



AECOM
Duluth Technology Village, Suite 260
11 East Superior Street
Duluth, MN 55802

218.625.8766 tel
218.625.2201 fax

April 15, 2014

Mr. Karl F. Beaster, P.G.
Environmental Analyst, Liquids Pipelines Environment
Enbridge Energy
Central Square Office
1320 Grand Avenue
Superior, Wisconsin 54880

RE: Annual Report - 2013; Enbridge Energy South Cass Lake Pumping Station, Cass Lake, Minnesota

Dear Mr. Beaster:

This letter report documents groundwater monitoring activities conducted in June, September and December 2013, remedial action activities conducted throughout 2013, and a bioventing and natural source zone depletion (NSZD) pilot study conducted at the site. **Figure 1** shows the site location and **Figure 2** depicts the layout of the pumping station, property boundaries and the monitoring well network (Site).

2013 Groundwater Monitoring Activities

Monitoring Well Installation & Aquifer Hydraulics

On October 15th and 16th, 2013 monitoring wells MW-20, MW-21 and MW-22 were installed along the eastern edge of the Site property southeast of the South Cass Lake pumping station. Termination depths of the monitoring well installation borings ranged from 26 feet below grade in MW-22 to 33 feet below grade in MW-20. Each monitoring well was developed using a submersible pump and a bailer as a surge block. The new monitoring well locations are shown on **Figure 2** and information pertaining to these wells can be found in **Attachment I**.

One soil sample was collected from each boring and submitted to Pace Analytical for BTEX and Extended Range Diesel Range Organics (ERDRO) analysis. Petroleum concentrations were not measured above the minimum laboratory detection limits in these soil samples. The laboratory analytical report and boring logs/monitoring well construction diagrams are included in **Attachment II** of this report.

Depth to groundwater measurements were collected from the monitoring well network prior to purging and groundwater sample collection. **Table 1** provides a comprehensive summary of groundwater elevation data collected at the Site. Groundwater flow for this investigation has historically been toward the south and southeast and depth to groundwater measurements from December 2013 indicate that groundwater flow remains in these directions. **Figure 3** depicts the groundwater flow direction based on December 2013 data.

Groundwater Monitoring Results

Groundwater samples were collected from the Site monitoring wells that did not contain LNAPL and were submitted to Pace Analytical for analysis. These groundwater samples were analyzed

for BTEX, ERDRO and a set of biodegradation evaluation parameters that included methane, nitrite and sulfate.

The addition of the three new monitoring wells above appears to have better defined the down gradient extent of the dissolved benzene plume for this release. Historically, the dissolved benzene plume has been shown to extend to monitoring well MW-16A (December 2012) or approximately 850 feet down gradient of the release location.

Groundwater samples from monitoring well MW-10 have consistently contained moderate (and the highest) benzene concentrations and samples from MW-9, along with the four USGS monitoring wells, have also shown historical benzene impacts, although recent benzene results from the latter five wells have been below the minimum laboratory limit. As of December 2013, the benzene results indicate that the dissolved phase benzene plume has decreased in size compared to the same time in 2012 and appears to be limited to the area near the historical petroleum release.

Table 2 contains the cumulative benzene results for this investigation.

Benzene was not detected in samples collected from monitoring well MW-16A during any of the monitoring events conducted in 2013. Therefore, it does not appear that the dissolved benzene plume is expanding or migrating toward the property boundary. The ERDRO concentration trends observed at monitoring wells MW-16 and MW-19 show a decreasing concentration during 2013, further supporting the dissolved plume was not migrating down gradient in 2013.

The 2013 ERDRO results are similar to the benzene results with the exception that moderate concentrations have also been detected in monitoring wells MW-16A, MW-16B, MW-17 and MW-19. **Table 2** contains the cumulative ERDRO results for this investigation.

Natural Attenuation Parameter Discussion

Water samples collected from monitoring wells were also submitted for laboratory analysis of nitrate + nitrite, sulfate, and methane during the June, September and December 2013 sampling events. These field and analytical results indicate that petroleum hydrocarbons are likely degrading by both aerobic and anaerobic (specifically methanogenic) processes as the methane concentrations tend to be elevated at monitoring wells where petroleum contamination has been documented.

Concentrations of sulfate and nitrate were similar for both non-impacted and impacted monitoring wells indicating that biodegradation via the sulfate and nitrate reduction pathways does not appear to be occurring to a significant extent within the groundwater monitoring network. Table 3 summarizes the results of these data collection activities.

Light Non-Aqueous Phase Liquid (LNAPL)

During the June, September and December 2013 monitoring events, LNAPL thickness measurements were collected with an oil/water interface probe from monitoring wells MW-3, MW-5, MW-11 and MW-13. During the most recent sampling event in December 2013, the crude oil thickness ranged from 0.92 feet at monitoring well MW-11 to 3.25 feet at monitoring well MW-13. **Table 1** provides a comprehensive summary of the LNAPL thickness measurements observed from these four monitoring locations.

LNAPL recovery will not be conducted in 2014 so that LNAPL thickness measurements can be collected to aid in design of the remedial system and to track system effectiveness over time.

2013 Bioventing and Natural Source Zone Depletion Study Activities

At the request of Enbridge, AECOM conducted site work to determine the site characteristics needed to design and develop a bioventing system at the Site. A more thorough discussion of these findings is attached to the report as the *“Report of Bioventing Pilot Study & NSZD Study”* in Attachment III.

A respiration and permeability test were conducted on the Site. The results indicate that oxygen may be limiting biodegradation of the LNAPL in the subsurface and that an oxygen utilization rate of approximately 1.5 to 3 percent can be expected after initially supplying air to the subsurface. The results of the permeability test indicate that the subsurface has adequate pore spaces to allow air distribution at depth to provide more air to potentially enhance the LNAPL degradation process.

A study of the carbon dioxide flux from the LNAPL plume was also conducted. Based on site and laboratory measurements, the observed zone of high carbon dioxide flux coincides well with the previously delineated “inferred extent of crude oil” from the United States Geological Survey. The slightly elevated CO₂ fluxes observed northeast of the LNAPL plume are likely the result of an impermeable soil layer inhibiting upward CO₂ at this location.

Overall, this information allows an estimate of the rate at which LNAPL may potentially be remediated from the site. The most reasonable estimate of source zone depletion is approximately 970 gallons per acre per year.

At this time AECOM proposes to install two additional bioventing wells on the property. Specific bioventing well locations can be found on Figure 9 of the attached *“Report of Bioventing Pilot Study & NSZD Study.”*

Recommendations & 2014 Project Schedule

Recommendations for proceeding with the design of a bioventing system are provided in attached *“Report of Bioventing Pilot Study & NSZD Study.”* The following is the proposed schedule for the design and installation activities:

- Mid-late April 2014: Submit initial design to Enbridge for review and comment;
- Late May 2014: Submit final design to Enbridge for approval;
- June 2014: Solicit and receive contractor bids;
- July 2014: Adjust work authorization for contractor procurement/construction administration;
- September 2014: Begin construction of bioventing system.
- Late October 2014: Startup bioventing system.

Based on site conditions observed in 2013, AECOM recommends the following activities be conducted for 2014:

- Conduct quarterly groundwater monitoring at the site (March, June, September, and December). The sampling locations and analytical parameters will be consistent with groundwater sampling activities conducted in 2013;
- Complete LNAPL monitoring and collect LNAPL thickness measurements when LNAPL is encountered;

- Model the groundwater plume using a simple groundwater fate and transport model (e.g., Natural Attenuation Software and/or BIOSCREEN) to assist in the prediction of down gradient transport of dissolved phase constituents. These platforms are preferable as they are each capable of incorporating dispersion and biodegradation effects in the model output.
- Prepare four quarterly Status Update Reports; and
- Prepare an Annual Report in December 2014 which will be submitted to Enbridge documenting groundwater monitoring and remedial action activities conducted at the Site in 2014.

Should you have any questions or comments related to the information provided in this submittal, please call Darin Albrecht at (218) 625-8768. AECOM appreciates the opportunity to assist Enbridge with this important assignment.

Sincerely yours,

AECOM Technical Services, Inc.



Darin Albrecht
Geologist/Project Manager
Darin.Albrecht@aecom.com



Christopher Brownfield
Project Engineer
Christopher.Brownfield@aecom.com

Tables

**Table 1: Groundwater Elevations/Crude Oil Thickness Measurements
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Well ID	Unique Well No.	Date	Top of Inner Casing Elevation (feet NGVD)	Depth to Groundwater (feet)	Depth to Oil (feet)	Oil Thickness (feet)	Equivalent Depth to Groundwater * (feet)	Groundwater Elevation (feet NGVD)	Top of Screen	Top of Screen Above Groundwater (feet)
MW-1	662109	06-Jun-01	100.00	26.29				73.71	77.00	3.29
		10-May-02	100.00	27.57				72.43	77.00	4.57
		14-May-02	100.00	27.60				72.40	77.00	4.60
		21-Jul-03	100.00	28.07				71.93	77.00	5.07
		06-Jan-04	100.00	28.50				71.50	77.00	5.50
		02-Apr-04	100.00	28.53				71.47	77.00	5.53
		12-May-04	100.00	28.55				71.45	77.00	5.55
		26-Aug-04	100.00	27.97				72.03	77.00	4.97
		30-Dec-04	100.00	27.00				73.00	77.00	4.00
		06-Apr-05	100.00	27.35				72.65	77.00	4.35
		26-Jun-08	100.00	27.33				72.67	77.00	4.33
		25-Nov-08	100.00	27.22				72.78	77.00	4.22
		04-Jun-09	100.00	26.75				73.25	77.00	3.75
		26-Oct-09	1340.19	27.25				1312.94	1317.19	4.25
		29-Jun-10	1340.19	27.52				1312.67	1317.19	4.52
		01-Dec-10	1340.19	27.10				1313.09	1317.19	4.10
		01-Dec-11	1340.19	27.18				1313.01	1317.19	4.18
		07-Jun-12	1340.19	27.80				1312.39	1317.19	4.80
		03-Dec-12	1340.19	28.26				1311.93	1317.19	5.26
		17-Jun-13	1340.19	27.43				1312.76	1317.19	4.43
		18-Sep-13	1340.19	27.50				1312.69	1317.19	4.50
		16-Dec-13	1340.19	27.87				1312.32	1317.19	4.87
MW-2	662110	06-Jun-01	99.57	25.87				73.70	77.07	3.37
		10-May-02	99.57	Not Recorded						
		14-May-02	99.57	27.25				72.32	77.07	4.75
		21-Jul-03	99.57	27.71				71.86	77.07	5.21
		06-Jan-04	99.57	28.12				71.45	77.07	5.62
		02-Apr-04	99.57	28.11				71.46	77.07	5.61
		12-May-04	99.57	28.28				71.29	77.07	5.78
		26-Aug-04	99.57	27.60				71.97	77.07	5.10
		30-Dec-04	99.57	26.62				72.95	77.07	4.12
		06-Apr-05	99.57	26.92				72.65	77.07	4.42
		26-Jun-08	99.57	27.13				72.44	77.07	4.63
		25-Nov-08	99.57	26.86				72.71	77.07	4.36
		04-Jun-09	99.57	26.52				73.05	77.07	4.02
WELL ABANDONED										
MW-3	662111	06-Jun-01	99.60	25.92	25.32	0.60	25.37	74.23	78.10	3.87
		10-May-02	99.60	27.19	26.51	0.68	26.57	73.03	78.10	5.07
		14-May-02	99.60	27.22	26.6	0.62	26.66	72.94	78.10	5.16
		21-Jul-03	99.60	28.30	27.77	0.53	27.82	71.78	78.10	6.32
		5-Jan-04	99.60	29.12	28.05	1.07	28.15	71.45	78.10	6.65
		2-Apr-04	99.60	28.77	28.09	0.68	28.15	71.45	78.10	6.65
		12-May-04	99.60	29.15	28.2	0.95	28.29	71.31	78.10	6.79
		26-Aug-04	99.60	28.05	27.62	0.43	27.66	71.94	78.10	6.16
		30-Dec-04	99.60	26.99	26.7	0.29	26.73	72.87	78.10	5.23
		06-Apr-05	99.60	27.51	26.97	0.54	27.02	72.58	78.10	5.52
		26-Jun-08	99.60	27.29	27.15	0.14	27.16	72.44	78.10	5.66
		25-Nov-08	99.60	27.10	26.87	0.23	26.89	72.71	78.10	5.39
		06-Feb-09	99.60	27.92	27.67	0.25	27.69	71.91	78.10	6.19
		04-Jun-09	99.60	26.57	26.56	0.01	26.56	73.04	78.10	5.06
		26-Oct-09	1339.79	26.92	26.91	0.01	26.91	1312.88	1318.29	5.41
		29-Jun-10	1339.79	27.95	27.25	0.70	27.31	1312.48	1318.29	5.81
		02-Dec-10	1339.79	27.19	26.8	0.39	26.83	1312.96	1318.29	5.33
		02-Dec-11	1339.79	26.68	26.68	0.00	26.68	1313.11	1318.29	5.18
		07-Jun-12	1339.79	29.38	27.2	2.18	27.40	1312.39	1318.29	5.90
		03-Dec-12	1339.79	28.47	27.52	0.95	27.61	1312.18	1318.29	6.11
		17-Jun-13	1339.79	27.27	27.07	0.20	27.09	1312.70	1318.29	5.59
		19-Dec-13	The well was dry. No level was obtained.							

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MW-4	662112	06-Jun-01	100.39	26.68				73.71	77.89	4.18
		10-May-02	100.39	27.92				72.47	77.89	5.42
		14-May-02	100.39	27.96				72.43	77.89	5.46
		21-Jul-03	100.39	28.35				72.04	77.89	5.85
		06-Jan-04	100.39	28.75				71.64	77.89	6.25
		02-Apr-04	100.39	28.80				71.59	77.89	6.30
		12-May-04	100.39	28.85				71.54	77.89	6.35
		26-Aug-04	100.39	28.22				72.17	77.89	5.72
		30-Dec-04	100.39	27.36				73.03	77.89	4.86
		06-Apr-05	100.39	27.71				72.68	77.89	5.21
		26-Jun-08	100.39	27.76				72.63	77.89	5.26
		25-Nov-08	100.39	27.56				72.83	77.89	5.06
		04-Jun-09	100.39	27.21				73.18	77.89	4.71
		26-Oct-09	1340.58	27.59				1312.99	1318.08	5.09
		29-Jun-10	1340.58	27.90				1312.68	1318.08	5.40
		01-Dec-10	1340.58	27.45				1313.13	1318.08	4.95
		01-Dec-11	1340.58	27.53				1313.05	1318.08	5.03
		07-Jun-12	1340.58	28.10				1312.48	1318.08	5.60
		03-Dec-12	1340.58	28.55				1312.03	1318.08	6.05
		17-Jun-13	1340.58	27.79				1312.79	1318.08	5.29
		18-Sep-13	1340.58	27.80				1312.78	1318.08	5.30
		16-Dec-13	1340.58	28.17				1312.41	1318.08	5.67
MW-5	705515	05-Jan-04	99.58	29.65	28.18	1.47	28.27	71.31	76.08	4.77
		2-Apr-04	99.58	29.72	28.47	1.25	28.55	71.03	76.08	5.05
		12-May-04	99.58	29.75	28.14	1.61	28.24	71.34	76.08	4.74
		26-Aug-04	99.58	28.05	27.6	0.45	27.63	71.95	76.08	4.13
		30-Dec-04	99.58	27.20	26.65	0.55	26.68	72.90	76.08	3.18
		06-Apr-05	99.58	28.03	26.94	1.09	27.01	72.57	76.08	3.51
		26-Jun-08	99.58	28.05	27.1	0.95	27.16	72.42	76.08	3.66
		25-Nov-08	99.58	27.17	26.9	0.27	26.92	72.66	76.08	3.42
		06-Feb-09	99.58	28.90	28.56	0.34	28.58	71.00	76.08	5.08
		04-Jun-09	99.58	26.82	26.56	0.26	26.58	73.00	76.08	3.08
		26-Oct-09	1339.78	27.11	26.9	0.21	26.91	1312.87	1316.28	3.41
		29-Jun-10	1339.78	28.86	27.24	1.62	27.34	1312.44	1316.28	3.84
		01-Dec-10	1339.78	26.95						
		02-Dec-11	1339.78	27.05	26.67	0.38	26.69	1313.09	1316.28	3.28
		07-Jun-12	1339.78	28.88	27.1	1.78	27.21	1312.57	1316.28	3.71
		03-Dec-12	1339.78	28.98	27.74	1.24	27.82	1311.96	1316.28	3.28
		17-Jun-13	1339.78	28.18	27.05	1.13	27.12	1312.66	1316.28	3.28
		18-Sep-13	1339.78	26.89			26.89	1312.89	1316.28	3.39
		19-Dec-13	1339.78	27.10	27.5	-0.40	27.48	1312.30	1316.28	3.28
MW-6	680691	21-Jul-03	100.71	28.75				71.96	72.71	0.75
		06-Jan-04	100.71	29.05				71.66	72.71	1.05
		02-Apr-04	100.71	29.15				71.56	72.71	1.15
		12-May-04	100.71	29.15				71.56	72.71	1.15
		26-Aug-04	100.71	28.62				72.09	72.71	0.62
		30-Dec-04	100.71	27.76				72.95	72.71	-0.24
		06-Apr-05	100.71	28.09				72.62	72.71	0.09
		26-Jun-08	100.71	28.17				72.54	72.71	0.17
		25-Nov-08	100.71	28.43				72.28	72.71	0.43
		04-Jun-09	100.71	27.60				73.11	72.71	-0.40
		26-Oct-09	1340.90	27.98				1312.92	1311.90	-1.02
		29-Jun-10	1340.90	28.28				1312.62	1311.90	-0.72
		01-Dec-10	1340.90	27.89				1313.01	1311.90	-1.11
		01-Dec-11	1340.90	27.89				1313.01	1311.90	-1.11
		07-Jun-12	1340.90	28.53				1312.37	1311.90	-0.47
		03-Dec-12	1340.90	28.89				1312.01	1311.90	-0.11
		17-Jun-13	1340.90	28.12				1312.78	1311.90	-0.88
		18-Sep-13	1340.90	28.12				1312.78	1311.90	-0.88
		17-Dec-13	1340.90	28.52				1312.38	1311.90	-0.48

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MW-7	680692	21-Jul-03	99.83	28.09				71.74	73.33	1.59
		06-Jan-04	99.83	28.34				71.49	73.33	1.84
		02-Apr-04	99.83	28.43				71.40	73.33	1.93
		12-May-04	99.83	28.46				71.37	73.33	1.96
		26-Aug-04	99.83	28.00				71.83	73.33	1.50
		30-Dec-04	99.83	27.05				72.78	73.33	0.55
		06-Apr-05	99.83	27.34				72.49	73.33	0.84
		26-Jun-08	99.83	27.15				72.68	73.33	0.65
		25-Nov-08	99.83	27.28				72.55	73.33	0.78
		04-Jun-09	99.83	26.87				72.96	73.33	0.37
		26-Oct-09	1340.03	27.24				1312.79	1313.53	0.74
		29-Jun-10	1340.03	27.61				1312.42	1313.53	1.11
		01-Dec-10	1340.03	27.21				1312.82	1313.53	0.71
		01-Dec-11	1340.03	27.11				1312.92	1313.53	0.61
		07-Jun-12	1340.03	27.80				1312.23	1313.53	1.30
		03-Dec-12	1340.03	28.16				1311.87	1313.53	1.66
		17-Jun-13	1340.03	27.39				1312.64	1313.53	0.89
		18-Sep-13	1340.03	27.42				1312.61	1313.53	0.92
		17-Dec-13	1340.03	27.80				1312.23	1313.53	1.30
MW-8	680693	21-Jul-03	101.00	29.37				71.63	74.50	2.87
		06-Jan-04	101.00	29.70				71.30	74.50	3.20
		02-Apr-04	101.00	29.77				71.23	74.50	3.27
		12-May-04	101.00	29.85				71.15	74.50	3.35
		26-Aug-04	101.00	29.21				71.79	74.50	2.71
		30-Dec-04	101.00	28.20				72.80	74.50	1.70
		06-Apr-05	101.00	28.54				72.46	74.50	2.04
		26-Jun-08	101.00	28.73				72.27	74.50	2.23
		25-Nov-08	101.00	28.45				72.55	74.50	1.95
		04-Jun-09	101.00	28.09				72.91	74.50	1.59
		26-Oct-09	1341.21	28.45				1312.76	1315.16	2.40
		29-Jun-10	1341.21	28.83				1312.38	1315.16	2.78
		01-Dec-10	1341.21	28.34				1312.87	1315.16	2.29
		01-Dec-11	1341.21	28.27				1312.94	1315.16	2.22
		07-Jun-12	1341.21	29.10				1312.11	1315.16	3.05
		03-Dec-12	1341.21	29.42				1311.79	1315.16	3.37
		17-Jun-13	1341.21	28.73				1312.48	1315.16	2.68
		18-Sep-13	1341.21	28.67				1312.54	1315.16	2.62
		17-Dec-13	1341.21	29.08				1312.13	1315.16	3.03
MW-9	680694	21-Jul-03	98.25	26.41				71.84	73.75	1.91
		21-Jul-03	98.25	26.79				71.46	73.75	2.29
		02-Apr-04	98.25	26.81				71.44	73.75	2.31
		12-May-04	98.25	26.91				71.34	73.75	2.41
		26-Aug-04	98.25	26.29				71.96	73.75	1.79
		30-Dec-04	98.25	25.35				72.90	73.75	0.85
		06-Apr-05	98.25	25.65				72.60	73.75	1.15
		26-Jun-08	98.25	25.83				72.42	73.75	1.33
		25-Nov-08	98.25	25.57				72.68	73.75	1.07
		04-Jun-09	98.25	25.22				73.03	73.75	0.72
		26-Oct-09	1338.45	25.59				1312.86	1314.38	1.52
		29-Jun-10	1338.45	25.94				1312.51	1314.38	1.87
		01-Dec-10	1338.45	25.49				1312.96	1314.38	1.42
		01-Dec-11	1338.45	25.45				1313.00	1314.38	1.38
		07-Jun-12	1338.45	26.14				1312.31	1314.38	2.07
		03-Dec-12	1338.45	26.55				1311.90	1314.38	2.48
		17-Jun-13	1338.45	25.83				1312.62	1314.38	1.76
		18-Sep-13	1338.45	25.80				1312.65	1314.38	1.73
		17-Dec-13	1338.45	26.18				1312.27	1314.38	2.11

**Table 1: Groundwater Elevations/Crude Oil Thickness Measurements
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Well ID	Unique Well No.	Date	Top of Inner Casing Elevation (feet NGVD)	Depth to Groundwater (feet)	Depth to Oil (feet)	Oil Thickness (feet)	Equivalent Depth to Groundwater * (feet)	Groundwater Elevation (feet NGVD)	Top of Screen	Top of Screen Above Groundwater (feet)
MW-10	705513	05-Jan-04	99.66	28.38				71.28	77.16	5.88
		2-Apr-04	99.66	28.30				71.36	77.16	5.80
		12-May-04	99.66	28.36				71.30	77.16	5.86
		26-Aug-04	99.66	27.76				71.90	77.16	5.26
		30-Dec-04	99.66	27.72				71.94	77.16	5.22
		06-Apr-05	99.66	27.02				72.64	77.16	4.52
		26-Jun-08	99.66	27.20				72.46	77.16	4.70
		25-Nov-08	99.66	26.94				72.72	77.16	4.44
		04-Jun-09	99.66	26.61				73.05	77.16	4.11
		26-Oct-09	1339.87	26.96				1312.91	1317.87	4.96
		29-Jun-10	1339.87	27.33				1312.54	1317.87	5.33
		01-Dec-10	1339.87	26.84				1313.03	1317.87	4.84
		01-Dec-11	1339.87	26.83				1313.04	1317.87	4.83
		07-Jun-12	1339.87	27.55				1312.32	1317.87	5.55
		03-Dec-12	1339.87	27.97				1311.90	1317.87	5.97
		17-Jun-13	1339.87	27.28				1312.59	1317.87	5.28
		19-Sep-13	1339.87	27.15				1312.72	1317.87	5.15
		19-Dec-13	1339.87	27.58				1312.29	1317.87	5.58
MW-11	705514	17-Dec-04	99.99	28.66	28.5	0.16	28.51	71.48	76.49	5.01
		05-Jan-04	99.99	29.70	28.49	1.21	28.60	71.39	76.49	5.10
		2-Apr-04	99.99	29.78	28.45	1.33	28.57	71.42	76.49	5.07
		12-May-04	99.99	29.75	28.5	1.25	28.61	71.38	76.49	5.11
		26-Aug-04	99.99	28.68	27.94	0.74	28.01	71.98	76.49	4.51
		30-Dec-04	99.99	27.60	27.06	0.54	27.11	72.88	76.49	3.61
		06-Apr-05	99.99	28.07	27.38	0.69	27.44	72.55	76.49	3.94
		26-Jun-08	99.99	27.79	27.58	0.21	27.60	72.39	76.49	4.10
		25-Nov-08	99.99	27.59	27.28	0.31	27.31	72.68	76.49	3.81
		29-Jan-09	99.99	28.20	27.32	0.88	27.40	72.59	76.49	3.90
		06-Feb-09	99.99	28.28	27.53	0.75	27.60	72.39	76.49	4.10
		04-Jun-09	99.99	27.13	26.95	0.18	26.97	73.02	76.49	3.47
		26-Oct-09	1340.18	27.65	27.30	0.35	27.33	1312.85	1316.68	3.83
		29-Jun-10	1340.18	28.13	27.62	0.51	27.67	1312.51	1316.68	4.17
		02-Dec-10	1340.18	27.50	26.61	0.89	26.69	1313.49	1316.68	3.19
		02-Dec-11	1340.18	27.68	27.02	0.66	27.08	1313.10	1316.68	3.58
		07-Jun-12	1340.18	32.50	27.7	4.80	28.13	1312.05	1316.68	4.63
		03-Dec-12	1340.18	29.31	28.09	1.22	28.20	1311.98	1316.68	4.70
		17-Jun-13	1340.18	27.63	27.5	0.13	27.51	1312.67	1316.68	4.01
		19-Dec-13	1340.18	28.73	27.81	0.92	27.89	1312.29	1316.68	4.39
MW-13	705516	05-Jan-04	101.02	29.92	29.52	0.40	29.58	71.44	74.52	3.08
		2-Apr-04	101.02	30.57	29.53	1.04	29.68	71.34	74.52	3.18
		12-May-04	101.02	31.22	29.59	1.63	29.83	71.19	74.52	3.33
		26-Aug-04	101.02	29.20	29.07	0.13	29.09	71.93	74.52	2.59
		30-Dec-04	101.02	28.20	28.11	0.09	28.12	72.90	74.52	1.62
		06-Apr-05	101.02	28.80	28.38	0.42	28.44	72.58	74.52	1.94
		26-Jun-08	101.02	28.70	28.62	0.08	28.63	72.39	74.52	2.13
		25-Nov-08	101.02	28.35	28.35	0.00	28.35	72.67	74.52	1.85
		06-Feb-09	101.02	28.62	28.61	0.01	28.61	72.41	74.52	2.11
		04-Jun-09	101.02	28.01	28.01	0.00	28.01	73.01	74.52	1.51
		26-Oct-09	1341.23	28.42	28.35	0.07	28.36	1312.87	1314.73	1.86
		29-Jun-10	1341.23	28.84	28.72	0.12	28.74	1312.49	1314.73	2.24
		02-Dec-10	1341.23	28.27	28.23	0.04	28.24	1312.99	1314.73	1.74
		02-Dec-11	1341.23	28.13	28.13	0.00	28.13	1313.10	1314.73	1.63
		07-Jun-12	1341.23	29.00	28.88	0.12	28.90	1312.33	1314.73	2.40
		03-Dec-12	1341.23	30.08	29.23	0.85	29.36	1311.87	1314.73	2.86
		17-Jun-13	1341.23	28.61	28.59	0.02	28.59	1312.64	1314.73	2.09
		19-Dec-13	1341.23	32.09	28.84	3.25	29.32	1311.91	1315.73	3.82
MW-14		26-Jun-08	98.73	26.93				71.80		
		25-Nov-08		25.99				72.74		
		04-Jun-09		26.31				72.42		
WELL ABANDONED										
MW-15		26-Jun-08	99.35	26.27				73.08		
		25-Nov-08	99.35	26.66				72.69		
		04-Jun-09	99.35	25.64				73.71		
		26-Oct-09	1339.61	26.70				1312.91		
		29-Jun-10	1339.61	27.05				1312.56		
		01-Dec-10	1339.61	not collected						
		01-Dec-11	1339.61	26.54				1313.07		
		07-Jun-12	1339.61	27.20				1312.41		
		03-Dec-12	1339.61	27.72				1311.89		
		17-Jun-13	1339.61	27.00				1312.61		
		16-Dec-13	1339.61	27.32				1312.29		

**Table 1: Groundwater Elevations/Crude Oil Thickness Measurements
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Well ID	Unique Well No.	Date	Top of Inner Casing Elevation (feet NGVD)	Depth to Groundwater (feet)	Depth to Oil (feet)	Oil Thickness (feet)	Equivalent Depth to Groundwater * (feet)	Groundwater Elevation (feet NGVD)	Top of Screen	Top of Screen Above Groundwater (feet)
MW-16A		29-Jun-10	1338.97	26.70				1312.27	1315.47	3.20
		01-Dec-10	1338.97	26.20				1312.77	1315.47	2.70
		01-Dec-11	1338.97	26.15				1312.82	1315.47	2.65
		07-Jun-12	1338.97	26.92				1312.05	1315.47	3.42
		03-Dec-12	1338.97	27.28				1311.69	1315.47	3.78
		17-Jun-13	1338.97	25.60				1313.37	1315.47	2.10
		19-Sep-13	1338.97	26.52				1312.45	1315.47	3.02
		17-Dec-13	1338.97	26.92				1312.05	1315.47	3.42
MW-16B		29-Jun-10	1339.52	27.26				1312.26	1301.02	-11.24
		01-Dec-10	1339.52	26.78				1312.74	1301.02	-11.72
		01-Dec-11	1339.52	26.71				1312.81	1301.02	-11.79
		07-Jun-12	1339.52	27.50				1312.02	1301.02	-10.24
		03-Dec-12	1339.52	27.82				1311.70	1301.02	-10.68
		17-Jun-13	1339.52	27.10				1312.42	1301.02	-11.40
		19-Sep-13	1339.52	27.12				1312.40	1301.02	-11.38
		17-Dec-13	1339.52	27.47				1312.05	1301.02	-11.03
MW-17		29-Jun-10	1338.79	26.56				1312.23	1315.29	3.06
		01-Dec-10	1338.79	26.08				1312.71	1315.29	2.58
		01-Dec-11	1338.79	26.00				1312.79	1315.29	2.50
		07-Jun-12	1338.79	26.80				1311.99	1315.29	3.30
		03-Dec-12	1338.79	27.11				1311.68	1315.29	3.61
		17-Jun-13	1338.79	26.41				1312.38	1315.29	2.91
		18-Sep-13	1338.79	26.37				1312.42	1315.29	2.87
		17-Dec-13	1338.79	26.74				1312.05	1316.29	4.24
MW-18		29-Jun-10	1340.29	27.92				1312.37	1316.79	4.42
		01-Dec-10	1340.29	27.41				1312.88	1316.79	3.91
		01-Dec-11	1340.29	27.35				1312.94	1316.79	3.85
		07-Jun-12	1340.29	28.15				1312.14	1316.79	4.65
		03-Dec-12	1340.29	28.50				1311.79	1316.79	5.00
		17-Jun-13	1340.29	27.78				1312.51	1316.79	4.28
		19-Sep-13	1340.29	27.75				1312.54	1316.79	4.25
		17-Dec-13	1340.29	28.13				1312.16	1316.79	4.63
MW-19		29-Jun-10	1334.72	22.54				1312.18	1315.22	3.04
		01-Dec-10	1334.72	22.03				1312.69	1315.22	2.53
		01-Dec-11	1334.72	21.97				1312.75	1315.22	2.47
		07-Jun-12	1334.72	22.76				1311.96	1315.22	4.04
		03-Dec-12	1334.72	23.10				1311.62	1315.22	3.60
		17-Jun-13	1334.72	22.37				1312.35	1315.22	2.87
		18-Sep-13	1334.72	22.37				1312.35	1315.22	2.87
		17-Dec-13	1334.72	22.77				1311.95	1315.22	3.27
MW-20		15-Oct-13	1340.06	25.30				1309.42	1317.22	7.80
		18-Dec-13	1340.06	28.11				1306.61	1317.22	10.61
MW-21		18-Dec-13	1337.70	25.72				1311.98	1318.90	6.92
MW-22		18-Dec-13	1333.64	21.70				1311.94	1318.24	6.30

**Table 1: Groundwater Elevations/Crude Oil Thickness Measurements
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Well ID	Unique Well No.	Date	Top of Inner Casing Elevation (feet NGVD)	Depth to Groundwater (feet)	Depth to Oil (feet)	Oil Thickness (feet)	Equivalent Depth to Groundwater * (feet)	Groundwater Elevation (feet NGVD)	Top of Screen	Top of Screen Above Groundwater (feet)
USGS 1A		26-Oct-09	1341.60	28.78				1312.82	1312.60	-0.22
		29-Jun-10	1341.60	29.15				1312.45	1312.60	0.15
		02-Dec-10	1341.60	28.70				1312.90	1312.60	-0.30
		01-Dec-11	1341.60	28.64				1312.96	1312.60	-0.36
		07-Jun-12	1341.60	29.38				1312.22	1312.60	0.38
		03-Dec-12	1341.60	29.77				1311.83	1312.60	0.77
		17-Jun-13	1341.60	29.07				1312.53	1312.60	0.07
		19-Sep-13	1341.60	28.96				1312.64	1312.60	-0.04
		17-Dec-13	1341.60	29.39				1312.21	1312.60	0.39
USGS 2A		26-Oct-09	1342.37	29.60				1312.77	1311.97	-0.80
		29-Jun-10	1342.37	29.97				1312.40	1311.97	-0.43
		02-Dec-10	1342.37	29.49				1312.88	1311.97	-0.91
		01-Dec-11	1342.37	29.42				1312.95	1311.97	-0.98
		07-Jun-12	1342.37	30.18				1312.19	1311.97	-0.22
		03-Dec-12	1342.37	30.57				1311.80	1311.97	0.17
		17-Jun-13	1342.37	29.89				1312.48	1311.97	-0.51
		19-Sep-13	1342.37	29.74				1312.63	1311.97	-0.66
		17-Dec-13	1342.37	30.23				1312.14	1311.97	-0.17
USGS 3A		26-Oct-09	1341.26	28.54				1312.72	1311.92	-0.80
		29-Jun-10	1341.26	28.93				1312.33	1311.92	-0.41
		02-Dec-10	1341.26	28.44				1312.82	1311.92	-0.90
		01-Dec-11	1341.26	28.36				1312.90	1311.92	-0.98
		07-Jun-12	1341.26	29.13				1312.13	1311.92	-0.21
		03-Dec-12	1341.26	29.51				1311.75	1311.92	0.17
		17-Jun-13	1341.26	28.82				1312.44	1311.92	-0.52
		19-Sep-13	1341.26	28.76				1312.50	1311.92	-0.58
		17-Dec-13	1341.26	29.18				1312.08	1311.92	-0.16
USGS 4A		26-Oct-09	1339.63	26.95				1312.68	1311.49	-1.19
		29-Jun-10	1339.63	27.32				1312.31	1311.49	-0.82
		02-Dec-10	1339.63	26.85				1312.78	1311.49	-1.29
		01-Dec-11	1339.63	26.76				1312.87	1311.49	-1.38
		07-Jun-12	1339.63	27.53				1312.10	1311.49	-0.61
		03-Dec-12	1339.63	27.90				1311.73	1311.49	-0.24
		17-Jun-13	1339.63	27.22				1312.41	1311.49	-0.92
		19-Sep-13	1339.63	27.10				1312.53	1311.49	-1.04
		16-Dec-13	1339.63	27.56				1312.07	1311.49	-0.58

Notes:

NGVD - National Geodetic Vertical Datum

* Assumed specific gravity for oil = 0.9105

** A re-survey was conducted in August 2009 to tie in the Enbridge and USGS monitoring wells to a common benchmark (MNDOT). Prior to that, top of inner casing elevations were based on an assumed inner casing elevation of 100.00 at monitoring well MW-1.

*** In June 2010, monitoring wells MW-16A, -16B, -17, -18, and -19 were surveyed by NREC. The wells were tied into a known elevation from monitoring well USGS-4A.

**Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
MW-1	6/6/2001	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 110
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	91.6
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	< 23.1
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 76.9
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	157
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 68
	6/13/2012	< 1.0	< 1.0	< 1.0	< 3.0		260
	12/3/2012	< 1.0	< 1.0	< 1.0	< 3.0		<110
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
12/16/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100	
MW-2	6/6/2001	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	140
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	114
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	242
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	159
10/26/2009	Well was abandoned due to new construction.						
MW-4	6/6/2001	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	276
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	137
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	<23.1
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5

Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
MW-4 (contd)	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2011	< 1.0	2.1	< 1.0	< 3.0		230
	6/13/2012	< 1.0	1.2	< 1.0	< 3.0		< 300
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	12/16/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
MW-5	1/6/2004	6,500	530	<50	1,800	<50	
MW-6	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	130
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	188
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	128
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	209
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	<23.1
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 76.9
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	290
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 71
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		110
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		<100
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		120
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		150
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		110
MW-7	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	118
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	134
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	<23.1
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 76.9
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	180
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 71
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		110
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		<100
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		<100
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		<100

Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
MW-8	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	150
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	149
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	143
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	<23.1
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	114
	6/14/2011	273	< 1.0	< 1.0	< 2.0	< 1.0	2,050
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		230
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		470
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		110
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		210
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		<110
	12/16/2013	<1.0	<1.0	<1.0	< 3.0		<110
MW-9	7/16/2003	0.51	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	1/6/2004	<1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	210
	12/30/2004	7.5	3.7	< 1.0	< 2.0	< 1.0	260
	4/6/2005	18	< 1.0	< 1.0	< 2.0	< 1.0	230
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	101
	11/25/2008	25.7	2.6	< 0.36	< 0.74	< 0.36	364
	6/4/2009	132	< 1.0	< 1.0	< 2.0	< 1.0	1,860
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	831
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010	573	95.4	< 5.0	18.1	< 5.0	3,690
	6/14/2011	573	7.0	< 5.0	< 10.0	< 5.0	3,460
	12/1/2011	500	5.5	2.7	< 3.0		6,400
	6/13/2012	48.9	< 1.0	< 1.0	< 3.0		5,400
	12/7/2012	3.9	< 1.0	< 1.0	< 3.0		630
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		190
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	12/16/2013	< 1.0	< 1.0	< 1.0	< 3.0		<110
MW-9 Duplicate	12/1/2011	498	4.8	2.5	< 6.0		10,300

Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
MW-10	1/5/2004	1,100	110	<5.0	520	<5.0	30,000
	5/12/2004	2,100	210	< 10	350	< 10	6,500
	8/26/2004	2,600	240	< 25	180	< 25	7,800
	12/30/2004	1,400	160	< 10	61	< 10	6,500
	4/6/2005	1,100	220	< 10	62	< 10	6,500
	6/26/2008	1,830	44.2	< 3.6	< 7.4	< 3.6	9,000
	11/25/2008	595	18.1	< 0.71	3.3	< 0.72	65,900
	6/4/2009	305	15	<1.0	3.4	<1.0	50,800
	10/26/2009	159	5.6	< 0.36	3	< 0.36	22,400
	6/29/2010	2,180	< 25.0	< 25.0	< 50.0	< 25.0	33,700
	12/1/2010	193	4.8	< 1.0	10.5	< 1.0	28,100
	6/14/2011	35.2	< 2.0	< 2.0	< 4.0	< 2.0	15,500
	12/1/2011	38.3	1.6	4.4	4.1		12,900
	6/13/2012	103	1.2	3.2	3.4		15,900
	12/6/2012	653	1.7	< 1.0	< 3.0		7,400
	6/19/2013	1,880	6.3	<5.0	<15.0		13,400
	9/19/2013	2,100	36.1	<20.0	<60.0		9,300
	12/19/2013	1,390	36.2	<5.0	<15.0		9,200
MW-10 Duplicate	6/13/2012	81.2	1.8	2.8	3.1		15,000
	12/6/2012	579.0	1.9	1	< 3.0		7,700
	6/19/2013	1,550	5.2	< 1.0	< 3.0		13,400
	9/19/2013	1,850	39.9	< 1.0	< 3.0		9,000
	12/19/2013	1,360	34.7	<5.0	<15.0		9,700
MW-15	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 330
	6/13/2012	< 1.0	< 1.0	< 1.0	< 3.0		110
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	12/16/2013	< 1.0	< 1.0	< 1.0	< 3.0		<100
MW-16A	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	234
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	1,150
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	413
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		670
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		1,410
	12/5/2012	59.8	< 1.0	< 1.0	< 3.0		1,000
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		950
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		650
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		270
MW-16B	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	1,310
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	9,470
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	2,790
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		1,580
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		610
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		250
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		200
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		510
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		320

**Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
MW-17	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	75.7
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 76.2
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	184
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		110
	6/12/2012	< 1.0	< 1.0	< 1.0	< 3.0		250
	12/6/2012	< 1.0	< 1.0	< 1.0	< 3.0		170
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		120
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		150
MW-18	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 77.7
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	134
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 330
	6/18/2012	< 1.0	< 1.0	< 1.0	< 3.0		130
	12/6/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		<110
MW-19	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	347
	12/1/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	843
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	608
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 330
	6/19/2012	< 1.0	< 1.0	< 1.0	< 3.0		5,400
	12/6/2012	< 1.0	< 1.0	< 1.0	< 3.0		370
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		360
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		290
	12/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		190
MW-20	12/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		<110
MW-21	12/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		320
MW-22	12/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		<100

Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
USGS 1A	10/26/2009	776	142	< 1.8	< 3.7	< 1.8	4,930
	6/29/2010	39.7	< 1.0	< 1.0	< 2.0	< 1.0	2,990
	12/2/2010	791	< 10.0	< 10.0	< 20.0	< 10.0	5,370
	6/14/2011	1,590	< 10.0	< 10.0	< 20.0	< 10.0	5,410
	12/1/2011	67.8	1.2	3.2	< 3.0		8,200
	6/13/2012	6.4	< 1.0	1.0	< 3.0		4,500
	12/6/2012	5.4	< 1.0	1.0	< 3.0		1,000
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		310
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		110
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
USGS 2A	10/26/2009	705	< 2.0	< 1.8	< 3.7	< 1.8	5,520
	6/29/2010	63.5	< 1.0	< 1.0	< 2.0	< 1.0	2,150
	12/2/2010	239	< 1.0	< 1.0	< 2.0	< 1.0	3,370
	6/14/2011	81.7	< 1.0	< 1.0	< 2.0	< 1.0	2,670
	12/1/2011	21.1	< 1.0	1.4	< 3.0		3,600
	6/13/2012	282	< 1.0	1.6	< 3.0		7,200
	12/6/2012	554	< 1.0	1	< 3.0		4,900
	6/18/2013	21.1	< 1.0	< 1.0	< 3.0		2,300
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		290
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		270
USGS 3A	10/26/2009	147	0.74	< 0.36	1.5	< 0.36	4,060
	6/29/2010	202	< 1.0	< 1.0	< 2.0	< 1.0	2,470
	12/2/2010	6.2	< 1.0	< 1.0	< 2.0	< 1.0	1,810
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	1,420
	12/1/2011	< 1.0	< 1.0	1.1	< 3.0		2,400
	6/13/2012	14.7	< 1.0	1	< 3.0		5,700
	12/6/2012	1	< 1.0	1	< 3.0		2,200
	6/18/2013	20.5	< 1.0	< 1.0	< 3.0		3,200
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		1,200
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		500
USGS 4A	10/26/2009	13.8	< 0.40	< 0.36	< 0.74	< 0.36	1,670
	6/29/2010	44.8	< 1.0	< 1.0	< 2.0	< 1.0	4,130
	12/2/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	2,010
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	2,420
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		1,320
	6/13/2012	< 1.0	< 1.0	< 1.0	< 3.0		2,160
	12/6/2012	7.2	< 1.0	< 1.0	< 3.0		1,700
	6/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		1,500
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		490
	12/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		120
SCDW	9/21/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 300
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 330
	6/25/2012						
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	6/17/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	9/18/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 100
	12/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110

**Table 2: Groundwater Sampling Results - BTEX and ERDRO
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Date	Benzene (ug/l)	Ethylbenzene (ug/l)	Toluene (ug/l)	Xylenes, -m, -p (ug/L)	Xylenes, -o (ug/L)	ERDRO (ug/L)
Field Blank	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 100
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	< 100
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	106
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	NA
	6/29/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2010						389
	6/14/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 75.5
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		< 300
	6/13/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 330
	12/5/2012	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	6/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
	12/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		< 110
Trip Blank	7/16/2003	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	1/6/2004	Froze during the sampling event.					
	5/12/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	8/26/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	12/30/2004	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	4/6/2005	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	6/26/2008	< 0.14	< 0.40	< 0.36	< 0.74	< 0.36	
	11/25/2008	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	
	6/4/2009	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	
	10/26/2009	< 0.23	< 0.40	< 0.36	< 0.74	< 0.36	
	12/1/2011	< 1.0	< 1.0	< 1.0	< 3.0		
	6/13/2012	< 1.0	< 1.0	< 1.0	< 3.0		
	6/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		
	9/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		
	12/19/2013	< 1.0	< 1.0	< 1.0	< 3.0		

Notes:

During the December 2011 sampling event, xylenes were reported as xylene (total).

Benzene analytical results in bold indicate a concentration greater than 10 ug/L.

**Table 3: Groundwater Sampling Results: Biodegradation Evaluation Parameters
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Collection Date	Nitrogen (mg/L)	Sulfate (mg/L)	Methane (ug/L)	ORP	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Fe ⁺² (mg/L)
MW-1	7/16/2003						5.4	<0.1
	1/6/2004	2.1	6.3				5.2	<0.1
	5/12/2004						5	<0.1
	8/26/2004	0.69	< 4.0	< 10			7	<0.1
	12/30/2004	0.81	< 4.0	< 10			6.5	<0.1
	4/6/2005	0.58	< 4.0	< 10			6	<0.1
	11/25/2008	0.62	3.6	4.9			11.35	516
	10/26/2009	0.2	3.3	< 0.93			11.82	0.024
	12/1/2010	0.61	< 4.0	< 2.8			11.06	< 0.12
	12/1/2011	< 0.10	< 2.5	< 10	210.8	0.381	9.9	NM
	6/13/2012	0.42	< 2.5	< 6.6	218	0.224	6.12	NM
	12/3/2012	1.2	<2.5	<6.6	127.5	0.408	15.09	NM
	6/17/2013	0.72	< 2.5	< 6.6	24.3	0.211	12.36	NM
	9/18/2013	0.23	< 2.5	< 6.6	24.3	0.211	12.36	NM
	12/16/2013	0.28	<2.5	<6.6	269.1	0.204	13.63	NM
MW-2	7/16/2003						4.1	<0.1
	1/6/2004	4.1	< 4.0				4.5	<0.1
	5/12/2004						4.3	<0.1
	11/25/2008	9.7	9.8	< 2.0			7	1.52
	10/26/2009	Well was removed due to new construction						
MW-4	7/16/2003						3.8	<0.1
	1/6/2004	1	< 4.0				5.5	<0.1
	5/12/2004						5.7	<0.1
	11/25/2008	5.8	6.3	< 2.0			7.7	2.12
	10/26/2009	6.2	6.6	< 0.93			10.57	< 0.018
	12/1/2010	4.8	5.9	< 2.8			9.78	< 0.05
	12/1/2011	< 0.10	6.1	< 10	217.7	0.505	8.64	NM
	6/13/2012	3.9	5.3	< 6.6	195.8	0.324	3.13	NM
	12/5/2012	3.0	4.5	< 6.6	138.8	0.585	8.26	NM
	6/17/2013	1.6	2.5	< 6.6	97.1	0.403	9.85	NM
	9/18/2013	2.3	4	< 6.6	97.1	0.403	9.85	NM
	12/16/2013	1.7	<2.5	<6.6	157.4	0.316	9.86	NM
MW-6	7/16/2003						2	<0.1
	1/6/2004	1.9	5.4				2.6	<0.1
	5/12/2004						2.2	<0.1
	11/25/2008	2.8	7	4.2			9.3	22.9
	10/26/2009	2	5.9	< 0.93			11.35	< 0.018
	12/1/2010	1.8	4.9	< 2.8			10.7	< 0.12
	12/1/2011	< 0.10	3.3	< 10	221.5	0.366	9.72	NM
	6/12/2012	2.6	3.6	< 6.6	115.2	0.279	9.05	NM
	12/5/2012	2.3	3.2	< 6.6	92.1	0.362	8.97	NM
	6/17/2013	1.3	3.7	< 6.6	73.4	0.353	12.31	NM
	9/18/2013	1.4	5.7	< 6.6	73.4	0.353	12.31	NM
	12/17/2013	0.97	5.6	<6.6	160.2	0.655	9.68	NM

**Table 3: Groundwater Sampling Results: Biodegradation Evaluation Parameters
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Collection Date	Nitrogen (mg/L)	Sulfate (mg/L)	Methane (ug/L)	ORP	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Fe ⁺² (mg/L)
MW-7	7/16/2003						3.4	<0.1
	1/6/2004	< 0.25	5.7				4.3	<0.1
	5/12/2004						5.5	<0.1
	11/25/2008	0.46	8.3	< 2.0			8.7	9.2
	10/26/2009	0.61	7.8	< 0.93			11.45	< 0.018
	12/1/2010	1.1	7.6	< 2.8			9.29	< 0.05
	12/1/2011	< 0.10	5.6	< 10	247.6	0.43	9.4	NM
	6/12/2012	0.18	5.5	< 6.6	107.5	0.281	3.14	NM
	12/5/2012	0.14	6.4	< 6.6	158.6	0.643	6.92	NM
	6/17/2013	0.14	5.3	< 6.6	79.1	0.303	12.06	NM
	9/18/2013	0.15	7.4	< 6.6	79.1	0.303	12.06	NM
	12/17/2013	<0.10	13.3	< 6.6	11.9	0.381	12.09	NM
MW-8	7/16/2003						2.5	<0.1
	1/6/2004	0.34	5.5				2.8	<0.1
	5/12/2004						2	<0.1
	8/26/2004	0.31	5.2	< 10			6	<0.1
	12/30/2004	< 0.25	7.5	< 10			5	<0.1
	4/6/2005	< 0.25	11	< 10			5	<0.1
	11/25/2008	0.26	9.5	< 2.0			8.3	22.2
	10/26/2009	0.33	10	< 0.93			12.75	< 0.018
	12/1/2010	< 0.40	7.4	< 2.8			8.9	< 0.05
	12/1/2011	< 0.10	5	< 10	NM	NM	NM	NM
	6/12/2012	0.1	7.3	< 6.6	149.3	0.343	1.91	NM
	12/5/2012	0.11	7.2	< 6.6	73.9	0.430	11.15	NM
	6/18/2013	< 0.10	6.0	< 6.6	188.0	0.767	7.20	NM
	9/18/2013	0.11	7.7	< 6.6	188.0	0.767	7.20	NM
	12/17/2013	<0.10	10.7	<6.6	-216	0.468	8.0	NM
MW-9	7/16/2003						2.8	<0.1
	1/6/2004	< 0.25	6.3				2	<0.1
	5/12/2004						1.5	<0.1
	8/26/2004	< 0.25	7.2	< 10			1.5	<0.1
	12/30/2004	< 0.25	< 4.0	1800			2	<0.1
	4/6/2005	< 0.25	4.7	280			2	<0.1
	11/25/2008	0.19	4	968			2.52	39.8
	10/26/2009	< 0.20	4.6	543			5.73	0.021
	12/1/2010	< 0.40	< 4.0	3590			0.87	0.09
	12/1/2011	< 0.10	< 2.5	8710	-132.3	NM	0.7	NM
	6/13/2012	< 0.10	< 2.5	1460	-0.2	0.514	1.14	NM
	12/7/2012	<0.10	< 2.5	359	-55.4	0.562	0.70	NM
	6/18/2013	< 0.10	4.6	15.2	-53.0	0.793	1.30	NM
	9/18/2013	< 0.10	4.9	< 6.6	-53.0	0.793	1.30	NM
	12/17/2013	< 0.10	4.1	< 6.6	-51.3	0.501	0.43	NM

**Table 3: Groundwater Sampling Results: Biodegradation Evaluation Parameters
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Collection Date	Nitrogen (mg/L)	Sulfate (mg/L)	Methane (ug/L)	ORP	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Fe ⁺² (mg/L)
MW-9 Duplicate	12/1/2011	< 0.10	< 2.5	8830	NM	NM	NM	NM
MW-10	1/5/2004	< 0.25	< 4.0				1.5	<0.1
	5/12/2004						1	<0.1
	8/26/2004	< 0.25	< 4.0	4900			0.8	<0.1
	12/30/2004	2.9	4.2	6100			1	<0.1
	4/6/2005	0.51	< 4.0	2600			1.5	<0.1
	11/25/2008	1.1	3.3	2290			2.7	54.8
	10/26/2009	0.3	2.9	5100			2.5	1.3
	12/1/2010	2.4	4.3	7030			0.72	5.1
	12/1/2011	< 0.10	< 2.5	3720	-56		0.3	NM
	6/13/2012	< 0.10	< 2.5	5470	-36.6	0.656	0.078	NM
	12/6/2012	< 0.10	< 2.5	6900	-80.2	1.291	1.11	NM
	6/19/2013	< 0.10	< 2.5	14000	-71.3	1.462	0.87	NM
	9/19/2013	< 0.10	< 2.5	9500	-71.3	1.462	0.87	NM
	12/19/2013	<0.10	<2.5	11500	-80.6	0.844	0.41	NM
MW-10 Duplicate	6/13/2012	< 0.10	< 2.5	3950				
	12/6/2012	< 0.10	<2.5	3030	NM	NM	NM	NM
	6/19/2013	< 0.10	< 2.5	11600	NM	NM	NM	NM
	9/19/2013	< 0.10	< 2.5	8820	NM	NM	NM	NM
	12/19/2013	< 0.10	3.0	11500	NM	NM	NM	NM
MW-15	12/1/2011	< 0.10	< 2.5	< 10	202.7	0.328	9.5	NM
	6/13/2012	2	< 2.5	< 6.6	80.8	0.224	4.2	NM
	12/5/2012	3.4	< 2.5	331	100.6	0.431	9.57	NM
	6/17/2013	2.2	2.6	< 6.6	72.7	0.258	10.81	NM
	9/18/2013	1.7	< 2.5	< 6.6	72.7	0.258	10.81	NM
	12/16/2013	2.5	<2.5	<6.6	172.5	0.275	11.89	NM
MW-16A	12/1/2010	< 0.40	< 4.0	528			1.41	0.09
	12/1/2011	< 0.10	3.1	81	-178.2	0.54	2.32	NM
	6/12/2012	< 0.10	3.1	20.5	107.5	0.372	0.66	NM
	12/5/2012	< 0.10	< 2.5	297	48.0	0.479	1.88	NM
	6/18/2013	< 0.10	5.2	58.2	31.6	0.747	1.97	NM
	9/19/2013	< 0.10	6.8	15.4	31.6	0.747	1.97	NM
	12/17/2013	<0.10	9.4	7.4	39.1	0.842	1.02	NM
MW-16B	12/1/2010	< 0.40	< 4.0	9.5			0.64	< 0.05
	12/1/2011	< 0.10	7.8	< 10	-143	0.62	1.5	NM
	6/12/2012	1.2	9.6	7.4	-8.8	0.417	0.83	NM
	12/5/2012	1.1	11.3	7.9	-34.3	0.503	0.49	NM
	6/18/2013	0.75	9.5	< 6.6	-24.1	0.757	1.05	NM
	9/19/2013	0.76	8.6	19.1	-24.1	0.757	1.05	NM
	12/17/2013	0.42	7.9	24.1	-69.1	0.879	1.58	NM

**Table 3: Groundwater Sampling Results: Biodegradation Evaluation Parameters
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Collection Date	Nitrogen (mg/L)	Sulfate (mg/L)	Methane (ug/L)	ORP	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Fe ⁺² (mg/L)
MW-17	12/1/2010	< 0.40	9.5	6.9			8.16	<0.12
	12/1/2011	< 0.10	5.6	< 10	256	0.503	7.93	NM
	6/12/2012	0.11	9.4	< 6.6	170.4	0.341	10.06	NM
	12/6/2012	< 0.10	8.5	< 6.6	81.9	0.699	5.99	NM
	6/17/2013	< 0.10	7.4	< 6.6	53.8	0.415	6.46	NM
	9/18/2013	0.13	9.6	< 6.6				
	12/17/2013	0.44	10.2	NM	-32.3	0.380	4.79	NM
MW-18	12/1/2010	4.2	5.8	4.4			10.01	<0.05
	12/1/2011	< 0.10	3.7	< 10	-117	0.363	9.7	NM
	6/12/2012	4.2	3.6	< 6.6	65.9	0.346	6.16	NM
	12/6/2012	2.8	3.4	< 6.6	97.8	0.400	10.26	NM
	6/18/2013	1.7	4.4	< 6.6	126.5	0.706	9.78	NM
	9/18/2013	1.8	6.7	< 6.6	126.5	0.706	9.78	NM
	12/17/2013	1.4	5.3	<6.6	Equipment Failure			NM
MW-19	12/1/2010	<0.40	5.2	187			2.1	<0.05
	12/1/2011	< 0.10	6.9	< 10	220.9	0.53	2.12	NM
	6/12/2012	0.13	5.8	< 6.6	125.7	0.339	2.37	NM
	12/6/2012	<0.10	3.5	12.8	57.3	0.657	2.37	NM
	6/18/2013	< 0.10	4.9	43.3	99.1	0.675	2.79	NM
	9/18/2013	0.32	5.2	18.5	99.1	0.675	2.79	NM
	12/17/2013	<0.10	7.4	<6.6	-14.4	0.505	2.36	NM
MW-20	12/18/2013	1.3	7.0	<6.6	2.90	0.611	4.49	NM
MW-21	12/18/2013	<0.10	4.5	53.9	77.9	0.412	0.91	NM
MW-22	12/18/2013	<0.10	8.4	<6.6	75.0	0.330	5.19	NM
USGS-1A	10/26/2009	< 0.20	2.1	11700			1.53	< 0.018
	12/2/2010	< 0.40	< 4.0	10200			1.2	12.3
	12/1/2011	< 0.10	< 2.5	5970	-142	0.715	0.5	NM
	6/13/2012	< 0.10	< 2.5	683	-54.2	0.486	11.93	NM
	12/6/2012	< 0.10	< 2.5	395	-99.5	0.818	1.43	NM
	6/18/2013	< 0.10	6.7	69.3	-93.3	0.780	0.98	NM
	9/19/2013	< 0.10	5.7	< 6.6	-93.3	0.780	0.98	NM
	12/17/2013	<0.10	5.4	<6.6	-13.5	0.484	1.55	NM
USGS-2A	10/26/2009	< 0.20	2.5	5480			1.71	< 0.018
	12/2/2010	< 0.40	< 4.0	2310			1.2	2.8
	12/1/2011	< 0.10	< 2.5	1730	-136	0.569	0.8	NM
	6/13/2012	< 0.10	< 2.5	5900	NM	NM	NM	NM
	12/6/2012	< 0.10	< 2.5	7210	-85.4	0.602	2.08	NM
	6/18/2013	< 0.10	< 2.5	3500	-88.7	0.958	0.81	NM
	9/19/2013	< 0.10	4.8	95.2	-88.7	0.958	0.81	NM
	12/17/2013	<0.10	4.7	338	Equipment Failure			NM

**Table 3: Groundwater Sampling Results: Biodegradation Evaluation Parameters
Enbridge Energy, Limited Partnership - South Cass Lake Station**

Location	Collection Date	Nitrogen (mg/L)	Sulfate (mg/L)	Methane (ug/L)	ORP	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Fe ⁺² (mg/L)
USGS-3A	10/26/2009	< 0.20	2.3	3240			3.72	< 0.018
	12/2/2010	< 0.40	< 4.0	1180			0.7	1.8
	12/1/2011	< 0.10	< 2.5	800	-156.1	0.544	0.4	NM
	6/13/2012	< 0.10	< 2.5	2340	NM	NM	NM	NM
	12/6/2012	< 0.10	< 2.5	1860	-106.1	0.534	1.02	NM
	6/18/2013	< 0.10	< 2.5	3860	-114.8	0.889	1.12	NM
	9/19/2013	< 0.10	5.9	1160	-114.8	0.889	1.12	NM
	12/17/2013	< 0.10	7.2	618	-117.1	0.990	0.99	NM
USGS-4A	10/26/2009	< 0.20	4.2	665			13.54	< 0.018
	12/2/2010	< 0.40	< 4.0	398			1.9	< 0.05
	12/1/2011	< 0.10	< 2.5	214	-157	0.525	1.2	NM
	6/13/2012	< 0.10	< 2.5	142	8.5	0.349	1.3	NM
	12/6/2012	< 0.10	< 2.5	270				
	6/18/2013	< 0.10	2.9	536	-79.1	0.803	1.01	NM
	9/19/2013	< 0.10	6.6	130				
	12/17/2013	< 0.10	6.9	< 6.6	-76.1	0.833	0.76	NM
SCDW	12/1/2011	< 0.10	< 2.5	< 10	NM	NM	NM	NM
	6/25/2012	0.45	3.3	< 6.6	NM	NM	NM	NM
	12/5/2012	0.38	< 2.5	< 6.6	NM	NM	NM	NM
	6/17/2013	0.70	3.8	< 6.6	NM	NM	NM	NM
	9/18/2013	0.53	3.9	< 6.6	NM	NM	NM	NM
	12/19/2013	NM	NM	< 6.6	NM	NM	NM	NM
Field Blank	12/30/2004	< 0.25	< 4.0	< 10				
	4/6/2005	< 0.25	< 4.0	< 10				
	11/25/2008	< 0.085	< 0.51	< 2.0				0.0115
	12/1/2011	< 0.10	< 2.5	19.8	NM	NM	NM	NM
	6/13/2012	< 0.10	< 2.5	< 6.6	NM	NM	NM	NM
	12/5/2012	< 0.10	< 2.5	25.9	NM	NM	NM	NM
	6/19/2013	< 0.10	< 2.5	10	NM	NM	NM	NM
	9/19/2013	NM	NM	NM	NM	NM	NM	NM
	12/19/2013	NM	NM	NM	NM	NM	NM	NM

NM - Not measured

Figures



Enbridge Energy, Limited Partnership

Figure 2: Site Layout Map

South Cass Lake Pumping Station

LEGEND

- + Approximate Release Location
- Monitoring Well
- USGS Monitoring Well
- Potable Well
- + Bioventing Well
- ▲ Vapor Monitoring Point
- Enbridge Pipeline



0 100 200 300 Feet

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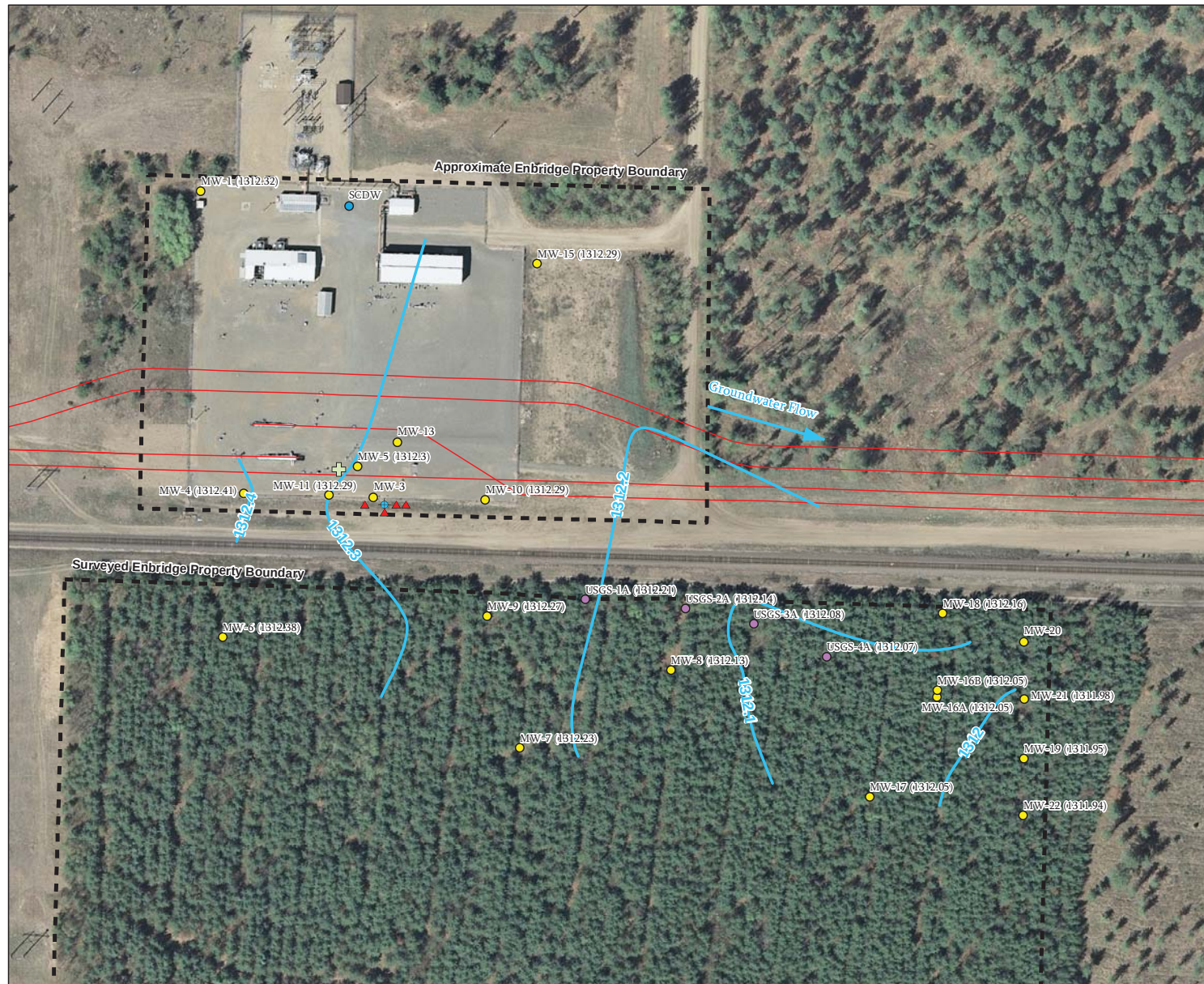
Drawn: KLM 12/23/2013

Approved: KF 12/23/2013

Scale: 1:1,500

PROJECT NUMBER 60254681

FIGURE NUMBER 2



Enbridge Energy, Limited Partnership

Figure 3: Groundwater Flow Map
December 2013

South Cass Lake Pumping Station

LEGEND

- Monitoring Well
- USGS Monitoring Well
- Potable Well
- ⊕ Bioventing Well
- ▲ Vapor Monitoring Point
- Enbridge Pipeline
- Groundwater Elevation Contours (ft, NAVD 88)



0 100 200 300 Feet

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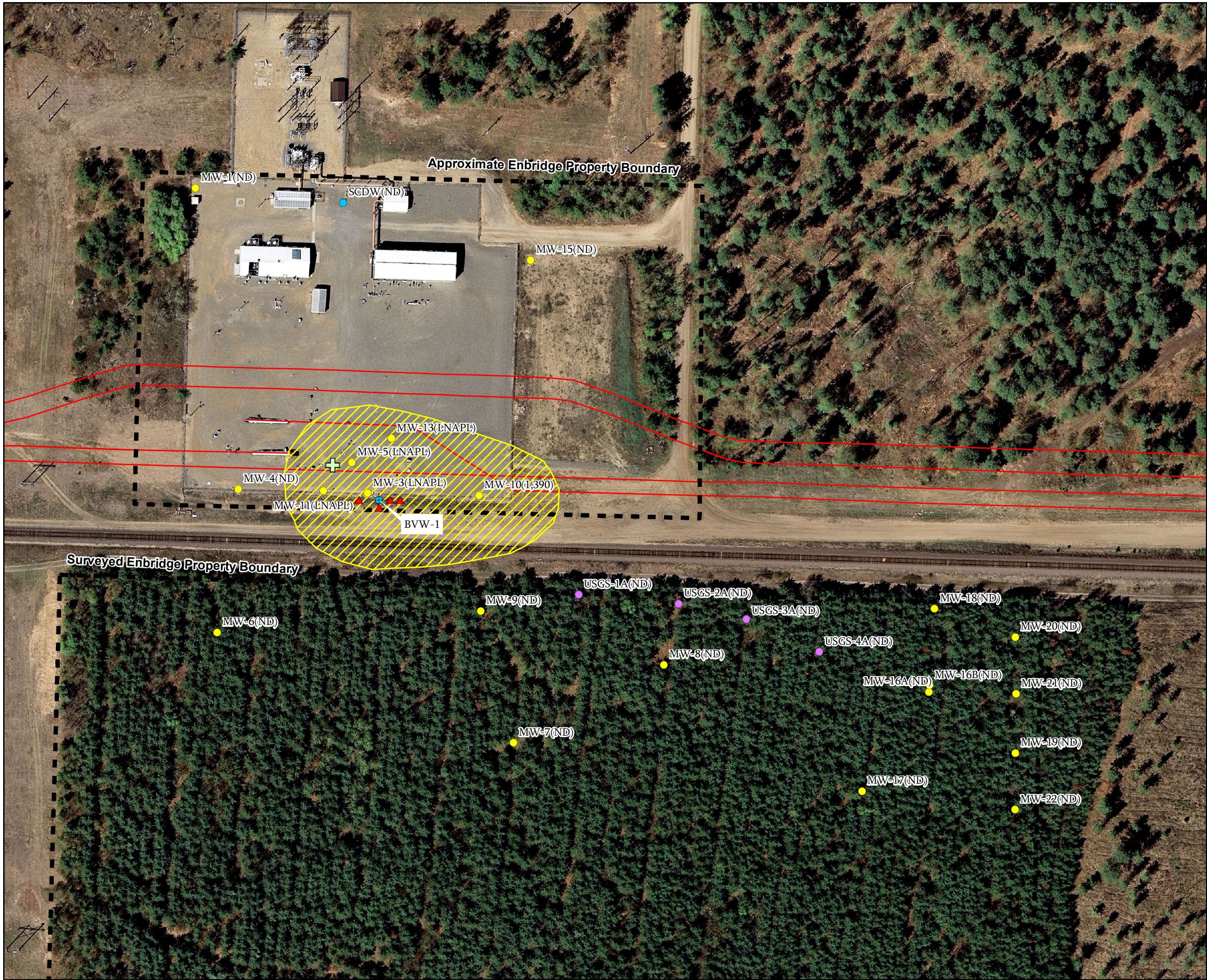
Drawn: KLM 01/14/2014

Approved: KF 01/14/2014

Scale: 1:1,500

PROJECT NUMBER 60254681

FIGURE NUMBER 3



Enbridge Energy, Limited Partnership

Inferred Extent of
Dissolved Phase Benzene Plume
December 2013

South Cass Lake Pumping Station

LEGEND

- + Approximate Release Location
- Monitoring Well
- USGS Monitoring Well
- Potable Well
- ⊕ Bioventing Well
- ▲ Vapor Monitoring Point
- Enbridge Pipeline
- ▨ Inferred Extent of Dissolved Phase Benzene > 1.0 µg/L



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PROJECT NUMBER 60254681

FIGURE NUMBER 4

Attachment I
Soil Boring Logs and
Monitoring Well Construction
Diagrams



Boring and Well Construction Log

Boring #: MW-20

Sheet 1 of 1

Project: South Cass Lake	Contractor: American Engineering	Location: Cass Lake, MN
Project #: 60254681	Operator:	
Client: Enbridge Energy	Drill Rig Type: CME 75	Surface Elevation (ft AMSL): 1337.66
Start Date & Time: 10-14-2013	Method: Hollow Stem	Total Depth (ft): 33
Finish Date & Time: 10-15-2013	Boring ID: 4.25	Logged By: Don Johnson, PG

Sample					Depth (ft.)	Lithology	USCS Symbol	Soil and Rock Description	Well Diagram
Analytical Sample	Sample Type	Blows/ 6 inch	% Rec	PID (ppm)					

MW-20	SS	1,1,1,2	75	<1	0	OL SM		TOPSOIL, sandy, very dark brown (10YR 2/2), moist, loose	Portland Cement/Grout PVC SCH 40 Well Casing Bentonite Chips Red Flint Sand Pack PVC SCH 40 Well Screen
								SAND, fine to very fine, trace silt, medium density, light olive brown (2.5YR 4/4), moist	
	SS	1,1,1,2	80	<1					
	SS	2,3,4,5	85	<1	5	SP		SAND, fine, trace silt, medium density, olive brown (2.5YR 4/4), moist	
	SS	2,3,4,5	85	<1		SP		SAND, fine to medium, trace silt, olive brown (2.5YR 4/4), moist, loose	
	SS	3,3,3,3	80	<1	10	SP		SAND, fine, trace silt, olive brown (2.5YR 4/4), moist, loose, color changes at 13 feet to grayish brown (2.5YR 5/2)	
	SS	3,3,3,3	75	<1					
	SS	3,3,8,8	80	<1					
	SS	2,7,11,12	90	<1	15	SP		SAND, fine, trace silt, medium density, dark yellowish brown (2.5YR 4/2), moist, loose, color change at 20 feet to grayish brown (2.5YR 5/2)	
	SS	2,7,11,11	100	<1					
	SS	2,7,1,1	100	4	20				
	SS	7,8,8,6	100	4					
	SS	7,8,8,6	90	4		SP		SAND, fine to coarse, trace silt, medium density, olive brown (2.5YR 4/4), saturated	
	SS	5,5,8,12	90	4	25				
	SS	5,5,8,12	90	4					
	SS	3,5,9,10	90	4					
	SS	3,5,9,10	90	4	30				
	SS	3,5,9,10	90	4					

Remarks and Datum Used:

Log compiled by Chris Knuteson

AECOM

Duluth Technology Village
11 East Superior Street, Ste 260
Duluth, MN 55802
Phone: (218) 625-8766

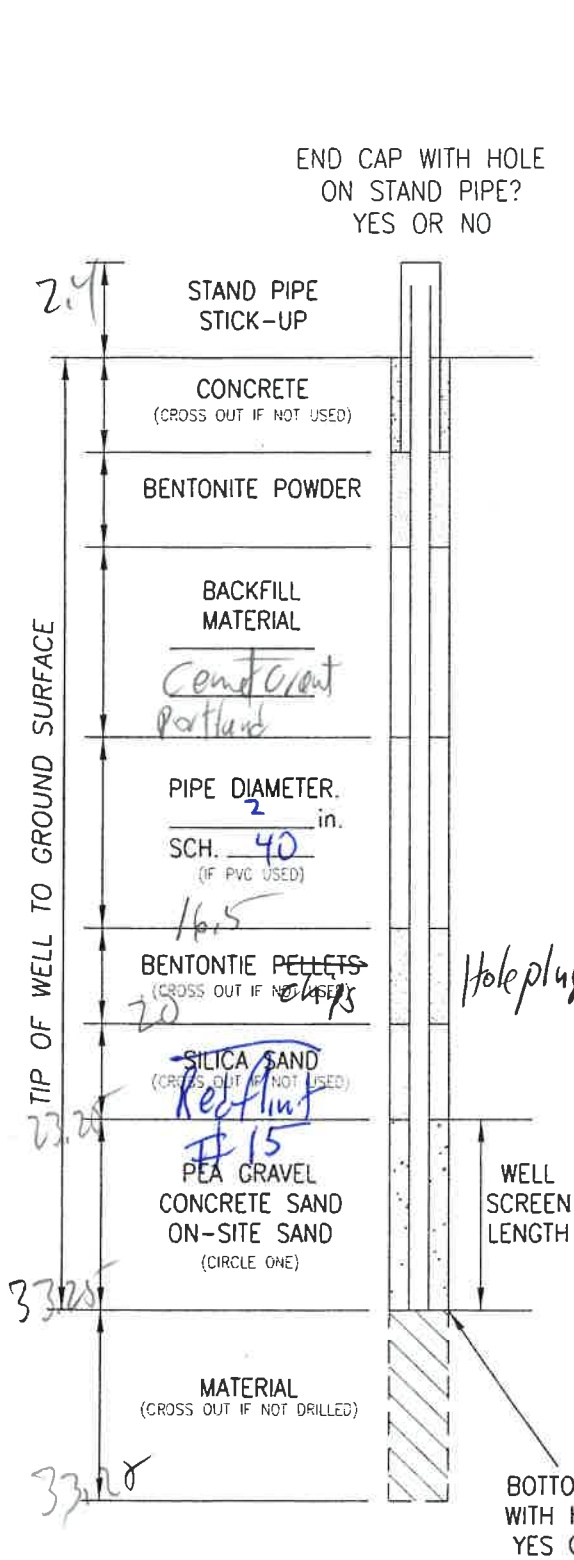
Weather: 43 Degrees F, Rain

Depth to Water Table (ft): 25.30

X:\STS-Legacy_CADD_Settings-Autodesk\Borders\8x11WELL-STS-AECOM-08.dwg, Model: 9/24/2009 2:05:01 PM, STS_PLOTSTAMP, STS_PLOTSTAMP

FIELD WELL INSTALLATION DIAGRAM

AECOM



- 1) TYPE OF PIPE? PVC, GALVANIZED, STAINLESS, OTHER _____
- 2) TYPE OF PIPE JOINTS? BELLED COUPLINGS, THREADED, OTHER _____
- 3) TYPE OF WELL SCREEN PVC, GALVANIZED, STAINLESS, OTHER Sch 40
- 4) SCREEN SIZE 2" X 10' 10s/ft
- 5) INSTALLED PROTECTOR PIPE W/LOCK? YES OR NO
- 6) WAS SOLVENT USED? YES OR NO
- 7) WAS DRILLING MUD USED? SOLID AUGER, HOLLOW STEM AUGER, WATER, REVERT, BENTONITE.
- 8) DID STANDPIPE COME UP WHEN CASING WAS PULLED? YES OR NO
- 9) HOW WAS WELL DEVELOPED whole BAILING, PUMPING, SURGING, COMPRESSED AIR.
- 10) TIME SPENT FOR WELL DEVELOPMENT 5 Min. 15 Min. 30 Min. OTHER 1 hr. 15 min.
- 11) APPROXIMATE WATER VOLUME REMOVED OR ADDED 5 Gal. 10 Gal. 15 Gal. OTHER 127
- 12) WATER CLARITY BEFORE DEVELOPMENT? CLEAR, TURBID, OPAQUE
- 13) WATER CLARITY AFTER DEVELOPMENT? CLEAR, TURBID, OPAQUE
- 14) DID THE WATER SMELL? YES OR NO
- 15) WATER LEVER SUMMARY
 - 1) DEPTH FROM T. STAND PIPE AFTER DEVELOPMENT? 27.9 FT. OR DRY
 - 2) OTHER MEASUREMENTS:
DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE

WELL No.: MW-20 DATE INSTALLED: 10-15-13 DRILL RIG: CME 750

DRILLER: Larry DRILL CREW: AKT

JOB/CLIENT: Enbridge SCLP 5 AECOM JOB No.: 6025 4681

AECOM

Water Level Observations

WL: _____ WS or WD

WL: _____ BCR _____ ACR

WL: _____ AB _____ HR, AB

WL: _____ 24 hr. AB

BOPELOG.XLS



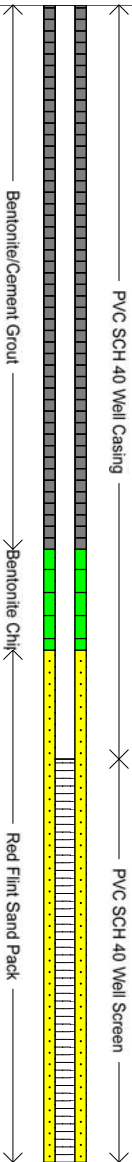
Boring and Well Construction Log

Boring #: MW-21

Sheet 1 of 1

Project: South Cass Lake	Contractor: American Engineering	Location: Cass Lake, MN
Project #: 60254681	Operator:	
Client: Enbridge Energy	Drill Rig Type: CME 75	Surface Elevation (ft AMSL): 1335.30
Start Date & Time: 10-15-2013	Method: Hollow Stem	Total Depth (ft): 30.5
Finish Date & Time: 10-15-2013	Boring ID: 4.25	Logged By: Don Johnson, PG

Sample					Depth (ft.)	Lithology	USCS Symbol	Soil and Rock Description	Well Diagram
Analytical Sample	Sample Type	Blows/ 6 inch	% Rec	PID (ppm)					

MW-21	SS	1,1,2,2	90	0.2	0	OL		TOPSOIL, sandy, black, very loose, moist	
	SS	3,4,5,7	90	2.7		SP		SAND, fine to very fine, trace silt, yellowish brown (10YR 5/4), moist, loose, color change to dark yellowish brown (10YR 4/6) at 2.7 Feet	
	SS	3,4,7,7	85	5	5	SP		SAND, fine, trace silt, medium density, dark yellowish brown (10YR 4/4), moist, color change to yellowish brown (10YR 4/4) at 8 feet	
	SS	2,2,2,2	85	7.8					
	SS	2,3,5,7	90	7.8					
	SS	3,4,7,6	80	10	10	SP		SAND, fine to very fine, trace silt, light brownish gray (2.5YR 6/2), moist, loose	
	SS	3,4,7,6	75	12.8		SP		SAND, fine, trace silt, medium density, olive gray (5YR 5/2), moist	
	SS	2,6,7,6	75	12.8	15				
	SS	2,6,7,6	75	0					
	SS	4,9,13,18	75	0	20				
	SS	4,9,13,18	75	0					
	SS	13,10,10,13	80	0					
	SS	13,10,10,13	80	0	25				
	SS	5,6,9,8	80	0					
	SS	5,6,8,9	90	28	30	SP		SAND, fine to coarse, trace gravel, trace silt, dark yellowish brown (2.5YR 4/2), saturated, loose	

Remarks and Datum Used:

Log compiled by Chris Knuteson

AECOM

Duluth Technology Village
11 East Superior Street, Ste 260
Duluth, MN 55802
Phone: (218) 625-8766

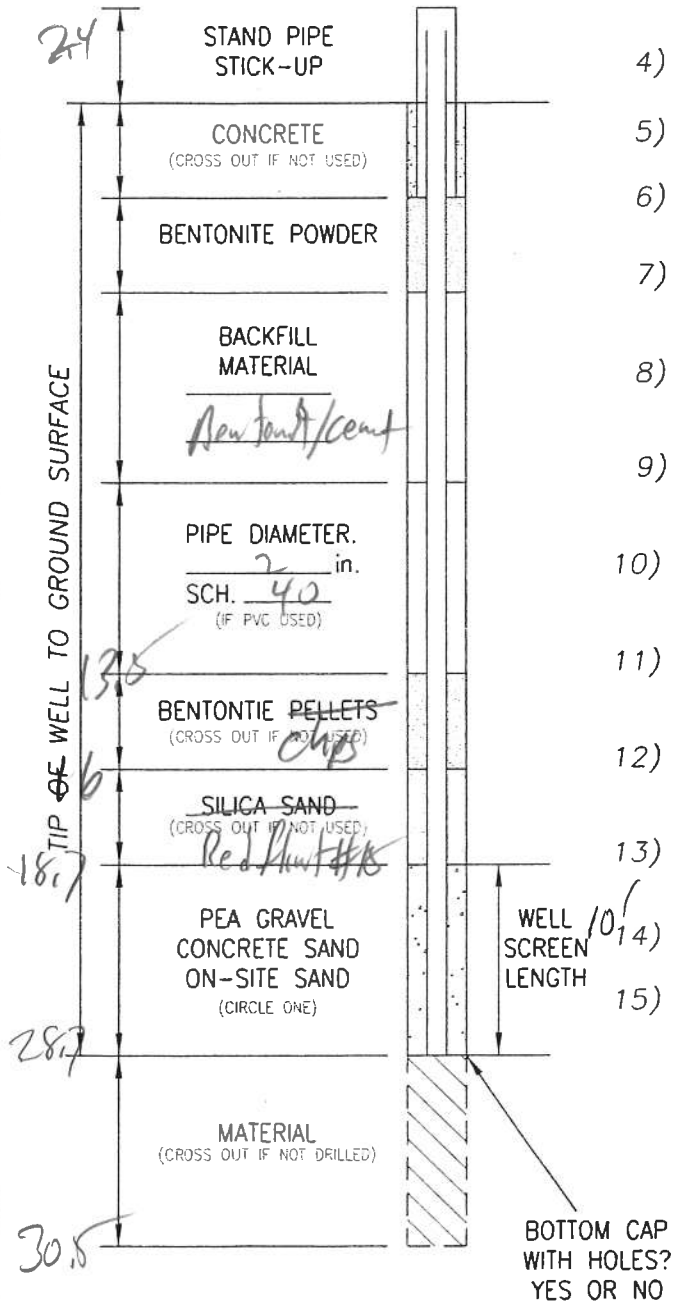
Weather: 40 Degrees F, Rain

Depth to Water Table (ft): 25.49

FIELD WELL INSTALLATION DIAGRAM

AECOM

END CAP WITH HOLE
ON STAND PIPE?
YES OR NO



- 1) TYPE OF PIPE? PVC, GALVANIZED, STAINLESS, OTHER _____
- 2) TYPE OF PIPE JOINTS? BELLED COUPLINGS, THREADED, OTHER _____
- 3) TYPE OF WELL SCREEN PVC, GALVANIZED, STAINLESS, OTHER _____
- 4) SCREEN SIZE 10 dot 10 x 2 1/2
- 5) INSTALLED PROTECTOR PIPE W/LOCK? YES OR NO
- 6) WAS SOLVENT USED? YES OR NO
- 7) WAS DRILLING MUD USED? SOLID AUGER HOLLOW STEM AUGER, WATER, REVERT, BENTONITE.
- 8) DID STANDPIPE COME UP WHEN CASING WAS PULLED? YES OR NO
- 9) HOW WAS WELL DEVELOPED BAILING, PUMPING, SURGING, COMPRESSED AIR.
- 10) TIME SPENT FOR WELL DEVELOPMENT
5 Min. 15 Min. 30 Min. OTHER 1 hr
- 11) APPROXIMATE WATER VOLUME REMOVED OR ADDED
5 Gal. 10 Gal. 15 Gal. OTHER _____
- 12) WATER CLARITY BEFORE DEVELOPMENT?
CLEAR, TURBID, OPAQUE
- 13) WATER CLARITY AFTER DEVELOPMENT?
CLEAR, TURBID, OPAQUE
- 14) DID THE WATER SMELL? YES OR NO
- 15) WATER LEVER SUMMARY
 - 1) DEPTH FROM T. STAND PIPE AFTER DEVELOPMENT? _____ FT. OR DRY
 - 2) OTHER MEASUREMENTS:

DATE: _____	FT. FROM T, ST. PIPE
DATE: _____	FT. FROM T, ST. PIPE
DATE: _____	FT. FROM T, ST. PIPE
DATE: _____	FT. FROM T, ST. PIPE

WELL No.: Mw-21 DATE INSTALLED: 10-15-13 DRILL RIG: CME 750
 DRILLER: Larry Anderson DRILL CREW: Shany Graski
 JOB/CLIENT: Enbridge SCLPS AECOM JOB No.: _____

Larry Anderson

FIELD BORING LOG

AECOM

Sheet 1 of 2

Technician Don Johnston - AECOM
 Driller Don Johnston
 Boring Completed 10-15-13
 Station CRASK
 Offset 15

Surface Elevation 10-15-13
 Boring Started 10-15-13
 Boring Completed 10-15-13
 Station CRASK
 Offset 15

Casing Used 15 Size 4 1/4

Water Level Observations
 WL: WS or WD
 WL: BCR
 WL: AB HR, AB
 WL: 24 hr, AB

Job # 1000-24 Client Enbridge Weather 40S Rain

Enbridge South Cass Lake Pumping Station
 Karl Beaster - LP Enbridge Environment
 Klete Fallowfield - AECOM PM

Abbreviations

MC - Macro Core
 LB - Large Bore
 ST - Shelby Tube
 SS - Spoon
 DB - Diamond Bit
 PA - Power Auger
 HAS - Hollow Stem Auger
 RB - Rock Bit

WS - While Sampling

WD - While Drilling

BCR - Before Casing Removal

ACR - After Casing Removal

AB - After Boring

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS

FILL THICKNESS

CAVE-IN LEVEL:

WHILE DRILLING AND SAMPLING

AFTER BORING COMPLETION

WATER LOSS:

AT TO

BOULDERS OR OBSTRUCTIONS:

AT TO

ARTESIAN PRESSURE:

DEPTH

HEIGHT OF SOIL RISE IN CASING

PIEZOMETER PVC OR SS

DIAMETER IN

SCREEN DEPTH FT.

