November 8, 2018 Project No. 923-1000.005.2000

Mr. Bill Kombol
Landsburg PLP Group
31407 Highway 169
PO Box 10
Black Diamond, WA 98010

LANDSBURG MINE SITE INTERIM GROUNDWATER MONITORING REPORT AUGUST 2018 SAMPLING

Dear Bill,

Golder Associates Inc. (Golder) completed a quarterly interim groundwater monitoring event at the Landsburg Mine Site during August 2018. Starting in 2018, the sampling frequency was increased to quarterly for all Site groundwater monitoring wells located on the north end of the Site and for well LMW-6, to provide additional data on the recent detection of 1,4-dioxane in LMW-2, LMW-4 and LMW-12. Groundwater samples were collected from monitoring wells LMW-2, LMW-4, LMW-6, LMW-10, LMW-12 and LMW-13R (Figure 1). 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. LMW-12 and LMW-13R were installed in spring 2018 as sentinel wells at the north portal of the Rogers Coal Mine subsidence trench. Figure 2 presents a cross-section along the strike at the coal seam that also depicts the location of the monitoring wells. Well LMW-6 monitors groundwater from the Frasier Coal Mine to the west Rogers Coal Mine.

Groundwater sampling was conducted in accordance with the Compliance Monitoring Plan, Landsburg Mine Site (Ecology 2017)[1], 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 insure sample representativeness.
- Measurement of field parameters including: pH, specific conductance, temperature, dissolved oxygen, redox potential (Eh), and turbidity.
- Collection of representative samples in appropriate containers provided by the analytical laboratory.

[1] 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.

- Analyses of groundwater samples for volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260C and for 1,4-Dioxane by EPA Method 8270D.

Appendix A presents the laboratory analytical reports for all analyses. Field sampling activities were documented on Sample Integrity Data Sheets (SIDS). Copies of the completed SIDS are provided in Appendix B. Appendix C provides the data validation report with added data qualifiers noted. Table 1 presents depth to groundwater measured on August 15, 2018 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.

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

The laboratory data packages underwent data validation. Items of note are provided in a validation memorandum in Appendix C. In general, data were found to be acceptable with minor qualification. Chloromethane and benzene were detected in the field and/or method blanks. Samples with chloromethane or benzene are qualified with U or UJ due to method/field blank contamination. Data qualifiers are defined, and all data qualifiers assigned under the data validation process are presented in the Appendix C data validation memorandum.

The parameters detected in groundwater samples during this sampling event were carbon disulfide, 1,4-Dioxane, 2-Butanone, 1,1-Dichloroethane, Naphthalene, and Toluene.

Carbon disulfide was detected in LMW-10 at a concentration of 0.25 µg/L and in LMW-13R at a concentration of 0.39 µg/L which is considerably lower than the MTCA Method B groundwater cleanup level for carbon disulfide (800 µg/L). Carbon disulfide has been detected at these 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.

2-Butanone, commonly referred to as methyl ethyl ketone (MEK), was detected in LMW-13R at a concentration of 7.64 µg/L J-flagged. The 2-butanone detection is significantly lower than the MTCA Method B groundwater cleanup level of 4800 µg/L.

Naphthalene was detected in LMW-13R at a concentration of 0.23 µg/L J-flagged, since it is less than the laboratory reporting limit of 0.50 µg/L. The LMW-13R concentration is also significantly less than the MTCA Method B groundwater cleanup level of 1600 µg/L.

Toluene was detected in LMW-13R at a concentration of 0.09 µg/L J-flagged, since it is less than the laboratory reporting limit of 0.20 µg/L. The LMW-13R concentration is also significantly less than the MTCA Method A groundwater cleanup level of 1000 µg/L.

1,1-Dichloroethane was detected in LMW-12 at a concentration of 0.14 µg/L. The trace detection was less than the laboratory reporting limit of 0.20 µg/L and is J-flagged. The LMW-12 concentration is also less than the MTCA Method B groundwater cleanup level of 7.68 µg/L.

1,4-Dioxane was detected in LMW-2 (1.6 µg/L), LMW-4 (1.5 µg/L), and LMW-12 (1.6 µg/L). The MTCA Method B groundwater cleanup level for 1,4-dioxane is 0.438 µg/L. 1,4-dioxane was initially detected in LMW-2 and LMW-4

in the November 2017 sampling event, which is the first sampling round that included analysis of 1,4-dioxane at the Site. Concentrations detected in LMW-2 and LMW-4 during August 2018 sampling round were lower than concentrations detected in November 2017. LMW-12 and LMW-13R were installed at the north end of the Site in March and April 2018. LMW-12 and LMW-13R were included in the May 2018 and August 2018 sampling rounds. 1,4-dioxane is detected in LMW-12 at low concentrations but has not been detected in LMW-13R. 1,4-Dioxane has not been detected in any other monitoring Site wells. Table 3 provides a summary of 1,4-dioxane detections at the Site. The 1,4-dioxane detection is being addressed by the Group in cooperation with Ecology.

If you have any questions or require any additional information, please contact Gary Zimmerman at (425) 883-0777.

Sincerely,

Golder Associates Inc.

Joe Miller
Project Geologist

Gary Zimmerman
Principal

JCM/GZ/sb

Attachments: Table 1: Groundwater Elevation Data Collection August 15, 2018 Landsburg Mine Site
Table 2: August 2018 Groundwater Analytical Results Landsburg Mine Site
Table 3: Groundwater 1,4-Dioxane Detections at the Landsburg Mine Site Since November 2017
Figure 1: Groundwater Monitoring Locations
Figure 2: Cross-Section along Strike at Coal Seam
Appendix A: Laboratory Analytical Reports
Appendix B: Sample Integrity Data Sheets (SIDS)
Appendix C: August 2018 Landsburg Mine Site Water Quality Monitoring Data Validation and Quality Assurance / Quality Control Review Memorandum

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Tables

Table 1: Groundwater Elevation Data Collection August 15, 2018 Landsburg Mine Site

	UNITS	LMW-2	LMW-4[1]	LMW-6	LMW-10	LMW-12	LMW-13R
Water Depths							
Time of data collection		9:43 AM	9:46 AM	8:20 AM	9:51 AM	9:56 AM	10:00 AM
Measured to Top of PVC	ft btc	8.46	10.00	41.40	0.48	12.42	12.96
Measured to Top of Monument	ft btm	NC	NC	NC	NC	NC	NC
Surveyed Elevation							
Top of PVC	ft asl	617.79	619.27	632.33	618.98	625.35	625.86
Top of Monument	ft asl	618.38	619.89	633.00	619.10	625.49	625.91
Ground Level	ft asl	614.92	617.37	629.95	615.78	621.90	622.07
Corrected Water Elevation							
Using PVC elevation	ft asl	**609.33**	**609.27**	**590.93**	**618.50**	**612.93**	**612.90**
Using Monument elevation	ft asl	NA	NA	NA	NA	NA	NA

Notes:

[1] Data corrected to accommodate well inclination of 20° from vertical

NA = Not applicable
NC = Data not collected
ft btc = feet below top of casing
ft btm = feet below top of monument
ft asl = feet above sea level

Table 2: August 2018 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2		LMW-4		LMW-6		LMW-10		LMW-12		LMW-12 Duplicate		LMW-13R		Field Blank		Trip Blank	
		8/15/2018		8/15/2018		8/15/2018		8/15/2018		8/15/2018		8/15/2018		8/15/2018		8/15/2018		8/15/2018	
Field Parameter																			
pH	stnd	6.90		6.93		6.83		8.58		6.71		-		7.25		-		-	
Conductivity	uS/cm	679		689		184		265		716		-		659		-		-	
Dissolved Oxygen	mg/L	0.90		0.79		1.47		0.62		0.36		-		0.38		-		-	
Temperature	^{o}C	8.9		8.9		8.0		9.7		9.6		-		9.5		-		-	
E_h	Rel mV	-64.6		-83.6		16.1		-191.1		-88.3		-		-129.3		-		-	
Turbidity	NTU	0.13		0.28		0.32		0.39		26.1		-		8.13		-		-	
Volatile Organic Compounds (VOCs)																			
Acetone	ug/L	5	UJ	5	UJ	5	U	5	U	5	UJ	5	UJ	5.44	UJ	5	U	5	U
Acrolein	ug/L	2.5	UJ	2.5	UJ	2.5	U	2.5	U	2.5	UJ	2.5	UJ	2.5	UJ	2.5	U	2.5	U
Acrylonitrile	ug/L	1	UJ	1	UJ	1	U	1	U	1	UJ	1	UJ	1	UJ	1	U	1	U
Benzene	ug/L	0.23	U	0.24	U	0.24	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	**0.14**	**J**	0.2	U
Bromobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Bromochloromethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Bromodichloromethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Bromoform	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Bromomethane	ug/L	1	UJ	1	UJ	1	U	1	U	1	UJ	1	UJ	1	UJ	1	U	1	U
2-Butanone	ug/L	5	UJ	5	UJ	5	U	5	U	5	UJ	5	UJ	**7.64**	**J**	5	U	5	U
n-Butylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	**0.05**	**J**
Sec-Butylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
tert-butylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Carbon Disulfide	ug/L	0.1	UJ	0.1	UJ	0.1	U	**0.25**		0.1	UJ	0.1	UJ	**0.39**	**J**	0.1	U	0.1	U
Carbon Tetrachloride	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Chlorobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Chloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Chloroform	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Chloromethane	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	**0.13**	**J**	0.5	U
2-Chlorotoluene	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
4-Chlorotoluene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Chlorodibromomethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2-Dibromo-3-Chloropropane	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U
1,2-Dibromoethane	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
Dibromomethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2-Dichlorobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,3-Dichlorobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,4-Dichlorobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Dichlorodifluoromethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,1-Dichloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ	**0.14**	**J**	**0.16**	**J**	0.2	UJ	0.2	U	0.2	U
1,2-Dichloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,1-Dichloroethene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Cis-1,2-Dichloroethene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Trans-1,2-Dichloroethene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U

Table 2: August 2018 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2		LMW-4		LMW-6		LMW-10		LMW-12		LMW-12 Duplicate		LMW-13R		Field Blank		Trip Blank	
1,2-Dichloropropane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,3-Dichloropropane	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
2,2-Dichloropropane	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
1,1-Dichloropropene	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
Cis-1,3-Dichloropropene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Trans-1,3-Dichloropropene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Ethylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Hexachloro-1,3-butadiene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
2-Hexanone	ug/L	5	UJ	5	UJ	5	U	5	U	5	UJ	5	UJ	5	UJ	5	U	5	U
Isopropylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
4-Isopropyltoluene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
4-Methyl-2-pentanone	ug/L	2.5	UJ	2.5	UJ	2.5	U	2.5	U	2.5	UJ	2.5	UJ	2.5	UJ	2.5	U	2.5	U
Methylene Chloride	ug/L	1	UJ	1	UJ	1	U	1	U	1	UJ	1	UJ	1	UJ	1	U	1	U
Naphthalene	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	UJ	**0.23**	**J**	0.5	U	0.5	U
n-Propylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Styrene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2,3-Trichlorobenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2,4-Trichlorobenzene	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U
1,1,1,2-Tetrachloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,1,2,2-Tetrachloroethane	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
Tetrachloroethene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Toluene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	**0.09**	**J**	0.2	U	0.2	U
1,1,1-Trichloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,1,2-Trichloroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Trichloroethene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Trichlorofluoromethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2,3-Trichloropropane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,2,4-Trimethylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
1,3,5-Trimethylbenzene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Vinyl Chloride	ug/L	0.1	UJ	0.1	UJ	0.1	U	0.1	U	0.1	UJ	0.1	UJ	0.1	UJ	0.1	U	0.1	U
o-Xylene	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
m-Xylene & p-Xylene	ug/L	0.4	UJ	0.4	UJ	0.4	U	0.4	U	0.4	UJ	0.4	UJ	0.4	UJ	0.4	U	0.4	U
Xylenes, Total	ug/L	0.6	UJ	0.6	UJ	0.6	U	0.6	U	0.6	UJ	0.6	UJ	0.6	UJ	0.6	U	0.6	U
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
2-Chloroethyl vinyl ether	ug/L	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U
Iodomethane	ug/L	0.5	UJ	0.5	UJ	0.5	U	0.5	U	0.5	UJ	0.5	UJ	0.5	UJ	0.5	U	0.5	U
Trans-1,4-Dichloro-2-butene	ug/L	1	UJ	1	UJ	1	U	1	U	1	UJ	1	UJ	1	UJ	1	U	1	U
Vinyl Acetate	ug/L	0.2	UJ	0.2	UJ	0.2	U	0.2	U	0.2	UJ	0.2	UJ	0.2	UJ	0.2	U	0.2	U
Semi-Volatile Organic Compounds (SVOCs)																			
1,4-Dioxane	ug/L	**1.6**		**1.5**		0.4	U	0.4	U	**1.6**		**1.4**		0.4	U	0.4	U	NA	

Notes:
" - " = Not Analyzed
U - The analyte was not detected above the level of the reporting limit.
UJ - The analyte was not detected above the reporting limit and is estimated.

