REPORT

Quarterly Monitoring Report
December 2023 Groundwater Sampling

Landsburg Mine Site

Submitted to:

Washington Department of Ecology
15700 Dayton Ave. N., Shoreline WA 98133

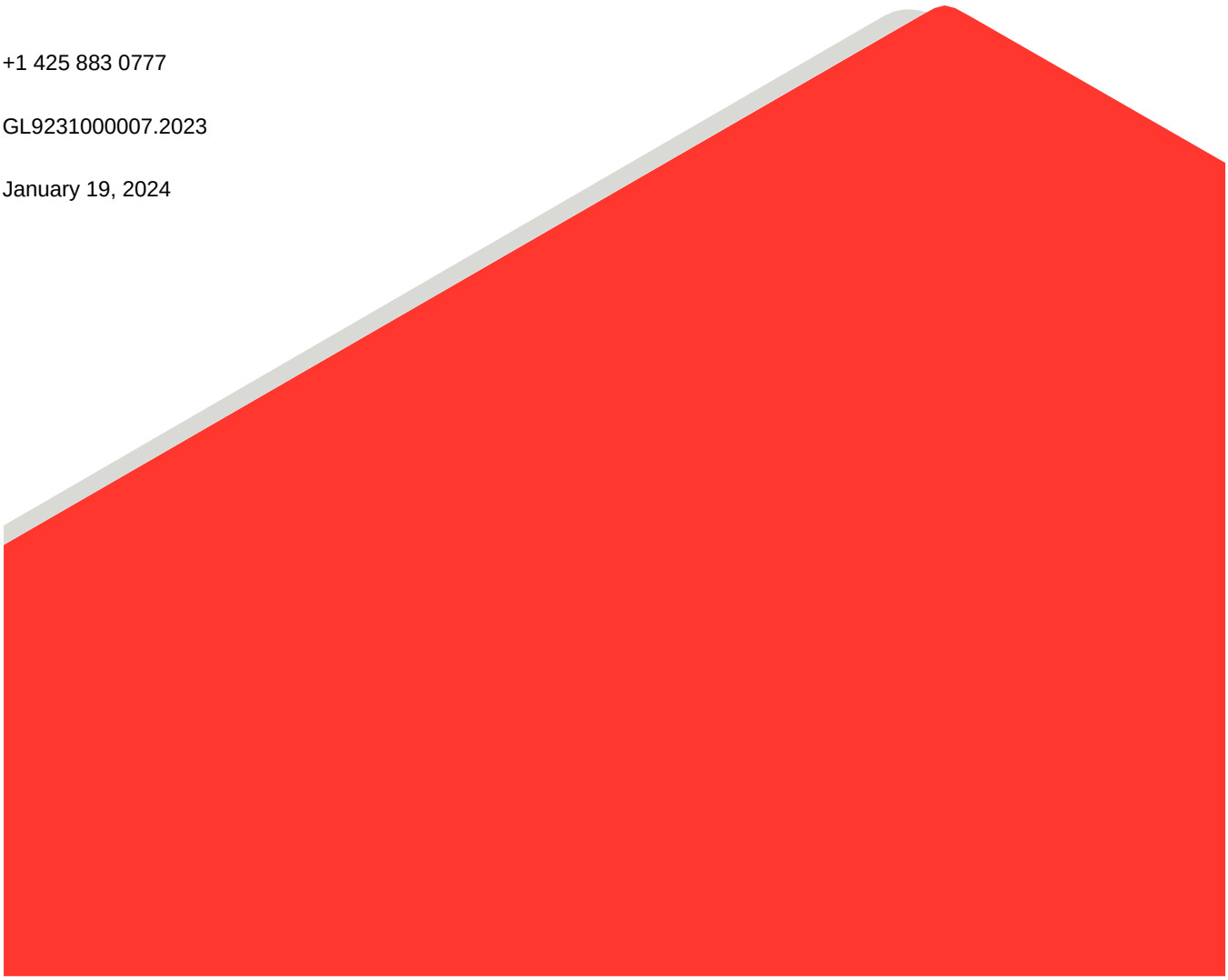
Submitted by:

