

Appendix A: Chapter 5 Addendum



Table A-1. Advanced Test Reactor Complex cold waste pond effluent permit-required monitoring results (2022).^{a,b}

PARAMETER	MINIMUM	MAXIMUM	MEDIAN
pH (standard units)	6.08	7.55	6.98
Conductivity (µS/cm)	402	419	410
Chromium, filtered (mg/L)	0.003U ^c	0.00487	0.00346
Chromium, total (mg/L)	0.00324	0.00392	0.00346
Iron, filtered (mg/L)	0.033U	0.0407	0.033U
Iron, total (mg/L)	0.033U	0.0515	0.033U
Nitrate + nitrite as nitrogen (mg/L)	0.905	1.01	0.932
Solids, total dissolved (mg/L)	204	266	221
Sulfate (mg/L)	21.1	30.1	25.5J ^d

a. Reuse Permit I-161-03 does not specify maximum effluent constituent loading or concentration limits.

b. Duplicate samples collected in July 2022 are included in the statistical summary.

c. U qualifier indicates the result was below the detection limit.

d. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.

Table A-2. Hydraulic loading rates for the Advanced Test Reactor Complex cold waste pond (2022).

	YEARLY TOTAL FLOW
2022 flow ^a	279.21 MG ^b
Annual permit limit ^c	375 MG
5-yr moving annual average permit limit	300 MG

a. Annual flow is reported for the 2022 permit reporting year. The 2022 flow is estimated due to the flowmeter failing its annual calibration in 2022.

b. MG = million gallons.

c. The reuse permit specifies an annual limit based on a twelve-month reuse year from November 1 through October 31.



Table A-3a. Advanced Test Reactor Complex cold waste pond industrial wastewater reuse permit monitoring well results (2022).^a

WELL NAME	USGS-098 (GW-0161-01)		USGS-065 (GW-161-02)		USGS-076 (GW-161-04)		TRA-08 (GW-161-05)		MIDDLE-1823 (GW-161-06)		USGS-136 (GW-161-08)		STANDARD ^b PCS/SCS
SAMPLE DATE:	04/20/22	09/14/22	04/26/22	09/15/22	04/21/22	09/16/22	04/21/22	09/15/22	04/20/22	09/15/22	04/27/22	09/16/22	
Water table depth (ft) bls ^c	429.28	430.74	475.97	477.25	484.52	486.22	489.72	492.08	494.30	495.93	489.93	491.55	NA ^d
Water table elevation (ft) ^e	4,459.93	4,458.47	4,452.60	4,451.32	4,448.69	4,446.99	4,449.34	4,446.98	4,448.57	4,446.94	4,448.80	4,447.18	NA
Borehole correction factor (ft) ^f	2.53	2.53	NA	NA	NA	NA	0.63	0.63	NA	NA	0.22	0.22	NA
pH (s.u.)	6.74	7.39	6.53	7.34	6.25	7.88	7.04	7.47	6.87	7.25	6.85	7.48	6.5 to 8.5 (SCS)
Conductivity (µS/cm)	398	393	611	586	428	423	414	414	431	422	449	435	NA
Temperature (°F)	52.3	57.4	53.1	58.1	53.8	55.6	55.8	56.3	53.4	56.1	54.0	55.0	NA
Nitrite + nitrate as nitrogen (mg/L)	1.16 (1.17) ^g	1.22	1.51	1.44	1.09	1.24J ^h	1.05	1.02	1.03	1.01	1.21	1.25J	10 (PCS)
Sulfate (mg/L)	21.4 (21.4)	21.7J	136J	129	32.3	32.1J	41.7	40.9	30.6	31.0J	32.3J	31.9J	250 (SCS)
Solids, total dissolved (mg/L)	257 (256)	214	359	372	240	222	239	224	270	222	250	232	500 (SCS)
Chromium, total (mg/L)	0.00646 (0.00667)	0.00677	0.0754	0.0752	0.0103	0.0108	0.0182	0.0191	0.00955	0.00995	0.0162	0.0170	0.1 (PCS)
Chromium, filtered (mg/L)	0.00622 (0.00616)	0.00647	0.0742	0.0744	0.0108	0.0107	0.0181	0.0186	0.0099	0.00951	0.0158	0.0163	0.1 (PCS)
Iron, filtered (mg/L)	0.03U ⁱ (0.03U)	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.03U	0.3 (SCS)



Table A-3a. continued.

