



February 2, 2015

Manitoba Conservation and Water Stewardship  
Environmental Approvals  
2<sup>nd</sup> Floor, 123 Main St.  
Winnipeg, MB R3C 1A5

Attn: Tracey Braun, M. Sc. – Director Environmental Approvals Branch

Dear Ms. Braun:

RE: Repository Cell – Dangerous Goods Handling & Transportation Act Licence No. 58 HW S2 RRR

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With the submission of Miller Environmental Corporation's ("Miller") repository cell proposal ("proposal") sent on July 25, 2014, please accept this letter as Miller's response to the document titled "Miller Repository Proposal Observations" received by Raj Rathanamo of Manitoba Conservation and Water Stewardship ("Conservation") on September 29, 2014. All Conservation observations are in bold.

**Stabilization/Solidification Process (page 2)**

- 1. This section deals with the stabilization and solidification process. A description on the following is required:**

***How the stabilized material is to be placed into the repository cell – the method and mechanism involved and whether a compaction of the material is involved.***

The stabilized material will be placed into the repository cell with an end dump. Once the material has been placed into the cell, it will be further pushed into the cell and spread by a trackhoe. The material will be compacted by the weight of the equipment during the spreading process.

- 2. According to the proposal, leachate collected will be applied to the top of the stabilized material. This method and addition of water (as stated in this section) could lead to generation of more leachate as opposed to measures adapted to control or limit the leachate formation. In addition, applying leachate or any other aqueous media on the stabilized material may interfere with the integrity of the already stabilized material.**

***Have other options related to wind dispersal controls been studied?***

Wind dispersal controls will be managed through application of collected leachate or water. The leachate will be pumped and treated appropriately depending on the contaminants found. If and when required, representative samples of the leachate will be sent to an external lab. Leachate will not be applied to the stabilized material until lab results have been received and reviewed internally to avoid interfering with the integrity of the stabilized material. In low leachate conditions, clean water will be applied as a wind dispersal control.

### **Capping Process (page 2)**

- 3. Cell closure and capping process require more detailed description including the proposed liner system(s) design details, design diagram, measures adopted to prevent precipitation run on and run off, design details of interceptor drains, etc.***

**Appendix B – compacted clay liner 1 m (see CLC request below), highlight C-0002 pdf from AECOM (ditches, land water flow, etc.), precipitation management – leachate collection system (highlight C-0002)**

**CLC request: 1.0 meter of clay be topped off with 0.5 meters of topsoil to provide additional protection from vegetative growth and burrowing animals as described in the 1992 EIA**

As per the Community Liaison Committee's ("CLC") recommendation in the approval letter received on September 18, 2014, Miller will apply a compacted clay cap on the repository 1.0 meter thick topped off with 0.5 meters of topsoil. As mentioned in Miller's proposal, the leachate collection system will continue to be operational to sample leachate when required, to determine whether there are any permeability issues in the cap. To ensure clarification of the leachate collection system design, it has been highlighted in yellow on AECOM's design drawing "C-0002" (Refer to Appendix A). A ditch system will be implemented around the southern portion of the cell to capture precipitation and will be incorporated into the facility's existing ditch system. This new system is highlighted in green in "C-0002" (Refer to Appendix A). Natural flow of water on Miller's property runs from the NE corner to the SW corner. The natural flow directs water into the current ditch system and will now be incorporated into the new proposed ditch system.

### **Groundwater Monitoring (pages 4 & 5)**

- 4. The proposal indicates that the existing 5 monitoring wells located in close proximity to the Process buildings will also serve the proposed repository. Reasoning: the ground water flows from the NW corner to the SE corner.***

***This requires further discussion and clarification - additional monitoring wells near the repository need to be installed in order to monitor and analyse the ground water up gradient and down gradient from the repository cell. In addition, baseline data on water quality needs to be established prior to filling of the cell.***

Miller proposes to install a monitoring well in the NW corner by the property line and another one SE of the repository cell (Refer to Appendix B on AECOM's design drawing "C-0002"). This will provide the ability to monitor and analyse ground water up gradient and down gradient from the repository cell. Baseline data on water quality has been submitted to Conservation for many years through annual environmental reports. Please refer to Appendix C (Ground Water and Soil Results), Appendix D (Surface Water Results – Bioassay) and Appendix E (Surface Water Results) for groundwater and surface water results for 2014 (to be submitted in Miller's environmental report due April 2015).

**Appendix A (page 5)**

5. ***3<sup>rd</sup> sentence states "Excavated slopes should be flattened with the hazardous waste as soon as possible after excavation".***

***This sentence requires further clarification.***

This sentence is in the "Slope Stability" section (4.1) in the AECOM Geotechnical Investigation Report submitted in the proposal. This sentence references the filling and flattening of the stabilized material once it has been placed into the repository to stabilize the repository walls. The stabilized material will be placed into the repository cell with an end dump. Once the material has been placed into the cell, it will be further pushed into the cell and spread by a trackhoe. The addition of stabilized material will stabilize the repository walls to further ensure the safety of workers and equipment in the repository cell.

6. ***Proposal discusses about using the existing cohesive soils found on the cell floor as the natural clay liner (as it exceeds 1M thickness) or placing compacted clay liner (min. thickness of 1M) for the base and side slopes.***

***The 1992 proposal discusses about the placement of HDPE liner on the soil barrier.***

***No reasoning has been given for not incorporating an HDPE liner.***

***Section 5.1 discusses about the clay liner. There is also a reference to the condition 33 of the Licence 58 HW S2 RRR issued by Manitoba Conservation.***

***It should be noted that the Condition 33 (including conditions 31-40) of the Licence 58 HW S2 RRR deals with construction of cells with respect to bulk material and sludge (soils or other solid materials that are contaminated with organics such as hydrocarbons or inorganic substances such as heavy metals) treatment and disposal.***

It is recognized that condition 33 in Miller's operating licence ("Licence") references construction of cells for use of processing waste material. All material placed into the repository cell will have

undergone an internal treatment process to stabilize the material. The current requirements for cell construction as per Miller's Licence, require a natural liner to have a hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec or less along with the requirement for the clay liner to be a minimum of 1 meter in thickness at the thinnest point. The measured hydraulic conductivity values, reported in Section 3.0 in the AECOM Geotechnical Investigation Report, meet and exceed the Licence requirements. The natural clay on Miller's facility site represents ideal clay conditions to allow Miller to meet these requirements. This was one of the reasons the site was chosen for the facility development. These natural clay conditions and the ability for Miller to meet natural liner hydraulic conductivity requirements are the reason why it is not necessary to incorporating the HDPE liner.

**7. *What measures are to be adapted to keep the precipitation out of the repository cell during its active life?***

The construction and operation of the cell will be conducted in three separate phases. Each phase of operation will consist of the excavation and deposition of stabilized material in approximately one third of the total cell floor area. Each phase of operation will commence when the total allowable area for each one third of floor area has been filled with stabilized material. This design procedure was chosen to properly manage controlled volumes of precipitation. During the active life of the repository cell, the leachate collection system will manage precipitation that will enter the cell. A sub drain system will be implemented in the cell floor design which will direct any leachate and precipitation to a pump out manhole covering a vertical collection conduit. The conduit will give access to a sump pump at the bottom of the conduit to extract and monitor leachate collected from the repository cell. For reference to the leachate collection system design, it has been highlighted in yellow on AECOM's design drawing "C-0002" (Refer to Appendix A).

If you have any questions, please feel free to contact me at 204-925-9604 or by email at [daveh@millerenvironmental.mb.ca](mailto:daveh@millerenvironmental.mb.ca).

Sincerely yours,  
**Miller Environmental Corporation**



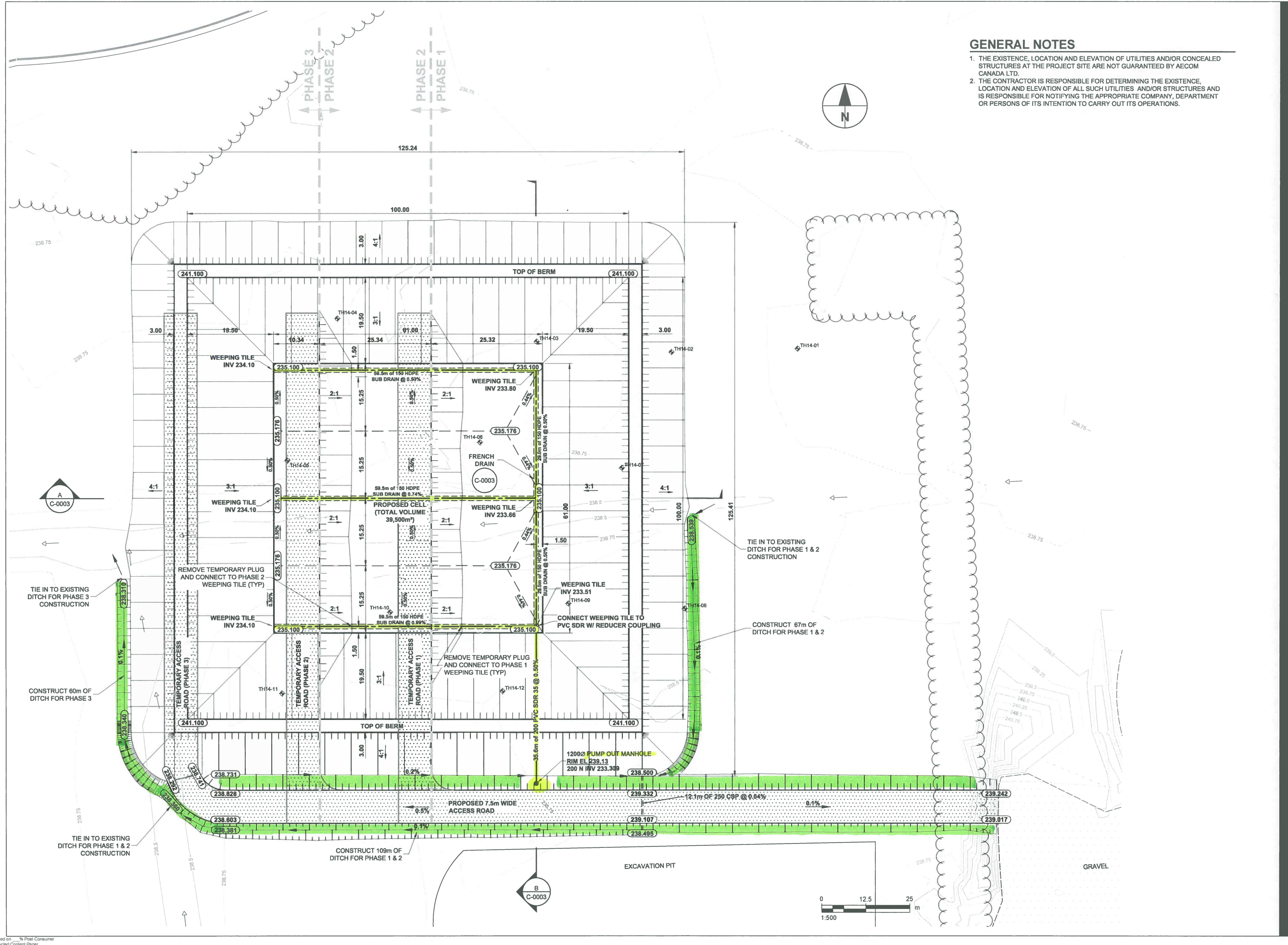
Dave Howes  
Technical Services Coordinator

CC: Raj Rathanamo - Manitoba Conservation and Water Stewardship  
Bruce Webb - Manitoba Conservation and Water Stewardship  
Vaughn Bullough – Vice President & General Manager, Miller Environmental Corporation  
Todd Normandeau – Projects Coordinator, Miller Environmental Corporation

**Appendix A**

**Leachate Collection System and Ditching System – C-0001**

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**GENERAL NOTES**

1. THE EXISTENCE, LOCATION AND ELEVATION OF UTILITIES AND/OR CONCEALED STRUCTURES AT THE PROJECT SITE ARE NOT GUARANTEED BY AECOM CANADA LTD.
2. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXISTENCE, LOCATION AND ELEVATION OF ALL SUCH UTILITIES AND/OR STRUCTURES AND IS RESPONSIBLE FOR NOTIFYING THE APPROPRIATE COMPANY, DEPARTMENT OR PERSONS OF ITS INTENTION TO CARRY OUT ITS OPERATIONS.