Table 2: August 2018 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-4	LMW-6	LMW-10	LMW-12	LMW-12 Duplicate	LMW-13R	Field Blank	Trip Blank

J - The analyte was detected less than the reporting limit but above the method detection limit and the concentration is estimated, or was qualified as an estimated concentration during data validation (Appenidx C).
µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
Rel mV = relative millivolts
NTU = nephelometric turbidity unit
µg/L = micrograms per liter

Figures

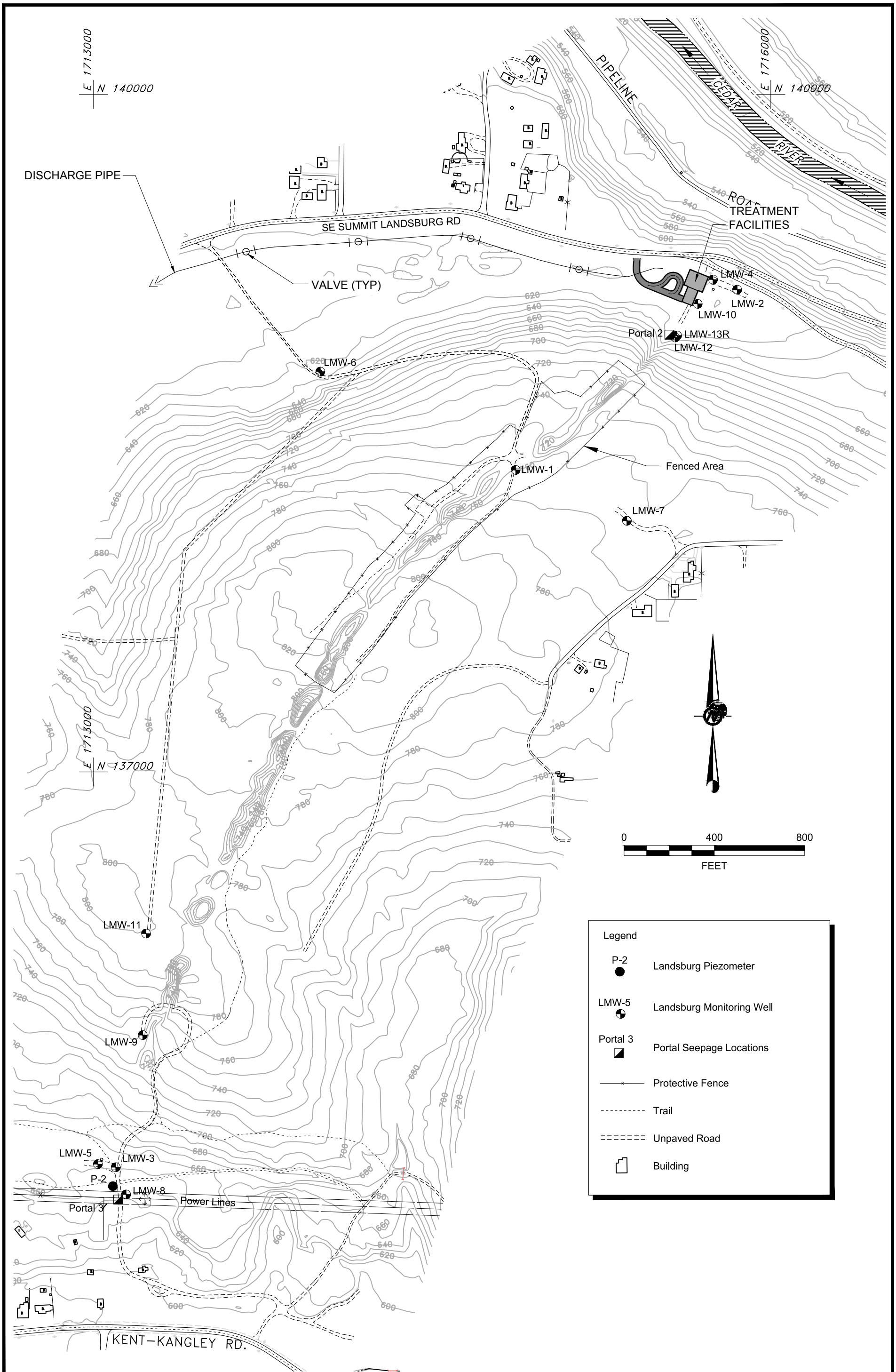
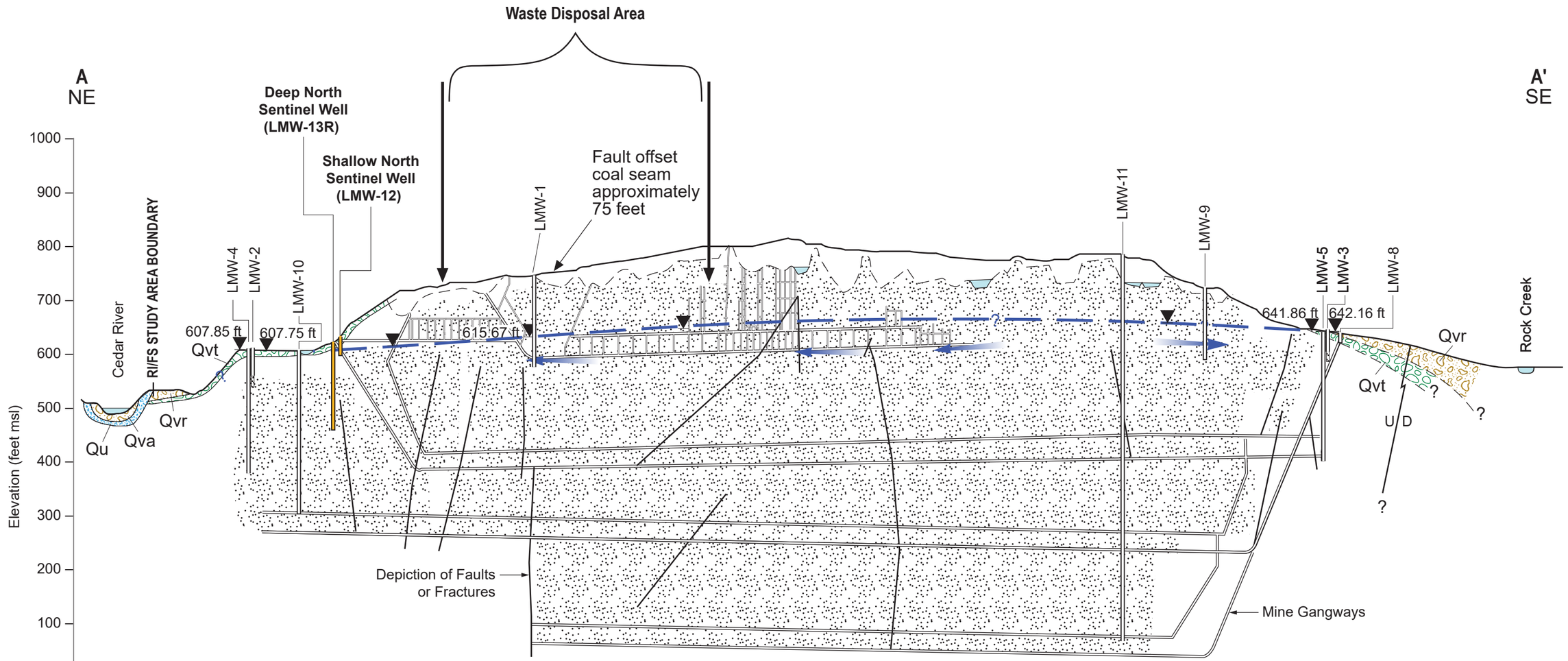


FIGURE **1**

GROUNDWATER MONITORING LOCATIONS

PALMER/LANDSBURG MINE/WA



EXPLANATION

- Potentiometric surface
- Outline of trench bottom
- Water Level (ft. amsl) 2/23/94
- Qvt Till, compact mixture of gravel occasional boulders in clayey silty sand matrix
- Sandstone
- Surface water feature

0 500
FEET

- Anticipated collapsed zone within mine
- Qu Drift, till, fluvial sand and gravel, lacustrine sand, silt, clay and peat
- Qvr Recessional outwash, well sorted sand and pebble-cobble
- Qva Advanced outwash pebble-cobble gravel may include very fine sand
- Monitoring Interval

Groundwater Flow Direction

Sources for the Geology and Mine Information:
J.E. Luzier 1969; surficial geology
State of Washington, Water Well reports
Mine Superintendant's Records
Landsburg Well Logs

NOTE: Vertical to horizontal scale ratio is 2.5:1
Wells are project normal into the strike of the Cross-Section A-A'

Assuming groundwater discharge at the north and south end of mine.

LMW-12 and LMW-13R have not yet been surveyed.

CLIENT
LANDSBURG PLP GROUP

CONSULTANT
GOLDER

YYYY-MM-DD	2018-06-15
PREPARED	REDMOND
DESIGN	
REVIEW	
APPROVED	

PROJECT
LANDSBURG MINE SITE

TITLE
CROSS-SECTION ALONG STRIKE AT COAL SEAM
CROSS-SECTION A-A'

PROJECT No.	PHASE	FIGURE
923-1000	005	2

G:\Palmer Coking Coal Co\Landsburg Mine WA\99_PROJECTS\923100002_Ph1_Remediation\R154102_PRODUCTION\INDD\923100_002_R154_002.indd

APPENDIX A

Laboratory Analytical Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

30 August 2018

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

RE: 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)
18H0208	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, Inc.

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.

Cert# 100006

PJLA Testing
Accreditation # 66169

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 18H0208	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Golder	Phone: 425-883-0777	Date: 8/15/18	Ice Present?
Client Contact: Gary Zimmerman		No. of Coolers:	Cooler Temps: 12.1 2.4
Client Project Name: Landsburg			
Client Project #: 923/000005.2000	Samplers: JM/AV		

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

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC Client List	1,4-Dioxane (8270-D)							Notes/Comments
LMW-6-0818	8/15/18	0910	W	5	X	X							Pls analyze under Current MSA w/ Golder
LMW-2-0818		1055	W	5	X	X							
LMW-4-0818		1155	W	5	X	X							
LMW-10-0818		1250	W	5	X	X							
LMW-12-0818		1350	W	5	X	X							
LMW-12-0818-D		1400	W	5	X	X							
LMW-13R-0818		1445	W	5	X	X							
~~FB~~ FieldBlank-0818		1430	W	5	X	X							
Trip Blank		—	W	3	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
-Client Specific RLs- Ecology EIM EDD pls cc jcmiller@golder.com	Printed Name: Joe Miller	Printed Name: Stephanie Fisher	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 8/15/18 1550	Date & Time: 8-15-18 1550	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LMW-6-0818	18H0208-01	Water	15-Aug-2018 09:10	15-Aug-2018 15:50
LMW-2-0818	18H0208-02	Water	15-Aug-2018 10:55	15-Aug-2018 15:50
LMW-4-0818	18H0208-03	Water	15-Aug-2018 11:55	15-Aug-2018 15:50
LMW-10-0818	18H0208-04	Water	15-Aug-2018 12:50	15-Aug-2018 15:50
LMW-12-0818	18H0208-05	Water	15-Aug-2018 13:50	15-Aug-2018 15:50
LMW-12-0818-D	18H0208-06	Water	15-Aug-2018 14:00	15-Aug-2018 15:50
LMW-13R-0818	18H0208-07	Water	15-Aug-2018 14:45	15-Aug-2018 15:50
Field Blank-0818	18H0208-08	Water	15-Aug-2018 14:30	15-Aug-2018 15:50
Trip Blank	18H0208-09	Water	15-Aug-2018 00:00	15-Aug-2018 15:50

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Case Narrative

1,4-Dioxane- EPA Method SW8270D

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 LCS percent recoveries were within control limits.

Volatiles - EPA Method SW8260C

The sample(s) were run within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of all associated "Q" flagged analytes which are out of control high in the CCAL and 1,1-Dichloroethane is out of control low. All associated samples that contain an analyte have been flagged with a "Q" qualifier.

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 LCS/LCSD percent recoveries and RPD were within control limits with the exception of analytes flagged on the associated forms.

Sample 18H0208-01 contained a peabubble at the time of the analysis and samples 18H0208-02, 03, 05, 06, 07 and 09 contained headspace.