WELL NAME	USGS-098 (GW-0161-01)		USGS-065 (GW-161-02)		USGS-076 (GW-161-04)		TRA-08 (GW-161-05)		MIDDLE-1823 (GW-161-06)		USGS-136 (GW-161-08)		STANDARD ^b PCS/SCS
SAMPLE DATE:	04/20/22	09/14/22	04/26/22	09/15/22	04/21/22	09/16/22	04/21/22	09/15/22	04/20/22	09/15/22	04/27/22	09/16/22	

- a. Reuse Permit I-161-03 was issued October 30, 2019.
- b. Primary constituent standards (PCS) and secondary constituent standards (SCS) in groundwater referenced in the Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01 a and b.
- c. bls = below land surface.
- d. NA = not applicable.
- e. Water table elevation above mean sea level (ft). Elevation data provided using the North American Vertical Datum of 1988 (NAVD 88).
- f. The borehole correction factors were determined from gyroscopic surveys conducted by U.S. Geological Survey to reconcile discrepancies in water level measurements from well deviations.
- g. Results shown in parenthesis are from the field duplicate samples.
- h. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.
- i. U qualification indicates the analyte was not detected above the instrument detection limit or the analyte was detected at or above the applicable detection limit but the value is not more than 5 times the highest positive amount in any laboratory blank and is U qualified as a result of data validation.



Table A-3b. Advanced Test Reactor Complex cold waste pond industrial wastewater reuse permit monitoring well results (2022).

WELL NAME	USGS-058 ^a (GW-161-07)		STANDARD (PCS/SCS) ^b
	SAMPLE DATE:	04/26/22	
Water table depth (ft) bgs ^c	472.59	474.16	NA ^d
Water table elevation (ft) ^e	4,449.30	4,447.73	NA
Borehole correction factor (ft) ^f	NA	NA	NA
pH (s.u.)	6.77	7.65	6.5 to 8.5 (SCS)
Conductivity (µS/cm)	473	424	NA
Temperature (°F)	53.6	54.7	NA
Solids, total dissolved (mg/L)	250	223	500 (SCS)
Sulfate (mg/L)	34.3J ^g	31.2	250 (SCS)

- a. Reuse permit I-161-03 only requires water table elevation, water table depth, pH, conductivity, temperature, total dissolved solids and sulfate reported for USGS-058.
- b. Primary constituent standards (PCS) and secondary constituent standards (SCS) in groundwater referenced in the Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.a and b.
- c. bgs = below ground surface.
- d. NA = not applicable.
- e. Water table elevation above mean sea level (ft). Elevation data provided using the North American Vertical Datum of 1988 (NAVD 88).
- f. The borehole correction factors were determined from gyroscopic surveys conducted by U.S. Geological Survey to reconcile discrepancies in water level measurements from well deviations.
- g. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.

Table A-4. Idaho Nuclear Technology and Engineering Center sewage treatment plant influent monitoring results at CPP-769 (2022).

PARAMETER	MINIMUM	MAXIMUM	MEAN
Biochemical oxygen demand (5-day) (mg/L)	10.6	213	106
Nitrate + nitrite, as nitrogen (mg/L)	0.01320 U ^a	0.99	0.164
Total kjeldahl nitrogen (mg/L)	15.0	130	63.0
Total phosphorus (mg/L)	3.59	11.1	6.09
Total suspended solids (mg/L)	19.6	215	100.3

- a. U flag indicates the analyte was analyzed for but not detected above the method detection limit.



