

REPORT

Compliance Monitoring Report

March 2021 Quarterly Groundwater Sampling

Landsburg Mine Site

Submitted to:

Washington Department of Ecology

15700 Dayton Ave. N., Shoreline WA 98133

Submitted by:

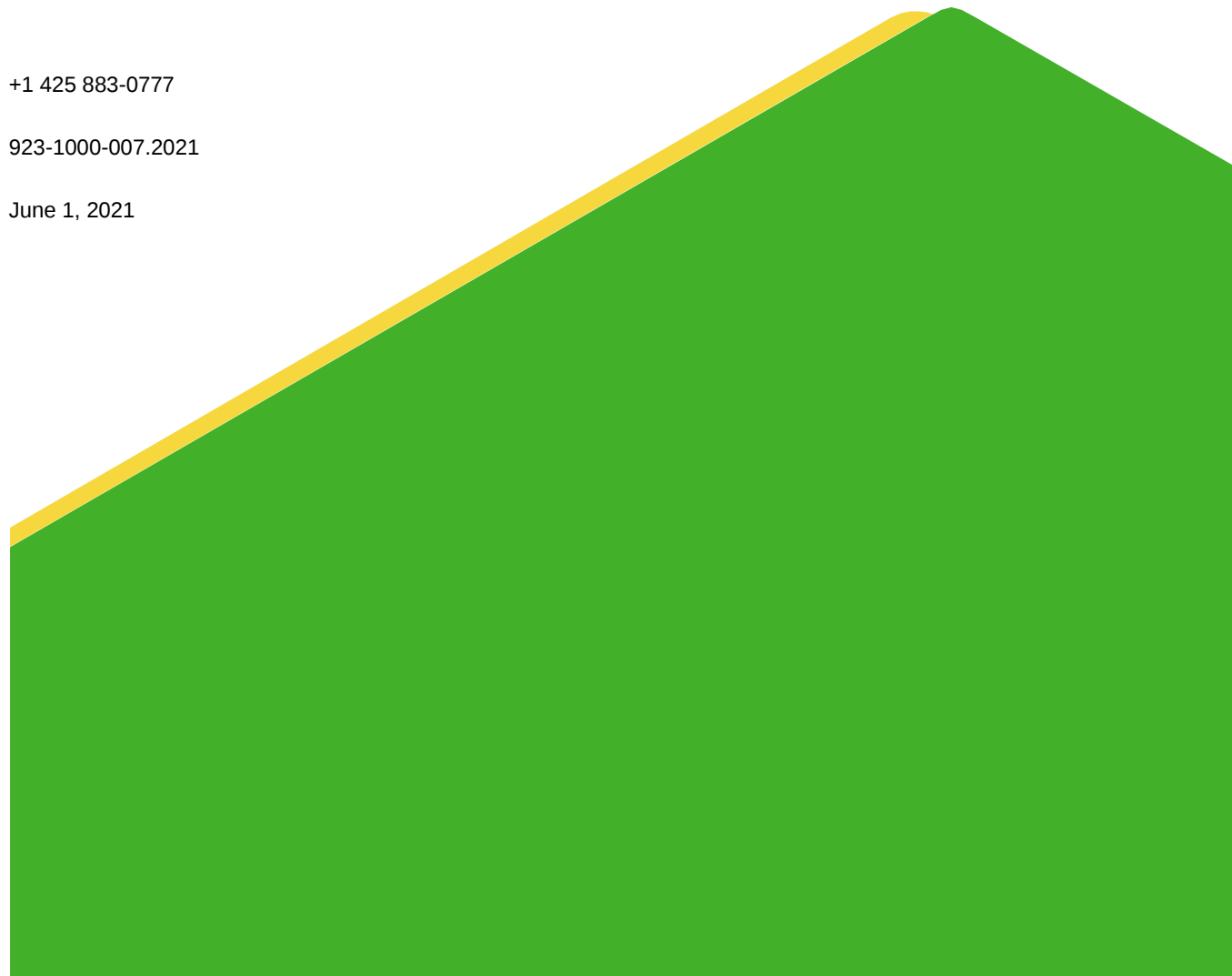
Golder Associates Inc.

18300 NE Union Hill Road, Suite 200, Redmond, Washington, USA 98052

+1 425 883-0777

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Distribution List

Jerome Cruz, PhD - Ecology

Landsburg PLP Group

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APPENDIX A

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1.0 INTRODUCTION

The Compliance Monitoring Plan (CMP) (Ecology 2017) requires long-term confirmational monitoring commence after remediation actions are completed at the Landsburg Mine Site (the Site). This letter report presents the results of the first quarterly long-term confirmational monitoring event, which was completed in March 2021. The event was conducted from March 29 to 31, 2021, and included collecting groundwater samples from monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, LMW-8, LMW-9, LMW-10, LMW-11, LMW-12, LMW-13R, LMW-14, and LMW-15.

Figure 1 presents the locations of the monitoring wells. Figure 2 presents a cross-section along the strike at the coal seam that also depicts the location of the monitoring wells. Monitoring wells LMW-2, LMW-4, LMW-10, LMW-12 and LMW-13R are completed to monitor shallow, middle, and deeper zones within the north end of the Rogers Coal Mine subsidence trench. Monitoring wells LMW-3, LMW-5, LMW-8, LMW-9, LMW-11, LMW-14 and LMW-15 are completed to monitor shallow, middle and deeper zones along the southern half of the Rogers Coal Mine. Wells LMW-6 and LMW-7 monitor groundwater from the Frasier and Landsburg Coal Mines to the west and east of the Rogers Coal Mine, respectively.

2.0 SAMPLING ACTIVITIES

Groundwater sampling was conducted in accordance with the CMP (Ecology 2017), and included the following activities:

- Measurement of static water levels at monitoring wells.
- Well purging with the dedicated pumping systems installed in each well to ensure sample representativeness.
- Measurement of field parameters including: pH, specific conductance, temperature, dissolved oxygen, oxidation-reduction potential (ORP) and turbidity.
- Collection of representative samples in appropriate containers provided by the analytical laboratory.
- Analyses of groundwater samples for the following parameters:
 - Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) USEPA Method 8260C
 - 1,4-Dioxane by USEPA SW-846 Method 8270D
 - Low-Level Polychlorinated Biphenyls (PCBs) by USEPA SW-846 Method 8082A
 - Organochlorine Pesticides by USEPA SW-846 Method 8081A
 - Total Petroleum Hydrocarbons (TPHs) by NWTPH-HCID
 - Total Metals by USEPA SW-846 Method 200.8 and SW-846 6010C
 - Total Mercury by USEPA SW-846 Method 7470A

Appendix A presents the laboratory analytical reports and the data validation report with added data qualifiers noted. Field sampling activities were documented on Sample Integrity Data Sheets (SIDS), provided in Appendix

B. Table 1 presents depths to groundwater measured during the event and calculated static water level elevations.

Following sample collection, all bottles were sealed, labeled, and placed in an iced cooler until delivery to the laboratory. Groundwater samples were transported under chain-of-custody procedures to Analytical Resources Incorporated (ARI), of Tukwila, Washington, for analyses.

The laboratory data packages underwent data validation. Items of note are provided in a validation memorandum in Appendix A. In general, data were found to be acceptable with minor qualification, with the following exception: the analytical result for 2-chloroethyl vinyl ether reported for sample LMW-2-0321 was rejected. The matrix spike/matrix spike duplicate (MS/MSD) results were non-detect and the calculated percent recovery of the associated MS/MSD did not recover. Following Guidelines and using professional judgment, the non-detect result for 2-chloroethyl vinyl ether for LMW-2-0321 was rejected. 2-chloroethyl vinyl ether has never been detected at the Site. Data qualifiers are defined, and all data qualifiers assigned under the data validation process are presented in the Appendix A data validation memorandum.

Table 2 presents the field parameter measurements and laboratory analytical results for each groundwater sample.

3.0 RESULTS

The results of the March 2021 monitoring event are summarized below:

- Laboratory analyses did not detect TPH, PCBs, or Pesticides above the laboratory reporting limits in any of the groundwater samples.
- There were no VOCs detected in groundwater above the triggers level concentrations prescribed in the CMP (Ecology 2017). The following VOCs were detected above their respective laboratory reporting limits.
 - Carbon disulfide was detected in LMW-10 at a concentration of 0.24 micrograms per liter (µg/L). The reported concentration is considerably lower than the MTCA Method A groundwater cleanup level of 800 µg/L. Carbon disulfide has been detected at low levels in Site groundwater in previous sampling events. The detection of carbon disulfide is attributed to being present in the coal bed material as a natural constituent.
 - 1,1-Dichloroethane (1,1-DCA) was detected in LMW-12 at a concentration of 0.93 µg/L. The reported concentration is consistent with previous concentrations of 1,1-DCA detected in LMW-12 and are significantly less than the MTCA Method B groundwater cleanup level of 7.68 µg/L.
- There were no SVOCs detected in groundwater above the trigger level concentrations prescribed in the CMP, except for 1,4-dioxane.
 - 1,4-Dioxane was detected in LMW-2 (2.2 µg/L), LMW-4 (2.5 µg/L), and LMW-12 (0.9 µg/L). The MTCA Method B groundwater cleanup level for 1,4-dioxane is 0.44 µg/L. 1,4-dioxane was initially detected in LMW-2 and LMW-4 in the November 2017 sampling event, which was the first sampling round that included analysis of 1,4-dioxane at the Site. 1,4-Dioxane concentrations reported during the March 2021 round are consistent with concentrations reported during previous sampling of these wells. 1,4-Dioxane has not been detected in any other Site monitoring wells. The 1,4-dioxane detection is being addressed by the Landsburg Mine Site Group in cooperation with Ecology.