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-6-0818

18H0208-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 09:10

Instrument: NT16 — Analyzed: 27-Aug-2018 18:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
PB

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.24**	ug/L	Q
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-6-0818

18H0208-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 09:10

Instrument: NT16 — Analyzed: 27-Aug-2018 18:11

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*88.9*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-6-0818

18H0208-01 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 09:10

Instrument: NT16 — Analyzed: 27-Aug-2018 18:11

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*86.8*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*95.2*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*98.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*101*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-6-0818

18H0208-01 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 09:10

Instrument: NT6 — Analyzed: 27-Aug-2018 12:45

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*69.2*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-2-0818

18H0208-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 10:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:31

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.23**	ug/L	Q
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-2-0818

18H0208-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 10:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:31

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*90.2*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-2-0818

18H0208-02 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 10:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:31

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*87.8*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*99.2*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*97.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*102*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-2-0818

18H0208-02 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 10:55

Instrument: NT6 — Analyzed: 27-Aug-2018 13:21

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	**1.6**	ug/L	
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*62.6*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-4-0818

18H0208-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 11:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.24**	ug/L	Q
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-4-0818

18H0208-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 11:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:51

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*93.1*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-4-0818

18H0208-03 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 11:55

Instrument: NT16 — Analyzed: 27-Aug-2018 18:51

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*91.3*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*98.0*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*94.9*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*101*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-4-0818

18H0208-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 11:55

Instrument: NT6 — Analyzed: 27-Aug-2018 13:54

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	**1.5**	ug/L	
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*66.6*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-10-0818

18H0208-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 12:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:12

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.16**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	**0.25**	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.18**	ug/L	J
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-10-0818

18H0208-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 12:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*102*	*%*	
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*94.2*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-10-0818

18H0208-04 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 12:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:12

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Toluene-d8		*80-120 %*	*97.8*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*94.7*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*103*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-10-0818

18H0208-04 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 12:50

Instrument: NT6 — Analyzed: 27-Aug-2018 14:27

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*53.9*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818

18H0208-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 13:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.14**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.18**	ug/L	J
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818

18H0208-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 13:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:32

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*92.4*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818

18H0208-05 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 13:50

Instrument: NT16 — Analyzed: 27-Aug-2018 19:32

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*86.0*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*98.2*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*96.4*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*97.9*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818

18H0208-05 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 13:50

Instrument: NT6 — Analyzed: 27-Aug-2018 15:01

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	**1.6**	ug/L	
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*82.4*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818-D

18H0208-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:00

Instrument: NT16 — Analyzed: 27-Aug-2018 19:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	**0.16**	ug/L	J
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.16**	ug/L	J
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818-D

18H0208-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:00

Instrument: NT16 — Analyzed: 27-Aug-2018 19:52

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*96.7*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818-D

18H0208-06 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:00

Instrument: NT16 — Analyzed: 27-Aug-2018 19:52

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*89.7*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*97.7*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*97.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*100*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-12-0818-D

18H0208-06 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 14:00

Instrument: NT6 — Analyzed: 27-Aug-2018 15:34

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	**1.4**	ug/L	
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*73.4*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-13R-0818

18H0208-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:45

Instrument: NT16 — Analyzed: 27-Aug-2018 20:12

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.13**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	**5.44**	ug/L	
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	**0.39**	ug/L	
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	**7.64**	ug/L	
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.19**	ug/L	J
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	**0.09**	ug/L	J

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-13R-0818

18H0208-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:45

Instrument: NT16 — Analyzed: 27-Aug-2018 20:12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	**0.23**	ug/L	J
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*85.4*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-13R-0818

18H0208-07 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:45

Instrument: NT16 — Analyzed: 27-Aug-2018 20:12

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*82.3*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*97.9*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*94.6*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*101*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

LMW-13R-0818

18H0208-07 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 14:45

Instrument: NT6 — Analyzed: 27-Aug-2018 16:07

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*50.3*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Field Blank-0818

18H0208-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:30

Instrument: NT16 — Analyzed: 27-Aug-2018 20:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0573 — Sample Size: 10 mL
Prepared: 27-Aug-2018 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	**0.13**	ug/L	J
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	**0.14**	ug/L	J
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Field Blank-0818

18H0208-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:30

Instrument: NT16 — Analyzed: 27-Aug-2018 20:32

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*91.3*	*%*	
Surrogate: 1,2-Dichloroethane-d4				*80-129 %*	*91.1*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Field Blank-0818

18H0208-08 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 14:30

Instrument: NT16 — Analyzed: 27-Aug-2018 20:32

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Toluene-d8		*80-120 %*	*98.9*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*97.8*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*101*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Field Blank-0818

18H0208-08 (Water)

Semivolatile Organic Compounds

Method: EPA 8270D — Sampled: 08/15/2018 14:30

Instrument: NT6 — Analyzed: 27-Aug-2018 16:41

Sample Preparation: Preparation Method: EPA 3520C (Liq Liq)
Preparation Batch: BGH0467 — Sample Size: 500 mL
Prepared: 22-Aug-2018 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dioxane	123-91-1	1	0.2	0.4	ND	ug/L	U
Surrogate: 1,4-Dioxane-d8				*33.6-120 %*	*79.6*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Trip Blank

18H0208-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 00:00

Instrument: NT16 — Analyzed: 28-Aug-2018 17:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)
Preparation Batch: BGH0806 — Sample Size: 10 mL
Prepared: 28-Aug-2018 — Final Volume: 10 mL
HS

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloromethane	74-87-3	1	0.09	0.50	ND	ug/L	U
Vinyl Chloride	75-01-4	1	0.06	0.10	ND	ug/L	U
Bromomethane	74-83-9	1	0.25	1.00	ND	ug/L	U
Chloroethane	75-00-3	1	0.09	0.20	ND	ug/L	U
Trichlorofluoromethane	75-69-4	1	0.04	0.20	ND	ug/L	U
Acrolein	107-02-8	1	2.48	2.50	ND	ug/L	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1	0.04	0.20	ND	ug/L	U
Acetone	67-64-1	1	2.06	5.00	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.05	0.20	ND	ug/L	U
Bromoethane	74-96-4	1	0.04	0.20	ND	ug/L	U
Iodomethane	74-88-4	1	0.23	0.50	ND	ug/L	U
Methylene Chloride	75-09-2	1	0.49	1.00	ND	ug/L	U
Acrylonitrile	107-13-1	1	0.60	1.00	ND	ug/L	U
Carbon Disulfide	75-15-0	1	0.04	0.10	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.05	0.20	ND	ug/L	U
Vinyl Acetate	108-05-4	1	0.07	0.20	ND	ug/L	U
1,1-Dichloroethane	75-34-3	1	0.05	0.20	ND	ug/L	U
2-Butanone	78-93-3	1	0.81	5.00	ND	ug/L	U
2,2-Dichloropropane	594-20-7	1	0.05	0.10	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.04	0.20	ND	ug/L	U
Chloroform	67-66-3	1	0.03	0.20	ND	ug/L	U
Bromochloromethane	74-97-5	1	0.06	0.20	ND	ug/L	U
1,1,1-Trichloroethane	71-55-6	1	0.04	0.20	ND	ug/L	U
1,1-Dichloropropene	563-58-6	1	0.03	0.10	ND	ug/L	U
Carbon tetrachloride	56-23-5	1	0.04	0.20	ND	ug/L	U
1,2-Dichloroethane	107-06-2	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.03	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.05	0.20	ND	ug/L	U
1,2-Dichloropropane	78-87-5	1	0.04	0.20	ND	ug/L	U
Bromodichloromethane	75-27-4	1	0.05	0.20	ND	ug/L	U
Dibromomethane	74-95-3	1	0.15	0.20	ND	ug/L	U
2-Chloroethyl vinyl ether	110-75-8	1	0.25	0.50	ND	ug/L	U
4-Methyl-2-Pentanone	108-10-1	1	0.97	2.50	ND	ug/L	U
cis-1,3-Dichloropropene	10061-01-5	1	0.06	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.04	0.20	ND	ug/L	U

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Trip Blank

18H0208-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 00:00

Instrument: NT16 — Analyzed: 28-Aug-2018 17:05

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,3-Dichloropropene	10061-02-6	1	0.08	0.20	ND	ug/L	U
2-Hexanone	591-78-6	1	0.90	5.00	ND	ug/L	U
1,1,2-Trichloroethane	79-00-5	1	0.13	0.20	ND	ug/L	U
1,3-Dichloropropane	142-28-9	1	0.06	0.10	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.05	0.20	ND	ug/L	U
Dibromochloromethane	124-48-1	1	0.05	0.20	ND	ug/L	U
1,2-Dibromoethane	106-93-4	1	0.07	0.10	ND	ug/L	U
Chlorobenzene	108-90-7	1	0.02	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.04	0.20	ND	ug/L	U
1,1,1,2-Tetrachloroethane	630-20-6	1	0.04	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.05	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.03	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.09	0.60	ND	ug/L	U
Styrene	100-42-5	1	0.05	0.20	ND	ug/L	U
Bromoform	75-25-2	1	0.06	0.20	ND	ug/L	U
1,1,2,2-Tetrachloroethane	79-34-5	1	0.06	0.10	ND	ug/L	U
1,2,3-Trichloropropane	96-18-4	1	0.13	0.20	ND	ug/L	U
trans-1,4-Dichloro 2-Butene	110-57-6	1	0.32	1.00	ND	ug/L	U
n-Propylbenzene	103-65-1	1	0.02	0.20	ND	ug/L	U
Bromobenzene	108-86-1	1	0.06	0.20	ND	ug/L	U
Isopropyl Benzene	98-82-8	1	0.02	0.20	ND	ug/L	U
2-Chlorotoluene	95-49-8	1	0.02	0.10	ND	ug/L	U
4-Chlorotoluene	106-43-4	1	0.02	0.20	ND	ug/L	U
t-Butylbenzene	98-06-6	1	0.03	0.20	ND	ug/L	U
1,3,5-Trimethylbenzene	108-67-8	1	0.02	0.20	ND	ug/L	U
1,2,4-Trimethylbenzene	95-63-6	1	0.02	0.20	ND	ug/L	U
s-Butylbenzene	135-98-8	1	0.02	0.20	ND	ug/L	U
4-Isopropyl Toluene	99-87-6	1	0.03	0.20	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.04	0.20	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.04	0.20	ND	ug/L	U
n-Butylbenzene	104-51-8	1	0.02	0.20	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.04	0.20	ND	ug/L	U
1,2-Dibromo-3-chloropropane	96-12-8	1	0.37	0.50	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.11	0.50	ND	ug/L	U
Hexachloro-1,3-Butadiene	87-68-3	1	0.07	0.20	ND	ug/L	U
Naphthalene	91-20-3	1	0.12	0.50	ND	ug/L	U
1,2,3-Trichlorobenzene	87-61-6	1	0.11	0.20	ND	ug/L	U
Dichlorodifluoromethane	75-71-8	1	0.05	0.20	ND	ug/L	U
Surrogate: Dibromofluoromethane				*80-120 %*	*91.7*	*%*	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Trip Blank

18H0208-09 (Water)

Volatile Organic Compounds

Method: EPA 8260C — Sampled: 08/15/2018 00:00

Instrument: NT16 — Analyzed: 28-Aug-2018 17:05

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 1,2-Dichloroethane-d4		*80-129 %*	*84.8*	*%*	
Surrogate: Toluene-d8		*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene		*80-120 %*	*84.1*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4		*80-120 %*	*97.9*	*%*	

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0573-BLK1)				Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 16:54							
Chloromethane	ND	0.09	0.50	ug/L							U
Vinyl Chloride	ND	0.06	0.10	ug/L							U
Bromomethane	ND	0.25	1.00	ug/L							U
Chloroethane	ND	0.09	0.20	ug/L							U
Trichlorofluoromethane	ND	0.04	0.20	ug/L							U
Acrolein	ND	2.48	2.50	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.04	0.20	ug/L							U
Acetone	ND	2.06	5.00	ug/L							U
1,1-Dichloroethene	ND	0.05	0.20	ug/L							U
Bromoethane	ND	0.04	0.20	ug/L							U
Iodomethane	ND	0.23	0.50	ug/L							U
Methylene Chloride	ND	0.49	1.00	ug/L							U
Acrylonitrile	ND	0.60	1.00	ug/L							U
Carbon Disulfide	ND	0.04	0.10	ug/L							U
trans-1,2-Dichloroethene	ND	0.05	0.20	ug/L							U
Vinyl Acetate	ND	0.07	0.20	ug/L							U
1,1-Dichloroethane	ND	0.05	0.20	ug/L							U
2-Butanone	ND	0.81	5.00	ug/L							U
2,2-Dichloropropane	ND	0.05	0.10	ug/L							U
cis-1,2-Dichloroethene	ND	0.04	0.20	ug/L							U
Chloroform	ND	0.03	0.20	ug/L							U
Bromochloromethane	ND	0.06	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.04	0.20	ug/L							U
1,1-Dichloropropene	ND	0.03	0.10	ug/L							U
Carbon tetrachloride	ND	0.04	0.20	ug/L							U
1,2-Dichloroethane	ND	0.07	0.20	ug/L							U
Benzene	0.10	0.03	0.20	ug/L							J
Trichloroethene	ND	0.05	0.20	ug/L							U
1,2-Dichloropropane	ND	0.04	0.20	ug/L							U
Bromodichloromethane	ND	0.05	0.20	ug/L							U
Dibromomethane	ND	0.15	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	0.25	0.50	ug/L							U
4-Methyl-2-Pentanone	ND	0.97	2.50	ug/L							U
cis-1,3-Dichloropropene	ND	0.06	0.20	ug/L							U
Toluene	ND	0.04	0.20	ug/L							U

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0573-BLK1)	Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 16:54										
trans-1,3-Dichloropropene	ND	0.08	0.20	ug/L							U
2-Hexanone	ND	0.90	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.13	0.20	ug/L							U
1,3-Dichloropropane	ND	0.06	0.10	ug/L							U
Tetrachloroethene	ND	0.05	0.20	ug/L							U
Dibromochloromethane	ND	0.05	0.20	ug/L							U
1,2-Dibromoethane	ND	0.07	0.10	ug/L							U
Chlorobenzene	ND	0.02	0.20	ug/L							U
Ethylbenzene	ND	0.04	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.04	0.20	ug/L							U
m,p-Xylene	ND	0.05	0.40	ug/L							U
o-Xylene	ND	0.03	0.20	ug/L							U
Xylenes, total	ND	0.09	0.60	ug/L							U
Styrene	ND	0.05	0.20	ug/L							U
Bromoform	ND	0.06	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.06	0.10	ug/L							U
1,2,3-Trichloropropane	ND	0.13	0.20	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	0.32	1.00	ug/L							U
n-Propylbenzene	ND	0.02	0.20	ug/L							U
Bromobenzene	ND	0.06	0.20	ug/L							U
Isopropyl Benzene	ND	0.02	0.20	ug/L							U
2-Chlorotoluene	ND	0.02	0.10	ug/L							U
4-Chlorotoluene	ND	0.02	0.20	ug/L							U
t-Butylbenzene	ND	0.03	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.02	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.02	0.20	ug/L							U
s-Butylbenzene	ND	0.02	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.03	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.04	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.04	0.20	ug/L							U
n-Butylbenzene	ND	0.02	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.04	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.37	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.11	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.07	0.20	ug/L							U

