

August 1, 2014

Project No. 923-1000-002.R273

Mr. Bill Kombol
Palmer Coking Coal Company
31407 Highway 169
PO Box 10
Black Diamond, WA 98010

RE: LANDSBURG MINE SITE INTERIM GROUNDWATER MONITORING REPORT – JUNE 2014

Dear Bill:

Golder Associates Inc. (Golder) completed an interim groundwater monitoring event at the Landsburg Mine Site during June 2014. Groundwater samples were collected from monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-8, LMW-9, LMW-10, and LMW-11 (Figure 1). Monitoring wells LMW-2, LMW-4 and LMW-10 are completed to monitor shallow and deeper zones within the Rogers Coal Seam north of the Rogers Coal Mine subsidence trench. Monitoring wells LMW-3 and LMW-5 are completed to monitor the shallow (~40 feet depth) and deeper zone (~250 feet depth), respectively, within the Rogers Coal Seam at the south end of the mine. See Figure 2 for a cross-section along the strike at the coal seam that also depicts the location of the monitoring wells. Monitoring well LMW-8 is receiving groundwater before discharge from Portal 3 and the mine access incline at the south end of the Rogers Coal Mine. These wells lay along the primary pathways for detection of a chemical release from the mine, were one to occur. Groundwater samples were also collected from well LMW-9 and the deep well LMW-11, which monitor groundwater from within the Rogers Coal Mine near its south end. Wells LMW-9 and LMW-11 are receiving groundwater from near the top of the water table and near the bottom of the mine, respectively. Wells LMW-6 and LMW-7 monitor groundwater from the Frasier and Landsburg Coal Mines to the west and east of the Rogers Coal Mine, respectively.

Groundwater sampling was conducted in accordance with the *Draft Interim Groundwater Monitoring Plan, Landsburg Mine Site* (Golder 1997)¹, and included the following activities:

- Measurement of static water levels at monitoring wells.
- Well purging to insure sample representativeness with the currently installed dedicated pumping systems.
- Measurement of field parameters including: pH, specific conductance, temperature, dissolved oxygen, Eh, and turbidity.
- Collection of representative samples in appropriate containers; dissolved metals samples were field filtered (total metals were not). The dissolved metals samples were not analyzed.
- Analyses of groundwater for volatile organic compounds (VOCs; EPA Method 8260C), priority pollutant metals (EPA Method 6010C/200.8/7470A Series), and a petroleum hydrocarbon identification scan (NWTPH-HCID).

The attached Appendix A presents the laboratory analytical reports for all analyses. Sampling activities were documented on Sample Integrity Data Sheets (SIDS). Copies of the completed SIDS are provided

¹ Golder Associates Inc. (Golder). 1997. *Draft Interim Groundwater Monitoring Plan, Landsburg Mine Site*. Prepared for the Landsburg PLP Steering Committee, Redmond, Washington.



in Appendix B. Table 1 presents water depth measurements and elevations that were collected from wells prior to sampling activities. Groundwater levels are similar to previous monitoring periods and indicate that groundwater is discharging out both ends of the Rogers Coal Mine.

Following sample collection, all bottles were sealed, labeled, and placed in an iced cooler until delivery to the laboratory. All groundwater samples from monitoring wells were transported under chain-of-custody procedures to Analytical Resources Incorporated (ARI), of Tukwila, Washington, for analyses. Screening levels are based on maximum contaminant levels (MCLs) or State of Washington Model Toxics Control Act (MTCA) Method B groundwater cleanup levels, whichever value is less. In cases where an established MCL or Method B Cleanup Level does not exist, a similar (surrogate) compound regulatory screening level is identified for comparison.

The analytical results indicate no significant changes in groundwater conditions from those observed during the remedial investigation (RI) and on-going interim groundwater monitoring. Table 2 presents the field parameter measurements and laboratory analytical results for each groundwater sample. Laboratory analyses did not detect any VOCs or petroleum hydrocarbon (HCID) in any of the groundwater samples. Carbon disulfide, which has been previously detected at low levels in site groundwater in previous sampling events, was not detected in any of the samples.

A sample was not collected at LMW-7 for the June 2014 round of sampling due to a malfunctioning pump. The pump was removed from the well and taken for repairs. It is expected that the pump will be repaired in time for the next round of sampling. Sampling results at LMW-7 have been consistent for the last 20 years of sampling since the pump was installed. The field duplicate was collected at LMW-6 instead for the June 2014 round of sampling.

The Equipment Blank sample contained a low level detection of methylene chloride, just above the limit of quantitation (LOQ, 1.0 [micrograms per liter] $\mu\text{g/L}$), at 1.2 $\mu\text{g/L}$. This trace detection was likely due to minor cross-contamination introduced during transport and/or at the laboratory. Since no samples were affected, no further action was taken.

Several samples had small- or pea-sized bubbles in one of the vials to be analyzed for VOCs (LMW-2, LMW-3, and LMW-EB, and Trip Blank). Small- and pea-sized bubbles (< 4 [millimeters] mm) are not considered to affect VOC results, especially if analyzed within 7 days (as these samples were). Protocol dictates that the lab will choose vials without bubbles or headspace for analysis. No other quality assurance / quality control issues were noted.

For the laboratory data packages labeled YM52 and YM69, it was noted that there was a sample identification (ID) discrepancy between the bottles and the chain-of-custody form for sample LMW-2. Since the ID listed on the bottles wasn't sampled on the day these samples were collected, the lab correctly identified (with confirmation from the field staff) that the actual sample ID was LMW-2. No further action was taken.

The primary parameters detected in groundwater samples during this sampling event were metals that are naturally occurring. The method reporting limits (MRLs) and method detection limits (MDLs) for all analytes were at or below acceptable concentrations under the MTCA.

Several groundwater samples from site wells contained iron and manganese concentrations above State of Washington secondary drinking water levels (SMCLs) of 0.3 milligrams per liter (mg/L) and 0.05 mg/L, respectively, which are not health-based standards, but are protective of aesthetic qualities of water. Iron and manganese have been detected in mine groundwater above MTCA cleanup levels in every monitoring event at the site and are naturally occurring metals that are typically associated with

groundwater from coal mines (Fuste et al. 1983)². The concentrations of iron and manganese detected during the June 2014 sampling event are similar to concentrations detected during the RI (Golder 1996)³ and the Interim Groundwater Sampling events previously conducted at the site.

The groundwater sample from the deep well (LMW-11) contained total arsenic at a concentration of 5 µg/L (0.005 mg/L), which is less than the Washington State primary drinking water MCL and equal to the MTCA groundwater cleanup level of 10 µg/L and 5 µg/L, respectively. Arsenic also has been detected in groundwater from LMW-11 near or above MTCA cleanup levels during every monitoring event since LMW-11 was installed. Arsenic is also a naturally occurring metal commonly detectable in groundwater, especially in older more stagnant groundwater having low reduction-oxidation (REDOX) and dissolved oxygen levels. The MTCA groundwater cleanup level is based on typical groundwater background levels in the State of Washington. It is probable that the arsenic concentrations are naturally occurring deep within the mine where groundwater is more stagnant and its geochemistry may be different than shallow groundwater within the mine.

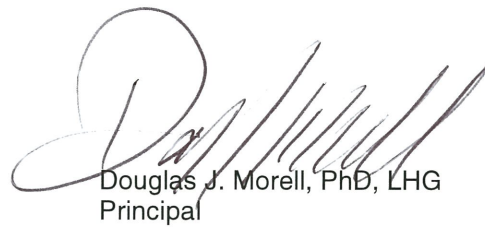
If you have any questions or require any additional information, please contact Douglas Morell at (425) 883-0777.

Sincerely,

GOLDER ASSOCIATES INC.



Jill S. Lamberts
Project Environmental Scientist



Douglas J. Morell, PhD, LHG
Principal

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JSL/DJM/ks

² Fuste, L.A., F.A. Packard, M.O. Fretwell, and D.P. Garland. 1983. Data Supplement To: Quality of Coal Mine Drainage in Washington, 1975-77. Open-File Report 83-205. Tacoma, Washington: US Geological Survey.

³ Golder Associates Inc. (Golder). 1996. Remedial Investigation and Feasibility Study for the Landsburg Mine Site. Landsburg PLP Steering Committee.

TABLES

Table 1: Groundwater Elevation Data Collection June 3, 2014 Landsburg Mine Site

	UNITS	LMW-1	LMW-1a	LMW-2	LMW-3	LMW-4 ¹	LMW-5	LMW-6	LMW-7 ¹	LMW-8	LMW-9	LMW-10	LMW-11	P-2	Water Drainage	Frazier Seam Tunnel
Water Depths																
Time of data collection	ft bgs	11:28 AM	11:20 AM	9:29 AM	10:30 AM	9:33 AM	10:36 AM	11:07 AM	9:13 AM	10:43 AM	10:20 AM	9:37 AM	10:11 AM	10:41 AM	NA	NA
Measured to Top of PVC	ft bgs	141.22	137.31	7.53	12.57	9.01	14.08	24.12	209.03	4.70	99.80	0.00	157.62	7.14	NA	NA
Measured to Top of Monument	ft bgs	141.99	137.51	8.20	13.34	9.69	14.73	24.85	209.54	NC	100.09	NC	157.98	NC	NA	NA
Surveyed Elevation																
Top of PVC	ft asl	765.16	759.51	617.73	656.75	619.26	658.27	632.33	771.51	646.97	743.99	618.87	801.87	651.37	NA	NA
Top of Monument	ft asl	765.89	NC	618.29	657.48	619.85	658.87	633.00	771.88	NC	NC	NC	802.20	NC	NA	NA
Ground Level	ft asl	762.90	756.59	615.35	654.40	617.09	655.63	629.95	768.79	645.25	741.13	615.75	799.50	648.54	551.38	542.15
Corrected Water Elevation																
Using PVC elevation	ft asl	623.94	622.20	610.20	644.18	610.25	644.19	608.21	562.48	642.27	644.19	618.87	644.25	644.23	NA	NA
Using Monument elevation	ft asl	623.90	NA	610.09	644.14	610.16	644.14	608.15	562.34	NA	NA	NA	644.22	NA	NA	NA

Notes:
¹ Data corrected to accommodate well inclination of 20° from vertical
NA = Not applicable
NC = Data not collected
ft bgs = feet below ground surface
ft asl = feet above sea level

Table 2: June 2014 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-5	LMW-6	LMW-6 Duplicate	LMW-7*	LMW-8	LMW-9	LMW-10	LMW-11	Equipment Blank	Trip Blank	Trip Blank	Trip Blank
		6/4/2014	6/5/2014	6/4/2014	6/5/2014	6/6/2014	6/6/2014	6/6/2014	6/5/2014	6/5/2014	6/4/2014	6/4/2014	6/5/2014	6/4/2014	6/5/2014	6/6/2014
Field Parameter																
pH	stnd	6.92	7.90	7.03	7.07	7.02	NA	NA	7.04	7.16	8.78	7.42	NA	NA	NA	NA
Conductivity	uS/cm	392	286.3	398	560	151.5	NA	NA	382	540	353	364	NA	NA	NA	NA
Dissolved Oxygen	mg/L	0.00	0.00	0.00	0.00	0.00	NA	NA	0.07	0.00	0.00	0.35	NA	NA	NA	NA
Temperature	°C	11.0	11.1	10.9	11.4	10.2	NA	NA	13.4	12.6	10.5	11.6	NA	NA	NA	NA
E _h	Rel mV	116.5	127.8	79.2	105.6	164.0	NA	NA	93.0	141.6	50.4	96.1	NA	NA	NA	NA
Turbidity	NTU	6.00	1.02	6.96	3.15	2.33	NA	NA	1.63	0.91	2.73	2.19	NA	NA	NA	NA
Metals (Total)																
Aluminum	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Antimony	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Arsenic	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Barium	mg/L	0.500 U	0.5 U	0.5 U	0.5 U	0.5 U	0.50 U	NA	0.5 U	0.500 U	0.5 U	0.5 U	0.5 U	NA	NA	NA
Beryllium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Cadmium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Calcium	mg/L	111	37.4	107	94.2	25.2	25.7	NA	48.5	86.1	7.08	59.1	0.5 U	NA	NA	NA
Chromium	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	NA
Cobalt	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Copper	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Iron	mg/L	0.200 U	0.2 U	0.9	0.2 U	2.2	2.02	NA	10.9	1.59	0.2 U	1.82	0.2 U	NA	NA	NA
Lead	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Magnesium	mg/L	67.4	15.2	64.2	52.1	12.2	12.4	NA	25.3	46.7	2.91	27.7	1 U	NA	NA	NA
Manganese	mg/L	0.210	0.050	0.16	0.25	0.03	0.03	NA	0.420	0.18	0.02 U	0.150	0.02 U	NA	NA	NA
Mercury	mg/L	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	NA	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	NA	NA	NA
Nickel	mg/L	0.02000 U	0.02000 U	0.02000 U	0.02000 U	0.02000 U	0.02000 U	NA	0.02000 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA
Potassium	mg/L	3.53	1.69	3.62	2.72	0.64	0.65	NA	1.93	2.54	1.33	2.14	0.5 U	NA	NA	NA
Selenium	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA	NA
Silver	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Sodium	mg/L	20.9	10.3	27.5	15.3	6.41	6.47	NA	9.16	15.6	82.7	34.5	0.500 U	NA	NA	NA
Thallium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Vanadium	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Zinc	mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA
Volatile Organic Compounds (VOCs)																
Acetone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acrolein	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acrylonitrile	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromomethane	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
n-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.200 U	0.2 U	0.2 U	0.2 U
Carbon disulfide	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon tetrachloride	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethylvinylether	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorodibromomethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-Chloropropane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U