RISE PIPE FT. TO

Sample No.	Depth or Elevation	From	To	Sample Method	R	QP	PID	Length Recovered (feet)	Penetrometer Test in TSF	PID Detection	Strata Change	Sample Description
1	0	2	SS	11	2	1.8	-	-	-	-	-	0.2' feet wet
2	2.5	4.5	SS	3	4	5	7	1.8	-	-	-	fine to med. fine sand, fine silt - yellowish-brown - moist - (SPSM) loose
3	5	7	SS	3	4	7	7	1.7	-	-	-	2.7 color change dark yellowish-brown 1/4" silt
4	7.5	9.5	SS	2	2	2	2	1.8	-	-	-	3' 1/4 silt cemented sand dark brown
5	10	12	SS	2	3	5	7	1.9	-	-	-	5' fine sand trace silt dark yellowish brown 1/4" 4/4" moist - (SPSM) med dense - SP
6	12.5	14.5	SS	3	4	7	6	1.8	-	-	-	7.5 color change 1/4" brown 2.5" 4/4" loose
7	15	17	SS	2	3	5	7	1.9	-	-	-	10 fine to med. fine sand trace silt light brownish gray 2.5" 6/2" moist loose (SPSM) 1
8	17.5	19.5	SS	3	4	7	6	1.8	-	-	-	12.5 fine sand trace silt dark gray 1.5" 1/2" moist - med dense - (SPSM) 1/2" 1/2"

AECOM

Sheet 5 of 5

Surface Elevation

Boring Started _____

Station _____

Offset_____

Casing Used

Size

WL: _____ 24 hr. AB

24 hr. AB

Water Level Observations
WS or WD
229

WS or WD

WL: _____ AB _____ HR, AB

WL: _____ 24 hr. AB

BORELOG.XLS



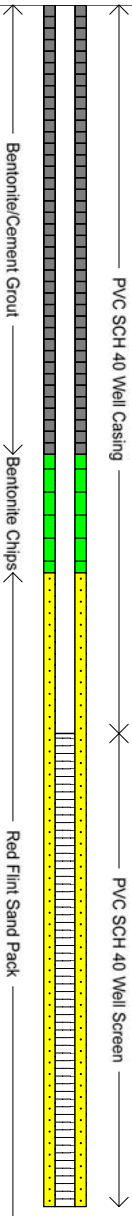
Boring and Well Construction Log

Boring #: MW-22

Sheet 1 of 1

Project: South Cass Lake	Contractor: American Engineering	Location: Cass Lake, MN
Project #: 60254681	Operator:	
Client: Enbridge Energy	Drill Rig Type: CME 75	Surface Elevation (ft AMSL): 1331.14
Start Date & Time: 10-16-2013	Method: Hollow Stem	Total Depth (ft): 26
Finish Date & Time: 10-16-2013	Boring ID: 4.25	Logged By: Don Johnson, PG

Sample					Depth (ft.)	Lithology	USCS Symbol	Soil and Rock Description	Well Diagram
Analytical Sample	Sample Type	Blows/ 6 inch	% Rec	PID (ppm)					

MW-22					0	OL SP		TOPSOIL, sandy, organics, roots	
	SS	1,1,2,4	89	<1				SAND, fine, trace silt, dark yellowish brown (10YR 4/4), moist, loose	
	SS	3,4,3,4	89	<1					
	SS	2,2,3,3	89	<1	5	SP		SAND, fine, trace silt, olive brown (2.5YR 4/4), moist, loose	
	SS	2,2,3,3	89	<1		SP		SAND, fine to medium, trace coarse sand, trace silt, cross bedding, light olive brown (2.5Y 5/4), moist, loose	
	SS	2,3,4,7	89	<1					
	SS	3,5,7,6	89	10	10	SP		SAND, fine, trace silt, medium density, cross bedding, grayish brown (2.5YR 5/2), moist, saturated at 18.9 feet	
	SS	2,13,9,10	89	<1					
	SS	2,6,11,11	89	<1	15				
	SS	2,6,11,11	89	1					
	SS	3,6,9,9	89	<1		SP		SAND, fine to medium, trace coarse sand, trace fine gravel, trace silt, medium density, grayish brown (2.5YR 5/2), saturated	
	SS	3,8,9,11	89	<1	20				
	SS	3,6,9,9	89	<1					
	SS	3,6,9,9	89	<1	25				

Remarks and Datum Used:	Log compiled by Chris Knuteson
AECOM Duluth Technology Village 11 East Superior Street, Ste 260 Duluth, MN 55802 Phone: (218) 625-8766	Weather: 30 Degrees F, Sunny
	Depth to Water Table (ft): 18.9

FIELD WELL INSTALLATION DIAGRAM

AECOM

END CAP WITH HOLE
ON STAND PIPE?
YES OR NO

1) TYPE OF PIPE?
PVC, GALVANIZED, STAINLESS, OTHER _____

2) TYPE OF PIPE JOINTS?
BELLED COUPLINGS, THREADED, OTHER _____

3) TYPE OF WELL SCREEN
PVC, GALVANIZED, STAINLESS, OTHER _____

4) SCREEN SIZE 10 slot 10' x 2"

5) INSTALLED PROTECTOR PIPE W/LOCK? YES OR NO

6) WAS SOLVENT USED? YES OR NO

7) WAS DRILLING MUD USED?
SOLID AUGER HOLLOW STEM AUGER, WATER, REVERT, BENTONITE.

8) DID STANDPIPE COME UP WHEN CASING WAS PULLED?
YES OR NO

9) HOW WAS WELL DEVELOPED whirl
BAILING, PUMPING, SURGING, COMPRESSED AIR.

10) TIME SPENT FOR WELL DEVELOPMENT
5 Min. 15 Min. 30 Min. OTHER 1 hr.

11) APPROXIMATE WATER VOLUME REMOVED OR ADDED
5 Gal. 10 Gal. 15 Gal. OTHER 150

12) WATER CLARITY BEFORE DEVELOPMENT?
CLEAR, TURBID, OPAQUE

13) WATER CLARITY AFTER DEVELOPMENT?
CLEAR, TURBID, OPAQUE

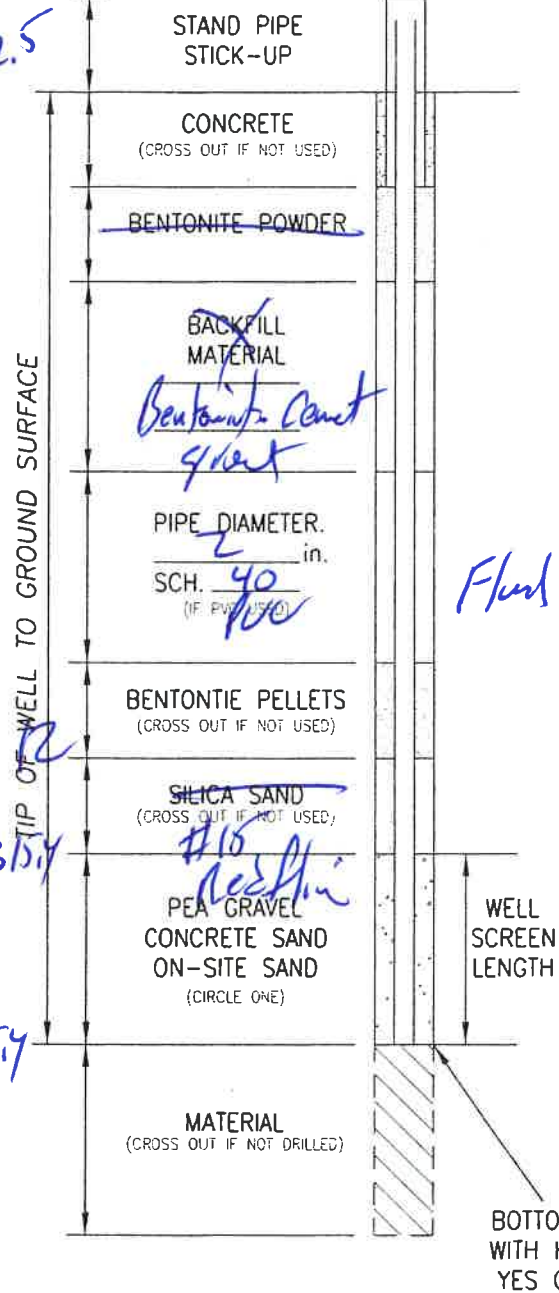
14) DID THE WATER SMELL? YES OR NO

15) WATER LEVER SUMMARY

1) DEPTH FROM T. STAND PIPE AFTER DEVELOPMENT?
_____ FT. OR DRY

2) OTHER MEASUREMENTS:

DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE
DATE: _____ FT. FROM T. ST. PIPE



WELL No.: MW-22 DATE INSTALLED: 10-10-13 DRILL RIG: CME 250

DRILLER: Larry Anderson DRILL CREW: Shawn G.

JOB/CLIENT: Enbridge South Canada AECOM JOB No.: _____

AECOM

Sheet 1 of 2

Casing Used 45 Size 4 1/2

Water Level Observations
W/L: 183 WS or WD
W/L: _____ BCR _____ ACR
W/L: _____ AB _____ HR, AB
W/L: _____ 24 hr. AB

H/6

FIELD BORING LOG

AECOM

Technician Don Johnston - AECOM
 Driller Therion Well
 Helper Lucy Atkinson
 RIG/MT/Model 750

Surface Elevation
 Boring Started 10-16-13
 Boring Completed 10-16-13
 Station
 Offset

Casing Used

(15) Size 4 1/4 ID

Sheet 22 of 22
 Waiver Level Observations
 WL: 40.9 WS or WD
 WL: BCR ACR
 WL: AB HR, AB
 WL: 24 hr. AB

Job # Boring No. mu-22 Client Enbridge Weather W/C 35

Enbridge South Cass Lake Pumping Station
 Karl Beaster - LP Enbridge Environment
 Klete Fallowfield - AECOM PM

Abbreviations

MC - Macro Core
 LB - Large Bore
 ST - Shelby Tube
 SS - Spoon
 DB - Diamond Bit
 PA - Power Auger
 HAS - Hollow Stem Auger
 RB - Rock Bit

WS - While Sampling

WD - While Drilling

BCR - Before Casing Removal

ACR - After Casing Removal

AB - After Boring

DRILL CREW CHECKLIST:

TOPSOIL THICKNESS

FILL THICKNESS

CAVE-IN LEVEL:

WHILE DRILLING AND

SAMPLING

AFTER BORING

COMPLETION

WATER LOSS:

AT

TO

BOULDERS OR

OBSTRUCTIONS:

AT

TO

ARTESIAN PRESSURE:

DEPTH:

HEIGHT OF SOIL RISE IN

CASING

PIEZOMETER PVC OR SS

DIAMETER

SCREEN DEPTH

TO

FT.

RIGER PIPE

FT. TO

WELL DEVELOPMENT RECORD

Job Name Eubridge SCLPS Start Date 10-15-13
 Stickup Above Ground Surface 2.4 feet Job Number _____
 Well # MW-20 Date of Installation 10-15-13 Your Name Don Johnston
 Screen Interval 23.25 to 33.25 feet below ground surface.
 Internal Diameter of Well Pipe 2.4 Screen Slot 10 slot
 Screen Material Sch 40 PVC 2" 10 slot Riser Material Sch 40 PVC 2"

INITIAL DATA PRIOR TO DEVELOPMENT

All measurements taken from top of riser pipe.

Water Level <u>27.9</u> feet	I.D. of riser pipe [inch]	Gallons per foot of depth
Sounded Bottom of Well <u>35.65</u> feet	2	0.163
Volume of Water in Well _____ gallons.	3	0.367
Minimum Volume of Water to be Removed for Development _____ gallons.	4	0.653
	5	1.02

PUMPING RECORD

All measurements taken from top of riser pipe.

Date	Run	Start Time	Finish Time	Elapsed Time	Pumping Rate [gal/min]	Volume Removed [gal]	Draw Down [feet]	Recharge Rate [gal/min]	Comments
10-15-13	1	9:50	11:05	1hr 15m	1.78/min	127	1'	Frack the pump	Surged till clear

STABILIZATION TEST

All measurements taken from top of riser pipe.

Date	Sample Number	pH	Temperature Corrected Conductivity [umhos]	Temperature [°C]	Total Volume Removed [gal]	Pumping Rate [gal/min]	Time	Comments
10-15	1	out of range	1097	7.11	1.67	8.5	1020	clear
	2	7.94	1089	7.13	1.10	167	1030	
	3		1077	7.05	1.31	8.0	1040	
	4		1068	7.08	1.6	8.9	1045	clear

WATER LEVEL AFTER DEVELOPMENT

All measurements taken from top of riser pipe.

Date _____
 Static Water Level _____ feet
 Sounded Bottom of Well After Development _____ feet
 Is there any sediment left at the bottom of the well? yes _____ no _____

WELL DEVELOPMENT RECORD

Job Name Enbridge South Cass Lake Start Date 10-16-13
 Stickup Above Ground Surface _____ feet Job Number _____
 Well # MW-21 Date of Installation 10-15-13 Your Name Don Johnston
 Screen Interval 18.7 to 28.7 feet below ground surface.
 Internal Diameter of Well Pipe 2 Screen Slot 10564
 Screen Material Sch 40 PVC 2" 10 slot Riser Material Sch 40 PVC 2"

INITIAL DATA PRIOR TO DEVELOPMENT

All measurements taken from top of riser pipe.

Water Level 25.49 feet. I.D. of riser pipe _____ Gallons per foot of depth _____
 Sounded Bottom of Well 30.53 feet. _____ 2 0.163
 Volume of Water in Well _____ gallons. _____ 3 0.367
 Minimum Volume of Water to be Removed _____ 4 0.653
 for Development _____ gallons. _____ 5 1.02

PUMPING RECORD

All measurements taken from top of riser pipe. 33 sec/gal

Date	Run	Start Time	Finish Time	Elapsed Time	Pumping Rate [gal/min]	Volume Removed [gal]	Draw Down [feet]	Recharge Rate [gal/min]	Comments
10-16-13	1	0934	1034	1hr	0.18	109	25.7		Battery went dead
10-16-13	2	1115	1130	15	.5	75	0		weak battery
10-16-13	3	1200	1215	15	2	30	25.7		

STABILIZATION TEST

All measurements taken from top of riser pipe. pH OK

Date	Sample Number	pH	Temperature Corrected Conductivity [umhos]	Temperature [°C]	Total Volume Removed [gal]	Pumping Rate [gal/min]	Time	Comments
10-16-13	1	94.44	1070	6.72	1.04	74.3	0958	Clear Gauge Brown
10-16-13	2	OR	1040	6.90	1.00	74.3	1005	
10-16-13	3	OR	1069	6.75	3.04	74.3	1015	Clear sample
10-16-13	4	OR	1076	7.16	2.75	74.3	1145	Clear

WATER LEVEL AFTER DEVELOPMENT

All measurements taken from top of riser pipe.

Date _____
 Static Water Level _____ feet
 Sounded Bottom of Well After Development _____ feet
 Is there any sediment left at the bottom of the well? yes _____ no _____

9:30 at vig
 repair hose 10:00
 10 meet MW 2.2

WELL DEVELOPMENT RECORD

Job Name Enbridge South Cross Lake Start Date 10-16-13
 Stickup Above Ground Surface 2.5 feet Job Number _____
 Well # MW-22 Date of Installation _____ Your Name Don Schwartz
 Screen Interval 15.9 to 28.4 feet below ground surface.
 Internal Diameter of Well Pipe _____ Screen Slot 1056
 Screen Material PVC Riser Material 5440 PVC

INITIAL DATA PRIOR TO DEVELOPMENT

All measurements taken from top of riser pipe.

Water Level _____ feet.	I.D. of riser pipe [inch]	Gallons per foot of depth
Sounded Bottom of Well _____ feet.	2	0.163
Volume of Water in Well _____ gallons.	3	0.367
Minimum Volume of Water to be Removed for Development _____ gallons.	4	0.653
	5	1.02

PUMPING RECORD

All measurements taken from top of riser pipe. 2320/gal

Date	Run	Start Time	Finish Time	Elapsed Time	Pumping Rate [gal/min]	Volume Removed [gal]	Draw Down [feet]	Recharge Rate [gal/min]	Comments
10-16-13	1	1215	1315	60m	2.46	156	—	Fast	clear Surged brown
									Surged until clear

STABILIZATION TEST

All measurements taken from top of riser pipe.

Date	Sample Number	pH	Temperature Corrected Conductivity [umhos]	Temperature [°C]	Total Volume Removed [gal]	Pumping Rate [gal/min]	Time	Comments
10-16-13	1	OR	1040	7.40	1.56	1-6.5	1230	Clear
10-16-13	2	OR	1058	7.88	2.55	-47.3	1245	
10-16-13	2	OR	1064	7.12	2.68	-51.3	1300	clear

WATER LEVEL AFTER DEVELOPMENT

All measurements taken from top of riser pipe.

Date _____
 Static Water Level _____
 Sounded Bottom of Well After Development _____ feet
 Is there any sediment left at the bottom of the well? yes _____ no _____

Attachment II
Laboratory Analytical Report

July 01, 2013

Klete Fallowfield
AECOM
Duluth Technology village
11 East Superior St. Suite 560
Duluth, MN 55802

RE: Project: 60254681 South Cass Lake
Pace Project No.: 10232745

Dear Klete Fallowfield:

Enclosed are the analytical results for sample(s) received by the laboratory on June 19, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carol Davy

carol.davy@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc..

CERTIFICATIONS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

Colorado Certification #Pace

Connecticut Certification #: PH-0256

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Hawaii Certification #Pace

Idaho Certification #: MN00064

Illinois Certification #: 200011

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Utah Certification #: MN00064

Virginia/DCLS Certification #: 002521

Virginia/VELAP Certification #: 460163

Washington Certification #: C754

West Virginia Certification #: 382

Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10232745001	SCDW	Water	06/17/13 13:25	06/19/13 15:05
10232745002	MW-1	Water	06/17/13 12:55	06/19/13 15:05
10232745003	MW-4	Water	06/17/13 14:20	06/19/13 15:05
10232745004	MW-15	Water	06/17/13 15:25	06/19/13 15:05
10232745005	MW-6	Water	06/17/13 16:10	06/19/13 15:05
10232745006	MW-7	Water	06/17/13 17:00	06/19/13 15:05
10232745007	MW-17	Water	06/17/13 18:05	06/19/13 15:05
10232745008	MW-19	Water	06/18/13 08:30	06/19/13 15:05
10232745009	MW-18	Water	06/18/13 09:15	06/19/13 15:05
10232745010	MW-8	Water	06/18/13 10:10	06/19/13 15:05
10232745011	MW-16B	Water	06/18/13 11:00	06/19/13 15:05
10232745012	MW-9	Water	06/18/13 11:50	06/19/13 15:05
10232745013	USGS 3A	Water	06/18/13 13:45	06/19/13 15:05
10232745014	USGS 1A	Water	06/18/13 14:35	06/19/13 15:05
10232745015	USGS 4A	Water	06/18/13 15:35	06/19/13 15:05
10232745016	USGS 2A	Water	06/18/13 16:20	06/19/13 15:05
10232745017	MW-16A	Water	06/18/13 17:20	06/19/13 15:05
10232745018	MW-10	Water	06/19/13 09:05	06/19/13 15:05
10232745019	Field Blank	Water	06/19/13 08:00	06/19/13 15:05
10232745020	Trip Blank	Water	06/19/13 08:00	06/19/13 15:05
10232745021	DUP	Water	06/19/13 08:00	06/19/13 15:05

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10232745001	SCDW	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745002	MW-1	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745003	MW-4	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745004	MW-15	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745005	MW-6	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745006	MW-7	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745007	MW-17	RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
10232745008	MW-19	RSK 175	DR1	1
		Diesel Range Organics	MT	4

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SAMPLE ANALYTE COUNT

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10232745009	MW-18	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745010	MW-8	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745011	MW-16B	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745012	MW-9	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745013	USGS 3A	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745014	USGS 1A	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
10232745015	USGS 4A	EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4

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SAMPLE ANALYTE COUNT

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10232745016	USGS 2A	ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	EB2	7
		SM 4500-NO3 H	PH1	1
10232745017	MW-16A	ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
10232745018	MW-10	ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	EB2, KT1	7
		SM 4500-NO3 H	PH1	1
10232745019	Field Blank	ASTM D516-02	KEO	1
		RSK 175	DR1	1
		Diesel Range Organics	MT	4
		EPA 8260	KT1	7
		SM 4500-NO3 H	PH1	1
10232745020	Trip Blank	ASTM D516-02	KEO	1
		EPA 8260	KT1	7
10232745021	DUP	RSK 175	CJR	1
		Diesel Range Organics	MT	4
		EPA 8260	EB2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516-02	KEO	1

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: RSK 175

Description: RSK 175 AIR Headspace

Client: AECOM

Date: July 01, 2013

General Information:

20 samples were analyzed for RSK 175. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

QC Batch: AIR/17647

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1464651)
- Methane

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: AIR/17663

R1: RPD value was outside control limits.

- DUP (Lab ID: 1465727)
- Methane

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: RSK 175

Description: RSK 175 AIR Headspace

Client: AECOM

Date: July 01, 2013

Analyte Comments:

QC Batch: AIR/17647

P8: Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

- BLANK (Lab ID: 1464651)
- Methane

QC Batch: AIR/17659

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- DUP (Lab ID: 1465672)
- Methane

QC Batch: AIR/17660

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MW-10 (Lab ID: 10232745018)
- Methane

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: Diesel Range Organics

Description: WIDRO Extended GCS

Client: AECOM

Date: July 01, 2013

General Information:

20 samples were analyzed for Diesel Range Organics. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with Diesel Range Organics with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: OEXT/22068

T7: Low boiling point hydrocarbons are present in the sample.

- USGS 2A (Lab ID: 10232745016)
 - WDRO C10-C28
- USGS 3A (Lab ID: 10232745013)
 - WDRO C10-C28

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: EPA 8260

Description: 8260 MSV UST

Client: AECOM

Date: July 01, 2013

General Information:

21 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: SM 4500-NO3 H

Description: SM4500NO3-H, NO2 + NO3 pres.

Client: AECOM

Date: July 01, 2013

General Information:

20 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/15286

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10232745001, 10232745014

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1461198)
 - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1461200)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1461199)
 - Nitrogen, NO2 plus NO3

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Method: ASTM D516-02

Description: ASTM D516-90 Sulfate Water

Client: AECOM

Date: July 01, 2013

General Information:

20 samples were analyzed for ASTM D516-02. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: SCDW		Lab ID: 10232745001		Collected: 06/17/13 13:25		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		06/24/13 21:06	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	ND mg/L		0.10	0.022	1	06/24/13 07:09	06/25/13 14:30		
WDRO C10-C28	ND mg/L		0.10	0.019	1	06/24/13 07:09	06/25/13 14:30		
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	06/24/13 07:09	06/25/13 14:30		
Surrogates									
n-Triacontane (S)	98 %		50-150		1	06/24/13 07:09	06/25/13 14:30	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 21:53	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 21:53	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 21:53	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 21:53	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116 %		75-125		1		06/21/13 21:53	17060-07-0	
Toluene-d8 (S)	103 %		75-125		1		06/21/13 21:53	2037-26-5	
4-Bromofluorobenzene (S)	103 %		75-125		1		06/21/13 21:53	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.70 mg/L		0.10	0.050	1		06/21/13 12:15		M1
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	3.8 mg/L		2.5	1.2	1		06/25/13 13:47	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-1		Lab ID: 10232745002		Collected: 06/17/13 12:55		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		06/24/13 21:17	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.11 mg/L		0.10	0.022	1	06/24/13 07:09	06/25/13 13:49		
WDRO C10-C28	ND mg/L		0.10	0.018	1	06/24/13 07:09	06/25/13 13:49		
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	06/24/13 07:09	06/25/13 13:49		
Surrogates									
n-Triacontane (S)	101 %		50-150		1	06/24/13 07:09	06/25/13 13:49	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 21:37	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 21:37	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 21:37	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 21:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115 %		75-125		1		06/21/13 21:37	17060-07-0	
Toluene-d8 (S)	103 %		75-125		1		06/21/13 21:37	2037-26-5	
4-Bromofluorobenzene (S)	102 %		75-125		1		06/21/13 21:37	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.72 mg/L		0.10	0.050	1		06/21/13 12:17		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND mg/L		2.5	1.2	1		06/25/13 13:50	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-4		Lab ID: 10232745003		Collected: 06/17/13 14:20		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		06/24/13 21:28	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	ND mg/L		0.10	0.022	1	06/24/13 07:09	06/25/13 13:55		
WDRO C10-C28	ND mg/L		0.10	0.018	1	06/24/13 07:09	06/25/13 13:55		
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	06/24/13 07:09	06/25/13 13:55		
Surrogates									
n-Triacontane (S)	89 %		50-150		1	06/24/13 07:09	06/25/13 13:55	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 22:24	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 22:24	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 22:24	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 22:24	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115 %		75-125		1		06/21/13 22:24	17060-07-0	
Toluene-d8 (S)	103 %		75-125		1		06/21/13 22:24	2037-26-5	
4-Bromofluorobenzene (S)	104 %		75-125		1		06/21/13 22:24	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.6 mg/L		0.10	0.050	1		06/21/13 12:20		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	2.5 mg/L		2.5	1.2	1		06/25/13 13:50	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-15		Lab ID: 10232745004		Collected: 06/17/13 15:25		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		06/24/13 21:38	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	ND mg/L		0.10	0.022	1	06/24/13 07:09	06/25/13 14:02		
WDRO C10-C28	ND mg/L		0.10	0.019	1	06/24/13 07:09	06/25/13 14:02		
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	06/24/13 07:09	06/25/13 14:02		
Surrogates									
n-Triacontane (S)	91 %		50-150		1	06/24/13 07:09	06/25/13 14:02	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 22:39	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 22:39	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 22:39	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 22:39	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	114 %		75-125		1		06/21/13 22:39	17060-07-0	
Toluene-d8 (S)	103 %		75-125		1		06/21/13 22:39	2037-26-5	
4-Bromofluorobenzene (S)	103 %		75-125		1		06/21/13 22:39	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	2.2 mg/L		0.10	0.050	1		06/21/13 12:21		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	2.6 mg/L		2.5	1.2	1		06/25/13 13:50	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-6		Lab ID: 10232745005		Collected: 06/17/13 16:10		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		06/24/13 21:49	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.15	mg/L	0.11	0.022	1	06/24/13 07:09	06/25/13 14:09		
WDRO C10-C28	ND	mg/L	0.11	0.019	1	06/24/13 07:09	06/25/13 14:09		
WDRO, Extended C10-C32	0.12	mg/L	0.11	0.021	1	06/24/13 07:09	06/25/13 14:09		
Surrogates									
n-Triacontane (S)	93	%	50-150		1	06/24/13 07:09	06/25/13 14:09	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/21/13 22:55	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/21/13 22:55	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/21/13 22:55	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/21/13 22:55	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116	%	75-125		1		06/21/13 22:55	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/21/13 22:55	2037-26-5	
4-Bromofluorobenzene (S)	103	%	75-125		1		06/21/13 22:55	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.3	mg/L	0.10	0.050	1		06/21/13 12:21		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	3.7	mg/L	2.5	1.2	1		06/25/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-7		Lab ID: 10232745006		Collected: 06/17/13 17:00		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		06/24/13 17:23	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.11	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 14:16		
WDRO C10-C28	ND	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 14:16		
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 14:16		
Surrogates									
n-Triacontane (S)	92	%	50-150		1	06/24/13 07:09	06/25/13 14:16	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/21/13 23:10	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/21/13 23:10	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/21/13 23:10	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/21/13 23:10	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116	%	75-125		1		06/21/13 23:10	17060-07-0	
Toluene-d8 (S)	102	%	75-125		1		06/21/13 23:10	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		1		06/21/13 23:10	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.14	mg/L	0.10	0.050	1		06/21/13 12:25		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	5.3	mg/L	2.5	1.2	1		06/25/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-17		Lab ID: 10232745007		Collected: 06/17/13 18:05		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		06/24/13 17:34	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.16 mg/L		0.10	0.022	1	06/24/13 07:09	06/25/13 14:23		
WDRO C10-C28	ND mg/L		0.10	0.019	1	06/24/13 07:09	06/25/13 14:23		
WDRO, Extended C10-C32	0.12 mg/L		0.10	0.021	1	06/24/13 07:09	06/25/13 14:23		
Surrogates									
n-Triacontane (S)	81 %		50-150		1	06/24/13 07:09	06/25/13 14:23	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 23:26	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 23:26	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 23:26	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 23:26	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115 %		75-125		1		06/21/13 23:26	17060-07-0	
Toluene-d8 (S)	103 %		75-125		1		06/21/13 23:26	2037-26-5	
4-Bromofluorobenzene (S)	103 %		75-125		1		06/21/13 23:26	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		06/21/13 12:26		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	7.4 mg/L		2.5	1.2	1		06/25/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-19		Lab ID: 10232745008		Collected: 06/18/13 08:30		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	43.3	ug/L	6.6	3.3	1		06/24/13 18:06	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.42	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:21		
WDRO C10-C28	0.32	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:21		
WDRO, Extended C10-C32	0.36	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:21		
Surrogates									
n-Triacontane (S)	82	%	50-150		1	06/24/13 07:09	06/25/13 13:21	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/21/13 23:42	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/21/13 23:42	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/21/13 23:42	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/21/13 23:42	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	117	%	75-125		1		06/21/13 23:42	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/21/13 23:42	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		1		06/21/13 23:42	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:27		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	4.9	mg/L	2.5	1.2	1		06/25/13 13:53	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-18		Lab ID: 10232745009		Collected: 06/18/13 09:15		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		06/24/13 18:27	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.11	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:28		
WDRO C10-C28	ND	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:28		
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:28		
Surrogates									
n-Triacontane (S)	85	%	50-150		1	06/24/13 07:09	06/25/13 13:28	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/21/13 23:57	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/21/13 23:57	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/21/13 23:57	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/21/13 23:57	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%	75-125		1		06/21/13 23:57	17060-07-0	
Toluene-d8 (S)	102	%	75-125		1		06/21/13 23:57	2037-26-5	
4-Bromofluorobenzene (S)	101	%	75-125		1		06/21/13 23:57	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.7	mg/L	0.10	0.050	1		06/21/13 12:30		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	4.4	mg/L	2.5	1.2	1		06/25/13 13:55	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-8		Lab ID: 10232745010		Collected: 06/18/13 10:10		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		06/24/13 18:37	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.25	mg/L	0.11	0.022	1	06/24/13 07:09	06/25/13 13:35		
WDRO C10-C28	0.16	mg/L	0.11	0.019	1	06/24/13 07:09	06/25/13 13:35		
WDRO, Extended C10-C32	0.21	mg/L	0.11	0.021	1	06/24/13 07:09	06/25/13 13:35		
Surrogates									
n-Triacontane (S)	88	%	50-150		1	06/24/13 07:09	06/25/13 13:35	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 00:13	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 00:13	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 00:13	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 00:13	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116	%	75-125		1		06/22/13 00:13	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/22/13 00:13	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		06/22/13 00:13	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:30		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	6.0	mg/L	2.5	1.2	1		06/25/13 13:55	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-16B		Lab ID: 10232745011		Collected: 06/18/13 11:00		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		06/24/13 18:48	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.24	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:42		
WDRO C10-C28	0.17	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:42		
WDRO, Extended C10-C32	0.20	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:42		
Surrogates									
n-Triacontane (S)	89	%	50-150		1	06/24/13 07:09	06/25/13 13:42	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 00:28	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 00:28	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 00:28	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 00:28	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%	75-125		1		06/22/13 00:28	17060-07-0	
Toluene-d8 (S)	102	%	75-125		1		06/22/13 00:28	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		1		06/22/13 00:28	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.75	mg/L	0.10	0.050	1		06/21/13 12:31		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	9.5	mg/L	2.5	1.2	1		06/25/13 13:55	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-9		Lab ID: 10232745012		Collected: 06/18/13 11:50		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	15.2	ug/L	6.6	3.3	1		06/24/13 18:59	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.23	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:14		
WDRO C10-C28	0.15	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:14		
WDRO, Extended C10-C32	0.19	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:14		
Surrogates									
n-Triacontane (S)	87	%	50-150		1	06/24/13 07:09	06/25/13 13:14	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 00:44	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 00:44	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 00:44	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 00:44	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%	75-125		1		06/22/13 00:44	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/22/13 00:44	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		1		06/22/13 00:44	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:31		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	4.6	mg/L	2.5	1.2	1		06/25/13 13:58	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: USGS 3A		Lab ID: 10232745013		Collected: 06/18/13 13:45		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	3860	ug/L	6.6	3.3	1		06/24/13 19:09	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	3.3	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 12:40		
WDRO C10-C28	3.1	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 12:40		T7
WDRO, Extended C10-C32	3.2	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 12:40		
Surrogates									
n-Triacontane (S)	88	%	50-150		1	06/24/13 07:09	06/25/13 12:40	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	20.5	ug/L	1.0	0.24	1		06/22/13 00:59	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 00:59	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 00:59	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 00:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	114	%	75-125		1		06/22/13 00:59	17060-07-0	
Toluene-d8 (S)	104	%	75-125		1		06/22/13 00:59	2037-26-5	
4-Bromofluorobenzene (S)	101	%	75-125		1		06/22/13 00:59	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:35		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND	mg/L	2.5	1.2	1		06/25/13 13:58	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: USGS 1A		Lab ID: 10232745014		Collected: 06/18/13 14:35		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	69.3	ug/L	6.6	3.3	1		06/24/13 19:20	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	0.37	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:08		
WDRO C10-C28	0.27	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:08		
WDRO, Extended C10-C32	0.31	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:08		
Surrogates									
n-Triacontane (S)	89	%	50-150		1	06/24/13 07:09	06/25/13 13:08	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 01:15	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 01:15	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 01:15	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 01:15	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%	75-125		1		06/22/13 01:15	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/22/13 01:15	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		06/22/13 01:15	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:35		M1
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	6.7	mg/L	2.5	1.2	1		06/25/13 13:58	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: USGS 4A		Lab ID: 10232745015		Collected: 06/18/13 15:35		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	536	ug/L	6.6	3.3	1		06/24/13 19:31	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	1.6	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 12:47		
WDRO C10-C28	1.4	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 12:47		
WDRO, Extended C10-C32	1.5	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 12:47		
Surrogates									
n-Triacontane (S)	81	%	50-150		1	06/24/13 07:09	06/25/13 12:47	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 01:30	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 01:30	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 01:30	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 01:30	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%	75-125		1		06/22/13 01:30	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/22/13 01:30	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		06/22/13 01:30	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:41		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	2.9	mg/L	2.5	1.2	1		06/25/13 13:58	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: USGS 2A		Lab ID: 10232745016		Collected: 06/18/13 16:20		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	3500	ug/L	6.6	3.3	1		06/24/13 19:41	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	2.4	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 12:54		
WDRO C10-C28	2.3	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 12:54		T7
WDRO, Extended C10-C32	2.3	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 12:54		
Surrogates									
n-Triacontane (S)	81	%	50-150		1	06/24/13 07:09	06/25/13 12:54	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	21.1	ug/L	1.0	0.24	1		06/25/13 13:17	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/25/13 13:17	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/25/13 13:17	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/25/13 13:17	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	108	%	75-125		1		06/25/13 13:17	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		06/25/13 13:17	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125		1		06/25/13 13:17	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:41		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND	mg/L	2.5	1.2	1		06/25/13 13:58	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-16A		Lab ID: 10232745017		Collected: 06/18/13 17:20		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	58.2	ug/L	6.6	3.3	1		06/25/13 15:19	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	1.0	mg/L	0.10	0.022	1	06/24/13 07:09	06/25/13 13:01		
WDRO C10-C28	0.88	mg/L	0.10	0.019	1	06/24/13 07:09	06/25/13 13:01		
WDRO, Extended C10-C32	0.95	mg/L	0.10	0.021	1	06/24/13 07:09	06/25/13 13:01		
Surrogates									
n-Triacontane (S)	82	%	50-150		1	06/24/13 07:09	06/25/13 13:01	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/22/13 01:46	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/22/13 01:46	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/22/13 01:46	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/22/13 01:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	114	%	75-125		1		06/22/13 01:46	17060-07-0	
Toluene-d8 (S)	102	%	75-125		1		06/22/13 01:46	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		06/22/13 01:46	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:44		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	5.2	mg/L	2.5	1.2	1		06/25/13 14:00	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: MW-10		Lab ID: 10232745018		Collected: 06/19/13 09:05		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	14000	ug/L	6.6	3.3	1		06/25/13 20:16	74-82-8	E
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	14.0	mg/L	1.0	0.22	10	06/24/13 07:09	06/25/13 15:04		
WDRO C10-C28	12.9	mg/L	1.0	0.19	10	06/24/13 07:09	06/25/13 15:04		
WDRO, Extended C10-C32	13.4	mg/L	1.0	0.21	10	06/24/13 07:09	06/25/13 15:04		
Surrogates									
n-Triacontane (S)	94	%	50-150		10	06/24/13 07:09	06/25/13 15:04	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	1880	ug/L	20.0	4.8	20		06/26/13 22:28	71-43-2	
Ethylbenzene	6.3	ug/L	5.0	1.2	5		06/22/13 09:46	100-41-4	
Toluene	ND	ug/L	5.0	1.2	5		06/22/13 09:46	108-88-3	
Xylene (Total)	ND	ug/L	15.0	3.6	5		06/22/13 09:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	113	%	75-125		5		06/22/13 09:46	17060-07-0	
Toluene-d8 (S)	104	%	75-125		5		06/22/13 09:46	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		5		06/22/13 09:46	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:45		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND	mg/L	2.5	1.2	1		06/25/13 14:00	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: Field Blank		Lab ID: 10232745019		Collected: 06/19/13 08:00		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	10 ug/L		6.6	3.3	1		06/25/13 20:27	74-82-8	
WDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	ND mg/L		0.11	0.022	1	06/24/13 07:09	06/25/13 14:36		
WDRO C10-C28	ND mg/L		0.11	0.019	1	06/24/13 07:09	06/25/13 14:36		
WDRO, Extended C10-C32	ND mg/L		0.11	0.021	1	06/24/13 07:09	06/25/13 14:36		
Surrogates									
n-Triacontane (S)	90 %		50-150		1	06/24/13 07:09	06/25/13 14:36	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		06/21/13 21:22	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		06/21/13 21:22	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		06/21/13 21:22	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		06/21/13 21:22	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115 %		75-125		1		06/21/13 21:22	17060-07-0	
Toluene-d8 (S)	104 %		75-125		1		06/21/13 21:22	2037-26-5	
4-Bromofluorobenzene (S)	104 %		75-125		1		06/21/13 21:22	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		06/21/13 12:45		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND mg/L		2.5	1.2	1		06/25/13 14:00	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: Trip Blank		Lab ID: 10232745020		Collected: 06/19/13 08:00		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		06/21/13 21:06	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		06/21/13 21:06	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/21/13 21:06	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/21/13 21:06	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	114	%	75-125		1		06/21/13 21:06	17060-07-0	
Toluene-d8 (S)	103	%	75-125		1		06/21/13 21:06	2037-26-5	
4-Bromofluorobenzene (S)	105	%	75-125		1		06/21/13 21:06	460-00-4	

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ANALYTICAL RESULTS

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Sample: DUP		Lab ID: 10232745021		Collected: 06/19/13 08:00		Received: 06/19/13 15:05		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	11600	ug/L	6.6	3.3	1		06/26/13 08:47	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
TEH (C10-C36), 8015	14.0	mg/L	1.0	0.22	10	06/24/13 07:09	06/25/13 15:10		
WDRO C10-C28	12.8	mg/L	1.0	0.19	10	06/24/13 07:09	06/25/13 15:10		
WDRO, Extended C10-C32	13.4	mg/L	1.0	0.21	10	06/24/13 07:09	06/25/13 15:10		
Surrogates									
n-Triacontane (S)	82	%	50-150		10	06/24/13 07:09	06/25/13 15:10	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	1550	ug/L	20.0	4.8	20		06/25/13 18:10	71-43-2	
Ethylbenzene	5.2	ug/L	1.0	0.24	1		06/25/13 13:33	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		06/25/13 13:33	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		06/25/13 13:33	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	117	%	75-125		1		06/25/13 13:33	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		06/25/13 13:33	2037-26-5	
4-Bromofluorobenzene (S)	97	%	75-125		1		06/25/13 13:33	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		06/21/13 12:46		
ASTM D516-90 Sulfate Water		Analytical Method: ASTM D516-02							
Sulfate	ND	mg/L	2.5	1.2	1		06/25/13 14:00	14808-79-8	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: AIR/17645

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10232745006, 10232745007

METHOD BLANK: 1464643

Matrix: Water

Associated Lab Samples: 10232745006, 10232745007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	06/24/13 13:17	

LABORATORY CONTROL SAMPLE & LCSD: 1464644

1464645

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.2	58.2	96	96	85-115	.02	20	

SAMPLE DUPLICATE: 1464921

Parameter	Units	92161982003 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch:	AIR/17646	Analysis Method:	RSK 175
QC Batch Method:	RSK 175	Analysis Description:	RSK 175 AIR HEADSPACE
Associated Lab Samples:	10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016		

METHOD BLANK:	1464648	Matrix:	Water
Associated Lab Samples:	10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	06/24/13 17:55	

LABORATORY CONTROL SAMPLE & LCSD:		1464649	1464650							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.2	58.6	96	97	85-115	.5	20	

SAMPLE DUPLICATE: 1465255						
Parameter	Units	10232745008 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	43.3	51.5	17	20	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: AIR/17647 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005

METHOD BLANK: 1464651 Matrix: Water
Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	7.9	6.6	06/24/13 20:03	P8

LABORATORY CONTROL SAMPLE & LCSD: 1464652			1464653							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.6	58.6	97	97	85-115	.02	20	

SAMPLE DUPLICATE: 1465282

Parameter	Units	60147089001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: AIR/17659

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10232745017

METHOD BLANK: 1465339

Matrix: Water

Associated Lab Samples: 10232745017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	06/25/13 14:15	

LABORATORY CONTROL SAMPLE & LCSD: 1465340

1465341

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.4	56.9	96	94	85-115	3	20	

SAMPLE DUPLICATE: 1465671

Parameter	Units	10233063001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

SAMPLE DUPLICATE: 1465672

Parameter	Units	10232939014 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	20900	25400	19	20 E	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: AIR/17660

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10232745018, 10232745019

METHOD BLANK: 1465343

Matrix: Water

Associated Lab Samples: 10232745018, 10232745019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	06/25/13 18:40	

LABORATORY CONTROL SAMPLE & LCSD: 1465344

1465345

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	56.9	57.7	94	95	85-115	1	20	

SAMPLE DUPLICATE: 1465673

Parameter	Units	10233246001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: AIR/17663

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10232745021

METHOD BLANK: 1465724

Matrix: Water

Associated Lab Samples: 10232745021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	06/26/13 08:24	

LABORATORY CONTROL SAMPLE & LCSD: 1465725

1465726

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	59.0	56.8	97	94	85-115	4	20	

SAMPLE DUPLICATE: 1465727

Parameter	Units	10232745021 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	11600	8950	26	20	R1

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch:	MSV/24064	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV UST-WATER
Associated Lab Samples:	10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745017, 10232745019, 10232745020		

METHOD BLANK: 1462978

Matrix: Water

Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745017, 10232745019, 10232745020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/21/13 20:50	
Ethylbenzene	ug/L	ND	1.0	06/21/13 20:50	
Toluene	ug/L	ND	1.0	06/21/13 20:50	
Xylene (Total)	ug/L	ND	3.0	06/21/13 20:50	
1,2-Dichloroethane-d4 (S)	%	116	75-125	06/21/13 20:50	
4-Bromofluorobenzene (S)	%	104	75-125	06/21/13 20:50	
Toluene-d8 (S)	%	104	75-125	06/21/13 20:50	

LABORATORY CONTROL SAMPLE: 1462979

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	18.0	90	75-125	
Ethylbenzene	ug/L	20	19.4	97	75-125	
Toluene	ug/L	20	18.6	93	75-125	
Xylene (Total)	ug/L	60	54.3	91	75-125	
1,2-Dichloroethane-d4 (S)	%			116	75-125	
4-Bromofluorobenzene (S)	%			101	75-125	
Toluene-d8 (S)	%			104	75-125	

MATRIX SPIKE SAMPLE: 1468096

Parameter	Units	10232745002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	20	17.9	90	70-135	
Ethylbenzene	ug/L	ND	20	19.7	98	75-125	
Toluene	ug/L	ND	20	18.6	93	75-125	
Xylene (Total)	ug/L	ND	60	54.3	91	75-125	
1,2-Dichloroethane-d4 (S)	%				113	75-125	
4-Bromofluorobenzene (S)	%				102	75-125	
Toluene-d8 (S)	%				103	75-125	

SAMPLE DUPLICATE: 1468095

Parameter	Units	10232745001 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	ND		30	

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

SAMPLE DUPLICATE: 1468095

Parameter	Units	10232745001 Result	Dup Result	RPD	Max RPD	Qualifiers
Toluene	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%	116	114	1		
4-Bromofluorobenzene (S)	%	103	104	1		
Toluene-d8 (S)	%	103	103	.08		

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: MSV/24067

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV UST-WATER

Associated Lab Samples: 10232745018

METHOD BLANK: 1463106

Matrix: Water

Associated Lab Samples: 10232745018

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/22/13 04:21	
Ethylbenzene	ug/L	ND	1.0	06/22/13 04:21	
Toluene	ug/L	ND	1.0	06/22/13 04:21	
Xylene (Total)	ug/L	ND	3.0	06/22/13 04:21	
1,2-Dichloroethane-d4 (S)	%	115	75-125	06/22/13 04:21	
4-Bromofluorobenzene (S)	%	101	75-125	06/22/13 04:21	
Toluene-d8 (S)	%	103	75-125	06/22/13 04:21	

LABORATORY CONTROL SAMPLE: 1463107

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	16.1	81	75-125	
Ethylbenzene	ug/L	20	17.5	88	75-125	
Toluene	ug/L	20	16.7	83	75-125	
Xylene (Total)	ug/L	60	49.6	83	75-125	
1,2-Dichloroethane-d4 (S)	%			114	75-125	
4-Bromofluorobenzene (S)	%			99	75-125	
Toluene-d8 (S)	%			103	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1468080

1468081

Parameter	Units	10232357003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	20	20	17.3	18.4	87	92	70-135	6	30	
Ethylbenzene	ug/L	ND	20	20	18.7	20.3	93	102	75-125	9	30	
Toluene	ug/L	ND	20	20	17.6	19.1	88	95	75-125	8	30	
Xylene (Total)	ug/L	ND	60	60	51.4	55.7	86	93	75-125	8	30	
1,2-Dichloroethane-d4 (S)	%						113	114	75-125			
4-Bromofluorobenzene (S)	%						99	100	75-125			
Toluene-d8 (S)	%						104	103	75-125			

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch: MSV/24095

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV UST-WATER

Associated Lab Samples: 10232745016, 10232745021

METHOD BLANK: 1464568

Matrix: Water

Associated Lab Samples: 10232745016, 10232745021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/25/13 10:43	
Ethylbenzene	ug/L	ND	1.0	06/25/13 10:43	
Toluene	ug/L	ND	1.0	06/25/13 10:43	
Xylene (Total)	ug/L	ND	3.0	06/25/13 10:43	
1,2-Dichloroethane-d4 (S)	%	110	75-125	06/25/13 10:43	
4-Bromofluorobenzene (S)	%	99	75-125	06/25/13 10:43	
Toluene-d8 (S)	%	100	75-125	06/25/13 10:43	

LABORATORY CONTROL SAMPLE: 1464569

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	17.7	88	75-125	
Ethylbenzene	ug/L	20	19.4	97	75-125	
Toluene	ug/L	20	18.5	93	75-125	
Xylene (Total)	ug/L	60	54.8	91	75-125	
1,2-Dichloroethane-d4 (S)	%			111	75-125	
4-Bromofluorobenzene (S)	%			97	75-125	
Toluene-d8 (S)	%			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1465627 1465628

Parameter	Units	10232527002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	363	200	200	511	531	74	84	70-135	4	30	
Ethylbenzene	ug/L	458	200	200	625	654	83	98	75-125	5	30	
Toluene	ug/L	371	200	200	536	556	83	93	75-125	4	30	
Xylene (Total)	ug/L	4900	600	600	5410	5650	86	125	75-125	4	30	ES
1,2-Dichloroethane-d4 (S)	%						108	107	75-125			
4-Bromofluorobenzene (S)	%						97	97	75-125			
Toluene-d8 (S)	%						102	102	75-125			

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch:	OEXT/22068	Analysis Method:	Diesel Range Organics
QC Batch Method:	Diesel Range Organics	Analysis Description:	WIDRO Extended GCS
Associated Lab Samples:	10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021		

METHOD BLANK: 1463428 Matrix: Water

Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TEH (C10-C36), 8015	mg/L	ND	0.10	06/25/13 12:10	
WDRO C10-C28	mg/L	ND	0.10	06/25/13 12:10	
WDRO, Extended C10-C32	mg/L	ND	0.10	06/25/13 12:10	
n-Triacontane (S)	%	87	50-150	06/25/13 12:10	

LABORATORY CONTROL SAMPLE & LCSD: 1463429 1463430

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
TEH (C10-C36), 8015	mg/L	2	1.8	1.8	92	92	75-115	.06	20	
WDRO C10-C28	mg/L	2	1.8	1.8	92	92	75-115	.06	20	
WDRO, Extended C10-C32	mg/L	2	1.8	1.8	92	92	75-115	.06	20	
n-Triacontane (S)	%				94	96	50-150			

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch:	WETA/15286	Analysis Method:	SM 4500-NO3 H
QC Batch Method:	SM 4500-NO3 H	Analysis Description:	SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples:	10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021		

METHOD BLANK: 1461196 Matrix: Water

Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	06/21/13 12:12	

LABORATORY CONTROL SAMPLE: 1461197

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.6	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1461198 1461199

Parameter	Units	10232745001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.70	2.5	2.5	2.3	2.4	66	68	80-120	2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1461200 1461201

Parameter	Units	10232745014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	2.0	2.1	78	83	80-120	6	30	M1

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QUALITY CONTROL DATA

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

QC Batch:	WETA/15321	Analysis Method:	ASTM D516-02
QC Batch Method:	ASTM D516-02	Analysis Description:	ASTM D516-9002 Sulfate Water
Associated Lab Samples:	10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021		

METHOD BLANK: 1464695 Matrix: Water

Associated Lab Samples: 10232745001, 10232745002, 10232745003, 10232745004, 10232745005, 10232745006, 10232745007, 10232745008, 10232745009, 10232745010, 10232745011, 10232745012, 10232745013, 10232745014, 10232745015, 10232745016, 10232745017, 10232745018, 10232745019, 10232745021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	06/25/13 13:47	

LABORATORY CONTROL SAMPLE: 1464696

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.7	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1464697 1464698

Parameter	Units	10232745001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	3.8	20	20	24.4	24.1	103	102	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1464699 1464700

Parameter	Units	10232745011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	9.5	20	20	27.1	26.9	88	87	80-120	.7	30	

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QUALIFIERS

Project: 60254681 South Cass Lake
Pace Project No.: 10232745

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

ES The reported result is estimated because one or more of the constituent results are qualified as such.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

p8 Analyte was detected in the method blank. All associated samples had concentrations of at least ten times greater than the blank or were below the reporting limit.

R1 RPD value was outside control limits.

T7 Low boiling point hydrocarbons are present in the sample.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10232745001	SCDW	RSK 175	AIR/17647		
10232745002	MW-1	RSK 175	AIR/17647		
10232745003	MW-4	RSK 175	AIR/17647		
10232745004	MW-15	RSK 175	AIR/17647		
10232745005	MW-6	RSK 175	AIR/17647		
10232745006	MW-7	RSK 175	AIR/17645		
10232745007	MW-17	RSK 175	AIR/17645		
10232745008	MW-19	RSK 175	AIR/17646		
10232745009	MW-18	RSK 175	AIR/17646		
10232745010	MW-8	RSK 175	AIR/17646		
10232745011	MW-16B	RSK 175	AIR/17646		
10232745012	MW-9	RSK 175	AIR/17646		
10232745013	USGS 3A	RSK 175	AIR/17646		
10232745014	USGS 1A	RSK 175	AIR/17646		
10232745015	USGS 4A	RSK 175	AIR/17646		
10232745016	USGS 2A	RSK 175	AIR/17646		
10232745017	MW-16A	RSK 175	AIR/17659		
10232745018	MW-10	RSK 175	AIR/17660		
10232745019	Field Blank	RSK 175	AIR/17660		
10232745021	DUP	RSK 175	AIR/17663		
10232745001	SCDW	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745002	MW-1	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745003	MW-4	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745004	MW-15	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745005	MW-6	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745006	MW-7	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745007	MW-17	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745008	MW-19	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745009	MW-18	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745010	MW-8	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745011	MW-16B	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745012	MW-9	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745013	USGS 3A	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745014	USGS 1A	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745015	USGS 4A	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745016	USGS 2A	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745017	MW-16A	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745018	MW-10	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745019	Field Blank	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745021	DUP	Diesel Range Organics	OEXT/22068	Diesel Range Organics	GCSV/11561
10232745001	SCDW	EPA 8260	MSV/24064		
10232745002	MW-1	EPA 8260	MSV/24064		
10232745003	MW-4	EPA 8260	MSV/24064		
10232745004	MW-15	EPA 8260	MSV/24064		
10232745005	MW-6	EPA 8260	MSV/24064		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10232745006	MW-7	EPA 8260	MSV/24064		
10232745007	MW-17	EPA 8260	MSV/24064		
10232745008	MW-19	EPA 8260	MSV/24064		
10232745009	MW-18	EPA 8260	MSV/24064		
10232745010	MW-8	EPA 8260	MSV/24064		
10232745011	MW-16B	EPA 8260	MSV/24064		
10232745012	MW-9	EPA 8260	MSV/24064		
10232745013	USGS 3A	EPA 8260	MSV/24064		
10232745014	USGS 1A	EPA 8260	MSV/24064		
10232745015	USGS 4A	EPA 8260	MSV/24064		
10232745016	USGS 2A	EPA 8260	MSV/24095		
10232745017	MW-16A	EPA 8260	MSV/24064		
10232745018	MW-10	EPA 8260	MSV/24067		
10232745019	Field Blank	EPA 8260	MSV/24064		
10232745020	Trip Blank	EPA 8260	MSV/24064		
10232745021	DUP	EPA 8260	MSV/24095		
10232745001	SCDW	SM 4500-NO3 H	WETA/15286		
10232745002	MW-1	SM 4500-NO3 H	WETA/15286		
10232745003	MW-4	SM 4500-NO3 H	WETA/15286		
10232745004	MW-15	SM 4500-NO3 H	WETA/15286		
10232745005	MW-6	SM 4500-NO3 H	WETA/15286		
10232745006	MW-7	SM 4500-NO3 H	WETA/15286		
10232745007	MW-17	SM 4500-NO3 H	WETA/15286		
10232745008	MW-19	SM 4500-NO3 H	WETA/15286		
10232745009	MW-18	SM 4500-NO3 H	WETA/15286		
10232745010	MW-8	SM 4500-NO3 H	WETA/15286		
10232745011	MW-16B	SM 4500-NO3 H	WETA/15286		
10232745012	MW-9	SM 4500-NO3 H	WETA/15286		
10232745013	USGS 3A	SM 4500-NO3 H	WETA/15286		
10232745014	USGS 1A	SM 4500-NO3 H	WETA/15286		
10232745015	USGS 4A	SM 4500-NO3 H	WETA/15286		
10232745016	USGS 2A	SM 4500-NO3 H	WETA/15286		
10232745017	MW-16A	SM 4500-NO3 H	WETA/15286		
10232745018	MW-10	SM 4500-NO3 H	WETA/15286		
10232745019	Field Blank	SM 4500-NO3 H	WETA/15286		
10232745021	DUP	SM 4500-NO3 H	WETA/15286		
10232745001	SCDW	ASTM D516-02	WETA/15321		
10232745002	MW-1	ASTM D516-02	WETA/15321		
10232745003	MW-4	ASTM D516-02	WETA/15321		
10232745004	MW-15	ASTM D516-02	WETA/15321		
10232745005	MW-6	ASTM D516-02	WETA/15321		
10232745006	MW-7	ASTM D516-02	WETA/15321		
10232745007	MW-17	ASTM D516-02	WETA/15321		
10232745008	MW-19	ASTM D516-02	WETA/15321		
10232745009	MW-18	ASTM D516-02	WETA/15321		

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc..

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 South Cass Lake

Pace Project No.: 10232745

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10232745010	MW-8	ASTM D516-02	WETA/15321		
10232745011	MW-16B	ASTM D516-02	WETA/15321		
10232745012	MW-9	ASTM D516-02	WETA/15321		
10232745013	USGS 3A	ASTM D516-02	WETA/15321		
10232745014	USGS 1A	ASTM D516-02	WETA/15321		
10232745015	USGS 4A	ASTM D516-02	WETA/15321		
10232745016	USGS 2A	ASTM D516-02	WETA/15321		
10232745017	MW-16A	ASTM D516-02	WETA/15321		
10232745018	MW-10	ASTM D516-02	WETA/15321		
10232745019	Field Blank	ASTM D516-02	WETA/15321		
10232745021	DUP	ASTM D516-02	WETA/15321		

REPORT OF LABORATORY ANALYSIS

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1126, 1135-1139

CHAIN-OF-CUSTODY / ANALYTICAL REQUEST DOCUMENT

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10232745

Section A

Required Client Information:

Company: **AECOM**

Address: **11 E. Superior St. Ste 260**

Email To: **Dan@fallerfield.com**

Phone: **218.625.8766**

Fax: **218.625.8766**

Requested Due Date: **Standard**

Section B

Required Project Information:

Report To: **Kyle Fallerfield**

Copy To:

Purchase Order No.:

Project Name: **South Cass Lake**

Project Number: **60254681**

Section C

Invoice Information:

Attention: **Karl Beaster**

Company Name: **Enbridge Energy**

Address: **1100 Louisiana St, Ste 3000**

Pace Quote Reference: **Houston, TX 77002**

Pace Project Manager: **Carol Davy**

Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER

Site Location

STATE: **MN**

Section D

Required Client Information

Matrix Codes
MATRIX / CODE

Drinking Water
Water
Waste Water
Product
Soil/Solid
Oil
Wipe
Air
Tissue
Other

SAMPLE ID

(A-Z, 0-9 / . -)
Sample IDs MUST BE UNIQUE

MATRIX CODE (see valid codes to left)

SAMPLE TYPE (G=GRAB C=COMP)

COLLECTED

COMPOSITE START

COMPOSITE END/GRAB

DATE

TIME

DATE

TIME

SAMPLE TEMP AT COLLECTION

OF CONTAINERS

Unpreserved

H₂O₄

HNO₃

HCl

NaOH

Na₂S₂O₃

Methanol

Other

Requested Analysis Filtered (Y/N)

Y

N

Analysis Test

DRG

STEX

Headspace

Headspace

Sulfate

Nitrate + Nitrite

Residual Chlorine (Y/N)

Pace Project No. / Lab I.D.

10232745001

10232745002

10232745003

10232745004

10232745005

10232745006

10232745007

10232745008

10232745009

10232745010

10232745011

10232745012

ADDITIONAL COMMENTS

RELINQUISHED BY / AFFILIATION

DATE

TIME

ACCEPTED BY / AFFILIATION

DATE

TIME

SAMPLE CONDITIONS

Y

N

Y

N

Y

N

Y

N

Y

N

Y

N

Y

N

Y

N

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY):

6-18-13

Temp in °C

Received on

Ice (Y/N)

Custody

Sealed Cooler

(Y/N)

Samples Intact

(Y/N)

FALL-Q-020rev.07, 15-May-2007

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company:	AELCM	Report To:	Klete Fallowfield	Attention:	Karl Beaster
Address:	11 E Superior St Ste 240 Duluth MN 55802	Copy To:		Company Name:	Enbridge Energy
Email To:	Klete.Fallowfield	Purchase Order No.:		Address:	1100 Louisiana St Ste 3000 Houston TX 77002
Phone:	218.625.8766	Project Name:	South Cass Lake	Pace Quote Reference:	
Fax:		Project Number:	60254681	Pace Project Manager:	Carol Davy
Requested Due Date/TAT:		STANDARD		Pace Profile #:	

[illegible]

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS					
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)		
	Don Johnston / Mica	6-14-13	1505	CS / Police	6-14-13	1505						

ORIGINAL

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	Don Johnston
SIGNATURE of SAMPLER:	Don Johnston
DATE Signed (MM/DD/YY):	6-14-13

Page 52 of 74

	Document Name: Sample Condition Upon Receipt Form	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: F-MN-L-213-rev.06	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt	Client Name: <u>Aecom</u>	Project #: WO# : 10232745
	Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Other:	 10232745
Tracking Number: _____		

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No Seals Intact? ☐ Yes ☒ No Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: Temp Blank? ☒ Yes ☐ No

Thermom. Used: ☒ B88A912167504 ☐ 80512447 ☐ 72337080 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): Cooler Temp Corrected (°C): Biological Tissue Frozen? ☐ Yes ☒ No
 Temp should be above freezing to 6°C Correction Factor: True Date and Initials of Person Examining Contents: CH/6-19-13
5.8, 5.8, 5.6, 8.1, 5.3, 6.1, 5.3 Comments:

Chain of Custody Present?	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes ☐ No ☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes ☐ No ☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes ☐ No ☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes ☐ No ☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes ☒ No ☐ N/A	7.
Sufficient Volume?	☒ Yes ☐ No ☐ N/A	8.
Correct Containers Used?	☒ Yes ☐ No ☐ N/A	9.
-Pace Containers Used?	☐ Yes ☐ No ☐ N/A	
Containers Intact?	☒ Yes ☐ No ☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes ☐ No ☒ N/A	11.
Sample Labels Match COC?	☒ Yes ☐ No ☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>		
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13.	☒ Yes ☐ No ☐ N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>12)	☒ Yes ☐ No ☐ N/A	☐ HNO ₃ ☒ H ₂ SO ₄ ☐ NaOH ☐ HCl Sample # <u>1-19</u> <u>Y</u> <u>Dup Y</u>
Exceptions: <u>VOA</u> Coliform, TOC, Oil and Grease, <u>WI-DRO (water)</u>	☒ Yes ☐ No	Initial when completed: <u>CH</u> Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes ☒ No ☐ N/A	14.
Trip Blank Present?	☒ Yes ☐ No ☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes ☐ No ☐ N/A	
Pace Trip Blank Lot # (if purchased): <u>051413-1</u>		

CLIENT NOTIFICATION/RESOLUTION CH Field Data Required? ☐ Yes ☐ No

Person Contacted: Kate Followfield Date/Time: 1819 6/19 1837

Comments/Resolution: Be shared with analyses for all samples including those out of temp.
Run expanded range D.M.
Run BTEX by 8260

Project Manager Review: CH Date: 6-20-13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Issuing Authority:
Pace Minnesota Quality Office

Workorder #: _____

[illegible]

Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000043.D

Report Date: 06/26/2013

Sample ID: 10232745001

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000043.D

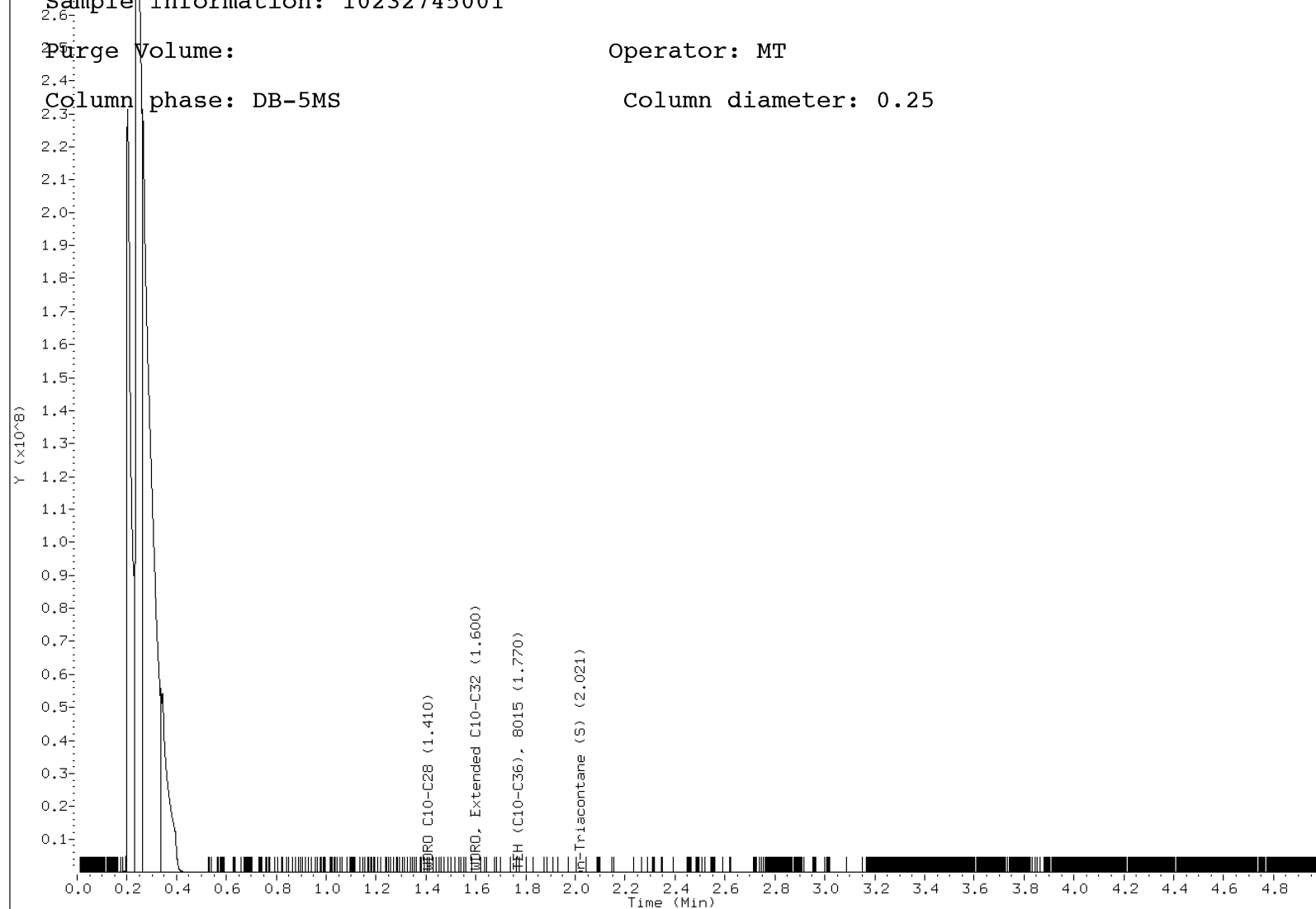
Sample Information: 10232745001

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000037.D

Report Date: 06/26/2013

Sample ID: 10232745002

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000037.D

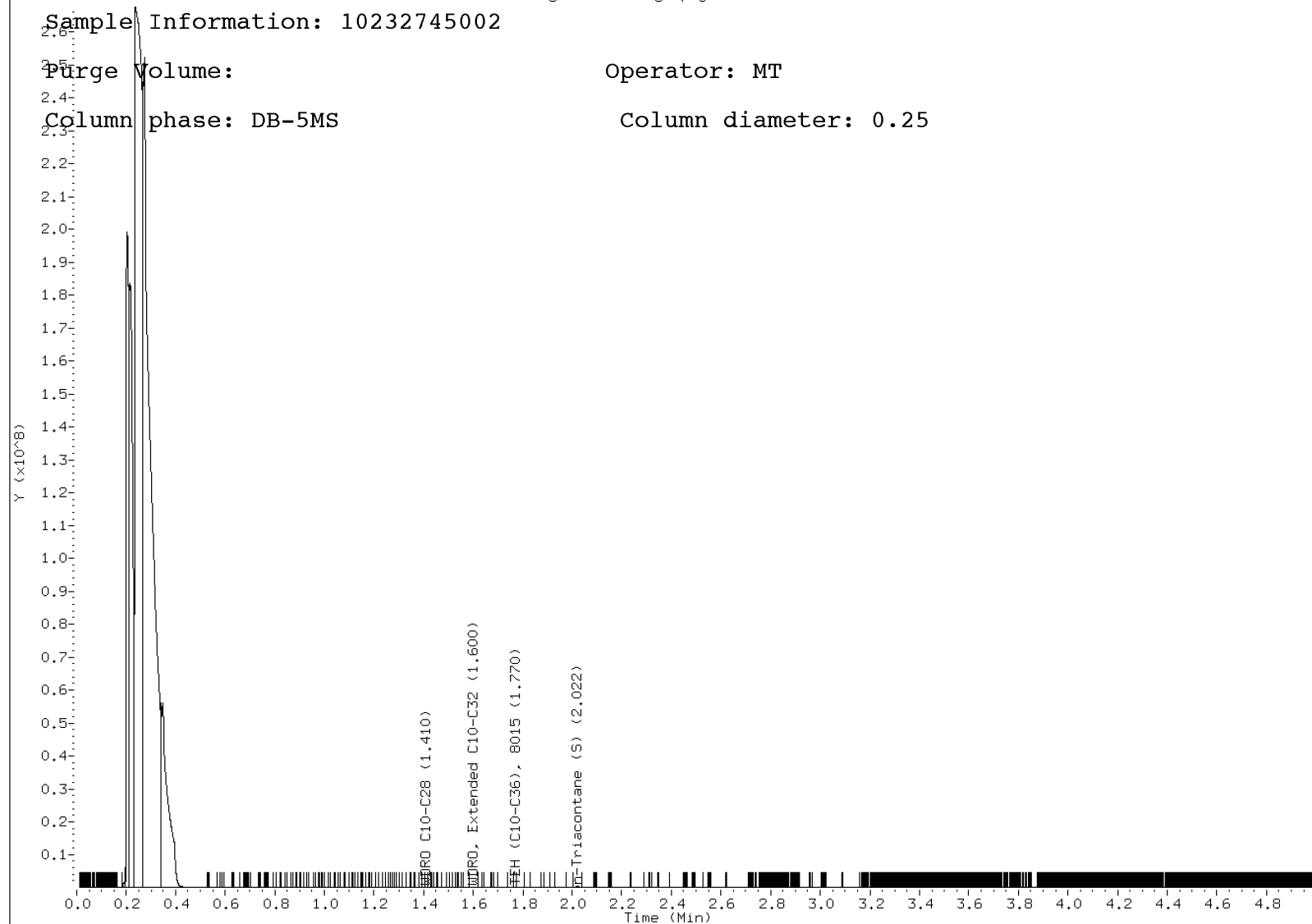
Sample Information: 10232745002

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000038.D

Report Date: 06/26/2013

Sample ID: 10232745003

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000038.D

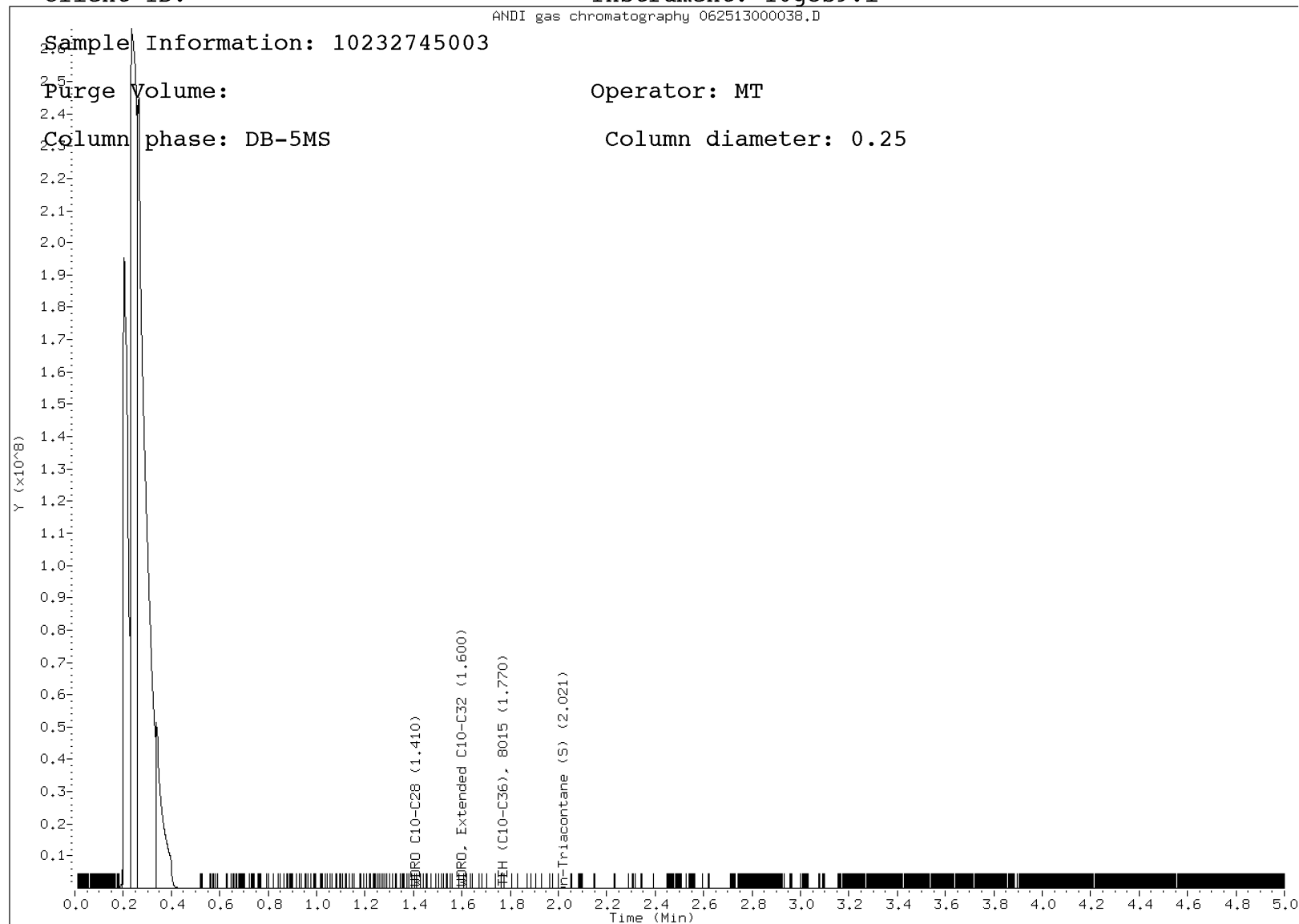
Sample Information: 10232745003

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000039.D

Report Date: 06/26/2013

Sample ID: 10232745004

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000039.D

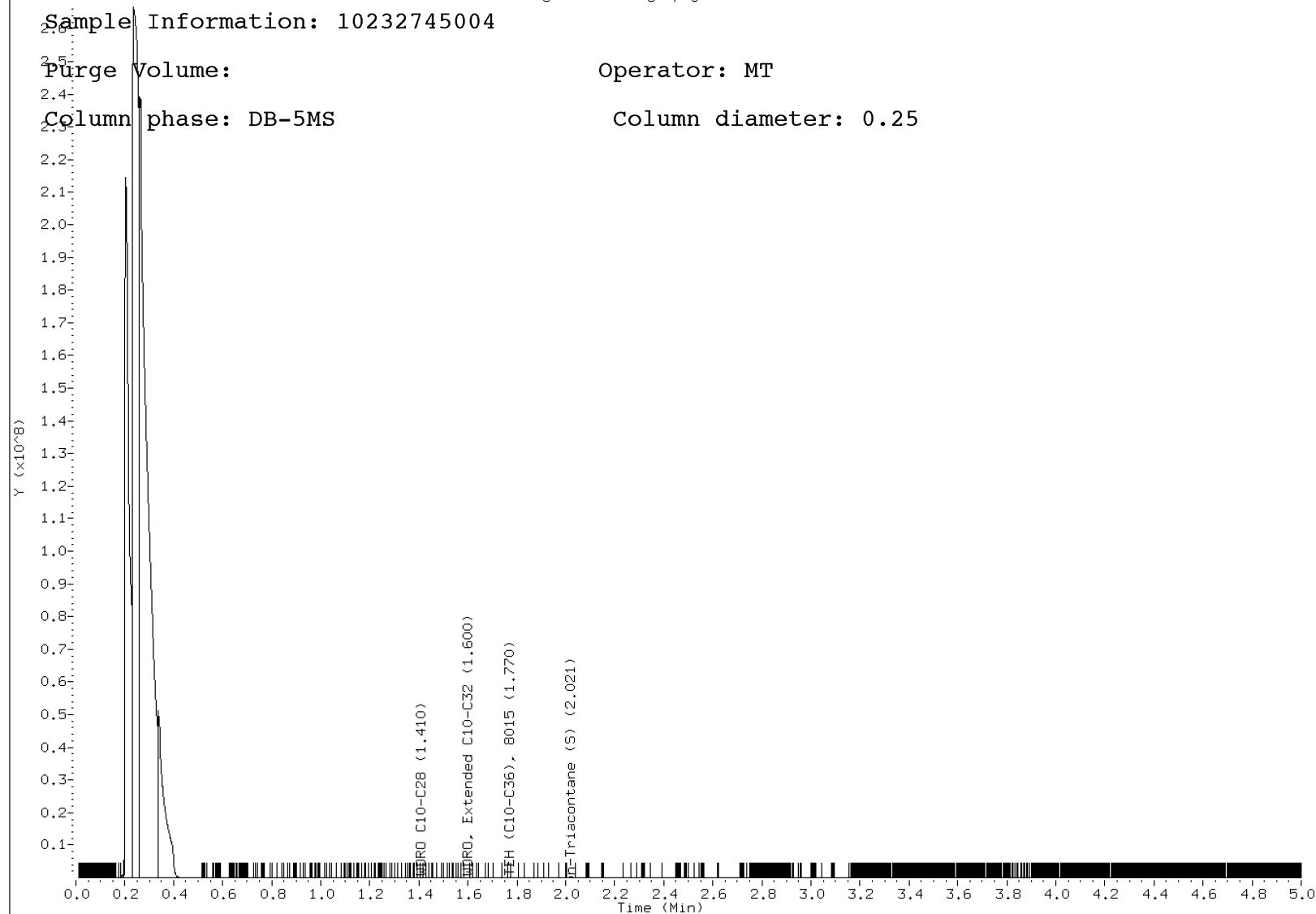
Sample Information: 10232745004

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000040.D

Report Date: 06/26/2013

Sample ID: 10232745005

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000040.D

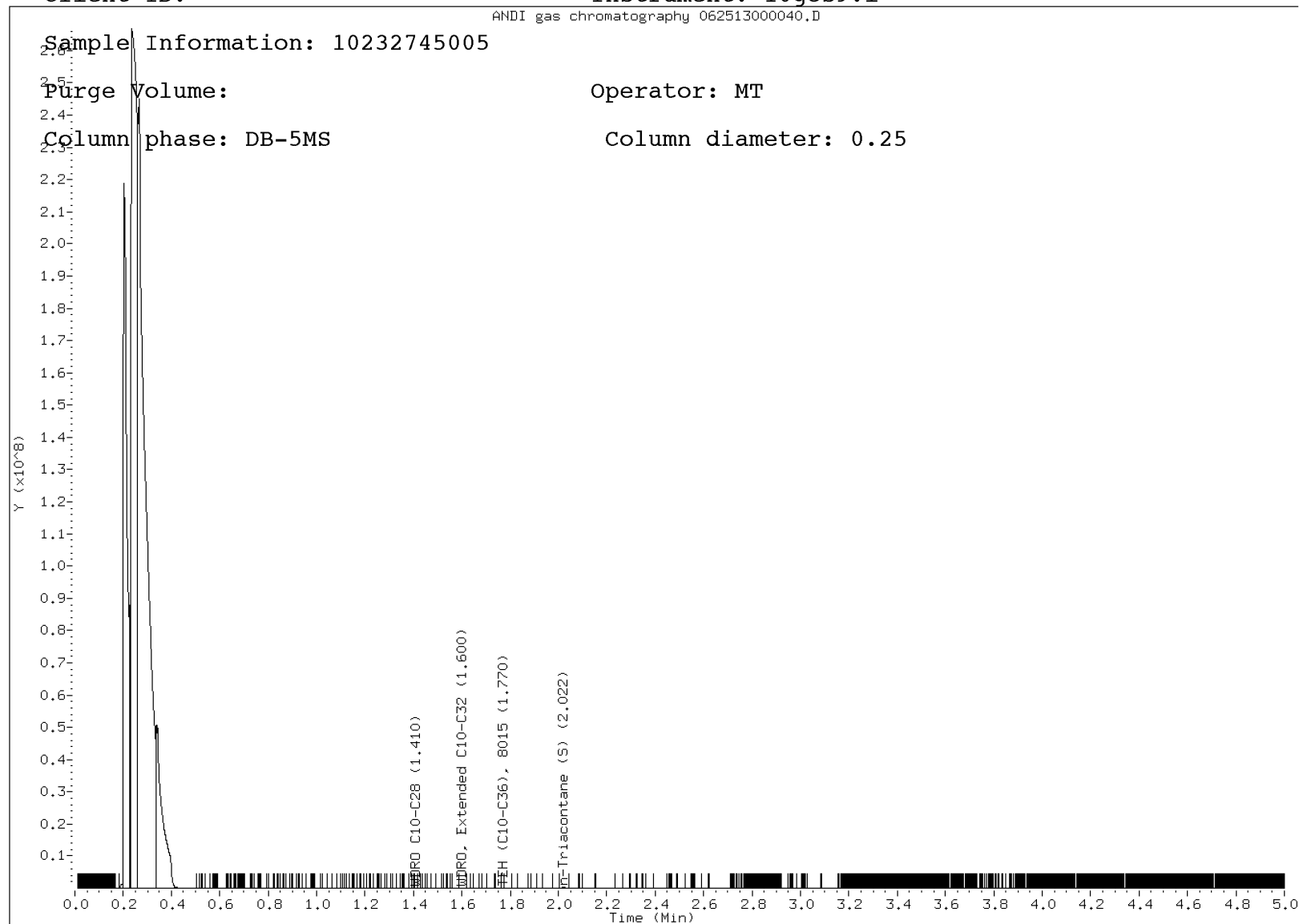
Sample Information: 10232745005

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000041.D

Report Date: 06/26/2013

Sample ID: 10232745006

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000041.D

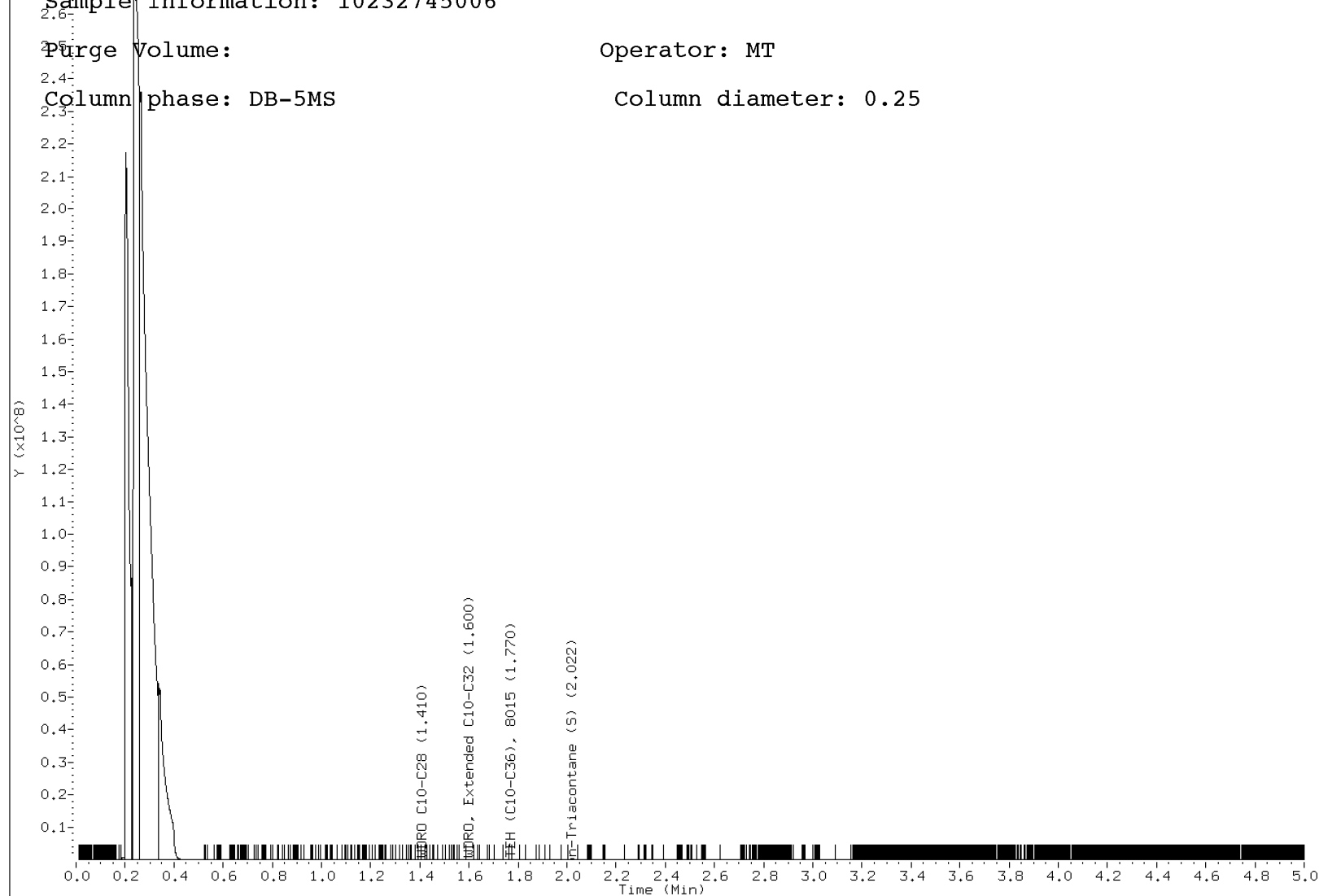
Sample Information: 10232745006

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000042.D

Report Date: 06/26/2013

Sample ID: 10232745007

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000042.D

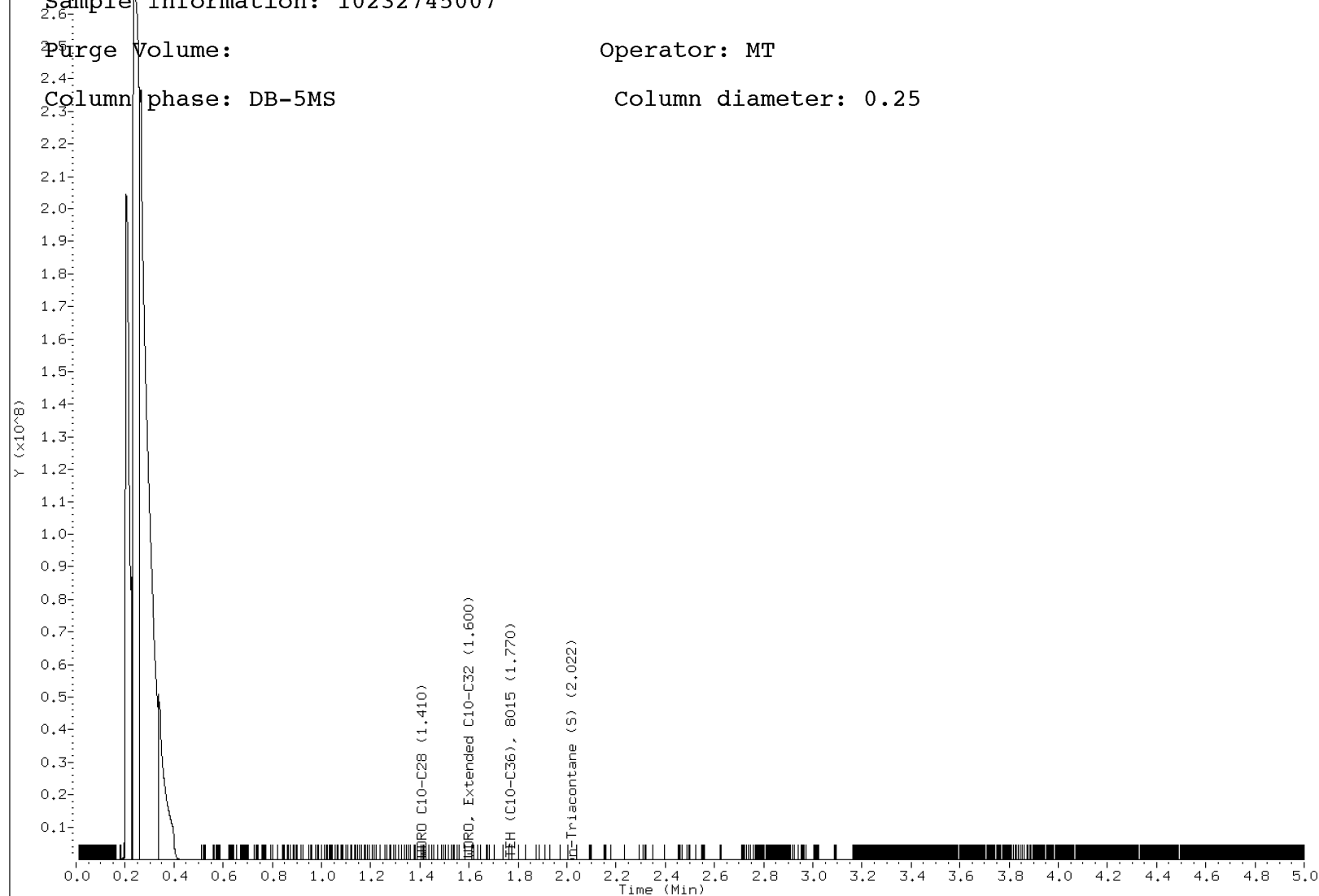
Sample Information: 10232745007

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000033.D

Report Date: 06/26/2013

Sample ID: 10232745008

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000033.D

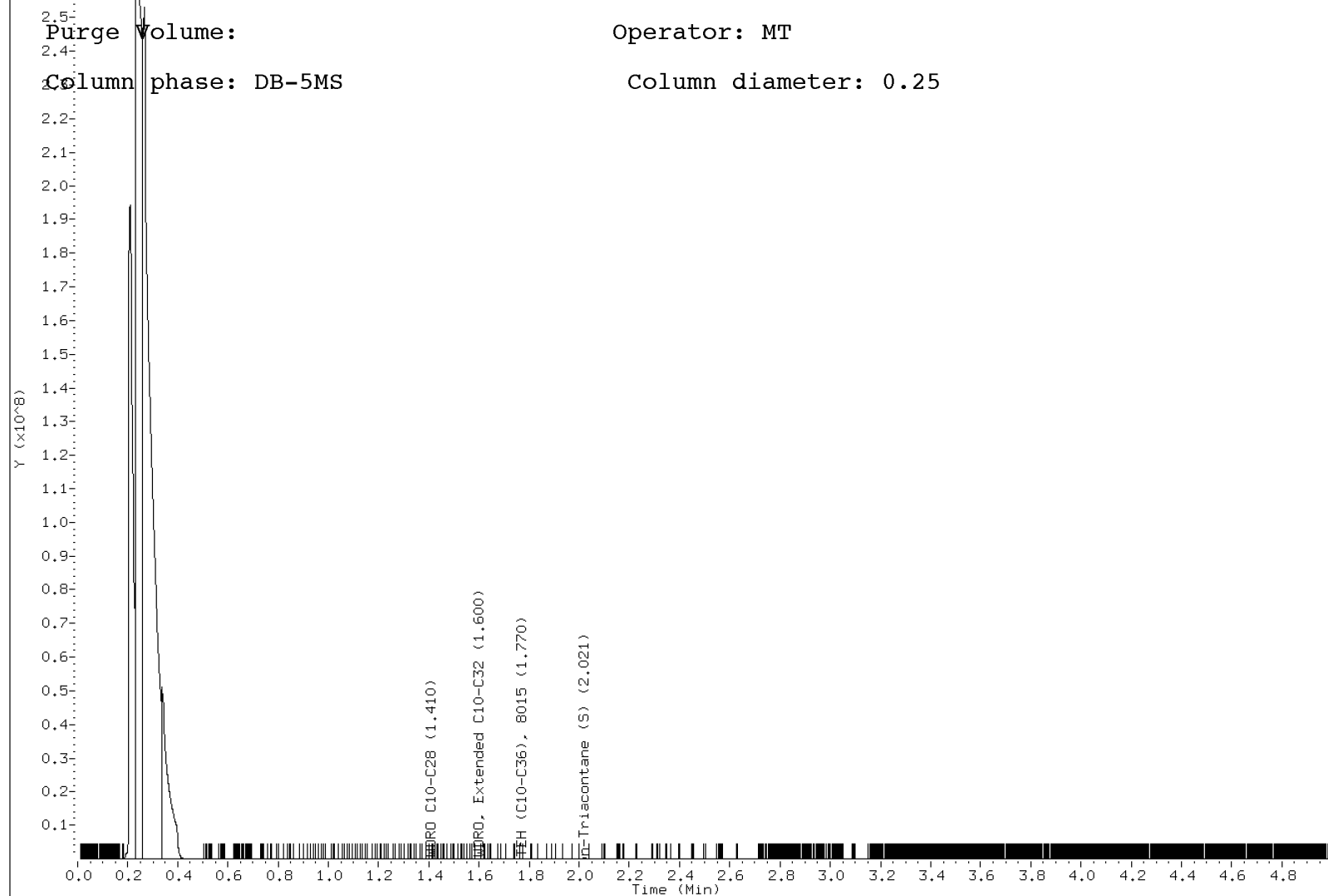
Sample Information: 10232745008

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000034.D

Report Date: 06/26/2013

Sample ID: 10232745009

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000034.D

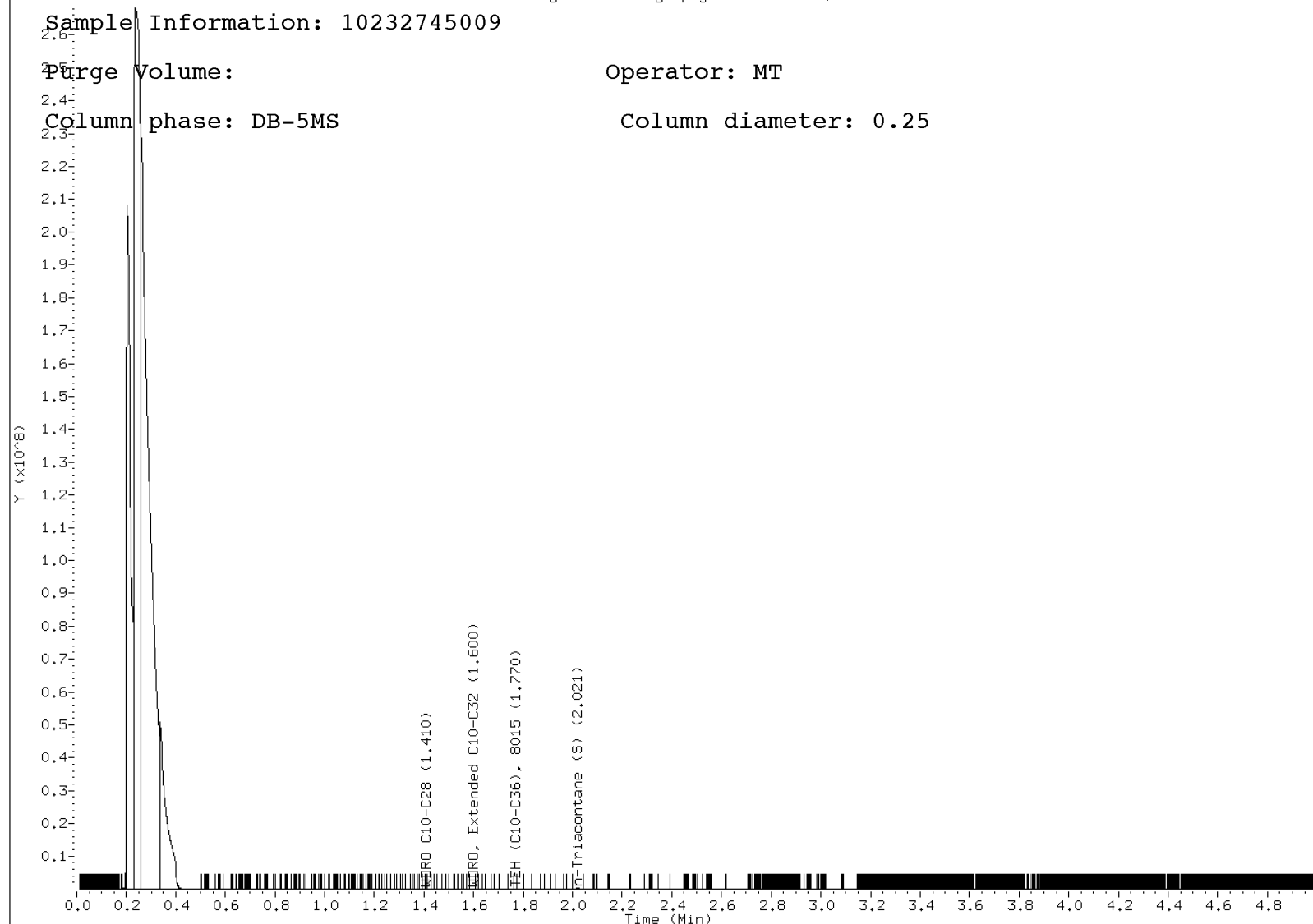
Sample Information: 10232745009

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000035.D

Report Date: 06/26/2013

Sample ID: 10232745010

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000035.D

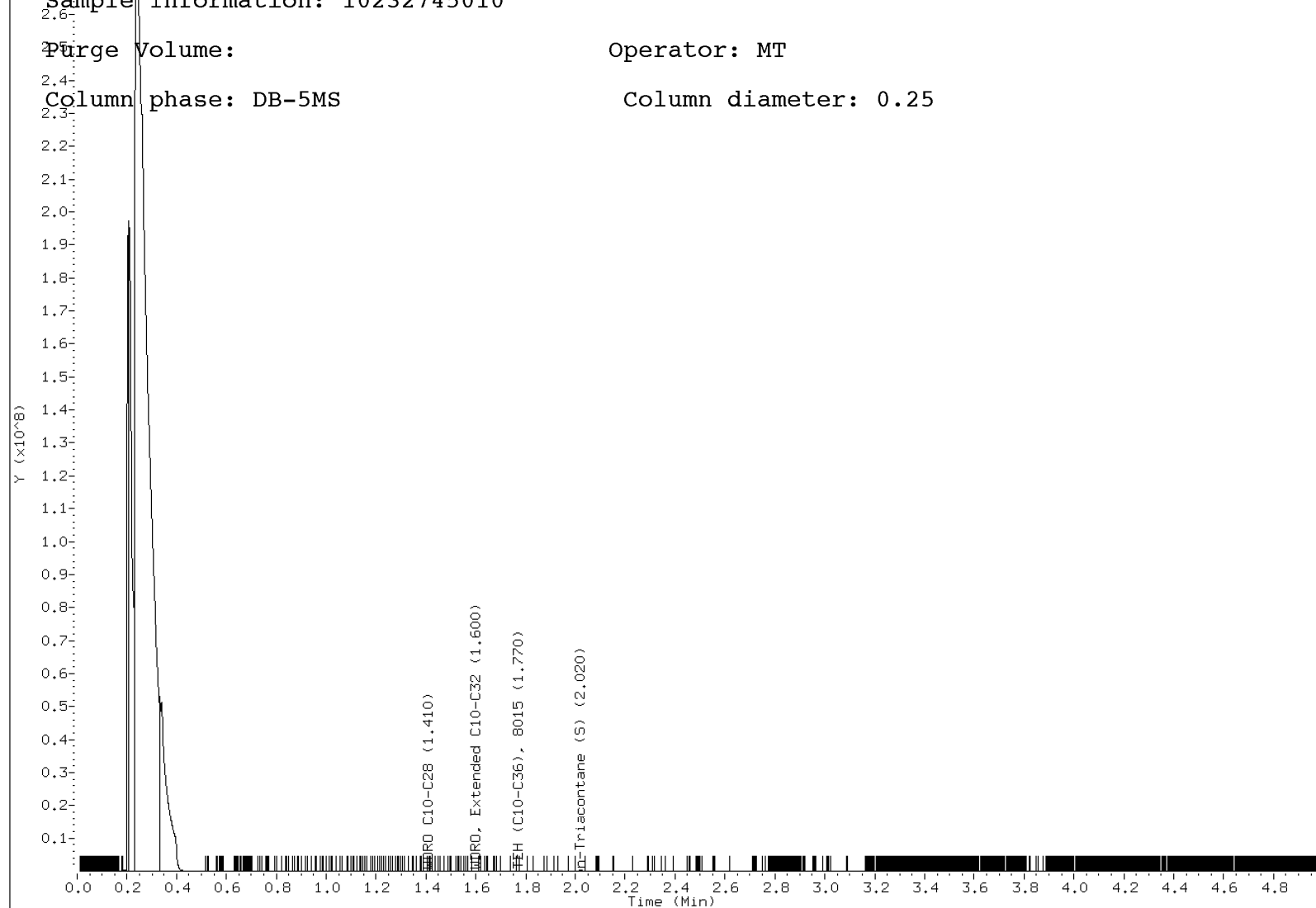
Sample Information: 10232745010

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000036.D

Report Date: 06/26/2013

Sample ID: 10232745011

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000036.D

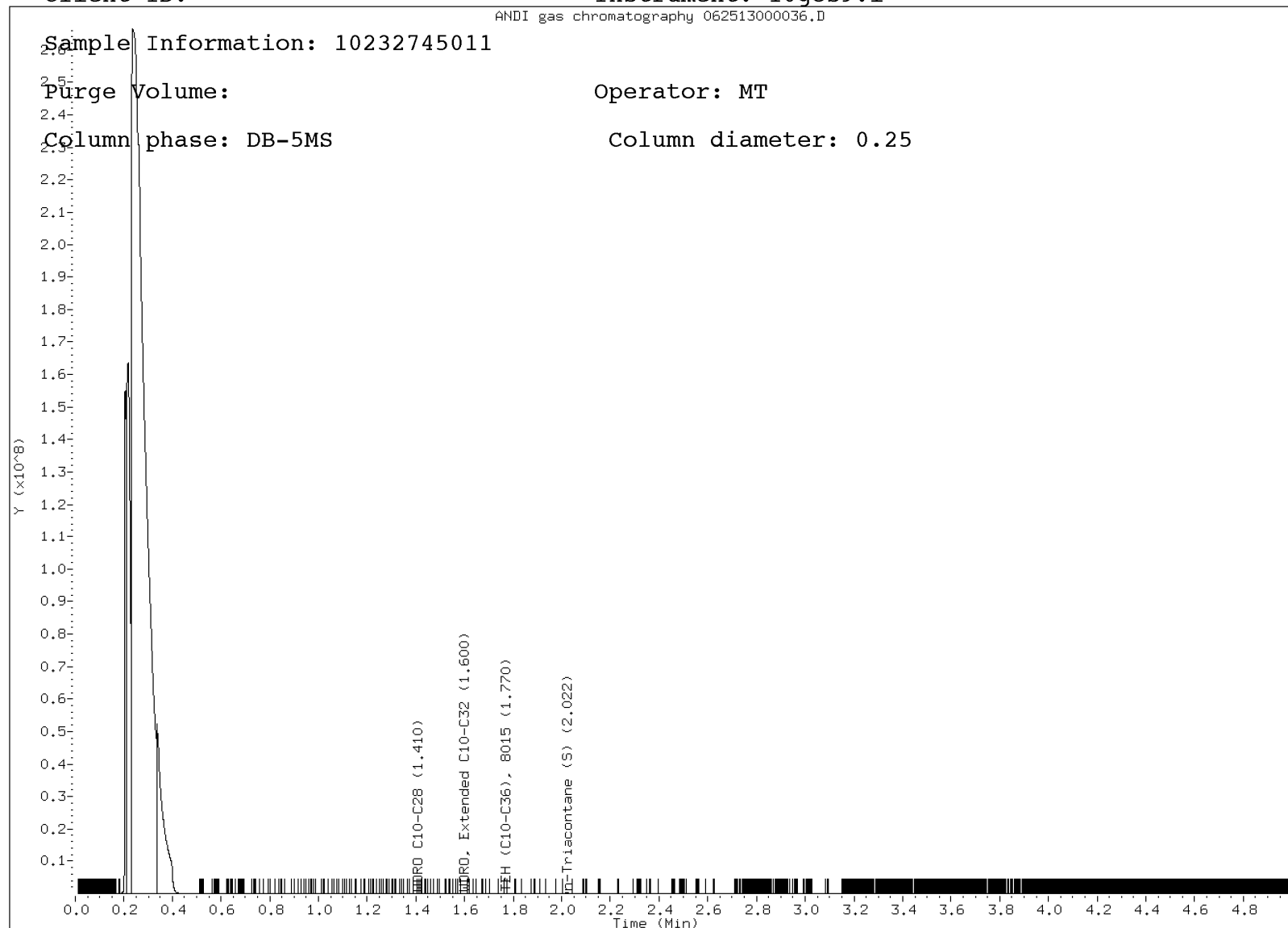
Sample Information: 10232745011

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000032.D

Report Date: 06/26/2013

Sample ID: 10232745012

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000032.D

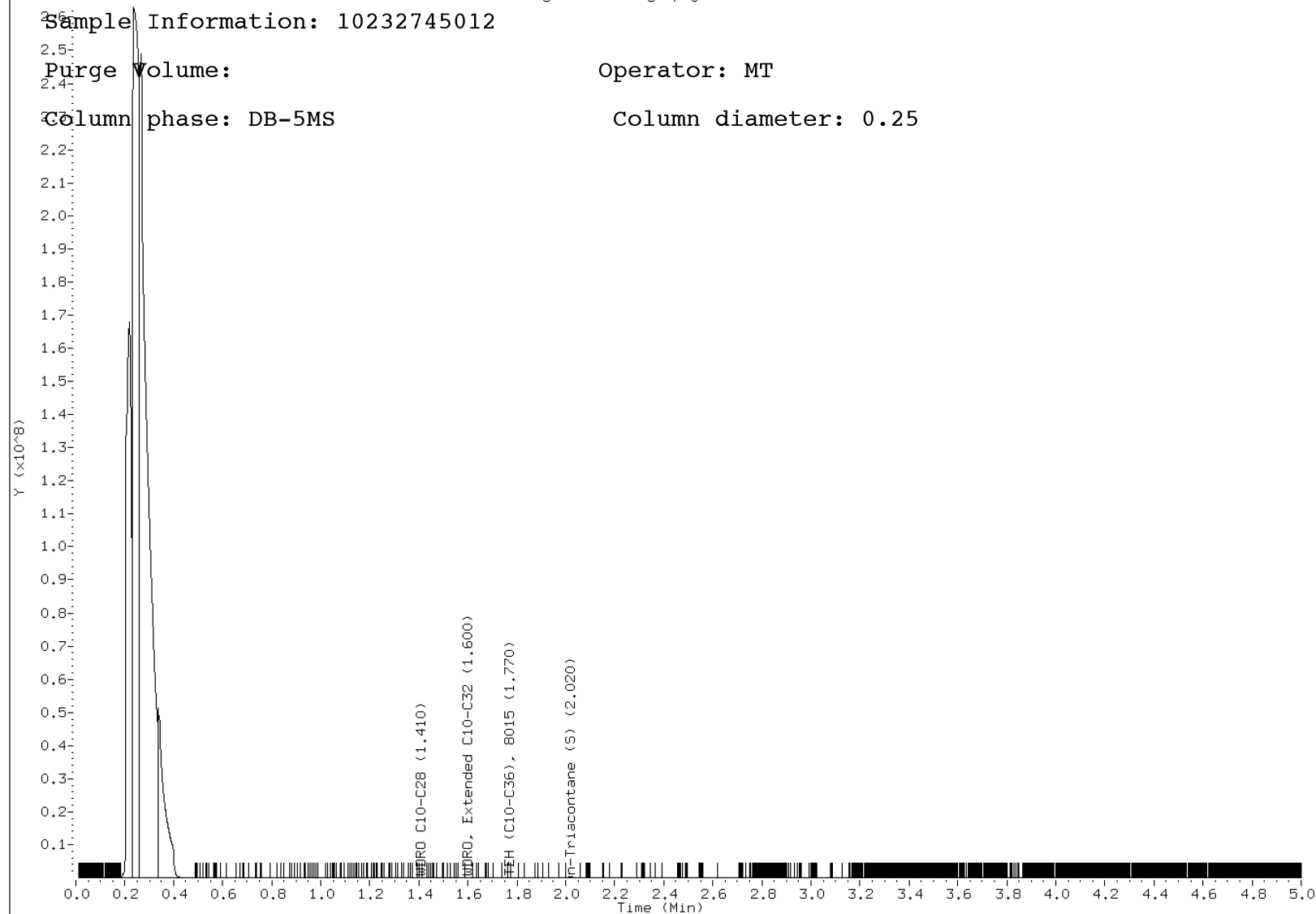
Sample Information: 10232745012

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000027.D

Report Date: 06/26/2013

Sample ID: 10232745013

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000027.D

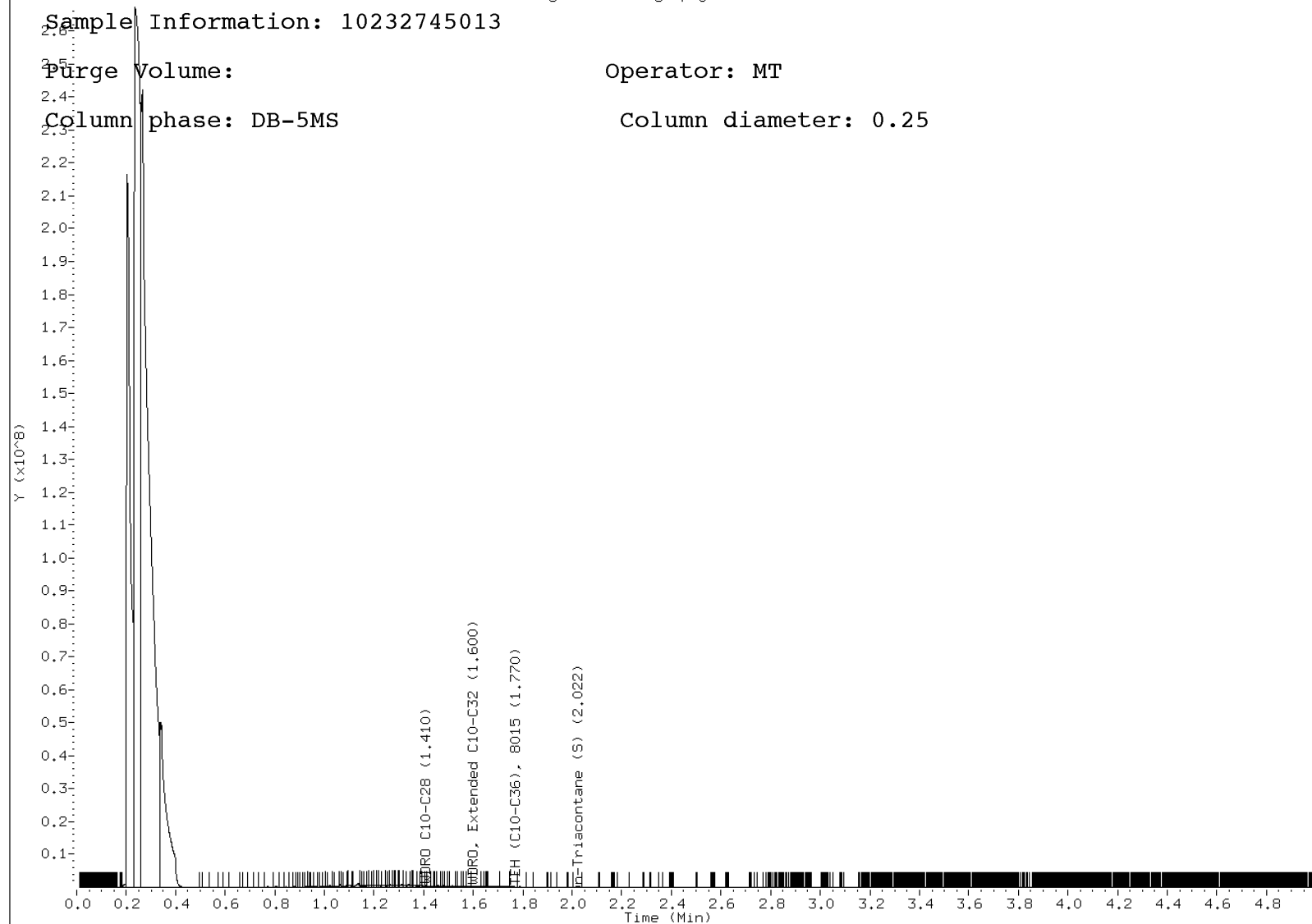
Sample Information: 10232745013

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000031.D

Report Date: 06/26/2013

Sample ID: 10232745014

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000031.D

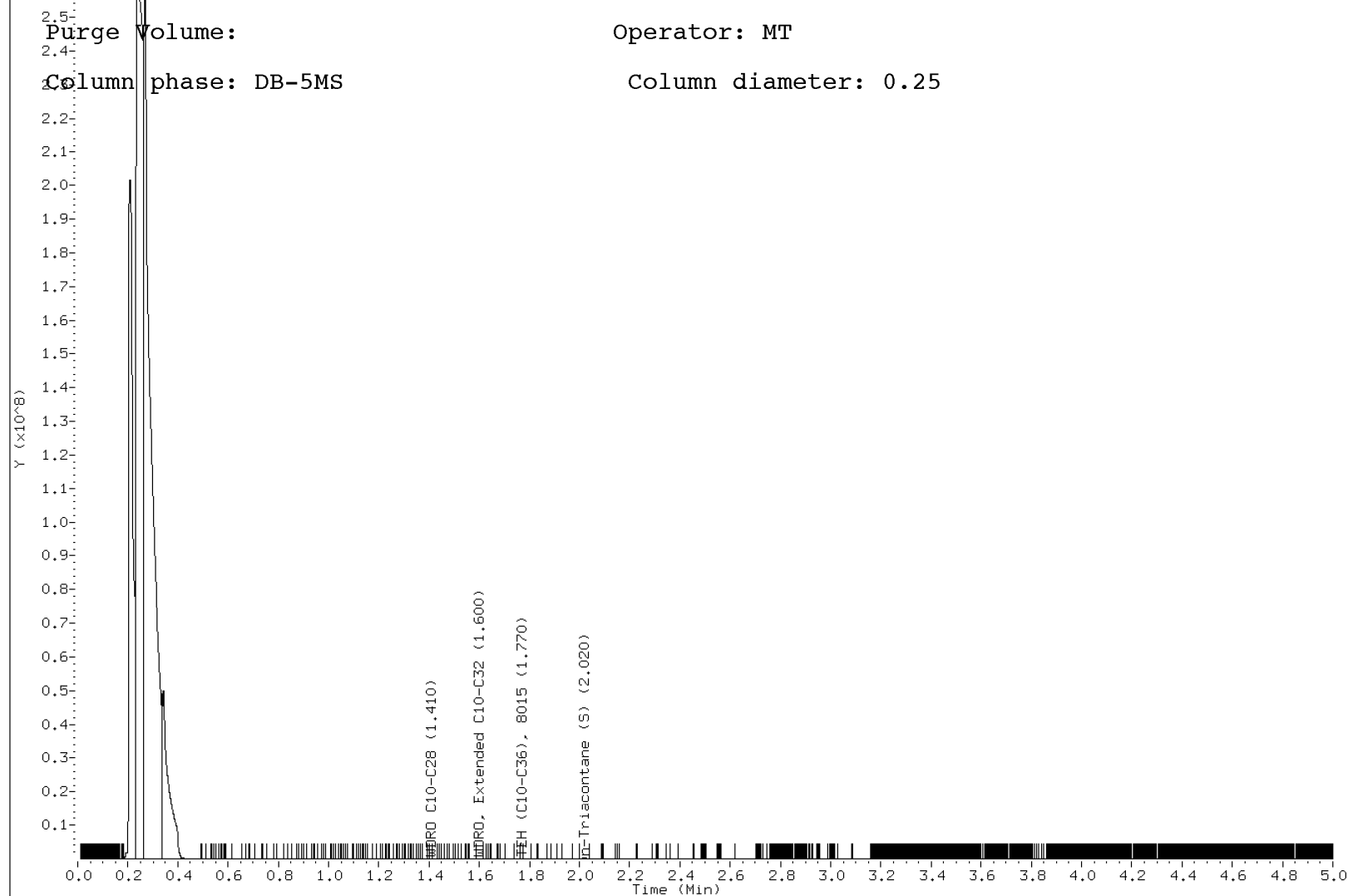
Sample Information: 10232745014

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000028.D

Report Date: 06/26/2013

Sample ID: 10232745015

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000028.D

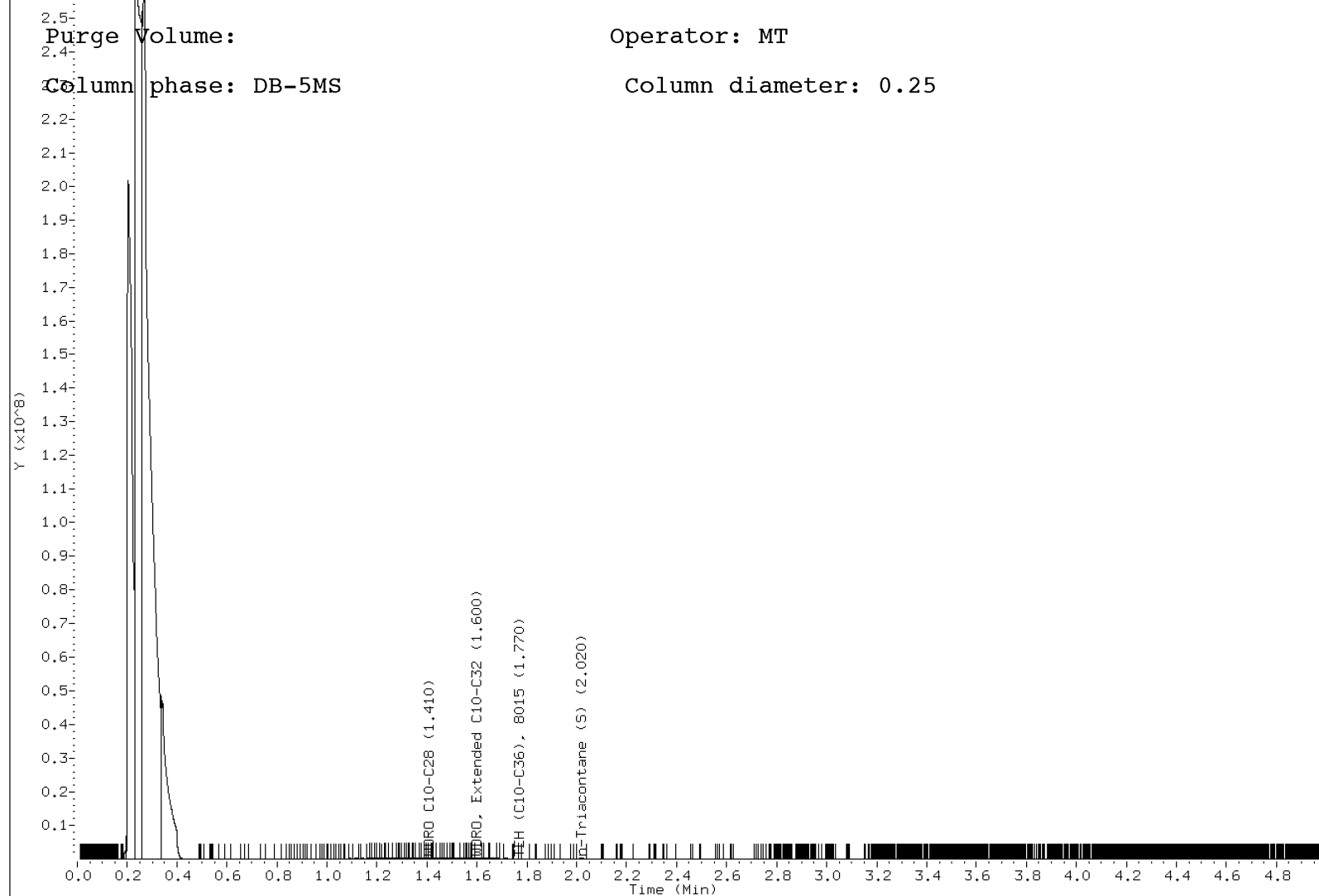
Sample Information: 10232745015

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000029.D

Report Date: 06/26/2013

Sample ID: 10232745016

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000029.D

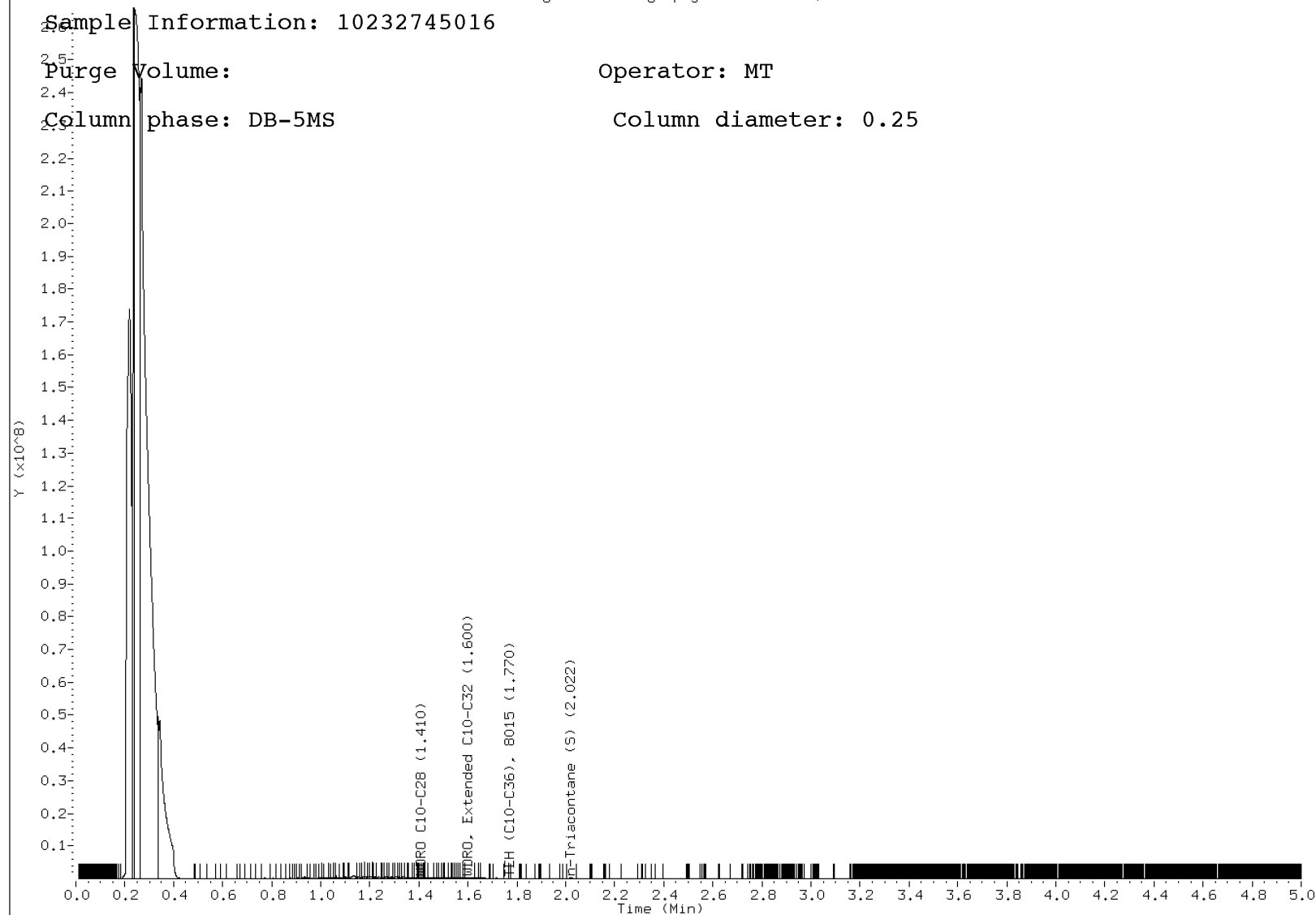
Sample Information: 10232745016

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000030.D

Report Date: 06/26/2013

Sample ID: 10232745017

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000030.D

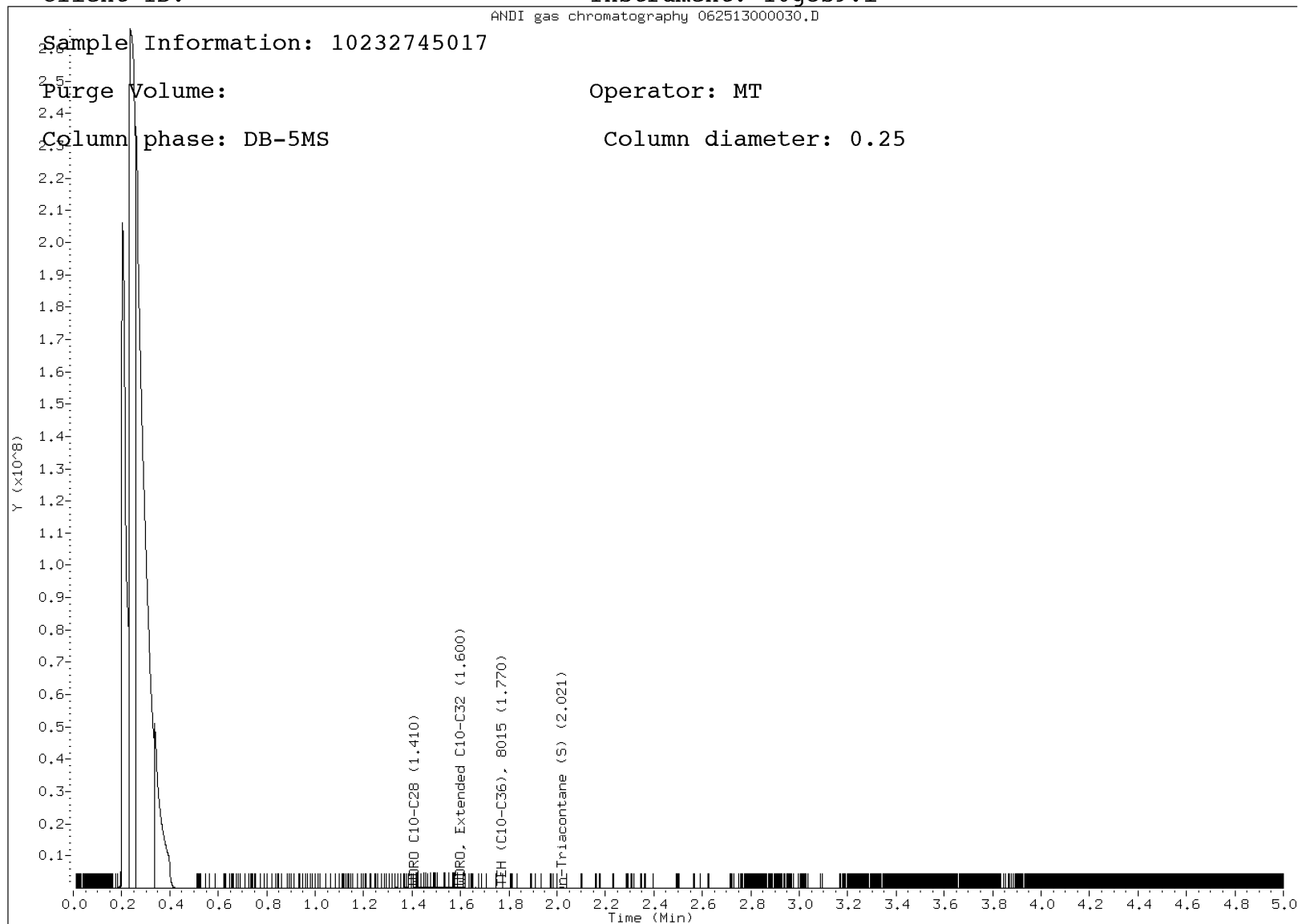
Sample Information: 10232745017

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000048.D

Report Date: 06/26/2013

Sample ID: 10232745018

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000048.D

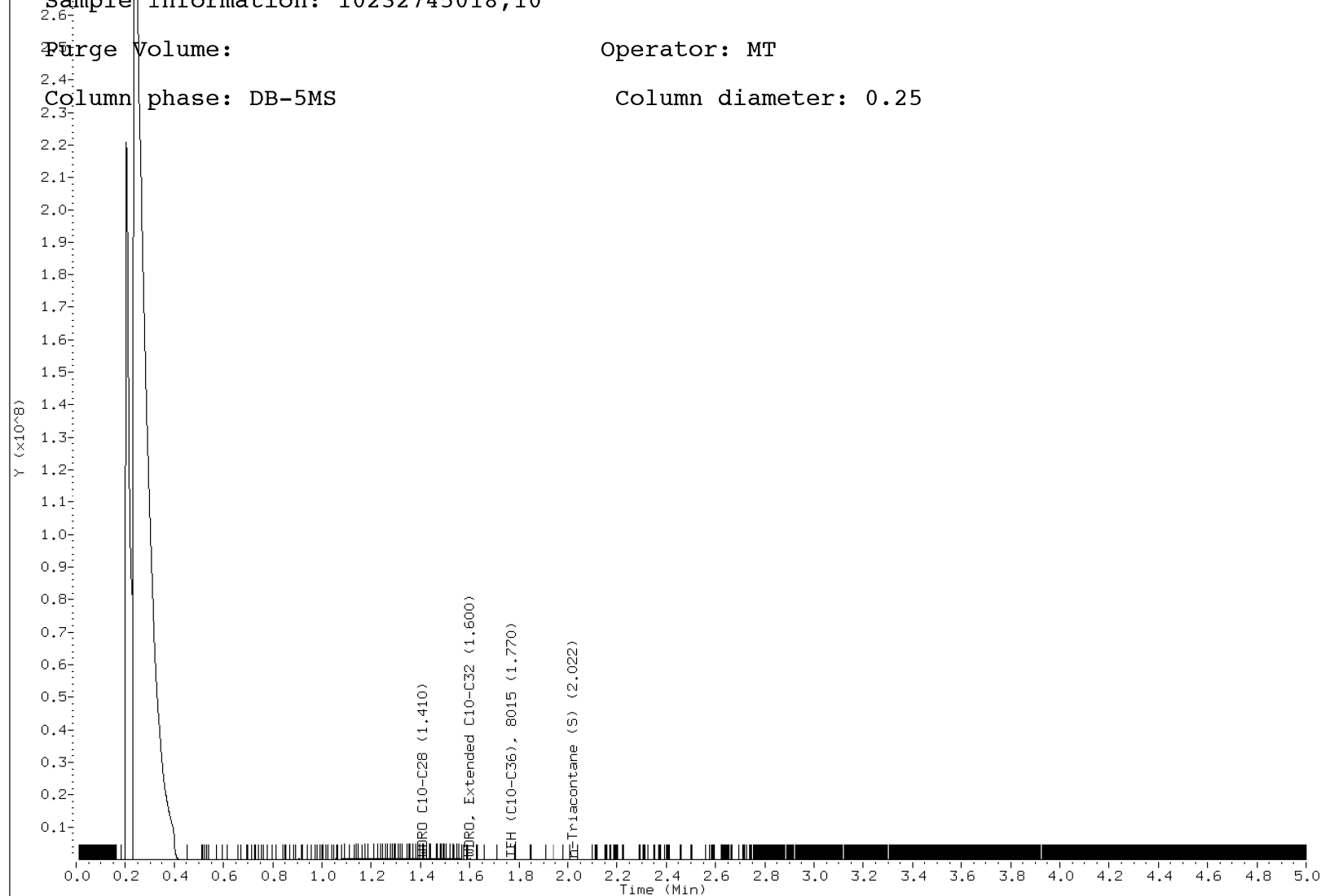
Sample Information: 10232745018,10

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000044.D

Report Date: 06/26/2013

Sample ID: 10232745019

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000044.D

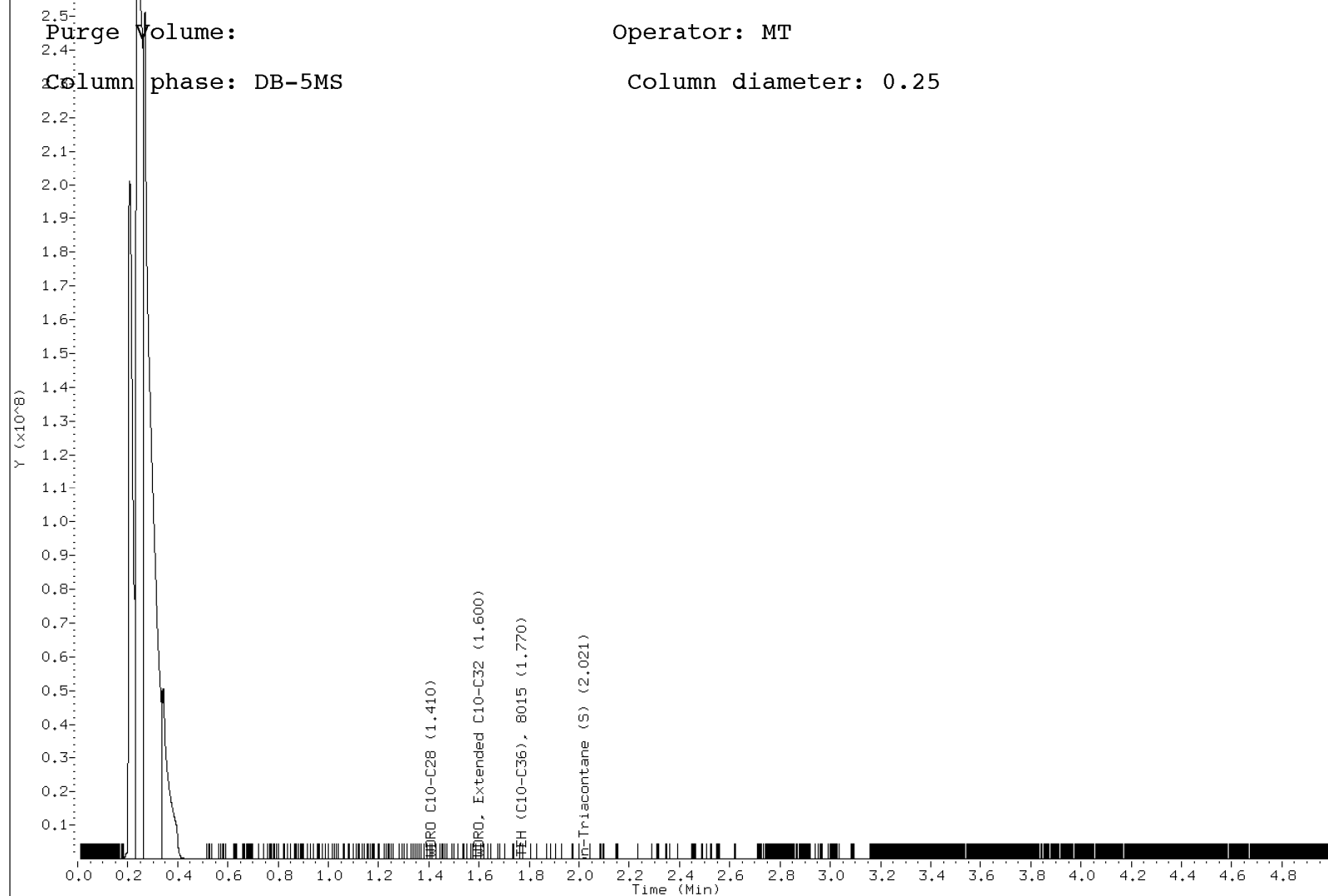
Sample Information: 10232745019

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\062513extdro.b\062513000049.D

Report Date: 06/26/2013

Sample ID: 10232745021

Client ID:

Instrument: 10gcs9.i

ANDI gas chromatography 062513000049.D

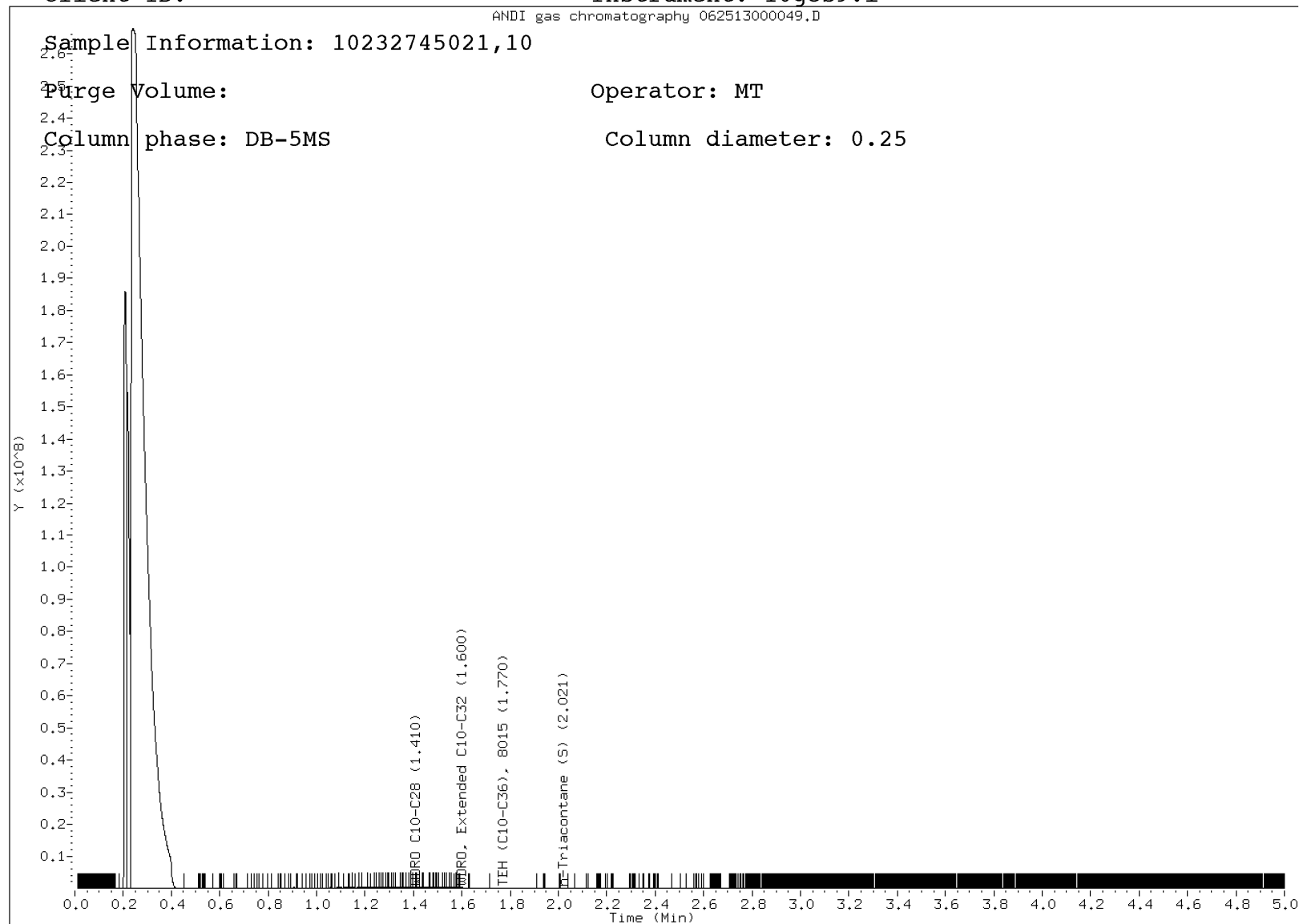
Sample Information: 10232745021,10

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



September 30, 2013

Klete Fallowfield
AECOM
Duluth Technology village
11 East Superior St. Suite 560
Duluth, MN 55802

RE: Project: 60254681 ENBRIDGE SOUTH CASS L
Pace Project No.: 10242763

Dear Klete Fallowfield:

Enclosed are the analytical results for sample(s) received by the laboratory on September 20, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carol Davy

carol.davy@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

Colorado Certification #Pace

Connecticut Certification #: PH-0256

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Hawaii Certification #Pace

Idaho Certification #: MN00064

Illinois Certification #: 200011

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nevada Certification #: MN_00064

Nebraska Certification #: Pace

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Utah Certification #: MN00064

Virginia/DCLS Certification #: 002521

Virginia/VELAP Certification #: 460163

Washington Certification #: C754

West Virginia Certification #: 382

Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10242763001	MW-1	Water	09/18/13 12:40	09/20/13 12:30
10242763002	MW-4	Water	09/18/13 13:15	09/20/13 12:30
10242763003	MW-15	Water	09/18/13 14:30	09/20/13 12:30
10242763004	MW-6	Water	09/18/13 16:20	09/20/13 12:30
10242763005	MW-7	Water	09/18/13 16:45	09/20/13 12:30
10242763006	MW-17	Water	09/18/13 17:30	09/20/13 12:30
10242763007	MW-19	Water	09/18/13 15:25	09/20/13 12:30
10242763008	MW-18	Water	09/19/13 10:55	09/20/13 12:30
10242763009	MW-8	Water	09/18/13 16:25	09/20/13 12:30
10242763010	MW-16B	Water	09/19/13 09:10	09/20/13 12:30
10242763011	MW-16A	Water	09/19/13 10:05	09/20/13 12:30
10242763012	USGS-3A	Water	09/19/13 08:40	09/20/13 12:30
10242763013	MW-9	Water	09/18/13 17:25	09/20/13 12:30
10242763014	USGS-1A	Water	09/19/13 09:25	09/20/13 12:30
10242763015	USGS-4A	Water	09/19/13 10:00	09/20/13 12:30
10242763016	USGS-2A	Water	09/19/13 10:40	09/20/13 12:30
10242763017	MW-10	Water	09/19/13 12:00	09/20/13 12:30
10242763018	DUPLICATE	Water	09/19/13 11:30	09/20/13 12:30
10242763019	FIELD BLANK	Water	09/19/13 11:00	09/20/13 12:30
10242763020	TRIP BLANK	Water	09/19/13 00:00	09/20/13 12:30
10242763021	SCDW	Water	09/18/13 13:45	09/20/13 12:30

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SAMPLE ANALYTE COUNT

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242763001	MW-1	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763002	MW-4	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763003	MW-15	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763004	MW-6	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763005	MW-7	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763006	MW-17	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763007	MW-19	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
10242763008	MW-18	RSK 175	DL1	1
		Diesel Range Organics	JRH	2

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SAMPLE ANALYTE COUNT

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242763009	MW-8	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763010	MW-16B	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763011	MW-16A	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763012	USGS-3A	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763013	MW-9	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763014	USGS-1A	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10242763015	USGS-4A	EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2

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SAMPLE ANALYTE COUNT

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10242763016	USGS-2A	ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
10242763017	MW-10	ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
10242763018	DUPLICATE	ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
10242763019	FIELD BLANK	ASTM D516	KEO	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
10242763020	TRIP BLANK	EPA 8260	SH2	7
10242763021	SCDW	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	PH1	1
		ASTM D516	KEO	1

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Method: RSK 175

Description: RSK 175 AIR Headspace

Client: AECOM

Date: September 30, 2013

General Information:

19 samples were analyzed for RSK 175. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: AIR/18321

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- DUPLICATE (Lab ID: 10242763018)
 - Methane
- MW-10 (Lab ID: 10242763017)
 - Methane

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Method: Diesel Range Organics

Description: WIDRO Extended GCS

Client: AECOM

Date: September 30, 2013

General Information:

20 samples were analyzed for Diesel Range Organics. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with Diesel Range Organics with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

QC Batch: OEXT/23102

R1: RPD value was outside control limits.

- LCSD (Lab ID: 1532651)
- WDRO, Extended C10-C32

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Method: EPA 8260

Description: 8260 MSV UST

Client: AECOM

Date: September 30, 2013

General Information:

21 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MSV/25097

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10243578002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1536930)
 - Toluene
- MSD (Lab ID: 1536931)
 - Toluene

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Method: SM 4500-NO3 H

Description: SM4500NO3-H, NO2 + NO3 pres.

Client: AECOM

Date: September 30, 2013

General Information:

19 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16118

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10242763001, 10242763015

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1534102)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1534103)
 - Nitrogen, NO2 plus NO3

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Method: ASTM D516

Description: ASTM D516 Sulfate Water

Client: AECOM

Date: September 30, 2013

General Information:

19 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-1		Lab ID: 10242763001		Collected: 09/18/13 12:40		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/24/13 12:08	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.11	0.021	1	09/24/13 07:21	09/26/13 12:18		
Surrogates									
n-Triacontane (S)	99	%	50-150		1	09/24/13 07:21	09/26/13 12:18	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 05:30	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 05:30	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 05:30	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 05:30	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 05:30	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 05:30	2037-26-5	
4-Bromofluorobenzene (S)	101	%	75-125		1		09/27/13 05:30	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.23	mg/L	0.10	0.050	1		09/27/13 17:06		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND	mg/L	2.5	1.2	1		09/23/13 16:22	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-4		Lab ID: 10242763002		Collected: 09/18/13 13:15		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/24/13 12:30	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 12:26		
Surrogates									
n-Triacontane (S)	102	%	50-150		1	09/24/13 07:21	09/26/13 12:26	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 06:01	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 06:01	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 06:01	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 06:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 06:01	17060-07-0	
Toluene-d8 (S)	101	%	75-125		1		09/27/13 06:01	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 06:01	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	2.3	mg/L	0.10	0.050	1		09/27/13 17:08		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.0	mg/L	2.5	1.2	1		09/23/13 16:25	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-15		Lab ID: 10242763003		Collected: 09/18/13 14:30		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		09/24/13 12:40	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.021	1	09/24/13 07:21	09/26/13 13:04		
Surrogates									
n-Triacontane (S)	105 %		50-150		1	09/24/13 07:21	09/26/13 13:04	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		09/27/13 07:50	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		09/27/13 07:50	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		09/27/13 07:50	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		09/27/13 07:50	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	107 %		75-125		1		09/27/13 07:50	17060-07-0	
Toluene-d8 (S)	100 %		75-125		1		09/27/13 07:50	2037-26-5	
4-Bromofluorobenzene (S)	101 %		75-125		1		09/27/13 07:50	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.7 mg/L		0.10	0.050	1		09/27/13 17:11		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND mg/L		2.5	1.2	1		09/23/13 16:25	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-6		Lab ID: 10242763004		Collected: 09/18/13 16:20		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/24/13 12:51	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.15	mg/L	0.11	0.021	1	09/24/13 07:21	09/26/13 12:10		
Surrogates									
n-Triacontane (S)	96	%	50-150		1	09/24/13 07:21	09/26/13 12:10	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 08:05	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 08:05	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 08:05	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 08:05	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%	75-125		1		09/27/13 08:05	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 08:05	2037-26-5	
4-Bromofluorobenzene (S)	101	%	75-125		1		09/27/13 08:05	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.4	mg/L	0.10	0.050	1		09/27/13 17:11		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.7	mg/L	2.5	1.2	1		09/23/13 16:25	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-7		Lab ID: 10242763005		Collected: 09/18/13 16:45		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/24/13 13:01	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 12:49		
Surrogates									
n-Triacontane (S)	130	%	50-150		1	09/24/13 07:21	09/26/13 12:49	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 06:17	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 06:17	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 06:17	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 06:17	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%	75-125		1		09/27/13 06:17	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 06:17	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 06:17	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.15	mg/L	0.10	0.050	1		09/27/13 17:12		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	7.4	mg/L	2.5	1.2	1		09/23/13 16:28	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-17		Lab ID: 10242763006		Collected: 09/18/13 17:30		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		09/24/13 13:12	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.021	1	09/24/13 07:21	09/26/13 11:40		
Surrogates									
n-Triacontane (S)	126 %		50-150		1	09/24/13 07:21	09/26/13 11:40	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		09/27/13 06:32	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		09/27/13 06:32	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		09/27/13 06:32	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		09/27/13 06:32	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106 %		75-125		1		09/27/13 06:32	17060-07-0	
Toluene-d8 (S)	99 %		75-125		1		09/27/13 06:32	2037-26-5	
4-Bromofluorobenzene (S)	100 %		75-125		1		09/27/13 06:32	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.13 mg/L		0.10	0.050	1		09/27/13 17:16		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	9.6 mg/L		2.5	1.2	1		09/23/13 16:28	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-19		Lab ID: 10242763007		Collected: 09/18/13 15:25		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	18.5	ug/L	6.6	3.3	1		09/24/13 13:23	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.29	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 11:47		
Surrogates									
n-Triacontane (S)	91	%	50-150		1	09/24/13 07:21	09/26/13 11:47	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 06:48	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 06:48	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 06:48	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 06:48	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 06:48	17060-07-0	
Toluene-d8 (S)	99	%	75-125		1		09/27/13 06:48	2037-26-5	
4-Bromofluorobenzene (S)	99	%	75-125		1		09/27/13 06:48	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.32	mg/L	0.10	0.050	1		09/27/13 17:17		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.2	mg/L	2.5	1.2	1		09/23/13 16:28	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-18		Lab ID: 10242763008		Collected: 09/19/13 10:55		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/25/13 09:13	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 11:55		
Surrogates									
n-Triacontane (S)	104	%	50-150		1	09/24/13 07:21	09/26/13 11:55	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 07:03	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 07:03	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 07:03	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 07:03	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 07:03	17060-07-0	
Toluene-d8 (S)	99	%	75-125		1		09/27/13 07:03	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 07:03	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.8	mg/L	0.10	0.050	1		09/27/13 17:17		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	6.7	mg/L	2.5	1.2	1		09/23/13 16:28	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-8		Lab ID: 10242763009		Collected: 09/18/13 16:25		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/24/13 13:33	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 12:03		
Surrogates									
n-Triacontane (S)	133	%	50-150		1	09/24/13 07:21	09/26/13 12:03	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 07:19	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 07:19	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 07:19	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 07:19	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 07:19	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 07:19	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 07:19	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.11	mg/L	0.10	0.050	1		09/27/13 17:21		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	7.7	mg/L	2.5	1.2	1		09/23/13 16:30	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-16B		Lab ID: 10242763010		Collected: 09/19/13 09:10		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	19.1	ug/L	6.6	3.3	1		09/25/13 09:34	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.51	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 11:32		
Surrogates									
n-Triacontane (S)	122	%	50-150		1	09/24/13 07:21	09/26/13 11:32	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 07:34	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 07:34	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 07:34	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 07:34	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 07:34	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 07:34	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 07:34	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.76	mg/L	0.10	0.050	1		09/27/13 17:21		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	8.6	mg/L	2.5	1.2	1		09/23/13 16:30	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-16A		Lab ID: 10242763011		Collected: 09/19/13 10:05		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	15.4	ug/L	6.6	3.3	1		09/25/13 09:45	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.65	mg/L	0.11	0.022	1	09/24/13 07:21	09/26/13 11:24		
Surrogates									
n-Triacontane (S)	117	%	50-150		1	09/24/13 07:21	09/26/13 11:24	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 08:21	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 08:21	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 08:21	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 08:21	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 08:21	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 08:21	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 08:21	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:22		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	6.8	mg/L	2.5	1.2	1		09/23/13 16:30	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: USGS-3A		Lab ID: 10242763012		Collected: 09/19/13 08:40		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	1160	ug/L	6.6	3.3	1		09/25/13 09:56	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	1.2	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 11:17		
Surrogates									
n-Triacontane (S)	96	%	50-150		1	09/24/13 07:21	09/26/13 11:17	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 08:36	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 08:36	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 08:36	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 08:36	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 08:36	17060-07-0	
Toluene-d8 (S)	101	%	75-125		1		09/27/13 08:36	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 08:36	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:22		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.9	mg/L	2.5	1.2	1		09/23/13 16:33	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-9		Lab ID: 10242763013		Collected: 09/18/13 17:25		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		09/24/13 14:27	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	09/24/13 07:21	09/26/13 12:33		
Surrogates									
n-Triacontane (S)	96 %		50-150		1	09/24/13 07:21	09/26/13 12:33	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		09/27/13 08:52	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		09/27/13 08:52	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		09/27/13 08:52	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		09/27/13 08:52	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	107 %		75-125		1		09/27/13 08:52	17060-07-0	
Toluene-d8 (S)	100 %		75-125		1		09/27/13 08:52	2037-26-5	
4-Bromofluorobenzene (S)	101 %		75-125		1		09/27/13 08:52	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		09/27/13 17:25		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.9 mg/L		2.5	1.2	1		09/23/13 16:33	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: USGS-1A		Lab ID: 10242763014		Collected: 09/19/13 09:25		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		09/25/13 10:06	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.11	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 12:41		
Surrogates									
n-Triacontane (S)	101	%	50-150		1	09/24/13 07:21	09/26/13 12:41	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 09:08	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 09:08	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 09:08	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 09:08	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 09:08	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 09:08	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 09:08	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:26		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.7	mg/L	2.5	1.2	1		09/23/13 16:33	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: USGS-4A		Lab ID: 10242763015		Collected: 09/19/13 10:00		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	130	ug/L	6.6	3.3	1		09/25/13 10:17	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.49	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 11:09		
Surrogates									
n-Triacontane (S)	89	%	50-150		1	09/24/13 07:21	09/26/13 11:09	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 09:23	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 09:23	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 09:23	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 09:23	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%	75-125		1		09/27/13 09:23	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 09:23	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 09:23	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:27		M1
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	6.6	mg/L	2.5	1.2	1		09/23/13 16:33	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: USGS-2A		Lab ID: 10242763016		Collected: 09/19/13 10:40		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	95.2	ug/L	6.6	3.3	1		09/25/13 10:28	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.29	mg/L	0.10	0.021	1	09/24/13 07:21	09/26/13 12:56		
Surrogates									
n-Triacontane (S)	121	%	50-150		1	09/24/13 07:21	09/26/13 12:56	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 09:39	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 09:39	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 09:39	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 09:39	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	107	%	75-125		1		09/27/13 09:39	17060-07-0	
Toluene-d8 (S)	101	%	75-125		1		09/27/13 09:39	2037-26-5	
4-Bromofluorobenzene (S)	101	%	75-125		1		09/27/13 09:39	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:32		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.8	mg/L	2.5	1.2	1		09/23/13 16:33	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: MW-10		Lab ID: 10242763017		Collected: 09/19/13 12:00		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	9500	ug/L	6.6	3.3	1		09/25/13 10:38	74-82-8	E
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	9.3	mg/L	0.56	0.11	5	09/24/13 07:21	09/27/13 15:49		
Surrogates									
n-Triacontane (S)	111	%	50-150		5	09/24/13 07:21	09/27/13 15:49	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	2100	ug/L	20.0	4.8	20		09/27/13 10:10	71-43-2	
Ethylbenzene	36.1	ug/L	20.0	4.7	20		09/27/13 10:10	100-41-4	
Toluene	ND	ug/L	20.0	4.7	20		09/27/13 10:10	108-88-3	
Xylene (Total)	ND	ug/L	60.0	14.4	20		09/27/13 10:10	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%	75-125		20		09/27/13 10:10	17060-07-0	
Toluene-d8 (S)	100	%	75-125		20		09/27/13 10:10	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		20		09/27/13 10:10	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:35		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND	mg/L	2.5	1.2	1		09/23/13 16:35	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: DUPLICATE		Lab ID: 10242763018		Collected: 09/19/13 11:30		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	8820	ug/L	6.6	3.3	1		09/25/13 10:49	74-82-8	E
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	9.0	mg/L	0.54	0.11	5	09/24/13 07:21	09/27/13 15:41		
Surrogates									
n-Triacontane (S)	108	%	50-150		5	09/24/13 07:21	09/27/13 15:41	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	1850	ug/L	10.0	2.4	10		09/27/13 11:43	71-43-2	
Ethylbenzene	39.9	ug/L	1.0	0.24	1		09/27/13 09:54	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 09:54	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 09:54	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	111	%	75-125		1		09/27/13 09:54	17060-07-0	
Toluene-d8 (S)	102	%	75-125		1		09/27/13 09:54	2037-26-5	
4-Bromofluorobenzene (S)	102	%	75-125		1		09/27/13 09:54	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		09/27/13 17:35		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND	mg/L	2.5	1.2	1		09/23/13 16:35	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: FIELD BLANK		Lab ID: 10242763019		Collected: 09/19/13 11:00		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.11	0.021	1	09/24/13 07:21	09/26/13 13:12		
Surrogates									
n-Triacontane (S)	99	%	50-150		1	09/24/13 07:21	09/26/13 13:12	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 05:14	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 05:14	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 05:14	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 05:14	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%	75-125		1		09/27/13 05:14	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 05:14	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 05:14	460-00-4	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: TRIP BLANK		Lab ID: 10242763020		Collected: 09/19/13 00:00		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		09/27/13 04:59	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		09/27/13 04:59	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		09/27/13 04:59	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		09/27/13 04:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	104	%	75-125		1		09/27/13 04:59	17060-07-0	
Toluene-d8 (S)	100	%	75-125		1		09/27/13 04:59	2037-26-5	
4-Bromofluorobenzene (S)	100	%	75-125		1		09/27/13 04:59	460-00-4	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Sample: SCDW		Lab ID: 10242763021		Collected: 09/18/13 13:45		Received: 09/20/13 12:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		09/24/13 14:48	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.021	1	09/24/13 07:21	09/26/13 13:19		
Surrogates									
n-Triacontane (S)	98 %		50-150		1	09/24/13 07:21	09/26/13 13:19	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		09/27/13 16:01	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		09/27/13 16:01	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		09/27/13 16:01	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		09/27/13 16:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	95 %		75-125		1		09/27/13 16:01	17060-07-0	
Toluene-d8 (S)	96 %		75-125		1		09/27/13 16:01	2037-26-5	
4-Bromofluorobenzene (S)	99 %		75-125		1		09/27/13 16:01	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.53 mg/L		0.10	0.050	1		09/27/13 17:36		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	3.9 mg/L		2.5	1.2	1		09/23/13 16:35	14808-79-8	

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	AIR/18305	Analysis Method:	RSK 175
QC Batch Method:	RSK 175	Analysis Description:	RSK 175 AIR HEADSPACE
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763009		

METHOD BLANK:	1532756	Matrix:	Water
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763009		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	09/24/13 08:55	

LABORATORY CONTROL SAMPLE & LCSD:		1532757	1532758							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	57.0	58.4	94	96	85-115	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:		1532759			1532760							
Parameter	Units	201125548 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methane	ug/L	ND	60.7	60.7	53.2	55.3	81	85	30-150	4	20	

SAMPLE DUPLICATE: 1532761						
		10242763001	Dup		Max	
Parameter	Units	Result	Result	RPD	RPD	Qualifiers
Methane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch: AIR/18315

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10242763013, 10242763021

METHOD BLANK: 1533221

Matrix: Water

Associated Lab Samples: 10242763013, 10242763021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	09/24/13 14:12	

LABORATORY CONTROL SAMPLE & LCSD: 1533222

1533223

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.4	57.7	96	95	85-115	1	20	

SAMPLE DUPLICATE: 1533224

Parameter	Units	10242763013 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

SAMPLE DUPLICATE: 1533225

Parameter	Units	30103298001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	1.7 mg/L	1630	2	20	

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	AIR/18321	Analysis Method:	RSK 175
QC Batch Method:	RSK 175	Analysis Description:	RSK 175 AIR HEADSPACE
Associated Lab Samples:	10242763008, 10242763010, 10242763011, 10242763012, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018		

METHOD BLANK:	1534155	Matrix:	Water
Associated Lab Samples:	10242763008, 10242763010, 10242763011, 10242763012, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	09/25/13 08:54	

LABORATORY CONTROL SAMPLE & LCSD:		1534156	1534157							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	56.9	58.4	94	96	85-115	3	20	

SAMPLE DUPLICATE:		1534158	10242763008	Dup Result	RPD	Max RPD	Qualifiers
Parameter	Units	Result					
Methane	ug/L	ND		ND		20	

SAMPLE DUPLICATE:		1534159	60153611001	Dup Result	RPD	Max RPD	Qualifiers
Parameter	Units	Result					
Methane	ug/L	ND		ND		20	

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	MSV/25078	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV UST-WATER
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763019, 10242763020		

METHOD BLANK: 1535483 Matrix: Water

Associated Lab Samples: 10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763019, 10242763020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	09/27/13 04:43	
Ethylbenzene	ug/L	ND	1.0	09/27/13 04:43	
Toluene	ug/L	ND	1.0	09/27/13 04:43	
Xylene (Total)	ug/L	ND	3.0	09/27/13 04:43	
1,2-Dichloroethane-d4 (S)	%	105	75-125	09/27/13 04:43	
4-Bromofluorobenzene (S)	%	100	75-125	09/27/13 04:43	
Toluene-d8 (S)	%	101	75-125	09/27/13 04:43	

LABORATORY CONTROL SAMPLE: 1535484

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.7	99	75-125	
Ethylbenzene	ug/L	20	19.5	98	75-125	
Toluene	ug/L	20	19.4	97	75-125	
Xylene (Total)	ug/L	60	59.9	100	75-125	
1,2-Dichloroethane-d4 (S)	%			104	75-125	
4-Bromofluorobenzene (S)	%			100	75-125	
Toluene-d8 (S)	%			101	75-125	

MATRIX SPIKE SAMPLE: 1536246

Parameter	Units	10242763001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	20	23.2	116	70-135	
Ethylbenzene	ug/L	ND	20	22.0	110	75-125	
Toluene	ug/L	ND	20	21.8	109	75-125	
Xylene (Total)	ug/L	ND	60	66.9	111	75-125	
1,2-Dichloroethane-d4 (S)	%				105	75-125	
4-Bromofluorobenzene (S)	%				100	75-125	
Toluene-d8 (S)	%				101	75-125	

SAMPLE DUPLICATE: 1536247

Parameter	Units	10242763002 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	ND		30	

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

SAMPLE DUPLICATE: 1536247

Parameter	Units	10242763002 Result	Dup Result	RPD	Max RPD	Qualifiers
Toluene	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%	106	105	.7		
4-Bromofluorobenzene (S)	%	100	99	.8		
Toluene-d8 (S)	%	101	101	.04		

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch: MSV/25097

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV UST-WATER

Associated Lab Samples: 10242763021

METHOD BLANK: 1536636

Matrix: Water

Associated Lab Samples: 10242763021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	09/27/13 10:53	
Ethylbenzene	ug/L	ND	1.0	09/27/13 10:53	
Toluene	ug/L	ND	1.0	09/27/13 10:53	
Xylene (Total)	ug/L	ND	3.0	09/27/13 10:53	
1,2-Dichloroethane-d4 (S)	%	96	75-125	09/27/13 10:53	
4-Bromofluorobenzene (S)	%	99	75-125	09/27/13 10:53	
Toluene-d8 (S)	%	96	75-125	09/27/13 10:53	

LABORATORY CONTROL SAMPLE: 1536637

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	16.3	81	75-125	
Ethylbenzene	ug/L	20	16.6	83	75-125	
Toluene	ug/L	20	16.4	82	75-125	
Xylene (Total)	ug/L	60	50.4	84	75-125	
1,2-Dichloroethane-d4 (S)	%			95	75-125	
4-Bromofluorobenzene (S)	%			99	75-125	
Toluene-d8 (S)	%			98	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1536930

1536931

Parameter	Units	10243578002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
Benzene	ug/L	ND	20	20	15.3	16.2	71	76	70-135	6	30
Ethylbenzene	ug/L	ND	20	20	15.5	16.3	78	82	75-125	5	30
Toluene	ug/L	ND	20	20	14.8	15.3	71	74	75-125	3	30 M1
Xylene (Total)	ug/L	ND	60	60	46.8	50.0	78	83	75-125	7	30 MS
1,2-Dichloroethane-d4 (S)	%						96	99	75-125		
4-Bromofluorobenzene (S)	%						98	98	75-125		
Toluene-d8 (S)	%						95	95	75-125		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	OEXT/23102	Analysis Method:	Diesel Range Organics
QC Batch Method:	Diesel Range Organics	Analysis Description:	WIDRO Extended GCS
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763019, 10242763021		

METHOD BLANK: 1532649 Matrix: Water

Associated Lab Samples: 10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763019, 10242763021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO, Extended C10-C32	mg/L	ND	0.10	09/26/13 10:38	
n-Triacontane (S)	%	118	50-150	09/26/13 10:38	

LABORATORY CONTROL SAMPLE & LCSD: 1532650

1532651

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO, Extended C10-C32	mg/L	2	2.2	1.7	110	84	75-115	27	20	R1
n-Triacontane (S)	%				128	97	50-150			

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	WETA/16118	Analysis Method:	SM 4500-NO3 H
QC Batch Method:	SM 4500-NO3 H	Analysis Description:	SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763021		

METHOD BLANK: 1534098

Matrix: Water

Associated Lab Samples: 10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	09/27/13 17:03	

LABORATORY CONTROL SAMPLE: 1534099

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534100 1534101

Parameter	Units	10242763001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.23	2.5	2.5	2.6	2.6	96	95	80-120	.5	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1534102 1534103

Parameter	Units	10242763015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	1.5	1.4	60	55	80-120	9	30	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

QC Batch:	WETA/16097	Analysis Method:	ASTM D516
QC Batch Method:	ASTM D516	Analysis Description:	ASTM D516 Sulfate Water
Associated Lab Samples:	10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763021		

METHOD BLANK: 1532303 Matrix: Water

Associated Lab Samples: 10242763001, 10242763002, 10242763003, 10242763004, 10242763005, 10242763006, 10242763007, 10242763008, 10242763009, 10242763010, 10242763011, 10242763012, 10242763013, 10242763014, 10242763015, 10242763016, 10242763017, 10242763018, 10242763021

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	09/23/13 16:22	

LABORATORY CONTROL SAMPLE: 1532304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.7	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1532305 1532306

Parameter	Units	10242763001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	19.1	19.3	90	91	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1532307 1532308

Parameter	Units	10242763011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	6.8	20	20	27.1	26.9	101	101	80-120	.5	30	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

MS Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242763001	MW-1	RSK 175	AIR/18305		
10242763002	MW-4	RSK 175	AIR/18305		
10242763003	MW-15	RSK 175	AIR/18305		
10242763004	MW-6	RSK 175	AIR/18305		
10242763005	MW-7	RSK 175	AIR/18305		
10242763006	MW-17	RSK 175	AIR/18305		
10242763007	MW-19	RSK 175	AIR/18305		
10242763008	MW-18	RSK 175	AIR/18321		
10242763009	MW-8	RSK 175	AIR/18305		
10242763010	MW-16B	RSK 175	AIR/18321		
10242763011	MW-16A	RSK 175	AIR/18321		
10242763012	USGS-3A	RSK 175	AIR/18321		
10242763013	MW-9	RSK 175	AIR/18315		
10242763014	USGS-1A	RSK 175	AIR/18321		
10242763015	USGS-4A	RSK 175	AIR/18321		
10242763016	USGS-2A	RSK 175	AIR/18321		
10242763017	MW-10	RSK 175	AIR/18321		
10242763018	DUPLICATE	RSK 175	AIR/18321		
10242763021	SCDW	RSK 175	AIR/18315		
10242763001	MW-1	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763002	MW-4	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763003	MW-15	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763004	MW-6	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763005	MW-7	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763006	MW-17	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763007	MW-19	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763008	MW-18	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763009	MW-8	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763010	MW-16B	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763011	MW-16A	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763012	USGS-3A	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763013	MW-9	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763014	USGS-1A	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763015	USGS-4A	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763016	USGS-2A	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763017	MW-10	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763018	DUPLICATE	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763019	FIELD BLANK	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763021	SCDW	Diesel Range Organics	OEXT/23102	Diesel Range Organics	GCSV/12116
10242763001	MW-1	EPA 8260	MSV/25078		
10242763002	MW-4	EPA 8260	MSV/25078		
10242763003	MW-15	EPA 8260	MSV/25078		
10242763004	MW-6	EPA 8260	MSV/25078		
10242763005	MW-7	EPA 8260	MSV/25078		
10242763006	MW-17	EPA 8260	MSV/25078		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242763007	MW-19	EPA 8260	MSV/25078		
10242763008	MW-18	EPA 8260	MSV/25078		
10242763009	MW-8	EPA 8260	MSV/25078		
10242763010	MW-16B	EPA 8260	MSV/25078		
10242763011	MW-16A	EPA 8260	MSV/25078		
10242763012	USGS-3A	EPA 8260	MSV/25078		
10242763013	MW-9	EPA 8260	MSV/25078		
10242763014	USGS-1A	EPA 8260	MSV/25078		
10242763015	USGS-4A	EPA 8260	MSV/25078		
10242763016	USGS-2A	EPA 8260	MSV/25078		
10242763017	MW-10	EPA 8260	MSV/25078		
10242763018	DUPLICATE	EPA 8260	MSV/25078		
10242763019	FIELD BLANK	EPA 8260	MSV/25078		
10242763020	TRIP BLANK	EPA 8260	MSV/25078		
10242763021	SCDW	EPA 8260	MSV/25097		
10242763001	MW-1	SM 4500-NO3 H	WETA/16118		
10242763002	MW-4	SM 4500-NO3 H	WETA/16118		
10242763003	MW-15	SM 4500-NO3 H	WETA/16118		
10242763004	MW-6	SM 4500-NO3 H	WETA/16118		
10242763005	MW-7	SM 4500-NO3 H	WETA/16118		
10242763006	MW-17	SM 4500-NO3 H	WETA/16118		
10242763007	MW-19	SM 4500-NO3 H	WETA/16118		
10242763008	MW-18	SM 4500-NO3 H	WETA/16118		
10242763009	MW-8	SM 4500-NO3 H	WETA/16118		
10242763010	MW-16B	SM 4500-NO3 H	WETA/16118		
10242763011	MW-16A	SM 4500-NO3 H	WETA/16118		
10242763012	USGS-3A	SM 4500-NO3 H	WETA/16118		
10242763013	MW-9	SM 4500-NO3 H	WETA/16118		
10242763014	USGS-1A	SM 4500-NO3 H	WETA/16118		
10242763015	USGS-4A	SM 4500-NO3 H	WETA/16118		
10242763016	USGS-2A	SM 4500-NO3 H	WETA/16118		
10242763017	MW-10	SM 4500-NO3 H	WETA/16118		
10242763018	DUPLICATE	SM 4500-NO3 H	WETA/16118		
10242763021	SCDW	SM 4500-NO3 H	WETA/16118		
10242763001	MW-1	ASTM D516	WETA/16097		
10242763002	MW-4	ASTM D516	WETA/16097		
10242763003	MW-15	ASTM D516	WETA/16097		
10242763004	MW-6	ASTM D516	WETA/16097		
10242763005	MW-7	ASTM D516	WETA/16097		
10242763006	MW-17	ASTM D516	WETA/16097		
10242763007	MW-19	ASTM D516	WETA/16097		
10242763008	MW-18	ASTM D516	WETA/16097		
10242763009	MW-8	ASTM D516	WETA/16097		
10242763010	MW-16B	ASTM D516	WETA/16097		
10242763011	MW-16A	ASTM D516	WETA/16097		
10242763012	USGS-3A	ASTM D516	WETA/16097		
10242763013	MW-9	ASTM D516	WETA/16097		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 ENBRIDGE SOUTH CASS L

Pace Project No.: 10242763

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10242763014	USGS-1A	ASTM D516	WETA/16097		
10242763015	USGS-4A	ASTM D516	WETA/16097		
10242763016	USGS-2A	ASTM D516	WETA/16097		
10242763017	MW-10	ASTM D516	WETA/16097		
10242763018	DUPLICATE	ASTM D516	WETA/16097		
10242763021	SCDW	ASTM D516	WETA/16097		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10242763

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Alcom	Report To:	Kate Fallowfield	Attention:	Kate Fallowfield
Address:	4 East-Superior St. Suite 260 Duluth, MN 55802	Copy To:		Company Name:	
Email To:	Kate Fallowfield	Purchase Order No.:		Address:	
Phone:	218 625 8766	Project Name:	Cambridge South Cass Lake	Pace Quote Reference:	
Fax:		Project Number:	60254681	Pace Project Manager:	Carol Murray
Requested Due Date/TAT:				Pace Profile #:	
Page: 1 of 2		1752014		REGULATORY AGENCY	
NPDES ☒ GROUND WATER ☐ DRINKING WATER		UST ☐ RCRA ☐ OTHER ☐		Site Location	
STATE:		MN		STATE:	

[illegible]

***Important Note:** By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

	Document Name: Sample Condition Upon Receipt Form	Document Revised: 19Sep2013 Page 1 of 1
	Document No.: F-MN-L-213-rev.07	Issuing Authority: Pace Minnesota Quality Office

Sample Condition
Upon Receipt

Client Name:

HECOM

Project #:

WO#: 10242763



Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client
☐ Commercial ☐ Pace ☐ Other: _____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No Seals Intact? ☐ Yes ☒ No Optional: Proj. Due Date: _____ Proj. Name: _____

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: _____ Temp Blank? ☒ Yes ☐ No

Thermom. Used: ☒ 80512447 ☐ 72337080 ☐ B88A912167504 ☐ B88A9132521491 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): S.A. Cooler Temp Corrected (°C): S.A. Biological Tissue Frozen? ☐ Yes ☒ No

Temp should be above freezing to 6°C Correction Factor: _____ Date and Initials of Person Examining Contents: R 9/20/13

Comments:

Chain of Custody Present?	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes ☐ No ☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes ☐ No ☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes ☐ No ☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☒ Yes ☐ No ☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes ☒ No ☐ N/A	7.
Sufficient Volume?	☒ Yes ☐ No ☐ N/A	8.
Correct Containers Used?	☒ Yes ☐ No ☐ N/A	9.
-Pace Containers Used?	☒ Yes ☐ No ☐ N/A	
Containers Intact?	☒ Yes ☐ No ☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes ☐ No ☒ N/A	11.
Sample Labels Match COC?	☐ Yes ☒ No ☐ N/A	12. EXTRA SAMPLE: "SCDW" NO DATE OR TIME
-Includes Date/Time/ID/Analysis Matrix: <u>WOT</u>		
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13.	☒ Yes ☐ No ☐ N/A	13. ☐ HNO ₃ ☒ H ₂ SO ₄ ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl <2; NaOH >12)	☒ Yes ☐ No ☐ N/A	Sample # <u>ALL</u>
Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water)	☒ Yes ☐ No	Initial when completed: <u>RS</u> Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes ☒ No ☐ N/A	14.
Trip Blank Present?	☒ Yes ☐ No ☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes ☐ No ☐ N/A	
Pace Trip Blank Lot # (if purchased): <u>082013-01</u>		Qty: 2

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: Klete Followfrad

Date/Time: 9-23-13

Comments/Resolution: Run all tests on JCDW

Jay Rowe 9-23-13 collection was 9/18/13 13:45 for JCDW.