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0573-BLK1)				Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 16:54							
Naphthalene	ND	0.12	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.11	0.20	ug/L							U
Dichlorodifluoromethane	ND	0.05	0.20	ug/L							U
Surrogate: Dibromofluoromethane	4.52			ug/L	*5.00*		*90.5*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.09			ug/L	*5.00*		*81.8*	*80-129*			
Surrogate: Toluene-d8	4.90			ug/L	*5.00*		*97.9*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.33			ug/L	*5.00*		*86.6*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.03			ug/L	*5.00*		*101*	*80-120*			
LCS (BGH0573-BS1)				Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 14:30							
Chloromethane	1.86	0.09	0.50	ug/L	2.00		93.2	60-138			
Vinyl Chloride	2.02	0.06	0.10	ug/L	2.00		101	66-133			
Bromomethane	2.18	0.25	1.00	ug/L	2.00		109	72-131			
Chloroethane	2.16	0.09	0.20	ug/L	2.00		108	60-155			
Trichlorofluoromethane	1.90	0.04	0.20	ug/L	2.00		95.1	80-129			
Acrolein	10.1	2.48	2.50	ug/L	10.0		101	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.13	0.04	0.20	ug/L	2.00		106	76-129			
Acetone	9.44	2.06	5.00	ug/L	10.0		94.4	58-142			
1,1-Dichloroethene	2.03	0.05	0.20	ug/L	2.00		102	69-135			
Bromoethane	1.75	0.04	0.20	ug/L	2.00		87.3	78-128			
Iodomethane	1.83	0.23	0.50	ug/L	2.00		91.3	56-147			
Methylene Chloride	1.95	0.49	1.00	ug/L	2.00		97.3	65-135			
Acrylonitrile	1.89	0.60	1.00	ug/L	2.00		94.3	64-134			
Carbon Disulfide	1.86	0.04	0.10	ug/L	2.00		93.2	78-125			
trans-1,2-Dichloroethene	2.05	0.05	0.20	ug/L	2.00		103	78-128			
Vinyl Acetate	1.75	0.07	0.20	ug/L	2.00		87.4	55-138			
1,1-Dichloroethane	1.54	0.05	0.20	ug/L	2.00		77.2	76-124			Q
2-Butanone	8.66	0.81	5.00	ug/L	10.0		86.6	61-140			
2,2-Dichloropropane	2.10	0.05	0.10	ug/L	2.00		105	78-125			
cis-1,2-Dichloroethene	1.97	0.04	0.20	ug/L	2.00		98.7	80-121			
Chloroform	1.93	0.03	0.20	ug/L	2.00		96.7	80-122			
Bromochloromethane	1.90	0.06	0.20	ug/L	2.00		95.0	80-121			
1,1,1-Trichloroethane	1.97	0.04	0.20	ug/L	2.00		98.5	79-123			
1,1-Dichloropropene	2.01	0.03	0.10	ug/L	2.00		101	80-120			
Carbon tetrachloride	2.07	0.04	0.20	ug/L	2.00		104	53-137			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0573-BS1)					Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 14:30						
1,2-Dichloroethane	1.93	0.07	0.20	ug/L	2.00		96.5	75-123			
Benzene	2.42	0.03	0.20	ug/L	2.00		121	80-120			*, Q
Trichloroethene	2.11	0.05	0.20	ug/L	2.00		105	80-120			
1,2-Dichloropropane	2.08	0.04	0.20	ug/L	2.00		104	80-120			
Bromodichloromethane	2.07	0.05	0.20	ug/L	2.00		104	80-121			
Dibromomethane	1.89	0.15	0.20	ug/L	2.00		94.4	80-120			
2-Chloroethyl vinyl ether	0.82	0.25	0.50	ug/L	2.00		40.8	74-127			*, Q
4-Methyl-2-Pentanone	9.35	0.97	2.50	ug/L	10.0		93.5	67-133			
cis-1,3-Dichloropropene	2.05	0.06	0.20	ug/L	2.00		102	80-124			
Toluene	2.10	0.04	0.20	ug/L	2.00		105	80-120			
trans-1,3-Dichloropropene	2.04	0.08	0.20	ug/L	2.00		102	71-127			
2-Hexanone	8.76	0.90	5.00	ug/L	10.0		87.6	69-133			
1,1,2-Trichloroethane	1.97	0.13	0.20	ug/L	2.00		98.6	80-121			
1,3-Dichloropropane	2.04	0.06	0.10	ug/L	2.00		102	80-120			
Tetrachloroethene	2.20	0.05	0.20	ug/L	2.00		110	80-120			
Dibromochloromethane	2.00	0.05	0.20	ug/L	2.00		99.9	65-135			
1,2-Dibromoethane	2.03	0.07	0.10	ug/L	2.00		101	80-121			
Chlorobenzene	2.11	0.02	0.20	ug/L	2.00		106	80-120			
Ethylbenzene	2.07	0.04	0.20	ug/L	2.00		103	80-120			
1,1,1,2-Tetrachloroethane	2.08	0.04	0.20	ug/L	2.00		104	80-120			
m,p-Xylene	4.32	0.05	0.40	ug/L	4.00		108	80-121			
o-Xylene	2.06	0.03	0.20	ug/L	2.00		103	80-121			
Xylenes, total	6.38	0.09	0.60	ug/L	6.00		106	76-127			
Styrene	1.99	0.05	0.20	ug/L	2.00		99.6	80-124			
Bromoform	2.22	0.06	0.20	ug/L	2.00		111	51-134			
1,1,2,2-Tetrachloroethane	2.11	0.06	0.10	ug/L	2.00		105	77-123			
1,2,3-Trichloropropane	2.16	0.13	0.20	ug/L	2.00		108	76-125			
trans-1,4-Dichloro 2-Butene	1.89	0.32	1.00	ug/L	2.00		94.6	55-129			
n-Propylbenzene	2.31	0.02	0.20	ug/L	2.00		116	78-130			
Bromobenzene	2.18	0.06	0.20	ug/L	2.00		109	80-120			
Isopropyl Benzene	2.23	0.02	0.20	ug/L	2.00		112	80-128			
2-Chlorotoluene	2.19	0.02	0.10	ug/L	2.00		109	78-122			
4-Chlorotoluene	2.20	0.02	0.20	ug/L	2.00		110	80-121			
t-Butylbenzene	2.20	0.03	0.20	ug/L	2.00		110	78-125			
1,3,5-Trimethylbenzene	2.24	0.02	0.20	ug/L	2.00		112	80-129			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0573-BS1)					Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 14:30						
1,2,4-Trimethylbenzene	2.24	0.02	0.20	ug/L	2.00		112	80-127			
s-Butylbenzene	2.27	0.02	0.20	ug/L	2.00		114	78-129			
4-Isopropyl Toluene	2.28	0.03	0.20	ug/L	2.00		114	79-130			
1,3-Dichlorobenzene	2.25	0.04	0.20	ug/L	2.00		113	80-120			
1,4-Dichlorobenzene	2.23	0.04	0.20	ug/L	2.00		112	80-120			
n-Butylbenzene	2.29	0.02	0.20	ug/L	2.00		114	74-129			
1,2-Dichlorobenzene	2.16	0.04	0.20	ug/L	2.00		108	80-120			
1,2-Dibromo-3-chloropropane	1.78	0.37	0.50	ug/L	2.00		89.2	62-123			
1,2,4-Trichlorobenzene	2.15	0.11	0.50	ug/L	2.00		107	64-124			
Hexachloro-1,3-Butadiene	2.49	0.07	0.20	ug/L	2.00		124	58-123			*, Q
Naphthalene	2.00	0.12	0.50	ug/L	2.00		100	50-134			
1,2,3-Trichlorobenzene	2.20	0.11	0.20	ug/L	2.00		110	49-133			
Dichlorodifluoromethane	2.18	0.05	0.20	ug/L	2.00		109	48-147			
Surrogate: Dibromofluoromethane	4.52			ug/L	*5.00*		*90.3*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.71			ug/L	*5.00*		*94.2*	*80-129*			
Surrogate: Toluene-d8	4.96			ug/L	*5.00*		*99.3*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.77			ug/L	*5.00*		*95.3*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	*5.00*		*99.5*	*80-120*			
LCS Dup (BGH0573-BSD1)					Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 15:59						
Chloromethane	1.84	0.09	0.50	ug/L	2.00		91.9	60-138	1.40	30	
Vinyl Chloride	1.93	0.06	0.10	ug/L	2.00		96.6	66-133	4.55	30	
Bromomethane	2.11	0.25	1.00	ug/L	2.00		106	72-131	3.16	30	
Chloroethane	2.23	0.09	0.20	ug/L	2.00		111	60-155	3.32	30	
Trichlorofluoromethane	1.96	0.04	0.20	ug/L	2.00		98.0	80-129	3.04	30	
Acrolein	10.7	2.48	2.50	ug/L	10.0		107	52-144	6.34	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.03	0.04	0.20	ug/L	2.00		101	76-129	4.76	30	
Acetone	8.43	2.06	5.00	ug/L	10.0		84.3	58-142	11.30	30	
1,1-Dichloroethene	1.90	0.05	0.20	ug/L	2.00		95.0	69-135	6.71	30	
Bromoethane	1.83	0.04	0.20	ug/L	2.00		91.5	78-128	4.76	30	
Iodomethane	1.80	0.23	0.50	ug/L	2.00		89.9	56-147	1.52	30	
Methylene Chloride	1.80	0.49	1.00	ug/L	2.00		89.9	65-135	7.89	30	
Acrylonitrile	1.64	0.60	1.00	ug/L	2.00		82.0	64-134	13.90	30	
Carbon Disulfide	1.97	0.04	0.10	ug/L	2.00		98.6	78-125	5.63	30	
trans-1,2-Dichloroethene	1.93	0.05	0.20	ug/L	2.00		96.3	78-128	6.50	30	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BGH0573-BSD1)	Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 15:59										
Vinyl Acetate	1.69	0.07	0.20	ug/L	2.00		84.5	55-138	3.37	30	
1,1-Dichloroethane	1.27	0.05	0.20	ug/L	2.00		63.7	76-124	19.20	30	*, Q
2-Butanone	7.85	0.81	5.00	ug/L	10.0		78.5	61-140	9.87	30	
2,2-Dichloropropane	1.98	0.05	0.10	ug/L	2.00		99.0	78-125	6.13	30	
cis-1,2-Dichloroethene	1.86	0.04	0.20	ug/L	2.00		93.1	80-121	5.86	30	
Chloroform	1.90	0.03	0.20	ug/L	2.00		95.2	80-122	1.60	30	
Bromochloromethane	1.91	0.06	0.20	ug/L	2.00		95.5	80-121	0.50	30	
1,1,1-Trichloroethane	1.87	0.04	0.20	ug/L	2.00		93.7	79-123	5.02	30	
1,1-Dichloropropene	2.01	0.03	0.10	ug/L	2.00		100	80-120	0.26	30	
Carbon tetrachloride	2.05	0.04	0.20	ug/L	2.00		102	53-137	1.11	30	
1,2-Dichloroethane	2.00	0.07	0.20	ug/L	2.00		100	75-123	3.82	30	
Benzene	2.42	0.03	0.20	ug/L	2.00		121	80-120	0.07	30	*, Q
Trichloroethene	2.11	0.05	0.20	ug/L	2.00		106	80-120	0.09	30	
1,2-Dichloropropane	2.10	0.04	0.20	ug/L	2.00		105	80-120	0.94	30	
Bromodichloromethane	2.03	0.05	0.20	ug/L	2.00		102	80-121	2.10	30	
Dibromomethane	2.00	0.15	0.20	ug/L	2.00		99.8	80-120	5.63	30	
2-Chloroethyl vinyl ether	0.59	0.25	0.50	ug/L	2.00		29.5	74-127	32.20	30	*, Q
4-Methyl-2-Pentanone	9.18	0.97	2.50	ug/L	10.0		91.8	67-133	1.84	30	
cis-1,3-Dichloropropene	2.03	0.06	0.20	ug/L	2.00		102	80-124	0.63	30	
Toluene	2.17	0.04	0.20	ug/L	2.00		109	80-120	3.47	30	
trans-1,3-Dichloropropene	2.02	0.08	0.20	ug/L	2.00		101	71-127	0.89	30	
2-Hexanone	8.99	0.90	5.00	ug/L	10.0		89.9	69-133	2.56	30	
1,1,2-Trichloroethane	1.99	0.13	0.20	ug/L	2.00		99.7	80-121	1.10	30	
1,3-Dichloropropane	1.95	0.06	0.10	ug/L	2.00		97.5	80-120	4.76	30	
Tetrachloroethene	2.23	0.05	0.20	ug/L	2.00		111	80-120	1.27	30	
Dibromochloromethane	2.01	0.05	0.20	ug/L	2.00		100	65-135	0.43	30	
1,2-Dibromoethane	1.93	0.07	0.10	ug/L	2.00		96.3	80-121	5.00	30	
Chlorobenzene	2.21	0.02	0.20	ug/L	2.00		111	80-120	4.55	30	
Ethylbenzene	2.14	0.04	0.20	ug/L	2.00		107	80-120	3.20	30	
1,1,1,2-Tetrachloroethane	2.21	0.04	0.20	ug/L	2.00		111	80-120	6.17	30	
m,p-Xylene	4.29	0.05	0.40	ug/L	4.00		107	80-121	0.72	30	
o-Xylene	2.31	0.03	0.20	ug/L	2.00		115	80-121	11.20	30	
Xylenes, total	6.60	0.09	0.60	ug/L	6.00		110	76-127	3.28	30	
Styrene	2.10	0.05	0.20	ug/L	2.00		105	80-124	5.21	30	
Bromoform	2.10	0.06	0.20	ug/L	2.00		105	51-134	6.01	30	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0573 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BGH0573-BSD1)				Prepared: 27-Aug-2018 Analyzed: 27-Aug-2018 15:59							
1,1,2,2-Tetrachloroethane	1.99	0.06	0.10	ug/L	2.00		99.6	77-123	5.74	30	
1,2,3-Trichloropropane	2.08	0.13	0.20	ug/L	2.00		104	76-125	3.72	30	
trans-1,4-Dichloro 2-Butene	1.86	0.32	1.00	ug/L	2.00		93.1	55-129	1.51	30	
n-Propylbenzene	2.32	0.02	0.20	ug/L	2.00		116	78-130	0.22	30	
Bromobenzene	2.17	0.06	0.20	ug/L	2.00		109	80-120	0.42	30	
Isopropyl Benzene	2.23	0.02	0.20	ug/L	2.00		112	80-128	0.05	30	
2-Chlorotoluene	2.31	0.02	0.10	ug/L	2.00		116	78-122	5.36	30	
4-Chlorotoluene	2.21	0.02	0.20	ug/L	2.00		111	80-121	0.70	30	
t-Butylbenzene	2.27	0.03	0.20	ug/L	2.00		114	78-125	3.19	30	
1,3,5-Trimethylbenzene	2.25	0.02	0.20	ug/L	2.00		113	80-129	0.75	30	
1,2,4-Trimethylbenzene	2.23	0.02	0.20	ug/L	2.00		111	80-127	0.48	30	
s-Butylbenzene	2.31	0.02	0.20	ug/L	2.00		115	78-129	1.33	30	
4-Isopropyl Toluene	2.25	0.03	0.20	ug/L	2.00		113	79-130	1.17	30	
1,3-Dichlorobenzene	2.25	0.04	0.20	ug/L	2.00		112	80-120	0.19	30	
1,4-Dichlorobenzene	2.22	0.04	0.20	ug/L	2.00		111	80-120	0.69	30	
n-Butylbenzene	2.33	0.02	0.20	ug/L	2.00		117	74-129	2.08	30	
1,2-Dichlorobenzene	2.20	0.04	0.20	ug/L	2.00		110	80-120	1.87	30	
1,2-Dibromo-3-chloropropane	1.95	0.37	0.50	ug/L	2.00		97.7	62-123	9.00	30	
1,2,4-Trichlorobenzene	2.25	0.11	0.50	ug/L	2.00		113	64-124	4.77	30	
Hexachloro-1,3-Butadiene	2.36	0.07	0.20	ug/L	2.00		118	58-123	5.21	30	Q
Naphthalene	1.97	0.12	0.50	ug/L	2.00		98.7	50-134	1.51	30	
1,2,3-Trichlorobenzene	2.25	0.11	0.20	ug/L	2.00		112	49-133	2.02	30	
Dichlorodifluoromethane	1.97	0.05	0.20	ug/L	2.00		98.6	48-147	9.81	30	
Surrogate: Dibromofluoromethane	4.51			ug/L	*5.00*		*90.2*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.25			ug/L	*5.00*		*84.9*	*80-129*			
Surrogate: Toluene-d8	4.97			ug/L	*5.00*		*99.4*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.89			ug/L	*5.00*		*97.8*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.00			ug/L	*5.00*		*100*	*80-120*			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0806-BLK1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 16:01							
Chloromethane	ND	0.09	0.50	ug/L							U
Vinyl Chloride	ND	0.06	0.10	ug/L							U
Bromomethane	ND	0.25	1.00	ug/L							U
Chloroethane	ND	0.09	0.20	ug/L							U
Trichlorofluoromethane	ND	0.04	0.20	ug/L							U
Acrolein	ND	2.48	2.50	ug/L							U
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	0.04	0.20	ug/L							U
Acetone	2.63	2.06	5.00	ug/L							J
1,1-Dichloroethene	ND	0.05	0.20	ug/L							U
Bromoethane	ND	0.04	0.20	ug/L							U
Iodomethane	ND	0.23	0.50	ug/L							U
Methylene Chloride	ND	0.49	1.00	ug/L							U
Acrylonitrile	ND	0.60	1.00	ug/L							U
Carbon Disulfide	ND	0.04	0.10	ug/L							U
trans-1,2-Dichloroethene	ND	0.05	0.20	ug/L							U
Vinyl Acetate	ND	0.07	0.20	ug/L							U
1,1-Dichloroethane	ND	0.05	0.20	ug/L							U
2-Butanone	ND	0.81	5.00	ug/L							U
2,2-Dichloropropane	ND	0.05	0.10	ug/L							U
cis-1,2-Dichloroethene	ND	0.04	0.20	ug/L							U
Chloroform	ND	0.03	0.20	ug/L							U
Bromochloromethane	ND	0.06	0.20	ug/L							U
1,1,1-Trichloroethane	ND	0.04	0.20	ug/L							U
1,1-Dichloropropene	ND	0.03	0.10	ug/L							U
Carbon tetrachloride	ND	0.04	0.20	ug/L							U
1,2-Dichloroethane	ND	0.07	0.20	ug/L							U
Benzene	0.15	0.03	0.20	ug/L							J
Trichloroethene	ND	0.05	0.20	ug/L							U
1,2-Dichloropropane	ND	0.04	0.20	ug/L							U
Bromodichloromethane	ND	0.05	0.20	ug/L							U
Dibromomethane	ND	0.15	0.20	ug/L							U
2-Chloroethyl vinyl ether	ND	0.25	0.50	ug/L							U
4-Methyl-2-Pentanone	ND	0.97	2.50	ug/L							U
cis-1,3-Dichloropropene	ND	0.06	0.20	ug/L							U
Toluene	ND	0.04	0.20	ug/L							U