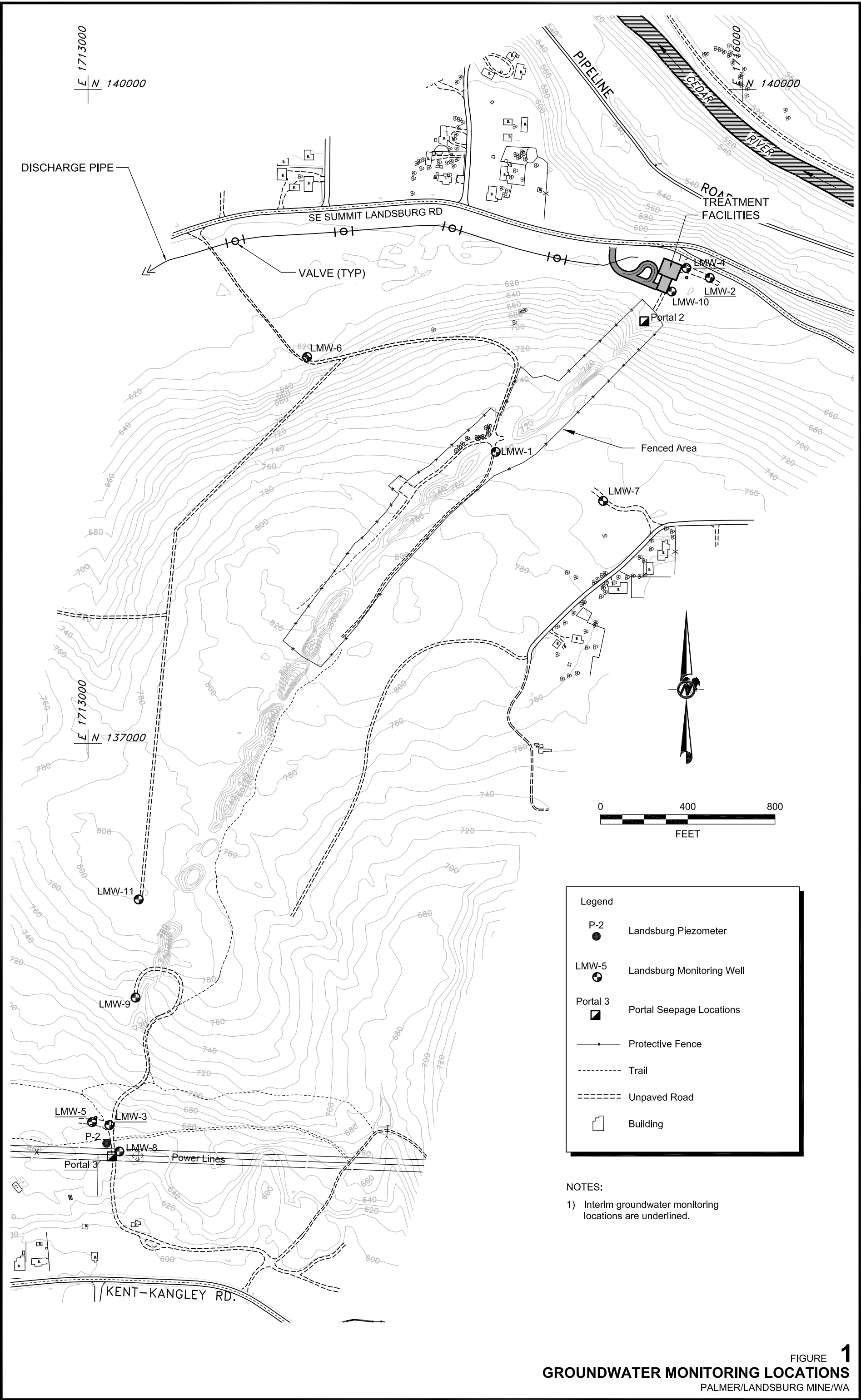
Table 2: June 2014 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-5	LMW-6	LMW-6 Duplicate	LMW-7*	LMW-8	LMW-9	LMW-10	LMW-11	Equipment Blank	Trip Blank	Trip Blank	Trip Blank
		6/4/2014	6/5/2014	6/4/2014	6/5/2014	6/6/2014	6/6/2014	6/6/2014	6/5/2014	6/5/2014	6/4/2014	6/4/2014	6/5/2014	6/4/2014	6/5/2014	6/6/2014
Dibromomethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,4-Dichloro-2-butene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,2-Dichloropropane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-Dichloropropene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,3-Dichloropropene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Isopropyltoluene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Methylene Chloride	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U
4-Methyl-2-pentanone	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Naphthalene	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Propylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1,2-Tetrachloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1,2,2-Tetrachloroethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Tetrachloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Total Benzofluoranthenes	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl acetate	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m-Xylene & p-Xylene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylenes, Total	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Hydrocarbon Identification																
Diesel Range	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA
Gas Range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	NA	NA
Lube Oil	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA

Notes:
NA = 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.
* LMW-7 was not sampled due to pump malfunction. Field Duplicate sample was collected at LMW-6 instead.
uS/cm = microsiemens per centimeter
mg/L = milligrams per liter
Rel mV = relative millivolts
NTU = nephelometric turbidity unit
µg/L = micrograms per liter



FIGURES



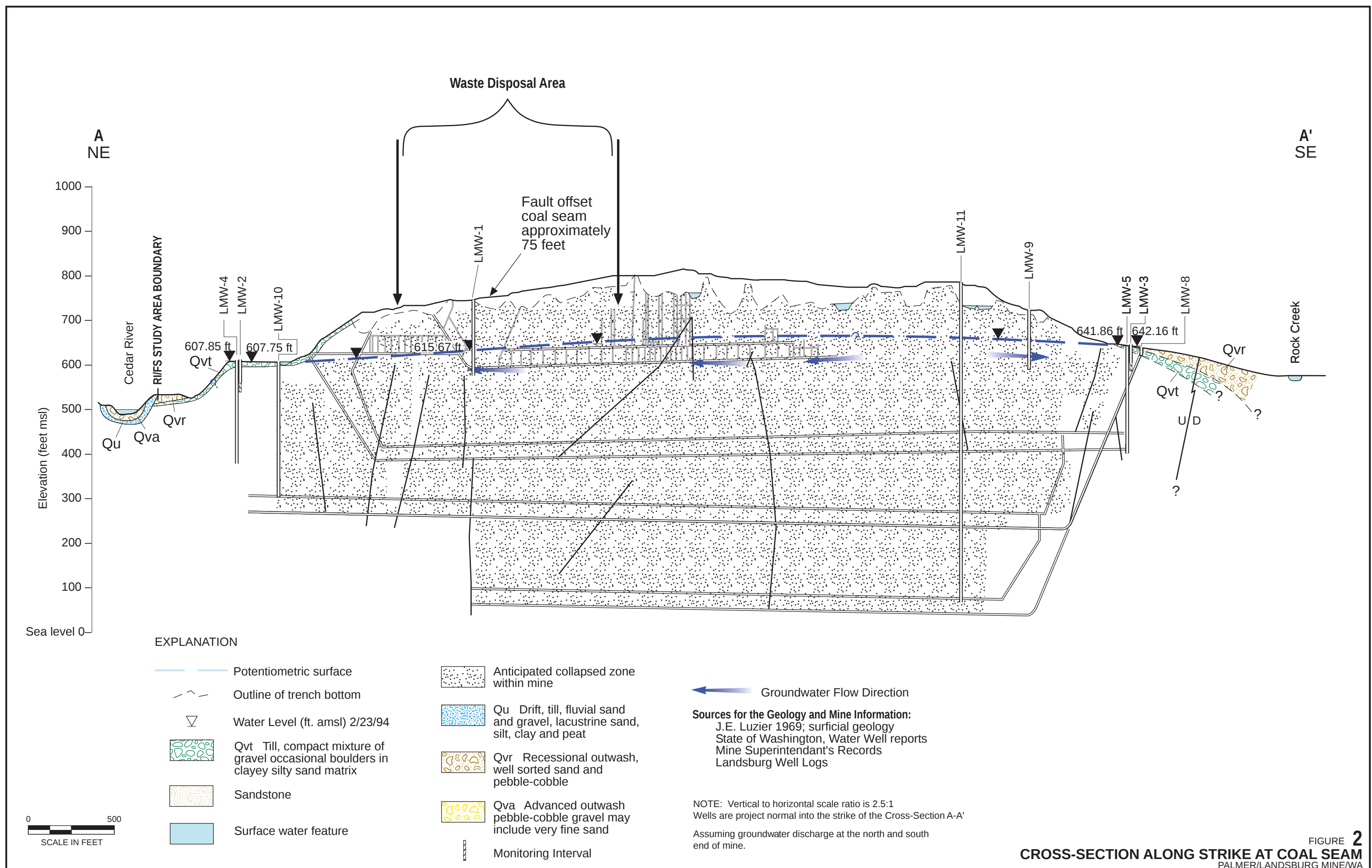


FIGURE 2
CROSS-SECTION ALONG STRIKE AT COAL SEAM
 PALMER/LANDBURG MINE/WA

APPENDIX A
LABORATORY ANALYTICAL REPORTS



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2014

Doug Morell
Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

Client Project Name: Landsburg Mine
Client Project Number: 923-1000-002.R273
ARI ID: YM51

Dear Mr. Morell:

Please find enclosed Chain-of-Custody (COC) record, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples and a trip blank in good condition on June 4, 2014. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for VOCs, HCID, Total Metals, as requested on the COC. Quality control analyses are included for your review.

The VOCs CCAL is out of control low for all associated FORM III "Q" flagged analytes with the exception of chloroethane which is out of control high.

The VOCs LCS is out of control high for chloroethane. The LCSD is in control and no further corrective action was taken.

The total metals matrix spike is out of control high for lead and has not recovered for chromium in association with sample LWM-10-0614. The not recovered is due to the raised reporting limit criteria for the project.

No other analytical complications were noted.

Per client request, the metals reporting limits were raised to meet client required limits.

An electronic copy of this report and all supporting raw data will remain on file at ARI. Please feel free to contact me if you have any questions or require any additional information.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: YMS1 Turn-around Requested: standard

ARI Client Company: Golder Associates Phone: 425-883-0772

Client Contact: Douglas Morell, Jill Lamberts

Client Project Name: Landsburg Mine

Client Project #: 923-1000-002.R273 Samplers: J. Lamberts, A. Rydecki

Page: 1 of 1

Date: 6/4/2014 Ice Present? Y

No. of Coolers: 3 Cooler Temps: 5.3, 4.3, 2.1



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	VOCs	TPH-HCIP	TAML	Total Metals	TAML (**)	Diss. Metals	Analysis Requested	Notes/Comments
Trip Blank	6/4/2014	—	DI	2	X							
LMW-10-0614		1110	W	11	X	X	X		HOLD			
LMW-2-0614		1250 JL	W	11	X	X	X					
LMW-4-0614		1405	W	11	X	X	X					
LMW-11-0614		1555	W	11	X	X	X					

Comments/Special Instructions <u>Ecology EIM EDD</u> <u>**Client specific RLs **</u> <u>+ analyte list **</u> <u>Pls cc jlamberts@golder.com</u> <u>arydecki@golder.com</u>	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) <u>J. Lamberts</u>	(Signature) <u>Jennifer Millsap</u>	(Signature)	(Signature)
	Printed Name: <u>J. Lamberts</u>	Printed Name: <u>Jennifer Millsap</u>	Printed Name:	Printed Name:
	Company: <u>Golder</u>	Company: <u>ARI</u>	Company:	Company:
	Date & Time: <u>6/4/2014 1729</u>	Date & Time: <u>6/4/14 1729</u>	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, notwithstanding 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.

Sample ID Cross Reference Report



ARI Job No: YM51
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg Mine

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. LMW-10-0614	YM51A	14-10712	Water	06/04/14 11:10	06/04/14 17:29
2. LMW-2-0614	YM51B	14-10713	Water	06/04/14 12:50	06/04/14 17:29
3. LMW-4-0614	YM51C	14-10714	Water	06/04/14 14:05	06/04/14 17:29
4. LMW-11-0614	YM51D	14-10715	Water	06/04/14 15:55	06/04/14 17:29
5. Trip Blank	YM51E	14-10716	Water	06/04/14 15:55	06/04/14 17:29



Cooler Receipt Form

ARI Client: Golder
COC No(s): _____
Assigned ARI Job No: YMS1

Project Name: Landsburg Mine
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO
Were custody papers included with the cooler? YES YES NO
Were custody papers properly filled out (ink, signed, etc.) YES YES NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.3 4.3 2.1
Time: _____
If cooler temperature is out of compliance fill out form 00070F
Cooler Accepted by: JM Date: 6/4/14 Time: 1729 Temp Gun ID#: 122412224

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____
Was sufficient ice used (if appropriate)? NA YES NO
Were all bottles sealed in individual plastic bags? YES NO
Did all bottles arrive in good condition (unbroken)? YES NO
Were all bottle labels complete and legible? YES NO
Did the number of containers listed on COC match with the number of containers received? YES NO
Did all bottle labels and tags agree with custody papers? YES NO
Were all bottles used correct for the requested analyses? YES NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO
Were all VOC vials free of air bubbles? NA YES NO
Was sufficient amount of sample sent in each bottle? YES NO
Date VOC Trip Blank was made at ARI: NA 5-28-14
Was Sample Split by ARI: NA YES Date/Time: _____ Equipment: _____ Split by: _____
Samples Logged by: TJ Date: 6-5-14 Time: 910

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

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
<u>LMW-3-0614</u>	<u>LMW-2-0614</u>		

Additional Notes, Discrepancies, & Resolutions: LMW-3-0614 1 pb

By: TJ Date: 6-5-14

Small Air Bubbles - 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)

PRESERVATION VERIFICATION 06/05/14

Page 1 of 1



ARI Job No: YM51

PC: Kelly

VTSR: 06/04/14

Inquiry Number: NONE

Analysis Requested: 06/05/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 923-1000-002.R273

Project:

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM		CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID	CLIENT ID	>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10712 YM51A	LMW-10-0614						TOT 9.55															
14-10713 YM51B	LMW-3-0614						TOT 6.51															
14-10714 YM51C	LMW-4-0614						TOT 8.21															
14-10715 YM51D	LMW-11-0614						TOT 8.55															

Checked By TS Date 6-5-14

YM51: 00005

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Matrix: Water

 Data Release Authorized: 

Reported: 06/09/14

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-060614 14-10712	Method Blank	06/06/14	06/06/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	104%
YM51A 14-10712	LMW-10-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	102%
YM51B 14-10713	LMW-2-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	91.3%
YM51C 14-10714	LMW-4-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	106%
YM51D 14-10715	LMW-11-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	101%

Reported in mg/L (ppm)

Gas value based on total peaks in the range from Toluene to C12.

Diesel value based on the total peaks in the range from C12 to C24.

