

July 25, 2011

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
RESULTS – MAY 2011**

Dear Bill:

Golder Associates Inc. (Golder) completed an interim groundwater monitoring event at the Landsburg Mine Site during May, 2011. 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), 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; only the dissolved metals samples were field filtered (total metals were not); however the dissolved metals samples were not analyzed
- Analyses of groundwater for volatile organic compounds (EPA Method 8260B), priority pollutant metals (EPA Method 6000/7000 Series), 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 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 Test America Corporation, of Tacoma, 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 petroleum hydrocarbon (HCID) in any of the groundwater samples. Only one volatile organic compound was detected in any of the samples: carbon disulfide (detected at 0.52, 0.54, 0.19, and 0.30 µg/L) in the samples collected from LMW-2, LMW-4, LMW-5, and LMW-10, respectively. These detections were considerably below the MTCA Method B groundwater cleanup level for carbon disulfide (800 µg/L). Data validation and inspection of the gas chromatographs of the carbon disulfide detections could not eliminate this analyte. The detection of carbon disulfide is most likely a natural constituent of the coal seam materials. Research has confirmed the presence of carbon disulfide in coal and detected its release from disturbed coal piles (Kozinc, et. al. 2004)¹. 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 0.3µg/L and 0.05µg/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 May 2011 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 µg/L, which is less than the Washington State primary drinking water MCL of 10 µg/L, but higher than the MTCA groundwater cleanup level of 5 µg/L. Arsenic also has been detected in groundwater from LMW-11 above MTCA Cleanup levels consistently since LMW-11 was installed. Arsenic is also a naturally occurring metal commonly detectable in groundwater and the unfiltered sample may contain suspended solid particles probably from the coal mine residues that probably contributed to increased concentration of arsenic in the water sample. The MTCA groundwater cleanup level is based on typical groundwater background levels in the State. 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.

Copies of research articles and other information concerning the natural occurrence of metals and other constituents is provided in Appendix C.

¹ Kozinc, J., Treeby, M., and Zupancic-Kralj, L., 2004. *Determination of Sulfur Gases from Velenje Coal Stockpile*. Acta Chim. Slov., Volume 51, pages 529 – 536.

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

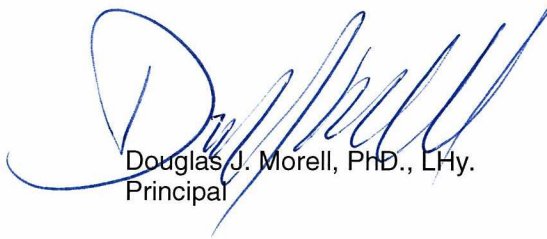
If you have any questions or require any additional information, please contact Douglas Morell at (425) 883-0777.

Sincerely,

GOLDER ASSOCIATES INC.



Jill Lamberts
Staff Environmental Scientist



Douglas J. Morell, PhD., LHy.
Principal

Attachments: Tables 1 & 2
Figures 1 & 2
Appendices A, B, & C

JL/DJM/sb

TABLES

Table 1: Groundwater Elevation Data Collection May 12, 2011 Landsburg Mine Site

	UNITS	LMW-1	LMW-1a	LMW-2	LMW-3	LMW-4*	LMW-5	LMW-6	LMW-7*	LMW-8	LMW-9	LMW-10	LMW-11	P-2	Water Drainage	Seam Tunnel
Water Depths																
Time of data collection	ft bgs	12:42 PM	12:34 PM	1:36 PM	11:55 AM	1:25 PM	11:29 AM	1:04 PM	2:23 PM	11:46 AM	10:54 AM	1:42 PM	10:38 AM	11:37 AM	NA	NA
Measured to Top of PVC	ft bgs	134.95	132.41	6.21	11.05	7.68	12.58	21.47	209.37	3.03	98.47	0.00	156.32	5.64	NA	NA
Measured to Top of Monument	ft bgs	135.73	132.68	6.88	11.82	8.37	13.24	22.19	209.88	NC	98.76	NC	156.70	6.03	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	630.21	627.10	611.52	645.70	611.58	645.69	610.86	562.14	643.94	645.52	618.87	645.55	645.73	NA	NA
Using Monument elevation	ft asl	630.16	NA	611.41	645.66	611.48	645.63	610.81	562.00	NA	NA	NA	645.50	NA	NA	NA

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

Table 2: May 2011 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-5	LMW-6	LMW-7	LMW-7 Duplicate	LMW-8	LMW-8 Duplicate ²	LMW-9	LMW-10	LMW-11	Equipment Blank	Trip Blank	Trip Blank
Date Sampled		5/16/2011	5/17/2011	5/16/2011	5/17/2011	5/13/2011	5/12/2011	5/12/2011	5/17/2011	5/17/2011	5/13/2011	5/16/2011	5/13/2011	5/17/2011	5/12/2011	5/16/2011
Field Parameter																
pH	std	6.97	7.75	7.12	6.90	6.83	7.05	NA	6.91	NA	6.97	8.68	7.24	NA	NA	NA
Conductivity	uS/cm	6.51	205.7	657	544	235.5	523	NA	258.9	NA	717	227.9	527	NA	NA	NA
Dissolved Oxygen	mg/L	0.02	0.04	0.03	0.08	0.03	0.07	NA	0.12	NA	0.03	0.03	0.36	NA	NA	NA
Temperature	°C	10.5	10.7	10.5	11.1	9.8	12.0	NA	11.5	NA	12.2	9.8	11.7	NA	NA	NA
E _h	Rel mV	NA ¹	515 ¹	NA ¹	157 ¹	160.5	137.7	NA	137 ¹	NA	127.0	241.5 ¹	119.0	NA	NA	NA
Turbidity	NTU	0.32	0.32	0.40	0.26	1.12	1.40	NA	4.21	NA	0.39	0.59	0.52	NA	NA	NA
Metals (Total)																
Aluminum	mg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	NA	NA
Antimony	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Arsenic	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0021	NA	0.002 U	0.002 U	0.008	0.002 U	NA	NA
Barium	mg/L	0.36	0.081	0.4	0.31	0.11	0.43	0.45	0.036	NA	0.3	0.038	0.27	0.006 U	NA	NA
Beryllium	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Calcium	mg/L	110	37	110	95	27	55	56	41	NA	87	6.6	55	1.1 U	NA	NA
Chromium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.0029	0.0023	0.0023	0.002 U	NA	0.0025	0.002 U	0.0021	0.002 U	NA	NA
Cobalt	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Copper	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0058	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U	0.005 U	NA	NA
Iron	mg/L	0.2 U	0.2 U	0.67	0.2 U	2.2	1.4	1.5	9.9	NA	1.5	0.2 U	2.2	0.2 U	NA	NA
Lead	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Magnesium	mg/L	72	16	70	56	14	25	26	23	NA	49	2.9	29	1.1 U	NA	NA
Manganese	mg/L	0.22	0.051	0.17	0.28	0.031	0.18	0.18	0.36	NA	0.18	0.0082	0.13	0.002 U	NA	NA
Mercury	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	NA	0.0002 U	0.0002 U	0.0002 U	0.0002 U	NA	NA
Nickel	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	NA	0.002 U	0.002 U	0.002	0.002 U	NA	NA
Potassium	mg/L	3.7	3.3 U	3.9	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	NA	3.3 U	3.3 U	3.3 U	3.3 U	NA	NA
Selenium	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Silver	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	NA	0.002 U	0.002 U	0.002 U	0.002 U	NA	NA
Sodium	mg/L	22	9.5	28	16	6.7	34	34	8.6	NA	16	81	27	2 U	NA	NA
Thallium	mg/L	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	NA	0.004 U	0.004 U	0.004 U	0.004 U	NA	NA
Vanadium	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	NA	0.01 U	0.01 U	0.01 U	0.01 U	NA	NA
Zinc	mg/L	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	NA	0.007 U	0.0099	0.007 U	0.007 U	NA	NA
Volatile Organic Compounds																
Acetone	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Acrolein	µg/L	6 U	6 U	6 U	6 U	6 U	6 U	6 U	NA	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Acrylonitrile	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Benzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromobenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromochloromethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromodichloromethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromoform	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromomethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Butanone	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U
n-Butylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
sec-Butylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
tert-Butylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbon disulfide	µg/L	0.52	0.1 U	0.54	0.19	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.30	0.1 U	0.1 U	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

Table 2: May 2011 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-5	LMW-6	LMW-7	LMW-7 Duplicate	LMW-8	LMW-8 Duplicate ²	LMW-9	LMW-10	LMW-11	Equipment Blank	Trip Blank	Trip Blank
Date Sampled		5/16/2011	5/17/2011	5/16/2011	5/17/2011	5/13/2011	5/12/2011	5/12/2011	5/17/2011	5/17/2011	5/13/2011	5/16/2011	5/13/2011	5/17/2011	5/12/2011	5/16/2011
Chlorobenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chloroethane	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloroethyl vinyl ether	µg/L	6 U	6 U	6 U	6 U	6 U	6 U	6 U	NA	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Chloroform	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chloromethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
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	NA	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	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorodibromomethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-Dibromo-3-Chloropropane	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
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	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibromomethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
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	NA	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	NA	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	NA	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	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-Dichloroethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1-Dichloroethene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-Dichloroethene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
trans-1,2-Dichloroethene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2-Dichloropropane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 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	NA	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	NA	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	NA	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	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
trans-1,3-Dichloropropene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Ethylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
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	NA	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	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iodomethane	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Isopropyltoluene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methylene Chloride	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
N-Propylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Styrene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,2,3-Trichlorobenzene	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
1,2,4-Trichlorobenzene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
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	NA	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	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
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	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Tetrachloroethene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Toluene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,1-Trichloroethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,1,2-Trichloroethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Trichloroethene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Trichlorofluoromethane	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

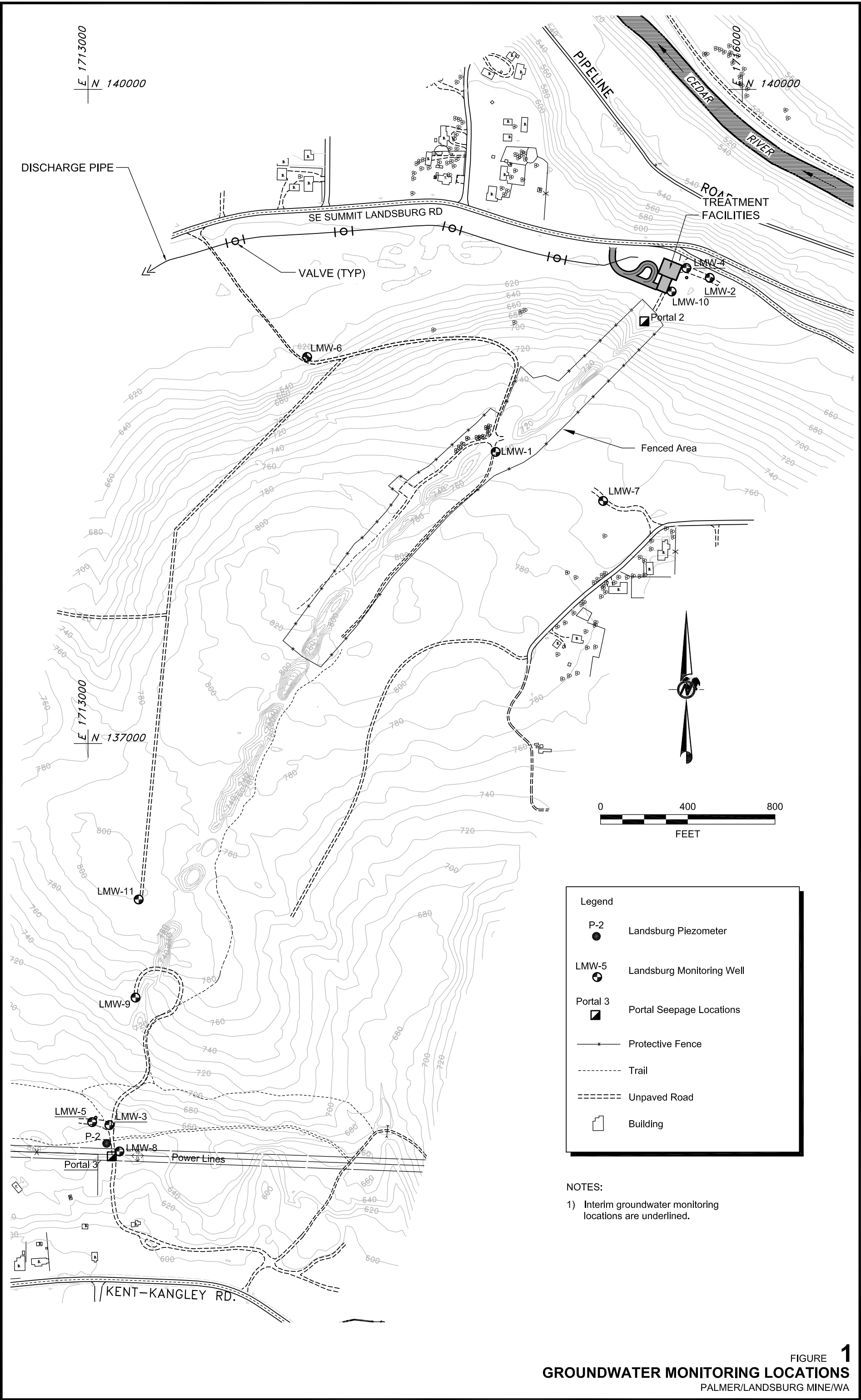
Table 2: May 2011 Groundwater Analytical Results Landsburg Mine Site

ANALYTE	UNITS	LMW-2	LMW-3	LMW-4	LMW-5	LMW-6	LMW-7	LMW-7 Duplicate	LMW-8	LMW-8 Duplicate ²	LMW-9	LMW-10	LMW-11	Equipment Blank	Trip Blank	Trip Blank
Date Sampled		5/16/2011	5/17/2011	5/16/2011	5/17/2011	5/13/2011	5/12/2011	5/12/2011	5/17/2011	5/17/2011	5/13/2011	5/16/2011	5/13/2011	5/17/2011	5/12/2011	5/16/2011
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	NA	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	NA	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	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,3,5-Trimethylbenzene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Vinyl acetate	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
m-Xylene & p-Xylene	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
o-Xylene	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, Total	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hydrocarbon Identification																
Diesel Range	mg/L	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	NA	0.24 U	0.24 U	0.25 U	0.24 U	NA	NA
Gas Range	mg/L	0.094 U	0.095 U	0.094 U	0.095 U	0.094 U	0.094 U	0.095 U	0.094 U	NA	0.094 U	0.094 U	0.098 U	0.095 U	NA	NA
Heavy Fuel Oil	mg/L	0.47 U	0.48 U	0.47 U	0.48 U	0.47 U	0.47 U	0.48 U	0.47 U	NA	0.47 U	0.47 U	0.49 U	0.48 U	NA	NA

Notes:
1 - eH meter not working, results estimated
2 - Collected VOC sample through bailer. The sample for LMW-8 was collected at the end of a peristaltic pump and not analyzed for VOCs.
NA - not available



FIGURES



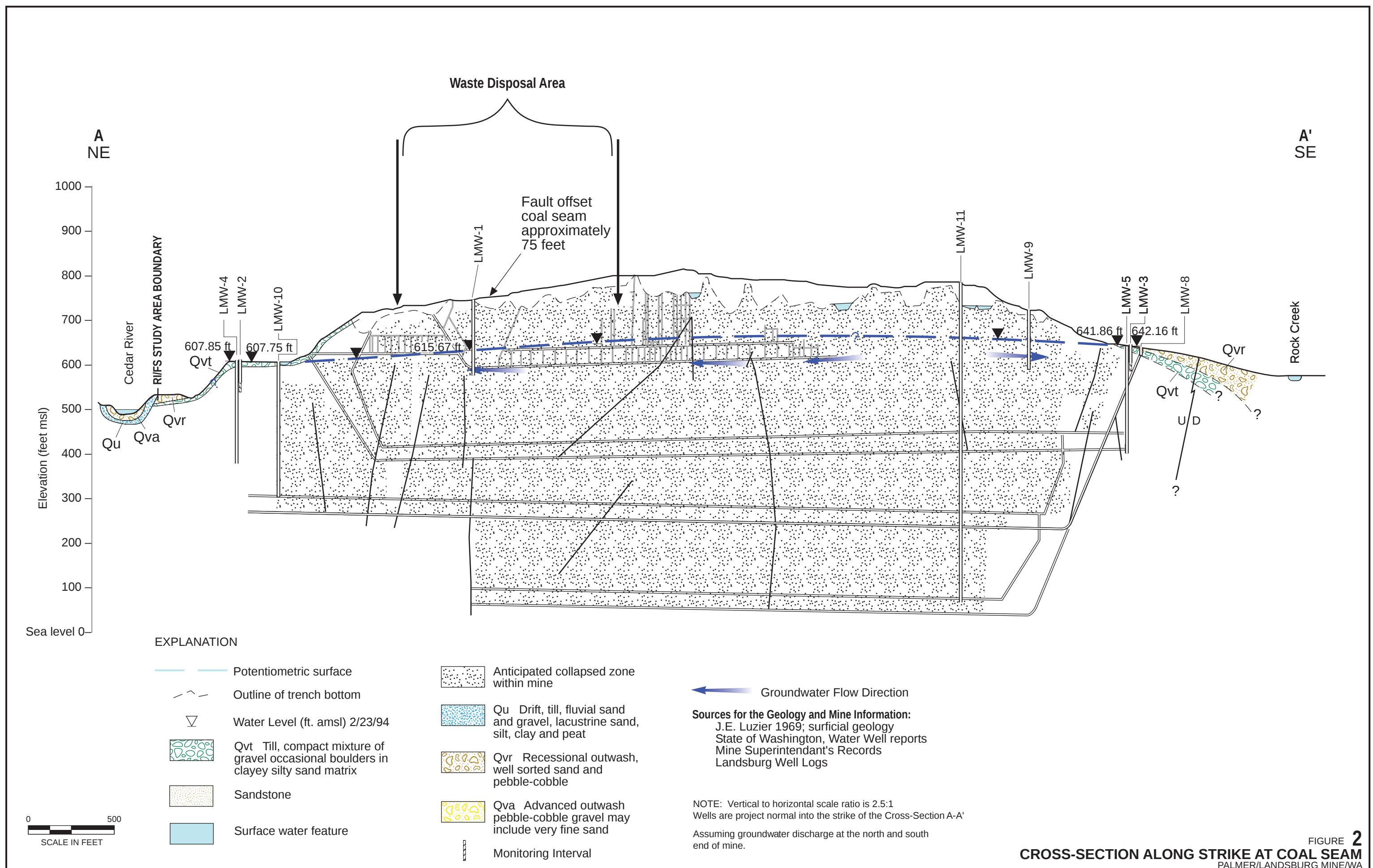


FIGURE 2
CROSS-SECTION ALONG STRIKE AT COAL SEAM
PALMER/LANDBURG MINE/WA

APPENDIX A
LABORATORY ANALYTICAL REPORTS

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle

5755 8th Street East

Tacoma, WA 98424

Tel: (253)922-2310

TestAmerica Job ID: 580-26182-1

Client Project/Site: Landsburg Mine

For:

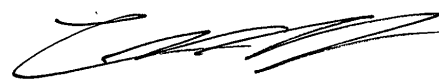
Golder Associates Inc.

18300 NE Union Hill Road

Suite 200

Redmond, Washington 98052-3333

Attn: Douglas Morell



Authorized for release by:

05/27/2011 02:49:00 PM

Curtis Armstrong

Project Manager I

curtis.armstrong@testamericainc.com

Designee for

Terri Torres

Project Manager II

terri.torres@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Case Narrative

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Job ID: 580-26182-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-26182-1

Comments

No additional comments.

Receipt

All samples were received in good condition within temperature requirements.

GC/MS VOA

Method(s) 8260B:

The method blank for preparation batch 580-86702 contained Carbon Disulfide, n-Butylbenzene, and Hexachlorobutadiene above the reporting limit (RL). None of the samples associated with this method blank contained the target compounds above the reporting limit; therefore, re-extraction and/or re-analysis of samples were not performed.

The initial calibration curve was not second source verified for the non-routine requested target compound 1,3,5-Trichlorobenzene as a second source was not available at time of calibration. All other target compounds including the two other requested Trichlorobenzene isomers met second source criteria.

No other analytical or quality issues were noted.

GC Semi VOA

No analytical or quality issues were noted.

Metals

No analytical or quality issues were noted.

Organic Prep

No analytical or quality issues were noted.

