Chapter 5: Environmental Monitoring Programs – Liquid Effluents Monitoring

CHAPTER 5

Wastewater (liquid effluent) discharged to land surfaces and infiltration basins (percolation ponds) at the Idaho National Laboratory (INL) Site is regulated by the state of Idaho groundwater quality and recycled water rules and requires a reuse permit. Liquid effluents and surface water runoff were monitored in 2024 by the INL contractor and the Idaho Cleanup Project (ICP) contractor for compliance with permit requirements and applicable United States (U.S.) Department of Energy (DOE) orders established to protect human health and the environment.

During 2024, permitted reuse facilities included the Advanced Test Reactor (ATR) Complex Cold Waste Ponds (CWP), the Idaho Nuclear Technology and Engineering Center (INTEC) Percolation Ponds and Sewage Treatment Plant (STP), and the Materials and Fuels Complex (MFC) Industrial Waste Pond (IWP). Liquid effluent and groundwater at these facilities were sampled for parameters required by their facility-specific permits. No permit limits were exceeded in 2024, with one exception. Groundwater chromium results in one monitoring well for the ATR Complex were elevated in 2024. The source of the elevated chromium levels is unlikely to be a result of current effluent discharges to the CWP but rather due to other factors, such as historical contamination. Chromium concentrations will continue to be monitored closely in the effluent and all permit monitoring wells

Additional liquid effluent and groundwater surveillance monitoring was performed in 2024 at the ATR Complex, INTEC, and MFC to comply with the DOE environmental protection objectives. All parameters were below the applicable health-based standards in 2024.

Surface water that runs off the Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex (RWMC) during periods of rapid snowmelt or heavy precipitation was sampled and analyzed for radionuclides. Specific human-made gamma-emitting radionuclides were not detected. Detected concentrations of americium-241 (^{241}Am), plutonium-239/240 ($^{239/240}$Pu), and uranium isotopes did not exceed the DOE Derived Concentration Standards (DCS).

5. ENVIRONMENTAL MONITORING PROGRAMS – LIQUID EFFLUENTS MONITORING

Some INL Site operations retain wastewater in lined, total containment evaporative ponds constructed to eliminate liquid effluent discharges to the environment. Other INL Site operations discharge liquid effluents to unlined infiltration basins or ponds that may potentially contain nonhazardous levels of radioactive, or nonradioactive, contaminants. Effluent discharges are subject to specified discharge limits, permit limits, or maximum contaminant levels (MCLs). INL Site contractor personnel conduct liquid effluent monitoring through liquid effluent and surface water runoff sampling and surveillance programs to ensure compliance with applicable permits, limits, and MCLs. These programs also sample groundwater to evaluate the potential for groundwater impacts from current effluent discharges and operations.

Table 5-1 presents requirements for liquid effluent monitoring and surveillance performed at the INL Site. Maps and a comprehensive discussion of environmental monitoring, including liquid effluent monitoring and surveillance programs performed by various organizations within and around the INL Site, can be found in the "INL Environmental Monitoring Plan" (DOE-ID 2023a) and the "Technical Basis for Environmental Monitoring and Surveillance at the Idaho National Laboratory Site" (DOE-ID 2023b). To improve readability of this chapter, most data tables only contain results exceeding the specified discharge limits, permit limits, or MCLs. Data tables for other monitoring results are provided in Appendix A.

Table 5-1. Liquid effluent monitoring and surveillance at the INL Site.

AREA/FACILITY	MONITORING REQUIREMENTS		
	IDAHO REUSE PERMIT[a]	DOE O 458.1[b] LIQUID EFFLUENT MONITORING	DOE O 435.1[c] SURFACE RUNOFF SURVEILLANCE
INL CONTRACTOR			
ATR Complex CWP	•	•	
MFC IWP	•	•	
ICP CONTRACTOR			
INTEC Percolation Ponds and STP	•	•	
RWMC SDA surface water runoff		•	•

a. Required by permits issued according to Idaho Department of Environmental Quality (DEQ) Rules, IDAPA 58.01.17, "Recycled Water Rules." This includes wastewater effluent and related groundwater monitoring.

b. Paragraph 4(g) of DOE Order 458.1, "Radiation Protection of the Public and the Environment," establishes specific requirements related to the control and management of radionuclides from DOE activities in liquid discharges, including protection of groundwater and drinking water. Radiological liquid effluent monitoring recommendations in DOE Handbook Environmental Radiological Effluent Monitoring and Environmental Surveillance (DOE-HDBK-1216-2015) (DOE 2015) are followed to ensure quality. DOE-STD-1196-2022, "Derived Concentration Technical Standard," (DOE 2022) supports the implementation of DOE O 458.1 and provides the DCSs as reference values to control effluent releases from DOE facilities.