WSP USA Inc.
18300 Redmond Way, Suite 200, Redmond, Washington, USA 98052

+1 425 883 0777

GL9231000007.2023

January 19, 2024



Distribution List

Vance Atkins, LHG - Ecology

Landsburg PLP Group

Table of Contents

1.0 INTRODUCTION

The Compliance Monitoring Plan (CMP) (Ecology 2017) describes the long-term confirmational monitoring required after completion of remediation actions at the Landsburg Mine Site (the Site). Additionally, the Amendment to Cleanup Action Plan (Ecology 2021) stipulated that quarterly monitoring of the wells located at the north end of the Landsburg Mine Site (Site) be conducted for five years from the initial detection of 1,4-dioxane. The five years of quarterly monitoring provide 20 discrete data sampling points in each of the north end monitoring wells, which is a statistically significant number of data points to evaluate concentration trends. The following five Site wells were included in this monitoring requirement: LMW-2, LMW-4, LMW-10, LMW-12, and LMW-13R. 1,4-dioxane has been previously detected in only three of these wells: LMW-2, LMW-4, and LMW-12. Figure 1 presents the locations of the monitoring wells.

Following completion of the March 2023 sampling round, the minimal five years of monitoring and 20 discrete data points were achieved, and the statistical trend analysis was completed. The statistical trend analyses using Mann-Kendall and Theil-Sen methods indicated that 1,4-dioxane concentrations in LMW-2 and LMW-12 were stable to decreasing. In LMW-4, 1,4-dioxane trends indicated no clear trend using the Theil-Sen statistical method and potentially increasing trends using the Mann-Kendall method. The statistical trend analysis results were presented to Ecology (WSP 2023). In an email response, Ecology indicated that based on the statistical trend analysis, future sampling of Site monitoring wells, except well LMW-4, shall continue at the frequency specified in the CMP (Ecology 2023). Ecology requested that quarterly monitoring of LMW-4 continue for 1,4-dioxane analysis until statistical trend analysis indicates concentrations are steady to decreasing in LMW-4. Further, Ecology requested that the semi-annual sampling of the three groundwater monitoring wells located north of the Site, LMW-20, LMW-21, and LMW-22 continue until a steady to decreasing trend can be confirmed at LMW-4.

Sampling of the off-Site Private Well, the Landsburg Estate's Well, was also scheduled to occur during this sampling round, but repeated attempts to contact the property owner were unsuccessful and the well was not sampled. Attempts to contact the homeowner included emails, cell phone messages, and actual visits to the residence. This private well has been sampled several times in the past, including in 2021 and 2022, with no analytes detected above drinking water standards.

This report presents the results of the December 2023 quarterly monitoring of LMW-4 and semi-annual sampling of LMW-20, LMW-21, and LMW-22.

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 and tubing 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 parameter:
  - 1,4-Dioxane following USEPA SW-846 Method 8270E SIM

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

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 LLC (ARL), of Tukwila, Washington, for analyses.

The laboratory data packages underwent data validation. The data validation is provided in Appendix A. The data were found to be acceptable with no qualifications.

Table 1 presents depths to groundwater measured during the event and calculated static water level elevations. Table 2 presents the field parameter measurements and laboratory analytical results for each groundwater sample at the Site.

3.0 RESULTS

1,4-Dioxane was not detected in LMW-20, LMW-21, or LMW-22 at a laboratory reporting limit of 0.4 micrograms per liter (µg/L) and a method detection limit of 0.04 µg/L. 1,4-Dioxane was detected in LMW-4 at a reported concentration of 1.5 µg/L, which is within the range of concentrations historically reported in this well. Table 3 provides a historical summary of 1,4-dioxane concentrations reported in LMW-4.

4.0 NEXT SAMPLING EVENT

The next compliance monitoring event is a confirmational monitoring event scheduled for March 2024, and will include sampling of all Site groundwater monitoring wells: LMW-2 through LMW-15.

WSP USA Inc.

Autumn Pearson
Associate Consultant

Gary Zimmerman
Vice President

AP/GLZ/ks

v:\projects_1992 projects\923-1000\gw_data & reports\2023\2023-12\report\final\9231000007-r-rev0-gw report-01192024.docx

5.0 REFERENCES

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 WSP. June 7.

Ecology. 2021. Amendment to Cleanup Action Plan Landsburg Mine Site MTCA Remediation Project, Ravensdale, Washington. March 26.

Ecology. 2023. Email from Vance Atkins, Ecology Project Manager, Response to Landsburg Mine Site – 1,4-Dioxane Contration Trend Analysis. Landsburg Mine Site MTCA Remediation Project, Ravensdale, Washington. June 23.