REGISTRATION



ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	2014/07/24	ISSUED FOR ENVIRONMENTAL APPROVAL

KEY PLAN

PROJECT NUMBER

60216914

SHEET TITLE

REPOSITORY CELL  
 CELL PHASING, ACCESS ROAD  
 AND SITE GRADING

SHEET NUMBER

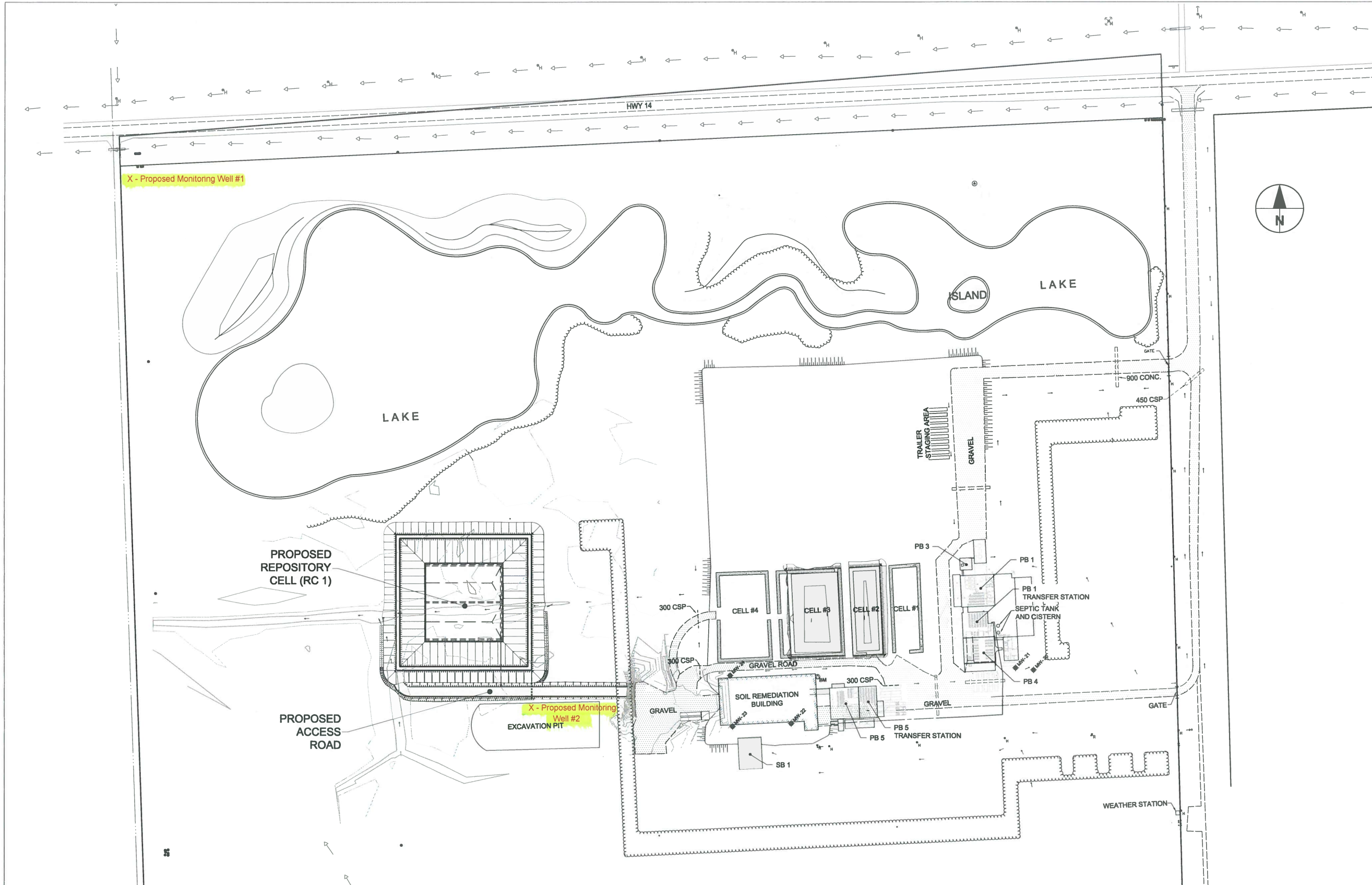
C-0002

**Appendix B**

**Proposed Monitoring Well Locations – C-0002**

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150 WM	WATERMAIN	150 WM	HYDRANT	MTS	150 WM	WATERMAIN	150 WM
300 LDS	LAND DRAINAGE SEWER	300 LDS	VALVE	GAS	300 LDS	LAND DRAINAGE SEWER	300 LDS
250 WWS	WASTE WATER SEWER	250 WWS	TEST HOLE	MONITORING WELL	250 WWS	WASTE WATER SEWER	250 WWS
○	MANHOLE	○	BENCH MARK	PAVEMENT CROWN	---	PAVEMENT CROWN	---
□	CATCH BASIN	□	ANCHOR	GROUNDLINE	---	GROUNDLINE	---
▶	FLOW DIRECTION	▶	HYDRO POLE				
▭	CULVERT	▭	EDGE OF ROAD				
○	TREE	○	DRAINAGE				
+	SURVEY BAR	+	TREE LINE				
---	EXISTING	---	LEGEND - PLAN	NEW	---	EXISTING	---
---	NEW	---	LEGEND - PROFILE	NEW	---	NEW	---



# AECOM

PROJECT  
**Repository Cell**

CLIENT  
**Miller Environmental Corporation**  
 Manitoba

CONSULTANT  
 AECOM  
 99 Commerce Drive  
 Winnipeg, Manitoba R3P 0Y7  
 204.477.5381 tel 204.284.2040 fax  
 www.aecom.com

REGISTRATION



ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	2014/07/24	ISSUED FOR ENVIRONMENTAL APPROVAL

KEY PLAN

PROJECT NUMBER

60216914

SHEET TITLE

REPOSITORY CELL  
 OVERALL SITE PLAN

SHEET NUMBER

C-0001



**Appendix C**

**2014 Ground Water and Soil Results**

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Your C.O.C. #: C446314

**Attention: Paul Reeks**

Miller Environmental Corporation  
PO Box 279  
St. Jean Baptiste, MB  
Canada ROG 2B0

**Report Date: 2014/10/02**

Report #: R1654970

Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B485577**

**Received: 2014/09/25, 10:15**

Sample Matrix: Soil  
# Samples Received: 3

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
BTEX/F1 by HS GC-MS/FID (MeOH extract) (2)	3	2014/09/25	2014/09/27	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
CCME Hydrocarbons (F2-F4 in soil) (3)	3	2014/09/26	2014/09/26	WINSOP-00056	CCME PHC-CWS
Elements by ICPMS (total) (1)	3	2014/09/27	2014/09/29	BBY7SOP-00001	EPA 6020a R1 m
Moisture	3	N/A	2014/09/29	WIN SOP-00060	Carter Method 51.2
PAH in Soil by GC/MS (SIM) - CCME (1)	3	2014/09/28	2014/10/02	BBY8SOP-00022	EPA 8270d R4 m
Benzo[a]pyrene Equivalency (1)	3	N/A	2014/10/02	BBY WI-00033	Auto Calc
Total LMW, HMW, Total PAH Calc (1)	3	N/A	2014/10/02	BBY WI-00033	Auto Calc
pH (2:1 DI Water Extract) (1)	3	2014/10/01	2014/10/01	BBY6SOP-00028	BCMOE BCLM Mar2005 m

Sample Matrix: Water  
# Samples Received: 5

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
BTEX/F1 in Water by HS GC/MS	5	N/A	2014/10/01	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
Chloride by Automated Colourimetry (1)	5	N/A	2014/09/26	BBY6SOP-00011	SM 22 4500-Cl- G m
Hardness Total (calculated as CaCO3) (1)	1	N/A	2014/09/30	BBY7SOP-00002	EPA 6020a R1 m
Hardness Total (calculated as CaCO3) (1)	4	N/A	2014/10/01	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Total) by CVAF (1)	5	2014/10/01	2014/10/02	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	2014/09/25	2014/09/30	BBY7SOP-00002	EPA 6020A R1 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	4	2014/09/25	2014/10/01	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total) (1)	5	2014/09/26	2014/09/30	BBY7SOP-00002	EPA 6020A R1 m
Nitrate + Nitrite (N) - Preserved (1)	5	N/A	2014/09/26	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N)	5	N/A	2014/09/25	WIN SOP-00016	Based on SM4500-NO2B
Nitrogen - Nitrate (as N) (1)	5	N/A	2014/09/29	BBY6SOP-00010	SM 22 4500-NO3 I m
pH in Water by PC Titrator (4)	5	N/A	2014/09/30	WIN SOP-00063	SM4500 H+B
Sulphate by Automated Colourimetry (1)	5	N/A	2014/09/29	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue)	5	N/A	2014/09/26	WIN SOP-00042	Based on SM 2540C
Carbon (Total Organic) (1, 5)	5	N/A	2014/09/27	BBY6SOP-00003	SM 22 5310 C m

Your C.O.C. #: C446314

**Attention:Paul Reeks**

Miller Environmental Corporation  
PO Box 279  
St.Jean Baptiste, MB  
Canada ROG 2B0

**Report Date: 2014/10/02**  
Report #: R1654970  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**MAXXAM JOB #: B485577**

**Received: 2014/09/25, 10:15**

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Maxxam Vancouver
- (2) This method complies with the reference method for the CWS PHC and is validated for use in the laboratory.  
Applicable only to F1 and/or LH - nC6 and nC10 response factors are within 30% of the toluene response factor.  
The hydrocarbon results are expressed as a dry weight basis.
- (3) This method complies with the reference method for the CWS PHC and is validated for use in the laboratory.  
The hydrocarbon results are expressed as a dry weight basis.
- (4) The APHA Standard Method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
- (5) TOC present in the sample should be considered as non-purgeable TOC.