c. The objective of DOE O 435.1, "Radioactive Waste Management," is to ensure that all DOE radioactive waste is managed in a manner that is protective of worker and public health, as well as safety and the environment. This order requires that radioactive waste management facilities, operations, and activities meet the environmental monitoring requirements of DOE O 458.1. DOE Handbook DOE-HDBK-1216-2015 suggests that potential impacts of stormwater runoff as a pathway to humans or biota should be evaluated.

5.1 Liquid Effluent and Related Groundwater Compliance Monitoring

The discharge of liquid effluent to the land surface for treatment or disposal is known as "reuse" in the state of Idaho and is regulated by the Idaho DEQ "Recycled Water Rules" (IDAPA 58.01.17), "Wastewater Rules" (IDAPA 58.01.16), and "Ground Water Quality Rule" (IDAPA 58.01.11). The Idaho DEQ issues reuse permits for the operation of these reuse systems. Reuse permits may require the monitoring of nonradioactive constituents in the effluent and groundwater in accordance with the monitoring requirements specified within each permit. Some facilities may have specified radiological constituents monitored for surveillance purposes to comply with DOE orders (but are not required by regulations). The reuse permits may specify annual discharge volumes, application rates, and effluent quality limits. Annual reports (ICP 2025a and 2025b; INL 2025a, 2025b, 2025c, and 2025d) were prepared and submitted to the Idaho DEQ.

During 2024, the INL Site contractors monitored the following reuse facilities as required by the permits, as shown in Table 5-2:

- ATR Complex CWP (see Subsection 5.1.1)
- INTEC Percolation Ponds and STP (see Subsection 5.1.2)
- MFC IWP (see Subsection 5.1.3).

Table 5-2. 2024 status of INL Site contractors reuse permits.

FACILITY	PERMIT STATUS AT END OF 2024	PERMIT EXPIRATION DATE	EXPLANATION
ATR Complex CWP	Active	October 29, 2029	Idaho DEQ issued Reuse Permit I-161-03 on October 30, 2019 (DEQ 2019), with modifications issued May 23, 2022 (DEQ 2022a); and October 24, 2023 (DEQ 2023a).
INTEC Percolation Ponds	Active	June 25, 2034	Idaho DEQ issued Permit M-130-07 on June 25, 2024 (DEQ 2024).
MFC IWP	Active	January 25, 2027	Idaho DEQ issued Reuse Permit I-160-02 on January 26, 2017, with modifications issued March 7, 2017; May 8, 2019; and May 21, 2020 (DEQ 2020); May 23, 2022 (DEQ 2022b); and October 24, 2023 (DEQ 2023b).

Additional effluent and groundwater radiological constituents are monitored at these facilities to comply with the environmental protection objectives of DOE O 458.1 and are discussed in Subsection 5.2. Surface water monitoring at RWMC is presented in Subsection 5.3.

5.1.1 Advanced Test Reactor Complex Cold Waste Ponds

Description. The Cold Waste Ponds (CWP) are located near the southeast corner of the ATR Complex compound, approximately 1.2 km (0.75 mi) northwest of the Big Lost River channel. The CWP was excavated in 1982 and consists of two unlined cells that function as percolation basins for the infiltration of nonhazardous industrial liquid effluent. This effluent consists primarily of noncontact cooling tower blowdown, once-through cooling water for air conditioning units, coolant water from air compressors, and wastewater from secondary system drains and other nonradioactive drains throughout the ATR Complex. Chemicals used in the cooling tower and other effluent streams discharged to the CWP include commercial biocides and corrosion inhibitors. The cold waste effluent reports through collection piping to a monitoring location where flow rates to the CWP are measured and effluent samples are collected using an automated composite sampler.

Effluent Monitoring Results for the Reuse Permit. Reuse Permit I-161-03 Modifications 1 and 2 require monthly sampling of the effluent to the CWP (DEQ 2022a, DEQ 2023a). The 2024 permit reporting year monitoring results are presented in the 2024 annual reuse report (INL 2025c). The 2024 calendar year monitoring results are summarized in Table A-1 in Appendix A. The total dissolved solids concentrations ranged from 195 mg/L to 1,020 mg/L. Sulfate ranged from 19.8 mg/L to 497 mg/L. Concentrations of sulfate and total dissolved solids are higher during reactor operation because of the evaporative concentration of the corrosion inhibitors and biocides added to the reactor cooling water. Due to the composition and characteristics of the effluent, the reuse permit does not require pretreatment or specify maximum constituent loading limits or concentration limits for the cold waste effluent discharged to the CWP. The 2024 constituent concentrations continue to remain stable and consistent with the historical results with no observable increasing or decreasing trends.

