

August 19, 2013

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 – MAY 2013**

Dear Bill:

Golder Associates Inc. (Golder) completed an interim groundwater monitoring event at the Landsburg Mine Site during May 2013. Groundwater samples were collected from monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, 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 on 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 (EPA Method 8260C), priority pollutant metals (EPA Method 200.8, 6010C, and 7470A), and a petroleum hydrocarbon identification scan (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. 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 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 volatile organic compounds (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.

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 Model Toxics Control Act (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 2013 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 8.0 micrograms per liter (µg/L) (0.008 mg/L), which is less than the Washington State primary drinking water MCL and greater than the MTCA groundwater cleanup level of 10 µg/L and 5.0 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.

Calcium and arsenic were detected in the equipment blank. Calcium was detected in all the groundwater samples at levels greater than 100 times the concentration in the equipment blank. Arsenic was detected in the groundwater samples at similar concentrations previous observed at the site. It is suspected that these detections of calcium and arsenic in the equipment blank were caused by the laboratory.

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: U.S. Geological Survey.

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

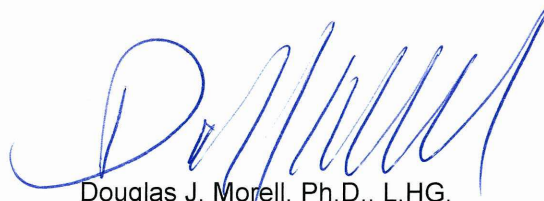
If you have any questions or require any additional information, please contact Douglas Morell at (425) 883-0777.

Sincerely,

GOLDER ASSOCIATES INC.



Jill Lamberts
Project Environmental Scientist



Douglas J. Morell, Ph.D., L.HG.
Principal

List of Attachments

Table 1	Groundwater Elevation Data Collection May 28, 2013 Landsburg Mine Site
Table 2	May 2013 Groundwater Analytical Results Landsburg Mine Site
Figure 1	Groundwater Monitoring Locations
Figure 2	Cross-Section Along Strike at Coal Seam
Appendix A	Laboratory Analytical Reports
Appendix B	Sample Integrity Data Sheets (SIDS)

JL/DJM/cw

TABLES

Table 1: Groundwater Elevation Data Collection May 28, 2013 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	11:10 AM	10:57 AM	10:24 AM	11:57 AM	10:30 AM	12:02 PM	10:44 AM	10:13 AM	12:08 PM	11:50 AM	10:32 AM	11:42 AM	12:06 PM	NA	NA
Measured to Top of PVC	ft bgs	NC	141.08	NC	NC	NC	NC	NC	NC	4.42	99.73	0.00	157.54	7.05	NA	NA
Measured to Top of Monument	ft bgs	144.55	NC	7.91	13.22	9.41	14.61	25.64	209.79	NC	NC	NC	NC	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	NA	618.43	NA	NA	NA	NA	NA	NA	642.55	644.26	618.87	644.33	644.32	NA	NA
Using Monument elevation	ft asl	621.34	NA	610.38	644.26	610.44	644.26	607.36	562.09	NA	NA	NA	NA	NA	NA	NA

Notes:
1 = Data corrected to accomodate well inclination of 20° from vertical
NA = Not applicable.
NC = Data not collected.

Table 2: May 2013 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2 5/31/2013	LMW-3 5/29/2013	LMW-4 5/31/2013	LMW-5 5/29/2013	LMW-6 5/30/2013	LMW-7 5/31/2013	LMW-7 Duplicate 5/31/2013	LMW-8 5/29/2013	LMW-9 5/30/2013	LMW-10 5/31/2013	LMW-11 5/30/2013	Equipment Blank 5/29/2013	Trip Blank 5/29/2013	Trip Blank 5/30/2013	Trip Blank 5/31/2013
Field Parameter																
pH	stnd	7.20	7.91	7.19	7.14	6.94	7.27	NA	7.06	7.13	8.75	7.25	NA	NA	NA	NA
Conductivity	uS/cm	1004	329	1001	830	258	568	NA	463	740	374	571	NA	NA	NA	NA
Dissolved Oxygen	mg/L	0.00	0.09	0.00	0.00	0.00	0.00	NA	0.07	0.00	0.00	0.45	NA	NA	NA	NA
Temperature	°C	11.0	11.1	10.8	11.1	10.0	11.8	NA	11.2	12.0	10.5	12.2	NA	NA	NA	NA
E _h	Rel mV	141.8	416.3	138.8	116.5	185.4	189.1	NA	108.8	NA ¹	63.7	139.2	NA	NA	NA	NA
Turbidity	NTU	0.17	0.20	0.08	0.31	0.58	0.31	NA	4.98	0.32	0.28	0.37	NA	NA	NA	NA
Metals (Total)																
Aluminum	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06	0.05 U	0.05 U	0.05 U	0.05 U	NA	NA	NA
Antimony	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	NA	NA
Arsenic	mg/L	0.0002 U	0.0006	0.0002 U	0.0002 U	0.0002 U	0.0018	0.0021	0.0021	0.0003	0.0002	0.008	0.0006	NA	NA	NA
Barium	mg/L	0.346	0.076	0.356	0.284	0.112	0.486	0.479	0.041	0.304	0.034	0.317	0.003 U	NA	NA	NA
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	NA	NA	NA
Cadmium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Calcium	mg/L	112	37.7	111	98.2	26.1	54.2	52.1	48.8	84.4	6.49	54.8	0.05	NA	NA	NA
Chromium	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA	NA
Cobalt	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Copper	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA	NA
Iron	mg/L	0.13	0.05 U	0.94	0.09	2.02	1.22	1.21	9.32	1.52	0.05 U	1.89	0.05 U	NA	NA	NA
Lead	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	NA	NA	NA
Magnesium	mg/L	68.2	15.6	67.8	54.4	13.1	24.7	23.8	26.1	46	2.69	27.5	0.05 U	NA	NA	NA
Manganese	mg/L	0.215	0.049	0.169	0.265	0.03	0.162	0.157	0.421	0.171	0.007	0.117	0.001 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	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	0.00002 U	NA	NA	NA
Nickel	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Potassium	mg/L	3.56	1.72	3.81	2.78	0.69	2.9	2.81	1.9	2.56	1.22	2.05	0.5 U	NA	NA	NA
Selenium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 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	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Sodium	mg/L	21.8	10.5	29.2	16.4	6.97	38.8	37.7	9.65	16.4	77	29.9	0.5 U	NA	NA	NA
Thallium	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	NA	NA
Vanadium	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	NA	NA	NA
Zinc	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.06	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA	NA
Volatile Organic Compounds																
Acetone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acrolein	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acrylonitrile	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromoform	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromomethane	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
n-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon disulfide	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon tetrachloride	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl vinyl ether	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

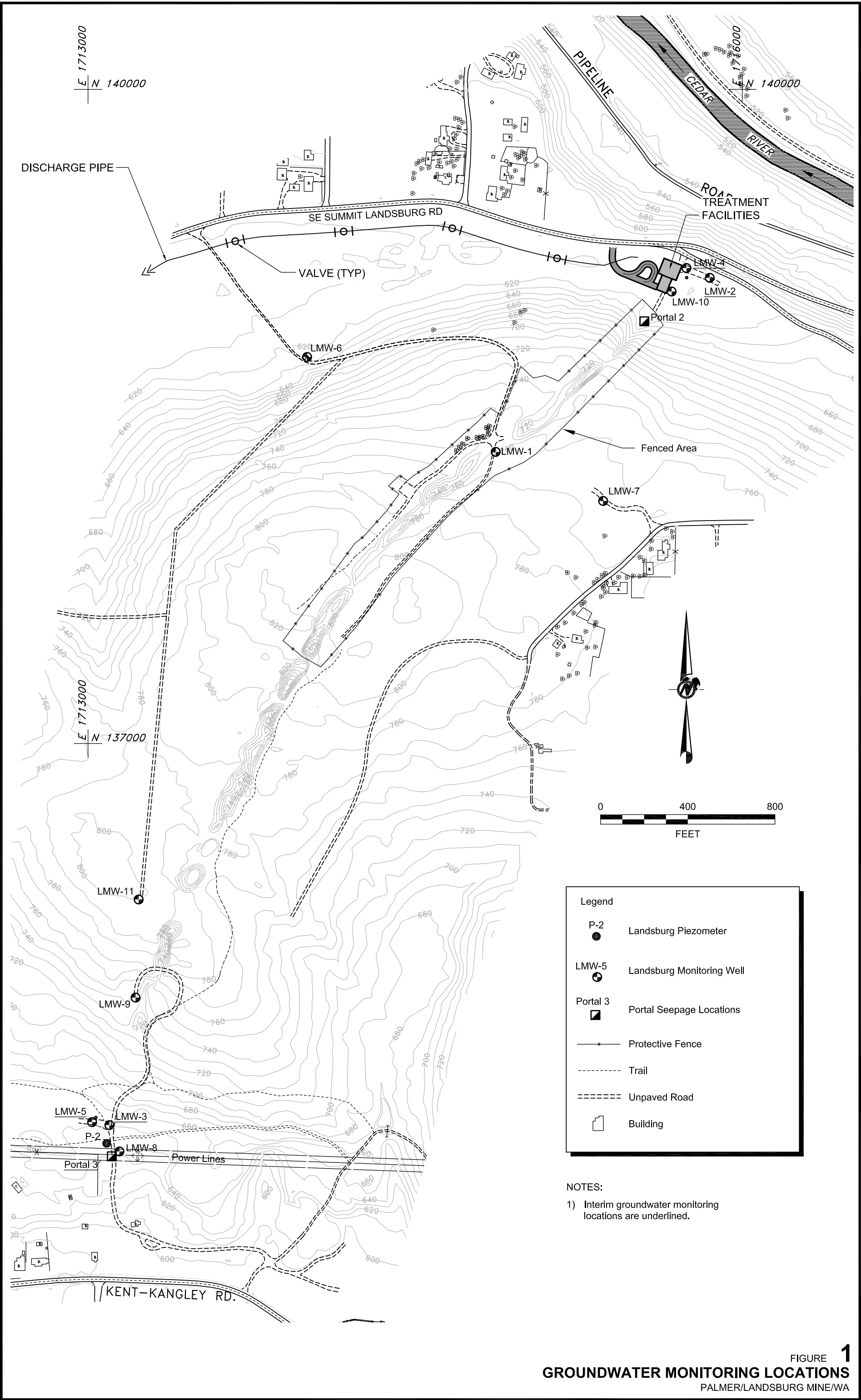
Table 2: May 2013 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2 5/31/2013	LMW-3 5/29/2013	LMW-4 5/31/2013	LMW-5 5/29/2013	LMW-6 5/30/2013	LMW-7 5/31/2013	LMW-7 Duplicate 5/31/2013	LMW-8 5/29/2013	LMW-9 5/30/2013	LMW-10 5/31/2013	LMW-11 5/30/2013	Equipment Blank 5/29/2013	Trip Blank 5/29/2013	Trip Blank 5/30/2013	Trip Blank 5/31/2013
Chloromethane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Volatile Organic Compounds (continued)																
2-Chlorotoluene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chlorotoluene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorodibromomethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibromomethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,4-Dichloro-2-butene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,2-Dichloropropane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-Dichloropropene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,3-Dichloropropene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachloro-1,3-butadiene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Iodomethane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Isopropyltoluene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Methylene Chloride	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Naphthalene	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Propylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Styrene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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	0.2 U	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	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Tetrachloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl chloride	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
m-Xylene & p-Xylene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylenes, Total	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Hydrocarbon Identification																
Diesel Range	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	NA
Gas Range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	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	0.5 U	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
1 - eH not collected because pH meter was not working and eH meter was used to collect pH readings



FIGURES



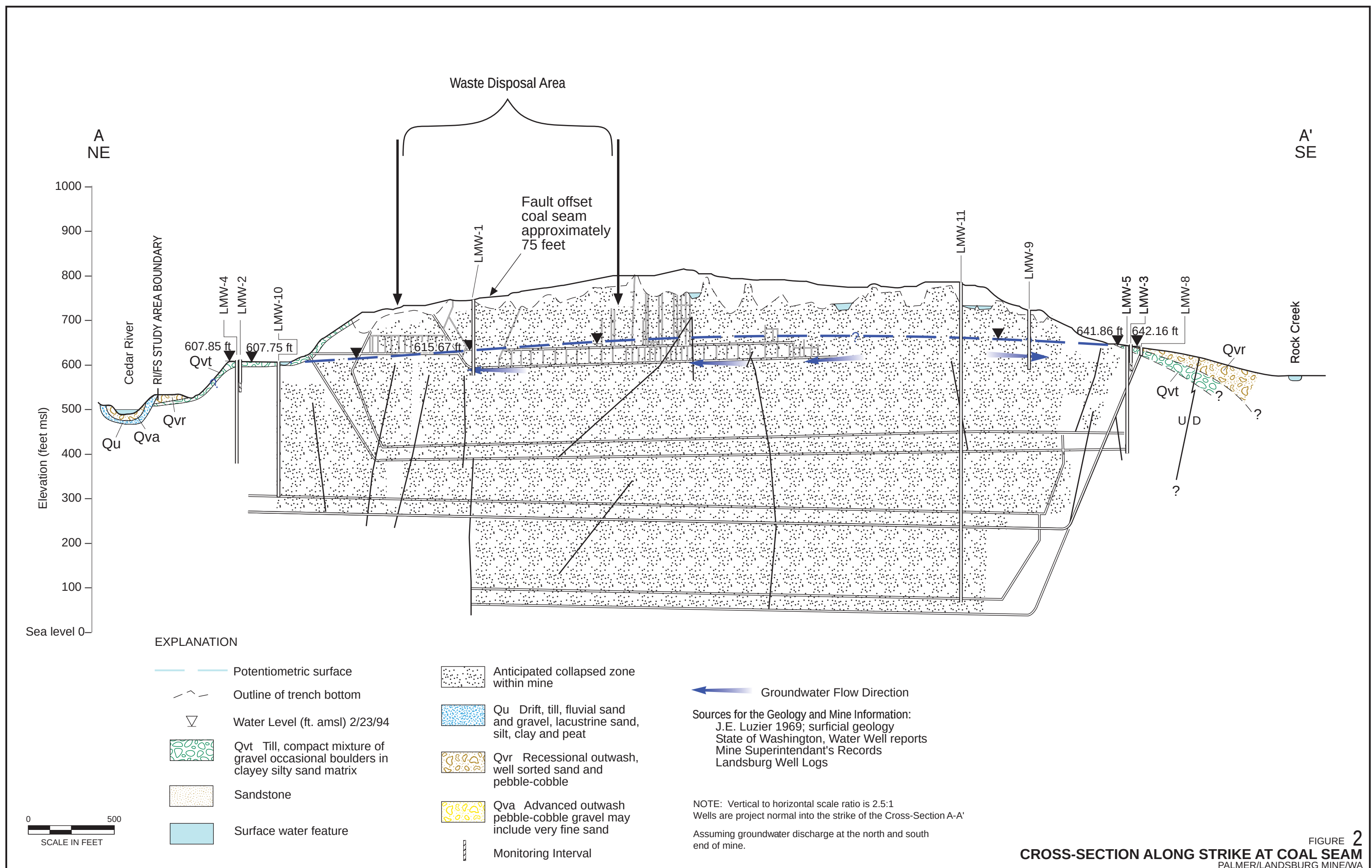


FIGURE 2
CROSS-SECTION ALONG STRIKE AT COAL SEAM
 PALMER/LANDBURG MINE/WA
Golder Associates

APPENDIX A
LABORATORY ANALYTICAL REPORTS



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2013

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: WR88 and WR90

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 four water samples and a trip blank in good condition on May 29, 2013. There were no discrepancies between the COC and the sample containers' labels. Select samples have been placed on hold pending further instructions.