Table A-5. Idaho Nuclear Technology and Engineering Center sewage treatment plant effluent monitoring results at CPP-773 (2022).

PARAMETER	MINIMUM	MAXIMUM	MEAN
Biochemical oxygen demand (5-day) (mg/L)	7.92 U ^a	132.0	28.6
Nitrate + nitrite, as nitrogen (mg/L)	0.00147	2.09	0.95
pH (standard units) ^b	7.52	9.91	8.54
Total coliform (MPN ^c /100 mL) ^b	55.0	2,419	1,153.2
Total kjeldahl nitrogen (mg/L)	4.00	52	23.1
Total phosphorus (mg/L)	1.40	7.0	4.22
Total suspended solids (mg/L)	1.0	61	29

- a. U flag indicates the analyte was analyzed for but not detected above the method detection limit.
- b. As required by the permit, the results for this parameter were obtained from a grab sample.
- c. MPN = most probable number.

Table A-6. Idaho Nuclear Technology and Engineering Center new percolation ponds effluent monitoring results at CPP-797 (2022).

PARAMETER	MINIMUM	MAXIMUM	MEAN
Chloride (mg/L)	11.5	81.5	36.2
Chromium (mg/L)	0.00560	0.00848	0.00656
Coliform, fecal (MPN/100 mL) ^a	1	4	1
Coliform, total (MPN/100 mL) ^a	47.1	2,419.2	1,809.6
Fluoride (mg/L)	0.193	0.277	0.233
Manganese, total (mg/L)	0.00200U ^b	0.00213U	0.00201U
Nitrate + nitrite, as nitrogen (mg/L)	0.675	2.34	1.36
pH (standard units) ^a	7.05	9.64	8.39
Selenium (mg/L)	0.00150U	0.00150U	0.00150U
Total dissolved solids (mg/L)	197	326	252
Total phosphorus (mg/L)	0.413	1.070	0.837

- a. As required by the permit, the results for this parameter were obtained from a grab sample.
- b. U flag indicates the analyte was analyzed for but not detected above the method detection limit.

Table A-7. Hydraulic loading rates for the Idaho Nuclear Technology and Engineering Center new percolation ponds (2022).

	MAXIMUM DAILY FLOW	YEARLY TOTAL FLOW
2022 flow	1,038,630 gallons	166,153,015 gallons
Permit limit	3,000,000 gallons	1,095 MG ^a

- a. MG = million gallons.



Table A-8. Idaho Nuclear Technology and Engineering Center new percolation ponds aquifer monitoring well groundwater results (2022).

PARAMETER	ICPP-MON-A-165 (GW-13006)		ICPP-MON-A-166 (GW-13007)		ICPP-MON-A-164B (GW-13011)		STANDARD PCS/SCS ^a
	SAMPLE DATE:	04/20/22	09/20/22	04/20/22	09/20/22	04/18/22	
Water table depth (ft below brass cap)	508.39	509.83	514.51	516.03	506.68	509.51	NA ^b
Water table elevation (at brass cap in ft) ^c	4,447.88	4,446.44	4,447.8	4,445.81	4,448.46	4,445.63	NA
Chloride (mg/L)	30.5J ^d	30.0	17.5J ^d	16.6	9.39J ^d	10.3	250
Chromium (mg/L)	0.0153	0.00934	0.00531	0.00677	0.0107	0.0132	0.1
Coliform, fecal (MPN ^e /100 mL)	<1	<1	<1	<1	<1	<1	<1 CFU ^f /100 mL
Coliform, total (MPN/100 mL)	<1	<1	<1	<1	<1	<1	1 CFU/100 mL ^g
Dissolved oxygen (mg/L)	7.75	8.25	6.33	5.82	7.30	7.93	NA
Electrical conductivity (µmhos/cm)	424	406	316	293	381	370	NA
Fluoride (mg/L)	0.244	0.164	0.353	0.221	0.22	0.137	4
Manganese, dissolved (mg/L) ^h	NR ⁱ	NR	NR	NR	NR	NR	0.05
Manganese, total (mg/L)	ND (<0.001) ^j	0.00165J ^k	0.00826	0.0404	ND (<0.001)	ND (<0.001)	0.05
Nitrate/nitrite, as nitrogen (mg/L)	1.13	1.11	0.338	0.368	0.909	1.02	10
pH (standard units)	7.75	7.94	7.62	7.82	7.74	7.74	6.5–8.5
Selenium (mg/L)	ND (<0.0015)	ND (<0.0015)	ND (<0.0015)	ND (<0.0015)	ND (<0.0015)	ND (<0.0015)	0.05
Temperature (°F)	53.87	54.46	53.22	53.81	54.41	55.34	NA
Total dissolved solids (mg/L)	279	248	197	181	251	221	500
Total phosphorus (mg/L)	0.12J ^k	0.0360	0.0932J ^k	0.129	0.142J ^k	0.0426	NA