- An initial detection of bis(2-ethylhexyl) phthalate at 16.3 µg/L was reported in the sample collected from well LMW-6. Bis(2-ethylhexyl) phthalate is a known common laboratory contaminant and the laboratory indicated that they believed the detection was likely associated with laboratory contamination. Although slightly past the recommended hold-time, Golder requested that the laboratory re-run the analysis using the remaining sample volume. The re-analysis did not detect bis(2-ethylhexyl) phthalate, which confirmed that the initial detection was the result of a laboratory contaminant.
- Metals detected in groundwater samples during the current sampling round include the following:
 - Groundwater samples from LMW-12 and LMW-14 contained iron concentrations above the MTCA Method B cleanup level of 11 milligrams per liter (mg/L). Iron has been detected in mine groundwater above MTCA cleanup levels in every monitoring event at the Site. It is a naturally occurring metal that is commonly associated with groundwater from coal mines (Fuste et al. 1983). The concentrations of iron reported during the March 2021 sampling event are within the range of typical concentrations reported during the RI (Golder 1996) and during the Interim Groundwater Sampling events previously conducted at the Site.
 - Groundwater samples from LMW-7, LMW-11, and LMW-15 contained total arsenic at concentrations of 0.00337 mg/L, 0.0107 mg/L, 0.00335 mg/L, respectively. Arsenic in LMW-11 is greater than the MTCA Method A groundwater cleanup level (0.005 mg/L) and slightly greater than the Washington State primary drinking water MCL (0.01 mg/L). The MTCA groundwater cleanup level is based on typical groundwater background levels in the State of Washington. Arsenic has been detected in groundwater from LMW-11 near or above MTCA cleanup levels during every monitoring event since LMW-11 was installed. LMW-11 is screened within the deepest portions of the Rogers coal seam, where the groundwater is naturally reducing with low reduction-oxidation (redox) potential and low dissolved oxygen levels. Arsenic is a naturally occurring metal commonly detectable in groundwater, especially in groundwater having low redox and dissolved oxygen levels. Arsenic was not detected in any other Site wells.

4.0 NEXT SAMPLING EVENT

The next compliance monitoring event is a quarterly confirmational monitoring event scheduled for June 2021. It includes sampling of all Site groundwater monitoring wells (LMW-2 through LMW-15). As indicated in the draft Amendment to the Cleanup Action Plan (Ecology 2021), the next sampling round will also include the semi-annual sampling of the three Cedar River Pipeline Road wells (LMW-20, LMW-21, LMW-22) for 1,4-dioxane.

Golder Associates Inc.



Joseph Xi, PE
Senior Project Engineer



Gary Zimmerman
Principal

JX/GZ/sb

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- Washington State Department of Ecology (Ecology). 2017. Exhibit D of the Consent Decree – Compliance Monitoring Plan Landsburg Mine Site MTCA Remediation Project, Ravensdale, Washington. Prepared by Golder Associates Inc. June 7.
- Ecology. 2021. Amendment to Cleanup Action Plan Landsburg Mine Site MTCA Remediation Project, Ravensdale, Washington. March 26.

Tables

Table 1: Groundwater Elevation Data, Landsburg Mine Site, March 29, 2021

	LMW-1	LMW-2	LMW-3	LMW-4 ¹	LMW-5	LMW-6	LMW-7 ¹	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14 ¹	LMW-15
Water Depths															
Date of data collection	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021	3/29/2021
Time of data collection	4:45 PM	9:03 AM	5:39 PM	9:14 AM	5:36 PM	2:38 PM	5:20 PM	5:30 PM	5:44 PM	4:27 PM	5:00 PM	1:43 PM	1:45 PM	4:51 PM	5:04 PM
Measured to Top of PVC (ft btc)	135.44	6.32	11.82	7.77	13.37	22.10	211.01	3.57	99.15	0.08	157.01	6.92	7.43	159.17	150.88
Surveyed Elevation															
Top of PVC (ft asl)	765.36	617.79	656.75	619.27	658.27	632.33	771.51	646.97	743.99	618.98	802.19	625.35	625.86	805.12	796.46
Top of Monument (ft asl)	766.16	618.38	657.48	619.89	658.87	633.00	771.88	NC	NC	619.10	802.51	625.49	625.91	805.14	796.61
Ground Level (ft asl)	763.02	614.92	654.40	617.37	655.63	629.95	768.79	645.25	741.13	615.78	799.89	621.90	622.07	802.22	792.64
Corrected Water Elevation															
Using PVC elevation (ft asl)	629.92	611.47	644.93	611.50	644.90	610.23	560.50	643.40	644.84	618.90	645.18	618.43	618.43	645.95	645.58

Notes:

¹ Data corrected to accommodate well inclination from vertical

NA = Not applicable

NC = Data not collected

ft btc = feet below top of casing

ft asl = feet above sea level

Table 2: March 2021 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-4 Duplicate	LMW-5	LMW-6	LMW-7	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14	LMW-15	Field Blank	Trip Blank 1	Trip Blank 2	Trip Blank 3
		3/29/2021	3/31/2021	3/29/2021	3/29/2021	3/31/2021	3/30/2021	3/31/2021	3/31/2021	3/31/2021	3/30/2021	3/30/2021	3/29/2021	3/29/2021	3/30/2021	3/30/2021	3/29/2021	-	-	-
Field Parameter																				
Temperature	°C	10.9	11.8	10.3	-	11.2	9.9	13.9	10.2	11.2	8.9	10.1	9.8	10.0	10.3	9.6	-	-	-	-
pH	stnd	6.75	7.76	6.79	-	6.96	6.89	7.26	6.84	7.00	8.68	7.27	6.61	7.28	6.61	7.48	-	-	-	-
Specific Conductance	uS/cm	750	244	746	-	543	181	413	311	523	253	396	531	680	1137	363	-	-	-	-
Dissolved Oxygen	mg/L	0.66	0.63	0.64	-	0.62	0.71	0.8	0.65	0.8	0.68	1.02	0.75	0.75	0.67	0.84	-	-	-	-
ORP	mV	22.9	15	14.2	-	15	10	5.7	-16	0.2	-150	8.7	10	-20	25.4	-67	-	-	-	-
Turbidity	NTU	2.01	0.88	0.66	-	2.61	2.63	2.68	7.71	2.35	0.85	1.24	22.9	1.58	1.94	1.98	-	-	-	-
Metals (Total)																				
Aluminum	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Antimony	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Arsenic	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.00337	0.003 U	0.003 U	0.003 U	0.0107	0.003 U	0.003 U	0.003 U	0.00335	0.003 U	NA	NA	NA
Barium	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA
Beryllium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Cadmium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Calcium	mg/L	112	36.7	113	115	85.2	26.2	39.8	43.1	82.8	6.83	61	81	84.9	182	62.5	0.5 U	NA	NA	NA
Chromium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Cobalt	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0271	0.01 U	0.01 U	NA	NA	NA
Copper	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Iron	mg/L	0.2 U	0.2 U	0.2 U	0.335	0.2 U	2.34	0.764	8.7	1.56	0.2 U	0.565	11.3	1.37	14.2	3.85	0.2 U	NA	NA	NA
Lead	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Magnesium	mg/L	74.3	15.1	74.6	75.7	48.1	13.4	19.3	23.1	45.5	3.38	29.1	54.9	41.9	110	28.5	0.5 U	NA	NA	NA
Manganese	mg/L	0.236	0.0509	0.193	0.199	0.227	0.0308	0.064	0.333	0.192	0.01 U	0.188	0.57	0.0415	0.676	0.378	0.01 U	NA	NA	NA
Mercury	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA
Nickel	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0133	0.01 U	0.01 U	NA	NA	NA
Potassium	mg/L	3.6	1.61	3.89	3.93	2.53	0.674	2.71	1.49	2.53	1.31	2.2	3.3	3.36	4.61	2.27	0.5 U	NA	NA	NA
Selenium	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
Silver	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA	NA
Sodium	mg/L	20.1	9.37	24	24.1	14.5	6.34	52.6	7.76	14.5	85.2	25.2	9.21	77.1	27.6	14.1	0.5 U	NA	NA	NA
Thallium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Vanadium	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Zinc	mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA
Volatile Organic Compounds (VOCs)																				
Acetone	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acrolein	ug/L	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Acrylonitrile	ug/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
Benzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromomethane	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
methyl ethyl ketone	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
n-Butylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Sec-Butylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-butylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon Disulfide	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon Tetrachloride	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl vinyl ether	ug/L	1 R	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ

Table 2: March 2021 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-4 Duplicate	LMW-5	LMW-6	LMW-7	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14	LMW-15	Field Blank	Trip Blank 1	Trip Blank 2	Trip Blank 3
Chloroform	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylene Dibromide	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibromomethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trans-1,4-Dichloro-2-butene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.93	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cis-1,2-Dichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trans-1,2-Dichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,2-Dichloropropane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cis-1,3-Dichloropropene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trans-1,3-Dichloropropene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cumene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
p-Isopropyltoluene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methylene Chloride	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl isobutyl ketone	ug/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Naphthalene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
CFC-113	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	ug/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2,4-Trimethylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Acetate	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m, p-Xylene	ug/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

Table 2: March 2021 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-4 Duplicate	LMW-5	LMW-6	LMW-7	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14	LMW-15	Field Blank	Trip Blank 1	Trip Blank 2	Trip Blank 3
o-Xylene	ug/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Xylenes	ug/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Semi-Volatile Organic Compounds (SVOCs)																				
1,2,4-Trichlorobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1,2-Dichlorobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1,3-Dichlorobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1,4-Dichlorobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1-Methylnaphthalene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
2,4,5-Trichlorophenol	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
2,4,6-Trichlorophenol	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2,4-Dichlorophenol	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2,4-Dimethylphenol	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2,4-Dinitrophenol	ug/L	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	NA	NA	NA
2,4-Dinitrotoluene	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2,6-Dinitrotoluene	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2-Chlorophenol	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
2-Methylnaphthalene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
2-Nitroaniline	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
2-Nitrophenol	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
3,3'-Dichlorobenzidine	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
4,6-Dinitro-2-Methylphenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA
4-Chloro-3-Methylphenol	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
4-Chloroaniline	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
4-chlorophenyl-Phenylether	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
4-Nitroaniline	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
4-Nitrophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA
Acenaphthene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Acenaphthylene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Anthracene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Benz[a]anthracene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Benzo(a)pyrene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Benzo(ghi)perylene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Benzofluoranthenes, Total (b+k+)	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA
Benzoic Acid	ug/L	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	NA	NA	NA
Benzyl Alcohol	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA
Bis(2-chloro-1-methylethyl) ether	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Bis(2-Chloroethoxy)Methane	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
bis(2-chloroethyl)Ether	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
bis(2-ethylhexyl) Phthalate	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
Butyl benzyl phthalate	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Carbazole	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Chrysene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Dibenzo(a,h)anthracene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Dibenzofuran	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
dibutyl phthalate	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Diethyl phthalate	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Dimethyl phthalate	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Di-n-Octyl Phthalate	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Fluoranthene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Fluorene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA

Table 2: March 2021 Groundwater Analytical Results Landsburg Mine Site

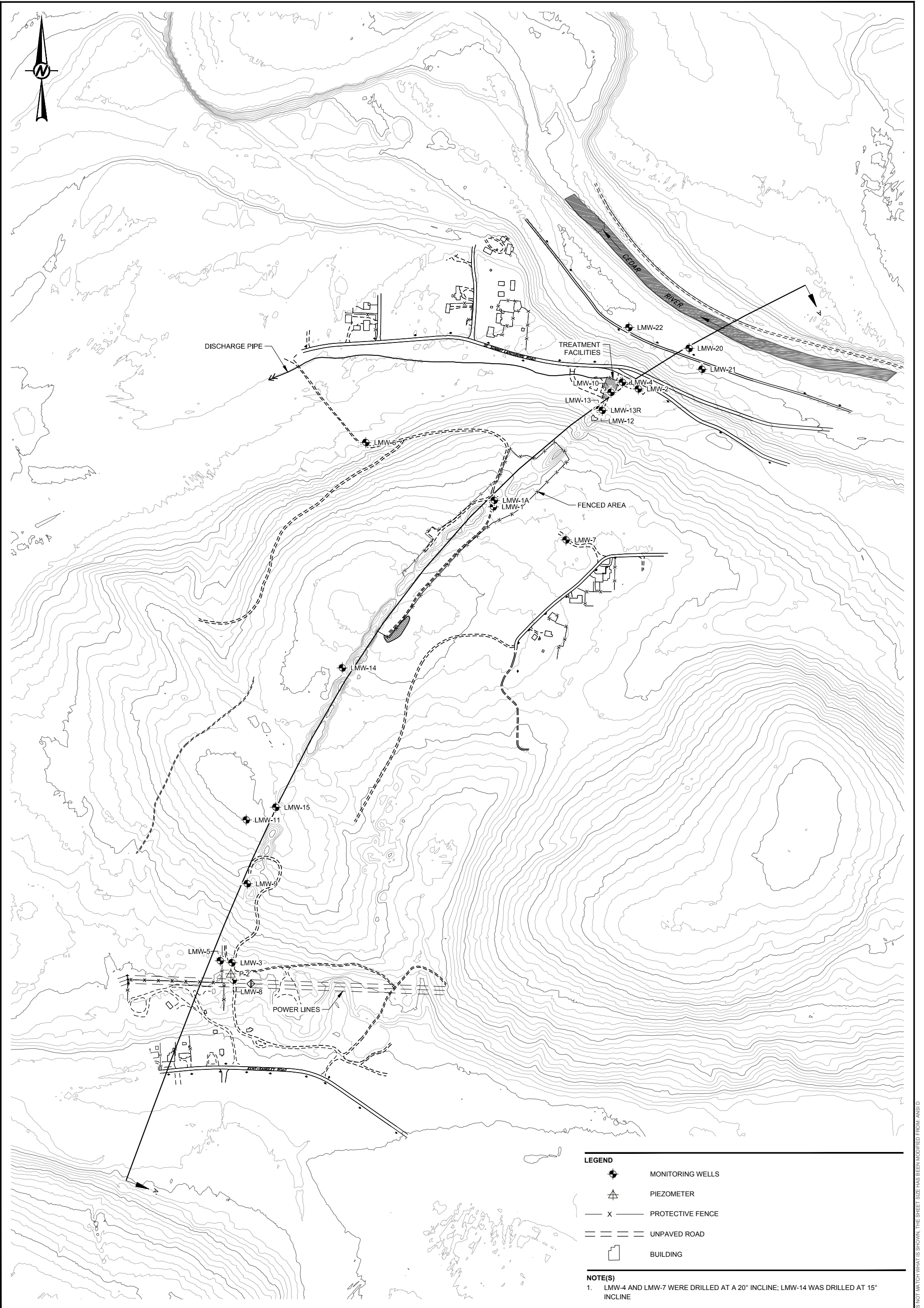
ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-4 Duplicate	LMW-5	LMW-6	LMW-7	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14	LMW-15	Field Blank	Trip Blank 1	Trip Blank 2	Trip Blank 3
Hexachlorobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Hexachlorobutadiene	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
Hexachlorocyclopentadiene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA
Hexachloroethane	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Isophorone	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
m-Nitroaniline	ug/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	NA	NA	NA
Naphthalene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Nitrobenzene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
N-Nitrosodi-n-propylamine	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
N-Nitrosodiphenylamine	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
o-cresol	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
pcn-002	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
p-cresol	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA
Pentachlorophenol	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NA	NA	NA
Phenanthrene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Phenol	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Pyrene	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
1,4-Dioxane	ug/L	2.2	0.4 U	2.5	2.3	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.9	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	NA
Polychlorinated Biphenyls (PCBs)																				
PCB-aroclor 1016	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1221	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1232	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1242	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1248	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1254	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
PCB-aroclor 1260	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Pesticides																				
4,4'-DDD	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
4,4'-DDE	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
4,4'-DDT	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Aldrin	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
alpha-BHC	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
beta-BHC	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
cis-Chlordane	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
delta-BHC	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
Dieldrin	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Endosulfan Sulfate	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Endrin	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Endrin Aldehyde	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Endrin Ketone	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Heptachlor	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
Heptachlor Epoxide	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Lindane	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA
Methoxychlor	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	NA	NA
Toxaphene	µg/L	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	1.25 U	NA	NA	NA
trans-Chlordane	µg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	NA	NA	NA

Table 2: March 2021 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-4 Duplicate	LMW-5	LMW-6	LMW-7	LMW-8	LMW-9	LMW-10	LMW-11	LMW-12	LMW-13R	LMW-14	LMW-15	Field Blank	Trip Blank 1	Trip Blank 2	Trip Blank 3
Hydrocarbon Identification																				
Diesel Range	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA
Gas Range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	NA	NA
Lube Oil Range	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA

Notes:
U - Analyte was not detected above the Reporting Limit (RL).
J - Analyte was detected above the Method Detection Limit (MDL) but below the RL.
R - Analytical result is unusable because certain data quality criteria were not met.

Figures



- LEGEND**
- MONITORING WELLS
 - PIEZOMETER
 - PROTECTIVE FENCE
 - UNPAVED ROAD
 - BUILDING

NOTE(S)

