

July 7, 2016

Nova Scotia Lands
45 Wabana Court
Harbourside Commercial Park
Sydney, Nova Scotia
B1P 6H2

ATTENTION: Mr. Frank Potter
Executive Director

***Long Term Maintenance and Monitoring
Semi-Annual Surface Water Quality Monitoring Program November 2015 Final Report***

Surface water quality monitoring has been implemented as part of the long term maintenance and monitoring (LTMM) program to provide ongoing data and compliance commitments to regulatory agencies and/or stakeholders. Nova Scotia Lands Incorporated (NS Lands) is a Crown Corporation of the Province of Nova Scotia responsible for the LTMM semi-annual surface water quality program. NS Lands retained Dillon Consulting Limited (Dillon) to conduct the November 2015 LTMM Surface Water Quality Monitoring Program, the details of which are provided herein.

PROJECT METHODOLOGY

The November 2015 Surface Water Quality Monitoring program was scheduled to consist of the collection of surface water samples at ten stations (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW, WB-1-SW, Narrows and BP-1-SW) on November 18, 2015 (**Figure 1**). A GPS unit was used to confirm that the monitoring locations sampled as part of the LTMM Surface Water Quality Monitoring Program were the same as those used during historical surface water monitoring events (e.g., Environmental Effects Monitoring and Surface Water Monitoring (EEMSWM) Program associated with the Sydney Tar Ponds remediation). Tasks associated with the November 2015 surface water monitoring included:

- Documenting ecological activity in the surface water bodies, if observed;
- Recording of physical conditions and potential contaminants (i.e., debris, precipitate);
- Measurement of field parameters (e.g., pH, conductivity, salinity and turbidity) with a calibrated Horiba U-22 multi-probe;
- Flow calculation; and,
- Collection of surface water samples from each station for petroleum hydrocarbons (PHC), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), general chemistry and total metals (including mercury) (RCApMS) analysis.

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Charlotte Street
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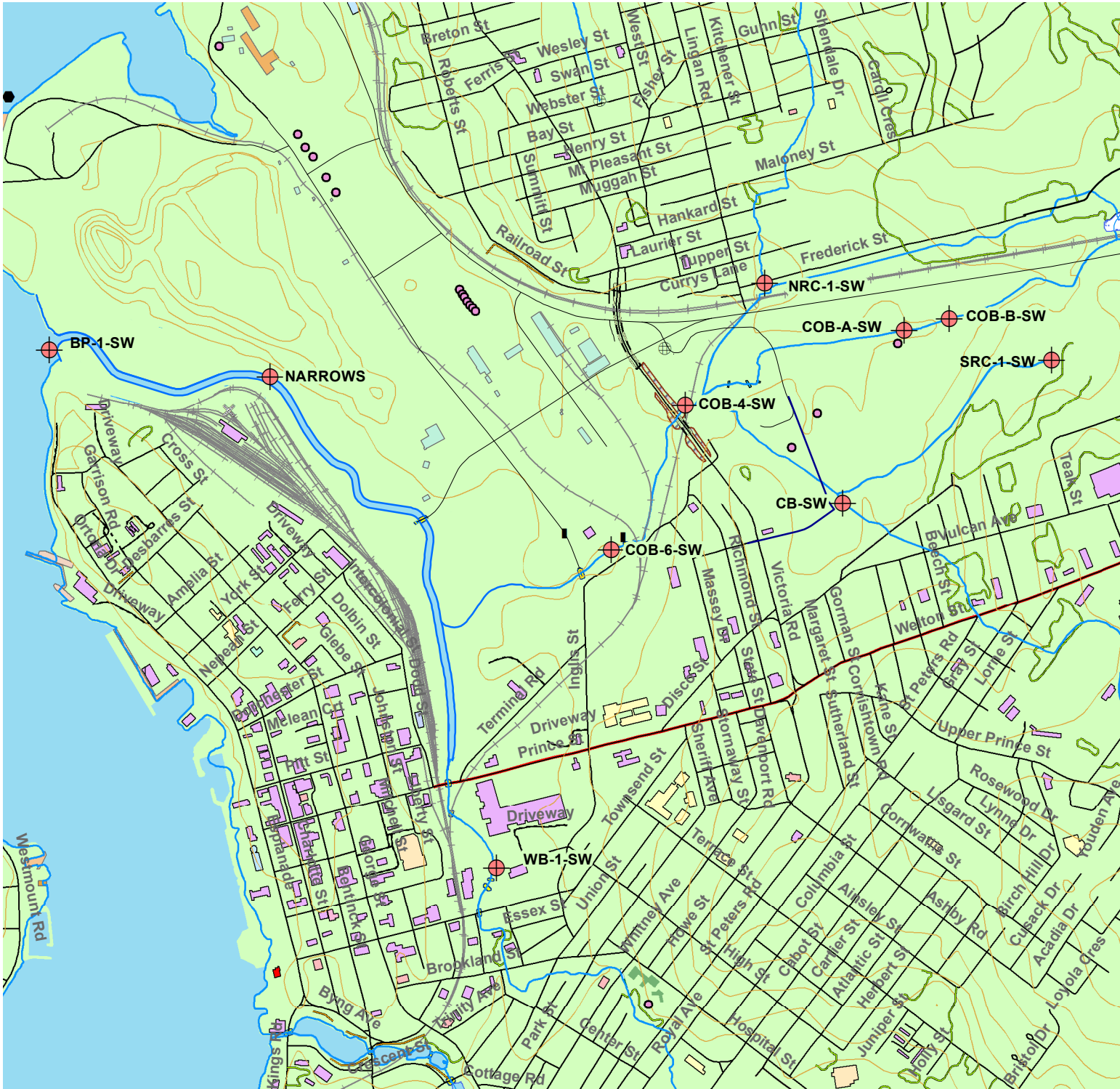
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LONG TERM MAINTENANCE AND MONITORING
 SURFACE WATER QUALITY MONITORING PROGRAM
 NOVEMBER 2015