Definitions/Glossary

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-26182-1

Date Collected: 05/12/11 16:05

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 20:27	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 20:27	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 20:27	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 20:27	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 20:27	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 20:27	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 20:27	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 20:27	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:27	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 20:27	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 20:27	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 20:27	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:27	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 20:27	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:27	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 20:27	1
2-Butanone	ND		2.0		ug/L			05/25/11 20:27	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 20:27	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 20:27	1
2-Hexanone	ND		1.0		ug/L			05/25/11 20:27	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 20:27	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 20:27	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 20:27	1
Acetone	ND		2.0		ug/L			05/25/11 20:27	1
Acrolein	ND		6.0		ug/L			05/25/11 20:27	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 20:27	1
Benzene	ND		0.10		ug/L			05/25/11 20:27	1
Bromobenzene	ND		0.10		ug/L			05/25/11 20:27	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 20:27	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 20:27	1
Bromoform	ND		0.10		ug/L			05/25/11 20:27	1
Bromomethane	ND		0.10		ug/L			05/25/11 20:27	1
Carbon disulfide	ND		0.10		ug/L			05/25/11 20:27	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 20:27	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 20:27	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 20:27	1
Chloroethane	ND		0.25		ug/L			05/25/11 20:27	1
Chloroform	ND		0.10		ug/L			05/25/11 20:27	1
Chloromethane	ND		0.10		ug/L			05/25/11 20:27	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 20:27	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 20:27	1
Dibromomethane	ND		0.10		ug/L			05/25/11 20:27	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-26182-1

Date Collected: 05/12/11 16:05

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/25/11 20:27	1
Iodomethane	ND		0.50		ug/L			05/25/11 20:27	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 20:27	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 20:27	1
Naphthalene	ND		0.40		ug/L			05/25/11 20:27	1
n-Butylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
o-Xylene	ND		0.10		ug/L			05/25/11 20:27	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
Styrene	ND		0.10		ug/L			05/25/11 20:27	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 20:27	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 20:27	1
Toluene	ND		0.10		ug/L			05/25/11 20:27	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 20:27	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 20:27	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 20:27	1
Trichloroethene	ND		0.10		ug/L			05/25/11 20:27	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 20:27	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 20:27	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 20:27	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 20:27	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		75 - 120		05/25/11 20:27	1
Ethylbenzene-d10	100		75 - 125		05/25/11 20:27	1
Fluorobenzene (Surr)	99		70 - 130		05/25/11 20:27	1
Toluene-d8 (Surr)	94		75 - 125		05/25/11 20:27	1
Trifluorotoluene (Surr)	108		80 - 125		05/25/11 20:27	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511

Lab Sample ID: 580-26182-2

Date Collected: 05/12/11 16:10

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 20:52	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 20:52	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 20:52	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 20:52	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 20:52	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 20:52	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 20:52	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 20:52	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:52	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 20:52	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 20:52	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 20:52	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:52	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 20:52	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 20:52	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 20:52	1
2-Butanone	ND		2.0		ug/L			05/25/11 20:52	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 20:52	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 20:52	1
2-Hexanone	ND		1.0		ug/L			05/25/11 20:52	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 20:52	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 20:52	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 20:52	1
Acetone	ND		2.0		ug/L			05/25/11 20:52	1
Acrolein	ND		6.0		ug/L			05/25/11 20:52	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 20:52	1
Benzene	ND		0.10		ug/L			05/25/11 20:52	1
Bromobenzene	ND		0.10		ug/L			05/25/11 20:52	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 20:52	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 20:52	1
Bromoform	ND		0.10		ug/L			05/25/11 20:52	1
Bromomethane	ND		0.10		ug/L			05/25/11 20:52	1
Carbon disulfide	ND		0.10		ug/L			05/25/11 20:52	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 20:52	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 20:52	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 20:52	1
Chloroethane	ND		0.25		ug/L			05/25/11 20:52	1
Chloroform	ND		0.10		ug/L			05/25/11 20:52	1
Chloromethane	ND		0.10		ug/L			05/25/11 20:52	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 20:52	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 20:52	1
Dibromomethane	ND		0.10		ug/L			05/25/11 20:52	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511

Lab Sample ID: 580-26182-2

Date Collected: 05/12/11 16:10

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/25/11 20:52	1
Iodomethane	ND		0.50		ug/L			05/25/11 20:52	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 20:52	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 20:52	1
Naphthalene	ND		0.40		ug/L			05/25/11 20:52	1
n-Butylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
o-Xylene	ND		0.10		ug/L			05/25/11 20:52	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
Styrene	ND		0.10		ug/L			05/25/11 20:52	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 20:52	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 20:52	1
Toluene	ND		0.10		ug/L			05/25/11 20:52	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 20:52	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 20:52	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 20:52	1
Trichloroethene	ND		0.10		ug/L			05/25/11 20:52	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 20:52	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 20:52	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 20:52	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 20:52	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		75 - 120		05/25/11 20:52	1
Ethylbenzene-d10	92		75 - 125		05/25/11 20:52	1
Fluorobenzene (Surr)	102		70 - 130		05/25/11 20:52	1
Toluene-d8 (Surr)	93		75 - 125		05/25/11 20:52	1
Trifluorotoluene (Surr)	118		80 - 125		05/25/11 20:52	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 20:25	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 20:25	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 20:25	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	91		50 - 150	05/19/11 09:29	05/23/11 20:25	1
4-Bromofluorobenzene (Surr)	64		50 - 150	05/19/11 09:29	05/23/11 20:25	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 20:40	1
Calcium	55		1.1		mg/L		05/23/11 11:02	05/23/11 20:40	1
Iron	1.4		0.20		mg/L		05/23/11 11:02	05/23/11 20:40	1
Magnesium	25		1.1		mg/L		05/23/11 11:02	05/23/11 20:40	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 20:40	1
Sodium	34		2.0		mg/L		05/23/11 11:02	05/23/11 20:40	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511

Lab Sample ID: 580-26182-2

Date Collected: 05/12/11 16:10

Matrix: Water

Date Received: 05/14/11 16:35

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Barium	0.43		0.0060		mg/L		05/23/11 11:02	05/24/11 10:32	5
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Chromium	0.0023		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Copper	0.0058		0.0050		mg/L		05/23/11 11:02	05/24/11 10:32	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Manganese	0.18		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Nickel	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:32	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 10:32	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 10:32	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 10:32	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 14:09	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511-D

Lab Sample ID: 580-26182-3

Date Collected: 05/12/11 16:15

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 21:26	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 21:26	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 21:26	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 21:26	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 21:26	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 21:26	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 21:26	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 21:26	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:26	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 21:26	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 21:26	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 21:26	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:26	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 21:26	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:26	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 21:26	1
2-Butanone	ND		2.0		ug/L			05/25/11 21:26	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 21:26	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 21:26	1
2-Hexanone	ND		1.0		ug/L			05/25/11 21:26	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 21:26	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 21:26	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 21:26	1
Acetone	ND		2.0		ug/L			05/25/11 21:26	1
Acrolein	ND		6.0		ug/L			05/25/11 21:26	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 21:26	1
Benzene	ND		0.10		ug/L			05/25/11 21:26	1
Bromobenzene	ND		0.10		ug/L			05/25/11 21:26	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 21:26	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 21:26	1
Bromoform	ND		0.10		ug/L			05/25/11 21:26	1
Bromomethane	ND		0.10		ug/L			05/25/11 21:26	1
Carbon disulfide	ND		0.10		ug/L			05/25/11 21:26	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 21:26	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 21:26	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 21:26	1
Chloroethane	ND		0.25		ug/L			05/25/11 21:26	1
Chloroform	ND		0.10		ug/L			05/25/11 21:26	1
Chloromethane	ND		0.10		ug/L			05/25/11 21:26	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 21:26	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 21:26	1
Dibromomethane	ND		0.10		ug/L			05/25/11 21:26	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511-D

Lab Sample ID: 580-26182-3

Date Collected: 05/12/11 16:15

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/25/11 21:26	1
Iodomethane	ND		0.50		ug/L			05/25/11 21:26	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 21:26	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 21:26	1
Naphthalene	ND		0.40		ug/L			05/25/11 21:26	1
n-Butylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
o-Xylene	ND		0.10		ug/L			05/25/11 21:26	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
Styrene	ND		0.10		ug/L			05/25/11 21:26	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 21:26	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 21:26	1
Toluene	ND		0.10		ug/L			05/25/11 21:26	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 21:26	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 21:26	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 21:26	1
Trichloroethene	ND		0.10		ug/L			05/25/11 21:26	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 21:26	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 21:26	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 21:26	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 21:26	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		75 - 120		05/25/11 21:26	1
Ethylbenzene-d10	108		75 - 125		05/25/11 21:26	1
Fluorobenzene (Surr)	103		70 - 130		05/25/11 21:26	1
Toluene-d8 (Surr)	97		75 - 125		05/25/11 21:26	1
Trifluorotoluene (Surr)	116		80 - 125		05/25/11 21:26	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.48		mg/L		05/19/11 09:29	05/23/11 20:48	1
Gasoline	ND		0.095		mg/L		05/19/11 09:29	05/23/11 20:48	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 20:48	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	91		50 - 150	05/19/11 09:29	05/23/11 20:48	1
4-Bromofluorobenzene (Surr)	54		50 - 150	05/19/11 09:29	05/23/11 20:48	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 20:46	1
Calcium	56		1.1		mg/L		05/23/11 11:02	05/23/11 20:46	1
Iron	1.5		0.20		mg/L		05/23/11 11:02	05/23/11 20:46	1
Magnesium	26		1.1		mg/L		05/23/11 11:02	05/23/11 20:46	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 20:46	1
Sodium	34		2.0		mg/L		05/23/11 11:02	05/23/11 20:46	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-7-0511-D

Lab Sample ID: 580-26182-3

Date Collected: 05/12/11 16:15

Matrix: Water

Date Received: 05/14/11 16:35

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0021		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Barium	0.45		0.0060		mg/L		05/23/11 11:02	05/24/11 10:35	5
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Chromium	0.0023		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Copper	ND		0.0050		mg/L		05/23/11 11:02	05/24/11 10:35	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Manganese	0.18		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Nickel	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:35	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 10:35	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 10:35	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 10:35	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 14:12	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-11-0511

Lab Sample ID: 580-26182-4

Date Collected: 05/13/11 10:55

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 21:53	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 21:53	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 21:53	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 21:53	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 21:53	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 21:53	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 21:53	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 21:53	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:53	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 21:53	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 21:53	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 21:53	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:53	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 21:53	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 21:53	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 21:53	1
2-Butanone	ND		2.0		ug/L			05/25/11 21:53	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 21:53	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 21:53	1
2-Hexanone	ND		1.0		ug/L			05/25/11 21:53	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 21:53	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 21:53	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 21:53	1
Acetone	ND		2.0		ug/L			05/25/11 21:53	1
Acrolein	ND		6.0		ug/L			05/25/11 21:53	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 21:53	1
Benzene	ND		0.10		ug/L			05/25/11 21:53	1
Bromobenzene	ND		0.10		ug/L			05/25/11 21:53	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 21:53	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 21:53	1
Bromoform	ND		0.10		ug/L			05/25/11 21:53	1
Bromomethane	ND		0.10		ug/L			05/25/11 21:53	1
Carbon disulfide	ND		0.10		ug/L			05/25/11 21:53	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 21:53	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 21:53	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 21:53	1
Chloroethane	ND		0.25		ug/L			05/25/11 21:53	1
Chloroform	ND		0.10		ug/L			05/25/11 21:53	1
Chloromethane	ND		0.10		ug/L			05/25/11 21:53	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 21:53	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 21:53	1
Dibromomethane	ND		0.10		ug/L			05/25/11 21:53	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-11-0511

Lab Sample ID: 580-26182-4

Date Collected: 05/13/11 10:55

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/25/11 21:53	1
Iodomethane	ND		0.50		ug/L			05/25/11 21:53	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 21:53	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 21:53	1
Naphthalene	ND		0.40		ug/L			05/25/11 21:53	1
n-Butylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
o-Xylene	ND		0.10		ug/L			05/25/11 21:53	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
Styrene	ND		0.10		ug/L			05/25/11 21:53	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 21:53	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 21:53	1
Toluene	ND		0.10		ug/L			05/25/11 21:53	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 21:53	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 21:53	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 21:53	1
Trichloroethene	ND		0.10		ug/L			05/25/11 21:53	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 21:53	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 21:53	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 21:53	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 21:53	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		75 - 120		05/25/11 21:53	1
Ethylbenzene-d10	94		75 - 125		05/25/11 21:53	1
Fluorobenzene (Surr)	100		70 - 130		05/25/11 21:53	1
Toluene-d8 (Surr)	92		75 - 125		05/25/11 21:53	1
Trifluorotoluene (Surr)	123		80 - 125		05/25/11 21:53	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.49		mg/L		05/19/11 09:29	05/23/11 21:12	1
Gasoline	ND		0.098		mg/L		05/19/11 09:29	05/23/11 21:12	1
#2 Diesel (>C12-C24)	ND		0.25		mg/L		05/19/11 09:29	05/23/11 21:12	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	92		50 - 150	05/19/11 09:29	05/23/11 21:12	1
4-Bromofluorobenzene (Surr)	60		50 - 150	05/19/11 09:29	05/23/11 21:12	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 21:04	1
Calcium	55		1.1		mg/L		05/23/11 11:02	05/23/11 21:04	1
Iron	2.2		0.20		mg/L		05/23/11 11:02	05/23/11 21:04	1
Magnesium	29		1.1		mg/L		05/23/11 11:02	05/23/11 21:04	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 21:04	1
Sodium	27		2.0		mg/L		05/23/11 11:02	05/23/11 21:04	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-11-0511

Lab Sample ID: 580-26182-4

Date Collected: 05/13/11 10:55

Matrix: Water

Date Received: 05/14/11 16:35

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0080		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Barium	0.27		0.0060		mg/L		05/23/11 11:02	05/24/11 10:38	5
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Chromium	0.0021		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Copper	ND		0.0050		mg/L		05/23/11 11:02	05/24/11 10:38	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Manganese	0.13		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Nickel	0.0020		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:38	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 10:38	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 10:38	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 10:38	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 14:14	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-9-0511

Lab Sample ID: 580-26182-5

Date Collected: 05/13/11 13:25

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 12:32	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 12:32	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 12:32	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 12:32	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 12:32	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 12:32	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 12:32	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 12:32	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 12:32	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 12:32	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 12:32	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 12:32	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 12:32	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 12:32	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 12:32	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 12:32	1
2-Butanone	ND		2.0		ug/L			05/26/11 12:32	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 12:32	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 12:32	1
2-Hexanone	ND		1.0		ug/L			05/26/11 12:32	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 12:32	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 12:32	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 12:32	1
Acetone	ND		2.0		ug/L			05/26/11 12:32	1
Acrolein	ND		6.0		ug/L			05/26/11 12:32	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 12:32	1
Benzene	ND		0.10		ug/L			05/26/11 12:32	1
Bromobenzene	ND		0.10		ug/L			05/26/11 12:32	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 12:32	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 12:32	1
Bromoform	ND		0.10		ug/L			05/26/11 12:32	1
Bromomethane	ND		0.10		ug/L			05/26/11 12:32	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 12:32	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 12:32	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 12:32	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 12:32	1
Chloroethane	ND		0.25		ug/L			05/26/11 12:32	1
Chloroform	ND		0.10		ug/L			05/26/11 12:32	1
Chloromethane	ND		0.10		ug/L			05/26/11 12:32	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 12:32	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 12:32	1
Dibromomethane	ND		0.10		ug/L			05/26/11 12:32	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-9-0511

Lab Sample ID: 580-26182-5

Date Collected: 05/13/11 13:25

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 12:32	1
Iodomethane	ND		0.50		ug/L			05/26/11 12:32	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 12:32	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 12:32	1
Naphthalene	ND		0.40		ug/L			05/26/11 12:32	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
o-Xylene	ND		0.10		ug/L			05/26/11 12:32	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
Styrene	ND		0.10		ug/L			05/26/11 12:32	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 12:32	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 12:32	1
Toluene	ND		0.10		ug/L			05/26/11 12:32	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 12:32	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 12:32	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 12:32	1
Trichloroethene	ND		0.10		ug/L			05/26/11 12:32	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 12:32	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 12:32	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 12:32	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 12:32	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		75 - 120		05/26/11 12:32	1
Ethylbenzene-d10	97		75 - 125		05/26/11 12:32	1
Fluorobenzene (Surr)	97		70 - 130		05/26/11 12:32	1
Toluene-d8 (Surr)	92		75 - 125		05/26/11 12:32	1
Trifluorotoluene (Surr)	122		80 - 125		05/26/11 12:32	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 21:35	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 21:35	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 21:35	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	89		50 - 150	05/19/11 09:29	05/23/11 21:35	1
4-Bromofluorobenzene (Surr)	63		50 - 150	05/19/11 09:29	05/23/11 21:35	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 21:10	1
Calcium	87		1.1		mg/L		05/23/11 11:02	05/23/11 21:10	1
Iron	1.5		0.20		mg/L		05/23/11 11:02	05/23/11 21:10	1
Magnesium	49		1.1		mg/L		05/23/11 11:02	05/23/11 21:10	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 21:10	1
Sodium	16		2.0		mg/L		05/23/11 11:02	05/23/11 21:10	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-9-0511

Lab Sample ID: 580-26182-5

Date Collected: 05/13/11 13:25

Matrix: Water

Date Received: 05/14/11 16:35

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Barium	0.30		0.0060		mg/L		05/23/11 11:02	05/24/11 10:41	5
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Chromium	0.0025		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Copper	ND		0.0050		mg/L		05/23/11 11:02	05/24/11 10:41	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Manganese	0.18		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Nickel	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:41	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 10:41	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 10:41	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 10:41	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 14:17	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-6-0511

Lab Sample ID: 580-26182-6

Date Collected: 05/13/11 15:30

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 22:46	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 22:46	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 22:46	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 22:46	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 22:46	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 22:46	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 22:46	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 22:46	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 22:46	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 22:46	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 22:46	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 22:46	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 22:46	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 22:46	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 22:46	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 22:46	1
2-Butanone	ND		2.0		ug/L			05/25/11 22:46	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 22:46	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 22:46	1
2-Hexanone	ND		1.0		ug/L			05/25/11 22:46	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 22:46	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 22:46	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 22:46	1
Acetone	ND		2.0		ug/L			05/25/11 22:46	1
Acrolein	ND		6.0		ug/L			05/25/11 22:46	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 22:46	1
Benzene	ND		0.10		ug/L			05/25/11 22:46	1
Bromobenzene	ND		0.10		ug/L			05/25/11 22:46	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 22:46	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 22:46	1
Bromoform	ND		0.10		ug/L			05/25/11 22:46	1
Bromomethane	ND		0.10		ug/L			05/25/11 22:46	1
Carbon disulfide	ND		0.10		ug/L			05/25/11 22:46	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 22:46	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 22:46	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 22:46	1
Chloroethane	ND		0.25		ug/L			05/25/11 22:46	1
Chloroform	ND		0.10		ug/L			05/25/11 22:46	1
Chloromethane	ND		0.10		ug/L			05/25/11 22:46	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 22:46	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 22:46	1
Dibromomethane	ND		0.10		ug/L			05/25/11 22:46	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-6-0511

Lab Sample ID: 580-26182-6

Date Collected: 05/13/11 15:30

Matrix: Water

Date Received: 05/14/11 16:35

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/25/11 22:46	1
Iodomethane	ND		0.50		ug/L			05/25/11 22:46	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 22:46	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 22:46	1
Naphthalene	ND		0.40		ug/L			05/25/11 22:46	1
n-Butylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
o-Xylene	ND		0.10		ug/L			05/25/11 22:46	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
Styrene	ND		0.10		ug/L			05/25/11 22:46	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 22:46	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 22:46	1
Toluene	ND		0.10		ug/L			05/25/11 22:46	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 22:46	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 22:46	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 22:46	1
Trichloroethene	ND		0.10		ug/L			05/25/11 22:46	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 22:46	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 22:46	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 22:46	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 22:46	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		75 - 120		05/25/11 22:46	1
Ethylbenzene-d10	101		75 - 125		05/25/11 22:46	1
Fluorobenzene (Surr)	101		70 - 130		05/25/11 22:46	1
Toluene-d8 (Surr)	94		75 - 125		05/25/11 22:46	1
Trifluorotoluene (Surr)	111		80 - 125		05/25/11 22:46	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 22:45	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 22:45	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 22:45	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	96		50 - 150	05/19/11 09:29	05/23/11 22:45	1
4-Bromofluorobenzene (Surr)	61		50 - 150	05/19/11 09:29	05/23/11 22:45	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 21:17	1
Calcium	27		1.1		mg/L		05/23/11 11:02	05/23/11 21:17	1
Iron	2.2		0.20		mg/L		05/23/11 11:02	05/23/11 21:17	1
Magnesium	14		1.1		mg/L		05/23/11 11:02	05/23/11 21:17	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 21:17	1
Sodium	6.7		2.0		mg/L		05/23/11 11:02	05/23/11 21:17	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-6-0511

