitive electronic devices that can experience intermittent malfunctions and/or interference; this typically results in characteristic positive and/or negative data spikes. These aberrations are removed from the data set based on the judgement of the data analyst.

**The range of background exposure rates from EcoGamma data collected to date is approximately 7 – 34 µR/hr.

[1]No valid data at Base of Howe 8/13 – 8/14/25 due to maintenance.

[2]No valid data at Rover 7/31, 8/4 – 8/5/25 due to maintenance.

[3]No valid data at Sand Dunes Tower 8/12/25 due to maintenance then 9/17 – 9/18/25 due to site construction power outage.

[4]No valid data at Atomic City 8/13 – 8/14/25 due to maintenance.

[5]No valid data at Monteview 8/11/25 due to maintenance.

[6]No valid data at Mud Lake/Terreton 8/11/25 due to maintenance.

[7]No valid data at Fort Hall 7/17 – 8/19/25 due to mechanical failure.

[8]No valid data at Idaho Falls 8/19/25 due to maintenance.

Table 11. Electret ionization chamber (EIC) cumulative average exposure rates at EcoGamma (real-time radiation monitoring) stations and air monitoring stations, third quarter, 2025.

Station Location	Exposure Rate (µR/hr)	
	Quarterly Average[1]	1 SD
On-Site Locations		
Base of Howe	12.5	1.5
Big Lost River Rest Area	15.6, 17.4	-
Experimental Field Station	17.4	0.3
MFC Guard House[2]	10.9	2.5
Rover	14.1, 16.9	-
Sand Dunes Tower	13.2	1.6
Van Buren Avenue	11.5	0.5
Boundary Locations		
Atomic City	13.1	1.7
Howe Met. Tower	12.1	0.7
Monteview	10.7	0.2
Mud Lake/ Terreton	11.9	1.2
Distant Locations		
Big Southern Butte	12.1	1.2
Craters of the Moon	13.7	0.3
Fort Hall	12.7	1.9
Idaho Falls	8.6	0.8

[1]Results are the average of triplicate exposure rate measurements with the associated sample variability (±1 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]MFC – Materials and Fuels Complex. MFC Guard House is a new monitoring location. Air monitoring data collection began here during the week of 5/16 - 5/23/24. EIC data collection began during the third quarter of 2025.

Water Monitoring Results

DEQ-INL OP collects groundwater samples from wells and springs located within, upgradient of, and downgradient of the INL to evaluate the effects of INL contaminants on water quality in the eastern Snake River Plain (ESRP) aquifer and verify the results of DOE and USGS monitoring. Each year, DEQ-INL OP samples approximately 85-90 locations concurrently with a DOE contractor or the USGS and 15-20 locations independently. Co-sampled locations are primarily on or near the INL Site and are usually sampled during the second and fourth calendar quarters. DEQ-INL OP publishes a comparison of its own analytical results with those obtained by co-samplers in the DEQ-INL Oversight Program Annual Report. Locations sampled independently by DEQ-INL OP are mostly in the Magic Valley and are typically sampled during the third calendar quarter.

Most water samples are collected from wells drilled into the aquifer or springs formed by the intersection of the aquifer water table with the surface. Each aquifer well or spring is categorized as upgradient, facility, boundary, or distant based on its location (**Figure 2** and **Figure 3**):

- *Upgradient* sites are situated north or northeast of INL facilities in areas that have not been affected by INL operations. They are used to monitor background concentrations in the aquifer.

- *Facility* sites are located near facility complexes within the INL, including the Advanced Test Reactor Complex (ATR), the Central Facilities Area (CFA), the Idaho Nuclear Technology and

Engineering Center (INTEC), the Materials and Fuels Complex (MFC), the Naval Reactors Facility (NRF), the Radioactive Waste Management Complex (RWMC), and Test Area North (TAN). Facility sites are located within or immediately downgradient of known areas of contamination and are sampled to monitor the concentrations and migration of specific contaminants.

- *Boundary* sites are located near the southern boundary of the INL, downgradient of potential sources of INL contamination. These include several wells equipped with Westbay Multilevel Groundwater Monitoring Systems ("Westbay wells"), which offer a look at the vertical distribution of constituents in the aquifer.

- *Distant* sites are located farther downgradient of the INL, primarily in the Magic Valley, and include wells and springs used for agricultural, municipal, domestic, and industrial purposes.

A small number of samples are also collected each year from streams, waste-pond effluent, and wells drilled into perched groundwater (groundwater that sits above the aquifer).

Samples collected from water-monitoring sites are analyzed for radiological and non-radiological constituents, many of which are present in the aquifer both naturally and as a result of INL operations. All locations are sampled for gross alpha and gross beta radioactivity, manmade gamma-emitting nuclides, tritium, chloride, sulfate, chromium, and nitrate-plus-nitrite.[6] Samples from locations at which tritium concentrations are too low to be detected by the standard method are re-analyzed for tritium using an electrolytic enrichment method (referred to as the low-level method), which has a minimum detectable concentration (MDC) about ten times lower than the standard method. Selected sites are also sampled for specific radionuclides—including uranium isotopes (^{234}U, ^{235}U, and ^{238}U), plutonium isotopes (^{238}Pu, $^{239/240}$Pu), americium-241 (^{241}Am), strontium-90 (^{90}Sr), iodine-129 (^{129}I), and technetium-99 (^{99}Tc)—selected trace metals, common ions, total phosphorous, and/or volatile organic compounds (VOCs) based on past and present INL operations or a history of elevated concentrations. If unexpected levels of radioactivity are detected in gross measurements, additional samples will be collected and analyzed for specific radionuclides.

During the third quarter of 2025, DEQ-INL OP sampled groundwater from the aquifer at two facility and 11 distant locations. **Table 12** lists the sample date, co-sampler, well depth, and analyses requested for the locations sampled this quarter. Analytical results are reported in **Tables 14 through 19** and summarized below. The results of low-level tritium analyses for six samples collected in the second quarter, along with nine samples collected in the third quarter of 2025, are reported in **Table 16** and discussed below.

Table 13 shows the range of background concentrations for each constituent in the ESRP aquifer and the EPA drinking water maximum contaminant level (MCL) or secondary MCL. Background concentrations depend on local geology, and the concentrations of constituents at sites not influenced by INL activities may on occasion be higher than the given background ranges due to local factors and natural variability.

Gross alpha and gross beta radioactivity

Gross alpha and gross beta analyses are used to screen for unexpectedly high levels of radioactivity in samples. DEQ-INL OP has determined from past sampling that background concentration ranges for

[6] Distant locations Alpheus Spring, Bill Jones Hatchery, Clear Spring, Minidoka Water Supply, and Shoshone Water Supply and upgradient location Mud Lake Water Supply are sampled for gross alpha and gross beta radioactivity, gamma-emitting radionuclides, and tritium during the second quarter. In the fourth quarter, samples are collected for common ions, metals, nitrate-plus-nitrate, and other constituents along with gross alpha and gross beta radioactivity, gamma-emitting radionuclides, and tritium.

gross alpha and gross beta radioactivity in the ESRP aquifer are approximately 0-5.6 pCi/L and 0-8.6 pCi/L, respectively. Occasional measurements of concentrations above these background ranges in uncontaminated samples are statistically probable due to uncertainties inherent in measuring low levels of radioactivity. Additionally, some samples will have levels of radioactivity slightly higher than background ranges due to higher-than-average concentrations of naturally occurring uranium, thorium, or potassium-40.

Gross alpha radioactivity was detected at five locations this quarter (**Table 14)**. Of the facility and distant wells sampled this quarter, distant well MV-13 had the highest gross alpha concentration of 2.5 ± 0.6 pCi/L, which is within the background and historical range for this well. The EPA maximum contaminant level (MCL) for alpha particles is 15 pCi/L. All locations sampled this quarter resulted in detections of gross beta radioactivity. Consistent with historical results, the highest gross beta concentrations were measured at facility wells USGS-112 (15.6 ± 0.8 pCi/L) and USGS-115 (10.2 ± 0.5 pCi/L). All distant well detections were within the known background range, with distant well MV-13 measuring the greatest gross beta concentration at 7.6 ± 0.6 pCi/L.

Manmade gamma-emitting radionuclides

Manmade gamma-emitting cesium-137 (^{137}Cs) was not detected at any of the facility or distant locations sampled this quarter. Results for ^{137}Cs are reported in **Table 14**.

Tritium

Tritium is analyzed at all locations sampled by the INL Oversight Program. All tritium samples are analyzed by the standard tritium method. In instances where lower tritium concentrations are anticipated, an enriched tritium analysis (low-level tritium analysis) is requested. When a sample has been analyzed using the standard tritium method and the enriched tritium method, the enriched analysis result is the preferred result.

This quarter tritium detections were measured at two facility locations (USGS-112: 278 ± 34 pCi/L and USGS-115: 677 ± 40 pCi/L) using the standard analytical method (**Table 15**). There was also a detection at one distant well (MV-07: 109 ± 32 pCi/L); however, a standard analytical method reanalysis (27 ± 32 pCi/L) and a low-level tritium analysis (2 ± 2 pCi/L) both resulted in non-detections. Staff requested that the lab perform an additional analysis for confirmation. Results will be published in a subsequent report.

Nine distant location samples from this quarter and six boundary location samples from second quarter 2025 were analyzed by the low-level tritium analysis method. Results are reported in **Table 16**. The highest concentration detected at a distant location was 14 ± 2 pCi/L at MV-40. For boundary locations, the highest concentration was 144 ± 3 pCi/L at USGS-105 (1,072 ft bgs), indicating an INL influence. The results do align with prior monitoring results. All reported low level tritium concentrations for the distant wells are within the background range (≤ 33 pCi/L) and all tritium concentrations reported in this quarter are well below the drinking water MCL of 20,000 pCi/L. A backlog of six samples for low-level tritium analysis remains. These results will be published in a subsequent report.

Strontium-90

Two INTEC wells, USGS-112 and USGS-115, were sampled for ^{90}Sr this quarter (**Table 17**)**.** USGS-112 exhibited the highest ^{90}Sr concentration at 9.00 ± 0.65 pCi/L, which is an increase from 4.55 ± 0.62 pCi/L in 2024. The year 2012 was the last time that concentrations were this high (9.2 ± 2.3 pCi/L). Due to the increase in concentration, a repeat analysis was requested of the laboratory. However, the laboratory

was unable to accommodate the request because there was not enough remaining sample water for reanalysis. This well is scheduled to be sampled again in 2026. The ^{90}Sr concentration for USGS-115 was 3.18 ± 0.43 pCi/L and in line with historical values.

Technetium-99

INTEC wells, USGS-112 and USGS-115, were sampled for ^{99}Tc this quarter (**Table 18**). Analysis from the sample collected at USGS-112 resulted in a non-detection. The analysis from the sample collected at USGS-115 (13.2 ± 0.8 pCi/L) was within the historical range for this location.

Actinides

Wells USGS-112 and USGS-115, both located at INTEC, were analyzed for uranium isotopes this quarter (**Table 19**). Within background levels, USGS-112 exhibited the highest ^{234}U concentration at 1.36 ± 0.10 pCi/L and the highest ^{238}U concentration at 0.52 ± 0.06 pCi/L. ^{235}U concentrations for both USGS-112 and USGS-115 were non-detections, as well as within background levels. All results were consistent with ranges observed in previous years.

Common ions, trace metals, and nutrients

All locations were sampled for chloride, sulfate, alkalinity, chromium, and dissolved nutrients (nitrate-plus-nitrite) (**Tables 20, 21 and 22**).

Most analytes tested at distant wells in the Magic Valley were within background ranges, with the exception of several chloride, sulfate and nitrate-plus-nitrite results. Well, MV-53 had the highest chloride (68.7 mg/L), sulfate (84.1 mg/L) and nitrate plus-nitrite (6.3 µg/L) concentrations of all distant wells. Sulfate concentrations also exceeded background levels at wells MV-05 (75.7 mg/L), MV-13 (64.7 mg/L) and MV-40 (44 mg/L). These elevated sulfate and nitrate-plus-nitrite concentrations are likely associated with agricultural practices. At MV-40, sulfate levels were higher than the 2022 results (25.2 mg/L). Chloride, alkalinity, and specific conductance at MV-40 also increased between 2022 to 2025 (from 11.2 to 21.9 mg/L, from 132 mg/L to 157 mg/L, and from 332.6 to 439.7 µS/cm, respectively), indicating an overall increase in dissolved ion content. What caused these increases is not clear, however, samples are usually collected from a valve located on the well's discharge line. During this quarter, samples were collected from a different valve located approximately 40 feet from the well, which may have influenced the results. Future sampling will be conducted from the valve located on the well's discharge line, closest to the wellhead.