Oil value based on the total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

HCID SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YM51-Golder Associates
Project: Landsburg Mine
923-1000-002.R273

<u>Client ID</u>	<u>O-TER</u>	<u>TOT OUT</u>
MB-060614	104%	0
LMW-10-0614	102%	0
LMW-2-0614	91.3%	0
LMW-4-0614	106%	0
LMW-11-0614	101%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-10712 to 14-10715

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-10-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM51A

QC Report No: YM51-Golder Associates

LIMS ID: 14-10712

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: 06/04/14

Reported: 06/12/14

Date Received: 06/04/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 19:50

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-10-0614

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SAMPLE

Lab Sample ID: YM51A

QC Report No: YM51-Golder Associates

LIMS ID: 14-10712

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 19:50

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	112%
d8-Toluene	103%
Bromofluorobenzene	98.8%
d4-1,2-Dichlorobenzene	103%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-2-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM51B

QC Report No: YM51-Golder Associates

LIMS ID: 14-10713

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: 06/04/14

Reported: 06/12/14

Date Received: 06/04/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 20:15

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-2-0614

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SAMPLE

Lab Sample ID: YM51B

QC Report No: YM51-Golder Associates

LIMS ID: 14-10713

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 20:15

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	114%
d8-Toluene	104%
Bromofluorobenzene	99.2%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-4-0614

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SAMPLE

Lab Sample ID: YM51C

QC Report No: YM51-Golder Associates

LIMS ID: 14-10714

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: 06/04/14

Reported: 06/12/14

Date Received: 06/04/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 20:40

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-4-0614

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SAMPLE

Lab Sample ID: YM51C

QC Report No: YM51-Golder Associates

LIMS ID: 14-10714

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 20:40

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	117%
d8-Toluene	104%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	101%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-11-0614

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SAMPLE

Lab Sample ID: YM51D

QC Report No: YM51-Golder Associates

LIMS ID: 14-10715

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/04/14

Reported: 06/12/14

Date Received: 06/04/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 21:04

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-11-0614

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SAMPLE

Lab Sample ID: YM51D

QC Report No: YM51-Golder Associates

LIMS ID: 14-10715

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 21:04

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	117%
d8-Toluene	106%
Bromofluorobenzene	99.6%
d4-1,2-Dichlorobenzene	101%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: Trip Blank
SAMPLE

Page 1 of 2

Lab Sample ID: YM51E

QC Report No: YM51-Golder Associates

LIMS ID: 14-10716

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: *AS*

Date Sampled: 06/04/14

Reported: 06/12/14

Date Received: 06/04/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 18:36

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: Trip Blank

Page 2 of 2

SAMPLE

Lab Sample ID: YM51E

QC Report No: YM51-Golder Associates

LIMS ID: 14-10716

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 18:36

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	102%
Bromofluorobenzene	99.4%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: MB-061114A

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METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM51-Golder Associates

LIMS ID: 14-10712

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: *[Signature]*

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 17:02

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MB-061114A

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METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM51-Golder Associates

LIMS ID: 14-10712

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 17:02

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	101%
Bromofluorobenzene	98.5%
d4-1,2-Dichlorobenzene	100%

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-061114A	Method Blank	10	106%	101%	98.5%	100%	0
LCS-061114A	Lab Control	10	106%	101%	99.1%	102%	0
LCSD-061114A	Lab Control Dup	10	103%	100%	101%	101%	0
YM51A	LMW-10-0614	10	112%	103%	98.8%	103%	0
YM51B	LMW-2-0614	10	114%	104%	99.2%	102%	0
YM51C	LMW-4-0614	10	117%	104%	98.0%	101%	0
YM51D	LMW-11-0614	10	117%	106%	99.6%	101%	0
YM51E	Trip Blank	10	108%	102%	99.4%	102%	0

LCS/MB LIMITS

QC LIMITS

SW8260C

(DCE) = d4-1,2-Dichloroethane
(TOL) = d8-Toluene
(BFB) = Bromofluorobenzene
(DCB) = d4-1,2-Dichlorobenzene

(80-120)
(80-120)
(80-120)
(80-120)

(80-130)
(80-120)
(80-120)
(80-120)

Prep Method: SW5030B

Log Number Range: 14-10712 to 14-10716

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LCS-061114A

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LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

QC Report No: YM51-Golder Associates

LIMS ID: 14-10712

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst LCS: NT15/LH

Sample Amount LCS: 10.0 mL

LCSD: NT15/LH

LCSD: 10.0 mL

Date Analyzed LCS: 06/11/14 15:51

Purge Volume LCS: 10.0 mL

LCSD: 06/11/14 16:15

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	11.2	10.0	112%	10.7	10.0	107%	4.6%
Bromomethane	10.2	10.0	102%	9.76	10.0	97.6%	4.4%
Vinyl Chloride	10.8	10.0	108%	10.2	10.0	102%	5.7%
Chloroethane	14.0 Q	10.0	140%	13.0 Q	10.0	130%	7.4%
Methylene Chloride	11.1	10.0	111%	10.5	10.0	105%	5.6%
Acetone	54.8	50.0	110%	50.2	50.0	100%	8.8%
Carbon Disulfide	9.73	10.0	97.3%	9.06	10.0	90.6%	7.1%
1,1-Dichloroethene	10.7	10.0	107%	9.98	10.0	99.8%	7.0%
1,1-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
trans-1,2-Dichloroethene	10.6	10.0	106%	10.0	10.0	100%	5.8%
cis-1,2-Dichloroethene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Chloroform	11.1	10.0	111%	10.5	10.0	105%	5.6%
1,2-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
2-Butanone	53.6 Q	50.0	107%	50.4 Q	50.0	101%	6.2%
1,1,1-Trichloroethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
Carbon Tetrachloride	11.2	10.0	112%	10.5	10.0	105%	6.5%
Vinyl Acetate	11.3	10.0	113%	10.5	10.0	105%	7.3%
Bromodichloromethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
1,2-Dichloropropane	10.7	10.0	107%	10.2	10.0	102%	4.8%
cis-1,3-Dichloropropene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Trichloroethene	10.4	10.0	104%	10.0	10.0	100%	3.9%
Dibromochloromethane	11.8	10.0	118%	11.3	10.0	113%	4.3%
1,1,2-Trichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Benzene	10.6	10.0	106%	10.2	10.0	102%	3.8%
trans-1,3-Dichloropropene	11.1	10.0	111%	10.4	10.0	104%	6.5%
2-Chloroethylvinylether	10.6	10.0	106%	10.0	10.0	100%	5.8%
Bromoform	11.1	10.0	111%	10.4	10.0	104%	6.5%
4-Methyl-2-Pentanone (MIBK)	55.4	50.0	111%	51.5	50.0	103%	7.3%
2-Hexanone	52.7	50.0	105%	50.2	50.0	100%	4.9%
Tetrachloroethene	10.4	10.0	104%	10.1	10.0	101%	2.9%
1,1,2,2-Tetrachloroethane	10.9	10.0	109%	10.2	10.0	102%	6.6%
Toluene	10.6	10.0	106%	10.1	10.0	101%	4.8%
Chlorobenzene	10.3	10.0	103%	9.99	10.0	99.9%	3.1%
Ethylbenzene	10.5	10.0	105%	10.2	10.0	102%	2.9%
Styrene	10.7	10.0	107%	10.3	10.0	103%	3.8%
Trichlorofluoromethane	10.3	10.0	103%	10.1	10.0	101%	2.0%
1,1,2-Trichloro-1,2,2-trifluoroetha	11.5	10.0	115%	11.2	10.0	112%	2.6%
m,p-Xylene	21.5	20.0	108%	20.7	20.0	104%	3.8%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 2 of 2

Sample ID: LCS-061114A
LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

LIMS ID: 14-10712

Matrix: Water

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	10.6	10.0	106%	10.3	10.0	103%	2.9%
1,2-Dichlorobenzene	10.2	10.0	102%	9.78	10.0	97.8%	4.2%
1,3-Dichlorobenzene	10.2	10.0	102%	9.61	10.0	96.1%	6.0%
1,4-Dichlorobenzene	9.99	10.0	99.9%	9.57	10.0	95.7%	4.3%
Acrolein	54.8	50.0	110%	50.4	50.0	101%	8.4%
Iodomethane	9.61 Q	10.0	96.1%	9.02 Q	10.0	90.2%	6.3%
Acrylonitrile	10.6	10.0	106%	10.0	10.0	100%	5.8%
1,1-Dichloropropene	10.6	10.0	106%	10.0	10.0	100%	5.8%
Dibromomethane	10.7	10.0	107%	10.1	10.0	101%	5.8%
1,1,1,2-Tetrachloroethane	11.1	10.0	111%	10.7	10.0	107%	3.7%
1,2-Dibromo-3-chloropropane	10.4	10.0	104%	9.94	10.0	99.4%	4.5%
1,2,3-Trichloropropane	11.1	10.0	111%	10.3	10.0	103%	7.5%
trans-1,4-Dichloro-2-butene	10.3	10.0	103%	9.64	10.0	96.4%	6.6%
1,3,5-Trimethylbenzene	10.8	10.0	108%	10.3	10.0	103%	4.7%
1,2,4-Trimethylbenzene	10.7	10.0	107%	10.1	10.0	101%	5.8%
Hexachlorobutadiene	9.42	10.0	94.2%	8.78	10.0	87.8%	7.0%
1,2-Dibromoethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Bromochloromethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
2,2-Dichloropropane	11.2	10.0	112%	10.6	10.0	106%	5.5%
1,3-Dichloropropane	10.7	10.0	107%	10.4	10.0	104%	2.8%
Isopropylbenzene	10.9	10.0	109%	10.4	10.0	104%	4.7%
n-Propylbenzene	10.6	10.0	106%	9.99	10.0	99.9%	5.9%
Bromobenzene	10.5	10.0	105%	9.90	10.0	99.0%	5.9%
2-Chlorotoluene	10.6	10.0	106%	10.0	10.0	100%	5.8%
4-Chlorotoluene	10.3	10.0	103%	9.87	10.0	98.7%	4.3%
tert-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
sec-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
4-Isopropyltoluene	10.8	10.0	108%	10.3	10.0	103%	4.7%
n-Butylbenzene	10.4	10.0	104%	9.89	10.0	98.9%	5.0%
1,2,4-Trichlorobenzene	9.77	10.0	97.7%	9.31	10.0	93.1%	4.8%
Naphthalene	10.3	10.0	103%	9.79	10.0	97.9%	5.1%
1,2,3-Trichlorobenzene	9.77	10.0	97.7%	9.28	10.0	92.8%	5.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	106%	103%
d8-Toluene	101%	100%
Bromofluorobenzene	99.1%	101%
d4-1,2-Dichlorobenzene	102%	101%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-10-0614

SAMPLE

Lab Sample ID: YM51A

LIMS ID: 14-10712

Matrix: Water

Data Release Authorized: *hll*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/06/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/06/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/06/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	7,080	
3010A	06/06/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/06/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/06/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/06/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/06/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	2,910	
3010A	06/06/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	1,330	
200.8	06/06/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/06/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	82,700	
200.8	06/06/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-10-0614

DUPLICATE

Lab Sample ID: YM51A

LIMS ID: 14-10712

Matrix: Water

Data Release Authorized: *xe/ly*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010C	1,000 U	1,000 U	0.0%	+/- 1,000	L
Antimony	200.8	3 U	3 U	0.0%	+/- 3	L
Arsenic	200.8	3 U	3 U	0.0%	+/- 3	L
Barium	6010C	500 U	500 U	0.0%	+/- 500	L
Beryllium	6010C	2 U	2 U	0.0%	+/- 2	L
Cadmium	6010C	2 U	2 U	0.0%	+/- 2	L
Calcium	6010C	7,080	6,980	1.4%	+/- 20%	
Chromium	6010C	1,000 U	1,000 U	0.0%	+/- 1,000	L
Cobalt	6010C	10 U	10 U	0.0%	+/- 10	L
Copper	6010C	3 U	3 U	0.0%	+/- 3	L
Iron	6010C	200 U	200 U	0.0%	+/- 200	L
Lead	200.8	10 U	10 U	0.0%	+/- 10	L
Magnesium	6010C	2,910	2,840	2.4%	+/- 1,000	L
Manganese	6010C	20 U	20 U	0.0%	+/- 20	L
Nickel	6010C	20 U	20 U	0.0%	+/- 20	L
Potassium	6010C	1,330	1,290	3.1%	+/- 500	L
Selenium	200.8	5 U	5 U	0.0%	+/- 5	L
Silver	6010C	3 U	3 U	0.0%	+/- 3	L
Sodium	6010C	82,700	81,500	1.5%	+/- 20%	
Thallium	200.8	2 U	2 U	0.0%	+/- 2	L
Vanadium	6010C	3 U	3 U	0.0%	+/- 3	L
Zinc	6010C	20 U	20 U	0.0%	+/- 20	L

Reported in µg/L

*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-10-0614

MATRIX SPIKE

Lab Sample ID: YM51A

LIMS ID: 14-10712

Matrix: Water

Data Release Authorized: *12/1/14*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010C	1,000 U	2,030	2,000	102%	
Antimony	200.8	3 U	27	25	108%	
Arsenic	200.8	3 U	26	25	104%	
Barium	6010C	500 U	2,110	2,000	106%	
Beryllium	6010C	2 U	511	500	102%	
Cadmium	6010C	2 U	511	500	102%	
Calcium	6010C	7,080	16,800	10,000	97.2%	
Chromium	6010C	1,000 U	1,000 U	500	NR	N
Cobalt	6010C	10 U	500	500	100%	
Copper	6010C	3 U	496	500	99.2%	
Iron	6010C	200 U	2,080	2,000	104%	
Lead	200.8	10 U	30	20	150%	N
Magnesium	6010C	2,910	13,000	10,000	101%	
Manganese	6010C	20 U	480	500	96.0%	
Nickel	6010C	20 U	510	500	102%	
Potassium	6010C	1,330	11,100	10,000	97.7%	
Selenium	200.8	5 U	77	80	96.2%	
Silver	6010C	3 U	533	500	107%	
Sodium	6010C	82,700	90,800	10,000	81.0%	H
Thallium	200.8	2 U	25	25	100%	
Vanadium	6010C	3 U	507	500	101%	
Zinc	6010C	20 U	500	500	100%	

Reported in µg/L

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

NR-Not Recovered

Percent Recovery Limits: 75-125%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-2-0614
SAMPLE

Lab Sample ID: YM51B

LIMS ID: 14-10713

Matrix: Water

Data Release Authorized: Yx/14

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/06/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/06/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/06/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	111,000	
3010A	06/06/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/06/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/06/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/06/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/06/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	67,400	
3010A	06/06/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	210	
3010A	06/06/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	3,530	
200.8	06/06/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/06/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	20,900	
200.8	06/06/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-4-0614

SAMPLE

Lab Sample ID: YM51C

LIMS ID: 14-10714

Matrix: Water

Data Release Authorized: *8/14*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/06/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/06/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/06/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	107,000	
3010A	06/06/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/06/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/06/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	900	
200.8	06/06/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/06/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	64,200	
3010A	06/06/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	160	
3010A	06/06/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	3,620	
200.8	06/06/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/06/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	27,500	
200.8	06/06/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-11-0614

SAMPLE

Lab Sample ID: YM51D

LIMS ID: 14-10715

Matrix: Water

Data Release Authorized: *Kelly*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/06/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/06/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/06/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	5	
3010A	06/06/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	59,100	
3010A	06/06/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/06/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/06/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	1,820	
200.8	06/06/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/06/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	27,700	
3010A	06/06/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	150	
3010A	06/06/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	2,140	
200.8	06/06/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/06/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	34,500	
200.8	06/06/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: YM51MB

LIMS ID: 14-10713

Matrix: Water

Data Release Authorized: *YLM*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/06/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/06/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/06/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	500	U
3010A	06/06/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/06/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/06/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/06/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/06/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	1,000	U
3010A	06/06/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/06/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	500	U
200.8	06/06/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/06/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	500	U
200.8	06/06/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/06/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/06/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM51LCS

LIMS ID: 14-10713

Matrix: Water

Data Release Authorized: *ES*

Reported: 06/13/14

QC Report No: YM51-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Aluminum	6010C	2020	2000	101%	
Antimony	200.8	25.4	25.0	102%	
Arsenic	200.8	25.4	25.0	102%	
Barium	6010C	2110	2000	106%	
Beryllium	6010C	510	500	102%	
Cadmium	6010C	516	500	103%	
Calcium	6010C	10000	10000	100%	
Chromium	6010C	516	500	103%	
Cobalt	6010C	509	500	102%	
Copper	6010C	491	500	98.2%	
Iron	6010C	2080	2000	104%	
Lead	200.8	25.8	25.0	103%	
Magnesium	6010C	10300	10000	103%	
Manganese	6010C	488	500	97.6%	
Nickel	6010C	530	500	106%	
Potassium	6010C	9980	10000	99.8%	
Selenium	200.8	77.4	80.0	96.8%	
Silver	6010C	537	500	107%	
Sodium	6010C	10400	10000	104%	
Thallium	200.8	25.2	25.0	101%	
Vanadium	6010C	515	500	103%	
Zinc	6010C	510	500	102%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2014

Doug Morell
Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

Client Project Name: Landsburg Mine
Client Project Number: 923-1000-002.R273
ARI ID: YM52, YM86 and YM69

Dear Mr. Morell:

Please find enclosed Chain-of-Custody (COC) record, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples and a trip blank in good condition on June 6, 2014, five water samples and a trip blank on June 5, 2014 and four water samples and a trip blank on June 4, 2014. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for VOCs, HCID, Total Metals, as requested on the COC. Quality control analyses are included for your review and reported under ARI SDGs YM67, YM51 and YM85.