SURFACE WATER LOCATIONS
 FIGURE 1

LEGEND

 Surface Water Locations



MAP DRAWING INFORMATION:
 Province of Nova Scotia Mapping

MAP CREATED BY: MCL
 MAP CHECKED BY: NJW
 MAP PROJECTION: NAD 1983 UTM Zone 20N

FILE LOCATION: \\DILLON_GA\DILLON_DFS\SYDNEY
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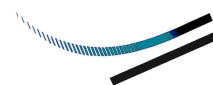


PROJECT: 14-1360
 STATUS: DRAFT
 DATE: 12/02/15



Field data was recorded on site specific data sheets. Stream flow measurements were calculated by measuring the width of the stream at the sampling location and by measuring the depth of the stream at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ width intervals. The stream flow velocity was also measured at $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ intervals. Using a spreadsheet formula, the approximate stream flow was calculated for each monitoring station. Due to the depth of surface water station BP-1-SW, it was not possible to obtain field measurements across the entire stream width. Dillon personnel collected as much field data at this deeper location as safely possible (i.e., from the stream banks/shoreline). Stream flow velocity for this location was calculated using the Muggah Creek North Channel Survey (CBCL Limited, October 2014) provided by NS Lands. A summary of the surface water stations included in the November 2015 monitoring program is presented in **Table 1**.

Table 1 – Surface Water Quality Monitoring Stations		
Monitoring Station ID	Water Body	Rationale for Sampling
CB-SW	Cagney Brook	To characterize surface water quality within the urban area of Sydney upstream of CO7/CO8.
NRC-1-SW	North Realigned Channel	To characterize surface water quality within the urban area of Whitney Pier upstream of CO7/CO8.
SRC-1-SW	South Realigned Channel	To characterize surface water quality related to runoff from the municipal landfill upstream of CO7/CO8.
COB-A-SW	Coke Ovens Brook - concrete riffles upstream of Stable Drive	To characterize surface water quality from runoff and leachate associated with the municipal landfill upstream of CO1, CO6 and CO7/CO8.
COB-B-SW ²	Coke Oven Brook along SPAR Road, east of COB-A-SW	To further characterize the potential for impacts from the municipal landfill to COB-A-SW.
COB-4-SW	Coke Ovens Brook	To characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B.
COB-6-SW	Coke Ovens Brook	To further characterize surface water quality from the upstream areas of CO1, CO6 and CO7/CO8. This sampling location is also upstream of TP6B.
WB-1-SW	Wash Brook	To characterize surface water quality within the urban area of Sydney upstream of TP6B and TP7.
NARROWS	North Channel, Open Hearth Park	To characterize surface water quality downgradient of the majority of the remediation sites.
BP-1-SW ¹	Battery Point	To further characterize surface water quality downgradient of the remediation sites and as it discharges to Sydney Harbour.
Notes: ¹ The LTMM location of surface water station BP-1-SW is similar to the location used during Pre-Construction activities associated with the EEM Program and is approximately 40 meters upstream from the collection point utilized during the Construction period of the EEM Program. ² Upstream sample, COB-B-SW added to the 2015 monitoring program to further characterize the potential for impacts from the municipal landfill to COB-A-SW ³ CO1: Coke Oven Brook ⁴ CO6: Surface Cap ⁵ CO7/CO8: Collection System (CO7)/Water Treatment Plant (CO8) ⁶ TP6B: Solidification/Stabilization/Channel ⁷ TP7: Tar Ponds Cap		



Sample containers were pre-labelled by the laboratory with the sample identification, analysis required and the project number. The date and time of sample collection were noted on the sample containers in the field at the time of collection. New nitrile gloves were worn by field staff for each sample to avoid cross-contamination between sampling stations. Samples were collected by opening the container facing upstream. Where samples were collected directly into the sample bottles containing preservative, the container was not fully submerged during sampling to avoid washing the preservative out of the container. Metals sample bottles contained nitric acid preservative to ensure that the metals remained in solution.