a. Primary constituent standards (PCS) and secondary constituent standards (SCS) in groundwater referenced in Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.a and b.

b. NA = not applicable.

c. Water table elevations referenced to North American Vertical Datum of 1988 (NAVD 88).

d. J flag indicates the parameter was positively identified, but the reported value is an estimate. This is because the matrix spike recovery was outside U.S. Environmental Protection Agency Method Recovery Criteria.

e. MPN = most probable number.

f. CFU = colony forming unit.

g. An exceedance of the PCS for total coliform is not a violation. If the PCS for total coliform is exceeded, analysis for fecal coliform is conducted. An exceedance of the PCS for fecal coliform is a violation.

h. The result of the dissolved concentrations of this parameter are used for SCS compliance determinations.

i. NR = parameter was not a monitoring requirement since the analytical result for total manganese did not exceed the standard in Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.b manganese standard of 0.05 mg/L.

j. ND = Parameter not detected in sample. Value in parentheses is the detection limit.

k. J flag indicates the parameter was positively identified, but the reported value is an estimate. This is because the value is less than the laboratory reporting limit.



Table A-9. Idaho Nuclear Technology and Engineering Center new percolation ponds perched water monitoring well groundwater results (2022).

PARAMETER	ICPP-MON-V-191 (GW-13008)		ICPP-MON-V-200 (GW-13009)		ICPP-MON-V-212 (GW-13010)		STANDARD PCS/SCS ^a	
	SAMPLE DATE:	04/18/22	09/19/22	04/18/22	09/19/22	04/18/22		09/19/22
Depth to water (ft below brass cap)		Dry ^b	Dry	113.34	119.81	239.19	238.89	NA ^c
Water table elevation (at brass cap in ft) ^d		NA	NA	4,842.23	4,835.79	4,722.12	4,722.52	NA
Chloride (mg/L)		NA	NA	75.1J ^e	68	81.8J ^e	73.4	250
Chromium (mg/L)		NA	NA	0.00658	0.00700	0.0318	0.0254	0.1
Coliform, fecal (MPN ^f /100 mL)		NA	NA	<1	<1	<1	<1	<1 CFU ^g /100 mL
Coliform, total (MPN/100 mL)		NA	NA	<1	<1	<1	<1	1 CFU/100 mL ^h
Dissolved oxygen (mg/L)		NA	NA	7.21	6.64	6.78	5.44	NA
Electrical conductivity (µmhos/cm)		NA	NA	572	517	569	497	NA
Fluoride (mg/L)		NA	NA	0.274	0.188	0.263	0.180	4
Manganese, dissolved (mg/L) ⁱ		NA	NA	NR ^j	NR	NR	NR	0.05
Manganese, total (mg/L)		NA	NA	ND (<0.001) ^k	0.00441J ^l	0.00569	0.0152	0.05
Nitrate/nitrite, as nitrogen (mg/L)		NA	NA	1.89	1.04	1.42	1.87	10
pH (standard units)		NA	NA	7.63	7.55	9.66	8.93	6.5–8.5
Selenium (mg/L)		NA	NA	0.00171J ^l	ND (<0.0015)	ND (<0.0015)	ND (<0.0015)	0.05
Temperature (°F)		NA	NA	60.62	59.79	61.12	62.79	NA
Total dissolved solids (mg/L)		NA	NA	350	309	374	313	500
Total phosphorus (mg/L)		NA	NA	0.537J ^l	0.466	0.132J ^l	0.0643J ^l	NA