The mercury was reported under ARI SDGs YM52, YM86 and YM69.

No analytical complications were noted.

Per client request, the metals reporting limits were raised to meet client required limits.

An electronic copy of this report and all supporting raw data will remain on file at ARI. Please feel free to contact me if you have any questions or require any additional information.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

ARI Assigned Number:	Turn-around Requested:
YMSA	standard

ARI Client Company: Golder Associates Phone: 425-883-0772

Client Contact: Douglas Morell, Jill Lamberts

Client Project Name: Landsburg Mine

Client Project #: 923-1000-002. R273	Samplers: J. Lamberts, A. Rydecki
---	--------------------------------------

Page: () of ()

Date: 6/4/2014	Ice Present? 4
-------------------	-------------------

No. of Coolers:	X 3	Cooler Temps:	5.3, 4.3, 2.
-----------------	-----	---------------	--------------

Analysis Requested								Notes/Comments
+		15	15				**Field Filtered	

[illegible]

10C5						(Please analyze under existing MSA b/wn)
- client						
TPH-H						
TAML						
Total						
TAML						
Diss.						

Trip Blank	6/4/2014	-	DI	2	X						Gulder - AKI)
------------	----------	---	----	---	---	--	--	--	--	--	---------------

LMW-10-0614		1110	W	11	X	X	X	HOLD					
-------------	--	------	---	----	---	---	---	------	--	--	--	--	--

LMW-2- ϕ 614	1250 J-1	1235	W	11	X	X	X						
-------------------	-------------	-----------------	---	----	---	---	---	--	--	--	--	--	--

LMW-4-0614		1405	W	11	X	X	X						
------------	--	------	---	----	---	---	---	--	--	--	--	--	--

LMW-11-0614	I	1555	W	11	X	X	X						
-------------	---	------	---	----	---	---	---	--	--	--	--	--	--

[illegible][illegible][illegible][illegible]

Comments/Special Instructions EED EIM EDD	Relinquished by: (Signature) 	Received by: (Signature) 	Relinquished by: (Signature)	Received by: (Signature)
--	---	--	---------------------------------	-----------------------------

*Client specific RLs **	Printed Name: J. Lamberts	Printed Name: Jennifer Mitts	Printed Name:	Printed Name:
-------------------------	---------------------------	------------------------------	---------------	---------------

t analyte list **	Company:	Company:	Company:	Company:
	Holder	ARI		

Pls cc j.lamberts@golder.com arydecki@golder.com	Date & Time: 6/4/2014 1729	Date & Time: 6/4/14 1729	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, notwithstanding 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

Electronic data will be appropriately discarded no later than 90 days after receipt or 90 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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

ARI Assigned Number: 21167 21169		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Golder Associates		Phone: 425 883 0777		Date: 6/5/2014	Ice Present? Y
Client Contact: Douglas Morell, Jill Lamberts				No. of Coolers: 3	Cooler Temps: 36-4.3

Client Project Name: <i>Handsburg Mine</i>					Analysis Requested								Notes/Comments
Client Project #: <i>9231000-002-R273</i>		Samplers: <i>J. Lamberts, A. Rydecker</i>			<i>VOCs - client list</i>	<i>TPH-HCD</i>	<i>TAML Total Metals</i>	<i>TAML (**) Diss. Metals</i>					(***) Field Filtered w/ 0.45um filter [Please analyze under existing MSA brown bottle + ARI]
Sample ID	Date	Time	Matrix	No. Containers									
<i>Trip Blank</i>	<i>6/5/2014</i>	<i>-</i>	<i>DI</i>	<i>2</i>	<i>X</i>								
<i>LMW-9-0614</i>		<i>1045</i>	<i>W</i>	<i>11</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>HOLD</i>					
<i>LMW-5-0614</i>		<i>1210</i>	<i>W</i>	<i>11</i>	<i>X</i>	<i>X</i>	<i>X</i>	<i>HOLD</i>					
<i>LMW-3-0614</i>		<i>1345</i>	<i>W</i>	<i>11</i>	<i>X</i>	<i>X</i>	<i>X</i>						
<i>LMW-EB-0614</i>	<i>1320</i>	<i>1320</i>	<i>W</i>	<i>11</i>	<i>X</i>	<i>X</i>	<i>X</i>						
<i>LMW-8-0614</i>		<i>1418</i>	<i>W</i>	<i>11</i>	<i>X</i>	<i>X</i>	<i>X</i>						
Comments/Special Instructions <i>Ecology EIM EDD</i> <i>** Client Specific RLS</i> <i>and analyte list **</i> <i>Pls. cc j.lamberts@golder.com</i> <i>amorell@golder.com</i>	Relinquished by: (Signature) <i>[Signature]</i> Printed Name: <i>J. Lamberts</i> Company: <i>Golder</i> Date & Time: <i>6/5/14 1552</i>		Received by: (Signature) <i>[Signature]</i> Printed Name: <i>A. Vobarsen</i> Company: <i>ARI</i> Date & Time: <i>6/5/14 1552</i>		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: 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, notwithstanding 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.

End of sampling round



(*) Field filtered w/
0.45um filter.
Pls analyze under
existing MSA b/w
Golden + ARE

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, notwithstanding 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.

Sample ID Cross Reference Report



ARI Job No: YM52
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg Mine

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. LMW-10-0614	YM52A	14-10717	Water	06/04/14 11:10	06/04/14 17:29
2. LMW-2-0614	YM52B	14-10718	Water	06/04/14 12:50	06/04/14 17:29
3. LMW-4-0614	YM52C	14-10719	Water	06/04/14 14:05	06/04/14 17:29
4. LMW-11-0614	YM52D	14-10720	Water	06/04/14 15:55	06/04/14 17:29

Sample ID Cross Reference Report



ARI Job No: YM86
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg

Sample ID	ARI	ARI	Matrix	Sample Date/Time	VTSR
	Lab ID	LIMS ID			
1. LMW-6-0614	YM86A	14-10921	Water	06/06/14 12:38	06/06/14 13:48
2. LMW-6-0614-D	YM86B	14-10922	Water	06/06/14 12:43	06/06/14 13:48

Sample ID Cross Reference Report



ARI Job No: YM69
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg Mine

Sample ID	ARI	ARI	Matrix	Sample Date/Time	VTSR
	Lab ID	LIMS ID			
1. LMW-9-0614	YM69A	14-10843	Water	06/05/14 10:45	06/05/14 15:52
2. LMW-5-0614	YM69B	14-10844	Water	06/05/14 12:10	06/05/14 15:52
3. LMW-3-0614	YM69C	14-10845	Water	06/05/14 13:45	06/05/14 15:52
4. LMW-EB-0614	YM69D	14-10846	Water	06/05/14 13:20	06/05/14 15:52
5. LMW-8-0614	YM69E	14-10847	Water	06/05/14 14:18	06/05/14 15:52

PRESERVATION VERIFICATION 06/06/14

Page 1 of 1



ARI Job No: YM86

PC: Kelly

VTSR: 06/06/14

Inquiry Number: NONE

Analysis Requested: 06/06/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 923-1000-002.R273

Project: Landsburg

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM		CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID	CLIENT ID	>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10921							TOT															
YM86A	LMW-6-0614						6.55															
14-10922							TOT															
YM86B	LMW-6-0614-D						6.55															

YM52:000008

Checked By TR Date 6-6-14

PRESERVATION VERIFICATION 06/05/14

Page 1 of 1



ARI Job No: YM52

PC: Kelly

VTSR: 06/04/14

Inquiry Number: NONE

Analysis Requested: 06/05/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 923-1000-002.R273

Project:

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM		CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID	CLIENT ID	>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10717 YM52A	LMW-10-0614						TOT PASS															
14-10718 YM52B	LMW-3-0614						TOT PASS															
14-10719 YM52C	LMW-4-0614						TOT PASS															
14-10720 YM52D	LMW-11-0614						TOT PASS															

YM52:000009

Checked By TB Date 6-5-14

PRESERVATION VERIFICATION 06/06/14

Page 1 of 1



ARI Job No: **YM69**

PC: Kelly

VTSR: 06/05/14

Inquiry Number: NONE

Analysis Requested: 06/06/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: AV

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 923-1000-002.R273

Project: Landsburg Mine

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM		CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID	CLIENT ID	>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10843 YM69A	LMW-9-0614						TOT															
14-10844 YM69B	LMW-5-0614						TOT															
14-10845 YM69C	LMW-3-0614						TOT															
14-10846 YM69D	LMW-EB-0614						TOT															
14-10847 YM69E	LMW-8-0614						TOT															

P=Pass

YMS2:00010

Checked By

AV

Date

6/6/14



Cooler Receipt Form

ARI Client: Golder
COC No(s): _____
Assigned ARI Job No: YM52

Project Name: Landsburg Mine
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES ☒ NO ☐
Were custody papers included with the cooler? YES ☒ NO ☐
Were custody papers properly filled out (ink, signed, etc.) YES ☒ NO ☐
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.3 4.3 2.1
Time: _____
If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: JM Date: 6/4/14 Time: 1729
Temp Gun ID#: 122412224

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES ☐ NO ☒
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____
Was sufficient ice used (if appropriate)? NA ☐ YES ☒ NO ☐
Were all bottles sealed in individual plastic bags? YES ☐ NO ☒
Did all bottles arrive in good condition (unbroken)? YES ☐ NO ☐
Were all bottle labels complete and legible? YES ☒ NO ☐
Did the number of containers listed on COC match with the number of containers received? YES ☒ NO ☐
Did all bottle labels and tags agree with custody papers? YES ☐ NO ☒
Were all bottles used correct for the requested analyses? YES ☒ NO ☐
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA ☐ YES ☒ NO ☐
Were all VOC vials free of air bubbles? NA ☐ YES ☐ NO ☒
Was sufficient amount of sample sent in each bottle? YES ☒ NO ☐
Date VOC Trip Blank was made at ARI: _____ NA 5-28-14
Was Sample Split by ARI: NA YES ☐ Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TB Date: 6-5-14 Time: 910

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

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
LMW-3-0614	LMW-2-0614		

Additional Notes, Discrepancies, & Resolutions:

LMW-3-0614 1 pb

By: TB Date: 6-5-14

Small Air Bubbles -2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	Small → "sm" (< 2 mm)
			Peabubbles → "pb" (2 to < 4 mm)
			Large → "lg" (4 to < 6 mm)
			Headspace → "hs" (> 6 mm)



Cooler Receipt Form

ARI Client: Golder

Project Name: Landberg

COC No(s): _____ NA

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

Assigned ARI Job No: 7m 8 7b

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? _____

YES NO

Were custody papers included with the cooler? _____

YES NO

Were custody papers properly filled out (ink, signed, etc.) _____

YES NO

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

Time: 1358

2.1 53

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

Temp Gun ID#: 90877982

Cooler Accepted by: AV

Date: 6/6/14

Time: 1348

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA YES NO

Were all bottles sealed in individual plastic bags? _____

YES NO

Did all bottles arrive in good condition (unbroken)? _____

YES NO

Were all bottle labels complete and legible? _____

YES NO

Did the number of containers listed on COC match with the number of containers received? _____

YES NO

Did all bottle labels and tags agree with custody papers? _____

YES NO

Were all bottles used correct for the requested analyses? _____

YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...

NA YES NO

Were all VOC vials free of air bubbles? _____

NA YES NO

Was sufficient amount of sample sent in each bottle? _____

YES NO

Date VOC Trip Blank was made at ARI: _____

NA

Was Sample Split by ARI: NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TS Date: 6-6-14 Time: 1458

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

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

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Small Air Bubbles - 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)



Cooler Receipt Form

ARI Client: Goldex

Project Name: Landsburg Mine

COC No(s): _____ (NA)

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

Assigned ARI Job No: YM69

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

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

Time: 1552

3.6 3.6 4.3

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

Temp Gun ID#: 90877982

Cooler Accepted by: AV Date: 6/5/14 Time: 1552

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

Were all bottles sealed in individual plastic bags? YES NO

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? NA YES (NO)

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 5/29/14

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 6/6/14 Time: 943

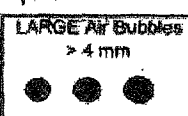
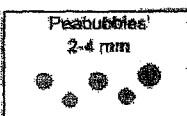
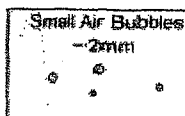
** Notify Project Manager of discrepancies or concerns **

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

Additional Notes, Discrepancies, & Resolutions:

TB=1sm LMW-3-06/14=1pb LMW-EB-06/14=1pb

By: AV Date: 6/6/14



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized: 
Reported: 06/12/14
Date Received: 06/06/14
Page 1 of 1

QC Report No: YM86-Golder Associates
Project: Landsburg
923-1000-002.R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-6-0614 YM86A 14-10921	06/06/14	Water	06/09/14 06/12/14	20.0	20.0 U
LMW-6-0614-D YM86B 14-10922	06/06/14	Water	06/09/14 06/12/14	20.0	20.0 U
MB-060914 Method Blank	NA	Water	06/09/14 06/12/14	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

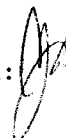
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM86LCS

LIMS ID: 14-10921

Matrix: Water

Data Release Authorized: 

Reported: 06/12/14

QC Report No: YM86-Golder Associates

Project: Landsburg

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	205	200	102%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized: *[Signature]*
Reported: 06/12/14
Date Received: 06/05/14
Page 1 of 1

QC Report No: YM69-Golder Associates
Project: Landsburg Mine
923-1000-002.R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-9-0614 YM69A 14-10843	06/05/14	Water	06/09/14 06/12/14	20.0	20.0 U
LMW-5-0614 YM69B 14-10844	06/05/14	Water	06/09/14 06/12/14	20.0	20.0 U
LMW-3-0614 YM69C 14-10845	06/05/14	Water	06/09/14 06/12/14	20.0	20.0 U
LMW-EB-0614 YM69D 14-10846	06/05/14	Water	06/09/14 06/12/14	20.0	20.0 U
LMW-8-0614 YM69E 14-10847	06/05/14	Water	06/09/14 06/12/14	20.0	20.0 U
MB-060914 Method Blank	NA	Water	06/09/14 06/12/14	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-9-0614

DUPLICATE

Lab Sample ID: YM69A

LIMS ID: 14-10843

Matrix: Water

Data Release Authorized:

Reported: 06/12/14

QC Report No: YM69-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-9-0614
MATRIX SPIKE

Lab Sample ID: YM69A

LIMS ID: 14-10843

Matrix: Water

Data Release Authorized: 

Reported: 06/12/14

QC Report No: YM69-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	92.5	100	92.5%	

Reported in ng/L

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM69LCS

LIMS ID: 14-10844

Matrix: Water

Data Release Authorized: 

Reported: 06/12/14

QC Report No: YM69-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	234	200	117%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized:
Reported: 06/12/14
Date Received: 06/04/14
Page 1 of 1

QC Report No: YM52-Golder Associates
Project: Landsburg Mine
923-1000-002.R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-10-0614 YM52A 14-10717	06/04/14	Water	06/06/14 06/12/14	20.0	20.0 U
LMW-2-0614 YM52B 14-10718	06/04/14	Water	06/06/14 06/12/14	20.0	20.0 U
LMW-4-0614 YM52C 14-10719	06/04/14	Water	06/06/14 06/12/14	20.0	20.0 U
LMW-11-0614 YM52D 14-10720	06/04/14	Water	06/06/14 06/12/14	20.0	20.0 U
MB-060614 Method Blank	NA	Water	06/06/14 06/12/14	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-10-0614

DUPLICATE

Lab Sample ID: YM52A

LIMS ID: 14-10717

Matrix: Water

Data Release Authorized: 

Reported: 06/12/14

QC Report No: YM52-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

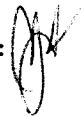
Page 1 of 1

Sample ID: LMW-10-0614
MATRIX SPIKE

Lab Sample ID: YM52A

LIMS ID: 14-10717

Matrix: Water

Data Release Authorized: 

Reported: 06/12/14

QC Report No: YM52-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/04/14

Date Received: 06/04/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	93.6	100	93.6%	

Reported in ng/L

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM52LCS

LIMS ID: 14-10718

Matrix: Water

Data Release Authorized

Reported: 06/12/14

QC Report No: YM52-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	190	200	95.0%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2014

Doug Morell
Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

Client Project Name: Landsburg Mine
Client Project Number: 923-1000-002.R273
ARI ID: YM67

Dear Mr. Morell:

Please find enclosed Chain-of-Custody (COC) record, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted five water samples and a trip blank in good condition on June 5, 2014. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for VOCs, HCID, Total Metals, as requested on the COC. Quality control analyses are included for your review.