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Janelle Kochan, B.Sc., Project Manager

Email: JKochan@maxxam.ca

Phone# (204)772-7276 Ext:2209

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B485577  
Report Date: 2014/10/02

Miller Environmental Corporation

**BTEX/F1-F4 IN SOIL (SOIL)**

Maxxam ID		KR5884	KR5885	KR5886		
Sampling Date		2014/09/24	2014/09/24	2014/09/24		
COC Number		C446314	C446314	C446314		
	Units	A1-8"-0924	A2-8"-0924	A3-8"-0924	RDL	QC Batch
<b>Physical Properties</b>						
Moisture	%	21	22	21	0.3	7654168
<b>Ext. Pet. Hydrocarbon</b>						
F2 (C10-C16 Hydrocarbons)	mg/kg	<20	<20	<20	20	7654165
F3 (C16-C34 Hydrocarbons)	mg/kg	32	46	20	20	7654165
F4 (C34-C50 Hydrocarbons)	mg/kg	<20	<20	<20	20	7654165
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	N/A	7654165
<b>Volatiles</b>						
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	7653516
Toluene	mg/kg	<0.020	<0.020	<0.020	0.020	7653516
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	0.010	7653516
Xylenes (Total)	mg/kg	<0.040	<0.040	<0.040	0.040	7653516
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	0.040	7653516
o-Xylene	mg/kg	<0.020	<0.020	<0.020	0.020	7653516
Methyl-tert-butylether (MTBE)	mg/kg	<0.10	<0.10	<0.10	0.10	7653516
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	10	7653516
(C6-C10)	mg/kg	<10	<10	<10	10	7653516
<b>Surrogate Recovery (%)</b>						
4-Bromofluorobenzene (sur.)	%	102	101	100		7653516
D10-ETHYLBENZENE (sur.)	%	110	109	109		7653516
D4-1,2-Dichloroethane (sur.)	%	104	105	106		7653516
D8-TOLUENE (sur.)	%	97	97	97		7653516
O-TERPHENYL (sur.)	%	99	88	98		7654165
RDL = Reportable Detection Limit N/A = Not Applicable						

**RESULTS OF CHEMICAL ANALYSES OF WATER**

Maxxam ID		KR5879	KR5880	KR5881		KR5882		
Sampling Date		2014/09/24 15:30	2014/09/24 15:30	2014/09/24 15:30		2014/09/24 15:30		
COC Number		C446314	C446314	C446314		C446314		
	Units	MW1-2.2M-0924	MW2-2.7M-0924	MW3-2.5M-0924	RDL	MW4-1.2M-0924	RDL	QC Batch
<b>Calculated Parameters</b>								
Nitrate (N)	mg/L	0.124	0.211	0.271	0.020	0.077	0.020	7652767
<b>Misc. Inorganics</b>								
Total Organic Carbon (C)	mg/L	19.7	29.1	11.4	0.50	22.1	0.50	7656166
pH	pH	7.68	7.57	7.57	N/A	7.61	N/A	7658762
<b>Anions</b>								
Dissolved Sulphate (SO4)	mg/L	2870	5710	2870	50	7140	50	7658457
Dissolved Chloride (Cl)	mg/L	93	55	99	0.50	300	5.0	7655767
<b>Nutrients</b>								
Nitrate plus Nitrite (N)	mg/L	0.124	0.211	0.271	0.020	0.077	0.020	7655684
Nitrite (N)	mg/L	<0.002	<0.002	<0.002	0.002	<0.002	0.002	7653754
<b>Physical Properties</b>								
Total Dissolved Solids	mg/L	4870	7930	4230	50	9930	50	7655129
RDL = Reportable Detection Limit N/A = Not Applicable								

Maxxam ID		KR5883		
Sampling Date		2014/09/24 15:30		
COC Number		C446314		
	Units	MW5-1.1M-0924	RDL	QC Batch
<b>Calculated Parameters</b>				
Nitrate (N)	mg/L	<0.020	0.020	7652767
<b>Misc. Inorganics</b>				
Total Organic Carbon (C)	mg/L	52.1	1.0	7656166
pH	pH	8.07	N/A	7658762
<b>Anions</b>				
Dissolved Sulphate (SO4)	mg/L	12900	50	7658457
Dissolved Chloride (Cl)	mg/L	590	5.0	7655767
<b>Nutrients</b>				
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	7655684
Nitrite (N)	mg/L	0.010	0.002	7653754
<b>Physical Properties</b>				
Total Dissolved Solids	mg/L	17600	50	7655129
RDL = Reportable Detection Limit N/A = Not Applicable				

Maxxam Job #: B485577  
Report Date: 2014/10/02

Miller Environmental Corporation

**VOLATILE ORGANICS BY GC-MS (WATER)**

Maxxam ID		KR5879	KR5880	KR5881	KR5882	KR5883		
Sampling Date		2014/09/24 15:30	2014/09/24 15:30	2014/09/24 15:30	2014/09/24 15:30	2014/09/24 15:30		
COC Number		C446314	C446314	C446314	C446314	C446314		
	Units	MW1-2.2M-0924	MW2-2.7M-0924	MW3-2.5M-0924	MW4-1.2M-0924	MW5-1.1M-0924	RDL	QC Batch
<b>Volatiles</b>								
Benzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	7660736
Toluene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	7660736
Ethylbenzene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	7660736
o-Xylene	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	7660736
m & p-Xylene	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	0.8	7660736
Xylenes (Total)	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	0.8	7660736
Methyl-tert-butylether (MTBE)	ug/L	<4	<4	<4	<4	<4	4	7660736
F1 (C6-C10) - BTEX	ug/L	<300	<300	<300	<300	<300	300	7660736
(C6-C10)	ug/L	<300	<300	<300	<300	<300	300	7660736
<b>Surrogate Recovery (%)</b>								
4-Bromofluorobenzene (sur.)	%	103	101	104	102	105		7660736
D4-1,2-Dichloroethane (sur.)	%	99	103	99	101	100		7660736
D8-TOLUENE (sur.)	%	101	101	103	101	103		7660736
RDL = Reportable Detection Limit								



Maxxam Job #: B485577  
Report Date: 2014/10/02

Miller Environmental Corporation

**CCME TOTAL METALS IN WATER (WATER)**

<b>Maxxam ID</b>		KR5879		KR5880		KR5881		KR5882		
<b>Sampling Date</b>		2014/09/24 15:30		2014/09/24 15:30		2014/09/24 15:30		2014/09/24 15:30		
<b>COC Number</b>		C446314		C446314		C446314		C446314		
	<b>Units</b>	<b>MW1-2.2M-0924</b>	<b>RDL</b>	<b>MW2-2.7M-0924</b>	<b>RDL</b>	<b>MW3-2.5M-0924</b>	<b>RDL</b>	<b>MW4-1.2M-0924</b>	<b>RDL</b>	<b>QC Batch</b>

**Calculated Parameters**

Total Hardness (CaCO3)	mg/L	3130	0.50	3970	0.50	4800	0.50	4860	0.50	7652508
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**Elements**

Total Mercury (Hg)	ug/L	<0.010	0.010	<0.010	0.010	0.011	0.010	<0.010	0.010	7662022
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**Total Metals by ICPMS**

Total Aluminum (Al)	ug/L	28.1	3.0	11.1	6.0	36.9	3.0	8.5	6.0	7655152
Total Antimony (Sb)	ug/L	<0.50	0.50	<1.0	1.0	<0.50	0.50	<1.0	1.0	7655152
Total Arsenic (As)	ug/L	0.76	0.10	0.90	0.20	0.96	0.10	0.85	0.20	7655152
Total Barium (Ba)	ug/L	7.3	1.0	5.4	2.0	24.1	1.0	5.9	2.0	7655152
Total Beryllium (Be)	ug/L	<0.10	0.10	<0.20	0.20	<0.10	0.10	<0.20	0.20	7655152
Total Bismuth (Bi)	ug/L	<1.0	1.0	<2.0	2.0	<1.0	1.0	<2.0	2.0	7655152
Total Boron (B)	ug/L	205	50	169	100	408	50	231	100	7655152
Total Cadmium (Cd)	ug/L	0.275	0.010	0.197	0.020	0.394	0.010	0.220	0.020	7655152
Total Chromium (Cr)	ug/L	12.6	1.0	2.5	2.0	117	1.0	<2.0	2.0	7655152
Total Cobalt (Co)	ug/L	2.39	0.50	4.6	1.0	0.51	0.50	13.2	1.0	7655152
Total Copper (Cu)	ug/L	10.8	0.50	8.7	1.0	36.4	0.50	7.6	1.0	7655152
Total Iron (Fe)	ug/L	213	10	61	20	197	10	202	20	7655152
Total Lead (Pb)	ug/L	1.74	0.20	0.57	0.40	4.26	0.20	1.20	0.40	7655152
Total Lithium (Li)	ug/L	798	5.0	988	10	1280	5.0	1400	10	7655152
Total Manganese (Mn)	ug/L	4280	1.0	7600	2.0	192	1.0	2310	2.0	7655152
Total Molybdenum (Mo)	ug/L	2.8	1.0	3.0	2.0	30.7	1.0	4.4	2.0	7655152
Total Nickel (Ni)	ug/L	32.5	1.0	34.3	2.0	45.1	1.0	34.4	2.0	7655152
Total Selenium (Se)	ug/L	0.32	0.10	0.32	0.20	0.73	0.10	<0.20	0.20	7655152
Total Silicon (Si)	ug/L	9810	100	9590	200	19200	100	8480	200	7655152
Total Silver (Ag)	ug/L	0.042	0.020	<0.040	0.040	0.182	0.020	<0.040	0.040	7655152
Total Strontium (Sr)	ug/L	4480	1.0	5330	2.0	6770	1.0	4930	2.0	7655152
Total Thallium (Tl)	ug/L	<0.050	0.050	<0.10	0.10	0.078	0.050	<0.10	0.10	7655152
Total Tin (Sn)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	<10	10	7655152
Total Titanium (Ti)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	<10	10	7655152
Total Uranium (U)	ug/L	122	0.10	157	0.20	154	0.10	125	0.20	7655152
Total Vanadium (V)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	<10	10	7655152
Total Zinc (Zn)	ug/L	9.8	5.0	<10	10	23.0	5.0	12	10	7655152
Total Zirconium (Zr)	ug/L	<0.50	0.50	<1.0	1.0	<0.50	0.50	<1.0	1.0	7655152
Total Calcium (Ca)	mg/L	473	0.050	431	0.10	881	0.050	376	0.10	7652509
Total Magnesium (Mg)	mg/L	472	0.050	702	0.10	632	0.050	951	0.10	7652509
Total Potassium (K)	mg/L	10.4	0.050	10.1	0.10	20.6	0.050	13.7	0.10	7652509
Total Sodium (Na)	mg/L	496	0.050	686	0.10	685	0.050	1080	0.10	7652509
Total Sulphur (S)	mg/L	1230	3.0	1610	6.0	1780	3.0	2100	6.0	7652509

RDL = Reportable Detection Limit

**CCME TOTAL METALS IN WATER (WATER)**

<b>Maxxam ID</b>		KR5883		
<b>Sampling Date</b>		2014/09/24 15:30		
<b>COC Number</b>		C446314		
	<b>Units</b>	<b>MW5-1.1M-0924</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Total Hardness (CaCO3)	mg/L	8460	0.50	7652508
<b>Elements</b>				
Total Mercury (Hg)	ug/L	<0.010	0.010	7662022
<b>Total Metals by ICPMS</b>				
Total Aluminum (Al)	ug/L	496	12	7655152
Total Antimony (Sb)	ug/L	<2.0	2.0	7655152
Total Arsenic (As)	ug/L	2.29	0.40	7655152
Total Barium (Ba)	ug/L	12.7	4.0	7655152
Total Beryllium (Be)	ug/L	<0.40	0.40	7655152
Total Bismuth (Bi)	ug/L	<4.0	4.0	7655152
Total Boron (B)	ug/L	<200	200	7655152
Total Cadmium (Cd)	ug/L	0.390	0.040	7655152
Total Chromium (Cr)	ug/L	18.1	4.0	7655152
Total Cobalt (Co)	ug/L	10.3	2.0	7655152
Total Copper (Cu)	ug/L	18.1	2.0	7655152
Total Iron (Fe)	ug/L	1360	40	7655152
Total Lead (Pb)	ug/L	4.08	0.80	7655152
Total Lithium (Li)	ug/L	2420	20	7655152
Total Manganese (Mn)	ug/L	5190	4.0	7655152
Total Molybdenum (Mo)	ug/L	6.1	4.0	7655152
Total Nickel (Ni)	ug/L	52.8	4.0	7655152
Total Selenium (Se)	ug/L	0.73	0.40	7655152
Total Silicon (Si)	ug/L	9770	400	7655152
Total Silver (Ag)	ug/L	0.098	0.080	7655152
Total Strontium (Sr)	ug/L	7980	4.0	7655152
Total Thallium (Tl)	ug/L	<0.20	0.20	7655152
Total Tin (Sn)	ug/L	<20	20	7655152
Total Titanium (Ti)	ug/L	<20	20	7655152
Total Uranium (U)	ug/L	284	0.40	7655152
Total Vanadium (V)	ug/L	<20	20	7655152
Total Zinc (Zn)	ug/L	<20	20	7655152
Total Zirconium (Zr)	ug/L	2.1	2.0	7655152
Total Calcium (Ca)	mg/L	404	0.20	7652509
Total Magnesium (Mg)	mg/L	1810	0.20	7652509
Total Potassium (K)	mg/L	16.7	0.20	7652509
Total Sodium (Na)	mg/L	2080	0.20	7652509
Total Sulphur (S)	mg/L	3800	12	7652509
RDL = Reportable Detection Limit				