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0806-BLK1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 16:01							
trans-1,3-Dichloropropene	ND	0.08	0.20	ug/L							U
2-Hexanone	ND	0.90	5.00	ug/L							U
1,1,2-Trichloroethane	ND	0.13	0.20	ug/L							U
1,3-Dichloropropane	ND	0.06	0.10	ug/L							U
Tetrachloroethene	ND	0.05	0.20	ug/L							U
Dibromochloromethane	ND	0.05	0.20	ug/L							U
1,2-Dibromoethane	ND	0.07	0.10	ug/L							U
Chlorobenzene	ND	0.02	0.20	ug/L							U
Ethylbenzene	ND	0.04	0.20	ug/L							U
1,1,1,2-Tetrachloroethane	ND	0.04	0.20	ug/L							U
m,p-Xylene	ND	0.05	0.40	ug/L							U
o-Xylene	ND	0.03	0.20	ug/L							U
Xylenes, total	ND	0.09	0.60	ug/L							U
Styrene	ND	0.05	0.20	ug/L							U
Bromoform	ND	0.06	0.20	ug/L							U
1,1,2,2-Tetrachloroethane	ND	0.06	0.10	ug/L							U
1,2,3-Trichloropropane	ND	0.13	0.20	ug/L							U
trans-1,4-Dichloro 2-Butene	ND	0.32	1.00	ug/L							U
n-Propylbenzene	ND	0.02	0.20	ug/L							U
Bromobenzene	ND	0.06	0.20	ug/L							U
Isopropyl Benzene	ND	0.02	0.20	ug/L							U
2-Chlorotoluene	ND	0.02	0.10	ug/L							U
4-Chlorotoluene	ND	0.02	0.20	ug/L							U
t-Butylbenzene	ND	0.03	0.20	ug/L							U
1,3,5-Trimethylbenzene	ND	0.02	0.20	ug/L							U
1,2,4-Trimethylbenzene	ND	0.02	0.20	ug/L							U
s-Butylbenzene	ND	0.02	0.20	ug/L							U
4-Isopropyl Toluene	ND	0.03	0.20	ug/L							U
1,3-Dichlorobenzene	ND	0.04	0.20	ug/L							U
1,4-Dichlorobenzene	ND	0.04	0.20	ug/L							U
n-Butylbenzene	ND	0.02	0.20	ug/L							U
1,2-Dichlorobenzene	ND	0.04	0.20	ug/L							U
1,2-Dibromo-3-chloropropane	ND	0.37	0.50	ug/L							U
1,2,4-Trichlorobenzene	ND	0.11	0.50	ug/L							U
Hexachloro-1,3-Butadiene	ND	0.07	0.20	ug/L							U