Chromium concentrations were above background for INTEC wells USGS-112 (11 µg/L) and USGS-115 (6.5 µg/L), but remained within the historical range for these locations. All other results were consistent with historical trends.

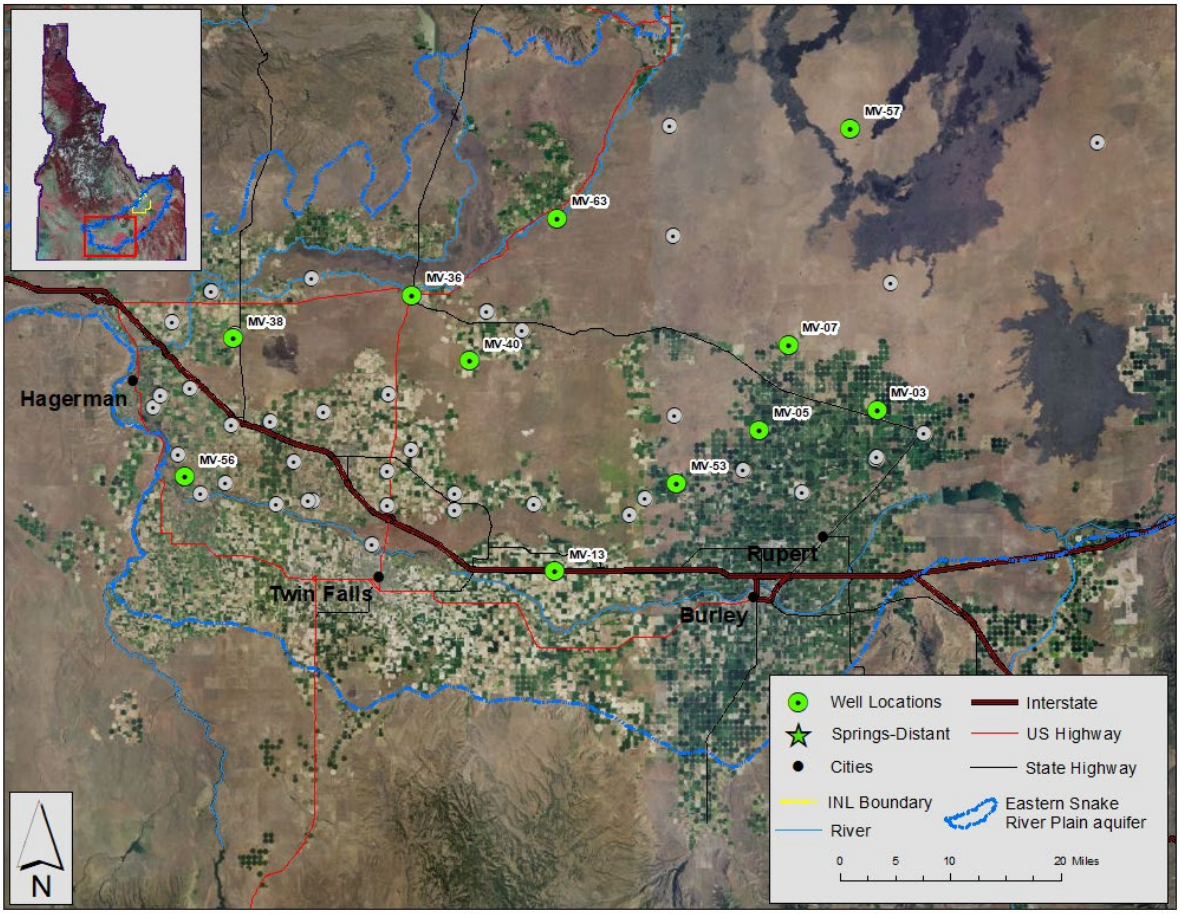


Figure 2. Distant water monitoring locations.

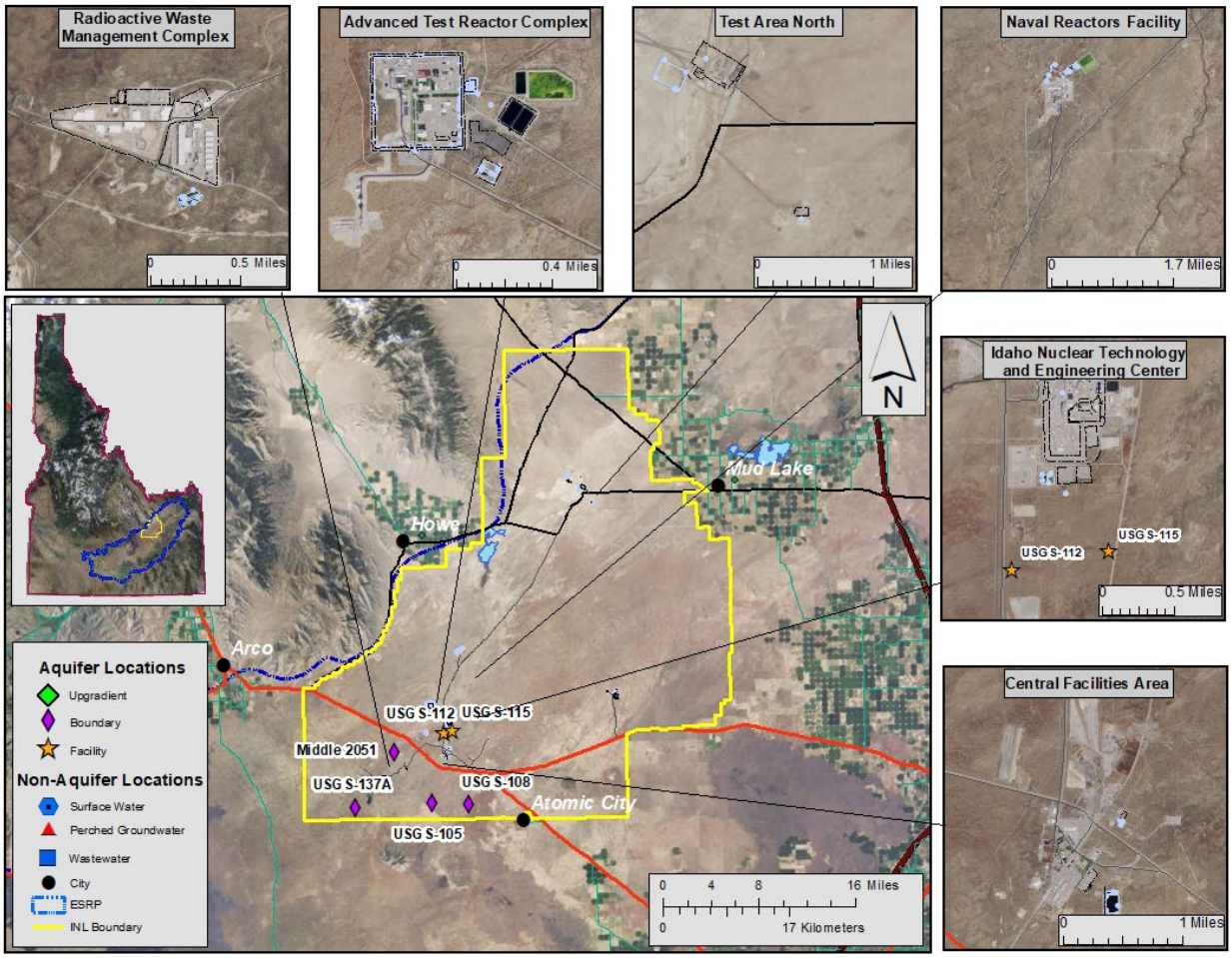


Figure 3. Upgradient, facility, boundary, perched groundwater (GW), surface water and wastewater monitoring locations. Boundary locations depicted on the map correspond to low-level tritium results from samples taken during the second quarter of 2025.

Table 12. Locations sampled for water, third quarter, 2025.

Sample Location	Date Sampled	Co-sampler	Well Depth (ft bgs)	Analyses*
Aquifer Samples				
Distant				
MV-03	7/15/2025	None	400	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-05	7/15/2025	None	388	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-07	7/14/2025	None	444	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-13	7/14/2025	None	390	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-36	7/14/2025	None	355	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, trace metals, NO_3+NO_2
MV-38	7/15/2025	None	n/a	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-53	7/14/2025	None	350	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-56	7/14/2025	None	n/a	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-40	7/14/2025	None	n/a	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-57	7/29/2025	None	652	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, NO_3+NO_2
MV-63	8/27/2025	None	420	α, β, γ, ^{3}H, com. ions, Cr, NO_3+NO_2
USGS-112	09/30/2025	USGS	509	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, ^{90}Sr, ^{99}Tc, ^{234}U, ^{235}U, ^{238}U, NO_3+NO_2
USGS-115	9/30/2025	USGS	581	α, β, γ, ^{3}H, Cl-, SO_4^{2-}, alk, Cr, ^{90}Sr, ^{99}Tc, ^{234}U, ^{235}U, ^{238}U, NO_3+NO_2

ft bgs = feet below ground surface.

*α = gross alpha radioactivity; β = gross beta radioactivity; γ = manmade gamma-emitting radionuclides; ^{3}H = tritium; ^{90}Sr = Strontium-90; ^{99}Tc = Technetium-99; ^{129}I = Iodine-129; Pu iso. = plutonium isotopes ^{238}Pu, $^{239/240}$ Pu; U iso. = uranium isotopes ^{234}U, ^{235}U, ^{238}U; Cl- = chloride; SO_4^{2-} = sulfate; alk = alkalinity; Cr = chromium; com. ions = Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Cl^{-}, SO_4^{2-}, alkalinity; trace metals (metals) = arsenic (As), barium (Ba), chromium (Cr), iron (Fe), manganese (Mn), lead (Pb), selenium (Se), zinc (Zn); NO_3+NO_2 = nitrate plus nitrite; P = phosphorus; and VOCs (volatile organic compounds).

n/a = well depth not available.

Table 13. Constituent background concentration ranges and EPA drinking water standards.

Constituent	Background[1]	MCL or SMCL[2]
Radiological Constituents (pCi/L)		
Gross alpha	0-5.6[a]	15
Gross beta	0-8.6[a]	4 mrem/yr
Cesium-137	0	200
Tritium	0-33[a]	20,000
Strontium-90	0	8
Technetium-99	0	900
Iodine-129	0.0000054[e]	1
Uranium-234	0.043-1.9[b]	30 µg/L (total U)
Uranium-235	0-0.048[b]	
Uranium-238	0.021-0.719[b]	
Plutonium-238	0	---
Plutonium-239/240	0	---
Americium-241	0	---
Non-radiological Constituents		
Common Ions (mg/L)		
Alkalinity (as $CaCO_3$)	91-261[a]	---
Calcium	23 – 71[a]	---
Chloride	4.9 – 66.6[a]	250*
Fluoride	0.1 – 1.50[a]	4
Magnesium	10.1 – 27.4[a]	---
Potassium	1.2 – 5.8[a]	---
Sodium	2.6 – 27.0[a]	---
Sulfate	9.6 – 40.4[a]	250*
Trace Metals (µg/L)		
Arsenic	2 – 3[c]	10
Barium	50 – 70[c]	2000
Chromium	<1.0 – 5.2[a]	100
Iron	4 – 16[d]	300*
Lead	<5[c]	15
Manganese	<1 – 4[a]	50*
Selenium	<1[c]	50
Zinc	<3 – 10.5[d]	5000*
Nutrients (mg/L)		
Nitrate plus nitrite	<0.04 – 3.59[b]	10 for NO_3^-, 1 for NO_2^-
Phosphorus	<0.01 – 0.02[d]	---
Volatile Organic Compounds (µg/L)		
Tetrachloroethene (PCE)	0	5
Trichloroethene (TCE)	0	5
1,1-Dichloroethene	0	7
cis-1,2-dichloroethene	0	70
trans-1,2-dichloroethene	0	100
Vinyl chloride	0	2
Carbon tetrachloride	0	5
Chloroform	0	80[f]
Chloromethane	0	---
Methylene Chloride	0	5
Methyl Ethyl Ketone	0	---
1,1-Dichloroethane	0	---

[1]Sources for background ranges are [a] DEQ data compiled from distant, boundary, and surface water sites from 1993-2018.
[b]Bartholomay and Hall, 2016 (DOE/ID-22237); [c]Knobel and others, 1992; [d]Knobel and others, 1999 (DOE/ID-22164); [e]Cecil and others, 2003 (DOE/ID-22186); [f]MCL is for total trihalomethanes.
[2]Maximum Contaminant Levels (MCLs) are the highest levels of contaminants legally allowed in public drinking water systems in Idaho. Most wells sampled by DEQ-INL OP are not used for drinking water. A * designates a Secondary MCL (SMCL), which is a guideline recommended by the EPA for constituents that may affect the taste, color, or odor of drinking water.