**CSR/CCME METALS IN SOIL (SOIL)**

Maxxam ID		KR5884	KR5885	KR5886		
Sampling Date		2014/09/24	2014/09/24	2014/09/24		
COC Number		C446314	C446314	C446314		
	Units	A1-8"-0924	A2-8"-0924	A3-8"-0924	RDL	QC Batch
<b>Physical Properties</b>						
Soluble (2:1) pH	pH	8.33	8.37	8.41	N/A	7655934
<b>Total Metals by ICPMS</b>						
Total Aluminum (Al)	mg/kg	16200	15400	17500	100	7655933
Total Antimony (Sb)	mg/kg	0.29	0.35	0.47	0.10	7655933
Total Arsenic (As)	mg/kg	5.62	6.23	7.22	0.50	7655933
Total Barium (Ba)	mg/kg	133	138	131	0.10	7655933
Total Beryllium (Be)	mg/kg	0.76	0.72	0.83	0.40	7655933
Total Bismuth (Bi)	mg/kg	0.17	0.17	0.18	0.10	7655933
Total Cadmium (Cd)	mg/kg	0.625	0.614	0.599	0.050	7655933
Total Calcium (Ca)	mg/kg	39900	43200	34300	100	7655933
Total Chromium (Cr)	mg/kg	26.7	25.6	28.4	1.0	7655933
Total Cobalt (Co)	mg/kg	8.29	8.09	8.93	0.30	7655933
Total Copper (Cu)	mg/kg	23.5	23.2	24.2	0.50	7655933
Total Iron (Fe)	mg/kg	19400	18700	20500	100	7655933
Total Lead (Pb)	mg/kg	10.9	44.2	11.5	0.10	7655933
Total Lithium (Li)	mg/kg	17.5	18.0	17.2	5.0	7655933
Total Magnesium (Mg)	mg/kg	18300	20800	14900	100	7655933
Total Manganese (Mn)	mg/kg	580	564	582	0.20	7655933
Total Mercury (Hg)	mg/kg	<0.050	<0.050	<0.050	0.050	7655933
Total Molybdenum (Mo)	mg/kg	0.35	0.39	0.35	0.10	7655933
Total Nickel (Ni)	mg/kg	24.0	24.5	25.9	0.80	7655933
Total Phosphorus (P)	mg/kg	816	756	687	10	7655933
Total Potassium (K)	mg/kg	4250	3770	4370	100	7655933
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	0.50	7655933
Total Silver (Ag)	mg/kg	0.112	0.117	0.110	0.050	7655933
Total Sodium (Na)	mg/kg	127	1530	159	100	7655933
Total Strontium (Sr)	mg/kg	79.6	86.0	74.1	0.10	7655933
Total Thallium (Tl)	mg/kg	0.260	0.270	0.277	0.050	7655933
Total Tin (Sn)	mg/kg	0.60	0.62	0.71	0.10	7655933
Total Titanium (Ti)	mg/kg	139	163	175	1.0	7655933
Total Uranium (U)	mg/kg	1.08	1.42	1.12	0.050	7655933
Total Vanadium (V)	mg/kg	48.7	50.0	58.1	2.0	7655933
Total Zinc (Zn)	mg/kg	72.7	67.8	71.9	1.0	7655933
Total Zirconium (Zr)	mg/kg	4.65	3.88	4.21	0.50	7655933
RDL = Reportable Detection Limit N/A = Not Applicable						

Maxxam Job #: B485577  
Report Date: 2014/10/02

Miller Environmental Corporation

**CCME PAH IN SOIL BY GC-MS (SOIL)**

Maxxam ID		KR5884	KR5885	KR5886		
Sampling Date		2014/09/24	2014/09/24	2014/09/24		
COC Number		C446314	C446314	C446314		
	Units	A1-8"-0924	A2-8"-0924	A3-8"-0924	RDL	QC Batch
<b>Calculated Parameters</b>						
Index of Additive Cancer Risk(IARC)	N/A	0.31	0.31	0.31	0.10	7652950
Benzo[a]pyrene equivalency	N/A	<0.10	<0.10	<0.10	0.10	7652950
<b>Polycyclic Aromatics</b>						
Naphthalene	mg/kg	<0.010	<0.010	<0.010	0.010	7662235
2-Methylnaphthalene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	7662235
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	0.0050	7662235
Fluorene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Phenanthrene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Anthracene	mg/kg	<0.0040	<0.0040	<0.0040	0.0040	7662235
Fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Benzo(a)anthracene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Chrysene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Benzo(b&j)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Benzo(b)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Benzo(k)fluoranthene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Benzo(a)pyrene	mg/kg	<0.020	<0.020	<0.020	0.020	7662235
Indeno(1,2,3-cd)pyrene	mg/kg	<0.050	<0.050	<0.050	0.050	7662235
Dibenz(a,h)anthracene	mg/kg	<0.050	<0.050	<0.050	0.050	7662235
Benzo(g,h,i)perylene	mg/kg	<0.050	<0.050	<0.050	0.050	7662235
Low Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	7652903
High Molecular Weight PAH`s	mg/kg	<0.050	<0.050	<0.050	0.050	7652903
Total PAH	mg/kg	<0.050	<0.050	<0.050	0.050	7652903
<b>Surrogate Recovery (%)</b>						
D10-ANTHRACENE (sur.)	%	90	91	92		7662235
D8-ACENAPHTHYLENE (sur.)	%	93	93	96		7662235
D8-NAPHTHALENE (sur.)	%	95	93	99		7662235
TERPHENYL-D14 (sur.)	%	93	92	94		7662235
RDL = Reportable Detection Limit						

Maxxam Job #: B485577  
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Miller Environmental Corporation

### GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.7°C
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#### CCME TOTAL METALS IN WATER (WATER) Comments

Sample KR5880-05 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.  
Sample KR5882-05 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.  
Sample KR5883-05 Elements by CRC ICPMS (total): RDL raised due to sample matrix interference.

**Results relate only to the items tested.**

Maxxam Job #: B485577  
Report Date: 2014/10/02

**QUALITY ASSURANCE REPORT**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7653516	4-Bromofluorobenzene (sur.)	2014/09/26	102	60 - 140	102	60 - 140	102	%				
7653516	D10-ETHYLBENZENE (sur.)	2014/09/26	110	50 - 130	108	50 - 130	110	%				
7653516	D4-1,2-Dichloroethane (sur.)	2014/09/26	104	60 - 140	105	60 - 140	113	%				
7653516	D8-TOLUENE (sur.)	2014/09/26	98	60 - 140	98	60 - 140	97	%				
7654165	O-TERPHENYL (sur.)	2014/09/26	89	50 - 130	86	50 - 130	97	%				
7660736	4-Bromofluorobenzene (sur.)	2014/10/01	106	60 - 140	106	60 - 140	103	%				
7660736	D4-1,2-Dichloroethane (sur.)	2014/10/01	97	60 - 140	92	60 - 140	99	%				
7660736	D8-TOLUENE (sur.)	2014/10/01	102	60 - 140	101	60 - 140	101	%				
7662235	D10-ANTHRACENE (sur.)	2014/10/02	94	60 - 130	91	60 - 130	103	%				
7662235	D8-ACENAPHTHYLENE (sur.)	2014/10/02	95	50 - 130	91	50 - 130	103	%				
7662235	D8-NAPHTHALENE (sur.)	2014/10/02	97	50 - 130	92	50 - 130	103	%				
7662235	TERPHENYL-D14 (sur.)	2014/10/02	95	60 - 130	92	60 - 130	103	%				
7653516	(C6-C10)	2014/09/27	117	60 - 140	116	60 - 140	<10	mg/kg	NC	50		
7653516	Benzene	2014/09/27	115	60 - 140	107	60 - 140	<0.0050	mg/kg	NC	50		
7653516	Ethylbenzene	2014/09/27	110	60 - 140	103	60 - 140	<0.010	mg/kg	NC	50		
7653516	F1 (C6-C10) - BTEX	2014/09/27					<10	mg/kg	NC	50		
7653516	m & p-Xylene	2014/09/27	104	60 - 140	97	60 - 140	<0.040	mg/kg	NC	50		
7653516	Methyl-tert-butylether (MTBE)	2014/09/26	122	60 - 140	113	60 - 140	<0.10	mg/kg				
7653516	o-Xylene	2014/09/27	111	60 - 140	103	60 - 140	<0.020	mg/kg	NC	50		
7653516	Toluene	2014/09/27	107	60 - 140	100	60 - 140	<0.020	mg/kg	NC	50		
7653516	Xylenes (Total)	2014/09/27					<0.040	mg/kg	NC	50		
7653754	Nitrite (N)	2014/09/25	98	80 - 120			<0.002	mg/L	NC	12		
7654165	F2 (C10-C16 Hydrocarbons)	2014/09/26	105	50 - 130	103	70 - 130	<20	mg/kg	NC	50		
7654165	F3 (C16-C34 Hydrocarbons)	2014/09/26	109	50 - 130	104	70 - 130	<20	mg/kg	NC	50		
7654165	F4 (C34-C50 Hydrocarbons)	2014/09/26	106	50 - 130	99	70 - 130	<20	mg/kg	NC	50		
7654168	Moisture	2014/09/29					<0.3	%	0.95	20		
7655129	Total Dissolved Solids	2014/09/26	NC	80 - 120	98	80 - 120	<10	mg/L	1.8	20		
7655152	Total Aluminum (Al)	2014/09/30	104	80 - 120	105	80 - 120	<3.0	ug/L	NC	20		
7655152	Total Antimony (Sb)	2014/09/30	104	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
7655152	Total Arsenic (As)	2014/09/30	104	80 - 120	103	80 - 120	<0.10	ug/L	NC	20		
7655152	Total Barium (Ba)	2014/09/30	103	80 - 120	103	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Beryllium (Be)	2014/09/30	105	80 - 120	103	80 - 120	<0.10	ug/L	NC	20		
7655152	Total Bismuth (Bi)	2014/09/30	101	80 - 120	101	80 - 120	<1.0	ug/L	NC	20		