Golder Associates	Project: Landsburg	
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Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0806-BLK1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 16:01							
Naphthalene	ND	0.12	0.50	ug/L							U
1,2,3-Trichlorobenzene	ND	0.11	0.20	ug/L							U
Dichlorodifluoromethane	ND	0.05	0.20	ug/L							U
Surrogate: Dibromofluoromethane	5.02			ug/L	*5.00*		*100*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.78			ug/L	*5.00*		*95.7*	*80-129*			
Surrogate: Toluene-d8	5.03			ug/L	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.81			ug/L	*5.00*		*96.2*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.84			ug/L	*5.00*		*96.7*	*80-120*			
LCS (BGH0806-BS1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:00							
Chloromethane	2.03	0.09	0.50	ug/L	2.00		101	60-138			
Vinyl Chloride	2.05	0.06	0.10	ug/L	2.00		103	66-133			
Bromomethane	2.12	0.25	1.00	ug/L	2.00		106	72-131			
Chloroethane	2.17	0.09	0.20	ug/L	2.00		109	60-155			
Trichlorofluoromethane	2.18	0.04	0.20	ug/L	2.00		109	80-129			
Acrolein	11.4	2.48	2.50	ug/L	10.0		114	52-144			
1,1,2-Trichloro-1,2,2-Trifluoroethane	2.05	0.04	0.20	ug/L	2.00		102	76-129			
Acetone	9.62	2.06	5.00	ug/L	10.0		96.2	58-142			
1,1-Dichloroethene	2.03	0.05	0.20	ug/L	2.00		102	69-135			
Bromoethane	1.97	0.04	0.20	ug/L	2.00		98.5	78-128			
Iodomethane	1.95	0.23	0.50	ug/L	2.00		97.7	56-147			
Methylene Chloride	2.12	0.49	1.00	ug/L	2.00		106	65-135			
Acrylonitrile	1.63	0.60	1.00	ug/L	2.00		81.5	64-134			
Carbon Disulfide	1.94	0.04	0.10	ug/L	2.00		97.1	78-125			
trans-1,2-Dichloroethene	2.12	0.05	0.20	ug/L	2.00		106	78-128			
Vinyl Acetate	1.84	0.07	0.20	ug/L	2.00		92.1	55-138			
1,1-Dichloroethane	1.57	0.05	0.20	ug/L	2.00		78.6	76-124			Q
2-Butanone	9.58	0.81	5.00	ug/L	10.0		95.8	61-140			
2,2-Dichloropropane	2.18	0.05	0.10	ug/L	2.00		109	78-125			
cis-1,2-Dichloroethene	2.08	0.04	0.20	ug/L	2.00		104	80-121			
Chloroform	2.10	0.03	0.20	ug/L	2.00		105	80-122			
Bromochloromethane	1.98	0.06	0.20	ug/L	2.00		98.8	80-121			
1,1,1-Trichloroethane	2.09	0.04	0.20	ug/L	2.00		105	79-123			
1,1-Dichloropropene	2.23	0.03	0.10	ug/L	2.00		111	80-120			
Carbon tetrachloride	2.22	0.04	0.20	ug/L	2.00		111	53-137			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0806-BS1)					Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:00						
1,2-Dichloroethane	2.14	0.07	0.20	ug/L	2.00		107	75-123			
Benzene	2.55	0.03	0.20	ug/L	2.00		128	80-120			*, Q
Trichloroethene	2.20	0.05	0.20	ug/L	2.00		110	80-120			
1,2-Dichloropropane	2.26	0.04	0.20	ug/L	2.00		113	80-120			
Bromodichloromethane	2.25	0.05	0.20	ug/L	2.00		112	80-121			
Dibromomethane	2.24	0.15	0.20	ug/L	2.00		112	80-120			
2-Chloroethyl vinyl ether	0.60	0.25	0.50	ug/L	2.00		30.1	74-127			*, Q
4-Methyl-2-Pentanone	9.90	0.97	2.50	ug/L	10.0		99.0	67-133			
cis-1,3-Dichloropropene	2.22	0.06	0.20	ug/L	2.00		111	80-124			
Toluene	2.27	0.04	0.20	ug/L	2.00		114	80-120			
trans-1,3-Dichloropropene	2.22	0.08	0.20	ug/L	2.00		111	71-127			
2-Hexanone	9.35	0.90	5.00	ug/L	10.0		93.5	69-133			
1,1,2-Trichloroethane	2.10	0.13	0.20	ug/L	2.00		105	80-121			
1,3-Dichloropropane	2.12	0.06	0.10	ug/L	2.00		106	80-120			
Tetrachloroethene	2.37	0.05	0.20	ug/L	2.00		118	80-120			
Dibromochloromethane	2.21	0.05	0.20	ug/L	2.00		111	65-135			
1,2-Dibromoethane	2.12	0.07	0.10	ug/L	2.00		106	80-121			
Chlorobenzene	2.27	0.02	0.20	ug/L	2.00		113	80-120			
Ethylbenzene	2.24	0.04	0.20	ug/L	2.00		112	80-120			
1,1,1,2-Tetrachloroethane	2.19	0.04	0.20	ug/L	2.00		109	80-120			
m,p-Xylene	4.70	0.05	0.40	ug/L	4.00		117	80-121			
o-Xylene	2.25	0.03	0.20	ug/L	2.00		112	80-121			
Xylenes, total	6.95	0.09	0.60	ug/L	6.00		116	76-127			
Styrene	2.23	0.05	0.20	ug/L	2.00		112	80-124			
Bromoform	2.08	0.06	0.20	ug/L	2.00		104	51-134			
1,1,2,2-Tetrachloroethane	2.05	0.06	0.10	ug/L	2.00		102	77-123			
1,2,3-Trichloropropane	2.18	0.13	0.20	ug/L	2.00		109	76-125			
trans-1,4-Dichloro 2-Butene	1.95	0.32	1.00	ug/L	2.00		97.5	55-129			
n-Propylbenzene	2.36	0.02	0.20	ug/L	2.00		118	78-130			
Bromobenzene	2.35	0.06	0.20	ug/L	2.00		118	80-120			
Isopropyl Benzene	2.26	0.02	0.20	ug/L	2.00		113	80-128			
2-Chlorotoluene	2.42	0.02	0.10	ug/L	2.00		121	78-122			Q
4-Chlorotoluene	2.22	0.02	0.20	ug/L	2.00		111	80-121			
t-Butylbenzene	2.33	0.03	0.20	ug/L	2.00		116	78-125			
1,3,5-Trimethylbenzene	2.30	0.02	0.20	ug/L	2.00		115	80-129			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BGH0806-BS1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:00							
1,2,4-Trimethylbenzene	2.32	0.02	0.20	ug/L	2.00		116	80-127			
s-Butylbenzene	2.34	0.02	0.20	ug/L	2.00		117	78-129			
4-Isopropyl Toluene	2.33	0.03	0.20	ug/L	2.00		116	79-130			
1,3-Dichlorobenzene	2.30	0.04	0.20	ug/L	2.00		115	80-120			
1,4-Dichlorobenzene	2.25	0.04	0.20	ug/L	2.00		112	80-120			
n-Butylbenzene	2.35	0.02	0.20	ug/L	2.00		118	74-129			
1,2-Dichlorobenzene	2.20	0.04	0.20	ug/L	2.00		110	80-120			
1,2-Dibromo-3-chloropropane	1.93	0.37	0.50	ug/L	2.00		96.3	62-123			
1,2,4-Trichlorobenzene	2.28	0.11	0.50	ug/L	2.00		114	64-124			
Hexachloro-1,3-Butadiene	2.35	0.07	0.20	ug/L	2.00		117	58-123			
Naphthalene	2.02	0.12	0.50	ug/L	2.00		101	50-134			
1,2,3-Trichlorobenzene	2.20	0.11	0.20	ug/L	2.00		110	49-133			
Dichlorodifluoromethane	3.03	0.05	0.20	ug/L	2.00		151	48-147			*, Q
Surrogate: Dibromofluoromethane	4.82			ug/L	*5.00*		*96.4*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.71			ug/L	*5.00*		*94.3*	*80-129*			
Surrogate: Toluene-d8	5.03			ug/L	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.89			ug/L	*5.00*		*97.8*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	4.99			ug/L	*5.00*		*99.8*	*80-120*			
LCS Dup (BGH0806-BSD1)				Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:41							
Chloromethane	1.76	0.09	0.50	ug/L	2.00		87.8	60-138	14.30	30	
Vinyl Chloride	1.78	0.06	0.10	ug/L	2.00		88.9	66-133	14.50	30	
Bromomethane	1.92	0.25	1.00	ug/L	2.00		96.1	72-131	9.74	30	
Chloroethane	1.96	0.09	0.20	ug/L	2.00		98.2	60-155	10.00	30	
Trichlorofluoromethane	1.90	0.04	0.20	ug/L	2.00		95.2	80-129	13.50	30	
Acrolein	11.3	2.48	2.50	ug/L	10.0		113	52-144	0.18	30	
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.76	0.04	0.20	ug/L	2.00		88.2	76-129	14.90	30	
Acetone	9.04	2.06	5.00	ug/L	10.0		90.4	58-142	6.30	30	
1,1-Dichloroethene	1.89	0.05	0.20	ug/L	2.00		94.6	69-135	7.15	30	
Bromoethane	1.79	0.04	0.20	ug/L	2.00		89.4	78-128	9.69	30	
Iodomethane	1.70	0.23	0.50	ug/L	2.00		84.8	56-147	14.10	30	
Methylene Chloride	1.94	0.49	1.00	ug/L	2.00		96.9	65-135	8.98	30	
Acrylonitrile	1.99	0.60	1.00	ug/L	2.00		99.4	64-134	19.70	30	
Carbon Disulfide	1.64	0.04	0.10	ug/L	2.00		81.8	78-125	17.10	30	
trans-1,2-Dichloroethene	2.00	0.05	0.20	ug/L	2.00		99.9	78-128	5.82	30	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BGH0806-BSD1)					Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:41						
Vinyl Acetate	1.85	0.07	0.20	ug/L	2.00		92.3	55-138	0.21	30	
1,1-Dichloroethane	1.27	0.05	0.20	ug/L	2.00		63.4	76-124	21.50	30	*, Q
2-Butanone	9.15	0.81	5.00	ug/L	10.0		91.5	61-140	4.55	30	
2,2-Dichloropropane	1.81	0.05	0.10	ug/L	2.00		90.4	78-125	18.70	30	
cis-1,2-Dichloroethene	1.87	0.04	0.20	ug/L	2.00		93.6	80-121	10.40	30	
Chloroform	1.93	0.03	0.20	ug/L	2.00		96.7	80-122	8.13	30	
Bromochloromethane	1.75	0.06	0.20	ug/L	2.00		87.5	80-121	12.10	30	
1,1,1-Trichloroethane	1.83	0.04	0.20	ug/L	2.00		91.3	79-123	13.70	30	
1,1-Dichloropropene	2.08	0.03	0.10	ug/L	2.00		104	80-120	6.54	30	
Carbon tetrachloride	2.09	0.04	0.20	ug/L	2.00		105	53-137	6.18	30	
1,2-Dichloroethane	2.08	0.07	0.20	ug/L	2.00		104	75-123	2.62	30	
Benzene	2.45	0.03	0.20	ug/L	2.00		122	80-120	4.26	30	*, Q
Trichloroethene	2.01	0.05	0.20	ug/L	2.00		101	80-120	8.83	30	
1,2-Dichloropropane	2.19	0.04	0.20	ug/L	2.00		110	80-120	3.08	30	
Bromodichloromethane	2.07	0.05	0.20	ug/L	2.00		103	80-121	8.23	30	
Dibromomethane	2.16	0.15	0.20	ug/L	2.00		108	80-120	3.47	30	
2-Chloroethyl vinyl ether	0.93	0.25	0.50	ug/L	2.00		46.5	74-127	42.80	30	*, Q
4-Methyl-2-Pentanone	10.0	0.97	2.50	ug/L	10.0		100	67-133	1.38	30	
cis-1,3-Dichloropropene	2.15	0.06	0.20	ug/L	2.00		107	80-124	3.27	30	
Toluene	2.18	0.04	0.20	ug/L	2.00		109	80-120	4.11	30	
trans-1,3-Dichloropropene	2.06	0.08	0.20	ug/L	2.00		103	71-127	7.56	30	
2-Hexanone	10.0	0.90	5.00	ug/L	10.0		100	69-133	6.78	30	
1,1,2-Trichloroethane	2.04	0.13	0.20	ug/L	2.00		102	80-121	3.12	30	
1,3-Dichloropropane	2.15	0.06	0.10	ug/L	2.00		108	80-120	1.59	30	
Tetrachloroethene	2.21	0.05	0.20	ug/L	2.00		110	80-120	7.03	30	
Dibromochloromethane	2.15	0.05	0.20	ug/L	2.00		108	65-135	2.75	30	
1,2-Dibromoethane	2.17	0.07	0.10	ug/L	2.00		109	80-121	2.56	30	
Chlorobenzene	2.17	0.02	0.20	ug/L	2.00		108	80-120	4.54	30	
Ethylbenzene	2.13	0.04	0.20	ug/L	2.00		106	80-120	5.37	30	
1,1,1,2-Tetrachloroethane	2.24	0.04	0.20	ug/L	2.00		112	80-120	2.35	30	
m,p-Xylene	4.34	0.05	0.40	ug/L	4.00		109	80-121	7.87	30	
o-Xylene	2.22	0.03	0.20	ug/L	2.00		111	80-121	1.36	30	
Xylenes, total	6.56	0.09	0.60	ug/L	6.00		109	76-127	5.72	30	
Styrene	2.08	0.05	0.20	ug/L	2.00		104	80-124	6.94	30	
Bromoform	2.24	0.06	0.20	ug/L	2.00		112	51-134	7.69	30	

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Volatile Organic Compounds - Quality Control

Batch BGH0806 - EPA 5030 (Purge and Trap)

Instrument: NT16 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BGH0806-BSD1)					Prepared: 28-Aug-2018 Analyzed: 28-Aug-2018 15:41						
1,1,2,2-Tetrachloroethane	2.08	0.06	0.10	ug/L	2.00		104	77-123	1.72	30	
1,2,3-Trichloropropane	2.31	0.13	0.20	ug/L	2.00		115	76-125	5.94	30	
trans-1,4-Dichloro 2-Butene	2.30	0.32	1.00	ug/L	2.00		115	55-129	16.60	30	
n-Propylbenzene	2.23	0.02	0.20	ug/L	2.00		112	78-130	5.30	30	
Bromobenzene	2.29	0.06	0.20	ug/L	2.00		114	80-120	2.69	30	
Isopropyl Benzene	2.21	0.02	0.20	ug/L	2.00		111	80-128	2.16	30	
2-Chlorotoluene	2.31	0.02	0.10	ug/L	2.00		115	78-122	4.77	30	Q
4-Chlorotoluene	2.22	0.02	0.20	ug/L	2.00		111	80-121	0.32	30	
t-Butylbenzene	2.24	0.03	0.20	ug/L	2.00		112	78-125	3.78	30	
1,3,5-Trimethylbenzene	2.18	0.02	0.20	ug/L	2.00		109	80-129	5.15	30	
1,2,4-Trimethylbenzene	2.20	0.02	0.20	ug/L	2.00		110	80-127	5.34	30	
s-Butylbenzene	2.27	0.02	0.20	ug/L	2.00		114	78-129	2.83	30	
4-Isopropyl Toluene	2.25	0.03	0.20	ug/L	2.00		112	79-130	3.47	30	
1,3-Dichlorobenzene	2.24	0.04	0.20	ug/L	2.00		112	80-120	2.60	30	
1,4-Dichlorobenzene	2.23	0.04	0.20	ug/L	2.00		112	80-120	0.78	30	
n-Butylbenzene	2.32	0.02	0.20	ug/L	2.00		116	74-129	1.37	30	
1,2-Dichlorobenzene	2.24	0.04	0.20	ug/L	2.00		112	80-120	1.59	30	
1,2-Dibromo-3-chloropropane	1.91	0.37	0.50	ug/L	2.00		95.5	62-123	0.82	30	
1,2,4-Trichlorobenzene	2.23	0.11	0.50	ug/L	2.00		111	64-124	2.20	30	
Hexachloro-1,3-Butadiene	2.36	0.07	0.20	ug/L	2.00		118	58-123	0.58	30	
Naphthalene	2.06	0.12	0.50	ug/L	2.00		103	50-134	1.96	30	
1,2,3-Trichlorobenzene	2.17	0.11	0.20	ug/L	2.00		109	49-133	1.21	30	
Dichlorodifluoromethane	1.69	0.05	0.20	ug/L	2.00		84.3	48-147	56.90	30	*, Q
Surrogate: Dibromofluoromethane	4.49			ug/L	*5.00*		*89.8*	*80-120*			
Surrogate: 1,2-Dichloroethane-d4	4.48			ug/L	*5.00*		*89.6*	*80-129*			
Surrogate: Toluene-d8	4.94			ug/L	*5.00*		*98.7*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.00			ug/L	*5.00*		*100*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	5.03			ug/L	*5.00*		*101*	*80-120*			

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Semivolatile Organic Compounds - Quality Control

Batch BGH0467 - EPA 3520C (Liq Liq)

Instrument: NT6 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGH0467-BLK1)				Prepared: 22-Aug-2018 Analyzed: 27-Aug-2018 11:05							
1,4-Dioxane	ND	0.2	0.4	ug/L							U
Surrogate: 1,4-Dioxane-d8	36.6			ug/L	*50.0*		*73.2*	*33.6-120*			
LCS (BGH0467-BS1)				Prepared: 22-Aug-2018 Analyzed: 27-Aug-2018 11:38							
1,4-Dioxane	32.4	0.2	0.4	ug/L	50.0		64.9	39.9-120			
Surrogate: 1,4-Dioxane-d8	35.1			ug/L	*50.0*		*70.2*	*33.6-120*			
LCS Dup (BGH0467-BSD1)				Prepared: 22-Aug-2018 Analyzed: 27-Aug-2018 12:12							
1,4-Dioxane	33.2	0.2	0.4	ug/L	50.0		66.4	39.9-120	2.28	30	
Surrogate: 1,4-Dioxane-d8	35.1			ug/L	*50.0*		*70.2*	*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	30-Aug-2018 16:39

Certified Analyses included in this Report

Analyte	Certifications
EPA 8260C in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrolein	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Iodomethane	DoD-ELAP,NELAP,CALAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,CALAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,CALAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,CALAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Butanone	DoD-ELAP,NELAP,CALAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,CALAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE

Golder Associates	Project: Landsburg	
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Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,CALAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Styrene	DoD-ELAP,NELAP,CALAP,WADOE
Bromoform	DoD-ELAP,NELAP,CALAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,CALAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,CALAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,CALAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,CALAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,CALAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

EPA 8270D in Water

1,4-Dioxane WADOE,NELAP,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	02/07/2019
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-011	05/12/2019
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019

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Golder Associates	Project: Landsburg	
18300 NE Union Hill Road Suite 200	Project Number: Landsburg	**Reported:**
Redmond WA, 98052-3333	Project Manager: Gary Zimmerman	30-Aug-2018 16:39

Notes and Definitions

*	Flagged value is not within established control limits.
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the applicable reporting or detection limit.
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 B

Sample Integrity Data Sheets (SIDS)

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-6- 08 18

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler Dedicated Pump Grundfos

Date 8/15/18 **Time** 0910

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.)