WSP. 2023. 1,4-Dioxane Trend Analysis and Groundwater Monitoring Frequency at the Landsburg Mine Site. June 6.

Tables

Table 1: Groundwater Elevation Data, Landsburg Mine Site, December 18, 2023

	LMW-4[1]	LMW-20	LMW-21	LMW-22
Water Depths				
Date of data collection	12/18/2023	12/18/2023	12/18/2023	12/18/2023
Time of data collection	1:37 PM	12:13 PM	8:52 AM	11:10 AM
Measured to Top of PVC (ft btc)	8.09	15.17	10.21	9.39
Surveyed Elevation				
Top of PVC (ft NAVD88)	619.27	546.8	544.09	542.86
Top of Monument (ft NAVD88)	619.89	546.92	544.36	543.13
Ground Level (ft NAVD88)	617.37	543.24	540.58	540.00
Corrected Water Elevation				
Using PVC elevation (ft NAVD88)	**611.18**	**531.63**	**533.88**	**533.47**

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 NAVD88 = elevation in feet NAVD88

Table 2: December 2023 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-4	LMW-20	LMW-21	LMW-22	Field Blank
		12/18/2023	12/18/2023	12/18/2023	12/18/2023	12/18/2023
Field Parameter						
Temperature	°C	10.1	9.3	9.7	10	NA
pH	stnd	7.00	6.71	7.69	7.36	NA
Specific Conductance	uS/cm	1062	300.7	365.1	407.6	NA
Dissolved Oxygen	mg/L	0.22	1.75	0.39	0.98	NA
ORP	mV	-15.2	108.8	135.6	97.5	NA
Turbidity	NTU	0.38	4.03	3.59	8.01	NA
Semi-Volatile Organic Compounds (SVOCs)						
1,4-Dioxane	µg/L	**1.5**	0.4 U	0.4 U	0.4 U	0.4 U

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.
Bold values indicate detections above the RL.
NA - Not Applicable

Table 3: Summary of 1,4-Dioxane Detections in Groundwater Monitoring Well LMW-4

Sample Date	LMW-4
	µg/L
11/30/2017	**2.3**
2/9/2018	**2.3**
5/24/2018	**1.5**
8/15/2018	**1.5**
12/4/2018	**1.6**
3/5/2019	**1.7**
5/22/2019	**2 (1.5)**
8/14/2019	**1.5**
12/10/2019	**1.6 (1.6)**
3/10/2020	**1.3 (1.4)**
6/25/2020	**1.8**
9/16/2020	**1.8**
11/23/2020	**2.3 (2.4)**
3/29/2021	**2.5 (2.3)**
6/2/2021	**1.8**
9/28/2021	**2.0**
12/8/2021	**1.6**
3/7/2022	**1.9**
6/7/2022	**2.2**
9/28/2022	**2.1**
12/21/2022	**2.0**
3/20/2023	**1.9**
7/24/2023	**2.0**
12/18/2023	**1.5**

Notes:

U - The analyte was not detected above the laboratory method detection limit of 0.04 µg/L.