Maxxam Job #: B485577  
Report Date: 2014/10/02

**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7655152	Total Boron (B)	2014/09/30					<50	ug/L	NC	20		
7655152	Total Cadmium (Cd)	2014/09/30	103	80 - 120	103	80 - 120	<0.010	ug/L	NC	20		
7655152	Total Chromium (Cr)	2014/09/30	104	80 - 120	108	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Cobalt (Co)	2014/09/30	107	80 - 120	110	80 - 120	<0.50	ug/L	NC	20		
7655152	Total Copper (Cu)	2014/09/30	108	80 - 120	108	80 - 120	<0.50	ug/L	NC	20		
7655152	Total Iron (Fe)	2014/09/30	107	80 - 120	112	80 - 120	<10	ug/L	NC	20		
7655152	Total Lead (Pb)	2014/09/30	101	80 - 120	102	80 - 120	<0.20	ug/L	NC	20		
7655152	Total Lithium (Li)	2014/09/30	110	80 - 120	106	80 - 120	<5.0	ug/L	NC	20		
7655152	Total Manganese (Mn)	2014/09/30	106	80 - 120	107	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Molybdenum (Mo)	2014/09/30	94	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Nickel (Ni)	2014/09/30	103	80 - 120	112	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Selenium (Se)	2014/09/30	98	80 - 120	104	80 - 120	<0.10	ug/L	NC	20		
7655152	Total Silicon (Si)	2014/09/30					<100	ug/L	NC	20		
7655152	Total Silver (Ag)	2014/09/30	102	80 - 120	86	80 - 120	0.021 ,RDL=0.020	ug/L	NC	20		
7655152	Total Strontium (Sr)	2014/09/30	104	80 - 120	104	80 - 120	<1.0	ug/L	NC	20		
7655152	Total Thallium (Tl)	2014/09/30	103	80 - 120	100	80 - 120	<0.050	ug/L	NC	20		
7655152	Total Tin (Sn)	2014/09/30	116	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
7655152	Total Titanium (Ti)	2014/09/30	87	80 - 120	106	80 - 120	<5.0	ug/L	NC	20		
7655152	Total Uranium (U)	2014/09/30	103	80 - 120	104	80 - 120	<0.10	ug/L	NC	20		
7655152	Total Vanadium (V)	2014/09/30	106	80 - 120	111	80 - 120	<5.0	ug/L	NC	20		
7655152	Total Zinc (Zn)	2014/09/30	104	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
7655152	Total Zirconium (Zr)	2014/09/30					<0.50	ug/L	NC	20		
7655684	Nitrate plus Nitrite (N)	2014/09/26	94	80 - 120	102	80 - 120	<0.020	mg/L	NC	25		
7655767	Dissolved Chloride (Cl)	2014/09/26	96	80 - 120	97	80 - 120	<0.50	mg/L	6.4	20		
7655933	Total Aluminum (Al)	2014/09/29					<100	mg/kg			106	70 - 130
7655933	Total Antimony (Sb)	2014/09/29	104	75 - 125	103	75 - 125	<0.10	mg/kg			106	70 - 130
7655933	Total Arsenic (As)	2014/09/29	101	75 - 125	100	75 - 125	<0.50	mg/kg			98	70 - 130
7655933	Total Barium (Ba)	2014/09/29	NC	75 - 125	102	75 - 125	<0.10	mg/kg	0.86	35	102	70 - 130
7655933	Total Beryllium (Be)	2014/09/29	100	75 - 125	101	75 - 125	<0.40	mg/kg				
7655933	Total Bismuth (Bi)	2014/09/29					<0.10	mg/kg				
7655933	Total Cadmium (Cd)	2014/09/29	105	75 - 125	103	75 - 125	<0.050	mg/kg			102	70 - 130
7655933	Total Calcium (Ca)	2014/09/29					<100	mg/kg			102	70 - 130

Maxxam Job #: B485577  
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**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7655933	Total Chromium (Cr)	2014/09/29	NC	75 - 125	104	75 - 125	<1.0	mg/kg			108	70 - 130
7655933	Total Cobalt (Co)	2014/09/29	103	75 - 125	106	75 - 125	<0.30	mg/kg			100	70 - 130
7655933	Total Copper (Cu)	2014/09/29	104	75 - 125	104	75 - 125	<0.50	mg/kg	0.30	30	93	70 - 130
7655933	Total Iron (Fe)	2014/09/29					<100	mg/kg			97	70 - 130
7655933	Total Lead (Pb)	2014/09/29	102	75 - 125	99	75 - 125	<0.10	mg/kg	0.66	35	96	70 - 130
7655933	Total Lithium (Li)	2014/09/29	100	75 - 125	97	75 - 125	<5.0	mg/kg				
7655933	Total Magnesium (Mg)	2014/09/29					<100	mg/kg			95	70 - 130
7655933	Total Manganese (Mn)	2014/09/29	NC	75 - 125	103	75 - 125	<0.20	mg/kg			100	70 - 130
7655933	Total Mercury (Hg)	2014/09/29	92	75 - 125	95	75 - 125	<0.050	mg/kg			86	70 - 130
7655933	Total Molybdenum (Mo)	2014/09/29	105	75 - 125	103	75 - 125	<0.10	mg/kg			118	70 - 130
7655933	Total Nickel (Ni)	2014/09/29	107	75 - 125	102	75 - 125	<0.80	mg/kg			97	70 - 130
7655933	Total Phosphorus (P)	2014/09/29					<10	mg/kg			95	70 - 130
7655933	Total Potassium (K)	2014/09/29					<100	mg/kg				
7655933	Total Selenium (Se)	2014/09/29	107	75 - 125	108	75 - 125	<0.50	mg/kg				
7655933	Total Silver (Ag)	2014/09/29	99	75 - 125	98	75 - 125	<0.050	mg/kg				
7655933	Total Sodium (Na)	2014/09/29					<100	mg/kg				
7655933	Total Strontium (Sr)	2014/09/29	NC	75 - 125	95	75 - 125	<0.10	mg/kg			101	70 - 130
7655933	Total Thallium (Tl)	2014/09/29	99	75 - 125	97	75 - 125	<0.050	mg/kg			88	70 - 130
7655933	Total Tin (Sn)	2014/09/29	95	75 - 125	95	75 - 125	<0.10	mg/kg				
7655933	Total Titanium (Ti)	2014/09/29	NC	75 - 125	97	75 - 125	<1.0	mg/kg			112	70 - 130
7655933	Total Uranium (U)	2014/09/29	98	75 - 125	97	75 - 125	<0.050	mg/kg			99	70 - 130
7655933	Total Vanadium (V)	2014/09/29	NC	75 - 125	103	75 - 125	<2.0	mg/kg			109	70 - 130
7655933	Total Zinc (Zn)	2014/09/29	NC	75 - 125	113	75 - 125	<1.0	mg/kg			93	70 - 130
7655933	Total Zirconium (Zr)	2014/09/29					<0.50	mg/kg				
7655934	Soluble (2:1) pH	2014/10/01			100	97 - 103			0.47	N/A		
7656166	Total Organic Carbon (C)	2014/09/27	NC	80 - 120	106	80 - 120	<0.50	mg/L	3.8	20		
7658457	Dissolved Sulphate (SO4)	2014/09/29	NC	80 - 120	101	80 - 120	<0.50	mg/L	0.54	20		
7660736	(C6-C10)	2014/10/01	86	70 - 130	115	70 - 130	<300	ug/L	NC	40		
7660736	Benzene	2014/10/01	82	70 - 130	81	70 - 130	<0.4	ug/L	NC	40		
7660736	Ethylbenzene	2014/10/01	93	70 - 130	93	70 - 130	<0.4	ug/L	NC	40		
7660736	F1 (C6-C10) - BTEX	2014/10/01					<300	ug/L	NC	40		
7660736	m & p-Xylene	2014/10/01	98	70 - 130	99	70 - 130	<0.8	ug/L	NC	40		
7660736	Methyl-tert-butylether (MTBE)	2014/10/01	96	70 - 130	93	70 - 130	<4	ug/L	NC	40		

Maxxam Job #: B485577  
Report Date: 2014/10/02

**QUALITY ASSURANCE REPORT(CONT'D)**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
7660736	o-Xylene	2014/10/01	98	70 - 130	99	70 - 130	<0.4	ug/L	NC	40		
7660736	Toluene	2014/10/01	88	70 - 130	89	70 - 130	<0.4	ug/L	NC	40		
7660736	Xylenes (Total)	2014/10/01					<0.8	ug/L	NC	40		
7662022	Total Mercury (Hg)	2014/10/02	101	80 - 120	95	80 - 120	<0.010	ug/L	NC	20		
7662235	2-Methylnaphthalene	2014/10/02	91	50 - 130	86	50 - 130	<0.020	mg/kg				
7662235	Acenaphthene	2014/10/02	90	50 - 130	85	50 - 130	<0.0050	mg/kg				
7662235	Acenaphthylene	2014/10/02	89	50 - 130	84	50 - 130	<0.0050	mg/kg				
7662235	Anthracene	2014/10/02	91	60 - 130	88	60 - 130	<0.0040	mg/kg				
7662235	Benzo(a)anthracene	2014/10/02	88	60 - 130	84	60 - 130	<0.020	mg/kg				
7662235	Benzo(a)pyrene	2014/10/02	91	60 - 130	85	60 - 130	<0.020	mg/kg				
7662235	Benzo(b&j)fluoranthene	2014/10/02	90	60 - 130	83	60 - 130	<0.020	mg/kg				
7662235	Benzo(b)fluoranthene	2014/10/02					<0.020	mg/kg				
7662235	Benzo(g,h,i)perylene	2014/10/02	85	60 - 130	81	60 - 130	<0.050	mg/kg				
7662235	Benzo(k)fluoranthene	2014/10/02	96	60 - 130	93	60 - 130	<0.020	mg/kg				
7662235	Chrysene	2014/10/02	91	60 - 130	86	60 - 130	<0.020	mg/kg				
7662235	Dibenz(a,h)anthracene	2014/10/02	84	60 - 130	83	60 - 130	<0.050	mg/kg				
7662235	Fluoranthene	2014/10/02	99	60 - 130	85	60 - 130	<0.020	mg/kg				
7662235	Fluorene	2014/10/02	91	50 - 130	85	50 - 130	<0.020	mg/kg				
7662235	Indeno(1,2,3-cd)pyrene	2014/10/02	90	60 - 130	85	60 - 130	<0.050	mg/kg				
7662235	Naphthalene	2014/10/02	92	50 - 130	86	50 - 130	<0.010	mg/kg				
7662235	Phenanthrene	2014/10/02	87	60 - 130	79	60 - 130	<0.020	mg/kg				
7662235	Pyrene	2014/10/02	99	60 - 130	87	60 - 130	<0.020	mg/kg				

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

Maxxam Job #: B485577  
Report Date: 2014/10/02

Miller Environmental Corporation

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Andy Lu, Data Validation Coordinator

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

**Appendix D**

**2014 Surface Water Results - Bioassay**

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Client : 5640 Miller Environmental Corporation, St.Jean Baptiste  
 Client Project Name & Number:

Job Number: B446636  
 Sample Number: JT9338-12

**Test Result:**

48 hrs LC50 % vol/vol (95% CL): >100 (N/A) Statistical Method: Visual

**Mean percent mortality:** Sample 0 Control 0

**Sample Name :** POND

Description: pale yellow

**Sample Prior to Analysis:**

Sample Collected: Jun 06, 2014 08:20 AM	Sampling Method : N/A	pH: 7.8
Sample Collected By: N/A	Site Collection: N/A	Temperature : 20.8 °C
Sample Received: Jun 06, 2014 11:20 AM	Volume Received: 1 x 1LP	Dissolved Oxygen: 7.6 mg/L
Analysis Start : Jun 10, 2014 12:00 PM	Temp.Upon Arrival: 19 °C	Sample Conductance: 651 µS/cm <sup>2</sup>
End : Jun 12, 2014 11:45 AM	Storage: 1-7 °C	Hardness: 264 mg CaCO <sub>3</sub> /L

Concentration	Temperature (°C)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (mg/L)	pH	pH	Conductivity uS/cm <sup>2</sup>	Mortality (#)	Mortality (%)	Immobility (#)
% vol/vol	Initial	48 hrs	Initial	48 hrs	Initial	48 hrs	Initial	48 hrs	48 hrs	48 hrs
0	20.7	20.2	8.9	8.8	8.1	8.1	346	0	0	0
0	20.7	20.4	8.9	8.8	8.1	8.0	346	0	0	0
0	20.7	20.4	8.9	8.8	8.1	8.0	346	0	0	0
100	20.8	20.4	7.5	8.8	7.8	8.1	652	0	0	0
100	20.8	20.4	7.5	8.8	7.8	8.2	652	0	0	0
100	20.8	20.4	7.5	8.8	7.8	8.2	652	0	0	0

**Comments :** All neonates appeared and behaved normally during the test.

**Culture/Control/Dilution Water:** Reconstituted Water-Moderately Hard

Hardness (EDTA Method): 100 mg/L CaCO<sub>3</sub> Other parameters available on request.

**Test Conditions** Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel :	10	Pre-aeration Time :	0 min	Rate of Pre-aeration :	25-50 mL/min/L
Total # of Organisms Used :	60	Test Temperature :	20 ± 2 °C	Test Hardness Adjusted :	No
Test Volume :	185 mL	Vessel Volume :	200 mL	Test pH Adjusted:	No
Loading Density :	18.5 mL/Daphnia	Photoperiod :	16:8 (light: dark)		

**Test Organism :**

<i>Daphnia magna</i>	Source :	Aquatic Biosystems	
Age at Test Initiation :	<24 hrs	Average Brood Size :	26.0
Culture Photoperiod :	16:8 (light: dark)	% Mortality within 7 days :	0
Culture Temperature :	20 ± 2 °C	Time To First Brood :	8 Days
Culture Diet	2.5ml algae + 2.5 ml YCT; Sun. 1.25 ml algae + 1.25ml YCT.		