Lab Sample ID: 580-26182-6

Date Collected: 05/13/11 15:30

Matrix: Water

Date Received: 05/14/11 16:35

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Barium	0.11		0.0060		mg/L		05/23/11 11:02	05/24/11 10:45	5
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Chromium	0.0029		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Copper	ND		0.0050		mg/L		05/23/11 11:02	05/24/11 10:45	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Manganese	0.031		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Nickel	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 10:45	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 10:45	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 10:45	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 10:45	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 14:19	1

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-86702/15

Matrix: Water

Analysis Batch: 86702

Client Sample ID: MB 580-86702/15

Prep Type: Total/NA

Analyte	Result	MB MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/25/11 19:12	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,1-Dichloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,1-Dichloroethene	ND		0.10		ug/L			05/25/11 19:12	1
1,1-Dichloropropene	ND		0.10		ug/L			05/25/11 19:12	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/25/11 19:12	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/25/11 19:12	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/25/11 19:12	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/25/11 19:12	1
1,2-Dibromoethane	ND		0.10		ug/L			05/25/11 19:12	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/25/11 19:12	1
1,2-Dichloroethane	ND		0.10		ug/L			05/25/11 19:12	1
1,2-Dichloropropane	ND		0.10		ug/L			05/25/11 19:12	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/25/11 19:12	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/25/11 19:12	1
1,3-Dichloropropane	ND		0.10		ug/L			05/25/11 19:12	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/25/11 19:12	1
2,2-Dichloropropane	ND		0.10		ug/L			05/25/11 19:12	1
2-Butanone	ND		2.0		ug/L			05/25/11 19:12	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/25/11 19:12	1
2-Chlorotoluene	ND		0.10		ug/L			05/25/11 19:12	1
2-Hexanone	ND		1.0		ug/L			05/25/11 19:12	1
4-Chlorotoluene	ND		0.20		ug/L			05/25/11 19:12	1
4-Isopropyltoluene	ND		0.20		ug/L			05/25/11 19:12	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/25/11 19:12	1
Acetone	ND		2.0		ug/L			05/25/11 19:12	1
Acrolein	ND		6.0		ug/L			05/25/11 19:12	1
Acrylonitrile	ND		2.0		ug/L			05/25/11 19:12	1
Benzene	ND		0.10		ug/L			05/25/11 19:12	1
Bromobenzene	ND		0.10		ug/L			05/25/11 19:12	1
Bromochloromethane	ND		0.10		ug/L			05/25/11 19:12	1
Bromodichloromethane	ND		0.10		ug/L			05/25/11 19:12	1
Bromoform	ND		0.10		ug/L			05/25/11 19:12	1
Bromomethane	ND		0.10		ug/L			05/25/11 19:12	1
Carbon disulfide	0.125		0.10		ug/L			05/25/11 19:12	1
Carbon tetrachloride	ND		0.10		ug/L			05/25/11 19:12	1
Chlorobenzene	ND		0.10		ug/L			05/25/11 19:12	1
Chlorodibromomethane	ND		0.10		ug/L			05/25/11 19:12	1
Chloroethane	ND		0.25		ug/L			05/25/11 19:12	1
Chloroform	ND		0.10		ug/L			05/25/11 19:12	1
Chloromethane	ND		0.10		ug/L			05/25/11 19:12	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 19:12	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 19:12	1
Dibromomethane	ND		0.10		ug/L			05/25/11 19:12	1

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-86702/15

Matrix: Water

Analysis Batch: 86702

Client Sample ID: MB 580-86702/15

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
Hexachloro-1,3-butadiene	0.276		0.20		ug/L			05/25/11 19:12	1
Iodomethane	ND		0.50		ug/L			05/25/11 19:12	1
Isopropylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
Methylene Chloride	ND		0.50		ug/L			05/25/11 19:12	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/25/11 19:12	1
Naphthalene	ND		0.40		ug/L			05/25/11 19:12	1
n-Butylbenzene	0.114		0.10		ug/L			05/25/11 19:12	1
N-Propylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
o-Xylene	ND		0.10		ug/L			05/25/11 19:12	1
sec-Butylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
Styrene	ND		0.10		ug/L			05/25/11 19:12	1
tert-Butylbenzene	ND		0.10		ug/L			05/25/11 19:12	1
Tetrachloroethene	ND		0.10		ug/L			05/25/11 19:12	1
Toluene	ND		0.10		ug/L			05/25/11 19:12	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/25/11 19:12	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/25/11 19:12	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/25/11 19:12	1
Trichloroethene	ND		0.10		ug/L			05/25/11 19:12	1
Trichlorofluoromethane	ND		0.10		ug/L			05/25/11 19:12	1
Vinyl acetate	ND		0.50		ug/L			05/25/11 19:12	1
Vinyl chloride	ND		0.020		ug/L			05/25/11 19:12	1
Xylenes, Total	ND		0.10		ug/L			05/25/11 19:12	1

Surrogate	MB % Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		75 - 120		05/25/11 19:12	1
Ethylbenzene-d10	98		75 - 125		05/25/11 19:12	1
Fluorobenzene (Surr)	103		70 - 130		05/25/11 19:12	1
Toluene-d8 (Surr)	94		75 - 125		05/25/11 19:12	1
Trifluorotoluene (Surr)	116		80 - 125		05/25/11 19:12	1

Lab Sample ID: LCS 580-86702/16

Matrix: Water

Analysis Batch: 86702

Client Sample ID: LCS 580-86702/16

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
1,1-Dichloroethene	5.00	5.79		ug/L		116	78 - 151
Benzene	5.00	5.11		ug/L		102	75 - 142
Chlorobenzene	5.00	5.06		ug/L		101	71 - 140
Toluene	5.00	5.16		ug/L		103	80 - 126
Trichloroethene	5.00	5.31		ug/L		106	79 - 131

Surrogate	LCS % Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	97		75 - 120
Ethylbenzene-d10	95		75 - 125
Fluorobenzene (Surr)	99		70 - 130
Toluene-d8 (Surr)	97		75 - 125
Trifluorotoluene (Surr)	110		80 - 125

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-86702/17

Matrix: Water

Analysis Batch: 86702

Client Sample ID: LCSD 580-86702/17

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	5.00	5.29		ug/L		106	78 - 151	9	20
Benzene	5.00	4.75		ug/L		95	75 - 142	7	20
Chlorobenzene	5.00	5.18		ug/L		104	71 - 140	2	20
Toluene	5.00	5.03		ug/L		101	80 - 126	3	20
Trichloroethene	5.00	4.99		ug/L		100	79 - 131	6	20

Surrogate	LCSD % Recovery	LCSD Qualifier	LCSD Limits
4-Bromofluorobenzene (Surr)	101		75 - 120
Ethylbenzene-d10	102		75 - 125
Fluorobenzene (Surr)	102		70 - 130
Toluene-d8 (Surr)	92		75 - 125
Trifluorotoluene (Surr)	102		80 - 125

Lab Sample ID: MB 580-86775/4

Matrix: Water

Analysis Batch: 86775

Client Sample ID: MB 580-86775/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 11:41	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 11:41	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 11:41	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 11:41	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
2-Butanone	ND		2.0		ug/L			05/26/11 11:41	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 11:41	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 11:41	1
2-Hexanone	ND		1.0		ug/L			05/26/11 11:41	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 11:41	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 11:41	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 11:41	1
Acetone	ND		2.0		ug/L			05/26/11 11:41	1

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-86775/4

Matrix: Water

Analysis Batch: 86775

Client Sample ID: MB 580-86775/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acrolein	ND		6.0		ug/L			05/26/11 11:41	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 11:41	1
Benzene	ND		0.10		ug/L			05/26/11 11:41	1
Bromobenzene	ND		0.10		ug/L			05/26/11 11:41	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 11:41	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 11:41	1
Bromoform	ND		0.10		ug/L			05/26/11 11:41	1
Bromomethane	ND		0.10		ug/L			05/26/11 11:41	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 11:41	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 11:41	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 11:41	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 11:41	1
Chloroethane	ND		0.25		ug/L			05/26/11 11:41	1
Chloroform	ND		0.10		ug/L			05/26/11 11:41	1
Chloromethane	ND		0.10		ug/L			05/26/11 11:41	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
Dibromomethane	ND		0.10		ug/L			05/26/11 11:41	1
Ethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 11:41	1
Iodomethane	ND		0.50		ug/L			05/26/11 11:41	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 11:41	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 11:41	1
Naphthalene	ND		0.40		ug/L			05/26/11 11:41	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
o-Xylene	ND		0.10		ug/L			05/26/11 11:41	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Styrene	ND		0.10		ug/L			05/26/11 11:41	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 11:41	1
Toluene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 11:41	1
Trichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 11:41	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 11:41	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 11:41	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 11:41	1
Surrogate	MB % Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		75 - 120					05/26/11 11:41	1
Ethylbenzene-d10	97		75 - 125					05/26/11 11:41	1
Fluorobenzene (Surr)	96		70 - 130					05/26/11 11:41	1
Toluene-d8 (Surr)	94		75 - 125					05/26/11 11:41	1
Trifluorotoluene (Surr)	122		80 - 125					05/26/11 11:41	1

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 580-86775/5

Matrix: Water

Analysis Batch: 86775

Client Sample ID: LCS 580-86775/5

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
1,1-Dichloroethene	5.00	5.40		ug/L		108	78 - 151
Benzene	5.00	4.71		ug/L		94	75 - 142
Chlorobenzene	5.00	5.32		ug/L		106	71 - 140
Toluene	5.00	5.11		ug/L		102	80 - 126
Trichloroethene	5.00	5.06		ug/L		101	79 - 131

Surrogate	LCS % Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		75 - 120
Ethylbenzene-d10	101		75 - 125
Fluorobenzene (Surr)	99		70 - 130
Toluene-d8 (Surr)	96		75 - 125
Trifluorotoluene (Surr)	118		80 - 125

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Lab Sample ID: MB 580-86307/1-A

Matrix: Water

Analysis Batch: 86479

Client Sample ID: MB 580-86307/1-A

Prep Type: Total/NA

Prep Batch: 86307

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.50		mg/L		05/19/11 09:29	05/23/11 18:05	1
Motor Oil	ND		0.50		mg/L		05/19/11 09:29	05/23/11 18:05	1
Gasoline	ND		0.10		mg/L		05/19/11 09:29	05/23/11 18:05	1
#2 Diesel (>C12-C24)	ND		0.25		mg/L		05/19/11 09:29	05/23/11 18:05	1

Surrogate	MB % Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	81		50 - 150	05/19/11 09:29	05/23/11 18:05	1
o-Terphenyl	84		50 - 150	05/19/11 09:29	05/23/11 18:05	1
4-Bromofluorobenzene (Surr)	56		50 - 150	05/19/11 09:29	05/23/11 18:05	1

Lab Sample ID: LCS 580-86307/2-A

Matrix: Water

Analysis Batch: 86479

Client Sample ID: LCS 580-86307/2-A

Prep Type: Total/NA

Prep Batch: 86307

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
Motor Oil	5.00	4.25		mg/L		85	
#2 Diesel (>C12-C24)	5.00	4.45		mg/L		89	

Surrogate	LCS % Recovery	LCS Qualifier	Limits
o-Terphenyl	76		50 - 150

Lab Sample ID: LCSD 580-86307/3-A

Matrix: Water

Analysis Batch: 86479

Client Sample ID: LCSD 580-86307/3-A

Prep Type: Total/NA

Prep Batch: 86307

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Motor Oil	5.00	4.24		mg/L		85		0.000	
#2 Diesel (>C12-C24)	5.00	4.52		mg/L		90		1.45	

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC) (Continued)

Lab Sample ID: LCSD 580-86307/3-A

Matrix: Water

Analysis Batch: 86479

Client Sample ID: LCSD 580-86307/3-A

Prep Type: Total/NA

Prep Batch: 86307

Surrogate	LCSD % Recovery	LCSD Qualifier	Limits
o-Terphenyl	76		50 - 150

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 580-86511/15-A

Matrix: Water

Analysis Batch: 86595

Client Sample ID: MB 580-86511/15-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/23/11 11:02	05/23/11 19:00	1
Calcium	ND		1.1		mg/L		05/23/11 11:02	05/23/11 19:00	1
Iron	ND		0.20		mg/L		05/23/11 11:02	05/23/11 19:00	1
Magnesium	ND		1.1		mg/L		05/23/11 11:02	05/23/11 19:00	1
Potassium	ND		3.3		mg/L		05/23/11 11:02	05/23/11 19:00	1
Sodium	ND		2.0		mg/L		05/23/11 11:02	05/23/11 19:00	1

Lab Sample ID: LCS 580-86511/16-A

Matrix: Water

Analysis Batch: 86595

Client Sample ID: LCS 580-86511/16-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
Aluminum	4.00	3.99		mg/L		100	80 - 120
Calcium	20.0	20.2		mg/L		101	80 - 120
Iron	22.0	22.5		mg/L		102	80 - 120
Magnesium	20.0	20.7		mg/L		103	80 - 120
Potassium	20.0	20.2		mg/L		101	80 - 120
Sodium	20.0	20.2		mg/L		101	80 - 120

Lab Sample ID: LCSD 580-86511/17-A

Matrix: Water

Analysis Batch: 86595

Client Sample ID: LCSD 580-86511/17-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD RPD	Limit
Aluminum	4.00	3.96		mg/L		99	80 - 120	1	20
Calcium	20.0	20.4		mg/L		102	80 - 120	1	20
Iron	22.0	22.0		mg/L		100	80 - 120	2	20
Magnesium	20.0	20.1		mg/L		101	80 - 120	3	20
Potassium	20.0	19.6		mg/L		98	80 - 120	3	20
Sodium	20.0	19.7		mg/L		99	80 - 120	2	20

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 580-86511/15-A

Matrix: Water

Analysis Batch: 86621

Client Sample ID: MB 580-86511/15-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Antimony	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Barium	ND		0.0060		mg/L		05/23/11 11:02	05/24/11 09:48	5

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-86511/15-A

Matrix: Water

Analysis Batch: 86621

Client Sample ID: MB 580-86511/15-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Cadmium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Chromium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Cobalt	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Copper	ND		0.0050		mg/L		05/23/11 11:02	05/24/11 09:48	5
Lead	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Manganese	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Nickel	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Selenium	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Silver	ND		0.0020		mg/L		05/23/11 11:02	05/24/11 09:48	5
Thallium	ND		0.0040		mg/L		05/23/11 11:02	05/24/11 09:48	5
Vanadium	ND		0.010		mg/L		05/23/11 11:02	05/24/11 09:48	5
Zinc	ND		0.0070		mg/L		05/23/11 11:02	05/24/11 09:48	5

Lab Sample ID: LCS 580-86511/16-A

Matrix: Water

Analysis Batch: 86621

Client Sample ID: LCS 580-86511/16-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
Arsenic	4.00	4.04		mg/L		101	80 - 120
Antimony	3.00	2.82		mg/L		94	80 - 120
Barium	4.00	3.79		mg/L		95	80 - 120
Beryllium	0.100	0.0974		mg/L		97	80 - 120
Cadmium	0.100	0.0979		mg/L		98	80 - 120
Chromium	0.400	0.382		mg/L		95	80 - 120
Cobalt	1.00	1.06		mg/L		106	80 - 120
Copper	0.500	0.529		mg/L		106	80 - 120
Lead	1.00	1.06		mg/L		106	80 - 120
Manganese	1.00	1.03		mg/L		103	80 - 120
Nickel	1.00	1.04		mg/L		104	80 - 120
Selenium	4.00	3.96		mg/L		99	80 - 120
Silver	0.600	0.603		mg/L		100	80 - 120
Thallium	4.00	4.06		mg/L		102	80 - 120
Vanadium	1.00	0.993		mg/L		99	80 - 120
Zinc	1.00	1.01		mg/L		101	80 - 120

Lab Sample ID: LCSD 580-86511/17-A

Matrix: Water

Analysis Batch: 86621

Client Sample ID: LCSD 580-86511/17-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	Limit
Arsenic	4.00	3.97		mg/L		99	80 - 120	2	20
Antimony	3.00	2.82		mg/L		94	80 - 120	0	20
Barium	4.00	3.89		mg/L		97	80 - 120	3	20
Beryllium	0.100	0.104		mg/L		104	80 - 120	7	20
Cadmium	0.100	0.0986		mg/L		99	80 - 120	1	20
Chromium	0.400	0.380		mg/L		95	80 - 120	1	20
Cobalt	1.00	1.06		mg/L		106	80 - 120	0	20
Copper	0.500	0.523		mg/L		105	80 - 120	1	20
Lead	1.00	1.06		mg/L		106	80 - 120	0	20

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 580-86511/17-A

Matrix: Water

Analysis Batch: 86621

Client Sample ID: LCSD 580-86511/17-A

Prep Type: Total Recoverable

Prep Batch: 86511

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec.		RPD	Limit
							Limits	RPD		
Manganese	1.00	1.02		mg/L		102	80 - 120	1		20
Nickel	1.00	1.02		mg/L		102	80 - 120	2		20
Selenium	4.00	3.87		mg/L		97	80 - 120	2		20
Silver	0.600	0.604		mg/L		101	80 - 120	0		20
Thallium	4.00	4.04		mg/L		101	80 - 120	1		20
Vanadium	1.00	1.02		mg/L		102	80 - 120	3		20
Zinc	1.00	0.968		mg/L		97	80 - 120	4		20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 580-86316/15-A

Matrix: Water

Analysis Batch: 86373

Client Sample ID: MB 580-86316/15-A

Prep Type: Total/NA

Prep Batch: 86316

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 10:00	05/19/11 13:38	1

Lab Sample ID: LCS 580-86316/16-A

Matrix: Water

Analysis Batch: 86373

Client Sample ID: LCS 580-86316/16-A

Prep Type: Total/NA

Prep Batch: 86316

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec.	
							Limits	RPD
Mercury	0.00200	0.00197		mg/L		98	80 - 120	

Lab Sample ID: LCSD 580-86316/17-A

Matrix: Water

Analysis Batch: 86373

Client Sample ID: LCSD 580-86316/17-A

Prep Type: Total/NA

Prep Batch: 86316

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec.		RPD	Limit
							Limits	RPD		
Mercury	0.00200	0.00196		mg/L		98	80 - 120	0		20

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: Trip Blank

Date Collected: 05/12/11 16:05

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86702	05/25/11 20:27	SK	TAL SEA

Client Sample ID: LMW-7-0511

Date Collected: 05/12/11 16:10

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86702	05/25/11 20:52	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 20:25	ES	TAL SEA
Total/NA	Prep	7470A			86316	05/19/11 10:00	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86373	05/19/11 14:09	FCW	TAL SEA
Total Recoverable	Prep	3005A			86511	05/23/11 11:02	PAB	TAL SEA
Total Recoverable	Analysis	6010B		1	86595	05/23/11 20:40	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86621	05/24/11 10:32	FCW	TAL SEA

Client Sample ID: LMW-7-0511-D

Date Collected: 05/12/11 16:15

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86702	05/25/11 21:26	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 20:48	ES	TAL SEA
Total/NA	Prep	7470A			86316	05/19/11 10:00	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86373	05/19/11 14:12	FCW	TAL SEA
Total Recoverable	Prep	3005A			86511	05/23/11 11:02	PAB	TAL SEA
Total Recoverable	Analysis	6010B		1	86595	05/23/11 20:46	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86621	05/24/11 10:35	FCW	TAL SEA

Client Sample ID: LMW-11-0511

Date Collected: 05/13/11 10:55

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86702	05/25/11 21:53	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 21:12	ES	TAL SEA
Total/NA	Prep	7470A			86316	05/19/11 10:00	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86373	05/19/11 14:14	FCW	TAL SEA
Total Recoverable	Prep	3005A			86511	05/23/11 11:02	PAB	TAL SEA
Total Recoverable	Analysis	6010B		1	86595	05/23/11 21:04	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86621	05/24/11 10:38	FCW	TAL SEA

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Client Sample ID: LMW-9-0511

Date Collected: 05/13/11 13:25

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 12:32	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 21:35	ES	TAL SEA
Total/NA	Prep	7470A			86316	05/19/11 10:00	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86373	05/19/11 14:17	FCW	TAL SEA
Total Recoverable	Prep	3005A			86511	05/23/11 11:02	PAB	TAL SEA
Total Recoverable	Analysis	6010B		1	86595	05/23/11 21:10	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86621	05/24/11 10:41	FCW	TAL SEA