Project Manager Review:

Date: 9-23-13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

December 31, 2013

Klete Fallowfield
AECOM
Duluth Technology village
11 East Superior St. Suite 560
Duluth, MN 55802

RE: Project: 60254681 ENBRIDGE-S CASS LAKE
Pace Project No.: 10253244

Dear Klete Fallowfield:

Enclosed are the analytical results for sample(s) received by the laboratory on December 21, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carol Davy

carol.davy@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 5 #WD-15J
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322

Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10253244001	MW-20	Water	12/18/13 09:45	12/21/13 10:30
10253244002	MW-21	Water	12/18/13 10:15	12/21/13 10:30
10253244003	MW-22	Water	12/18/13 09:30	12/21/13 10:30
10253244004	MW-10	Water	12/19/13 09:10	12/21/13 10:30
10253244005	DUPLICATE	Water	12/19/13 09:30	12/21/13 10:30
10253244006	FIELD BLANK	Water	12/19/13 08:45	12/21/13 10:30
10253244007	SCDW	Water	12/19/13 08:30	12/21/13 10:30
10253244008	TRIP BLANK	Water	12/19/13 00:00	12/21/13 10:30

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10253244001	MW-20	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10253244002	MW-21	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10253244003	MW-22	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10253244004	MW-10	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10253244005	DUPLICATE	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10253244006	FIELD BLANK	Diesel Range Organics	JRH	2
		EPA 8260	SH2	7
10253244007	SCDW	RSK 175	DL1	1
		Diesel Range Organics	JRH	2
10253244008	TRIP BLANK	EPA 8260	SH2	7
		EPA 8260	SH2	7

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Method: RSK 175

Description: RSK 175 AIR Headspace

Client: AECOM

Date: December 31, 2013

General Information:

6 samples were analyzed for RSK 175. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: AIR/19020

R1: RPD value was outside control limits.

- DUP (Lab ID: 1601296)
- Methane

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Method: Diesel Range Organics

Description: WIDRO Extended GCS

Client: AECOM

Date: December 31, 2013

General Information:

7 samples were analyzed for Diesel Range Organics. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with Diesel Range Organics with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Method: EPA 8260

Description: 8260 MSV UST

Client: AECOM

Date: December 31, 2013

General Information:

8 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Method: SM 4500-NO3 H

Description: SM4500NO3-H, NO2 + NO3 pres.

Client: AECOM

Date: December 31, 2013

General Information:

5 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16987

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10252865025,10253028001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1601653)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1601654)
 - Nitrogen, NO2 plus NO3

M6: Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

- MS (Lab ID: 1601655)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1601656)
 - Nitrogen, NO2 plus NO3

Additional Comments:

Analyte Comments:

QC Batch: WETA/16987

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 1601655)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1601656)
 - Nitrogen, NO2 plus NO3

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PROJECT NARRATIVE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Method: ASTM D516

Description: ASTM D516 Sulfate Water

Client: AECOM

Date: December 31, 2013

General Information:

5 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: MW-20		Lab ID: 10253244001		Collected: 12/18/13 09:45		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/23/13 17:51	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.11	1	12/24/13 07:46	12/28/13 16:51		
Surrogates									
n-Triacontane (S)	86 %.		50-150		1	12/24/13 07:46	12/28/13 16:51	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		12/24/13 06:22	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/24/13 06:22	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		12/24/13 06:22	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/24/13 06:22	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94 %.		75-125		1		12/24/13 06:22	17060-07-0	
Toluene-d8 (S)	97 %.		75-125		1		12/24/13 06:22	2037-26-5	
4-Bromofluorobenzene (S)	97 %.		75-125		1		12/24/13 06:22	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.3 mg/L		0.10	0.050	1		12/26/13 13:18		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	7.0 mg/L		2.5	1.2	1		12/30/13 12:06	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: MW-21		Lab ID: 10253244002		Collected: 12/18/13 10:15		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	53.9	ug/L	6.6	3.3	1		12/23/13 18:55	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.32	mg/L	0.10	0.10	1	12/24/13 07:46	12/28/13 16:58		
Surrogates									
n-Triacontane (S)	89	%.	50-150		1	12/24/13 07:46	12/28/13 16:58	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		12/24/13 06:37	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		12/24/13 06:37	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		12/24/13 06:37	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		12/24/13 06:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1		12/24/13 06:37	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		12/24/13 06:37	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1		12/24/13 06:37	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		12/26/13 13:18		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.5	mg/L	2.5	1.2	1		12/30/13 12:09	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: MW-22		Lab ID: 10253244003		Collected: 12/18/13 09:30		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/23/13 19:06	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.10	1	12/24/13 07:46	12/28/13 17:05		
Surrogates									
n-Triacontane (S)	89 %.		50-150		1	12/24/13 07:46	12/28/13 17:05	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		12/24/13 06:53	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/24/13 06:53	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		12/24/13 06:53	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/24/13 06:53	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	93 %.		75-125		1		12/24/13 06:53	17060-07-0	
Toluene-d8 (S)	97 %.		75-125		1		12/24/13 06:53	2037-26-5	
4-Bromofluorobenzene (S)	96 %.		75-125		1		12/24/13 06:53	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 13:27		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	8.4 mg/L		2.5	1.2	1		12/30/13 12:09	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: MW-10		Lab ID: 10253244004		Collected: 12/19/13 09:10		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	11500	ug/L	6.6	3.3	1		12/24/13 12:01	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	9.2	mg/L	0.53	0.53	5	12/24/13 07:46	12/28/13 17:33		
Surrogates									
n-Triacontane (S)	104	%	50-150		5	12/24/13 07:46	12/28/13 17:33	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	1390	ug/L	10.0	2.4	10		12/25/13 06:27	71-43-2	
Ethylbenzene	36.2	ug/L	5.0	1.2	5		12/24/13 07:40	100-41-4	
Toluene	ND	ug/L	5.0	1.2	5		12/24/13 07:40	108-88-3	
Xylene (Total)	ND	ug/L	15.0	3.6	5		12/24/13 07:40	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	92	%	75-125		5		12/24/13 07:40	17060-07-0	
Toluene-d8 (S)	98	%	75-125		5		12/24/13 07:40	2037-26-5	
4-Bromofluorobenzene (S)	96	%	75-125		5		12/24/13 07:40	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		12/26/13 13:27		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND	mg/L	2.5	1.2	1		12/30/13 12:09	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: DUPLICATE		Lab ID: 10253244005		Collected: 12/19/13 09:30		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	11500	ug/L	6.6	3.3	1		12/24/13 12:33	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	9.7	mg/L	0.52	0.52	5	12/24/13 07:46	12/28/13 17:40		
Surrogates									
n-Triacontane (S)	108	%.	50-150		5	12/24/13 07:46	12/28/13 17:40	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	1360	ug/L	10.0	2.4	10		12/25/13 06:11	71-43-2	
Ethylbenzene	34.7	ug/L	5.0	1.2	5		12/24/13 07:56	100-41-4	
Toluene	ND	ug/L	5.0	1.2	5		12/24/13 07:56	108-88-3	
Xylene (Total)	ND	ug/L	15.0	3.6	5		12/24/13 07:56	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	92	%.	75-125		5		12/24/13 07:56	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		5		12/24/13 07:56	2037-26-5	
4-Bromofluorobenzene (S)	95	%.	75-125		5		12/24/13 07:56	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		12/26/13 13:28		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	3.0	mg/L	2.5	1.2	1		12/30/13 12:11	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: FIELD BLANK		Lab ID: 10253244006		Collected: 12/19/13 08:45		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.10	0.10	1	12/24/13 07:46	12/28/13 16:17		
Surrogates									
n-Triacontane (S)	87	%.	50-150		1	12/24/13 07:46	12/28/13 16:17	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	0.24	1		12/24/13 03:15	71-43-2	
Ethylbenzene	ND	ug/L	1.0	0.24	1		12/24/13 03:15	100-41-4	
Toluene	ND	ug/L	1.0	0.23	1		12/24/13 03:15	108-88-3	
Xylene (Total)	ND	ug/L	3.0	0.72	1		12/24/13 03:15	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	93	%.	75-125		1		12/24/13 03:15	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		12/24/13 03:15	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1		12/24/13 03:15	460-00-4	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: SCDW		Lab ID: 10253244007		Collected: 12/19/13 08:30		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/24/13 12:44	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.11	1	12/24/13 07:46	12/28/13 16:23		
Surrogates									
n-Triacontane (S)	92 %.		50-150		1	12/24/13 07:46	12/28/13 16:23	638-68-6	
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		12/24/13 05:04	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/24/13 05:04	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		12/24/13 05:04	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/24/13 05:04	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	93 %.		75-125		1		12/24/13 05:04	17060-07-0	
Toluene-d8 (S)	97 %.		75-125		1		12/24/13 05:04	2037-26-5	
4-Bromofluorobenzene (S)	96 %.		75-125		1		12/24/13 05:04	460-00-4	

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ANALYTICAL RESULTS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Sample: TRIP BLANK		Lab ID: 10253244008		Collected: 12/19/13 00:00		Received: 12/21/13 10:30		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST		Analytical Method: EPA 8260							
Benzene	ND ug/L		1.0	0.24	1		12/24/13 02:59	71-43-2	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/24/13 02:59	100-41-4	
Toluene	ND ug/L		1.0	0.23	1		12/24/13 02:59	108-88-3	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/24/13 02:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94 %.		75-125		1		12/24/13 02:59	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/24/13 02:59	2037-26-5	
4-Bromofluorobenzene (S)	96 %.		75-125		1		12/24/13 02:59	460-00-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch: AIR/19012 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 10253244001, 10253244002, 10253244003

METHOD BLANK: 1600986 Matrix: Water

Associated Lab Samples: 10253244001, 10253244002, 10253244003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	12/23/13 17:40	

LABORATORY CONTROL SAMPLE & LCSD: 1600987

1600988

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	57.4	57.9	95	96	85-115	.9	20	

SAMPLE DUPLICATE: 1600989

Parameter	Units	10253244001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

SAMPLE DUPLICATE: 1600990

Parameter	Units	10253245003 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch: AIR/19020

Analysis Method: RSK 175

QC Batch Method: RSK 175

Analysis Description: RSK 175 AIR HEADSPACE

Associated Lab Samples: 10253244004, 10253244005, 10253244007

METHOD BLANK: 1601293

Matrix: Water

Associated Lab Samples: 10253244004, 10253244005, 10253244007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	12/24/13 09:43	

LABORATORY CONTROL SAMPLE & LCSD: 1601294

1601295

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	57.5	57.1	95	94	85-115	.6	20	

SAMPLE DUPLICATE: 1601296

Parameter	Units	10253098005 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	2300	3570	43	20	R1

SAMPLE DUPLICATE: 1601297

Parameter	Units	10253244004 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	11500	10800	6	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch:	MSV/26008	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV UST-WATER
Associated Lab Samples:	10253244001, 10253244002, 10253244003, 10253244004, 10253244005, 10253244006, 10253244007, 10253244008		

METHOD BLANK: 1600952 Matrix: Water
Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005, 10253244006, 10253244007, 10253244008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	12/24/13 02:44	
Ethylbenzene	ug/L	ND	1.0	12/24/13 02:44	
Toluene	ug/L	ND	1.0	12/24/13 02:44	
Xylene (Total)	ug/L	ND	3.0	12/24/13 02:44	
1,2-Dichloroethane-d4 (S)	%	93	75-125	12/24/13 02:44	
4-Bromofluorobenzene (S)	%	96	75-125	12/24/13 02:44	
Toluene-d8 (S)	%	97	75-125	12/24/13 02:44	

LABORATORY CONTROL SAMPLE: 1600953

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	16.4	82	75-125	
Ethylbenzene	ug/L	20	16.8	84	75-125	
Toluene	ug/L	20	16.6	83	75-125	
Xylene (Total)	ug/L	60	52.4	87	75-125	
1,2-Dichloroethane-d4 (S)	%			91	75-125	
4-Bromofluorobenzene (S)	%			95	75-125	
Toluene-d8 (S)	%			99	75-125	

MATRIX SPIKE SAMPLE: 1601741

Parameter	Units	10253245007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	ND	20	18.7	94	70-135	
Ethylbenzene	ug/L	ND	20	18.7	93	75-125	
Toluene	ug/L	ND	20	18.2	91	75-125	
Xylene (Total)	ug/L	ND	60	57.7	96	75-125	
1,2-Dichloroethane-d4 (S)	%				92	75-125	
4-Bromofluorobenzene (S)	%				95	75-125	
Toluene-d8 (S)	%				98	75-125	

SAMPLE DUPLICATE: 1601740

Parameter	Units	10253245005 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	ND		30	
Toluene	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

SAMPLE DUPLICATE: 1601740

Parameter	Units	10253245005 Result	Dup Result	RPD	Max RPD	Qualifiers
1,2-Dichloroethane-d4 (S)	%.	93	94	1		
4-Bromofluorobenzene (S)	%.	96	97	1		
Toluene-d8 (S)	%.	97	99	2		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch:	OEXT/24008	Analysis Method:	Diesel Range Organics
QC Batch Method:	Diesel Range Organics	Analysis Description:	WIDRO Extended GCS
Associated Lab Samples:	10253244001, 10253244002, 10253244003, 10253244004, 10253244005, 10253244006, 10253244007		

METHOD BLANK: 1601087

Matrix: Water

Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005, 10253244006, 10253244007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO, Extended C10-C32	mg/L	ND	0.10	12/28/13 14:39	
n-Triacontane (S)	%.	81	50-150	12/28/13 14:39	

LABORATORY CONTROL SAMPLE & LCSD: 1601088

1601089

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO, Extended C10-C32	mg/L	2	1.6	1.7	82	84	75-115	2	20	
n-Triacontane (S)	%.				92	96	50-150			

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch: WETA/16987 Analysis Method: SM 4500-NO3 H
QC Batch Method: SM 4500-NO3 H Analysis Description: SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005

METHOD BLANK: 1601651 Matrix: Water
Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	12/26/13 12:49	

LABORATORY CONTROL SAMPLE: 1601652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.7	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1601653 1601654

Parameter	Units	10252865025 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	.052J	.053J	2	2	80-120		30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1601655 1601656

Parameter	Units	10253028001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	40.4	50	50	102	103	124	125	80-120	.4	30	E,M6

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

QC Batch: WETA/17010 Analysis Method: ASTM D516
QC Batch Method: ASTM D516 Analysis Description: ASTM D516 Sulfate Water
Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005

METHOD BLANK: 1602806 Matrix: Water
Associated Lab Samples: 10253244001, 10253244002, 10253244003, 10253244004, 10253244005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	12/30/13 12:06	

LABORATORY CONTROL SAMPLE: 1602807

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	6.7	89	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1602808 1602809

Parameter	Units	10253244001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	7.0	20	20	28.1	27.6	105	103	80-120	1	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1602810 1602811

Parameter	Units	10253245006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	21.4	21.2	107	106	80-120	1	30	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

M6 Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 ENBRIDGE-S CASS LAKE

Pace Project No.: 10253244

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10253244001	MW-20	RSK 175	AIR/19012		
10253244002	MW-21	RSK 175	AIR/19012		
10253244003	MW-22	RSK 175	AIR/19012		
10253244004	MW-10	RSK 175	AIR/19020		
10253244005	DUPLICATE	RSK 175	AIR/19020		
10253244007	SCDW	RSK 175	AIR/19020		
10253244001	MW-20	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244002	MW-21	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244003	MW-22	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244004	MW-10	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244005	DUPLICATE	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244006	FIELD BLANK	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244007	SCDW	Diesel Range Organics	OEXT/24008	Diesel Range Organics	GCSV/12643
10253244001	MW-20	EPA 8260	MSV/26008		
10253244002	MW-21	EPA 8260	MSV/26008		
10253244003	MW-22	EPA 8260	MSV/26008		
10253244004	MW-10	EPA 8260	MSV/26008		
10253244005	DUPLICATE	EPA 8260	MSV/26008		
10253244006	FIELD BLANK	EPA 8260	MSV/26008		
10253244007	SCDW	EPA 8260	MSV/26008		
10253244008	TRIP BLANK	EPA 8260	MSV/26008		
10253244001	MW-20	SM 4500-NO3 H	WETA/16987		
10253244002	MW-21	SM 4500-NO3 H	WETA/16987		
10253244003	MW-22	SM 4500-NO3 H	WETA/16987		
10253244004	MW-10	SM 4500-NO3 H	WETA/16987		
10253244005	DUPLICATE	SM 4500-NO3 H	WETA/16987		
10253244001	MW-20	ASTM D516	WETA/17010		
10253244002	MW-21	ASTM D516	WETA/17010		
10253244003	MW-22	ASTM D516	WETA/17010		
10253244004	MW-10	ASTM D516	WETA/17010		
10253244005	DUPLICATE	ASTM D516	WETA/17010		

REPORT OF LABORATORY ANALYSIS

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	Document Name:	Document Revised: 07Nov2013
	Sample Condition Upon Receipt Form	Page 1 of 1
	Document No.: F-MN-L-213-rev.08	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt **Client Name:** AE CAM **Project #:** WO# : 10253244
Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client
☐ Commercial ☐ Pace ☐ Other: _____
Tracking Number: 7974 7843 2577 (88) (2772) (2989)
(2614) (2463) 3091
Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No **Optional:** Proj. Due Date: _____ Proj. Name: _____
Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No
Thermom. Used: ☐ 80512447 ☐ B88A912167504 ☒ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun
0.4, 2.1, 4.2, 2.0, 0.5, 1.3, 0.7 0.5, 2.2, 4.3, 2.1, 0.6, 1.4, 0.8
Cooler Temp Read (°C): _____ **Cooler Temp Corrected (°C):** _____ **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A
Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** GB 12/21/13

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☒ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☒ No	☐ N/A	11.
Sample Labels Match COC? <u>GB 12/21/13</u>	☒ Yes	☒ No	☐ N/A	12. <u>See exception sheet</u>
-Includes Date/Time/ID/Analysis Matrix: <u>WAT</u>				
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13.	☒ Yes	☐ No	☐ N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>12)	☒ Yes	☐ No	☐ N/A	Sample # <u>1-7</u>
Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water) DOC	☒ Yes	☐ No		Initial when completed: <u>GB</u> Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	☐ Yes	☒ No	☐ N/A	14.
Trip Blank Present?	☒ Yes	☐ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☒ Yes	☐ No	☐ N/A	
Pace Trip Blank Lot # (if purchased): <u>11141301</u>				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No
Person Contacted: Kirk Falkenfeld **Date/Time:** 12-23-13
Comments/Resolution: _____
Client inform of missing containers
in SCIDW

Project Manager Review: CMD **Date:** 12-23-13
Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000033.D

Report Date: 12/29/2013

Sample ID: 10253244001

Client ID:

Instrument: 10gcs9.i

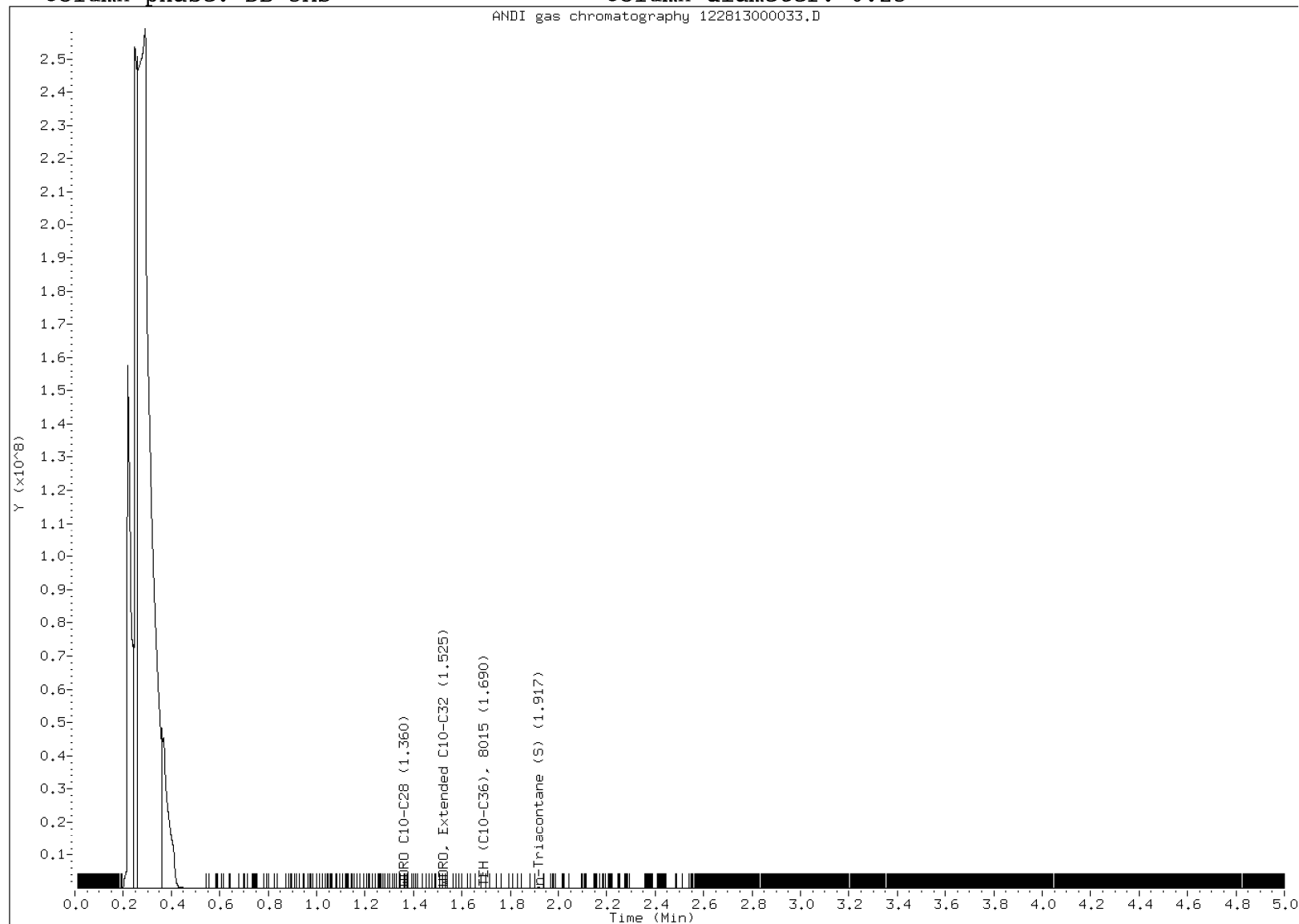
Sample Information: 10253244001

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000034.D

Report Date: 12/29/2013

Sample ID: 10253244002

Client ID:

Instrument: 10gcs9.i

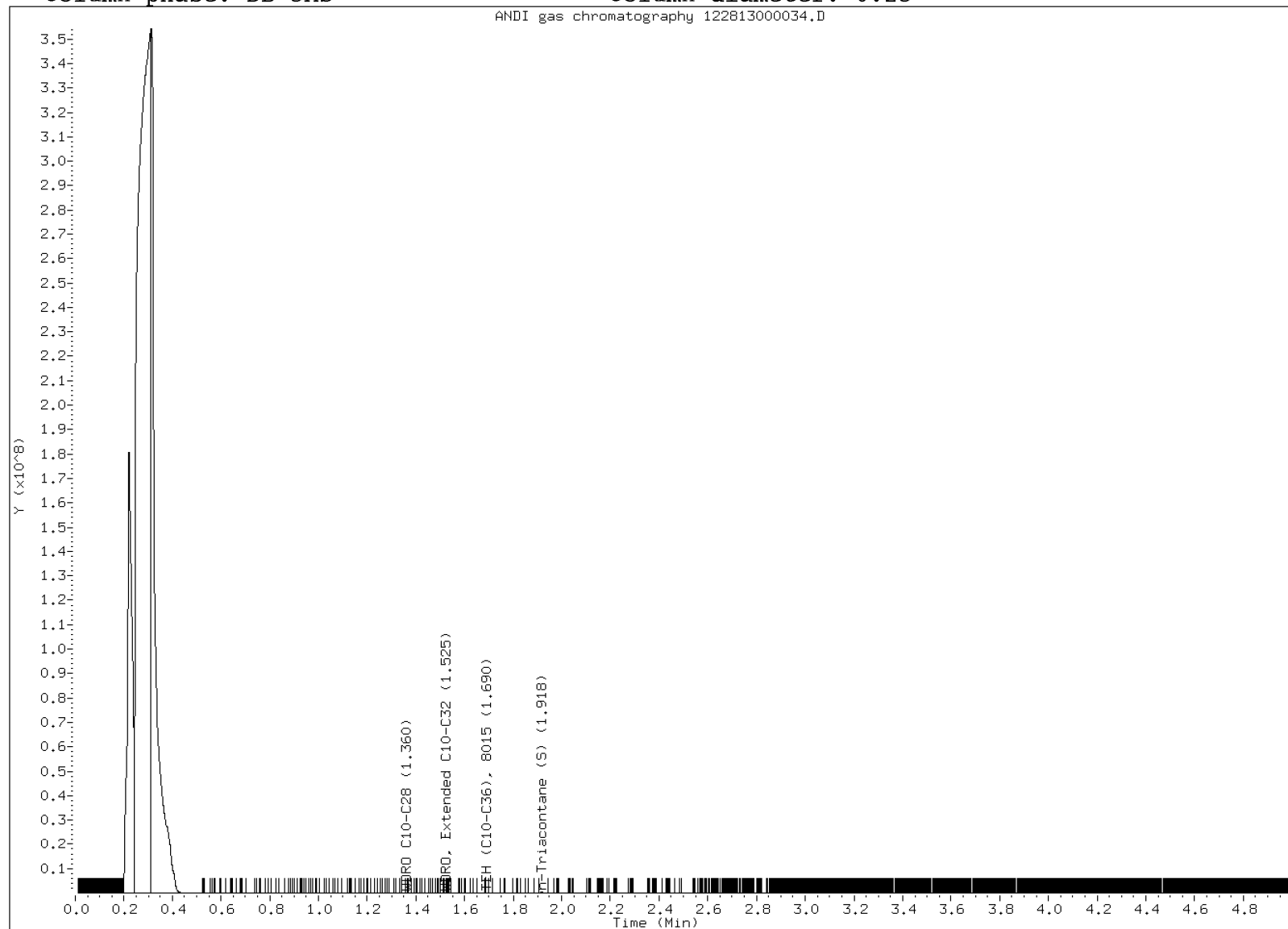
Sample Information: 10253244002

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000035.D

Report Date: 12/29/2013

Sample ID: 10253244003

Client ID:

Instrument: 10gcs9.i

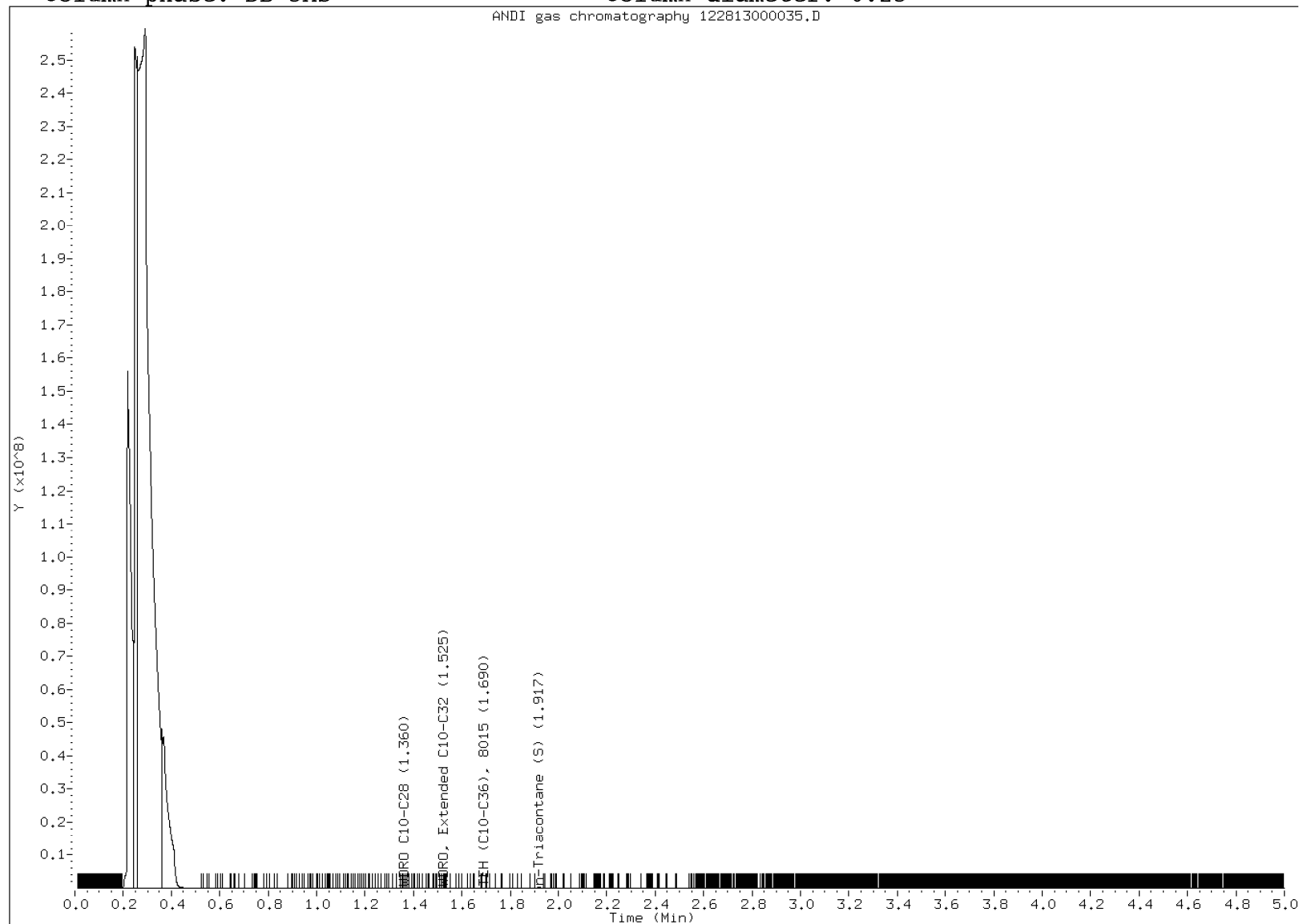
Sample Information: 10253244003

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000039.D

Report Date: 12/29/2013

Sample ID: 10253244004

Client ID:

Instrument: 10gcs9.i

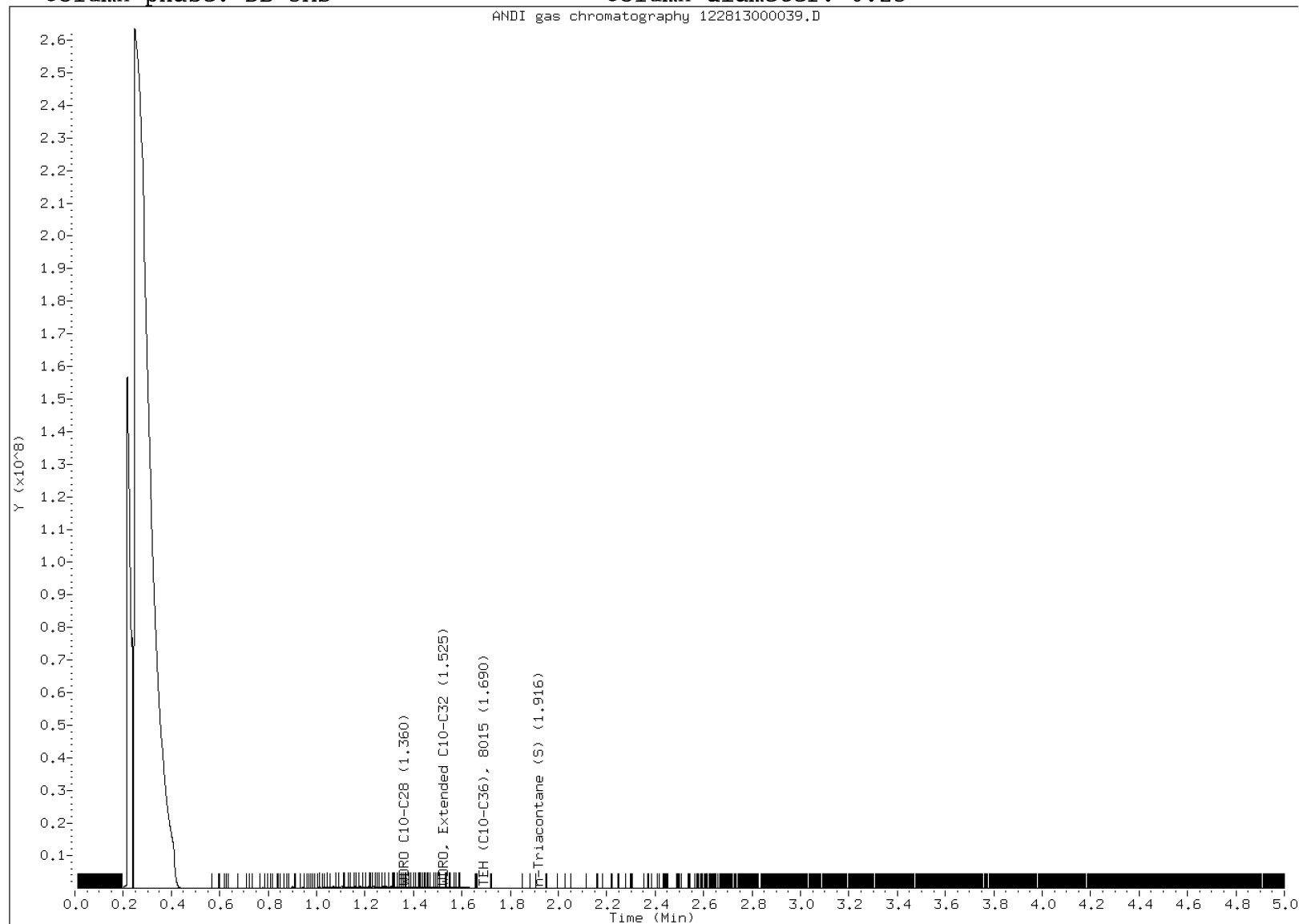
Sample Information: 10253244004,5

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000040.D

Report Date: 12/29/2013

Sample ID: 10253244005

Client ID:

Instrument: 10gcs9.i

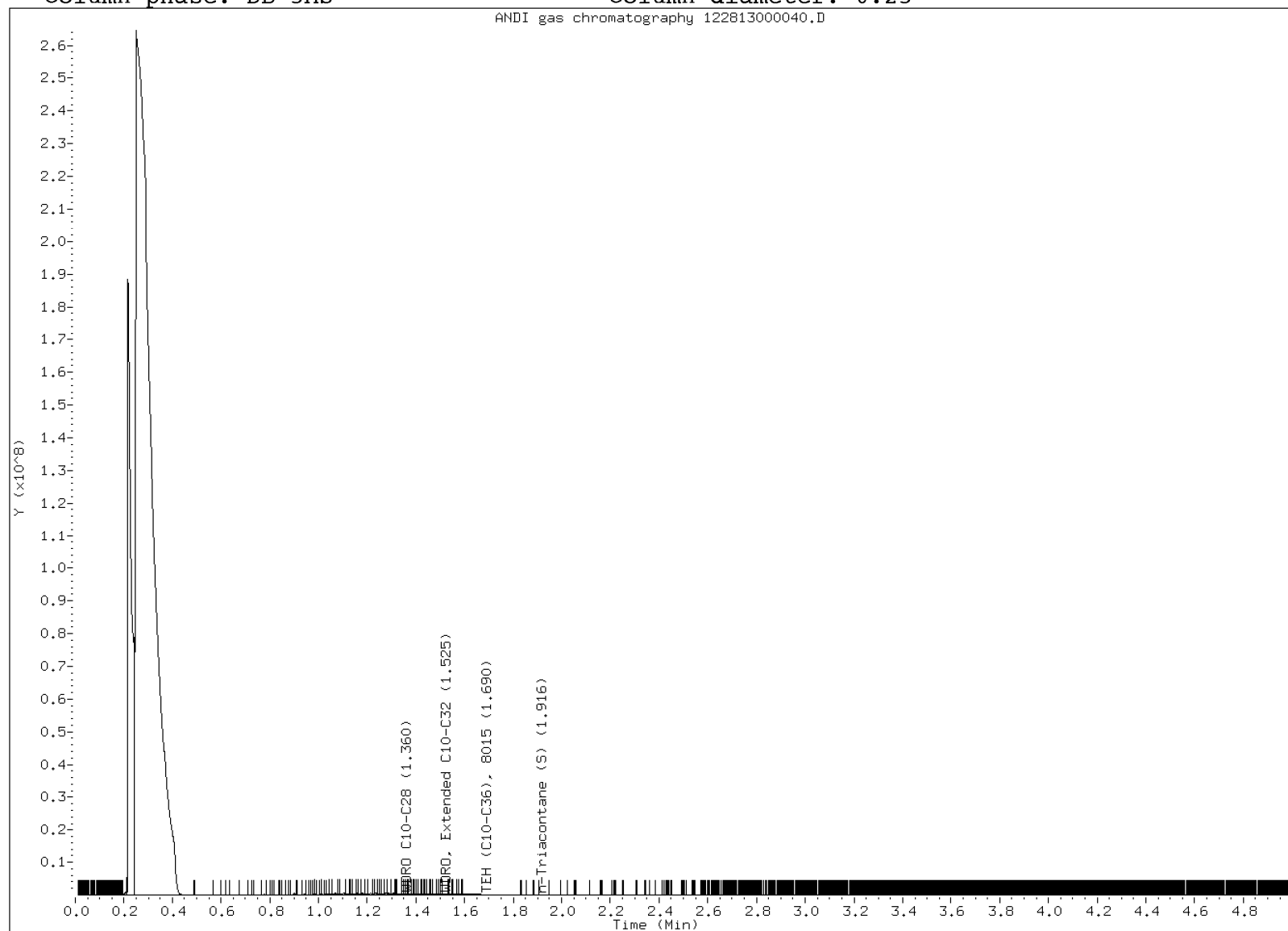
Sample Information: 10253244005,5

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000028.D

Report Date: 12/29/2013

Sample ID: 10253244006

Client ID:

Instrument: 10gcs9.i

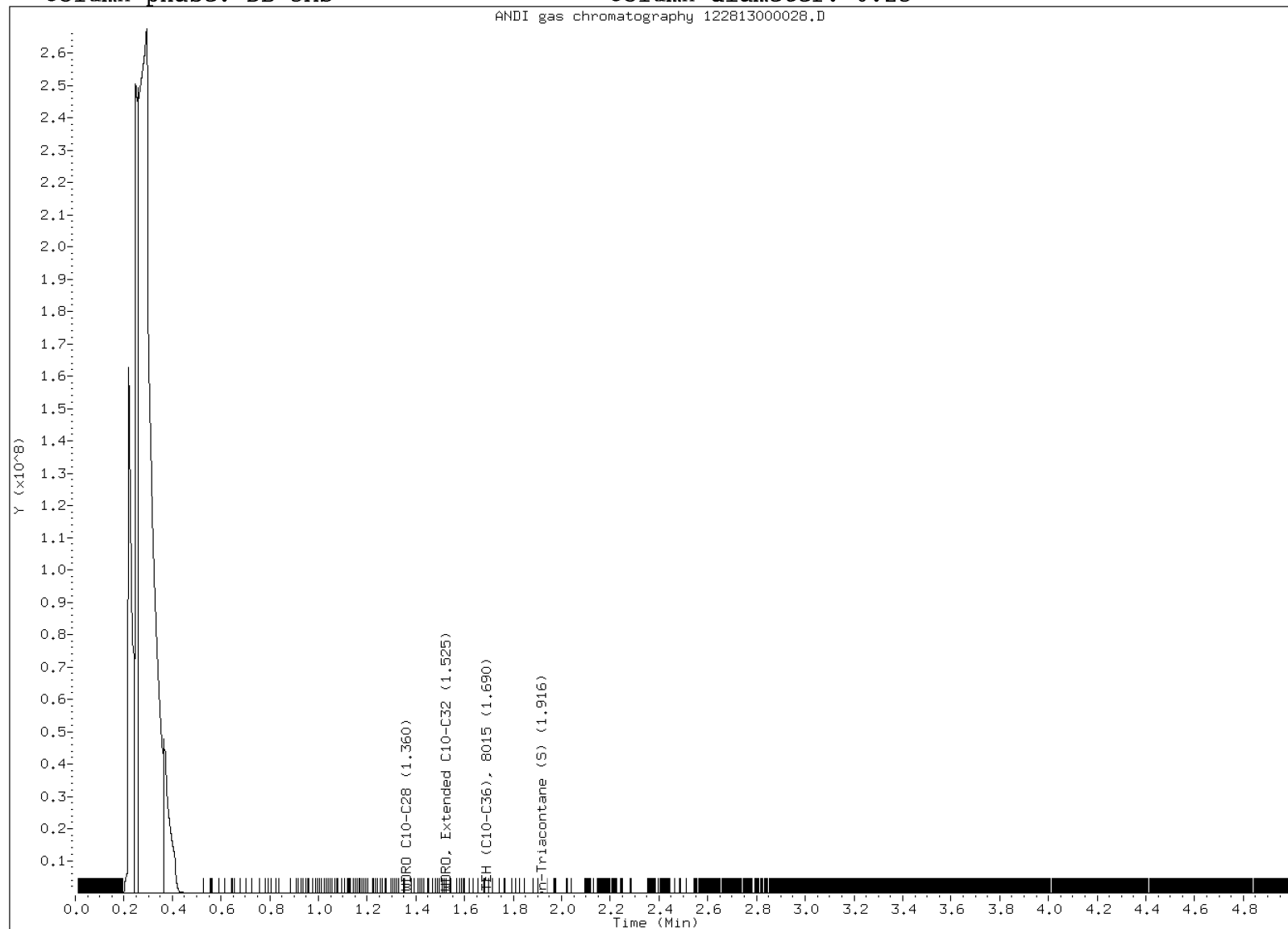
Sample Information: 10253244006

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122813extdro.b\122813000029.D

Report Date: 12/29/2013

Sample ID: 10253244007

Client ID:

Instrument: 10gcs9.i

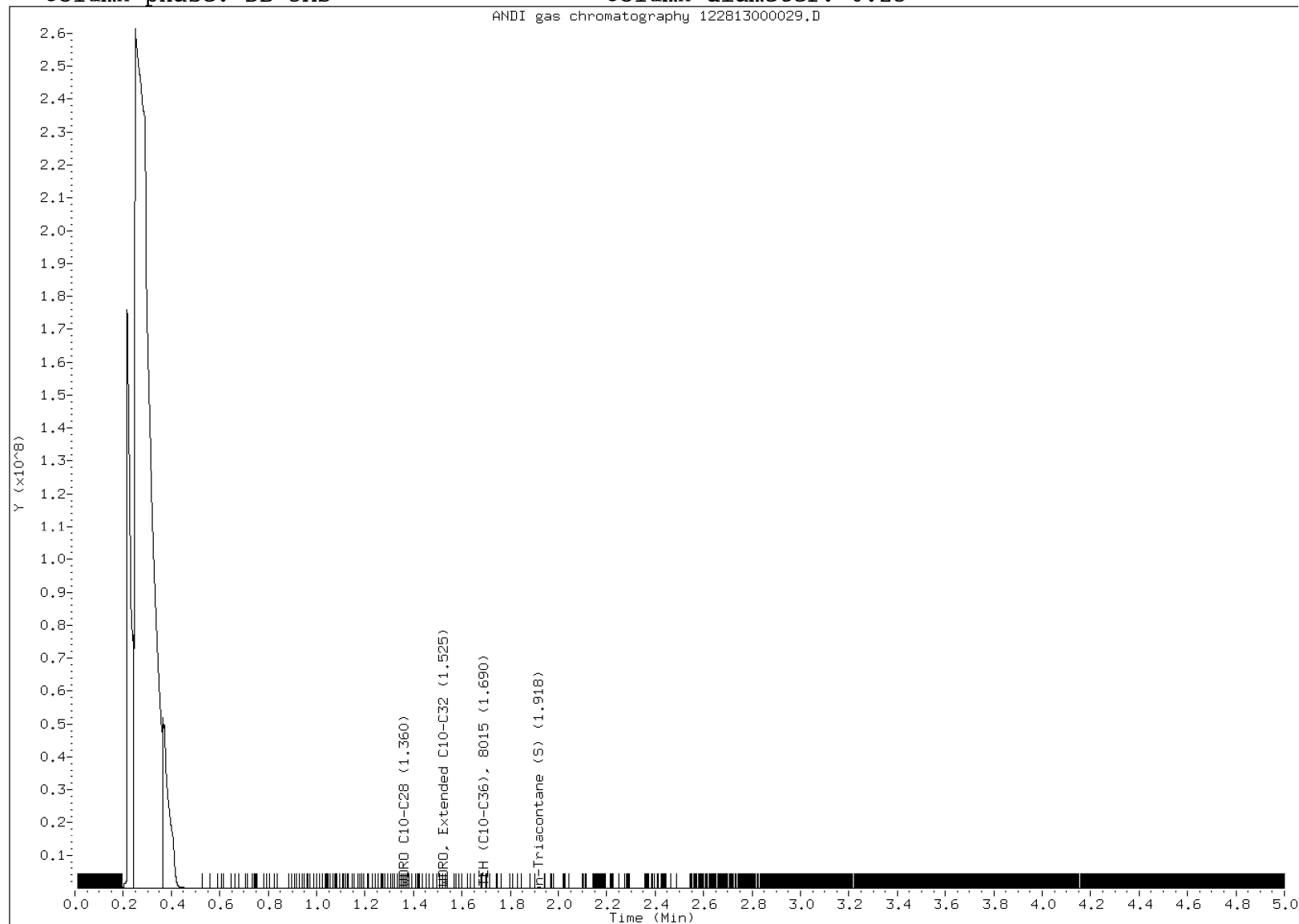
Sample Information: 10253244007

Purge Volume:

Operator: JRH

Column phase: DB-5MS

Column diameter: 0.25



December 26, 2013

Klete Fallowfield
AECOM
Duluth Technology village
11 East Superior St. Suite 560
Duluth, MN 55802

RE: Project: 60254681 Enbridge-South Cass L
Pace Project No.: 10252733

Dear Klete Fallowfield:

Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carol Davy

carol.davy@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Dept of Environmental Management #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
EPA Region 5 #WD-15J
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322

Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10252733001	MW-8	Water	12/16/13 16:55	12/18/13 11:51
10252733002	MW-9	Water	12/16/13 15:55	12/18/13 11:51
10252733003	MW-15	Water	12/16/13 16:52	12/18/13 11:51
10252733004	MW-4	Water	12/16/13 15:45	12/18/13 11:51
10252733005	MW-1	Water	12/16/13 14:45	12/18/13 11:51
10252733006	MW-7	Water	12/17/13 09:20	12/18/13 11:51
10252733007	MW-18	Water	12/17/13 10:30	12/18/13 11:51
10252733008	MW-19	Water	12/17/13 12:35	12/18/13 11:51
10252733009	MW-17	Water	12/17/13 13:40	12/18/13 11:51
10252733010	USGS-1A	Water	12/17/13 14:25	12/18/13 11:51
10252733011	MW-6	Water	12/17/13 09:05	12/18/13 11:51
10252733012	MW-16A	Water	12/17/13 10:25	12/18/13 11:51
10252733013	MW-16B	Water	12/17/13 12:20	12/18/13 11:51
10252733014	USGS-4A	Water	12/17/13 13:20	12/18/13 11:51
10252733015	USGS-3A	Water	12/17/13 14:20	12/18/13 11:51
10252733016	USGS-2A	Water	12/17/13 15:00	12/18/13 11:51

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10252733001	MW-8	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733002	MW-9	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733003	MW-15	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733004	MW-4	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733005	MW-1	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733006	MW-7	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733007	MW-18	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
10252733008	MW-19	RSK 175	DL1	1
		Diesel Range Organics	MT	2

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SAMPLE ANALYTE COUNT

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10252733009	MW-17	EPA 8260	LPM	70
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733010	USGS-1A	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733011	MW-6	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733012	MW-16A	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733013	MW-16B	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733014	USGS-4A	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70
10252733015	USGS-3A	SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1
		RSK 175	DL1	1
		Diesel Range Organics	MT	2
		EPA 8260	LPM	70

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10252733016	USGS-2A	RSK 175	DL1	1
		Diesel Range Organics	MT	2
		SM 4500-NO3 H	MWD	1
		ASTM D516	KEO	1

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: RSK 175

Description: RSK 175 AIR Headspace

Client: AECOM

Date: December 26, 2013

General Information:

15 samples were analyzed for RSK 175. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: AIR/19006

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10252882007,10252888004

R1: RPD value was outside control limits.

- MSD (Lab ID: 1600704)
- Methane

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: Diesel Range Organics

Description: WIDRO Extended GCS

Client: AECOM

Date: December 26, 2013

General Information:

16 samples were analyzed for Diesel Range Organics. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with Diesel Range Organics with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: EPA 8260

Description: 8260 VOC

Client: AECOM

Date: December 26, 2013

General Information:

15 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

QC Batch: MSV/25983

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

- BLANK (Lab ID: 1599132)
 - Bromomethane
- DUP (Lab ID: 1600423)
 - Bromomethane
- LCS (Lab ID: 1599133)
 - Bromomethane
- MS (Lab ID: 1601681)
 - Bromomethane
- MW-1 (Lab ID: 10252733005)
 - Bromomethane
- MW-15 (Lab ID: 10252733003)
 - Bromomethane
- MW-16A (Lab ID: 10252733012)
 - Bromomethane
- MW-16B (Lab ID: 10252733013)
 - Bromomethane
- MW-17 (Lab ID: 10252733009)
 - Bromomethane
- MW-18 (Lab ID: 10252733007)
 - Bromomethane
- MW-19 (Lab ID: 10252733008)
 - Bromomethane
- MW-4 (Lab ID: 10252733004)
 - Bromomethane
- MW-6 (Lab ID: 10252733011)
 - Bromomethane
- MW-7 (Lab ID: 10252733006)
 - Bromomethane
- MW-8 (Lab ID: 10252733001)
 - Bromomethane
- MW-9 (Lab ID: 10252733002)

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: EPA 8260

Description: 8260 VOC

Client: AECOM

Date: December 26, 2013

QC Batch: MSV/25983

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

- Bromomethane
- USGS-1A (Lab ID: 10252733010)
- Bromomethane
- USGS-3A (Lab ID: 10252733015)
- Bromomethane
- USGS-4A (Lab ID: 10252733014)
- Bromomethane

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: SM 4500-NO3 H

Description: SM4500NO3-H, NO2 + NO3 pres.

Client: AECOM

Date: December 26, 2013

General Information:

16 samples were analyzed for SM 4500-NO3 H. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WETA/16985

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10252733001,10252865003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1601641)
 - Nitrogen, NO2 plus NO3
- MS (Lab ID: 1601643)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1601642)
 - Nitrogen, NO2 plus NO3
- MSD (Lab ID: 1601644)
 - Nitrogen, NO2 plus NO3

Additional Comments:

Workorder Comments:

No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Method: ASTM D516

Description: ASTM D516 Sulfate Water

Client: AECOM

Date: December 26, 2013

General Information:

16 samples were analyzed for ASTM D516. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Workorder Comments:

No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-8		Lab ID: 10252733001		Collected: 12/16/13 16:55		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 12:07	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.11	1	12/20/13 08:41	12/22/13 16:17		
Surrogates									
n-Triacontane (S)	85 %		50-150		1	12/20/13 08:41	12/22/13 16:17	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 12:49	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 12:49	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 12:49	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 12:49	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 12:49	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 12:49	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 12:49	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 12:49	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 12:49	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 12:49	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 12:49	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 12:49	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 12:49	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 12:49	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 12:49	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 12:49	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 12:49	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 12:49	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 12:49	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 12:49	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 12:49	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 12:49	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 12:49	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 12:49	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 12:49	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 12:49	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 12:49	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 12:49	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 12:49	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 12:49	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 12:49	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 12:49	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 12:49	10061-01-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-8		Lab ID: 10252733001		Collected: 12/16/13 16:55		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 12:49	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 12:49	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 12:49	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 12:49	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 12:49	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 12:49	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 12:49	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 12:49	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 12:49	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 12:49	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 12:49	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 12:49	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 12:49	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 12:49	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 12:49	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 12:49	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 12:49	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 12:49	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 12:49	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 12:49	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 12:49	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 12:49	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 12:49	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 12:49	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 12:49	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97 %		75-125		1		12/23/13 12:49	17060-07-0	
Toluene-d8 (S)	98 %		75-125		1		12/23/13 12:49	2037-26-5	
4-Bromofluorobenzene (S)	98 %		75-125		1		12/23/13 12:49	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:03		M1
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	10.7 mg/L		2.5	1.2	1		12/19/13 12:41	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-9		Lab ID: 10252733002		Collected: 12/16/13 15:55		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		12/20/13 12:43	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND	mg/L	0.11	0.11	1	12/20/13 08:41	12/22/13 16:24		
Surrogates									
n-Triacontane (S)	84	%	50-150		1	12/20/13 08:41	12/22/13 16:24	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	10.0	1		12/23/13 13:05	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.23	1		12/23/13 13:05	107-05-1	
Benzene	ND	ug/L	1.0	0.24	1		12/23/13 13:05	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.23	1		12/23/13 13:05	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.50	1		12/23/13 13:05	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.25	1		12/23/13 13:05	75-27-4	
Bromoform	ND	ug/L	4.0	2.0	1		12/23/13 13:05	75-25-2	
Bromomethane	ND	ug/L	4.0	2.0	1		12/23/13 13:05	74-83-9	CL
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/23/13 13:05	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.31	1		12/23/13 13:05	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.24	1		12/23/13 13:05	108-90-7	
Chloroethane	ND	ug/L	4.0	0.50	1		12/23/13 13:05	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/23/13 13:05	67-66-3	
Chloromethane	ND	ug/L	4.0	2.0	1		12/23/13 13:05	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.23	1		12/23/13 13:05	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	2.0	1		12/23/13 13:05	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.27	1		12/23/13 13:05	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/23/13 13:05	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.14	1		12/23/13 13:05	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.092	1		12/23/13 13:05	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 13:05	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.40	1		12/23/13 13:05	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.50	1		12/23/13 13:05	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.22	1		12/23/13 13:05	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 13:05	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.23	1		12/23/13 13:05	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 13:05	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.20	1		12/23/13 13:05	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.20	1		12/23/13 13:05	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.50	1		12/23/13 13:05	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.50	1		12/23/13 13:05	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.25	1		12/23/13 13:05	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.50	1		12/23/13 13:05	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-9		Lab ID: 10252733002		Collected: 12/16/13 15:55		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 13:05	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 13:05	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 13:05	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 13:05	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 13:05	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 13:05	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 13:05	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 13:05	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 13:05	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 13:05	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:05	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 13:05	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:05	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 13:05	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 13:05	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 13:05	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 13:05	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:05	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:05	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:05	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 13:05	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 13:05	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 13:05	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 13:05	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 13:05	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:05	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:05	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 13:05	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 13:05	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96 %.		75-125		1		12/23/13 13:05	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 13:05	2037-26-5	
4-Bromofluorobenzene (S)	98 %.		75-125		1		12/23/13 13:05	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:04		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.1 mg/L		2.5	1.2	1		12/19/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-15		Lab ID: 10252733003		Collected: 12/16/13 16:52		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 12:53	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 16:31		
Surrogates									
n-Triacontane (S)	94 %		50-150		1	12/20/13 08:41	12/22/13 16:31	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 13:20	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 13:20	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 13:20	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 13:20	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 13:20	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 13:20	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 13:20	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 13:20	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 13:20	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 13:20	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 13:20	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 13:20	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 13:20	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 13:20	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 13:20	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 13:20	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 13:20	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 13:20	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 13:20	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 13:20	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 13:20	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 13:20	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:20	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 13:20	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:20	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 13:20	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:20	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 13:20	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 13:20	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 13:20	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 13:20	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 13:20	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 13:20	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-15		Lab ID: 10252733003		Collected: 12/16/13 16:52		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 13:20	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 13:20	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 13:20	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 13:20	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 13:20	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 13:20	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 13:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 13:20	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 13:20	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 13:20	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 13:20	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:20	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 13:20	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 13:20	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 13:20	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 13:20	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:20	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 13:20	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 13:20	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 13:20	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 13:20	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 13:20	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:20	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 13:20	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 13:20	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96 %.		75-125		1		12/23/13 13:20	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 13:20	2037-26-5	
4-Bromofluorobenzene (S)	98 %.		75-125		1		12/23/13 13:20	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	2.5 mg/L		0.10	0.050	1		12/26/13 10:07		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	ND mg/L		2.5	1.2	1		12/19/13 12:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-4		Lab ID: 10252733004		Collected: 12/16/13 15:45		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 13:04	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 16:38		
Surrogates									
n-Triacontane (S)	92 %		50-150		1	12/20/13 08:41	12/22/13 16:38	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 13:36	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 13:36	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 13:36	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 13:36	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 13:36	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 13:36	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 13:36	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 13:36	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 13:36	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 13:36	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 13:36	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 13:36	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 13:36	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 13:36	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 13:36	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 13:36	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 13:36	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 13:36	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 13:36	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 13:36	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 13:36	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 13:36	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:36	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 13:36	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:36	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 13:36	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:36	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 13:36	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 13:36	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 13:36	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 13:36	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 13:36	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 13:36	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-4		Lab ID: 10252733004		Collected: 12/16/13 15:45		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 13:36	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 13:36	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 13:36	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 13:36	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 13:36	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 13:36	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 13:36	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 13:36	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 13:36	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 13:36	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 13:36	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:36	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 13:36	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 13:36	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 13:36	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 13:36	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:36	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 13:36	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 13:36	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 13:36	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 13:36	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 13:36	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:36	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 13:36	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 13:36	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97 %.		75-125		1		12/23/13 13:36	17060-07-0	
Toluene-d8 (S)	99 %.		75-125		1		12/23/13 13:36	2037-26-5	
4-Bromofluorobenzene (S)	98 %.		75-125		1		12/23/13 13:36	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.7 mg/L		0.10	0.050	1		12/26/13 10:08		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND mg/L		2.5	1.2	1		12/19/13 12:43	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-1		Lab ID: 10252733005		Collected: 12/16/13 14:45		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 13:15	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 16:45		
Surrogates									
n-Triacontane (S)	83 %		50-150		1	12/20/13 08:41	12/22/13 16:45	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 13:51	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 13:51	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 13:51	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 13:51	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 13:51	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 13:51	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 13:51	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 13:51	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 13:51	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 13:51	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 13:51	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 13:51	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 13:51	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 13:51	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 13:51	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 13:51	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 13:51	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 13:51	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 13:51	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 13:51	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 13:51	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 13:51	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:51	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 13:51	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:51	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 13:51	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 13:51	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 13:51	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 13:51	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 13:51	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 13:51	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 13:51	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 13:51	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-1		Lab ID: 10252733005		Collected: 12/16/13 14:45		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 13:51	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 13:51	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 13:51	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 13:51	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 13:51	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 13:51	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 13:51	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 13:51	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 13:51	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 13:51	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 13:51	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:51	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 13:51	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 13:51	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 13:51	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 13:51	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 13:51	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 13:51	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 13:51	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 13:51	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 13:51	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 13:51	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 13:51	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 13:51	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 13:51	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97 %.		75-125		1		12/23/13 13:51	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 13:51	2037-26-5	
4-Bromofluorobenzene (S)	99 %.		75-125		1		12/23/13 13:51	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.28 mg/L		0.10	0.050	1		12/26/13 10:09		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	ND mg/L		2.5	1.2	1		12/19/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-7		Lab ID: 10252733006		Collected: 12/17/13 09:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 15:12	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 16:52		
Surrogates									
n-Triacontane (S)	92 %		50-150		1	12/20/13 08:41	12/22/13 16:52	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 14:22	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 14:22	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 14:22	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 14:22	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 14:22	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 14:22	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 14:22	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 14:22	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 14:22	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 14:22	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 14:22	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 14:22	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 14:22	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 14:22	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 14:22	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 14:22	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 14:22	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 14:22	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 14:22	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 14:22	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 14:22	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 14:22	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:22	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 14:22	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 14:22	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 14:22	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 14:22	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 14:22	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 14:22	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 14:22	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 14:22	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 14:22	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 14:22	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-7		Lab ID: 10252733006		Collected: 12/17/13 09:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 14:22	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 14:22	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 14:22	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 14:22	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 14:22	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 14:22	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 14:22	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 14:22	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 14:22	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 14:22	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 14:22	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:22	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 14:22	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 14:22	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 14:22	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 14:22	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:22	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 14:22	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 14:22	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 14:22	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 14:22	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 14:22	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:22	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 14:22	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 14:22	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %.		75-125		1		12/23/13 14:22	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 14:22	2037-26-5	
4-Bromofluorobenzene (S)	97 %.		75-125		1		12/23/13 14:22	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:12		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	13.3 mg/L		2.5	1.2	1		12/19/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-18		Lab ID: 10252733007		Collected: 12/17/13 10:30		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 15:22	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.11	1	12/20/13 08:41	12/22/13 15:49		
Surrogates									
n-Triacontane (S)	71 %		50-150		1	12/20/13 08:41	12/22/13 15:49	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 14:37	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 14:37	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 14:37	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 14:37	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 14:37	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 14:37	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 14:37	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 14:37	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 14:37	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 14:37	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 14:37	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 14:37	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 14:37	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 14:37	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 14:37	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 14:37	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 14:37	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 14:37	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 14:37	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 14:37	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 14:37	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 14:37	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:37	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 14:37	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 14:37	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 14:37	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 14:37	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 14:37	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 14:37	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 14:37	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 14:37	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 14:37	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 14:37	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-18		Lab ID: 10252733007		Collected: 12/17/13 10:30		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 14:37	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 14:37	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 14:37	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 14:37	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 14:37	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 14:37	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 14:37	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 14:37	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 14:37	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 14:37	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 14:37	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:37	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 14:37	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 14:37	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 14:37	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 14:37	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:37	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 14:37	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 14:37	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 14:37	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 14:37	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 14:37	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:37	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 14:37	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 14:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97 %.		75-125		1		12/23/13 14:37	17060-07-0	
Toluene-d8 (S)	97 %.		75-125		1		12/23/13 14:37	2037-26-5	
4-Bromofluorobenzene (S)	97 %.		75-125		1		12/23/13 14:37	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	1.4 mg/L		0.10	0.050	1		12/26/13 10:13		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.3 mg/L		2.5	1.2	1		12/19/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-19		Lab ID: 10252733008		Collected: 12/17/13 12:35		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		12/20/13 15:33	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.19	mg/L	0.10	0.10	1	12/20/13 08:41	12/22/13 15:56		
Surrogates									
n-Triacontane (S)	89	%	50-150		1	12/20/13 08:41	12/22/13 15:56	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	10.0	1		12/23/13 14:53	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.23	1		12/23/13 14:53	107-05-1	
Benzene	ND	ug/L	1.0	0.24	1		12/23/13 14:53	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.23	1		12/23/13 14:53	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.50	1		12/23/13 14:53	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.25	1		12/23/13 14:53	75-27-4	
Bromoform	ND	ug/L	4.0	2.0	1		12/23/13 14:53	75-25-2	
Bromomethane	ND	ug/L	4.0	2.0	1		12/23/13 14:53	74-83-9	CL
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/23/13 14:53	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.31	1		12/23/13 14:53	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.24	1		12/23/13 14:53	108-90-7	
Chloroethane	ND	ug/L	4.0	0.50	1		12/23/13 14:53	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/23/13 14:53	67-66-3	
Chloromethane	ND	ug/L	4.0	2.0	1		12/23/13 14:53	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.23	1		12/23/13 14:53	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	2.0	1		12/23/13 14:53	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.27	1		12/23/13 14:53	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/23/13 14:53	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.14	1		12/23/13 14:53	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.092	1		12/23/13 14:53	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 14:53	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.40	1		12/23/13 14:53	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.50	1		12/23/13 14:53	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.22	1		12/23/13 14:53	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 14:53	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.23	1		12/23/13 14:53	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 14:53	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.20	1		12/23/13 14:53	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.20	1		12/23/13 14:53	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.50	1		12/23/13 14:53	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.50	1		12/23/13 14:53	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.25	1		12/23/13 14:53	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.50	1		12/23/13 14:53	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-19		Lab ID: 10252733008		Collected: 12/17/13 12:35		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 14:53	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 14:53	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 14:53	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 14:53	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 14:53	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 14:53	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 14:53	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 14:53	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 14:53	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 14:53	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:53	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 14:53	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:53	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 14:53	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 14:53	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 14:53	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 14:53	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:53	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 14:53	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 14:53	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 14:53	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 14:53	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 14:53	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 14:53	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 14:53	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:53	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 14:53	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 14:53	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 14:53	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %.		75-125		1		12/23/13 14:53	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 14:53	2037-26-5	
4-Bromofluorobenzene (S)	97 %.		75-125		1		12/23/13 14:53	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:14		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	7.4 mg/L		2.5	1.2	1		12/19/13 12:46	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-17		Lab ID: 10252733009		Collected: 12/17/13 13:40		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.15	mg/L	0.10	0.10	1	12/20/13 08:41	12/22/13 16:03		
Surrogates									
n-Triacontane (S)	87	%	50-150		1	12/20/13 08:41	12/22/13 16:03	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	10.0	1		12/23/13 15:08	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.23	1		12/23/13 15:08	107-05-1	
Benzene	ND	ug/L	1.0	0.24	1		12/23/13 15:08	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.23	1		12/23/13 15:08	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.50	1		12/23/13 15:08	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.25	1		12/23/13 15:08	75-27-4	
Bromoform	ND	ug/L	4.0	2.0	1		12/23/13 15:08	75-25-2	
Bromomethane	ND	ug/L	4.0	2.0	1		12/23/13 15:08	74-83-9	CL
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/23/13 15:08	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.31	1		12/23/13 15:08	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.24	1		12/23/13 15:08	108-90-7	
Chloroethane	ND	ug/L	4.0	0.50	1		12/23/13 15:08	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/23/13 15:08	67-66-3	
Chloromethane	ND	ug/L	4.0	2.0	1		12/23/13 15:08	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.23	1		12/23/13 15:08	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	2.0	1		12/23/13 15:08	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.27	1		12/23/13 15:08	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/23/13 15:08	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.14	1		12/23/13 15:08	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.092	1		12/23/13 15:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 15:08	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.40	1		12/23/13 15:08	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.50	1		12/23/13 15:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.22	1		12/23/13 15:08	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 15:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.23	1		12/23/13 15:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 15:08	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.20	1		12/23/13 15:08	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.20	1		12/23/13 15:08	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.50	1		12/23/13 15:08	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.50	1		12/23/13 15:08	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.25	1		12/23/13 15:08	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.50	1		12/23/13 15:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	2.0	1		12/23/13 15:08	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	2.0	1		12/23/13 15:08	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.24	1		12/23/13 15:08	100-41-4	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-17		Lab ID: 10252733009		Collected: 12/17/13 13:40		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 15:08	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 15:08	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 15:08	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 15:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 15:08	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 15:08	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 15:08	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:08	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 15:08	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:08	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 15:08	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 15:08	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 15:08	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 15:08	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:08	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:08	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:08	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 15:08	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 15:08	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 15:08	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 15:08	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 15:08	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:08	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:08	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 15:08	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 15:08	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %		75-125		1		12/23/13 15:08	17060-07-0	
Toluene-d8 (S)	98 %		75-125		1		12/23/13 15:08	2037-26-5	
4-Bromofluorobenzene (S)	97 %		75-125		1		12/23/13 15:08	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.44 mg/L		0.10	0.050	1		12/26/13 10:17		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	10.2 mg/L		2.5	1.2	1		12/19/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-1A		Lab ID: 10252733010		Collected: 12/17/13 14:25		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 15:43	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	ND mg/L		0.11	0.11	1	12/20/13 08:41	12/22/13 16:10		
Surrogates									
n-Triacontane (S)	70 %		50-150		1	12/20/13 08:41	12/22/13 16:10	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 15:24	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 15:24	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 15:24	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 15:24	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 15:24	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 15:24	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 15:24	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 15:24	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 15:24	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 15:24	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 15:24	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 15:24	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 15:24	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 15:24	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 15:24	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 15:24	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 15:24	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 15:24	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 15:24	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 15:24	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 15:24	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 15:24	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:24	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 15:24	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:24	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 15:24	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:24	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 15:24	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 15:24	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 15:24	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 15:24	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 15:24	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 15:24	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-1A		Lab ID: 10252733010		Collected: 12/17/13 14:25		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 15:24	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 15:24	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 15:24	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 15:24	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 15:24	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 15:24	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 15:24	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 15:24	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 15:24	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 15:24	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 15:24	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:24	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 15:24	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 15:24	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 15:24	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 15:24	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:24	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 15:24	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 15:24	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 15:24	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 15:24	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 15:24	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:24	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 15:24	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 15:24	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %.		75-125		1		12/23/13 15:24	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 15:24	2037-26-5	
4-Bromofluorobenzene (S)	99 %.		75-125		1		12/23/13 15:24	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:17		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	5.4 mg/L		2.5	1.2	1		12/19/13 12:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L
Pace Project No.: 10252733