**Reference chemical:**

Zinc	Test Date:	Jun 03, 2014	
Test Endpoint 48 hrs LC50 (95% confidence interval) :	0.32 (0.23, 0.44) mg/L	Statistical Method :	Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) :	0.55 (0.24, 1.23) mg/L	Concentration :	0,0.05,0.1,0.5,1,5,10 mg/L

**Test Method**

Maxxam's BBY2SOP-00007 based on Environment Canada's EPS/RM/14, 2nd Ed., 2000.

Method Deviations: None.

**Note:** The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Michael Armstrong



Verified By : Pam Howes, Study Director

Date: Jun 17, 2014 10:47 AM



**Appendix E**

**2014 Surface Water Results**

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**Attention: Paul Reeks**

 Miller Environmental Corporation  
 PO Box 279  
 St. Jean Baptiste, MB  
 Canada R0G 2B0

**Report Date: 2014/06/18**  
**Report #: R1587506**  
**Version: 1**

## CERTIFICATE OF ANALYSIS

**MAXXAM JOB #: B446636**  
**Received: 2014/06/06, 11:20**

 Sample Matrix: Water  
 # Samples Received: 1

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity in Water by PC Titrator	1	N/A	2014/06/09	WIN SOP-00063	Based on SM-2320B
BTEX/F1 in Water by HS GC/MS	1	N/A	2014/06/11	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
Chloride by Automated Colourimetry (1)	1	N/A	2014/06/09	BBY6SOP-00011	SM-4500-CI-
Cyanide WAD (weak acid dissociable) (1)	1	N/A	2014/06/12	BBY6SOP-00005	SM-4500CN O
Colour (True)	1	N/A	2014/06/06	WIN SOP-00026	Based on SM-2120B
Daphnia magna 48 hr LC50 @ 100% (1)	1	N/A	2014/06/10	BBY2SOP-00007	EPS 1/RM/14
Oxygen (Dissolved, winkler)	1	N/A	2014/06/06	WIN SOP-00021	Based on SM 4500-O
Conductivity in Water by PC Titrator	1	N/A	2014/06/09	WIN SOP-00063	Based on SM-2510B
Fluoride (1)	1	N/A	2014/06/09	BBY6SOP-00012	SM - 4500 F C
Hardness Total (calculated as CaCO3) (1)	1	N/A	2014/06/13	BBY7SOP-00002	EPA 6020A
Mercury (Total) by CVAf (1)	1	2014/06/16	2014/06/16	BBY7SOP-00015	BC MOE Lab Manual
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	2014/06/06	2014/06/13	BBY7SOP-00002	EPA 6020A
Elements by CRC ICPMS (total) (1)	1	2014/06/12	2014/06/13	BBY7SOP-00002	EPA 6020A
Nitrate + Nitrite (N) - Preserved (1)	1	N/A	2014/06/10	BBY6SOP-00010	USEPA 353.2
Nitrite (N)	1	N/A	2014/06/06	WIN SOP-00016	Based on SM4500-NO2B
Nitrogen - Nitrate (as N) (1)	1	N/A	2014/06/11	BBY6SOP-00010	SM 4500NO3-I
pH in Water by PC Titrator (2)	1	N/A	2014/06/09	WIN SOP-00063	SM4500 H+B
Sulphate by Automated Colourimetry (1)	1	N/A	2014/06/09	BBY6SOP-00017	SM4500-SO42- E
Total Dissolved Solids (Filt. Residue)	1	N/A	2014/06/10	WIN SOP-00042	Based on SM 2540C
Hydrocarbons (C10-C30) in Water - GC/FID (1)	1	2014/06/10	2014/06/10	BBY8SOP-00029	BC Env. Lab Manual
Threshold Odour Number (1)	1	N/A	2014/05/09	CAL SOP-0075, EDM SOP-0031	Manual
Total Suspended Solids	1	N/A	2014/06/09	WIN SOP-00042	Based on SM2540 D
Total Solids	1	N/A	2014/06/09	WIN SOP-00042	Based on SM-2540 B
Turbidity	1	N/A	2014/06/06	WIN SOP-00024	Based on SM-2130B

\* Results relate only to the items tested.

(1) This test was performed by Maxxam Vancouver

(2) The APHA Standard Method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

Maxxam Job #: B446636  
Report Date: 2014/06/18

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Janelle Kochan, B.Sc., Project Manager  
Email: JKochan@maxxam.ca  
Phone# (204) 772-7276 Ext:2209

=====  
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B446636  
 Report Date: 2014/06/18

**RESULTS OF CHEMICAL ANALYSES OF WATER**

Maxxam ID		JT9338		
Sampling Date		2014/06/06 08:20		
	<b>UNITS</b>	<b>POND</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Nitrate (N)	mg/L	<0.020	0.020	7514330
<b>Daphnia Magna Bioassay</b>				
LC50	% vol/vol	ATTACHED	N/A	7527151
<b>Misc. Inorganics</b>				
Weak Acid Dissoc. Cyanide (CN)	mg/L	0.00142	0.00050	7523024
Fluoride (F)	mg/L	0.150	0.010	7517767
Dissolved Oxygen (O <sub>2</sub> )	mg/L	4.2	0.1	7515317
Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	183	0.50	7517185
Conductivity	uS/cm	648	1.0	7517158
pH	pH	8.26		7517134
Bicarbonate (HCO <sub>3</sub> )	mg/L	223	0.50	7517185
Carbonate (CO <sub>3</sub> )	mg/L	<0.50	0.50	7517185
Hydroxide (OH)	mg/L	<0.50	0.50	7517185
<b>Anions</b>				
Dissolved Sulphate (SO <sub>4</sub> )	mg/L	130	0.50	7518381
Dissolved Chloride (Cl)	mg/L	20	0.50	7518378
<b>Nutrients</b>				
Nitrate plus Nitrite (N)	mg/L	<0.020	0.020	7520141
Nitrite (N)	mg/L	<0.002	0.002	7517061
<b>Physical Properties</b>				
True Colour	Col. Unit	22	5	7517055
Odour	TON	1.00	N/A	7518423
Total Solids	mg/L	450	10	7518070
Total Dissolved Solids	mg/L	398	10	7519724
Turbidity	NTU	4.6	0.1	7517067
Total Suspended Solids	mg/L	7.5	4.0	7517792

N/A = Not Applicable

RDL = Reportable Detection Limit

Maxxam Job #: B446636  
 Report Date: 2014/06/18

**TOTAL PETROLEUM HYDROCARBONS (WATER)**

Maxxam ID		JT9338		
Sampling Date		2014/06/06 08:20		
	<b>UNITS</b>	<b>POND</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Hydrocarbons</b>				
Total Extractables C10 to C30	mg/L	<0.20	0.20	7519034
<b>Surrogate Recovery (%)</b>				
O-TERPHENYL (sur.)	%	97		7519034

**VOLATILE ORGANICS BY GC-MS (WATER)**

Maxxam ID		JT9338		
Sampling Date		2014/06/06 08:20		
	<b>UNITS</b>	<b>POND</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Volatiles</b>				
Benzene	ug/L	<0.4	0.4	7517457
Toluene	ug/L	<0.4	0.4	7517457
Ethylbenzene	ug/L	<0.4	0.4	7517457
o-Xylene	ug/L	<0.4	0.4	7517457
m & p-Xylene	ug/L	<0.8	0.8	7517457
Xylenes (Total)	ug/L	<0.8	0.8	7517457
Methyl-tert-butylether (MTBE)	ug/L	<4	4	7517457
F1 (C6-C10) - BTEX	ug/L	<300	300	7517457
(C6-C10)	ug/L	<300	300	7517457
<b>Surrogate Recovery (%)</b>				
4-Bromofluorobenzene (sur.)	%	100		7517457
D4-1,2-Dichloroethane (sur.)	%	96		7517457
D8-TOLUENE (sur.)	%	101		7517457

RDL = Reportable Detection Limit

Maxxam Job #: B446636  
 Report Date: 2014/06/18

**CCME TOTAL METALS IN WATER (WATER)**

Maxxam ID		JT9338		
Sampling Date		2014/06/06 08:20		
	<b>UNITS</b>	<b>POND</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Total Hardness (CaCO3)	mg/L	248	0.50	7514328
<b>Elements</b>				
Total Mercury (Hg)	ug/L	<0.010	0.010	7526964

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RDL = Reportable Detection Limit



Maxxam Job #: B446636  
 Report Date: 2014/06/18

**CCME TOTAL METALS IN WATER (WATER)**

Maxxam ID		JT9338		
Sampling Date		2014/06/06 08:20		
	<b>UNITS</b>	<b>POND</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Total Metals by ICPMS</b>				
Total Aluminum (Al)	ug/L	58.5	3.0	7522292
Total Antimony (Sb)	ug/L	<0.50	0.50	7522292
Total Arsenic (As)	ug/L	4.13	0.10	7522292
Total Barium (Ba)	ug/L	50.0	1.0	7522292
Total Beryllium (Be)	ug/L	<0.10	0.10	7522292
Total Bismuth (Bi)	ug/L	<1.0	1.0	7522292
Total Boron (B)	ug/L	<50	50	7522292
Total Cadmium (Cd)	ug/L	0.016	0.010	7522292
Total Chromium (Cr)	ug/L	<1.0	1.0	7522292
Total Cobalt (Co)	ug/L	<0.50	0.50	7522292
Total Copper (Cu)	ug/L	2.87	0.50	7522292
Total Iron (Fe)	ug/L	122	10	7522292
Total Lead (Pb)	ug/L	0.75	0.20	7522292
Total Lithium (Li)	ug/L	48.5	5.0	7522292
Total Manganese (Mn)	ug/L	47.9	1.0	7522292
Total Molybdenum (Mo)	ug/L	2.5	1.0	7522292
Total Nickel (Ni)	ug/L	5.9	1.0	7522292
Total Selenium (Se)	ug/L	<0.10	0.10	7522292
Total Silicon (Si)	ug/L	1350	100	7522292
Total Silver (Ag)	ug/L	<0.020	0.020	7522292
Total Strontium (Sr)	ug/L	210	1.0	7522292
Total Thallium (Tl)	ug/L	<0.050	0.050	7522292
Total Tin (Sn)	ug/L	<5.0	5.0	7522292
Total Titanium (Ti)	ug/L	<5.0	5.0	7522292
Total Uranium (U)	ug/L	2.40	0.10	7522292
Total Vanadium (V)	ug/L	<5.0	5.0	7522292
Total Zinc (Zn)	ug/L	8.5	5.0	7522292
Total Zirconium (Zr)	ug/L	<0.50	0.50	7522292
Total Calcium (Ca)	mg/L	37.8	0.050	7514468
Total Magnesium (Mg)	mg/L	37.3	0.050	7514468
Total Potassium (K)	mg/L	5.98	0.050	7514468
Total Sodium (Na)	mg/L	32.0	0.050	7514468
Total Sulphur (S)	mg/L	39.3	3.0	7514468

RDL = Reportable Detection Limit

Maxxam Job #: B446636  
Report Date: 2014/06/18

Package 1	18.7°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

#### General Comments

Sample JT9338-01: The BC-MOE and APHA Standard Method require Dissolved Oxygen to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory Dissolved Oxygen analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Job #: B446636  
 Report Date: 2014/06/18