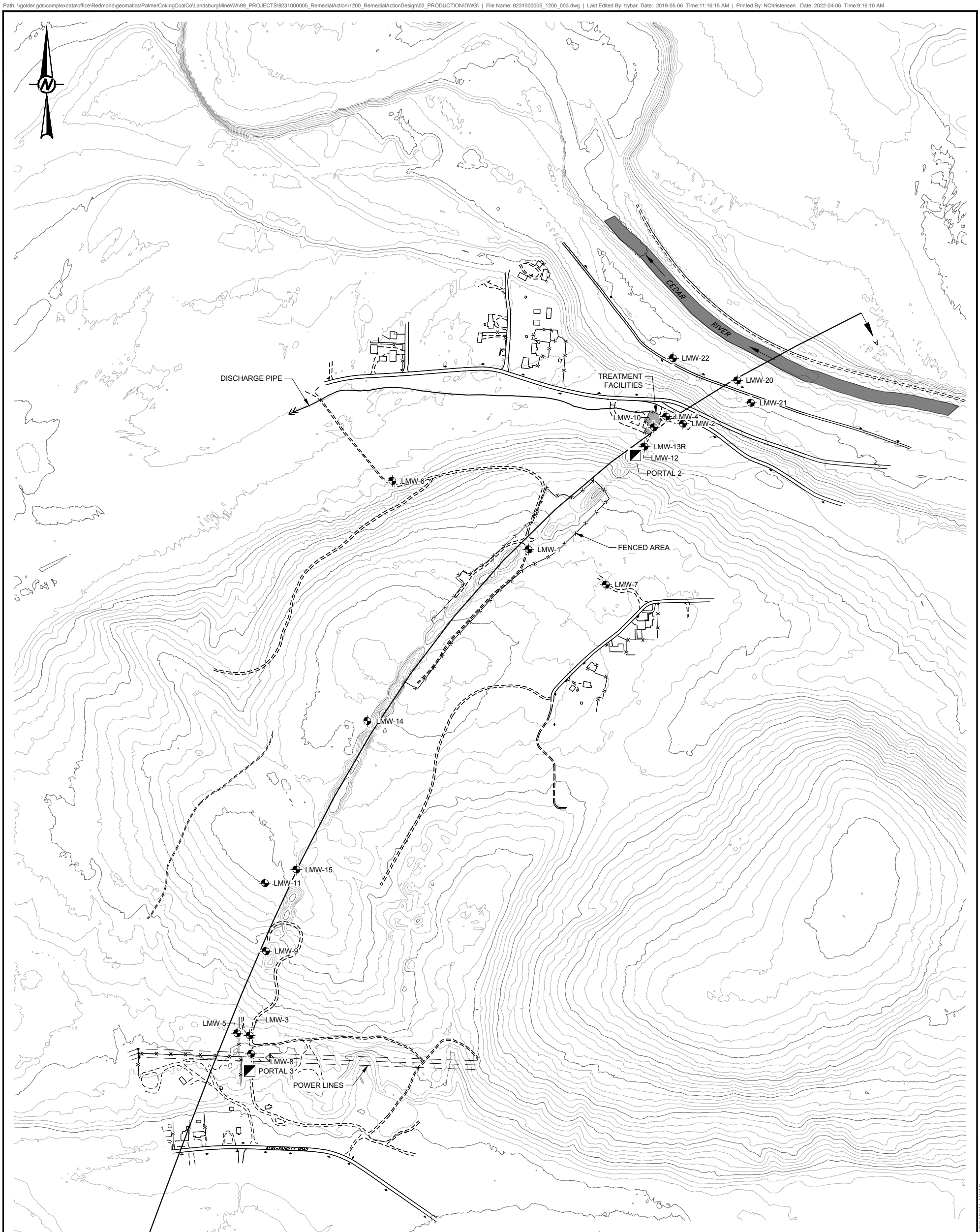
µg/L = micrograms per liter

Analyses performed by EPA Method 8270

Duplicate results are included in parentheses

MTCA Method B Cleanup Level of 1,4-Dioxane is 0.44 µg/L

Figure



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

0 300 600
1" = 300' FEET

CLIENT
LANDSBURG MINE SITE PLP GROUP

CONSULTANT
wsp

YYYY-MM-DD	2019-05-06
DESIGNED	REDMOND
PREPARED	JX
REVIEWED	JX
APPROVED	GZ

PROJECT
LANDSBURG MINE SITE
MTCA REMEDIAL ACTION

TITLE
GROUNDWATER MONITORING LOCATIONS

PROJECT NO.	PHASE	REV.	FIGURE
9231000005	1200	A	1

APPENDIX A

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

TECHNICAL MEMORANDUM

DATE January 5, 2024 **Project No.** GL923-1000-007.2023

TO Bill Kombol
Palmer Coking Coal Company

FROM Gary Zimmerman (WSP) **EMAIL gary.zimmerman@wsp.com**

LANDSBURG MINE SITE DECEMBER 2023 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 December 18, 2023 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 were reviewed in this DUSR to identify quality issues which could affect the use of the sample data for decision making purposes.

Four water samples and one field blank were collected by WSP. Samples were analyzed by Analytical Resources Inc. of Tukwila, Washington for the following parameter:

- 1,4-Dioxane following USEPA SW-846 Method 8270E.

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 2020a[1]) and Inorganic Review (USEPA 2020b[2]), 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.

[1] United States Environmental Protection Agency (USEPA). 2020a. National Functional Guidelines for Organic Superfund Methods Data Review. OLEM 9240.0-51. EPA-540-R-20-005, November.

[2] USEPA. 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. OLEM 9240.0-66. EPA-542-R-20-006, November.

WSP USA Inc.
18300 Redmond Way, Suite 200, Redmond, Washington, USA 98052 T: +1 425 883-0777 F: +1 425 882-5498

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.