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

No analytical complications were noted.

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

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

[illegible]

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-ordinated 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
COC No(s) _____
Assigned ARI Job No: WR88

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 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) 4.6 4.4 5.7
If cooler temperature is out of compliance fill out form 00070F Temp Gun ID# 90877952
Cooler Accepted by Jm Date: 5/29/13 Time: 1700

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 5/17/13
Was Sample Split by ARI: NA YES Date/Time _____ Equipment _____ Split by: _____

Samples Logged by: Jm Date: 5/30/13 Time: 1325

**** 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:
Trip Blank = 8m in 2582 Dissolved metals preserved upon receipt.

By: Jm Date: 5/30/13

Small Air Bubbles ~2mm	Pea bubbles 2-4 mm	LARGE Air Bubbles > 4 mm	Small → "sm"
			Pea bubbles → "pb"
			Large → "lg"
			Headspace → "hs"



ARI Job No: **WR88**
PC: Kelly
VTSR: 05/29/13

Inquiry Number: NONE
Analysis Requested: 05/30/13
Contact: Morell, Douglas
Client: Golder Associates
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: LV4
Deliverables:

Project #: 923-1000-002-R273
Project: Landsburg Mine
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11516 WR88A	LMW-3-0513						TOT 0.55														
13-11517 WR88B	LMW-EB-0513						TOT 0.55														
13-11518 WR88C	LMW-8-0513						TOT 0.55														
13-11519 WR88D	LMW-5-0513						TOT 0.55														

Checked By JW Date 5/30/13

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

Page: 1	of	
Date: 5/29/2013	Ice Present?	✓
No. of Coolers: 3	Cooler Temps: 4.6, 4.4, 5.1	

ARI Assigned Number:	WK90-111887	Turn-around Requested:	steel
ARI Client Company:	Golden Associates	Phone:	425 883 0777
Client Contact:	Dwight Morell		Jill Lamberts
Client Project Name:	Landsburg Mine		
Client Project #:	923 1000-002-R273	Samplers:	J. Lamberts, C. Wilder

Sample ID	Date	Time	Matrix	No. Containers
Trip Blank	5/29/13	-	DI	
LMW-3-0513		1135	W	11
LMW-EB-0513		1150	W	10
LMW-8-0513		1327	W	11
LMW-S-0513		1545	W	11

Comments/Special Instructions	Relinquished by: (Signature) Printed Name	Received by: (Signature) Printed Name
Ecology ELMEDD Pis cc jlamberk@opbder.com dmorell@opbder.com	<i>[Signature]</i> CLARA WILDER	<i>[Signature]</i> CLARA WILDER
	Company: GOLDER	Company: GOLDER
	Date & Time: 5/29/13 1700	Date & Time: 5/29/13 1700

[illegible]

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

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



Cooler Receipt Form

ARI Client Goldner
COC No(s) NA
Assigned ARI Job No. _____

Project Name: Landsburg Mine
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
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): 4.6 4.4 5.7
If cooler temperature is out of compliance fill out form 00070F Temp Gun ID# 90877952
Cooler Accepted by: Jm Date: 5/29/13 Time: 1700

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 5/17/13
Was Sample Split by ARI: NA YES Date/Time _____ Equipment _____ Split by: _____

Samples Logged by: Jm Date: 5/30/13 Time: 1325

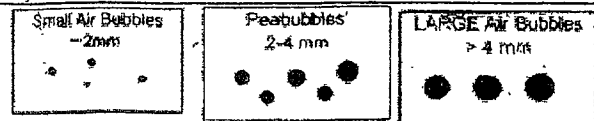
** Notify Project Manager of discrepancies or concerns **

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

Additional Notes, Discrepancies, & Resolutions:

Trip Blank = 8m in 2582

By: _____ Date: _____



Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"



ARI Job No: **WR90**
PC: Kelly
VTSR: 05/29/13

Inquiry Number: NONE
Analysis Requested: 05/30/13
Contact: Morell, Douglas
Client: Golder Associates
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: LV4
Deliverables:

Project #: 923-1000-002-R273
Project: Landsburg Mine
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11522 WR90A	LMW-3-0513						TOT 0.55														
13-11523 WR90B	LMW-EB-0513						TOT 0.55														
13-11524 WR90C	LMW-8-0513						TOT 0.55														
13-11525 WR90D	LMW-5-0513						TOT 0.55														

13-11525 : 0.00000

Checked By JM Date 5/30/13

Sample ID Cross Reference Report



ARI Job No: WR88
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-3-0513	WR88A	13-11516	Water	05/29/13 11:35	05/29/13 17:00
2. LMW-EB-0513	WR88B	13-11517	Water	05/29/13 11:50	05/29/13 17:00
3. LMW-8-0513	WR88C	13-11518	Water	05/29/13 13:27	05/29/13 17:00
4. LMW-5-0513	WR88D	13-11519	Water	05/29/13 15:45	05/29/13 17:00
5. Trip Blank	WR88E	13-11520	Water	05/29/13	05/29/13 17:00

Sample ID Cross Reference Report



ARI Job No: WR90
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-3-0513	WR90A	13-11522	Water	05/29/13 11:35	05/29/13 17:00
2. LMW-EB-0513	WR90B	13-11523	Water	05/29/13 11:50	05/29/13 17:00
3. LMW-8-0513	WR90C	13-11524	Water	05/29/13 13:27	05/29/13 17:00
4. LMW-5-0513	WR90D	13-11525	Water	05/29/13 15:45	05/29/13 17:00



Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

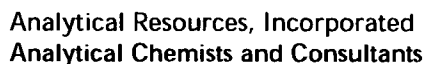
- U Indicates that the target analyte was not detected at the reported concentration
- * Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but $\geq$ the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- * Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ Drift or minimum RRF).



- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by $\geq 40\%$ RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**



A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of “fines” required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MB-060613A

Page 1 of 2

METHOD BLANK

Lab Sample ID: MB-060613A

QC Report No: WR88-Golder Associates

LIMS ID: 13-11516

Project: Landsburg Mine

Matrix: Water

923-1000-002-R273

Data Release Authorized: 

Date Sampled: NA

Reported: 06/10/13

Date Received: NA

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/06/13 16:48

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

Page 2 of 2



Sample ID: MB-060613A

METHOD BLANK

Lab Sample ID: MB-060613A

LIMS ID: 13-11516

Matrix: Water

Date Analyzed: 06/06/13 16:48

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	97.9%
d8-Toluene	96.9%
Bromofluorobenzene	99.4%
d4-1,2-Dichlorobenzene	103%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 1 of 2

Sample ID: LMW-3-0513

SAMPLE

Lab Sample ID: WR88A

LIMS ID: 13-11516

Matrix: Water

Data Release Authorized: 

Reported: 06/10/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/06/13 18:33

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Sample ID: LMW-3-0513

SAMPLE



Lab Sample ID: WR88A

LIMS ID: 13-11516

Matrix: Water

Date Analyzed: 06/06/13 18:33

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	103%
d8-Toluene	101%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	106%

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

Page 1 of 2

Sample ID: LMW-EB-0513

SAMPLE

Lab Sample ID: WR88B

LIMS ID: 13-11517

Matrix: Water

Data Release Authorized: 

Reported: 06/10/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/06/13 19:00

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Sample ID: LMW-EB-0513

SAMPLE

Lab Sample ID: WR88B

LIMS ID: 13-11517

Matrix: Water

Date Analyzed: 06/06/13 19:00

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	105%
d8-Toluene	98.9%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	104%

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

Page 1 of 2

Sample ID: LMW-8-0513

SAMPLE



Lab Sample ID: WR88C

LIMS ID: 13-11518

Matrix: Water

Data Release Authorized: 

Reported: 06/10/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/06/13 19:27

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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**

Page 2 of 2

Sample ID: LMW-8-0513**SAMPLE**

Lab Sample ID: WR88C

LIMS ID: 13-11518

Matrix: Water

Date Analyzed: 06/06/13 19:27

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	102%
d8-Toluene	101%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	107%

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-5-0513

Page 1 of 2

SAMPLE

Lab Sample ID: WR88D

QC Report No: WR88-Golder Associates

LIMS ID: 13-11519

Project: Landsburg Mine

Matrix: Water

923-1000-002-R273

Data Release Authorized: 

Date Sampled: 05/29/13

Reported: 06/10/13

Date Received: 05/29/13

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/06/13 19:53

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Sample ID: LMW-5-0513

SAMPLE

Lab Sample ID: WR88D

LIMS ID: 13-11519

Matrix: Water

Date Analyzed: 06/06/13 19:53

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	101%
d8-Toluene	100%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	108%

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

Page 1 of 2

**Sample ID: Trip Blank
SAMPLE**

Lab Sample ID: WR88E

LIMS ID: 13-11520

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 06/10/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/06/13 17:41

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Sample ID: Trip Blank
SAMPLE

Lab Sample ID: WR88E

LIMS ID: 13-11520

Matrix: Water

Date Analyzed: 06/06/13 17:41

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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 ug/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.6%
d8-Toluene	100%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	80.1%

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.

VOA SURROGATE RECOVERY SUMMARY



Matrix: Water

QC Report No: WR88-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-060613A	Method Blank	10	97.9%	96.9%	99.4%	103%	0
LCS-060613A	Lab Control	10	93.3%	100%	100%	105%	0
LCSD-060613A	Lab Control Dup	10	99.7%	101%	101%	104%	0
WR88A	LMW-3-0513	10	103%	101%	102%	106%	0
WR88B	LMW-EB-0513	10	105%	98.9%	103%	104%	0
WR88C	LMW-8-0513	10	102%	101%	100%	107%	0
WR88D	LMW-5-0513	10	101%	100%	100%	108%	0
WR88E	Trip Blank	10	99.6%	100%	100%	80.1%	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: 13-11516 to 13-11520

WR88 : 00025

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 1 of 2

Sample ID: LCS-060613A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-060613A

LIMS ID: 13-11516

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 06/10/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT3/PAB

LCSD: NT3/PAB

Date Analyzed LCS: 06/06/13 15:29

LCSD: 06/06/13 15:55

Sample Amount LCS: 10.0 mL

LCSD: 10.0 mL

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCSD Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	10.3	10.0	103%	10.6	10.0	106%	2.9%
Bromomethane	10.5	10.0	105%	10.8	10.0	108%	2.8%
Vinyl Chloride	9.81	10.0	98.1%	10.4	10.0	104%	5.8%
Chloroethane	9.32	10.0	93.2%	9.90	10.0	99.0%	6.0%
Methylene Chloride	9.25	10.0	92.5%	9.68	10.0	96.8%	4.5%
Acetone	33.4	50.0	66.8%	41.2	50.0	82.4%	20.9%
Carbon Disulfide	9.88	10.0	98.8%	10.3	10.0	103%	4.2%
1,1-Dichloroethene	9.78	10.0	97.8%	9.73	10.0	97.3%	0.5%
1,1-Dichloroethane	10.1	10.0	101%	10.4	10.0	104%	2.9%
trans-1,2-Dichloroethene	9.71	10.0	97.1%	9.91	10.0	99.1%	2.0%
cis-1,2-Dichloroethene	9.30	10.0	93.0%	9.79	10.0	97.9%	5.1%
Chloroform	9.61	10.0	96.1%	10.2	10.0	102%	6.0%
1,2-Dichloroethane	9.52	10.0	95.2%	9.55	10.0	95.5%	0.3%
2-Butanone	47.2	50.0	94.4%	48.0	50.0	96.0%	1.7%
1,1,1-Trichloroethane	9.97	10.0	99.7%	10.1	10.0	101%	1.3%
Carbon Tetrachloride	9.45	10.0	94.5%	9.64	10.0	96.4%	2.0%
Vinyl Acetate	9.36	10.0	93.6%	9.70	10.0	97.0%	3.6%
Bromodichloromethane	9.25	10.0	92.5%	10.0	10.0	100%	7.8%
1,2-Dichloropropane	9.52	10.0	95.2%	9.95	10.0	99.5%	4.4%
cis-1,3-Dichloropropene	9.95	10.0	99.5%	9.99	10.0	99.9%	0.4%
Trichloroethene	9.72	10.0	97.2%	9.91	10.0	99.1%	1.9%
Dibromochloromethane	9.78	10.0	97.8%	9.79	10.0	97.9%	0.1%
1,1,2-Trichloroethane	9.46	10.0	94.6%	9.57	10.0	95.7%	1.2%
Benzene	9.88	10.0	98.8%	10.1	10.0	101%	2.2%
trans-1,3-Dichloropropene	9.96	10.0	99.6%	10.2	10.0	102%	2.4%
2-Chloroethylvinylether	8.79	10.0	87.9%	10.1	10.0	101%	13.9%
Bromoform	9.73	10.0	97.3%	9.56	10.0	95.6%	1.8%
4-Methyl-2-Pentanone (MIBK)	43.3	50.0	86.6%	50.7	50.0	101%	15.7%
2-Hexanone	48.0	50.0	96.0%	49.0	50.0	98.0%	2.1%
Tetrachloroethene	10.0	10.0	100%	9.99	10.0	99.9%	0.1%
1,1,2,2-Tetrachloroethane	9.78	10.0	97.8%	9.42	10.0	94.2%	3.8%
Toluene	9.63	10.0	96.3%	9.80	10.0	98.0%	1.7%
Chlorobenzene	9.86	10.0	98.6%	10.1	10.0	101%	2.4%
Ethylbenzene	9.87	10.0	98.7%	10.0	10.0	100%	1.3%
Styrene	10.2	10.0	102%	10.4	10.0	104%	1.9%
Trichlorofluoromethane	10.7	10.0	107%	10.7	10.0	107%	0.0%
1,1,2-Trichloro-1,2,2-trifluoroetha	10.1	10.0	101%	10.2	10.0	102%	1.0%
m,p-Xylene	20.3	20.0	102%	20.4	20.0	102%	0.5%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LCS-060613A