**QUALITY ASSURANCE REPORT**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7517055	True Colour	2014/06/06					<5	Col. Unit	NC	20
7517061	Nitrite (N)	2014/06/06	92	80 - 120			<0.002	mg/L	NC	12
7517067	Turbidity	2014/06/06					<0.1	NTU	2.2	20
7517158	Conductivity	2014/06/09			100	90 - 110	<1.0	uS/cm	NC	20
7517185	Alkalinity (Total as CaCO3)	2014/06/09	NC	80 - 120	87	80 - 120	<0.50	mg/L	NC	20
7517185	Bicarbonate (HCO3)	2014/06/09					<0.50	mg/L	NC	20
7517185	Carbonate (CO3)	2014/06/09					<0.50	mg/L	NC	20
7517185	Hydroxide (OH)	2014/06/09					<0.50	mg/L	NC	20
7517457	4-Bromofluorobenzene (sur.)	2014/06/11	101	60 - 140	102	60 - 140	99	%		
7517457	D4-1,2-Dichloroethane (sur.)	2014/06/11	93	60 - 140	95	60 - 140	94	%		
7517457	D8-TOLUENE (sur.)	2014/06/11	98	60 - 140	101	60 - 140	100	%		
7517457	Benzene	2014/06/11	90	70 - 130	88	70 - 130	<0.4	ug/L	NC	40
7517457	Toluene	2014/06/11	92	70 - 130	92	70 - 130	<0.4	ug/L	NC	40
7517457	Ethylbenzene	2014/06/11	99	70 - 130	98	70 - 130	<0.4	ug/L	NC	40
7517457	o-Xylene	2014/06/11	102	70 - 130	101	70 - 130	<0.4	ug/L	NC	40
7517457	m & p-Xylene	2014/06/11	102	70 - 130	100	70 - 130	<0.8	ug/L	NC	40
7517457	Methyl-tert-butylether(MTBE)	2014/06/11	93	70 - 130	92	70 - 130	<4	ug/L	NC	40
7517457	(C6-C10)	2014/06/11	114	70 - 130	84	70 - 130	<300	ug/L	NC	40
7517457	Xylenes (Total)	2014/06/11					<0.8	ug/L	NC	40
7517457	F1 (C6-C10) - BTEX	2014/06/11					<300	ug/L	NC	40
7517767	Fluoride (F)	2014/06/09	101	80 - 120	104	80 - 120	<0.010	mg/L	0	20
7517792	Total Suspended Solids	2014/06/09	106	80 - 120	95	80 - 120	<4.0	mg/L	NC(1)	20
7518070	Total Solids	2014/06/09	107	N/A	113	N/A	<10	mg/L	1.8	20
7518378	Dissolved Chloride (Cl)	2014/06/09	NC	80 - 120	101	80 - 120	0.69, RDL=0.50	mg/L	1.1	20
7518381	Dissolved Sulphate (SO4)	2014/06/09	NC	80 - 120	96	80 - 120	<0.50	mg/L	0.9	20
7518423	Odour	2014/06/02					1.00, RDL=N/A	TON	0	20
7519034	O-TERPHENYL (sur.)	2014/06/10	98	60 - 130	96	60 - 130	95	%		
7519034	Total Extractables C10 to C30	2014/06/10	NC	50 - 130	98	50 - 130	<0.20	mg/L	NC	40
7519724	Total Dissolved Solids	2014/06/10	NC	80 - 120	102	80 - 120	<10	mg/L	0.5	20
7520141	Nitrate plus Nitrite (N)	2014/06/10	108	80 - 120	104	80 - 120	<0.020	mg/L	NC	25
7522292	Total Aluminum (Al)	2014/06/13	NC	80 - 120	98	80 - 120	<3.0	ug/L	2.3	20
7522292	Total Antimony (Sb)	2014/06/13	101	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
7522292	Total Arsenic (As)	2014/06/13	99	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
7522292	Total Barium (Ba)	2014/06/13	99	80 - 120	92	80 - 120	<1.0	ug/L	NC	20
7522292	Total Beryllium (Be)	2014/06/13	92	80 - 120	98	80 - 120	<0.10	ug/L	NC	20
7522292	Total Bismuth (Bi)	2014/06/13	104	80 - 120	93	80 - 120	<1.0	ug/L	NC	20
7522292	Total Cadmium (Cd)	2014/06/13	99	80 - 120	101	80 - 120	<0.010	ug/L	NC	20
7522292	Total Chromium (Cr)	2014/06/13	103	80 - 120	106	80 - 120	<1.0	ug/L	NC	20
7522292	Total Cobalt (Co)	2014/06/13	99	80 - 120	106	80 - 120	<0.50	ug/L	NC	20
7522292	Total Copper (Cu)	2014/06/13	93	80 - 120	105	80 - 120	<0.50	ug/L	NC	20

Maxxam Job #: B446636  
 Report Date: 2014/06/18

**QUALITY ASSURANCE REPORT**

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7522292	Total Iron (Fe)	2014/06/13	NC	80 - 120	106	80 - 120	<10	ug/L	2.1	20
7522292	Total Lead (Pb)	2014/06/13	97	80 - 120	97	80 - 120	<0.20	ug/L	NC	20
7522292	Total Lithium (Li)	2014/06/13	90	80 - 120	91	80 - 120	<5.0	ug/L	NC	20
7522292	Total Manganese (Mn)	2014/06/13	NC	80 - 120	104	80 - 120	<1.0	ug/L	16.2	20
7522292	Total Molybdenum (Mo)	2014/06/13	NC	80 - 120	95	80 - 120	<1.0	ug/L	NC	20
7522292	Total Nickel (Ni)	2014/06/13	105	80 - 120	113	80 - 120	<1.0	ug/L	NC	20
7522292	Total Selenium (Se)	2014/06/13	105	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
7522292	Total Silver (Ag)	2014/06/13	97	80 - 120	89	80 - 120	0.024, RDL=0.020	ug/L	NC	20
7522292	Total Strontium (Sr)	2014/06/13	NC	80 - 120	100	80 - 120	<1.0	ug/L	0.2	20
7522292	Total Thallium (Tl)	2014/06/13	96	80 - 120	95	80 - 120	<0.050	ug/L	NC	20
7522292	Total Tin (Sn)	2014/06/13	105	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
7522292	Total Titanium (Ti)	2014/06/13	95	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
7522292	Total Uranium (U)	2014/06/13	91	80 - 120	93	80 - 120	<0.10	ug/L	NC	20
7522292	Total Vanadium (V)	2014/06/13	101	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
7522292	Total Zinc (Zn)	2014/06/13	89	80 - 120	112	80 - 120	<5.0	ug/L	NC	20
7522292	Total Boron (B)	2014/06/13					<50	ug/L	NC	20
7522292	Total Silicon (Si)	2014/06/13					<100	ug/L	2.9	20
7522292	Total Zirconium (Zr)	2014/06/13					<0.50	ug/L	NC	20
7523024	Weak Acid Dissoc. Cyanide (CN)	2014/06/12	98	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20
7526964	Total Mercury (Hg)	2014/06/16	95	80 - 120	99	80 - 120	<0.010	ug/L	NC	20

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples &lt; 5x RDL).


(1) - Limited smpl vol

**Validation Signature Page**

**Maxxam Job #: B446636**

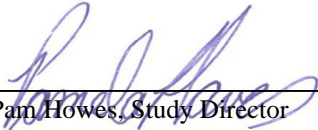
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The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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David Huang, BBV Scientific Specialist



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Pam Howes, Study Director

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

INVOICE INFORMATION:	Report Information	Project Information	Laboratory Use Only	
Company Name: #5640 Miller Environmental Corporation	Company Name: Paul Reeks	Quotation #: B00481	Maxxam Job #: B446636	Bottle Order #: 432703
Contact Name: Accounts Payable	Contact Name: Paul Reeks	P.O. #:	Chain Of Custody Record	Project Manager
Address: PO Box 279 St. Jean Baptiste MB R0G 2B0	Address:	Project #:		
Phone: (204) 594-9267 Fax: (204) 737-2226	Phone: (204) 594-9267 Fax: (204) 737-2225	Project Name:	 C#432703-01-01	
Email: ap@millerenvironmental.mb.ca	Email: PaulR@millerenvironmental.mb.ca	Site #:		
Regulatory Criteria		Special Instructions		Turnaround Time (TAT) Required

**Turnaround Time (TAT) Required**  
 Please provide advance notice for rush projects

**Regular (Standard) TAT**  
 (will be applied if Rush TAT is not specified)  
 Standard TAT = 5-7 Working days for most tests.  
 Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

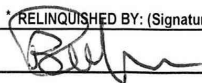
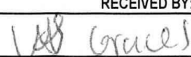
**Job Specific Rush TAT (if applies to entire submission)**  
 Date Required: \_\_\_\_\_ Time Required: \_\_\_\_\_  
 Rush Confirmation Number \_\_\_\_\_ (call lab for #)

Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Analysis Requested									
		Alkalinity	Colour	Conductivity	Dissolved Oxygen	Total Suspended Solids	Total Dissolved Solids	Total Solids	Odour	pH	Turbidity

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Alkalinity	Colour	Conductivity	Dissolved Oxygen	Total Suspended Solids	Total Dissolved Solids	Total Solids	Odour	pH	Turbidity	# of Bottles	Comments
1 JT9338	POND	06/06	830	H2O			-	-	-	-	-	-	-	-	-	-		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

RELINQUISHED BY: (Signature/Print) 	Date: (YY/MM/DD) 14/06/06	Time 830	RECEIVED BY: (Signature/Print) 	Date: (YY/MM/DD) 14/06/06	Time 1120	# jars used and not submitted	Lab Use Only		
Page 11 of 14							Time Sensitive <input checked="" type="checkbox"/>	Temperature (°C) on Receipt 17.2/19.2/19.8	Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input type="checkbox"/> No

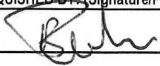
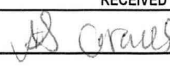
INVOICE INFORMATION:	Report Information	Project Information	Laboratory Use Only	
Company Name: #5640 Miller Environmental Corporation	Company Name: _____	Quotation #: B00481	Maxxam Job #	Bottle Order #:
Contact Name: Accounts Payable	Contact Name: Paul Reeks	P.O. #	B440636	
Address: PO Box 279 St. Jean Baptiste MB R0G 2B0	Address: _____	Project #	Chain Of Custody Record	Project Manager
Phone: (204) 594-9267 Fax: (204) 737-2226	Phone: (204) 594-9267 Fax: (204) 737-2225	Project Name		Janelle Kochan
Email: ap@millerenvironmental.mb.ca	Email: PaulR@millerenvironmental.mb.ca	Site #	C#432703-01-02	
		Sampled By		

Regulatory Criteria	Special Instructions	Analysis Requested	Turnaround Time (TAT) Required																						
		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Regulated Drinking Water ? ( Y / N )</td> <td></td> </tr> <tr> <td>Metals Field Filtered ? ( Y / N )</td> <td></td> </tr> <tr> <td>Total Metals in Water</td> <td></td> </tr> <tr> <td>Cyanide (WAD)</td> <td></td> </tr> <tr> <td>Chloride</td> <td></td> </tr> <tr> <td>Fluoride</td> <td></td> </tr> <tr> <td>Nitrite, Nitrate</td> <td></td> </tr> <tr> <td>Sulphate</td> <td></td> </tr> <tr> <td>Daphnia (pass/fail)</td> <td></td> </tr> <tr> <td>Hydrocarbons (C10-C30) in Water - GC/FID</td> <td></td> </tr> <tr> <td>BTEX in Water by HS GC/MS</td> <td></td> </tr> </table>	Regulated Drinking Water ? ( Y / N )		Metals Field Filtered ? ( Y / N )		Total Metals in Water		Cyanide (WAD)		Chloride		Fluoride		Nitrite, Nitrate		Sulphate		Daphnia (pass/fail)		Hydrocarbons (C10-C30) in Water - GC/FID		BTEX in Water by HS GC/MS		<p>Please provide advance notice for rush projects</p> <p><b>Regular (Standard) TAT</b>                  (will be applied if Rush TAT is not specified)                  Standard TAT = 5-7 Working days for most tests.                  Please note. Standard TAT for certain tests such as BOD and Dioxins/Furans are &gt; 5 days - contact your Project Manager for details.</p> <p><b>Job Specific Rush TAT (if applies to entire submission)</b>                  Date Required: _____ Time Required: _____</p> <p>Rush Confirmation Number _____                  (call lab for #)</p>
Regulated Drinking Water ? ( Y / N )																									
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Hydrocarbons (C10-C30) in Water - GC/FID																									
BTEX in Water by HS GC/MS																									