B The analyte was not detected in the method blank.

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
- 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.

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% 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 December 2023

Table 2: Qualifier Summary Table Landsburg Mine Water Sampling Investigation December 2023

Table 3: MS/MSD Recoveries

Table 4: LCS/LCSD Recoveries

Attachment B Level 2A Data Validation Checklist

v:\projects_1992 projects\923-1000\gw_data & reports\2023\2023-12\report\draft\app a\9231000-tm-rev0-dusr_2023_12_landsburg.docx

ATTACHMENT A

Tables

Table 1: Sample Collection and Analysis Summary
Quarterly Groundwater Sampling - December 2023

						Analyses/Parameters							
SDG	**Field Identification**	**Collection Date**	**Lab Identification**	**Matrix**	**QC Samples**	**VOCs by 8260D**	**1,4-Dioxane by 8270E-SIM**	**NWTPH HCID**	**TPH-DX+TPH-GX**	**PCBs by 8082A**	**Organochlorine Pesticides by 8081B**	**SVOCs by 8270E**	**Total Priority Pollutant Metals**
23L0517	LMW-20-1223	12/18/2023 12:45	23L0517-03	GW	-		X						
23L0517	LMW-21-1223	12/18/2023 10:55	23L0517-01	GW	-		X						
23L0517	LMW-22-1223	12/18/2023 11:45	23L0517-02	GW	-		X						
23L0517	LMW-4-1223	12/18/2023 14:20	23L0517-05	GW	MS/MSD		X						
23L0517	LMW-FB-1223	12/18/2023 13:55	23L0517-04	WQ	-		X						

Notes:
All analyses performed by Analytical Resources, LLC (ARL), Tukwila WA.

Abbreviations:
GW: Groundwater
WQ: Water quality
SIM: Selective Ion Monitoring
FB: Field Blank
FD: Field Duplicate
SDG: Sample Delivery Group

Table 2: Qualifier Summary Table
Quarterly Groundwater Sampling - December 2023

SDG	Sample Name	Constituent	New Result	New MDL	New RL	Qualifier	Reason
All SDGs	All Samples	All Results	--	--	--	--	Laboratory applied U-qualifiers are retained unless other qualifications are indicated in this table. All other laboratory qualifiers are removed.

Abbreviations
MDL - Method Detection Limit
MSD - Matrix Spike Duplicate
RL - Reporting Limit
SDG - Sample Delivery Group
%R - Percent Recovery

Qualifier Definitions
U: Not detected above sample concentration

Table 3 LCS/LCSD Recoveries
Q4 Groundwater Sampling

SDG	Sample Name	Parameter	Analyte	LCS/LCSD% R	RPD	%R/RPD Criteria
23L0517	23L0517-05	8270E-SIM	1,4-dioxane	**56.4/61.5**	8.68	39.9-120/30

Abbreviations

MS - Matrix Spike
MSD - Matrix Spike Duplicate
SDG - Sample Delivery Group
%R - Percent Recovery

Table 4 MS/MSD Recoveries
Q4 Groundwater Sampling

SDG	Sample Name	Parameter	Analyte	MS/MSD% R	RPD	%R/RPD Criteria	Sample>4x spike value
23L0517	23L0517-05	8270E-SIM	1,4-dioxane	**58.6/68.2**	12.2	35.1-120/30	Yes

Abbreviations

MS - Matrix Spike
MSD - Matrix Spike Duplicate
SDG - Sample Delivery Group
%R - Percent Recovery

ATTACHMENT B

Level 2A Data Validation Checklist

Project Name: Landsburg Groundwater
Project Number/Phase/Task: GL9231000007.2023
Reviewing Company: WSP
Project Manager: Gary Zimmerman
Data Evaluator: Autumn Pearson
Data Evaluation Date: January 4, 2024
Checked by: Gary Zimmerman
Review Date: January 8, 2024
Laboratory: Analytical Resources, Inc., Tukwila, WA
Lab SDG #: 23L0517

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-20-005, November 2020

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)?	☒	☐	☐	Field Blank; See Table 1
d) Did the cooler contents match the COC?	☒	☐		
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?	☒	☐		
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?	☒	☐		

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?	☒	☐		
e) Were detected concentrations above the calibration range reported by the laboratory?	☒	☐		
f) Did the laboratory satisfy the requested sensitivity requirements?	☒	☐		