1. LMW-4 AND LMW-7 WERE DRILLED AT A 20° INCLINE; LMW-14 WAS DRILLED AT 15° INCLINE

CLIENT
LANDSBURG MINE SITE PLP GROUP

PROJECT
LANDSBURG MINE SITE
MTCA REMEDIAL ACTION

CONSULTANT

YYYY-MM-DD	2019-04-25
DESIGNED	XXX
PREPARED	XXX
REVIEWED	XXX
APPROVED	XXX

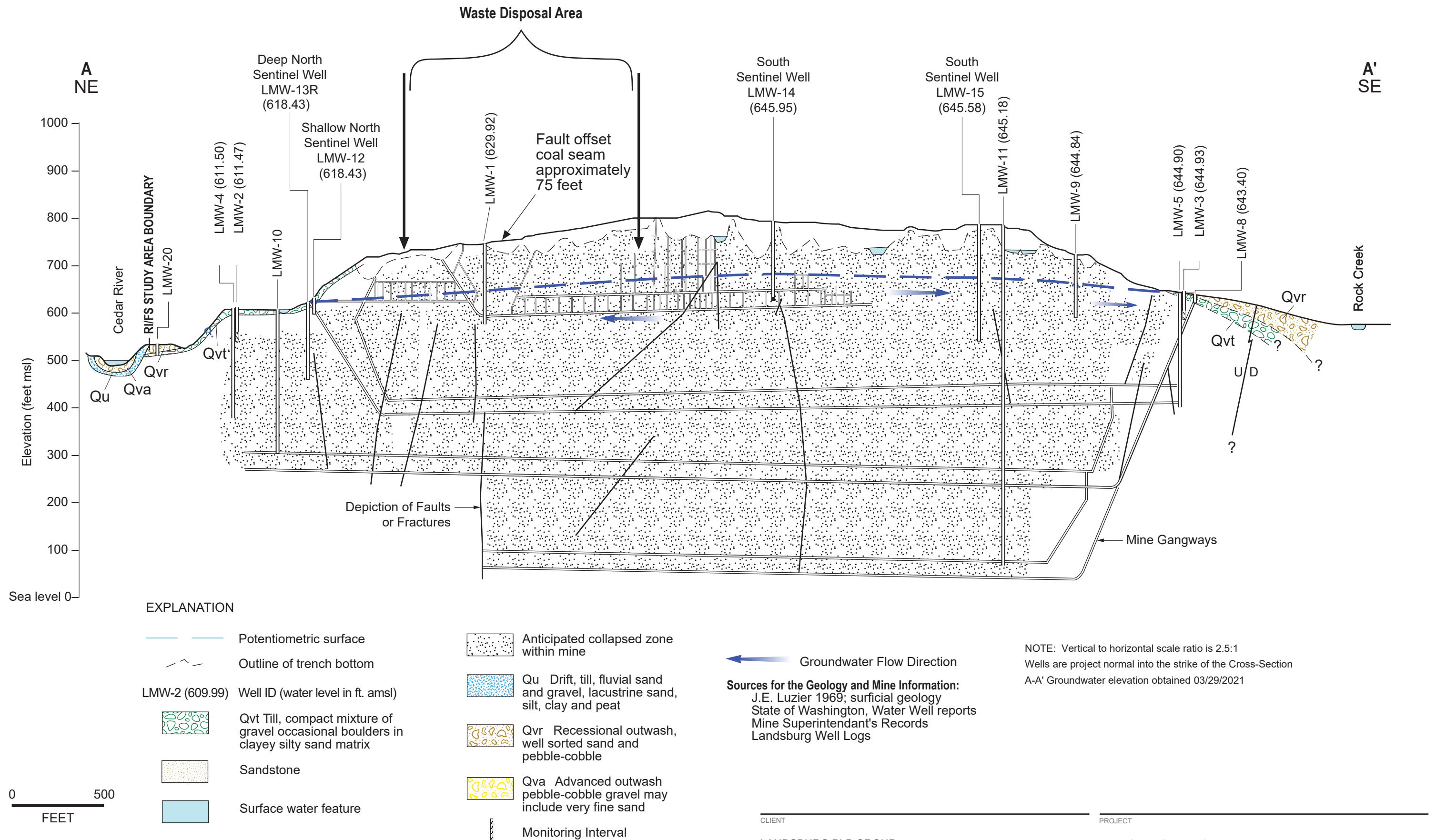


TITLE
SITE MAP

PROJECT NO.	PHASE	REV.	SHEET
9231000005	1200	A	1

0 300 600
1" = 300' FEET

G:\PalmerCokingCoal\LandsburgMine\VA99_PROJECTS\9231000002_Phi Remediation\15A02_PRODUCTION\INDD\9231000_002_R154_003.indd



CLIENT			PROJECT		
LANDSBURG PLP GROUP			LANDSBURG MINE SITE		
CONSULTANT			TITLE		
			CROSS-SECTION ALONG STRIKE AT COAL SEAM MARCH 29, 2021		
			CROSS-SECTION A-A'		
YYYY-MM-DD		2020-08-17	PROJECT No.		PHASE
PREPARED		REDMOND	923-1000-007		2021
DESIGN					
REVIEW					
APPROVED					



APPENDIX A

Laboratory Analytical Reports Data Validation
and Quality Assurance / Quality Control Review
Memorandum and March 2021 Laboratory
Analytical Report

TECHNICAL MEMORANDUM

DATE June 1, 2021

Project No. 923-1000-007.2021

TO Bill Kombol,
Palmer Coking Coal Company

FROM Joseph Xi (Golder Associates)

EMAIL jxi@golder.com

LANDSBURG MINE SITE MARCH 2021 DATA VALIDATION & QUALITY ASSURANCE / QUALITY CONTROL REVIEW

This Data Usability Summary Report (DUSR) presents the findings of the data quality assessment performed on the analyses of water samples collected on March 29 to 31, 2021 at the Landsburg Mine Site in Washington (Site) as part of the Landsburg Groundwater sampling project. Samples in the laboratory sample delivery group (SDG) as indicated in Table 1 was reviewed in this DUSR to identify quality issues which could affect the use of the sample data for decision making purposes.

Fourteen water samples, one field duplicate sample, one field blank, and three trip blanks were collected by Golder Associates, Inc. (Golder). Samples were analyzed by Analytical Resources Inc. of Tukwila, Washington for the following parameters:

- Volatile Organic Compounds (VOCs) following United States Environmental Protection Agency (USEPA) USEPA SW-846¹ Method 8260D, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)
- 1,4-Dioxane following USEPA SW-846 Method 8270E, Semivolatile Organic Compounds by GC/MS
- Low-Level Polychlorinated Biphenyls (PCBs) following USEPA SW-846 Method 8082A, Polychlorinated Biphenyls (PCBs) by Gas Chromatography
- Organochlorine Pesticides following USEPA SW-846 Method 8081B, Organochlorine Pesticides by Gas Chromatography
- Northwest Total Petroleum Hydrocarbons – Hydrocarbon Identification Scan by NWTPH-HCID
- Total Metals by USEPA SW-846 Method 200.8 and SW-846 6010D
- Total Mercury by USEPA SW-846 Method 7470A

An initial detection of bis(2-ethylhexyl) phthalate at 16.3 µg/L was reported in the sample collected from well LMW-6. Bis(2-ethylhexyl) phthalate is a known common laboratory contaminant and the laboratory indicated that they believed the detection was likely associated with laboratory contamination. Although slightly past the recommended hold-time, Golder requested that the laboratory re-run the analysis using the remaining sample

¹ USEPA. 2015. Test methods for evaluating solid waste, physical/chemical methods (SW-846): 3rd edition, and subsequent updates, Environmental Protection Agency, National Center for Environmental Publications, Cincinnati, Ohio, accessed at URL <http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm>

volume. The re-analysis did not detect bis(2-ethylhexyl) phthalate, which confirmed that the initial detection was the result of a laboratory contaminant. LMW-6-0321 SVOC reanalysis results were accepted and qualified as UJ because it was completed slightly outside of hold-time.

Quality assurance / quality control (QA/QC) reviews of laboratory data were performed in the laboratory in accordance with the laboratory quality assurance program plan (QAPP). The data validation QA/QC review focused primarily on laboratory results and quality control data to ensure that work plan data quality objectives were met for the project.

Data validation was conducted in accordance with the criteria outlined in the National Functional Guidelines for Organic Review (USEPA 2017a²) and Inorganic Review (USEPA 2017b³), modified to include method specific requirements of the laboratory, and laboratory standard operating procedures. Where there was a discrepancy between the QC criteria in the Guidelines and the QC criterion established in the analytic methodology, method-specific criteria, the QAPP, or professional judgment was used.

In general, chemical results for the samples collected at the Site were evaluated based on laboratory preservation, hold times, laboratory and field blank contamination, outlying precision or accuracy parameters, or based on professional judgment. The following definitions provide brief explanations of the qualifiers which may have been assigned to data during the data validation process.

Data Qualifier Definitions

- | | |
|----|---|
| J | The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| UJ | The analyte was analyzed for but was not detected. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. |
| U | The analyte was analyzed for but was not detected. |
| R | The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample. |

The validation level for the data is Tier 2A, and included the following:

- Data package completeness assessment
- Verification of required deliverables
- Evaluation of holding times
- Laboratory narrative evaluation

² USEPA. 2017a. USEPA Contract Laboratory Program, National Functional Guidelines for Organic Superfund Methods Data Review. OLEM 9355.0-135, EPA-540-R-2017-001, January.

³ United States Environmental Protection Agency (EPA). 2017b. National Functional Guidelines for Organic Superfund Methods Data Review. OLEM 9355.0-136, EPA-540-R-2017-002, January.

- Evaluation and qualification of QC elements for surrogates, matrix spike samples, laboratory control samples, blanks (method, equipment, and trip blank) laboratory duplicate samples and field duplicate samples
- Evaluation of detection limits

Raw data and calibration elements, including GC instrument tuning and performance check, initial and continuing calibration, internal standard performance, and analyte identification, were not provided by the lab. Data review and validation was performed by an experienced QA personnel independent of the analytical laboratory and not directly involved in the project. Data qualifiers that were applied by the laboratory have been removed from the data summary report sheets, when applicable, and superseded by data validation qualifiers.

Overall, the data review showed that data are acceptable for use, except for 2-chloroethyl vinyl ether for LMW-2-0321. The MS/MSD results were non-detect and the calculated percent recovery of the associated MS/MSD did not recover. Following Guidelines and using professional judgment, the result for 2-chloroethyl vinyl ether for LMW-2-0321 was rejected. 2-chloroethyl vinyl ether was not detected during the March 2021 sampling round and has never been detected at the Site. Other minor data qualifiers related to sample preservation, MS/MSD recoveries below QC criteria, and matrix interference were also reported.

The laboratory analyzed analytes 2-chloroethyl vinyl ether, acrolein, and acrylonitrile from the preserved VOA vials. Due to the acid-labile nature of analytes 2-chloroethyl vinyl ether, acrolein and acrylonitrile, when samples were collected in acid-preserved vials but all associated LCS/LCSDs were within or above QC criteria, the associated non-detect results for these three analytes were qualified as estimated (UJ) due to possible acid degradation. 2-chloroethyl vinyl ether, acrolein, and acrylonitrile were not detected during the March 2021 sampling round and have never been detected at the Site. Qualifier Summary Table (Table 2) is included with the qualifiers applied. For details about the data validation, refer to the data validation checklist in Attachment A. The following bulleted items highlight comments and/or qualifications to specific parameters:

- A data completeness of 99.9% was achieved, which exceeds the QAPP stipulated completeness goal of 90%.