Client Sample ID: LMW-6-0511

Date Collected: 05/13/11 15:30

Date Received: 05/14/11 16:35

Lab Sample ID: 580-26182-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86702	05/25/11 22:46	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 22:45	ES	TAL SEA
Total/NA	Prep	7470A			86316	05/19/11 10:00	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86373	05/19/11 14:19	FCW	TAL SEA
Total Recoverable	Prep	3005A			86511	05/23/11 11:02	PAB	TAL SEA
Total Recoverable	Analysis	6010B		1	86595	05/23/11 21:17	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86621	05/24/11 10:45	FCW	TAL SEA

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle		USDA		P330-11-00222
TestAmerica Seattle	Alaska	Alaska UST	10	UST-022
TestAmerica Seattle	California	NELAC	9	1115CA
TestAmerica Seattle	Florida	NELAC	4	E871074
TestAmerica Seattle	L-A-B	DoD ELAP	0	L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025	0	L2236
TestAmerica Seattle	Louisiana	NELAC	6	05016
TestAmerica Seattle	Montana	MT DEQ UST	8	N/A
TestAmerica Seattle	Oregon	NELAC	10	WA100007
TestAmerica Seattle	Washington	State Program	10	C553

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Summary

Client: Golder Associates Inc.
Project/Site: Landsburg Mine

TestAmerica Job ID: 580-26182-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-26182-1	Trip Blank	Water	05/12/11 16:05	05/14/11 16:35
580-26182-2	LMW-7-0511	Water	05/12/11 16:10	05/14/11 16:35
580-26182-3	LMW-7-0511-D	Water	05/12/11 16:15	05/14/11 16:35
580-26182-4	LMW-11-0511	Water	05/13/11 10:55	05/14/11 16:35
580-26182-5	LMW-9-0511	Water	05/13/11 13:25	05/14/11 16:35
580-26182-6	LMW-6-0511	Water	05/13/11 15:30	05/14/11 16:35

Chain of Custody Record

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124 (1007)

Client Golden Associates		Project Manager Douglas Morell		Date 5/12/2011	Chain of Custody Number 143881
Address 18300 NE Union Hill Rd. Suite 200		Telephone Number (Area Code)/Fax Number 425 883 0777		Lab Number	Page 1 of 1

City Redmond	State WA	Zip Code 98052	Site Contact J. Lamberts	Lab Contact T. Torres	Analysis (Attach list if more space is needed)
Project Name and Location (State) Landsburg Mine			Carrier/Waybill Number		Special Instructions/ Conditions of Receipt

Contract/Purchase Order/Quote No. 923-1000-002-R273	Matrix	Containers & Preservatives
---	--------	----------------------------

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc2/NaOH	VOCs - client list	TPH - HClD	Metals	TAMC - Total Metals	TAMC - Dissolved	Special Instructions/ Conditions of Receipt
Trip Blank	5/12/2011	1605	✓							3			✓					HOLD all field filtered, unpreserved samples pending analytical results (preserve upon receipt)
LMW-7-0511	5/12/2011	1610	✓				1	1	8				✓	✓	✓			
LMW-7-0511-D	5/12/2011	1615	✓				1	1	8				✓	✓	✓			
LMW-11-0511	5/13/2011	1055	✓				1	1	8				✓	✓	✓			
LMW-9-0511	5/13/2011	1325	✓				1	1	8				✓	✓	✓			
LMW-6-0511	5/13/2011	1530	✓				1	1	8				✓	✓	✓			

Cooler/TB Dig/IR cor 0.3°C unc 0.3°C	Cooler/TB Dig/IR cor 0.5°C unc 0.5°C
Cooler Dsc Lg Blue/white @ Lab 1635	Cooler Dsc Lg Blue/white @ Lab 1635
Wet/Packs Packing Bubble Bag #2	Wet/Packs Packing Bubble Bag #2

Possible Hazard Identification ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown	Sample Disposal ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months	(A fee may be assessed if samples are retained longer than 1 month)
---	--	---

Turn Around Time Required ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other standard	QC Requirements (Specify)
--	---------------------------

1. Relinquished By Jill Lamberts	Date 5/13/2011	Time 1545	1. Received By [Signature]	Date 5/13/11	Time 1545
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: **Please cc klongley@golder.com, jlamberts@golder.com**

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Login Sample Receipt Checklist

Client: Golder Associates Inc.

Job Number: 580-26182-1

Login Number: 26182

List Source: TestAmerica Seattle

List Number: 1

Creator: Luna, Francisco

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-26276-1

Client Project/Site: Landsburg Mine, Maple Valley, WA
Revision: 1

For:

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

Attn: Douglas Morell



Authorized for release by:
06/02/2011 12:45:21 PM

Terri Torres
Project Manager II
terri.torres@testamericainc.com

LINKS

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results through

TotalAccess

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Visit us at:

www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

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Case Narrative

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Job ID: 580-26276-1

Laboratory: TestAmerica Seattle

Narrative

Receipt

The following samples submitted for dissolved metals analysis were received with insufficient preservation (pH >2): Samples unpreserved when received. Preserved with HNO3 from lot J41037 on receipt.

All other samples were received in good condition within temperature requirements.

GC/MS VOA - Method(s) 8260B

The initial calibration curve was not second source verified for the non-routine requested target compound 1,3,5-Trichlorobenzene as a second source was not available at time of calibration. All other target compounds including the two other requested Trichlorobenzene isomers met second source criteria.

The 128% Trifluorotoluene surrogate recovery for the LCS associated with batch 580-86853 was above QC recovery limits of 80-125%. All associated sample surrogates fell within acceptance criteria or confirmed matrix interference; therefore, the data have been reported.

Samples 580-26276-3 and 580-26276-6 were reanalyzed in analytical batch 580-86853 due to deficient surrogate recoveries in the original analyses.

Trifluorotoluene surrogate recovery for the following sample was outside control limits: LMW-2-0511 (580-26276-3). The sample was reanalyzed and the elevated recovery confirmed. The reanalysis was chosen for reporting as the elevated recovery was closer to control limits. The affected surrogate has been flagged "X" and "I" on the appropriate forms and the data reported.

No other analytical or quality issues were noted.

GC Semi VOA

No analytical or quality issues were noted.

Metals

No analytical or quality issues were noted.

Organic Prep

No analytical or quality issues were noted.

Definitions/Glossary

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	Indicates the presence of an interference, recovery is not calculated.
X	Surrogate is outside control limits

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis.
EPA	United States Environmental Protection Agency
ND	Not Detected above the reporting level.
MDL	Method Detection Limit
RL	Reporting Limit
RE, RE1 (etc.)	Indicates a Re-extraction or Reanalysis of the sample.
%R	Percent Recovery
RPD	Relative Percent Difference, a measure of the relative difference between two points.

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-26276-1

Date Collected: 05/16/11 00:00

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 13:09	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 13:09	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 13:09	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 13:09	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 13:09	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 13:09	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 13:09	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 13:09	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:09	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 13:09	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 13:09	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 13:09	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:09	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 13:09	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:09	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 13:09	1
2-Butanone	ND		2.0		ug/L			05/26/11 13:09	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 13:09	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 13:09	1
2-Hexanone	ND		1.0		ug/L			05/26/11 13:09	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 13:09	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 13:09	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 13:09	1
Acetone	ND		2.0		ug/L			05/26/11 13:09	1
Acrolein	ND		6.0		ug/L			05/26/11 13:09	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 13:09	1
Benzene	ND		0.10		ug/L			05/26/11 13:09	1
Bromobenzene	ND		0.10		ug/L			05/26/11 13:09	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 13:09	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 13:09	1
Bromoform	ND		0.10		ug/L			05/26/11 13:09	1
Bromomethane	ND		0.10		ug/L			05/26/11 13:09	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 13:09	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 13:09	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 13:09	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 13:09	1
Chloroethane	ND		0.25		ug/L			05/26/11 13:09	1
Chloroform	ND		0.10		ug/L			05/26/11 13:09	1
Chloromethane	ND		0.10		ug/L			05/26/11 13:09	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 13:09	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 13:09	1
Dibromomethane	ND		0.10		ug/L			05/26/11 13:09	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-26276-1

Date Collected: 05/16/11 00:00

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 13:09	1
Iodomethane	ND		0.50		ug/L			05/26/11 13:09	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 13:09	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 13:09	1
Naphthalene	ND		0.40		ug/L			05/26/11 13:09	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
o-Xylene	ND		0.10		ug/L			05/26/11 13:09	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
Styrene	ND		0.10		ug/L			05/26/11 13:09	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 13:09	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 13:09	1
Toluene	ND		0.10		ug/L			05/26/11 13:09	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 13:09	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 13:09	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 13:09	1
Trichloroethene	ND		0.10		ug/L			05/26/11 13:09	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 13:09	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 13:09	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 13:09	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 13:09	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		75 - 120		05/26/11 13:09	1
Ethylbenzene-d10	97		75 - 125		05/26/11 13:09	1
Fluorobenzene (Surr)	98		70 - 130		05/26/11 13:09	1
Toluene-d8 (Surr)	94		75 - 125		05/26/11 13:09	1
Trifluorotoluene (Surr)	121		80 - 125		05/26/11 13:09	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-10-0511

Lab Sample ID: 580-26276-2

Date Collected: 05/16/11 09:45

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 13:34	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 13:34	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 13:34	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 13:34	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 13:34	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 13:34	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 13:34	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 13:34	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:34	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 13:34	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 13:34	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 13:34	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:34	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 13:34	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 13:34	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 13:34	1
2-Butanone	ND		2.0		ug/L			05/26/11 13:34	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 13:34	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 13:34	1
2-Hexanone	ND		1.0		ug/L			05/26/11 13:34	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 13:34	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 13:34	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 13:34	1
Acetone	ND		2.0		ug/L			05/26/11 13:34	1
Acrolein	ND		6.0		ug/L			05/26/11 13:34	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 13:34	1
Benzene	ND		0.10		ug/L			05/26/11 13:34	1
Bromobenzene	ND		0.10		ug/L			05/26/11 13:34	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 13:34	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 13:34	1
Bromoform	ND		0.10		ug/L			05/26/11 13:34	1
Bromomethane	ND		0.10		ug/L			05/26/11 13:34	1
Carbon disulfide	0.30		0.10		ug/L			05/26/11 13:34	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 13:34	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 13:34	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 13:34	1
Chloroethane	ND		0.25		ug/L			05/26/11 13:34	1
Chloroform	ND		0.10		ug/L			05/26/11 13:34	1
Chloromethane	ND		0.10		ug/L			05/26/11 13:34	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 13:34	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 13:34	1
Dibromomethane	ND		0.10		ug/L			05/26/11 13:34	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-10-0511

Lab Sample ID: 580-26276-2

Date Collected: 05/16/11 09:45

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 13:34	1
Iodomethane	ND		0.50		ug/L			05/26/11 13:34	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 13:34	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 13:34	1
Naphthalene	ND		0.40		ug/L			05/26/11 13:34	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
o-Xylene	ND		0.10		ug/L			05/26/11 13:34	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
Styrene	ND		0.10		ug/L			05/26/11 13:34	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 13:34	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 13:34	1
Toluene	ND		0.10		ug/L			05/26/11 13:34	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 13:34	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 13:34	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 13:34	1
Trichloroethene	ND		0.10		ug/L			05/26/11 13:34	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 13:34	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 13:34	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 13:34	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 13:34	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		75 - 120		05/26/11 13:34	1
Ethylbenzene-d10	97		75 - 125		05/26/11 13:34	1
Fluorobenzene (Surr)	97		70 - 130		05/26/11 13:34	1
Toluene-d8 (Surr)	91		75 - 125		05/26/11 13:34	1
Trifluorotoluene (Surr)	115		80 - 125		05/26/11 13:34	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 23:08	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 23:08	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 23:08	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	98		50 - 150	05/19/11 09:29	05/23/11 23:08	1
4-Bromofluorobenzene (Surr)	69		50 - 150	05/19/11 09:29	05/23/11 23:08	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 18:36	1
Calcium	6.6		1.1		mg/L		05/27/11 11:13	05/27/11 18:36	1
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 18:36	1
Magnesium	2.9		1.1		mg/L		05/27/11 11:13	05/27/11 18:36	1
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 18:36	1
Sodium	81		2.0		mg/L		05/27/11 11:13	05/27/11 18:36	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-10-0511

Lab Sample ID: 580-26276-2

Date Collected: 05/16/11 09:45

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Barium	0.038		0.0060		mg/L		05/27/11 11:13	05/31/11 10:56	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 10:56	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Manganese	0.0082		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:56	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 10:56	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 10:56	5
Zinc	0.0099		0.0070		mg/L		05/27/11 11:13	05/31/11 10:56	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:37	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-2-0511

Lab Sample ID: 580-26276-3

Date Collected: 05/16/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/27/11 12:10	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,1-Dichloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,1-Dichloroethene	ND		0.10		ug/L			05/27/11 12:10	1
1,1-Dichloropropene	ND		0.10		ug/L			05/27/11 12:10	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/27/11 12:10	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/27/11 12:10	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/27/11 12:10	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/27/11 12:10	1
1,2-Dibromoethane	ND		0.10		ug/L			05/27/11 12:10	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:10	1
1,2-Dichloroethane	ND		0.10		ug/L			05/27/11 12:10	1
1,2-Dichloropropane	ND		0.10		ug/L			05/27/11 12:10	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/27/11 12:10	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:10	1
1,3-Dichloropropane	ND		0.10		ug/L			05/27/11 12:10	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:10	1
2,2-Dichloropropane	ND		0.10		ug/L			05/27/11 12:10	1
2-Butanone	ND		2.0		ug/L			05/27/11 12:10	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/27/11 12:10	1
2-Chlorotoluene	ND		0.10		ug/L			05/27/11 12:10	1
2-Hexanone	ND		1.0		ug/L			05/27/11 12:10	1
4-Chlorotoluene	ND		0.20		ug/L			05/27/11 12:10	1
4-Isopropyltoluene	ND		0.20		ug/L			05/27/11 12:10	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/27/11 12:10	1
Acetone	ND		2.0		ug/L			05/27/11 12:10	1
Acrolein	ND		6.0		ug/L			05/27/11 12:10	1
Acrylonitrile	ND		2.0		ug/L			05/27/11 12:10	1
Benzene	ND		0.10		ug/L			05/27/11 12:10	1
Bromobenzene	ND		0.10		ug/L			05/27/11 12:10	1
Bromochloromethane	ND		0.10		ug/L			05/27/11 12:10	1
Bromodichloromethane	ND		0.10		ug/L			05/27/11 12:10	1
Bromoform	ND		0.10		ug/L			05/27/11 12:10	1
Bromomethane	ND		0.10		ug/L			05/27/11 12:10	1
Carbon disulfide	0.52		0.10		ug/L			05/27/11 12:10	1
Carbon tetrachloride	ND		0.10		ug/L			05/27/11 12:10	1
Chlorobenzene	ND		0.10		ug/L			05/27/11 12:10	1
Chlorodibromomethane	ND		0.10		ug/L			05/27/11 12:10	1
Chloroethane	ND		0.25		ug/L			05/27/11 12:10	1
Chloroform	ND		0.10		ug/L			05/27/11 12:10	1
Chloromethane	ND		0.10		ug/L			05/27/11 12:10	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 12:10	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 12:10	1
Dibromomethane	ND		0.10		ug/L			05/27/11 12:10	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-2-0511

Lab Sample ID: 580-26276-3

Date Collected: 05/16/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/27/11 12:10	1
Iodomethane	ND		0.50		ug/L			05/27/11 12:10	1
Isopropylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
Methylene Chloride	ND		0.50		ug/L			05/27/11 12:10	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/27/11 12:10	1
Naphthalene	ND		0.40		ug/L			05/27/11 12:10	1
n-Butylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
N-Propylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
o-Xylene	ND		0.10		ug/L			05/27/11 12:10	1
sec-Butylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
Styrene	ND		0.10		ug/L			05/27/11 12:10	1
tert-Butylbenzene	ND		0.10		ug/L			05/27/11 12:10	1
Tetrachloroethene	ND		0.10		ug/L			05/27/11 12:10	1
Toluene	ND		0.10		ug/L			05/27/11 12:10	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 12:10	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 12:10	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/27/11 12:10	1
Trichloroethene	ND		0.10		ug/L			05/27/11 12:10	1
Trichlorofluoromethane	ND		0.10		ug/L			05/27/11 12:10	1
Vinyl acetate	ND		0.50		ug/L			05/27/11 12:10	1
Vinyl chloride	ND		0.020		ug/L			05/27/11 12:10	1
Xylenes, Total	ND		0.10		ug/L			05/27/11 12:10	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		75 - 120		05/27/11 12:10	1
Ethylbenzene-d10	104		75 - 125		05/27/11 12:10	1
Fluorobenzene (Surr)	100		70 - 130		05/27/11 12:10	1
Toluene-d8 (Surr)	95		75 - 125		05/27/11 12:10	1
Trifluorotoluene (Surr)	129	X I	80 - 125		05/27/11 12:10	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 23:31	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 23:31	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 23:31	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	97		50 - 150	05/19/11 09:29	05/23/11 23:31	1
4-Bromofluorobenzene (Surr)	62		50 - 150	05/19/11 09:29	05/23/11 23:31	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:20	1
Calcium	110		1.1		mg/L		05/27/11 11:13	05/27/11 19:20	1
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 19:20	1
Magnesium	72		1.1		mg/L		05/27/11 11:13	05/27/11 19:20	1
Potassium	3.7		3.3		mg/L		05/27/11 11:13	05/27/11 19:20	1
Sodium	22		2.0		mg/L		05/27/11 11:13	05/27/11 19:20	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-2-0511

Lab Sample ID: 580-26276-3

Date Collected: 05/16/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Barium	0.36		0.0060		mg/L		05/27/11 11:13	05/31/11 11:57	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 11:57	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Manganese	0.22		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 11:57	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 11:57	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 11:57	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 11:57	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:39	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-4-0511

Lab Sample ID: 580-26276-4

Date Collected: 05/16/11 13:10

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 14:37	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 14:37	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 14:37	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 14:37	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 14:37	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 14:37	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 14:37	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 14:37	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 14:37	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 14:37	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 14:37	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 14:37	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 14:37	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 14:37	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 14:37	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 14:37	1
2-Butanone	ND		2.0		ug/L			05/26/11 14:37	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 14:37	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 14:37	1
2-Hexanone	ND		1.0		ug/L			05/26/11 14:37	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 14:37	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 14:37	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 14:37	1
Acetone	ND		2.0		ug/L			05/26/11 14:37	1
Acrolein	ND		6.0		ug/L			05/26/11 14:37	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 14:37	1
Benzene	ND		0.10		ug/L			05/26/11 14:37	1
Bromobenzene	ND		0.10		ug/L			05/26/11 14:37	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 14:37	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 14:37	1
Bromoform	ND		0.10		ug/L			05/26/11 14:37	1
Bromomethane	ND		0.10		ug/L			05/26/11 14:37	1
Carbon disulfide	0.54		0.10		ug/L			05/26/11 14:37	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 14:37	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 14:37	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 14:37	1
Chloroethane	ND		0.25		ug/L			05/26/11 14:37	1
Chloroform	ND		0.10		ug/L			05/26/11 14:37	1
Chloromethane	ND		0.10		ug/L			05/26/11 14:37	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 14:37	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 14:37	1
Dibromomethane	ND		0.10		ug/L			05/26/11 14:37	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-4-0511

Lab Sample ID: 580-26276-4

Date Collected: 05/16/11 13:10

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 14:37	1
Iodomethane	ND		0.50		ug/L			05/26/11 14:37	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 14:37	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 14:37	1
Naphthalene	ND		0.40		ug/L			05/26/11 14:37	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
o-Xylene	ND		0.10		ug/L			05/26/11 14:37	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
Styrene	ND		0.10		ug/L			05/26/11 14:37	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 14:37	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 14:37	1
Toluene	ND		0.10		ug/L			05/26/11 14:37	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 14:37	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 14:37	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 14:37	1
Trichloroethene	ND		0.10		ug/L			05/26/11 14:37	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 14:37	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 14:37	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 14:37	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 14:37	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		75 - 120		05/26/11 14:37	1
Ethylbenzene-d10	99		75 - 125		05/26/11 14:37	1
Fluorobenzene (Surr)	100		70 - 130		05/26/11 14:37	1
Toluene-d8 (Surr)	92		75 - 125		05/26/11 14:37	1
Trifluorotoluene (Surr)	124		80 - 125		05/26/11 14:37	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/23/11 23:54	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/23/11 23:54	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/23/11 23:54	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	96		50 - 150	05/19/11 09:29	05/23/11 23:54	1
4-Bromofluorobenzene (Surr)	63		50 - 150	05/19/11 09:29	05/23/11 23:54	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:26	1
Calcium	110		1.1		mg/L		05/27/11 11:13	05/27/11 19:26	1
Iron	0.67		0.20		mg/L		05/27/11 11:13	05/27/11 19:26	1
Magnesium	70		1.1		mg/L		05/27/11 11:13	05/27/11 19:26	1
Potassium	3.9		3.3		mg/L		05/27/11 11:13	05/27/11 19:26	1
Sodium	28		2.0		mg/L		05/27/11 11:13	05/27/11 19:26	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-4-0511