- a. Primary constituent standards (PCS) and secondary constituent standards (SCS) in groundwater referenced in Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.a and b.
- b. ICPP-MON-V-191 was dry in April and September 2022.
- c. NA = not applicable.
- d. Water table elevations referenced to North American Vertical Datum of 1988 (NAVD 88).
- e. J flag indicates the parameter was positively identified, but the reported value is an estimate. This is because the matrix spike recovery was outside United States Environmental Protection Agency Method Recovery Criteria.
- f. MPN = most probable number.
- g. CFU = colony forming units.
- h. An exceedance of the PCS for total coliform is not a violation. If the PCS for total coliform is exceeded, analysis for fecal coliform is conducted. An exceedance of the PCS for fecal coliform is a violation.
- i. The results of dissolved concentrations of this parameter are used for SCS compliance determinations.
- j. NR = not required since the analytical result for total manganese did not exceed the standard in Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.b for manganese of 0.05 mg/L.
- k. ND = Parameter not detected in sample. Value in parentheses is the detection limit.
- l. J flag indicates that the parameter was positively identified, but the reported value is an estimate. This is because the value is less than the laboratory reporting limit.



Table A-10. Materials and Fuels Complex industrial waste pond effluent monitoring results for the reuse permit (2022).^{a,b,c}

PARAMETER	MINIMUM	MAXIMUM	MEDIAN
pH (standard units)	6.78	8.22	7.09
Conductivity ^d (μS/cm)	401	587	451
Chloride ^d (mg/L)	5.35J ^e	53.8J	19.7J
Nitrate + nitrite as nitrogen (mg/L)	2.66	3.53	2.87
Iron (mg/L)	0.03U ^f	0.0638	0.03U
Iron, filtered (mg/L)	0.03U	0.03U	0.03U
Manganese (mg/L)	0.002U	0.0052J	0.002U
Manganese, filtered (mg/L)	0.002U	0.00453J	0.002U
Sodium ^d (mg/L)	18.7	42.7	21.5
Sodium, ^d filtered (mg/L)	18.6	41.2	21.8
Solids, total dissolved (mg/L)	204	356	260

- a. Liquid effluent results for permit-required constituents collected at the sampling station located on the Industrial Wastewater Collection System (IWCS) primary line prior to discharge into the pond. The results represent effluent contributions from both the IWCS Primary Line (PL) and Southwestern Branch Line (SBL), which are combined upstream of the sampling station.
- b. Duplicate samples were collected in July 2021. The duplicate results are included in the data summary.
- c. Reuse permit I-160-02 does not specify maximum constituent loading or concentration limits.
- d. Conductivity, chloride and sodium are not required effluent monitoring parameters in the reuse permit.
- e. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.
- f. U qualifier indicates the result was below the detection limit.

Table A-11. Materials and Fuels Complex effluent hydraulic loading to the industrial waste pond (2022).

YEARLY TOTAL FLOW	
2022 flow ^a	10.188 MG ^b
Annual permit limit ^c	17 MG

- a. Annual flow is reported for the 2022 permit reporting year. The annual flow is an estimate due to adjustments during instances when the flow rate exceeded the maximum measurable flow rate of the flow meter.
- b. MG = million gallons.
- c. The reuse permit specifies an annual limit based on a twelve-month reuse year from November 1 through October 31.



Table A-12. Materials and Fuels Complex industrial waste pond summary of groundwater quality data collected for the reuse permit (2022).