Table 14. Gross alpha, gross beta, and man-made gamma-emitting radionuclide concentrations (pCi/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Gross Alpha			Gross Beta			Cesium-137*		
		Concentration		1 SD	Concentration		1 SD	Concentration		1 SD
Aquifer Samples										
Distant										
MV-03	7/15/2025	1.0	U	0.3	**3.8**	-	0.4	1.3	U	0.8
MV-05	7/15/2025	1.7	U	0.6	**4.6**	-	0.7	0.1	U	0.6
MV-07	7/14/2025	0.0	U	0.3	**2.8**	-	0.4	-0.4	U	0.7
MV-13	7/14/2025	**2.5**	-	0.6	**7.6**	-	0.6	1.4	U	0.5
MV-36	7/14/2025	**1.7**	-	0.4	**2.3**	-	0.4	0.4	U	0.8
MV-38	7/15/2025	**1.2**	-	0.3	**2.4**	-	0.3	0.9	U	0.6
MV-40	7/14/2025	0.5	U	0.3	**3.3**	-	0.4	1.0	U	0.7
MV-53	7/14/2025	1.5	U	0.6	**6.9**	-	0.6	0.5	U	0.8
MV-56	7/14/2025	1.3	U	0.5	**3.9**	-	0.5	0.7	U	0.6
MV-57	7/29/2025	0.6	U	0.3	**1.5**	-	0.4	-0.1	U	0.5
MV-63	8/27/2025	**1.6**	-	0.4	**3.8**	-	0.4	0.1	U	0.6
USGS-112	9/30/2025	**2.2**	-	0.6	**15.6**	-	0.8	1.3	U	0.7
USGS-115	9/30/2025	1.1	U	0.4	**10.2**	-	0.5	0.0	U	0.6

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
were larger due to high dissolved/suspended solids requiring a smaller aliquot for analysis.
*ISU-EML analyzes water samples for all common manmade gamma-emitting radionuclides. If none are detected, only the results for ^{137}Cs, the manmade gamma-emitter most likely to be detected in groundwater, are reported in this table.
Bold concentrations are positive detections, greater than or equal to 3 SD.

Table 15. Tritium concentrations (pCi/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Tritium		
		Concentration		1 SD
Aquifer Samples				
Distant				
MV-03	7/15/2025	24	U	30
MV-05	7/15/2025	75	U	31
MV-07	7/14/2025	**109**	-	32
MV-07[1]	7/14/2025	27	U	32
MV-13	7/14/2025	61	U	31
MV-36	7/14/2025	27	U	30
MV-38	7/15/2025	34	U	30
MV-40	7/14/2025	28	U	32
MV-53	7/14/2025	27	U	30
MV-56	7/14/2025	17	U	32
MV-57	7/29/2025	31	U	32
MV-63	8/27/2025	-41	U	32
USGS-112	9/30/2025	**278**	-	34
USGS-115	9/30/2025	**677**	-	40

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Bold concentrations are positive detections, greater than or equal to 3 SD.
Note 1: This sample was re-pipetted and recounted due to concerns with the original result.

Table 16. Low-level tritium concentrations (pCi/L) in water samples collected and analyzed using the electrolytic enrichment method, second and third quarter, 2025.

Sample Location	Sample Date	Tritium		
		Concentration		1 SD
Aquifer Samples				
Distant				
MV-03	7/15/2025	5	U	2
MV-05	7/15/2025	**6**	-	2
MV-07	7/14/2025	2	U	2
MV-13	7/14/2025	**10**	-	2
MV-36	7/14/2025	**6**	-	2
MV-38	7/15/2025	**8**	-	1
MV-40	7/14/2025	**14**	-	2
MV-53	7/14/2025	**8**	-	1
MV-56	7/14/2025	5	U	2
Boundary				
Middle-2051 (749 ft bgs)	6/25/2025	**135**	-	3
Middle-2051 (1091 ft bgs)	6/25/2025	**89**	-	2
USGS-105 (952 ft bgs)	6/24/2025	**137**	-	3
USGS-105 (1072 ft bgs)	6/24/2025	**144**	-	3
USGS-108 (1172 ft bgs)	6/26/2025	**32**	-	2
USGS-137A (747 ft bgs)	6/23/2025	**78**	-	2

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
ft bgs = feet below ground surface.
Bold concentrations are positive detections, greater than or equal to 3 SD.

Table 17. Strontium-90 concentrations (pCi/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Strontium-90		
		Concentration		1 SD
Aquifer Samples				
Facility				
Idaho Nuclear Technology and Engineering Center				
USGS-112	9/30/2025	**9.00**	-	0.65
USGS-115	9/30/2025	**3.18**	-	0.43

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Bold concentrations are positive detections, greater than or equal to 3 SD.

Table 18. Technetium-99 concentrations (pCi/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Technetium-99		
		Concentration		1 SD
Aquifer Samples				
Facility				
Idaho Nuclear Technology and Engineering Center				
			-	
USGS-112	9/30/2025	0.16	U	0.27
USGS-115	9/30/2025	**13.2**	-	0.8

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Bold concentrations are positive detections, greater than or equal to 3 SD.

Table 19. Uranium isotope concentrations (pCi/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Uranium-234			Uranium-235			Uranium-238		
		Concentration		1 SD	Concentration		1 SD	Concentration		1 SD
Aquifer Samples										
Facility										
Idaho Nuclear Technology and Engineering Center										
USGS-112	9/30/2025	**1.36**	-	0.10	0.04	U	0.02	**0.52**	-	0.06
USGS-115	9/30/2025	**0.71**	-	0.07	0.01	U	0.01	**0.36**	-	0.05

Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Bold concentrations are positive detections, greater than or equal to 3 SD.

Table 20. Common ion concentrations (mg/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Calcium*		Magnesium*		Sodium*		Potassium*		Fluoride		Chloride		Sulfate		Alkalinity†	
Aquifer Samples																	
Distant																	
MV-03	7/15/2025	-	-	-	-	-	-	-	-	-	-	23.8	-	32.9	-	130	-
MV-05	7/15/2025	-	-	-	-	-	-	-	-	-	-	60.0[2]	-	75.7[2]	-	185	-
MV-07	7/14/2025	-	-	-	-	-	-	-	-	-	-	14.2	-	32.0	-	124	-
MV-13	7/14/2025	-	-	-	-	-	-	-	-	-	-	38.8[1]	-	64.7	-	210	-
MV-36	7/14/2025	48.0	-	16.0	-	15.0	-	3.0	-	-	-	9.85	-	22.0	-	176	-
MV-38	7/15/2025	-	-	-	-	-	-	-	-	-	-	10.7	-	21.2	-	149	-
MV-40	7/14/2025	-	-	-	-	-	-	-	-	-	-	21.9	-	44.0	-	157	-
MV-53	7/14/2025	-	-	-	-	-	-	-	-	-	-	68.7[2]	-	84.1[2]	-	225	-
MV-56	7/14/2025	-	-	-	-	-	-	-	-	-	-	23.9	-	39.2	-	140	-
MV-57	7/29/2025	-	-	-	-	-	-	-	-	-	-	6.22	-	16.4	-	103	-
MV-63	8/27/2025	39.0	-	16.0	-	15.0	-	2.8	-	-	-	5.26	-	14.6	-	176	-
USGS-112	9/30/2025	-	-	-	-	-	-	-	-	-	-	13.5	-	28.6	-	145	-
USGS-115	9/30/2025	-	-	-	-	-	-	-	-	-	-	39.9[1]	-	24.5	-	113	-

Data qualifiers: U = undetected, J = estimate, R = rejected, "<" = less than detection limit, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
*Samples are filtered for calcium, magnesium, sodium, and potassium.
†As $CaCO_3$.
"-" = not analyzed.
Note 1. Lab indicated that a 1:2 dilution of this sample was required for this analyte.
Note 2. Lab indicated that a 1:5 dilution of this sample was required for this analyte.

Table 21. Dissolved metals concentrations (µg/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Arsenic		Barium		Chromium		Iron		Lead		Manganese		Selenium		Zinc	
Aquifer Samples																	
Distant																	
MV-03	7/15/2025	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-	-	-
MV-05	7/15/2025	-	-	-	-	2.2	-	-	-	-	-	-	-	-	-	-	-
MV-07	7/14/2025	-	-	-	-	2.9	-	-	-	-	-	-	-	-	-	-	-
MV-13	7/14/2025	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	-	-
MV-36	7/14/2025	1.6	-	43	-	2.2	-	<10	U	<1	U	<1	U	<2	U	<5	U
MV-38	7/15/2025	-	-	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-
MV-40	7/14/2025	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-
MV-53	7/14/2025	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-
MV-56	7/14/2025	-	-	-	-	2.9	-	-	-	-	-	-	-	-	-	-	-
MV-57	7/29/2025	-	-	-	-	4.1	-	-	-	-	-	-	-	-	-	-	-
MV-63	8/27/2025	-	-	-	-	1.8	-	-	-	-	-	-	-	-	-	-	-
USGS-112	9/30/2025	-	-	-	-	11.0	-	-	-	-	-	-	-	-	-	-	-
USGS-115	9/30/2025	-	-	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-

Samples were filtered in the field unless otherwise noted.
Data qualifiers: U = undetected, J = estimate, R = rejected, "<" = less than detection limit, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
"-" = not analyzed.

Table 22. Dissolved nutrient concentrations (mg/L) in water samples, third quarter, 2025.

Sample Location	Sample Date	Nitrate + Nitrite*		Total Phosphorus	
Aquifer Samples					
Distant					
MV-03	7/15/2025	1.2	-	-	-
MV-05	7/15/2025	3.6[1]	-	-	-
MV-07	7/14/2025	0.57	-	-	-
MV-13	7/14/2025	3.3[2]	-	-	-
MV-36	7/14/2025	1.9	-	-	-
MV-38	7/15/2025	1.3	-	-	-
MV-40	7/14/2025	0.15	-	-	-
MV-53	7/14/2025	6.3[3]	-	-	-
MV-56	7/14/2025	1.6	-	-	-
MV-57	7/29/2025	0.42	-	-	-
MV-63	8/27/2025	1.3	-	-	-
USGS-112	9/30/2025	0.82	-	-	-
USGS-115	9/30/2025	1.6	-	-	-

Samples were filtered in the field unless otherwise noted.
Data qualifiers: U = undetected, J = estimate, R = rejected, "<" = less than detection limit, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
*As N.
"-" = not analyzed.
Note 1. Lab indicated that a 1:2 dilution of this sample was required for this analyte.
Note 2. Lab indicated that a 1:4 dilution of this sample was required for this analyte.
Note 3. Lab indicated that a 1:5 dilution of this sample was required for this analyte.

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. Twelve milk samples were analyzed during the quarter.

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 23**. ^{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 23. Gamma spectrometry analysis data for milk samples, third quarter, 2025.

Sample Location/Dairy	Sample Date	Naturally occurring Potassium-40		Man-made Iodine-131		
		Concentration[2]	1 SD	Concentration[2]		1 SD
Monitoring Samples						
Gooding	07/14/25	**1589**	56	0.0	U	0.4
Gooding	08/11/25	**1469**	60	-0.1	U	0.7
Gooding	09/08/25	**1387**	57	0.6	U	0.8
Monteview	07/28/25	**1411**	58	-0.7	U	1.1
Monteview	08/25/25	**1352**	56	0.4	U	0.7
Monteview	09/22/25	**1374**	57	1.2	U	0.9
Ucon	07/11/25	**1758**	67	-2.6	U	1.6
Ucon	08/02/25	**1626**	64	0.2	U	1.0
Ucon	08/30/25	**1563**	62	-1.3	U	1.0
Verification Samples[1]						
Howe	07/22/25	**1363**	57	-0.1	U	0.7
Dietrich	08/19/25	**1349**	55	0.1	U	0.6
Terreton	09/16/25	**1370**	57	-0.1	U	0.7

[1] DEQ-INL OP samples collected by the off-site INL environmental surveillance contractor.
[2] Concentrations with associated uncertainties (1 SD) are expressed in pCi/L. **Bold** concentrations are positive detections, greater than or equal to 3 SD. Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

Quality Assurance

Measurements of constituent concentrations in environmental media are subject to inaccuracy from errors that may be introduced during the collection, transportation, and analysis of samples, calibration of equipment, and recording and reporting of results. While it is impossible to quantify every error that may affect a result, a quality assurance (QA) program can evaluate the overall quality of a dataset and, in many cases, identify and address errors or inaccuracies. DEQ-INL OP's QA program is designed to (1) ensure sample integrity, (2) evaluate the precision and accuracy of analytical results, and (3) ensure that the environmental data are representative and complete.