Lab Sample ID: 580-26276-4

Date Collected: 05/16/11 13:10

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Barium	0.40		0.0060		mg/L		05/27/11 11:13	05/31/11 12:03	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 12:03	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Manganese	0.17		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:03	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 12:03	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 12:03	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 12:03	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:42	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-3-0511

Lab Sample ID: 580-26276-5

Date Collected: 05/17/11 10:35

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 15:02	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 15:02	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 15:02	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 15:02	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 15:02	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 15:02	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 15:02	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 15:02	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:02	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 15:02	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 15:02	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 15:02	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:02	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 15:02	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:02	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 15:02	1
2-Butanone	ND		2.0		ug/L			05/26/11 15:02	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 15:02	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 15:02	1
2-Hexanone	ND		1.0		ug/L			05/26/11 15:02	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 15:02	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 15:02	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 15:02	1
Acetone	ND		2.0		ug/L			05/26/11 15:02	1
Acrolein	ND		6.0		ug/L			05/26/11 15:02	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 15:02	1
Benzene	ND		0.10		ug/L			05/26/11 15:02	1
Bromobenzene	ND		0.10		ug/L			05/26/11 15:02	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 15:02	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 15:02	1
Bromoform	ND		0.10		ug/L			05/26/11 15:02	1
Bromomethane	ND		0.10		ug/L			05/26/11 15:02	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 15:02	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 15:02	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 15:02	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 15:02	1
Chloroethane	ND		0.25		ug/L			05/26/11 15:02	1
Chloroform	ND		0.10		ug/L			05/26/11 15:02	1
Chloromethane	ND		0.10		ug/L			05/26/11 15:02	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 15:02	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 15:02	1
Dibromomethane	ND		0.10		ug/L			05/26/11 15:02	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-3-0511

Lab Sample ID: 580-26276-5

Date Collected: 05/17/11 10:35

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 15:02	1
Iodomethane	ND		0.50		ug/L			05/26/11 15:02	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 15:02	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 15:02	1
Naphthalene	ND		0.40		ug/L			05/26/11 15:02	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
o-Xylene	ND		0.10		ug/L			05/26/11 15:02	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
Styrene	ND		0.10		ug/L			05/26/11 15:02	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 15:02	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 15:02	1
Toluene	ND		0.10		ug/L			05/26/11 15:02	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 15:02	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 15:02	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 15:02	1
Trichloroethene	ND		0.10		ug/L			05/26/11 15:02	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 15:02	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 15:02	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 15:02	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 15:02	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		75 - 120		05/26/11 15:02	1
Ethylbenzene-d10	95		75 - 125		05/26/11 15:02	1
Fluorobenzene (Surr)	95		70 - 130		05/26/11 15:02	1
Toluene-d8 (Surr)	91		75 - 125		05/26/11 15:02	1
Trifluorotoluene (Surr)	114		80 - 125		05/26/11 15:02	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.48		mg/L		05/19/11 09:29	05/24/11 00:17	1
Gasoline	ND		0.095		mg/L		05/19/11 09:29	05/24/11 00:17	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/24/11 00:17	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	98		50 - 150	05/19/11 09:29	05/24/11 00:17	1
4-Bromofluorobenzene (Surr)	71		50 - 150	05/19/11 09:29	05/24/11 00:17	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:33	1
Calcium	37		1.1		mg/L		05/27/11 11:13	05/27/11 19:33	1
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 19:33	1
Magnesium	16		1.1		mg/L		05/27/11 11:13	05/27/11 19:33	1
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 19:33	1
Sodium	9.5		2.0		mg/L		05/27/11 11:13	05/27/11 19:33	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-3-0511

Lab Sample ID: 580-26276-5

Date Collected: 05/17/11 10:35

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Barium	0.081		0.0060		mg/L		05/27/11 11:13	05/31/11 12:09	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 12:09	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Manganese	0.051		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:09	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 12:09	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 12:09	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 12:09	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:44	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-5-0511

Lab Sample ID: 580-26276-6

Date Collected: 05/17/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/27/11 12:36	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,1-Dichloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,1-Dichloroethene	ND		0.10		ug/L			05/27/11 12:36	1
1,1-Dichloropropene	ND		0.10		ug/L			05/27/11 12:36	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/27/11 12:36	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/27/11 12:36	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/27/11 12:36	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/27/11 12:36	1
1,2-Dibromoethane	ND		0.10		ug/L			05/27/11 12:36	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:36	1
1,2-Dichloroethane	ND		0.10		ug/L			05/27/11 12:36	1
1,2-Dichloropropane	ND		0.10		ug/L			05/27/11 12:36	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/27/11 12:36	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:36	1
1,3-Dichloropropane	ND		0.10		ug/L			05/27/11 12:36	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/27/11 12:36	1
2,2-Dichloropropane	ND		0.10		ug/L			05/27/11 12:36	1
2-Butanone	ND		2.0		ug/L			05/27/11 12:36	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/27/11 12:36	1
2-Chlorotoluene	ND		0.10		ug/L			05/27/11 12:36	1
2-Hexanone	ND		1.0		ug/L			05/27/11 12:36	1
4-Chlorotoluene	ND		0.20		ug/L			05/27/11 12:36	1
4-Isopropyltoluene	ND		0.20		ug/L			05/27/11 12:36	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/27/11 12:36	1
Acetone	ND		2.0		ug/L			05/27/11 12:36	1
Acrolein	ND		6.0		ug/L			05/27/11 12:36	1
Acrylonitrile	ND		2.0		ug/L			05/27/11 12:36	1
Benzene	ND		0.10		ug/L			05/27/11 12:36	1
Bromobenzene	ND		0.10		ug/L			05/27/11 12:36	1
Bromochloromethane	ND		0.10		ug/L			05/27/11 12:36	1
Bromodichloromethane	ND		0.10		ug/L			05/27/11 12:36	1
Bromoform	ND		0.10		ug/L			05/27/11 12:36	1
Bromomethane	ND		0.10		ug/L			05/27/11 12:36	1
Carbon disulfide	0.19		0.10		ug/L			05/27/11 12:36	1
Carbon tetrachloride	ND		0.10		ug/L			05/27/11 12:36	1
Chlorobenzene	ND		0.10		ug/L			05/27/11 12:36	1
Chlorodibromomethane	ND		0.10		ug/L			05/27/11 12:36	1
Chloroethane	ND		0.25		ug/L			05/27/11 12:36	1
Chloroform	ND		0.10		ug/L			05/27/11 12:36	1
Chloromethane	ND		0.10		ug/L			05/27/11 12:36	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 12:36	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 12:36	1
Dibromomethane	ND		0.10		ug/L			05/27/11 12:36	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-5-0511

Lab Sample ID: 580-26276-6

Date Collected: 05/17/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) - RA (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/27/11 12:36	1
Iodomethane	ND		0.50		ug/L			05/27/11 12:36	1
Isopropylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
Methylene Chloride	ND		0.50		ug/L			05/27/11 12:36	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/27/11 12:36	1
Naphthalene	ND		0.40		ug/L			05/27/11 12:36	1
n-Butylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
N-Propylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
o-Xylene	ND		0.10		ug/L			05/27/11 12:36	1
sec-Butylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
Styrene	ND		0.10		ug/L			05/27/11 12:36	1
tert-Butylbenzene	ND		0.10		ug/L			05/27/11 12:36	1
Tetrachloroethene	ND		0.10		ug/L			05/27/11 12:36	1
Toluene	ND		0.10		ug/L			05/27/11 12:36	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 12:36	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 12:36	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/27/11 12:36	1
Trichloroethene	ND		0.10		ug/L			05/27/11 12:36	1
Trichlorofluoromethane	ND		0.10		ug/L			05/27/11 12:36	1
Vinyl acetate	ND		0.50		ug/L			05/27/11 12:36	1
Vinyl chloride	ND		0.020		ug/L			05/27/11 12:36	1
Xylenes, Total	ND		0.10		ug/L			05/27/11 12:36	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		75 - 120		05/27/11 12:36	1
Ethylbenzene-d10	100		75 - 125		05/27/11 12:36	1
Fluorobenzene (Surr)	97		70 - 130		05/27/11 12:36	1
Toluene-d8 (Surr)	92		75 - 125		05/27/11 12:36	1
Trifluorotoluene (Surr)	110		80 - 125		05/27/11 12:36	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.48		mg/L		05/19/11 09:29	05/24/11 00:40	1
Gasoline	ND		0.095		mg/L		05/19/11 09:29	05/24/11 00:40	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/24/11 00:40	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	96		50 - 150	05/19/11 09:29	05/24/11 00:40	1
4-Bromofluorobenzene (Surr)	63		50 - 150	05/19/11 09:29	05/24/11 00:40	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:39	1
Calcium	95		1.1		mg/L		05/27/11 11:13	05/27/11 19:39	1
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 19:39	1
Magnesium	56		1.1		mg/L		05/27/11 11:13	05/27/11 19:39	1
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 19:39	1
Sodium	16		2.0		mg/L		05/27/11 11:13	05/27/11 19:39	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-5-0511

Lab Sample ID: 580-26276-6

Date Collected: 05/17/11 11:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Barium	0.31		0.0060		mg/L		05/27/11 11:13	05/31/11 12:14	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 12:14	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Manganese	0.28		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:14	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 12:14	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 12:14	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 12:14	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:46	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-EB-0511

Lab Sample ID: 580-26276-7

Date Collected: 05/17/11 13:00

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 15:54	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 15:54	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 15:54	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 15:54	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 15:54	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 15:54	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 15:54	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 15:54	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:54	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 15:54	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 15:54	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 15:54	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:54	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 15:54	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 15:54	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 15:54	1
2-Butanone	ND		2.0		ug/L			05/26/11 15:54	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 15:54	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 15:54	1
2-Hexanone	ND		1.0		ug/L			05/26/11 15:54	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 15:54	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 15:54	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 15:54	1
Acetone	ND		2.0		ug/L			05/26/11 15:54	1
Acrolein	ND		6.0		ug/L			05/26/11 15:54	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 15:54	1
Benzene	ND		0.10		ug/L			05/26/11 15:54	1
Bromobenzene	ND		0.10		ug/L			05/26/11 15:54	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 15:54	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 15:54	1
Bromoform	ND		0.10		ug/L			05/26/11 15:54	1
Bromomethane	ND		0.10		ug/L			05/26/11 15:54	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 15:54	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 15:54	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 15:54	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 15:54	1
Chloroethane	ND		0.25		ug/L			05/26/11 15:54	1
Chloroform	ND		0.10		ug/L			05/26/11 15:54	1
Chloromethane	ND		0.10		ug/L			05/26/11 15:54	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 15:54	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 15:54	1
Dibromomethane	ND		0.10		ug/L			05/26/11 15:54	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-EB-0511

Lab Sample ID: 580-26276-7

Date Collected: 05/17/11 13:00

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 15:54	1
Iodomethane	ND		0.50		ug/L			05/26/11 15:54	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 15:54	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 15:54	1
Naphthalene	ND		0.40		ug/L			05/26/11 15:54	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
o-Xylene	ND		0.10		ug/L			05/26/11 15:54	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
Styrene	ND		0.10		ug/L			05/26/11 15:54	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 15:54	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 15:54	1
Toluene	ND		0.10		ug/L			05/26/11 15:54	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 15:54	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 15:54	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 15:54	1
Trichloroethene	ND		0.10		ug/L			05/26/11 15:54	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 15:54	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 15:54	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 15:54	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 15:54	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		75 - 120		05/26/11 15:54	1
Ethylbenzene-d10	94		75 - 125		05/26/11 15:54	1
Fluorobenzene (Surr)	96		70 - 130		05/26/11 15:54	1
Toluene-d8 (Surr)	93		75 - 125		05/26/11 15:54	1
Trifluorotoluene (Surr)	115		80 - 125		05/26/11 15:54	1

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.48		mg/L		05/19/11 09:29	05/24/11 01:02	1
Gasoline	ND		0.095		mg/L		05/19/11 09:29	05/24/11 01:02	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/24/11 01:02	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	88		50 - 150	05/19/11 09:29	05/24/11 01:02	1
4-Bromofluorobenzene (Surr)	63		50 - 150	05/19/11 09:29	05/24/11 01:02	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:45	1
Calcium	ND		1.1		mg/L		05/27/11 11:13	05/27/11 19:45	1
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 19:45	1
Magnesium	ND		1.1		mg/L		05/27/11 11:13	05/27/11 19:45	1
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 19:45	1
Sodium	ND		2.0		mg/L		05/27/11 11:13	05/27/11 19:45	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-EB-0511

Lab Sample ID: 580-26276-7

Date Collected: 05/17/11 13:00

Matrix: Water

Date Received: 05/18/11 13:45

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Barium	ND		0.0060		mg/L		05/27/11 11:13	05/31/11 12:19	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 12:19	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Manganese	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 12:19	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 12:19	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 12:19	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 12:19	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:53	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-8-0511

Lab Sample ID: 580-26276-8

Date Collected: 05/17/11 13:50

Matrix: Water

Date Received: 05/18/11 13:45

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Motor Oil	ND		0.47		mg/L		05/19/11 09:29	05/24/11 01:25	1
Gasoline	ND		0.094		mg/L		05/19/11 09:29	05/24/11 01:25	1
#2 Diesel (>C12-C24)	ND		0.24		mg/L		05/19/11 09:29	05/24/11 01:25	1
Surrogate	% Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	97		50 - 150				05/19/11 09:29	05/24/11 01:25	1
4-Bromofluorobenzene (Surr)	64		50 - 150				05/19/11 09:29	05/24/11 01:25	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 19:51	1
Calcium	41		1.1		mg/L		05/27/11 11:13	05/27/11 19:51	1
Iron	9.9		0.20		mg/L		05/27/11 11:13	05/27/11 19:51	1
Magnesium	23		1.1		mg/L		05/27/11 11:13	05/27/11 19:51	1
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 19:51	1
Sodium	8.6		2.0		mg/L		05/27/11 11:13	05/27/11 19:51	1

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Barium	0.036		0.0060		mg/L		05/27/11 11:13	05/31/11 13:00	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 13:00	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Manganese	0.36		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 13:00	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 13:00	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 13:00	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 13:00	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 10:55	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-8-0511-D

Lab Sample ID: 580-26276-9

Date Collected: 05/17/11 13:55

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 16:19	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 16:19	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 16:19	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 16:19	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 16:19	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 16:19	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 16:19	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 16:19	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 16:19	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 16:19	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 16:19	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 16:19	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 16:19	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 16:19	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 16:19	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 16:19	1
2-Butanone	ND		2.0		ug/L			05/26/11 16:19	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 16:19	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 16:19	1
2-Hexanone	ND		1.0		ug/L			05/26/11 16:19	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 16:19	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 16:19	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 16:19	1
Acetone	ND		2.0		ug/L			05/26/11 16:19	1
Acrolein	ND		6.0		ug/L			05/26/11 16:19	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 16:19	1
Benzene	ND		0.10		ug/L			05/26/11 16:19	1
Bromobenzene	ND		0.10		ug/L			05/26/11 16:19	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 16:19	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 16:19	1
Bromoform	ND		0.10		ug/L			05/26/11 16:19	1
Bromomethane	ND		0.10		ug/L			05/26/11 16:19	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 16:19	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 16:19	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 16:19	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 16:19	1
Chloroethane	ND		0.25		ug/L			05/26/11 16:19	1
Chloroform	ND		0.10		ug/L			05/26/11 16:19	1
Chloromethane	ND		0.10		ug/L			05/26/11 16:19	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 16:19	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 16:19	1
Dibromomethane	ND		0.10		ug/L			05/26/11 16:19	1

TestAmerica Seattle

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-8-0511-D

Lab Sample ID: 580-26276-9

Date Collected: 05/17/11 13:55

Matrix: Water

Date Received: 05/18/11 13:45

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 16:19	1
Iodomethane	ND		0.50		ug/L			05/26/11 16:19	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 16:19	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 16:19	1
Naphthalene	ND		0.40		ug/L			05/26/11 16:19	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
o-Xylene	ND		0.10		ug/L			05/26/11 16:19	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
Styrene	ND		0.10		ug/L			05/26/11 16:19	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 16:19	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 16:19	1
Toluene	ND		0.10		ug/L			05/26/11 16:19	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 16:19	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 16:19	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 16:19	1
Trichloroethene	ND		0.10		ug/L			05/26/11 16:19	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 16:19	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 16:19	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 16:19	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 16:19	1

Surrogate	% Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		75 - 120		05/26/11 16:19	1
Ethylbenzene-d10	106		75 - 125		05/26/11 16:19	1
Fluorobenzene (Surr)	97		70 - 130		05/26/11 16:19	1
Toluene-d8 (Surr)	97		75 - 125		05/26/11 16:19	1
Trifluorotoluene (Surr)	119		80 - 125		05/26/11 16:19	1

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-86775/4

Matrix: Water

Analysis Batch: 86775

Client Sample ID: MB 580-86775/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/26/11 11:41	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
1,1-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/26/11 11:41	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/26/11 11:41	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/26/11 11:41	1
1,2-Dibromoethane	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,2-Dichloroethane	ND		0.10		ug/L			05/26/11 11:41	1
1,2-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
1,3-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/26/11 11:41	1
2,2-Dichloropropane	ND		0.10		ug/L			05/26/11 11:41	1
2-Butanone	ND		2.0		ug/L			05/26/11 11:41	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/26/11 11:41	1
2-Chlorotoluene	ND		0.10		ug/L			05/26/11 11:41	1
2-Hexanone	ND		1.0		ug/L			05/26/11 11:41	1
4-Chlorotoluene	ND		0.20		ug/L			05/26/11 11:41	1
4-Isopropyltoluene	ND		0.20		ug/L			05/26/11 11:41	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/26/11 11:41	1
Acetone	ND		2.0		ug/L			05/26/11 11:41	1
Acrolein	ND		6.0		ug/L			05/26/11 11:41	1
Acrylonitrile	ND		2.0		ug/L			05/26/11 11:41	1
Benzene	ND		0.10		ug/L			05/26/11 11:41	1
Bromobenzene	ND		0.10		ug/L			05/26/11 11:41	1
Bromochloromethane	ND		0.10		ug/L			05/26/11 11:41	1
Bromodichloromethane	ND		0.10		ug/L			05/26/11 11:41	1
Bromoform	ND		0.10		ug/L			05/26/11 11:41	1
Bromomethane	ND		0.10		ug/L			05/26/11 11:41	1
Carbon disulfide	ND		0.10		ug/L			05/26/11 11:41	1
Carbon tetrachloride	ND		0.10		ug/L			05/26/11 11:41	1
Chlorobenzene	ND		0.10		ug/L			05/26/11 11:41	1
Chlorodibromomethane	ND		0.10		ug/L			05/26/11 11:41	1
Chloroethane	ND		0.25		ug/L			05/26/11 11:41	1
Chloroform	ND		0.10		ug/L			05/26/11 11:41	1
Chloromethane	ND		0.10		ug/L			05/26/11 11:41	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
Dibromomethane	ND		0.10		ug/L			05/26/11 11:41	1

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-86775/4

Matrix: Water

Analysis Batch: 86775

Client Sample ID: MB 580-86775/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/26/11 11:41	1
Iodomethane	ND		0.50		ug/L			05/26/11 11:41	1
Isopropylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Methylene Chloride	ND		0.50		ug/L			05/26/11 11:41	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/26/11 11:41	1
Naphthalene	ND		0.40		ug/L			05/26/11 11:41	1
n-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
N-Propylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
o-Xylene	ND		0.10		ug/L			05/26/11 11:41	1
sec-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Styrene	ND		0.10		ug/L			05/26/11 11:41	1
tert-Butylbenzene	ND		0.10		ug/L			05/26/11 11:41	1
Tetrachloroethene	ND		0.10		ug/L			05/26/11 11:41	1
Toluene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/26/11 11:41	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/26/11 11:41	1
Trichloroethene	ND		0.10		ug/L			05/26/11 11:41	1
Trichlorofluoromethane	ND		0.10		ug/L			05/26/11 11:41	1
Vinyl acetate	ND		0.50		ug/L			05/26/11 11:41	1
Vinyl chloride	ND		0.020		ug/L			05/26/11 11:41	1
Xylenes, Total	ND		0.10		ug/L			05/26/11 11:41	1