Page 2 of 2

LAB CONTROL SAMPLE

Lab Sample ID: LCS-060613A

QC Report No: WR88-Golder Associates

LIMS ID: 13-11516

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	10.4	10.0	104%	10.4	10.0	104%	0.0%
1,2-Dichlorobenzene	8.96	10.0	89.6%	10.0	10.0	100%	11.0%
1,3-Dichlorobenzene	9.65	10.0	96.5%	9.87	10.0	98.7%	2.3%
1,4-Dichlorobenzene	9.85	10.0	98.5%	9.82	10.0	98.2%	0.3%
Acrolein	38.4	50.0	76.8%	45.2	50.0	90.4%	16.3%
Iodomethane	9.70	10.0	97.0%	10.1	10.0	101%	4.0%
Acrylonitrile	8.50	10.0	85.0%	10.1	10.0	101%	17.2%
1,1-Dichloropropene	9.45	10.0	94.5%	9.76	10.0	97.6%	3.2%
Dibromomethane	9.42	10.0	94.2%	9.61	10.0	96.1%	2.0%
1,1,1,2-Tetrachloroethane	9.29	10.0	92.9%	9.54	10.0	95.4%	2.7%
1,2-Dibromo-3-chloropropane	8.83	10.0	88.3%	9.13	10.0	91.3%	3.3%
1,2,3-Trichloropropane	9.33	10.0	93.3%	9.37	10.0	93.7%	0.4%
trans-1,4-Dichloro-2-butene	10.1	10.0	101%	9.74	10.0	97.4%	3.6%
1,3,5-Trimethylbenzene	10.3	10.0	103%	10.4	10.0	104%	1.0%
1,2,4-Trimethylbenzene	10.3	10.0	103%	10.2	10.0	102%	1.0%
Hexachlorobutadiene	12.2	10.0	122%	12.0	10.0	120%	1.7%
1,2-Dibromoethane	8.90	10.0	89.0%	9.58	10.0	95.8%	7.4%
Bromochloromethane	9.32	10.0	93.2%	10.1	10.0	101%	8.0%
2,2-Dichloropropane	10.6	10.0	106%	10.9	10.0	109%	2.8%
1,3-Dichloropropane	9.66	10.0	96.6%	10.0	10.0	100%	3.5%
Isopropylbenzene	10.4	10.0	104%	10.4	10.0	104%	0.0%
n-Propylbenzene	10.1	10.0	101%	10.2	10.0	102%	1.0%
Bromobenzene	9.54	10.0	95.4%	9.41	10.0	94.1%	1.4%
2-Chlorotoluene	10.2	10.0	102%	10.2	10.0	102%	0.0%
4-Chlorotoluene	9.94	10.0	99.4%	9.94	10.0	99.4%	0.0%
tert-Butylbenzene	10.5	10.0	105%	10.6	10.0	106%	0.9%
sec-Butylbenzene	10.3	10.0	103%	10.3	10.0	103%	0.0%
4-Isopropyltoluene	10.4	10.0	104%	10.4	10.0	104%	0.0%
n-Butylbenzene	10.9	10.0	109%	10.7	10.0	107%	1.9%
1,2,4-Trichlorobenzene	11.1	10.0	111%	11.0	10.0	110%	0.9%
Naphthalene	10.8	10.0	108%	10.8	10.0	108%	0.0%
1,2,3-Trichlorobenzene	10.9	10.0	109%	10.1	10.0	101%	7.6%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	93.3%	99.7%
d8-Toluene	100%	101%
Bromofluorobenzene	100%	101%
d4-1,2-Dichlorobenzene	105%	104%

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Matrix: Water

 Data Release Authorized: 

Reported: 06/04/13

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-053113 13-11516	Method Blank	05/31/13	06/01/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 81.8%
WR88A 13-11516	LMW-3-0513 HC ID: ---	05/31/13	06/01/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 73.9%
WR88B 13-11517	LMW-EB-0513 HC ID: ---	05/31/13	06/01/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 82.1%
WR88C 13-11518	LMW-8-0513 HC ID: ---	05/31/13	06/01/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 79.5%
WR88D 13-11519	LMW-5-0513 HC ID: ---	05/31/13	06/01/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 82.9%

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: WR88-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

Client ID	O-TER	TOT OUT
MB-053113	81.8%	0
LCS-053113	76.3%	0
LCSD-053113	68.0%	0
LMW-3-0513	73.9%	0
LMW-EB-0513	82.1%	0
LMW-8-0513	79.5%	0
LMW-5-0513	82.9%	0

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

Prep Method: SW3510C
Log Number Range: 13-11516 to 13-11519

ORGANICS ANALYSIS DATA SHEET
 NWTPH-HCID Method by GC/FID
 Page 1 of 1



Sample ID: LCS-053113
 LCS/LCSD

Lab Sample ID: LCS-053113
 LIMS ID: 13-11516
 Matrix: Water
 Data Release Authorized: *[Signature]*
 Reported: 06/04/13

QC Report No: WR88-Golder Associates
 Project: Landsburg Mine
 923-1000-002-R273
 Date Sampled: 05/29/13
 Date Received: 05/29/13

Date Extracted LCS/LCSD: 05/31/13

Sample Amount LCS: 500 mL

Date Analyzed LCS: 06/01/13 19:46

Final Extract Volume LCS: 1.0 mL

LCSD: 06/01/13 20:16

LCSD: 500 mL

LCSD: 1.0 mL

Instrument/Analyst LCS: FID/JLW

Dilution Factor LCS: 1.00

LCSD: FID/JLW

LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.37	3.00	79.0%	2.21	3.00	73.7%	7.0%

HCID Surrogate Recovery

	LCS	LCSD
o-Terphenyl	76.3%	68.0%

Results reported in mg/L

RPD calculated using sample concentrations per SW846.

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-3-0513

SAMPLE

Lab Sample ID: WR88A

LIMS ID: 13-11516

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	05/31/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	05/31/13	200.8	06/04/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	05/31/13	200.8	06/04/13	7440-38-2	Arsenic	0.048	0.2	0.6	
3010A	05/31/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	76	
3010A	05/31/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	05/31/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	37,700	
3010A	05/31/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	05/31/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	05/31/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	50	U
200.8	05/31/13	200.8	06/04/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	05/31/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	15,600	
3010A	05/31/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	49	
3010A	05/31/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	05/31/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	1,720	
200.8	05/31/13	200.8	06/04/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	05/31/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	10,500	
200.8	05/31/13	200.8	06/04/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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-3-0513

DUPLICATE

Lab Sample ID: WR88A

LIMS ID: 13-11516

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010C	50 U	50 U	0.0%	+/- 50	L
Antimony	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Arsenic	200.8	0.6	0.6	0.0%	+/- 0.2	L
Barium	6010C	76	75	1.3%	+/- 20%	
Beryllium	6010C	1 U	1 U	0.0%	+/- 1	L
Cadmium	6010C	2 U	2 U	0.0%	+/- 2	L
Calcium	6010C	37,700	37,400	0.8%	+/- 20%	
Chromium	6010C	5 U	5 U	0.0%	+/- 5	L
Cobalt	6010C	3 U	3 U	0.0%	+/- 3	L
Copper	6010C	2 U	2 U	0.0%	+/- 2	L
Iron	6010C	50 U	50 U	0.0%	+/- 50	L
Lead	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Magnesium	6010C	15,600	15,400	1.3%	+/- 20%	
Manganese	6010C	49	49	0.0%	+/- 20%	
Nickel	6010C	10 U	10 U	0.0%	+/- 10	L
Potassium	6010C	1,720	1,700	1.2%	+/- 500	L
Selenium	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Silver	6010C	3 U	3 U	0.0%	+/- 3	L
Sodium	6010C	10,500	10,400	1.0%	+/- 20%	
Thallium	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Vanadium	6010C	3 U	3 U	0.0%	+/- 3	L
Zinc	6010C	10 U	10 U	0.0%	+/- 10	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-3-0513

MATRIX SPIKE

Lab Sample ID: WR88A

LIMS ID: 13-11516

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010C	50 U	1,970	2,000	98.5%	
Antimony	200.8	0.2 U	23.6	25.0	94.4%	
Arsenic	200.8	0.6	27.7	25.0	108%	
Barium	6010C	76	2,100	2,000	101%	
Beryllium	6010C	1 U	470	500	94.0%	
Cadmium	6010C	2 U	498	500	99.6%	
Calcium	6010C	37,700	46,500	10,000	88.0%	
Chromium	6010C	5 U	505	500	101%	
Cobalt	6010C	3 U	483	500	96.6%	
Copper	6010C	2 U	497	500	99.4%	
Iron	6010C	50 U	1,980	2,000	99.0%	
Lead	200.8	0.1 U	24.1	25.0	96.4%	
Magnesium	6010C	15,600	25,700	10,000	101%	
Manganese	6010C	49	542	500	98.6%	
Nickel	6010C	10 U	500	500	100%	
Potassium	6010C	1,720	11,600	10,000	98.8%	
Selenium	200.8	0.5 U	75.6	80.0	94.5%	
Silver	6010C	3 U	508	500	102%	
Sodium	6010C	10,500	20,600	10,000	101%	
Thallium	200.8	0.2 U	24.6	25.0	98.4%	
Vanadium	6010C	3 U	495	500	99.0%	
Zinc	6010C	10 U	480	500	96.0%	

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

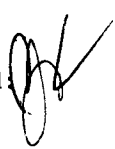
Page 1 of 1

Sample ID: LMW-EB-0513
SAMPLE

Lab Sample ID: WR88B

LIMS ID: 13-11517

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	05/31/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	05/31/13	200.8	06/04/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	05/31/13	200.8	06/04/13	7440-38-2	Arsenic	0.048	0.2	0.6	
3010A	05/31/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	05/31/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	50	
3010A	05/31/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	05/31/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	05/31/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	50	U
200.8	05/31/13	200.8	06/04/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	05/31/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	50	U
3010A	05/31/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	05/31/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	500	U
200.8	05/31/13	200.8	06/04/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	05/31/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	500	U
200.8	05/31/13	200.8	06/04/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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-8-0513

SAMPLE

Lab Sample ID: WR88C

LIMS ID: 13-11518

Matrix: Water

Data Release Authorized:

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	05/31/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	60	
200.8	05/31/13	200.8	06/04/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	05/31/13	200.8	06/04/13	7440-38-2	Arsenic	0.048	0.2	2.1	
3010A	05/31/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	41	
3010A	05/31/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	05/31/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	48,800	
3010A	05/31/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	05/31/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	05/31/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	9,320	
200.8	05/31/13	200.8	06/04/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	05/31/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	26,100	
3010A	05/31/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	421	
3010A	05/31/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	05/31/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	1,900	
200.8	05/31/13	200.8	06/04/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	05/31/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	9,650	
200.8	05/31/13	200.8	06/04/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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-5-0513

SAMPLE

Lab Sample ID: WR88D

LIMS ID: 13-11519

Matrix: Water

Data Release Authorized:

Reported: 06/06/13

QC Report No: WR88-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	05/31/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	05/31/13	200.8	06/04/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	05/31/13	200.8	06/04/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	284	
3010A	05/31/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	05/31/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	98,200	
3010A	05/31/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	05/31/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	05/31/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	90	
200.8	05/31/13	200.8	06/04/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	05/31/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	54,400	
3010A	05/31/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	265	
3010A	05/31/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	05/31/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	2,780	
200.8	05/31/13	200.8	06/04/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	05/31/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	16,400	
200.8	05/31/13	200.8	06/04/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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: WR88MB

LIMS ID: 13-11519

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-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	MDL	LOQ	Result	Q
3010A	05/31/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	05/31/13	200.8	06/04/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	05/31/13	200.8	06/04/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	05/31/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	50	U
3010A	05/31/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	05/31/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	05/31/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	50	U
200.8	05/31/13	200.8	06/04/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	05/31/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	50	U
3010A	05/31/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	1	U
3010A	05/31/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	05/31/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	500	U
200.8	05/31/13	200.8	06/04/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	05/31/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	500	U
200.8	05/31/13	200.8	06/04/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	05/31/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	05/31/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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: WR88LCS

LIMS ID: 13-11519

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WR88-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	2050	2000	102%	
Antimony	200.8	22.9	25.0	91.6%	
Arsenic	200.8	27.5	25.0	110%	
Barium	6010C	2050	2000	102%	
Beryllium	6010C	486	500	97.2%	
Cadmium	6010C	520	500	104%	
Calcium	6010C	10100	10000	101%	
Chromium	6010C	531	500	106%	
Cobalt	6010C	513	500	103%	
Copper	6010C	518	500	104%	
Iron	6010C	2060	2000	103%	
Lead	200.8	26.0	25.0	104%	
Magnesium	6010C	10400	10000	104%	
Manganese	6010C	490	500	98.0%	
Nickel	6010C	520	500	104%	
Potassium	6010C	10100	10000	101%	
Selenium	200.8	77.9	80.0	97.4%	
Silver	6010C	528	500	106%	
Sodium	6010C	10300	10000	103%	
Thallium	200.8	26.2	25.0	105%	
Vanadium	6010C	520	500	104%	
Zinc	6010C	510	500	102%	

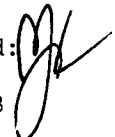
Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized: 
Reported: 05/31/13
Date Received: 05/29/13
Page 1 of 1

QC Report No: WR90-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-3-0513 WR90A 13-11522	05/29/13	Water	05/31/13 05/31/13	20.0	20.0 U
LMW-EB-0513 WR90B 13-11523	05/29/13	Water	05/31/13 05/31/13	20.0	20.0 U
LMW-8-0513 WR90C 13-11524	05/29/13	Water	05/31/13 05/31/13	20.0	20.0 U
LMW-5-0513 WR90D 13-11525	05/29/13	Water	05/31/13 05/31/13	20.0	20.0 U
MB-053113 Method Blank	NA	Water	05/31/13 05/31/13	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-EB-0513

DUPLICATE

Lab Sample ID: WR90B

LIMS ID: 13-11523

Matrix: Water

Data Release Authorized: 

Reported: 05/31/13

QC Report No: WR90-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

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-EB-0513
MATRIX SPIKE

Lab Sample ID: WR90B

LIMS ID: 13-11523

Matrix: Water

Data Release Authorized: 

Reported: 05/31/13

QC Report No: WR90-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/29/13

Date Received: 05/29/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	115	100	115%	

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: WR90LCS

LIMS ID: 13-11525

Matrix: Water

Data Release Authorized: 

Reported: 05/31/13

QC Report No: WR90-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	217	200	108%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 13, 2013

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: WS02 and WS03

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 three water samples and a trip blank in good condition on May 30, 2013. There were no discrepancies between the COC and the sample containers' labels. Select samples have been placed on hold pending further instructions.

The sample was analyzed for HCID, Total Metals and VOCs, 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. All associated samples that contain analyte have been flagged with a "Q" qualifier.

The VOCs LCS and/ or LCSD are out of control low for several analytes. All other QC is in control and no further corrective action was taken.

No other analytical complications were noted.

