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Radiological Monitoring Results for Samples Associated with the Industrial Wastewater Reuse Permit for the Materials and Fuels Complex Industrial Waste Ditch and Pond: November 1, 2015–October 31, 2016

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ABSTRACT

This report summarizes radiological monitoring performed on samples from specific groundwater monitoring wells associated with the Industrial Wastewater Reuse Permit for the Materials and Fuels Complex Industrial Waste Ditch and Industrial Waste Pond WRU-I-0160-01, Modification 1 (formerly LA-000160-01). The radiological monitoring was performed to fulfill Department of Energy requirements under the Atomic Energy Act.

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1 BACKGROUND

The radiological information presented in this report is provided based upon an agreement between the Idaho Department of Environmental Quality and the U.S. Department of Energy Idaho Operations Office. The agreement is documented in the Industrial Wastewater Reuse Permit (IWRP) WRU-I-0160-01 (formerly LA-000160-01), Modification 1, for the Idaho National Laboratory Site's Materials and Fuels Complex (MFC) Industrial Waste Ditch (IWD) and Industrial Waste Pond (IWP). The initial IWRP was issued in April 2010 (Neher 2010). Modification 1 was issued in June 2012 (Neher 2012). Items 7 and 8 of Section H ("Standard Reporting Requirements") of the IWRP state:

- The permittee agrees to provide to the Department the results of ground water radiological monitoring with respect to the MFC Industrial Waste Pond and Ditch hydraulic management unit (HMU) that is performed to fulfill Department of Energy requirements under the Atomic Energy Act. The permittee agrees to provide the results with the Annual Report.
- The permittee agrees to provide to the Department the results of radiological monitoring of the MFC effluent, prior to discharge into the HMU, with respect to the MFC Industrial Waste Pond and Ditch HMU that is performed to fulfill Department of Energy requirements under the Atomic Energy Act.

2 RADIOLOGICAL SAMPLE RESULTS

2.1 Reporting Period

For the MFC Industrial Waste Pond and Ditch, the 2016 reporting year runs from November 1, 2015 through October 31, 2016. As stated in the "Facility Monitoring Table" of Section G of the IWRP, groundwater sampling shall be conducted in April/May and September/October.

2.2 Effluent

Composite samples were collected monthly from the Industrial Waste Pipeline (WW-016001) over a 24-hour period. Grab samples were collected quarterly from the wastewater discharged to Ditch C from the Industrial Waste Water Underground Pipe (WW-016002). No radiological analyses are performed on samples collected at these locations.

2.3 Groundwater

Groundwater samples for radiological parameters were collected from aquifer wells ANL-MON-A-012, ANL-MON-A-013, ANL-MON-A-014 in May and September 2016. The samples were shipped under full chain of custody to GEL Laboratories in Charleston, South Carolina, and analyzed for gamma spectrometry, gross alpha, gross beta, tritium, and alpha spectroscopy. Samples were collected to satisfy the release objectives of DOE Order 458.1 addressed within the Environmental Management System as required by DOE Order 436.1, and requirements for the Comprehensive Environmental Response, Compensation, and Liability Act.

Table 1 shows the positive detections in groundwater samples. Positive detections are considered measurements exceeding the instrument's minimum detection level and greater than two times the uncertainty. Gross beta activity, uranium-233/234, and uranium-238 were detected in both the upgradient well (ANL-MON-A-012) and the downgradient wells (ANL-MON-A-013 and ANL-MON-A-014) at low levels. Uranium-235 was positively detected in both the upgradient (ANL-MON-A-012), and downgradient (ANL-MON-A-14) wells. No other radionuclides were positively detected in any of the wells.

Table 1. Positive detections in groundwater samples collected in 2016 from the monitoring wells sampled for the Materials and Fuels Complex Industrial Waste Ditch and Pond Industrial Wastewater Reuse Permit.

Monitoring Well	Sample Date	Parameter	Sample Result (pCi/L)
ANL-MON-A-012 (upgradient)	05/02/16	Uranium-233/234	1.01 (± 0.139)[a]
		Uranium-238	0.737 (± 0.115)
	09/12/16	Gross beta	3.33(±0.599) 2.33(±0.589)[b]
		Uranium-233/234	1.86 (±0.299) 1.35 (±0.239)[b]
		Uranium-235	0.258 (±0.116)[b]
		Uranium-238	1.06 (± 0.216) 1.01 (±0.203)[b]
ANL-MON-A-013 (downgradient)	05/03/16	Gross beta	5.15 (± 1.13)
		Uranium-233/234	1.51 (± 0.0182)
		Uranium-238	0.784 (± 0.12)
	09/13/16	Gross beta	2.39 (± 0.651)
		Uranium-233/234	1.46 (± 0.247)
		Uranium-238	0.675(± 0.162)
ANL-MON-A-014 (downgradient)	05/03/16	Gross beta	4.34 (± 0.941)
		Uranium-233/234	1.66 (± 0.187)
		Uranium-235	0.14 (± 0.0504)
		Uranium-238	0.646 (± 0.103)
	09/13/16	Gross beta	3.12 (± 0.604)
		Uranium-233/234	1.48 (± 0.270)
		Uranium-238	1.00 (± 0.219)

a. One sigma uncertainty shown in parentheses.
b. Analytical result from field duplicate sample collected on September 12, 2016, from well ANL-MON-A-012.

3 REFERENCES

42 USC § 2011–2259, 1954, "Atomic Energy Act of 1954," *United States Code*.

DOE Order 436.1, 2011, "Departmental Sustainability," U.S. Department of Energy, May 2, 2011.

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