Attachments

- Attachment A Tables
 Table 1 – Sample Collection and Analysis Summary Landsburg Mine Water Sampling Investigation March 2021
 Table 2 – Qualifier Summary Table Landsburg Mine Water Sampling Investigation March 2021
- Attachment B Level 2A Data Validation Checklist

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APPENDIX A

Tables

Table 1: Sample Collection and Analysis Summary Landsburg Mine Water Sampling Investigation - March 2021

SDG	Field Identification	Collection Date	Lab Identification	Matrix	QC Samples	Analyses/Parameters							
						VOCs (8260D)	1,4-Dioxane (8270E)	Total Metals	Dissolved Metals ¹	TPH HClD	PCBs (LL) (8082A)	Organochlorine Pesticides (8081B)	SVOCs (8270E)
21C0439	LMW-2-0321	3/29/21 10:10	21C0439-01 21C0439-02	WG	MS/MSD	X	X	X		X	X	X	X
21C0439	LMW-FB-0321	3/29/21 11:20	21C0439-03 21C0439-04	WQ	FB	X	X	X		X	X	X	X
21C0439	LMW-4-0321	3/29/21 12:40	21C0439-05 21C0439-06	WG		X	X	X		X	X	X	X
21C0439	LMW-4-0321-D	3/29/21 12:45	21C0439-07 21C0439-08	WG	FD (LMW-4-0321)	X	X	X		X	X	X	X
21C0439	LMW-12-0321	3/29/21 14:25	21C0439-09 21C0439-10	WG		X	X	X		X	X	X	X
21C0439	LMW-13R-0321	3/29/21 15:45	21C0439-11 21C0439-12	WG		X	X	X		X	X	X	X
21C0439	Trip Blank-0321-1		21C0439-13	WQ	TB	X							
21C0450	LMW-10-0321	3/30/21 09:00	21C0450-01 21C0450-02	WG		X	X	X		X	X	X	X
21C0450	LMW-6-0321	3/30/21 10:50	21C0450-03 21C0450-04	WG		X	X	X		X	X	X	X
21C0450	LMW-14-0321	3/30/21 11:50	21C0450-05 21C0450-06	WG		X	X	X		X	X	X	X
21C0450	LMW-11-0321	3/30/21 13:35	21C0450-07 21C0450-08	WG		X	X	X		X	X	X	X
21C0450	LMW-15-0321	3/30/21 15:05	21C0450-09 21C0450-10	WG		X	X	X		X	X	X	X
21C0450	Trip Blank-0321-2		21C0450-11	WQ	TB	X							
21D0033	LMW-7-0321	3/31/21 08:40	21D0033-01 21D0033-02	WG		X	X	X		X	X	X	X
21D0033	LMW-8-0321	3/31/21 10:45	21D0033-03 21D0033-04	WG		X	X	X		X	X	X	X
21D0033	LMW-3-0321	3/31/21 12:00	21D0033-05 21D0033-06	WG		X	X	X		X	X	X	X

Table 1: Sample Collection and Analysis Summary Landsburg Mine Water Sampling Investigation - March 2021

SDG	Field Identification	Collection Date	Lab Identification	Matrix	QC Samples	Analyses/Parameters							
						VOCs (8260D)	1,4-Dioxane (8270E)	Total Metals	Dissolved Metals ¹	TPH HCID	PCBs (LL) (8082A)	Organochlorine Pesticides (8081B)	SVOCs (8270E)
21D0033	LMW-5-0321	3/31/21 13:05	21D0033-07 21D0033-08	WG		X	X	X		X	X	X	X
21D0033	LMW-9-0321	3/31/21 14:45	21D0033-09 21D0033-10	WG		X	X	X		X	X	X	X
21D0033	Trip Blank-0321-3		21D0033-11	WQ	TB	X							

Notes:

All analyses performed by Analytical Resources, Incorporated (ARI), Tukwila WA.

¹ Sample collected but put on hold

Abbreviations:

FB - Field Blank

FD - Field Duplicate

MS/MSD - Matrix Spike/Matrix Spike Duplicate

PCBs - Polychlorinated Biphenyls

QC - Quality Control

SDG - Sample Delivery Group

SVOC - Semi Volatile Organic Compound

TB - Trip Blank

TPH HCID - Total Petroleum Hydrocarbons Hydrocarbon Identification

VOCs - Volatile Organic Compounds

WG - Groundwater

WQ - Water Quality

Table 2: Qualifier Summary Table Landsburg Mine Water Sampling Investigation - March 2021

SDG	Sample Name	Constituent	New Result	New MDL	New RL	Qualifier	Reason
21C0439 21C0450 21D0033	All Samples	Acrolein	--	--	--	UJ	Sample Preservation
21C0439 21C0450 21D0033	All Samples	Acrylonitrile	--	--	--	UJ	Sample Preservation
21C0439 21C0450 21D0033	All Samples except LMW-2-0321	2-Chloroethyl vinyl ether	--	--	--	UJ	Sample Preservation
21C0439	LMW-2-0321	2-Chloroethyl vinyl ether	--	--	--	R	MS/MSD did not recover.
21C0450	LMW-6-0321	bis(2-ethylhexyl) phthalate	--	--	--	UJ	Extraction holding time exceedance
--	All Samples	All Results	--	--	--	--	Laboratory applied U-qualifiers or J-qualifiers are retained unless other qualifications are indicated in this table. All other laboratory qualifiers are removed.

Abbreviations

MDL - Method Detection Limit
MS - Matrix Spike
MSD - Matrix Spike Duplicate
QC - Quality Control
RL - Reporting Limit
SDG - Sample Delivery Group

Qualifier Definitions

R - Rejected Result
UJ - Non-Detect Result, RL is estimated

APPENDIX B

**Level 2A Data Validation
Checklist**

QA LEVEL 2A - DATA VERIFICATION/DATA VALIDATION CHECKLIST

Project Name: Landsburg Groundwater

Project Number/Phase/Task: 9231000007 p2021

Reviewing Company: Golder Associates

Project Manager: Gary Zimmerman

Data Evaluator: Sarah Gilles/Michael Shadle

Data Evaluation Date: May 12, 2021

Checked by: Michael Shadle

Review Date: May 14, 2021

Laboratory: Analytical Resources, Inc., Tukwila, WA

Lab SDG #: 21C0439, 21C0450, 21D0033

Matrix: ☒ Aqueous ☐ Soil ☐ Sediment ☐ Waste ☐ Air ☐ Other:

Analytical Methods: See Table 1.

Sample Information: See Table 1.

Work Plan or QAPP: Compliance Monitoring Plan and QAPP for Landsburg Mine Site (Exhibit D, to the Consent Decree, 2017).

Data Validation Guidance: National Functional Guidelines for Organic Superfund Methods Data Review, EPA-540-R-2017-002, January 2017 and National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-540-R-2017-001, January 2017

COC and Sample Receipt	YES	NO	NA	COMMENT
a) COC complete and correct?	☒	☐		
b) COC documents release of custody (signed and dated)?	☒	☐		
c) Field QC types provided (note types)?	☒	☐	☐	FD, MS/MSD, TB, and FB; See Table 1
d) Did the cooler contents match the COC?	☐	☒		See Note 1.
e) Were samples received in good condition?	☒	☐		
f) Were cooler temperatures within control limits?	☒	☐		

Data Package Information	YES	NO	NA	COMMENT
a) Laboratory name and location documented?	☒	☐		
b) All samples on COC reported in data package?	☐	☒		See Note 1
c) Requested analytical methods used?	☒	☐		
d) Requested sample preparation methods used?	☒	☐	☐	
e) Requested analyte list reported?	☒	☐		
f) Requested units reported?	☐	☐	☐	
g) Did the laboratory define the qualifiers used?	☒	☐		
h) Data package contains all information necessary to complete the data quality review?	☒	☐		All Information for a 2A Scope

Analytical Assessment	YES	NO	NA	COMMENT
a) Solid samples reported on a dry-weight basis?	☐	☐	☒	
b) Were solid samples percent moisture criteria acceptable?	☐	☐	☒	
c) Were sample dilutions noted?	☒	☐		
d) Were detected concentrations less than the QL qualified by the laboratory?	☐	☒		No Results Less than QL
e) Were detected concentrations above the calibration range reported by the laboratory?	☐	☒		

Analytical Assessment	YES	NO	NA	COMMENT
f) Did the laboratory satisfy the requested sensitivity requirements?	☒	☐		Results were only reported to the RL.
Laboratory Case Narrative	YES	NO	NA	COMMENT
a) Do the laboratory narrative or laboratory qualifiers indicate deficiencies?	☒	☐	☐	See Notes Below
b) Were all deficiencies noted in the laboratory qualifiers or narrative?	☒	☐	☐	
Sample Preservation and Holding Time	YES	NO	NA	COMMENT
a) Were samples properly preserved?	☐	☒		See Note 2
b) Were holding times met for sample preparation?	☐	☒	☐	See Note 3
c) Were holding times met for sample analysis?	☒	☐		
Blanks	YES	NO	NA	COMMENTS
a) Were blanks analyzed at the appropriate frequency?	☒	☐		
b) Were any analytes detected in the associated preparation/method blank?	☐	☒		
c) Were any analytes detected in the associated trip blanks?	☐	☒	☐	
d) Were any analytes detected in the associated field or equipment/rinsate blanks?	☐	☒	☐	
e) Were any analytes detected in the associated storage blanks?	☐	☐	☒	
Surrogates or Deuterated Monitoring Compounds	YES	NO	NA	COMMENTS
a) Were the correct surrogate compounds added to each sample?	☒	☐	☐	
b) Were surrogate recoveries within control limits?	☒	☐	☐	
c) If not, were samples analyzed at dilution factors of 20x or greater?	☐	☐	☒	
LCS/LCSD	YES	NO	NA	COMMENTS
a) Were LCS/LCSD reported at the appropriate frequency?	☒	☐		
b) Were proper analytes included in the LCS/LCSD?	☒	☐		
c) Were LCS/LCSD recoveries within control limits?	☐	☒		See Notes 4
d) Were RPD values within control limits (if LCSD was analyzed)?	☒	☐	☐	
MS/MSDs	YES	NO	NA	COMMENTS
a) Were project-specific MS (and MSD) reported?	☒	☐		LMW-2-0321
b) Were proper analytes reported in the MS/MSD?	☐	☐	☐	
c) Were project-specific MS/MSD recoveries within control limits?	☐	☒	☐	See Note 5

MS/MSDs	YES	NO	NA	COMMENTS
d) If not, were sample concentrations greater than 4x the spiking concentration?	☐	☒	☐	
e) Was the RPD or absolute difference within control limits (if project-specific MSD analyzed)?	☐	☒	☐	See Note 5
f) Were project-specific post-digestion spikes analyzed?	☐	☐	☒	
g) Were project-specific post-digestion spike recoveries within control limits?	☐	☐	☒	
Duplicates	YES	NO	NA	COMMENTS
a) Were project-specific laboratory duplicates reported?	☒	☐	☐	
b) Was laboratory duplicate RPD or absolute difference criteria acceptable?	☒	☐	☐	
c) Were field duplicates reported?	☒	☐	☐	LMW-4-0321/ LMW-4-0321-D
d) Was field duplicate RPD or absolute difference criteria acceptable?	☒	☐	☐	
ICP Serial Dilution (SD)	YES	NO	NA	COMMENTS
a) Was project-specific ICP SD data provided?	☐	☐	☒	
b) Were project-specific ICP SD within acceptable criteria?	☐	☐	☒	
Overall Evaluation	YES	NO	NA	COMMENTS
a) Were there any other technical problems not previously addressed?	☒	☐		See Note 6
b) Were data acceptable and usable, except where noted?	☒	☐		

Comments/Notes:

1. In Lab SDG 21C0439, the Cooler Receipt Form indicated that the sample ID on bottle LMW-4-0321 did not match the sample ID on COC LMW-4-0321-D. There is no other indication in the Work Order Case Narrative of this potential issue. There is no other action but to note.