WELL NAME	ANL-MON-A-012 (GW-16001)		ANL-MON-A-013 (GW-16002)		ANL-MON-A-014 (GW-16003)		PCS/SCS ^a
	SAMPLE DATE:	04/28/22	09/19/22	04/28/22	09/19/22	05/03/22	
Water table depth (ft bls) ^b	659.60	662.86	647.95	651.18	647.36	650.39	NA ^c
Water table elevation (ft above mean sea level) ^d	4,473.10	4,469.84	4,472.42	4,469.19	4,470.72	4,467.69	NA
Temperature (°F)	54.14	55.40	54.32	56.12	53.60	57.56	NA
pH (s.u)	6.90	7.48	6.99	7.60	6.63	7.62	6.5 to 8.5 (SCS)
Conductivity (µmhos/cm)	375 (379) ^e	325	400	335	381	328	NA
Nitrite + nitrate as N (mg/L)	2.73 (2.72)	2.48	2.63	2.50	2.74	2.55	10 (PCS)
Nitrate nitrogen (mg/L) ^f	2.40J ^g (2.37J)	2.39J	2.44J	2.39J	2.36	2.45J	10 (PCS)
Total dissolved solids (mg/L)	227 (226)	212	244	221	223	224	500 (SCS)
Iron, total (mg/L)	0.03U ^h (0.03U)	0.03U	0.03U	0.0364	0.03U	0.03U	0.3 (SCS)
Iron, filtered (mg/L)	0.03U (0.03U)	0.03U	0.03U	0.03U	0.03U	0.03U	0.3 (SCS)
Manganese, total (mg/L)	0.001U (0.001U)	0.001U	0.001U	0.00202	0.001U	0.001U	0.05 (SCS)
Manganese, filtered (mg/L)	0.001U (0.001U)	0.001U	0.001U	0.001U	0.001U	0.001U	0.05 (SCS)

a. Primary Constituent Standard (PCS) or Secondary Constituent Standard (SCS) specified in the Ground Water Quality Rule, Idaho Ground Water Quality Rule, IDAPA 58.01.11.200.01.a and b.

b. bls = below land surface.

c. NA = not applicable.

d. Elevations are given in the National Geodetic Vertical Datum of 1929.

e. Duplicate sample results are shown in parentheses.

f. Nitrate nitrogen is not required by the reuse permit. It was analyzed for surveillance and historical trending purposes.

g. J qualification indicates the associated value is an estimate and may be inaccurate or imprecise.

h. U qualification indicates the analyte was not detected above the instrument detection limit or the analyte was detected at or above the applicable detection limit, but the value is not more than five times the highest positive amount in any laboratory blank.

**Table A-13. Advanced Test Reactor Complex cold waste ponds effluent surveillance monitoring results (2022).^a**

PARAMETER	MINIMUM	MAXIMUM	DCS ^b (pCi/L)
Gross alpha (pCi/L ± 1s) ^{c,d}	1.46 (± 0.419)	2.41 (± 0.503)	NA ^e
Gross beta (pCi/L ± 1s) ^f	0.886 (± 0.259)	4.52 (± 0.845)	NA

- a. Monthly samples were analyzed for gross alpha, gross beta, tritium, and gamma-emitting radionuclides including americium-241, antimony-125, cerium-144, cesium-134, cesium-137, cobalt-58, cobalt-60, europium-152, europium-154, europium-155, manganese-54, niobium-95, potassium-40, radium-226, ruthenium-103, ruthenium-106, silver-108m, silver-110m, uranium-235, zinc-65, and zirconium-95.
- b. DOE Derived Concentration Standards for ingested water.
- c. Result ± 1σ. Results are shown only for statistically positive detections greater than 3σ.
- d. Gross alpha was positively detected in May and November 2022. Results were non-detect for the other ten months of 2022.
- e. NA = not applicable. Derived Concentration Standards values are not established.
- f. Gross beta was positively detected in March, May, July, October, and November 2022. Results were non-detect for the other seven months of 2022.

Table A-14. Radioactivity detected in surveillance groundwater samples collected at the Advanced Test Reactor Complex (2022).