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

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

Client Project Name:	Analysis Requested

Sample ID	Date	Time	Matrix	No Containers	VCS Client	TPH %	TAML Total Metals	TAML Diss. Metals

LMW-11-0513	1	W	11	X	X	HOLD
						HOLD

LMMW-9-0513	T	1440	W	11	X	X	Hold
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[illegible][illegible][illegible]

Ecology E/11/1 EDD			Printed Name:	Printed Name:	Printed Name
DL-cc: The Hon. Mr. Justice	cc: A.A. B. N. S.	A. A. B. N. S.			

62 OVER	AR	Date & Time:	Date & Time
		Date & Time:	

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the request, shall not exceed the amount of the fee for the request. ARI does not accept any liability for damages, including consequential damages, that may be incurred by the requester in connection with the request.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission.



Cooler Receipt Form

ARI Client Golder

Project Name: Landsburg mine

COC No(s): _____ NA

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

Assigned ARI Job No. WS02

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) 2.2 3.9 3.4

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID# 90877952

Cooler Accepted by: AV Date: 5/30/13 Time: 1600

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 5-17-13

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

Samples Logged by: TS Date: 5-31-13 Time: 927

**** 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:

Trip blanks 1"lg" D.35 Metals Preserved upon receipt

By: TS Date: 5-31-13

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm	Small → "sm" Peabubbles → "pb" Large → "lg" Headspace → "hs"
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ARI Job No: **WS02**
PC: Kelly
VTSR: 05/30/13

Inquiry Number: NONE
Analysis Requested: 05/31/13
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 Mine
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11549 WS02A	LMW-11-0513						TOT 9.31													
13-11550 WS02B	LMW-6-0513						TOT 6.15													
13-11551 WS02C	LMW-9-0513						TOT 6.45													

11052 : 50005 J

Checked By WS Date 5-31-13

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

Page: 1	of 1
Date: 5/30/2013	Ice Present? Y
No. of Coolers: 3	Cooler Temps: 22-39

ARI Assigned Number:	W503	Turn-around Requested:	Standard
ARI Client Company:	Golder Associates		
Client Contact:	Phone: 425 883 0777		
Client Project Name:	Doug Morell / J. H. Lamberts		
Client Project #:	Landsburg Mine		
Client Project #:	923 1000-002-A273	Samplers:	J. Lamberts, C. Wilder

Sample ID	Date	Time	Matrix	No. Containers
Tryp Blank	5/3/2013	-	DI	2
LMW-11-0513		1100	W	11
LMW-6-0513		1255	W	11
LMW-9-0513		1440	W	11

[illegible]

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Ecology ETM/EDD				
Pls cc: jlambers@cgider.com	Printed Name: CLARA WINDER	Printed Name: A. Vukobratovic		
Amorell@cgider.com	Company: GOLDER	Company: ARI		
	Date & Time: 5/31/13 1600	Date & Time: 5/30/13 1600		

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

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



Cooler Receipt Form

ARI Client Goldier

Project Name: Landsburg mine

COC No(s): _____ NA

Delivered by Fed-Ex UPS Courier Hand Delivered Other _____

Assigned ARI Job No. WS63

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) 2.2 3.9 3.4

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID# 90877952

Cooler Accepted by: AV Date: 5/30/13 Time: 1600

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: _____

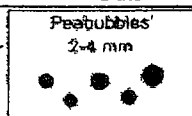
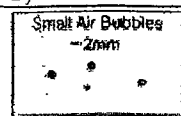
Samples Logged by: JS Date: 5-31-13 Time: 924

**** 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 → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"



ARI Job No: **WS03**

PC: Kelly
VTSR: 05/30/13

Inquiry Number: NONE
Analysis Requested: 05/31/13
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 Mine
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11553 WS03A	LMW-11-0513						TOT Pass													
13-11554 WS03B	LMW-6-0513						TOT Pass													
13-11555 WS03C	LMW-9-0513						TOT Pass													

4502 : 00007

Checked By TS Date 5-31-13

Sample ID Cross Reference Report



ARI Job No: WS02
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-11-0513	WS02A	13-11549	Water	05/30/13 11:00	05/30/13 16:00
2. LMW-6-0513	WS02B	13-11550	Water	05/30/13 12:55	05/30/13 16:00
3. LMW-9-0513	WS02C	13-11551	Water	05/30/13 14:40	05/30/13 16:00
4. Trip Blanks	WS02D	13-11552	Water	05/30/13	05/30/13 16:00

Sample ID Cross Reference Report



ARI Job No: WS03
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-11-0513	WS03A	13-11553	Water	05/30/13 11:00	05/30/13 16:00
2. LMW-6-0513	WS03B	13-11554	Water	05/30/13 12:55	05/30/13 16:00
3. LMW-9-0513	WS03C	13-11555	Water	05/30/13 14:40	05/30/13 16:00



Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- * Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but $\geq$ the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is ≤ 5 times the Reporting Limit and the replicate control limit defaults to ± 1 RL instead of the normal 20% RPD

Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- * Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ Drift or minimum RRF).



- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NR Spiked compound recovery is not reported due to chromatographic interference
- NS The flagged analyte was not spiked into the sample
- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by $\geq 40\%$ RPD with no obvious chromatographic interference
- X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
- Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**



Geotechnical Data

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C
Sample ID: MB-061013A

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METHOD BLANK

Lab Sample ID: MB-061013A

QC Report No: WS02-Golder Associates

LIMS ID: 13-11549

Project: Landsburg Mine

Matrix: Water

923-1000-002-R273

Data Release Authorized: 

Date Sampled: NA

Reported: 06/11/13

Date Received: NA

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/10/13 11:30

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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-trifluoro	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	0.04	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

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Sample ID: MB-061013A

METHOD BLANK

Lab Sample ID: MB-061013A

LIMS ID: 13-11549

Matrix: Water

Date Analyzed: 06/10/13 11:30

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	98.7%
d8-Toluene	104%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	105%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-11-0513

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SAMPLE

Lab Sample ID: WS02A

LIMS ID: 13-11549

Matrix: Water

Data Release Authorized: 

Reported: 06/11/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/10/13 16:13

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Sample ID: LMW-11-0513

SAMPLE



Lab Sample ID: WS02A

LIMS ID: 13-11549

Matrix: Water

Date Analyzed: 06/10/13 16:13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	101%
d8-Toluene	101%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	104%

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-6-0513

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SAMPLE

Lab Sample ID: WS02B

QC Report No: WS02-Golder Associates

LIMS ID: 13-11550

Project: Landsburg Mine

Matrix: Water

923-1000-002-R273

Data Release Authorized: 

Date Sampled: 05/30/13

Reported: 06/11/13

Date Received: 05/30/13

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/10/13 16:39

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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-6-0513
SAMPLE**

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Lab Sample ID: WS02B

LIMS ID: 13-11550

Matrix: Water

Date Analyzed: 06/10/13 16:39

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

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	0.08	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	102%
d8-Toluene	102%
Bromofluorobenzene	97.0%
d4-1,2-Dichlorobenzene	105%

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-9-0513

Page 1 of 2

SAMPLE

Lab Sample ID: WS02C

LIMS ID: 13-11551

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 06/11/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/10/13 17:05

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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-9-0513

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SAMPLE

Lab Sample ID: WS02C

QC Report No: WS02-Golder Associates

LIMS ID: 13-11551

Project: Landsburg Mine

Matrix: Water

923-1000-002-R273

Date Analyzed: 06/10/13 17:05

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	0.08	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	104%
d8-Toluene	99.6%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	106%

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

Page 1 of 2

**Sample ID: Trip Blanks
SAMPLE**

Lab Sample ID: WS02D

LIMS ID: 13-11552

Matrix: Water

Data Release Authorized: 

Reported: 06/11/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002.R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Instrument/Analyst: NT3/PAB
Date Analyzed: 06/10/13 17:32

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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Lab Sample ID: WS02D

QC Report No: WS02-Golder Associates

LIMS ID: 13-11552

Project: Landsburg Mine

Matrix: Water

923-1000-002.R273

Date Analyzed: 06/10/13 17:32

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	0.08	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	102%
d8-Toluene	100%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	87.2%

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.

VOA SURROGATE RECOVERY SUMMARY



Matrix: Water

QC Report No: WS02-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-061013A	Method Blank	10	98.7%	104%	103%	105%	0
LCS-061013A	Lab Control	10	94.3%	104%	105%	96.7%	0
LCSD-061013A	Lab Control Dup	10	95.7%	100%	102%	103%	0
WS02A	LMW-11-0513	10	101%	101%	102%	104%	0
WS02B	LMW-6-0513	10	102%	102%	97.0%	105%	0
WS02C	LMW-9-0513	10	104%	99.6%	100%	106%	0
WS02D	Trip Blanks	10	102%	100%	101%	87.2%	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: 13-11549 to 13-11552

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 1 of 2

Sample ID: LCS-061013A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061013A

LIMS ID: 13-11549

Matrix: Water

Data Release Authorized: 

Reported: 06/11/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT3/PAB

LCSD: NT3/PAB

Date Analyzed LCS: 06/10/13 10:37

LCSD: 06/10/13 11:04

Sample Amount LCS: 10.0 mL

LCSD: 10.0 mL

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	9.21	10.0	92.1%	9.02	10.0	90.2%	2.1%
Bromomethane	9.43	10.0	94.3%	9.17	10.0	91.7%	2.8%
Vinyl Chloride	9.11	10.0	91.1%	8.98	10.0	89.8%	1.4%
Chloroethane	8.82	10.0	88.2%	8.75	10.0	87.5%	0.8%
Methylene Chloride	8.66	10.0	86.6%	8.47	10.0	84.7%	2.2%
Acetone	43.8 Q	50.0	87.6%	51.5 Q	50.0	103%	16.2%
Carbon Disulfide	9.29	10.0	92.9%	8.99	10.0	89.9%	3.3%
1,1-Dichloroethene	8.83	10.0	88.3%	8.90	10.0	89.0%	0.8%
1,1-Dichloroethane	9.11	10.0	91.1%	9.06	10.0	90.6%	0.6%
trans-1,2-Dichloroethene	8.57	10.0	85.7%	8.67	10.0	86.7%	1.2%
cis-1,2-Dichloroethene	8.65	10.0	86.5%	8.40	10.0	84.0%	2.9%
Chloroform	9.09	10.0	90.9%	8.89	10.0	88.9%	2.2%
1,2-Dichloroethane	8.60	10.0	86.0%	8.84	10.0	88.4%	2.8%
2-Butanone	39.1	50.0	78.2%	45.7	50.0	91.4%	15.6%
1,1,1-Trichloroethane	9.22	10.0	92.2%	8.91	10.0	89.1%	3.4%
Carbon Tetrachloride	8.86	10.0	88.6%	8.73	10.0	87.3%	1.5%
Vinyl Acetate	8.87	10.0	88.7%	9.09	10.0	90.9%	2.4%
Bromodichloromethane	8.99	10.0	89.9%	8.83	10.0	88.3%	1.8%
1,2-Dichloropropane	8.99	10.0	89.9%	8.79	10.0	87.9%	2.2%
cis-1,3-Dichloropropene	9.54	10.0	95.4%	9.05	10.0	90.5%	5.3%
Trichloroethene	8.98	10.0	89.8%	8.93	10.0	89.3%	0.6%
Dibromochloromethane	8.87	10.0	88.7%	8.42	10.0	84.2%	5.2%
1,1,2-Trichloroethane	8.80	10.0	88.0%	8.64	10.0	86.4%	1.8%
Benzene	8.98	10.0	89.8%	8.92	10.0	89.2%	0.7%
trans-1,3-Dichloropropene	9.61	10.0	96.1%	9.25	10.0	92.5%	3.8%
2-Chloroethylvinylether	8.86	10.0	88.6%	8.62	10.0	86.2%	2.7%
Bromoform	8.36	10.0	83.6%	8.37	10.0	83.7%	0.1%
4-Methyl-2-Pentanone (MIBK)	43.0	50.0	86.0%	44.8	50.0	89.6%	4.1%
2-Hexanone	40.8 Q	50.0	81.6%	41.4 Q	50.0	82.8%	1.5%
Tetrachloroethene	8.82	10.0	88.2%	8.38	10.0	83.8%	5.1%
1,1,2,2-Tetrachloroethane	8.28 Q	10.0	82.8%	7.78 Q	10.0	77.8%	6.2%
Toluene	8.92	10.0	89.2%	8.54	10.0	85.4%	4.4%
Chlorobenzene	8.82	10.0	88.2%	8.47	10.0	84.7%	4.0%
Ethylbenzene	9.13	10.0	91.3%	8.53	10.0	85.3%	6.8%
Styrene	9.19	10.0	91.9%	8.76	10.0	87.6%	4.8%
Trichlorofluoromethane	9.40	10.0	94.0%	9.22	10.0	92.2%	1.9%
1,1,2-Trichloro-1,2,2-trifluoroetha	9.14	10.0	91.4%	8.80	10.0	88.0%	3.8%
m,p-Xylene	18.2	20.0	91.0%	17.3	20.0	86.5%	5.1%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Page 2 of 2

Sample ID: LCS-061013A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061013A
LIMS ID: 13-11549
Matrix: Water