The permit specifies the maximum annual and five-year moving average hydraulic loading rate limits of 300 million gallons per year (MG/yr) and 375 MG/yr, respectively, based on the annual reporting year of the permit. As shown in Table A-2, the 2024 annual reporting year flow of 187.59 MG did not exceed either of these hydraulic loading limits.

Groundwater Monitoring Results for the Reuse Permit. The permit requires groundwater monitoring twice annually in April/May and September/October at the seven groundwater wells shown in Figure 5-1 to measure potential impacts from the CWP. In 2024, all constituents, with the exception of chromium, remained below their respective primary or secondary constituent standards. These constituents are presented in Table A-3. Well USGS-065 is the closest downgradient well and has historically had the highest concentrations for the constituents of interest, including chromium, nitrate + nitrite as nitrogen, sulfate, and total dissolved solids. Nitrate + nitrite as nitrogen continues to show a minor increasing trend in both

the upgradient and downgradient wells but remains well below the primary constituent standard. Sulfate and total dissolved solids are below their applicable secondary constituent standards and continue to gradually trend downward. Iron concentrations continue to remain at low levels and are consistent with the historical ranges with no observable trend. Chromium is a constituent of concern being addressed under the Comprehensive Environmental Response, Compensation, and Liability due to historical discharges that have been discontinued (see Chapter 6, Subsections 6.4 and 6.5.2 for more information). Chromium results in Well USGS-65 decreased from approximately 0.500 mg/L in the early 1970s to consistently being less than the primary constituent standard (PCS) of 0.100 mg/L starting in 2009. As shown in Figure 5-1, these concentrations remained relatively stable in the range of approximately 0.070 to 0.090 mg/L from 2010 through April 2024.