This section summarizes the quality assurance assessment of the data collected by DEQ-INL OP in the third quarter of 2025. Included are the results of quality control (QC) samples (blanks, duplicates, and spikes) that DEQ-INL OP submitted to Idaho State University's Environmental Monitoring Laboratory (ISU-EML) for radiological analyses and to the Idaho Bureau of Laboratories-Boise (IBL) for non-radiological analyses during the quarter. The analytical results of QC samples are used to assess the precision, accuracy, and representativeness of the environmental data presented in this report. During the third quarter of 2025, DEQ-INL OP and contracted laboratories performed 94 QC analyses on various radiological and non-radiological samples. (**Table 24**).

All samples referenced in this report were collected in accordance with written procedures maintained by the DEQ-INL OP. Analytical methods and QC procedures used by the laboratories were performed in accordance with approved written procedures maintained by each lab. QC samples analyzed by the labs as part of each lab's internal QA program are not discussed in this report.

Blank Samples

Blank samples consist of matrices that contain immeasurable or acceptably low concentrations of the analyte(s) of interest. They are used to monitor contamination introduced during sample collection, storage, shipment, and analysis. For water matrices other than tritium, a blank sample consists of 18-megaohm deionized water from the DEQ-Idaho Falls Regional office. Mud Lake Well #2 serves as the water source for tritium analysis blanks, notable for its low atmospheric recharge, which results in tritium concentrations below detectable levels.

A blank sample is categorized as a field blank, equipment blank, or trip blank depending on how the blank is handled. A field blank is used to monitor for contamination introduced from the environment during sample collection, an equipment blank is used to monitor for contamination introduced by contaminated equipment, and a trip blank is used to monitor for contamination introduced during transportation of samples (trip blanks are typically only used for VOCs). Also, method blanks for airborne tritium are used to monitor for contamination introduced during processing of molecular sieve sample material. Most water blank samples submitted to laboratories by DEQ-INL OP are field blanks.

For all analyses a blank sample result is considered acceptable if it is less than three standard deviations (3 SD) of the result. If a blank result exceeds acceptance criteria, detected results in other samples collected, transported, or analyzed together with the failed blank may be qualified as biased high (J+) or rejected (R), or may remain unqualified, depending on the relative sizes of the blank detection and other sample results.

Sample results for blank 47-mm TSP filters submitted for gross alpha and gross beta screening in air for the third quarter of 2025 are presented in **Table 25**. Blank sample results for selected gamma emitters in

air from 47-mm TSP filter quarterly composites and 8x10-inch monthly composites from third quarter 2025 are presented in **Table 26**. Blank sample results for radiochemical analysis of 8x10-inch TSP filter quarterly composites from second quarter 2025 are presented in **Table 27**. All TSP blank results met acceptance criteria.

Method blank and control sample analysis results used to assess data quality for tritium in water vapor in air are presented in **Table 28**. Method blanks are prepared by vaporizing tritium-free water and passing the air-vapor mixture through molecular sieve columns. The molecular sieve material is then processed identically to the field samples. Control samples are used to determine if tritium contamination is introduced into the samples from areas used for processing field samples and storage of the processed water. All results for tritium method blanks and control samples met acceptance criteria.

Blank sample results for radiological constituents in water are presented in **Table 29.** Blank sample results for metals, common ions and nutrients in water are presented in **Tables 30** and **31**. All blank sample results for water met acceptance criteria.

Duplicate Samples

A duplicate sample is one that is collected at the same location and approximately the same time as another sample (referred to as the "original" sample). Duplicate sample results are compared to the original sample's results to evaluate reproducibility. Significant differences between the two could indicate poor analytical precision or a non-uniform sample matrix.

The difference between the results of an original and duplicate sample (referred to below as a "duplicate-sample pair") is evaluated differently for radiological and non-radiological analyses. For radiological analyses, the results of a duplicate-sample pair are considered to be in agreement if their absolute difference is less than or equal to three times the pooled error of the results:

$|R_1 - R_2| \leq 3\sqrt{SD_1^2 + SD_2^2}$
R_1 = Original sample result
R_2 = Duplicate sample result
SD_1 = Analytical uncertainty (1 sample standard deviation) of the original result
SD_2 = Analytical uncertainty (1 sample standard deviation) of the duplicate result

Duplicate radiological results are also considered to be in agreement if their relative percent difference (RPD) is no more than ±20 percent. RPD is calculated as:

$$RPD = \frac{R_1 - R_2}{(R_1 + R_2)/2} \times 100$$

For non-radiological analyses, the RPD is used to evaluate duplicate sample pairs in which both results exceed five times the reporting detection limit (RDL). An RPD of up to ±20 percent is acceptable. If one or both sample results are less than five times the RDL, the results agree if their absolute difference is less than or equal to the RDL.

Duplicate sample results for selected gamma emitters in air from 8x10-inch monthly TSP filter composites from the Idaho Falls monitoring location are presented in **Table 32**. Duplicate sample results for radiochemical analysis of 8x10-inch TSP filter quarterly composites from second quarter 2025, from the Idaho Falls monitoring location, are presented n **Table 33.** All TSP duplicate sample results met acceptance criteria.

Duplicate results for quarterly average EcoGamma readings from the Big Southern Butte monitoring location are presented in **Table 34.** These duplicate results met acceptance criteria.

Duplicate results for radiological analyses in groundwater and surface water are presented in **Table 35**. Duplicate results for metals, common ions, and nutrients in groundwater are presented in **Tables 36** and **37.** All duplicate water sample results met acceptance criteria for the third quarter 2025.

Spiked Samples

Spiked samples are samples to which known concentrations of specific analytes have been added. They are used to assess a laboratory's analytical accuracy. The percent recovery (%R) of each spiked-sample analysis is calculated as the ratio of the spike concentration determined by the lab to the known spike concentration. DEQ-INL OP considers the lab's result to be in control if the percent recovery is 100 ± 25%. If the percent recovery of a spiked sample is 50-74%, detected results of samples analyzed in the same batch as the spiked sample may be qualified as low-biased estimates (J-), and undetected results may be qualified as undetected estimates (UJ). If the percent recovery of a spiked sample is 126-150%, detected results of associated samples may be qualified as high-biased estimates (J+), and undetected results may be qualified as undetected (U). If the percent recovery of a spiked sample is <50% or >150%, the results of all associated samples may be qualified as rejected (R), except for undetected sample results associated with a spiked-sample analysis having a percent recovery >150%, in which case the sample result remains qualified as undetected (U).

There were no spiked sample results for third quarter, 2025.

DEQ-INL OP also prepares additional "spike-like" quality control samples to assess ambient radiation measurement bias. Once per quarter, DEQ-INL OP irradiates several electret ionization chambers (EICs) at ISU 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. Overall response for each control set is considered acceptable if the average of the three individual results for the set has a percent recovery of 100 ± 25%. Real-time pressure correction is used to calculate the net exposure measured by these EIC control sets. The ISU irradiation results for the third quarter 2025 are presented in **Table 38**. All individual EIC results and all EIC control set averages passed the DEQ-INL OP acceptance criterion.

Laboratory QC Issues

ISU-EML's internal quality data from one of their two liquid scintillation counters indicated control chart failures for tritium standards, backgrounds or blanks during part of the reporting period. EML recommended that associated atmospheric moisture sample results be considered estimates (J qualifier). Results include those from 6/26-7/17/25 for Sand Dunes, Howe, Mud Lake, Monteview, and Craters of the Moon.

DEQ-INL OP Equipment QC Issues

There were no DEQ-INL OP equipment QC issues in the third quarter of 2025.

Qualification of Low-Level Sample Results

Starting in the first quarter of 2024, DEQ-INL OP changed the methods used for qualifying and reporting sample results. These changes apply primarily to low-level results. The changes listed below will bring DEQ-INL OP's qualification and reporting conventions more closely in line with the INL contractors' methods.

For radiological results, the minimum detectable concentration (MDC) will no longer be used as the criterion above which the result is considered a positive detection. The following criteria will be used instead[7,8,9]:

1. Results greater than or equal to 3 SD are reported as positive detections, where SD is the sample standard deviation.
2. Results less than 3 SD are reported as non-detections (U qualifier).
3. Field sample results are reported together with the 1-SD value.

For non-radiological results, the qualification and reporting conventions followed by the sample analysis contractor, Idaho Bureau of Laboratories (IBL), will be used. With each result, the IBL reports both the Method Detection Limit[10] (MDL) and the higher Reporting Detection Limit[11] (RDL).

1. Results greater than MDL and greater than RDL are reported as positive detections.
2. Results greater than MDL but less than RDL are reported as detected estimates (J qualifier) with greater associated uncertainty.
3. Results less than MDL are non-detections and reported as less than (RDL value).

Analytical QA/QC Assessment

Other than those discussed above, no issues involving sample chain of custody, sample holding times, and the analysis of blank, duplicate, and spiked samples were observed during the third quarter of 2025 which significantly affected data quality. The ratio of total QC analyses to total field sample analyses of 14.1% is above the DEQ-INL OP minimum requirement of 10%. Methodologies and data reports issued by the contracting laboratories conformed to the requirements of DEQ-INL OP during the third quarter of 2025.

Data usability is the measure of field sample results that are not rejected divided by the total number of field sample results obtained. The overall data usability (non-rejected results divided by the total number of field sample results reported) of 100.0% for the third quarter of 2025 is well above the acceptable value of 90% for the DEQ-INL OP ESP and is summarized in **Table 24**. The overall data completeness (usable results divided by the total number of field sample results expected) of 100.0% is also well above the acceptable value of 90%.

Preventative Maintenance and Equipment Reliability

All equipment was calibrated and checked according to prescribed periodicity. Service reliability for air sampling equipment for the third quarter of 2025 is summarized in **Table 39**.

[7] Idaho National Laboratory Site Environmental Surveillance Program Report, Third Quarter 2023, INL/RPT-24-77413, p.
[8] HANDBOOK FOR THE DEPARTMENT OF ENERGY'S MIXED ANALYTE PERFORMANCE EVALUATION PROGRAM (MAPEP), MAPEP-HB-1, July 6,2022, p.30.
[9] An Update of Hydrologic Conditions and Distribution of Selected Constituents in Water, Eastern Snake River Aquifer and Perched Groundwater Zones, Idaho National Laboratory, Idaho, Emphasis 2019–21, U. S. Geological Survey, DOE/ID-22261, p. 29.
[10] The MDL is defined as the minimum concentration of substance that can be measured and reported with 99% confidence that an analyte concentration is greater than zero and is determined from an analysis of a sample in a given matrix containing the analyte.
[11] IBL utilizes the Practical Quantitation Limit (PQL) as the Reporting Detection Limit (RDL) for final data reports. PQL represents a practical and routinely achievable quantitation limit with a high degree of certainty (> 99.9% confidence) that the result is a positive detection.

Conclusion

All data collected for the third quarter of 2025 have been assigned the applicable qualifiers to designate the appropriate use of the data. The overall data usability of 100.0% and data completeness of 100.0% are well above the acceptable value of 90% for the quarter, with the data meeting the requirements and data quality objectives established by DEQ-INL OP.

Table 24. Summary of the analyses performed, third quarter, 2025.