QC Report No: WS02-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	9.11	10.0	91.1%	8.68	10.0	86.8%	4.8%
1,2-Dichlorobenzene	8.58 Q	10.0	85.8%	8.10 Q	10.0	81.0%	5.8%
1,3-Dichlorobenzene	8.55	10.0	85.5%	7.87	10.0	78.7%	8.3%
1,4-Dichlorobenzene	8.58	10.0	85.8%	8.10	10.0	81.0%	5.8%
Acrolein	33.2 Q	50.0	66.4%	39.4 Q	50.0	78.8%	17.1%
Iodomethane	9.20	10.0	92.0%	9.09	10.0	90.9%	1.2%
Acrylonitrile	8.10	10.0	81.0%	9.95	10.0	99.5%	20.5%
1,1-Dichloropropene	8.72	10.0	87.2%	8.63	10.0	86.3%	1.0%
Dibromomethane	8.23	10.0	82.3%	8.60	10.0	86.0%	4.4%
1,1,1,2-Tetrachloroethane	8.50	10.0	85.0%	8.15	10.0	81.5%	4.2%
1,2-Dibromo-3-chloropropane	7.67 Q	10.0	76.7%	8.20 Q	10.0	82.0%	6.7%
1,2,3-Trichloropropane	8.09 Q	10.0	80.9%	7.99 Q	10.0	79.9%	1.2%
trans-1,4-Dichloro-2-butene	8.42	10.0	84.2%	8.43	10.0	84.3%	0.1%
1,3,5-Trimethylbenzene	9.06	10.0	90.6%	8.39	10.0	83.9%	7.7%
1,2,4-Trimethylbenzene	8.94	10.0	89.4%	8.29	10.0	82.9%	7.5%
Hexachlorobutadiene	10.1	10.0	101%	8.97	10.0	89.7%	11.9%
1,2-Dibromoethane	8.23	10.0	82.3%	8.42	10.0	84.2%	2.3%
Bromochloromethane	8.93	10.0	89.3%	8.87	10.0	88.7%	0.7%
2,2-Dichloropropane	9.04	10.0	90.4%	8.69	10.0	86.9%	3.9%
1,3-Dichloropropane	8.56	10.0	85.6%	8.28	10.0	82.8%	3.3%
Isopropylbenzene	9.08	10.0	90.8%	8.40	10.0	84.0%	7.8%
n-Propylbenzene	8.95	10.0	89.5%	8.24	10.0	82.4%	8.3%
Bromobenzene	8.62	10.0	86.2%	7.89	10.0	78.9%	8.8%
2-Chlorotoluene	9.03	10.0	90.3%	8.18	10.0	81.8%	9.9%
4-Chlorotoluene	8.82	10.0	88.2%	8.16	10.0	81.6%	7.8%
tert-Butylbenzene	9.28	10.0	92.8%	8.54	10.0	85.4%	8.3%
sec-Butylbenzene	8.89	10.0	88.9%	8.39	10.0	83.9%	5.8%
4-Isopropyltoluene	8.72	10.0	87.2%	8.39	10.0	83.9%	3.9%
n-Butylbenzene	8.92	10.0	89.2%	8.40	10.0	84.0%	6.0%
1,2,4-Trichlorobenzene	8.82	10.0	88.2%	8.73	10.0	87.3%	1.0%
Naphthalene	8.46 Q	10.0	84.6%	8.46 Q	10.0	84.6%	0.0%
1,2,3-Trichlorobenzene	8.57	10.0	85.7%	8.04	10.0	80.4%	6.4%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	94.3%	95.7%
d8-Toluene	104%	100%
Bromofluorobenzene	105%	102%
d4-1,2-Dichlorobenzene	96.7%	103%

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Matrix: Water

 Data Release Authorized: 

Reported: 06/04/13

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-060313 13-11549	Method Blank	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 83.0%
WS02A 13-11549	LMW-11-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 85.8%
WS02B 13-11550	LMW-6-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 83.7%
WS02C 13-11551	LMW-9-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 89.1%

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: WS02-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

<u>Client ID</u>	<u>O-TER</u>	<u>TOT OUT</u>
MB-060313	83.0%	0
LCS-060313	74.1%	0
LMW-11-0513	85.8%	0
LMW-6-0513	83.7%	0
LMW-9-0513	89.1%	0

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

Prep Method: SW3510C
Log Number Range: 13-11549 to 13-11551

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Page 1 of 1



Sample ID: LCS-060313
LAB CONTROL

Lab Sample ID: LCS-060313
LIMS ID: 13-11549
Matrix: Water
Data Release Authorized: *B*
Reported: 06/04/13

QC Report No: WS02-Golder Associates
Project: Landsburg Mine
923-1000-002-R273
Date Sampled: 05/30/13
Date Received: 05/30/13

Date Extracted: 06/03/13
Date Analyzed: 06/03/13 17:51
Instrument/Analyst: FID/JLW

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.27	3.00	75.7%

HCID Surrogate Recovery

o-Terphenyl	74.1%
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Results reported in mg/L

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-11-0513

SAMPLE

Lab Sample ID: WS02A

LIMS ID: 13-11549

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	8.0	
3010A	06/03/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	317	
3010A	06/03/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	54,800	
3010A	06/03/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	1,890	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	27,500	
3010A	06/03/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	117	
3010A	06/03/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	2,050	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	29,900	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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-11-0513

DUPLICATE

Lab Sample ID: WS02A

LIMS ID: 13-11549

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010C	50 U	50 U	0.0%	+/- 50	L
Antimony	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Arsenic	200.8	8.0	7.7	3.8%	+/- 20%	
Barium	6010C	317	327	3.1%	+/- 20%	
Beryllium	6010C	1 U	1 U	0.0%	+/- 1	L
Cadmium	6010C	2 U	2 U	0.0%	+/- 2	L
Calcium	6010C	54,800	56,200	2.5%	+/- 20%	
Chromium	6010C	5 U	5 U	0.0%	+/- 5	L
Cobalt	6010C	3 U	3 U	0.0%	+/- 3	L
Copper	6010C	2 U	2 U	0.0%	+/- 2	L
Iron	6010C	1,890	1,920	1.6%	+/- 20%	
Lead	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Magnesium	6010C	27,500	28,200	2.5%	+/- 20%	
Manganese	6010C	117	120	2.5%	+/- 20%	
Nickel	6010C	10 U	10 U	0.0%	+/- 10	L
Potassium	6010C	2,050	2,110	2.9%	+/- 500	L
Selenium	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Silver	6010C	3 U	3 U	0.0%	+/- 3	L
Sodium	6010C	29,900	30,600	2.3%	+/- 20%	
Thallium	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Vanadium	6010C	3 U	3 U	0.0%	+/- 3	L
Zinc	6010C	10 U	10 U	0.0%	+/- 10	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-11-0513

MATRIX SPIKE

Lab Sample ID: WS02A

LIMS ID: 13-11549

Matrix: Water

Data Release Authorized

Reported: 06/06/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010C	50 U	2,000	2,000	100%	
Antimony	200.8	0.2 U	23.2	25.0	92.8%	
Arsenic	200.8	8.0	33.1	25.0	100%	
Barium	6010C	317	2,390	2,000	104%	
Beryllium	6010C	1 U	480	500	96.0%	
Cadmium	6010C	2 U	513	500	103%	
Calcium	6010C	54,800	66,700	10,000	119%	H
Chromium	6010C	5 U	522	500	104%	
Cobalt	6010C	3 U	500	500	100%	
Copper	6010C	2 U	514	500	103%	
Iron	6010C	1,890	3,990	2,000	105%	
Lead	200.8	0.1 U	24.4	25.0	97.6%	
Magnesium	6010C	27,500	37,400	10,000	99.0%	
Manganese	6010C	117	625	500	102%	
Nickel	6010C	10 U	490	500	98.0%	
Potassium	6010C	2,050	12,300	10,000	102%	
Selenium	200.8	0.5 U	77.8	80.0	97.2%	
Silver	6010C	3 U	523	500	105%	
Sodium	6010C	29,900	41,600	10,000	117%	
Thallium	200.8	0.2 U	24.6	25.0	98.4%	
Vanadium	6010C	3 U	513	500	103%	
Zinc	6010C	10 U	490	500	98.0%	

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

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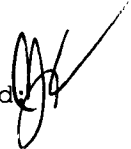
Sample ID: LMW-6-0513

SAMPLE

Lab Sample ID: WS02B

LIMS ID: 13-11550

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	112	
3010A	06/03/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	26,100	
3010A	06/03/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	2,020	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	13,100	
3010A	06/03/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	30	
3010A	06/03/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	690	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	6,970	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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-9-0513

SAMPLE

Lab Sample ID: WS02C

LIMS ID: 13-11551

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.3	
3010A	06/03/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	304	
3010A	06/03/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	84,400	
3010A	06/03/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	1,520	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	46,000	
3010A	06/03/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	171	
3010A	06/03/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	2,560	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	16,400	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	U

Reported in ug/L (ppb).

U-Analyte undetected at given LOQ

LOQ-Reporting Limit

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

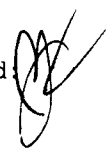
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: WS02MB

LIMS ID: 13-11551

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-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	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/05/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-39-3	Barium	1.33	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/05/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/05/13	7440-70-2	Calcium	11.3	50	50	U
3010A	06/03/13	6010C	06/05/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/05/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/05/13	7439-89-6	Iron	7.5	50	50	U
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/05/13	7439-95-4	Magnesium	9.6	50	50	U
3010A	06/03/13	6010C	06/05/13	7439-96-5	Manganese	0.28	1	1	U
3010A	06/03/13	6010C	06/05/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/05/13	7440-09-7	Potassium	65.7	500	500	U
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/05/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-23-5	Sodium	11.4	500	500	U
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/05/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/05/13	7440-66-6	Zinc	1.4	10	10	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: WS02LCS

LIMS ID: 13-11551

Matrix: Water

Data Release Authorized: 

Reported: 06/06/13

QC Report No: WS02-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	1990	2000	99.5%	
Antimony	200.8	24.1	25.0	96.4%	
Arsenic	200.8	25.5	25.0	102%	
Barium	6010C	2010	2000	100%	
Beryllium	6010C	480	500	96.0%	
Cadmium	6010C	512	500	102%	
Calcium	6010C	9760	10000	97.6%	
Chromium	6010C	526	500	105%	
Cobalt	6010C	508	500	102%	
Copper	6010C	510	500	102%	
Iron	6010C	2020	2000	101%	
Lead	200.8	25.7	25.0	103%	
Magnesium	6010C	10100	10000	101%	
Manganese	6010C	481	500	96.2%	
Nickel	6010C	500	500	100%	
Potassium	6010C	9990	10000	99.9%	
Selenium	200.8	76.4	80.0	95.5%	
Silver	6010C	517	500	103%	
Sodium	6010C	10400	10000	104%	
Thallium	200.8	25.5	25.0	102%	
Vanadium	6010C	513	500	103%	
Zinc	6010C	500	500	100%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized: *ef*
Reported: 06/12/13
Date Received: 05/30/13
Page 1 of 1

QC Report No: WS03-Golder Associates
Project: Landsburg Mine
923-1000-002-R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-11-0513 WS03A 13-11553	05/30/13	Water	06/03/13 06/11/13	20.0	20.0 U
LMW-6-0513 WS03B 13-11554	05/30/13	Water	06/03/13 06/11/13	20.0	20.0 U
LMW-9-0513 WS03C 13-11555	05/30/13	Water	06/03/13 06/11/13	20.0	20.0 U
MB-060313 Method Blank	NA	Water	06/03/13 06/11/13	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-6-0513

DUPLICATE

Lab Sample ID: WS03B

LIMS ID: 13-11554

Matrix: Water

Data Release Authorized:

Reported: 06/12/13

QC Report No: WS03-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

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-6-0513

MATRIX SPIKE

Lab Sample ID: WS03B

LIMS ID: 13-11554

Matrix: Water

Data Release Authorized:

Reported: 06/12/13

QC Report No: WS03-Golder Associates

Project: Landsburg Mine

923-1000-002-R273

Date Sampled: 05/30/13

Date Received: 05/30/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	82.7	100	82.7%	

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: WS03LCS

LIMS ID: 13-11555

Matrix: Water

Data Release Authorized: *ES*

Reported: 06/12/13

QC Report No: WS03-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	183	200	91.5%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%



Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 17, 2013

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: WS22 and WS23

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 May 31, 2013. There were no discrepancies between the COC and the sample containers' labels. Select samples have been placed on hold pending further instructions.

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

The VOCs 6/10/13 CCAL is out of control low for all associated FORM III "Q" flagged analytes. All associated samples that contain analyte have been flagged with a "Q" qualifier.

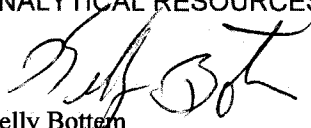
The VOCs 6/10/13 LCS and/ or LCSD are out of control low for several analytes. All other QC is in control and no further corrective action was taken.

No other analytical complications were noted.

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

Chain of Custody Record & Laboratory Analysis Request

Trace of sampling

ARI Assigned Number: WSP-6523	Turn-around Requested: Standard
ARI Client Company: Golden Associates	Phone: 425-883-0777
Client Contact: Landsburg Mine	Doug Morell, J. Lamberts
Client Project Name:	
Client Project #: 9231000002-A273	Samplers: J. Lamberts, C. Wilder

Page: 1	of 1
Date: 5/31/2013	Ice Present? Y
No. of Coolers: 3	Cooler Temps: 8.4-12.4



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

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested				Notes/Comments
					Client list	TPH-HCID	TOTAL Metals	AM/L Diss. Metals	
Trip Blanks	5/31/2013	-	DI	2	X	X			X Field Filtered w/ 0.45um filter
LMW-7-0513		0935	W	11	X	X			Pis. an alyte under existing MSA btwn Golden + ARI
LMW-7-0513-D		0940	W	11	X	X			
LMW-10-0513		1105	W	11	X	X			
LMW-2-0513		1225	W	11	X	X			
LMW-4-0513		1325	W	11	X	X			
Comments/Special Instructions Ecology EIM EDD	Relinquished by (Signature) <i>[Signature]</i>				Received by (Signature) <i>[Signature]</i>				
Pls c/Lambertsegolden.com	Printed Name: J. Lamberts				Printed Name: A. Volgardson				
dmcellegolden.com	Company: Golden				Company: ARI				
	Date & Time: 5/31/2013 1432				Date & Time: 5/31/13 1432				

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

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



Cooler Receipt Form

ARI Client Golder Project Name: Landsburg Mine
COC No(s) _____ Delivered by Fed-Ex UPS Courier Hand Delivered Other _____
Assigned ARI Job No WS 22 / WS 23 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) 12.4 8.4 12.2
If cooler temperature is out of compliance fill out form 00070F Temp Gun ID# 910877952
Cooler Accepted by AV Date: 5/31/13 Time 1432

Complete custody forms and attach all shipping documents

Log-In Phase:

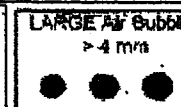
Was a temperature blank included in the cooler? YES (NO)
What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____
Was sufficient ice used (if appropriate)? NA YES NO
Were all bottles sealed in individual plastic bags? YES NO
Did all bottles arrive in 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 5-17-13
Was Sample Split by ARI: (NA) YES Date/Time _____ Equipment: _____ Split by: _____
Samples Logged by: TS Date: 5-31-13 Time: 1545

** 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: ASS preserved on arrival

By: TS Date: 5-31-13

			Small → "sm"
			Peabubbles → "pb"
			Large → "lg"
			Headspace → "hs"

Sample ID Cross Reference Report



ARI Job No: WS22
Client: Golder Associates
Project Event: 9231000002R273
Project Name: Landsburg Mine

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. LMW-7-0513	WS22A	13-11680	Water	05/31/13 09:35	05/31/13 14:32
2. LMW-7-0513-D	WS22B	13-11681	Water	05/31/13 09:40	05/31/13 14:32
3. LMW-10-0513	WS22C	13-11682	Water	05/31/13 11:05	05/31/13 14:32
4. LMW-2-0513	WS22D	13-11683	Water	05/31/13 12:25	05/31/13 14:32
5. LMW-4-0513	WS22E	13-11684	Water	05/31/13 13:25	05/31/13 14:32
6. Trip Blanks	WS22F	13-11685	Water	05/31/13	05/31/13 14:32

Sample ID Cross Reference Report



ARI Job No: WS23
Client: Golder Associates
Project Event: 9231000002R273
Project Name: Landsburg Mine

Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1. LMW-7-0513	WS23A	13-11686	Water	05/31/13 09:35	05/31/13 14:32
2. LMW-7-0513-D	WS23B	13-11687	Water	05/31/13 09:40	05/31/13 14:32
3. LMW-10-0513	WS23C	13-11688	Water	05/31/13 11:05	05/31/13 14:32
4. LMW-2-0513	WS23D	13-11689	Water	05/31/13 12:25	05/31/13 14:32
5. LMW-4-0513	WS23E	13-11690	Water	05/31/13 13:25	05/31/13 14:32



ARI Job No: WS22

PC: Kelly

VTSR: 05/31/13

Inquiry Number: NONE

Analysis Requested: 05/31/13

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: Lv4

Deliverables:

Project #: 9231000002R273

Project: Landsburg Mine

Sample Site:

SDG No:

Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11680 WS22A	LMW-7-0513						TOT PASS														
13-11681 WS22B	LMW-7-0513-D						TOT PASS														
13-11682 WS22C	LMW-10-0513						TOT PASS														
13-11683 WS22D	LMW-2-0513						TOT PASS														
13-11684 WS22E	LMW-4-0513						TOT PASS														

WS22: 000000

Checked By RS Date 5-31-13



ARI Job No: WS23

PC: Kelly

VTSR: 05/31/13

Inquiry Number: NONE

Analysis Requested: 05/31/13

Contact: Morell, Douglas

Client: Golder Associates

Logged by: TS

Sample Set Used: Yes-119

Validatable Package: LV4

Deliverables:

Project #: 9231000002R273

Project: Landsburg Mine

Sample Site:

SDG No:

Analytical Protocol: In-house

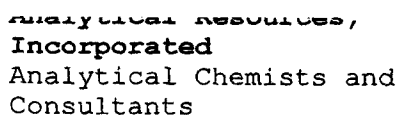
LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET DOC FLT FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
13-11686 WS23A	LMW-7-0513						TOT PSS														
13-11687 WS23B	LMW-7-0513-D						TOT PSS														
13-11688 WS23C	LMW-10-0513						TOT PSS														
13-11689 WS23D	LMW-2-0513						TOT PSS														
13-11690 WS23E	LMW-4-0513						TOT PSS														

4922: 00007

Checked By

Date

TS
5-31-13



Cooler Temperature Compliance Form

Completed by: LS Date: 5-5-13 Time: 15:50

INORGANICS ANALYSIS DATA SHEET
Total Mercury by Method SW7470A



Data Release Authorized: *EF*
Reported: 06/19/13
Date Received: 05/31/13
Page 1 of 1

QC Report No: WS23-Golder Associates
Project: Landsburg Mine
9231000002R273

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
LMW-7-0513 WS23A 13-11686	05/31/13	Water	06/18/13 06/19/13	20.0	20.0 U
LMW-7-0513-D WS23B 13-11687	05/31/13	Water	06/03/13 06/11/13	20.0	20.0 U
LMW-10-0513 WS23C 13-11688	05/31/13	Water	06/03/13 06/11/13	20.0	20.0 U
LMW-2-0513 WS23D 13-11689	05/31/13	Water	06/03/13 06/11/13	20.0	20.0 U
LMW-4-0513 WS23E 13-11690	05/31/13	Water	06/03/13 06/11/13	20.0	20.0 U
MB-061813 Method Blank	NA	Water	06/18/13 06/19/13	20.0	20.0 U
MB-060313 Method Blank	NA	Water	06/03/13 06/11/13	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-7-0513-D

DUPLICATE

Lab Sample ID: WS23B

LIMS ID: 13-11687

Matrix: Water

Data Release Authorized:

Reported: 06/12/13

QC Report No: WS23-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

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-7-0513-D

MATRIX SPIKE

Lab Sample ID: WS23B

LIMS ID: 13-11687

Matrix: Water

Data Release Authorized: *Ed*

Reported: 06/12/13

QC Report No: WS23-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	89.4	100	89.4%	

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: WS23LCS

LIMS ID: 13-11690

Matrix: Water

Data Release Authorized: *ef*

Reported: 06/12/13

QC Report No: WS23-Golder Associates

Project: Landsburg Mine

9231000002R273

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%

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: WS23LCS

LIMS ID: 13-11686

Matrix: Water

Data Release Authorized:

Reported: 06/19/13

QC Report No: WS23-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	208	200	104%	

Reported in ng/L

N-Control limit not met

Control Limits: 80-120%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: LMW-7-0513

Page 1 of 2

SAMPLE

Lab Sample ID: WS22A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11680

Project: Landsburg Mine

Matrix: Water

9231000002R273

Data Release Authorized: *AB*

Date Sampled: 05/31/13

Reported: 06/11/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/06/13 20:19

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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-7-0513

Page 2 of 2

SAMPLE

Lab Sample ID: WS22A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11680

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/06/13 20:19

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	0.08	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	99.2%
d8-Toluene	98.0%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	104%

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

Page 1 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Sample ID: LMW-7-0513-D

SAMPLE

Lab Sample ID: WS22B

LIMS ID: 13-11681

Matrix: Water

Data Release Authorized: 

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/10/13 14:28

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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-trifluoro	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	0.04	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-7-0513-D

Page 2 of 2

SAMPLE

Lab Sample ID: WS22B

QC Report No: WS22-Golder Associates

LIMS ID: 13-11681

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/10/13 14:28

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	0.08	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	99.1%
d8-Toluene	99.6%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	105%

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

Page 1 of 2

ANALYTICAL
RESOURCES
INCORPORATED

Sample ID: LMW-10-0513

SAMPLE

Lab Sample ID: WS22C

LIMS ID: 13-11682

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/10/13 14:54

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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-10-0513

Page 2 of 2

SAMPLE

Lab Sample ID: WS22C

QC Report No: WS22-Golder Associates

LIMS ID: 13-11682

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/10/13 14:54

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	0.08	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	101%
d8-Toluene	101%
Bromofluorobenzene	97.2%
d4-1,2-Dichlorobenzene	85.5%

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
Page 1 of 2Sample ID: LMW-2-0513
SAMPLEANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: WS22D

LIMS ID: 13-11683

Matrix: Water

Data Release Authorized: *AB*

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/10/13 15:20

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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
Page 2 of 2Sample ID: LMW-2-0513
SAMPLEANALYTICAL
RESOURCES
INCORPORATED

Lab Sample ID: WS22D

QC Report No: WS22-Golder Associates

LIMS ID: 13-11683

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/10/13 15:20

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	0.08	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	99.7%
d8-Toluene	98.1%
Bromofluorobenzene	98.4%
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-4-0513

Page 1 of 2

SAMPLE

Lab Sample ID: WS22E

QC Report No: WS22-Golder Associates

LIMS ID: 13-11684

Project: Landsburg Mine

Matrix: Water

9231000002R273

Data Release Authorized: *AB*

Date Sampled: 05/31/13

Reported: 06/11/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/10/13 15:47

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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**

Page 2 of 2

Sample ID: LMW-4-0513

SAMPLE

Lab Sample ID: WS22E

QC Report No: WS22-Golder Associates

LIMS ID: 13-11684

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/10/13 15:47

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	0.08	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	102%
d8-Toluene	99.6%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	104%

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

Page 1 of 2

Sample ID: Trip Blanks
SAMPLE

Lab Sample ID: WS22F

LIMS ID: 13-11685

Matrix: Water

Data Release Authorized: *[Signature]*

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Instrument/Analyst: NT3/PAB

Date Analyzed: 06/06/13 18:07

Sample Amount: 10.0 mL

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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: WS22F

QC Report No: WS22-Golder Associates

LIMS ID: 13-11685

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/06/13 18:07

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	0.08	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	104%
d8-Toluene	99.1%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	99.7%

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-060613A

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METHOD BLANK

Lab Sample ID: MB-060613A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11680

Project: Landsburg Mine

Matrix: Water

9231000002R273

Data Release Authorized:

Date Sampled: NA

Reported: 06/11/13

Date Received: NA

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/06/13 16:48

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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-060613A

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METHOD BLANK

Lab Sample ID: MB-060613A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11680

Project: Landsburg Mine

Matrix: Water

9231000002R273

Date Analyzed: 06/06/13 16:48

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	0.08	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	97.9%
d8-Toluene	96.9%
Bromofluorobenzene	99.4%
d4-1,2-Dichlorobenzene	103%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MB-061013A

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METHOD BLANK

Lab Sample ID: MB-061013A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11681

Project: Landsburg Mine

Matrix: Water

9231000002R273

Data Release Authorized: *AB*

Date Sampled: NA

Reported: 06/11/13

Date Received: NA

Instrument/Analyst: NT3/PAB

Sample Amount: 10.0 mL

Date Analyzed: 06/10/13 11:30

Purge Volume: 10.0 mL

CAS Number	Analyte	DL	LOQ	Result
74-87-3	Chloromethane	0.10	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	0.04	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	0.04	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

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ANALYTICAL
RESOURCES
INCORPORATED

Sample ID: MB-061013A

METHOD BLANK

Lab Sample ID: MB-061013A

LIMS ID: 13-11681

Matrix: Water

Date Analyzed: 06/10/13 11:30

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

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	0.08	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	98.7%
d8-Toluene	104%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	105%

VOA SURROGATE RECOVERY SUMMARY



Matrix: Water

QC Report No: WS22-Golder Associates
Project: Landsburg Mine
9231000002R273

ARI ID	Client ID	FV	DCE	TOL	BFB	DCB	TOT OUT
MB-060613A	Method Blank	10	97.9%	96.9%	99.4%	103%	0
LCS-060613A	Lab Control	10	93.3%	100%	100%	105%	0
LCSD-060613A	Lab Control Dup	10	99.7%	101%	101%	104%	0
WS22A	LMW-7-0513	10	99.2%	98.0%	100%	104%	0
MB-061013A	Method Blank	10	98.7%	104%	103%	105%	0
LCS-061013A	Lab Control	10	94.3%	104%	105%	96.7%	0
LCSD-061013A	Lab Control Dup	10	95.7%	100%	102%	103%	0
WS22B	LMW-7-0513-D	10	99.1%	99.6%	101%	105%	0
WS22C	LMW-10-0513	10	101%	101%	97.2%	85.5%	0
WS22D	LMW-2-0513	10	99.7%	98.1%	98.4%	103%	0
WS22E	LMW-4-0513	10	102%	99.6%	101%	104%	0
WS22F	Trip Blanks	10	104%	99.1%	101%	99.7%	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: 13-11680 to 13-11685

WS22: 00029

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

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Sample ID: LCS-060613A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-060613A

LIMS ID: 13-11680

Matrix: Water

Data Release Authorized: *AB*

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT3/PAB

LCSD: NT3/PAB

Date Analyzed LCS: 06/06/13 15:29

LCSD: 06/06/13 15:55

Sample Amount LCS: 10.0 mL

LCSD: 10.0 mL

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	10.3	10.0	103%	10.6	10.0	106%	2.9%
Bromomethane	10.5	10.0	105%	10.8	10.0	108%	2.8%
Vinyl Chloride	9.81	10.0	98.1%	10.4	10.0	104%	5.8%
Chloroethane	9.32	10.0	93.2%	9.90	10.0	99.0%	6.0%
Methylene Chloride	9.25	10.0	92.5%	9.68	10.0	96.8%	4.5%
Acetone	33.4	50.0	66.8%	41.2	50.0	82.4%	20.9%
Carbon Disulfide	9.88	10.0	98.8%	10.3	10.0	103%	4.2%
1,1-Dichloroethene	9.78	10.0	97.8%	9.73	10.0	97.3%	0.5%
1,1-Dichloroethane	10.1	10.0	101%	10.4	10.0	104%	2.9%
trans-1,2-Dichloroethene	9.71	10.0	97.1%	9.91	10.0	99.1%	2.0%
cis-1,2-Dichloroethene	9.30	10.0	93.0%	9.79	10.0	97.9%	5.1%
Chloroform	9.61	10.0	96.1%	10.2	10.0	102%	6.0%
1,2-Dichloroethane	9.52	10.0	95.2%	9.55	10.0	95.5%	0.3%
2-Butanone	47.2	50.0	94.4%	48.0	50.0	96.0%	1.7%
1,1,1-Trichloroethane	9.97	10.0	99.7%	10.1	10.0	101%	1.3%
Carbon Tetrachloride	9.45	10.0	94.5%	9.64	10.0	96.4%	2.0%
Vinyl Acetate	9.36	10.0	93.6%	9.70	10.0	97.0%	3.6%
Bromodichloromethane	9.25	10.0	92.5%	10.0	10.0	100%	7.8%
1,2-Dichloropropane	9.52	10.0	95.2%	9.95	10.0	99.5%	4.4%
cis-1,3-Dichloropropene	9.95	10.0	99.5%	9.99	10.0	99.9%	0.4%
Trichloroethene	9.72	10.0	97.2%	9.91	10.0	99.1%	1.9%
Dibromochloromethane	9.78	10.0	97.8%	9.79	10.0	97.9%	0.1%
1,1,2-Trichloroethane	9.46	10.0	94.6%	9.57	10.0	95.7%	1.2%
Benzene	9.88	10.0	98.8%	10.1	10.0	101%	2.2%
trans-1,3-Dichloropropene	9.96	10.0	99.6%	10.2	10.0	102%	2.4%
2-Chloroethylvinylether	8.79	10.0	87.9%	10.1	10.0	101%	13.9%
Bromoform	9.73	10.0	97.3%	9.56	10.0	95.6%	1.8%
4-Methyl-2-Pentanone (MIBK)	43.3	50.0	86.6%	50.7	50.0	101%	15.7%
2-Hexanone	48.0	50.0	96.0%	49.0	50.0	98.0%	2.1%
Tetrachloroethene	10.0	10.0	100%	9.99	10.0	99.9%	0.1%
1,1,2,2-Tetrachloroethane	9.78	10.0	97.8%	9.42	10.0	94.2%	3.8%
Toluene	9.63	10.0	96.3%	9.80	10.0	98.0%	1.7%
Chlorobenzene	9.86	10.0	98.6%	10.1	10.0	101%	2.4%
Ethylbenzene	9.87	10.0	98.7%	10.0	10.0	100%	1.3%
Styrene	10.2	10.0	102%	10.4	10.0	104%	1.9%
Trichlorofluoromethane	10.7	10.0	107%	10.7	10.0	107%	0.0%
1,1,2-Trichloro-1,2,2-trifluoroetha	10.1	10.0	101%	10.2	10.0	102%	1.0%
m,p-Xylene	20.3	20.0	102%	20.4	20.0	102%	0.5%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

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Sample ID: LCS-060613A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-060613A