All field samples in SDGs 21C0439, 21C0450 and 21D0033 were collected for dissolved metals but placed on hold for possible future analysis. None of the filtered samples were taken off hold and analyzed. There is no other action but to note.

2. All VOC samples were preserved with HCl in accordance with the method requirement to a pH value less than 2. The laboratory analyzed analytes 2-chloroethyl vinyl ether, acrolein, and acrylonitrile from the preserved VOA vials. Due to the acid-labile nature of 2-chloroethyl vinyl ether, acrolein and acrylonitrile, it is recommended that those analytes are collected in and analyzed from unpreserved vials. Based on professional judgment, when samples were outside of method and preservation requirements but all associated LCS/LCSDs were within or above QC criteria, the associated non-detect results for these three analytes were qualified as estimated (UJ) due to possible acid degradation.
3. In SDG 21C0450, the laboratory re-extracted and re-analyzed sample LMW-6-0321 for bis(2-ethylhexyl) phthalate due to potential laboratory contamination. The sample was re-extracted outside of the recommended holding time. The non-detect result was qualified UJ. Historical results for this analyte have been non-detect; which matches the non-detect result in the re-extracted sample. It is recommended that the re-extracted and re-analyzed sample result for bis(2-ethylhexyl) phthalate be used for data use.

4. LCS/LCSD recoveries were outside QC criteria, as shown in the table below for project-specific analytes. Data are qualified when more than one of the recoveries between the LCS and LCSD pair and/or the RPD value is outside the control limits. When only one of the three QC indicators (LCS or LCSD recovery or RPD value) are outside of control limits, no qualification is necessary. When the LCSD recovery is greater than the upper control limit and the RPD value is greater than the control limit, non-detect results are not qualified.

SDG	LCS Sample Name	Parameter	Analyte	LCS/LCSD Recovery (%)	RPD (%)	Recovery (%) / RPD Criteria
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	Acetone	144/145	1.15	58-142/30
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	Dibromomethane	121/119	2.18	80-120/30
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	1,3-Dichlorobenzene	121/117	3.32	80-120/30
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	1,2-Dichlorobenzene	123/120	1.17	80-120/30
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	Hexachloro-1,3-Butadiene	135/110	20.60	58-123/30
21C0439 21C0450 21D0033	LCS BJD0232-BS1 LCSD BJD0232-BSD1	8260D	1,2,3-Trichloropropane	120/ 128	6.32	76-125/30
21C0439	BJC0899-BS1 BJC0899-BSD1	SW8081B	Endosulfan II	163/164	0.68	60-120/30
21C0439	BJC0899-BS1 BJC0899-BSD1	SW8081B	Endrin Aldehyde	152/183	18.70	53-120/30
21C0439	BJC0899-BS1 BJC0899-BSD1	SW8081B	4,4'-DDT	166/171	2.93	57-122/30
21C0439	BJC0899-BS1 BJC0899-BSD1	SW8081B	Dieldrin	122/ 138	12.60	57-130/30
21C0439	BJC0899-BS2	SW8081B	Endrin	122	-	52-121
21C0439	BJC0899-BS2	SW8081B	Endosulfan II	175	-	60-120
21C0439	BJC0899-BS2	SW8081B	4,4'-DDD	128	-	60-120
21C0439	BJC0899-BS2	SW8081B	Endrin Aldehyde	146	-	53-120
21C0439	BJC0899-BS2	SW8081B	4,4'-DDT	183	-	57-122
21C0439	BJC0899-BS2	SW8081B	Endosulfan Sulfate	128	-	56-120

5. MS/MSD recoveries were outside of acceptance criteria for select analytes, as summarized in the table below for project specific samples. Using professional judgment, when only one QC indicator (MS/MSD/RPD) did not meet QC criteria, qualification was not required. When the MS/MSD recoveries were below QC criteria, associated non-detect results were qualified as estimated (UJ).

The MS/MSD results for 2-chloroethyl vinyl were non-detect and the lab did not calculate both the recoveries and RPD. Samples were collected in preserved VOA vials and the recovery was most likely lost due to the acid-labile nature of 2-chloroethyl vinyl ether. Following Guidelines and using professional judgment, when the MS/MSD results were ND and the calculated percent recovery of the associated MS/MSD did not recover (NR), the associated non-detect results were rejected (R).

The RPD values for all analytes, including those listed in the table below, were above the RPD Criteria. Following Guidelines and using professional judgment, when the MS/MSD results were ND and the RPD is greater than the RPD criteria, there is no other action but to note.

Primary Sample Name	Parameter	Analyte	MS/MSD % Recovery	RPD	% Recovery / RPD Criteria
LMW-2-0321	8260D	2-Chloroethyl vinyl ether	NR	-	64-120
LMW-2-0321	8260D	1,1,2-Trichloro-1,2,2-Trifluoroethane	101/ 65.2	42.8	76-129/30
LMW-2-0321	8260D	Carbon Disulfide	116/ 75.2	42.6	78-125/30
LMW-2-0321	8260D	trans-1,2-Dichloroethene	116/ 74.1	44.4	78-128/30
LMW-2-0321	8260D	Vinyl Acetate	85.5/ 51.9	48.9	55-138/30
LMW-2-0321	8260D	1,1-Dichloroethane	122/ 70.5	53.5	76-124/30
LMW-2-0321	8260D	cis-1,2-Dichloroethene	114/ 68.9	49.1	80-121/30
LMW-2-0321	8260D	Chloroform	115/ 69.2	49.6	80-122/30
LMW-2-0321	8260D	Bromochloromethane	96.8/ 61.3	44.9	80-121/30
LMW-2-0321	8260D	1,1,1-Trichloroethane	110/ 67.2	48.4	79-123/30
LMW-2-0321	8260D	1,1-Dichloropropene	110/ 73.5	39.8	80-127/30
LMW-2-0321	8260D	1,2-Dichloroethane	102/ 66.1	42.4	75-123/30
LMW-2-0321	8260D	Benzene	113/ 73	43	80-120/30
LMW-2-0321	8260D	Trichloroethene	107/ 71	40.1	80-120/30
LMW-2-0321	8260D	1,2-Dichloropropane	110/ 71.7	42.4	80-120/30
LMW-2-0321	8260D	Bromodichloromethane	103/ 67.3	42.2	80-121/30
LMW-2-0321	8260D	Dibromomethane	102/ 64.3	45.4	80-120/30
LMW-2-0321	8260D	4-Methyl-2-Pentanone	94.1/ 61.8	41.4	67-133/30
LMW-2-0321	8260D	cis-1,3-Dichloropropene	107/ 70.1	41.3	80-124/30
LMW-2-0321	8260D	Toluene	108/ 68.9	44	80-120/30
LMW-2-0321	8260D	trans-1,3-Dichloropropene	103/ 64.2	46.7	71-127/30
LMW-2-0321	8260D	2-Hexanone	92.3/ 58.9	44.1	69-133/30
LMW-2-0321	8260D	1,1,2-Trichloroethane	98.1/ 64.4	41.5	80-121/30
LMW-2-0321	8260D	1,3-Dichloropropane	97.4/ 60.4	46.8	80-120/30
LMW-2-0321	8260D	Tetrachloroethene	101/ 66.3	41.5	80-120/30
LMW-2-0321	8260D	Dibromochloromethane	96.7/ 59.8	47.1	65-135/30
LMW-2-0321	8260D	1,2-Dibromoethane	91.8/ 60.8	40.6	80-121/30
LMW-2-0321	8260D	Chlorobenzene	104/ 68.2	41.2	80-120/30
LMW-2-0321	8260D	Ethylbenzene	103/ 67.5	41.5	80-120/30
LMW-2-0321	8260D	1,1,1,2-Tetrachloroethane	97.3/ 61.7	44.8	80-120/30
LMW-2-0321	8260D	m,p-Xylene	108/ 70.4	42.1	80-121/30
LMW-2-0321	8260D	o-Xylene	103/ 65.4	45	80-121/30
LMW-2-0321	8260D	Xylenes, total	106/ 68.7	43.1	76-127/30
LMW-2-0321	8260D	Styrene	104/ 69.7	39.7	80-124/30
LMW-2-0321	8260D	1,1,2,2-Tetrachloroethane	94/ 62.1	40.8	77-123/30
LMW-2-0321	8260D	1,2,3-Trichloropropane	103/ 66.7	42.5	76-125/30
LMW-2-0321	8260D	trans-1,4-Dichloro 2-Butene	77.2/ 48.1	46.5	55-129/30
LMW-2-0321	8260D	n-Propylbenzene	113/ 73.2	42.8	78-130/30
LMW-2-0321	8260D	Bromobenzene	104/ 68.1	41.8	80-120/30
LMW-2-0321	8260D	Isopropyl Benzene	112/ 70.9	45.4	80-128/30
LMW-2-0321	8260D	2-Chlorotoluene	109/ 67.7	46.4	78-122/30
LMW-2-0321	8260D	4-Chlorotoluene	103/ 67.6	41.3	80-121/30