Media Sampled	Collection Device	Analyte	Field Sample Analyses	QC Blank Analyses	QC Duplicate Analyses	QC Spike Analyses	Field Data Rejected[1]	Analyzing Lab[2]
Air								
Total Suspended Particulate	47-mm filters	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
	8x10-inch filter	Gamma emitters	36	3	3	0	0	ISU-EML
		Radiochemical[6]:						
		Sr-90	12	1	1	0	0	ISU-Sub
		Pu-238, 239/240	12	1	1	0	0	ISU-Sub
		Am-241	12	1	1	0	0	ISU-Sub
Water Vapor	Desiccant column	Tritium	44	6 [8]	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								
Ground water, perched ground water, waste pond effluent, and surface water	Grab or composite	Gross alpha	13	2	3	0	0	ISU-EML
		Gross beta	13	2	3	0	0	ISU-EML
		Gamma emitters	13	2	3	0	0	ISU-EML
		Tritium	13	2	3	0	0	ISU-EML
		Low-level tritium	15	1	0	0	0	ISU-EML
		Radiochemical[7]:						
		Sr-90	2	0	1	0	0	ISU-Sub
		Tc-99	2	0	1	0	0	ISU-Sub
		U-234, 235,238	2	0	1	0	0	ISU-Sub
		Pu-238, 239/240	0	0	0	0	0	ISU-Sub
		Am-241	0	0	0	0	0	ISU-Sub
		I-129	0	0	0	0	0	ISU-Sub
		Metals	13	2	3	0	0	IBL
		Common Ions	13	2	3	0	0	IBL
		Nutrients	13	2	3	0	0	IBL
		Volatile Organics	0	0	0	0	0	IBL
Terrestrial								
Milk	Grab or composite	Gamma emitters	12	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	68	0	0	9	0	DEQ-INL OP
	EcoGamma	Gamma Radiation	11	NA	1	0	0	DEQ-INL OP
Total analyses performed			**668**	**54**	**31**	**9**	**0**	
Total QC analyses performed (blanks, duplicates, and spikes)			**94**					
Ratio of total QC analyses to total sample analyses[3]			**14.1%**					
Data usability[4], percent			**100.0%**					
Data completeness[5], percent			**100.0%**					

[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] DEQ-INL OP requires that the number of QC analyses performed be at least 10 percent of the number of sample analyses performed.

[4] Data usability is calculated as [total analyses – rejected data]/[total analyses]. DEQ-INL OP considers a data usability rate of 90 percent or higher to be acceptable.

[5] Data completeness is calculated as usable results divided by the total number of field sample results expected. DEQ-INL OP considers a data completeness rate of 90 percent or higher to be acceptable.

[6] Radiochemical analyses for these filter composites include Strontium-90 (Sr-90), Plutonium-238 and 239/240 (Pu-238, 239/240), and Americium-241 (Am-241).

[7] Radiochemical analyses for these water samples may include Strontium-90, Technetium-99 (Tc-99), Uranium 234, 235, and 238 (U-234, 235, 238), Plutonium-238 and 239/240, Americium-241, and Iodine-129 (I-129).

[8] Method blanks and control samples are included here.

Table 25. Blank analysis results for gross alpha and beta in 47-mm particulate air (TSP), third quarter, 2025.

Collection Period		Corrected volume (m^3)[1]	Gross alpha			Gross beta		
Start	Stop		Value		3 SD	Value		3 SD
06/26/25	07/03/25	580	0.1	U	0.4	0.2	U	0.9
07/03/25	07/10/25	580	0.3	U	0.4	-0.1	U	0.9
07/10/25	07/17/25	580	0.2	U	0.4	0.1	U	0.9
07/17/25	07/24/25	580	0.0	U	0.4	-0.6	U	0.9
07/24/25	07/31/25	580	0.0	U	0.5	-0.3	U	0.6
07/31/25	08/07/25	580	0.0	U	0.4	0.8	U	0.9
08/07/25	08/14/25	580	0.2	U	0.4	0.4	U	0.9
08/14/25	08/21/25	580	0.2	U	0.4	0.0	U	0.9
08/21/25	08/28/25	580	0.3	U	0.4	0.1	U	0.9
08/28/25	09/04/25	580	0.0	U	0.5	-0.6	U	0.9
09/04/25	09/11/25	580	0.2	U	0.4	-0.2	U	0.9
09/11/25	09/18/25	580	0.0	U	0.3	-0.1	U	0.9
09/18/25	09/25/25	580	0.0	U	0.5	0.3	U	0.9

Concentration values and associated uncertainty (3 SD) are expressed in 1 x 10^{-3} pCi/m^3.
A blank sample result is acceptable if it is less than three standard deviations (3 SD) of the result. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
[1] A volume equal to the average of the weekly 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 26. Blank results for gamma spectrometry analysis of monthly composites of 8x10-inch TSP air filters, and quarterly composites of 47-mm TSP air filters, third quarter, 2025.

Time period	Beryllium-7			Ruthenium-106/ Rhodium-106			Antimony-125			Cesium-134			Cesium-137		
	Conc		3 SD	Conc		3 SD	Conc		3 SD	Conc		3 SD	Conc		3 SD
Monthly composites[1] of 8x10-inch TSP air filters															
July	-2	U	24	-22	U	63	2	U	6	-1	U	3	-1	U	3
Aug	5	U	18	-23	U	126	-1	U	9	0	U	3	-1	U	3
Sep	2	U	30	-1	U	90	0	U	9	3	U	6	-3	U	6
Quarterly composite[2] of 47-mm TSP air filters															
3rd Qtr.	12	U	81	-29	U	168	-2	U	21	2	U	6	8	U	12

Concentrations (Conc) are expressed in 1 x 10^{-5} pCi/m^3 with associated uncertainty (3 SD) and minimum detectable concentration (MDC).
A blank sample result is acceptable if it is less than three standard deviations (3 SD) of the result. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
[1]These concentrations (Conc) are from blank 8x10-inch filters collected weekly, composited, and analyzed for the calendar month.
[2]These concentrations are from blank 47-mm 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 actually passed through the blank filters.

Table 27. Blank analysis results for radiochemical analysis of 8x10-inch TSP air filters, quarterly composite samples, from second quarter, 2025.

Sample Description	^{90}Sr			^{238}Pu			$^{239}Pu/^{240}Pu$			^{241}Am		
	Value[1]		3 SD	Value[1]		3 SD	Value[1]	Qualifier	3 SD	Value[1]		3 SD
2Q 25 Blank	-0.09	U	0.33	0.01	U	0.03	0.01	U	0.03	0.00	U	0.06

Concentrations are expressed in 1 x 10^{-5} pCi/m^3 with associated uncertainty (3 SD).
A blank sample result is acceptable if it is less than three standard deviations (3 SD) of the result. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

[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 passed through the blank filters.

Table 28. Method blank and control sample analysis results for tritium in water vapor from air samples, third quarter, 2025.

Sample Number	Start Date	Collection Date	Analysis Date	Tritium		
				Concentration		3 SD
Method Blanks						
OP253ZTR01	08/19/25	08/21/25	10/14/25	0.01	U	0.06
OP253ZTR02	08/25/25	08/27/25	10/14/25	-0.01	U	0.06
Control Samples						
Refrigerator	07/01/25	10/01/25	10/14/25	0.03	U	0.06
Refrigerator	07/01/25	10/01/25	10/14/25	-0.01	U	0.06
Distilled Retail	10/01/25	10/01/25	10/14/25	-0.02	U	0.06
Sink	07/07/25	10/01/25	10/14/25	0.00	U	0.06

Concentrations are expressed in nCi/L with associated uncertainty (3 SD).
A blank sample result is acceptable if it is less than three standard deviations (3 SD) of the result. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

Table 29. Blank analysis results (pCi/L) for radiological constituents in water, third quarter, 2025.

Sample Number	Sample Date	Blank Type	Concentration		3 SD	Within Blank Criteria?
Gross Alpha						
251W507	07/14/25	Field	0.0	U	0.3	Yes
251W532	08/27/25	Field	0.1	U	0.3	Yes
Gross Beta						
251W507	07/14/25	Field	0.7	U	0.9	Yes
251W532	08/27/25	Field	0.6	U	0.9	Yes
Cesium-137						
251W507	07/14/25	Field	-0.4	U	1.8	Yes
251W532	08/27/25	Field	0.3	U	1.8	Yes
Tritium (standard method)						
251W508	07/14/25	Field	-30	U	90	Yes
251W533	08/27/25	Field	-10	U	90	Yes
Tritium (low-level method)						
251W398	06/26/25	Field	0	U	6	Yes
Strontium-90						
None	-	-	-	-	-	-
Uranium-234						
None	-	-	-	-	-	-
Uranium-235						
None	-	-	-	-	-	-
Uranium-238						
None	-	-	-	-	-	-
Technetium-99						
None	-	-	-	-	-	-

Concentrations are expressed in pCi/L with associated uncertainty (3 SD).
A blank sample result is acceptable if it is less than three standard deviations (3 SD) of the result. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.

Table 30. Blank analysis results (µg/L) for metals in water, third quarter, 2025.

Sample Number	Sample Date	Blank Type	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
251W510	07/14/25	Field	-	-	<1.0	-	-	-	-	-
251W535	08/27/25	Field	-	-	<1.0	-	-	-	-	-

Table 31. Blank analysis results (mg/L) for common ions and nutrients in water, third quarter, 2025.

Sample Number	Sample Date	Blank Type	Calcium	Magnesium	Sodium	Potassium	Chloride	Sulfate	Alkalinity†	NO_3+NO_2*	Total Phosphorus
251W509, 511	07/14/25	Field	-	-	-	-	<0.4	<0.8	<1.0	<0.010	-
251W534, 535, 536	08/27/25	Field	<0.10	<0.10	<0.10	<0.10	<0.4	<0.8	<1.0	<0.010	-

Table 32. Duplicate sample results for gamma emitters from monthly composited 8x10-inch TSP air filters, third quarter, 2025.

Month and Nuclide	Original Sample ID	Concentration (R_1)		1 SD_1	Duplicate Sample ID	Concentration (R_2)		1 SD_2	RPD (%)	$\lvert R_1-R_2 \rvert$	$3(SD_1^2+SD_2^2)^{1/2}$	Within either criterion?
July												
^{7}Be	Idaho Falls	**153.7**	-	5.1	Idaho Falls Dup	**153.4**	-	4.8	0.2	0.3	21.0	Yes
$^{106}Ru/^{106}Rh$		-0.05	U	0.18		0.23	U	0.15	-311	0.28	0.70	Yes
^{125}Sb		-0.02	U	0.03		0.03	U	0.04	-1000	0.05	0.15	Yes
^{134}Cs		0.00	U	0.01		0.00	U	0.01	0	0.00	0.04	Yes
^{137}Cs		0.00	U	0.02		0.01	U	0.01	-200	0.01	0.07	Yes
August												
^{7}Be	Idaho Falls	**166.8**	-	5.6	Idaho Falls Dup	**170.6**	-	3.1	-2	3.8	19.2	Yes
$^{106}Ru/^{106}Rh$		-0.07	U	0.25		-0.17	U	0.26	-83	0.10	1.08	Yes
^{125}Sb		0.00	U	0.04		-0.01	U	0.05	-200	0.01	0.19	Yes
^{134}Cs		0.03	U	0.02		0.01	U	0.01	100	0.02	0.07	Yes
^{137}Cs		0.03	U	0.02		-0.02	U	0.02	1000	0.05	0.08	Yes
September												
^{7}Be	Idaho Falls	**132.2**	-	4.1	Idaho Falls Dup	**140.2**	-	2.7	-6	8.0	14.7	Yes
$^{106}Ru/^{106}Rh$		-0.10	U	0.28		0.01	U	0.35	244	0.11	1.34	Yes
^{125}Sb		-0.01	U	0.05		0.04	U	0.06	-333	0.05	0.23	Yes
^{134}Cs		0.02	U	0.03		0.03	U	0.02	-40	0.01	0.11	Yes
^{137}Cs		0.01	U	0.01		0.03	U	0.02	-100	0.02	0.07	Yes

Air concentrations and uncertainties (1 SD) are expressed in units of 10^{-3} pCi/m^3. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Criteria for duplicate agreement: RPD (relative percent difference) within ± 20% or $\lvert R_1-R_2 \rvert \leq 3(SD_1^2+SD_2^2)^{1/2}$.

Table 33. Duplicate sample results for radiochemical analyses of composited 8x10 inch TSP air filters from the second quarter of 2025.