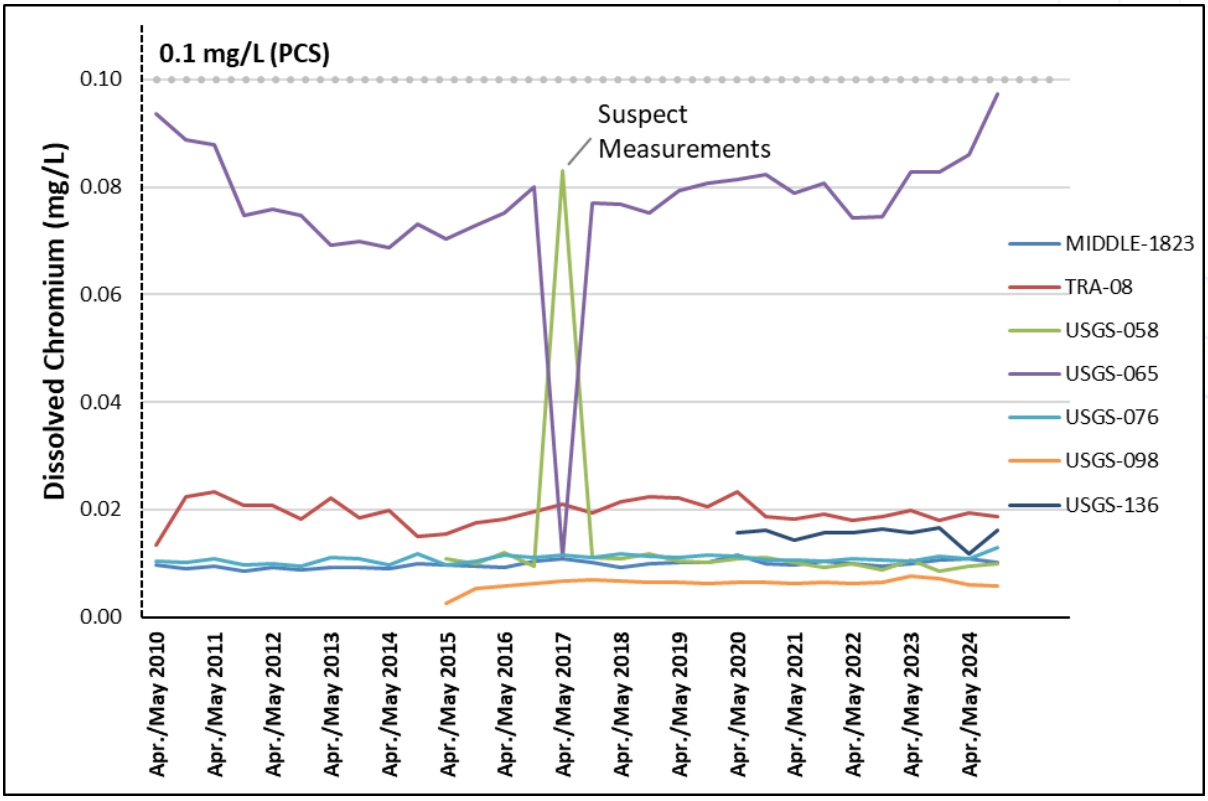

Figure 5-1. Dissolved chromium concentrations in the ATR Complex reuse permit monitoring wells (INL 2025c).

The September 2024 total and filtered chromium results collected from Well USGS-065 exceeded the PCS at 0.112 mg/L and 0.107 mg/L, respectively. During data validation, the laboratory chromium results were qualified as an estimate due to high-calibration bias. The results were reanalyzed by the laboratory and found to be below the PCS at 0.0979 mg/L and 0.0974 mg/L, respectively; however, the re-analysis results also were qualified during validation due to positive serial-dilution bias. As shown in Table A-1, the CWP effluent chromium concentrations in 2024 ranged from 0.0032 mg/L to 0.0136 mg/L, which is consistent with the historical results and significantly less than the concentrations observed in Well USGS-065. A comparison of the chromium concentrations in the CWP effluent and Well USGS-065 is shown in Figure 5-2. This difference suggests the source of these elevated chromium levels is unlikely to be a result of current effluent discharges to the CWP but rather due to other factors, such as historical contamination. Chromium concentrations will continue to be monitored closely in the effluent and all permit monitoring wells.

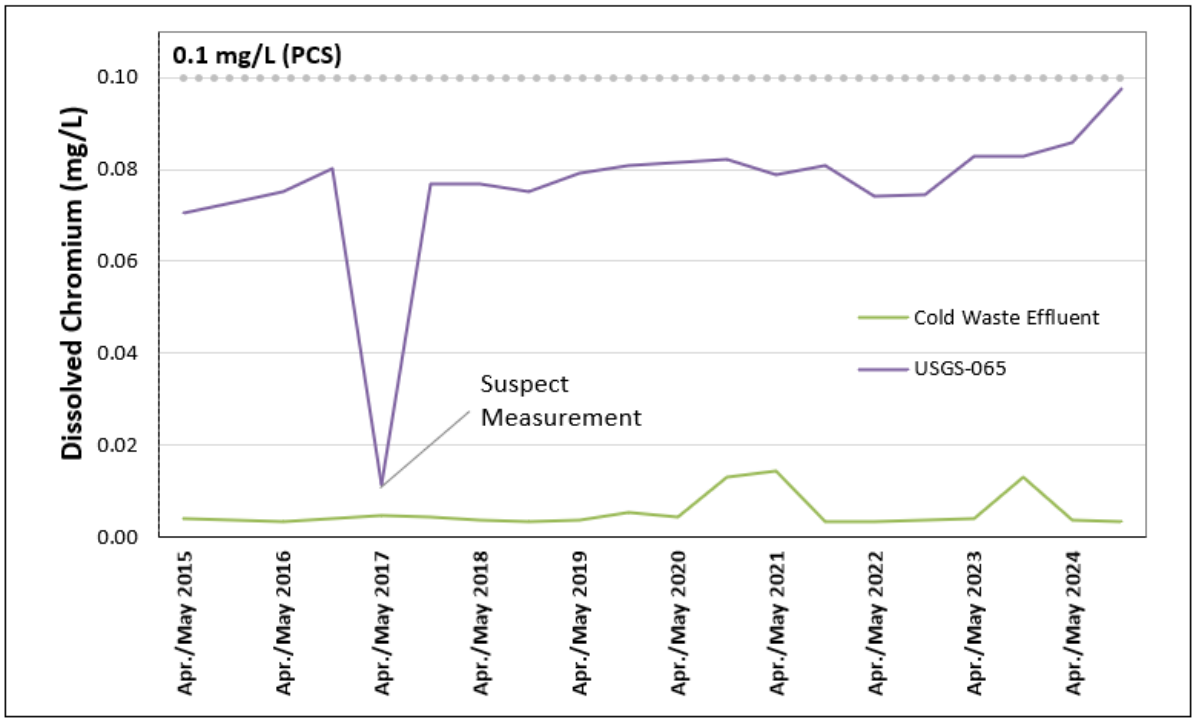

Figure 5-2. Dissolved chromium concentrations in the ATR Complex cold waste effluent from Well USGS-065 (INL 2025c).