WEATHER CONDITIONS

Weather information obtained from Environment Canada's climate station at the Sydney Airport indicates that accumulated precipitation for the month of November 2015 was approximately 64.8 millimeters (mm) of rain and 7.0 centimeters (cm) of snow. Over half of the November 2015 amount of precipitation (35.8 mm of rain) occurred before the date of the surface water sampling event (i.e., November 18, 2015). No significant rainfall or snow was recorded on the day of the sampling event.

FIELD OBSERVATIONS AND MEASUREMENTS

Observations at the ten surface water stations during the November 2015 monitoring program are summarized in **Table 2**. Field measurements are summarized in **Table 3**.

Monitoring Station ID	Field Observations	Corresponding Photograph # (Appendix A)
CB-SW	Vegetation and debris (i.e., basketball, golf clubs, plastic and cardboard) observed on brook banks.	1
NRC-1-SW	Debris (i.e., plastic, cardboard and paper) observed in the channel and on the channel banks. Channel banks appeared to have been recently re-worked/disturbed.	2
SRC-1-SW	Algae observed in the channel. Concrete channel walls had extensive spray painted graffiti, which was visibly dissolving at the high water point. Debris (e.g., plastic and aerosol cans) observed at channel wall edges.	3
COB-A-SW	Visible orange staining observed on the brook banks at the high water level point. Debris (i.e., Styrofoam and plastic) observed on brook banks. Canadian Geese observed near brook banks.	4
COB-B-SW	Visible orange staining observed on brook banks at the high water level point. Algae observed on brook rocks.	5
COB-4-SW	Debris (i.e., plastic and clothes) observed on brook banks. High turbidity observed within the brook.	6
COB-6-SW	Debris (i.e., cardboard, Styrofoam and plastic) observed within the brook and on the brook banks. High turbidity observed within the brook.	7
WB-1-SW	Debris (i.e., metal, plastic, rubber hose and concrete) observed within the brook and on the brook banks.	8
NARROWS	Algae observed within the channel. Debris (i.e., plastic and wood) observed on the channel banks.	9
BP-1-SW	Sampling conducted at low tide. Algae and seaweed observed on exposed shoreline rocks. Seabirds visible in water and on shoreline.	10



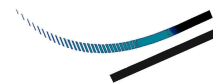
Monitoring Station ID	pH	Turbidity (NTU)	Conductivity (mS/cm)	Salinity (%)	Stream Flow₁ (m³/s)
CB-SW	5.92	- ⁴	0.230	0	0.111
NRC-1-SW	5.77	- ⁴	0.113	0	0.415
SRC-1-SW	5.71	- ⁴	0.036	0	0.129
COB-A-SW	5.99	- ⁴	0.449	0	0.006
COB-B-SW	5.90	- ⁴	0.472	0	0.017
COB-4-SW	5.45	High – above the high range of the field instrument measurement scale	0.214	0	0.353
COB-6-SW	5.74	High – above the high range of the field instrument measurement scale	0.255	0	3.29
WB-1-SW	6.30	37.2	0.106	0	0.997
NARROWS	6.55	178	2.25	0.1	1.62 ³
BP-1-SW ²	6.36	60	31.6	1.6	3.00 ³

Notes:
¹ Stream flow is an approximate calculated value.
² Collected during low tide conditions.
³ As surface water stations Narrows and BP-1-SW were monitored at different times of the day during November 18, 2015, there is some difference in the calculated flow rates due to tidal fluctuation. Both locations were monitored during the early morning (i.e., low tide) portion of the field program.
⁴ Equipment malfunction of turbidity sensor occurred during the field program.

REGULATORY FRAME WORK

As specified in Section 4.2, page 21 of the NS Lands LTMM Plan, the remedial criteria used for eight of the ten surface water stations included in the LTMM monitoring program (i.e., CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW and WB-1-SW) were the November 2013 Nova Scotia Contaminated Sites Regulations (NS CSRs) Tier I Environmental Quality Standards (EQS) (revised January 2015) for surface water (freshwater) and the Canadian Council of Ministers of the Environment (CCME) for the protection of freshwater aquatic life (FWAL), 2015. Analytical results for the remaining two surface water stations included in the November 2015 monitoring program (i.e., Narrows and BP-1-SW) were compared to the November 2013 (revised January 2015) NS CSRs Tier I EQS for surface water (marine) and the CCME guidelines for the protection of aquatic life (marine), 2015.