Sample: MW-6		Lab ID: 10252733011		Collected: 12/17/13 09:05		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND ug/L		6.6	3.3	1		12/20/13 15:54	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.11 mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 15:21		
Surrogates									
n-Triacontane (S)	87 %		50-150		1	12/20/13 08:41	12/22/13 15:21	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 15:39	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 15:39	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 15:39	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 15:39	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 15:39	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 15:39	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 15:39	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 15:39	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 15:39	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 15:39	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 15:39	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 15:39	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 15:39	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 15:39	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 15:39	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 15:39	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 15:39	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 15:39	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 15:39	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 15:39	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 15:39	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 15:39	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:39	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 15:39	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:39	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 15:39	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:39	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 15:39	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 15:39	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 15:39	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 15:39	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 15:39	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 15:39	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-6		Lab ID: 10252733011		Collected: 12/17/13 09:05		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC		Analytical Method: EPA 8260							
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 15:39	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 15:39	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 15:39	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 15:39	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 15:39	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 15:39	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 15:39	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 15:39	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 15:39	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 15:39	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 15:39	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:39	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 15:39	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 15:39	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 15:39	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 15:39	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:39	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 15:39	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 15:39	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 15:39	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 15:39	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 15:39	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:39	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 15:39	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 15:39	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %		75-125		1		12/23/13 15:39	17060-07-0	
Toluene-d8 (S)	98 %		75-125		1		12/23/13 15:39	2037-26-5	
4-Bromofluorobenzene (S)	98 %		75-125		1		12/23/13 15:39	460-00-4	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	0.97 mg/L		0.10	0.050	1		12/26/13 10:18		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	5.6 mg/L		2.5	1.2	1		12/19/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-16A		Lab ID: 10252733012		Collected: 12/17/13 10:25		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	7.4 ug/L		6.6	3.3	1		12/20/13 16:05	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.27 mg/L		0.10	0.10	1	12/20/13 08:41	12/22/13 15:28		
Surrogates									
n-Triacontane (S)	91 %		50-150		1	12/20/13 08:41	12/22/13 15:28	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 15:55	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 15:55	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 15:55	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 15:55	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 15:55	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 15:55	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 15:55	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 15:55	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 15:55	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 15:55	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 15:55	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 15:55	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 15:55	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 15:55	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 15:55	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 15:55	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 15:55	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 15:55	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 15:55	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 15:55	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 15:55	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 15:55	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:55	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 15:55	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:55	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 15:55	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 15:55	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 15:55	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 15:55	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 15:55	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 15:55	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 15:55	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 15:55	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-16A		Lab ID: 10252733012		Collected: 12/17/13 10:25		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 15:55	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 15:55	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 15:55	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 15:55	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 15:55	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 15:55	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 15:55	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 15:55	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 15:55	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 15:55	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 15:55	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:55	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 15:55	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 15:55	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 15:55	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 15:55	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 15:55	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 15:55	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 15:55	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 15:55	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 15:55	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 15:55	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 15:55	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 15:55	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 15:55	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97 %.		75-125		1		12/23/13 15:55	17060-07-0	
Toluene-d8 (S)	97 %.		75-125		1		12/23/13 15:55	2037-26-5	
4-Bromofluorobenzene (S)	96 %.		75-125		1		12/23/13 15:55	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:18		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	9.4 mg/L		2.5	1.2	1		12/19/13 12:49	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-16B		Lab ID: 10252733013		Collected: 12/17/13 12:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	24.1	ug/L	6.6	3.3	1		12/23/13 11:01	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.32	mg/L	0.10	0.10	1	12/20/13 08:41	12/22/13 15:35		
Surrogates									
n-Triacontane (S)	84	%	50-150		1	12/20/13 08:41	12/22/13 15:35	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	10.0	1		12/23/13 16:11	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.23	1		12/23/13 16:11	107-05-1	
Benzene	ND	ug/L	1.0	0.24	1		12/23/13 16:11	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.23	1		12/23/13 16:11	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.50	1		12/23/13 16:11	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.25	1		12/23/13 16:11	75-27-4	
Bromoform	ND	ug/L	4.0	2.0	1		12/23/13 16:11	75-25-2	
Bromomethane	ND	ug/L	4.0	2.0	1		12/23/13 16:11	74-83-9	CL
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/23/13 16:11	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.31	1		12/23/13 16:11	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.24	1		12/23/13 16:11	108-90-7	
Chloroethane	ND	ug/L	4.0	0.50	1		12/23/13 16:11	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/23/13 16:11	67-66-3	
Chloromethane	ND	ug/L	4.0	2.0	1		12/23/13 16:11	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.23	1		12/23/13 16:11	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	2.0	1		12/23/13 16:11	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.27	1		12/23/13 16:11	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/23/13 16:11	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.14	1		12/23/13 16:11	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.092	1		12/23/13 16:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:11	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.40	1		12/23/13 16:11	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.50	1		12/23/13 16:11	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.22	1		12/23/13 16:11	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 16:11	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.23	1		12/23/13 16:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 16:11	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.20	1		12/23/13 16:11	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.20	1		12/23/13 16:11	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.50	1		12/23/13 16:11	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.50	1		12/23/13 16:11	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.25	1		12/23/13 16:11	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.50	1		12/23/13 16:11	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: MW-16B		Lab ID: 10252733013		Collected: 12/17/13 12:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 16:11	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 16:11	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 16:11	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 16:11	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 16:11	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 16:11	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 16:11	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 16:11	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 16:11	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 16:11	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:11	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 16:11	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:11	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 16:11	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 16:11	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 16:11	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 16:11	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:11	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:11	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:11	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 16:11	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 16:11	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 16:11	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 16:11	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 16:11	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:11	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:11	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 16:11	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 16:11	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %.		75-125		1		12/23/13 16:11	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 16:11	2037-26-5	
4-Bromofluorobenzene (S)	97 %.		75-125		1		12/23/13 16:11	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	0.42 mg/L		0.10	0.050	1		12/26/13 10:22		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	7.9 mg/L		2.5	1.2	1		12/19/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-4A		Lab ID: 10252733014		Collected: 12/17/13 13:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	3.3	1		12/23/13 11:12	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.12	mg/L	0.10	0.10	1	12/20/13 08:41	12/22/13 15:07		
Surrogates									
n-Triacontane (S)	83	%	50-150		1	12/20/13 08:41	12/22/13 15:07	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	10.0	1		12/23/13 16:26	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.23	1		12/23/13 16:26	107-05-1	
Benzene	ND	ug/L	1.0	0.24	1		12/23/13 16:26	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.23	1		12/23/13 16:26	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.50	1		12/23/13 16:26	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.25	1		12/23/13 16:26	75-27-4	
Bromoform	ND	ug/L	4.0	2.0	1		12/23/13 16:26	75-25-2	
Bromomethane	ND	ug/L	4.0	2.0	1		12/23/13 16:26	74-83-9	CL
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/23/13 16:26	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.31	1		12/23/13 16:26	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.24	1		12/23/13 16:26	108-90-7	
Chloroethane	ND	ug/L	4.0	0.50	1		12/23/13 16:26	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/23/13 16:26	67-66-3	
Chloromethane	ND	ug/L	4.0	2.0	1		12/23/13 16:26	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.23	1		12/23/13 16:26	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	2.0	1		12/23/13 16:26	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.27	1		12/23/13 16:26	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/23/13 16:26	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.14	1		12/23/13 16:26	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.092	1		12/23/13 16:26	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.50	1		12/23/13 16:26	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.40	1		12/23/13 16:26	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.50	1		12/23/13 16:26	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.22	1		12/23/13 16:26	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 16:26	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.23	1		12/23/13 16:26	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.24	1		12/23/13 16:26	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.20	1		12/23/13 16:26	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.20	1		12/23/13 16:26	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.50	1		12/23/13 16:26	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.50	1		12/23/13 16:26	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.25	1		12/23/13 16:26	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.50	1		12/23/13 16:26	10061-01-5	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-4A		Lab ID: 10252733014		Collected: 12/17/13 13:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 16:26	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 16:26	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 16:26	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 16:26	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 16:26	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 16:26	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 16:26	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 16:26	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 16:26	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 16:26	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:26	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 16:26	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:26	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 16:26	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 16:26	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 16:26	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 16:26	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:26	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:26	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:26	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 16:26	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 16:26	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 16:26	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 16:26	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 16:26	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:26	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:26	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 16:26	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 16:26	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %.		75-125		1		12/23/13 16:26	17060-07-0	
Toluene-d8 (S)	98 %.		75-125		1		12/23/13 16:26	2037-26-5	
4-Bromofluorobenzene (S)	99 %.		75-125		1		12/23/13 16:26	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:22		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	6.9 mg/L		2.5	1.2	1		12/19/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-3A		Lab ID: 10252733015	Collected: 12/17/13 14:20	Received: 12/18/13 11:51	Matrix: Water				
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	618 ug/L		6.6	3.3	1		12/23/13 11:22	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.50 mg/L		0.11	0.11	1	12/20/13 08:41	12/22/13 15:14		
Surrogates									
n-Triacontane (S)	87 %		50-150		1	12/20/13 08:41	12/22/13 15:14	638-68-6	
8260 VOC		Analytical Method: EPA 8260							
Acetone	ND ug/L		20.0	10.0	1		12/23/13 16:42	67-64-1	
Allyl chloride	ND ug/L		4.0	0.23	1		12/23/13 16:42	107-05-1	
Benzene	ND ug/L		1.0	0.24	1		12/23/13 16:42	71-43-2	
Bromobenzene	ND ug/L		1.0	0.23	1		12/23/13 16:42	108-86-1	
Bromochloromethane	ND ug/L		1.0	0.50	1		12/23/13 16:42	74-97-5	
Bromodichloromethane	ND ug/L		1.0	0.25	1		12/23/13 16:42	75-27-4	
Bromoform	ND ug/L		4.0	2.0	1		12/23/13 16:42	75-25-2	
Bromomethane	ND ug/L		4.0	2.0	1		12/23/13 16:42	74-83-9	CL
2-Butanone (MEK)	ND ug/L		5.0	2.5	1		12/23/13 16:42	78-93-3	
n-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	104-51-8	
sec-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	135-98-8	
tert-Butylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	98-06-6	
Carbon tetrachloride	ND ug/L		1.0	0.31	1		12/23/13 16:42	56-23-5	
Chlorobenzene	ND ug/L		1.0	0.24	1		12/23/13 16:42	108-90-7	
Chloroethane	ND ug/L		4.0	0.50	1		12/23/13 16:42	75-00-3	
Chloroform	ND ug/L		1.0	0.27	1		12/23/13 16:42	67-66-3	
Chloromethane	ND ug/L		4.0	2.0	1		12/23/13 16:42	74-87-3	
2-Chlorotoluene	ND ug/L		1.0	0.50	1		12/23/13 16:42	95-49-8	
4-Chlorotoluene	ND ug/L		1.0	0.23	1		12/23/13 16:42	106-43-4	
1,2-Dibromo-3-chloropropane	ND ug/L		4.0	2.0	1		12/23/13 16:42	96-12-8	
Dibromochloromethane	ND ug/L		1.0	0.27	1		12/23/13 16:42	124-48-1	
1,2-Dibromoethane (EDB)	ND ug/L		1.0	0.23	1		12/23/13 16:42	106-93-4	
Dibromomethane	ND ug/L		4.0	0.14	1		12/23/13 16:42	74-95-3	
1,2-Dichlorobenzene	ND ug/L		1.0	0.092	1		12/23/13 16:42	95-50-1	
1,3-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	541-73-1	
1,4-Dichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	106-46-7	
Dichlorodifluoromethane	ND ug/L		1.0	0.40	1		12/23/13 16:42	75-71-8	
1,1-Dichloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:42	75-34-3	
1,2-Dichloroethane	ND ug/L		1.0	0.22	1		12/23/13 16:42	107-06-2	
1,1-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 16:42	75-35-4	
cis-1,2-Dichloroethene	ND ug/L		1.0	0.23	1		12/23/13 16:42	156-59-2	
trans-1,2-Dichloroethene	ND ug/L		1.0	0.24	1		12/23/13 16:42	156-60-5	
Dichlorofluoromethane	ND ug/L		1.0	0.20	1		12/23/13 16:42	75-43-4	
1,2-Dichloropropane	ND ug/L		4.0	0.20	1		12/23/13 16:42	78-87-5	
1,3-Dichloropropane	ND ug/L		1.0	0.50	1		12/23/13 16:42	142-28-9	
2,2-Dichloropropane	ND ug/L		4.0	0.50	1		12/23/13 16:42	594-20-7	
1,1-Dichloropropene	ND ug/L		1.0	0.25	1		12/23/13 16:42	563-58-6	
cis-1,3-Dichloropropene	ND ug/L		4.0	0.50	1		12/23/13 16:42	10061-01-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-3A		Lab ID: 10252733015		Collected: 12/17/13 14:20		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC Analytical Method: EPA 8260									
trans-1,3-Dichloropropene	ND ug/L		4.0	2.0	1		12/23/13 16:42	10061-02-6	
Diethyl ether (Ethyl ether)	ND ug/L		4.0	2.0	1		12/23/13 16:42	60-29-7	
Ethylbenzene	ND ug/L		1.0	0.24	1		12/23/13 16:42	100-41-4	
Hexachloro-1,3-butadiene	ND ug/L		1.0	0.50	1		12/23/13 16:42	87-68-3	
Isopropylbenzene (Cumene)	ND ug/L		1.0	0.50	1		12/23/13 16:42	98-82-8	
p-Isopropyltoluene	ND ug/L		1.0	0.50	1		12/23/13 16:42	99-87-6	
Methylene Chloride	ND ug/L		4.0	2.0	1		12/23/13 16:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND ug/L		5.0	2.5	1		12/23/13 16:42	108-10-1	
Methyl-tert-butyl ether	ND ug/L		1.0	0.50	1		12/23/13 16:42	1634-04-4	
Naphthalene	ND ug/L		4.0	2.0	1		12/23/13 16:42	91-20-3	
n-Propylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	103-65-1	
Styrene	ND ug/L		1.0	0.24	1		12/23/13 16:42	100-42-5	
1,1,1,2-Tetrachloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:42	630-20-6	
1,1,2,2-Tetrachloroethane	ND ug/L		1.0	0.13	1		12/23/13 16:42	79-34-5	
Tetrachloroethene	ND ug/L		1.0	0.29	1		12/23/13 16:42	127-18-4	
Tetrahydrofuran	ND ug/L		10.0	2.9	1		12/23/13 16:42	109-99-9	
Toluene	ND ug/L		1.0	0.23	1		12/23/13 16:42	108-88-3	
1,2,3-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	87-61-6	
1,2,4-Trichlorobenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	120-82-1	
1,1,1-Trichloroethane	ND ug/L		1.0	0.50	1		12/23/13 16:42	71-55-6	
1,1,2-Trichloroethane	ND ug/L		1.0	0.16	1		12/23/13 16:42	79-00-5	
Trichloroethene	ND ug/L		1.0	0.12	1		12/23/13 16:42	79-01-6	
Trichlorofluoromethane	ND ug/L		1.0	0.13	1		12/23/13 16:42	75-69-4	
1,2,3-Trichloropropane	ND ug/L		4.0	0.54	1		12/23/13 16:42	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND ug/L		1.0	0.33	1		12/23/13 16:42	76-13-1	
1,2,4-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	95-63-6	
1,3,5-Trimethylbenzene	ND ug/L		1.0	0.50	1		12/23/13 16:42	108-67-8	
Vinyl chloride	ND ug/L		0.40	0.14	1		12/23/13 16:42	75-01-4	
Xylene (Total)	ND ug/L		3.0	0.72	1		12/23/13 16:42	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98 %		75-125		1		12/23/13 16:42	17060-07-0	
Toluene-d8 (S)	97 %		75-125		1		12/23/13 16:42	2037-26-5	
4-Bromofluorobenzene (S)	98 %		75-125		1		12/23/13 16:42	460-00-4	
SM4500NO3-H, NO2 + NO3 pres. Analytical Method: SM 4500-NO3 H									
Nitrogen, NO2 plus NO3	ND mg/L		0.10	0.050	1		12/26/13 10:23		
ASTM D516 Sulfate Water Analytical Method: ASTM D516									
Sulfate	7.2 mg/L		2.5	1.2	1		12/19/13 12:51	14808-79-8	

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ANALYTICAL RESULTS

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Sample: USGS-2A		Lab ID: 10252733016		Collected: 12/17/13 15:00		Received: 12/18/13 11:51		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace		Analytical Method: RSK 175							
Methane	338	ug/L	6.6	3.3	1		12/23/13 12:58	74-82-8	
WIDRO Extended GCS		Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics							
WDRO, Extended C10-C32	0.27	mg/L	0.10	0.10	1	12/20/13 08:41	12/22/13 15:42		
Surrogates									
n-Triacontane (S)	82	%	50-150		1	12/20/13 08:41	12/22/13 15:42	638-68-6	
SM4500NO3-H, NO2 + NO3 pres.		Analytical Method: SM 4500-NO3 H							
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.050	1		12/26/13 10:27		
ASTM D516 Sulfate Water		Analytical Method: ASTM D516							
Sulfate	4.7	mg/L	2.5	1.2	1		12/19/13 12:51	14808-79-8	

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch:	AIR/18991	Analysis Method:	RSK 175
QC Batch Method:	RSK 175	Analysis Description:	RSK 175 AIR HEADSPACE
Associated Lab Samples:	10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733010, 10252733011, 10252733012		

METHOD BLANK: 1599462 Matrix: Water
Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733010, 10252733011, 10252733012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	12/20/13 11:13	

LABORATORY CONTROL SAMPLE & LCSD: 1599463

LABORATORY CONTROL SAMPLE & LCSD: 1599463			1599464							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	55.9	55.5	92	92	85-115	.6	20	

SAMPLE DUPLICATE: 1599465

Parameter	Units	10252733001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	ND	ND		20	

SAMPLE DUPLICATE: 1599466

Parameter	Units	7510820001 Result	Dup Result	RPD	Max RPD	Qualifiers
Methane	ug/L	<0.0066 mg/L	ND		20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch: AIR/19006 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 10252733013, 10252733014, 10252733015, 10252733016

METHOD BLANK: 1600700 Matrix: Water
Associated Lab Samples: 10252733013, 10252733014, 10252733015, 10252733016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	12/23/13 09:06	

LABORATORY CONTROL SAMPLE & LCSD: 1600701			1600702							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	56.9	56.1	94	92	85-115	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1600703		1600704										
Parameter	Units	10252882007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methane	ug/L	ND	60.7	60.7	40.7	57.9	60	89	30-150	35	20	R1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1600705		1600706										
Parameter	Units	10252888004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methane	ug/L	ND	60.7	60.7	91.9	95.4	144	150	30-150	4	20	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch:	MSV/25983	Analysis Method:	EPA 8260
QC Batch Method:	EPA 8260	Analysis Description:	8260 MSV 465 W
Associated Lab Samples:	10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015		

METHOD BLANK: 1599132 Matrix: Water

Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1,1-Trichloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1,2-Trichloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1-Dichloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,1-Dichloroethene	ug/L	ND	1.0	12/23/13 09:45	
1,1-Dichloropropene	ug/L	ND	1.0	12/23/13 09:45	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
1,2,3-Trichloropropane	ug/L	ND	4.0	12/23/13 09:45	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	12/23/13 09:45	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	12/23/13 09:45	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	12/23/13 09:45	
1,2-Dichlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
1,2-Dichloroethane	ug/L	ND	1.0	12/23/13 09:45	
1,2-Dichloropropane	ug/L	ND	4.0	12/23/13 09:45	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	12/23/13 09:45	
1,3-Dichlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
1,3-Dichloropropane	ug/L	ND	1.0	12/23/13 09:45	
1,4-Dichlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
2,2-Dichloropropane	ug/L	ND	4.0	12/23/13 09:45	
2-Butanone (MEK)	ug/L	ND	5.0	12/23/13 09:45	
2-Chlorotoluene	ug/L	ND	1.0	12/23/13 09:45	
4-Chlorotoluene	ug/L	ND	1.0	12/23/13 09:45	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	12/23/13 09:45	
Acetone	ug/L	ND	20.0	12/23/13 09:45	
Allyl chloride	ug/L	ND	4.0	12/23/13 09:45	
Benzene	ug/L	ND	1.0	12/23/13 09:45	
Bromobenzene	ug/L	ND	1.0	12/23/13 09:45	
Bromochloromethane	ug/L	ND	1.0	12/23/13 09:45	
Bromodichloromethane	ug/L	ND	1.0	12/23/13 09:45	
Bromoform	ug/L	ND	4.0	12/23/13 09:45	
Bromomethane	ug/L	ND	4.0	12/23/13 09:45	CL
Carbon tetrachloride	ug/L	ND	1.0	12/23/13 09:45	
Chlorobenzene	ug/L	ND	1.0	12/23/13 09:45	
Chloroethane	ug/L	ND	4.0	12/23/13 09:45	
Chloroform	ug/L	ND	1.0	12/23/13 09:45	
Chloromethane	ug/L	ND	4.0	12/23/13 09:45	

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

METHOD BLANK: 1599132

Matrix: Water

Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	ND	1.0	12/23/13 09:45	
cis-1,3-Dichloropropene	ug/L	ND	4.0	12/23/13 09:45	
Dibromochloromethane	ug/L	ND	1.0	12/23/13 09:45	
Dibromomethane	ug/L	ND	4.0	12/23/13 09:45	
Dichlorodifluoromethane	ug/L	ND	1.0	12/23/13 09:45	
Dichlorofluoromethane	ug/L	ND	1.0	12/23/13 09:45	
Diethyl ether (Ethyl ether)	ug/L	ND	4.0	12/23/13 09:45	
Ethylbenzene	ug/L	ND	1.0	12/23/13 09:45	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	12/23/13 09:45	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	12/23/13 09:45	
Methyl-tert-butyl ether	ug/L	ND	1.0	12/23/13 09:45	
Methylene Chloride	ug/L	ND	4.0	12/23/13 09:45	
n-Butylbenzene	ug/L	ND	1.0	12/23/13 09:45	
n-Propylbenzene	ug/L	ND	1.0	12/23/13 09:45	
Naphthalene	ug/L	ND	4.0	12/23/13 09:45	
p-Isopropyltoluene	ug/L	ND	1.0	12/23/13 09:45	
sec-Butylbenzene	ug/L	ND	1.0	12/23/13 09:45	
Styrene	ug/L	ND	1.0	12/23/13 09:45	
tert-Butylbenzene	ug/L	ND	1.0	12/23/13 09:45	
Tetrachloroethene	ug/L	ND	1.0	12/23/13 09:45	
Tetrahydrofuran	ug/L	ND	10.0	12/23/13 09:45	
Toluene	ug/L	ND	1.0	12/23/13 09:45	
trans-1,2-Dichloroethene	ug/L	ND	1.0	12/23/13 09:45	
trans-1,3-Dichloropropene	ug/L	ND	4.0	12/23/13 09:45	
Trichloroethene	ug/L	ND	1.0	12/23/13 09:45	
Trichlorofluoromethane	ug/L	ND	1.0	12/23/13 09:45	
Vinyl chloride	ug/L	ND	0.40	12/23/13 09:45	
Xylene (Total)	ug/L	ND	3.0	12/23/13 09:45	
1,2-Dichloroethane-d4 (S)	%	92	75-125	12/23/13 09:45	
4-Bromofluorobenzene (S)	%	97	75-125	12/23/13 09:45	
Toluene-d8 (S)	%	98	75-125	12/23/13 09:45	

LABORATORY CONTROL SAMPLE: 1599133

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	20.8	104	75-125	
1,1,1-Trichloroethane	ug/L	20	18.5	92	75-126	
1,1,2,2-Tetrachloroethane	ug/L	20	18.6	93	75-125	
1,1,2-Trichloroethane	ug/L	20	19.9	100	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	14.9	75	51-139	
1,1-Dichloroethane	ug/L	20	17.4	87	75-125	
1,1-Dichloroethene	ug/L	20	16.3	81	71-126	
1,1-Dichloropropene	ug/L	20	16.9	85	74-125	
1,2,3-Trichlorobenzene	ug/L	20	18.9	94	75-125	

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

LABORATORY CONTROL SAMPLE: 1599133

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichloropropane	ug/L	20	19.3	97	75-125	
1,2,4-Trichlorobenzene	ug/L	20	19.4	97	75-125	
1,2,4-Trimethylbenzene	ug/L	20	18.7	93	75-125	
1,2-Dibromo-3-chloropropane	ug/L	50	55.8	112	73-125	
1,2-Dibromoethane (EDB)	ug/L	20	19.5	97	75-125	
1,2-Dichlorobenzene	ug/L	20	18.3	91	75-125	
1,2-Dichloroethane	ug/L	20	17.3	87	74-125	
1,2-Dichloropropane	ug/L	20	18.2	91	75-125	
1,3,5-Trimethylbenzene	ug/L	20	18.2	91	75-125	
1,3-Dichlorobenzene	ug/L	20	18.5	93	75-125	
1,3-Dichloropropane	ug/L	20	18.6	93	75-125	
1,4-Dichlorobenzene	ug/L	20	18.7	93	75-125	
2,2-Dichloropropane	ug/L	20	20.9	104	67-132	
2-Butanone (MEK)	ug/L	100	91.2	91	68-126	
2-Chlorotoluene	ug/L	20	17.6	88	74-125	
4-Chlorotoluene	ug/L	20	18.0	90	74-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	95.7	96	72-125	
Acetone	ug/L	100	106	106	69-132	
Allyl chloride	ug/L	20	16.0	80	74-125	
Benzene	ug/L	20	17.4	87	75-125	
Bromobenzene	ug/L	20	18.2	91	75-125	
Bromochloromethane	ug/L	20	19.3	97	75-125	
Bromodichloromethane	ug/L	20	19.2	96	75-125	
Bromoform	ug/L	20	20.5	102	75-126	
Bromomethane	ug/L	20	12.0	60	30-150	CL
Carbon tetrachloride	ug/L	20	20.4	102	74-127	
Chlorobenzene	ug/L	20	18.4	92	75-125	
Chloroethane	ug/L	20	21.4	107	68-132	
Chloroform	ug/L	20	17.2	86	75-125	
Chloromethane	ug/L	20	15.4	77	61-129	
cis-1,2-Dichloroethene	ug/L	20	18.2	91	75-125	
cis-1,3-Dichloropropene	ug/L	20	19.6	98	75-125	
Dibromochloromethane	ug/L	20	21.2	106	75-125	
Dibromomethane	ug/L	20	20.7	103	75-125	
Dichlorodifluoromethane	ug/L	20	16.3	82	49-137	
Dichlorofluoromethane	ug/L	20	18.8	94	66-133	
Diethyl ether (Ethyl ether)	ug/L	20	16.7	83	75-125	
Ethylbenzene	ug/L	20	17.8	89	75-125	
Hexachloro-1,3-butadiene	ug/L	20	18.8	94	69-127	
Isopropylbenzene (Cumene)	ug/L	20	19.3	97	75-125	
Methyl-tert-butyl ether	ug/L	20	18.6	93	74-126	
Methylene Chloride	ug/L	20	17.8	89	75-125	
n-Butylbenzene	ug/L	20	18.5	92	72-126	
n-Propylbenzene	ug/L	20	18.0	90	73-125	
Naphthalene	ug/L	20	17.6	88	75-125	
p-Isopropyltoluene	ug/L	20	18.9	95	74-125	
sec-Butylbenzene	ug/L	20	18.3	91	73-125	
Styrene	ug/L	20	19.5	97	75-125	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

LABORATORY CONTROL SAMPLE: 1599133

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/L	20	18.3	92	73-125	
Tetrachloroethene	ug/L	20	18.5	92	75-125	
Tetrahydrofuran	ug/L	200	219	110	71-125	
Toluene	ug/L	20	17.5	88	75-125	
trans-1,2-Dichloroethene	ug/L	20	17.6	88	74-125	
trans-1,3-Dichloropropene	ug/L	20	21.9	109	75-125	
Trichloroethene	ug/L	20	18.7	94	75-125	
Trichlorofluoromethane	ug/L	20	17.4	87	69-129	
Vinyl chloride	ug/L	20	18.0	90	70-128	
Xylene (Total)	ug/L	60	55.7	93	75-125	
1,2-Dichloroethane-d4 (S)	%			92	75-125	
4-Bromofluorobenzene (S)	%			96	75-125	
Toluene-d8 (S)	%			99	75-125	

MATRIX SPIKE SAMPLE: 1601681

Parameter	Units	10252733004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20.8	104	75-125	
1,1,1-Trichloroethane	ug/L	ND	20	20.4	102	75-136	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	18.7	93	66-131	
1,1,2-Trichloroethane	ug/L	ND	20	19.7	98	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	21.6	108	75-150	
1,1-Dichloroethane	ug/L	ND	20	18.6	93	75-131	
1,1-Dichloroethene	ug/L	ND	20	19.3	96	75-138	
1,1-Dichloropropene	ug/L	ND	20	18.7	93	75-136	
1,2,3-Trichlorobenzene	ug/L	ND	20	18.0	90	75-125	
1,2,3-Trichloropropane	ug/L	ND	20	18.9	95	71-126	
1,2,4-Trichlorobenzene	ug/L	ND	20	18.4	92	75-125	
1,2,4-Trimethylbenzene	ug/L	ND	20	18.7	94	70-126	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	52.9	106	69-127	
1,2-Dibromoethane (EDB)	ug/L	ND	20	18.8	94	75-125	
1,2-Dichlorobenzene	ug/L	ND	20	18.3	91	75-125	
1,2-Dichloroethane	ug/L	ND	20	17.8	89	74-128	
1,2-Dichloropropane	ug/L	ND	20	18.6	93	75-125	
1,3,5-Trimethylbenzene	ug/L	ND	20	18.5	92	72-126	
1,3-Dichlorobenzene	ug/L	ND	20	18.5	92	75-125	
1,3-Dichloropropane	ug/L	ND	20	18.1	90	75-125	
1,4-Dichlorobenzene	ug/L	ND	20	18.6	93	75-125	
2,2-Dichloropropane	ug/L	ND	20	19.2	96	71-143	
2-Butanone (MEK)	ug/L	ND	100	89.3	89	64-125	
2-Chlorotoluene	ug/L	ND	20	18.0	90	74-125	
4-Chlorotoluene	ug/L	ND	20	18.1	90	75-125	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	91.3	91	69-125	
Acetone	ug/L	ND	100	96.0	91	57-135	
Allyl chloride	ug/L	ND	20	16.5	82	73-134	
Benzene	ug/L	ND	20	18.8	94	70-135	
Bromobenzene	ug/L	ND	20	18.4	92	75-125	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

MATRIX SPIKE SAMPLE: 1601681		10252733004	Spike	MS	MS	% Rec	Qualifiers
Parameter	Units	Result	Conc.	Result	% Rec	Limits	
Bromochloromethane	ug/L	ND	20	20.6	103	75-125	
Bromodichloromethane	ug/L	ND	20	19.2	96	75-125	
Bromoform	ug/L	ND	20	19.3	97	68-133	
Bromomethane	ug/L	ND	20	17.2	86	56-150	CL
Carbon tetrachloride	ug/L	ND	20	21.4	107	75-137	
Chlorobenzene	ug/L	ND	20	18.5	92	75-125	
Chloroethane	ug/L	ND	20	22.4	112	64-150	
Chloroform	ug/L	ND	20	19.2	96	75-127	
Chloromethane	ug/L	ND	20	18.3	92	65-140	
cis-1,2-Dichloroethene	ug/L	ND	20	19.8	99	75-129	
cis-1,3-Dichloropropene	ug/L	ND	20	18.4	92	75-125	
Dibromochloromethane	ug/L	ND	20	20.4	102	75-125	
Dibromomethane	ug/L	ND	20	19.9	99	75-125	
Dichlorodifluoromethane	ug/L	ND	20	24.7	124	70-150	
Dichlorofluoromethane	ug/L	ND	20	21.6	108	69-142	
Diethyl ether (Ethyl ether)	ug/L	ND	20	17.0	85	75-125	
Ethylbenzene	ug/L	ND	20	18.3	92	75-125	
Hexachloro-1,3-butadiene	ug/L	ND	20	19.0	95	75-135	
Isopropylbenzene (Cumene)	ug/L	ND	20	19.6	98	75-125	
Methyl-tert-butyl ether	ug/L	ND	20	17.1	85	70-132	
Methylene Chloride	ug/L	ND	20	18.5	93	73-125	
n-Butylbenzene	ug/L	ND	20	18.4	92	75-130	
n-Propylbenzene	ug/L	ND	20	18.4	92	75-128	
Naphthalene	ug/L	ND	20	16.8	84	73-126	
p-Isopropyltoluene	ug/L	ND	20	19.3	97	75-125	
sec-Butylbenzene	ug/L	ND	20	18.9	94	75-126	
Styrene	ug/L	ND	20	19.7	98	52-137	
tert-Butylbenzene	ug/L	ND	20	19.1	96	75-125	
Tetrachloroethene	ug/L	ND	20	19.0	95	75-130	
Tetrahydrofuran	ug/L	ND	200	215	108	69-125	
Toluene	ug/L	ND	20	18.0	90	75-125	
trans-1,2-Dichloroethene	ug/L	ND	20	18.0	90	75-135	
trans-1,3-Dichloropropene	ug/L	ND	20	20.1	100	75-125	
Trichloroethene	ug/L	ND	20	19.7	98	75-129	
Trichlorofluoromethane	ug/L	ND	20	23.7	118	75-150	
Vinyl chloride	ug/L	ND	20	21.7	109	75-147	
Xylene (Total)	ug/L	ND	60	56.7	95	75-125	
1,2-Dichloroethane-d4 (S)	%				97	75-125	
4-Bromofluorobenzene (S)	%				97	75-125	
Toluene-d8 (S)	%				99	75-125	

SAMPLE DUPLICATE: 1600423

Parameter	Units	10252733005	Dup	RPD	Max	Qualifiers
		Result	Result		RPD	
1,1,1,2-Tetrachloroethane	ug/L	ND	ND		30	
1,1,1-Trichloroethane	ug/L	ND	ND		30	
1,1,2,2-Tetrachloroethane	ug/L	ND	ND		30	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

SAMPLE DUPLICATE: 1600423

Parameter	Units	10252733005 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,2-Trichloroethane	ug/L	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	ND		30	
1,1-Dichloroethane	ug/L	ND	ND		30	
1,1-Dichloroethene	ug/L	ND	ND		30	
1,1-Dichloropropene	ug/L	ND	ND		30	
1,2,3-Trichlorobenzene	ug/L	ND	ND		30	
1,2,3-Trichloropropane	ug/L	ND	ND		30	
1,2,4-Trichlorobenzene	ug/L	ND	ND		30	
1,2,4-Trimethylbenzene	ug/L	ND	ND		30	
1,2-Dibromo-3-chloropropane	ug/L	ND	ND		30	
1,2-Dibromoethane (EDB)	ug/L	ND	ND		30	
1,2-Dichlorobenzene	ug/L	ND	ND		30	
1,2-Dichloroethane	ug/L	ND	ND		30	
1,2-Dichloropropane	ug/L	ND	ND		30	
1,3,5-Trimethylbenzene	ug/L	ND	ND		30	
1,3-Dichlorobenzene	ug/L	ND	ND		30	
1,3-Dichloropropane	ug/L	ND	ND		30	
1,4-Dichlorobenzene	ug/L	ND	ND		30	
2,2-Dichloropropane	ug/L	ND	ND		30	
2-Butanone (MEK)	ug/L	ND	ND		30	
2-Chlorotoluene	ug/L	ND	ND		30	
4-Chlorotoluene	ug/L	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	ND		30	
Acetone	ug/L	ND	ND		30	
Allyl chloride	ug/L	ND	ND		30	
Benzene	ug/L	ND	ND		30	
Bromobenzene	ug/L	ND	ND		30	
Bromochloromethane	ug/L	ND	ND		30	
Bromodichloromethane	ug/L	ND	ND		30	
Bromoform	ug/L	ND	ND		30	
Bromomethane	ug/L	ND	ND		30	CL
Carbon tetrachloride	ug/L	ND	ND		30	
Chlorobenzene	ug/L	ND	ND		30	
Chloroethane	ug/L	ND	ND		30	
Chloroform	ug/L	ND	ND		30	
Chloromethane	ug/L	ND	2.2J		30	
cis-1,2-Dichloroethene	ug/L	ND	ND		30	
cis-1,3-Dichloropropene	ug/L	ND	ND		30	
Dibromochloromethane	ug/L	ND	ND		30	
Dibromomethane	ug/L	ND	ND		30	
Dichlorodifluoromethane	ug/L	ND	ND		30	
Dichlorofluoromethane	ug/L	ND	ND		30	
Diethyl ether (Ethyl ether)	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	ND		30	
Hexachloro-1,3-butadiene	ug/L	ND	ND		30	
Isopropylbenzene (Cumene)	ug/L	ND	ND		30	
Methyl-tert-butyl ether	ug/L	ND	ND		30	
Methylene Chloride	ug/L	ND	ND		30	

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

SAMPLE DUPLICATE: 1600423

Parameter	Units	10252733005 Result	Dup Result	RPD	Max RPD	Qualifiers
n-Butylbenzene	ug/L	ND	ND		30	
n-Propylbenzene	ug/L	ND	ND		30	
Naphthalene	ug/L	ND	ND		30	
p-Isopropyltoluene	ug/L	ND	ND		30	
sec-Butylbenzene	ug/L	ND	ND		30	
Styrene	ug/L	ND	ND		30	
tert-Butylbenzene	ug/L	ND	ND		30	
Tetrachloroethene	ug/L	ND	ND		30	
Tetrahydrofuran	ug/L	ND	ND		30	
Toluene	ug/L	ND	ND		30	
trans-1,2-Dichloroethene	ug/L	ND	ND		30	
trans-1,3-Dichloropropene	ug/L	ND	ND		30	
Trichloroethene	ug/L	ND	ND		30	
Trichlorofluoromethane	ug/L	ND	ND		30	
Vinyl chloride	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	97	97	.5		
4-Bromofluorobenzene (S)	%.	99	97	1		
Toluene-d8 (S)	%.	98	97	.5		

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch:	OEXT/23981	Analysis Method:	Diesel Range Organics
QC Batch Method:	Diesel Range Organics	Analysis Description:	WIDRO Extended GCS
Associated Lab Samples:	10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016		

METHOD BLANK: 1598925

Matrix: Water

Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO, Extended C10-C32	mg/L	ND	0.10	12/22/13 14:53	
n-Triacontane (S)	%.	84	50-150	12/22/13 14:53	

LABORATORY CONTROL SAMPLE & LCSD: 1598926

1598927

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO, Extended C10-C32	mg/L	2	1.6	1.7	81	87	75-115	7	20	
n-Triacontane (S)	%.				92	97	50-150			

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch:	WETA/16985	Analysis Method:	SM 4500-NO3 H
QC Batch Method:	SM 4500-NO3 H	Analysis Description:	SM4500NO3-H, NO2 + NO3 pres.
Associated Lab Samples:	10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016		

METHOD BLANK: 1601639

Matrix: Water

Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	12/26/13 09:59	

LABORATORY CONTROL SAMPLE: 1601640

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1601641 1601642

Parameter	Units	10252733001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	2.5	2.5	1.2	1.2	48	48	80-120	1	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1601643 1601644

Parameter	Units	10252865003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	0.13	2.5	2.5	0.13	0.11	.2	-.6	80-120	17	30	M1

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

QC Batch:	WETA/16927	Analysis Method:	ASTM D516
QC Batch Method:	ASTM D516	Analysis Description:	ASTM D516 Sulfate Water
Associated Lab Samples:	10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016		

METHOD BLANK: 1597922

Matrix: Water

Associated Lab Samples: 10252733001, 10252733002, 10252733003, 10252733004, 10252733005, 10252733006, 10252733007, 10252733008, 10252733009, 10252733010, 10252733011, 10252733012, 10252733013, 10252733014, 10252733015, 10252733016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	2.5	12/19/13 12:41	

LABORATORY CONTROL SAMPLE: 1597923

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	7.5	7.1	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1597924 1597925

Parameter	Units	10252733001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	10.7	20	20	30.0	29.2	97	93	80-120	3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1597926 1597927

Parameter	Units	10252733011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	5.6	20	20	26.4	26.7	104	105	80-120	1	30	

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60254681 Enbridge-South Cass L
Pace Project No.: 10252733

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WORKORDER QUALIFIERS

WO: 10252733

[1] No sample was received to run methane on MW-17. Two VOA vials were received broken for sample USGS-2A. The remaining vial was used in an unsuccessful VOC run, so the lab was not able to analyze for VOCs on this sample.

ANALYTE QUALIFIERS

CL The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10252733001	MW-8	RSK 175	AIR/18991		
10252733002	MW-9	RSK 175	AIR/18991		
10252733003	MW-15	RSK 175	AIR/18991		
10252733004	MW-4	RSK 175	AIR/18991		
10252733005	MW-1	RSK 175	AIR/18991		
10252733006	MW-7	RSK 175	AIR/18991		
10252733007	MW-18	RSK 175	AIR/18991		
10252733008	MW-19	RSK 175	AIR/18991		
10252733010	USGS-1A	RSK 175	AIR/18991		
10252733011	MW-6	RSK 175	AIR/18991		
10252733012	MW-16A	RSK 175	AIR/18991		
10252733013	MW-16B	RSK 175	AIR/19006		
10252733014	USGS-4A	RSK 175	AIR/19006		
10252733015	USGS-3A	RSK 175	AIR/19006		
10252733016	USGS-2A	RSK 175	AIR/19006		
10252733001	MW-8	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733002	MW-9	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733003	MW-15	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733004	MW-4	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733005	MW-1	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733006	MW-7	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733007	MW-18	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733008	MW-19	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733009	MW-17	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733010	USGS-1A	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733011	MW-6	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733012	MW-16A	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733013	MW-16B	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733014	USGS-4A	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733015	USGS-3A	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733016	USGS-2A	Diesel Range Organics	OEXT/23981	Diesel Range Organics	GCSV/12619
10252733001	MW-8	EPA 8260	MSV/25983		
10252733002	MW-9	EPA 8260	MSV/25983		
10252733003	MW-15	EPA 8260	MSV/25983		
10252733004	MW-4	EPA 8260	MSV/25983		
10252733005	MW-1	EPA 8260	MSV/25983		
10252733006	MW-7	EPA 8260	MSV/25983		
10252733007	MW-18	EPA 8260	MSV/25983		
10252733008	MW-19	EPA 8260	MSV/25983		
10252733009	MW-17	EPA 8260	MSV/25983		
10252733010	USGS-1A	EPA 8260	MSV/25983		
10252733011	MW-6	EPA 8260	MSV/25983		
10252733012	MW-16A	EPA 8260	MSV/25983		
10252733013	MW-16B	EPA 8260	MSV/25983		
10252733014	USGS-4A	EPA 8260	MSV/25983		
10252733015	USGS-3A	EPA 8260	MSV/25983		
10252733001	MW-8	SM 4500-NO3 H	WETA/16985		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 Enbridge-South Cass L

Pace Project No.: 10252733

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10252733002	MW-9	SM 4500-NO3 H	WETA/16985		
10252733003	MW-15	SM 4500-NO3 H	WETA/16985		
10252733004	MW-4	SM 4500-NO3 H	WETA/16985		
10252733005	MW-1	SM 4500-NO3 H	WETA/16985		
10252733006	MW-7	SM 4500-NO3 H	WETA/16985		
10252733007	MW-18	SM 4500-NO3 H	WETA/16985		
10252733008	MW-19	SM 4500-NO3 H	WETA/16985		
10252733009	MW-17	SM 4500-NO3 H	WETA/16985		
10252733010	USGS-1A	SM 4500-NO3 H	WETA/16985		
10252733011	MW-6	SM 4500-NO3 H	WETA/16985		
10252733012	MW-16A	SM 4500-NO3 H	WETA/16985		
10252733013	MW-16B	SM 4500-NO3 H	WETA/16985		
10252733014	USGS-4A	SM 4500-NO3 H	WETA/16985		
10252733015	USGS-3A	SM 4500-NO3 H	WETA/16985		
10252733016	USGS-2A	SM 4500-NO3 H	WETA/16985		
10252733001	MW-8	ASTM D516	WETA/16927		
10252733002	MW-9	ASTM D516	WETA/16927		
10252733003	MW-15	ASTM D516	WETA/16927		
10252733004	MW-4	ASTM D516	WETA/16927		
10252733005	MW-1	ASTM D516	WETA/16927		
10252733006	MW-7	ASTM D516	WETA/16927		
10252733007	MW-18	ASTM D516	WETA/16927		
10252733008	MW-19	ASTM D516	WETA/16927		
10252733009	MW-17	ASTM D516	WETA/16927		
10252733010	USGS-1A	ASTM D516	WETA/16927		
10252733011	MW-6	ASTM D516	WETA/16927		
10252733012	MW-16A	ASTM D516	WETA/16927		
10252733013	MW-16B	ASTM D516	WETA/16927		
10252733014	USGS-4A	ASTM D516	WETA/16927		
10252733015	USGS-3A	ASTM D516	WETA/16927		
10252733016	USGS-2A	ASTM D516	WETA/16927		

REPORT OF LABORATORY ANALYSIS

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Section A
Required Client Information:

Company: **AELCM**
Address: **11 E Superior St
Duluth, MN 55802**
Email To: **Klete.Fallon@elcm.com**
Phone: **218-625-8706**
Requested Due Date/TAT: **12/16/25**

Section B
Required Project Information:

Report To: **Klete Fallonfield**
Copy To:
Purchase Order No.:
Project Name: **Enbridge - South Cass Lake**
Project Number: **60254681**

Section C
Invoice Information:

Attention: **Klete Fallonfield**
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: **Carol Davy**
Pace Profile #:

Section D
Required Client Information:

Matrix Codes
Matrix / CODE
DW Drinking Water
WT Waste Water
WW Wastewater
P Product
SL Soil/Solid
OL Oil
WP Wipe
AR Air
TS Tissue
OT Other

Sample ID
(A-Z, 0-9 / -)
Sample IDs MUST BE UNIQUE

Section E
Regulatory Agency

NPDES ☒ GROUND WATER ☐ DRINKING WATER
UST ☐ RCRA ☐ OTHER ☐
Site Location STATE: **MN**

Section F
Page Information

Page: **1** of **2**
1693682

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED				SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	DATE		TIME		DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test ↑	Y/N ↑	ERD 20	VOL	Methanol	Sulfate	N:fract/N:total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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ADDITIONAL COMMENTS

RELINQUISHED BY / AFFILIATION

DATE

TIME

ACCEPTED BY / AFFILIATION

DATE

12-18-13

TIME

11:51

SAMPLE CONDITIONS

Temp in °C

6.0

Received on

Custody Sealed Cooler (Y/N)

Samples Intact (Y/N)

	Document Name: Sample Condition Upon Receipt Form	Document Revised: 07Nov2013 Page 1 of 1
	Document No.: F-MN-I-213-rev.08	Issuing Authority: Pace Minnesota Quality Office

**Sample Condition
Upon Receipt**

Client Name:

Project #:

WO# : 10252733



Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client
☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 535741962530, "2562", "2529"
 "2551", "2340"

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☒ Yes ☐ No

Thermom. Used: ☐ 80512447 ☐ B88A912167504 ☐ B88A9132521491 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun
☐ 72337080

Cooler Temp Read (°C): 0.30, 4.0, 6.1, 0.0, 3.0 **Cooler Temp Corrected (°C):** 0.0, 0.1, 0.3, 0.7, 0.0 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A
 Temp should be above freezing to 6°C **Correction Factor:** -3 **Date and Initials of Person Examining Contents:** JP 12-18-13

Comments:

Chain of Custody Present?	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody Relinquished?	☐ Yes ☒ No ☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes ☐ No ☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes ☐ No ☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☒ Yes ☐ No ☐ N/A	6. VSG
Rush Turn Around Time Requested?	☐ Yes ☒ No ☐ N/A	7.
Sufficient Volume?	☐ Yes ☒ No ☐ N/A	8. empty VSG received for MW-17
Correct Containers Used?	☒ Yes ☐ No ☐ N/A	9. 2 of 3 VSGs for USGS-2A
-Pace Containers Used?	☒ Yes ☐ No ☐ N/A	received broken
Containers Intact?	☒ Yes ☐ No ☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes ☐ No ☒ N/A	11.
Sample Labels Match COC?	☐ Yes ☒ No ☐ N/A	12. see exceptions sheet
-Includes Date/Time/ID/Analysis Matrix: WT		
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13.	☒ Yes ☐ No ☐ N/A	13. ☐ HNO ₃ ☒ H ₂ SO ₄ ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>12)	☒ Yes ☐ No ☐ N/A	Sample # 1-17
Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water) DOC	☒ Yes ☐ No	Initial when completed: JP Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☒ Yes ☐ No ☐ N/A	14. 1 of 3 MW7, 3 of 3 MW18, 2 of 3 MW16B
Trip Blank Present?	☐ Yes ☒ No ☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes ☒ No ☐ N/A	
Pace Trip Blank Lot # (if purchased):		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: **Date/Time:**

Comments/Resolution:

Project Manager Review:

Date: 12-19-13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000033.D

Report Date: 12/23/2013

Sample ID: 10252733001

Client ID:

Instrument: 10gcs9.i

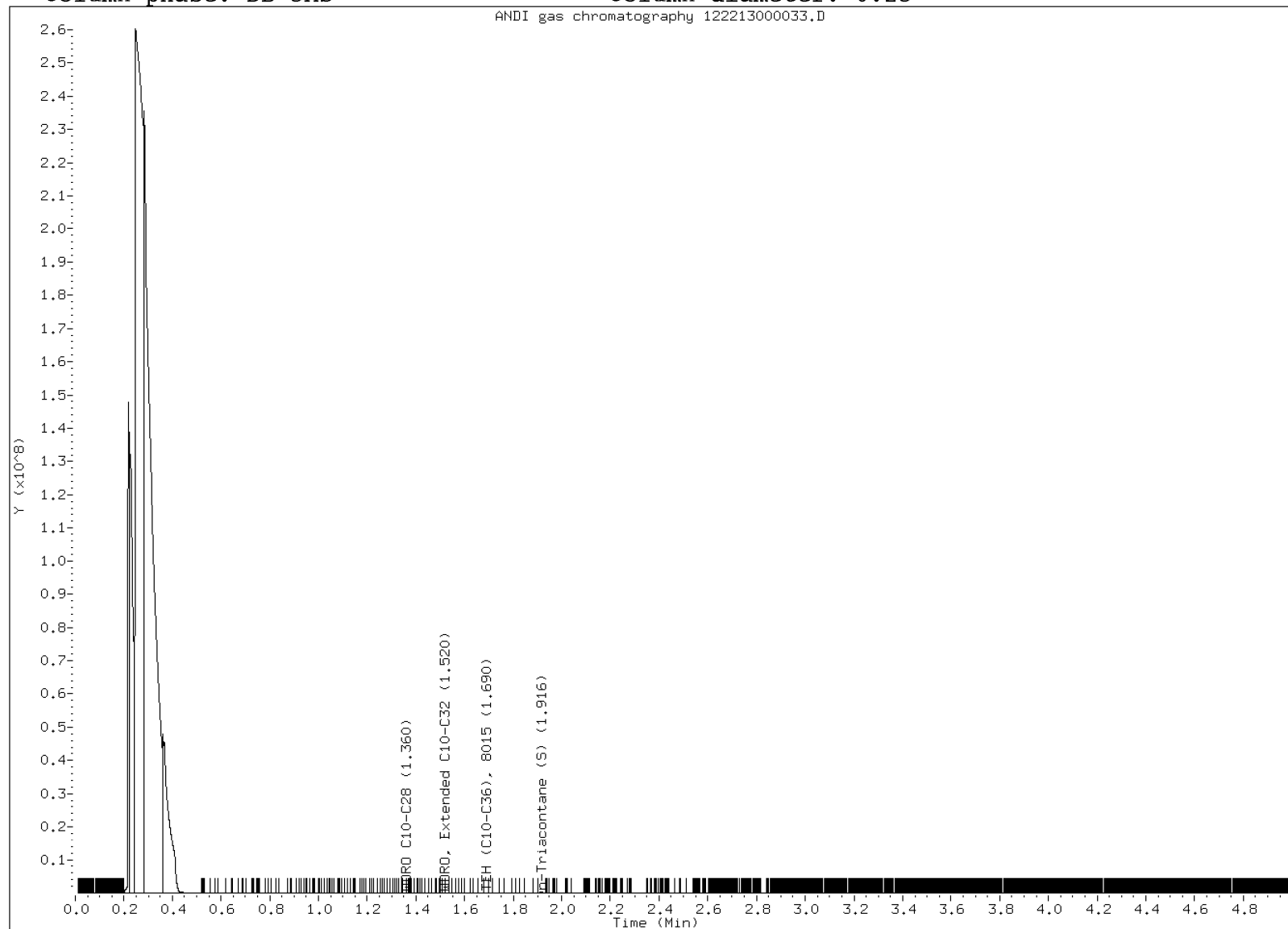
Sample Information: 10252733001

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000034.D

Report Date: 12/23/2013

Sample ID: 10252733002

Client ID:

Instrument: 10gcs9.i

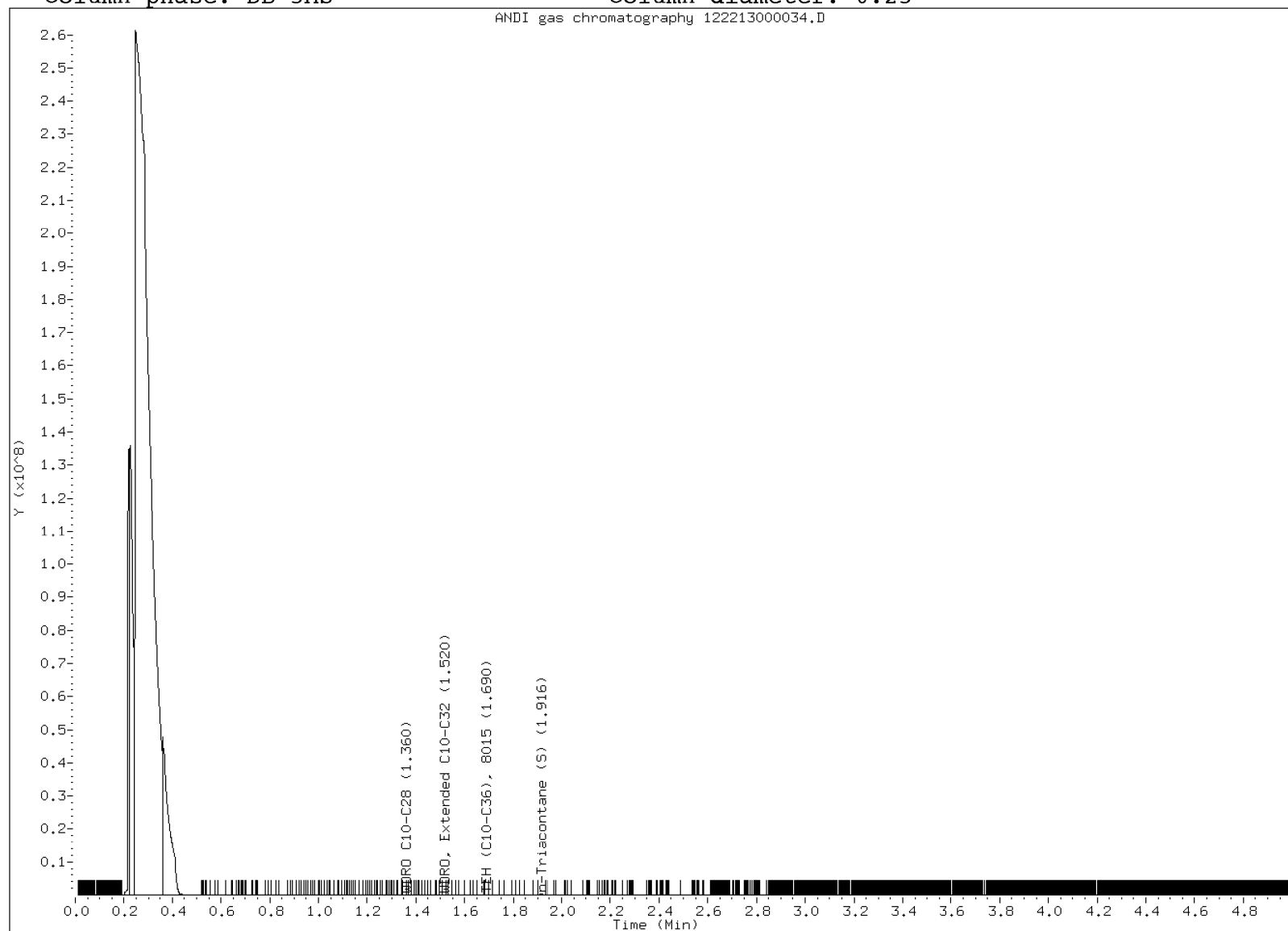
Sample Information: 10252733002

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000035.D

Report Date: 12/23/2013

Sample ID: 10252733003

Client ID:

Instrument: 10gcs9.i

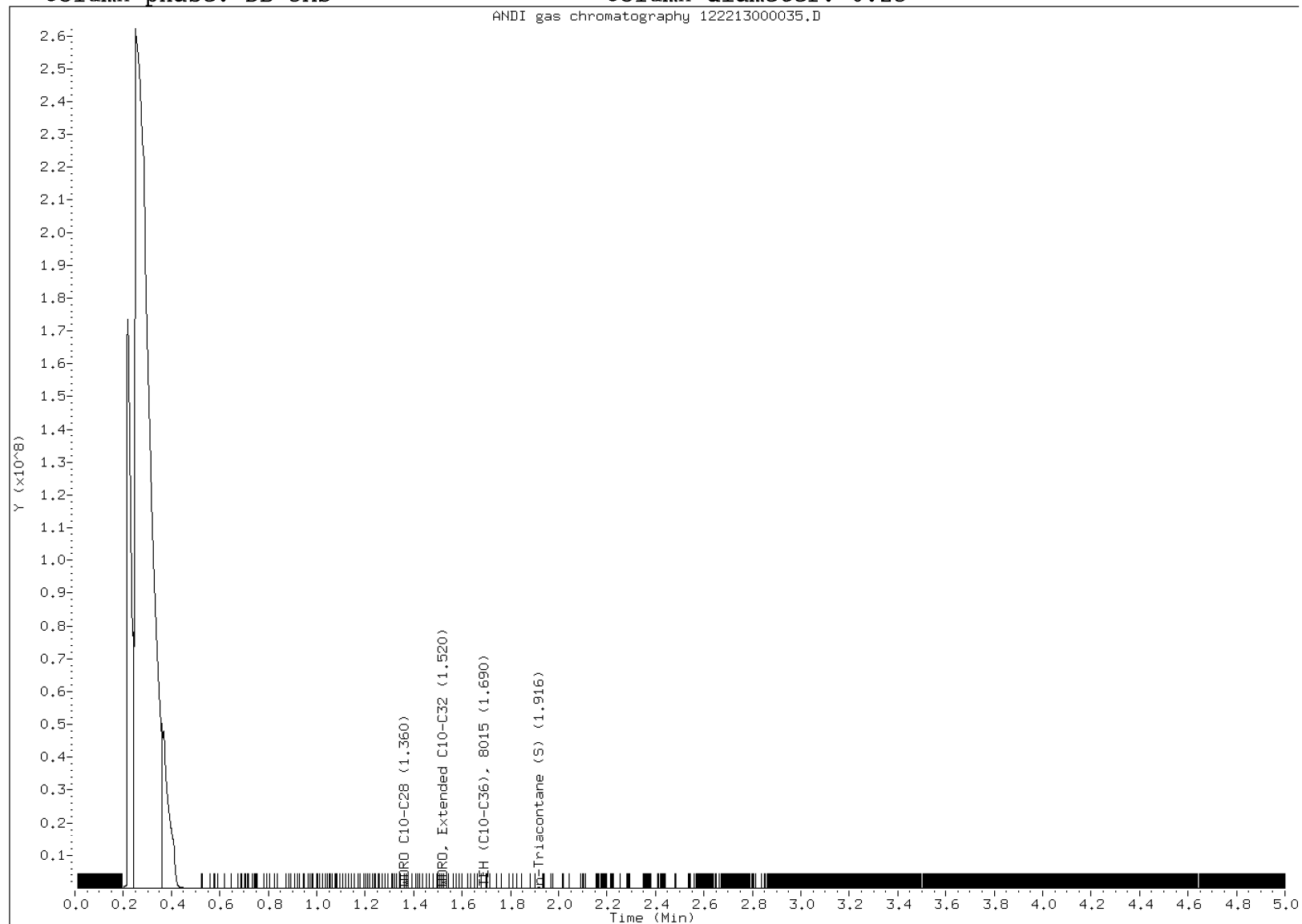
Sample Information: 10252733003

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000036.D

Report Date: 12/23/2013

Sample ID: 10252733004

Client ID:

Instrument: 10gcs9.i

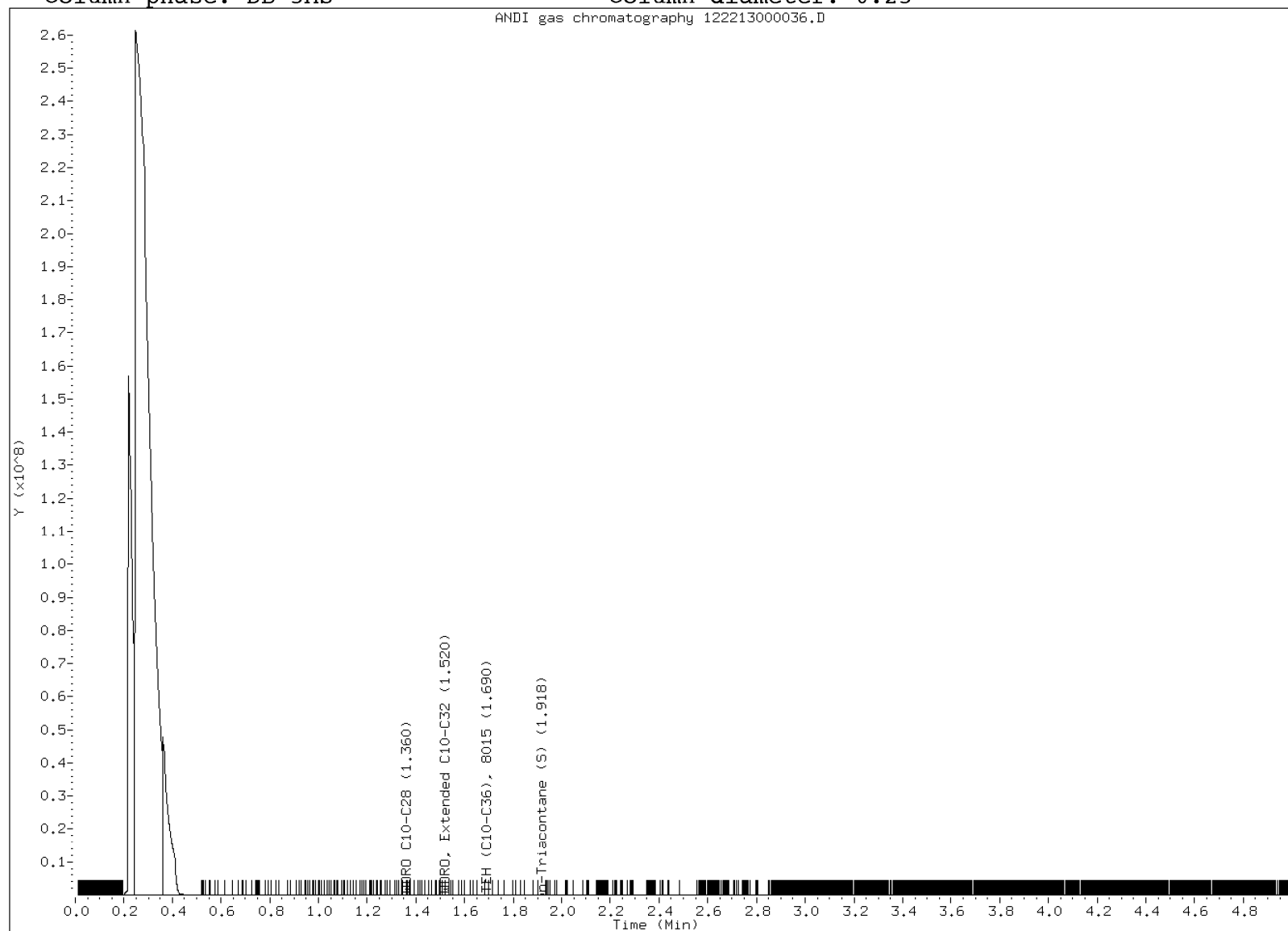
Sample Information: 10252733004

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000037.D

Report Date: 12/23/2013

Sample ID: 10252733005

Client ID:

Instrument: 10gcs9.i

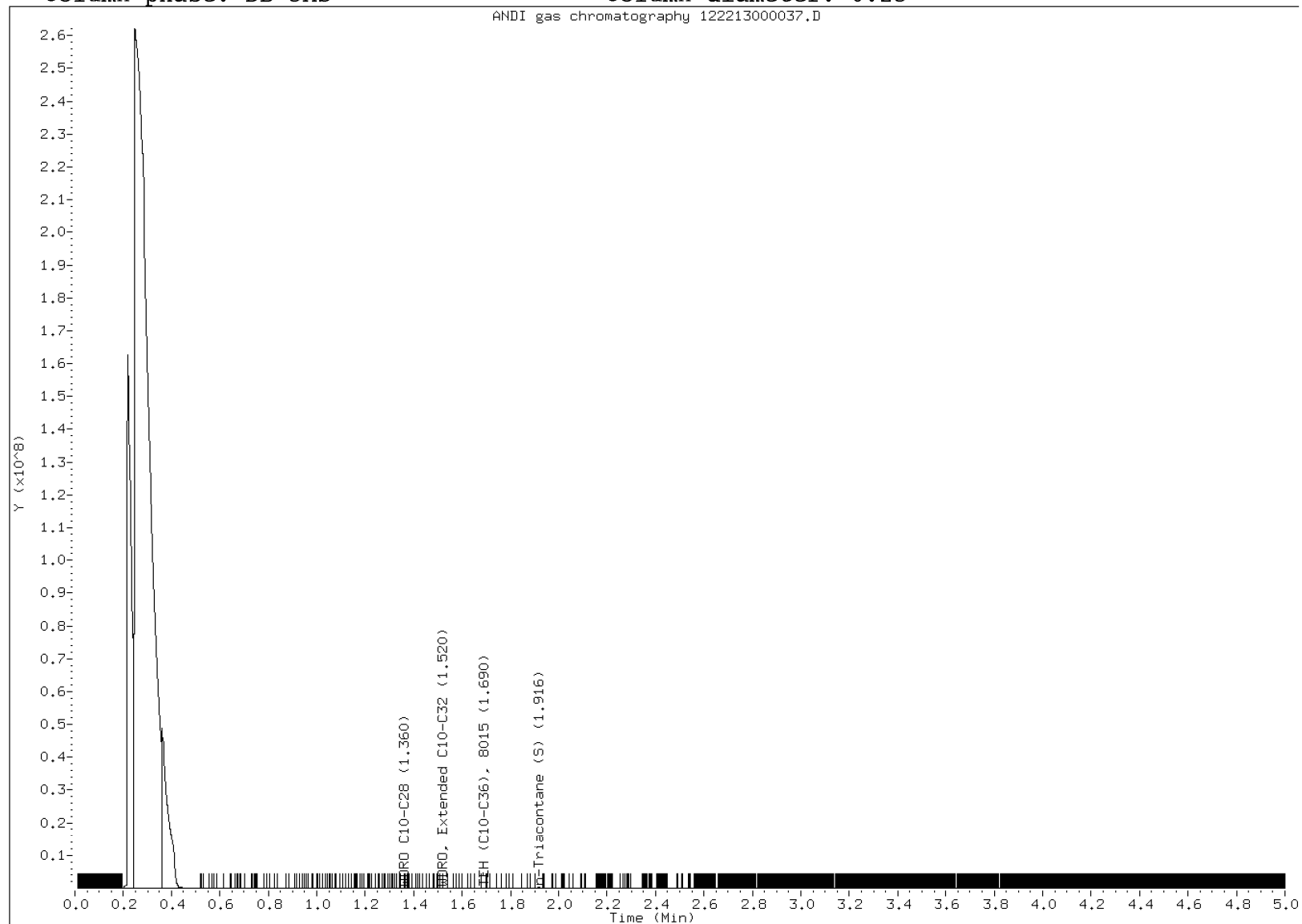
Sample Information: 10252733005

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000038.D

Report Date: 12/23/2013

Sample ID: 10252733006

Client ID:

Instrument: 10gcs9.i

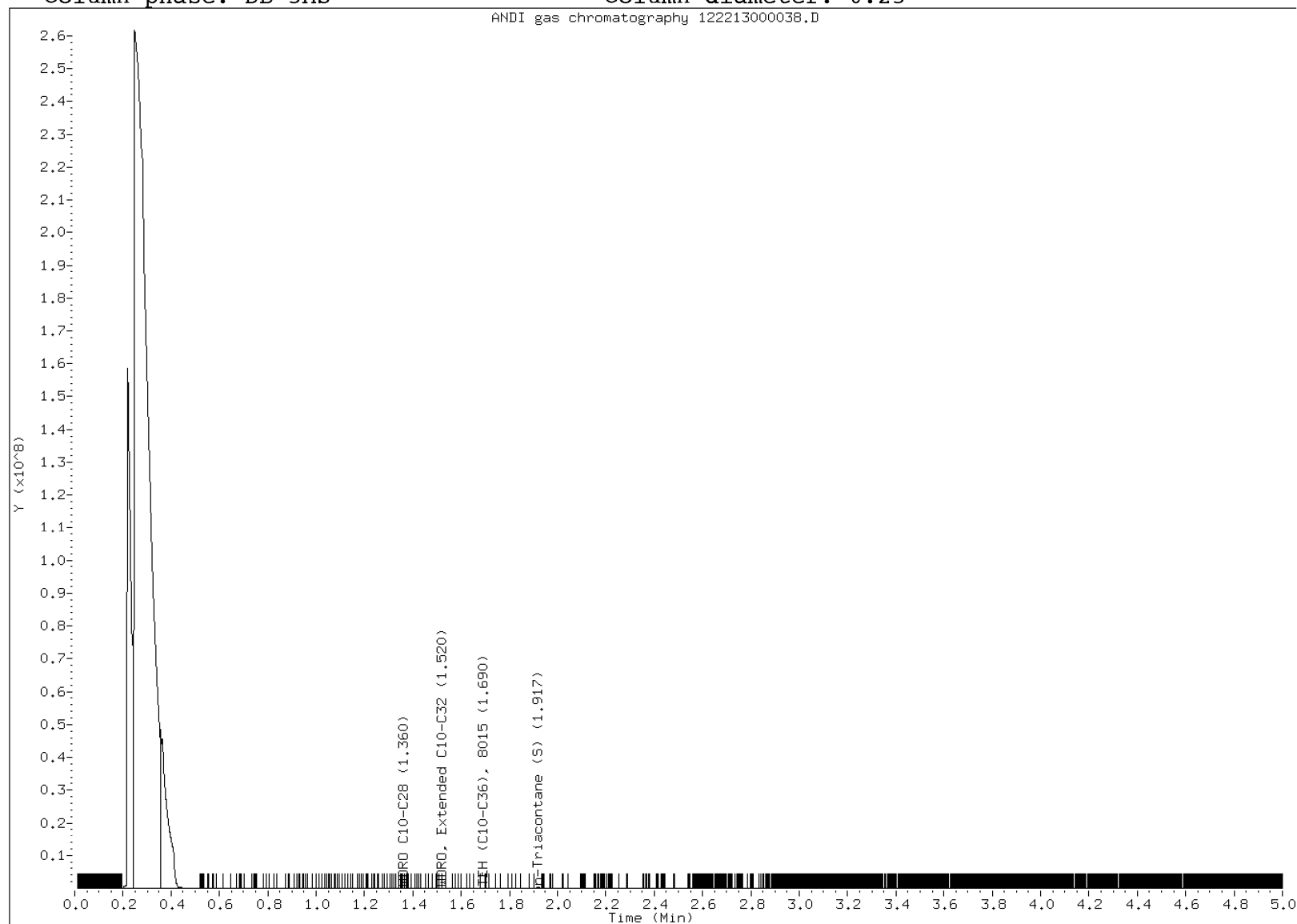
Sample Information: 10252733006

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000029.D

Report Date: 12/23/2013

Sample ID: 10252733007

Client ID:

Instrument: 10gcs9.i

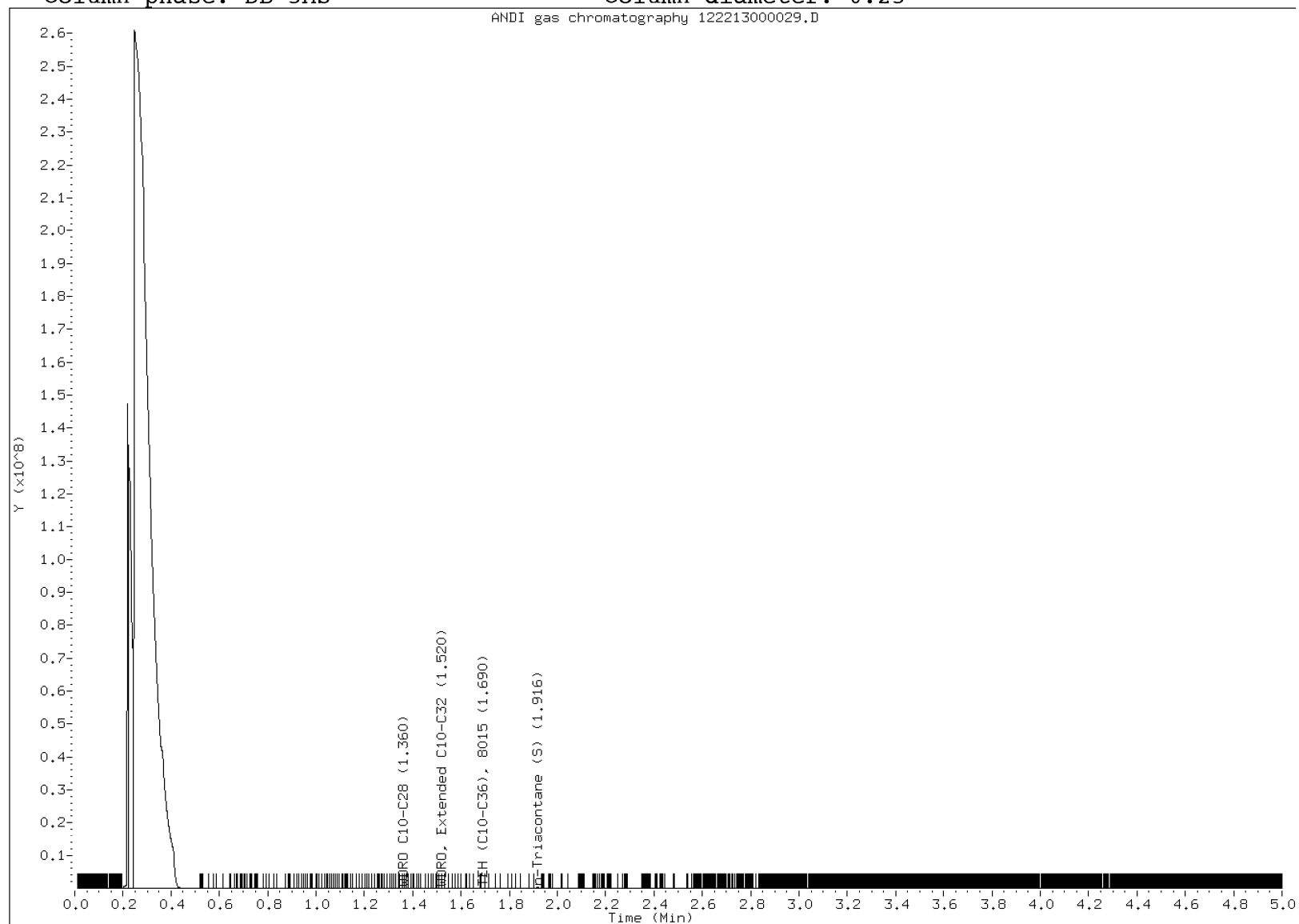
Sample Information: 10252733007

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000030.D

Report Date: 12/23/2013

Sample ID: 10252733008

Client ID:

Instrument: 10gcs9.i

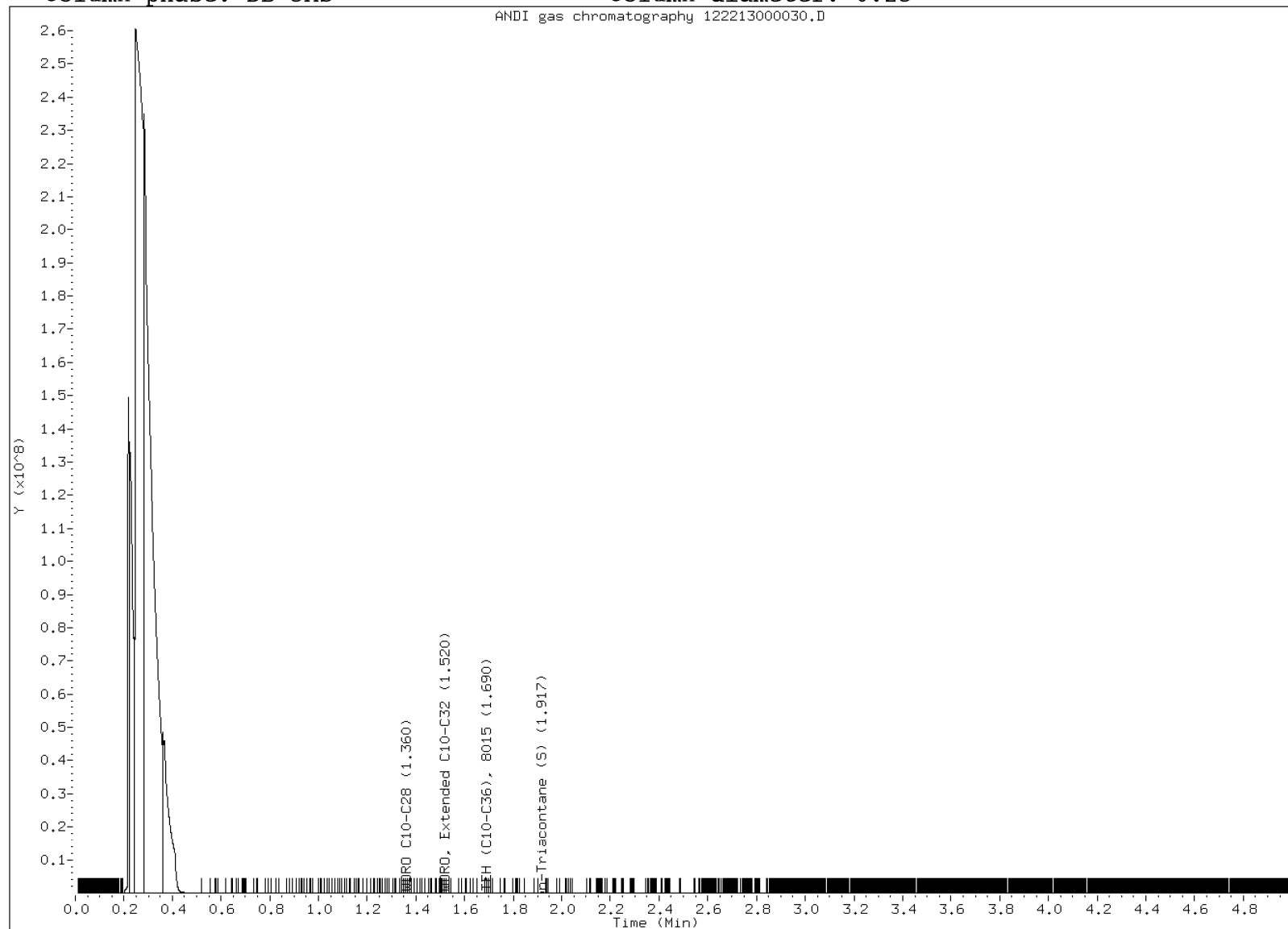
Sample Information: 10252733008

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000031.D

Report Date: 12/23/2013

Sample ID: 10252733009

Client ID:

Instrument: 10gcs9.i

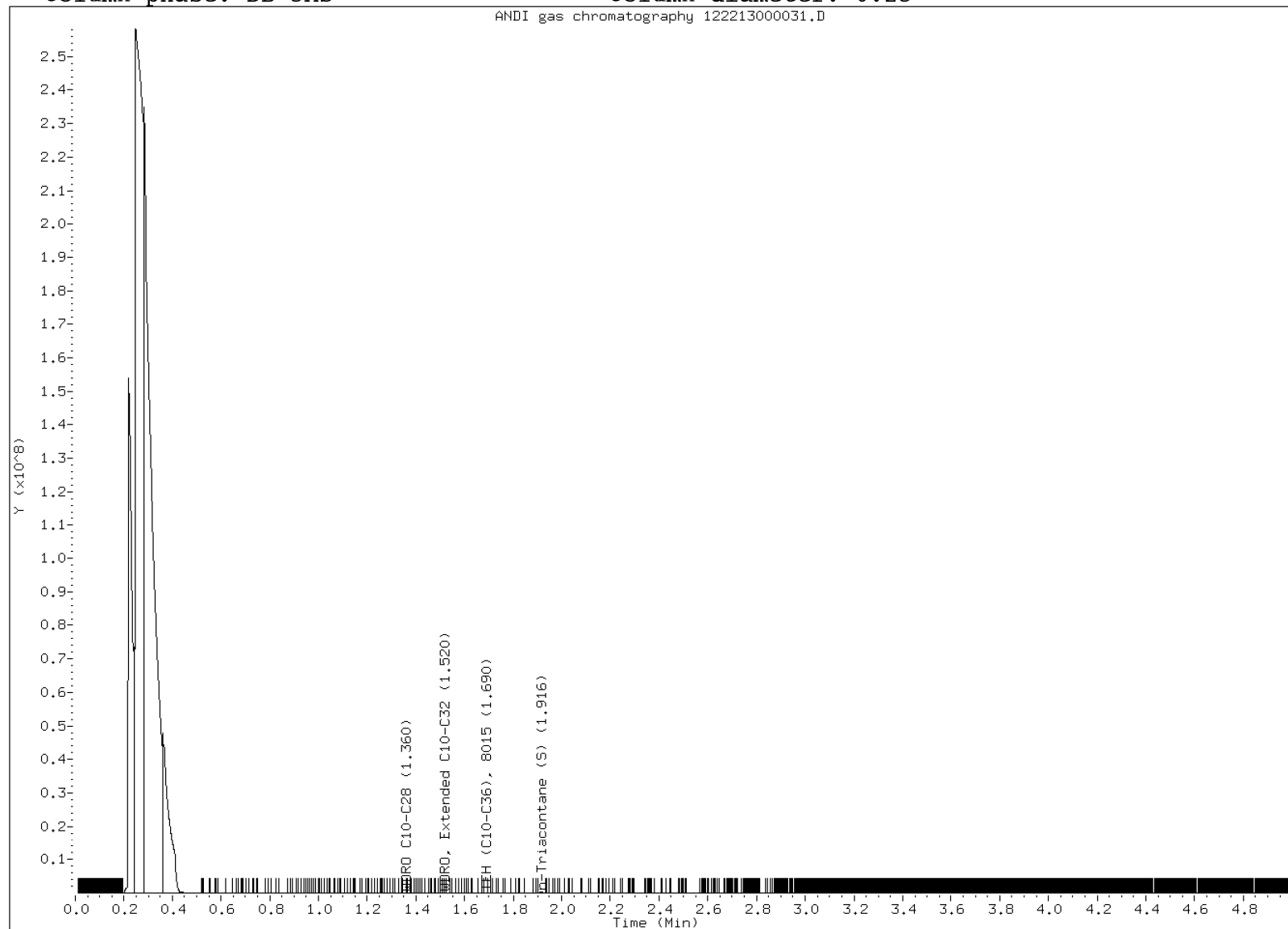
Sample Information: 10252733009

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000032.D

Report Date: 12/23/2013

Sample ID: 10252733010

Client ID:

Instrument: 10gcs9.i

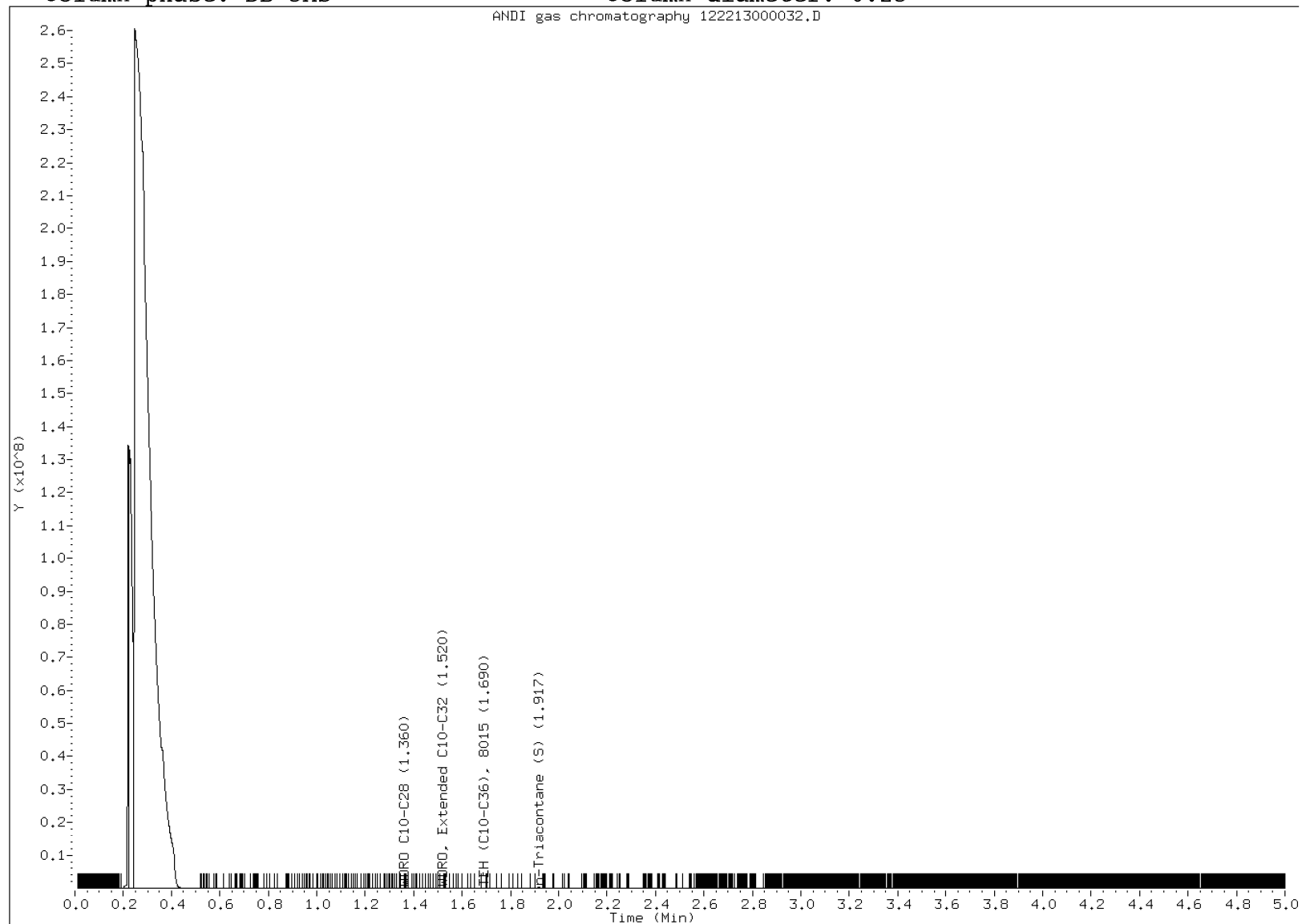
Sample Information: 10252733010

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000025.D

Report Date: 12/23/2013

Sample ID: 10252733011

Client ID:

Instrument: 10gcs9.i

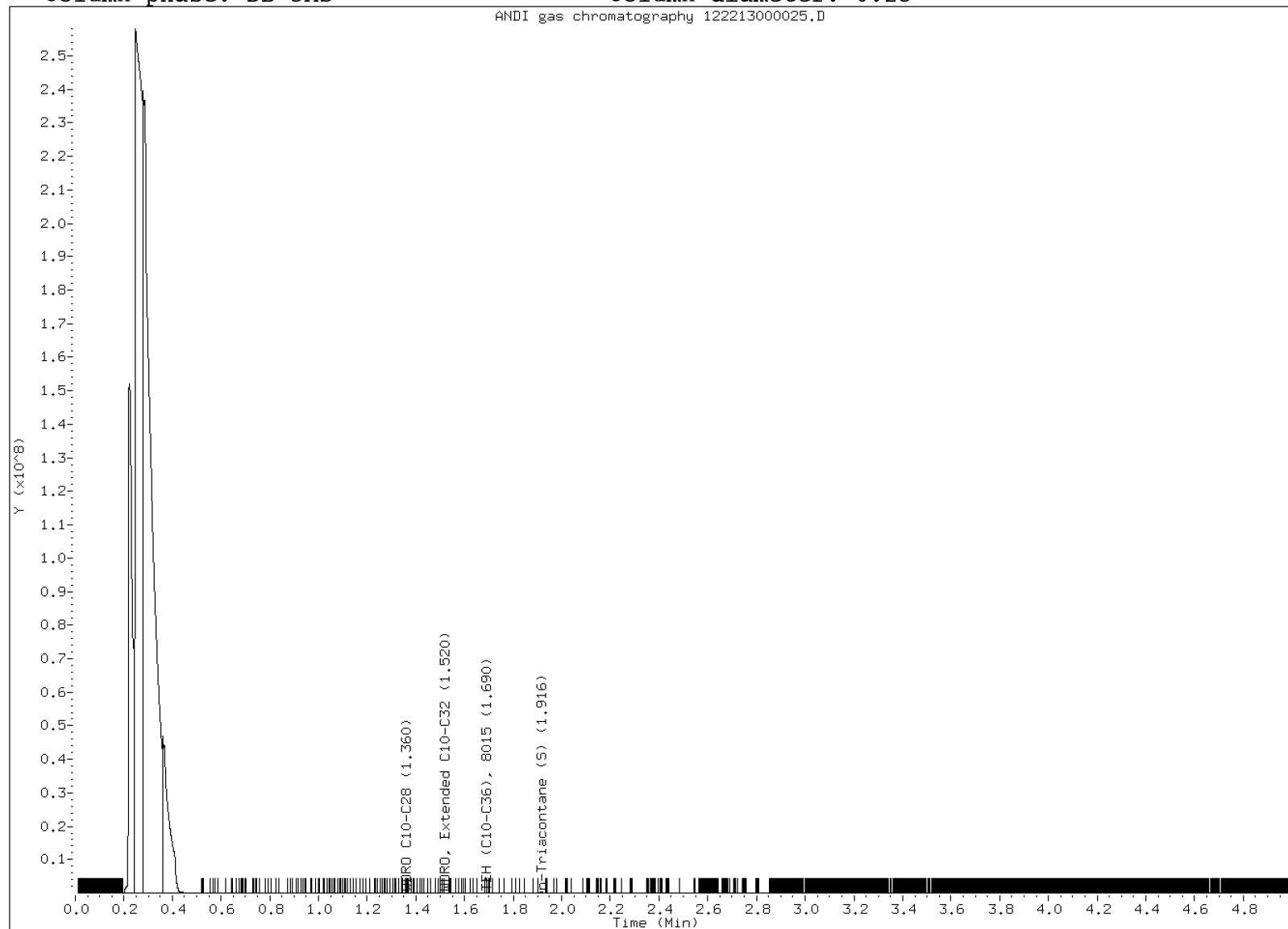
Sample Information: 10252733011

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000026.D

Report Date: 12/23/2013

Sample ID: 10252733012

Client ID:

Instrument: 10gcs9.i

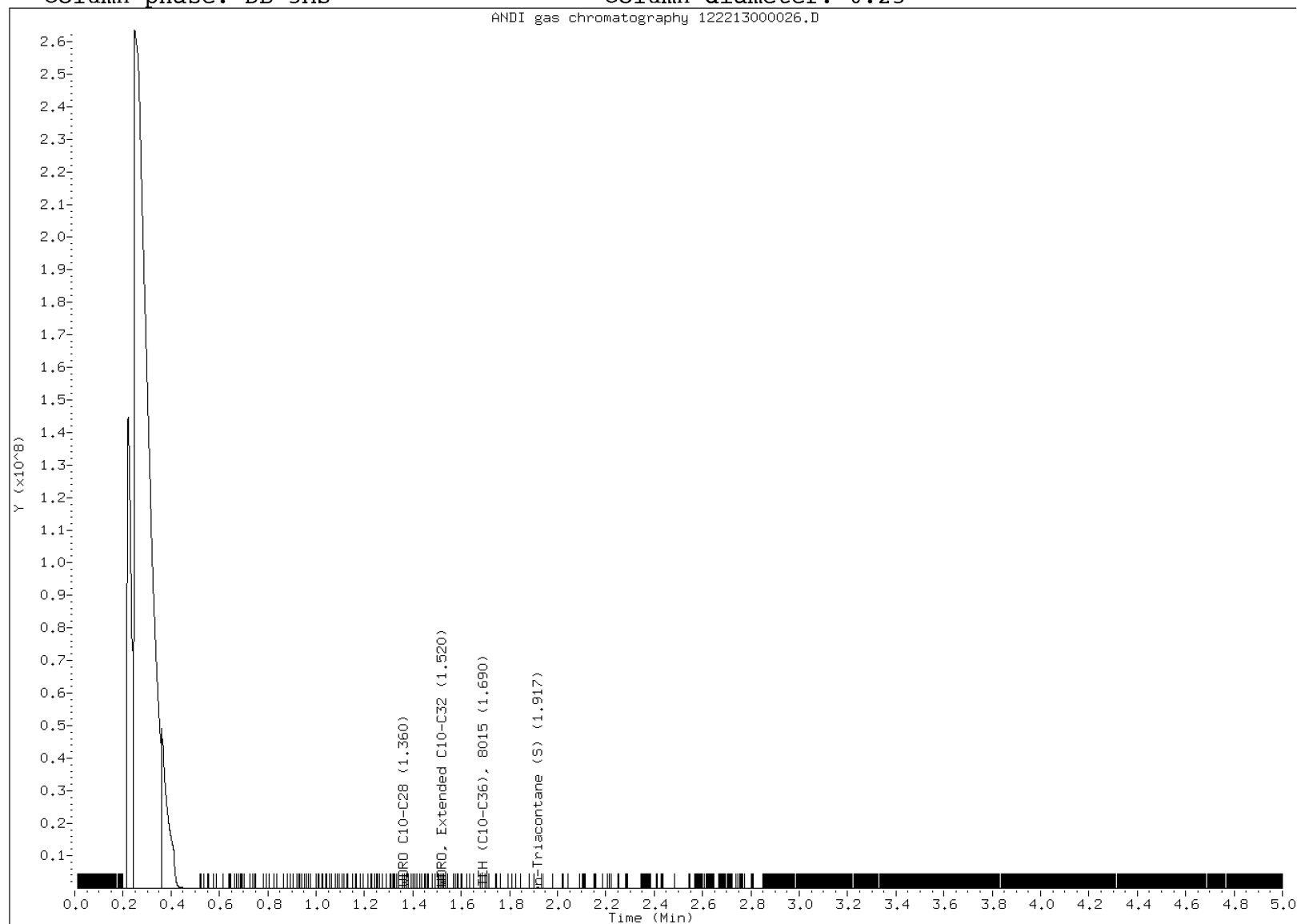
Sample Information: 10252733012

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000027.D

Report Date: 12/23/2013

Sample ID: 10252733013

Client ID:

Instrument: 10gcs9.i

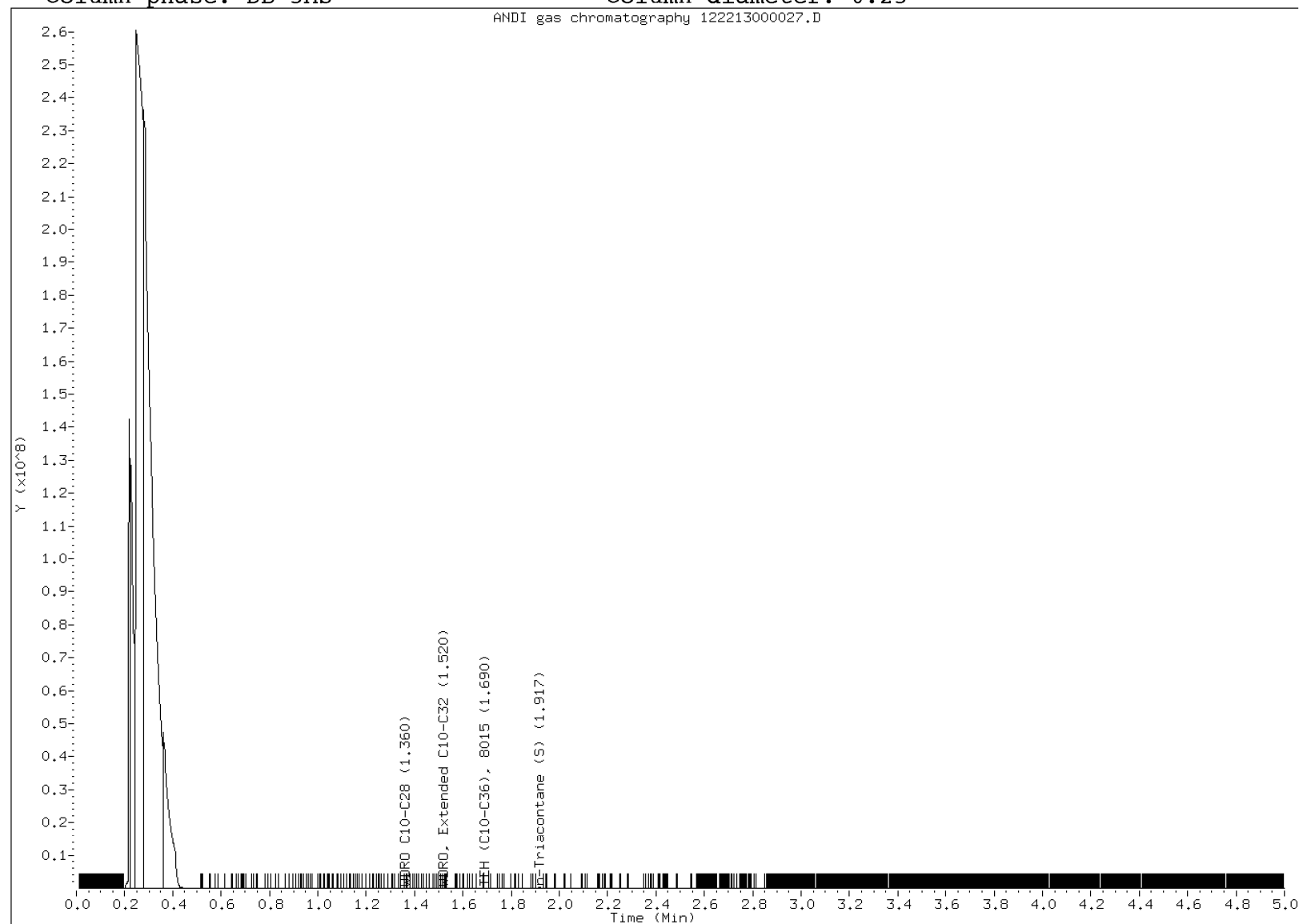
Sample Information: 10252733013

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000023.D

Report Date: 12/23/2013

Sample ID: 10252733014

Client ID:

Instrument: 10gcs9.i

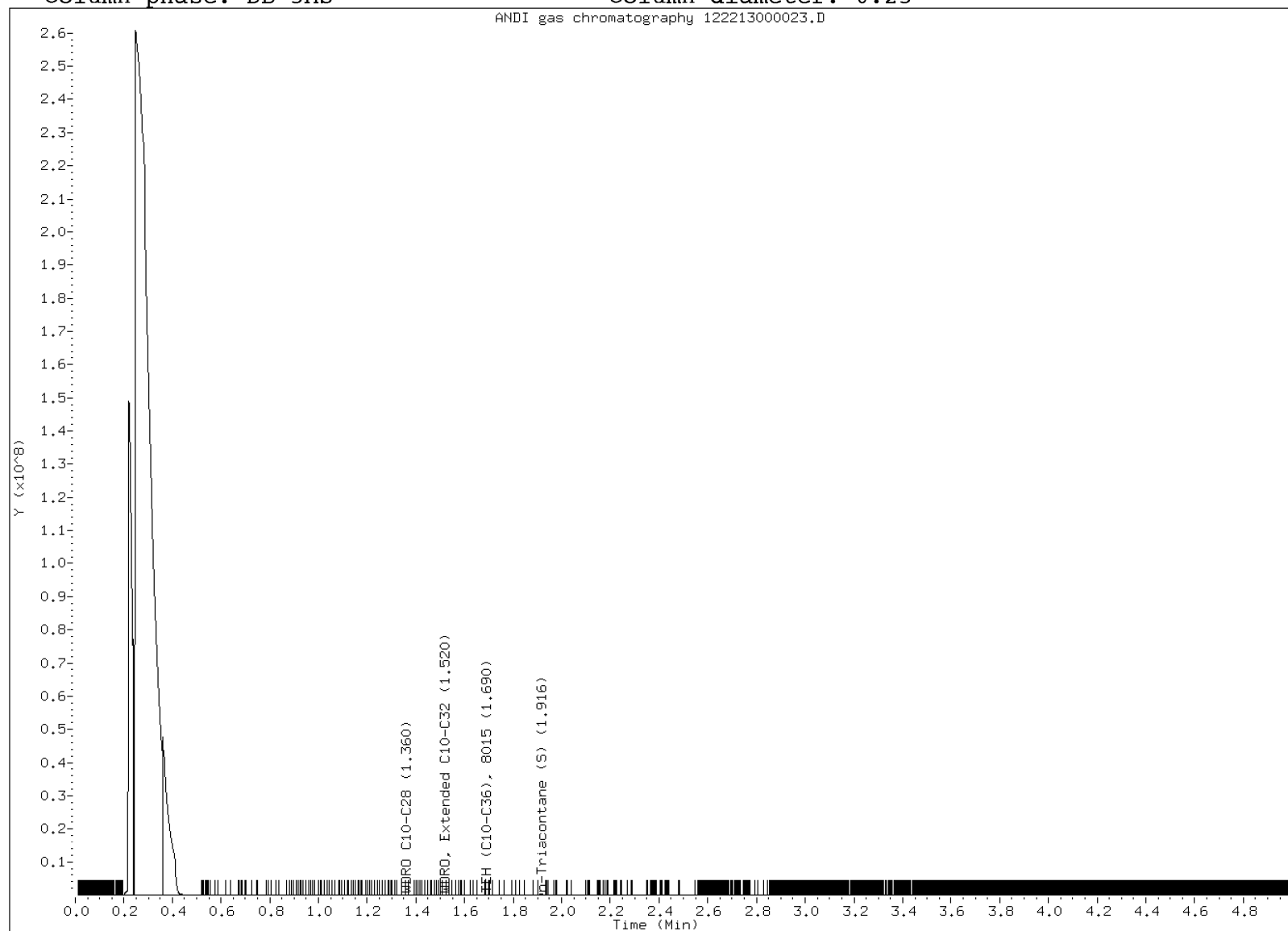
Sample Information: 10252733014

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000024.D

Report Date: 12/23/2013

Sample ID: 10252733015

Client ID:

Instrument: 10gcs9.i

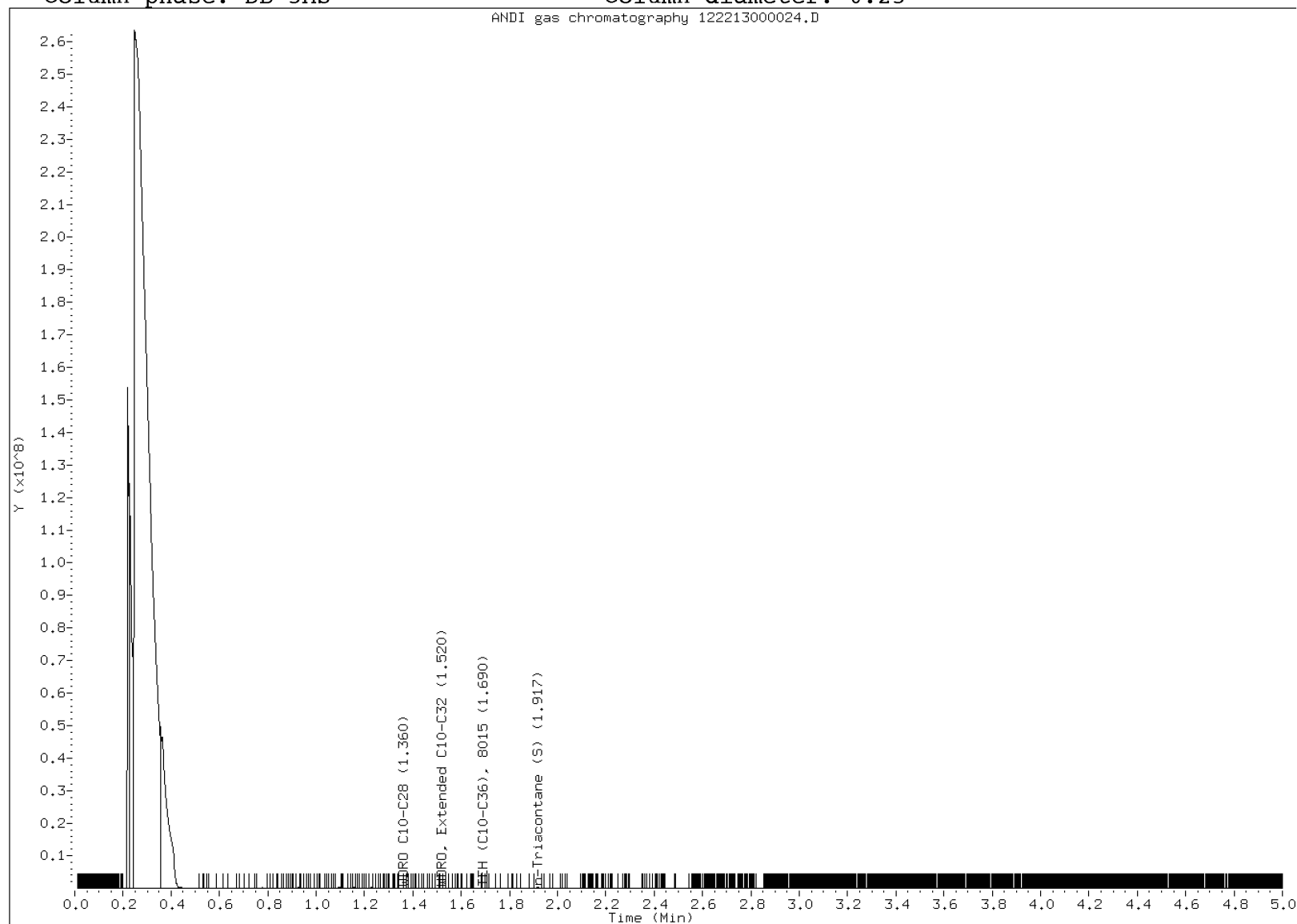
Sample Information: 10252733015

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs9.i\122213extdro.b\122213000028.D

Report Date: 12/23/2013

Sample ID: 10252733016

Client ID:

Instrument: 10gcs9.i

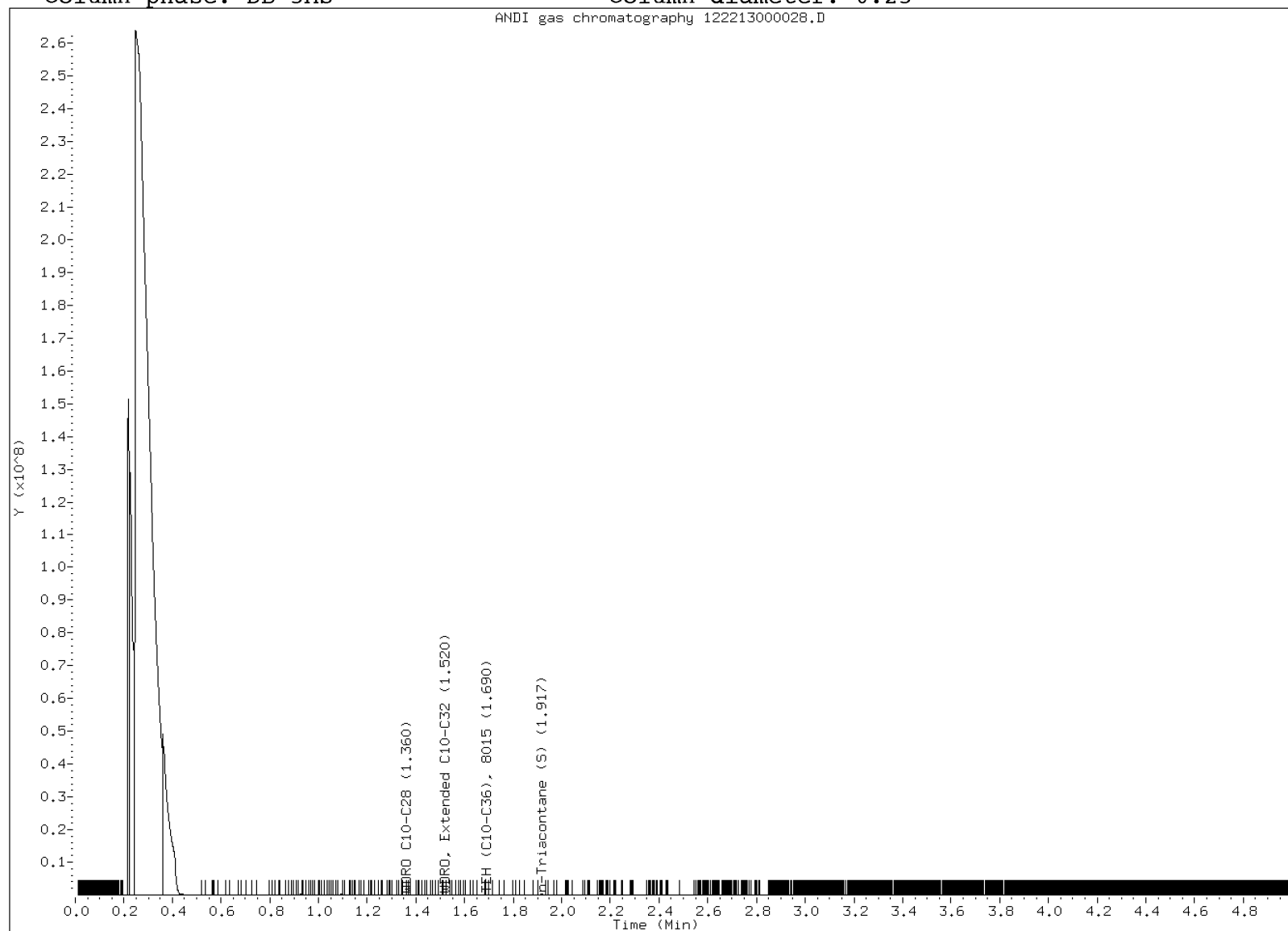
Sample Information: 10252733016

Purge Volume:

Operator: MT

Column phase: DB-5MS

Column diameter: 0.25



October 30, 2013

Klete Fallowfield
AECOM
Duluth Technology village
11 East Superior St. Suite 560
Duluth, MN 55802

RE: Project: 60254681 Enbridge S. Cass Lake
Pace Project No.: 10246599

Dear Klete Fallowfield:

Enclosed are the analytical results for sample(s) received by the laboratory on October 21, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carol Davy

carol.davy@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

Colorado Certification #Pace

Connecticut Certification #: PH-0256

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Hawaii Certification #Pace

Idaho Certification #: MN00064

Illinois Certification #: 200011

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nevada Certification #: MN_00064

Nebraska Certification #: Pace

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Utah Certification #: MN00064

Virginia/DCLS Certification #: 002521

Virginia/VELAP Certification #: 460163

Washington Certification #: C754

West Virginia Certification #: 382

Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10246599001	MW-20 (22')	Solid	10/14/13 16:45	10/21/13 10:30
10246599002	MW-21 (22-22.7')	Solid	10/15/13 14:10	10/21/13 10:30
10246599003	MW-22 (17.8-18.8')	Solid	10/16/13 11:00	10/21/13 10:30
10246599004	MeOH Trip Blank	Solid	10/14/13 00:00	10/21/13 10:30

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SAMPLE ANALYTE COUNT

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10246599001	MW-20 (22')	Diesel Range Organics	JRH	2
		ASTM D2974	JDL	1
		EPA 8260	HBP	7
10246599002	MW-21 (22-22.7')	Diesel Range Organics	JRH	2
		ASTM D2974	JDL	1
		EPA 8260	HBP	7
10246599003	MW-22 (17.8-18.8')	Diesel Range Organics	JRH	2
		ASTM D2974	JDL	1
		EPA 8260	HBP	7
10246599004	MeOH Trip Blank	EPA 8260	HBP	7

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Method: Diesel Range Organics

Description: WIDRO Extended GCS

Client: AECOM

Date: October 30, 2013

General Information:

3 samples were analyzed for Diesel Range Organics. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with Diesel Range Organics with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Method: EPA 8260

Description: 8260 MSV UST

Client: AECOM

Date: October 30, 2013

General Information:

4 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 5035/5030B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MSV/25397

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10246599001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1560749)
 - Benzene
 - Ethylbenzene
 - Toluene

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Method: EPA 8260

Description: 8260 MSV UST

Client: AECOM

Date: October 30, 2013

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Sample: MW-20 (22') **Lab ID:** 10246599001 **Collected:** 10/14/13 16:45 **Received:** 10/21/13 10:30 **Matrix:** Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS									
Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics									
WDRO, Extended C10-C32	ND	mg/kg	9.4	1.0	1	10/23/13 11:36	10/26/13 16:08		
Surrogates									
n-Triacontane (S)	97	%	50-150		1	10/23/13 11:36	10/26/13 16:08	638-68-6	
Dry Weight									
Analytical Method: ASTM D2974									
Percent Moisture	3.3	%	0.10	0.10	1		10/22/13 00:00		
8260 MSV UST									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	ND	ug/kg	19.9	9.9	1	10/24/13 11:37	10/26/13 01:19	71-43-2	M1
Ethylbenzene	ND	ug/kg	49.7	19.9	1	10/24/13 11:37	10/26/13 01:19	100-41-4	M1
Toluene	ND	ug/kg	49.7	19.9	1	10/24/13 11:37	10/26/13 01:19	108-88-3	M1
Xylene (Total)	ND	ug/kg	149	59.7	1	10/24/13 11:37	10/26/13 01:19	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	92	%	57-150		1	10/24/13 11:37	10/26/13 01:19	17060-07-0	
Toluene-d8 (S)	97	%	70-136		1	10/24/13 11:37	10/26/13 01:19	2037-26-5	
4-Bromofluorobenzene (S)	94	%	67-138		1	10/24/13 11:37	10/26/13 01:19	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Sample: MW-21 (22-22.7') Lab ID: 10246599002 Collected: 10/15/13 14:10 Received: 10/21/13 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics									
WDRO, Extended C10-C32	ND	mg/kg	10.4	1.1	1	10/23/13 11:36	10/26/13 16:16		
Surrogates									
n-Triacontane (S)	73	%	50-150		1	10/23/13 11:36	10/26/13 16:16	638-68-6	
Dry Weight Analytical Method: ASTM D2974									
Percent Moisture	19.1	%	0.10	0.10	1		10/22/13 00:00		
8260 MSV UST Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	ND	ug/kg	25.2	12.6	1	10/24/13 11:37	10/26/13 01:37	71-43-2	
Ethylbenzene	ND	ug/kg	63.1	25.2	1	10/24/13 11:37	10/26/13 01:37	100-41-4	
Toluene	ND	ug/kg	63.1	25.2	1	10/24/13 11:37	10/26/13 01:37	108-88-3	
Xylene (Total)	ND	ug/kg	189	75.7	1	10/24/13 11:37	10/26/13 01:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	92	%	57-150		1	10/24/13 11:37	10/26/13 01:37	17060-07-0	
Toluene-d8 (S)	99	%	70-136		1	10/24/13 11:37	10/26/13 01:37	2037-26-5	
4-Bromofluorobenzene (S)	94	%	67-138		1	10/24/13 11:37	10/26/13 01:37	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Sample: MW-22 (17.8-18.8") **Lab ID:** 10246599003 Collected: 10/16/13 11:00 Received: 10/21/13 10:30 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO Extended GCS Analytical Method: Diesel Range Organics Preparation Method: Diesel Range Organics									
WDRO, Extended C10-C32	ND	mg/kg	9.5	1.0	1	10/23/13 11:36	10/26/13 16:24		
Surrogates									
n-Triacontane (S)	75	%	50-150		1	10/23/13 11:36	10/26/13 16:24	638-68-6	
Dry Weight Analytical Method: ASTM D2974									
Percent Moisture	5.5	%	0.10	0.10	1		10/22/13 00:00		
8260 MSV UST Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	ND	ug/kg	21.8	10.9	1	10/24/13 11:37	10/26/13 02:12	71-43-2	
Ethylbenzene	ND	ug/kg	54.5	21.8	1	10/24/13 11:37	10/26/13 02:12	100-41-4	
Toluene	ND	ug/kg	54.5	21.8	1	10/24/13 11:37	10/26/13 02:12	108-88-3	
Xylene (Total)	ND	ug/kg	163	65.4	1	10/24/13 11:37	10/26/13 02:12	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	92	%	57-150		1	10/24/13 11:37	10/26/13 02:12	17060-07-0	
Toluene-d8 (S)	98	%	70-136		1	10/24/13 11:37	10/26/13 02:12	2037-26-5	
4-Bromofluorobenzene (S)	94	%	67-138		1	10/24/13 11:37	10/26/13 02:12	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Sample: MeOH Trip Blank **Lab ID: 10246599004** Collected: 10/14/13 00:00 Received: 10/21/13 10:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	ND	ug/kg	20.0	10.0	1	10/24/13 11:37	10/26/13 01:01	71-43-2	
Ethylbenzene	ND	ug/kg	50.0	20.0	1	10/24/13 11:37	10/26/13 01:01	100-41-4	
Toluene	ND	ug/kg	50.0	20.0	1	10/24/13 11:37	10/26/13 01:01	108-88-3	
Xylene (Total)	ND	ug/kg	150	60.0	1	10/24/13 11:37	10/26/13 01:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	90	%	57-150		1	10/24/13 11:37	10/26/13 01:01	17060-07-0	
Toluene-d8 (S)	98	%	70-136		1	10/24/13 11:37	10/26/13 01:01	2037-26-5	
4-Bromofluorobenzene (S)	94	%	67-138		1	10/24/13 11:37	10/26/13 01:01	460-00-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

QC Batch:	MPRP/42799	Analysis Method:	ASTM D2974
QC Batch Method:	ASTM D2974	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	10246599001, 10246599002, 10246599003		

SAMPLE DUPLICATE: 1558992

Parameter	Units	10246317004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	56.7	56.2	1	30	

SAMPLE DUPLICATE: 1559556

Parameter	Units	10246599003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.5	5.4	2	30	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

QC Batch: MSV/25397 Analysis Method: EPA 8260
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV UST
Associated Lab Samples: 10246599001, 10246599002, 10246599003, 10246599004

METHOD BLANK: 1560747 Matrix: Solid
Associated Lab Samples: 10246599001, 10246599002, 10246599003, 10246599004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/kg	ND	20.0	10/26/13 00:44	
Ethylbenzene	ug/kg	ND	50.0	10/26/13 00:44	
Toluene	ug/kg	ND	50.0	10/26/13 00:44	
Xylene (Total)	ug/kg	ND	150	10/26/13 00:44	
1,2-Dichloroethane-d4 (S)	%	92	57-150	10/26/13 00:44	
4-Bromofluorobenzene (S)	%	94	67-138	10/26/13 00:44	
Toluene-d8 (S)	%	97	70-136	10/26/13 00:44	

LABORATORY CONTROL SAMPLE: 1560748

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	1000	912	91	72-125	
Ethylbenzene	ug/kg	1000	932	93	75-125	
Toluene	ug/kg	1000	927	93	75-125	
Xylene (Total)	ug/kg	3000	2880	96	75-125	
1,2-Dichloroethane-d4 (S)	%			90	57-150	
4-Bromofluorobenzene (S)	%			98	67-138	
Toluene-d8 (S)	%			98	70-136	

MATRIX SPIKE SAMPLE: 1560749

Parameter	Units	10246599001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Benzene	ug/kg	ND	992	692	70	71-137	M1
Ethylbenzene	ug/kg	ND	992	682	69	75-134	M1
Toluene	ug/kg	ND	992	690	70	74-133	M1
Xylene (Total)	ug/kg	ND	2980	2120	71	75-135	MS
1,2-Dichloroethane-d4 (S)	%				89	57-150	
4-Bromofluorobenzene (S)	%				97	67-138	
Toluene-d8 (S)	%				99	70-136	

SAMPLE DUPLICATE: 1560750

Parameter	Units	10246599002 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/kg	ND	ND		30	
Ethylbenzene	ug/kg	ND	ND		30	
Toluene	ug/kg	ND	ND		30	
Xylene (Total)	ug/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%	92	91	7		

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QUALITY CONTROL DATA

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

SAMPLE DUPLICATE: 1560750

Parameter	Units	10246599002 Result	Dup Result	RPD	Max RPD	Qualifiers
4-Bromofluorobenzene (S)	%	94	94	6		
Toluene-d8 (S)	%	99	99	6		

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QUALITY CONTROL DATA

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

QC Batch:	OEXT/23421	Analysis Method:	Diesel Range Organics
QC Batch Method:	Diesel Range Organics	Analysis Description:	WIDRO Extended GCS
Associated Lab Samples:	10246599001, 10246599002, 10246599003		

METHOD BLANK: 1559860 Matrix: Solid

Associated Lab Samples: 10246599001, 10246599002, 10246599003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO, Extended C10-C32	mg/kg	ND	10.0	10/26/13 15:29	
n-Triacontane (S)	%	86	50-150	10/26/13 15:29	

LABORATORY CONTROL SAMPLE & LCSD: 1559861

1559862

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO, Extended C10-C32	mg/kg	80	76.5	75.4	96	94	70-120	2	20	
n-Triacontane (S)	%				98	95	50-150			

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 60254681 Enbridge S. Cass Lake
Pace Project No.: 10246599

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MS	Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60254681 Enbridge S. Cass Lake

Pace Project No.: 10246599

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10246599001	MW-20 (22')	Diesel Range Organics	OEXT/23421	Diesel Range Organics	GCSV/12308
10246599002	MW-21 (22-22.7')	Diesel Range Organics	OEXT/23421	Diesel Range Organics	GCSV/12308
10246599003	MW-22 (17.8-18.8')	Diesel Range Organics	OEXT/23421	Diesel Range Organics	GCSV/12308
10246599001	MW-20 (22')	ASTM D2974	MPRP/42799		
10246599002	MW-21 (22-22.7')	ASTM D2974	MPRP/42799		
10246599003	MW-22 (17.8-18.8')	ASTM D2974	MPRP/42799		
10246599001	MW-20 (22')	EPA 5035/5030B	MSV/25397	EPA 8260	MSV/25398
10246599002	MW-21 (22-22.7')	EPA 5035/5030B	MSV/25397	EPA 8260	MSV/25398
10246599003	MW-22 (17.8-18.8')	EPA 5035/5030B	MSV/25397	EPA 8260	MSV/25398
10246599004	MeOH Trip Blank	EPA 5035/5030B	MSV/25397	EPA 8260	MSV/25398

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.



10246599

Section A Required Client Information: Company: <u>MC Com</u> Address: <u>Delaware</u> Email To: <u>Klete Fallowfield</u> Phone: <u>218 625 8766</u> Fax: <u></u> Requested Due Date/TAT: <u></u>		Section B Required Project Information: Report To: <u>Klete Fallowfield</u> Copy To: <u></u> Purchase Order No.: <u></u> Project Name: <u>Endbridge South Cross Lake</u> Project Number: <u>60 25 4681</u>		Section C Invoice Information: Attention: <u>Klete Fallowfield</u> Company Name: <u></u> Address: <u></u> Pace Quote Reference: <u></u> Pace Project Manager: <u></u> Pace Profile #: <u></u>	
Page: <u>1</u> of <u>1</u> 1752497		REGULATORY AGENCY ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER <u></u>			
Site Location STATE: <u></u>		Requested Analysis Filtered (Y/N)			

ITEM #	Section D Required Client Information		Section B Required Project Information		Section C Invoice Information		Section A Required Client Information		Section B Required Project Information		Section C Invoice Information		Section A Required Client Information	
	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE	MATRIX / CODE
1	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)	MW - 20 (22)
2	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)	MW - 21 (22-22.7)
3	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)	MW - 22 (178-188)
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ADDITIONAL COMMENTS <u></u>		RELINQUISHED BY / AFFILIATION <u>Don Schuster</u>		DATE <u>10-21-13</u>		TIME <u>10:30</u>		ACCEPTED BY / AFFILIATION <u>Don Schuster</u>		DATE <u>10-21-13</u>		TIME <u>10:30</u>		SAMPLE CONDITIONS Temp in °C <u>0-1</u> Received on Ice (Y/N) <u>Y</u> Sealed Cooler (Y/N) <u>Y</u> Custody (Y/N) <u>Y</u> Samples Intact (Y/N) <u>Y</u>	
--------------------------------	--	--	--	-------------------------	--	----------------------	--	--	--	-------------------------	--	----------------------	--	---	--

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

	Document Name: Sample Condition Upon Receipt Form	Document Revised: 19Sep2013 Page 1 of 1
	Document No.: F-MN-L-213-rev.07	Issuing Authority: Pace Minnesota Quality Office

Sample Condition
Upon Receipt

Client Name:

Aecon

Project #:

WO#: **10246599**



Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client
☐ Commercial ☐ Pace ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No Seals Intact? ☐ Yes ☒ No Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: Temp Blank? ☒ Yes ☐ No

Thermom. Used: ☐ 80512447 ☐ 888A912167504 ☒ 888A9132521491 Type of Ice: ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): -0.8 Cooler Temp Corrected (°C): 0.1 Biological Tissue Frozen? ☐ Yes ☐ No

Temp should be above freezing to 6°C Correction Factor: 0.3 Date and Initials of Person Examining Contents: 10/2/13

Comments:

Chain of Custody Present?	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes ☐ No ☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes ☐ No ☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes ☐ No ☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes ☒ No ☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes ☒ No ☐ N/A	7.
Sufficient Volume?	☒ Yes ☐ No ☐ N/A	8.
Correct Containers Used?	☒ Yes ☐ No ☐ N/A	9.
-Pace Containers Used?	☒ Yes ☐ No ☐ N/A	
Containers Intact?	☒ Yes ☐ No ☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes ☐ No ☒ N/A	11.
Sample Labels Match COC?	☒ Yes ☐ No ☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: <u>52</u>		
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13.	☐ Yes ☐ No ☒ N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>12)	☐ Yes ☐ No ☒ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water)	☐ Yes ☒ No	Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes ☐ No ☒ N/A	14.
Trip Blank Present?	☒ Yes ☐ No ☐ N/A	15.
Trip Blank Custody Seals Present?	☒ Yes ☐ No ☐ N/A	
Pace Trip Blank Lot # (if purchased): <u>050613-3</u>		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review:

CPM

Date: 10-22-13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

**Attachment III
Report on Bioventing Pilot
Study and NSZD Study
Enbridge Energy
South Cass Lake Pumping
Station Cass Lake Minnesota**



AEOM
Duluth Technology Village, Suite 260
11 East Superior Street
Duluth, MN 55802

218.625.8766 tel
218.625.2201 fax

To	Karl F. Beaster, P.G.
CC	AECOM Project Files
Subject	Report on Bioventing Pilot Study & NSZD Study Enbridge Energy South Cass Lake Pumping Station Cass Lake, Minnesota
From	Darin Albrecht and Chris Brownfield
Date	April 15, 2014

Background

AECOM Technical Services, Inc. (AECOM) has prepared this report to summarize the results of a bioventing pilot study and a natural source zone depletion (NSZD) investigation completed at the Enbridge Energy (Enbridge) South Cass Lake Pumping Station located in Cass Lake, Minnesota (Site). Both studies occurred from May through October 2013.

The purposes of the study and investigation were to:

- 1) Guide Enbridge in selecting an appropriate remedial action for the light, non-aqueous phase liquid (LNAPL) contamination in unsaturated soils
- 2) Establish a baseline for documenting the progress of remedial action

Figure 1 and **Figure 2** depict the Site Location and Site Layout Map, respectively. **Figure 2** is comprehensive and shows the inferred extent of LNAPL, the bioventing study area and the CO₂ Flux study area and associated sampling locations all of which are discussed in this report.

1.0 Bioventing Pilot Study

1.1 Pilot Study Overview

The bioventing pilot study activities included a respiration test and a soil gas permeability test. The goal of the respiration test was to quantify oxygen utilization rates by microbes within the study area before and after oxygen addition to unsaturated soils. Oxygen addition was achieved by injecting compressed air into the subsurface through a dry well for 1 day. Oxygen utilization was quantified by measuring changes in the oxygen concentration in soil gas for approximately 2 days following the first day of air injection. The goal of the soil gas permeability test was to quantify the relationship between the rate of air injection into unsaturated soils and the area of unsaturated soils that is affected by the injected air. This goal was achieved by injecting pressurized air at a variety of measured flow rates and measuring the soil gas pressure at established air monitoring locations. Information gained by performing these tests will be useful for designing a bioventing system that will aid in the remediation of the LNAPL impacts due to this release.

1.2 Pilot Study Methods & Procedures

Injection Point Well Construction

Bioventing test well, BVW-1 and nested vapor monitoring points, VP-1, VP-2, VP-3 and VP-4 were installed in November 2012 within the LNAPL footprint along the south fence line of the facility. Test well BVW-1 was screened from 15 and 25 feet below ground surface (bgs) while each of the vapor monitoring points consisted of nested tubes installed to 15 feet (shallow, -s), 20 feet (middle, -m), and 24 feet (deep, -d) bgs, respectively. Bioventing test well and vapor monitoring point construction diagrams are included as Attachments to this letter report.

Baseline Field & Laboratory Methods

Prior to starting the bioventing tests, field measurements of the concentrations of oxygen, carbon dioxide and methane in the subsurface air were determined using a handheld landfill gas meter at monitoring locations. Additionally, concentrations of volatile organic compounds (VOC) were measured with a photoionization detector (PID) and pressure readings were measured and recorded from Magnehelic pressure gauges. Measurements were conducted for approximately 4 hours on August 20, 2013.

Respiration Test

The respiration test began on August 20 and ended on August 23, 2013. On August 20, continuous air injection into well BVW-1 was started at approximately 40 cubic feet per minute (cfm) and continued for approximately 24 hours. The pressurized air was spiked with approximately 3 percent industrial grade helium (He) gas which was used as a tracer for quantifying oxygen depletion that is related to natural processes that are unassociated with consumption of oxygen by microorganisms during respiration. The pressure and the concentrations of VOCs, oxygen, carbon dioxide and methane were measured at the vapor monitoring locations during injection to document that oxygen was distributed throughout the entire test area.

Grab samples were collected from each of the vapor monitoring points for laboratory analysis using method TO-15 for VOCs and Method 1946 for oxygen, carbon dioxide, methane and helium. Concentrations of oxygen were observed in decline for approximately 48 additional hours in order to document the rate of decline due to respiration and other natural processes. Laboratory samples were also collected for the above analyses at the end of the respiration test on August 23, 2013. Laboratory analysis was conducted by Eurofins Air Toxics in Folsom California.

Soil Gas Permeability Test

The soil gas permeability test was conducted between August 23 and August 24, 2013. During this test, compressed air was injected into the ground at flow rates of 5 cfm, 10 cfm, 20 cfm, and 80 cfm and soil gas pressures were measured at the vapor monitoring locations. A spatial distribution of the measured pressures (**Figure 3**) was created to understand the radius of influence at the tested flow rates. This information was used to determine an appropriate spacing for future bioventing wells.

1.3 Pilot Study Results & Discussion

Baseline Measurements

Oxygen concentrations ranged from 0 to 19 percent, with the lowest oxygen concentrations (0.0 percent) measured at points VP-3d and VP-4d. Carbon dioxide concentrations ranged from 9 percent to 17 percent with the highest baseline carbon dioxide concentration measured at point VP-4d (17 percent). In general, oxygen concentrations were higher at the shallow intervals and

decreased with depth. The opposite trend was observed in carbon dioxide concentrations. The highest concentration of VOCs was observed at point VP-4d (118 ppm). Location VP-4d was the only location where measureable methane was detected above the minimum laboratory detection limit (0.2 percent).

The baseline measurements indicate that subsoil oxygen concentrations are low enough to limit microbial activity and LNAPL decomposition and are enriched in carbon dioxide relative to ambient air. The baseline measurements also suggest that the eastern portion of the pilot test area may be straddling an LNAPL body boundary and that the LNAPL composition/distribution may be more heterogeneous than reported in the United States Geological Survey (USGS) study¹. A summary of all samples collected as part of the respiration test are included in **Table 1**, **Table 2** and **Table 3**.

Respiration Test

The subsoil pressure isobar graphs in **Figure 3** show that the injected helium/air mixture advanced in a nearly plug-flow (constant velocity through the media) regime after being injected. The arrival of the injected mixture was characterized most commonly by a decrease in carbon dioxide concentration and a corresponding increase in oxygen concentration. Delayed arrival of the injected mixture was observed in the shallow zones which suggest that horizontal distribution of the injected mixture was more efficient in the middle and deep zones than in the shallow zones.

The oxygen decay rate was estimated using both laboratory and field measurements and was found to be between 0 and 2.84 percent by volume per day. Measured concentrations of helium indicate that diffusion and natural convection likely affected the helium concentration in subsoil gas by no more than 1 percent by volume per day in either direction. Therefore, changes in oxygen and carbon dioxide concentrations as a result of processes other than natural convection and diffusion are thought to be quantifiable within about 1 percent by volume per day. Measured concentrations of carbon dioxide, oxygen, methane and helium collected from points VP-2 (3 feet) and VP-4 (23 feet) before and after the 48-hour period of observation are shown in **Tables 4-6**. Graphs pertaining to the oxygen utilization rates can be found in **Figure 4**, **Figure 5** and **Figure 6**.

The presence of elevated concentrations of benzene and cyclohexane in samples from point VP-4 (deep) suggest that the injection of air may enhance LNAPL volatilization within LNAPL bodies. Therefore it is possible that more than one attenuation process may occur as a result of the installation of a bioventing system. Measured concentrations of VOCs are shown on **Table 7**.

Soil Gas Permeability Test

A permeability calculation was performed at each flow rate and an extrapolated radius of influence was determined using the steady state method for air injection published in Battelle (1996)². The range of subsoil permeability was estimated to be between 55 and 124 darcy, indicating that gas distribution in unsaturated soils at the Site will likely be very feasible.

¹ USGS, 2010. *Fate and Transport of Petroleum Hydrocarbons in the Subsurface near Cass Lake, Minnesota*. Scientific Investigations Report 2010-5085. United States Geological Survey: Reston, Virginia.

² Battelle, 1996. *Bioventing Design Tool™ User's Guide*. Battelle Memorial Institute, Columbus, Ohio.

The oxygen radius of influence was modeled using the equation provided in Leeson and Hinchee (1997)³ to calculate the distance from the injection well at which the oxygen concentration above 5 percent could not be maintained for the injected air flow rates. The calculated radii are between 67 and 370 feet depending on the oxygen utilization rate. A graph of the modeled oxygen radius of influence versus the injection flow rates for the two different assumed oxygen utilization rates (1.5 percent/day and 3 percent/day) is included as **Figure 6**. Permeability test data are summarized in **Tables 8-10**. **Table 11** also contains the oxygen radius of influence estimates determined for this investigation.

1.4 Pilot Study Conclusions

The results of the respiration and permeability studies suggests that the subsurface is currently oxygen depleted and that oxygen availability is likely an important factor that limits the rate of degradation of LNAPL in unsaturated soils. The permeability to air of soils was estimated to be between 55 and 124 darcy, and a maximum oxygen utilization rate of approximately 3 percent per day was observed; therefore, replenishment of depleted oxygen is likely to be straightforward.

AECOM estimates that a well spacing of approximately 100 feet would be sufficient for an injection flow rate of 40-80 cfm. Conceptual placement of two proposed bioventing wells in addition to the existing bioventing well BVW-1 is depicted in **Figure 10**. The conceptual placement shown on **Figure 10** was developed based on the location of the inferred extents of LNAPL and the locations of Enbridge process piping. The conceptual placement shown on **Figure 10** is thought to be conservative relative to the air delivery results extrapolated from the permeability test.

2.0 Natural Source Zone Depletion (NSZD) Investigation

2.1 Overview

The NSZD study focused on evaluating the flux of carbon dioxide from the soil vadose zone to the atmosphere in order to develop an estimated rate at which LNAPL may naturally degrade.

The objectives of the NSZD study were to:

- 1) Confirm the previously inferred location of the LNAPL body
- 2) Quantify the amount of LNAPL degradation occurring naturally, if possible.

The results from this study may also be used to understand future decreases in LNAPL degradability that may occur as a result of the remediation and therefore may be useful for evaluating and optimizing project costs.

³ Leeson, Andrea and Robert E. Hinchee, 1997. *Soil Bioventing Principles and Practice*. CRC Press, Inc., Boca Raton, FL.

2.2 NSZD Field Methods & Procedures

Soil Collar Configurations

Near-surface and surface soil collars were used at the monitoring locations to achieve sealed contact between the flux measurement devices and soil gas. The near-surface soil collars consisted of a 4-inch diameter, schedule 40, polyvinylchloride (PVC) pipe installed within an 8.25-inch diameter borehole approximately 32 inches deep. The bottom of the near-surface soil collar was installed to a depth of 24 inches bgs. The remaining borehole space was filled with neat cement grout and completed inside of an 8-inch diameter steel flush mount vault. Installation occurred in June 2013 at the locations shown as green "CO₂ Flux Survey Points" on **Figure 2**. A diagram of the typical surface and near-surface soil collars is included as **Figure 7**.

Surface soil collars consisted of 4 or 8-inch diameter PVC sewer pipe sections driven and seated approximately 6 inches into surface soils. Installation was completed by hand-excavating 1 to 5 inches of surficial soil and driving the PVC pipe to the final depth. Surface material was then replaced inside of the driven pipe. Installation of surface soil collars occurred in June 2013 at locations LS-08, LS-15, and LS-16 and in August at locations LS-07, LS-09 and LS-10.

Carbon Dioxide Flux Measurement Techniques

The instantaneous carbon dioxide flux from soils was measured at up to 17 of the CO₂ Flux Survey Points using the LI-COR 8100A carbon dioxide flux meter (LI-COR Biosciences, Lincoln, Nebraska). The average carbon dioxide flux from soils was measured at four of the CO₂ Flux Survey Points using a modification of the method of Zimbron and McCoy (2012). This method involved the deployment of CO₂ traps onto near-surface soil collars during the initial deployment and onto soil collars during the second deployment. Carbon dioxide traps were provided and analyzed by E-Flux, LLC (Fort Collins, Colorado).

Initial measurements of instantaneous flux were conducted at all 17 locations in June 2013 and the locations for subsequent measurements were prioritized according to the amount of time that was available to make the measurements. Instantaneous and average flux measurements were made at the locations and frequencies indicated on **Table 12** for near-surface and surface soil collars.

2.3 NSZD Results & Discussion

Flux values obtained using both instantaneous and average flux measurements via the carbon dioxide traps were over one order of magnitude higher when they were obtained using near-surface soil collars than they were using surface soil collars. The high variability and the high magnitude of the flux measurements using these methods make extrapolation of an LNAPL respiration rate (in gallons per acre per year [gal/ac/yr]) difficult. In addition, measurements derived solely from LICOR measurements in conjunction with surface soil collars exceed previous literature estimates by several times.

One possible explanation for the high variability and high magnitude of carbon dioxide fluxes is that surface soils (24 inches bgs) represent the majority of resistance to gas diffusion between the zone of respiration and the atmosphere. If this explanation is true, possible circumstances that might create more resistance within the 24 inches bgs zone include compaction of surficial layers or occupation of surficial pore spaces by plant roots or pore water. A summary of project carbon dioxide flux data is included as **Table 12**.

The highest flux values coincided well with the USGS¹ results and extend eastward to survey point LS-04. In general, flux values are more than one order of magnitude greater than values previously

reported for this Site and similar sites. Average flux values from both the instantaneous and average determination at the 17 sampling locations were contoured and the results are shown in **Figure 8**.

Flux measurements at points LS-07, LS-08 and LS-09 using the carbon dioxide meter and surface soil collars in August 2013 and points LS-05, LS-16, LS-17 and LS-18 made using the carbon dioxide traps and surface-soil collars in October 2013 fall in line with previous site measurements. The average carbon dioxide flux among these points is $1.8 \mu\text{mol}/\text{m}^2\text{-s} \pm 0.8 \mu\text{mol}/\text{m}^2\text{-s}$. If complete octane to carbon dioxide degradation would occur an LNAPL degradation rate of approximately 641 gal/ac/yr would be expected. This flux was translated to an estimated natural source zone depletion rate of approximately 970 ± 430 gal/ac/year at the Site using the assumptions documented in the calculations provided in the Attachment. The density of 0.75-g/mL is a laboratory derived value and the 0.894-g/mL is a LNAPL density derived from measurements of product from the Site.

2.4 NSZD Conclusions

Overall, the NSZD study showed that the previously identified zone of contamination coincided with the contamination zone delineated by the carbon dioxide flux. Furthermore, based on AECOM calculations, an estimate of natural source zone depletion was quantified to be between 540 and 1,400 gal/ac/year or 970 ± 430 gal/ac/year.

According to estimates prepared by Wenck Associates in 2005 and cited in the USGS study, the amount of crude oil floating on the water table in 2005 was about 48,100 gallons (182,000 liters) and the area of the inferred extent of crude oil was estimated to be 0.32 acres.¹ Using the LNAPL volumes and areas estimated by Wenck (2005) and the depletion rate determined by the NSZD study, a minimum of 107 to 278 additional years may be required to naturally degrade the released crude oil near the site.

3.0 Conclusions & Recommendations

3.1 Conclusions

The results of the respiration test were used to infer that lack of oxygen is limiting LNAPL biodegradation in the subsurface and that an oxygen utilization rate of approximately 1.5 to 3 percent can be expected after initially supplying air to the subsurface.

The results of the permeability test indicate that adequate air distribution could be achieved with injection wells constructed similar to BVW-1 and spaced approximately 100 feet apart. Air injection flow rates between 40 and 80 cfm per well are also expected. Bioventing at these rates is likely to induce LNAPL volatilization as well.

Based on the respiration test, the LNAPL composition and location is likely more complex than the extent of LNAPL impacts inferred from the USGS report. In contrast, the areas of high carbon dioxide efflux from the soil observed during the NSZD study correspond well with the previously inferred extent of LNAPL.

A reasonable estimate of natural source zone depletion is approximately 970 gal/ac/yr, although the majority of data collected using surface soil collars suggests that a true depletion rate may be greater. A proposed bioventing well layout is shown on **Figure 9**.

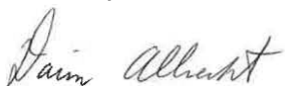
Based on the results of the bioventing pilot study activities, bioventing is likely to be a feasible technology for improving oxygen distribution at the Site and will likely enhance microbial respiration and LNAPL decomposition.

3.2 Recommendations

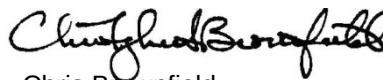
AECOM recommends proceeding with installation of a full-scale bioventing system. Based on the preliminary results from the bioventing pilot study activities and previous site characterization and conceptual model development by the USGS, AECOM believes that a presumptive design approach could be used and will likely move the project toward the remedial action objectives.

AECOM looks forward to discussing this letter report and the details of the proposed bioventing system at your convenience. Should you have any questions or comments related to the information provided in this submittal, please call Darin Albrecht at (218) 625-8768. AECOM appreciates the opportunity to assist Enbridge with this important assignment.

Sincerely,

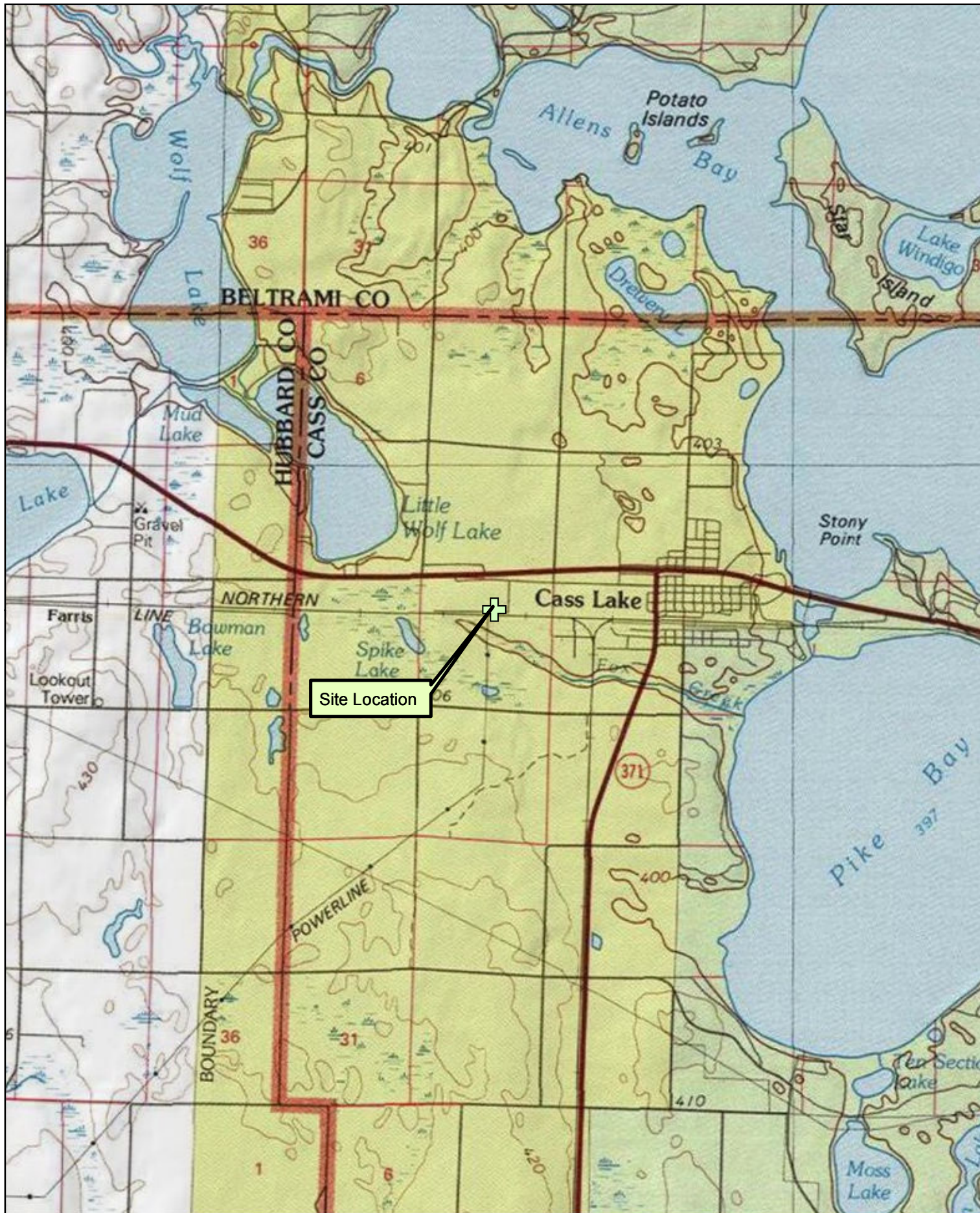


Darin Albrecht
Project Manager
darin.albrecht@aecom.com

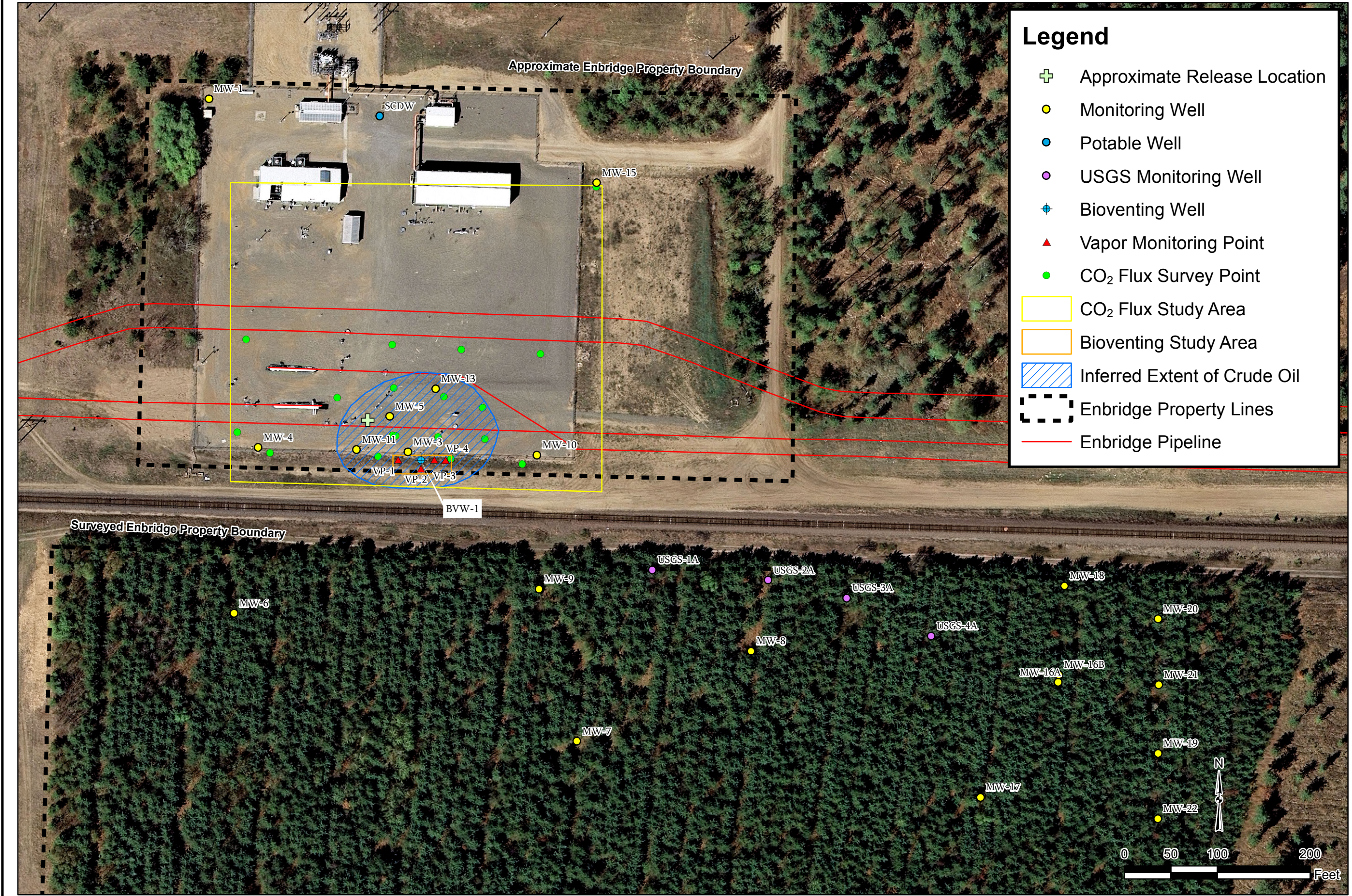


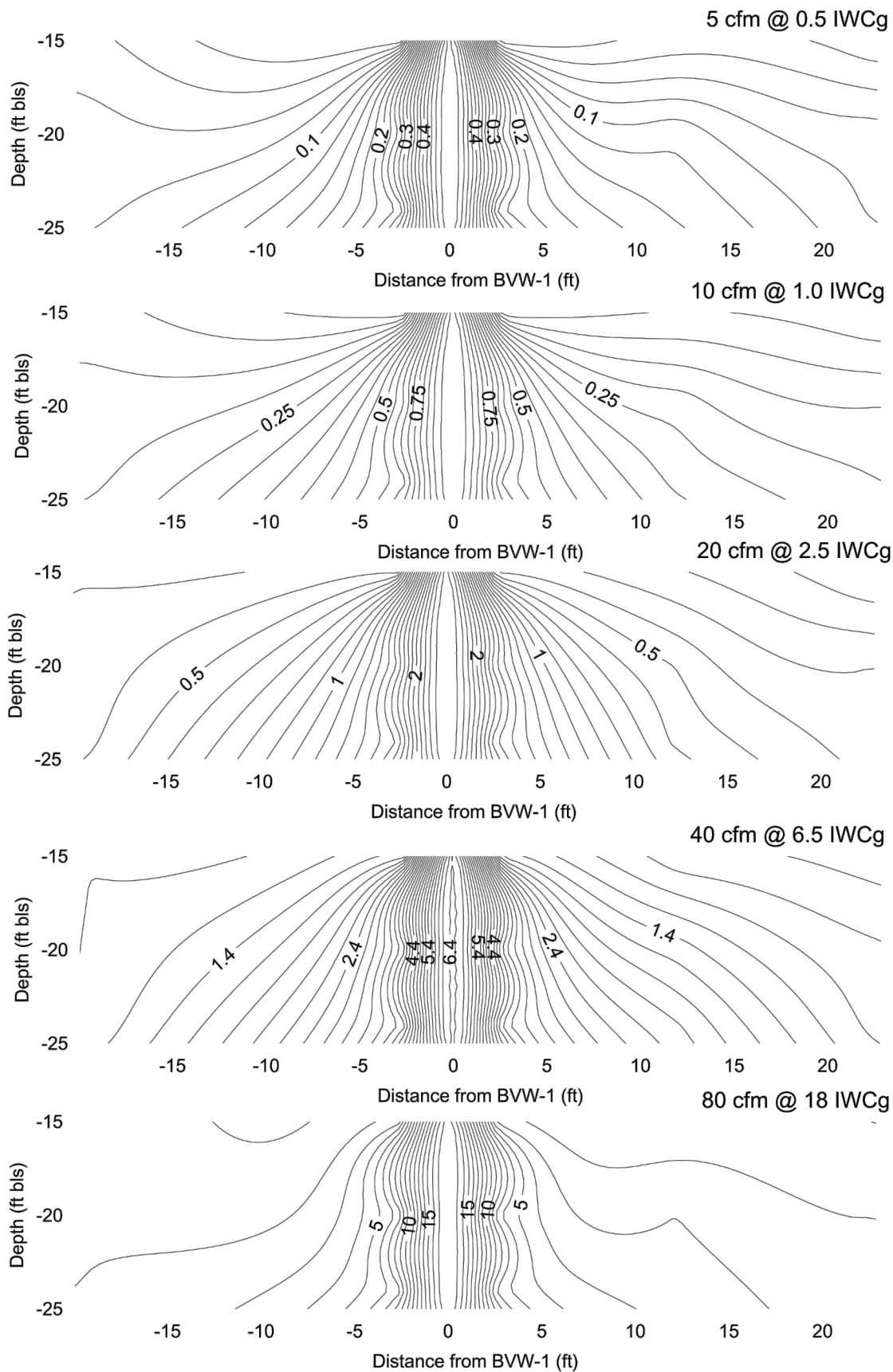
Chris Brownfield
Project Engineer
christopher.brownfield@aecom.com

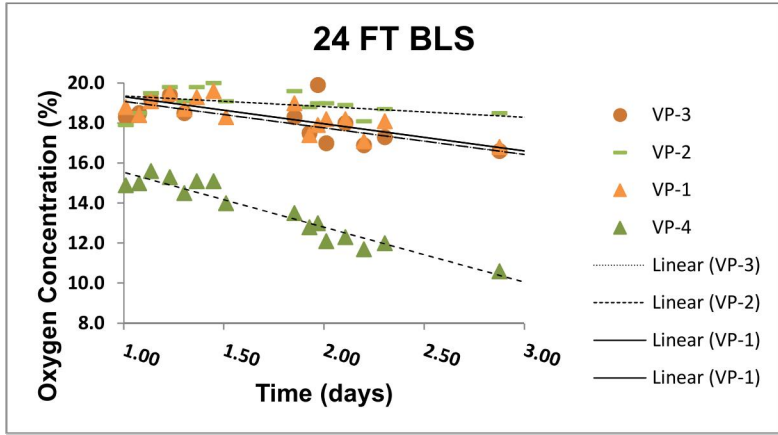
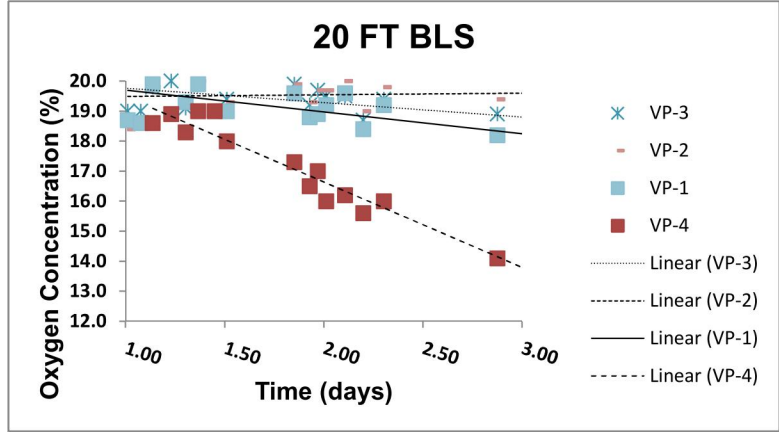
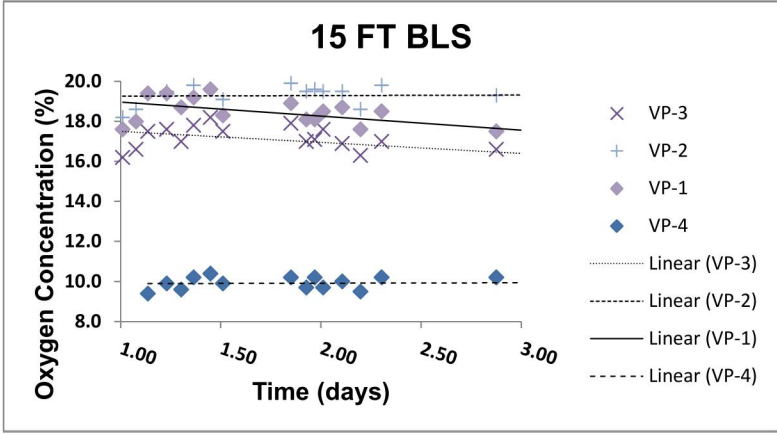
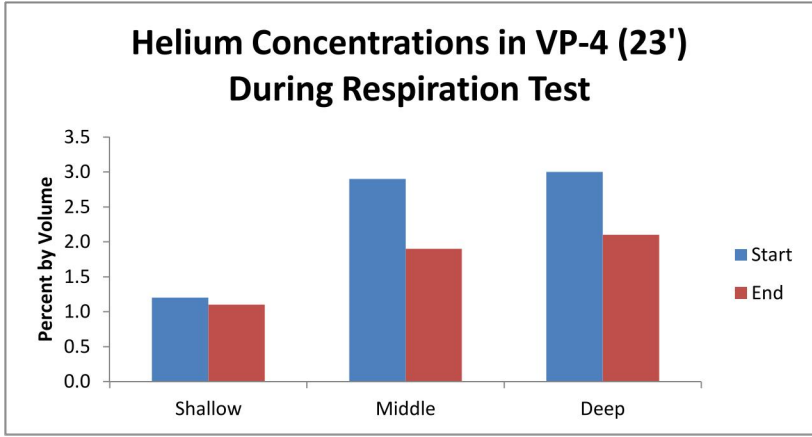
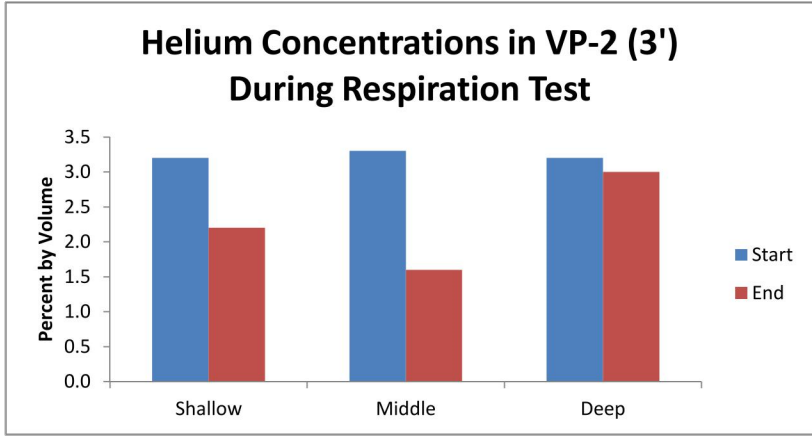
Figures

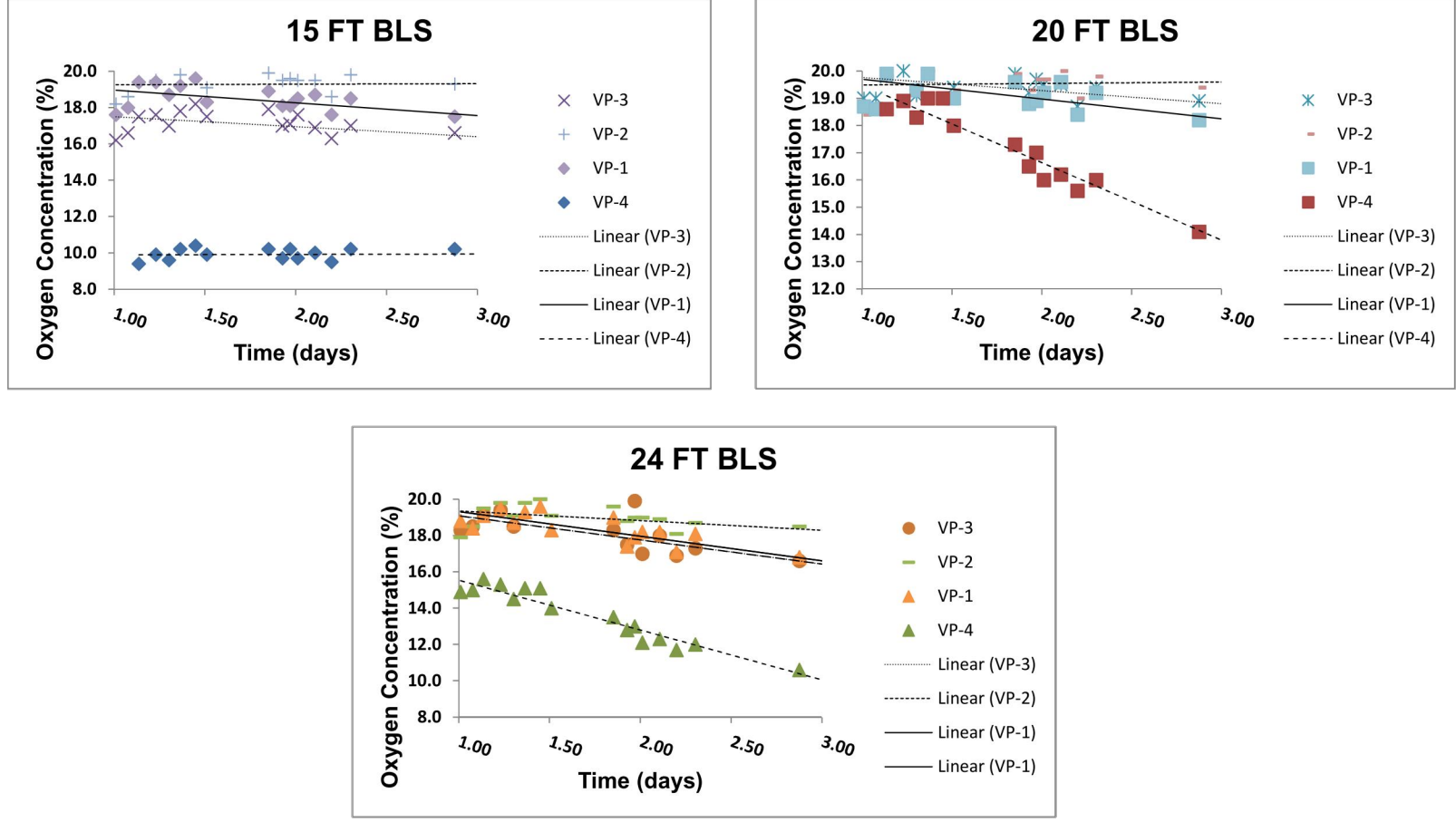


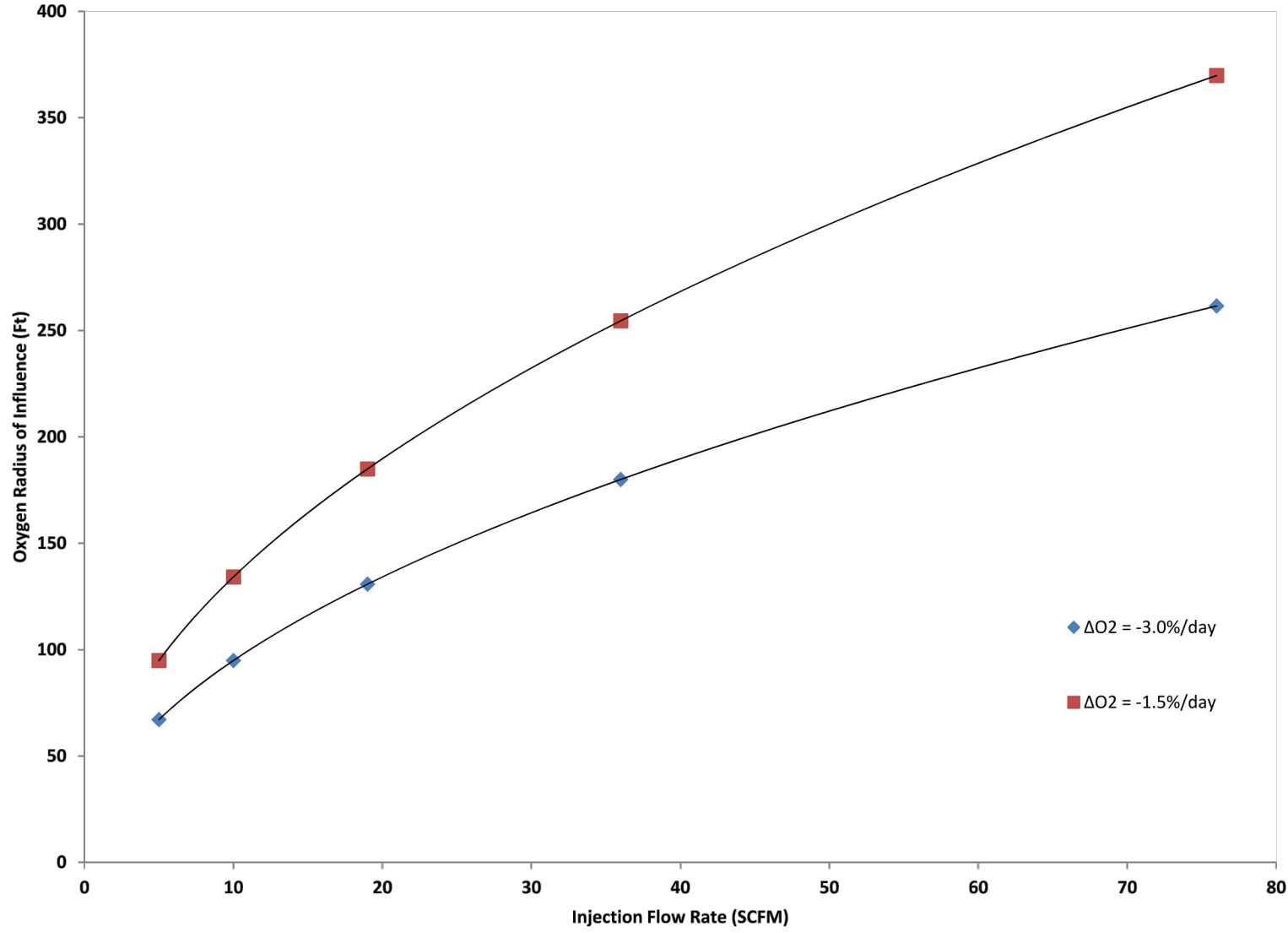
	LEGEND Site Location	Enbridge Pipelines, Limited Partnership Figure 1-1: Site Location Map South Cass Lake Pumping Station 0 1 2 3 Miles	AECOM 11 East Superior Street Suite 280 Duluth, MN 55802 www.AECOM.com Copyright ©2012 By: AECOM	Drawn: TTB 12/19/2012 Approved: BDH 01/02/2013 Scale: 1:60,000 PROJECT NUMBER: 60254681 FIGURE NUMBER: 1-1
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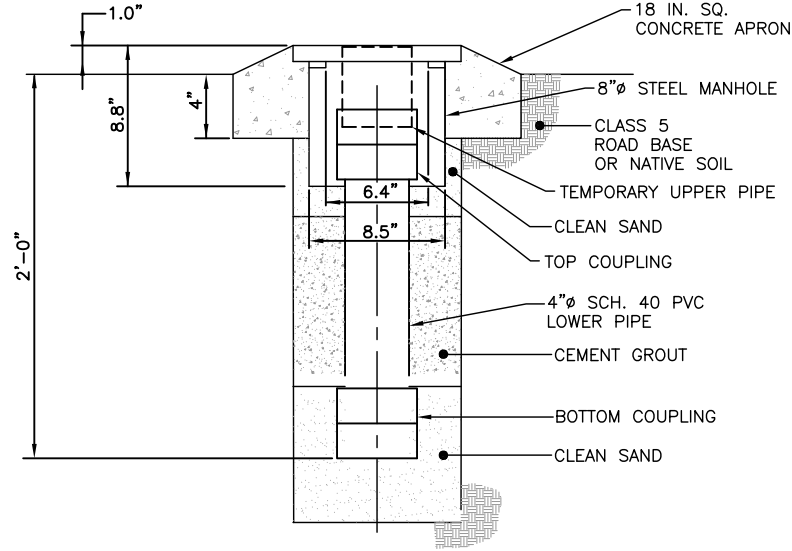






NOTES:

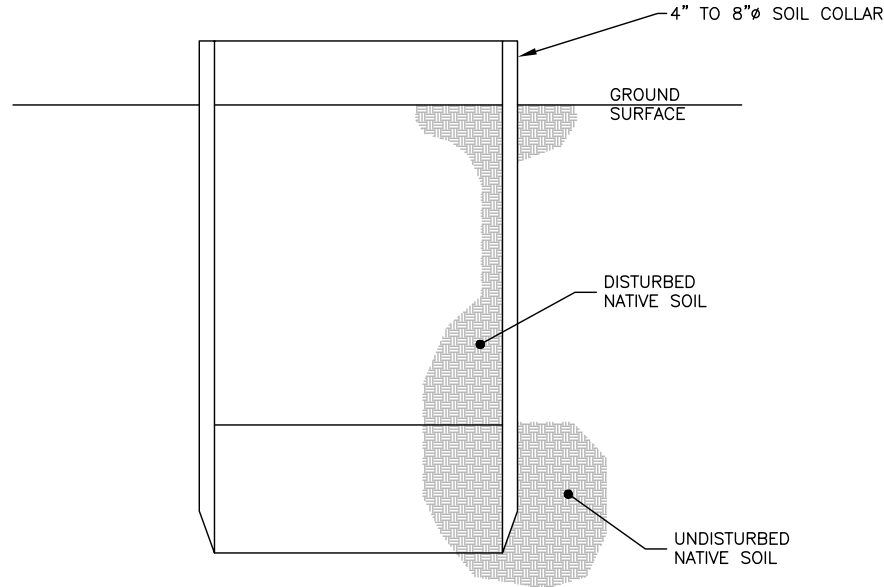
- ① TEMPORARY 8-INCH LONG UPPER PIPE WAS ADDED TO TOP OF COUPLING AT THE TIME OF MEASUREMENT.
- ② CO₂ MEASUREMENT DEVICE WAS CONNECTED TO THE UPPER PIPE AT THE TIME OF MEASUREMENT.