Surrogate	MB % Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		75 - 120		05/26/11 11:41	1
Ethylbenzene-d10	97		75 - 125		05/26/11 11:41	1
Fluorobenzene (Surr)	96		70 - 130		05/26/11 11:41	1
Toluene-d8 (Surr)	94		75 - 125		05/26/11 11:41	1
Trifluorotoluene (Surr)	122		80 - 125		05/26/11 11:41	1

Lab Sample ID: LCS 580-86775/5

Matrix: Water

Analysis Batch: 86775

Client Sample ID: LCS 580-86775/5

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
1,1-Dichloroethene	5.00	5.40		ug/L		108	78 - 151
Benzene	5.00	4.71		ug/L		94	75 - 142
Chlorobenzene	5.00	5.32		ug/L		106	71 - 140
Toluene	5.00	5.11		ug/L		102	80 - 126
Trichloroethene	5.00	5.06		ug/L		101	79 - 131

Surrogate	LCS % Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		75 - 120
Ethylbenzene-d10	101		75 - 125
Fluorobenzene (Surr)	99		70 - 130
Toluene-d8 (Surr)	96		75 - 125
Trifluorotoluene (Surr)	118		80 - 125

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-26276-9 MS

Matrix: Water

Analysis Batch: 86775

Client Sample ID: LMW-8-0511-D

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	% Rec	% Rec. Limits
1,1-Dichloroethene	ND		5.00	4.98		ug/L		100	78 - 151
Benzene	ND		5.00	4.55		ug/L		91	75 - 142
Chlorobenzene	ND		5.00	5.50		ug/L		110	71 - 140
Toluene	ND		5.00	5.05		ug/L		101	80 - 126
Trichloroethene	ND		5.00	4.88		ug/L		98	79 - 131

Surrogate	MS % Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		75 - 120
Ethylbenzene-d10	102		75 - 125
Fluorobenzene (Surr)	97		70 - 130
Toluene-d8 (Surr)	96		75 - 125
Trifluorotoluene (Surr)	118		80 - 125

Lab Sample ID: 580-26276-9 MSD

Matrix: Water

Analysis Batch: 86775

Client Sample ID: LMW-8-0511-D

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	ND		5.00	5.06		ug/L		101	78 - 151	2	30
Benzene	ND		5.00	4.30		ug/L		86	75 - 142	6	30
Chlorobenzene	ND		5.00	5.17		ug/L		103	71 - 140	6	30
Toluene	ND		5.00	4.77		ug/L		95	80 - 126	6	30
Trichloroethene	ND		5.00	4.93		ug/L		99	79 - 131	1	30

Surrogate	MSD % Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	98		75 - 120
Ethylbenzene-d10	101		75 - 125
Fluorobenzene (Surr)	96		70 - 130
Toluene-d8 (Surr)	93		75 - 125
Trifluorotoluene (Surr)	111		80 - 125

Lab Sample ID: MB 580-86853/4

Matrix: Water

Analysis Batch: 86853

Client Sample ID: MB 580-86853/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,1,1-Trichloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,1,2,2-Tetrachloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		0.20		ug/L			05/27/11 10:54	1
1,1,2-Trichloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,1-Dichloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,1-Dichloropropene	ND		0.10		ug/L			05/27/11 10:54	1
1,2,3-Trichlorobenzene	ND		0.40		ug/L			05/27/11 10:54	1
1,2,3-Trichloropropane	ND		0.20		ug/L			05/27/11 10:54	1
1,2,4-Trichlorobenzene	ND		0.20		ug/L			05/27/11 10:54	1
1,2,4-Trimethylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
1,2-Dibromo-3-Chloropropane	ND		0.40		ug/L			05/27/11 10:54	1

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-86853/4

Matrix: Water

Analysis Batch: 86853

Client Sample ID: MB 580-86853/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.10		ug/L			05/27/11 10:54	1
1,2-Dichlorobenzene	ND		0.20		ug/L			05/27/11 10:54	1
1,2-Dichloroethane	ND		0.10		ug/L			05/27/11 10:54	1
1,2-Dichloropropane	ND		0.10		ug/L			05/27/11 10:54	1
1,3,5-Trichlorobenzene	ND		0.20		ug/L			05/27/11 10:54	1
1,3,5-Trimethylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
1,3-Dichlorobenzene	ND		0.20		ug/L			05/27/11 10:54	1
1,3-Dichloropropane	ND		0.10		ug/L			05/27/11 10:54	1
1,4-Dichlorobenzene	ND		0.20		ug/L			05/27/11 10:54	1
2,2-Dichloropropane	ND		0.10		ug/L			05/27/11 10:54	1
2-Butanone	ND		2.0		ug/L			05/27/11 10:54	1
2-Chloroethyl vinyl ether	ND		6.0		ug/L			05/27/11 10:54	1
2-Chlorotoluene	ND		0.10		ug/L			05/27/11 10:54	1
2-Hexanone	ND		1.0		ug/L			05/27/11 10:54	1
4-Chlorotoluene	ND		0.20		ug/L			05/27/11 10:54	1
4-Isopropyltoluene	ND		0.20		ug/L			05/27/11 10:54	1
4-Methyl-2-pentanone	ND		0.50		ug/L			05/27/11 10:54	1
Acetone	ND		2.0		ug/L			05/27/11 10:54	1
Acrolein	ND		6.0		ug/L			05/27/11 10:54	1
Acrylonitrile	ND		2.0		ug/L			05/27/11 10:54	1
Benzene	ND		0.10		ug/L			05/27/11 10:54	1
Bromobenzene	ND		0.10		ug/L			05/27/11 10:54	1
Bromochloromethane	ND		0.10		ug/L			05/27/11 10:54	1
Bromodichloromethane	ND		0.10		ug/L			05/27/11 10:54	1
Bromoform	ND		0.10		ug/L			05/27/11 10:54	1
Bromomethane	ND		0.10		ug/L			05/27/11 10:54	1
Carbon disulfide	ND		0.10		ug/L			05/27/11 10:54	1
Carbon tetrachloride	ND		0.10		ug/L			05/27/11 10:54	1
Chlorobenzene	ND		0.10		ug/L			05/27/11 10:54	1
Chlorodibromomethane	ND		0.10		ug/L			05/27/11 10:54	1
Chloroethane	ND		0.25		ug/L			05/27/11 10:54	1
Chloroform	ND		0.10		ug/L			05/27/11 10:54	1
Chloromethane	ND		0.10		ug/L			05/27/11 10:54	1
cis-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 10:54	1
cis-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 10:54	1
Dibromomethane	ND		0.10		ug/L			05/27/11 10:54	1
Ethylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
Hexachloro-1,3-butadiene	ND		0.20		ug/L			05/27/11 10:54	1
Iodomethane	ND		0.50		ug/L			05/27/11 10:54	1
Isopropylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
Methylene Chloride	ND		0.50		ug/L			05/27/11 10:54	1
m-Xylene & p-Xylene	ND		0.20		ug/L			05/27/11 10:54	1
Naphthalene	ND		0.40		ug/L			05/27/11 10:54	1
n-Butylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
N-Propylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
o-Xylene	ND		0.10		ug/L			05/27/11 10:54	1
sec-Butylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
Styrene	ND		0.10		ug/L			05/27/11 10:54	1
tert-Butylbenzene	ND		0.10		ug/L			05/27/11 10:54	1
Tetrachloroethene	ND		0.10		ug/L			05/27/11 10:54	1

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-86853/4

Matrix: Water

Analysis Batch: 86853

Client Sample ID: MB 580-86853/4

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		0.10		ug/L			05/27/11 10:54	1
trans-1,2-Dichloroethene	ND		0.10		ug/L			05/27/11 10:54	1
trans-1,3-Dichloropropene	ND		0.10		ug/L			05/27/11 10:54	1
trans-1,4-Dichloro-2-butene	ND		1.0		ug/L			05/27/11 10:54	1
Trichloroethene	ND		0.10		ug/L			05/27/11 10:54	1
Trichlorofluoromethane	ND		0.10		ug/L			05/27/11 10:54	1
Vinyl acetate	ND		0.50		ug/L			05/27/11 10:54	1
Vinyl chloride	ND		0.020		ug/L			05/27/11 10:54	1
Xylenes, Total	ND		0.10		ug/L			05/27/11 10:54	1

Surrogate	MB % Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		75 - 120		05/27/11 10:54	1
Ethylbenzene-d10	96		75 - 125		05/27/11 10:54	1
Fluorobenzene (Surr)	94		70 - 130		05/27/11 10:54	1
Toluene-d8 (Surr)	92		75 - 125		05/27/11 10:54	1
Trifluorotoluene (Surr)	110		80 - 125		05/27/11 10:54	1

Lab Sample ID: LCS 580-86853/5

Matrix: Water

Analysis Batch: 86853

Client Sample ID: LCS 580-86853/5

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
1,1-Dichloroethene	5.00	5.74		ug/L		115	78 - 151
Benzene	5.00	4.73		ug/L		95	75 - 142
Chlorobenzene	5.00	4.92		ug/L		98	71 - 140
Toluene	5.00	5.09		ug/L		102	80 - 126
Trichloroethene	5.00	5.47		ug/L		109	79 - 131

Surrogate	LCS % Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	98		75 - 120
Ethylbenzene-d10	96		75 - 125
Fluorobenzene (Surr)	97		70 - 130
Toluene-d8 (Surr)	93		75 - 125
Trifluorotoluene (Surr)	128 X		80 - 125

Lab Sample ID: LCSD 580-86853/6

Matrix: Water

Analysis Batch: 86853

Client Sample ID: LCSD 580-86853/6

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	5.00	5.54		ug/L		111	78 - 151	4	20
Benzene	5.00	4.70		ug/L		94	75 - 142	1	20
Chlorobenzene	5.00	5.18		ug/L		104	71 - 140	5	20
Toluene	5.00	4.90		ug/L		98	80 - 126	4	20
Trichloroethene	5.00	5.30		ug/L		106	79 - 131	3	20

Surrogate	LCSD % Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	96		75 - 120
Ethylbenzene-d10	96		75 - 125

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-86853/6

Matrix: Water

Analysis Batch: 86853

Client Sample ID: LCSD 580-86853/6

Prep Type: Total/NA

	LCSD	LCSD	
Surrogate	% Recovery	Qualifier	Limits
Fluorobenzene (Surr)	95		70 - 130
Toluene-d8 (Surr)	90		75 - 125
Trifluorotoluene (Surr)	117		80 - 125

Method: NWTPH-HCID - Northwest - Hydrocarbon Identification (GC)

Lab Sample ID: MB 580-86307/1-A

Matrix: Water

Analysis Batch: 86482

Client Sample ID: MB 580-86307/1-A

Prep Type: Total/NA

Prep Batch: 86307

	MB	MB								
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Motor Oil	ND		0.50		mg/L		05/19/11 09:29	05/23/11 18:05	1	
Gasoline	ND		0.10		mg/L		05/19/11 09:29	05/23/11 18:05	1	
#2 Diesel (>C12-C24)	ND		0.25		mg/L		05/19/11 09:29	05/23/11 18:05	1	
Surrogate	% Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
o-Terphenyl	84		50 - 150				05/19/11 09:29	05/23/11 18:05	1	
4-Bromofluorobenzene (Surr)	56		50 - 150				05/19/11 09:29	05/23/11 18:05	1	

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 580-86859/18-A

Matrix: Water

Analysis Batch: 86919

Client Sample ID: MB 580-86859/18-A

Prep Type: Total Recoverable

Prep Batch: 86859

	MB	MB								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Aluminum	ND		1.0		mg/L		05/27/11 11:13	05/27/11 18:12	1	
Calcium	ND		1.1		mg/L		05/27/11 11:13	05/27/11 18:12	1	
Iron	ND		0.20		mg/L		05/27/11 11:13	05/27/11 18:12	1	
Magnesium	ND		1.1		mg/L		05/27/11 11:13	05/27/11 18:12	1	
Potassium	ND		3.3		mg/L		05/27/11 11:13	05/27/11 18:12	1	
Sodium	ND		2.0		mg/L		05/27/11 11:13	05/27/11 18:12	1	

Lab Sample ID: LCS 580-86859/19-A

Matrix: Water

Analysis Batch: 86919

Client Sample ID: LCS 580-86859/19-A

Prep Type: Total Recoverable

Prep Batch: 86859

	Spike	LCS	LCS							
Analyte	Added	Result	Qualifier	Unit	D	% Rec	% Rec.	Limits		
Aluminum	4.00	3.98		mg/L		99		80 - 120		
Calcium	20.0	20.4		mg/L		102		80 - 120		
Iron	22.0	22.4		mg/L		102		80 - 120		
Magnesium	20.0	20.8		mg/L		104		80 - 120		
Potassium	20.0	20.8		mg/L		104		80 - 120		
Sodium	20.0	19.8		mg/L		99		80 - 120		

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCSD 580-86859/20-A

Matrix: Water

Analysis Batch: 86919

Client Sample ID: LCSD 580-86859/20-A

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec.		RPD	Limit
							Limits	RPD		
Aluminum	4.00	3.88		mg/L		97	80 - 120	2		20
Calcium	20.0	20.6		mg/L		103	80 - 120	1		20
Iron	22.0	22.4		mg/L		102	80 - 120	0		20
Magnesium	20.0	21.1		mg/L		105	80 - 120	1		20
Potassium	20.0	21.4		mg/L		107	80 - 120	3		20
Sodium	20.0	20.8		mg/L		104	80 - 120	5		20

Lab Sample ID: 580-26276-2 MS

Matrix: Water

Analysis Batch: 86919

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	% Rec	% Rec.		RPD	Limit
									Limits	RPD		
Aluminum	ND		4.00	4.04		mg/L		101	80 - 120			
Calcium	6.6		20.0	26.9		mg/L		101	80 - 120			
Iron	ND		22.0	22.5		mg/L		102	80 - 120			
Magnesium	2.9		20.0	23.3		mg/L		102	80 - 120			
Potassium	ND		20.0	22.8		mg/L		107	80 - 120			
Sodium	81		20.0	101	4	mg/L		103	80 - 120			

Lab Sample ID: 580-26276-2 MSD

Matrix: Water

Analysis Batch: 86919

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	% Rec	% Rec.		RPD	Limit
									Limits	RPD		
Aluminum	ND		4.00	3.89		mg/L		97	80 - 120	4		20
Calcium	6.6		20.0	26.6		mg/L		100	80 - 120	1		20
Iron	ND		22.0	22.3		mg/L		101	80 - 120	1		20
Magnesium	2.9		20.0	23.5		mg/L		103	80 - 120	1		20
Potassium	ND		20.0	22.6		mg/L		106	80 - 120	1		20
Sodium	81		20.0	101	4	mg/L		100	80 - 120	0		20

Lab Sample ID: 580-26276-2 DU

Matrix: Water

Analysis Batch: 86919

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Aluminum	ND		ND		mg/L		NC	20
Calcium	6.6		6.70		mg/L		1	20
Iron	ND		ND		mg/L		NC	20
Magnesium	2.9		2.98		mg/L		2	20
Potassium	ND		ND		mg/L		NC	20
Sodium	81		80.1		mg/L		0.6	20

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 580-86859/18-A

Matrix: Water

Analysis Batch: 86963

Client Sample ID: MB 580-86859/18-A

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Antimony	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Barium	ND		0.0060		mg/L		05/27/11 11:13	05/31/11 10:44	5
Beryllium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Cadmium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Chromium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Cobalt	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Copper	ND		0.0050		mg/L		05/27/11 11:13	05/31/11 10:44	5
Lead	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Manganese	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Nickel	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Selenium	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Silver	ND		0.0020		mg/L		05/27/11 11:13	05/31/11 10:44	5
Thallium	ND		0.0040		mg/L		05/27/11 11:13	05/31/11 10:44	5
Vanadium	ND		0.010		mg/L		05/27/11 11:13	05/31/11 10:44	5
Zinc	ND		0.0070		mg/L		05/27/11 11:13	05/31/11 10:44	5

Lab Sample ID: LCS 580-86859/19-A

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LCS 580-86859/19-A

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
Arsenic	4.00	4.12		mg/L		103	80 - 120
Antimony	3.00	2.98		mg/L		100	80 - 120
Barium	4.00	4.06		mg/L		102	80 - 120
Beryllium	0.100	0.0978		mg/L		98	80 - 120
Cadmium	0.100	0.0997		mg/L		100	80 - 120
Chromium	0.400	0.402		mg/L		100	80 - 120
Cobalt	1.00	1.02		mg/L		102	80 - 120
Copper	0.500	0.514		mg/L		103	80 - 120
Lead	1.00	1.01		mg/L		101	80 - 120
Manganese	1.00	1.03		mg/L		103	80 - 120
Nickel	1.00	1.00		mg/L		100	80 - 120
Selenium	4.00	4.18		mg/L		105	80 - 120
Silver	0.600	0.635		mg/L		106	80 - 120
Thallium	4.00	4.17		mg/L		104	80 - 120
Vanadium	1.00	0.999		mg/L		100	80 - 120
Zinc	1.00	1.02		mg/L		102	80 - 120

Lab Sample ID: LCSD 580-86859/20-A

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LCSD 580-86859/20-A

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Arsenic	4.00	4.06		mg/L		101	80 - 120	2	20
Antimony	3.00	2.94		mg/L		98	80 - 120	2	20
Barium	4.00	4.00		mg/L		100	80 - 120	2	20
Beryllium	0.100	0.104		mg/L		104	80 - 120	6	20
Cadmium	0.100	0.0980		mg/L		98	80 - 120	2	20
Chromium	0.400	0.389		mg/L		97	80 - 120	3	20

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 580-86859/20-A

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LCSD 580-86859/20-A

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Cobalt	1.00	0.999		mg/L		100	80 - 120	2	20
Copper	0.500	0.510		mg/L		102	80 - 120	1	20
Lead	1.00	1.01		mg/L		101	80 - 120	0	20
Manganese	1.00	1.01		mg/L		101	80 - 120	2	20
Nickel	1.00	0.978		mg/L		98	80 - 120	3	20
Selenium	4.00	4.20		mg/L		105	80 - 120	1	20
Silver	0.600	0.619		mg/L		103	80 - 120	3	20
Thallium	4.00	4.17		mg/L		104	80 - 120	0	20
Vanadium	1.00	0.982		mg/L		98	80 - 120	2	20
Zinc	1.00	1.00		mg/L		100	80 - 120	2	20

Lab Sample ID: 580-26276-2 MS

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Arsenic	ND		4.00	4.34		mg/L		108	80 - 120		
Antimony	ND		3.00	3.17		mg/L		106	80 - 120		
Barium	0.038		4.00	4.25		mg/L		105	80 - 120		
Beryllium	ND		0.100	0.104		mg/L		104	80 - 120		
Cadmium	ND		0.100	0.104		mg/L		104	80 - 120		
Chromium	ND		0.400	0.426		mg/L		106	80 - 120		
Cobalt	ND		1.00	1.09		mg/L		109	80 - 120		
Copper	ND		0.500	0.545		mg/L		109	80 - 120		
Lead	ND		1.00	1.08		mg/L		108	80 - 120		
Manganese	0.0082		1.00	1.11		mg/L		110	80 - 120		
Nickel	ND		1.00	1.08		mg/L		108	80 - 120		
Selenium	ND		4.00	4.44		mg/L		111	80 - 120		
Silver	ND		0.600	0.650		mg/L		108	80 - 120		
Thallium	ND		4.00	4.43		mg/L		111	80 - 120		
Vanadium	ND		1.00	1.09		mg/L		109	80 - 120		
Zinc	0.0099		1.00	1.07		mg/L		106	80 - 120		

Lab Sample ID: 580-26276-2 MSD

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Arsenic	ND		4.00	4.35		mg/L		109	80 - 120	0	20
Antimony	ND		3.00	3.16		mg/L		105	80 - 120	0	20
Barium	0.038		4.00	4.28		mg/L		106	80 - 120	1	20
Beryllium	ND		0.100	0.0996		mg/L		100	80 - 120	4	20
Cadmium	ND		0.100	0.109		mg/L		109	80 - 120	4	20
Chromium	ND		0.400	0.435		mg/L		108	80 - 120	2	20
Cobalt	ND		1.00	1.08		mg/L		108	80 - 120	1	20
Copper	ND		0.500	0.548		mg/L		109	80 - 120	1	20
Lead	ND		1.00	1.07		mg/L		107	80 - 120	1	20
Manganese	0.0082		1.00	1.11		mg/L		110	80 - 120	0	20
Nickel	ND		1.00	1.08		mg/L		108	80 - 120	1	20
Selenium	ND		4.00	4.53		mg/L		113	80 - 120	2	20