Laboratory Case Narrative	**YES**	**NO**	**NA**	**COMMENT**
a) Do the laboratory narrative or laboratory qualifiers indicate deficiencies?	☐	☒	☐	
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?	☒	☐		
b) Were holding times met for sample preparation?	☒	☐	☐	
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?	☒	☐		
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-4-1223
b) Were proper analytes reported in the MS/MSD?	☒	☐	☐	
c) Were project-specific MS/MSD recoveries within control limits?	☒	☐	☐	
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)?	☒	☐	☐	

MS/MSDs	**YES**	**NO**	**NA**	**COMMENTS**
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?	☐	☐	☒	
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**	**COMMENTS**
a) Were there any other technical problems not previously addressed?	☐	☒	
b) Were data acceptable and usable, except where noted?	☒	☐	

Comments/Notes:

N/A

Data qualification: NONE

APPENDIX B

Laboratory Analytical Report

Analytical Resources, LLC
Analytical Chemists and Consultants
Tukwila, WA

27 December 2023

Gary Zimmerman
Golder Associates
18300 NE Union Hill Road Suite 200
Redmond, WA 98052-3333

RE: Landsburg (Landsburg)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23L0517	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Kelly Bottem, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 23L0517	Turn-around Requested: Standard
ARI Client Company: WSP	Phone: 425-883-0777
Client Contact: Gary Zimmerman/Autumn Pearson	
Client Project Name: Landsburg 2023-12 Sampling	
Client Project #: GL9231000007.2023	Samplers: AP + SJ

Date: 12/18/23
Page: 1 of 1
No. of Coolers: Cooler Temps: 4, 7

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOCs	1,4-Dioxane	Total Priority Metal	TPH-HCID (NWTPH)	TPH-Dx (HOLD)	TPH-Gx (HOLD)			Notes/Comments
LMW-21-1223	12/18/23	1055	W	2		X							Analyze in accordance with MSA between WSP (formerly Golder) and ARL Ecology EIM EDD
LMW-22-1223	12/18/23	1145	W	2		X							
LMW-20-1223	12/18/23	1245	W	2		X							
LMW-FB-1223	12/18/23	1355	W	2		X							
LMW-4-1223	12/18/23	1420	W	6		X							MS/MSD collected

Comments/Special Instructions
HOLD TPH FOLLOW-UPS. CLIENT SPECIFIC RLs/Analyte List

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Autumn Pearson	Printed Name: Jacobha	Printed Name:	Printed Name:
Company: WSP	Company: ARL LLC	Company:	Company:
Date & Time: 12/18/23 1521	Date & Time: 12/18/23 1521	Date & Time:	Date & Time:

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LMW-21-1223	23L0517-01	Water	18-Dec-2023 10:55	19-Dec-2023 15:21
LMW-22-1223	23L0517-02	Water	18-Dec-2023 11:45	19-Dec-2023 15:21
LMW-20-1223	23L0517-03	Water	18-Dec-2023 12:45	19-Dec-2023 15:21
LMW-FB-1223	23L0517-04	Water	18-Dec-2023 13:55	19-Dec-2023 15:21
LMW-4-1223	23L0517-05	Water	18-Dec-2023 14:20	19-Dec-2023 15:21

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Work Order Case Narrative

1,4-Dioxane- EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: WSP

Project Name: Landsburg

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 23L0517

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1521 4.7

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 30097708

Cooler Accepted by: JB Date: 12/18/23 Time: 1521

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	YES	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO
Date VOC Trip Blank was made at ARI	NA		

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KFC Date: 12-19-23 Time: 1356 Labels checked by: KFC

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

LMW-21-1223
23L0517-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 12/18/2023 10:55
Instrument: NT6 Analyst: JZ — Analyzed: 12/26/2023 16:50

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq) — Extract ID: 23L0517-01 A 01
Preparation Batch: BLL0637 — Sample Size: 500 mL
Prepared: 12/22/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8			*33.6-120 %*	*63.3*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

LMW-22-1223

23L0517-02 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 12/18/2023 11:45

Instrument: NT6 Analyst: JZ — Analyzed: 12/26/2023 17:15

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq) — Extract ID: 23L0517-02 A 01

Preparation Batch: BLL0637 — Sample Size: 500 mL

Prepared: 12/22/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8			*33.6-120 %*	*64.7*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

LMW-20-1223

23L0517-03 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 12/18/2023 12:45

Instrument: NT6 Analyst: JZ — Analyzed: 12/26/2023 17:40

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq) — Extract ID: 23L0517-03 A 01