Additionally, as specified in Section 4.2, page 21 of the NS Lands LTMM Plan, analytical results for surface water samples collected at the upstream sampling stations were compared to previously calculated 95% upper confidence limits (UCL) of available Pre-Construction/Baseline analytical data from the EEMSWCM Program associated with the Sydney Tar Ponds remediation. Furthermore, analytical results for the upstream sampling stations were also compared to calculated 95% UCLs of available historical upstream analytical data (i.e., the Upstream Calculated 95% UCL). Analytical results for the two sampling stations near Sydney Harbour were compared to the calculated 95% UCLs of available Pre-Construction/Baseline analytical data for the Battery Point sampling station.



SURFACE WATER RESULTS

The surface water quality results for the November 2015 event and available post-remediation surface water data are presented in the attached **Tables B-1, B-2, B-3 and B-4** in **Appendix B**. Surface water samples were analyzed for PHCs, PAHs, PCBs, and RCAPMS. Samples were delivered to Maxxam Analytics in Sydney, Nova Scotia (Maxxam) who are contracted directly by NS Lands to conduct the sample analysis. Maxxam is a Canadian Association for Laboratory Accreditation (CALA) certified laboratory for the parameters analyzed. Review of the data indicates:

- Petroleum hydrocarbons and PCBs were not detected in the ten surface water samples analyzed.
- Review of the PAH data indicates:
 - Anthracene concentrations of 0.037 ug/L and 0.12 ug/L in NRC-1-SW and COB-4-SW, respectively, exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 0.012 ug/L;
 - Benzo(a)anthracene concentrations of 0.075 ug/L and 0.43 ug/L in NRC-1-SW and COB-4-SW, respectively, exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 0.018 ug/L;
 - Benzo(a)pyrene concentrations of 0.068 ug/L and 0.39 ug/L in NRC-1-SW and COB-4-SW, respectively, exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 0.015 ug/L and the Pre-Construction/Baseline Calculated 95% UCL of 0.05 ug/L;
 - The benzo(g,h,i)perylene concentration of 0.24 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) of 0.17 ug/L.
 - Fluoranthene concentrations of 0.18 ug/L and 0.88 ug/L in NRC-1-SW and COB-4-SW, respectively, exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 0.04 ug/L;
 - The indeno(1,2,3-cd)pyrene concentration of 0.22 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) of 0.21 ug/L.
 - The phenanthrene concentration of 0.48 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) and CCME FWAL guideline of 0.4 ug/L; and,
 - Pyrene concentrations ranging from 0.030 ug/L to 0.74 ug/L in NRC-1-SW, COB-4-SW and COB-6-SW exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 0.025 ug/L.

The remaining PAH parameters analyzed were below criteria. A summary of concentrations of select organic parameters (i.e., PAHs) at each station recorded during the November 2015 event relative to the calculated 95% UCLs is provided in **Table 4**.

- Review of general chemistry and metals data indicates:
 - Concentrations of aluminum ranging from 5.1 ug/L to 7100 ug/L exceed the Tier I EQS (freshwater) of 5 ug/L in CB-SW, NRC-1-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW, COB-6-SW and WB-1-SW. The aluminum concentrations in CB-SW, NRC-1-SW, SRC-1-SW, COB-4-SW and COB-6-SW also exceed the CCME FWAL guideline of 100 ug/L. The aluminum concentrations in NRC-1-SW, SRC-1-SW and COB-4-SW are above the Upstream Calculated 95% UCL of 220 ug/L;
 - The arsenic concentration of 3.5 ug/L in NRC-1-SW is above the Upstream Calculated 95% UCL of 1.6 ug/L and the Pre-Construction/Baseline Calculated 95% UCL of 1.98 ug/L.

Table 4 - Summary of Organic Surface Water Indicator Parameter Concentrations relative to Calculated 95% UCLs (ug/L)

Parameter	UCL ¹ 95%	Date	Sample Location									
			CB-SW	NRC-1-SW	SRC-1-SW	COB-A-SW	COB-B-SW ²	COB-4-SW	COB-6-SW	WE-1-SW	NARROWS	BP-1-SW
Naphthalene	1.8	12/22/2014	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	0.22	<0.20
		7/27/2015	<0.20	<0.20	<0.20	N/A	N/A	<0.20	<0.20	<0.20	<0.20	<0.20
		11/18/2015	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	0.05	12/22/2014	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
		7/27/2015	<0.010	<0.010	<0.010	N/A	N/A	<0.010	<0.010	<0.010	<0.010	<0.010
		11/18/2015	<0.010	0.068	<0.010	<0.010	<0.010	0.39	0.015	<0.010	<0.010	<0.010

Notes:

¹ Pre-Construction/Baseline Calculated 95% UCL from the EEMSWCM Program

² Added to the program in July 2015

Red indicates the concentration exceeds the 95% UCL

N/A – Not analyzed as surface water station was dry



- Concentrations of cadmium ranging from 0.011 ug/L to 0.29 ug/L exceed the Tier I EQS (freshwater) of 0.01 ug/L at CB-SW, NRC-1-SW, SRC-1-SW, COB-4-SW and COB-6-SW. The cadmium concentrations of 0.14 ug/L and 0.29 ug/L in NRC-1-SW and COB-4-SW also exceed the CCME FWAL guideline of 0.09 ug/L and are above the Upstream Calculated 95% UCL of 0.1 ug/L;
- The chromium concentrations of 1.9 ug/L and 8.0 ug/L in NRC-1-SW and COB-4-SW, respectively, exceed the CCME FWAL guideline of 1 ug/L;
- The cobalt concentrations of 1.5 and 4.6 ug/L in NRC-1-SW and COB-4-SW, respectively, are above the Pre-Construction/Baseline Calculated 95% UCL of 1.3 ug/L;
- Copper concentrations ranging from 2.2 to 17 ug/L in NRC-1-SW, SRC-1-SW and COB-4-SW exceeded the Tier I EQS (freshwater) of 2.0 ug/L.
- Iron concentrations ranging from 310 ug/L to 14,000 ug/L in NRC-1-SW, SRC-1-SW, COB-4-SW and COB-6-SW exceed the Tier I EQS (freshwater) and CCME FWAL guideline of 300 ug/L. Additionally, the iron concentrations in NRC-1-SW and COB-4-SW also exceed the Upstream Calculated 95% UCL of 3,318 ug/L and are above the Pre-Construction/Baseline Calculated 95% UCL of 1,900 ug/L. The iron concentrations of 410 ug/L and 320 ug/L in BP-1-SW and the Narrows, respectively, are above the calculated 95% UCL value of 190 ug/L;
- Lead concentrations of 9.5 ug/L, 37 ug/L and 1.5 ug/L in NRC-1-SW, COB-4-SW and COB-6-SW exceed the Tier I EQS (freshwater) of 1 ug/L and are above the Upstream Calculated 95% UCL of 1.2 ug/L.
- Manganese concentrations of 1,100 ug/L and 1,500 ug/L at the NRC-1-SW and COB-4-SW, respectively, exceed the Tier I EQS (freshwater) of 820 ug/L and are above the Upstream Calculated 95% UCL of 583 ug/L and the Pre-Construction/Baseline Calculated 95% UCL of 800 ug/L;
- The mercury concentration of 0.082 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) and CCME FWAL guideline value of 0.026 ug/L;
- Concentrations of strontium ranging from 140 ug/L to 260 ug/L are above the Upstream 95% UCL of 132 ug/L at CB-SW, SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW and COB-6-SW. The concentrations at COB-A-SW, COB-B-SW, COB-4-SW and COB-6-SW also exceed the Pre-Construction/Baseline 95% UCL of 210 ug/L;
- Concentrations of sulphate ranging from 41 ug/L to 190 ug/L are above the Upstream 95% UCL of 26 ug/L at SRC-1-SW, COB-A-SW, COB-B-SW, COB-4-SW and COB-6-SW. The concentrations of sulphate at COB-A-SW and COB-B-SW are also above the Pre-Construction/Baseline 95% UCL of 84 ug/L.
- The vanadium concentration of 14 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) of 6 ug/L; and,
- The zinc concentration of 96 ug/L in COB-4-SW exceeds the Tier I EQS (freshwater) and CCME FWAL guideline of 30 ug/L. The zinc concentrations of 41 ug/L and 63 ug/L in BP-1-SW and the Narrows exceed the Tier I EQS (marine water) of 10 ug/L.

The remaining general chemistry parameters were below applicable criteria. **Table 5** provides a summary of concentrations for select inorganic parameters from the November 2015 sampling event relative to the calculated 95% UCLs.

Table 5 – Summary of Inorganic Surface Water Indicator Parameter Concentrations relative to Calculated 95% UCLs