Nuclide	Original Sample ID	Concentration (R_1)		1 SD_1	Duplicate Sample ID	Concentration (R_2)		1 SD_2	RPD (%)	$\lvert R_1-R_2 \rvert$	$3(SD_1^2+SD_2^2)^{1/2}$	Within either criterion?
$^{89/90}Sr$	Idaho Falls	**0.76**	-	0.19	Idaho Falls Dup	**0.51**	-	0.19	39	0.25	0.81	Yes
^{238}Pu		0.00	U	0.01		0.02	U	0.02	-200	0.02	0.07	Yes
$^{239}Pu/^{240}Pu$		0.03	U	0.01		0.04	U	0.02	-29	0.01	0.07	Yes
^{241}Am		0.00	U	0.01		0.03	U	0.02	-200	0.03	0.07	Yes

Air concentrations and uncertainties (1 SD) are expressed in units of 10^{-5} pCi/m^3. **Bold** concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Criteria for duplicate agreement: RPD (relative percent difference) within ± 20% or $\lvert R_1-R_2 \rvert \leq 3(SD_1^2+SD_2^2)^{1/2}$.

Table 34. Duplicate results for quarterly average EcoGamma readings (µR/hr) for the third quarter of 2025.

Primary EcoGamma ID	Quarterly Average (R_1) and {Median}	1 SD_1	Duplicate EcoGamma ID	Quarterly Average (R_2) and {Median}	1 SD_2	RPD (%)	$\lvert R_1-R_2 \rvert$	$3(SD_1^2+SD_2^2)^{1/2}$	Within either criterion?
Big Southern Butte	14.6 {14.6}	0.6	Big Southern Butte DUP	14.1 {14.1}	0.6	3	0.5	2.6	Yes

Criteria for duplicate agreement: RPD (relative percent difference) within ± 20% or $\lvert R_1-R_2 \rvert \leq 3(SD_1^2+SD_2^2)^{1/2}$.
RPD = relative percent difference.

Table 35. Duplicate sample results (pCi/L) for radiological constituents in groundwater and/or surface water, third quarter, 2025.

Analysis/Sample Location	Original Sample Number	Concentration (R_1)		1 SD_1	Duplicate Sample Number	Concentration (R_2)		1 SD_2	RPD (%)	$\lvert R_1-R_2 \rvert$	$3(SD_1^2+SD_2^2)^{1/2}$	Within either criterion?
Gross Alpha												
MV-13	251W472	**2.5**	-	0.6	251W512	**1.9**	-	0.5	27	0.6	2.3	Yes
MV-57	251W517	0.6	U	0.3	251W522	0.5	U	0.3	18	0.1	1.3	Yes
USGS-115	251W555	1.1	U	0.4	251W648	0.7	U	0.3	44	0.4	1.5	Yes
Gross Beta												
MV-13	251W472	**7.6**	-	0.6	251W512	**7.1**	-	0.5	7	0.5	2.3	Yes
MV-57	251W517	**1.5**	-	0.4	251W522	**1.8**	-	0.4	-18	0.3	1.7	Yes
USGS-115	251W555	**10.2**	-	0.5	251W648	**9.2**	-	0.5	10	1.0	2.1	Yes
Cesium-137												
MV-13	251W472	1.4	U	0.5	251W512	0.4	U	0.8	111	1.0	2.8	Yes
MV-57	251W517	-0.1	U	0.5	251W522	0.5	U	0.9	-300	0.6	3.1	Yes
USGS-115	251W555	0.0	U	0.6	251W648	0.3	U	0.7	-200	0.3	2.8	Yes
Tritium (standard method)												
MV-13	251W473	61	U	31	251W513	65	U	33	-6	4	136	Yes
MV-57	251W518	31	U	32	251W523	41	U	32	-28	10	136	Yes
USGS-115	251W559	**677**	-	40	251W651	**627**	-	40	8	50	170	Yes
Tritium (low-level method)												
None	-	-	-	-	-	-	-	-	-	-	-	-
Strontium-90												
USGS-115	251W557	**3.18**	-	0.43	251W649	**3.03**	-	0.39	5	0.15	1.74	Yes
Technetium-99												
USGS-115	251W558	**13.2**	-	0.8	251W650	**14.2**	-	0.8	-7	1.0	3.4	Yes
Uranium-234												
USGS-115	251W560	**0.71**	-	0.07	251W652	**0.60**	-	0.18	17	0.11	0.58	Yes
Uranium-235												
USGS-115	251W560	0.01	U	0.01	251W652	0.01	U	0.01	0	0.00	0.04	Yes
Uranium-238												
USGS-115	251W560	**0.36**	-	0.05	251W652	0.36	U	0.15	0	0.00	0.47	Yes
Plutonium-238												
None	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium-239/240												
None	-	-	-	-	-	-	-	-	-	-	-	-
Americium-241												
None	-	-	-	-	-	-	-	-	-	-	-	-

Bold concentrations are positive detections, greater than or equal to 3 SD.
Data qualifiers: U = undetected, J = estimate, R = rejected, "+" or "-" after a J means that the estimated result is biased high or low, respectively.
Criteria for duplicate agreement: RPD (relative percent difference) within ± 20% or $\lvert R_1-R_2 \rvert \leq 3(SD_1^2+SD_2^2)^{1/2}$.

Table 36. Duplicate sample results for metals (µg/L) in groundwater, third quarter, 2025.

Sample Location	Sample Number	Sample Date	Arsenic	Barium	Chromium	Iron	Lead	Manganese	Selenium	Zinc
MV-13	251W475	07/14/25	-	-	1.7	-	-	-	-	-
MV-13	251W515	07/14/25	-	-	1.6	-	-	-	-	-
RPD (%)			**-**	**-**	**6.1**	**-**	**-**	**-**	**-**	**-**
MV-57	251W520	07/29/25	-	-	4.1	-	-	-	-	-
MV-57	251W525	07/29/25	-	-	3.9	-	-	-	-	-
RPD (%)			**-**	**-**	**5.0**	**-**	**-**	**-**	**-**	**-**
USGS-115	251W562	09/30/25			6.5					
USGS-115	251W654	09/30/25			6.2					
RPD (%)			**-**	**-**	**4.7**	**-**	**-**	**-**	**-**	**-**

Criteria for duplicate agreement: RPD (relative percent difference) within ± 20%. If one or both sample results are less than five times the RDL (reporting detection limit), the results agree if their absolute difference is less than or equal to the RDL.

Table 37. Duplicate sample results for common ions and nutrients (mg/L) in groundwater, third quarter, 2025.

Sample Location	Sample Number	Sample Date	Calcium	Magnesium	Sodium	Potassium	Chloride	Sulfate	Total Alkalinity†	Total Nitrogen	Total Phosphorus
MV-13	251W474, 476	07/14/25	-	-	-	-	38.8	64.7	210	3.3	-
MV-13	251W514, 516	07/14/25	-	-	-	-	38.2	64.8	212	3.3	-
RPD (%)			**-**	**-**	**-**	**-**	**1.6**	**-0.2**	**1.0**	**0.0**	**-**
MV-57	251W519, 521	07/29/25	-	-	-	-	6.22	16.4	103	0.42	-
MV-57	251W524, 526	07/29/25	-	-	-	-	6.21	16.4	105	0.42	-
RPD (%)			**-**	**-**	**-**	**-**	**0.2**	**0.0**	**-1.9**	**0.0**	**-**
USGS-115	251W561, 563	09/30/25	-	-	-	-	39.9	24.5	113	1.6	-
USGS-115	251W653, 655	09/30/25	-	-	-	-	39.4	24.2	113	1.6	-
RPD (%)			**-**	**-**	**-**	**-**	**1.3**	**1.2**	**0.0**	**0.0**	**-**

†As $CaCO_3$.

Criteria for duplicate agreement: RPD (relative percent difference) within ± 20%. If one or both sample results are less than five times the RDL (reporting detection limit), the results agree if their absolute difference is less than or equal to the RDL.

Table 38. ISU-EML electret ionization chamber (EIC) irradiation results (categorized as spiked samples), third quarter, 2025.

Electret #	Exposure Received		Net Measured Exposure[1]		%R	Within Spec?
	(mR)	Uncertainty (1 SD, mR)	(mR)	Uncertainty (1 SD, mR)		
SOI918	39.6	1.4	35.7	1.4	90.3	Yes
SOI897	39.6	1.4	37.1	1.4	93.6	Yes
SOJ140	39.6	1.4	35.8	1.4	90.3	Yes
				Triplicate AVG:	**91.4**	**Yes**
SNQ168	30.0	1.1	28.3	1.3	94.5	Yes
SNQ262	30.0	1.1	29.6	1.3	98.6	Yes
SNQ265	30.0	1.1	29.1	1.3	96.8	Yes
				Triplicate AVG:	**96.6**	**Yes**
SMV095	19.9	0.7	19.6	1.3	98.3	Yes
SNQ048	19.9	0.7	17.9	1.3	89.9	Yes
SOI858	19.9	0.7	19.1	1.4	95.9	Yes
				Triplicate AVG:	**94.7**	**Yes**

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

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

Table 39. Air sampling field equipment service reliability (percent operational), third quarter, 2025.

Station Locations	Sample Type				
	47-mm TSP	8x10-inch TSP	Radioiodine	Atmospheric Moisture	Precipitation
Onsite Locations					
Big Lost River Rest Area	100%	100%	100%	100%	100%
Experimental Field Station	100%	100%	100%	100%	NC[1]
MFC Guard House	100%	100%	100%	100%	NC[1]
Sand Dunes Tower	100%	100%	100%	100%	NC[1]
Van Buren Avenue	100%	100%	100%	100%	NC[1]
Boundary Locations					
Atomic City	100%	100%	100%	100%	100%
Howe	100%	100%	100%	100%	100%
Monteview	100%	100%	100%	100%	100%
Mud Lake	100%	100%	100%	100%	100%
Distant Locations[2]					
Craters of the Moon	100%	100%	100%	100%	NC[1]
Idaho Falls	100%	100%	100%	100%	100%
Idaho Falls Duplicate[3]	NC[1]	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.

[2] Fort Hall Station, operated by the Shoshone-Bannock Tribes, is not included here.

[3] A duplicate 8x10-inch filter TSP sampler is currently installed at the Idaho Falls location.

Appendix A

Table A-1. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses of 47-mm TSP filters for all locations, third quarter, 2025.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	1 SD	Concentration	1 SD
On-Site Locations						
Big Lost River Rest Area	06/26/25	07/03/25	**0.7**	0.2	**26.9**	0.7
	07/03/25	07/10/25	**1.3**	0.2	**23.8**	0.6
	07/10/25	07/17/25	**1.0**	0.2	**21.4**	0.6
	07/17/25	07/24/25	**1.1**	0.2	**24.7**	0.7
	07/24/25	07/31/25	**1.1**	0.2	**29.8**	0.7
	07/31/25	08/07/25	**1.5**	0.2	**27.5**	0.7
	08/07/25	08/14/25	**0.9**	0.2	**21.0**	0.6
	08/14/25	08/21/25	**1.6**	0.2	**28.7**	0.7
	08/21/25	08/28/25	**1.9**	0.2	**38.5**	0.9
	08/28/25	09/04/25	**1.9**	0.3	**43.4**	0.9
	09/04/25	09/11/25	**2.7**	0.3	**42.4**	0.9
	09/11/25	09/18/25	**1.3**	0.2	**31.1**	0.8
	09/18/25	09/25/25	**1.3**	0.2	**39.3**	0.9
Experimental Field Station	06/26/25	07/03/25	**1.7**	0.2	**26.5**	0.7
	07/03/25	07/10/25	**1.3**	0.2	**24.5**	0.7
	07/10/25	07/17/25	**1.4**	0.2	**21.2**	0.6
	07/17/25	07/24/25	**1.8**	0.2	**25.2**	0.7
	07/24/25	07/31/25	**1.4**	0.2	**28.4**	0.7
	07/31/25	08/07/25	**1.5**	0.2	**26.2**	0.7
	08/07/25	08/14/25	**1.5**	0.2	**20.4**	0.6
	08/14/25	08/21/25	**1.0**	0.2	**23.2**	0.7
	08/21/25	08/28/25	**2.3**	0.2	**35.6**	0.8
	08/28/25	09/04/25	**2.3**	0.3	**39.3**	0.8
	09/04/25	09/11/25	**2.3**	0.3	**37.7**	0.8
	09/11/25	09/18/25	**1.6**	0.2	**26.0**	0.7
	09/18/25	09/25/25	**1.7**	0.2	**33.6**	0.8
MFC[5] Guard House	06/26/25	07/03/25	**1.5**	0.2	**23.6**	0.6
	07/03/25	07/10/25	**1.1**	0.2	**23.4**	0.6
	07/10/25	07/17/25	**2.0**	0.3	**27.7**	0.8
	07/17/25	07/24/25	**1.2**	0.2	**24.1**	0.6
	07/24/25	07/31/25	**1.2**	0.2	**28.1**	0.7
	07/31/25	08/07/25	**1.3**	0.2	**27.1**	0.7
	08/07/25	08/14/25	**1.5**	0.2	**19.4**	0.6
	08/14/25	08/21/25	**1.8**	0.2	**24.3**	0.7
	08/21/25	08/28/25	**2.1**	0.2	**36.2**	0.8
	08/28/25	09/04/25	**1.6**	0.2	**41.1**	0.8
	09/04/25	09/11/25	**2.0**	0.2	**35.8**	0.8
	09/11/25	09/18/25	**1.2**	0.2	**25.8**	0.7
	09/18/25	09/25/25	**1.6**	0.2	**30.7**	0.7
Sand Dunes Tower	06/26/25	07/03/25	**1.1**	0.2	**25.5**	0.7
	07/03/25	07/10/25	**0.9**	0.2	**24.5**	0.7
	07/10/25	07/17/25	**1.1**	0.2	**22.3**	0.6
	07/17/25	07/24/25	**1.2**	0.2	**26.1**	0.7
	07/24/25	07/31/25	**1.0**	0.2	**28.1**	0.7
	07/31/25	08/07/25	**1.5**	0.2	**28.1**	0.7
	08/07/25	08/14/25	**0.9**	0.2	**20.5**	0.6
	08/14/25	08/21/25	**1.5**	0.2	**29.7**	0.7
	08/21/25	08/28/25	**1.6**	0.2	**35.6**	0.8
	08/28/25	09/04/25	**1.9 J[2]**	0.3	**39.9 J[2]**	0.9
	09/04/25	09/11/25	**2.2 J[2]**	0.3	**36.3 J[2]**	0.9
	09/11/25	09/18/25	**1.4 J[2]**	0.3	**24.9 J[2]**	0.8
	09/18/25	09/25/25	**1.0 J[2]**	0.2	**31.5 J[2]**	0.8