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? ( Y / N )	Metals Field Filtered ? ( Y / N )	Total Metals in Water	Cyanide (WAD)	Chloride	Fluoride	Nitrite, Nitrate	Sulphate	Daphnia (pass/fail)	Hydrocarbons (C10-C30) in Water - GC/FID	BTEX in Water by HS GC/MS	# of Bottles	Comments
1 JT9338	POND	06/06	830	ltz0													
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

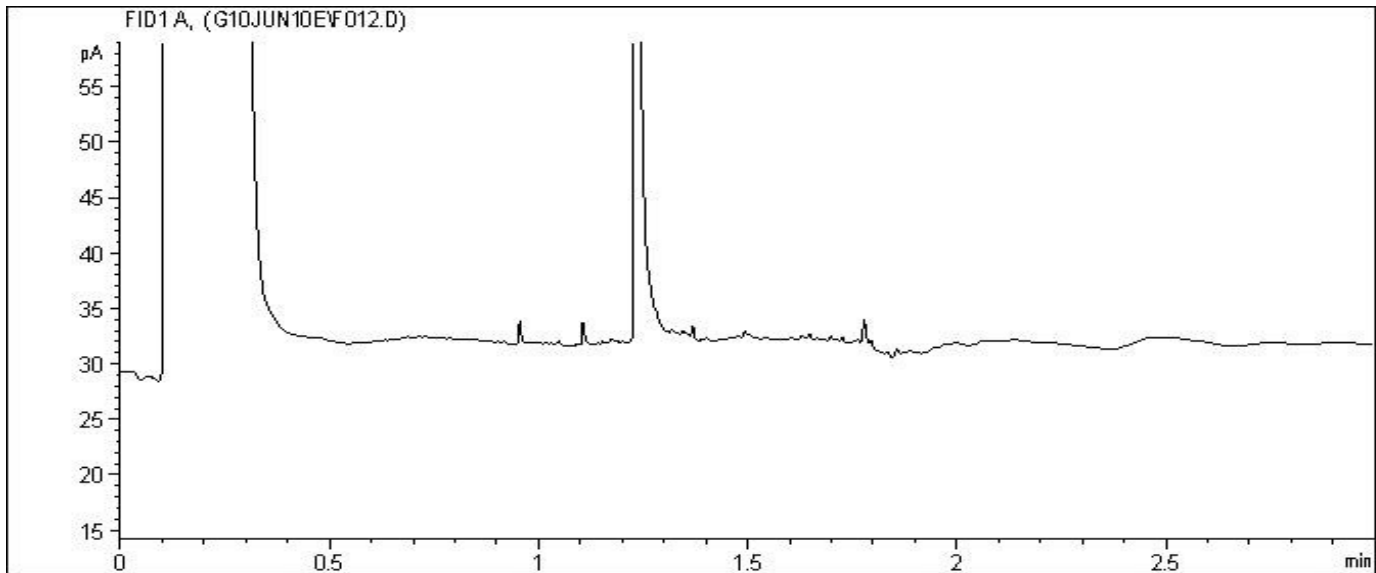
* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only	
	14/06/06	830		14/06/06	1120		Time Sensitive	Temperature (°C) on Receipt
							<input checked="" type="checkbox"/>	17.2/19.2/19.8
								Custody Seal Intact on Cooler?
								<input type="checkbox"/> Yes <input type="checkbox"/> No



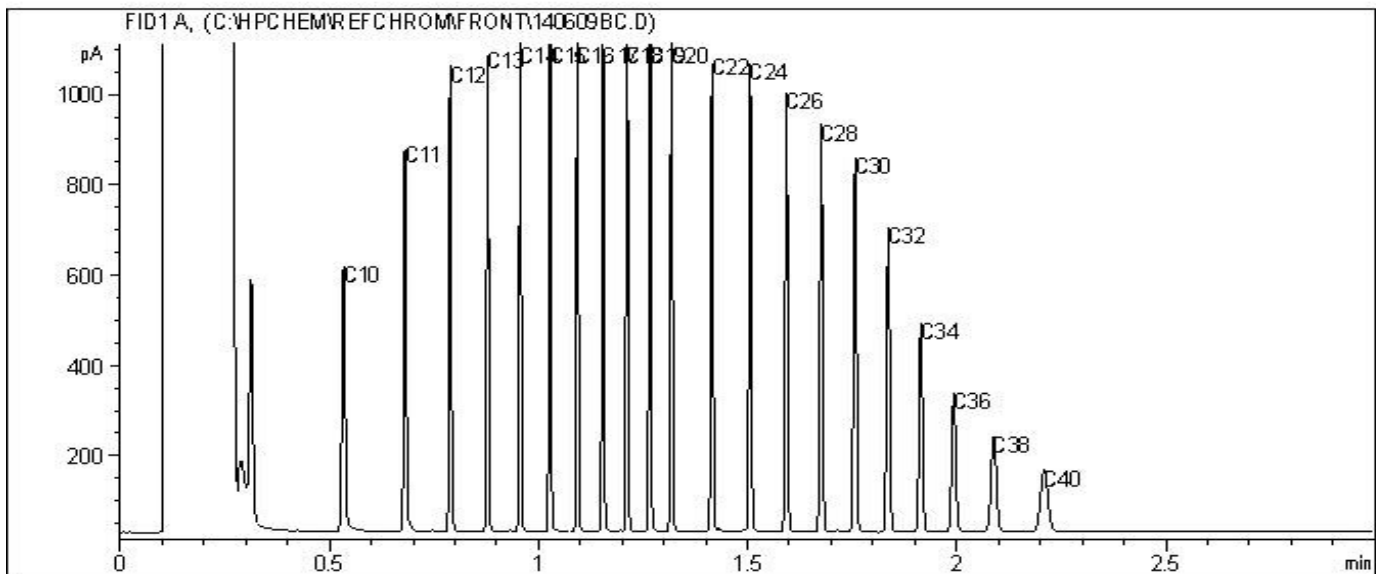
Report Date: 2014/06/18  
 Maxxam Job #: B446636  
 Maxxam Sample: JT9338

Client ID: POND

**Hydrocarbons (C10-C30) in Water - GC/FID Chromatogram**



**Carbon Range Distribution - Reference Chromatogram**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating oils:	C20 - C40

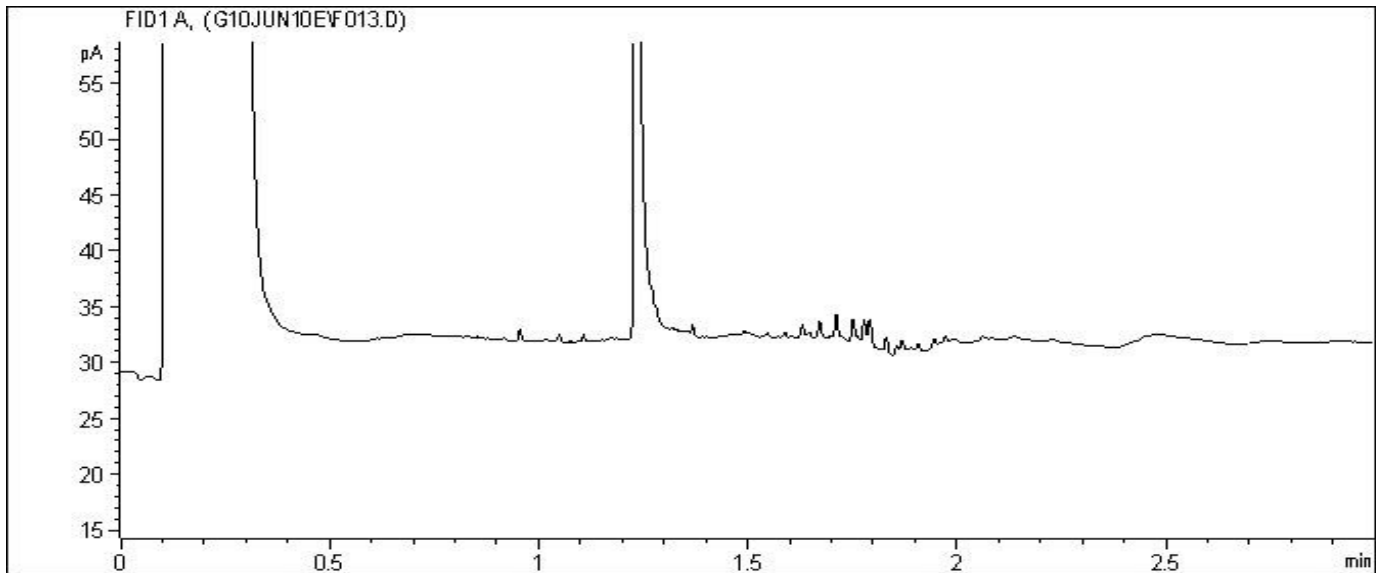
**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**



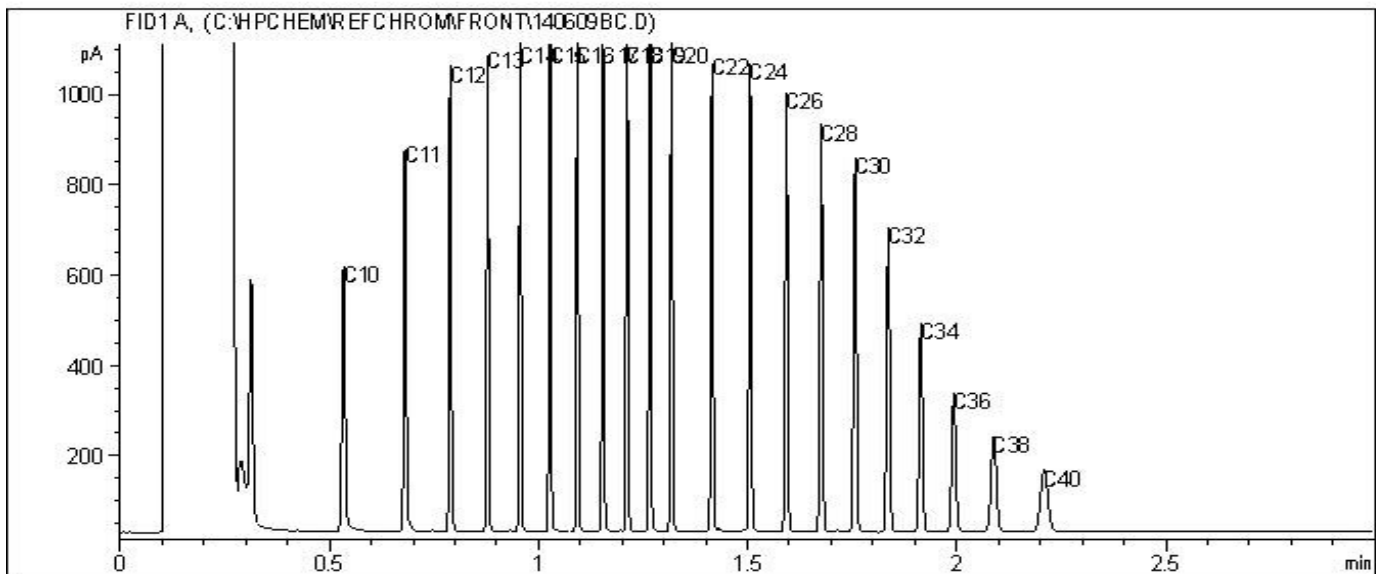
Report Date: 2014/06/18  
 Maxxam Job #: B446636  
 Maxxam Sample: JT9338 Lab-Dup

Client ID: POND

**Hydrocarbons (C10-C30) in Water - GC/FID Chromatogram**



**Carbon Range Distribution - Reference Chromatogram**



**TYPICAL PRODUCT CARBON NUMBER RANGES**

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40

**Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.**