Sample Location	Date	SO4	Al	As	Cd	Cr	Co	Fe	Pb	Mn	Se	Sr
	Units	(mg/L)	(ug/L)									
Upstream Calculated 95% UCL		26	220	1.6	0.1	8.3	-	3,318	1.2	583	1.9	132
Pre-Construction/Baseline Calculated 95% UCL		84	-	1.98	-	-	1.3	1,900	-	800	-	210
CB-SW	12/22.2014	26	110	<1.0	0.018	<1.0	<0.40	290	<0.50	190	<1.0	130
	7/27/2015	16	28	<1.0	<0.010	<1.0	<0.40	260	<0.50	61	<1.0	<u>320</u>
	11/18/2015	24	130	<1.0	0.011	<1.0	<0.40	280	<0.50	140	<1.0	<u>140</u>
NRC-1-SW	12/22.2014	20	58	<1.0	0.022	<1.0	<0.40	150	<0.50	85	<1.0	32
	7/27/2015	22	45	<1.0	0.019	<1.0	<0.40	1,300	<0.50	75	<1.0	54
	11/18/2015	15	<u>1,500</u>	<u>3.5</u>	<u>0.14</u>	1.9	<u>1.5</u>	<u>3,800</u>	<u>9.5</u>	<u>1,100</u>	<1.0	36
SRC-1-SW	12/22.2014	<u>54</u>	<u>290</u>	<1.0	0.035	<1.0	<0.40	340	1.2	190	<1.0	<u>150</u>
	7/27/2015	<u>47</u>	51	1.0	0.013	<1.0	<0.40	210	1.1	260	<1.0	<u>150</u>
	11/18/2015	<u>43</u>	<u>240</u>	<1.0	0.023	1.2	<0.40	310	0.75	230	<1.0	<u>150</u>
COB-A-SW	12/22/2014	<u>160</u>	16	<1.0	<0.010	<1.0	<0.40	51	<0.50	25	<1.0	<u>260</u>
	7/27/2015						Dry					
	11/18/2015	<u>170</u>	5.1	<1.0	<0.010	<1.0	<0.40	82	<0.50	74	<1.0	<u>260</u>
COB-B-SW ¹	7/27/2015						Dry					
	11/18/2015	<u>190</u>	7.9	<1.0	<0.010	<1.0	<0.40	<50	<0.50	21	<1.0	<u>250</u>
COB-4-SW	12/22.2014	<u>47</u>	82	<1.0	0.014	<1.0	<0.40	210	<0.50	95	<1.0	<u>140</u>
	7/27/2015	<u>100</u>	51	<1.0	<0.010	<1.0	<0.40	460	<0.50	110	<1.0	<u>250</u>
	11/18/2015	<u>41</u>	<u>7,100</u>	<u>13</u>	<u>0.29</u>	8.0	<u>4.6</u>	<u>14,000</u>	<u>37</u>	<u>1,500</u>	<1.0	<u>150</u>
COS-6-SW	12/22.2014	<u>56</u>	61	<1.0	0.01	<1.0	<0.40	170	<0.50	56	<1.0	<u>180</u>
	7/27/2015	<u>91</u>	39	<1.0	<0.010	<1.0	<0.40	160	<0.50	23	<1.0	<u>300</u>
	11/18/2015	<u>44</u>	220	<1.0	0.018	<1.0	<0.40	490	<u>1.5</u>	79	<1.0	<u>180</u>
WB-1-SW	12/22.2014	7.9	160	<1.0	0.038	<1.0	<0.40	270	0.71	95	<1.0	53
	7/27/2015	10	89	<1.0	0.012	<1.0	<0.40	480	<0.50	41	<1.0	100
	11/18/2015	8.3	63	<1.0	<0.010	<1.0	<0.40	200	<0.50	43	<1.0	73
Battery Point/ Narrows Calculated 95% UCL		2,180	-	-	-	-	0.9	190	-	70	-	7,000
NARROWS	12/22.2014	270	110	<1.0	0.027	<1.0	<0.40	250	<0.50	63	<1.0	610
	7/27/2015	1,500	86	<1.0	<0.10	<1.0	<4.0	<500	<5.0	100	<1.0	5,400
	11/18/2015	110	76	<1.0	0.012	<1.0	<0.40	320	<0.50	45	<1.0	370
BP-1-SW	12/22.2014	170	110	<1.0	0.028	<1.0	<0.40	240	<0.50	61	<1.0	950
	7/27/2015	1,300	140	<1.0	<0.10	<1.0	<4.0	<500	<5.0	59	<1.0	5,300
	11/18/2015	190	140	<1.0	0.014	<1.0	<0.40	410	<0.50	57	<1.0	580

Notes:

- Double Underline Indicates exceedance of the Upstream Calculated 95% UCL
- Red** Indicates exceedance of the Pre-Construction/Baseline Calculated 95% UCL
- Dashed Border** Indicates exceedance of the Battery Point/Narrows Calculated 95% UCL
- Italics* indicates that the laboratory detection limit is greater than the comparison criteria



QUALITY CONTROL PROCESS

One field duplicate of sample, WB-1-SW, and one trip blank were collected during the November 2015 monitoring event. The relative percent difference (RPD) was calculated between the sample and associated field duplicate results. The RPD was not calculated for those parameters where one or both of the results associated with the original and/or field duplicate sample exhibited concentrations less than five times the laboratory reportable detection limit (RDL). The calculated RPDs were within established limits (i.e., less than 30% RPD). Volatile organic compounds were not detected in the trip blank. There were no holding time exceedances.

The laboratory analytical certificates have been reviewed for quality assurance/quality control purposes. The laboratory completed quality control analysis including duplicates, blanks, spikes, surrogate recoveries and spiked blanks to assess accuracy and precision as well as the potential for bias, contamination and degradation or matrix effects. No issues were found with the laboratory quality control reports.