MONITORING WELL	SAMPLE DATE	GAMMA EMITTERS ^a (pCi/L)	GROSS ALPHA (pCi/L)	GROSS BETA (pCi/L)	STRONTIUM-90 (pCi/L)	TRITIUM (pCi/L)
PCS/SCS ^b		NA	15	4 mrem/yr ^c	8	20,000
USGS-098	04/20/2022	ND ^d	0.848 (±0.271) ^e [1.35 (±0.323)] ^f	2.34 (±0.215) [2.53 (±0.237)]	ND	ND
	09/14/2022	ND	ND	1.81 (±0.242)	ND	ND
USGS-058	04/26/2022	ND	ND	2.02 (±0.490)	ND	403 (±126)
	09/16/2022	ND	ND	1.37 (±0.222)	ND	ND
USGS-065	04/26/2022	ND	ND	4.27 (±0.521)	ND	1,070 (±192)
	09/15/2022	ND	3.51 (±0.660)	3.32 (±0.419)	ND	1,490 (±223)
TRA-08	04/21/2022	ND	ND	3.15 (±0.574)	ND	723 (±141)
	09/15/2022	ND	1.55 (±0.471)	2.18 (±0.337)	1.13 (±0.331)	721 (±146)
USGS-076	04/21/2022	ND	ND	2.28 (±0.558)	ND	ND
	09/16/2022	ND	1.84 (±0.350)	1.97 (±0.218)	ND	ND
MIDDLE-1823	04/20/2022	ND	ND	2.15 (±0.216)	ND	ND
	09/15/2022	ND	1.15 (±0.346)	1.58 (±0.257)	ND	403 (±114)
USGS-136	04/27/2022	ND	ND	2.45 (±0.508)	ND	890 (±173)
	09/16/2022	ND	1.52 (±0.319)	1.62 (±0.203)	ND	910 (±133)

- a. Gamma-emitting radionuclides including americium-241, antimony-125, cerium-144, cesium-134, cesium-137, cobalt-58, cobalt-60, europium-152, europium-154, europium-155, manganese-54, niobium-95, potassium-40, radium-226, ruthenium-103, ruthenium-106, silver-108m, silver-110m, uranium-235, zinc-65, and zirconium-95.
- b. Primary Constituent Standards (PCS) in the Ground Water Quality Rule, IDAPA 58.01.11.200.01.a, are provided for perspective.
- c. Gross Beta PCS = 4 mrem/yr effective dose, Ground Water Quality Rule, IDAPA 58.01.11.200.01.a. For perspective, the U.S. Environmental Protection Agency public drinking water system regulations also specify a maximum contaminant limit of 4 mrem/yr for gross beta and use a screening level of 50 pCi/L to determine when speciation of individual beta/photon emitters is necessary.
- d. ND = not detected.
- e. Results shown are for statistically positive detections greater than 3σ, along with the reported 1σ uncertainty.
- f. Results from field duplicate samples shown in brackets.



Table A-15. Liquid effluent radiological monitoring results for the Idaho Nuclear Technology and Engineering Center New Percolation Ponds CPP-797 (2022).

SAMPLE DATE	GAMMA EMITTERS ^a (pCi/L)	GROSS ALPHA ^b (pCi/L)	GROSS BETA ^b (pCi/L)	TOTAL STRONTIUM (pCi/L)
PCS/SCS ^b	NA	15	4 mrem/yr ^c	8
January 2022	ND ^e	ND	5.01 (±0.738)	ND
February 2022	ND	ND	4.45(±0.799)	ND
March 2022	ND	ND	4.71 (±0.902)	ND
April 2022	ND	ND	4.55 (±0.859) ^{Jf}	ND
May 2022	ND	ND	7.11 (±0.892)	ND
June 2022	ND	ND	6.07 (±0.911) ^{Jf}	ND
July 2022	ND	ND	5.23 (±0.868)	ND
August 2022	ND	ND	8.69 (±0.863)	ND
September 2022	ND	ND	4.57 (±0.902)	ND
October 2022	ND	ND	5.81 (±0.870)	ND
November 2022	ND	ND	6.36 (±9.25)	ND
December 2022	ND	ND	5.61 (±7.09)	ND