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-26276-2 MSD

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Silver	ND		0.600	0.652		mg/L		109	80 - 120	0	20
Thallium	ND		4.00	4.43		mg/L		111	80 - 120	0	20
Vanadium	ND		1.00	1.08		mg/L		108	80 - 120	1	20
Zinc	0.0099		1.00	1.09		mg/L		108	80 - 120	2	20

Lab Sample ID: 580-26276-2 DU

Matrix: Water

Analysis Batch: 86963

Client Sample ID: LMW-10-0511

Prep Type: Total Recoverable

Prep Batch: 86859

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	ND		ND		mg/L		NC	20
Antimony	ND		ND		mg/L		NC	20
Barium	0.038		0.0374		mg/L		2	20
Beryllium	ND		ND		mg/L		NC	20
Cadmium	ND		ND		mg/L		NC	20
Chromium	ND		ND		mg/L		NC	20
Cobalt	ND		ND		mg/L		NC	20
Copper	ND		ND		mg/L		NC	20
Lead	ND		ND		mg/L		NC	20
Manganese	0.0082		0.00755		mg/L		8	20
Nickel	ND		ND		mg/L		NC	20
Selenium	ND		ND		mg/L		NC	20
Silver	ND		ND		mg/L		NC	20
Thallium	ND		ND		mg/L		NC	20
Vanadium	ND		ND		mg/L		NC	20
Zinc	0.0099		ND		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 580-86343/19-A

Matrix: Water

Analysis Batch: 86425

Client Sample ID: MB 580-86343/19-A

Prep Type: Total/NA

Prep Batch: 86343

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		05/19/11 13:45	05/20/11 09:58	1

Lab Sample ID: LCS 580-86343/20-A

Matrix: Water

Analysis Batch: 86425

Client Sample ID: LCS 580-86343/20-A

Prep Type: Total/NA

Prep Batch: 86343

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	% Rec	% Rec. Limits
Mercury	0.00200	0.00200		mg/L		100	80 - 120

Lab Sample ID: LCSD 580-86343/21-A

Matrix: Water

Analysis Batch: 86425

Client Sample ID: LCSD 580-86343/21-A

Prep Type: Total/NA

Prep Batch: 86343

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	% Rec	% Rec. Limits	RPD	RPD Limit
Mercury	0.00200	0.00196		mg/L		98	80 - 120	2	20

TestAmerica Seattle

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCSSRM 580-86343/22-A

Matrix: Water

Analysis Batch: 86425

Client Sample ID: LCSSRM 580-86343/22-A

Prep Type: Total/NA

Prep Batch: 86343

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	% Rec	% Rec. Limits
Mercury	0.00200	0.00192		mg/L		96	75 - 125

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: Trip Blank

Date Collected: 05/16/11 00:00

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 13:09	SK	TAL SEA

Client Sample ID: LMW-10-0511

Date Collected: 05/16/11 09:45

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 13:34	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 23:08	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:37	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 18:36	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 10:56	FCW	TAL SEA

Client Sample ID: LMW-2-0511

Date Collected: 05/16/11 11:50

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	RA	1	86853	05/27/11 12:10	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 23:31	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:39	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:20	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 11:57	FCW	TAL SEA

Client Sample ID: LMW-4-0511

Date Collected: 05/16/11 13:10

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 14:37	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/23/11 23:54	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:42	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:26	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 12:03	FCW	TAL SEA

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-3-0511

Date Collected: 05/17/11 10:35

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 15:02	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/24/11 00:17	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:44	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:33	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 12:09	FCW	TAL SEA

Client Sample ID: LMW-5-0511

Date Collected: 05/17/11 11:50

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	RA	1	86853	05/27/11 12:36	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/24/11 00:40	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:46	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:39	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 12:14	FCW	TAL SEA

Client Sample ID: LMW-EB-0511

Date Collected: 05/17/11 13:00

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 15:54	SK	TAL SEA
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/24/11 01:02	ES	TAL SEA
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:53	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:45	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 12:19	FCW	TAL SEA

Client Sample ID: LMW-8-0511

Date Collected: 05/17/11 13:50

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			86307	05/19/11 09:29	DB	TAL SEA
Total/NA	Analysis	NWTPH-HCID		1	86482	05/24/11 01:25	ES	TAL SEA

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Client Sample ID: LMW-8-0511

Date Collected: 05/17/11 13:50

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			86343	05/19/11 13:45	PAB	TAL SEA
Total/NA	Analysis	7470A		1	86425	05/20/11 10:55	FCW	TAL SEA
Total Recoverable	Prep	3005A			86859	05/27/11 11:13	ZF	TAL SEA
Total Recoverable	Analysis	6010B		1	86919	05/27/11 19:51	SP	TAL SEA
Total Recoverable	Analysis	6020		5	86963	05/31/11 13:00	FCW	TAL SEA

Client Sample ID: LMW-8-0511-D

Date Collected: 05/17/11 13:55

Date Received: 05/18/11 13:45

Lab Sample ID: 580-26276-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared Or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	86775	05/26/11 16:19	SK	TAL SEA

Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Golder Associates Inc.
Project/Site: Landsburg Mine, Maple Valley, WA

TestAmerica Job ID: 580-26276-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle		USDA		P330-11-00222
TestAmerica Seattle	Alaska	Alaska UST	10	UST-022
TestAmerica Seattle	California	NELAC	9	1115CA
TestAmerica Seattle	Florida	NELAC	4	E871074
TestAmerica Seattle	L-A-B	DoD ELAP	0	L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025	0	L2236
TestAmerica Seattle	Louisiana	NELAC	6	05016
TestAmerica Seattle	Montana	MT DEQ UST	8	N/A
TestAmerica Seattle	Oregon	NELAC	10	WA100007
TestAmerica Seattle	Washington	State Program	10	C553

Accreditation may not be offered or required for all methods and analytes reported in this package . Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Summary

Client: Golder Associates Inc.

TestAmerica Job ID: 580-26276-1

Project/Site: Landsburg Mine, Maple Valley, WA

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-26276-1	Trip Blank	Water	05/16/11 00:00	05/18/11 13:45
580-26276-2	LMW-10-0511	Water	05/16/11 09:45	05/18/11 13:45
580-26276-3	LMW-2-0511	Water	05/16/11 11:50	05/18/11 13:45
580-26276-4	LMW-4-0511	Water	05/16/11 13:10	05/18/11 13:45
580-26276-5	LMW-3-0511	Water	05/17/11 10:35	05/18/11 13:45
580-26276-6	LMW-5-0511	Water	05/17/11 11:50	05/18/11 13:45
580-26276-7	LMW-EB-0511	Water	05/17/11 13:00	05/18/11 13:45
580-26276-8	LMW-8-0511	Water	05/17/11 13:50	05/18/11 13:45
580-26276-9	LMW-8-0511-D	Water	05/17/11 13:55	05/18/11 13:45

Login Sample Receipt Checklist

Client: Golder Associates Inc.

Job Number: 580-26276-1

Login Number: 26276

List Source: TestAmerica Seattle

List Number: 1

Creator: Luna, Francisco

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Not requested on COC.
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	containers for diss. met. received unpres.;pres. on receipt w/HNO3, lot J41037.
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX B
SAMPLE INTEGRITY DATA SHEETS (SIDS)

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-2-0511
 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 5/16/2011 Time 1150

Media Water Station LMW-2

Sample Type: grab time composite space composite

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

SWL 6.84 (21010 on 5/16/2011), 6.88 @ 1336 on 5/12/11
ft below TOC (monument at elev. X) (bottom at 38.1 ft bgs, 4-in casing)

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

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

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

Sample Description clear, sulfur odor

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

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 – 40 mL	VOA	VOA Vial	HCl
1 – 250 ml	Total Metals	HDPE	HNO3 (non)
1 – 250 ml	Dissolved Metals	HDPE	None (filter)
2 – 1 Liter, 3 – 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/16/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-2
 Date 5/16/2011
 Time Begin Purge 1015
 Time Collect Sample 1150

on pH meter, verified
 w/ the 1 meter

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
6.84	1020	~7 gal	6.87	652	10.5	0.07	0.47	NA
	1025		6.91	653	10.5	0.05	0.41	NA
	1045	30	6.90	652	10.5	0.02	0.41	NA
	1100		6.96	652	10.5	0.02	0.40	NA
	1115	60	6.96	652	10.5	0.02	0.46	NA
	1130		6.94	651	10.5	0.02	0.36	NA
	1145		6.96	651	10.5	0.02	0.38	NA
	1140		6.97	651	10.5	0.02	0.31	NA
	1145	90 gal	6.97	651	10.5	0.02	0.32	NA

Comments:

Ground for controller @ 80 Hz
 Sulfur odor

Eh - no readings, meter not
 working

PID = 0.0 ppm

$\frac{5 \text{ gal}}{5 \text{ min}} = \frac{1 \text{ gal}}{\text{min}}$

$\frac{30 \text{ gal}}{1 \text{ gal/min}} = 30 \text{ min / well vol}$

Sampler's Initials SL

SAMPLE INTEGRITY DATA SHEET

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

Site Location Ravensdale, WA Sample ID LMW-3-0511

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 5/17/2011 Time 1035

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 - 10.68 ^{0830 5/17/2011} ft below TOC (monument at elev. X) (bottom at 64.8 ft bgs, 4-in casing)

Screen Interval - 49.8-64.8 ft bgs Monument: 3.08 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)

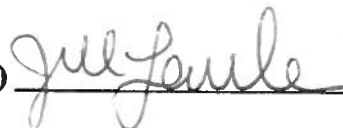
(~27.0 gal/total well vol below packer)

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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/17/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-3
 Date 5/17/2011
 Time Begin Purge 0906
 Time Collect Sample 1035

Split Samples prepared for Aspect Consultant.

*

* Data from pH Meter. Thermo Verified

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
	933		7.66	191.5	10.7	0.15	0.37	506.1*
	1000		7.79	199.9	10.7	0.03	0.43	380.
	1005		8.04	202.1	10.7	0.03	0.46	392.
	1010		7.85	203.7	10.7	0.02	0.39	473.
	1015		7.80	204.3	10.7	0.02	0.40	299.
	1020		7.77	204.9	10.7	0.02	0.40	481.1
	1025		7.76	205.2	10.7	0.02	0.44	358.
	1030		7.75	205.7	10.7	0.04	0.32	515.

Comments:

Gruncifos @ 110 HZ / * Eh meter is a little erratic. Variable from 503-509.

Packer inflated to 180 psi - 3.08

$$25 \text{ psi} + \left[(64.8 - \frac{10.68}{10.68}) \times 0.43 \frac{\text{psi}}{\text{ft}} \right] \times 1.1 = 50 \text{ psi}$$

$$\frac{5 \text{ gal}}{5 \text{ min}} = \frac{1 \text{ gal}}{\text{min}} = 27 \frac{\text{min}}{\text{well vol}}$$

PID = 0.0 ppm

* Cond. readings taken w/ temp

conv. off need to convert to 25°C

Sampler's Initials jsl

902
27
932
27
60

Golder Associates

Field_parameters_blank.xls Landsburg

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-4-0511
 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 5/16/2011 Time 1310

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 - 8.91 @ 1325 on 5/12/2011 ft below TOC (monument at elev. X) (bottom at 209.7 ft bgs, 4-in casing)

Screen Interval - 195-209.7 ft bgs Monument: 2.76 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)

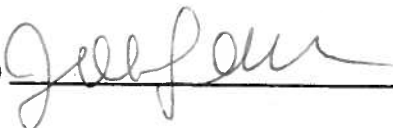
** Depths corrected for 70° inclination

Sample Description clear, 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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/16/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-4
 Date 5/16/2011
 Time Begin Purge 1201
 Time Collect Sample 1310

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
	1205		7.00	662	10.4°	0.08	0.35	NA
	1220	~22 gal	7.01	660	10.4	0.04	0.47	NA
	1235		7.02	659	10.4	0.03	0.45	NA
	1250	~44 gal	7.74	657	10.5	0.03	0.41	NA
	1255		7.46	658	10.5	0.03	0.58	NA
	1300		7.20	657	10.5	0.03	0.40	NA
	1305	~66 gal	7.12	657	10.5	0.03	0.40	NA

Comments:

Grundfos @ 118 Hz

Sulfur odor.

$$\frac{5 \text{ gal}}{4 \text{ min}} = 1.25 \frac{\text{gal}}{\text{min}}$$

* no eh readings b/c meter is not working.

$$\frac{27 \text{ gal}}{1.25 \frac{\text{gal}}{\text{min}}} = 22 \text{ min}$$

Inflated packer to 140 psi

PID = 0.0 ppm

Sampler's Initials JK

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-5-0511
 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 5/17/2011 Time 1140 1150 js

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 - 12.11 @ 0830 on 5/17/2011 ft below TOC (monument at elev. X) (bottom at 241.8 ft bgs, 4-in casing)

Screen Interval - 231.8-241.8 ft bgs Monument: 3.24 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, 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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) Jell Bank Date 5/17/2011
 Supervisor (signature) _____ Date _____

Well ID LMW-5 / Split samples prepared
 Date 5/17/2011 for Aspect consultant
 Time Begin Purge 1054
 Time Collect Sample ~~1110~~ 1050

Q) Graph meter - verified w/ Thermometer.

[illegible]

Comments:
Ground pos @ 157 Hz $\rightarrow$ reduced to 150 Hz @ 1107.

lacher@125Hz

$\frac{5 \text{ gal}}{3.5 \text{ min}} = 1.45 \frac{\text{gal}}{\text{min}}$
 $\frac{19}{1.4} = \frac{13 \text{ min}}{\text{well vol}}$

$$25 \text{ psi} + \left[(241.8 - 12.11 - 3.24) \times 0.43 \frac{\text{psi}}{\text{ft}} \right] \times 1.1 = 132 \text{ psi}$$

$PID = 0.0ppm$

* Cond. readings taken w/ temp conv. off

Sampler's Initials gcl

need to convert to 25°C

cH meter continues to be erratic - likely due to poor wire⁹ connection on instrument.

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-6-0511
 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 5/13/2011 Time 1530

Media Water Station LMW-6

Sample Type: grab time composite space composite

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

SWL -22.19 @ 1304 on 5/12/2011 ft below TOC (monument at elev. X) (bottom at 105.9 ft bgs, 4-in casing)

Screen Interval – 90.9-105.9 ft bgs Monument: 3.05 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 – 250 ml	Total Metals	HDPE	HNO3 (non)
1 – 250 ml	Dissolved Metals	HDPE	None (filter)
2 – 1 Liter, 3 – 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/13/2011

Supervisor (signature) _____ Date _____

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-7-0511, LMW-7-0511-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 5/12/2011 Time 1610, 1615 (dup)

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 - ³⁵¹ ~~227.71~~ ^{223.35 (not corrected) on 5/12/11 @ 1423} ft below TOC (monument at elev. X) (bottom at 253.7 ft bgs, 4-in casing)

Screen Interval - 239.6-253.7 ft bgs Monument: 3.09 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
3 - 40 mL	VOA	VOA Vial	HCl
1 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/12/2011

Supervisor (signature) _____ Date _____

Well ID LMW-7
Date 5/12/2011
Time Begin Purge 1447
Time Collect Sample 1610, 1615

$$\begin{array}{r} 9 \\ 22 \\ \hline 31 \\ 22 \\ \hline 53 \end{array}$$
$$\begin{array}{r} 1 \\ 56 \\ 28 \\ \hline 84 \\ 14 \\ \hline 78 \end{array} \quad \begin{array}{r} 1 \\ 54 \\ 7 \\ \hline 91 \end{array} \quad \begin{array}{r} 1 \\ 98 \\ 2 \\ \hline 105 \end{array}$$

w/pH meter *

Grundfos set @ 336Hz

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

Turbid @ start of purge

curbid @ start of purge

$$\frac{5 \text{ gal}}{4 \text{ min}} = 1.25 \frac{\text{gal}}{\text{min}} \quad \frac{28 \text{ gal/well vol}}{1.25 \text{ gal/min}} = 22 \text{ min/well vol}$$

4min
1453-pump cut out, 1456-restart

* Temps confirmed w/ thermometer

1515 - pump out owl, 1517 - resistant.

*1612 pump cut out during sampling, 1615, restart, purge 5 mins before continuing, took readings to make sure they were stable

Sampler's Initials JSI

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-8-0511, LMW-EB-0511
 Sampling Location Groundwater Monitoring Well End of dedicated sampling tube LMW-8-0511-D

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

Type of Sampler Dedicated Tubing and Peristaltic Pump 1355 (dup)

Date 5/14/2011 Time 1350 EB = 1300

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 - 2.51 @ 0830 on 5/13/2011 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 pump @ 8 ft below TOC.

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

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

Sample Description clear, no odor

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

SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation / Amount
3 - 40 mL	VOA	VOA Vial	HCl
1 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)

[Signature]

Date 5/17/2011

Supervisor (signature)

Date

FIELD PARAMETERS SHEET

Well ID LMW-8
 Date 5/17/2011
 Time Begin Purge 1300
 Time Collect Sample 1350 ✓, 1355

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. * °C	DO mg/L	Turbidity NTU	Eh Rel mV
3.96	1310		6.84	238.0	12.0	0.37	1.16	166.7
	1315		6.86	237.6	11.4	0.23	9.32	157.5
4.11	1320		6.88	238.9	11.8	0.18	6.55	151.0
	1325		6.85	245.1	11.8	0.16	6.72	143.5 #
	1330		6.88	251.5	11.8	0.16	6.72	143.5
4.42	1335		6.90	255.6	11.8	0.14	4.53	141.9
	1340	7.2 L	6.91	256.0	11.4	0.13	4.21	141.0
4.48	1345		6.89	257.0	11.5	0.13	4.21	140.0
	1350		6.91	258.9	11.5	0.12	4.21	132.0

Comments:

Purge rate = 180 ml/min PID = 0.0 ppm

~~Fast~~
 1300 collect eb thru tubing and filter before beginning purge
 LMW-EB-0511

Value for Eh in question; Electrical contact suspected. Recommend "Estimate" to results.
 * Temp from pH meter; Corroborated w/ Thermom.

Sampler's Initials jel

*1355 - collect dup of VOC vials using bailer. LMW-8-0511-D
 (first set was collected @ w/ peristaltic pump)

SAMPLE INTEGRITY DATA SHEET

Plant/Site Landsburg Mine Site Project No. 923-1000-002
 Site Location Ravensdale, WA Sample ID LMW-9-0511
 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 5/13/2011 Time 1325

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 - 98.48' @ 1054 on 5/12/2011
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 clean, 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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/13/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-9
Date 5/13/2011
Time Begin Purge 1207
Time Collect Sample 1325

[illegible]

Comments:

Grundfos set @ 230 Hz $\frac{\sim 1 \text{ gal}}{\text{min}} \div 20 \text{ g}$
no odor, clear.

$PID = 0.09 \text{ ppm}$

Sampler's Initials Jol

SAMPLE INTEGRITY DATA SHEET

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

Site Location Ravensdale, WA Sample ID LMW-10-0511

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 OED Bladder

Date 5/16/2011 Time 0935 0945 ^{5/16/2011}

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 - 0.0 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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature) [Signature] Date 5/16/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-10

Date 5/16/2011

Time Begin Purge 855

Time Collect Sample 0445 0945

5/16/2011

w/ pH meter (but verified w/ thermometer)

Water Level feet bmp	Time	Volume Purged	pH	Conductivity uS/cm	Temp. °C	DO mg/L	Turbidity NTU	Eh Rel mV
1.76	0900	21 gal	8.42	228.3	9.8	0.16	2.91	454.3
2.12	0905		8.59	227.8	9.8	0.07	0.81	362.9
2.56	0910	2.5 gal	8.64	227.6	9.7	0.06	0.46	242.8
2.85	0915		8.66	227.8	9.8	0.06	0.71	331.8
3.37	0920		8.44	227.8	9.8	0.06	0.89	311.2
	0925		8.59	227.9	9.8	0.05	0.47	197.6
4.13	0930	~4 gal	8.65	227.9	9.8	0.04	0.52	218.9
4.54	0935		8.67	227.9	9.8	0.02	0.50	241.5
4.87	0940		8.68	227.9	9.8	0.03	0.59	—

*

Comments:

-60psi on controller

PID = 0.0ppm

-110psi on tank

-2 cpm, ID = 50

-Purge rate = ~320 mLs/min

-clear, no odor

*eth jumping around, needs to be recal'd. All other readings are stable, so going to pull sample

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-11-0511
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 5/13/2011 Time 1055

Media Water Station LMW-11

Sample Type: grab time composite space composite

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

SWL - 156.32 @ 1038 on 5/12/2011
ft below TOC (PVC) (bottom at 707 ft bgs, 4-in casing)

Screen Interval - 695-707 ft bgs PVC stickup: 2.70 ags

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

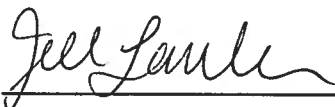
Packer Depth - NA (~360.4 gal/casing vol) (~371.6 gal/total well vol)

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 - 250 ml	Total Metals	HDPE	HNO3 (non)
1 - 250 ml	Dissolved Metals	HDPE	None (filter)
2 - 1 Liter, 3 - 40 ml	TPH-HCID	Glass Amber, VOA Vial	HCl

Sampler (signature)  Date 5/13/2011

Supervisor (signature) _____ Date _____

FIELD PARAMETERS SHEET

Well ID LMW-11

Date 5/13/2011

Well ID 5/13/2011
Date 5/13/2011
Time Begin Purge 0845 ← Grandfos
1910 ← QED

Time Collect Sample 1053

pH, verified w/ thermometer

[illegible]

Comments:

Comments:
0845 began Grundfos to initialize flow inside well. Pump
set @ ~170 ft below TOC, pump controller @ 330 Hz. Purge rate
2.5 gal/min. PID = 0.22 rpm

$$\frac{371}{2.5} = 148.4 \text{ min} = 2.25 \text{ hrs for one well vol.}$$

PID = 0.0 ppm

Slight sulfur odor.