5.1.2 Idaho Nuclear Technology and Engineering Center Percolation Ponds and Sewage Treatment Plant

Description. The INTEC Percolation Ponds are composed of two rapid infiltration ponds excavated into the surficial alluvium and surrounded by bermed alluvial material. The rapid infiltration system uses the soil ecosystem to treat wastewater. Each pond is 93 m × 93 m (305 ft × 305 ft) at the top of the berm and is approximately 3 m (10 ft) deep. Each pond is designed to accommodate a continuous wastewater discharge rate of 11.36 mL (3 mg) per day.

The INTEC Percolation Ponds receive a discharge of only industrial and municipal wastewater. Industrial wastewater (i.e., service waste) from INTEC operations consists of steam condensates, noncontact cooling water, water treatment effluent, boiler blowdown wastewater, stormwater, and small volumes of other nonhazardous/nonradiological liquids. Municipal wastewater (i.e., sanitary waste) is treated at the INTEC STP.

The STP is located east of INTEC, outside the INTEC security fence, and treats and disposes of sewage, septage, and other nonhazardous industrial wastewater at INTEC. The sanitary waste is treated by natural biological and physical processes (e.g., digestion, oxidation, photosynthesis, respiration, aeration, evaporation) in four lagoons. After treatment in the lagoons, the effluent is combined with the service waste and discharged to the INTEC Percolation Ponds.

The INTEC Percolation Ponds were permitted by Idaho DEQ to operate as a reuse facility under Reuse Permit M-130-07 (DEQ 2024).

Wastewater Monitoring Results for the Reuse Permit. Monthly samples were collected from CPP-769 (influent to STP), CPP-773 (effluent from STP), and CPP-797 (effluent to the INTEC Percolation Ponds). As required by the permit, all samples are collected as 24-hour composites, except pH, fecal coliform, and total coliform, which are collected as grab samples. The permit specifies the constituents that must be monitored at each location. The permit does not specify any wastewater discharge limits at these three locations. The 2024 reporting year monitoring results for CPP-769, CPP-773, and CPP-797 are provided in the 2024 Wastewater Reuse Report (ICP 2025a), and the 2024 calendar year monitoring results are summarized in Tables A-4, A-5, and A-6 in Appendix A.

The permit specifies maximum daily and yearly hydraulic loading rates for the INTEC Percolation Ponds. As shown in Table A-7, the maximum daily flow and yearly total flow to the INTEC Percolation Ponds were below the permit limits in 2024.

Groundwater Monitoring Results for the Reuse Permit. To measure the potential impact on groundwater from wastewater discharges to the INTEC Percolation Ponds, the permit requires that groundwater samples are collected from six monitoring wells.

The permit requires that groundwater samples are collected semiannually during April/May and September/October and lists which constituents must be analyzed. Contaminant concentrations in the monitoring wells are limited by primary constituent standards and secondary constituent standards as specified in IDAPA 58.01.11, "Ground Water Quality Rules."

Table A-8 shows the 2024 water table elevations and depth-to-water table, determined prior to purging and sampling, and the analytical results for all constituents specified by the permit for the aquifer wells. Table A-9 presents similar information for the perched water wells.

Tables A-8 and A-9 show all permit-required constituents associated with the aquifer monitoring wells were below their respective primary constituent standards and secondary constituent standards in 2024.

5.1.3 Materials and Fuels Complex Industrial Waste Pond

Description. The MFC Industrial Waste Pond (IWP) is an unlined basin that was first excavated in 1959. The industrial wastewater discharged to the IWP consists of primarily noncontact cooling water, cooling tower drains, and air wash flows. Small volumes of MFC-768 power plant cooling water system blowdown, intermittent reverse osmosis blowdown, and floor drain and laboratory sink discharges are also sent to the IWP. On occasion, with pre-approval, industrial wastewater from the MFC facility process holdup tanks discharge to the pipeline. The IWP functions as a percolation basin for the infiltration of the nonhazardous industrial effluent. The effluent reports through collection piping to a monitoring location where flow rates to the IWP are measured and the effluent samples are collected using an automated composite sampler.