- Gamma-emitting radionuclides include americium-241, antimony-125, cerium-144, cesium-134, cesium-137, cobalt-58, cobalt-60, europium-152, europium-154, europium-155, manganese-54, niobium-95, potassium-40, radium-226, ruthenium-103, ruthenium-106, silver-108m, silver-110m, uranium-235, zinc-65, and zirconium-95.
- Detected results are shown along with the reported 1 σ uncertainty.
- Primary constituent standards (PCS) in the Ground Water Quality Rule, IDAPA 58.01.11.200.01.a, are provided for perspective.
- Gross Beta PCS = 4 mrem/yr effective dose, IDAPA 58.01.11.200.01.a. For perspective, the U.S. Environmental Protection Agency public drinking water system regulations also specify a maximum contaminant limit of 4 mrem/yr for gross beta and use a screening level of 50 pCi/L to determine when speciation of individual beta/photon emitters is necessary.
- ND = no radioactivity was detected. The result was not statistically positive at the 95% confidence interval and was below its minimum detectable activity.
- J flag indicates the associated value is an estimate.



Table A-16. Groundwater radiological monitoring results for the Idaho Nuclear Technology and Engineering Center (2022).

MONITORING WELL	SAMPLE DATE	GROSS ALPHA ^a (pCi/L)	GROSS BETA ^a (pCi/L)
ICPP-MON-A-165	04/20/2022	ND ^b	4.85 (±0.900)
	09/20/2022	ND	2.84 (±0.745)
ICPP-MON-A-166	04/20/2022	ND	3.03 (±0.797)
	09/20/2022	ND	ND
ICPP-MON-V-200	04/20/2022	ND	5.90 (±0.874)
	09/19/2022	ND	7.98 (±0.986)
ICPP-MON-V-212	04/18/2022	ND	24.0 (±1.38)
	09/19/2022	7.76 (±1.48)	15.6 (±1.25)

- a. Detected results are shown along with the reported 1 σ uncertainty.
 b. ND = no radioactivity was detected. The result was not statistically positive at the 95% confidence interval and was below its minimum detectable activity.

Table A-17. Radiological Monitoring Results for Materials and Fuels Complex industrial waste pond (2022).^a

PARAMETER ^b (pCi/L)	MINIMUM	MAXIMUM	DCS ^c (pCi/L)
Gross alpha	ND ^d	3.96 (±1.15)	NA ^e
Gross beta	ND	10.8 (± 0.902)	NA
Uranium-238 ^f	0.241 (± 0.0624)	0.241 (± 0.0624)	1,400
Uranium-233/234 ^f	0.273 (± 0.0731)	0.273 (± 0.0731)	1,200

- a. Samples were analyzed for gross alpha; gross beta; plutonium-241; strontium-90; tritium; gamma-emitting radionuclides, including americium-241, antimony-125, cerium-144, cesium-134, cesium-137, cobalt-58, cobalt-60, europium-152, europium-154, europium-155, manganese-54, niobium-95, potassium-40, radium-226, ruthenium-103, ruthenium-106, silver-108m, silver-110m, uranium-235, zinc-65, zirconium-95; alpha-emitting radionuclides including americium-241, uranium-233/234, uranium-235, uranium-238, plutonium-236, plutonium-238, plutonium-239/240, and plutonium-242.
 b. Results shown are for statistically positive detections greater than 3 σ , along with the reported 1 σ uncertainty. Only parameters with at least one positively detected result are shown.
 c. DCS = DOE Derived Concentration Standard for ingested water (DOE-STD-1196-2022).
 d. ND indicates the result was below the detection limit.
 e. NA = not applicable. DCS values are not established.
 f. Parameter was analyzed in August only; therefore, the minimum and maximum are the same.