LIMS ID: 13-11680

Matrix: Water

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	10.4	10.0	104%	10.4	10.0	104%	0.0%
1,2-Dichlorobenzene	8.96	10.0	89.6%	10.0	10.0	100%	11.0%
1,3-Dichlorobenzene	9.65	10.0	96.5%	9.87	10.0	98.7%	2.3%
1,4-Dichlorobenzene	9.85	10.0	98.5%	9.82	10.0	98.2%	0.3%
Acrolein	38.4	50.0	76.8%	45.2	50.0	90.4%	16.3%
Iodomethane	9.70	10.0	97.0%	10.1	10.0	101%	4.0%
Acrylonitrile	8.50	10.0	85.0%	10.1	10.0	101%	17.2%
1,1-Dichloropropene	9.45	10.0	94.5%	9.76	10.0	97.6%	3.2%
Dibromomethane	9.42	10.0	94.2%	9.61	10.0	96.1%	2.0%
1,1,1,2-Tetrachloroethane	9.29	10.0	92.9%	9.54	10.0	95.4%	2.7%
1,2-Dibromo-3-chloropropane	8.83	10.0	88.3%	9.13	10.0	91.3%	3.3%
1,2,3-Trichloropropane	9.33	10.0	93.3%	9.37	10.0	93.7%	0.4%
trans-1,4-Dichloro-2-butene	10.1	10.0	101%	9.74	10.0	97.4%	3.6%
1,3,5-Trimethylbenzene	10.3	10.0	103%	10.4	10.0	104%	1.0%
1,2,4-Trimethylbenzene	10.3	10.0	103%	10.2	10.0	102%	1.0%
Hexachlorobutadiene	12.2	10.0	122%	12.0	10.0	120%	1.7%
1,2-Dibromoethane	8.90	10.0	89.0%	9.58	10.0	95.8%	7.4%
Bromochloromethane	9.32	10.0	93.2%	10.1	10.0	101%	8.0%
2,2-Dichloropropane	10.6	10.0	106%	10.9	10.0	109%	2.8%
1,3-Dichloropropane	9.66	10.0	96.6%	10.0	10.0	100%	3.5%
Isopropylbenzene	10.4	10.0	104%	10.4	10.0	104%	0.0%
n-Propylbenzene	10.1	10.0	101%	10.2	10.0	102%	1.0%
Bromobenzene	9.54	10.0	95.4%	9.41	10.0	94.1%	1.4%
2-Chlorotoluene	10.2	10.0	102%	10.2	10.0	102%	0.0%
4-Chlorotoluene	9.94	10.0	99.4%	9.94	10.0	99.4%	0.0%
tert-Butylbenzene	10.5	10.0	105%	10.6	10.0	106%	0.9%
sec-Butylbenzene	10.3	10.0	103%	10.3	10.0	103%	0.0%
4-Isopropyltoluene	10.4	10.0	104%	10.4	10.0	104%	0.0%
n-Butylbenzene	10.9	10.0	109%	10.7	10.0	107%	1.9%
1,2,4-Trichlorobenzene	11.1	10.0	111%	11.0	10.0	110%	0.9%
Naphthalene	10.8	10.0	108%	10.8	10.0	108%	0.0%
1,2,3-Trichlorobenzene	10.9	10.0	109%	10.1	10.0	101%	7.6%

Reported in ug/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	93.3%	99.7%
d8-Toluene	100%	101%
Bromofluorobenzene	100%	101%
d4-1,2-Dichlorobenzene	105%	104%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

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ANALYTICAL
RESOURCES
INCORPORATED

Sample ID: LCS-061013A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061013A

LIMS ID: 13-11681

Matrix: Water

Data Release Authorized: *AB*

Reported: 06/11/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: NA

Date Received: NA

Instrument/Analyst LCS: NT3/PAB

LCSD: NT3/PAB

Date Analyzed LCS: 06/10/13 10:37

LCSD: 06/10/13 11:04

Sample Amount LCS: 10.0 mL

LCSD: 10.0 mL

Purge Volume LCS: 10.0 mL

LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	9.21	10.0	92.1%	9.02	10.0	90.2%	2.1%
Bromomethane	9.43	10.0	94.3%	9.17	10.0	91.7%	2.8%
Vinyl Chloride	9.11	10.0	91.1%	8.98	10.0	89.8%	1.4%
Chloroethane	8.82	10.0	88.2%	8.75	10.0	87.5%	0.8%
Methylene Chloride	8.66	10.0	86.6%	8.47	10.0	84.7%	2.2%
Acetone	43.8 Q	50.0	87.6%	51.5 Q	50.0	103%	16.2%
Carbon Disulfide	9.29	10.0	92.9%	8.99	10.0	89.9%	3.3%
1,1-Dichloroethene	8.83	10.0	88.3%	8.90	10.0	89.0%	0.8%
1,1-Dichloroethane	9.11	10.0	91.1%	9.06	10.0	90.6%	0.6%
trans-1,2-Dichloroethene	8.57	10.0	85.7%	8.67	10.0	86.7%	1.2%
cis-1,2-Dichloroethene	8.65	10.0	86.5%	8.40	10.0	84.0%	2.9%
Chloroform	9.09	10.0	90.9%	8.89	10.0	88.9%	2.2%
1,2-Dichloroethane	8.60	10.0	86.0%	8.84	10.0	88.4%	2.8%
2-Butanone	39.1	50.0	78.2%	45.7	50.0	91.4%	15.6%
1,1,1-Trichloroethane	9.22	10.0	92.2%	8.91	10.0	89.1%	3.4%
Carbon Tetrachloride	8.86	10.0	88.6%	8.73	10.0	87.3%	1.5%
Vinyl Acetate	8.87	10.0	88.7%	9.09	10.0	90.9%	2.4%
Bromodichloromethane	8.99	10.0	89.9%	8.83	10.0	88.3%	1.8%
1,2-Dichloropropane	8.99	10.0	89.9%	8.79	10.0	87.9%	2.2%
cis-1,3-Dichloropropene	9.54	10.0	95.4%	9.05	10.0	90.5%	5.3%
Trichloroethene	8.98	10.0	89.8%	8.93	10.0	89.3%	0.6%
Dibromochloromethane	8.87	10.0	88.7%	8.42	10.0	84.2%	5.2%
1,1,2-Trichloroethane	8.80	10.0	88.0%	8.64	10.0	86.4%	1.8%
Benzene	8.98	10.0	89.8%	8.92	10.0	89.2%	0.7%
trans-1,3-Dichloropropene	9.61	10.0	96.1%	9.25	10.0	92.5%	3.8%
2-Chloroethylvinylether	8.86	10.0	88.6%	8.62	10.0	86.2%	2.7%
Bromoform	8.36	10.0	83.6%	8.37	10.0	83.7%	0.1%
4-Methyl-2-Pentanone (MIBK)	43.0	50.0	86.0%	44.8	50.0	89.6%	4.1%
2-Hexanone	40.8 Q	50.0	81.6%	41.4 Q	50.0	82.8%	1.5%
Tetrachloroethene	8.82	10.0	88.2%	8.38	10.0	83.8%	5.1%
1,1,2,2-Tetrachloroethane	8.28 Q	10.0	82.8%	7.78 Q	10.0	77.8%	6.2%
Toluene	8.92	10.0	89.2%	8.54	10.0	85.4%	4.4%
Chlorobenzene	8.82	10.0	88.2%	8.47	10.0	84.7%	4.0%
Ethylbenzene	9.13	10.0	91.3%	8.53	10.0	85.3%	6.8%
Styrene	9.19	10.0	91.9%	8.76	10.0	87.6%	4.8%
Trichlorofluoromethane	9.40	10.0	94.0%	9.22	10.0	92.2%	1.9%
1,1,2-Trichloro-1,2,2-trifluoroethane	9.14	10.0	91.4%	8.80	10.0	88.0%	3.8%
m,p-Xylene	18.2	20.0	91.0%	17.3	20.0	86.5%	5.1%

ORGANICS ANALYSIS DATA SHEET

Volatiles by Purge & Trap GC/MS-Method SW8260C

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RESOURCES
INCORPORATED

Sample ID: LCS-061013A

LAB CONTROL SAMPLE

Lab Sample ID: LCS-061013A

QC Report No: WS22-Golder Associates

LIMS ID: 13-11681

Project: Landsburg Mine

Matrix: Water

9231000002R273

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	9.11	10.0	91.1%	8.68	10.0	86.8%	4.8%
1,2-Dichlorobenzene	8.58 Q	10.0	85.8%	8.10 Q	10.0	81.0%	5.8%
1,3-Dichlorobenzene	8.55	10.0	85.5%	7.87	10.0	78.7%	8.3%
1,4-Dichlorobenzene	8.58	10.0	85.8%	8.10	10.0	81.0%	5.8%
Acrolein	33.2 Q	50.0	66.4%	39.4 Q	50.0	78.8%	17.1%
Iodomethane	9.20	10.0	92.0%	9.09	10.0	90.9%	1.2%
Acrylonitrile	8.10	10.0	81.0%	9.95	10.0	99.5%	20.5%
1,1-Dichloropropene	8.72	10.0	87.2%	8.63	10.0	86.3%	1.0%
Dibromomethane	8.23	10.0	82.3%	8.60	10.0	86.0%	4.4%
1,1,1,2-Tetrachloroethane	8.50	10.0	85.0%	8.15	10.0	81.5%	4.2%
1,2-Dibromo-3-chloropropane	7.67 Q	10.0	76.7%	8.20 Q	10.0	82.0%	6.7%
1,2,3-Trichloropropane	8.09 Q	10.0	80.9%	7.99 Q	10.0	79.9%	1.2%
trans-1,4-Dichloro-2-butene	8.42	10.0	84.2%	8.43	10.0	84.3%	0.1%
1,3,5-Trimethylbenzene	9.06	10.0	90.6%	8.39	10.0	83.9%	7.7%
1,2,4-Trimethylbenzene	8.94	10.0	89.4%	8.29	10.0	82.9%	7.5%
Hexachlorobutadiene	10.1	10.0	101%	8.97	10.0	89.7%	11.9%
1,2-Dibromoethane	8.23	10.0	82.3%	8.42	10.0	84.2%	2.3%
Bromochloromethane	8.93	10.0	89.3%	8.87	10.0	88.7%	0.7%
2,2-Dichloropropane	9.04	10.0	90.4%	8.69	10.0	86.9%	3.9%
1,3-Dichloropropane	8.56	10.0	85.6%	8.28	10.0	82.8%	3.3%
Isopropylbenzene	9.08	10.0	90.8%	8.40	10.0	84.0%	7.8%
n-Propylbenzene	8.95	10.0	89.5%	8.24	10.0	82.4%	8.3%
Bromobenzene	8.62	10.0	86.2%	7.89	10.0	78.9%	8.8%
2-Chlorotoluene	9.03	10.0	90.3%	8.18	10.0	81.8%	9.9%
4-Chlorotoluene	8.82	10.0	88.2%	8.16	10.0	81.6%	7.8%
tert-Butylbenzene	9.28	10.0	92.8%	8.54	10.0	85.4%	8.3%
sec-Butylbenzene	8.89	10.0	88.9%	8.39	10.0	83.9%	5.8%
4-Isopropyltoluene	8.72	10.0	87.2%	8.39	10.0	83.9%	3.9%
n-Butylbenzene	8.92	10.0	89.2%	8.40	10.0	84.0%	6.0%
1,2,4-Trichlorobenzene	8.82	10.0	88.2%	8.73	10.0	87.3%	1.0%
Naphthalene	8.46 Q	10.0	84.6%	8.46 Q	10.0	84.6%	0.0%
1,2,3-Trichlorobenzene	8.57	10.0	85.7%	8.04	10.0	80.4%	6.4%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	94.3%	95.7%
d8-Toluene	104%	100%
Bromofluorobenzene	105%	102%
d4-1,2-Dichlorobenzene	96.7%	103%

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Extraction Method: SW3510C

Page 1 of 1

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Matrix: Water

Data Release Authorized: *MB*

Reported: 06/04/13

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-060313 13-11680	Method Blank	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 83.0%
WS22A 13-11680	LMW-7-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 86.0%
WS22B 13-11681	LMW-7-0513-D HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 86.7%
WS22C 13-11682	LMW-10-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 82.7%
WS22D 13-11683	LMW-2-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 89.0%
WS22E 13-11684	LMW-4-0513 HC ID: ---	06/03/13	06/03/13	1.0	Gas Diesel Oil o-Terphenyl	< 0.25 U < 0.50 U < 0.50 U 85.5%

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: WS22-Golder Associates
Project: Landsburg Mine
9231000002R273

<u>Client ID</u>	<u>O-TER</u>	<u>TOT OUT</u>
MB-060313	83.0%	0
LCS-060313	74.1%	0
LMW-7-0513	86.0%	0
LMW-7-0513-D	86.7%	0
LMW-10-0513	82.7%	0
LMW-2-0513	89.0%	0
LMW-4-0513	85.5%	0

LCS/MB LIMITS QC LIMITS

(O-TER) = o-Terphenyl

(50-150)

(50-150)

Prep Method: SW3510C

Log Number Range: 13-11680 to 13-11684

ORGANICS ANALYSIS DATA SHEET

NWTPH-HCID Method by GC/FID

Page 1 of 1

Sample ID: LCS-060313

LAB CONTROL

Lab Sample ID: LCS-060313

LIMS ID: 13-11680

Matrix: Water

Data Release Authorized: *JB*

Reported: 06/04/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Date Extracted: 06/03/13

Date Analyzed: 06/03/13 17:51

Instrument/Analyst: FID/JLW

Sample Amount: 500 mL

Final Extract Volume: 1.0 mL

Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.27	3.00	75.7%

HCID Surrogate Recovery

o-Terphenyl	74.1%
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Results reported in mg/L

INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1

Sample ID: LMW-7-0513

SAMPLE

Lab Sample ID: WS22A

LIMS ID: 13-11680

Matrix: Water

Data Release Authorized: *EF*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	1.8	
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	486	
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	54,200	
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	1,220	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	24,700	
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	162	
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	2,900	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	38,800	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	10	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-7-0513

DUPLICATE

Lab Sample ID: WS22A
LIMS ID: 13-11680
Matrix: Water
Data Release Authorized: *EF*
Reported: 06/10/13

QC Report No: WS22-Golder Associates
Project: Landsburg Mine
9231000002R273
Date Sampled: 05/31/13
Date Received: 05/31/13

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Aluminum	6010C	50 U	50 U	0.0%	+/- 50	L
Antimony	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Arsenic	200.8	1.8	1.8	0.0%	+/- 20%	
Barium	6010C	486	482	0.8%	+/- 20%	
Beryllium	6010C	1 U	1 U	0.0%	+/- 1	L
Cadmium	6010C	2 U	2 U	0.0%	+/- 2	L
Calcium	6010C	54,200	52,700	2.8%	+/- 20%	
Chromium	6010C	5 U	5 U	0.0%	+/- 5	L
Cobalt	6010C	3 U	3 U	0.0%	+/- 3	L
Copper	6010C	2	2 U	0.0%	+/- 2	L
Iron	6010C	1,220	1,190	2.5%	+/- 20%	
Lead	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Magnesium	6010C	24,700	24,200	2.0%	+/- 20%	
Manganese	6010C	162	159	1.9%	+/- 20%	
Nickel	6010C	10 U	10 U	0.0%	+/- 10	L
Potassium	6010C	2,900	2,830	2.4%	+/- 20%	
Selenium	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Silver	6010C	3 U	3 U	0.0%	+/- 3	L
Sodium	6010C	38,800	37,800	2.6%	+/- 20%	
Thallium	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Vanadium	6010C	3 U	3 U	0.0%	+/- 3	L
Zinc	6010C	10 U	10 U	0.0%	+/- 10	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-7-0513