The VOCs CCAL is out of control low for all associated FORM III "Q" flagged analytes with the exception of chloroethane which is out of control high.

The VOCs LCS is out of control high for chloroethane. The LCSD is in control and no further corrective action was taken.

The total metals matrix spike is out of control high for lead and has not recovered for chromium in association with sample LWM-9-0614. The not recovered is due to the raised reporting limit criteria for the project.

No other analytical complications were noted.

Per client request, the metals reporting limits were raised to meet client required limits.

An electronic copy of this report and all supporting raw data will remain on file at ARI. Please feel free to contact me if you have any questions or require any additional information.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: Y1067	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Golder Associates	Phone: 425 883 0777	Date: 6/5/2014
Client Contact: Douglas Morell, Jill Lamberts	No. of Coolers: 3	Ice Present? Y Cooler Temps: 36-43



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								Notes/Comments		
					VOCs - client list	TPH-HCD	TAML Total Metals	TAML (**) Diss. Metals							
Trip Blank	6/5/2014	-	DI	2	X										
LMW-9-0614		1045	W	11	X	X	X	HOLD							
LMW-5-0614		1210	W	11	X	X	X	HOLD							
LMW-3-0614		1345	W	11	X	X	X								
LMW-EB-0614	1320	1350	W	11	X	X	X								
LMW-8-0614		1718	W	11	X	X	X								
Comments/Special Instructions Ecology EIM EDD ** Client Specific RLS and analyte list ** Pls. cc j.lamberts@golder.com dmorell@golder.com	Relinquished by: (Signature) <i>[Signature]</i> Printed Name: J. Lamberts Company: Golder Date & Time: 6/5/14 1552	Received by: (Signature) <i>[Signature]</i> Printed Name: A. Vobarsen Company: ARI Date & Time: 6/5/14 1552	Relinquished by: (Signature) <i>[Signature]</i> Printed Name: Company: Date & Time:	Received by: (Signature) Printed Name: Company: 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, notwithstanding 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.



Cooler Receipt Form

ARI Client: Golder

Project Name: bandsburg Mine

COC No(s): _____ (NA)

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

Assigned ARI Job No: YMO07

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

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

Time: 1552

3.6 3.6 4.3

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

Temp Gun ID#: 90877982

Cooler Accepted by: AV Date: 6/5/14 Time: 1552

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

Were all bottles sealed in individual plastic bags? YES NO

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? NA YES (NO)

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 5/29/14

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 6/6/14 Time: 942

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

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

Additional Notes, Discrepancies, & Resolutions:

TB=1sm LMW-3-06/14=1PB LMW-EB-06/14=1PB

By: AV Date: 6/6/14



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report



ARI Job No: YM67
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg Mine

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. LMW-9-0614	YM67A	14-10837	Water	06/05/14 10:45	06/05/14 15:52
2. LMW-5-0614	YM67B	14-10838	Water	06/05/14 12:10	06/05/14 15:52
3. LMW-3-0614	YM67C	14-10839	Water	06/05/14 13:45	06/05/14 15:52
4. LMW-EB-0614	YM67D	14-10840	Water	06/05/14 13:20	06/05/14 15:52
5. LMW-8-0614	YM67E	14-10841	Water	06/05/14 14:18	06/05/14 15:52
6. Trip Blanks	YM67F	14-10842	Water	06/05/14	06/05/14 15:52

PRESERVATION VERIFICATION 06/06/14

Page 1 of 1



ARI Job No: **YM67**

Inquiry Number: NONE

Analysis Requested: 06/06/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: AV

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

PC: Kelly

VTSR: 06/05/14

Project #: 923-1000-002.R273

Project: Landsburg Mine

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM	CLIENT ID	CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID		>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10837 YM67A	LMW-9-0614						TOT															
14-10838 YM67B	LMW-5-0614						TOT															
14-10839 YM67C	LMW-3-0614						TOT															
14-10840 YM67D	LMW-EB-0614						TOT															
14-10841 YM67E	LMW-8-0614						TOT															

P=Pass

YM67: 000005

Checked By AV Date 6/6/14

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-9-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM67A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 21:29

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

FORM I
YM67: 00005

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-9-0614

Page 2 of 2

SAMPLE

Lab Sample ID: YM67A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 21:29

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	120%
d8-Toluene	106%
Bromofluorobenzene	98.1%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-5-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM67B

QC Report No: YM67-Golder Associates

LIMS ID: 14-10838

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

 Data Release Authorized: 

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 21:54

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-5-0614

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SAMPLE

Lab Sample ID: YM67B

QC Report No: YM67-Golder Associates

LIMS ID: 14-10838

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 21:54

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	123%
d8-Toluene	105%
Bromofluorobenzene	98.6%
d4-1,2-Dichlorobenzene	103%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-3-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM67C

QC Report No: YM67-Golder Associates

LIMS ID: 14-10839

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 22:19

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-3-0614

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SAMPLE

Lab Sample ID: YM67C

QC Report No: YM67-Golder Associates

LIMS ID: 14-10839

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 22:19

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	121%
d8-Toluene	106%
Bromofluorobenzene	98.7%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-EB-0614

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SAMPLE

Lab Sample ID: YM67D

QC Report No: YM67-Golder Associates

LIMS ID: 14-10840

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: *[Signature]*

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 22:44

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	1.2
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-EB-0614

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SAMPLE

Lab Sample ID: YM67D

QC Report No: YM67-Golder Associates

LIMS ID: 14-10840

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 22:44

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	124%
d8-Toluene	107%
Bromofluorobenzene	97.3%
d4-1,2-Dichlorobenzene	100%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-8-0614

Page 1 of 2

SAMPLE

Lab Sample ID: YM67E

QC Report No: YM67-Golder Associates

LIMS ID: 14-10841

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 23:09

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-8-0614

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SAMPLE

Lab Sample ID: YM67E

QC Report No: YM67-Golder Associates

LIMS ID: 14-10841

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 23:09

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	124%
d8-Toluene	106%
Bromofluorobenzene	98.7%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: Trip Blanks
SAMPLE

Page 1 of 2

Lab Sample ID: YM67F

QC Report No: YM67-Golder Associates

LIMS ID: 14-10842

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Data Release Authorized: 

Date Sampled: 06/05/14

Reported: 06/12/14

Date Received: 06/05/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 19:01

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: Trip Blanks
SAMPLE

Page 2 of 2

Lab Sample ID: YM67F

QC Report No: YM67-Golder Associates

LIMS ID: 14-10842

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 19:01

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	102%
Bromofluorobenzene	99.1%
d4-1,2-Dichlorobenzene	102%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: MB-061114A

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METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

 Data Release Authorized: *AB*

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 17:02

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MB-061114A

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METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 17:02

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	101%
Bromofluorobenzene	98.5%
d4-1,2-Dichlorobenzene	100%

VOA SURROGATE RECOVERY SUMMARY



Matrix: Water

QC Report No: YM67-Golder Associates
Project: Landsburg Mine
923-1000-002.R273

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-061114A	Method Blank	10	106%	101%	98.5%	100%	0
LCS-061114A	Lab Control	10	106%	101%	99.1%	102%	0
LCSD-061114A	Lab Control Dup	10	103%	100%	101%	101%	0
YM67A	LMW-9-0614	10	120%	106%	98.1%	102%	0
YM67B	LMW-5-0614	10	123%	105%	98.6%	103%	0
YM67C	LMW-3-0614	10	121%	106%	98.7%	102%	0
YM67D	LMW-EB-0614	10	124%	107%	97.3%	100%	0
YM67E	LMW-8-0614	10	124%	106%	98.7%	102%	0
YM67F	Trip Blanks	10	110%	102%	99.1%	102%	0

LCS/MB LIMITS

QC LIMITS

SW8260C

(DCE) = d4-1,2-Dichloroethane
(TOL) = d8-Toluene
(BFB) = Bromofluorobenzene
(DCB) = d4-1,2-Dichlorobenzene

(80-120)
(80-120)
(80-120)
(80-120)

(80-130)
(80-120)
(80-120)
(80-120)

Prep Method: SW5030B
Log Number Range: 14-10837 to 14-10842

YM67: 00020

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LCS-061114A

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LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

 Data Release Authorized: *[Signature]*

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst LCS: NT15/LH

Sample Amount LCS: 10.0 mL

LCSD: NT15/LH

LCSD: 10.0 mL

Date Analyzed LCS: 06/11/14 15:51

Purge Volume LCS: 10.0 mL

LCSD: 06/11/14 16:15

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	11.2	10.0	112%	10.7	10.0	107%	4.6%
Bromomethane	10.2	10.0	102%	9.76	10.0	97.6%	4.4%
Vinyl Chloride	10.8	10.0	108%	10.2	10.0	102%	5.7%
Chloroethane	14.0 Q	10.0	140%	13.0 Q	10.0	130%	7.4%
Methylene Chloride	11.1	10.0	111%	10.5	10.0	105%	5.6%
Acetone	54.8	50.0	110%	50.2	50.0	100%	8.8%
Carbon Disulfide	9.73	10.0	97.3%	9.06	10.0	90.6%	7.1%
1,1-Dichloroethene	10.7	10.0	107%	9.98	10.0	99.8%	7.0%
1,1-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
trans-1,2-Dichloroethene	10.6	10.0	106%	10.0	10.0	100%	5.8%
cis-1,2-Dichloroethene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Chloroform	11.1	10.0	111%	10.5	10.0	105%	5.6%
1,2-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
2-Butanone	53.6 Q	50.0	107%	50.4 Q	50.0	101%	6.2%
1,1,1-Trichloroethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
Carbon Tetrachloride	11.2	10.0	112%	10.5	10.0	105%	6.5%
Vinyl Acetate	11.3	10.0	113%	10.5	10.0	105%	7.3%
Bromodichloromethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
1,2-Dichloropropane	10.7	10.0	107%	10.2	10.0	102%	4.8%
cis-1,3-Dichloropropene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Trichloroethene	10.4	10.0	104%	10.0	10.0	100%	3.9%
Dibromochloromethane	11.8	10.0	118%	11.3	10.0	113%	4.3%
1,1,2-Trichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Benzene	10.6	10.0	106%	10.2	10.0	102%	3.8%
trans-1,3-Dichloropropene	11.1	10.0	111%	10.4	10.0	104%	6.5%
2-Chloroethylvinylether	10.6	10.0	106%	10.0	10.0	100%	5.8%
Bromoform	11.1	10.0	111%	10.4	10.0	104%	6.5%
4-Methyl-2-Pentanone (MIBK)	55.4	50.0	111%	51.5	50.0	103%	7.3%
2-Hexanone	52.7	50.0	105%	50.2	50.0	100%	4.9%
Tetrachloroethene	10.4	10.0	104%	10.1	10.0	101%	2.9%
1,1,2,2-Tetrachloroethane	10.9	10.0	109%	10.2	10.0	102%	6.6%
Toluene	10.6	10.0	106%	10.1	10.0	101%	4.8%
Chlorobenzene	10.3	10.0	103%	9.99	10.0	99.9%	3.1%
Ethylbenzene	10.5	10.0	105%	10.2	10.0	102%	2.9%
Styrene	10.7	10.0	107%	10.3	10.0	103%	3.8%
Trichlorofluoromethane	10.3	10.0	103%	10.1	10.0	101%	2.0%
1,1,2-Trichloro-1,2,2-trifluoroethane	11.5	10.0	115%	11.2	10.0	112%	2.6%
m,p-Xylene	21.5	20.0	108%	20.7	20.0	104%	3.8%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LCS-061114A

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LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