SUMMARY

Analytical results of the November 2015 surface water monitoring program indicate that concentrations of the majority of the analyzed parameters are below the applicable criteria and respective 95% UCLs. Criteria and 95% UCL exceedances are summarized in **Table 6**.

Table 6 Summary of Surface Water Station Criteria and 95 % UCL Exceedances November 2015	
Parameter	Location (Criteria and/or 95% UCL Exceedance)
Anthracene	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater) and CCME FWAL)
Benzo(a)anthracene	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL)
Benzo(a)pyrene	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater), CCME FWAL and the Pre-Construction/Baseline Calculated 95% UCL) • COB-4-SW (Tier I EQS (freshwater), CCME FWAL and the Pre-Construction/Baseline Calculated 95% UCL)
Benzo(g,h,i)perylene	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater))
Fluoranthene	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater) and CCME FWAL) • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL)
Indeno(1,2,3-cd) pyrene	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater))
Phenanthrene	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL)
Pyrene	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater) and CCME FWAL) • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL) • COB-6-SW (Tier I EQS (freshwater) and CCME FWAL)



Table 6 Summary of Surface Water Station Criteria and 95 % UCL Exceedances November 2015	
Parameter	Location (Criteria and/or 95% UCL Exceedance)
Aluminum	<ul style="list-style-type: none"> • CB-SW (Tier I EQS (freshwater) and CCME FWAL) • NRC-1-SW (Tier I EQS (freshwater), CCME FWAL and Upstream Calculated 95% UCL) • SRC-1-SW (Tier I EQS (freshwater), CCME FWAL and Upstream Calculated 95% UCL) • COB-A-SW (Tier I EQS (freshwater)) • COB-B-SW (Tier I EQS (freshwater)) • COB-4-SW (Tier I EQS (freshwater), CCME FWAL and Upstream Calculated 95% UCL) • COB-6-SW (Tier I EQS (freshwater) and CCME FWAL) • WB-1-SW (Tier I EQS)
Arsenic	<ul style="list-style-type: none"> • NRC-1-SW (Upstream Calculated 95% UCL and the Pre-Construction/Baseline Calculated 95% UCL)
Cadmium	<ul style="list-style-type: none"> • CB-SW (Tier I EQS (freshwater)) • NRC-1-SW (Tier I EQS (freshwater), CCME FWAL and the Upstream Calculated 95% UCL) • SRC-1-SW (Tier I EQS (freshwater)) • COB-4-SW (Tier I EQS (freshwater), CCME FWAL and the Upstream Calculated 95% UCL) • COB-6-SW (Tier I EQS (freshwater))
Chromium	<ul style="list-style-type: none"> • NRC-1-SW (CCME FWAL) • COB-4-SW (CCME FWAL)
Cobalt	<ul style="list-style-type: none"> • NRC-1-SW (Pre-Construction/Baseline Calculated 95% UCL) • COB-4-SW (Pre-Construction/Baseline Calculated 95% UCL)
Copper	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater)) • SRC-1-SW (Tier I EQS (freshwater)) • COB-4-SW (Tier I EQS (freshwater))
Iron	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater), CCME FWAL and Upstream Calculated 95% UCL) • SRC-1-SW (Tier I EQS (freshwater) and CCME FWAL) • COB-4-SW (Tier I EQS, CCME FWAL and Upstream Calculated 95% UCL) • COB-6-SW (Tier I EQS (freshwater) and CCME FWAL) • Narrows (Battery Point/Narrows 95% UCL) • BP-1-SW (Battery Point/Narrows 95% UCL)
Lead	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater) and Upstream Calculated 95% UCL) • COB-4-SW (Tier I EQS (freshwater) and Upstream Calculated 95% UCL) • COB-6-SW (Tier I EQS (freshwater) and Upstream Calculated 95% UCL)
Manganese	<ul style="list-style-type: none"> • NRC-1-SW (Tier I EQS (freshwater), Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL) • COB-4-SW (Tier I EQS (freshwater), Upstream Calculated 95% UCL and Pre-Construction/Baseline Calculated 95% UCL)



Table 6 Summary of Surface Water Station Criteria and 95 % UCL Exceedances November 2015	
Parameter	Location (Criteria and/or 95% UCL Exceedance)
Mercury	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL)
Strontium	<ul style="list-style-type: none"> • CB-SW (Upstream 95% UCL) • SRC-1-SW (Upstream 95% UCL) • COB-A-SW (Upstream 95% UCL and Pre-Construction/Baseline 95% UCL) • COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline 95% UCL) • COB-4-SW (Upstream 95% UCL and Pre-Construction/Baseline 95% UCL) • COB-6-SW (Upstream 95% UCL and Pre-Construction/Baseline 95% UCL)
Sulphate	<ul style="list-style-type: none"> • SRC-1-SW (Upstream 95% UCL) • COB-A-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL)) • COB-B-SW (Upstream 95% UCL and Pre-Construction/Baseline Calculated 95% UCL)) • COB-4-SW (Upstream 95% UCL) • COB-6-SW (Upstream 95% UCL)
Vandium	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater))
Zinc	<ul style="list-style-type: none"> • COB-4-SW (Tier I EQS (freshwater) and CCME FWAL) • BP-1-SW (Tier I EQS (marine water)) • Narrows (Tier I EQS (marine water))