Wastewater Monitoring Results for the Reuse Permit. Reuse Permit I-160-02 Modifications 4 and 5 require monthly sampling of effluent discharging into the IWP (DEQ 2022b, DEQ 2023b). The 2024 permit reporting year monitoring results are presented in the 2024 annual reuse report (INL 2025d), and the calendar year results are summarized in Table A-10. Based on the composition of the industrial effluent, the reuse permit does not require pretreatment or specify the maximum constituent loading limits or concentration limits. In 2024, concentrations of iron and manganese continued to be at or near the minimum detection levels of the laboratory instruments. Total dissolved solids ranged from 215 mg/L to 328 mg/L. The 2024 metals and total dissolved solids concentrations continue to be within historical ranges and remain stable with no observable trends. Effluent nitrate + nitrite as nitrogen concentrations are gradually trending upward at approximately the same rate and concentrations as the upgradient background groundwater concentration in Well ANL-MON-A-012. The aquifer is the source of water from which the industrial effluent is generated, and it is likely that the upgradient aquifer nitrogen concentrations are passing through the system to the effluent. As shown in Figure 5-3, there are no discernible impacts or changes between upgradient and downgradient groundwater quality. The lack of a significant difference from upgradient to downgradient indicates the reuse system is not impacting the groundwater.

The permit specifies an annual reporting year hydraulic loading limit of 17 MG/yr. As shown in Table A-11, the 2024 reporting year effluent flow of 7.753 MG/yr was well below the permit limit.

Groundwater Monitoring Results for the Reuse Permit. The reuse permit requires groundwater monitoring twice per year, in April/May and September/October, at one upgradient well and two downgradient wells, to measure potential impacts from the pond. The analytical results are summarized in Table A-12. In 2024, none of the constituents exceeded their respective primary or secondary constituent standards, and the analyte concentrations in the downgradient wells remained consistent with the background levels in the upgradient well.

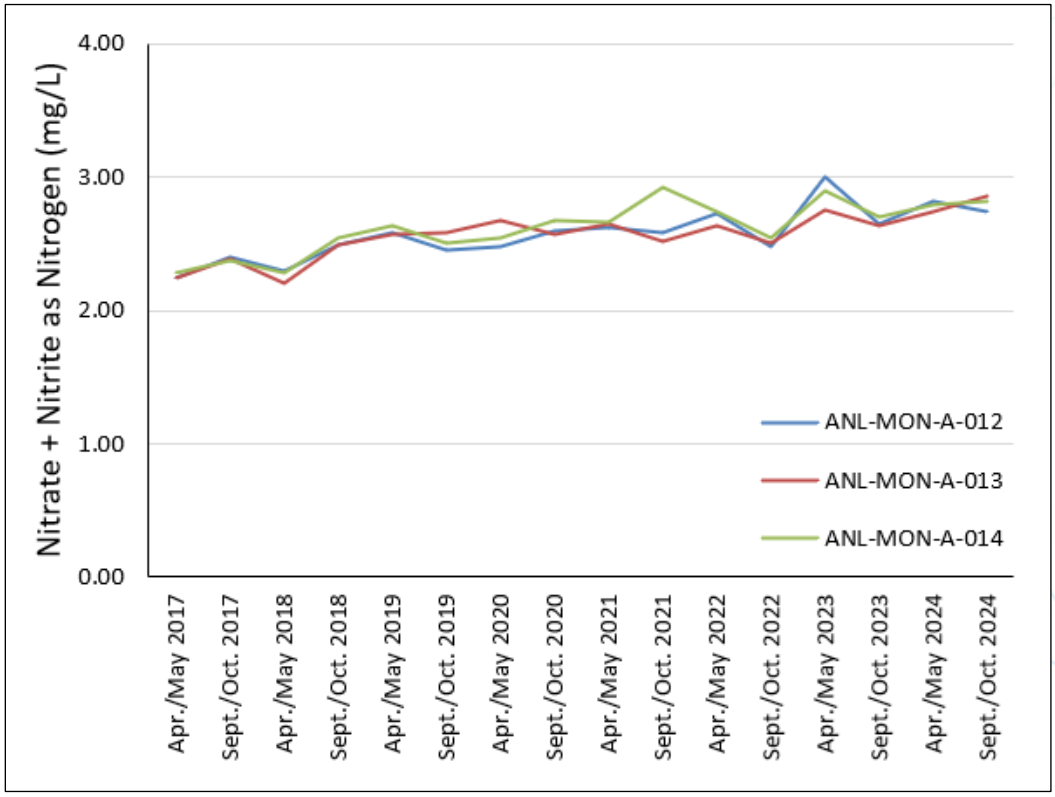

Figure 5-3. MFC groundwater nitrate + nitrite as nitrogen concentrations 2017 to 2024 (INL 2025d).