Preparation Batch: BLL0637 — Sample Size: 500 mL

Prepared: 12/22/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8			*33.6-120 %*	*65.0*	*%*	

Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

LMW-FB-1223

23L0517-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 12/18/2023 13:55

Instrument: NT6 Analyst: JZ — Analyzed: 12/26/2023 18:05

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq) — Extract ID: 23L0517-04 A 01

Preparation Batch: BLL0637 — Sample Size: 500 mL

Prepared: 12/22/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8			*33.6-120 %*	*65.7*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

LMW-4-1223

23L0517-05 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 12/18/2023 14:20
Instrument: NT6 Analyst: JZ — Analyzed: 12/26/2023 18:30

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq) — Extract ID: 23L0517-05 A 01
Preparation Batch: BLL0637 — Sample Size: 500 mL
Prepared: 12/22/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.4	1.5	ug/L	
Surrogate: 1,4-Dioxane-d8			*33.6-120 %*	*60.2*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLL0637 - EPA 8270E-SIM

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLL0637-BLK1)			Prepared: 22-Dec-2023 Analyzed: 26-Dec-2023 15:08							
1,4-Dioxane	ND	0.4	ug/L							U
Surrogate: 1,4-Dioxane-d8	6.69		ug/L	*10.0*		*66.9*	*33.6-120*			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLL0637 - EPA 8270E-SIM

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLL0637-BS1)				Prepared: 22-Dec-2023 Analyzed: 26-Dec-2023 15:34						
1,4-Dioxane	5.6	0.4	ug/L	10.0		56.4	39.9-120			
Surrogate: 1,4-Dioxane-d8	6.82		ug/L	*10.0*		*68.2*	*33.6-120*			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLL0637 - EPA 8270E-SIM

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLL0637-BSD1)				Prepared: 22-Dec-2023 Analyzed: 26-Dec-2023 15:59						
1,4-Dioxane	6.2	0.4	ug/L	10.0		61.5	39.9-120	8.68	30	
Surrogate: 1,4-Dioxane-d8	6.88		ug/L	*10.0*		*68.8*	*33.6-120*			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLL0637 - EPA 8270E-SIM

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BLL0637-MS1)	**Source: 23L0517-05**		Prepared: 22-Dec-2023 Analyzed: 26-Dec-2023 18:55							
1,4-Dioxane	7.4	0.4	ug/L	10.0	1.5	58.6	35.1-120			
Surrogate: 1,4-Dioxane-d8	6.86		ug/L	*10.0*	*6.02*	*68.6*	*33.6-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLL0637 - EPA 8270E-SIM

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BLL0637-MSD1)	**Source: 23L0517-05**		Prepared: 22-Dec-2023 Analyzed: 26-Dec-2023 19:21							
1,4-Dioxane	8.3	0.4	ug/L	10.0	1.5	68.2	35.1-120	12.20	30	
Surrogate: 1,4-Dioxane-d8	7.24		ug/L	*10.0*	*6.02*	*72.4*	*33.6-120*			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Certified Analyses included in this Report

Analyte	Certifications
EPA 8270E-SIM in Water	
1,4-Dioxane	WADOE,NELAP,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2025
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program, PJLA Testing	66169	02/28/2025
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2024
WADOE	WA Dept of Ecology	C558	06/30/2024
WA-DW	Ecology - Drinking Water	C558	06/30/2024

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	27-Dec-2023 12:21

Notes and Definitions

H	Hold time violation - Hold time was exceeded.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

APPENDIX C

Sample Integrity Data Sheets (SIDS)

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2023

Site Location Ravensdale, WA **Sample ID** LMW-4-1223

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 December 18, 2023 **Time** 14:20

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: 8.61 ft BTOC

Screened Interval: 195' - 209.7' BGS

Sand Pack Interval: 189' - 209.7' BGS

Packer Depth: 187.3' BGS

Sample Description clear, slight sulfur odor, no sheen

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

Aliquot Amount	Analysis	Container	Preservation / Amount
6-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-4
Date 12/18/2023
Time Begin Purge 13:42
Time Collect Sample 14:20

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
8.63	13:45	7.37	1,042	9.7	4.03	128.2	1.03
8.62	13:50	6.97	1,060	9.9	0.83	79.4	0.60
8.62	13:55	6.96	1,063	10	0.51	59.4	0.60
8.62	14:00	6.97	1,061	10	0.29	39.5	0.39
8.62	14:05	6.95	1,062	10	0.28	27.3	0.34
8.63	14:10	7	1,062	10	0.26	7.6	0.56
8.63	14:15	6.99	1,060	10.1	0.24	-9.3	0.30
8.63	14:18	7	1,062	10.1	0.22	-15.2	0.38

Comments:
MS/MSD collected.