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses of 47-mm TSP filters for all locations, third quarter, 2025.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	1 SD	Concentration	1 SD
Van Buren Avenue	06/26/25	07/03/25	**1.7**	0.2	**30.5**	0.8
	07/03/25	07/10/25	**1.3**	0.2	**27.7**	0.7
	07/10/25	07/17/25	**1.2**	0.2	**25.1**	0.7
	07/17/25	07/24/25	**1.7**	0.2	**29.3**	0.8
	07/24/25	07/31/25	**2.0**	0.3	**34.1**	0.8
	07/31/25	08/07/25	**1.9**	0.3	**31.8**	0.8
	08/07/25	08/14/25	**1.6**	0.2	**24.8**	0.7
	08/14/25	08/21/25	**2.0**	0.3	**31.8**	0.8
	08/21/25	08/28/25	**2.2**	0.3	**41.8**	0.9
	08/28/25	09/04/25	**2.0**	0.3	**48.3**	1.0
	09/04/25	09/11/25	**2.9**	0.3	**43.5**	0.9
	09/11/25	09/18/25	**2.0**	0.3	**31.2**	0.8
	09/18/25	09/25/25	**1.4**	0.3	**39.9**	0.9
Boundary Locations						
Atomic City	06/26/25	07/03/25	**1.5**	0.2	**27.8**	0.7
	07/03/25	07/10/25	**1.5**	0.2	**22.9**	0.6
	07/10/25	07/17/25	**2.0**	0.2	**22.7**	0.6
	07/17/25	07/24/25	**1.6**	0.2	**23.9**	0.6
	07/24/25	07/31/25	**1.9**	0.2	**29.4**	0.7
	07/31/25	08/07/25	**2.1**	0.2	**28.4**	0.7
	08/07/25	08/14/25	**1.4**	0.2	**21.4**	0.6
	08/14/25	08/21/25	**2.3**	0.2	**27.1**	0.7
	08/21/25	08/28/25	**2.1**	0.2	**35.3**	0.8
	08/28/25	09/04/25	**1.7**	0.2	**40.6**	0.8
	09/04/25	09/11/25	**2.3**	0.2	**37.8**	0.8
	09/11/25	09/18/25	**1.6**	0.2	**25.7**	0.7
	09/18/25	09/25/25	**1.5**	0.2	**34.2**	0.8
Howe	06/26/25	07/03/25	**1.9 J[3]**	0.3	**35.1 J[3]**	1.0
	07/03/25	07/10/25	**1.4 J[3]**	0.3	**30.5 J[3]**	0.9
	07/10/25	07/17/25	**2.1 J[3]**	0.3	**31.4 J[3]**	0.9
	07/17/25	07/24/25	**1.6 J[3]**	0.3	**32.4 J[3]**	0.9
	07/24/25	07/31/25	**2.1 J[3]**	0.3	**38.9 J[3]**	1.0
	07/31/25	08/07/25	**2.1 J[3]**	0.3	**37.5 J[3]**	1.0
	08/07/25	08/14/25	**2.1 J[3]**	0.3	**26.1 J[3]**	0.8
	08/14/25	08/21/25	**1.8**	0.2	**26.7**	0.7
	08/21/25	08/28/25	**1.9**	0.2	**33.2**	0.7
	08/28/25	09/04/25	**1.5**	0.2	**36.3**	0.8
	09/04/25	09/11/25	**2.5**	0.2	**35.9**	0.8
	09/11/25	09/18/25	**1.0**	0.2	**24.4**	0.7
	09/18/25	09/25/25	**1.2**	0.2	**31.5**	0.7

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses for 47-mm TSP filters for all locations, third quarter, 2025.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	1 SD	Concentration	1 SD
Monteview	06/26/25	07/03/25	**1.2**	0.2	**24.6**	0.7
	07/03/25	07/10/25	**1.2**	0.2	**22.5**	0.6
	07/10/25	07/17/25	**1.1**	0.2	**20.4**	0.6
	07/17/25	07/24/25	**1.3**	0.2	**22.2**	0.7
	07/24/25	07/31/25	**1.2**	0.2	**27.8**	0.7
	07/31/25	08/07/25	**1.5**	0.2	**27.2**	0.7
	08/07/25	08/14/25	**1.2**	0.2	**19.4**	0.6
	08/14/25	08/21/25	**1.4**	0.2	**25.3**	0.7
	08/21/25	08/28/25	**1.8**	0.2	**34.1**	0.8
	08/28/25	09/04/25	**1.3**	0.2	**34.4**	0.8
	09/04/25	09/11/25	**2.5**	0.3	**35.3**	0.8
	09/11/25	09/18/25	**1.4**	0.2	**25.0**	0.7
	09/18/25	09/25/25	**0.9**	0.2	**31.5**	0.7
Mud Lake	06/26/25	07/03/25	**0.8**	0.2	**24.5**	0.6
	07/03/25	07/10/25	**1.3**	0.2	**22.9**	0.6
	07/10/25	07/17/25	**1.0**	0.2	**21.3**	0.6
	07/17/25	07/24/25	**1.1**	0.2	**24.7**	0.6
	07/24/25	07/31/25	**1.0**	0.2	**24.0**	0.6
	07/31/25	08/07/25	**1.5**	0.2	**27.4**	0.7
	08/07/25	08/14/25	0.5	0.2	**18.0**	0.5
	08/14/25	08/21/25	**1.4**	0.2	**26.3**	0.6
	08/21/25	08/28/25	**1.8**	0.2	**29.2**	0.6
	08/28/25	09/04/25	**1.5**	0.2	**35.2**	0.7
	09/04/25	09/11/25	**2.3**	0.2	**36.1**	0.7
	09/11/25	09/18/25	**1.2**	0.2	**24.2**	0.7
	09/18/25	09/25/25	**1.0**	0.2	**28.3**	0.7
Distant Locations						
Craters of the Moon	06/26/25	07/03/25	**1.2**	0.2	**23.5**	0.6
	07/03/25	07/10/25	**0.8**	0.2	**21.0**	0.6
	07/10/25	07/17/25	**0.9**	0.2	**19.7**	0.6
	07/17/25	07/24/25	**2.0**	0.2	**22.6**	0.6
	07/24/25	07/31/25	**1.4**	0.2	**27.1**	0.7
	07/31/25	08/07/25	**1.3**	0.2	**25.2**	0.6
	08/07/25	08/14/25	**0.7**	0.2	**17.5**	0.5
	08/14/25	08/21/25	**1.3**	0.2	**24.5**	0.6
	08/21/25	08/28/25	**1.4**	0.2	**27.6**	0.7
	08/28/25	09/04/25	**2.2**	0.3	**39.1**	0.8
	09/04/25	09/11/25	**2.2**	0.2	**38.2**	0.8
	09/11/25	09/18/25	**1.1**	0.2	**24.2**	0.6
	09/18/25	09/25/25	**0.8**	0.2	**30.4**	0.7

Table A-1 continued. Weekly concentrations (in 1 x 10^{-3} pCi/m^3) for gross alpha and gross beta analyses of 47-mm TSP filters for all locations, third quarter, 2025.

Sample Location	Collection Date		Gross Alpha		Gross Beta	
	Start	Stop	Concentration	1 SD	Concentration	1 SD
Fort Hall[1]	06/26/25	07/03/25	**1.6**	0.2	**25.6**	0.7
	07/03/25	07/10/25	**1.3**	0.2	**22.9**	0.6
	07/10/25	07/17/25	**1.1**	0.2	**20.1**	0.6
	07/17/25	07/24/25	**1.2**	0.2	**23.0**	0.6
	07/24/25	07/31/25	**1.2**	0.2	**25.9**	0.7
	07/31/25	08/07/25	**1.3**	0.2	**26.8**	0.7
	08/07/25	08/14/25	**1.4**	0.2	**21.6**	0.6
	08/14/25	08/21/25	**1.1**	0.2	**25.7**	0.7
	08/21/25	08/28/25	**1.9 J**[2]	0.3	**34.5 J**[2]	0.9
	08/28/25	09/04/25	**1.9 J**[2]	0.3	**34.8 J**[2]	0.9
	09/04/25	09/11/25	**1.6**	0.2	**36.7**	0.8
	09/11/25	09/18/25	**1.2**	0.2	**24.3**	0.7
	09/18/25	09/25/25	**1.1**	0.2	**30.7**	0.8
Idaho Falls	06/26/25	07/03/25	**1.4**	0.2	**27.6**	0.7
	07/03/25	07/10/25	**1.4**	0.2	**22.0**	0.6
	07/10/25	07/17/25	**1.1**	0.2	**22.0**	0.6
	07/17/25	07/24/25	**1.7**	0.2	**21.8**	0.6
	07/24/25	07/31/25	**1.3**	0.2	**29.0**	0.7
	07/31/25	08/07/25	**1.5 J**[3]	0.2	**27.7 J**[3]	0.8
	08/07/25	08/14/25	**0.7**	0.2	**20.6**	0.6
	08/14/25	08/21/25	**1.2**	0.2	**24.7**	0.6
	08/21/25	08/28/25	**1.5**	0.2	**31.4**	0.7
	08/28/25	09/04/25	**1.4**	0.2	**31.1**	0.7
	09/04/25	09/11/25	**2.2**	0.2	**33.1**	0.7
	09/11/25	09/18/25	**1.6**	0.2	**22.4**	0.6
	09/18/25	09/25/25	**1.2**	0.2	**29.5**	0.7

Note: **Bold** concentrations are positive detections, greater or equal to 3 SD.
[1]Operated by Shoshone-Bannock Tribes.
[2] Volume is an estimate due to power outage. Results are a usable estimate (J).
[3] Volume is an estimate due to mechanical failure. Results are a usable estimate (J).
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Appendix B

Table B-1. Results for all electret ionization chamber (EIC) locations, third quarter, 2025.