5.2 Liquid Effluent Surveillance Monitoring

The following subsections discuss the results of liquid effluent radiological surveillance monitoring performed at each wastewater reuse-permitted facility.

5.2.1 Advanced Test Reactor Complex

The effluent to the CWP is a combination of processed water from various ATR Complex facilities. Radiological surveillance of the CWP effluent is performed monthly for gross alpha, gross beta, gamma spectrometry, and tritium. The monthly CWP effluent radiological surveillance monitoring results are presented in the INL 2024 quarterly reports (INL 2025e, INL 2025f, INL 2025g, and INL 2025h). In 2024, gross alpha and gross beta were the only surveillance constituents that were detected in the CWP effluent but were within the historical ranges with no observable trends. When gross alpha levels exceed a threshold of 5 pCi/L, additional analysis for radium-226 and radium-228 are performed as well. Radium-226 and radium-228 were analyzed in May and June 2024 but were not positively detected.

Additionally, seven groundwater monitoring wells are sampled twice per year for radiological surveillance and analyzed for gross alpha, gross beta, gamma spectrometry, strontium-90, and tritium. The groundwater radionuclide surveillance monitoring results are presented in the second and third quarter reports for 2024 (INL 2025f, INL 2025g). All detected constituents, including tritium, gross alpha, and gross beta, were well below the Idaho groundwater primary constituent standards (IDAPA 58.01.11) and DCS (DOE 2022). Gross alpha and gross beta measurements remain within the historical ranges. Tritium continues to trend downward in the monitoring wells that have positive detections.

5.2.2 Idaho Nuclear Technology and Engineering Center

In addition to the permit-required monitoring summarized in Subsection 5.1.3, surveillance monitoring was conducted at CPP-797 (effluent to the INTEC Percolation Ponds), and groundwater monitoring was conducted at the INTEC

Percolation Ponds. Table A-13 summarizes the results of radiological monitoring at CPP-797, while Table A-14 provides the results of groundwater radiological monitoring in Wells ICPP-MON-A-165, ICPP-MON-A-166, ICPP-MON-V-200, and ICPP-MON-V-212.

Twenty-four-hour flow proportional samples were collected from the CPP-797 wastewater effluent and composited daily into a monthly sample. Each collected monthly composite sample was analyzed for specific gamma-emitting radionuclides, gross alpha, gross beta, and total strontium activity. As shown in Table A-13, no total strontium activity was detected in any of the samples collected at CPP-797 in 2024. Gross alpha was detected in four samples, while gross beta was detected in all 12 samples collected in 2024.

Groundwater samples were collected from the aquifer from Wells ICPP-MON-A-165 and ICPP-MON-A-166 and from perched water from Wells ICPP-MON-V-200 and ICPP-MON-V-212 in April/May 2024 and September 2024 and were analyzed for gross alpha and gross beta. As shown in Table A-14, gross alpha was detected in three of the four monitoring wells in April/May 2024 and one of the four monitoring wells in September 2024. Gross beta was detected in all monitoring wells in both the spring (April/May) and fall (September/October) sampling events. All detected constituents, including strontium-90, tritium, gross alpha, and gross beta, were below the Idaho groundwater primary constituent standards in IDAPA 58.01.11.

5.2.3 Materials and Fuels Complex

Radiological surveillance of the effluent in the IWP is performed three times per year and analyzed for gross alpha, gross beta, gamma spectrometry, and tritium. Annual samples also are collected and analyzed for select isotopes of americium, strontium, plutonium, and uranium. The radiological surveillance monitoring results are presented in the second, third, and fourth quarter 2024 reports (INL 2025f, INL 2025g, INL 2025h). In 2024, gross alpha, gross beta, uranium-233/234, and uranium-238 were the only surveillance constituents detected in the IWP and are all well below the applicable DCS (DOE 2022) and remain within the historical ranges.

Additionally, three ground water monitoring wells are sampled twice per year for radiological surveillance and analyzed for gross alpha, gross beta, alpha spectrometry, gamma spectrometry, and tritium. The 2024 groundwater surveillance monitoring results are presented in the second and third quarter 2024 reports (INL 2025f, INL 2025g). Overall, the detected results were below the Idaho groundwater primary constituent standards (IDAPA 58.01.11) and the applicable DCS (DOE 2022), remain within the historical ranges, and show no discernible impact from MFC operations.