SWL – 41.40 ft below TOC (inner PVC at elev. X) (bottom at 105.9 ft bgs, 4-in casing) @ 0827

Screen Interval – 90.9-105.9 ft bgs Monument: 3.05 ags Inner PVC: 2.38 ags

Sand Pack Interval – 82.5-105.9 ft bgs (8-in hole) (~13.7 gal/sand pack)

Packer Depth – 81.22 ft bgs (~53 gal/casing vol) (~16.1 gal/packer casing volume)

(~29.9 gal/total well vol below packer)

Sample Description Clear No Odor

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) _____ **Date** 8/15/18

Supervisor (signature) _____ **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID / MW-6
Date 8/15/18
Time Begin Purge 0830
Time Collect Sample 0910

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
	0840	7.72	6.50	187	2.70	+90.3	2.18
	0845	7.84	6.71	189	1.92	+57.6	1.90
	0850	7.85	6.76	184	1.76	+47.7	2.66
	0855	7.91	6.79	184	1.60	+33.9	0.52
	0900	7.95	6.82	188	1.56	+23.2	0.31
	0905	8.02	6.83	184	1.47	+16.1	0.32

Comments:

Flow rate = 5 gal / 4 ½ min

Packer = 110 psi

Grundfos = 180 Hz

PID = 0.0

Sampler's Initials

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-2- 0818

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler Dedicated Pump Grundfos

Date 8/15/18 **Time** 1055

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.)

SWL – 8.46 ft below TOC (inner PVC at elev. X) (bottom at 38.1 ft bgs, 4-in casing) @ 0947

Screen Interval – 27.9-38.1 ft bgs Monument: 2.94 ags Inner PVC: 2.38 ags

Sand Pack Interval – 24.8-38.1 ft bgs (8-in hole) (~7.8 gal/sand pack vol)

Packer Depth – NA (~22.3 gal/casing vol) (~30.1 gal/total well vol)

Sample Description Sulfur Odor

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) [signature] **Date** 8/15/18

Supervisor (signature) [signature] **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID LMW-2
Date 6/18/15
Time Begin Purge 1016
Time Collect Sample 1055

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
—	1026	8.87	6.81	680	1.76	-13.8	0.27
—	1031	8.90	6.86	682	1.35	-31.8	0.26
—	1036	8.88	6.88	681	1.15	-45.0	0.25
—	1041	8.88	6.88	681	1.03	-51.6	0.28
—	1046	8.91	6.89	681	0.96	-56.9	0.26
—	1051	8.87	6.90	679	0.90	-64.6	0.13

Comments: Grundfos 75Hz
Strong Sulfur odor
5gal/5.5min

Sampler's Initials

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-4-0818

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler Dedicated Pump Grundfos

Date 8/15/18 **Time** 1155

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.)

SWL – 160.64 ft below TOC (inner PVC at elev. X) (bottom at 209.7 ft bgs, 4-in casing) eCF46

Screen Interval – 195-209.7 ft bgs Monument: 2.76 ags Inner PVC: 2.17 ags

Sand Pack Interval – 189-209.7 ft bgs (8-in hole) (~12.3 gal/sand pack)

Packer Depth – 187.3 ft bgs (~133.3 gal/casing vol) (~14.6 gal/packer casing volume)

(~26.9 gal/total well vol below packer)

** Depths corrected for 70° inclination

Sample Description Sulfur Odor

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) _____ **Date** 8/15/18

Supervisor (signature) _____ **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID LMW-4
Date 8/15/18
Time Begin Purge 1118
Time Collect Sample 1155

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
—	1128	8.96	6.82	693	3.68	-42.6	0.63
—	1133	8.97	6.88	6.90	1.78	-56.4	0.28
—	1138	8.90	6.90	688	1.26	-66.5	0.25
—	1143	8.84	6.90	687	1.00	-74.5	0.24
—	1148	8.92	6.91	689	0.88	-79.8	0.24
—	1153	8.92	6.93	689	0.79	-83.6	0.28
	~~#5~~						

Comments:

Purge 135 psi
Grundfos 80 Lte
Sulfur Odor
3 gal/5 min

Sampler's Initials

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-10- 0818

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler QED Bladder

Date 8/15/18 **Time** 1250

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.)

SWL – 0.48 ft below TOC (PVC) (bottom at 289 ft bgs, 4-in casing) @ 0951

Screen Interval – 267-289 ft bgs PVC stickup: 3.12 ags

Sand Pack Interval – 258-289 ft bgs (9-in hole) (~18.2 gal/sand pack)

Packer Depth – NA (~191 gal/casing vol) (~209 gal/total well vol)

Sample Description ~~Slight Odor~~ Clear

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) _____ **Date** 8/15/18

Supervisor (signature) _____ **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID LMW-10
Date 8/15/18
Time Begin Purge 1214
Time Collect Sample 1250

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
3.00	1224	9.89	8.58	266	1.00	-104.7	0.27
4.00	1229	9.87	8.62	266	0.85	-140.7	0.45
4.41	1234	9.82	8.60	266	0.75	-163.2	0.27
5.37	1239	9.72	8.56	266	0.66	-179.7	0.18
6.15	1244	~~8.56~~ 9.71	8.56	265	0.65	-187.2	0.30
6.97	1249	9.74	8.58	265	0.62	-191.1	0.39

Comments:
Throttle 50 psi
CID 50
CPM 2
Tank 110
500 ml/min

Sampler's Initials JM

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-12-0818 LMW-12-0818-D

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler QED Bladder

Date 8/15/18 **Time** 1350 / 1400

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.)

SWL – 12.48 @ 1313

Screen Interval – 15-25

Sand Pack Interval – 11-25

Packer Depth – NA

Sample Description Slightly Turbid

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

	Aliquot Amount	Analysis	Container	Preservation / Amount
6	3 – 40 mL	VOA	VOA Vial	HCl
4	2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) _____ **Date** 8/15/18

Supervisor (signature) _____ **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID MW-12
Date 8/15/18
Time Begin Purge 1314
Time Collect Sample 1350/1400

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
12.34	1324	9.41	6.63	658	1.30	-64.9	23.3
12.34	1329	9.33	6.67	662	1.00	-74.4	34.9
12.34	1334	9.38	6.75	692	0.87	-84.1	78.6
12.34	1339	9.61	6.78	708	0.89	-87.9	36.8
12.34	1344	9.77	6.78	714	0.75	-89.2	35.2
12.34	1349	9.64	6.71	716	0.36	-88.3	26.1

reduced flow rate *

Comments:
Tip kill 10 psi
Throttle 20 psi
CID 50
CPM 2
600 ml/min * reduced to 500 mL/min

Sampler's Initials

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** LMW-13R-0818

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler QED Bladder

Date 8/15/18 **Time** 1445

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.)

SWL – 12.95 TOC 12.84 to Lip 1410

Screen Interval – 115-140

Sand Pack Interval – 110-150

Packer Depth – NA

Sample Description Clear Slight Sulfur Odor

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) [signature] **Date** 8/15/18

Supervisor (signature) [signature] **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID LMW-13R
Date 8/15/18
Time Begin Purge 1411
Time Collect Sample 1445

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU
13.11	1421	9.67	7.21	6161	0.81	-97.5	5.78
13.15	1426	9.57	7.25	6600	0.74	-110.8	6.85
13.15	1431	9.59	7.28	6161	0.73	-121.3	5.46
13.12	1436	9.54	7.27	659	1.00	-126.5	5.25
13.11	1441	9.53	7.25	659	0.38	-129.3	8.13

Comments:

Tank 110psi
Throttle 35psi
CPM 2
CID 48

500ml/min
initial Purge slight Sulfur Odor

Sampler's Initials

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site **Project No.** 923-1000-002

Site Location Ravensdale, WA **Sample ID** ~~EB~~ Field Blank-0818

Sampling Location Groundwater Monitoring Well End of dedicated sampling tube

Technical Procedure Reference(s) TP-1.4-6A, TP-1.2-20, TP-1.2-23

Type of Sampler Pump Grundfos and QED Bladder

Date 8/15/18 **Time** 1430

Media Water **Station** ~~LMW-11~~ LMW-13R

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

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

SWL – ~~NA~~

Screen Interval – ~~NA~~

Sand Pack Interval – ~~NA~~

Packer Depth – NA

Sample Description Blank collected from Lab provided DI @ LMW-13R

Field Measurements on Sample (pH, conductivity, etc.)

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
2 – 500 mL	1,4-Dioxane	Glass Amber	none

Sampler (signature) [signature] **Date** 8/15/18

Supervisor (signature) [signature] **Date** 8-16-18

FIELD PARAMETERS SHEET

Well ID_____
Date_____
Time Begin Purge_____
Time Collect Sample_____

Water Level feet bmp	Time	Temp. °C	pH	Conductivity uS/cm	DO mg/L	Eh Rel mV	Turbidity NTU

No Parameters Collected

Comments:

Sampler's Initials_____

APPENDIX C

May 2018 Landsburg Mine Site Water Quality Monitoring Data Validation and Quality Assurance / Quality Control Review Memorandum

TECHNICAL MEMORANDUM

DATE September 19, 2018 **Project No.** 9231000.005.2000

TO Bill Kombol, Palmer Coking Coal Company

FROM Youki Sato / Cindi Lucas-Youmans **EMAIL** youki_sato@golder.com

RE: LANDSBURG MINE SITE AUGUST 2018 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 August 15, 2018 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.

A total of nine (9) water samples (this includes one field duplicate, one trip blank, and one field blank) were collected by Golder Associates, Inc. (Golder) in August. 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-846[1] Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), August 2006; and,
- 1,4-Dioxane following USEPA SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), January 1998.

Quality assurance / quality control (QA/QC) reviews of laboratory data were performed in the laboratory in accordance with the laboratory quality assurance program plan. 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 (EPA 2017), modified to include method specific requirements of the laboratory and laboratory standard operating procedures (SOPs). 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,

[1]USEPA, 1996, 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

or on the basis of 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.
U	The analyte was analyzed for but was not detected.
UJ	The analyte was analyzed for but was not detected. The reporting limit is approximate and may be inaccurate or imprecise.

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

- Data Package Completeness
- Verification of required deliverables
- Evaluation of holding times
- Laboratory narrative evaluation
- Evaluation and qualification of quality control elements for: Surrogates, Matrix Spike, Laboratory Control samples, Method Blanks, Field and Trip Blanks, and Field Duplicate evaluation as applicable
- Evaluation of detection limits

Raw data and calibration elements, including Gas Chromatograph (GC) instrument tuning and performance check, initial and continuing calibration, internal standard performance, and compound identification, were not provided by the lab. Data review and validation was performed by an experienced quality assurance chemist 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 where indicated by data qualifiers. For details about the data validation, refer to the data validation checklist in Attachment A. Table 2 is a summary of the qualifiers applied to the data.

Attachments

Attachment A Tables
Table 1 – Sample Collection and Analysis Summary
Table 2 – Qualifier Summary Table

Attachment B Level 2A Data Validation Checklists

References

EPA. 2017. USEPA Contract Laboratory Program, National Functional Guidelines for Organic Superfund Methods Data Review. OLEM 9355.0-136. EPA-540-R-2017-002, January. Available on the Web at: https://www.epa.gov/sites/production/files/2017-01/documents/national_functional_guidelines_for_organic_superfund_methods_data_review_013072017.pdf (accessed September 11, 2018)

USEPA. 2015. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846. Third Edition. Washington DC: USEPA Office of Solid Waste. Available on the Web at: https://www.epa.gov/hw-sw846(accessed September 11, 2018).