MATRIX SPIKE

Lab Sample ID: WS22A

LIMS ID: 13-11680

Matrix: Water

Data Release Authorized: *af*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Aluminum	6010C	50 U	1,950	2,000	97.5%	
Antimony	200.8	0.2 U	23.7	25.0	94.8%	
Arsenic	200.8	1.8	27.2	25.0	102%	
Barium	6010C	486	2,550	2,000	103%	
Beryllium	6010C	1 U	491	500	98.2%	
Cadmium	6010C	2 U	513	500	103%	
Calcium	6010C	54,200	62,300	10,000	81.0%	H
Chromium	6010C	5 U	520	500	104%	
Cobalt	6010C	3 U	497	500	99.4%	
Copper	6010C	2	509	500	101%	
Iron	6010C	1,220	3,130	2,000	95.5%	
Lead	200.8	0.1 U	25.0	25.0	100%	
Magnesium	6010C	24,700	33,000	10,000	83.0%	
Manganese	6010C	162	645	500	96.6%	
Nickel	6010C	10 U	490	500	98.0%	
Potassium	6010C	2,900	12,700	10,000	98.0%	
Selenium	200.8	0.5 U	76.2	80.0	95.2%	
Silver	6010C	3 U	515	500	103%	
Sodium	6010C	38,800	48,100	10,000	93.0%	
Thallium	200.8	0.2 U	25.0	25.0	100%	
Vanadium	6010C	3 U	510	500	102%	
Zinc	6010C	10 U	490	500	98.0%	

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-7-0513-D
SAMPLE

Lab Sample ID: WS22B

LIMS ID: 13-11681

Matrix: Water

Data Release Authorized: *ef*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	2.1	
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	479	
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	52,100	
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	1,210	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	23,800	
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	157	
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	2,810	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	37,700	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	60	

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-10-0513
SAMPLE

Lab Sample ID: WS22C

LIMS ID: 13-11682

Matrix: Water

Data Release Authorized: 

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	34	
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	6,490	
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	50	U
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	2,690	
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	7	
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	1,220	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	77,000	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	10	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-2-0513

SAMPLE

Lab Sample ID: WS22D

LIMS ID: 13-11683

Matrix: Water

Data Release Authorized: *EL*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	346	
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	112,000	
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	130	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	68,200	
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	215	
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	3,560	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	21,800	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	10	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-4-0513
SAMPLE

Lab Sample ID: WS22E

LIMS ID: 13-11684

Matrix: Water

Data Release Authorized: *EL*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: 05/31/13

Date Received: 05/31/13

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	356	
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	111,000	
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	940	
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	67,800	
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	169	
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	3,810	
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	29,200	
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	10	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: WS22MB

LIMS ID: 13-11684

Matrix: Water

Data Release Authorized: *ESL*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: NA

Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	LOQ	Result	Q
3010A	06/03/13	6010C	06/06/13	7429-90-5	Aluminum	7.6	50	50	U
200.8	06/04/13	200.8	06/05/13	7440-36-0	Antimony	0.010	0.2	0.2	U
200.8	06/04/13	200.8	06/05/13	7440-38-2	Arsenic	0.048	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-39-3	Barium	1.33	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-41-7	Beryllium	0.16	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-43-9	Cadmium	0.18	2	2	U
3010A	06/03/13	6010C	06/06/13	7440-70-2	Calcium	11.3	50	50	U
3010A	06/03/13	6010C	06/06/13	7440-47-3	Chromium	1.24	5	5	U
3010A	06/03/13	6010C	06/06/13	7440-48-4	Cobalt	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-50-8	Copper	0.92	2	2	U
3010A	06/03/13	6010C	06/06/13	7439-89-6	Iron	7.5	50	50	U
200.8	06/04/13	200.8	06/05/13	7439-92-1	Lead	0.046	0.1	0.1	U
3010A	06/03/13	6010C	06/06/13	7439-95-4	Magnesium	9.6	50	50	U
3010A	06/03/13	6010C	06/06/13	7439-96-5	Manganese	0.28	1	1	U
3010A	06/03/13	6010C	06/06/13	7440-02-0	Nickel	3.9	10	10	U
3010A	06/03/13	6010C	06/06/13	7440-09-7	Potassium	65.7	500	500	U
200.8	06/04/13	200.8	06/05/13	7782-49-2	Selenium	0.127	0.5	0.5	U
3010A	06/03/13	6010C	06/06/13	7440-22-4	Silver	0.43	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-23-5	Sodium	11.4	500	500	U
200.8	06/04/13	200.8	06/05/13	7440-28-0	Thallium	0.004	0.2	0.2	U
3010A	06/03/13	6010C	06/06/13	7440-62-2	Vanadium	0.27	3	3	U
3010A	06/03/13	6010C	06/06/13	7440-66-6	Zinc	1.4	10	10	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: WS22LCS

LIMS ID: 13-11684

Matrix: Water

Data Release Authorized: *EF*

Reported: 06/10/13

QC Report No: WS22-Golder Associates

Project: Landsburg Mine

9231000002R273

Date Sampled: NA

Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Aluminum	6010C	2030	2000	102%	
Antimony	200.8	24.1	25.0	96.4%	
Arsenic	200.8	25.5	25.0	102%	
Barium	6010C	2100	2000	105%	
Beryllium	6010C	511	500	102%	
Cadmium	6010C	537	500	107%	
Calcium	6010C	9880	10000	98.8%	
Chromium	6010C	547	500	109%	
Cobalt	6010C	530	500	106%	
Copper	6010C	505	500	101%	
Iron	6010C	2090	2000	104%	
Lead	200.8	26.3	25.0	105%	
Magnesium	6010C	10300	10000	103%	
Manganese	6010C	506	500	101%	
Nickel	6010C	520	500	104%	
Potassium	6010C	10000	10000	100%	
Selenium	200.8	77.4	80.0	96.8%	
Silver	6010C	510	500	102%	
Sodium	6010C	10500	10000	105%	
Thallium	200.8	26.4	25.0	106%	
Vanadium	6010C	539	500	108%	
Zinc	6010C	520	500	104%	

Reported in µg/L

N-Control limit not met

Control Limits: 80-120%

APPENDIX B
SAMPLE INTEGRITY DATA SHEETS (SIDS)

X002.15.A

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
Site Location Ravensdale, WA Sample ID LMW-2-0513
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 5/31/13 Time 1225

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.)

@ 1624 SWL -7.91 ft below TOC (^{monument} inner PVC at elev. X) (bottom at 38.1 ft bgs, 4-in casing)

on 5/28/13 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, sulphur 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	note HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/31/2013

Supervisor (signature) [Signature] Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID 1 MW-2

Date 5/31/13

Time Begin Purge 1172

Time Collect Sample 1225

(from DO)

[illegible]

Comments:

$$\frac{5 \text{ gal}}{3.5 \text{ min}} = 1.4 \text{ gpm}$$

$$\frac{30 \text{ gal/well}}{1.4 \text{ gpm}} = 21 \text{ min/well volume} = 63 \text{ min purge}$$

$\rho_{1D} = 0.0 \text{ ppm}$

sulphur color

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-3-0513
 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 5/29/13 Time 1135

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 - 13.22 ft below TOC (^{monument} 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	^{NONE} HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/29/2013

Supervisor (signature) [Signature] Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID MW-3
 Date 5/29/13
 Time Begin Purge 1000
 Time Collect Sample 1135

(from pH)

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Red mV
	1010		7.87	300	11.1	0.36	0.33	462.8
	1020		8.00	304	11.1	0.27	0.66	464.9
	1030		8.01	308	11.1	0.16	0.27	454.5
	1040		7.99	309	11.1	0.09	0.38	441.5
	1050		7.95	309	11.1	0.10	0.32	437.2
	1100		7.94	322	11.1	0.07	0.22	428.2
	1110		7.95	326	11.1	0.09	0.23	422.1
	1120		7.92	328	11.1	0.08	0.19	419.1
	1130		7.91	329	11.1	0.09	0.20	416.3

Comments: packer @ 110psi
Grundfor @ 110 Hz

$$\frac{5 \text{ gal}}{5 \text{ min}} = 1 \text{ gpm} \rightarrow \frac{27 \text{ gal}}{\text{well volume}} = 27 \text{ min/well volume}$$

Sampler's Initials CC

SAMPLE INTEGRITY DATA SHEET

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

Site Location Ravensdale, WA Sample ID LMW-4-0513

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 5/31/13 Time 1325

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 - 10.01 ft below TOC (^{monument} ~~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

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	none HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/31/2013

Supervisor (signature) [Signature] Date 6/3/2013

Well ID CMW-4

Date 5/31/13

Time Begin Purge 1225Time Collect Sample 1325

(from 100)

[illegible]

Comments:

GRUNDFOOS @ 120 Hz

PACKER @140 PSI

$$\frac{5.91}{3 \text{ min}} = 1.67 \text{ rpm}$$

$$\frac{275 \text{ ml/well volume}}{1.75 \text{ pm}}$$

$= 17 \text{ min/vol}$ below pscnr

$$\rho_1 \rho = 0.0 \text{ ppm}$$

50 min pulse

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-5-0513

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 5/29/2013 Time 1545

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 - 14.61 ft below TOC (^{monument} 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	none HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/29/2013

Supervisor (signature) [Signature] Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID LMW-5
Date 5/29/2013
Time Begin Purge 1329-1509
Time Collect Sample 1545

(from pH)

[illegible]

Comments:

Grundfos @ 160 Hz. Started purge @ 1329 but pump controller stopped working. Fixed controller + restarted purge.

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm}$$

$$\frac{19 \text{ gal}}{1.67 \text{ gpm}} = 11.4 \text{ min/well vol.}$$

Sulphur odor

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-6-0513

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 5/30/2013 Time 1255

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.)

@ 1044
on 5/28/13 SWL -25.64 ft below TOC (^{monument}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)

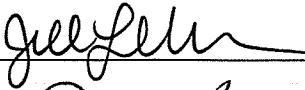
(~29.9 gal/total well vol below packer)

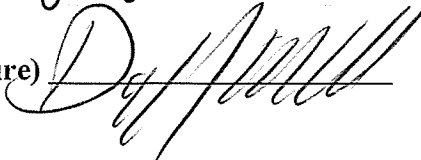
Sample Description clear, no odor

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

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
1 – 500 mL	Total Metals	HDPE	HNO3 (non)
1 – 500 mL	Dissolved Metals	HDPE	none HNO3 (filter)
4 – 500 mL, 2 – 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/30/2013

Supervisor (signature)  Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID LMW-6
Date 5/30/2013
Time Begin Purge 1155
Time Collect Sample 1255

from
(DO)

[illegible]

Comments:

PID = 0.0 ppm
GRUNDIGS @ 155 Hz, PACHER @ 15 PSI

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

$$\frac{30 \text{ gal}}{1.67 \text{ gpm}}$$

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-7-0513, LMW-7-0513-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 5/31/13

Time 935 / 940 (PUP)

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 - 223.25 ft below TOC (^{monument} ~~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 clear, no odor

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)

Date 5/31/2013

Supervisor (signature)

Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID LMW-7

Date 5/31/13

Time Begin Purge 834

Time Collect Sample 935 / 940 (Dup)

from (pH)

[illegible]

Comments:

GRUNDPOS @ 345 Hz

$$\frac{5 \text{ gal}}{3 \text{ min}} = 1.67 \text{ gpm}$$

$$\frac{2.8 \text{ g/g}}{\text{well volume}} / 1.67 \text{ gpm} = 16.72 \text{ min/well volume}$$

PID = 0.0 ppm

50 min pulse

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-8-0513, LMW-EB-0513

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 5/29/13 Time 1327 EB@ 1150

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 - 4.4² 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, rust @ start of pump

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	none HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/29/2013

Supervisor (signature) [Signature] Date 6/3/2013

2004 = 100, 1997 = 100

Well ID Mw-8

Date 5/29/13

Time Begin Purge 1732

Time Collect Sample 1327

(from pH)

Comments: flow rate ~ 180 ml/min
VOCs + HClD collected using bailer
PID = 0.0 ppm
turbid / brown @ start of purge
1150 collected field blank prior to purge. Thru tubing (+filter)
(for diss. metals) LMW-EB-0513. Used Lab DI.

Sampler's Initials CW

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-9-0513
 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 5/30/13 Time 1440

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 - 99.73 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	<u>none</u> HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/30/2013

Supervisor (signature) [Signature] Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID LMW-9

Date 5/30/2013

Time Begin Purge 1334

Time Collect Sample 1440

(from DO)

[illegible]

Comments:

Brundage @ 230 Hz

purge rate = 15 psm

$$21.6 \text{ gal} / 1 \text{ gpm} = 21.6 \text{ min} / \text{well volume}$$

PID @ 0.0

3 well wallner = 64 min purge

* pit never not working, switches probe on Et meter

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-10-0513
 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 5/31/2013 Time 1105

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 - 0.50 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	<u>None</u> HNO3 (filter)
4 - 500 mL, 2 - 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/31/2013

Supervisor (signature) [Signature] Date 6/3/2013

$$f(x) = \frac{1}{x^2} = x^{-2}, f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

Well ID *LMW-10*

Date 5/31/2013

Time Begin Purge 1028

Time Collect Sample 1105

from DO
(#)

[illegible]

Comments:

Tank = 110 psi

Controller: 60ps

Cycle 10 = 50 (20/10s) 2c per

Purge Rate: 700 mL/min

$P_{10} = 0.0 \text{ ppm}$

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-11-0513
 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 5/30/2013 Time 11:00

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.)

01142 on 5/28/2013 SWL -157.54 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	<i>none</i> HNO3 (filter)
4 – 500 mL, 2 – 40 mL	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/30/2013

Supervisor (signature) [Signature] Date 6/3/2013

FIELD PARAMETERS SHEET

Well ID *LMV-11*

Date 5/30/2013

Date 5/30/2013
Time Begin Purge 9:00 (Grindfos), 10:00 (Bladder) JP

Time Collect Sample 11:00

~~(Apt)~~ from
(DO)

[illegible]

Comments:

900 Began Grundfos to initialize flow inside well. Pump set @ ~170' below TOC, purge controller @ 330 Hz. Purge rate. ~2 gpm.

Per PM, purged for 1hr before starting bladder (instead of 3 well volumes)

1000 started bladder pump @ 120 gal purged. pump @ 110psi, 1cpm
tank @ 110psi

PID = 0.000m

Rate = 450 mL/min

Sampler's Initials

jel