Primary Sample Name	Parameter	Analyte	MS/MSD % Recovery	RPD	% Recovery / RPD Criteria
LMW-2-0321	8260D	t-Butylbenzene	107/ 66.9	46.5	78-125/30
LMW-2-0321	8260D	1,3,5-Trimethylbenzene	114/ 72.9	44.1	80-129/30
LMW-2-0321	8260D	1,2,4-Trimethylbenzene	112/ 71.1	45.1	80-127/30
LMW-2-0321	8260D	s-Butylbenzene	108/ 69.2	43.5	78-129/30
LMW-2-0321	8260D	4-Isopropyl Toluene	109/ 70.8	42.3	79-130/30
LMW-2-0321	8260D	1,3-Dichlorobenzene	105/ 70.2	39.9	80-120/30
LMW-2-0321	8260D	1,4-Dichlorobenzene	103/ 66.1	43.6	80-120/30
LMW-2-0321	8260D	n-Butylbenzene	112/ 72.6	42.3	74-129/30
LMW-2-0321	8260D	1,2-Dichlorobenzene	108/ 70.1	42.1	80-120/30
LMW-2-0321	8260D	1,2-Dibromo-3-chloropropane	79.6/ 55.9	34.9	62-123/30
LMW-2-0321	8260D	1,2,4-Trichlorobenzene	91.2/ 62.5	37.3	64-124/30
LMW-2-0321	SW8270E	Bis(2-ethylhexyl)phthalate	121 /77.7	43.60	68.3-120/30
LMW-2-0321	SW8081B	Endosulfan II	164 / 159	3.20	60-120/30
LMW-2-0321	SW8081B	Endrin aldehyde	179 / 173	3.72	53-120/30
LMW-2-0321	SW8081B	4,4'-DDT	172 / 169	2.14	57-122/30
LMW-10-0321	SW6010D	Sodium*	103/ 126	2.33	80-120/20
LMW-7-0321	SW6010D	Calcium*	66.9 / 74.3	1.57	75-125/20

6. The laboratory case narrative noted that certain CCVs and ICVs were outside of control criteria for select analytes in the VOC analysis and marked with the "Q" qualifier. Review of calibration data is outside of the scope of a Level IIA validation, and the calibration results were not included in the data package. There is no other action but to note.

Data qualification: See Table 2.

Definitions:

%D:	Percent Difference / Drift	QAPP:	Quality Assurance Project Plan
%R:	Percent Recovery	QC:	Quality Control
CCB:	Continuing Calibration Blank	QL:	Quantitation Limit
CCV:	Continuing Calibration Verification	RB:	Rinsate Blank
COC:	Chain of Custody	RDL:	Reported Detection Limit
CRQL:	Contract Required Quantitation Limit	RL:	Reporting Limit
DMC:	Deuterated Monitoring Compound	RPD:	Relative Percent Deviation
DRO:	Diesel Range Organics	RRF:	Relative Response Factor
EB:	Equipment Blank	RSD:	Relative Standard Deviation
FB:	Field Blank	SD:	Serial Dilution
GRO:	Gasoline Range Organics	SDG:	Sample Delivery Group
HT:	Holding Time	SPLP:	Synthetic Precipitate Leachate Procedure
ICB:	Initial Calibration Blank	SVOC:	Semivolatile Organic Compound
ICV:	Initial Calibration Verification	TAL:	Target Analyte List
IS:	Internal Standard	TAT:	Turn Around Time
LCS:	Laboratory Control Sample	TB:	Trip Blank
LCSD:	Laboratory Control Sample Duplicate	TCL:	Target Compound List

MB:	Method Blank	TCLP:	Toxicity Characteristic Leachate Procedure
MDL:	Method Detection Limit	TDS:	Total Dissolved Solids
MS:	Matrix Spike	TOC:	Total Organic Carbon
MSD:	Matrix Spike Duplicate	TPH:	Total Petroleum Hydrocarbons
PCB:	Polychlorinated Biphenyl	TSS:	Total Suspended Solids
PQL:	Practical Quantitation Limit	VOC:	Volatile Organic Compound
		ZHE:	Zero Headspace Extraction

APPENDIX B

Sample Integrity Data Sheets (SIDS)

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-9-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 31, 2021

Time 14:14

Media Water

Station LMW-9

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 99.15 ft BTOC

Screened Interval: 149' - 159' BGS

Sand Pack Interval: 143.5' - 159' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-9

Date 03/31/2021

Time Begin Purge N/A

Time Collect Sample 14:14

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
99.23	14:23	7.01	523	11.1	1.07	7.4	1.23
99.25	14:28	7.01	523	11.1	1.00	5.6	2.95
99.25	14:32	7.01	523	11.1	0.89	3.5	2.10
99.25	14:37	7.00	523	11	0.81	1.2	2.26
99.25	14:42	7.00	523	11.2	0.80	0.2	2.35

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 130

Throttle: 95

CPM: 2

CID: 51

Flow Rate: 300 mL/min

Sampler TH

Date March 31, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-5-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 31, 2021 **Time** 13:05

Media Water **Station** LMW-5

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 13.37 ft BTOC

Screened Interval: 231.8' - 241.8' BGS

Sand Pack Interval: 231.8' - 241.8' BGS

Packer Depth: 222.11' BGS

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-5

Date 03/31/2021

Time Begin Purge 12:37

Time Collect Sample 13:05

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
13.46	12:42	6.96	539	10.8	0.79	41	7.83
13.47	12:47	6.96	542	11.0	0.70	30	3.58
13.48	12:52	6.97	543	11.1	0.65	20	2.28
13.48	12:57	6.96	543	11.1	0.63	17	3.70
13.47	13:02	6.96	543	11.2	0.62	15	2.61

Comments:

Clear, no odor, no sheen.

Grundfos: ~135 Hz

Packer: 110 psi

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 2200 mL/min

Sampler TH

Date March 31, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-3-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 31, 2021 **Time** 12:00

Media Water **Station** LMW-3

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 11.82 ft BTOC

Screened Interval: 49.8' - 64.8' BGS

Sand Pack Interval: 47.1' - 64.8' BGS

Packer Depth: 39.33' BGS

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-3

Date 03/31/2021

Time Begin Purge 11:11

Time Collect Sample 12:00

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
11.46	11:16	7.80	236	11.6	0.92	159	1.70
11.46	11:21	7.79	239	11.7	0.75	142	1.11
11.46	11:26	7.79	240	11.7	0.71	106	1.32
11.46	11:31	7.79	240	11.7	0.68	65	1.23
11.46	11:36	7.79	241	11.7	0.67	52	0.91
11.46	11:41	7.78	241	11.7	0.65	36	1.06
11.46	11:46	7.77	242	11.8	0.64	22	1.01
11.46	11:51	7.77	243	11.8	0.63	22	0.90
11.47	11:56	7.76	244	11.8	0.63	15	0.88

Comments:

Clear, no odor, no sheen.

Grundfos: ~135 Hz

Packer: 130 psi

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 2100 mL/min

Sampler TH

Date March 31, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-8-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler New Tubing and Peristaltic Pump

Date March 31, 2021

Time 10:45

Media Water

Station LMW-8

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 3.57 ft BTOC

Screened Interval: 8' - 13' BGS

Sand Pack Interval: 6' - 13' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-8

Date 03/31/2021

Time Begin Purge 09:40

Time Collect Sample 10:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
5.68	09:45	6.79	278	9.8	0.94	20	94
6.07	09:50	6.78	283	9.9	0.83	8.4	53
6.55	09:55	6.79	285	10.0	0.77	5.9	53
6.79	10:00	6.80	286	10.0	0.75	1.6	35
6.96	10:05	6.81	288	10	0.72	-3.3	30
7.07	10:10	6.82	292	10.1	0.69	-7.2	21.8
7.08	10:15	6.82	294	10.1	0.69	-9.1	19.3
7.29	10:20	6.83	299	10.0	0.67	-12	14.4
7.4	10:25	6.83	301	10.0	0.66	-14	7.76
7.4	10:30	6.83	303	10.1	0.66	-15	8.94
7.2	10:35	6.84	310	10.1	0.66	-15	7.10
7.1	10:40	6.84	311	10.2	0.65	-16	7.71

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 325 mL/min

Sampler TH

Date March 31, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-7-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 31, 2021

Time 08:40

Media Water

Station LMW-7

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 224.55 ft BTOC

Screened Interval: 239.6' - 253.7' BGS

Sand Pack Interval: N/A

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-7

Date 03/31/2021

Time Begin Purge 7:55

Time Collect Sample 08:40

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
N/A	08:00	7.21	379	10.7	1.58	160	10.9
N/A	08:05	7.23	398	12.5	1.38	136	30.7
N/A	08:10	7.25	408	13.5	1.04	100	12.1
N/A	08:15	7.25	409	13.7	0.97	78	8.39
N/A	08:20	7.25	410	13.8	0.91	52	5.39
N/A	08:25	7.24	411	13.9	0.86	11	3.39
N/A	08:30	7.25	413	13.9	0.83	2.8	2.75
N/A	08:35	7.26	413	13.9	0.80	5.7	2.68

Comments:

Water level tape stuck. No water levels collected.

Clear, no odor, no sheen.