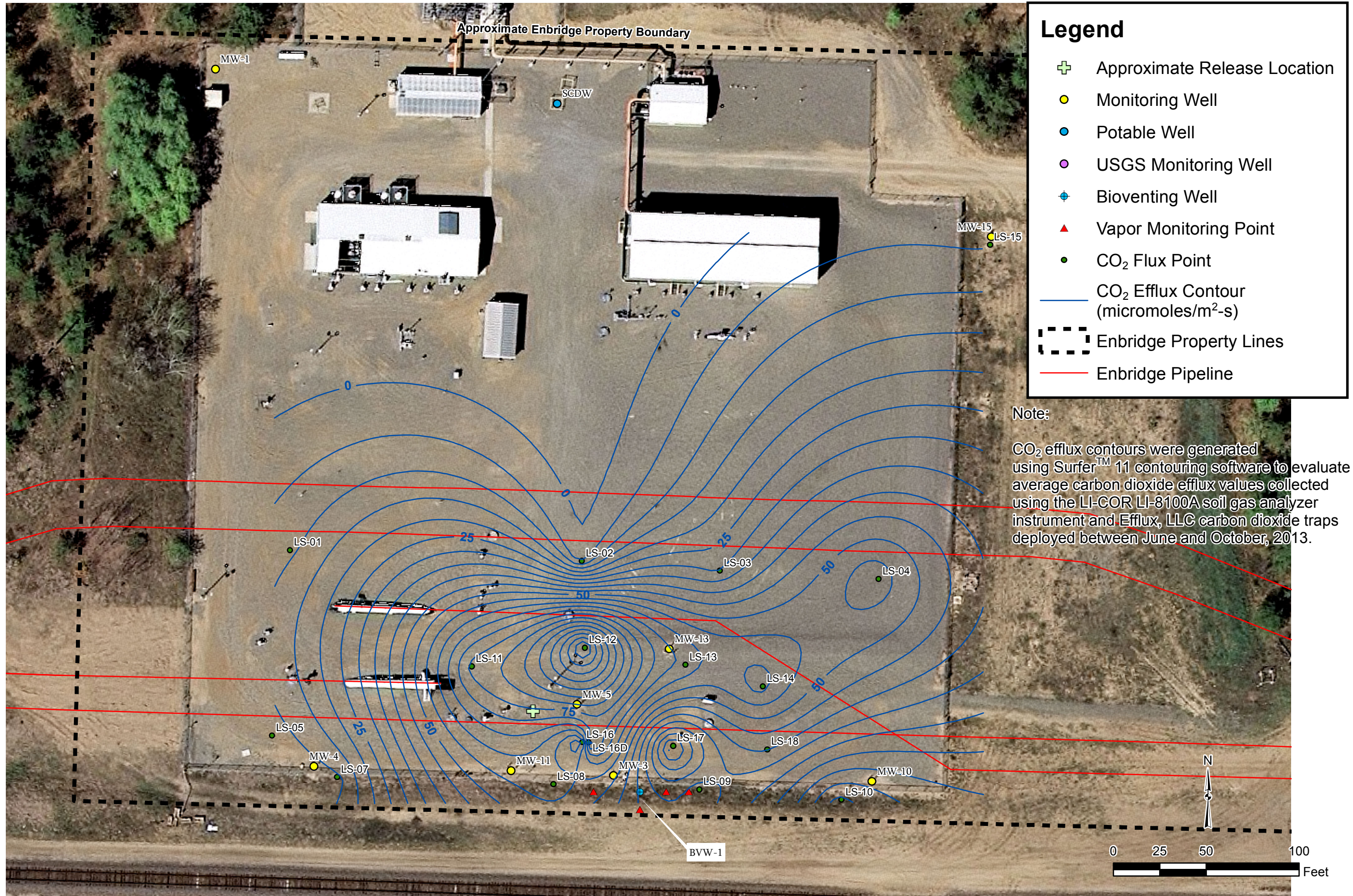
NEAR-SURFACE SOIL COLLAR INSTALLATION DETAIL
 TYPICAL 1 OF 18 SCALE: 1"=1'-0"

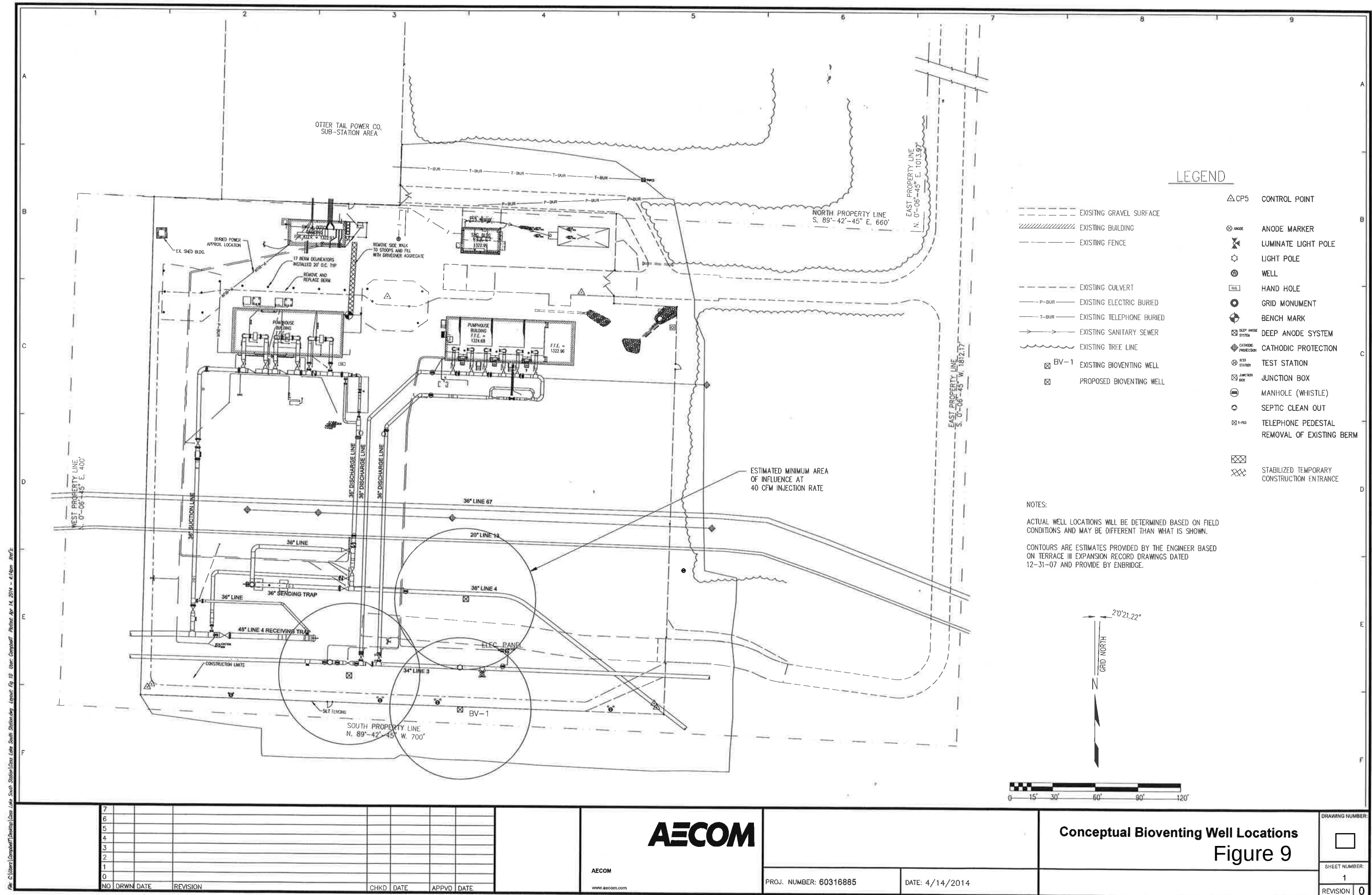
NOTES:

A FOUR INCH SOIL COLLAR IS SHOWN. EIGHT INCH COLLARS WERE USED AT POINTS LS-07, LS-08, LS-09, LS-10, AND LS-15



SURFACE SOIL COLLAR CROSS SECTION
 TYPICAL SCALE: 1"=0'-3"





Tables

Table 1
***In-Situ* Repiration Test Sample Collection Summary**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Injection Status	Sample Time	Days after Beginning Air Injection	Field Measurements Using GEM™, PID, and Pressure Gauges	TO-15/ASTMD1496 Laboratory Sample Collected
He/Air Injection at 40 CFM	8/20/2013 10:45	0.00	x	
	8/20/2013 15:45	0.21	x	
	8/20/2013 17:00	0.26	x	
	8/20/2013 18:00	0.30	x	
	8/20/2013 19:00	0.34	x	
	8/20/2013 20:00	0.39	x	
	8/20/2013 22:00	0.47	x	
	8/21/2013 0:00	0.55	x	
	8/21/2013 3:30	0.70	x	
	8/21/2013 5:40	0.79	x	
	8/21/2013 7:00	0.84	x	
	8/21/2013 8:00	0.89	x	
	8/21/2013 9:30	0.95	x	
	8/21/2013 11:00	1.01	x	
	8/21/2013 12:35	1.08	x	
	8/21/2013 14:00	1.14	x	
	8/21/2013 14:50	1.17		x
No Air or He/Air Injection	8/21/2013 16:15	1.23	x	
	8/21/2013 18:00	1.30	x	
	8/21/2013 19:30	1.36	x	
	8/21/2013 21:30	1.45	x	
	8/21/2013 23:00	1.51	x	
	8/22/2013 7:10	1.85	x	
	8/22/2013 9:00	1.93	x	
	8/22/2013 10:00	1.97	x	
	8/22/2013 11:00	2.01	x	
	8/22/2013 13:18	2.11	x	
	8/22/2013 15:30	2.20	x	
	8/22/2013 18:00	2.30	x	
	8/23/2013 7:45	2.88	x	
	8/23/2013 11:30	3.03	x	
	8/23/2013 13:00	3.09	x	
	8/23/2013 14:00	3.14	x	x

Notes:
PID = photoionization detector

Table 2
***In-Situ* Respiration Test and Soil Permeability Test Baseline Data**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Baseline Respiration Data - Field Measurements							
VP	Depth	Distance from BVW-1	CH ₄	CO ₂	O ₂	BAL	PID
		feet	%	%	%	%	PPM
1	Deep (24 feet)	20	0.0	12.7	3.2	NR	1.2
1	Middle (20 feet)	20	0.0	11.8	4.1	NR	0.7
1	Shallow (15 feet)	20	0.0	10.0	6.6	NR	2.0
2	Deep (24 feet)	3	0.0	13.7	19.0	NR	0.2
2	Middle (20 feet)	3	0.0	12.8	3.0	NR	1.3
2	Shallow (15 feet)	3	0.0	9.1	7.9	NR	1.1
3	Deep (24 feet)	12	0.0	15.5	0.0	NR	1.0
3	Middle (20 feet)	12	0.0	13.6	2.5	NR	1.7
3	Shallow (15 feet)	12	0.0	10.8	6.3	NR	0.9
4	Deep (24 feet)	23	0.2	17.1	0.0	NR	118.2
4	Middle (20 feet)	23	0.0	14.0	1.9	NR	2.6
4	Shallow (15 feet)	23	0.0	11.2	5.9	NR	1.6

Notes:

% = percent

CH₄ = methane

CO₂ = carbon dioxide

NR = not recorded

O₂ = oxygen

PID = photoionization detector

PPM = parts per million (by volume)

VP = Vapor Point

The distances and depths reported in this table are approximate.

Table 3
In-Situ Repiration Test Data
 Enbridge Energy
 South Cass Lake Pumping Station
 Cass Lake, Minnesota

Vapor Point 1D (20 feet from BVW-1)					
Time (days)	CH ₄	CO ₂	O ₂	BAL	PID
	%	%	%	%	PPM
0.00	0.0	12.7	3.2	NR	1.2
0.21	0.0	13.2	3.9	82.9	1.4
0.26	0.0	13.0	3.8	83.2	0.8
0.30	0.0	13.0	2.9	84.1	0.7
0.34	0.0	12.9	4.0	83.0	0.7
0.39	0.0	12.6	7.3	79.9	0.6
0.47	0.0	9.2	14.9	75.9	0.9
0.55	0.0	6.1	17.0	76.9	1.0
0.70	0.0	3.0	18.5	78.4	1.0
0.79	0.0	2.3	18.9	78.7	1.0
0.84	0.0	1.2	18.8	79.9	1.7
0.89	0.0	1.7	18.6	79.7	1.0
0.95	0.0	1.3	19.2	79.2	1.4
1.01	0.0	1.2	18.8	79.9	1.7
1.08	0.0	1.0	18.4	80.6	2.5
1.14	0.0	0.8	19.1	79.9	2.4
1.23	0.0	0.8	19.5	79.8	2.3
1.30	0.0	0.9	18.7	80.4	3.6
1.36	0.0	1.0	19.3	79.6	3.1
1.45	0.0	1.1	19.6	79.1	0.2
1.51	0.0	1.3	18.3	80.2	1.3
1.85	0.0	1.9	19.0	79.1	0.2
1.93	0.0	1.8	17.4	80.4	0.6
1.97	0.0	1.6	17.9	80.6	0.4
2.01	0.0	1.7	18.2	79.7	0.6
2.11	0.0	1.8	18.2	80.1	0.4
2.20	0.0	1.9	17.1	80.9	0.5
2.30	0.0	2.0	18.1	79.8	0.6
2.88	0.0	3.3	16.8	79.9	0.0
3.03	0.0	3.0	15.9	80.9	0.0
3.09	0.0	2.7	16.5	80.7	0.4
3.14	0.0	2.8	16.6	80.6	0.5

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 2D (3 feet from BVW-1)					
Time	CH4	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	13.7	19.0	NR	0.2
0.21	0.7	0.2	17.6	81.5	0.7
0.26	0.1	0.0	18.2	81.6	0.2
0.30	0.0	0.0	19.4	80.4	0.4
0.34	0.0	0.0	19.7	80.3	0.5
0.39	0.0	0.0	19.6	80.4	0.6
0.47	0.0	0.1	19.6	80.3	0.8
0.55	0.0	0.1	18.9	81.0	1.0
0.70	0.0	0.1	19.3	80.6	0.9
0.79	0.0	0.1	19.4	80.4	0.8
0.84	0.0	0.0	17.9	82.0	0.5
0.89	0.0	0.0	19.4	80.5	0.6
0.95	0.0	0.0	19.4	80.5	0.6
1.01	0.0	0.0	17.9	82.0	0.5
1.08	0.0	0.0	18.5	81.5	0.4
1.14	0.0	0.0	19.5	80.4	0.9
1.23	0.0	0.0	19.8	80.2	1.6
1.30	0.0	0.0	19.1	80.8	2.1
1.36	0.0	0.0	19.8	80.0	2.1
1.45	0.0	0.0	20.0	79.9	0.1
1.51	0.0	0.0	19.1	80.8	0.8
1.85	0.0	0.2	19.6	80.0	0.0
1.93	0.0	0.1	18.8	81.0	0.3
1.97	0.0	0.1	19.0	80.9	0.3
2.01	0.0	0.1	19.0	80.9	0.5
2.11	0.0	0.1	18.9	80.9	0.3
2.20	0.0	0.1	18.1	81.7	0.5
2.30	0.0	0.1	18.7	81.1	0.3
2.88	0.0	0.3	18.5	81.2	0.0
3.03	0.0	0.2	17.7	82.0	0.0
3.09	0.0	0.1	18.4	81.4	0.2
3.14	0.0	0.1	18.0	81.9	0.3

Notes:

BAL = balance

CH4 = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 3D (12 feet from BVW-1)					
Time	CH4	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	15.5	0.0	NR	1.0
0.21	0.2	17.2	1.0	81.6	1.7
0.26	0.0	13.8	8.7	77.5	0.9
0.30	0.0	9.8	15.7	74.4	0.7
0.34	0.0	5.8	17.9	76.2	1.0
0.39	0.0	3.6	18.6	77.7	1.2
0.47	0.0	1.9	19.2	78.9	1.6
0.55	0.0	1.3	18.4	80.3	1.8
0.70	0.0	0.9	19.3	79.4	2.0
0.79	0.0	0.7	19.4	79.8	1.9
0.84	0.0	0.3	18.3	81.3	0.9
0.89	0.0	0.6	18.8	80.5	2.2
0.95	0.0	0.5	19.1	80.3	1.7
1.01	0.0	0.3	18.3	81.3	0.9
1.08	0.0	0.3	18.5	81.1	0.7
1.14	0.0	0.2	19.2	80.5	1.4
1.23	0.0	0.2	19.4	80.3	1.6
1.30	0.0	0.3	18.5	81.2	2.0
1.36	NM	NM	NM	NM	2.0
1.45	NM	NM	NM	NM	0.2
1.51	NM	NM	NM	NM	0.8
1.85	0.0	1.0	18.3	80.6	0.1
1.93	0.0	0.9	17.5	81.6	0.4
1.97	0.0	0.8	19.9	81.1	0.5
2.01	0.0	0.8	17.0	78.1	0.7
2.11	0.0	0.8	18.0	81.1	0.4
2.20	0.0	0.9	16.9	82.2	0.5
2.30	0.0	1.0	17.3	81.6	0.3
2.88	0.0	1.6	16.6	81.6	0.0
3.03	0.0	1.5	16.0	82.4	0.3
3.09	0.0	1.3	16.3	82.3	0.3
3.14	0.0	1.4	16.2	82.4	0.4

Notes:

BAL = balance

CH4 = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
***In-Situ* Repiration Test Data**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 4D (23 feet from BVW-1)					
Time	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.2	17.1	0.0	NR	118.2
0.21	0.4	18.6	0.0	81.1	116.0
0.26	0.4	16.2	0.0	83.3	130.0
0.30	0.1	16.4	0.0	83.5	132.0
0.34	0.0	16.3	0.0	83.7	130.5
0.39	0.1	16.3	0.0	83.7	145.7
0.47	0.1	16.9	0.0	83.0	149.3
0.55	0.1	16.5	0.0	83.2	183.9
0.70	0.1	14.3	7.8	77.9	181.9
0.79	0.1	11.7	10.8	77.4	190.6
0.84	0.1	5.2	14.9	79.7	167.0
0.89	0.0	8.6	13.1	78.1	206.7
0.95	0.0	7.2	14.2	78.4	168.5
1.01	0.1	5.2	14.9	79.7	167.0
1.08	0.1	4.4	15.0	80.3	148.0
1.14	0.2	4.0	15.6	80.1	159.0
1.23	0.1	3.7	15.3	80.7	156.4
1.30	0.0	4.0	14.5	81.2	162.6
1.36	0.0	4.2	15.1	80.7	163.0
1.45	0.1	4.4	15.1	80.4	146.7
1.51	0.0	4.7	14.0	81.2	159.2
1.85	0.1	5.3	13.5	81.2	124.5
1.93	0.0	4.9	12.8	82.0	141.9
1.97	0.1	4.8	13.0	81.9	154.1
2.01	0.1	4.7	12.1	83.0	149.7
2.11	0.1	4.8	12.3	82.8	130.0
2.20	0.0	5.0	11.7	83.2	117.4
2.30	0.1	5.1	12.0	82.7	156.4
2.88	0.1	6.4	10.6	82.8	190.0
3.03	0.0	6.1	9.8	84.0	166.5
3.09	0.0	5.7	10.1	84.0	142.3
3.14	0.0	5.7	9.8	84.3	146.4

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 1M (20 feet from BVW-1)					
Time (days)	CH ₄	CO ₂	O ₂	BAL	PID
	%	%	%	%	PPM
0.00	0.0	11.8	4.1	NR	0.7
0.21	0.0	12.2	5.1	82.7	0.7
0.26	0.1	12.2	4.4	82.8	0.4
0.30	0.0	12.1	4.1	83.7	0.4
0.34	0.0	12.3	5.1	82.4	0.4
0.39	0.0	11.9	8.0	80.0	0.4
0.47	0.0	8.4	15.1	76.5	0.5
0.55	0.0	5.2	17.3	77.4	0.7
0.70	0.0	2.4	19.2	78.6	0.7
0.79	0.0	1.8	19.4	78.7	0.5
0.84	0.0	0.9	18.7	80.4	0.5
0.89	0.0	1.3	18.9	79.7	1.0
0.95	0.0	0.9	19.3	79.7	0.8
1.01	0.0	0.9	18.7	80.4	0.5
1.08	0.0	0.7	18.6	80.7	0.9
1.14	0.0	0.5	19.9	79.5	1.2
1.23	0.0	0.5	20.1	79.4	1.5
1.30	0.0	0.6	19.3	80.1	2.6
1.36	0.0	0.7	19.9	79.4	2.5
1.45	0.0	0.0	20.3	78.9	0.2
1.51	0.0	0.9	19.0	80.0	0.9
1.85	0.0	1.3	19.6	79.6	0.1
1.93	0.0	1.2	18.8	80.0	0.4
1.97	0.0	1.1	18.9	79.9	0.4
2.01	0.0	1.1	19.2	79.4	0.5
2.11	0.0	1.2	19.6	79.1	0.8
2.20	0.0	1.0	18.4	80.2	0.5
2.30	0.0	1.4	19.2	79.4	0.4
2.88	0.0	2.3	18.2	79.6	0.0
3.03	0.0	2.1	17.4	80.3	0.2
3.09	0.0	1.9	18.4	79.7	0.3
3.14	0.0	1.9	18.1	79.9	0.4

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
***In-Situ* Repiration Test Data**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 2M (3 feet from BVW-1)					
Time	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	12.8	3.0	NR	1.3
0.21	0.1	0.1	16.9	82.9	1.1
0.26	0.1	0.0	18.7	81.2	0.8
0.30	0.0	0.0	20.0	80.0	0.8
0.34	0.0	0.0	20.0	79.9	0.8
0.39	0.0	0.0	20.0	80.0	0.8
0.47	0.0	0.0	19.8	79.9	0.9
0.55	0.0	0.0	19.3	80.7	1.0
0.70	0.0	0.1	19.6	80.4	1.0
0.79	0.0	0.0	20.0	79.9	0.9
0.84	0.0	0.0	18.4	81.6	0.8
0.89	0.0	0.1	18.9	80.9	0.4
0.95	0.0	0.0	19.4	80.5	0.9
1.01	0.0	0.0	18.4	81.6	0.8
1.08	0.0	0.0	18.8	81.2	0.9
1.14	0.0	0.0	19.8	80.1	1.1
1.23	0.0	0.0	20.1	79.9	1.6
1.30	0.0	0.0	19.2	80.6	2.0
1.36	0.0	0.0	20.0	79.8	1.9
1.45	0.0	0.0	20.4	79.5	0.2
1.51	0.0	0.1	19.3	80.6	0.7
1.85	0.0	0.1	19.9	79.9	0.0
1.93	0.0	0.1	19.3	80.6	0.3
1.97	0.0	0.0	19.7	80.2	0.3
2.01	0.0	0.0	19.7	79.9	0.5
2.11	0.0	0.1	20.0	79.9	0.6
2.20	0.0	0.1	19.0	80.9	0.6
2.30	0.0	0.1	19.8	80.0	0.3
2.88	0.0	0.2	19.4	80.2	0.0
3.03	0.0	0.1	19.0	80.8	0.2
3.09	0.0	0.0	19.9	80.0	0.5
3.14	0.0	0.0	19.6	80.3	0.3

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
***In-Situ* Repiration Test Data**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 3M (12 feet from BVW-1)					
Time	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	13.6	2.5	NR	1.7
0.21	0.0	14.7	3.1	82.2	1.5
0.26	0.1	8.6	14.4	76.9	0.9
0.30	0.0	4.4	18.5	77.1	0.5
0.34	0.0	2.3	19.5	78.2	0.8
0.39	0.0	1.5	19.5	78.4	1.1
0.47	0.0	0.9	19.9	79.1	1.5
0.55	0.0	0.7	18.9	80.4	1.5
0.70	0.0	0.5	19.3	80.2	1.5
0.79	0.0	0.4	19.4	80.1	1.3
0.84	0.0	0.1	19.0	80.8	1.0
0.89	0.0	0.3	19.0	80.6	1.3
0.95	0.0	0.3	19.5	80.2	1.5
1.01	0.0	0.1	19.0	80.8	1.0
1.08	0.0	0.1	19.0	80.8	1.1
1.14	0.0	0.1	19.8	80.0	1.3
1.23	0.0	0.1	20.0	79.9	1.3
1.30	0.0	0.2	19.1	80.7	1.5
1.36	0.0	0.2	20.1	79.6	1.7
1.45	0.0	0.3	20.3	79.3	0.1
1.51	0.0	0.4	19.4	80.2	0.6
1.85	0.0	0.6	19.9	79.3	0.0
1.93	0.0	0.5	19.2	80.2	0.2
1.97	0.0	0.4	19.7	79.8	0.4
2.01	0.0	0.4	19.5	80.0	0.6
2.11	0.0	0.4	19.5	80.0	0.6
2.20	0.0	0.5	18.7	80.7	0.5
2.30	0.0	0.5	19.4	80.0	0.3
2.88	0.0	1.0	18.9	80.1	0.0
3.03	0.0	0.9	18.1	81.0	0.3
3.09	0.0	0.7	18.9	80.3	0.5
3.14	0.0	0.7	18.6	80.6	0.5

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
 Enbridge Energy
 South Cass Lake Pumping Station
 Cass Lake, Minnesota

Vapor Point 4M (23 feet from BVW-1)					
Time	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	14.0	1.9	NR	2.6
0.21	0.0	14.6	2.6	83.0	4.4
0.26	0.1	14.0	2.6	83.3	2.4
0.30	0.0	14.0	1.6	84.1	2.1
0.34	0.0	13.9	1.8	84.3	3.0
0.39	0.0	14.0	1.6	84.7	3.1
0.47	0.0	14.8	1.9	83.2	3.1
0.55	0.0	14.8	4.6	80.6	2.3
0.70	0.0	12.0	12.8	75.2	3.5
0.79	0.0	9.4	15.5	75.3	3.5
0.84	0.0	3.6	17.9	78.3	1.3
0.89	0.0	6.6	16.9	76.4	3.1
0.95	0.0	5.3	17.8	76.8	3.4
1.01	0.0	3.6	17.9	78.3	1.3
1.08	0.0	3.0	17.9	79.0	1.2
1.14	0.0	2.5	18.6	78.7	1.1
1.23	0.0	2.5	18.9	78.4	1.1
1.30	0.0	2.9	18.3	78.8	1.4
1.36	0.0	3.1	19.0	77.9	1.4
1.45	0.0	3.3	19.0	77.4	0.2
1.51	0.0	3.7	18.0	78.4	0.6
1.85	0.0	4.5	17.3	77.9	0.1
1.93	0.0	4.3	16.5	79.1	0.3
1.97	0.0	4.1	17.0	78.8	0.7
2.01	0.0	4.1	16.0	79.8	0.5
2.11	0.0	4.3	16.2	79.4	0.4
2.20	0.0	4.5	15.6	79.7	0.4
2.30	0.0	4.7	16.0	79.3	0.2
2.88	0.0	6.0	14.1	79.8	0.0
3.03	0.0	5.8	13.6	80.6	0.2
3.09	0.0	5.3	13.8	80.8	0.3
3.14	0.0	5.4	13.5	81.0	0.4

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 1S (20 feet from BVW-1)					
Time (days)	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	10.0	6.6	NR	2.0
0.21	0.1	10.2	6.9	82.8	1.0
0.26	0.1	10.4	6.8	82.7	0.7
0.30	0.0	10.1	6.3	83.2	0.7
0.34	0.0	10.6	6.0	83.5	0.8
0.39	0.0	10.7	5.9	83.1	0.6
0.47	0.0	11.3	7.8	80.9	0.7
0.55	0.0	10.4	11.1	78.5	0.8
0.70	0.0	6.8	16.0	76.8	0.8
0.79	0.0	5.4	17.5	77.0	0.6
0.84	0.0	2.8	17.6	79.5	0.9
0.89	0.0	4.0	17.9	78.1	0.5
0.95	0.0	3.1	18.5	78.3	0.8
1.01	0.0	2.8	17.6	79.5	0.9
1.08	0.0	2.4	18.0	79.5	1.1
1.14	0.0	1.9	19.4	78.7	1.1
1.23	0.0	1.9	19.4	78.5	1.6
1.30	0.0	2.2	18.7	79.1	2.6
1.36	0.0	2.4	19.2	78.3	2.3
1.45	0.0	2.6	19.6	77.7	0.2
1.51	0.0	2.9	18.3	78.8	0.9
1.85	0.0	3.3	18.9	77.7	0.1
1.93	0.0	3.3	18.1	78.5	0.4
1.97	0.0	3.1	18.1	78.7	0.3
2.01	0.0	3.1	18.5	78.2	0.5
2.11	0.0	3.2	18.7	78.0	0.8
2.20	0.0	3.3	17.6	79.0	0.6
2.30	0.0	3.4	18.5	78.1	0.5
2.88	0.0	4.2	17.5	78.3	0.0
3.03	0.0	3.8	16.9	79.3	0.3
3.09	0.0	3.4	17.6	78.9	0.5
3.14	0.0	3.4	17.5	79.0	0.6

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
***In-Situ* Repiration Test Data**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point 2S (3 feet from BVW-1)					
Time	CH4	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	9.1	7.9	NR	1.1
0.21	0.0	1.5	17.3	81.2	1.0
0.26	0.0	0.4	18.0	81.6	0.6
0.30	0.0	0.3	19.3	80.3	0.6
0.34	0.0	0.2	19.4	80.4	0.5
0.39	0.0	0.2	19.6	80.2	0.7
0.47	0.0	0.1	19.7	80.1	0.7
0.55	0.0	0.1	18.8	80.9	0.8
0.70	0.0	0.1	19.4	80.4	1.1
0.79	0.0	0.1	19.5	80.3	0.9
0.84	0.0	0.0	18.2	81.7	0.8
0.89	0.0	0.1	19.0	80.9	1.1
0.95	0.0	0.0	19.4	80.5	0.9
1.01	0.0	0.0	18.2	81.7	0.8
1.08	0.0	0.0	18.6	81.3	0.9
1.14	0.0	0.0	19.4	80.6	1.1
1.23	0.0	0.0	19.5	80.4	1.3
1.30	0.0	0.0	18.7	81.1	1.7
1.36	0.0	0.0	19.8	80.1	2.2
1.45	0.0	0.1	20.3	79.7	0.2
1.51	0.0	0.1	19.1	80.6	0.9
1.85	0.0	0.2	19.9	79.9	0.2
1.93	0.0	0.2	19.5	80.3	0.4
1.97	0.0	0.1	19.6	80.2	0.4
2.01	0.0	0.1	19.5	80.3	0.6
2.11	0.0	0.1	19.5	80.2	0.4
2.20	0.0	0.1	18.6	81.2	0.5
2.30	0.0	0.2	19.8	80.2	0.6
2.88	0.0	0.4	19.3	80.1	0.0
3.03	0.0	0.4	19.1	80.6	0.0
3.09	0.0	0.2	19.1	80.6	0.5
3.14	0.0	0.2	19.0	80.6	0.4

Notes:

BAL = balance

CH4 = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
 Enbridge Energy
 South Cass Lake Pumping Station
 Cass Lake, Minnesota

Vapor Point 3S (12 feet from BVW-1)					
Time	CH ₄	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	10.8	6.3	NR	0.9
0.21	0.0	11.7	6.4	81.9	2.2
0.26	0.0	10.8	6.2	83.0	1.2
0.30	0.0	10.8	5.8	83.4	0.8
0.34	0.0	10.4	5.6	83.3	0.8
0.39	0.0	11.1	5.6	83.3	1.3
0.47	0.0	11.8	5.8	82.4	1.7
0.55	0.0	11.9	6.9	81.2	1.5
0.70	0.0	11.2	11.1	77.7	1.7
0.79	0.0	10.4	13.1	76.5	1.4
0.84	0.0	6.4	16.2	77.2	1.4
0.89	0.0	8.9	14.4	76.7	1.6
0.95	0.0	7.7	15.7	76.5	1.4
1.01	0.0	6.4	16.2	77.2	1.4
1.08	0.0	5.6	16.6	77.8	1.9
1.14	0.0	5.0	17.5	77.5	1.9
1.23	0.0	4.8	17.6	77.6	1.9
1.30	0.0	5.0	17.0	77.9	2.1
1.36	0.0	5.0	17.8	77.1	2.1
1.45	0.0	5.1	18.2	76.5	0.4
1.51	0.0	5.3	17.5	77.3	0.8
1.85	0.0	5.4	17.9	76.6	0.3
1.93	0.0	5.0	17.0	77.9	0.5
1.97	0.0	4.8	17.1	77.7	0.4
2.01	0.0	4.7	17.6	81.7	0.6
2.11	0.0	4.6	16.9	78.3	0.9
2.20	0.0	4.7	16.3	79.0	0.6
2.30	0.0	4.6	17.0	78.3	0.5
2.88	0.0	5.3	16.6	78.0	0.1
3.03	0.0	4.8	15.9	79.3	0.8
3.09	0.0	4.3	16.2	79.3	0.6
3.14	0.0	4.3	16.0	79.6	0.5

Notes:

BAL = balance

CH₄ = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 3
In-Situ Repiration Test Data
 Enbridge Energy
 South Cass Lake Pumping Station
 Cass Lake, Minnesota

Vapor Point 4S (23 feet from BVW-1)					
Time	CH4	CO ₂	O ₂	BAL	PID
days	%	%	%	%	PPM
0.00	0.0	11.2	5.9	NR	1.6
0.21	4.9	10.1	6.4	78.6	3.3
0.26	0.1	10.8	6.2	82.8	1.8
0.30	0.0	11.0	5.7	83.1	2.1
0.34	0.0	10.9	5.6	83.5	1.7
0.39	0.0	11.3	5.3	83.4	2.1
0.47	0.0	11.8	5.1	82.9	2.7
0.55	0.0	12.3	4.4	83.3	2.9
0.70	0.0	12.7	4.6	83.2	4.1
0.79	0.0	12.9	4.9	82.5	3.7
0.84	0.0	11.7	7.6	80.6	2.2
0.89	0.0	12.9	5.5	81.5	3.8
0.95	0.0	12.6	6.3	81.0	3.3
1.01	0.0	11.7	7.6	80.6	2.2
1.08	0.0	11.2	8.4	80.4	1.2
1.14	0.0	10.9	9.4	79.7	2.1
1.23	0.0	10.5	9.9	79.7	1.6
1.30	0.0	10.8	9.6	79.5	1.8
1.36	0.0	10.8	10.2	79.0	2.0
1.45	0.0	11.1	10.4	78.5	0.5
1.51	0.0	11.3	9.9	78.7	0.9
1.85	0.0	11.5	10.2	78.2	0.4
1.93	0.0	10.8	9.7	79.3	0.6
1.97	0.0	10.3	10.2	79.4	0.9
2.01	0.0	10.1	9.7	80.1	0.7
2.11	0.0	9.4	10.0	80.0	0.7
2.20	0.0	10.1	9.5	80.3	0.7
2.30	0.0	10.1	10.2	79.7	0.6
2.88	0.0	10.9	10.2	78.8	0.3
3.03	0.0	9.9	9.8	80.2	0.8
3.09	0.0	9.3	9.9	80.7	0.4
3.14	0.0	9.3	9.8	80.8	0.7

Notes:

BAL = balance

CH4 = Methane

CO₂ = carbon dioxide

NM = not measured

O₂ = oxygen

PID = photoionization detector measurement (VOCs)

PPM = parts per million (by volume)

Table 4

***In-Situ* Respiration Test Laboratory Permanent Gas Sample Results**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Compound	VP-2 ASTM D 1946 Gas Concentrations (Percent)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
Carbon Dioxide	0.083	0.39	0.048	0.11	0.053	0.21
Carbon Monoxide	<0.018	<0.018	<0.018	<0.018	<0.017	<0.017
Ethane	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0017
Ethene	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0017
Helium	3.2	2.2	3.3	1.6	3.2	3
Methane	0.00021	<0.00018	0.00020	<0.00018	0.00020	<0.00017
Nitrogen	77	77	76	77	77	78
Oxygen	20	20	21	21	20	19

Compound	VP-4 ASTM D 1946 Gas Concentrations (Percent)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
Carbon Dioxide	12	9.9	2.8	6.1	4.2	6.1
Carbon Monoxide	<0.018	<0.018	<0.017	<0.018	<0.018	<0.017
Ethane	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018	<0.0017
Ethene	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018	<0.0017
Helium	1.2	1.1	2.9	1.9	3.0	2.1
Methane	<0.00018	<0.00018	<0.00017	<0.00018	0.0015	0.0022
Nitrogen	76	77	74	77	76	80
Oxygen	11	12	20	15	17	12

Notes:

VP-2 is approximately 3 feet from well BVW-1.

VP-4 is approximately 23 feet from well BVW-1.

Table 5

***In-Situ* Respiration Test Summary of Oxygen Decay Rate Observations using ASTM D-1946 Results**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Depth	Fitting Parameter	Vapor Point ¹			
		VP-1 (20 feet)	VP-2 (3 feet)	VP-3 (12 feet)	VP-4 (23 feet)
15 ft bls	O ₂ Decay (% d ⁻¹)	0.70	-0.03	0.55	-0.03
	Intercept (%)	19.67	19.23	18.05	9.86
	R ²	0.42	0.0018	0.32	0.0039
20 ft bls	O ₂ Decay (% d ⁻¹)	0.72	-0.06	0.48	2.84
	Intercept (%)	20.43	19.43	20.25	22.32
	R ²	0.45	0.01	0.36	0.96
24 ft bls	O ₂ Decay (% d ⁻¹)	1.36	0.53	1.33	2.75
	Intercept (%)	20.68	19.89	20.43	18.30
	R ²	0.77	0.31	0.67	0.96

Notes:

% = percent

d = day

ft bls = feet below land surface

O₂ = OxygenPositive values for O₂ Decay indicate decay. Negative values indicate accumulation.¹ Approximate distance from well BVW-1 is noted in parentheses.

Table 6

***In-Situ* Respiration Test Comparison of Oxygen and Helium Decay Rate Observations**
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Vapor Point ¹	O ₂ Decay Rate - Field Measurement	O ₂ Decay Rate - Lab Measurement	He Decay Rate - Lab Measurement	CO ₂ Production Rate - Lab Measurement
	% d ⁻¹	% d ⁻¹	% d ⁻¹	% d ⁻¹
VP-1S (20 feet)	0.70	NM	NM	NM
VP-1M (20 feet)	0.72			
VP-1D (20 feet)	1.36			
VP-2S (3 feet)	-0.03	0.00	-0.05	0.14
VP-2M (3 feet)	-0.06	0.00	0.85	0.03
VP-2D (3 feet)	0.53	0.00	0.10	0.11
VP-3S (12 feet)	0.55	NM	NM	NM
VP-3M (12 feet)	0.48			
VP-3D (12 feet)	1.33			
VP-4S (23 feet)	-0.03	-0.50	-0.85	1.90
VP-4M (23 feet)	2.84	2.50	0.50	0.95
VP-4D (23 feet)	2.75	2.50	0.45	3.05

Notes:

% = percent

d = day

He = Helium

NM = not measured

O₂ = Oxygen

Positive values for decay indicate decay. Negative values indicate accumulation.

¹ Approximate distance from well BVW-1 is noted in parentheses.

Table 7
In-Situ Respiration Test Laboratory TO-15 Sample Results
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Compound	VP-2 TO-15 Gas Concentrations (PPBV)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
1,2,4-Trimethylbenzene	1.2	<0.91	<0.90	<0.91	<0.85	<0.83
1,3,5-Trimethylbenzene	<0.88	<0.91	<0.90	<0.91	<0.85	<0.83
1,3-Dichlorobenzene	<0.88	<0.91	0.92	<0.91	0.96	0.93
2-Butanone (Methyl Ethyl Ketone)	<3.5	14	<3.6	<3.6	<3.4	<3.3
2-Propanol	13	<3.6	8.4	87	11	<3.3
4-Ethyltoluene	1.1	<0.91	<0.90	<0.91	<0.85	<0.83
Acetone	120	200	66	63	29	56
Benzene	<0.88	<0.91	1.3	<0.91	<0.85	<0.83
Cumene	<0.88	<0.91	4.4	<0.91	<0.85	<0.83
Cyclohexane	<0.88	<0.91	<0.90	<0.91	<0.85	<0.83
Ethanol	11	<3.6	<3.6	120	4.3	<3.3
Hexane	<0.88	<0.91	<0.90	1.1	<0.85	<0.83
m,p-Xylene	2.7	<0.91	<0.90	<0.91	<0.85	<0.83
o-Xylene	1.0	<0.91	<0.90	<0.91	<0.85	<0.83
Toluene	1.5	<0.91	<0.90	4.2	<0.85	<0.83

Compound	VP-2 TO-15 Gas Concentrations (µg/m ³)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
1,2,4-Trimethylbenzene	5.9	<4.5	<4.4	<4.5	<4.2	<4.1
1,3,5-Trimethylbenzene	<4.3	<4.5	<4.4	<4.5	<4.2	<4.1
1,3-Dichlorobenzene	<5.3	<5.5	5.6	<5.5	5.8	5.6
2-Butanone (Methyl Ethyl Ketone)	<10	42	<10	<11	<10	<9.8
2-Propanol	32	<8.9	21	210	27	<8.2
4-Ethyltoluene	5.3	<4.5	<4.4	<4.5	<4.2	<4.1
Acetone	290	480	160	150	70	130
Benzene	<2.8	<2.9	4.1	<2.9	<2.7	<2.6
Cumene	<4.3	<4.5	21	<4.5	<4.2	<4.1
Cyclohexane	<3.0	<3.1	<3.1	<3.1	<2.9	<2.8
Ethanol	21	<6.8	<6.7	220	8.1	<6.2
Hexane	<3.1	<3.2	<3.2	3.9	<3.0	<2.9
m,p-Xylene	12	<4.0	<3.9	<4.0	<3.7	<3.6
o-Xylene	4.4	<4.0	<3.9	<4.0	<3.7	<3.6
Toluene	5.6	<3.4	<3.4	16	<3.2	<3.1

Notes:

PPBV = parts per million (by volume)

µg/m³ = micrograms per cubic meter

VP-2 is approximately 3 feet from well BVW-1.

VP-4 is approximately 23 feet from well BVW-1.

Table 7
In-Situ Respiration Test Laboratory TO-15 Sample Results
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Compound	VP-4 TO-15 Gas Concentrations (PPBV)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
1,2,4-Trimethylbenzene	1.7	<0.88	<0.87	<0.88	<12	<12
1,3,5-Trimethylbenzene	<0.88	<0.88	<0.87	<0.88	18	<12
1,3-Dichlorobenzene	1.1	1.1	1.4	0.87J	<12	<12
2-Butanone (Methyl Ethyl Ketone)	<3.5	<3.5	<3.5	<3.5	<48	<46
2-Propanol	11	<3.5	15	19	<48	<46
4-Ethyltoluene	1.4	<0.88	<0.87	<0.88	<12	<12
Acetone	90	110	39	46	<120	<120
Benzene	<0.88	<0.88	<0.87	<0.88	21	<12
Cumene	<0.88	<0.88	1.6	<0.88	<12	<12
Cyclohexane	<0.88	<0.88	<0.87	<0.88	4000	2800
Ethanol	8.1	<3.5	6.8	6.6	<48	<46
Hexane	<0.88	<0.88	<0.87	<0.88	<12	<12
m,p-Xylene	3.0	1.6	<0.87	<0.88	16	<12
o-Xylene	1.1	<0.88	<0.87	<0.88	<12	<12
Toluene	1.1	<0.88	<0.87	<0.88	<12	<12

Compound	VP-4 TO-15 Gas Concentrations (µg/m ³)					
	Shallow		Middle		Deep	
	Start	End	Start	End	Start	End
1,2,4-Trimethylbenzene	8.2	<4.3	<4.3	<4.3	<59	<57
1,3,5-Trimethylbenzene	<4.3	<4.3	<4.3	<4.3	86	<57
1,3-Dichlorobenzene	6.4	6.8	8.3	5.2J	<72	<70
2-Butanone (Methyl Ethyl Ketone)	<10	<10	<10	<10	<140	<140
2-Propanol	26	<8.6	38	48	<120	<110
4-Ethyltoluene	7.2	<4.3	<4.3	<4.3	<59	<57
Acetone	210	260	94	110	<280	<280
Benzene	<2.8	<2.8	<2.8	<2.8	67	<37
Cumene	<4.3	<4.3	8.1	<4.3	<59	<57
Cyclohexane	<3.0	<3.0	<3.0	<3.0	14000	9700
Ethanol	15	<6.6	13	12	<90	<87
Hexane	<3.1	<3.1	<3.1	<3.1	<42	<41
m,p-Xylene	13	6.8	<3.8	<3.8	68	<50
o-Xylene	4.8	<3.8	<3.8	<3.8	<52	<50
Toluene	4.1	<3.3	<3.3	<3.3	<45	<44

Notes:

PPMV = parts per million (by volume)

µg/m³ = micrograms per cubic meter

VP-2 is approximately 3 feet from well BVW-1.

VP-4 is approximately 23 feet from well BVW-1.

Table 8
Summary of Injection Flow Data Used for Permeability Calculations
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Nominal Flow	Actual Flow	Flow Temp	Flow Pressure	Assumed RH	Well Head Pressure	Atmospheric Pressure	Atmospheric Pressure	Well Head Pressure	Well Head Pressure
cfm	acfm	F	psig	%	IWCg	In Hg	psi	IWCa	psia
5	5	85	0.02	36	0.5	28.56	14.03	388.77	14.05
10	11	80	0.04	36	1.0	28.33	13.91	386.15	13.95
20	20	78	4	36	2.5	28.54	14.02	390.50	14.11
40	40	104	15	36	6.5	28.47	13.98	393.55	14.22
80	87	140.1	0.65	36	18	28.44	13.97	404.64	14.62

Actual Flow	Pipe ID	Pipe IA	Center Velocity	Wall Velocity	Velocity
cfm	in	ft ² /ft	fpm	fpm	fpm
86.7	1.939	0.021	4230	3100	4230

Notes:
% = percent
acfm = actual cubic feet per minute
cfm = cubic feet per minute
F = Farenheit
fpm = feet per minute
ft = feet
ft²/ft = feet square per foot
IA = Inside area
ID = Inside diameter
in = inches
In Hg = inches of water, gauge
IWCa = Inches of water column, absolute
IWCg = inches of water column, gauge
psi = pounds per square inch
psia = pounds per square inch, absolute
psig = pounds per square inch, gauge
RH = Relative Humidity

Table 9
Permeability Test Data
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Nominal Flow	Standard Flow	Vapor Point ¹	Monitoring Point Depth	Monitoring Point Radius	Monitoring Point Pressure
cfm	scfm	-	ft bls (nominal)	ft (nominal)	IWCg
5	5	VP-1s (20 feet)	15	19.95	0.05
5	5	VP-1m (20 feet)	20	19.95	0.07
5	5	VP-1d (20 feet)	24	19.95	0.07
5	5	VP-2s (3 feet)	15	2.63	0.005
5	5	VP-2m (3 feet)	20	2.63	0.245
5	5	VP-2d (3 feet)	24	2.63	0.225
5	5	VP-3s (12 feet)	15	12.15	0.005
5	5	VP-3m (12 feet)	20	12.15	0.115
5	5	VP-3d (12 feet)	24	12.15	0.135
5	5	VP-4s (23 feet)	15	22.85	0.005
5	5	VP-4m (23 feet)	20	22.85	0.07
5	5	VP-4d (23 feet)	24	22.85	0.075
10	10	VP-1s (20 feet)	15	19.95	0.13
10	10	VP-1m (20 feet)	20	19.95	0.17
10	10	VP-1d (20 feet)	24	19.95	0.18
10	10	VP-2s (3 feet)	15	2.63	0.005
10	10	VP-2m (3 feet)	20	2.63	0.60
10	10	VP-2d (3 feet)	24	2.63	0.58
10	10	VP-3s (12 feet)	15	12.15	0.005
10	10	VP-3m (12 feet)	20	12.15	0.23
10	10	VP-3d (12 feet)	24	12.15	0.28
10	10	VP-4s (23 feet)	15	22.85	0.005
10	10	VP-4m (23 feet)	20	22.85	0.15
10	10	VP-4d (23 feet)	24	22.85	0.20
20	19	VP-1s (20 feet)	15	19.95	0.29
20	19	VP-1m (20 feet)	20	19.95	0.34
20	19	VP-1d (20 feet)	24	19.95	0.34
20	19	VP-2s (3 feet)	15	2.63	0.38
20	19	VP-2m (3 feet)	20	2.63	1.5
20	19	VP-2d (3 feet)	24	2.63	1.5
20	19	VP-3s (12 feet)	15	12.15	0.005
20	19	VP-3m (12 feet)	20	12.15	0.50
20	19	VP-3d (12 feet)	24	12.15	0.58
20	19	VP-4s (23 feet)	15	22.85	0.005
20	19	VP-4m (23 feet)	20	22.85	0.30
20	19	VP-4d (23 feet)	24	22.85	0.33
40	36	VP-1s (20 feet)	15	19.95	1.0
40	36	VP-1m (20 feet)	20	19.95	1.0
40	36	VP-1d (20 feet)	24	19.95	1.0
40	36	VP-2s (3 feet)	15	2.63	1.5
40	36	VP-2m (3 feet)	20	2.63	3.5
40	36	VP-2d (3 feet)	24	2.63	3.5
40	36	VP-3s (12 feet)	15	12.15	0.67
40	36	VP-3m (12 feet)	20	12.15	1.5
40	36	VP-3d (12 feet)	24	12.15	2.0
40	36	VP-4s (23 feet)	15	22.85	0.5
40	36	VP-4m (23 feet)	20	22.85	0.83
40	36	VP-4d (23 feet)	24	22.85	0.90
80	76	VP-1s (20 feet)	15	19.95	2.0
80	76	VP-1m (20 feet)	20	19.95	2.0
80	76	VP-1d (20 feet)	24	19.95	2.0
80	76	VP-2s (3 feet)	15	2.63	2.5
80	76	VP-2m (3 feet)	20	2.63	6.25
80	76	VP-2d (3 feet)	24	2.63	6.5
80	76	VP-3s (12 feet)	15	12.15	1.5
80	76	VP-3m (12 feet)	20	12.15	3.0
80	76	VP-3d (12 feet)	24	12.15	3.5
80	76	VP-4s (23 feet)	15	22.85	0.98
80	76	VP-4m (23 feet)	20	22.85	2.0
80	76	VP-4d (23 feet)	24	22.85	2.0

Notes:
bls = below land surface
cfm = cubic feet per minute
ft = feet
IWCg = Inches of water column, gauge
scfm = standard cubic feet per minute
¹ Approximate distance from well BVW-1 is noted in parentheses.

Table 10
Results of Permeability Calculations
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Flow	Flow	max ROI	Permeability
CFM	SCFM	ft	darcy
5	5	17	96
10	10	50	123
20	19	75	101
40	36	95	76
80	76	97	55

Notes:

CFM = cubic feet per minute

ft = feet

ROI = Radius of Influence

SCFM = standard cubic feet per minute

Table 11
Results of Oxygen Radius of Influence Estimates
Enbridge Energy
South Cass Lake Pumping Station
Cass Lake, Minnesota

Flow	Flow	Flow	Oxygen ROI	
			$\Delta O_2 = -1.5\%/day$	$\Delta O_2 = -3.0\%/day$
CFM	SCFM	SCFD	Ft	Ft
5	5	7200	95	67
10	10	14400	134	95
20	19	27360	185	131
40	36	51840	255	180
80	76	109440	370	261

Notes:

% = percent

assumed aerated thickness = 9 feet

assumed air filled porosity = 0.3

CFM = cubic feet per minute

ft = feet

ROI = Radius of Influence

SCFD = standard cubic feet per day

SCFM = standard cubic feet per minute

Table 12
Carbon Efflux Measurements
Natural Source Zone Depletion Study
Enbridge Energy
South Cass Lake Pumping Station
South Cass Lake, Minnesota

Location	LICOR Measurements with Near-Surface Soil Collars			
	6/17/2013	6/27/2013	8/27/2013	Average
	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$
LS-01	13.18	4.92		9.05
LS-02	0.59	0.89		0.74
LS-03	48.42	8.39		28.41
LS-04	58.60			58.60
LS-05	1.78	0.79	22.78	8.45
LS-07	15.10	2.52	8.83	8.82
LS-08	1.46	11.45	161.57	58.16
LS-09	71.54	42.56	1.78	38.63
LS-10	10.34	5.16		7.75
LS-11	149.76	4.29		77.03
LS-12	229.34	4.57		116.96
LS-13	123.69	16.54	52.77	64.33
LS-14	0.81	60.26	126.32	62.46
LS-15	1.50	4.74		3.12
LS-16	93.59	10.17		51.88
LS-16D	150.54	4.15		77.34
LS-17	12.26	6.05		9.16
LS-18	92.41	2.98		47.70

Location	LICOR Measurements with Surface Soil Collars				
	6/17/2013	6/27/2013	8/27/2013	9/6/2016	Average
	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$
LS-07			1.57	4.37	2.97
LS-08	5.74	7.08	2.05	4.27	4.78
LS-09			2.63	6.25	4.44
LS-10				5.48	5.48
LS-15	0.79	3.31			2.05
LS-16		0.84			0.84

Location	Long-Term Measurements Using Traps	
	Near Surface Soil Collar	Surface Soil Collar
	7/9/2013	10/3/2013
	$\mu\text{mol}/\text{m}^2\text{-s}$	$\mu\text{mol}/\text{m}^2\text{-s}$
LS-05	6.2	0.78
LS-16	26.3	2.38
LS-17	17.8	2.49
LS-18	25.1	0.63

Notes:
 $\mu\text{mol}/\text{m}^2\text{-s}$ = micromoles per square meter per second

Attachments

Air Toxics Analytical Soil Gas Report

9/9/2013

Mr. Christopher Brownfield
AECOM Environment
8540 Colonnade Center Drive
Suite 306
Raleigh NC 27615

Project Name: Enbridge S. Cass Lake
Project #: 60254681-5.3
Workorder #: 1308609A

Dear Mr. Christopher Brownfield

The following report includes the data for the above referenced project for sample(s) received on 8/26/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1308609A

Work Order Summary

CLIENT:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615	BILL TO:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615
PHONE:	919.872.6600	P.O. #	48835ACM
FAX:		PROJECT #	60254681-5.3 Enbridge S. Cass Lake
DATE RECEIVED:	08/26/2013	CONTACT:	Ausha Scott
DATE COMPLETED:	09/09/2013		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VP-2s-A	Modified TO-15	7.3 "Hg	4.9 psi
02A	VP-2m-A	Modified TO-15	7.6 "Hg	5 psi
03A	VP-2d-A	Modified TO-15	6.3 "Hg	5.1 psi
04A	VP-4s-A	Modified TO-15	7.1 "Hg	5 psi
05A	VP-4m-A	Modified TO-15	6.9 "Hg	5 psi
06A	VP-4d-A	Modified TO-15	7.3 "Hg	5.3 psi
07A	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA
09AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:



Technical Director

DATE: 09/09/13

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, VA NELAP - 460197, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.

Eurofins Air Toxics Inc., certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



LABORATORY NARRATIVE
EPA Method TO-15
AECOM Environment
Workorder# 1308609A

Six 6 Liter Summa Canister samples were received on August 26, 2013. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on sample VP-4d-A due to the presence of high level target and non-target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds

EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-2s-A

Lab ID#: 1308609A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.5	11	6.6	21
Acetone	8.8	120	21	290
2-Propanol	3.5	13	8.6	32
Toluene	0.88	1.5	3.3	5.6
m,p-Xylene	0.88	2.7	3.8	12
o-Xylene	0.88	1.0	3.8	4.4
4-Ethyltoluene	0.88	1.1	4.3	5.3
1,2,4-Trimethylbenzene	0.88	1.2	4.3	5.9

Client Sample ID: VP-2m-A

Lab ID#: 1308609A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	9.0	66	21	160
2-Propanol	3.6	8.4	8.8	21
Benzene	0.90	1.3	2.8	4.1
Cumene	0.90	4.4	4.4	21
1,3-Dichlorobenzene	0.90	0.92	5.4	5.6

Client Sample ID: VP-2d-A

Lab ID#: 1308609A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.4	4.3	6.4	8.1
Acetone	8.5	29	20	70
2-Propanol	3.4	11	8.4	27
1,3-Dichlorobenzene	0.85	0.96	5.1	5.8

Client Sample ID: VP-4s-A

Lab ID#: 1308609A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-4s-A

Lab ID#: 1308609A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.5	8.1	6.6	15
Acetone	8.8	90	21	210
2-Propanol	3.5	11	8.6	26
Toluene	0.88	1.1	3.3	4.1
m,p-Xylene	0.88	3.0	3.8	13
o-Xylene	0.88	1.1	3.8	4.8
4-Ethyltoluene	0.88	1.4	4.3	7.2
1,2,4-Trimethylbenzene	0.88	1.7	4.3	8.2
1,3-Dichlorobenzene	0.88	1.1	5.3	6.4

Client Sample ID: VP-4m-A

Lab ID#: 1308609A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.5	6.8	6.6	13
Acetone	8.7	39	21	94
2-Propanol	3.5	15	8.6	38
Cumene	0.87	1.6	4.3	8.1
1,3-Dichlorobenzene	0.87	1.4	5.2	8.3

Client Sample ID: VP-4d-A

Lab ID#: 1308609A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Cyclohexane	12	4000	41	14000
Benzene	12	21	38	67
m,p-Xylene	12	16	52	68
1,3,5-Trimethylbenzene	12	18	59	86



Air Toxics

Client Sample ID: VP-2s-A

Lab ID#: 1308609A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 17090418

Date of Collection: 8/21/13 4:04:00 PM

Dil. Factor: 1.76

Date of Analysis: 9/4/13 04:59 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.88	Not Detected	4.4	Not Detected
Freon 114	0.88	Not Detected	6.2	Not Detected
Chloromethane	8.8	Not Detected	18	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
1,3-Butadiene	0.88	Not Detected	1.9	Not Detected
Bromomethane	8.8	Not Detected	34	Not Detected
Chloroethane	3.5	Not Detected	9.3	Not Detected
Freon 11	0.88	Not Detected	4.9	Not Detected
Ethanol	3.5	11	6.6	21
Freon 113	0.88	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Acetone	8.8	120	21	290
2-Propanol	3.5	13	8.6	32
Carbon Disulfide	3.5	Not Detected	11	Not Detected
3-Chloropropene	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.8	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.88	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Hexane	0.88	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Tetrahydrofuran	0.88	Not Detected	2.6	Not Detected
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Cyclohexane	0.88	Not Detected	3.0	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.5	Not Detected
2,2,4-Trimethylpentane	0.88	Not Detected	4.1	Not Detected
Benzene	0.88	Not Detected	2.8	Not Detected
1,2-Dichloroethane	0.88	Not Detected	3.6	Not Detected
Heptane	0.88	Not Detected	3.6	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected
1,2-Dichloropropane	0.88	Not Detected	4.1	Not Detected
1,4-Dioxane	3.5	Not Detected	13	Not Detected
Bromodichloromethane	0.88	Not Detected	5.9	Not Detected
cis-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
4-Methyl-2-pentanone	0.88	Not Detected	3.6	Not Detected
Toluene	0.88	1.5	3.3	5.6
trans-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	Not Detected	6.0	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected



Air Toxics

Client Sample ID: VP-2s-A

Lab ID#: 1308609A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090418	Date of Collection:	8/21/13 4:04:00 PM
Dil. Factor:	1.76	Date of Analysis:	9/4/13 04:59 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.88	Not Detected	7.5	Not Detected
1,2-Dibromoethane (EDB)	0.88	Not Detected	6.8	Not Detected
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
Ethyl Benzene	0.88	Not Detected	3.8	Not Detected
m,p-Xylene	0.88	2.7	3.8	12
o-Xylene	0.88	1.0	3.8	4.4
Styrene	0.88	Not Detected	3.7	Not Detected
Bromoform	0.88	Not Detected	9.1	Not Detected
Cumene	0.88	Not Detected	4.3	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.0	Not Detected
Propylbenzene	0.88	Not Detected	4.3	Not Detected
4-Ethyltoluene	0.88	1.1	4.3	5.3
1,3,5-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.88	1.2	4.3	5.9
1,3-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
1,4-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
alpha-Chlorotoluene	0.88	Not Detected	4.6	Not Detected
1,2-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
1,2,4-Trichlorobenzene	3.5	Not Detected	26	Not Detected
Hexachlorobutadiene	3.5	Not Detected	38	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: VP-2m-A

Lab ID#: 1308609A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090419	Date of Collection:	8/21/13 3:57:00 PM
Dil. Factor:	1.79	Date of Analysis:	9/4/13 05:21 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.90	Not Detected	4.4	Not Detected
Freon 114	0.90	Not Detected	6.2	Not Detected
Chloromethane	9.0	Not Detected	18	Not Detected
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
1,3-Butadiene	0.90	Not Detected	2.0	Not Detected
Bromomethane	9.0	Not Detected	35	Not Detected
Chloroethane	3.6	Not Detected	9.4	Not Detected
Freon 11	0.90	Not Detected	5.0	Not Detected
Ethanol	3.6	Not Detected	6.7	Not Detected
Freon 113	0.90	Not Detected	6.8	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Acetone	9.0	66	21	160
2-Propanol	3.6	8.4	8.8	21
Carbon Disulfide	3.6	Not Detected	11	Not Detected
3-Chloropropene	3.6	Not Detected	11	Not Detected
Methylene Chloride	9.0	Not Detected	31	Not Detected
Methyl tert-butyl ether	0.90	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Hexane	0.90	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.6	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Tetrahydrofuran	0.90	Not Detected	2.6	Not Detected
Chloroform	0.90	Not Detected	4.4	Not Detected
1,1,1-Trichloroethane	0.90	Not Detected	4.9	Not Detected
Cyclohexane	0.90	Not Detected	3.1	Not Detected
Carbon Tetrachloride	0.90	Not Detected	5.6	Not Detected
2,2,4-Trimethylpentane	0.90	Not Detected	4.2	Not Detected
Benzene	0.90	1.3	2.8	4.1
1,2-Dichloroethane	0.90	Not Detected	3.6	Not Detected
Heptane	0.90	Not Detected	3.7	Not Detected
Trichloroethene	0.90	Not Detected	4.8	Not Detected
1,2-Dichloropropane	0.90	Not Detected	4.1	Not Detected
1,4-Dioxane	3.6	Not Detected	13	Not Detected
Bromodichloromethane	0.90	Not Detected	6.0	Not Detected
cis-1,3-Dichloropropene	0.90	Not Detected	4.1	Not Detected
4-Methyl-2-pentanone	0.90	Not Detected	3.7	Not Detected
Toluene	0.90	Not Detected	3.4	Not Detected
trans-1,3-Dichloropropene	0.90	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	0.90	Not Detected	4.9	Not Detected
Tetrachloroethene	0.90	Not Detected	6.1	Not Detected
2-Hexanone	3.6	Not Detected	15	Not Detected



Air Toxics

Client Sample ID: VP-2m-A

Lab ID#: 1308609A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090419	Date of Collection: 8/21/13 3:57:00 PM
Dil. Factor:	1.79	Date of Analysis: 9/4/13 05:21 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.90	Not Detected	7.6	Not Detected
1,2-Dibromoethane (EDB)	0.90	Not Detected	6.9	Not Detected
Chlorobenzene	0.90	Not Detected	4.1	Not Detected
Ethyl Benzene	0.90	Not Detected	3.9	Not Detected
m,p-Xylene	0.90	Not Detected	3.9	Not Detected
o-Xylene	0.90	Not Detected	3.9	Not Detected
Styrene	0.90	Not Detected	3.8	Not Detected
Bromoform	0.90	Not Detected	9.2	Not Detected
Cumene	0.90	4.4	4.4	21
1,1,2,2-Tetrachloroethane	0.90	Not Detected	6.1	Not Detected
Propylbenzene	0.90	Not Detected	4.4	Not Detected
4-Ethyltoluene	0.90	Not Detected	4.4	Not Detected
1,3,5-Trimethylbenzene	0.90	Not Detected	4.4	Not Detected
1,2,4-Trimethylbenzene	0.90	Not Detected	4.4	Not Detected
1,3-Dichlorobenzene	0.90	0.92	5.4	5.6
1,4-Dichlorobenzene	0.90	Not Detected	5.4	Not Detected
alpha-Chlorotoluene	0.90	Not Detected	4.6	Not Detected
1,2-Dichlorobenzene	0.90	Not Detected	5.4	Not Detected
1,2,4-Trichlorobenzene	3.6	Not Detected	26	Not Detected
Hexachlorobutadiene	3.6	Not Detected	38	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	86	70-130
4-Bromofluorobenzene	104	70-130



Air Toxics

Client Sample ID: VP-2d-A

Lab ID#: 1308609A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 17090420

Date of Collection: 8/21/13 4:03:00 PM

Dil. Factor: 1.70

Date of Analysis: 9/4/13 05:42 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.85	Not Detected	4.2	Not Detected
Freon 114	0.85	Not Detected	5.9	Not Detected
Chloromethane	8.5	Not Detected	18	Not Detected
Vinyl Chloride	0.85	Not Detected	2.2	Not Detected
1,3-Butadiene	0.85	Not Detected	1.9	Not Detected
Bromomethane	8.5	Not Detected	33	Not Detected
Chloroethane	3.4	Not Detected	9.0	Not Detected
Freon 11	0.85	Not Detected	4.8	Not Detected
Ethanol	3.4	4.3	6.4	8.1
Freon 113	0.85	Not Detected	6.5	Not Detected
1,1-Dichloroethene	0.85	Not Detected	3.4	Not Detected
Acetone	8.5	29	20	70
2-Propanol	3.4	11	8.4	27
Carbon Disulfide	3.4	Not Detected	10	Not Detected
3-Chloropropene	3.4	Not Detected	11	Not Detected
Methylene Chloride	8.5	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.85	Not Detected	3.1	Not Detected
trans-1,2-Dichloroethene	0.85	Not Detected	3.4	Not Detected
Hexane	0.85	Not Detected	3.0	Not Detected
1,1-Dichloroethane	0.85	Not Detected	3.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.4	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.85	Not Detected	3.4	Not Detected
Tetrahydrofuran	0.85	Not Detected	2.5	Not Detected
Chloroform	0.85	Not Detected	4.2	Not Detected
1,1,1-Trichloroethane	0.85	Not Detected	4.6	Not Detected
Cyclohexane	0.85	Not Detected	2.9	Not Detected
Carbon Tetrachloride	0.85	Not Detected	5.3	Not Detected
2,2,4-Trimethylpentane	0.85	Not Detected	4.0	Not Detected
Benzene	0.85	Not Detected	2.7	Not Detected
1,2-Dichloroethane	0.85	Not Detected	3.4	Not Detected
Heptane	0.85	Not Detected	3.5	Not Detected
Trichloroethene	0.85	Not Detected	4.6	Not Detected
1,2-Dichloropropane	0.85	Not Detected	3.9	Not Detected
1,4-Dioxane	3.4	Not Detected	12	Not Detected
Bromodichloromethane	0.85	Not Detected	5.7	Not Detected
cis-1,3-Dichloropropene	0.85	Not Detected	3.8	Not Detected
4-Methyl-2-pentanone	0.85	Not Detected	3.5	Not Detected
Toluene	0.85	Not Detected	3.2	Not Detected
trans-1,3-Dichloropropene	0.85	Not Detected	3.8	Not Detected
1,1,2-Trichloroethane	0.85	Not Detected	4.6	Not Detected
Tetrachloroethene	0.85	Not Detected	5.8	Not Detected
2-Hexanone	3.4	Not Detected	14	Not Detected



Air Toxics

Client Sample ID: VP-2d-A

Lab ID#: 1308609A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090420	Date of Collection:	8/21/13 4:03:00 PM
Dil. Factor:	1.70	Date of Analysis:	9/4/13 05:42 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.85	Not Detected	7.2	Not Detected
1,2-Dibromoethane (EDB)	0.85	Not Detected	6.5	Not Detected
Chlorobenzene	0.85	Not Detected	3.9	Not Detected
Ethyl Benzene	0.85	Not Detected	3.7	Not Detected
m,p-Xylene	0.85	Not Detected	3.7	Not Detected
o-Xylene	0.85	Not Detected	3.7	Not Detected
Styrene	0.85	Not Detected	3.6	Not Detected
Bromoform	0.85	Not Detected	8.8	Not Detected
Cumene	0.85	Not Detected	4.2	Not Detected
1,1,2,2-Tetrachloroethane	0.85	Not Detected	5.8	Not Detected
Propylbenzene	0.85	Not Detected	4.2	Not Detected
4-Ethyltoluene	0.85	Not Detected	4.2	Not Detected
1,3,5-Trimethylbenzene	0.85	Not Detected	4.2	Not Detected
1,2,4-Trimethylbenzene	0.85	Not Detected	4.2	Not Detected
1,3-Dichlorobenzene	0.85	0.96	5.1	5.8
1,4-Dichlorobenzene	0.85	Not Detected	5.1	Not Detected
alpha-Chlorotoluene	0.85	Not Detected	4.4	Not Detected
1,2-Dichlorobenzene	0.85	Not Detected	5.1	Not Detected
1,2,4-Trichlorobenzene	3.4	Not Detected	25	Not Detected
Hexachlorobutadiene	3.4	Not Detected	36	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: VP-4s-A

Lab ID#: 1308609A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090421	Date of Collection:	8/21/13 3:50:00 PM
Dil. Factor:	1.76	Date of Analysis:	9/4/13 06:04 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.88	Not Detected	4.4	Not Detected
Freon 114	0.88	Not Detected	6.2	Not Detected
Chloromethane	8.8	Not Detected	18	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
1,3-Butadiene	0.88	Not Detected	1.9	Not Detected
Bromomethane	8.8	Not Detected	34	Not Detected
Chloroethane	3.5	Not Detected	9.3	Not Detected
Freon 11	0.88	Not Detected	4.9	Not Detected
Ethanol	3.5	8.1	6.6	15
Freon 113	0.88	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Acetone	8.8	90	21	210
2-Propanol	3.5	11	8.6	26
Carbon Disulfide	3.5	Not Detected	11	Not Detected
3-Chloropropene	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.8	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.88	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Hexane	0.88	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Tetrahydrofuran	0.88	Not Detected	2.6	Not Detected
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Cyclohexane	0.88	Not Detected	3.0	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.5	Not Detected
2,2,4-Trimethylpentane	0.88	Not Detected	4.1	Not Detected
Benzene	0.88	Not Detected	2.8	Not Detected
1,2-Dichloroethane	0.88	Not Detected	3.6	Not Detected
Heptane	0.88	Not Detected	3.6	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected
1,2-Dichloropropane	0.88	Not Detected	4.1	Not Detected
1,4-Dioxane	3.5	Not Detected	13	Not Detected
Bromodichloromethane	0.88	Not Detected	5.9	Not Detected
cis-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
4-Methyl-2-pentanone	0.88	Not Detected	3.6	Not Detected
Toluene	0.88	1.1	3.3	4.1
trans-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	Not Detected	6.0	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected



Air Toxics

Client Sample ID: VP-4s-A

Lab ID#: 1308609A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090421	Date of Collection:	8/21/13 3:50:00 PM
Dil. Factor:	1.76	Date of Analysis:	9/4/13 06:04 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.88	Not Detected	7.5	Not Detected
1,2-Dibromoethane (EDB)	0.88	Not Detected	6.8	Not Detected
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
Ethyl Benzene	0.88	Not Detected	3.8	Not Detected
m,p-Xylene	0.88	3.0	3.8	13
o-Xylene	0.88	1.1	3.8	4.8
Styrene	0.88	Not Detected	3.7	Not Detected
Bromoform	0.88	Not Detected	9.1	Not Detected
Cumene	0.88	Not Detected	4.3	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.0	Not Detected
Propylbenzene	0.88	Not Detected	4.3	Not Detected
4-Ethyltoluene	0.88	1.4	4.3	7.2
1,3,5-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.88	1.7	4.3	8.2
1,3-Dichlorobenzene	0.88	1.1	5.3	6.4
1,4-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
alpha-Chlorotoluene	0.88	Not Detected	4.6	Not Detected
1,2-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
1,2,4-Trichlorobenzene	3.5	Not Detected	26	Not Detected
Hexachlorobutadiene	3.5	Not Detected	38	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	84	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: VP-4m-A

Lab ID#: 1308609A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090422	Date of Collection:	8/21/13 4:01:00 PM
Dil. Factor:	1.74	Date of Analysis:	9/4/13 06:26 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.87	Not Detected	4.3	Not Detected
Freon 114	0.87	Not Detected	6.1	Not Detected
Chloromethane	8.7	Not Detected	18	Not Detected
Vinyl Chloride	0.87	Not Detected	2.2	Not Detected
1,3-Butadiene	0.87	Not Detected	1.9	Not Detected
Bromomethane	8.7	Not Detected	34	Not Detected
Chloroethane	3.5	Not Detected	9.2	Not Detected
Freon 11	0.87	Not Detected	4.9	Not Detected
Ethanol	3.5	6.8	6.6	13
Freon 113	0.87	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.87	Not Detected	3.4	Not Detected
Acetone	8.7	39	21	94
2-Propanol	3.5	15	8.6	38
Carbon Disulfide	3.5	Not Detected	11	Not Detected
3-Chloropropene	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.7	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.87	Not Detected	3.1	Not Detected
trans-1,2-Dichloroethene	0.87	Not Detected	3.4	Not Detected
Hexane	0.87	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.87	Not Detected	3.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.87	Not Detected	3.4	Not Detected
Tetrahydrofuran	0.87	Not Detected	2.6	Not Detected
Chloroform	0.87	Not Detected	4.2	Not Detected
1,1,1-Trichloroethane	0.87	Not Detected	4.7	Not Detected
Cyclohexane	0.87	Not Detected	3.0	Not Detected
Carbon Tetrachloride	0.87	Not Detected	5.5	Not Detected
2,2,4-Trimethylpentane	0.87	Not Detected	4.1	Not Detected
Benzene	0.87	Not Detected	2.8	Not Detected
1,2-Dichloroethane	0.87	Not Detected	3.5	Not Detected
Heptane	0.87	Not Detected	3.6	Not Detected
Trichloroethene	0.87	Not Detected	4.7	Not Detected
1,2-Dichloropropane	0.87	Not Detected	4.0	Not Detected
1,4-Dioxane	3.5	Not Detected	12	Not Detected
Bromodichloromethane	0.87	Not Detected	5.8	Not Detected
cis-1,3-Dichloropropene	0.87	Not Detected	3.9	Not Detected
4-Methyl-2-pentanone	0.87	Not Detected	3.6	Not Detected
Toluene	0.87	Not Detected	3.3	Not Detected
trans-1,3-Dichloropropene	0.87	Not Detected	3.9	Not Detected
1,1,2-Trichloroethane	0.87	Not Detected	4.7	Not Detected
Tetrachloroethene	0.87	Not Detected	5.9	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected



Air Toxics

Client Sample ID: VP-4m-A

Lab ID#: 1308609A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090422	Date of Collection:	8/21/13 4:01:00 PM
Dil. Factor:	1.74	Date of Analysis:	9/4/13 06:26 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.87	Not Detected	7.4	Not Detected
1,2-Dibromoethane (EDB)	0.87	Not Detected	6.7	Not Detected
Chlorobenzene	0.87	Not Detected	4.0	Not Detected
Ethyl Benzene	0.87	Not Detected	3.8	Not Detected
m,p-Xylene	0.87	Not Detected	3.8	Not Detected
o-Xylene	0.87	Not Detected	3.8	Not Detected
Styrene	0.87	Not Detected	3.7	Not Detected
Bromoform	0.87	Not Detected	9.0	Not Detected
Cumene	0.87	1.6	4.3	8.1
1,1,2,2-Tetrachloroethane	0.87	Not Detected	6.0	Not Detected
Propylbenzene	0.87	Not Detected	4.3	Not Detected
4-Ethyltoluene	0.87	Not Detected	4.3	Not Detected
1,3,5-Trimethylbenzene	0.87	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.87	Not Detected	4.3	Not Detected
1,3-Dichlorobenzene	0.87	1.4	5.2	8.3
1,4-Dichlorobenzene	0.87	Not Detected	5.2	Not Detected
alpha-Chlorotoluene	0.87	Not Detected	4.5	Not Detected
1,2-Dichlorobenzene	0.87	Not Detected	5.2	Not Detected
1,2,4-Trichlorobenzene	3.5	Not Detected	26	Not Detected
Hexachlorobutadiene	3.5	Not Detected	37	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	106	70-130



Air Toxics

Client Sample ID: VP-4d-A

Lab ID#: 1308609A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 17090427

Date of Collection: 8/21/13 3:59:00 PM

Dil. Factor: 24.0

Date of Analysis: 9/4/13 08:13 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	Not Detected	59	Not Detected
Freon 114	12	Not Detected	84	Not Detected
Chloromethane	120	Not Detected	250	Not Detected
Vinyl Chloride	12	Not Detected	31	Not Detected
1,3-Butadiene	12	Not Detected	26	Not Detected
Bromomethane	120	Not Detected	470	Not Detected
Chloroethane	48	Not Detected	130	Not Detected
Freon 11	12	Not Detected	67	Not Detected
Ethanol	48	Not Detected	90	Not Detected
Freon 113	12	Not Detected	92	Not Detected
1,1-Dichloroethene	12	Not Detected	48	Not Detected
Acetone	120	Not Detected	280	Not Detected
2-Propanol	48	Not Detected	120	Not Detected
Carbon Disulfide	48	Not Detected	150	Not Detected
3-Chloropropene	48	Not Detected	150	Not Detected
Methylene Chloride	120	Not Detected	420	Not Detected
Methyl tert-butyl ether	12	Not Detected	43	Not Detected
trans-1,2-Dichloroethene	12	Not Detected	48	Not Detected
Hexane	12	Not Detected	42	Not Detected
1,1-Dichloroethane	12	Not Detected	48	Not Detected
2-Butanone (Methyl Ethyl Ketone)	48	Not Detected	140	Not Detected
cis-1,2-Dichloroethene	12	Not Detected	48	Not Detected
Tetrahydrofuran	12	Not Detected	35	Not Detected
Chloroform	12	Not Detected	58	Not Detected
1,1,1-Trichloroethane	12	Not Detected	65	Not Detected
Cyclohexane	12	4000	41	14000
Carbon Tetrachloride	12	Not Detected	76	Not Detected
2,2,4-Trimethylpentane	12	Not Detected	56	Not Detected
Benzene	12	21	38	67
1,2-Dichloroethane	12	Not Detected	48	Not Detected
Heptane	12	Not Detected	49	Not Detected
Trichloroethene	12	Not Detected	64	Not Detected
1,2-Dichloropropane	12	Not Detected	55	Not Detected
1,4-Dioxane	48	Not Detected	170	Not Detected
Bromodichloromethane	12	Not Detected	80	Not Detected
cis-1,3-Dichloropropene	12	Not Detected	54	Not Detected
4-Methyl-2-pentanone	12	Not Detected	49	Not Detected
Toluene	12	Not Detected	45	Not Detected
trans-1,3-Dichloropropene	12	Not Detected	54	Not Detected
1,1,2-Trichloroethane	12	Not Detected	65	Not Detected
Tetrachloroethene	12	Not Detected	81	Not Detected
2-Hexanone	48	Not Detected	200	Not Detected



Air Toxics

Client Sample ID: VP-4d-A

Lab ID#: 1308609A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090427	Date of Collection:	8/21/13 3:59:00 PM
Dil. Factor:	24.0	Date of Analysis:	9/4/13 08:13 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	12	Not Detected	100	Not Detected
1,2-Dibromoethane (EDB)	12	Not Detected	92	Not Detected
Chlorobenzene	12	Not Detected	55	Not Detected
Ethyl Benzene	12	Not Detected	52	Not Detected
m,p-Xylene	12	16	52	68
o-Xylene	12	Not Detected	52	Not Detected
Styrene	12	Not Detected	51	Not Detected
Bromoform	12	Not Detected	120	Not Detected
Cumene	12	Not Detected	59	Not Detected
1,1,2,2-Tetrachloroethane	12	Not Detected	82	Not Detected
Propylbenzene	12	Not Detected	59	Not Detected
4-Ethyltoluene	12	Not Detected	59	Not Detected
1,3,5-Trimethylbenzene	12	18	59	86
1,2,4-Trimethylbenzene	12	Not Detected	59	Not Detected
1,3-Dichlorobenzene	12	Not Detected	72	Not Detected
1,4-Dichlorobenzene	12	Not Detected	72	Not Detected
alpha-Chlorotoluene	12	Not Detected	62	Not Detected
1,2-Dichlorobenzene	12	Not Detected	72	Not Detected
1,2,4-Trichlorobenzene	48	Not Detected	360	Not Detected
Hexachlorobutadiene	48	Not Detected	510	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	116	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1308609A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090407	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	9/4/13 11:14 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 1308609A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090407	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 11:14 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	86	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: CCV

Lab ID#: 1308609A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 09:05 AM

Compound	%Recovery
Freon 12	92
Freon 114	98
Chloromethane	94
Vinyl Chloride	87
1,3-Butadiene	82
Bromomethane	89
Chloroethane	92
Freon 11	97
Ethanol	83
Freon 113	98
1,1-Dichloroethene	95
Acetone	84
2-Propanol	85
Carbon Disulfide	93
3-Chloropropene	92
Methylene Chloride	87
Methyl tert-butyl ether	91
trans-1,2-Dichloroethene	97
Hexane	88
1,1-Dichloroethane	93
2-Butanone (Methyl Ethyl Ketone)	91
cis-1,2-Dichloroethene	89
Tetrahydrofuran	84
Chloroform	96
1,1,1-Trichloroethane	95
Cyclohexane	92
Carbon Tetrachloride	96
2,2,4-Trimethylpentane	88
Benzene	93
1,2-Dichloroethane	92
Heptane	91
Trichloroethene	94
1,2-Dichloropropane	91
1,4-Dioxane	95
Bromodichloromethane	97
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	84
Toluene	98
trans-1,3-Dichloropropene	92
1,1,2-Trichloroethane	94
Tetrachloroethene	92
2-Hexanone	86

Client Sample ID: CCV

Lab ID#: 1308609A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 09:05 AM

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	93
Chlorobenzene	97
Ethyl Benzene	96
m,p-Xylene	94
o-Xylene	93
Styrene	98
Bromoform	94
Cumene	94
1,1,2,2-Tetrachloroethane	93
Propylbenzene	94
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	94
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	94
1,4-Dichlorobenzene	94
alpha-Chlorotoluene	88
1,2-Dichlorobenzene	93
1,2,4-Trichlorobenzene	92
Hexachlorobutadiene	88

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: LCS

Lab ID#: 1308609A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 17090403

Date of Collection: NA

Dil. Factor: 1.00

Date of Analysis: 9/4/13 09:26 AM

Compound	%Recovery	Method Limits
Freon 12	92	70-130
Freon 114	97	70-130
Chloromethane	95	70-130
Vinyl Chloride	88	70-130
1,3-Butadiene	81	70-130
Bromomethane	86	70-130
Chloroethane	90	70-130
Freon 11	94	70-130
Ethanol	82	70-130
Freon 113	97	70-130
1,1-Dichloroethene	98	70-130
Acetone	81	70-130
2-Propanol	84	70-130
Carbon Disulfide	112	70-130
3-Chloropropene	103	70-130
Methylene Chloride	85	70-130
Methyl tert-butyl ether	91	70-130
trans-1,2-Dichloroethene	106	70-130
Hexane	86	70-130
1,1-Dichloroethane	91	70-130
2-Butanone (Methyl Ethyl Ketone)	89	70-130
cis-1,2-Dichloroethene	87	70-130
Tetrahydrofuran	81	70-130
Chloroform	96	70-130
1,1,1-Trichloroethane	95	70-130
Cyclohexane	90	70-130
Carbon Tetrachloride	95	70-130
2,2,4-Trimethylpentane	86	70-130
Benzene	92	70-130
1,2-Dichloroethane	90	70-130
Heptane	90	70-130
Trichloroethene	94	70-130
1,2-Dichloropropane	91	70-130
1,4-Dioxane	90	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	80	70-130
Toluene	95	70-130
trans-1,3-Dichloropropene	96	70-130
1,1,2-Trichloroethane	97	70-130
Tetrachloroethene	95	70-130
2-Hexanone	85	70-130

Client Sample ID: LCS

Lab ID#: 1308609A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090403	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 09:26 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	95	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	101	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	98	70-130
o-Xylene	96	70-130
Styrene	99	70-130
Bromoform	95	70-130
Cumene	98	70-130
1,1,2,2-Tetrachloroethane	98	70-130
Propylbenzene	98	70-130
4-Ethyltoluene	94	70-130
1,3,5-Trimethylbenzene	95	70-130
1,2,4-Trimethylbenzene	97	70-130
1,3-Dichlorobenzene	99	70-130
1,4-Dichlorobenzene	96	70-130
alpha-Chlorotoluene	86	70-130
1,2-Dichlorobenzene	96	70-130
1,2,4-Trichlorobenzene	97	70-130
Hexachlorobutadiene	90	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: LCSD

Lab ID#: 1308609A-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 17090404

Date of Collection: NA

Dil. Factor: 1.00

Date of Analysis: 9/4/13 09:47 AM

Compound	%Recovery	Method Limits
Freon 12	93	70-130
Freon 114	99	70-130
Chloromethane	96	70-130
Vinyl Chloride	88	70-130
1,3-Butadiene	83	70-130
Bromomethane	87	70-130
Chloroethane	92	70-130
Freon 11	96	70-130
Ethanol	80	70-130
Freon 113	98	70-130
1,1-Dichloroethene	98	70-130
Acetone	84	70-130
2-Propanol	84	70-130
Carbon Disulfide	114	70-130
3-Chloropropene	104	70-130
Methylene Chloride	87	70-130
Methyl tert-butyl ether	92	70-130
trans-1,2-Dichloroethene	107	70-130
Hexane	87	70-130
1,1-Dichloroethane	93	70-130
2-Butanone (Methyl Ethyl Ketone)	90	70-130
cis-1,2-Dichloroethene	89	70-130
Tetrahydrofuran	80	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	97	70-130
Cyclohexane	92	70-130
Carbon Tetrachloride	97	70-130
2,2,4-Trimethylpentane	88	70-130
Benzene	94	70-130
1,2-Dichloroethane	91	70-130
Heptane	89	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	91	70-130
1,4-Dioxane	93	70-130
Bromodichloromethane	95	70-130
cis-1,3-Dichloropropene	94	70-130
4-Methyl-2-pentanone	81	70-130
Toluene	96	70-130
trans-1,3-Dichloropropene	94	70-130
1,1,2-Trichloroethane	97	70-130
Tetrachloroethene	93	70-130
2-Hexanone	84	70-130

Client Sample ID: LCSD

Lab ID#: 1308609A-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	17090404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 09:47 AM

Compound	%Recovery	Method Limits
Dibromochloromethane	95	70-130
1,2-Dibromoethane (EDB)	95	70-130
Chlorobenzene	100	70-130
Ethyl Benzene	97	70-130
m,p-Xylene	98	70-130
o-Xylene	96	70-130
Styrene	99	70-130
Bromoform	94	70-130
Cumene	96	70-130
1,1,2,2-Tetrachloroethane	98	70-130
Propylbenzene	97	70-130
4-Ethyltoluene	94	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	97	70-130
1,3-Dichlorobenzene	98	70-130
1,4-Dichlorobenzene	96	70-130
alpha-Chlorotoluene	85	70-130
1,2-Dichlorobenzene	99	70-130
1,2,4-Trichlorobenzene	97	70-130
Hexachlorobutadiene	92	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	97	70-130

9/10/2013

Mr. Christopher Brownfield
AECOM Environment
8540 Colonnade Center Drive
Suite 306
Raleigh NC 27615

Project Name: Enbridge S. Cass Lake
Project #: 60254681-5.3
Workorder #: 1308609B

Dear Mr. Christopher Brownfield

The following report includes the data for the above referenced project for sample(s) received on 8/26/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1308609B

Work Order Summary

CLIENT:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615	BILL TO:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615
PHONE:	919.872.6600	P.O. #	48835ACM
FAX:		PROJECT #	60254681-5.3 Enbridge S. Cass Lake
DATE RECEIVED:	08/26/2013	CONTACT:	Ausha Scott
DATE COMPLETED:	09/10/2013		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VP-2s-A	Modified ASTM D-1946	7.3 "Hg	4.9 psi
02A	VP-2m-A	Modified ASTM D-1946	7.6 "Hg	5 psi
03A	VP-2d-A	Modified ASTM D-1946	6.3 "Hg	5.1 psi
04A	VP-4s-A	Modified ASTM D-1946	7.1 "Hg	5 psi
05A	VP-4m-A	Modified ASTM D-1946	6.9 "Hg	5 psi
06A	VP-4d-A	Modified ASTM D-1946	7.3 "Hg	5.3 psi
07A	Lab Blank	Modified ASTM D-1946	NA	NA
07B	Lab Blank	Modified ASTM D-1946	NA	NA
08A	LCS	Modified ASTM D-1946	NA	NA
08AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:



Technical Director

DATE: 09/10/13

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.

Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM Environment
Workorder# 1308609B

Six 6 Liter Summa Canister samples were received on August 26, 2013. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a $\geq 95\%$ accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections $> 5 \times$ the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reporting limit for Nitrogen was raised from 0.10% to 0.50%.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-2s-A

Lab ID#: 1308609B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	20
Nitrogen	0.88	77
Methane	0.00018	0.00021
Carbon Dioxide	0.018	0.083
Helium	0.088	3.2

Client Sample ID: VP-2m-A

Lab ID#: 1308609B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	21
Nitrogen	0.90	76
Methane	0.00018	0.00020
Carbon Dioxide	0.018	0.048
Helium	0.090	3.3

Client Sample ID: VP-2d-A

Lab ID#: 1308609B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.86	77
Methane	0.00017	0.00020
Carbon Dioxide	0.017	0.053
Helium	0.086	3.2

Client Sample ID: VP-4s-A

Lab ID#: 1308609B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	11
Nitrogen	0.88	76

Summary of Detected Compounds

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-4s-A

Lab ID#: 1308609B-04A

Carbon Dioxide	0.018	12
Helium	0.088	1.2

Client Sample ID: VP-4m-A

Lab ID#: 1308609B-05A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.87	74
Carbon Dioxide	0.017	2.8
Helium	0.087	2.9

Client Sample ID: VP-4d-A

Lab ID#: 1308609B-06A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	17
Nitrogen	0.90	76
Methane	0.00018	0.0015
Carbon Dioxide	0.018	4.2
Helium	0.090	3.0

Client Sample ID: VP-2s-A

Lab ID#: 1308609B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090317	Date of Collection: 8/21/13 4:04:00 PM
Dil. Factor:	1.76	Date of Analysis: 9/3/13 07:05 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	20
Nitrogen	0.88	77
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	0.00021
Carbon Dioxide	0.018	0.083
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.088	3.2

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-2m-A

Lab ID#: 1308609B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090316	Date of Collection: 8/21/13 3:57:00 PM
Dil. Factor:	1.79	Date of Analysis: 9/3/13 06:23 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	21
Nitrogen	0.90	76
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	0.00020
Carbon Dioxide	0.018	0.048
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.090	3.3

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-2d-A

Lab ID#: 1308609B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090315	Date of Collection: 8/21/13 4:03:00 PM
Dil. Factor:	1.71	Date of Analysis: 9/3/13 05:36 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.86	77
Carbon Monoxide	0.017	Not Detected
Methane	0.00017	0.00020
Carbon Dioxide	0.017	0.053
Ethane	0.0017	Not Detected
Ethene	0.0017	Not Detected
Helium	0.086	3.2

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4s-A

Lab ID#: 1308609B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090314	Date of Collection: 8/21/13 3:50:00 PM
Dil. Factor:	1.76	Date of Analysis: 9/3/13 05:13 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	11
Nitrogen	0.88	76
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	Not Detected
Carbon Dioxide	0.018	12
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.088	1.2

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4m-A

Lab ID#: 1308609B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090313	Date of Collection: 8/21/13 4:01:00 PM
Dil. Factor:	1.74	Date of Analysis: 9/3/13 04:51 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.87	74
Carbon Monoxide	0.017	Not Detected
Methane	0.00017	Not Detected
Carbon Dioxide	0.017	2.8
Ethane	0.0017	Not Detected
Ethene	0.0017	Not Detected
Helium	0.087	2.9

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4d-A

Lab ID#: 1308609B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090312	Date of Collection: 8/21/13 3:59:00 PM
Dil. Factor:	1.80	Date of Analysis: 9/3/13 04:22 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	17
Nitrogen	0.90	76
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	0.0015
Carbon Dioxide	0.018	4.2
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.090	3.0

Container Type: 6 Liter Summa Canister

Client Sample ID: Lab Blank

Lab ID#: 1308609B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10080307	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 12:23 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.50	Not Detected
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

Container Type: NA - Not Applicable

Client Sample ID: Lab Blank

Lab ID#: 1308609B-07B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090306c	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 12:00 PM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

Client Sample ID: LCS

Lab ID#: 1308609B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10080305	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 11:23 AM

Compound	%Recovery
Oxygen	100
Nitrogen	100
Carbon Monoxide	102
Methane	101
Carbon Dioxide	101
Ethane	98
Ethene	102
Helium	96

Container Type: NA - Not Applicable

Client Sample ID: LCSD

Lab ID#: 1308609B-08AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name: 10090324

Date of Collection: NA

Dil. Factor: 1.00

Date of Analysis: 9/3/13 10:02 PM

Compound	%Recovery
Oxygen	101
Nitrogen	100
Carbon Monoxide	102
Methane	100
Carbon Dioxide	101
Ethane	97
Ethene	101
Helium	96

Container Type: NA - Not Applicable

9/10/2013

Mr. Christopher Brownfield
AECOM Environment
8540 Colonnade Center Drive
Suite 306
Raleigh NC 27615

Project Name: S. CASS LAKE
Project #: 60254681-5.3
Workorder #: 1308613A

Dear Mr. Christopher Brownfield

The following report includes the data for the above referenced project for sample(s) received on 8/27/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

WORK ORDER #: 1308613A

Work Order Summary

CLIENT:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615	BILL TO:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615
PHONE:	919.872.6600	P.O. #	48835ACM
FAX:		PROJECT #	60254681-5.3 S. CASS LAKE
DATE RECEIVED:	08/27/2013	CONTACT:	Ausha Scott
DATE COMPLETED:	09/10/2013		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VP-2s_B	Modified TO-15	7.8 "Hg	5.2 psi
02A	VP-2m_B	Modified TO-15	7.8 "Hg	5.1 psi
03A	VP-2d_B	Modified TO-15	5.9 "Hg	4.9 psi
04A	VP-4s_B	Modified TO-15	7.3 "Hg	4.8 psi
05A	VP-4m_B	Modified TO-15	7.1 "Hg	5 psi
06A	VP-4d_B	Modified TO-15	6.7 "Hg	5.1 psi
07A	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA
09AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:



Technical Director

DATE: 09/10/13

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, VA NELAP - 460197, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.

Eurofins Air Toxics Inc., certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



LABORATORY NARRATIVE
EPA Method TO-15
AECOM Environment
Workorder# 1308613A

Six 6 Liter Summa Canister samples were received on August 27, 2013. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on sample VP-4d_B due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

- J - Estimated value.

- E - Exceeds instrument calibration range.

- S - Saturated peak.

- Q - Exceeds quality control limits.

- U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

- UJ- Non-detected compound associated with low bias in the CCV

- N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified

- b-File was quantified by a second column and detector

- r1-File was requantified for the purpose of reissue

Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-2s_B

Lab ID#: 1308613A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	9.1	200	22	480
2-Butanone (Methyl Ethyl Ketone)	3.6	14	11	42

Client Sample ID: VP-2m_B

Lab ID#: 1308613A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.6	120	6.8	220
Acetone	9.1	63	22	150
2-Propanol	3.6	87	8.9	210
Hexane	0.91	1.1	3.2	3.9
Toluene	0.91	4.2	3.4	16

Client Sample ID: VP-2d_B

Lab ID#: 1308613A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	8.3	56	20	130
1,3-Dichlorobenzene	0.83	0.93	5.0	5.6

Client Sample ID: VP-4s_B

Lab ID#: 1308613A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	8.8	110	21	260
m,p-Xylene	0.88	1.6	3.8	6.8
1,3-Dichlorobenzene	0.88	1.1	5.3	6.8

Client Sample ID: VP-4m_B

Lab ID#: 1308613A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-4m_B

Lab ID#: 1308613A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.5	6.6	6.6	12
Acetone	8.8	46	21	110
2-Propanol	3.5	19	8.6	48
1,3-Dichlorobenzene	0.88	0.87 J	5.3	5.2 J

Client Sample ID: VP-4d_B

Lab ID#: 1308613A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Cyclohexane	12	2800	40	9700



Air Toxics

Client Sample ID: VP-2s_B

Lab ID#: 1308613A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 2090407

Date of Collection: 8/23/13 2:45:00 PM

Dil. Factor: 1.82

Date of Analysis: 9/4/13 04:07 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.91	Not Detected	4.5	Not Detected
Freon 114	0.91	Not Detected	6.4	Not Detected
Chloromethane	9.1	Not Detected	19	Not Detected
Vinyl Chloride	0.91	Not Detected	2.3	Not Detected
1,3-Butadiene	0.91	Not Detected	2.0	Not Detected
Bromomethane	9.1	Not Detected	35	Not Detected
Chloroethane	3.6	Not Detected	9.6	Not Detected
Freon 11	0.91	Not Detected	5.1	Not Detected
Ethanol	3.6	Not Detected	6.8	Not Detected
Freon 113	0.91	Not Detected	7.0	Not Detected
1,1-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Acetone	9.1	200	22	480
2-Propanol	3.6	Not Detected	8.9	Not Detected
Carbon Disulfide	3.6	Not Detected	11	Not Detected
3-Chloropropene	3.6	Not Detected	11	Not Detected
Methylene Chloride	9.1	Not Detected	32	Not Detected
Methyl tert-butyl ether	0.91	Not Detected	3.3	Not Detected
trans-1,2-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Hexane	0.91	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.91	Not Detected	3.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.6	14	11	42
cis-1,2-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Tetrahydrofuran	0.91	Not Detected	2.7	Not Detected
Chloroform	0.91	Not Detected	4.4	Not Detected
1,1,1-Trichloroethane	0.91	Not Detected	5.0	Not Detected
Cyclohexane	0.91	Not Detected	3.1	Not Detected
Carbon Tetrachloride	0.91	Not Detected	5.7	Not Detected
2,2,4-Trimethylpentane	0.91	Not Detected	4.2	Not Detected
Benzene	0.91	Not Detected	2.9	Not Detected
1,2-Dichloroethane	0.91	Not Detected	3.7	Not Detected
Heptane	0.91	Not Detected	3.7	Not Detected
Trichloroethene	0.91	Not Detected	4.9	Not Detected
1,2-Dichloropropane	0.91	Not Detected	4.2	Not Detected
1,4-Dioxane	3.6	Not Detected	13	Not Detected
Bromodichloromethane	0.91	Not Detected	6.1	Not Detected
cis-1,3-Dichloropropene	0.91	Not Detected	4.1	Not Detected
4-Methyl-2-pentanone	0.91	Not Detected	3.7	Not Detected
Toluene	0.91	Not Detected	3.4	Not Detected
trans-1,3-Dichloropropene	0.91	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	0.91	Not Detected	5.0	Not Detected
Tetrachloroethene	0.91	Not Detected	6.2	Not Detected
2-Hexanone	3.6	Not Detected	15	Not Detected



Air Toxics

Client Sample ID: VP-2s_B

Lab ID#: 1308613A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090407	Date of Collection: 8/23/13 2:45:00 PM		
Dil. Factor:	1.82	Date of Analysis: 9/4/13 04:07 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.91	Not Detected	7.8	Not Detected
1,2-Dibromoethane (EDB)	0.91	Not Detected	7.0	Not Detected
Chlorobenzene	0.91	Not Detected	4.2	Not Detected
Ethyl Benzene	0.91	Not Detected	4.0	Not Detected
m,p-Xylene	0.91	Not Detected	4.0	Not Detected
o-Xylene	0.91	Not Detected	4.0	Not Detected
Styrene	0.91	Not Detected	3.9	Not Detected
Bromoform	0.91	Not Detected	9.4	Not Detected
Cumene	0.91	Not Detected	4.5	Not Detected
1,1,2,2-Tetrachloroethane	0.91	Not Detected	6.2	Not Detected
Propylbenzene	0.91	Not Detected	4.5	Not Detected
4-Ethyltoluene	0.91	Not Detected	4.5	Not Detected
1,3,5-Trimethylbenzene	0.91	Not Detected	4.5	Not Detected
1,2,4-Trimethylbenzene	0.91	Not Detected	4.5	Not Detected
1,3-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
1,4-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
alpha-Chlorotoluene	0.91	Not Detected	4.7	Not Detected
1,2-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
1,2,4-Trichlorobenzene	3.6	Not Detected UJ	27	Not Detected UJ
Hexachlorobutadiene	3.6	Not Detected	39	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	115	70-130
4-Bromofluorobenzene	94	70-130



Air Toxics

Client Sample ID: VP-2m_B

Lab ID#: 1308613A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 2090408

Date of Collection: 8/23/13 3:06:00 PM

Dil. Factor: 1.82

Date of Analysis: 9/4/13 04:57 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.91	Not Detected	4.5	Not Detected
Freon 114	0.91	Not Detected	6.4	Not Detected
Chloromethane	9.1	Not Detected	19	Not Detected
Vinyl Chloride	0.91	Not Detected	2.3	Not Detected
1,3-Butadiene	0.91	Not Detected	2.0	Not Detected
Bromomethane	9.1	Not Detected	35	Not Detected
Chloroethane	3.6	Not Detected	9.6	Not Detected
Freon 11	0.91	Not Detected	5.1	Not Detected
Ethanol	3.6	120	6.8	220
Freon 113	0.91	Not Detected	7.0	Not Detected
1,1-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Acetone	9.1	63	22	150
2-Propanol	3.6	87	8.9	210
Carbon Disulfide	3.6	Not Detected	11	Not Detected
3-Chloropropene	3.6	Not Detected	11	Not Detected
Methylene Chloride	9.1	Not Detected	32	Not Detected
Methyl tert-butyl ether	0.91	Not Detected	3.3	Not Detected
trans-1,2-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Hexane	0.91	1.1	3.2	3.9
1,1-Dichloroethane	0.91	Not Detected	3.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.6	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.91	Not Detected	3.6	Not Detected
Tetrahydrofuran	0.91	Not Detected	2.7	Not Detected
Chloroform	0.91	Not Detected	4.4	Not Detected
1,1,1-Trichloroethane	0.91	Not Detected	5.0	Not Detected
Cyclohexane	0.91	Not Detected	3.1	Not Detected
Carbon Tetrachloride	0.91	Not Detected	5.7	Not Detected
2,2,4-Trimethylpentane	0.91	Not Detected	4.2	Not Detected
Benzene	0.91	Not Detected	2.9	Not Detected
1,2-Dichloroethane	0.91	Not Detected	3.7	Not Detected
Heptane	0.91	Not Detected	3.7	Not Detected
Trichloroethene	0.91	Not Detected	4.9	Not Detected
1,2-Dichloropropane	0.91	Not Detected	4.2	Not Detected
1,4-Dioxane	3.6	Not Detected	13	Not Detected
Bromodichloromethane	0.91	Not Detected	6.1	Not Detected
cis-1,3-Dichloropropene	0.91	Not Detected	4.1	Not Detected
4-Methyl-2-pentanone	0.91	Not Detected	3.7	Not Detected
Toluene	0.91	4.2	3.4	16
trans-1,3-Dichloropropene	0.91	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	0.91	Not Detected	5.0	Not Detected
Tetrachloroethene	0.91	Not Detected	6.2	Not Detected
2-Hexanone	3.6	Not Detected	15	Not Detected



Air Toxics

Client Sample ID: VP-2m_B

Lab ID#: 1308613A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090408	Date of Collection: 8/23/13 3:06:00 PM		
Dil. Factor:	1.82	Date of Analysis: 9/4/13 04:57 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.91	Not Detected	7.8	Not Detected
1,2-Dibromoethane (EDB)	0.91	Not Detected	7.0	Not Detected
Chlorobenzene	0.91	Not Detected	4.2	Not Detected
Ethyl Benzene	0.91	Not Detected	4.0	Not Detected
m,p-Xylene	0.91	Not Detected	4.0	Not Detected
o-Xylene	0.91	Not Detected	4.0	Not Detected
Styrene	0.91	Not Detected	3.9	Not Detected
Bromoform	0.91	Not Detected	9.4	Not Detected
Cumene	0.91	Not Detected	4.5	Not Detected
1,1,2,2-Tetrachloroethane	0.91	Not Detected	6.2	Not Detected
Propylbenzene	0.91	Not Detected	4.5	Not Detected
4-Ethyltoluene	0.91	Not Detected	4.5	Not Detected
1,3,5-Trimethylbenzene	0.91	Not Detected	4.5	Not Detected
1,2,4-Trimethylbenzene	0.91	Not Detected	4.5	Not Detected
1,3-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
1,4-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
alpha-Chlorotoluene	0.91	Not Detected	4.7	Not Detected
1,2-Dichlorobenzene	0.91	Not Detected	5.5	Not Detected
1,2,4-Trichlorobenzene	3.6	Not Detected UJ	27	Not Detected UJ
Hexachlorobutadiene	3.6	Not Detected	39	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	97	70-130



Air Toxics

Client Sample ID: VP-2d_B

Lab ID#: 1308613A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090415	Date of Collection:	8/23/13 3:17:00 PM
Dil. Factor:	1.66	Date of Analysis:	9/4/13 11:09 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.83	Not Detected	4.1	Not Detected
Freon 114	0.83	Not Detected	5.8	Not Detected
Chloromethane	8.3	Not Detected	17	Not Detected
Vinyl Chloride	0.83	Not Detected	2.1	Not Detected
1,3-Butadiene	0.83	Not Detected	1.8	Not Detected
Bromomethane	8.3	Not Detected	32	Not Detected
Chloroethane	3.3	Not Detected	8.8	Not Detected
Freon 11	0.83	Not Detected	4.7	Not Detected
Ethanol	3.3	Not Detected	6.2	Not Detected
Freon 113	0.83	Not Detected	6.4	Not Detected
1,1-Dichloroethene	0.83	Not Detected	3.3	Not Detected
Acetone	8.3	56	20	130
2-Propanol	3.3	Not Detected	8.2	Not Detected
Carbon Disulfide	3.3	Not Detected	10	Not Detected
3-Chloropropene	3.3	Not Detected	10	Not Detected
Methylene Chloride	8.3	Not Detected	29	Not Detected
Methyl tert-butyl ether	0.83	Not Detected	3.0	Not Detected
trans-1,2-Dichloroethene	0.83	Not Detected	3.3	Not Detected
Hexane	0.83	Not Detected	2.9	Not Detected
1,1-Dichloroethane	0.83	Not Detected	3.4	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.3	Not Detected	9.8	Not Detected
cis-1,2-Dichloroethene	0.83	Not Detected	3.3	Not Detected
Tetrahydrofuran	0.83	Not Detected	2.4	Not Detected
Chloroform	0.83	Not Detected	4.0	Not Detected
1,1,1-Trichloroethane	0.83	Not Detected	4.5	Not Detected
Cyclohexane	0.83	Not Detected	2.8	Not Detected
Carbon Tetrachloride	0.83	Not Detected	5.2	Not Detected
2,2,4-Trimethylpentane	0.83	Not Detected	3.9	Not Detected
Benzene	0.83	Not Detected	2.6	Not Detected
1,2-Dichloroethane	0.83	Not Detected	3.4	Not Detected
Heptane	0.83	Not Detected	3.4	Not Detected
Trichloroethene	0.83	Not Detected	4.5	Not Detected
1,2-Dichloropropane	0.83	Not Detected	3.8	Not Detected
1,4-Dioxane	3.3	Not Detected	12	Not Detected
Bromodichloromethane	0.83	Not Detected	5.6	Not Detected
cis-1,3-Dichloropropene	0.83	Not Detected	3.8	Not Detected
4-Methyl-2-pentanone	0.83	Not Detected	3.4	Not Detected
Toluene	0.83	Not Detected	3.1	Not Detected
trans-1,3-Dichloropropene	0.83	Not Detected	3.8	Not Detected
1,1,2-Trichloroethane	0.83	Not Detected	4.5	Not Detected
Tetrachloroethene	0.83	Not Detected	5.6	Not Detected
2-Hexanone	3.3	Not Detected	14	Not Detected



Air Toxics

Client Sample ID: VP-2d_B

Lab ID#: 1308613A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090415	Date of Collection: 8/23/13 3:17:00 PM		
Dil. Factor:	1.66	Date of Analysis: 9/4/13 11:09 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.83	Not Detected	7.1	Not Detected
1,2-Dibromoethane (EDB)	0.83	Not Detected	6.4	Not Detected
Chlorobenzene	0.83	Not Detected	3.8	Not Detected
Ethyl Benzene	0.83	Not Detected	3.6	Not Detected
m,p-Xylene	0.83	Not Detected	3.6	Not Detected
o-Xylene	0.83	Not Detected	3.6	Not Detected
Styrene	0.83	Not Detected	3.5	Not Detected
Bromoform	0.83	Not Detected	8.6	Not Detected
Cumene	0.83	Not Detected	4.1	Not Detected
1,1,2,2-Tetrachloroethane	0.83	Not Detected	5.7	Not Detected
Propylbenzene	0.83	Not Detected	4.1	Not Detected
4-Ethyltoluene	0.83	Not Detected	4.1	Not Detected
1,3,5-Trimethylbenzene	0.83	Not Detected	4.1	Not Detected
1,2,4-Trimethylbenzene	0.83	Not Detected	4.1	Not Detected
1,3-Dichlorobenzene	0.83	0.93	5.0	5.6
1,4-Dichlorobenzene	0.83	Not Detected	5.0	Not Detected
alpha-Chlorotoluene	0.83	Not Detected	4.3	Not Detected
1,2-Dichlorobenzene	0.83	Not Detected	5.0	Not Detected
1,2,4-Trichlorobenzene	3.3	Not Detected UJ	25	Not Detected UJ
Hexachlorobutadiene	3.3	Not Detected	35	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	119	70-130
4-Bromofluorobenzene	98	70-130



Air Toxics

Client Sample ID: VP-4s_B

Lab ID#: 1308613A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 2090409

Date of Collection: 8/23/13 3:25:00 PM

Dil. Factor: 1.76

Date of Analysis: 9/4/13 05:34 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.88	Not Detected	4.4	Not Detected
Freon 114	0.88	Not Detected	6.2	Not Detected
Chloromethane	8.8	Not Detected	18	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
1,3-Butadiene	0.88	Not Detected	1.9	Not Detected
Bromomethane	8.8	Not Detected	34	Not Detected
Chloroethane	3.5	Not Detected	9.3	Not Detected
Freon 11	0.88	Not Detected	4.9	Not Detected
Ethanol	3.5	Not Detected	6.6	Not Detected
Freon 113	0.88	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Acetone	8.8	110	21	260
2-Propanol	3.5	Not Detected	8.6	Not Detected
Carbon Disulfide	3.5	Not Detected	11	Not Detected
3-Chloropropene	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.8	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.88	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Hexane	0.88	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Tetrahydrofuran	0.88	Not Detected	2.6	Not Detected
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Cyclohexane	0.88	Not Detected	3.0	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.5	Not Detected
2,2,4-Trimethylpentane	0.88	Not Detected	4.1	Not Detected
Benzene	0.88	Not Detected	2.8	Not Detected
1,2-Dichloroethane	0.88	Not Detected	3.6	Not Detected
Heptane	0.88	Not Detected	3.6	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected
1,2-Dichloropropane	0.88	Not Detected	4.1	Not Detected
1,4-Dioxane	3.5	Not Detected	13	Not Detected
Bromodichloromethane	0.88	Not Detected	5.9	Not Detected
cis-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
4-Methyl-2-pentanone	0.88	Not Detected	3.6	Not Detected
Toluene	0.88	Not Detected	3.3	Not Detected
trans-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	Not Detected	6.0	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected

Client Sample ID: VP-4s_B

Lab ID#: 1308613A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090409	Date of Collection: 8/23/13 3:25:00 PM		
Dil. Factor:	1.76	Date of Analysis: 9/4/13 05:34 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.88	Not Detected	7.5	Not Detected
1,2-Dibromoethane (EDB)	0.88	Not Detected	6.8	Not Detected
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
Ethyl Benzene	0.88	Not Detected	3.8	Not Detected
m,p-Xylene	0.88	1.6	3.8	6.8
o-Xylene	0.88	Not Detected	3.8	Not Detected
Styrene	0.88	Not Detected	3.7	Not Detected
Bromoform	0.88	Not Detected	9.1	Not Detected
Cumene	0.88	Not Detected	4.3	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.0	Not Detected
Propylbenzene	0.88	Not Detected	4.3	Not Detected
4-Ethyltoluene	0.88	Not Detected	4.3	Not Detected
1,3,5-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,3-Dichlorobenzene	0.88	1.1	5.3	6.8
1,4-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
alpha-Chlorotoluene	0.88	Not Detected	4.6	Not Detected
1,2-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
1,2,4-Trichlorobenzene	3.5	Not Detected UJ	26	Not Detected UJ
Hexachlorobutadiene	3.5	Not Detected	38	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	118	70-130
4-Bromofluorobenzene	102	70-130



Air Toxics

Client Sample ID: VP-4m_B

Lab ID#: 1308613A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 2090410

Date of Collection: 8/23/13 3:21:00 PM

Dil. Factor: 1.76

Date of Analysis: 9/4/13 06:17 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.88	Not Detected	4.4	Not Detected
Freon 114	0.88	Not Detected	6.2	Not Detected
Chloromethane	8.8	Not Detected	18	Not Detected
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
1,3-Butadiene	0.88	Not Detected	1.9	Not Detected
Bromomethane	8.8	Not Detected	34	Not Detected
Chloroethane	3.5	Not Detected	9.3	Not Detected
Freon 11	0.88	Not Detected	4.9	Not Detected
Ethanol	3.5	6.6	6.6	12
Freon 113	0.88	Not Detected	6.7	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Acetone	8.8	46	21	110
2-Propanol	3.5	19	8.6	48
Carbon Disulfide	3.5	Not Detected	11	Not Detected
3-Chloropropene	3.5	Not Detected	11	Not Detected
Methylene Chloride	8.8	Not Detected	30	Not Detected
Methyl tert-butyl ether	0.88	Not Detected	3.2	Not Detected
trans-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Hexane	0.88	Not Detected	3.1	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.6	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	Not Detected	10	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Tetrahydrofuran	0.88	Not Detected	2.6	Not Detected
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Cyclohexane	0.88	Not Detected	3.0	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.5	Not Detected
2,2,4-Trimethylpentane	0.88	Not Detected	4.1	Not Detected
Benzene	0.88	Not Detected	2.8	Not Detected
1,2-Dichloroethane	0.88	Not Detected	3.6	Not Detected
Heptane	0.88	Not Detected	3.6	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected
1,2-Dichloropropane	0.88	Not Detected	4.1	Not Detected
1,4-Dioxane	3.5	Not Detected	13	Not Detected
Bromodichloromethane	0.88	Not Detected	5.9	Not Detected
cis-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
4-Methyl-2-pentanone	0.88	Not Detected	3.6	Not Detected
Toluene	0.88	Not Detected	3.3	Not Detected
trans-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	Not Detected	6.0	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected

Client Sample ID: VP-4m_B

Lab ID#: 1308613A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090410	Date of Collection:	8/23/13 3:21:00 PM	
Dil. Factor:	1.76	Date of Analysis:	9/4/13 06:17 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.88	Not Detected	7.5	Not Detected
1,2-Dibromoethane (EDB)	0.88	Not Detected	6.8	Not Detected
Chlorobenzene	0.88	Not Detected	4.0	Not Detected
Ethyl Benzene	0.88	Not Detected	3.8	Not Detected
m,p-Xylene	0.88	Not Detected	3.8	Not Detected
o-Xylene	0.88	Not Detected	3.8	Not Detected
Styrene	0.88	Not Detected	3.7	Not Detected
Bromoform	0.88	Not Detected	9.1	Not Detected
Cumene	0.88	Not Detected	4.3	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.0	Not Detected
Propylbenzene	0.88	Not Detected	4.3	Not Detected
4-Ethyltoluene	0.88	Not Detected	4.3	Not Detected
1,3,5-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,2,4-Trimethylbenzene	0.88	Not Detected	4.3	Not Detected
1,3-Dichlorobenzene	0.88	0.87 J	5.3	5.2 J
1,4-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
alpha-Chlorotoluene	0.88	Not Detected	4.6	Not Detected
1,2-Dichlorobenzene	0.88	Not Detected	5.3	Not Detected
1,2,4-Trichlorobenzene	3.5	Not Detected UJ	26	Not Detected UJ
Hexachlorobutadiene	3.5	Not Detected	38	Not Detected

J = Estimated value.

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	114	70-130
4-Bromofluorobenzene	95	70-130

Client Sample ID: VP-4d_B

Lab ID#: 1308613A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090411	Date of Collection:	8/23/13 3:20:00 PM
Dil. Factor:	23.2	Date of Analysis:	9/4/13 06:48 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	Not Detected	57	Not Detected
Freon 114	12	Not Detected	81	Not Detected
Chloromethane	120	Not Detected	240	Not Detected
Vinyl Chloride	12	Not Detected	30	Not Detected
1,3-Butadiene	12	Not Detected	26	Not Detected
Bromomethane	120	Not Detected	450	Not Detected
Chloroethane	46	Not Detected	120	Not Detected
Freon 11	12	Not Detected	65	Not Detected
Ethanol	46	Not Detected	87	Not Detected
Freon 113	12	Not Detected	89	Not Detected
1,1-Dichloroethene	12	Not Detected	46	Not Detected
Acetone	120	Not Detected	280	Not Detected
2-Propanol	46	Not Detected	110	Not Detected
Carbon Disulfide	46	Not Detected	140	Not Detected
3-Chloropropene	46	Not Detected	140	Not Detected
Methylene Chloride	120	Not Detected	400	Not Detected
Methyl tert-butyl ether	12	Not Detected	42	Not Detected
trans-1,2-Dichloroethene	12	Not Detected	46	Not Detected
Hexane	12	Not Detected	41	Not Detected
1,1-Dichloroethane	12	Not Detected	47	Not Detected
2-Butanone (Methyl Ethyl Ketone)	46	Not Detected	140	Not Detected
cis-1,2-Dichloroethene	12	Not Detected	46	Not Detected
Tetrahydrofuran	12	Not Detected	34	Not Detected
Chloroform	12	Not Detected	57	Not Detected
1,1,1-Trichloroethane	12	Not Detected	63	Not Detected
Cyclohexane	12	2800	40	9700
Carbon Tetrachloride	12	Not Detected	73	Not Detected
2,2,4-Trimethylpentane	12	Not Detected	54	Not Detected
Benzene	12	Not Detected	37	Not Detected
1,2-Dichloroethane	12	Not Detected	47	Not Detected
Heptane	12	Not Detected	48	Not Detected
Trichloroethene	12	Not Detected	62	Not Detected
1,2-Dichloropropane	12	Not Detected	54	Not Detected
1,4-Dioxane	46	Not Detected	170	Not Detected
Bromodichloromethane	12	Not Detected	78	Not Detected
cis-1,3-Dichloropropene	12	Not Detected	53	Not Detected
4-Methyl-2-pentanone	12	Not Detected	48	Not Detected
Toluene	12	Not Detected	44	Not Detected
trans-1,3-Dichloropropene	12	Not Detected	53	Not Detected
1,1,2-Trichloroethane	12	Not Detected	63	Not Detected
Tetrachloroethene	12	Not Detected	79	Not Detected
2-Hexanone	46	Not Detected	190	Not Detected

Client Sample ID: VP-4d_B

Lab ID#: 1308613A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090411	Date of Collection: 8/23/13 3:20:00 PM		
Dil. Factor:	23.2	Date of Analysis: 9/4/13 06:48 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	12	Not Detected	99	Not Detected
1,2-Dibromoethane (EDB)	12	Not Detected	89	Not Detected
Chlorobenzene	12	Not Detected	53	Not Detected
Ethyl Benzene	12	Not Detected	50	Not Detected
m,p-Xylene	12	Not Detected	50	Not Detected
o-Xylene	12	Not Detected	50	Not Detected
Styrene	12	Not Detected	49	Not Detected
Bromoform	12	Not Detected	120	Not Detected
Cumene	12	Not Detected	57	Not Detected
1,1,2,2-Tetrachloroethane	12	Not Detected	80	Not Detected
Propylbenzene	12	Not Detected	57	Not Detected
4-Ethyltoluene	12	Not Detected	57	Not Detected
1,3,5-Trimethylbenzene	12	Not Detected	57	Not Detected
1,2,4-Trimethylbenzene	12	Not Detected	57	Not Detected
1,3-Dichlorobenzene	12	Not Detected	70	Not Detected
1,4-Dichlorobenzene	12	Not Detected	70	Not Detected
alpha-Chlorotoluene	12	Not Detected	60	Not Detected
1,2-Dichlorobenzene	12	Not Detected	70	Not Detected
1,2,4-Trichlorobenzene	46	Not Detected UJ	340	Not Detected UJ
Hexachlorobutadiene	46	Not Detected	490	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130
1,2-Dichloroethane-d4	113	70-130
4-Bromofluorobenzene	101	70-130

Client Sample ID: Lab Blank

Lab ID#: 1308613A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090406	Date of Collection: NA		
Dil. Factor:	1.00	Date of Analysis: 9/4/13 03:13 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 1308613A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

EXAM METHOD 10-15 GC/MS FOLE SCAN				
File Name:	2090406	Date of Collection: NA		
Dil. Factor:	1.00	Date of Analysis: 9/4/13 03:13 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected UJ	15	Not Detected UJ
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

UJ = Non-detected compound associated with low bias in the CCV and/or LCS.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	96	70-130



Air Toxics

Client Sample ID: CCV

Lab ID#: 1308613A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 12:04 PM

Compound	%Recovery
----------	-----------

Freon 12	84
Freon 114	76
Chloromethane	77
Vinyl Chloride	78
1,3-Butadiene	77
Bromomethane	89
Chloroethane	81
Freon 11	86
Ethanol	86
Freon 113	79
1,1-Dichloroethene	83
Acetone	85
2-Propanol	86
Carbon Disulfide	90
3-Chloropropene	88
Methylene Chloride	80
Methyl tert-butyl ether	79
trans-1,2-Dichloroethene	79
Hexane	85
1,1-Dichloroethane	84
2-Butanone (Methyl Ethyl Ketone)	88
cis-1,2-Dichloroethene	82
Tetrahydrofuran	89
Chloroform	87
1,1,1-Trichloroethane	90
Cyclohexane	84
Carbon Tetrachloride	92
2,2,4-Trimethylpentane	86
Benzene	79
1,2-Dichloroethane	88
Heptane	84
Trichloroethene	80
1,2-Dichloropropane	84
1,4-Dioxane	86
Bromodichloromethane	91
cis-1,3-Dichloropropene	92
4-Methyl-2-pentanone	90
Toluene	78
trans-1,3-Dichloropropene	98
1,1,2-Trichloroethane	82
Tetrachloroethene	79
2-Hexanone	95

Client Sample ID: CCV

Lab ID#: 1308613A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090402	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 12:04 PM

Compound	%Recovery
Dibromochloromethane	90
1,2-Dibromoethane (EDB)	86
Chlorobenzene	79
Ethyl Benzene	80
m,p-Xylene	78
o-Xylene	78
Styrene	84
Bromoform	91
Cumene	82
1,1,2,2-Tetrachloroethane	81
Propylbenzene	83
4-Ethyltoluene	81
1,3,5-Trimethylbenzene	77
1,2,4-Trimethylbenzene	79
1,3-Dichlorobenzene	78
1,4-Dichlorobenzene	74
alpha-Chlorotoluene	112
1,2-Dichlorobenzene	75
1,2,4-Trichlorobenzene	61 Q
Hexachlorobutadiene	78

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	112	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: LCS

Lab ID#: 1308613A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 01:43 PM

Compound	%Recovery	Method Limits
Freon 12	91	70-130
Freon 114	83	70-130
Chloromethane	90	70-130
Vinyl Chloride	88	70-130
1,3-Butadiene	86	70-130
Bromomethane	97	70-130
Chloroethane	89	70-130
Freon 11	91	70-130
Ethanol	101	70-130
Freon 113	84	70-130
1,1-Dichloroethene	92	70-130
Acetone	95	70-130
2-Propanol	95	70-130
Carbon Disulfide	117	70-130
3-Chloropropene	107	70-130
Methylene Chloride	85	70-130
Methyl tert-butyl ether	88	70-130
trans-1,2-Dichloroethene	96	70-130
Hexane	87	70-130
1,1-Dichloroethane	89	70-130
2-Butanone (Methyl Ethyl Ketone)	96	70-130
cis-1,2-Dichloroethene	88	70-130
Tetrahydrofuran	90	70-130
Chloroform	90	70-130
1,1,1-Trichloroethane	94	70-130
Cyclohexane	89	70-130
Carbon Tetrachloride	97	70-130
2,2,4-Trimethylpentane	87	70-130
Benzene	84	70-130
1,2-Dichloroethane	92	70-130
Heptane	90	70-130
Trichloroethene	86	70-130
1,2-Dichloropropane	89	70-130
1,4-Dioxane	89	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	99	70-130
4-Methyl-2-pentanone	95	70-130
Toluene	82	70-130
trans-1,3-Dichloropropene	106	70-130
1,1,2-Trichloroethane	88	70-130
Tetrachloroethene	84	70-130
2-Hexanone	100	70-130



Air Toxics

Client Sample ID: LCS

Lab ID#: 1308613A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090404	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 01:43 PM

Compound	%Recovery	Method Limits
Dibromochloromethane	93	70-130
1,2-Dibromoethane (EDB)	93	70-130
Chlorobenzene	86	70-130
Ethyl Benzene	86	70-130
m,p-Xylene	87	70-130
o-Xylene	85	70-130
Styrene	91	70-130
Bromoform	94	70-130
Cumene	88	70-130
1,1,2,2-Tetrachloroethane	88	70-130
Propylbenzene	90	70-130
4-Ethyltoluene	84	70-130
1,3,5-Trimethylbenzene	82	70-130
1,2,4-Trimethylbenzene	83	70-130
1,3-Dichlorobenzene	84	70-130
1,4-Dichlorobenzene	77	70-130
alpha-Chlorotoluene	122	70-130
1,2-Dichlorobenzene	80	70-130
1,2,4-Trichlorobenzene	62 Q	70-130
Hexachlorobutadiene	78	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	102	70-130

Client Sample ID: LCSD

Lab ID#: 1308613A-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090405	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 02:24 PM

Compound	%Recovery	Method Limits
Freon 12	90	70-130
Freon 114	83	70-130
Chloromethane	88	70-130
Vinyl Chloride	87	70-130
1,3-Butadiene	86	70-130
Bromomethane	94	70-130
Chloroethane	87	70-130
Freon 11	88	70-130
Ethanol	89	70-130
Freon 113	83	70-130
1,1-Dichloroethene	90	70-130
Acetone	96	70-130
2-Propanol	95	70-130
Carbon Disulfide	113	70-130
3-Chloropropene	106	70-130
Methylene Chloride	84	70-130
Methyl tert-butyl ether	86	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	84	70-130
1,1-Dichloroethane	87	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	86	70-130
Tetrahydrofuran	88	70-130
Chloroform	89	70-130
1,1,1-Trichloroethane	91	70-130
Cyclohexane	86	70-130
Carbon Tetrachloride	94	70-130
2,2,4-Trimethylpentane	86	70-130
Benzene	83	70-130
1,2-Dichloroethane	91	70-130
Heptane	88	70-130
Trichloroethene	86	70-130
1,2-Dichloropropane	90	70-130
1,4-Dioxane	89	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	92	70-130
Toluene	82	70-130
trans-1,3-Dichloropropene	106	70-130
1,1,2-Trichloroethane	87	70-130
Tetrachloroethene	83	70-130
2-Hexanone	100	70-130

Client Sample ID: LCSD

Lab ID#: 1308613A-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	2090405	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/4/13 02:24 PM

Compound	%Recovery	Method Limits
Dibromochloromethane	93	70-130
1,2-Dibromoethane (EDB)	94	70-130
Chlorobenzene	86	70-130
Ethyl Benzene	86	70-130
m,p-Xylene	87	70-130
o-Xylene	86	70-130
Styrene	92	70-130
Bromoform	94	70-130
Cumene	87	70-130
1,1,2,2-Tetrachloroethane	89	70-130
Propylbenzene	89	70-130
4-Ethyltoluene	84	70-130
1,3,5-Trimethylbenzene	82	70-130
1,2,4-Trimethylbenzene	85	70-130
1,3-Dichlorobenzene	84	70-130
1,4-Dichlorobenzene	78	70-130
alpha-Chlorotoluene	122	70-130
1,2-Dichlorobenzene	81	70-130
1,2,4-Trichlorobenzene	68 Q	70-130
Hexachlorobutadiene	81	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	103	70-130

9/11/2013

Mr. Christopher Brownfield
AECOM Environment
8540 Colonnade Center Drive
Suite 306
Raleigh NC 27615

Project Name: S. CASS LAKE
Project #: 60254681-5.3
Workorder #: 1308613B

Dear Mr. Christopher Brownfield

The following report includes the data for the above referenced project for sample(s) received on 8/27/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Ausha Scott
Project Manager

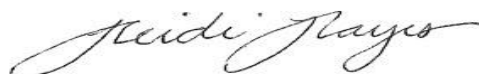
WORK ORDER #: 1308613B

Work Order Summary

CLIENT:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615	BILL TO:	Mr. Christopher Brownfield AECOM Environment 8540 Colonnade Center Drive Suite 306 Raleigh, NC 27615
PHONE:	919.872.6600	P.O. #	48835ACM
FAX:		PROJECT #	60254681-5.3 S. CASS LAKE
DATE RECEIVED:	08/27/2013	CONTACT:	Ausha Scott
DATE COMPLETED:	09/11/2013		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	VP-2s_B	Modified ASTM D-1946	7.8 "Hg	5.2 psi
02A	VP-2m_B	Modified ASTM D-1946	7.8 "Hg	5.1 psi
03A	VP-2d_B	Modified ASTM D-1946	5.9 "Hg	4.9 psi
04A	VP-4s_B	Modified ASTM D-1946	7.3 "Hg	4.8 psi
05A	VP-4m_B	Modified ASTM D-1946	7.1 "Hg	5 psi
06A	VP-4d_B	Modified ASTM D-1946	6.7 "Hg	5.1 psi
07A	Lab Blank	Modified ASTM D-1946	NA	NA
07B	Lab Blank	Modified ASTM D-1946	NA	NA
08A	LCS	Modified ASTM D-1946	NA	NA
08AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:



Technical Director

DATE: 09/11/13

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.

Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563

(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020



LABORATORY NARRATIVE
Modified ASTM D-1946
AECOM Environment
Workorder# 1308613B

Six 6 Liter Summa Canister samples were received on August 27, 2013. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	ASTM D-1946	ATL Modifications
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a $\geq 95\%$ accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections $> 5 \times$ the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reporting limit for Nitrogen was raised from 0.10% to 0.50%.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-2s_B

Lab ID#: 1308613B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	20
Nitrogen	0.91	77
Carbon Dioxide	0.018	0.39
Helium	0.091	2.2

Client Sample ID: VP-2m_B

Lab ID#: 1308613B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	21
Nitrogen	0.91	77
Carbon Dioxide	0.018	0.11
Helium	0.091	1.6

Client Sample ID: VP-2d_B

Lab ID#: 1308613B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	19
Nitrogen	0.83	78
Carbon Dioxide	0.017	0.21
Helium	0.083	3.0

Client Sample ID: VP-4s_B

Lab ID#: 1308613B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	12
Nitrogen	0.88	77
Carbon Dioxide	0.018	9.9
Helium	0.088	1.1

Summary of Detected Compounds

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-4m_B

Lab ID#: 1308613B-05A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	15
Nitrogen	0.88	77
Carbon Dioxide	0.018	6.1
Helium	0.088	1.9

Client Sample ID: VP-4d_B

Lab ID#: 1308613B-06A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	12
Nitrogen	0.87	80
Methane	0.00017	0.0022
Carbon Dioxide	0.017	6.1
Helium	0.087	2.1

Client Sample ID: VP-2s_B

Lab ID#: 1308613B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090318	Date of Collection: 8/23/13 2:45:00 PM
Dil. Factor:	1.82	Date of Analysis: 9/3/13 07:37 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	20
Nitrogen	0.91	77
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	Not Detected
Carbon Dioxide	0.018	0.39
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.091	2.2

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-2m_B

Lab ID#: 1308613B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090319	Date of Collection: 8/23/13 3:06:00 PM
Dil. Factor:	1.82	Date of Analysis: 9/3/13 08:10 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	21
Nitrogen	0.91	77
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	Not Detected
Carbon Dioxide	0.018	0.11
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.091	1.6

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-2d_B

Lab ID#: 1308613B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090320	Date of Collection: 8/23/13 3:17:00 PM
Dil. Factor:	1.66	Date of Analysis: 9/3/13 08:32 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	19
Nitrogen	0.83	78
Carbon Monoxide	0.017	Not Detected
Methane	0.00017	Not Detected
Carbon Dioxide	0.017	0.21
Ethane	0.0017	Not Detected
Ethene	0.0017	Not Detected
Helium	0.083	3.0

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4s_B

Lab ID#: 1308613B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090321	Date of Collection: 8/23/13 3:25:00 PM
Dil. Factor:	1.76	Date of Analysis: 9/3/13 08:55 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	12
Nitrogen	0.88	77
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	Not Detected
Carbon Dioxide	0.018	9.9
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.088	1.1

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4m_B

Lab ID#: 1308613B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090322	Date of Collection: 8/23/13 3:21:00 PM
Dil. Factor:	1.76	Date of Analysis: 9/3/13 09:17 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.18	15
Nitrogen	0.88	77
Carbon Monoxide	0.018	Not Detected
Methane	0.00018	Not Detected
Carbon Dioxide	0.018	6.1
Ethane	0.0018	Not Detected
Ethene	0.0018	Not Detected
Helium	0.088	1.9

Container Type: 6 Liter Summa Canister

Client Sample ID: VP-4d_B

Lab ID#: 1308613B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090323	Date of Collection: 8/23/13 3:20:00 PM
Dil. Factor:	1.74	Date of Analysis: 9/3/13 09:39 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	12
Nitrogen	0.87	80
Carbon Monoxide	0.017	Not Detected
Methane	0.00017	0.0022
Carbon Dioxide	0.017	6.1
Ethane	0.0017	Not Detected
Ethene	0.0017	Not Detected
Helium	0.087	2.1

Container Type: 6 Liter Summa Canister

Client Sample ID: Lab Blank

Lab ID#: 1308613B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090307	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 12:23 PM

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.50	Not Detected
Carbon Monoxide	0.010	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected
Ethane	0.0010	Not Detected
Ethene	0.0010	Not Detected

Container Type: NA - Not Applicable

Client Sample ID: Lab Blank

Lab ID#: 1308613B-07B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090306c	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 12:00 PM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

Client Sample ID: LCS

Lab ID#: 1308613B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090305	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 11:23 AM

Compound	%Recovery
Oxygen	100
Nitrogen	100
Carbon Monoxide	102
Methane	101
Carbon Dioxide	101
Ethane	98
Ethene	102
Helium	96

Container Type: NA - Not Applicable

Client Sample ID: LCSD

Lab ID#: 1308613B-08AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	10090324	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 9/3/13 10:02 PM

Compound	%Recovery
Oxygen	101
Nitrogen	100
Carbon Monoxide	102
Methane	100
Carbon Dioxide	101
Ethane	97
Ethene	101
Helium	96

Container Type: NA - Not Applicable

Efflux, LLC. Analytical Reports

E-Flux, LLC**ANALYSIS REPORT
Confidential Information**

Project: South Cass Lake, MN. First Round of Sampling
 Customer: Arcadis
 Customer Contact: Chris Brownfield

Report Date:
 9/9/13

Basis for Analysis:

This report is based on E-Flux proprietary technology and equipment to measure soil gas efflux.
 Chemical analysis is based on methods ASTM 4373-02 (Rapid Determination for Carbonate Content in Soils).
 and ASTM D6686-12 (Determining the Biobased Content in Solids, Liquids and Gases Using Radiocarbon Analysis).

Sample	Deployment Dates			Raw Results (not blank corrected)				Blank Corrected Results			
								Carbon Content		CO2 Flux	Eq. LNAPL loss
	deployed	retrieved	days	moisture, dry basis	dry sorbent mass, g	avg % CO2	CV % CO2	%CO2	g CO2	microM/m ² .sec	gallons/acre yr
CASS-CO2-R1-01	7/9/13 10:10	8/5/13 12:45	27.11	11%	45.535	12.81%	1.98%	11.46%	5.22	6.2	3,919
CASS-CO2-R1-02	7/9/13 10:35	8/5/13 12:55	27.10	9%	56.071	40.48%	0.75%	39.13%	21.94	26.3	16,490
CASS-CO2-R1-03	7/9/13 10:50	8/5/13 13:05	27.09	6%	51.874	30.00%	0.68%	28.65%	14.86	17.8	11,171
CASS-CO2-R1-04	7/9/13 11:05	8/5/13 13:15	27.09	5%	55.674	38.93%	0.02%	37.57%	20.92	25.1	15,728
CASS-CO2-R1-TB	NA	NA	NA	17%	42.377	1.35%	1.52%	0.00%	-	NA	NA

Assumptions and General Notes:

Results are travel blank corrected but not background location corrected.
 If trap carbon content is not larger than travel blank, results are reported as ND.
 Carbon analysis was conducted in duplicate.
 C.V. is coefficient of variation, equal to the ratio of the standard deviation over the average.
 The flux equivalence is 1 microMole/(m² . S) equals 627 gallons/(acre.yr). This assumes a hydrocarbon density of 0.75 g/mL and a formula of C8H18.
 Trap cross sectional area is 8.11 e-03 m²
 NA: Not Applicable

Quality Assurance/Quality Control Notes:

Travel blank (TB) bottom element concentration was 1.3%. Typical travel blank concentrations are < 2%.
 Traps CASS-CO2-02, -03, and -04 were saturated (per manufacturer's guidelines, sorbent saturation is 30%). Thus, actual CO2 fluxes for these samples might be higher than those reported.
 Trap tops for CASS-CO2-02 and -04 were saturated. Max. measured top concentration was 8.2%. Sorbent saturation is 30%.
 Moisture levels for field deployed traps were less than 11%, within typical values.

For any comments or questions, please contact:

Julio Zimbron, Ph.D.
 E-Flux, LLC
 2260 Eastwood Dr.
 Fort Collins CO 80525
 Phone 970 491 0626
izimbron@soilgasflux.com

E-Flux, LLC

Project: South Cass Lake, MN
Customer: AECOM
Customer Contact: Chris Brownfield

Report Date:
11/21/13

Basis for Analysis:

This report is based on E-Flux proprietary technology and equipment to measure soil gas efflux.
Chemical analysis is based on methods ASTM 4373-02 (Rapid Determination for Carbonate Content in Soils).
and ASTM D6686-12 (Determining the Biobased Content in Solids, Liquids and Gases Using Radiocarbon Analysis).

This report contains Confidential Information and is to be delivered only to the Customer indicated above.

Sample	Deployment Dates			Raw Results (not blank corrected)					Blank Corrected Results			
									Carbon Content		CO2 Flux	Eq. LNAPL loss
	deployed	retrieved	days	moisture, dry basis	dry sorbent mass, g	Number of Replicates	avg % CO2	CV % CO2	%CO2	g CO2	microM/ m^2.sec	gallons/ acre yr
CASS-CO2-R2-TB	NA	NA	NA	19%	42.319	2	1.26%	0.53%	0.00%	-	NA	NA
CASS-CO2-R2-01	10/3/13 13:30	10/23/13 15:20	20.08	32%	43.208	2	2.39%	0.26%	1.12%	0.48	0.78	492
CASS-CO2-R2-02	10/3/13 13:45	10/23/13 15:15	20.06	32%	43.361	2	4.66%	1.06%	3.40%	1.47	2.38	1,496
CASS-CO2-R2-03	10/3/13 13:52	10/23/13 15:10	20.05	31%	44.595	2	4.72%	31.76%	3.46%	1.54	2.49	1,566
CASS-CO2-R2-04	10/3/13 14:00	10/23/13 15:05	20.05	34%	37.189	2	2.31%	1.14%	1.05%	0.39	0.63	396

Assumptions and General Notes:

Results are travel blank corrected but not background location corrected.
If trap carbon content is not larger than travel blank, results are reported as ND.
Carbon analysis was conducted in duplicate.
C.V. is coefficient of variation, equal to the ratio of the standard deviation over the average.
The flux equivalence is 1 microMole/(m² . S) equals 627 gallons/(acre.yr). This assumes a hydrocarbon density of 0.75 g/mL and a formula of C₈H₁₈.
Trap cross sectional area is 8.11 e-03 m²
NA: Not Applicable

Quality Assurance/Quality Control Notes:

Travel blank (TB) concentration was 1.26%. Typical travel blank concentrations are < 2%.
Trap tops were not saturated. Max. measured top concentration was 16.7% (the top of trap CASS-CO2-R2-02). Sorbent saturation is 30%.

For any comments or questions, please contact:

Julio Zimbron, Ph.D.
E-Flux, LLC
3185-A Rampart Road, Room 250D
Fort Collins, CO 80521
o: (970) 491.0626 c: (970) 219-2401
jzimbron@soilgasflux.com

**AECOM Site Specific Calculations & Associated
Documentation**

CALCULATE NSZD RATE BASED ON CO₂ FLUX OF 1.8 ± 0.8 μmol/m².s.

- ① ASSUME COMPLETE OXIDATION OF OCTANE TO CO₂, QUANTITATIVE CAPTURE OF RESPIRED CO₂ IN MEASURED FLUX.



$$\begin{aligned} & 1 \frac{\mu\text{mol CO}_2}{\text{m}^2 \cdot \text{s}} \times \frac{1 \mu\text{mol C}_8\text{H}_{18}}{8 \mu\text{mol CO}_2} \times \frac{1 \text{ mol C}_8\text{H}_{18}}{10^6 \mu\text{mol C}_8\text{H}_{18}} \times \frac{114 \text{ g C}_8\text{H}_{18}}{1 \text{ mol C}_8\text{H}_{18}} \\ & \times \frac{1 \text{ g LNAPL}}{1 \text{ g C}_8\text{H}_{18}} \times \frac{1 \text{ mL LNAPL}}{0.75 \text{ g LNAPL}} \times \frac{1 \text{ L LNAPL}}{1000 \text{ mL LNAPL}} \\ & \times \frac{1 \text{ gal LNAPL}}{3.7854 \text{ L LNAPL}} \times \frac{4046.86 \text{ m}^2}{1 \text{ acre}} \times \frac{3.1557 \times 10^7 \text{ s}}{1 \text{ yr}} \\ & = 641 \frac{\text{gal}}{\text{ac} \cdot \text{yr}} \end{aligned}$$

NOTE: THIS VALUE IS VERY CLOSE TO THE VALUE REPORTED BY EFFLUX, LLC USING 4046 m²/ac 3.8L/GAL AND AN ASSUMED DENSITY OF 0.75 G/ML LNAPL.

VALUE REPORTED BY EFFLUX, LLC. = 627 gal/ac·yr

- ② CORRECT FOR ACTUAL LNAPL COMPOSITION AT SITE.

$$64.1 \frac{\text{gal}}{\text{ac} \cdot \text{yr}} \times \frac{0.75 \text{ g/mL LNAPL}}{0.894 \text{ g/mL LNAPL}} = 538 \frac{\text{gal}}{\text{ac} \cdot \text{yr}}$$

$$538 \frac{\text{GAL}}{\text{AC} \cdot \text{YR}} \times \frac{1.8 \pm 0.8 \frac{\mu\text{mol CO}_2}{\text{m}^2 \cdot \text{s}}}{1 \frac{\mu\text{mol CO}_2}{\text{m}^2 \cdot \text{s}}} = \boxed{968 \text{ GAL/AC} \cdot \text{YR} \pm 430 \frac{\text{GAL}}{\text{AC} \cdot \text{YR}}}$$

Fate and Transport of Petroleum Hydrocarbons in the Subsurface near Cass Lake, Minnesota

By Dina M. Drennan, Barbara A. Bekins, Ean Warren, Isabelle M. Cozzarelli, Mary Jo Baedecker, William N. Herkelrath, Geoffrey N. Delin, Robert J. Rosenbauer, and Pamela L. Campbell

Abstract

The U.S. Geological Survey (USGS) investigated the natural attenuation of subsurface petroleum hydrocarbons leaked over an unknown number of years from an oil pipeline under the Enbridge Energy Limited Partnership South Cass Lake Pumping Station, in Cass Lake, Minnesota. Three weeks of field work conducted between May 2007 and July 2008 delineated a dissolved plume of aromatic hydrocarbons and characterized the biodegradation processes of the petroleum. Field activities included installing monitoring wells, collecting sediment cores, sampling water from wells, and measuring water-table elevations. Geochemical measurements included concentrations of constituents in both spilled and pipeline oil, dissolved alkylbenzenes and redox constituents, sediment bioavailable iron, and aquifer microbial populations. Groundwater in this area flows east-southeast at approximately 26 meters per year. Results from the oil analyses indicate a high degree of biodegradation, characterized by nearly complete absence of *n*-alkanes. Cass Lake oil samples were more degraded than two oil samples collected in 2008 from the similarly contaminated USGS Bemidji, Minnesota, research site 40 kilometers away. Based on 19 ratios developed for comparing oil sources, the conclusion is that the oils at the two sites appear to be from the same hydrocarbon source.

In the Cass Lake groundwater plume, benzene concentrations decrease by three orders of magnitude within 150 meters (m) downgradient from the oil body floating on the water table (between well MW-10 and USGS-4 well nest). The depths of the highest benzene concentrations increase with distance downgradient from the oil, a condition typical of plumes in shallow, unconfined aquifers. Background groundwater, which is nearly saturated with oxygen, becomes almost entirely anaerobic in the plume. As at the Bemidji site, the most important biodegradation processes are anaerobic and dominated by iron reduction. The similarity between the Cass Lake and Bemidji benzene degradation rates, redox conditions, and aquifer material all support a hypothesis that the Cass Lake plume, like the Bemidji plume, is decades old.

As concentrations of alkylbenzenes in the oil decrease over time, the benzene concentrations in the groundwater plume will also decrease and the plume is expected to shrink. The Fox Creek wetland, about 250 m south of the Cass Lake site, is the nearest receptor to the south.

Introduction

Crude-oil contamination was detected in the subsurface beneath an oil pipeline pumping station (the Enbridge Energy Limited Partnership South Cass Lake Pumping Station) in Cass Lake, Minnesota (fig. 1) in May 2001 (Natural Resources Engineering Company, 2003). The Leech Lake Band of Ojibwe Department of Resource Management (DRM) is concerned that crude-oil contaminants may threaten water supplies, human health, or the environment by migrating off site to nearby domestic water wells and surface water bodies. To address this concern, USGS did a study in cooperation with Leech Lake Band of Ojibwe, Department of Resource Management. Previous studies on the fate of crude oil in the subsurface in a similar sand-and-gravel aquifer at a long-term research site 20 kilometers (km) northwest of Bemidji, Minnesota, and 40 km northwest of the Cass Lake site, provide a comprehensive scientific framework within which to evaluate the Cass Lake spill.

Studies at the oil-contaminated Bemidji research site (Baedecker and others, 1993; Eganhouse and others, 1993; Bennett and others, 1993) and other hydrocarbon-contaminated sites nationwide (for example, Rice and others, 1995) show that groundwater contaminants from crude oil and gasoline biodegrade naturally in the subsurface. When the degradation rate is rapid compared to the groundwater velocity, the distance of migration of contaminants away from the relatively stationary oil is limited to less than a few hundred meters. The long-term outlook for contaminant migration depends on the continued ability of subsurface microbial communities to degrade the contaminants. How long a hydrocarbon groundwater contaminant plume will persist depends on the amount of oil in the subsurface and the rate that contaminants are leached from the oil. Degradation rates must be examined individually at each site

Simple Aug
0.894

well data, borings GP-1 through GP-16 were collected using a Geoprobe in September 2001 to define the magnitude and extent of the dissolved and free-phase hydrocarbons.

In February 2002, a weeping flange connecting two pipes was found 23 m upgradient from well MW-3 (Natural Resources Engineering Company, 2003) and was identified as the location of the original spill site. It was repaired soon after its discovery, but the date that the leak first started is unknown. About 278 cubic meters (m^3) of contaminated soil were removed in 2002; some impacted soil was left in place to maintain the integrity of the pipeline. A second Geoprobe survey (GP-17 through GP-20, fig. 2) was conducted on August 13-14, 2002, to define the area of offsite contamination.

The extent of the separate-phase oil body shown in figure 2 was established by the two Geoprobe surveys conducted by Natural Resources Engineering Company (2003). The maximum thickness of oil contamination observed in the drill cuttings was 0.61 m. About 182,000 liters (L) of crude oil were estimated to be floating on the water table in 2005 (Wenck Associates, 2005). Kinematic viscosity of the crude oil measured at 10°C varied from a low of 23×10^{-6} meters squared per second (m^2/s) at MW-13 to a high of $421 \times 10^{-6} m^2/s$ at MW-5 (Natural

Resources Engineering Company, 2004). Similarly, the density of the crude oil varied from a low of 0.85 grams per cubic centimeter (g/cm^3) at MW-13 to a high of 0.938 g/cm^3 at MW-5. Crude oil thickness was measured in the wells 13 times from June 2001 to January 2006, with thicknesses ranging from 2.7 cm to 49.7 cm (Wenck Associates, 2006). Crude oil thicknesses were greater than 30 cm in wells MW-3, MW-5, MW-11, and MW-13 (fig. 2) in January 2006. Current remediation at the Cass Lake site consists of natural attenuation and periodic bailing of oil from the monitoring wells. In 2008 about 1.4 L were removed from the wells (Natural Resources Engineering Company, 2009).

Initial groundwater quality samples were collected from monitoring wells in June 2001, and the wells have been sampled regularly since 2004 (Natural Resources Engineering Company, 2009). The dissolved plume of benzene was previously estimated to extend to the southeast from the Cass Lake site to beneath the adjacent railroad tracks. The greatest concentrations of dissolved petroleum hydrocarbon constituents (benzene, 6,500 micrograms per liter, $\mu g/L$) were detected in well MW-5 (closest to the leaking flange) on January 6, 2004 (Wenck Associates, 2006). The greatest concentration of dis-

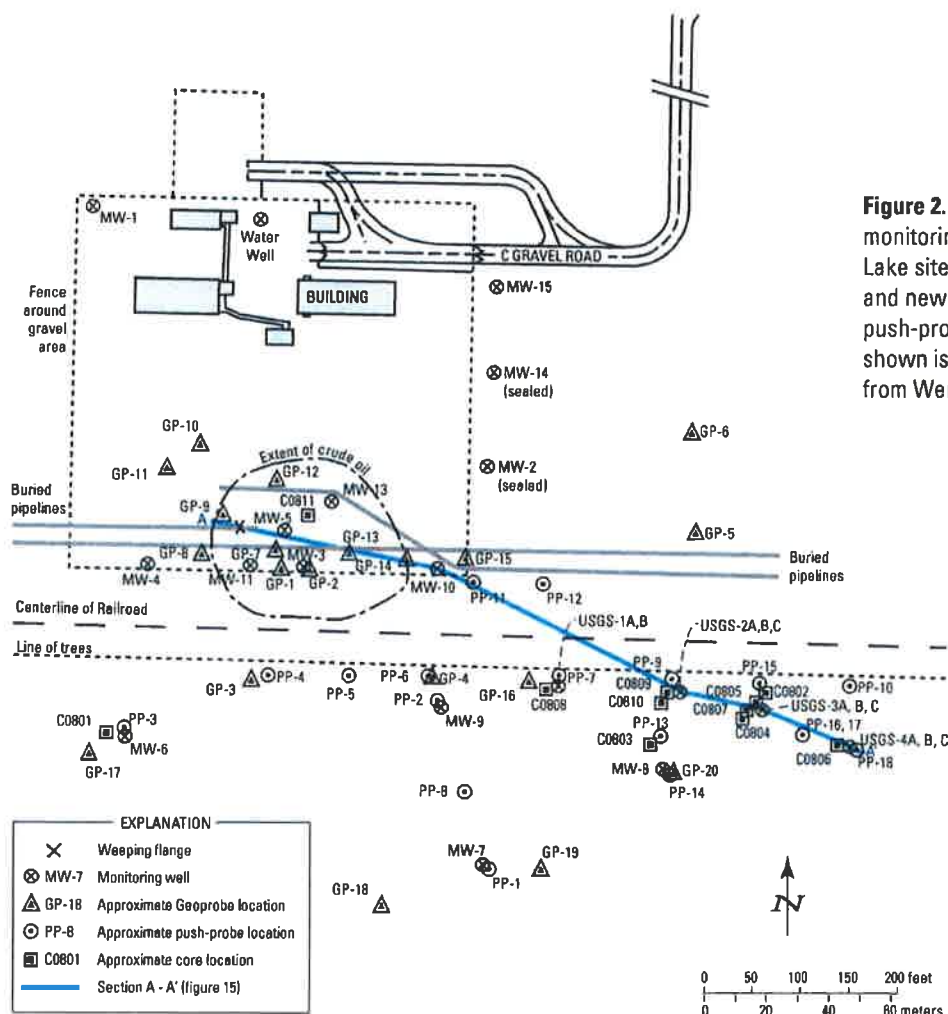


Figure 2. Locations of previous monitoring wells and borings at the Cass Lake site from Wenck Associates (2006) and new U.S. Geological Survey (USGS) push-probe, core, and well sites. Also shown is extent of subsurface crude oil from Wenck Associates (2005).

Lake pipeline oil (sample obtained in 2008), which indicated that the compositions of the oils are very similar. Some caution should be applied because there are no data indicating that the composition of the leaking oil was constant over time.

The VHC in the well oil and oil-contaminated sediment, compared to the VHC in pipeline oil, fall into three groups based on structure and degradation from biological and physical processes. In the first group, BTEX and the cyclohexanes are attenuated within the oil body (fig. 7). The most abundant compound in this group is methylcyclohexane, and about 60 percent of it is depleted in the MW-3 well oil compared to the pipeline oil. About 90 percent of the benzene is depleted in the well oil. Some components are below detection limit, such as toluene and

o-xylene, whereas others, such as *m*- and *p*-xylenes, were relatively unchanged. In the second group, the C₃- and C₄-alkylbenzenes, naphthalene, and the methylnaphthalenes show similar patterns between the pipeline, well oil, and sediment. There is little or no loss of these compounds in the well oil compared to the pipeline oil, and some of the trimethylbenzenes and tetramethylbenzenes are higher in concentration in the well oil compared to the pipeline oil. The sediment sample has a similar distribution of VHC as in the well oil. In the third group, the normal hydrocarbons in the C₆ to C₁₂ range are present in the pipeline oil and not detected in the well oil or in the sediment sample (table 6).

The loss of BTEX in the well oil and oil-contaminated sediment compared to the pipeline oil is likely due primarily

Table 6. Results of analyses of oil collected from a South Cass Lake Pumping Station pipeline (2008), bailed from MW-3 (2007), and extracted from C0811-91 centimeters (cm) (2008).

[ND, not detected. Results in milligrams per gram (mg/g)]

Hydrocarbons identified	Pipeline oil, mg/g oil	Well MW-3 oil, mg/g oil ¹	C0811-91 cm, mg/g dry weight sediment
benzene	1.186	0.132	0.494
toluene	4.025	ND	ND
ethylbenzene	2.182	0.514	3.312
<i>o</i> -xylene	1.231	0.022	ND
<i>m</i> -xylene	2.089	1.711	8.411
<i>p</i> -xylene	0.737	0.486	0.702
cyclohexane ²	3.808	0.584	3.783
methylcyclohexane ²	5.326	2.010	10.543
ethylcyclohexane ²	1.905	0.980	4.888
1,3,5-trimethylbenzene	0.602	0.853	2.727
1,2,4-trimethylbenzene	2.037	2.319	9.238
1,2,3-trimethylbenzene	0.970	0.871	3.105
1,2,3,4-tetramethylbenzene ²	0.439	0.742	2.455
1,2,3,5-tetramethylbenzene ²	0.305	0.417	1.345
1,2,4,5-tetramethylbenzene ²	0.138	0.175	0.567
naphthalene	0.360	0.342	1.106
1-methylnaphthalene ²	0.522	0.446	1.088
2-methylnaphthalene ²	0.674	0.650	1.635
hexane	10.400	ND	ND
heptane	15.391	ND	ND
octane	6.952	ND	ND
nonane	7.951	ND	ND
decane	7.873	ND	ND
undecane	7.687	ND	ND
dodecane	6.037	ND	ND

¹Average of two samples analyzed

²External standard used to quantify

See attached calc

<u>Identified Hydrocarbon</u>	Well MW-3 oil mg/g o mass fraction	# carbons	MW (g/mol)
benzene	0.132	6	78.11
toluene	0	7	92.13
ethylbenzene	0.514	8	106.16
o-xylene	0.022	8	106.16
m-xylene	1.711	8	106.16
p-xylene	0.486	8	106.16
cyclohexane	0.584	6	84.16
methylcyclohexane	2.01	7	98.18
ethylcyclohexane	0.98	8	112.21
1,3,5-trimethylbenzene	0.853	9	120.2
1,2,4-trimethylbenzene	2.319	9	120.2
1,3,3-trimethylbenzene	0.871	9	120.2
1,2,3,4-tetramethylbenzene	0.742	10	134.2
1,2,3,5-tetramethylbenzene	0.417	10	134.2
1,2,4,5-tetramethylbenzene	0.175	10	134.2
naphthalene	0.342	10	128.2
1-methylnaphthalene	0.446	11	142.2
2-methylnaphthalene	0.65	11	142.2
hexane	0	8	86.17
heptane	0	9	100.2
octane	0	8	114.28
nonane	0	9	128.25
decane	0	10	142.48
undecane	0	11	156.3
dodecane	0	12	170.33

Weighted Carbon Number

8.5

THESE ARE REALLY SIMILAR

TO OCTANE

(8, 114.2g/mol)

Weighted MW (g/mol)

114.8

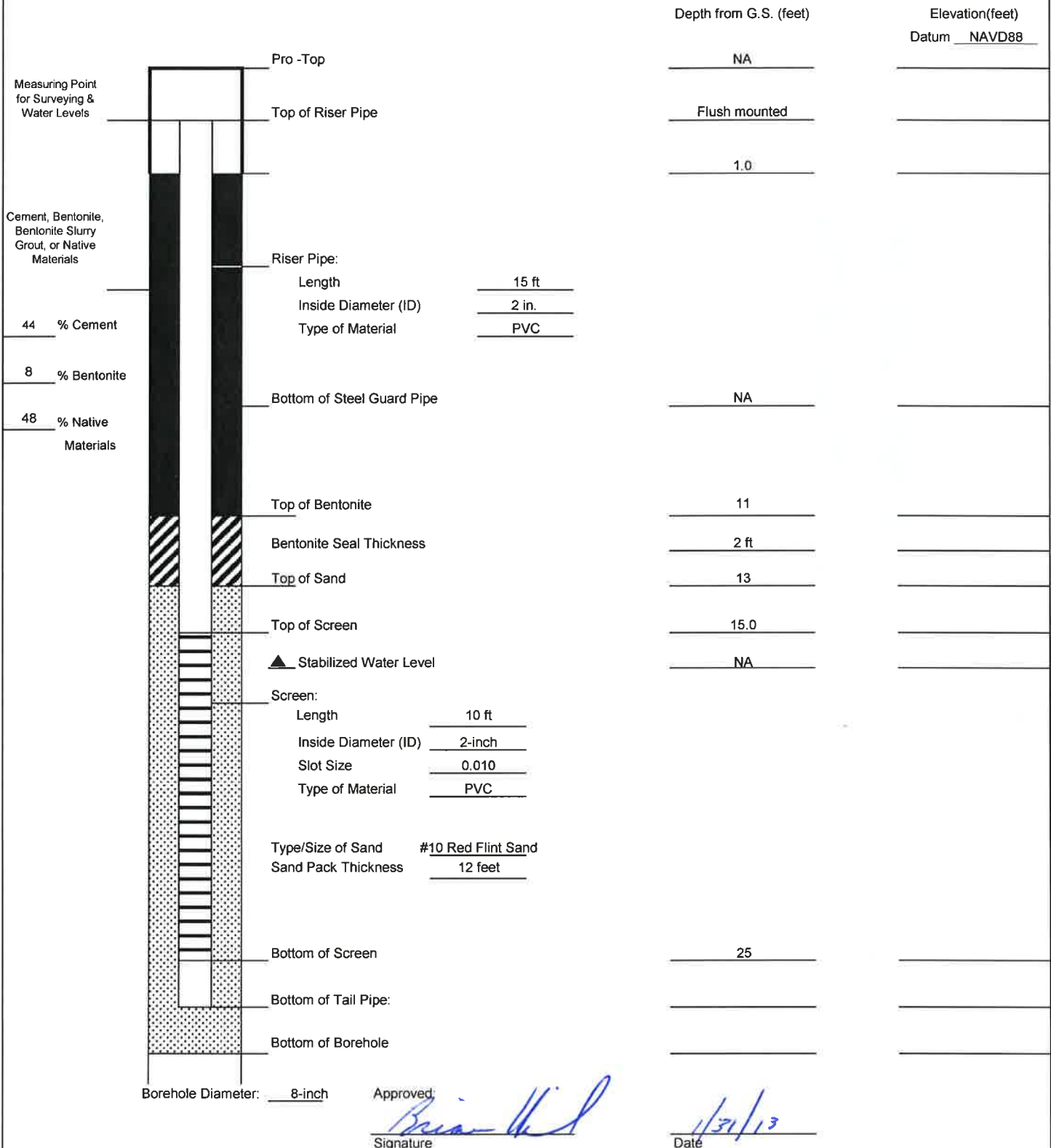
Well Construction Details

Client: *Enbridge Energy*Project Number: *60254681*Site Location: *South Cass Lake, Cass Lake, MN*

Well Location: _____ Coords: _____

Method: *Hollow Stem Auger*WELL ID: *BVW-1*

UNIQUE WELL ID: _____

Date Installed: *19-Nov-12*Inspector: *Brian Hill*Contractor: *Thein Well Company***BIOVENTING WELL CONSTRUCTION DETAIL**

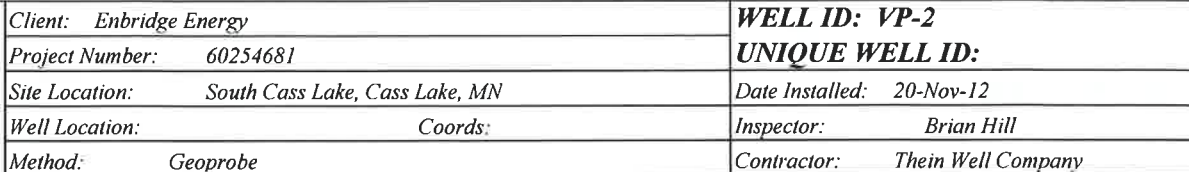
Client: *Enbridge Energy*Project Number: *60254681*Site Location: *South Cass Lake, Cass Lake, MN*Well Location: *Coords:*Method: *Geoprobe*WELL ID: *VP-1*

UNIQUE WELL ID:

Date Installed: *19-Nov-12*Inspector: *Brian Hill*Contractor: *Thein Well Company*

NESTED VAPOR POINTS CONSTRUCTION DETAIL (DEPTHS: 15ft, 20ft, 24ft)

		Depth from G.S. (feet)	Elevation(feet)
			Datum <u>NAVD88</u>
Measuring Point for Surveying & Water Levels	Pro -Top	<u>NA</u>	
	Top of Riser Pipe	<u>Flush mounted</u>	
Cement, Bentonite, Bentonite Slurry Grout, or Native Materials	Riser Pipe:		
	Length	<u>14.5ft, 19.5ft, 23.5ft</u>	
	Inside Diameter (ID)	<u>3/8-inch</u>	
	Type of Material	<u>Silicone tubing:</u> <u>[opaque(15'), clear (20'), black (24')]</u>	
NA, NA, NA	% Cement		
87, 90, 92	% Bentonite		
13, 10, 8	% Native Materials		
	Bottom of Steel Guard Pipe	<u>NA</u>	
	Top of Bentonite	<u>1</u>	
	Bentonite Seal Thickness	<u>12ft, 17ft, 21ft</u>	
	Top of Sand	<u>13, 18, 22</u>	
	Top of Screen	<u>14.5, 19.5, 23.5</u>	
	▲ Stabilized Water Level	<u>NA</u>	
	Screen:		
	Length	<u>0.5 ft</u>	
	Inside Diameter (ID)	<u>3/8-inch</u>	
	Slot Size	<u>0.010</u>	
	Type of Material	<u>Steel</u>	
	Type/Size of Sand	<u>Silica Sand</u>	
	Sand Pack Thickness	<u>2 feet</u>	
	Bottom of Screen	<u>15, 20, 24</u>	
	Bottom of Tail Pipe:		
	Bottom of Borehole		
Borehole Diameter: <u>2-inch</u>			
Approved: <u><i>Brian Hill</i></u>			
Signature		Date <u>1/31/13</u>	



		Depth from G.S. (feet)	Elevation(feet)
		NA	Datum NAVD88
Measuring Point for Surveying & Water Levels	Pro -Top	NA	
	Top of Riser Pipe	Flush mounted	
Cement, Bentonite, Bentonite Slurry Grout, or Native Materials	Riser Pipe:		
	Length	14.5ft, 19.5ft, 23.5ft	
	Inside Diameter (ID)	3/8-inch	
NA, NA, NA	Type of Material	Silicone tubing:	
87, 90, 92		[opaque(15'), clear (20'), black (24')]	
13, 10, 8	Bottom of Steel Guard Pipe	NA	
% Cement			
% Bentonite			
% Native Materials			
	Top of Bentonite	1	
	Bentonite Seal Thickness	12ft, 17ft, 21ft	
	Top of Sand	13, 18, 22	
	Top of Screen	14.5, 19.5, 23.5	
	▲ Stabilized Water Level	NA	
	Screen:		
	Length	0.5 ft	
	Inside Diameter (ID)	3/8-inch	
	Slot Size	0.010	
	Type of Material	Steel	
	Type/Size of Sand	Silica Sand	
	Sand Pack Thickness	2 feet	
	Bottom of Screen	15, 20, 24	
	Bottom of Tail Pipe:		
	Bottom of Borehole		
Borehole Diameter: 2-inch			
Approved:		1/31/13	
Signature		Date	



Client: Enbridge Energy

Project Number: 60254681

Site Location: South Cass Lake, Cass Lake, MN

Well Location: Coords:

Method: Geoprobe

WELL ID: VP-3

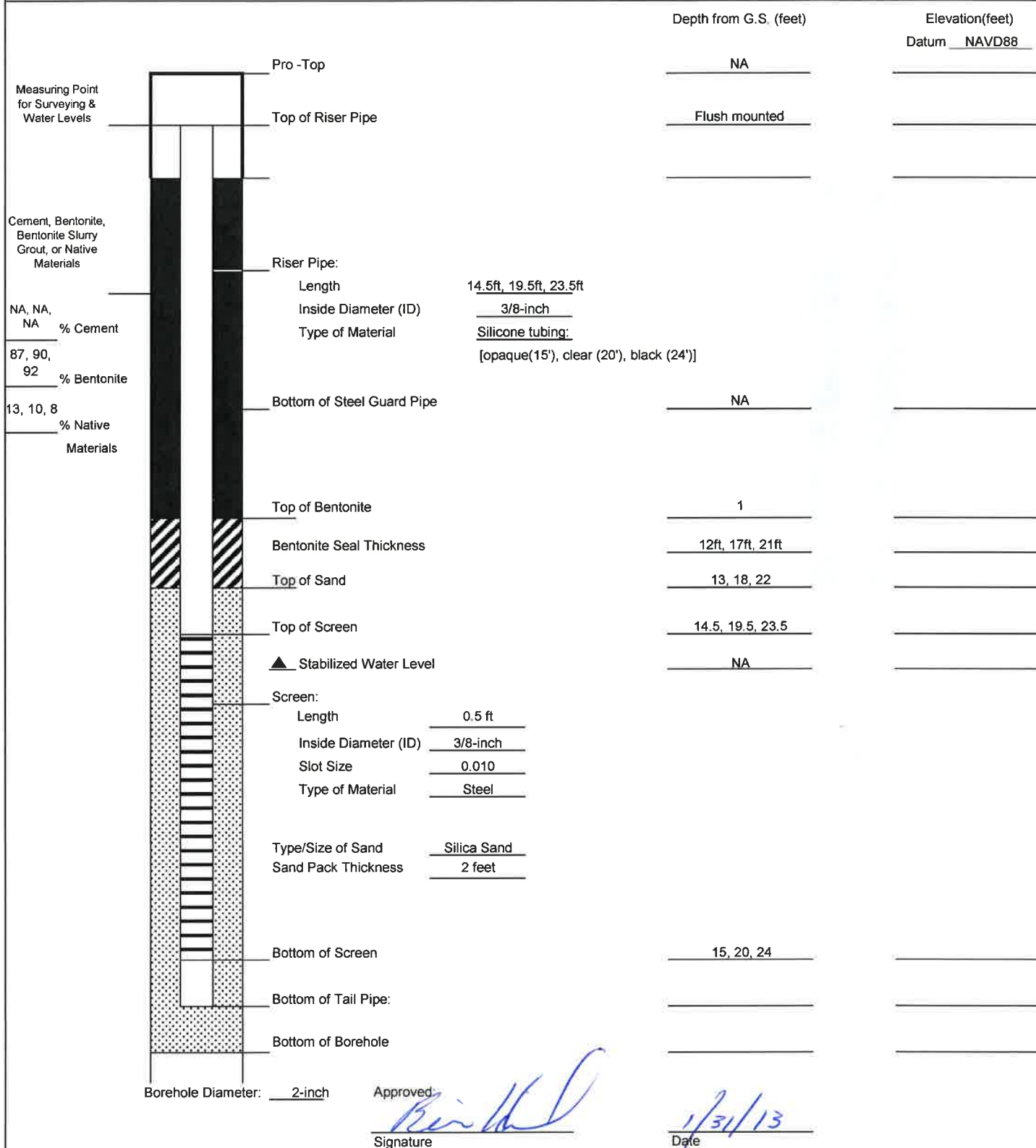
UNIQUE WELL ID:

Date Installed: 20-Nov-12

Inspector: Brian Hill

Contractor: Thein Well Company

NESTED VAPOR POINTS CONSTRUCTION DETAIL (DEPTHS: 15ft, 20ft, 24ft)





Client: Enbridge Energy

Project Number: 60254681

Site Location: South Cass Lake, Cass Lake, MN

Well Location: Coords:

Method: Geoprobe

WELL ID: VP-4

UNIQUE WELL ID:

Date Installed: 20-Nov-12

Inspector: Brian Hill

Contractor: Thein Well Company

NESTED VAPOR POINTS CONSTRUCTION DETAIL (DEPTHS: 15ft, 20ft, 24ft)