ATTACHMENT A

Tables

Table 1:
Sample Collection and Analysis Summary
Landsburg Groundwater Monitoring - August 2018

						Analyses	
SDG	Field Identification	Collection Date	Lab Identification	Matrix	QC Samples	VOCs by SW8260C	1,4-Dioxane by SW8270D
18H0208	LMW-6-0818	8/15/2018	18H0208-01	GW	--	X	X
18H0208	LMW-2-0818	8/15/2018	18H0208-02	GW	--	X	X
18H0208	LMW-4-0818	8/15/2018	18H0208-03	GW	--	X	X
18H0208	LMW-10-0818	8/15/2018	18H0208-04	GW	--	X	X
18H0208	LMW-12-0818	8/15/2018	18H0208-05	GW	--	X	X
18H0208	LMW-12-0818-D	8/15/2018	18H0208-06	GW	FD (LMW-12-0818)	X	X
18H0208	LMW-13R-0818	8/15/2018	18H0208-07	GW	--	X	X
18H0208	Field Blank-0818	8/15/2018	18H0208-08	WQ	FB	X	X
18H0208	Trip Blank	8/15/2018	18H0208-09	WQ	TB	X	

Notes:
All analyses performed by ARI Laboratories

Abbreviations:
FB - Field Blank
FD - Field Duplicate
GW - Groundwater
QC - Quality Control
SDG - Sample Delivery Group
TB - Trip Blank
VOCs - Volatile Organic Compounds
WQ - Water Quality

Table 2:
Qualifier Summary Table
Landsburg Groundwater Monitoring - August 2018

SDG	Sample Name	Constituent	New Result	New RL	Qualifier	Reason
18H0208	LMW-2-0818	All Detected VOCs	-	-	J	Headspace in VOC Sample Vial
18H0208	LMW-4-0818	All Detected VOCs	-	-	J	Headspace in VOC Sample Vial
18H0208	LMW-12-0818	All Detected VOCs	-	-	J	Headspace in VOC Sample Vial
18H0208	LMW-12-0818-D	All Detected VOCs	-	-	J	Headspace in VOC Sample Vial
18H0208	LMW-13R-0818	All Detected VOCs	-	-	J	Headspace in VOC Sample Vial
18H0208	LMW-2-0818	All Non-Detect VOCs	-	-	UJ	Headspace in VOC Sample Vial
18H0208	LMW-4-0818	All Non-Detect VOCs	-	-	UJ	Headspace in VOC Sample Vial
18H0208	LMW-12-0818	All Non-Detect VOCs	-	-	UJ	Headspace in VOC Sample Vial
18H0208	LMW-12-0818-D	All Non-Detect VOCs	-	-	UJ	Headspace in VOC Sample Vial
18H0208	LMW-13R-0818	All Non-Detect VOCs	-	-	UJ	Headspace in VOC Sample Vial
18H0208	LMW-10-0818	Benzene	0.2	-	U	Method and Field Blank Contamination
18H0208	LMW-12-0818	Benzene	0.2	-	UJ	Method and Field Blank Contamination / Headspace in Sample Vial
18H0208	LMW-12-0818-D	Benzene	0.2	-	UJ	Method and Field Blank Contamination / Headspace in Sample Vial
18H0208	LMW-13R-0818	Benzene	0.2	-	UJ	Method and Field Blank Contamination / Headspace in Sample Vial
18H0208	LMW-13R-0818	Acetone	-	5.44	UJ	Method Blank Contamination / Headspace in Sample Vial
18H0208	LMW-10-0818	Chloromethane	0.5	-	U	Field Blank Contamination
18H0208	LMW-13R-0818	Chloromethane	0.5	-	UJ	Field Blank Contamination / Headspace in Sample Vial
18H0208	LMW-6-0818	Benzene	0.24	-	U	Method Blank Contamination
18H0208	LMW-2-0818	Benzene	0.23	-	U	Method Blank Contamination
18H0208	LMW-4-0818	Benzene	0.24	-	U	Method Blank Contamination
18H0208	LMW-6-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria
18H0208	LMW-2-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-4-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-10-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria
18H0208	LMW-12-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-12-0818-D	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-13R-0818	2-Chloroethyl vinyl ether	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-6-0818	1,1-Dichloroethane	-	-	UJ	LCS Recovery Below QC Criteria
18H0208	LMW-2-0818	1,1-Dichloroethane	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-4-0818	1,1-Dichloroethane	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-10-0818	1,1-Dichloroethane	-	-	UJ	LCS Recovery Below QC Criteria
18H0208	LMW-12-0818	1,1-Dichloroethane	-	-	J	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-12-0818-D	1,1-Dichloroethane	-	-	J	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0208	LMW-13R-0818	1,1-Dichloroethane	-	-	UJ	LCS Recovery Below QC Criteria / Headspace in Sample Vial
18H0209	All Samples	All Results	-	-	-	Laboratory applied U-qualifiers indicating non-detect results and J-qualifiers indicating results below the reporting limit are retained unless other qualifications are indicated in this table. All other laboratory qualifiers are removed.

Abbreviations
LCS - Laboratory Control Sample
QC - Quality Control
RL - Reporting Limit
SDG - Sample Delivery Group
VOC - Volatile Organic Compounds

Qualifier Definitions
J - Estimated Result
U - Non-detect Result
UJ - Non-detect Result; RL is Estimated

ATTACHMENT B

Level 2A Data Validation Checklist

DATA REVIEW CHECKLIST - QA LEVEL II

Reviewing Company: Golder Associates
Project Manager: Gary Zimmerman
Project Name: Landsburg Groundwater 2018-08
Project Number: 923-1000-005.2000
Reviewer: Youki Sato / C. Lucas-Youmans
Validation Date: September 5, 2018
Reviewed by: C. Lucas-Youmans
Review Date: 9/11/2018
Laboratory: Analytical Resources, Inc (Tukwila, WA)
SDG #: 18H0208
Analytical Method (type and no.): See Table 1
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ Other

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

Applicable Data Validation Guidance: National Functional Guidelines for Organic and Inorganic Review (USEPA 2017).

Sample Information: See Table 1 (attached)

Field/COC Information	**YES**	**NO**	**NA**	**COMMENTS**
a) Sampling dates noted?	☒	☐	☐	
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample type indicated (grab/composite)?	☐	☒	☐	Not indicated on CoC
e) Field QC noted?	☒	☐	☐	Field Duplicate, Field Blank, Trip Blank
f) Field parameters collected (note types)?	☐	☐	☒	
g) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
h) Were samples received in good condition?	☐	☒	☐	See Note 1
i) Were the correct preservatives used?	☒	☐	☐	
j) Was the sample cooler temperature within QC limits?	☒	☐	☐	See Note 2

Laboratory Case Narrative

a) Does the laboratory narrative indicate deficiencies?	☒	☐	☐	

Note Deficiencies:

- Certain CCV recoveries were outside QC criteria.
- Certain LCS/LCSD recoveries and RPDs were outside of QC limits.
- Certain samples were analyzed from VOA vials that contained headspace.

These issues are addressed in the appropriate sections below.

General (reference QAPP or Method)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was the correct method used?	☒	☐	☐	
b) Were hold times met for sample pretreatment?	☒	☐	☐	
c) Were hold times met for sample analysis?	☒	☐	☐	
d) Were appropriate reporting limits achieved?	☒	☐	☐	
e) Were any sample dilutions noted?	☐	☒	☐	
f) Were any matrix problems noted?	☐	☒	☐	

DATA REVIEW CHECKLIST - QA LEVEL II

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☒	☐	☐	See Note 3
b) Were analytes detected in the field blank(s)?	☒	☐	☐	See Note 3
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☒	☐	
e) Were analytes detected in the storage blank(s)?	☐	☐	☒	

Surrogate (System Monitoring) Compounds	**YES**	**NO**	**NA**	**COMMENTS**
a) Were surrogate compounds added to all samples?	☒	☐	☐	
b) Were recoveries within control limits?	☒	☐	☐	
c) Were surrogate recoveries not calculated due to dilutions?	☐	☒	☐	
d) Were recoveries not calculated due to interference?	☐	☒	☐	

Laboratory Control Sample	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a LCS analyzed at the appropriate frequency?	☒	☐	☐	
b) Were the proper compounds included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☐	☒	☐	See Note 4

Matrix Spike/Matrix Spike Duplicate	**YES**	**NO**	**NA**	**COMMENTS**
a) Was MS accuracy criteria met?	☐	☐	☒	No MS/MSDs analyzed this SDG
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☐	☒	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☐	☐	☒	

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?	☒	☐	☐	LMW-12-0818 / LMW-12-0818-D
b) Were field dup. precision criteria met (20%)?	☒	☐	☐	
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	
d) Were lab dup. precision criteria met (Note RPD)?	☐	☐	☒	

ICP Serial Dilution (SD)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was an ICP SD analyzed once per SDG?	☐	☐	☒	Not required for VOC/SVOC analyses
b) Was the ICP SD criteria met?	☐	☐	☒	

Overall Evaluation	**YES**	**NO**	**NA**	**COMMENTS**
a) Were there any other technical problems not previously addressed?	☒	☐	☐	See Note 5
b) Checked for transcription errors?	☒	☐	☐	
c) Do target analytes fall within calibration ranges?	☒	☐	☐	
d) Data are acceptable and usable except as noted?	☒	☐	☐	

DATA REVIEW CHECKLIST - QA LEVEL II

Comments/Notes:

1. The laboratory case narrative noted that sample 18H0208-01 (LMW-6-0818) contained “pea-bubbles,” roughly 2-4 mm in size. Results from vials with the presence of air bubbles in the sample vial may be biased low due to potential loss of VOCs. However, as the results from this sample are similar to historic results, using professional judgement, no qualification was required.

   The samples listed in the table below had headspace in the sample vials. The laboratory noted that the best vials (i.e. with minimal headspace or bubbles) were used for analysis, when possible. Given that the results for these samples are consistent with historical data with the exception of certain contaminants, following Guidelines for Organics and using professional judgement, when a sample vial used for VOC analysis contained headspace, all associated results were qualified as estimated (J/UJ).

Lab ID	Sample Name
18H0208-02	LMW-2-0818
18H0208-03	LMW-4-0818
18H0208-05	LMW-12-0818
18H0208-06	LMW-12-0818-D
18H0208-07	LMW-13R-0818
18H0208-09	Trip Blank

2. The chain of custody (COC) noted that one of the cooler temperatures at the time of receipt was outside QC criteria (≤ 6°C) with a temperature of 12.1°C. The laboratory was contacted and confirmed that this cooler did not contain any sample containers. Therefore, no further action was necessary other than to note.

3. Analytes were detected in the method and field blanks, as shown in the table below. When contamination was found in more than one blank, the blank with the highest concentration was used to qualify the data. Following Guidelines and using professional judgement, when the blank concentration was below the RL, associated sample results detected between the MDL and the RL were qualified as non-detect (U) and reported at the RL. Associated sample results greater than 2x the RL, and non-detect results, did not require qualification.

   Using professional judgement, for common laboratory contaminants like acetone, when the blank result was less than the RL and associated sample results were greater than the RL but less than 2x the RL, the associated RL was reported as the sample result and qualified as non-detect (U). Associated non-detect sample results did not require qualification.

   Using professional judgment and since the laboratory noted that the calibration was above QC criteria for benzene (see note 5) for certain samples, indicating a high bias, when the blank result was less than the RL and the sample result was less than 2x the RL, associated results were reported at the sample result and qualified as non-detect (U).

Sample Name	Parameter	Analyte	Blank Result	Reporting Limit	Units
BGH0573-BLK1	8260C	Benzene	0.10	0.20	ug/L
BGH0806-BLK1	8260C	Acetone	2.63	5.00	ug/L
BGH0806-BLK1	8260C	Benzene	0.15	0.20	ug/L
Field Blank-0818	8260C	Chloromethane	0.13	0.50	ug/L
Field Blank-0818	8260C	Benzene	0.14	0.20	ug/L

4. LCS recoveries and RPDs were outside QC criteria for select analytes, as seen in the table below. The Guidelines for Organics do not cover qualifications based on LCS recoveries. Using professional judgement analogous to the MS/MSD Guidelines for Organics, when the %R was greater than the upper acceptance limit, associated detected results were qualified as estimated (J) and associated non-detect results did not require qualification. When the %R was less than the lower acceptance limit but greater than 20%, all associated results were qualified as estimated (J/UJ).

Sample Name	Parameter	Surrogate	LCS/LCSD Recovery (%)	RPD	Recovery / RPD Limits (%)
LCS (BGH0573-BS1)	8260C	Benzene	**121 / 121**	0.07	80-120 / 30
LCS (BGH0573-BS1)	8260C	2-Chloroethyl vinyl ether	**40.8 / 29.5**	**32.0**	74-127 / 30
LCS (BGH0573-BS1)	8260C	Hexachloro-1,3-Butadiene	**124 /** 118	5.21	58-123 / 30
LCS (BGH0573-BS1)	8260C	1,1-Dichloroethane	96.5 **/ 63.7**	19.20	76-124 / 30
LCS (BGH0806-BS1)	8260C	Benzene	**128 / 122**	4.26	80-120 / 30
LCS (BGH0806-BS1)	8260C	2-Chloroethyl vinyl ether	**30.1 / 46.5**	**42.80**	74-127 / 30
LCS (BGH0806-BS1)	8260C	Dichlorodifluoromethane	**151** / 84.3	**56.90**	48-147 / 30
LCS (BGH0806-BS1)	8260C	1,1-Dichloroethane	107 **/ 63.4**	21.50	76-124 / 30

5. The laboratory case narrative indicated that certain CCV recoveries were outside of QC criteria. Review of calibration data is outside the scope of a level II validation, and the calibration summaries were not provided by the laboratory as part of this data package. Using professional judgment, the CCV information provided was reviewed only to determine if serious deficiencies warranting data rejection were present. The laboratory indicated that sample results associated with the failing CCVs were qualified with a "Q" qualifier, which were removed as part of this data validation. Using professional judgement, no further action is necessary as the guidelines do no require rejection of data based on the CCV %D.

Data Qualification: See Table 2.

Definitions:

SDG: Sample Delivery Group
COC: Chain of Custody
VOC: Volatile Organic Compound
TCL: Target Compound List
%D: Percent Difference
LCS: Laboratory Control Sample
MS/MSD: Matrix Spike/Matrix Spike Duplicate
MDL: Method Detection Limit
%R: Percent Recovery
CC: Continuing Calibration
RRF: Relative Response Factor
TCLP: Toxicity Characteristic Leaching Procedure
QC: Quality Control
QAPP: Quality Assurance Project Plan
SVOC: Semivolatile Organic Compound
PCB: Polychlorinated Biphenyl
RPD: Relative Percent Difference
RSD: Relative Standard Deviation
CRDL: Contract Required Quantitation Limit
RL: Reporting Limit
PEM: Performance Evaluation Mixture
SPCC: System Performance Check Compound
RT: Retention Time
LOQ: Limit of Quantitation