5.3 Surface Water Runoff Surveillance Water Sampling

Radionuclides could be transported outside the RWMC boundaries via surface water runoff. Surface water runs off the SDA only during periods of rapid snowmelt or heavy precipitation. At these times, water may be pumped out of the SDA retention basin into a drainage canal, which directs the flow outside RWMC. The canal also carries runoff from outside RWMC that has been diverted around the SDA. In addition, water sheet flows across asphalt surfaces and infiltrates around/under door seals at Waste Management Facility (WMF)-636 at the Advanced Mixed Waste Treatment Project. The resulting surface water inflow accumulates in the WMF-636 Fire Water Catch Tanks A, B, C, and D. If the level of surface water in the Fire Water Catch Tanks reaches a predetermined level, the water is pumped into aboveground holding tanks, where it can be sampled, prior to discharge into the drainage canal surrounding the SDA.

In compliance with DOE O 435.1, the ICP contractor collects surface water runoff samples at RWMC SDA from the WMF-636 Fire Water Catch Tanks. Surface water is collected to determine whether radionuclide concentrations exceed the administrative control levels or if concentrations have increased significantly, as compared with the historical data. A field blank is also collected for comparison. Samples from the WMF-636 Fire Water Catch Tanks were not collected during 2024 as periodic measurements of tank levels did not indicate pumping to be necessary.

A water sample was collected from the SDA Lift Station in 2024. This sample was analyzed for a suite of radionuclides that included americium-241 strontium-90, and plutonium and uranium isotopes. There were no positive three sigma (3σ) detections of americium-241, plutonium-238, plutonium-239/240, or strontium-90 in the samples taken in 2024. The maximum concentration detected for americium-241 was 0.984 (± 0.13) pCi/L, which is well below the 740 pCi/L DCS. The maximum concentration detected for plutonium-238 was 0.02 (± 0.01) pCi/L, which is well below the 430 pCi/L DCS.

The maximum concentration detected for plutonium-239/240 was 0.76 (± 0.07) pCi/L, which is well below the 400 pCi/L DCS as well. Finally, the maximum concentration detected for strontium-90 was 0.10 (± 0.03) pCi/L, which is well below the applicable DCS of 1,700 pCi/L. In addition to sampling for these nuclides, uranium isotopes were detected at levels consistent with the historical results, which were below any applicable DCS.

Table 5-3 summarizes the specific alpha and beta results of human-made radionuclides. No human-made gamma-emitting radionuclides were detected in the surface water runoff sample. ICP temporarily ceased sample collection since the teardown of the Accelerated Retrieval Project (ARP) V facility removed electrical facilities to the SDA Lift Station. The ICP contractor has revised their sampling procedure to allow for continued sampling at the SDA Lift Station considering the changes resulting from these closure activities.

Table 5-3. Radionuclides detected in surface water runoff at the RWMC SDA (2024).

LOCATION	PARAMETER	MAXIMUM CONCENTRATION[a] (pCi/L)	% DCS[b]
SDA Lift Station	Americium-241	2.35 ± 0.13	0.13
	Plutonium-238	0.02 ± 0.01	0.01
	Plutonium-239/240	0.76 ± 0.07	0.04
	Strontium-90	0.10 ± 0.03	0.04
	Uranium-234	0.53 ± 0.04	0.04
	Uranium-235	0.04 ± 0.01	0.00
	Uranium-238	0.44 ± 0.03	0.03

a. Result ±1s. Results shown are greater than 3σ.
b. See DOE-STD-1196-2022, Table A-6 (DOE 2022).

5.4 References

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IDAPA 58.01.16. 2025. "Wastewater Rules," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality, Boise, ID.

IDAPA 58.01.17. 2025. "Recycled Water Rules," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality, Boise, ID.

INL. 2025a. "2024 Groundwater Radiological Monitoring Results Associated with the Advanced Test Reactor Complex Cold Waste Ponds." INL/RPT-24-82592, January 2025. Idaho National Laboratory, Idaho Falls, ID.

INL. 2025b. "2024 Groundwater Radiological Monitoring Results Associated with the Materials and Fuels Complex Industrial Waste Pond." INL/RPT-24-82593, January 2025. Idaho National Laboratory, Idaho Falls, ID.

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