0910 started bladder pump Pump @ 110psi, 20cpm
Tank @ 110psi

Purge rate of Bladder Pump = $\sim 180 \text{ ml/min}$ cycle ID = 54 (16/4s)

Sampler's Initials jsl

APPENDIX C
DETERMINATION OF SULFUR GASES FROM VELENJE COAL STOCKPILE

DETERMINATION OF SULFUR GASES FROM VELENJE COAL STOCKPILE

Janez Kozinc,^a Mireille Treeby,^a and Lucija Zupančič–Kralj^b^a ERICo Velenje, Institute for Ecological Research, Koroška 58, 3320-SI Velenje, Slovenia^b Faculty of Chemistry & Chemical Technology, University of Ljubljana, Aškerčeva 5, 1000-SI Ljubljana, Slovenia

Received 14-03-2004

Abstract

Dimethyl sulfide (DMS), carbonyl sulfide (COS) and carbon disulfide (CS₂) were detected at the Velenje coal stockpile. The gases were collected in a sampling tent placed on the stockpile. Several sampling and measuring techniques were tested for their determination. For direct analysis and solid phase micro extraction (SPME) the gases were pumped from the tent into Tedlar bags, while for cryogenic trapping the gas was pumped through a cryo-trap from the tent. The analyses were performed by gas chromatographs, equipped with a flame photometric detector (FPD) and a mass selective detector (MSD).

It was found that direct gas analysis by GC-MSD is the method of choice for determination of the gases in the ppbv concentration level. DMS was rarely quantified, while concentrations of COS and CS₂ were temperature dependant. It was confirmed that oxygen was necessary for the formation of COS and CS₂. The source of COS and CS₂ is probably oxidation of pyrite in coal, which was determined by X-ray spectroscopy.

Key words: sulfur gases, oxidation of pyrite, coal stockpile, SPME

Introduction

Lignite, produced in the Velenje Coal Mine, Slovenia, is used as a fuel in the Šoštanj Thermal Power Plant. Due to its high coal consumption (755 MW power plant), it is necessary to keep a coal reserve in case of insufficient coal production. However, coal stockpiles involve problems such as environmental pollution and loss of coal calorific value. The volatile sulfur compounds (VSC) especially DMS, COS and CS₂ are also malodorous for living beings even at low concentration levels.

It has long been known that coal beds are reservoirs of gases, mainly carbon dioxide and methane. The desorption process begins when coal is mined and due to the presence of oxygen mined coal is also subject to oxidation. On the Velenje stockpile the minor product of these processes are also dimethyl sulfide (DMS), carbonyl sulfide (COS) and carbon disulfide (CS₂). It was found that the source of DMS from the lignite is desorption, while the presence of COS and CS₂ is probably the product of oxidation process.¹ Many authors investigated the presence of VSC in the neighborhood of

sulfide-bearing ore deposits.²⁻⁷ The experiments showed, that these gases, particularly COS, are related to the oxidation of pyrite, sphalerite and galena.⁵⁻⁷

The Verein der Deutschen Ingenieuren describes a direct method for gas sampling from a surface emission source.⁸ An airtight “tent” should be placed on the surface of the stockpile and after a certain time, a gas sample is taken. The gases from the tent can be pumped into a glass sampling cylinder, a rubber bladder or Teflon bags.

Gas chromatography is the method of choice for determination of VSC in air samples. The flame photometric detector (FPD) or mass selective detector (MSD) are appropriate detectors for determination of sulfur compounds, while the enrichment step of VSC can be done by cryogenic trapping, adsorption on solid surfaces (solid phase micro extraction), or chemisorption onto gold foil.⁹

The aim of our work was to develop and test methods for determination of sulfur gases (COS, CS₂ and DMS) collected from the coal surface and to assess their emission from the coal stockpile in Velenje.

Experimental

Sampling

The gas-tight polycarbonate sampling tent was placed on the stockpile and the emitted gases were collected in the tent. Its dimensions were 1 m in length, 1 m in width and 0.5 m in height. The total amount of stored lignite on the coal stockpile ranges between 50,000 and 800,000 tons and its surface varies between 60,000 and 120,000 m². Other characteristics of stored lignite on the stockpile are: calorific value 9,500–11,000 kJ/kg, moisture 37–43%, content of sulfur 1.5–1.9%. For direct analyses (without the preconcentration step) gas samples were taken from the sampling tent into 2 L Tedlar sampling bags. Moisture from the gas sampled was removed in the cold trap (0 – 4 °C). The gas for analyses was injected into the gas chromatograph (GC) directly from the bag via a sampling loop or using a gas-tight syringe.

Preconcentration by cryogenic trapping

The gas collected in the tent was pumped through a wet NaOH trap to remove carbon dioxide, through a cold trap (0–4 °C) to remove moisture and through the cryo-trap placed in liquid nitrogen. The components COS, CS₂ and DMS freeze at

temperatures -138.8 °C, -111.5 °C and -98.3 °C respectively. The flow through the trap was 0.67 L/min. After sampling the trap was heated and flushed with synthetic air and the released gases were collected in a 10 L Tedlar sampling bag.

Preconcentration with SPME fiber

The gas collected in the sampling tent was pumped through the cold trap (0-4 °C) where the moisture was removed and placed into 2 L Tedlar sampling bags. COS, CS₂ and DMS were preconcentrated on the 75 µm Carboxen-PDMS SPME fiber, which was introduced to the sampling bag. The extraction time was 15 min at ambient temperature.

GC analyses

The gas samples were analyzed using an HP 6890 gas chromatograph, equipped with an HP 5973 MS detector and a PE AutoSystemXL with an FPD detector. The GC operating conditions for both systems are listed in Table 1.

For qualification and quantification Messer's secondary gas standards for each gas component were used. Gas standards were diluted by an ECHO gas mixing chamber. In the sampling period, one sample was taken each day from the sampling tent situated on the stockpile. After sampling the tent was ventilated. For routine analysis direct GC-MSD was used. For comparison of different sampling methods, experiments with the two different sampling methods (cryogenic trapping and direct analysis) were performed.

Table 1. Operating conditions for HP 6890 and PE AutoSystemXL.

	HP 6890 ^a	PE AutoSystemXL ^b
Column	VOCOL 60m, 0.25mm id, 1.5µm film thickness	SUPEL-Q PLOT 30m, 0.53mm id
Carrier flow (He)	4 mL/min	0.5 mL/min
Inlet	splitless, 80°C ^c	sampling loop
Injection vol.	500 µL	100 µL
Oven temperature	50 °C, 1 min	35 °C, 10,5 min
Heating rate	18 °C/min to 170 °C	1: 5 °C/min to 57 °C 2: 120 °C/min to 180 °C, 5 min final time

^a Detector: MSD SIM mode (*m/z*): COS: 60, 62; CS₂: 76, 78; DMS: 62, 47, ^b FPD: Air flow: 100 mL/min; Hydrogen flow: 75 mL/min; Temperature: 300 °C, ^c When the gases were preconcentrated by SPME the inlet was heated to 250 °C, desorption time was 5 minutes.

Results and Discussion

In Table 2 measurement characteristics of chromatographs are shown. For the methods with the MSD detector (SPME and direct analyses), a calibration curve was recorded every measuring day, while with the FPD detector calibration curves were stable for at least one year. For the limits of detection (LOD) and quantification (LOQ) spiked samples which gave detectable responses were measured. For estimation of LOD and LOQ $3s$ (s =standard deviation) and $10s$ of measurements was added to the known concentration of spiked samples.

Table 2. Some characteristics for different measuring methods.

Parameter		GC-FPD	GC-MS
LOD	COS	0.5 ppm	5.2 ppb
	CS ₂	0.1 ppm	8.8 ppb
	DMS	0.3 ppm	3.0 ppb
LOQ	COS	1.1 ppm	6.4 ppb
	CS ₂	0.2 ppm	12.5 ppb
	DMS	0.6 ppm	4.2 ppb
Linearity	COS	R ² >0.99	R ² > 0.99
	CS ₂	R ² >0.99	R ² > 0.99
	DMS	R ² >0.99	R ² > 0.99
Working range	COS	10 – 50 ppm	26 – 1000 ppb
	CS ₂	10 – 50 ppm	24 – 1000 ppb
	DMS	1 – 100 ppm	8 – 350 ppb
Peak resolution	COS	} R=1.42	
	CS ₂		
	DMS		

Peak resolution (R) is more than 2 where not stated differently.

Initially a GC with an FPD detector was used for determination of VSC. As the concentrations of gas components in the samples from the coal pile were below the first point of the calibration curve, a preconcentration step by cryogenic trapping was performed. Moisture and small amounts of CO₂ caused the flow through the cryo-trap to stop even though the NaOH trap for CO₂ and cold trap for moisture removal were used. The NaOH trap lowered the concentration of CS₂ and DMS by 13 and 10%. Another disadvantage was low resolution between DMS and CS₂ with the SUPEL Q column.

The experiments showed that the recoveries of the preconcentrating procedure by cryo-trap are 65% for DMS, 59% for CS₂ and 69% for COS. Assessed RSD of the

recovery study are 5.1, 3.2 and 6.7% for COS, CS₂ and DMS (4 replicates). Other disadvantages of such sampling are time consumption, complicated sampling equipment and transportation of frozen samples to the laboratory. The VSC were enriched 12 to 15 times by this procedure. By the use of a smaller sampling bag the gases can be better enriched after heating and flushing of preconcentrated gases from the cryo-trap.

To avoid the disadvantages described above, a better detection system or a simpler preconcentration technique can be used. A gas chromatograph, equipped with a VOCOL column offered good separation between CS₂ and DMS ($R > 2$) and connected to the mass selective detector it was sensitive enough to detect COS and CS₂ directly from the gas sample. DMS was quantified only a few times by direct GC-MSD, because it was mainly desorbed from the coal before the experiments were performed.

In Table 3 the results of parallel determination of VSC after each method of sampling are presented. In the case of cryo-trapping the recoveries (65, 59, and 69%) were taken into account for calculation of final gas concentrations. The flow through cryo-trap was 40 L/h and the total amount of gas passed through the trap was 120 L on 11th August and 140 L on 10th and 12th August 2003.

Table 3. COS, CS₂ and DMS concentrations (ppb), in the gas samples determined by direct analysis and via cryogenic trapping.

Date	Direct determination			Cryo-trap		
	COS	CS ₂	DMS	COS	CS ₂	DMS
10.8.2003	240	165	10	215	147	8
11.8.2003	356	263	<8	365	266	<8
12.8.2003	244	151	<8	227	135	<8

The differences between direct determination and via cryogenic trapping are not significant. As the concentration of DMS was determined only four times during the sampling period by direct injection, SPME sampling was tested to achieve lower LOD for DMS. CAR-PDMS is a solid coating onto which the analytes are adsorbed and as adsorption sites are limited, competitive adsorption and displacement can occur.¹⁰ To determine the extraction efficiency of the gases by SPME, different mixtures of the gases were analyzed. The average peak areas of COS, CS₂ and DMS are presented in Table 4.

It is seen from Table 4 that displacement of DMS occurred when CS₂ and COS were present. The average peak area of DMS is approximately 16% lower in case of the gas mixture (COS, CS₂ and DMS in air). To avoid this limitation the gas components in calibration standards should be prepared in the same concentration ratio as they are in a sample. Due to variability of VSC concentrations in samples, preparation of calibration standards can be time-consuming. The repeatability (expressed as RSD) of 4 replicates is less than 3%. Achieved LOD for DMS by SPME was approximately 40 ppt.

Table 4. Average peak areas of COS, CS₂ and DMS in different gas mixtures.

Gas	COS		DMS		CS ₂	
	Concentration	Area (10 ³)	Concentration	Area (10 ³)	Concentration	Area (10 ³)
1. mixture	200 ppb	10	87 ppb	23	254 ppb	140
2. mixture	0 ppb (ambient air)	0	87 ppb	27	0 ppb (ambient air)	0

The results in Figure 1 show that concentrations lines of COS and CS₂ have the same trend as temperature, although there is not a direct correlation between them. While COS and CS₂ were quantified almost every day DMS was quantified only four times which was expected as our stockpile was made approximately a year previous to the date of our sampling period. As has been shown the source of DMS from coal is the desorption process and the concentration of DMS fell to less than 1 ppm in a few days.¹

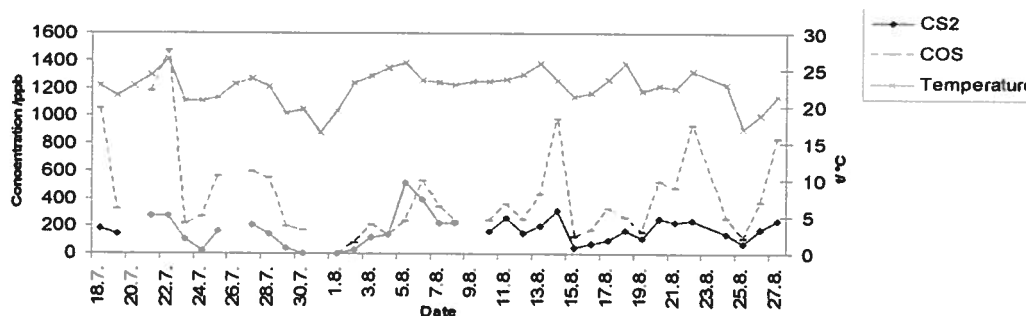


Figure 1. Concentrations of COS and CS₂ versus temperature in gas samples from coal stockpile.

Regarding the previous investigations the source of COS and CS₂ in the lignite is probably oxidation of pyrite. Its presence was confirmed by X-ray spectroscopy. The content of sulfide sulfur ranged between 0,3 to 0,4 w% in the coal from the pile.

To confirm the formation of VSC two coal samples were incubated in different atmospheres and temperatures. Two coal samples were dried at 30 °C to constant mass

(DIN 51718), ground to powder (<0.2 mm particle size) and than put into 20 mL vials which were crimped. Half of them were filled with nitrogen (99,999%) while the other half was filled with synthetic air. A quarter was than incubated at 70 °C, another quarter was kept at 25 °C in the dark. Four replicates for each quarter were prepared. After four days of incubation the atmospheres above the coal samples were analyzed. The results for both samples are presented in Table 5.

Table 5. Concentrations (ppb) of COS, CS₂ and DMS in glass vials after 4 days of incubation.

Atmosphere in the vial	Component	Incubation at 25 °C		Incubation at 70 °C	
		Sample 1	Sample 2	Sample 1	Sample 2
Nitrogen	CS ₂	<24	<24	39	44
	COS	74	69	201	221
	DMS	<8	<8	45	26
Synthetic air	CS ₂	<24	<24	293	342
	COS	560	502	1444	1682
	DMS	<8	<8	82	37

In both samples the concentrations of measured gases were lower in the vials which were flushed with nitrogen. As shown in Table 5, synthetic air plays an important role in the formation of COS and CS₂, particularly when the incubation temperature is high. In the vials containing nitrogen the concentrations of CS₂ and DMS were under the quantification limit, only COS was quantified in this case. Its concentration was approximately 7 times higher in the vials filled with synthetic air, confirming the results from previous studies that the source of COS is oxidation. The presence of COS in the vials filled with nitrogen was probably the consequence of the coal samples' exposition to air before being placed into the vials and due to trace amounts of oxygen in the vials.

When the incubation temperature was higher (70 °C) all the gases were determined. The increase in CS₂ concentration in the vials with synthetic air in comparison to the vials filled with nitrogen showed that more CS₂ was formed in the presence of oxygen. The concentrations of COS and CS₂ are several times higher (7 to 8) in the case of the vials filled with synthetic air to those filled with nitrogen. The RSD of the whole procedure (sampling of coal, preparation of the vials, measurements) is less than 20%.

A similar effect to the one in the vials was observed on the stockpile, where at higher air temperatures higher concentrations of COS and CS₂ were determined in the gas samples taken. The estimated daily emissions of COS and CS₂ for the whole stockpile in the sampling period were 20 g CS₂ and 70 g COS.

Conclusion

Emissions of COS, CS₂ and DMS were studied from the coal stockpile in Velenje. Several techniques were used for preconcentration and analyses. At first the gas was pre-concentrated from the tent in a cryo-trap via NaOH for CO₂ removal, and subsequent analyses of gases released from the trap were performed by GC-FPD. As the method was complicated the method for determination of VSC on GC-MSD was developed. With this method the preconcentration step was not needed for determination of a few ppb COS, CS₂ and DMS.

The results show that concentrations of COS and CS₂ are influenced by temperature and that oxygen is required for their formation. The presence of oxygen does not have an influence on the concentration of DMS in the same way as temperature does.

Acknowledgement

The financial support of the Šoštanj Thermal Power Plant, Velenje Coal Mine and the Ministry of Education, Science and Sport are gratefully acknowledged.

References

1. A. Zapašek, J. Marsel, *Chromatographia* **1998**, 48, 154–155.
2. T. K. Ball, R. A. Nicholson, D. Peachey, *Trans. Inst. Min. Metall.* **1985**, Sect. B181.
3. R. A. Nicholson, D. Peachey, T. K. Ball, *Trans. Inst. Min. Metall.* **1988**, Sect. B57.
4. B. W. Oakes, M. Hale, *Geochem. Explor.* **1987**, 28, 235–249.
5. C. H. Taylor, S. E. Kesler, P. L. Cloke, *J. Geochem. Explor.* **1982**, 17, 165–185.
6. M. E. Hinkle, J. L. Ryder, S. J. Sutley, T. Botinelly, *J. Geochem. Explor.* **1990**, 38, 43–67.
7. D. H. Stedman, M. Z. Creech, S. E. Kesler, *M. Gardner. Geophys. Res. Lett.* **1984**, 1, 858–860.
8. VDI directives 3790/1997.
9. R. A. Ketola, T. Mansikka, M. Ojala, T. Kotiaho, R. Kostinen, *Anal. Chem.* **1997**, 69, 4536–4539.
10. A. T. Nielsen, S. Jonsson, *J. Chromatogr. A* **2002**, 963, 57–64.

Povzetek

Na odlagališču premoga v Velenju so bili zaznani plini dimetilsulfid (DMS), karbonilsulfid (COS) in ogljikov disulfid (CS₂). Plini so bili ulovljeni v vzorčevalni šotor, postavljen na vrh odlagališča. Zaradi nizkih koncentracij plinov so bili poleg direktnega določevanja opravljene različni poskusi koncentriranja omenjenih plinov – vzorčenje v hladno past in adsorpcija na SPME. Analize plinov so bile opravljene s plinskima kromatografoma s plamensko fotometričnim detektorjem (FPD) in masno selektivnim detektorjem (MSD). Kot najustreznejši način določevanja plinov v območju ppb se je izkazala neposredna določitev z GC-MSD, brez koncentriranja. Dimetilsulfid je bil le redkokdaj določen, koncentracije COS in CS₂ pa so temperaturno odvisne. Z laboratorijskimi poskusi je bilo potrjeno, da je prisotnost kisika nujno potrebna za nastanek COS in CS₂. Vir COS in CS₂ je torej verjetno oksidacija pirita v premogu, ki je bil dokazan z rentgensko spektroskopijo.