Sample Location	Net Corrected Exposure Rate (μR/hr)[1]	± 2 SD (μR/hr)
On-Site Locations		
Big Lost River Rest Area	15.6, 17.4	-
Van Buren Avenue	11.5	0.5
Experimental Field Station	17.4	0.3
Main Gate	12.9	1.6
Sand Dunes Tower	13.2	1.6
MP276 -20	10.4	0.7
MP274 -20	9.5	1.3
MP272 -20	12.1	2.6
MP270 -20	11.0, 11.5	-
MP268 -20	14.2	1.8
MP266 -20	13.7	1.5
MP264 -20	13.9	0.6
MP270 -20/26	18.8, 21.7	-
MP268 -20/26	13.3	1.0
MP266 -20/26	13.7, 15.8	-
MP263 -20/26	14.0	0.7
MP261 -20/26	10.1	1.9
MP259 -20/26	15.1	0.6
MP256 -20/26	11.4	0.9
MFC (EBR II)	12.5	0.9
EBR I	13.1	1.3
RWMC	15.7	1.3
CFA	15.4	0.4
CITRC (PBF)	11.6	1.2
INTEC	16.5	2.3
ATR (TRA)	13.3	2.6
NRF	15.6	1.9
TAN/SMC	13.5	2.0
MP39-33	15.3	0.9
MP37-33	14.1	1.5
MP35-33	10.0	1.4
MP33-33	16.0	1.5
MP31-33	10.8	2.2
MP29-33	14.6	1.3
MP27-33	13.2, 14.1	-
MP25-33	13.3	1.5
MP23-33	12.6	1.9
Base of Howe	12.5	1.5
Rover	14.1, 16.9	-
T4 North	13.7	1.7
T4 South	13.8	1.6
MFC Guard House[2]	10.9	2.5
Boundary Locations		
Atomic City	13.1	1.7
Mud Lake/ Terreton	11.9	1.2
Monteview	10.7	0.2
Howe Met. Tower	12.1	0.7
MP282 -20	11.0	1.5
MP280 -20	13.1	1.1
MP278 -20	13.6	1.2
Mud Lake Bank of Commerce	14.8	0.7

Table B-1. continued. Results for all electret ionization chamber (EIC) locations, third quarter, 2025.

Sample Location	Net Corrected Exposure Rate (μR/hr)[1]	± 2 SD (μR/hr)
MP43-33	16.3	1.0
MP41-33	15.5	1.7
MP21-33	10.9	1.6
MP19-33	12.6	2.3
MP14-33	10.9, 12.3	-
MP11-33	13.7	1.7
MP06-33	9.7	1.5
MP03-33	12.4	0.2
Distant Locations		
Arco	14.7	1.6
Craters of the Moon	13.7	0.3
Taber	12.0	1.8
Blackfoot	12.5	0.9
Fort Hall	12.7	1.9
Idaho Falls	8.6	0.8
Hamer	17.2	1.1
Sugar City	15.4	1.0
Roberts	13.1	1.2
Big Southern Butte[2]	12.1	1.2

[1]Results are the average of triplicate exposure rate measurements with the associated sample variability (1 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]MFC Guard House is a new monitoring location. EIC data collection began during the third quarter of 2025.

Appendix C

Table C-1. Summary of the minimum detectable concentrations (MDCs) for radiological analytes and reporting detection limits (RDLs) for non-radiological analytes, together with the EPA Maximum Contaminant Levels (MCLs) and DOE Derived Concentration Standards (DCSs) for comparison.

Media Sampled	Collection Device	Analyte	Typical MDC or RDL range[1]	Units	EPA Limit[2,3]	DOE DCS[4]	Notes
Air							
Total Suspended Particulate	47-mm filters	Gross alpha	$(0.3 – 0.7) \times 10^{-3}$	pCi/m^3	--	0.11	5
		Gross beta	$(1 – 2) \times 10^{-3}$	pCi/m^3	1	9.6	5, 16
		Gamma emitters	$(0.1 – 0.2) \times 10^{-3}$	pCi/m^3 (^{137}Cs)	1.9×10^{-2}	38	
	8x10-inch filter	Gamma emitters	$(0.03 – 0.07) \times 10^{-5}$	pCi/m^3 (^{137}Cs)	1.9×10^{-2}	38	
		Radiochemical:					
		Sr-90	$(0.4 – 0.7) \times 10^{-5}$	pCi/m^3	1.9×10^{-2}	9.6	
		Pu-238	$(0.05 – 0.2) \times 10^{-5}$	pCi/m^3	2.1×10^{-3}	0.12	
		Pu-239/240	$(0.03 – 0.1) \times 10^{-5}$	pCi/m^3	2.0×10^{-3}	0.11	
		Am-241	$(0.2 – 0.4) \times 10^{-5}$	pCi/m^3	1.9×10^{-3}	0.13	
Water Vapor	Desiccant column	Tritium	0.3 – 0.6	pCi/m^3	1.5×10^{3}	1.3×10^{5}	
Gaseous	Charcoal filter	Iodine-131	$(6 – 8) \times 10^{-4}$	pCi/m^3	2.1×10^{-1}	4.5×10^{2}	
Precipitation	Plastic Carboy	Tritium	100 – 140	pCi/L	20,000	2.6×10^{6}	6
		Gamma emitters	2 - 3	pCi/L (^{137}Cs)	200	4.1×10^{3}	6
Water							
Ground water, perched ground water, waste pond effluent, and surface water	Grab or composite	Gross alpha	0.3 – 1.9	pCi/L	15	4.0×10^{2}	
		Gross beta	0.8 – 1.9	pCi/L	4 mrem/yr	1.7×10^{3}	
		Gamma emitters	0.5 – 3.0	pCi/L (^{137}Cs)	200	4.1×10^{3}	
		Tritium – standard analytical method	140 - – 189	pCi/L	20,000	2.6×10^{6}	
		Tritium – low-level analytical method	5 – 15	pCi/L	20,000	2.6×10^{6}	7
		Radiochemical:					
		Sr-90	0– 0.8	pCi/L	8	1.7×10^{3}	
		Tc-99	0.8 – 1.4	pCi/L	900	3.9×10^{5}	
		U-234	0.01 – 0.8	pCi/L	30 µg/L (total U)	1.2×10^{3}	8
		U-235	0.02 – 0.6	pCi/L		1.3×10^{3}	
		U-238	0.01 – 0.7	pCi/L		1.4×10^{3}	
		Pu-238	0.01 – 0.2	pCi/L	15	4.3×10^{2}	9
		Pu-239/240	0.01 – 0.2	pCi/L	15	4.0×10^{2}	9
		Am-241	0.03 – 0.1	pCi/L	15	7.4×10^{2}	9
		I-129	0.002	pCi/L	1	5.7×10^{2}	
		Metals					

Media Sampled	Collection Device	Analyte	Typical MDC or RDL range[1]	Units	EPA Limit[2,3]	DOE DCS[4]	Notes
		Arsenic	2	µg/L	10	--	
		Barium	1	µg/L	2000	--	
		Chromium	1	µg/L	100	--	
		Iron	10	µg/L	300*	--	
		Lead	1	µg/L	15	--	
		Manganese	1	µg/L	50*	--	
		Selenium	2	µg/L	50	--	
		Zinc	5	µg/L	5000*	--	
		Common Ions					
		Alkalinity (as $CaCO_3$)	1.0	mg/L	--	--	
		Calcium	0.1	mg/L	--	--	
		Chloride	0.4	mg/L	250*	--	
		Magnesium	0.1	mg/L	--	--	
		Potassium	0.1	mg/L	--	--	
		Sodium	0.1	mg/L	--	--	
		Sulfate	0.8	mg/L	250*	--	
		Nutrients					
		Nitrate/Nitrite	0.01	mg/L	10 (NO_3^-),1 (NO_2^-)	--	
		Total Phosphorus	0.005	mg/L	--	--	
		Volatile Organics					
		Tetrachloroethene (PCE)	0.5	µg/L	5	--	
		Trichloroethene (TCE)	0.5	µg/L	5	--	
		1,1-Dichloroethene	0.5	µg/L	7	--	
		cis-1,2-dichloroethene	0.5	µg/L	70	--	
		trans-1,2-dichloroethene	0.5	µg/L	100	--	
		Vinyl chloride	0.5	µg/L	2	--	
		Carbon tetrachloride	0.5	µg/L	5	--	
		Chloroform	0.5	µg/L	80	--	10
		Chloromethane	0.5	µg/L	--	--	
		Methylene Chloride	0.5	µg/L	5	--	
		Methyl Ethyl Ketone	10	µg/L	--	--	
		1,1-Dichloroethane	0.5	µg/L	--	--	
Terrestrial							
Milk	Grab or composite	Gamma emitters	4.0	pCi/L (^{131}I)	4.59 x10^3	1.0 x10^4	11
Soil	*in situ*	Gamma emitters	0.02 – 0.03	pCi/g (^{137}Cs)	6.8	6.8	12
	Grab	Gamma emitters	0.09	pCi/g (^{137}Cs)	6.8	6.8	12
Radiation							

Media Sampled	Collection Device	Analyte	Typical MDC or RDL range[1]	Units	EPA Limit[2,3]	DOE DCS[4]	Notes
Ambient	EICs	Gamma Radiation	5	mR	--	100 mrem/yr (103.5 mR/yr)	13, 14,
	EcoGamma	Gamma Radiation	1	µR/hr	--	100 mrem/yr (103,500 µR/yr)	13, 15,

Notes:

1.Minimum Detectable Concentrations (MDCs) are a measure of method/instrument performance. They are not a criterion above which a result is considered a detection. DOE Derived concentration standards (DCS) and EPA Maximum Contaminant Levels (MCLs) are listed here only as reference values for comparison to typical MDC or Reporting Detection Limit (RDL) ranges. The MCLs are the most restrictive and do not necessarily apply to the environmental media sampled. For example, the MCLs for water listed here are the highest levels of contaminants legally allowed in public drinking water systems in Idaho, but most wells sampled by DEQ-INL OP are not used for drinking water.

2. For radionuclides in water - EPA derived concentrations (pCi/l) of Beta and Photon Emitters in Drinking Water Yielding a Dose of 4 mrem/year to the Total Body or to any Critical Organ as defined in NBS Handbook 69. For non-radiological analytes – 40 CFR Part 141: National Primary Drinking Water Regulations. The Maximum Contaminant Levels (MCLs) listed here are the highest levels of contaminants legally allowed in public drinking water systems in Idaho. A * designates a Secondary MCL (SMCL), which is a guideline recommended by the EPA for constituents that may affect the taste, color, or odor of drinking water. The values listed are generally consistent with the Idaho Primary Constituent Standards (PCSs) and Secondary Constituent Standards in IDAPA 58.01.11, Ground Water Quality Rule, Tables II and III.

3. For radionuclides in air – EPA Concentration Levels for Environmental Compliance as defined in 40 CFR 61, subpart H -National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities, and Appendix E, Table 2.

4. Derived concentration standards (DCS) set by the DOE represent reference values for radiation exposure. They are based on a radiation dose of 100 mrem/year for exposure through a particular exposure mode such as direct exposure, inhalation, or ingestion of water (DOE-STD-1196-2022).

5. Based on the most restrictive human-made alpha emitter (^{239}Pu) and beta-emitter (^{90}Sr) and the most restrictive absorption type in DOE-STD-1196-2022, Table 7.

6. There are no regulatory standards for precipitation. For comparison only, the MCL and DCS for water are listed.

7. Water samples from locations at which tritium concentrations are too low to be detected by the standard method are re-analyzed for tritium using an electrolytic enrichment method (referred to as the low-level method), which has a minimum detectable concentration (MDC) about ten times lower than the standard method.

8. Example: For natural uranium, 30 µg/L (total U) is equivalent to approximately 10.3 pCi/L U-234, 0.468 pCi/L U-235, and 10.0 pCi/L U-238.

9. There are no specific MCLs for these nuclides. Listed MCLs are the gross alpha activity MCL.

10. MCL is for total trihalomethanes.

11. The Food and Drug Administration derived intervention level for I-131 in milk is 170 Bq/L or 4590 pCi/L. The DOE DCS for I-131 in milk is 1.0 x10^4 pCi/L.

12. Recommended federal screening limit for surface soil is 6.8 pCi/g (NCRP Report No. 129,"Recommended Screening Limits for Contaminated Surface Soil and Review of Factors Relevant to Site-Specific Studies", Table 2.1, Agricultural (AG) land use).

13. Mrem/hr is converted to µR/yr assuming 1.035 R/rad in muscle.

14. The "Typical MDC" for EICs is expressed as the EIC sensitivity for gamma radiation with less than a 10% error, which is 5 mR per the EPERM System Manual.

15. The "Typical MDC" for the EcoGamma is expressed as the lower end of EcoGamma low range.

16. Per the EPA RadNet Sampling and Analyses Schedules, Routine Sample Analyses [for air filters], "If the beta concentration is greater than 1 pCi/m3, gamma spectroscopy and possibly other analyses are performed."