QC Report No: YM67-Golder Associates

LIMS ID: 14-10837

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	10.6	10.0	106%	10.3	10.0	103%	2.9%
1,2-Dichlorobenzene	10.2	10.0	102%	9.78	10.0	97.8%	4.2%
1,3-Dichlorobenzene	10.2	10.0	102%	9.61	10.0	96.1%	6.0%
1,4-Dichlorobenzene	9.99	10.0	99.9%	9.57	10.0	95.7%	4.3%
Acrolein	54.8	50.0	110%	50.4	50.0	101%	8.4%
Iodomethane	9.61 Q	10.0	96.1%	9.02 Q	10.0	90.2%	6.3%
Acrylonitrile	10.6	10.0	106%	10.0	10.0	100%	5.8%
1,1-Dichloropropene	10.6	10.0	106%	10.0	10.0	100%	5.8%
Dibromomethane	10.7	10.0	107%	10.1	10.0	101%	5.8%
1,1,1,2-Tetrachloroethane	11.1	10.0	111%	10.7	10.0	107%	3.7%
1,2-Dibromo-3-chloropropane	10.4	10.0	104%	9.94	10.0	99.4%	4.5%
1,2,3-Trichloropropane	11.1	10.0	111%	10.3	10.0	103%	7.5%
trans-1,4-Dichloro-2-butene	10.3	10.0	103%	9.64	10.0	96.4%	6.6%
1,3,5-Trimethylbenzene	10.8	10.0	108%	10.3	10.0	103%	4.7%
1,2,4-Trimethylbenzene	10.7	10.0	107%	10.1	10.0	101%	5.8%
Hexachlorobutadiene	9.42	10.0	94.2%	8.78	10.0	87.8%	7.0%
1,2-Dibromoethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Bromochloromethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
2,2-Dichloropropane	11.2	10.0	112%	10.6	10.0	106%	5.5%
1,3-Dichloropropane	10.7	10.0	107%	10.4	10.0	104%	2.8%
Isopropylbenzene	10.9	10.0	109%	10.4	10.0	104%	4.7%
n-Propylbenzene	10.6	10.0	106%	9.99	10.0	99.9%	5.9%
Bromobenzene	10.5	10.0	105%	9.90	10.0	99.0%	5.9%
2-Chlorotoluene	10.6	10.0	106%	10.0	10.0	100%	5.8%
4-Chlorotoluene	10.3	10.0	103%	9.87	10.0	98.7%	4.3%
tert-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
sec-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
4-Isopropyltoluene	10.8	10.0	108%	10.3	10.0	103%	4.7%
n-Butylbenzene	10.4	10.0	104%	9.89	10.0	98.9%	5.0%
1,2,4-Trichlorobenzene	9.77	10.0	97.7%	9.31	10.0	93.1%	4.8%
Naphthalene	10.3	10.0	103%	9.79	10.0	97.9%	5.1%
1,2,3-Trichlorobenzene	9.77	10.0	97.7%	9.28	10.0	92.8%	5.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	106%	103%
d8-Toluene	101%	100%
Bromofluorobenzene	99.1%	101%
d4-1,2-Dichlorobenzene	102%	101%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-9-0614

SAMPLE

Lab Sample ID: YM67A

LIMS ID: 14-10837

Matrix: Water

Data Release Authorized: *3/1/14*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/12/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/12/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	86,100	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	1,590	
200.8	06/09/14	200.8	06/12/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	46,700	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	180	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	2,540	
200.8	06/09/14	200.8	06/12/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	15,600	
200.8	06/09/14	200.8	06/12/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-9-0614

DUPLICATE

Lab Sample ID: YM67A

LIMS ID: 14-10837

Matrix: Water

Data Release Authorized: *helly*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010C	1,000 U	1,000 U	0.0%	+/- 1,000	L
Antimony	200.8	3 U	3 U	0.0%	+/- 3	L
Arsenic	200.8	3 U	3 U	0.0%	+/- 3	L
Barium	6010C	500 U	500 U	0.0%	+/- 500	L
Beryllium	6010C	2 U	2 U	0.0%	+/- 2	L
Cadmium	6010C	2 U	2 U	0.0%	+/- 2	L
Calcium	6010C	86,100	86,300	0.2%	+/- 20%	
Chromium	6010C	1,000 U	1,000 U	0.0%	+/- 1,000	L
Cobalt	6010C	10 U	10 U	0.0%	+/- 10	L
Copper	6010C	3 U	3 U	0.0%	+/- 3	L
Iron	6010C	1,590	1,580	0.6%	+/- 20%	
Lead	200.8	10 U	10 U	0.0%	+/- 10	L
Magnesium	6010C	46,700	46,500	0.4%	+/- 20%	
Manganese	6010C	180	180	0.0%	+/- 20%	
Nickel	6010C	20 U	20 U	0.0%	+/- 20	L
Potassium	6010C	2,540	2,530	0.4%	+/- 20%	
Selenium	200.8	5 U	5 U	0.0%	+/- 5	L
Silver	6010C	3 U	3 U	0.0%	+/- 3	L
Sodium	6010C	15,600	15,700	0.6%	+/- 20%	
Thallium	200.8	2 U	2 U	0.0%	+/- 2	L
Vanadium	6010C	3 U	3 U	0.0%	+/- 3	L
Zinc	6010C	20 U	20 U	0.0%	+/- 20	L

Reported in µg/L

*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-9-0614

MATRIX SPIKE

Lab Sample ID: YM67A

LIMS ID: 14-10837

Matrix: Water

Data Release Authorized: *12/14*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010C	1,000 U	2,030	2,000	102%	
Antimony	200.8	3 U	25	25	100%	
Arsenic	200.8	3 U	25	25	100%	
Barium	6010C	500 U	2,410	2,000	120%	
Beryllium	6010C	2 U	514	500	103%	
Cadmium	6010C	2 U	510	500	102%	
Calcium	6010C	86,100	96,300	10,000	102%	H
Chromium	6010C	1,000 U	1,000 U	500	NR	N
Cobalt	6010C	10 U	490	500	98.0%	
Copper	6010C	3 U	516	500	103%	
Iron	6010C	1,590	3,630	2,000	102%	
Lead	200.8	10 U	30	20	150%	N
Magnesium	6010C	46,700	54,800	10,000	81.0%	H
Manganese	6010C	180	690	500	102%	
Nickel	6010C	20 U	520	500	104%	
Potassium	6010C	2,540	12,800	10,000	103%	
Selenium	200.8	5 U	75	80	93.8%	
Silver	6010C	3 U	533	500	107%	
Sodium	6010C	15,600	26,200	10,000	106%	
Thallium	200.8	2 U	25	25	100%	
Vanadium	6010C	3 U	504	500	101%	
Zinc	6010C	20 U	500	500	100%	

Reported in µg/L

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

NR-Not Recovered

Percent Recovery Limits: 75-125%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-5-0614
SAMPLE

Lab Sample ID: YM67B

LIMS ID: 14-10838

Matrix: Water

Data Release Authorized: *hdy*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	94,200	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/09/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	52,100	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	250	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	2,720	
200.8	06/09/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	15,300	
200.8	06/09/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-3-0614
SAMPLE

Lab Sample ID: YM67C

LIMS ID: 14-10839

Matrix: Water

Data Release Authorized: *Jelly*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/10/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/10/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	37,400	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/09/14	200.8	06/10/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	15,200	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	50	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	1,690	
200.8	06/09/14	200.8	06/10/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	10,300	
200.8	06/09/14	200.8	06/10/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-EB-0614

SAMPLE

Lab Sample ID: YM67D

LIMS ID: 14-10840

Matrix: Water

Data Release Authorized: *Yx/hy*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/12/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/12/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/09/14	200.8	06/12/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	500	U
200.8	06/09/14	200.8	06/12/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	500	U
200.8	06/09/14	200.8	06/12/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-8-0614

SAMPLE

Lab Sample ID: YM67E

LIMS ID: 14-10841

Matrix: Water

Data Release Authorized: *YH-1*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 06/05/14

Date Received: 06/05/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/12/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/12/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	48,500	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	10,900	
200.8	06/09/14	200.8	06/12/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	25,300	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	420	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	1,930	
200.8	06/09/14	200.8	06/12/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	9,160	
200.8	06/09/14	200.8	06/12/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: YM67MB

LIMS ID: 14-10838

Matrix: Water

Data Release Authorized: *7/2/14*

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/12/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/12/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/09/14	200.8	06/12/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	500	U
200.8	06/09/14	200.8	06/12/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	500	U
200.8	06/09/14	200.8	06/12/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM67LCS

LIMS ID: 14-10838

Matrix: Water

Data Release Authorized:

Reported: 06/13/14

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Aluminum	6010C	2000	2000	100%	
Antimony	200.8	25.8	25.0	103%	
Arsenic	200.8	26.5	25.0	106%	
Barium	6010C	2080	2000	104%	
Beryllium	6010C	513	500	103%	
Cadmium	6010C	508	500	102%	
Calcium	6010C	9990	10000	99.9%	
Chromium	6010C	513	500	103%	
Cobalt	6010C	500	500	100%	
Copper	6010C	486	500	97.2%	
Iron	6010C	2080	2000	104%	
Lead	200.8	27.5	25.0	110%	
Magnesium	6010C	10200	10000	102%	
Manganese	6010C	488	500	97.6%	
Nickel	6010C	520	500	104%	
Potassium	6010C	9940	10000	99.4%	
Selenium	200.8	80.9	80.0	101%	
Silver	6010C	528	500	106%	
Sodium	6010C	10300	10000	103%	
Thallium	200.8	27.4	25.0	110%	
Vanadium	6010C	506	500	101%	
Zinc	6010C	510	500	102%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: YM67-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Matrix: Water

Data Release Authorized: 

Reported: 06/09/14

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-060614 14-10837	Method Blank	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 107%
YM67A 14-10837	LMW-9-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 81.4%
YM67B 14-10838	LMW-5-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 109%
YM67C 14-10839	LMW-3-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 93.4%
YM67D 14-10840	LMW-EB-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 97.5%
YM67E 14-10841	LMW-8-0614 HC ID: ---	06/06/14	06/06/14	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 99.8%

Reported in mg/L (ppm)

Gas value based on total peaks in the range from Toluene to C12.

Diesel value based on the total peaks in the range from C12 to C24.

Oil value based on the total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

HCID SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YM67-Golder Associates
Project: Landsburg Mine
923-1000-002.R273

<u>Client ID</u>	<u>O-TER</u>	<u>TOT OUT</u>
MB-060614	107%	0
LMW-9-0614	81.4%	0
LMW-5-0614	109%	0
LMW-3-0614	93.4%	0
LMW-EB-0614	97.5%	0
LMW-8-0614	99.8%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-10837 to 14-10841



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2014

Doug Morell
Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

Client Project Name: Landsburg Mine
Client Project Number: 923-1000-002.R273
ARI ID: YM85

Dear Mr. Morell:

Please find enclosed Chain-of-Custody (COC) record, sample receipt documentation, and the final results for the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples and a trip blank in good condition on June 6, 2014. There were no discrepancies between the COC and the sample containers' labels.

The samples were analyzed for VOCs, HCID, Total Metals, as requested on the COC. Quality control analyses are included for your review.

The VOCs CCAL is out of control low for all associated FORM III "Q" flagged analytes with the exception of chloroethane which is out of control high.

The VOCs LCS is out of control high for chloroethane. The LCSD is in control and no further corrective action was taken.

No other analytical complications were noted.

Per client request, the metals reporting limits were raised to meet client required limits.

An electronic copy of this report and all supporting raw data will remain on file at ARI. Please feel free to contact me if you have any questions or require any additional information.

Respectfully,

ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

End of sampling round

Page: 1 of 1

Date: 6/6/2014	Ice Present? Y
-------------------	-------------------

No. of Coolers:	2	Cooler Temps:	21.53
-----------------	---	---------------	-------

Analysis Requested								Notes/Comments
1.	0	els	0	5				(X) Field filtered w/

0.45um filter.

(**) Field filtered w/
0.45um filter.
Pls analyze under
existing MSA btwn
Golden + ARE

Pls cc jlambeats
@golder.com
dmorell@golder.com
X Client specific RLS
and Analyte List X

C O C O

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.



Cooler Receipt Form

ARI Client: Golder

Project Name: Landsburg

COC No(s): _____ (NA)

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

Assigned ARI Job No: YM85

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? YES (NO)

Were custody papers properly filled out (ink, signed, etc.) YES (NO)

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

Time: 1358

2.1 53

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

Temp Gun ID#: 90877952

Cooler Accepted by: AV

Date: 6/6/14

Time: 1348

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES (NO)

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? YES (NO)

Were all bottle labels complete and legible? YES (NO)

Did the number of containers listed on COC match with the number of containers received? YES (NO)

Did all bottle labels and tags agree with custody papers? YES (NO)

Were all bottles used correct for the requested analyses? YES (NO)

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... (NA) YES (NO)

Were all VOC vials free of air bubbles? (NA) YES (NO)

Was sufficient amount of sample sent in each bottle? YES (NO)

Date VOC Trip Blank was made at ARI: NA

Was Sample Split by ARI: NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TJ Date: 6-6-14 Time: 1454

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

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

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Small Air Bubbles -2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report



ARI Job No: YM85
Client: Golder Associates
Project Event: 923-1000-002.R273
Project Name: Landsburg

Sample ID	ARI	ARI	Matrix	Sample Date/Time	VTSR
	Lab ID	LIMS ID			
1. LMW-6-0614	YM85A	14-10918	Water	06/06/14 12:38	06/06/14 13:48
2. LMW-6-0614-D	YM85B	14-10919	Water	06/06/14 12:43	06/06/14 13:48
3. Trip Blank	YM85C	14-10920	Water	06/06/14	06/06/14 13:48

PRESERVATION VERIFICATION 06/06/14

Page 1 of 1



ARI Job No: YM85

PC: Kelly

VTSR: 06/06/14

Inquiry Number: NONE

Analysis Requested: 06/06/14

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 923-1000-002.R273

Project: Landsburg

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM		CN	WAD	NH3	COD	FOG	MET	PHEN	PHOS	TKN	NO23	TOC	S2	TPHD	Fe2+	DMET	DOC	ADJUSTED	LOT	AMOUNT		
ARI ID	CLIENT ID	>12	>12	<2	<2	<2	<2	<2	<2	<2	<2	<2	>9	<2	<2	FLT	FLT	PARAMETER	TO	NUMBER	ADDED	DATE/BY
14-10918 YM85A	LMW-6-0614						TOT Pass															
14-10919 YM85B	LMW-6-0614-D						TOT Pass															

Checked By TS Date 6-6-14

YM85:00005

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-6-0614

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SAMPLE

Lab Sample ID: YM85A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/06/14

Reported: 06/12/14

Date Received: 06/06/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 23:33

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-6-0614

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SAMPLE

Lab Sample ID: YM85A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 23:33

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	129%
d8-Toluene	107%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	103%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LMW-6-0614-D

Page 1 of 2

SAMPLE

Lab Sample ID: YM85B

QC Report No: YM85-Golder Associates

LIMS ID: 14-10919

Project: Landsburg

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/06/14

Reported: 06/12/14

Date Received: 06/06/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 23:59

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

FORM I
YM85: 00000

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-6-0614-D

Page 2 of 2

SAMPLE

Lab Sample ID: YM85B

QC Report No: YM85-Golder Associates

LIMS ID: 14-10919

Project: Landsburg

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 23:59

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	130%
d8-Toluene	108%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	103%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
**Sample ID: Trip Blank
SAMPLE**

Page 1 of 2

Lab Sample ID: YM85C

QC Report No: YM85-Golder Associates

LIMS ID: 14-10920

Project: Landsburg

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: 06/06/14

Reported: 06/12/14

Date Received: 06/06/14

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 19:25

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: Trip Blank

Page 2 of 2

SAMPLE

Lab Sample ID: YM85C

QC Report No: YM85-Golder Associates

LIMS ID: 14-10920

Project: Landsburg

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 19:25

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	112%
d8-Toluene	104%
Bromofluorobenzene	98.1%
d4-1,2-Dichlorobenzene	100%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: MB-061114A

Page 1 of 2

METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Data Release Authorized:

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst: NT15/LH

Sample Amount: 10.0 mL

Date Analyzed: 06/11/14 17:02

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.09	0.50	< 0.50 U
74-83-9	Bromomethane	0.25	1.0	< 1.0 U
75-01-4	Vinyl Chloride	0.06	0.10	< 0.10 U
75-00-3	Chloroethane	0.09	0.20	< 0.20 U
75-09-2	Methylene Chloride	0.48	1.0	< 1.0 U
67-64-1	Acetone	2.1	5.0	< 5.0 U
75-15-0	Carbon Disulfide	0.04	0.20	< 0.20 U
75-35-4	1,1-Dichloroethene	0.05	0.20	< 0.20 U
75-34-3	1,1-Dichloroethane	0.05	0.20	< 0.20 U
156-60-5	trans-1,2-Dichloroethene	0.05	0.20	< 0.20 U
156-59-2	cis-1,2-Dichloroethene	0.04	0.20	< 0.20 U
67-66-3	Chloroform	0.03	0.20	< 0.20 U
107-06-2	1,2-Dichloroethane	0.07	0.20	< 0.20 U
78-93-3	2-Butanone	0.81	5.0	< 5.0 U
71-55-6	1,1,1-Trichloroethane	0.04	0.20	< 0.20 U
56-23-5	Carbon Tetrachloride	0.04	0.20	< 0.20 U
108-05-4	Vinyl Acetate	0.07	0.20	< 0.20 U
75-27-4	Bromodichloromethane	0.05	0.20	< 0.20 U
78-87-5	1,2-Dichloropropane	0.04	0.20	< 0.20 U
10061-01-5	cis-1,3-Dichloropropene	0.06	0.20	< 0.20 U
79-01-6	Trichloroethene	0.05	0.20	< 0.20 U
124-48-1	Dibromochloromethane	0.05	0.20	< 0.20 U
79-00-5	1,1,2-Trichloroethane	0.13	0.20	< 0.20 U
71-43-2	Benzene	0.03	0.20	< 0.20 U
10061-02-6	trans-1,3-Dichloropropene	0.08	0.20	< 0.20 U
110-75-8	2-Chloroethylvinylether	0.25	0.50	< 0.50 U
75-25-2	Bromoform	0.06	0.20	< 0.20 U
108-10-1	4-Methyl-2-Pentanone (MIBK)	0.97	2.5	< 2.5 U
591-78-6	2-Hexanone	0.90	5.0	< 5.0 U
127-18-4	Tetrachloroethene	0.05	0.20	< 0.20 U
79-34-5	1,1,2,2-Tetrachloroethane	0.06	0.10	< 0.10 U
108-88-3	Toluene	0.04	0.20	< 0.20 U
108-90-7	Chlorobenzene	0.02	0.20	< 0.20 U
100-41-4	Ethylbenzene	0.04	0.20	< 0.20 U
100-42-5	Styrene	0.05	0.20	< 0.20 U
75-69-4	Trichlorofluoromethane	0.04	0.20	< 0.20 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.04	0.20	< 0.20 U
179601-23-1	m,p-Xylene	0.05	0.40	< 0.40 U
95-47-6	o-Xylene	0.03	0.20	< 0.20 U
95-50-1	1,2-Dichlorobenzene	0.04	0.20	< 0.20 U
541-73-1	1,3-Dichlorobenzene	0.04	0.20	< 0.20 U
106-46-7	1,4-Dichlorobenzene	0.04	0.20	< 0.20 U
107-02-8	Acrolein	2.5	2.5	< 2.5 U
74-88-4	Iodomethane	0.23	0.50	< 0.50 U
107-13-1	Acrylonitrile	0.60	1.0	< 1.0 U
563-58-6	1,1-Dichloropropene	0.03	0.10	< 0.10 U
74-95-3	Dibromomethane	0.14	0.20	< 0.20 U
630-20-6	1,1,1,2-Tetrachloroethane	0.04	0.20	< 0.20 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	0.50	< 0.50 U
96-18-4	1,2,3-Trichloropropane	0.13	0.20	< 0.20 U

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MB-061114A

Page 2 of 2

METHOD BLANK

Lab Sample ID: MB-061114A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/11/14 17:02

CAS Number	Analyte	DL	LOQ	Result
110-57-6	trans-1,4-Dichloro-2-butene	0.32	1.0	< 1.0 U
108-67-8	1,3,5-Trimethylbenzene	0.02	0.20	< 0.20 U
95-63-6	1,2,4-Trimethylbenzene	0.02	0.20	< 0.20 U
87-68-3	Hexachlorobutadiene	0.07	0.20	< 0.20 U
106-93-4	1,2-Dibromoethane	0.07	0.10	< 0.10 U
74-97-5	Bromochloromethane	0.06	0.20	< 0.20 U
594-20-7	2,2-Dichloropropane	0.05	0.10	< 0.10 U
142-28-9	1,3-Dichloropropane	0.06	0.10	< 0.10 U
98-82-8	Isopropylbenzene	0.02	0.20	< 0.20 U
103-65-1	n-Propylbenzene	0.02	0.20	< 0.20 U
108-86-1	Bromobenzene	0.06	0.20	< 0.20 U
95-49-8	2-Chlorotoluene	0.02	0.10	< 0.10 U
106-43-4	4-Chlorotoluene	0.02	0.20	< 0.20 U
98-06-6	tert-Butylbenzene	0.03	0.20	< 0.20 U
135-98-8	sec-Butylbenzene	0.02	0.20	< 0.20 U
99-87-6	4-Isopropyltoluene	0.03	0.10	< 0.10 U
104-51-8	n-Butylbenzene	0.02	0.20	< 0.20 U
120-82-1	1,2,4-Trichlorobenzene	0.11	0.50	< 0.50 U
91-20-3	Naphthalene	0.12	0.50	< 0.50 U
87-61-6	1,2,3-Trichlorobenzene	0.11	0.20	< 0.20 U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	101%
Bromofluorobenzene	98.5%
d4-1,2-Dichlorobenzene	100%

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-061114A	Method Blank	10	106%	101%	98.5%	100%	0
LCS-061114A	Lab Control	10	106%	101%	99.1%	102%	0
LCSD-061114A	Lab Control Dup	10	103%	100%	101%	101%	0
YM85A	LMW-6-0614	10	129%	107%	99.0%	103%	0
YM85B	LMW-6-0614-D	10	130%	108%	98.0%	103%	0
YM85C	Trip Blank	10	112%	104%	98.1%	100%	0

LCS/MB LIMITS

QC LIMITS

SW8260C

(DCE) = d4-1,2-Dichloroethane
(TOL) = d8-Toluene
(BFB) = Bromofluorobenzene
(DCB) = d4-1,2-Dichlorobenzene

(80-120)
(80-120)
(80-120)
(80-120)

(80-130)
(80-120)
(80-120)
(80-120)

Prep Method: SW5030B

Log Number Range: 14-10918 to 14-10920

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LCS-061114A

Page 1 of 2

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Data Release Authorized: *B*

Date Sampled: NA

Reported: 06/12/14

Date Received: NA

Instrument/Analyst LCS: NT15/LH

Sample Amount LCS: 10.0 mL

LCSD: NT15/LH

LCSD: 10.0 mL

Date Analyzed LCS: 06/11/14 15:51

Purge Volume LCS: 10.0 mL

LCSD: 06/11/14 16:15

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	11.2	10.0	112%	10.7	10.0	107%	4.6%
Bromomethane	10.2	10.0	102%	9.76	10.0	97.6%	4.4%
Vinyl Chloride	10.8	10.0	108%	10.2	10.0	102%	5.7%
Chloroethane	14.0 Q	10.0	140%	13.0 Q	10.0	130%	7.4%
Methylene Chloride	11.1	10.0	111%	10.5	10.0	105%	5.6%
Acetone	54.8	50.0	110%	50.2	50.0	100%	8.8%
Carbon Disulfide	9.73	10.0	97.3%	9.06	10.0	90.6%	7.1%
1,1-Dichloroethene	10.7	10.0	107%	9.98	10.0	99.8%	7.0%
1,1-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
trans-1,2-Dichloroethene	10.6	10.0	106%	10.0	10.0	100%	5.8%
cis-1,2-Dichloroethene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Chloroform	11.1	10.0	111%	10.5	10.0	105%	5.6%
1,2-Dichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
2-Butanone	53.6 Q	50.0	107%	50.4 Q	50.0	101%	6.2%
1,1,1-Trichloroethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
Carbon Tetrachloride	11.2	10.0	112%	10.5	10.0	105%	6.5%
Vinyl Acetate	11.3	10.0	113%	10.5	10.0	105%	7.3%
Bromodichloromethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
1,2-Dichloropropane	10.7	10.0	107%	10.2	10.0	102%	4.8%
cis-1,3-Dichloropropene	10.8	10.0	108%	10.3	10.0	103%	4.7%
Trichloroethene	10.4	10.0	104%	10.0	10.0	100%	3.9%
Dibromochloromethane	11.8	10.0	118%	11.3	10.0	113%	4.3%
1,1,2-Trichloroethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Benzene	10.6	10.0	106%	10.2	10.0	102%	3.8%
trans-1,3-Dichloropropene	11.1	10.0	111%	10.4	10.0	104%	6.5%
2-Chloroethylvinylether	10.6	10.0	106%	10.0	10.0	100%	5.8%
Bromoform	11.1	10.0	111%	10.4	10.0	104%	6.5%
4-Methyl-2-Pentanone (MIBK)	55.4	50.0	111%	51.5	50.0	103%	7.3%
2-Hexanone	52.7	50.0	105%	50.2	50.0	100%	4.9%
Tetrachloroethene	10.4	10.0	104%	10.1	10.0	101%	2.9%
1,1,2,2-Tetrachloroethane	10.9	10.0	109%	10.2	10.0	102%	6.6%
Toluene	10.6	10.0	106%	10.1	10.0	101%	4.8%
Chlorobenzene	10.3	10.0	103%	9.99	10.0	99.9%	3.1%
Ethylbenzene	10.5	10.0	105%	10.2	10.0	102%	2.9%
Styrene	10.7	10.0	107%	10.3	10.0	103%	3.8%
Trichlorofluoromethane	10.3	10.0	103%	10.1	10.0	101%	2.0%
1,1,2-Trichloro-1,2,2-trifluoroethane	11.5	10.0	115%	11.2	10.0	112%	2.6%
m,p-Xylene	21.5	20.0	108%	20.7	20.0	104%	3.8%

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: LCS-061114A

Page 2 of 2

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061114A

QC Report No: YM85-Golder Associates

LIMS ID: 14-10918

Project: Landsburg

Matrix: Water

923-1000-002.R273

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	10.6	10.0	106%	10.3	10.0	103%	2.9%
1,2-Dichlorobenzene	10.2	10.0	102%	9.78	10.0	97.8%	4.2%
1,3-Dichlorobenzene	10.2	10.0	102%	9.61	10.0	96.1%	6.0%
1,4-Dichlorobenzene	9.99	10.0	99.9%	9.57	10.0	95.7%	4.3%
Acrolein	54.8	50.0	110%	50.4	50.0	101%	8.4%
Iodomethane	9.61 Q	10.0	96.1%	9.02 Q	10.0	90.2%	6.3%
Acrylonitrile	10.6	10.0	106%	10.0	10.0	100%	5.8%
1,1-Dichloropropene	10.6	10.0	106%	10.0	10.0	100%	5.8%
Dibromomethane	10.7	10.0	107%	10.1	10.0	101%	5.8%
1,1,1,2-Tetrachloroethane	11.1	10.0	111%	10.7	10.0	107%	3.7%
1,2-Dibromo-3-chloropropane	10.4	10.0	104%	9.94	10.0	99.4%	4.5%
1,2,3-Trichloropropane	11.1	10.0	111%	10.3	10.0	103%	7.5%
trans-1,4-Dichloro-2-butene	10.3	10.0	103%	9.64	10.0	96.4%	6.6%
1,3,5-Trimethylbenzene	10.8	10.0	108%	10.3	10.0	103%	4.7%
1,2,4-Trimethylbenzene	10.7	10.0	107%	10.1	10.0	101%	5.8%
Hexachlorobutadiene	9.42	10.0	94.2%	8.78	10.0	87.8%	7.0%
1,2-Dibromoethane	11.0	10.0	110%	10.4	10.0	104%	5.6%
Bromochloromethane	11.2	10.0	112%	10.6	10.0	106%	5.5%
2,2-Dichloropropane	11.2	10.0	112%	10.6	10.0	106%	5.5%
1,3-Dichloropropane	10.7	10.0	107%	10.4	10.0	104%	2.8%
Isopropylbenzene	10.9	10.0	109%	10.4	10.0	104%	4.7%
n-Propylbenzene	10.6	10.0	106%	9.99	10.0	99.9%	5.9%
Bromobenzene	10.5	10.0	105%	9.90	10.0	99.0%	5.9%
2-Chlorotoluene	10.6	10.0	106%	10.0	10.0	100%	5.8%
4-Chlorotoluene	10.3	10.0	103%	9.87	10.0	98.7%	4.3%
tert-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
sec-Butylbenzene	10.7	10.0	107%	10.2	10.0	102%	4.8%
4-Isopropyltoluene	10.8	10.0	108%	10.3	10.0	103%	4.7%
n-Butylbenzene	10.4	10.0	104%	9.89	10.0	98.9%	5.0%
1,2,4-Trichlorobenzene	9.77	10.0	97.7%	9.31	10.0	93.1%	4.8%
Naphthalene	10.3	10.0	103%	9.79	10.0	97.9%	5.1%
1,2,3-Trichlorobenzene	9.77	10.0	97.7%	9.28	10.0	92.8%	5.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	106%	103%
d8-Toluene	101%	100%
Bromofluorobenzene	99.1%	101%
d4-1,2-Dichlorobenzene	102%	101%

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

Matrix: Water

Data Release Authorized: 

Reported: 06/11/14

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-060914 14-10918	Method Blank	06/09/14	06/09/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	97.8%
YM85A 14-10918	LMW-6-0614 HC ID: ---	06/09/14	06/09/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	90.5%
YM85B 14-10919	LMW-6-0614-D HC ID: ---	06/09/14	06/09/14	1.0	Gas	< 0.25 U
					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	98.8%

Reported in mg/L (ppm)

Gas value based on total peaks in the range from Toluene to C12.

Diesel value based on the total peaks in the range from C12 to C24.