Grundfos: 320 Hz

Packer: N/A

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 1200 mL/min

Sampler TH

Date March 31, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-15-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 30, 2021

Time 15:05

Media Water

Station LMW-15

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 150.88 ft BTOC

Screened Interval: 235' - 245' BGS

Sand Pack Interval: 231' - 245' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-15

Date 03/30/2021

Time Begin Purge 14:40

Time Collect Sample 15:05

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
151.15	14:35	7.36	344	9.8	2.50	-15	8.18
150.95	14:40	7.38	353	9.7	1.32	-53	3.83
150.95	14:45	7.43	360	9.6	1.01	-63	2.16
150.95	14:50	7.45	361	9.6	0.93	-65	1.54
150.96	14:55	7.47	362	9.7	0.88	-66	1.95
150.94	15:00	7.48	363	9.6	0.84	-67	1.98

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 130

Throttle: 95

CPM: 2

CID: 53

Flow Rate: 400 mL/min

Sampler TH

Date March 30, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-11-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 30, 2021

Time 13:35

Media Water

Station LMW-11

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 157.01 ft BTOC

Screened Interval: 696' - 707' BGS

Sand Pack Interval: 688' - 707' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-11

Date 03/30/2021

Time Begin Purge N/A

Time Collect Sample 13:35

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
157.08	12:59	7.42	388	10.3	3.54	55	1.90
157.07	13:04	7.29	389	10.2	1.78	24	1.21
157.01	13:09	7.27	390	10.2	1.48	20	1.09
157.1	13:14	7.27	394	10.2	1.23	15	1.07
157.08	13:19	7.27	396	10.2	1.14	12	0.95
157.1	13:24	7.27	396	10.2	1.05	10	1.03
157.1	13:29	7.27	396	10.1	1.02	8.7	1.24

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 130

Throttle: 110

CPM: 1

CID: 15

Flow Rate: 350 mL/min

Sampler TH

Date March 30, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-14-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 30, 2021

Time 11:55

Media Water

Station LMW-14

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 164.78 ft BTOC

Screened Interval: 156.5' - 172.3' BGS

Sand Pack Interval: 152.5' - 175.8' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-14

Date 03/30/2021

Time Begin Purge 11:22

Time Collect Sample 11:55

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
165.4	11:27	6.60	1,083	10.4	1.11	84.7	2.82
165.25	11:31	6.60	1,220	10.4	0.77	37.4	4.88
165.35	11:36	6.61	1,158	10.3	0.71	29.9	2.18
165.05	11:41	6.61	1,139	10.3	0.69	27.1	1.77
165.4	11:46	6.61	1,137	10.3	0.67	25.4	1.94

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 140

Throttle: 115

CPM: 2

CID: 49

Flow Rate: 450 mL/min

Sampler TH

Date March 30, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-6-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 30, 2021 **Time** 10:50

Media Water **Station** LMW-6

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 22.1 ft BTOC

Screened Interval: 90.9' - 105.9' BGS

Sand Pack Interval: 82.5' - 105.9' BGS

Packer Depth: 81.22' BGS

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-6

Date 03/30/2021

Time Begin Purge 10:22

Time Collect Sample 10:50

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
21.7	10:27	6.97	180	9.6	0.89	22	3.11
21.7	10:32	6.93	180	9.8	0.80	16	1.74
21.7	10:37	6.91	181	9.8	0.75	13	1.94
21.7	10:42	6.89	181	9.9	0.71	10	2.63

Comments:

Clear, no odor, no sheen.

Grundfos: 180 Hz

Packer: 110 psi

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 2400 mL/min

Sampler TH

Date March 30, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-10-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 30, 2021

Time 09:00

Media Water

Station LMW-10

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 0.08 ft BTOC

Screened Interval: 267' - 289' BGS

Sand Pack Interval: 258' - 289' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-10

Date 03/30/2021

Time Begin Purge 09:19

Time Collect Sample 09:00

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
0.65	08:24	8.60	253	8.7	1.02	54	0.94
1.6	08:29	8.65	252	8.7	0.82	-65	0.86
1.9	08:34	8.65	252	8.7	0.78	-88	0.81
2.6	08:39	8.67	252	8.8	0.74	-121	0.77
3.19	08:44	8.67	252	8.8	0.72	-134	0.75
3.65	08:49	8.67	253	8.8	0.70	-141	0.81
4.1	08:54	8.67	253	8.8	0.69	-145	0.87
4.45	08:59	8.68	253	8.9	0.68	-150	0.85

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 110

Throttle: 40

CPM: 2

CID: 50

Flow Rate: 350 mL/min

Sampler TH

Date March 30, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-13R-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 29, 2021

Time 15:45

Media Water

Station LMW-13R

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 7.43 ft BTOC

Screened Interval: 115' - 140' BGS

Sand Pack Interval: 110' - 150' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-13R

Date 03/29/2021

Time Begin Purge N/A

Time Collect Sample 15:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
7.43	15:17	7.28	674	9.9	1.19	6.8	2.07
7.43	15:22	7.27	678	10.0	0.93	-5.4	2.11
7.45	15:27	7.28	679	10.0	0.86	-10	1.89
7.43	15:32	7.28	679	10.0	0.78	-16	1.19
7.43	15:37	7.28	680	10.0	0.75	-20	1.58

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 110

Throttle: 35

CPM: 2

CID: 48

Flow Rate: 300 mL/min

Sampler TH

Date March 29, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site
Project No. 923-1000-007.2021
Site Location Ravensdale, WA
Sample ID LMW-12-0321
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated QED Bladder

Date March 29, 2021

Time 14:25

Media Water

Station LMW-12

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 6.92 ft BTOC

Screened Interval: 15' - 25' BGS

Sand Pack Interval: 11' - 25' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-500 mL	PCBs	Glass amber	None
2-500 mL	Pesticides	Glass amber	None
2-500 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-12

Date 03/29/2021

Time Begin Purge N/A

Time Collect Sample 14:25

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
6.8	13:53	6.61	399	9.7	0.99	29	13.9
6.75	14:58	6.59	398	9.6	0.81	29	12.4
6.78	14:03	6.58	446	9.8	0.78	24	21.1
6.79	14:08	6.59	504	9.7	0.78	15	23.0
6.79	14:12	6.60	523	9.7	0.76	11	20.0
6.78	14:17	6.61	531	9.8	0.75	10	22.9

Comments:

Clear, no odor, no sheen.

Grundfos: N/A

Packer: N/A

Tank: 110

Throttle: 20

CPM: 2

CID: 47

Flow Rate: 450 mL/min

Sampler TH

Date March 29, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-4-0321/LMW-4-0321-D
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 29, 2021

Time 12:40/12:45

Media Water

Station LMW-4

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 8.27 ft BTOC

Screened Interval: 195' - 209.7' BGS

Sand Pack Interval: 189' - 209.7' BGS

Packer Depth: 187.3' BGS

Sample Description Clear, no odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
6-40 mL	VOA	VOA vial	HCl
2-500 mL	Total Metals	HDPE	HNO3
2-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
8-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
4-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
4-1000 mL	PCBs	Glass amber	None
4-1000 mL	Pesticides	Glass amber	None
4-1000 mL	SVOCs	Glass amber	None
4-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-4

Date 03/29/2021

Time Begin Purge 12:05

Time Collect Sample 12:40 /12:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
8.28	12:10	6.98	733	10.1	1.07	43	1.26
8.28	12:15	6.84	737	10.2	0.78	33.9	0.82
8.28	12:20	6.81	742	10.2	0.7	24.2	1.20
8.28	12:25	6.8	743	10.2	0.66	18.5	1.05
8.28	12:30	6.79	745	10.3	0.64	15.2	1.74
8.28	12:35	6.79	746	10.3	0.64	14.2	0.66

Comments:

Clear, no odor, no sheen. Duplicate @ 12:45

Grundfos: 80 Hz

Packer: 110 psi

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 900 mL/min

Sampler TH

Date March 29, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-FB-0321
Sampling Location Direct pour/end of dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Direct Pour/Peristaltic Pump with New Tubing

Date March 29, 2021 **Time** 11:20

Media Lab provided DI **Station** LMW-2

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: ft BTOC

Screened Interval:

Sand Pack Interval:

Packer Depth:

Sample Description Lab-provided DI water poured directly into sample containers.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3-40 mL	VOA	VOA vial	HCl
1-500 mL	Total Metals	HDPE	HNO3
1-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
4-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
2-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
2-1000 mL	PCBs	Glass amber	None
2-1000 mL	Pesticides	Glass amber	None
2-1000 mL	SVOCs	Glass amber	None
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-FB

Date 03/29/2021

Time Begin Purge N/A

Time Collect Sample 11:20

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)

Parameters not applicable.

Comments:

Lab provided DI water.

Grundfos: N/A

Packer: N/A

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: _____ mL/min

Sampler TH

Date March 29, 2021

Supervisor 

Date April 1, 2021

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2021
Site Location Ravensdale, WA **Sample ID** LMW-2-0321 (+MS/MSD)
Sampling Location Groundwater Monitoring Well - end dedicated sampling tube

Technical Procedure Reference(s) Landsburg Mine Site Compliance Monitoring Plan (2017)

Type of Sampler Dedicated Pump Grundfos

Date March 29, 2021

Time 10:10

Media Water

Station LMW-2

Sample Type: grab time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

Static Water Level: 6.32 ft BTOC

Screened Interval: 27.9' - 38.1' BGS

Sand Pack Interval: 24.8' - 38.1' BGS

Packer Depth: N/A

Sample Description Clear, no odor, no sheen. MS/MSD volume collected.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
9-40 mL	VOA	VOA vial	HCl
3-500 mL	Total Metals	HDPE	HNO3
3-500 mL	Dissolved Metals	HDPE	HNO3 + field filter
12-500 mL	TPH-HCID, -Dx (HOLD)	Glass amber	None
6-40 mL	TPH-Gx (HOLD)	VOA vial	HCl
6-1000 mL	PCBs	Glass amber	None
6-1000 mL	Pesticides	Glass amber	None
6-1000 mL	SVOCs	Glass amber	None
6-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-2

Date 03/29/2021

Time Begin Purge N/A

Time Collect Sample 10:10

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
6.34	09:40	6.72	750	10.7	0.85	71.8	1.09
6.34	09:45	6.74	750	10.8	0.76	43.4	3.01
6.34	09:50	6.74	751	10.9	0.70	30.4	1.52
6.34	09:55	6.75	751	10.9	0.68	25.7	1.93
6.34	10:00	6.75	750	10.9	0.66	22.9	2.01

Comments:

Clear, no odor.

Grundfos: ~80 Hz

Packer: N/A

Tank: N/A

Throttle: N/A

CPM: N/A

CID: N/A

Flow Rate: 1200 mL/min

Sampler TH

Date March 29, 2021

Supervisor [Signature]

Date April 1, 2021



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