Grundfos: 80 Hz
Packer: 110 psi
Tank: N/A
Throttle: N/A
CPM: N/A
CID: N/A
Flow Rate: 1100 mL/min

Sampler _____ **Date** December 18, 2023

Supervisor _____ **Date** _____

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2023

Site Location Ravensdale, WA **Sample ID** LMW-20-1223

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 December 18, 2023 **Time** 12:45

Media Water **Station** LMW-20

Sample Type: **grab** time composite space composite

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

Static Water Level: 15.17 ft BTOC

Screened Interval: 14' - 24' BGS

Sand Pack Interval: 11' - 24.5' 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
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-20
Date 12/18/2023
Time Begin Purge 12:10
Time Collect Sample 12:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
15.26	12:20	6.78	303.4	9.2	2.01	109.7	12.7
15.26	12:25	6.74	300.6	9.2	1.8	109.7	5.84
15.26	12:30	6.71	298.3	9.3	1.66	109.4	4.85
15.26	12:35	6.71	298.5	9.2	1.61	109.1	4.41
15.27	12:40	6.71	300.7	9.3	1.75	108.8	4.03

Comments:

Grundfos: N/A
Packer: N/A
Tank: N/A
Throttle: N/A
CPM: N/A
CID: N/A
Flow Rate: 200 mL/min

Sampler _____ **Date** December 18, 2023

Supervisor _____ **Date** _____

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2023

Site Location Ravensdale, WA **Sample ID** LMW-21-1223

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 December 18, 2023 **Time** 10:55

Media Water **Station** LMW-21

Sample Type: **grab** time composite space composite

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

Static Water Level: 10.21 ft BTOC

Screened Interval: 9.8' - 14.8' BGS

Sand Pack Interval: 6.8' - 15' 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
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-21
Date 12/18/2023
Time Begin Purge 10:21
Time Collect Sample 10:55

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
11.5	10:30	7.51	371.4	9.5	0.86	129.8	18.6
11.87	10:35	7.58	369.2	9.6	0.56	131.1	10.7
12.32	10:40	7.63	367.3	9.7	0.47	132.7	7.48
12.72	10:45	7.66	365.9	9.7	0.39	134.9	6.04
13.21	10:50	7.68	365.4	9.7	0.41	135.9	4.66
13.51	10:55	7.69	365.1	9.7	0.39	135.6	3.59

Comments:

Grundfos: N/A
Packer: N/A
Tank: N/A
Throttle: N/A
CPM: N/A
CID: N/A
Flow Rate: 200 mL/min

Sampler _____ **Date** December 18, 2023

Supervisor _____ **Date** _____

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-007.2023

Site Location Ravensdale, WA **Sample ID** LMW-22-1223

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 December 18, 2023 **Time** 11:45

Media Water **Station** LMW-22

Sample Type: **grab** time composite space composite

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

Static Water Level: 9.39 ft BTOC

Screened Interval: 17' - 27' BGS

Sand Pack Interval: 14' - 27.3' 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
2-500 mL	1,4-dioxane	500 mL amber bottles	None

SAMPLE INTEGRITY DATA SHEET

Well ID LMW-22
Date 12/18/2023
Time Begin Purge 11:12
Time Collect Sample 11:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
10.14	11:15	7.39	407.3	9.4	1.28	132.2	11.0
10.22	11:20	7.34	405	9.7	0.48	119.2	35.9
10.25	11:25	7.32	404.2	9.8	0.54	105.3	27.8
10.19	11:30	7.32	403.7	9.8	0.8	102.1	28.1
10.23	11:35	7.33	403.6	9.9	1.24	100.6	16.4
10.26	11:40	7.34	404.4	9.9	1.22	99.4	11.8
10.24	11:45	7.36	407.6	10	0.98	97.5	8.01

Comments:

Grundfos: N/A
Packer: N/A
Tank: N/A
Throttle: N/A
CPM: N/A
CID: N/A
Flow Rate: 250 mL/min

Sampler _____ **Date** December 18, 2023

Supervisor _____ **Date** _____

wsp.com