Oil value based on the total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

HCID SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YM85-Golder Associates
Project: Landsburg
923-1000-002.R273

<u>Client ID</u>	<u>O-TER</u>	<u>TOT OUT</u>
MB-060914	97.8%	0
LMW-6-0614	90.5%	0
LMW-6-0614-D	98.8%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-10918 to 14-10919

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-6-0614
SAMPLE

Lab Sample ID: YM85A

LIMS ID: 14-10918

Matrix: Water

Data Release Authorized: *YML*

Reported: 06/13/14

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

Date Sampled: 06/06/14

Date Received: 06/06/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/11/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/11/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	25,200	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	2,200	
200.8	06/09/14	200.8	06/11/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	12,200	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	30	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	640	
200.8	06/09/14	200.8	06/11/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	6,410	
200.8	06/09/14	200.8	06/11/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-6-0614-D
SAMPLE

Lab Sample ID: YM85B

LIMS ID: 14-10919

Matrix: Water

Data Release Authorized: *7/2/14*

Reported: 06/13/14

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

Date Sampled: 06/06/14

Date Received: 06/06/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/11/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/11/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	25,700	
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	2,020	
200.8	06/09/14	200.8	06/11/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	12,400	
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	30	
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	650	
200.8	06/09/14	200.8	06/11/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	6,470	
200.8	06/09/14	200.8	06/11/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: YM85MB

LIMS ID: 14-10918

Matrix: Water

Data Release Authorized: *W/M*

Reported: 06/13/14

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	DL	LOQ	Result	Q
3010A	06/09/14	6010C	06/12/14	7429-90-5	Aluminum	7.6	1,000	1,000	U
200.8	06/09/14	200.8	06/11/14	7440-36-0	Antimony	0.01	3	3	U
200.8	06/09/14	200.8	06/11/14	7440-38-2	Arsenic	0.05	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-39-3	Barium	1.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-41-7	Beryllium	0.16	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-70-2	Calcium	11.3	500	500	U
3010A	06/09/14	6010C	06/12/14	7440-47-3	Chromium	1.2	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7440-48-4	Cobalt	0.3	10	10	U
3010A	06/09/14	6010C	06/12/14	7440-50-8	Copper	0.92	3	3	U
3010A	06/09/14	6010C	06/12/14	7439-89-6	Iron	7.5	200	200	U
200.8	06/09/14	200.8	06/11/14	7439-92-1	Lead	0.0	10	10	U
3010A	06/09/14	6010C	06/12/14	7439-95-4	Magnesium	9.6	1,000	1,000	U
3010A	06/09/14	6010C	06/12/14	7439-96-5	Manganese	0.3	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-02-0	Nickel	3.9	20	20	U
3010A	06/09/14	6010C	06/12/14	7440-09-7	Potassium	65.7	500	500	U
200.8	06/09/14	200.8	06/11/14	7782-49-2	Selenium	0.13	5	5	U
3010A	06/09/14	6010C	06/12/14	7440-22-4	Silver	0.43	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-23-5	Sodium	11.4	500	500	U
200.8	06/09/14	200.8	06/11/14	7440-28-0	Thallium	0.00	2	2	U
3010A	06/09/14	6010C	06/12/14	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/09/14	6010C	06/12/14	7440-66-6	Zinc	1.4	20	20	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YM85LCS

LIMS ID: 14-10918

Matrix: Water

Data Release Authorized: *EA*

Reported: 06/13/14

QC Report No: YM85-Golder Associates

Project: Landsburg

923-1000-002.R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Aluminum	6010C	1990	2000	99.5%	
Antimony	200.8	25.0	25.0	100%	
Arsenic	200.8	27.1	25.0	108%	
Barium	6010C	2060	2000	103%	
Beryllium	6010C	507	500	101%	
Cadmium	6010C	504	500	101%	
Calcium	6010C	9880	10000	98.8%	
Chromium	6010C	513	500	103%	
Cobalt	6010C	498	500	99.6%	
Copper	6010C	503	500	101%	
Iron	6010C	2080	2000	104%	
Lead	200.8	27.1	25.0	108%	
Magnesium	6010C	10200	10000	102%	
Manganese	6010C	482	500	96.4%	
Nickel	6010C	520	500	104%	
Potassium	6010C	9860	10000	98.6%	
Selenium	200.8	77.5	80.0	96.9%	
Silver	6010C	520	500	104%	
Sodium	6010C	10200	10000	102%	
Thallium	200.8	26.6	25.0	106%	
Vanadium	6010C	501	500	100%	
Zinc	6010C	510	500	102%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

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-2-0514
 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 6/4/2014 Time 1250

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 - 7.53 ft below TOC (inner PVC at elev. X) (bottom at 38.1 ft bgs, 4-in casing)

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 clear, 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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/4/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-2
Date 6/4/2014
Time Begin Purge 1140
Time Collect Sample 1235 1250

(pH)

[illegible]

Comments:

Grundfos @ 103 Hz $\rightarrow$ upped to 151 Hz $\rightarrow$ upped to 200 Hz

PID = 0.0 ppm

Sulfur odor

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm} \rightarrow \frac{30 \text{ gal/well volume}}{1.67 \text{ gpm}} = 18 \text{ min/well volume} = 54 \text{ min purge}$$

- Generator ran out of gas @ ~1235; Missed reading. Restarted generator and purged for 10 mins before sampling.

Sampler's Initials JSL

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-3-0514
 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 6/5/2014 Time 1345

Media Water Station LMW-3

Sample Type: grab time composite space composite

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

SWL - 12.57 ft below TOC (inner PVC at elev. X) (bottom at 64.8 ft bgs, 4-in casing)

Screen Interval - 49.8-64.8 ft bgs Monument: 3.08 ags Inner PVC: 2.35 ags

Sand Pack Interval - 47.1-64.8 ft bgs (8-in hole) (~10.4 gal/sand pack)

Packer Depth - 39.33 ft bgs (~36.1 gal/casing vol) (~16.6 gal/packer casing volume)

(~27.0 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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/5/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-3

Date 6/5/2014

Time Begin Purge 1255

Time Collect Sample 1345

(pH)

[illegible]

Comments:

Packer @ 110 psi

Grundfos @ 251 Hz

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gal/min} \rightarrow \frac{27 \text{ gal}}{\text{well vol.}} = 16 \text{ min/well volume}$$

c. 48 min purge time

PID = 0.0 ppm

Sampler's Initials jsl

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-4-0514
 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 6/4/2014 Time 1405

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 - 9.59 ft below TOC (inner PVC at elev. X) (bottom at 209.7 ft bgs, 4-in casing)

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 clear, no odor - sulfur

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

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 - 40 mL	VOA	VOA Vial	HCl
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) Jill Bueh Date 6/4/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-4
Date 6/7/2014
Time Begin Purge 1313
Time Collect Sample 1405

(pH)

[illegible]

Comments:

Packer @ 140psi

Grundfos @ 201 Hz

$PID = 0.000 \text{ ppm}$

$$\frac{5 \text{ gal}}{3 \text{ min}} \rightarrow 1.67 \text{ gpm}$$
$$\frac{27 \text{ gal/well vol.}}{1.67 \text{ gpm}} = 16 \text{ min / volume beneath packer}$$

∴ 48 min purge

(c) 1400 more of sulfur odor observed;

- 1st Turbidity reading; bottle wiped and re-run 2 more times w/a 6.34 NTU readings. ~~same~~
- 3rd Turbidity reading; ^{uu} w/ 5.45 reading the 2nd time; (NTU)

Sampler's Initials JSL

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-5-0514
 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 6/5/2014 Time 1210

Media Water Station LMW-5

Sample Type: grab time composite space composite

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

SWL - 14.08 ft below TOC (inner PVC at elev. X) (bottom at 241.8 ft bgs, 4-in casing)

Screen Interval - 231.8-241.8 ft bgs Monument: 3.24 ags Inner PVC: 2.64 ags

Sand Pack Interval - 231.8-241.8 ft bgs (8-in hole) (~5.9 gal/sand pack)

Packer Depth - 222.11 ft bgs (~150.8 gal/casing vol) (~12.9 gal/packer casing volume)

(~18.7 gal/total well vol below packer)

Sample Description clear, 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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) Jill Paul Date 6/5/2014

Supervisor (signature) Dan Smith Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-5

Date 6/5/2014

Time Begin Purge 1125

Time Collect Sample 1210

(pH)

[illegible]

Comments:

Grundfos @ 180 Hz

Packer inflated to 130 psi

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm} \rightarrow \frac{19 \text{ gal / 1 well volume}}{1.67 \text{ gpm}} = 11.4 \text{ min / well vol.}$$

- Sulfur odor during purge,

• 35 min purge

PID = 0.0 ppm

Sampler's Initials JSL

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site

Project No. 923-1000-002

Site Location Ravensdale, WA

Sample ID LMW-6-0514 / LMW-06-0614-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 Dedicated Pump Grundfos

Date 6/6/2014

Time 1238 / 1243 (amp)

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 - 24.12 ft below TOC (inner PVC at elev. X) (bottom at 105.9 ft bgs, 4-in casing)

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 x 2	VOA	VOA Vial	HCl
1 - 500 mL x 2	Total Metals	HDPE	HNO3 (non)
1 - 500 mL x 2	Dissolved Metals	HDPE	HNO3 (filter)
(4 - 500 mL, 2 - 40 mL) x 2	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)

Date

Supervisor (signature)

Date

FIELD PARAMETERS SHEET

Well ID LMW-6

Date 6/6/2014

Time Begin Purge 1143

Time Collect Sample 1238/1243 [Dup]

(pit)

[illegible]

Comments:

Packer @ 110Hz ; Turbid @ start of purge then clear by 1150;

Ground for @ 211 Hz $\rightarrow$ upped to @ 75 Hz

$$P_{IO} = Q_c \cdot \Phi_{ppm}$$

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm} = 18 \text{ min/well volume below packer}$$

o 54 mm purge

Sampler's Initials JSL

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site

Project No. 923-1000-002

Site Location Ravensdale, WA

Sample ID LMW-7-0514, LMW-7-0514-D

No sample

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 6/6/2014

Time N/A

Media Water

Station LMW-7

Sample Type: grab

time composite

space composite

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

SWL 222.44 ft below TOC (inner PVC at elev. X) (bottom at 253.7 ft bgs, 4-in casing)

Screen Interval - 239.6-253.7 ft bgs Monument: 3.09 ags Inner PVC: 2.72 ags

Sand Pack Interval - NA

Packer Depth - NA (~28.3 gal/casing vol) ** Depths corrected for 70° inclination

Sample Description N/A *No sample - see back for details*

Pump is not working.

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

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
6 - 40 mL	VOA	VOA Vial	HCl
2 - 500 mL	Total Metals	HDPE	HNO3 (non)
2 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
8 - 500 mL, 4 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) *Jill Lill*

Date 6/6/2014

Supervisor (signature) *Don Williams*

Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-7

Date 6/6/2014

Time Begin Purge n/a

Time Collect Sample n/a

(pH)

[illegible]

Comments:
No sample. Pump not working. Called INW + T. Morris for troubleshooting.
Pulled pump to take to INW for repairs. Impellers are likely worn out.
* Grundfos pump controller should not go over 350 Hz.

Sampler's Initials JSP

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-8-0514
 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 Tubing and Peristaltic Pump, Bailer for VOC samples

Date 6/5/2014 Time 1410

Media Water Station LMW-8

Sample Type: grab time composite space composite

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

SWL - 4.70 ft below TOC (PVC at black notch) (bottom at 13 ft bgs, 2-in casing)

Screen Interval - 8-13 ft bgs PVC stickup: 1.72 ags

Sand Pack Interval - 6-13 ft bgs (8-in hole) (~5.1 gal/sand pack)

Packer Depth - NA (~1.9 gal/casing vol) (~7.0 gal/total well vol)

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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/5/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-8

Date 6/5/2014

Time Begin Purge 1340

Time Collect Sample 1418

(pH)

[illegible]

Comments:

$\rho_{ID} = 0.0 \text{ ppm}$

Rusty @ start of purge..

Flow Rate: $\sim 240 \text{ ml/min}$

VOCs + HCLD vials collected using bailer.

1320: Collected field blank before purge. Thru tubing (and filter for diss. metals) LMW-EB-Ø614. Used lab provided DI.

Sampler's Initials JS

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-9-0514
 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 Dedicated Tubing

Date 6/5/2014 Time 1045

Media Water Station LMW-9

Sample Type: grab time composite space composite

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

SWL -99.80 ft below TOC (PVC at black notch) (bottom at 159 ft bgs, 2-in casing)

Screen Interval - 149-159 ft bgs PVC stickup: 2.86 ags

Sand Pack Interval - 143.5-159 ft bgs (8-in hole) (~11.4 gal/sand pack)

Packer Depth - NA (~10.2 gal/casing vol) (~21.6 gal/total well vol)

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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/5/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-9
 Date 6/5/2014
 Time Begin Purge 1000
 Time Collect Sample 1045

(pH)

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
	1010		7.15	592	12.6	0.01	4.64	191.3
	1015		7.15	573	12.6	0.00	1.85	167.7
	1020		7.15	562	12.6	0.00	1.10	158.4
	1025		7.15	559	12.6	0.00	1.12	155.0
	1030		7.16	552	12.6	0.00	1.09	151.2
	1035		7.16	547	12.7	0.00	0.94	147.4
	1040		7.16	543	12.7	0.00	1.04	144.1
	1045		7.16	540	12.6	0.00	0.91	141.6

Comments:

PID = 0.0 ppm

Grundfos @ 375 Hz

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm} \quad \frac{21.6 \text{ gal}}{1.67 \text{ gpm}} = 12.9 \text{ min} \quad \therefore 3 \text{ well volumes} = 39 \text{ min purge}$$

Sampler's Initials JSP

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-10-0514
 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 6/4/2014 Time 1110

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 -0.67 ft below TOC (PVC) (bottom at 289 ft bgs, 4-in casing)

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 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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/4/2014

Supervisor (signature) [Signature] Date 6/9/2014

FIELD PARAMETERS SHEET

Well ID LMW-10
 Date 6/4/2014
 Time Begin Purge 10:28
 Time Collect Sample 11:10

(pH)

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
	1030		8.76	358	10.5	0.05	7.91	170.0
	1045		8.77	361	10.5	0.01	3.41	108.6
	1050		8.77	362	10.5	0.00	3.72	95.5
	1055 1100		8.77	354	10.5	0.00	4.04	78.8
	1100 1105		8.78	357	10.5	0.00	3.11	71.7
	1105 1110		8.78	355	10.5	0.00	2.73 4.76	65.5
	1110		8.78	353	10.5	0.00	2.73	50.4

Comments:

Tank- 110 psi

Controller- 60 psi

Cycle ID 50(20/20) = 20 n 2 cpm

PID = 0.00 ppm

Purge Rate = ~760 mL/min

Turbidity measured @ 1105 was re-measured since it appeared higher than previous readings.
 2nd measurement yielded Turbidity closer to prev. measurements.

Sampler's Initials jsl

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-11-0514
 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 6/4/2014 Time 1555

Media Water Station LMW-11

Sample Type: grab time composite space composite

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

SWL -157.62 ft below TOC (PVC) (bottom at 707 ft bgs, 4-in casing)

Screen Interval - 696-707 ft bgs PVC stickup: 2.37 ags Outer metal Casing: 2.70 ags

Sand Pack Interval - 688-707 ft bgs (8-in hole) (~11.2 gal/sand pack)

Packer Depth - NA (~360.4 gal/casing vol) (~371.6 gal/total well vol)

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
1 - 500 mL	Total Metals	HDPE	HNO3 (non)
1 - 500 mL	Dissolved Metals	HDPE	HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 6/4/2014

Supervisor (signature) [Signature] Date 6/9/2014

• • •

Well ID LMW-11

Date 6/4/2014

Time Begin Purge 1445 (Gr. und for) 1515 (Bladder QED)

Time Collect Sample 1555

(pH)

[illegible]

Comments:

1445: start Grundfos. Pump is set @ 170' below T.O.C. Purge controller is 400 Hz

Purge rate $\frac{5 \text{ gal}}{8.5 \text{ min}} = 0.6 \text{ gal/min}$

1515 : start bladder pump. after 30mins. ~ 18 gal

Tank: 110psi

Controller: 110psi

ID: 1c pm (#30 → 30s/30s)

Rate: 330 mL/min

PID = 0.0 ppm

Sampler's Initials

JSP