The PAH exceedances (i.e., anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene phenanthrene and/or pyrene) observed in NRC-1-SW and COB-4-SW during the November 2015 monitoring program are the first PAH exceedances reported for these surface water stations since the LTMM program commenced in December 2014. The metal exceedances of arsenic, chromium, cobalt and manganese within NRC-1-SW are the first metal exceedances for these parameters within this surface water monitoring station since the LTMM commenced. A significant increase in the concentrations of aluminum, arsenic, barium, chromium, cobalt, copper, iron, lead and manganese were also observed in COB-4-SW during the November 2015 monitoring program. The mercury concentration of 0.082 ug/L in COB-4-SW, which exceeds the Tier I EQS (freshwater) and CCME FWAL guideline value of 0.026 ug/L, is the first mercury exceedance recorded during LTMM monitoring. It is noted that turbidity was elevated in NRC-1-SW and COB-4-SW sampling stations during the November 2015 monitoring event.

Review of the analytical results for COB-A-SW and the upstream monitoring station COB-B-SW show concentrations for the analyzed parameters to be similar, with both exceeding the Tier I EQS for aluminum, sulphate and strontium.

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RECOMMENDATIONS AND CONSIDERATIONS

It is recommended that the additional upstream sample, COB-B-SW, be carried forward during the next surface water sampling event (i.e., Summer 2016) to further characterize the potential for impacts from the municipal landfill to COB-A-SW during low flow conditions.

Water quality trend analysis will be conducted when sufficient post-remediation data is available (i.e., Summer 2016). The next surface water monitoring event will be conducted during low flow conditions (i.e., Summer 2016). As concentrations of petroleum hydrocarbons and PCBs within the surface water monitoring stations have remained below laboratory detection limits, it is recommended that Summer 2016 sampling program include PAH and RCapMS analysis only.

DISCLAIMER

This report was prepared exclusively for the purposes, project and site location outlined in the report. The report is based on information provided to, or obtained by Dillon Consulting Limited ("Dillon") as indicated in the report, and applies solely to site conditions existing at the time of the site investigation. Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site. Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule and budget. It is therefore possible that currently unrecognized contamination or potentially hazardous materials may exist at the site, and that the levels of contamination or hazardous materials may vary across the site. Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

CLOSING

We trust this information is adequate for your needs. Please, however, contact the undersigned if you have any comments or questions regarding the content of this report.

Yours truly,

DILLON CONSULTING LIMITED



Nadine J. Wambolt, B. Tech., CET
Project Manager

NJW:kme
Our File: 14-1360-9000

Attachments

APPENDIX A
SITE PHOTOGRAPHS



PHOTO 1: View of CB-SW looking southeast.



PHOTO 2: View of NRC-1-SW looking southeast.



PHOTO 3: View of SRC-1-SW looking northeast.



PHOTO 4: View of COB-A-SW looking northwest.



PHOTO 5: View of COB-B-SW looking northwest.



PHOTO 6: View of COB-4-SW looking north.



PHOTO 7: View of COB-6-SW looking northwest.



PHOTO 8: View of WB-1-SW looking southwest.



PHOTO 9: View of NARROWS looking southeast.



PHOTO 10: View of BP-1-SW looking northwest.

APPENDIX B
TABLES B-1 THROUGH B-4

TABLE B-1
SURFACE WATER ANALYTICAL RESULTS - BTEX/TPH
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - NOVEMBER 2015

Sample Location	Sample Date	BTEX Concentration				Petroleum Hydrocarbons					Reached Baseline at C32
		Benzene	Toluene	E. Benzene	Xylenes	C6 - C10	C10-C16	C16-C21	C21 - C32	Modified TPH	
		Units				mg/L					-
NSE Tier 1 EQS Fresh Water ¹		2.1	0.77	0.32	0.33	-	-	-	-	1.5 (Gas) 0.1 (Fuel) 0.1 (Lube)	-
CCME FWAL ²		0.37	0.002	0.090	-	-	-	-	-	-	-
Calculated Upstream 95% UCL		-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		0.009	-	-	-	-	-	-	-	-	-
CB-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
NRC-1-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
SRC-1-SW	12/22/14 ^D	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15 ^D	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
COB-A-SW	11/26/12	DRY - NO SAMPLE									
	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	DRY - NO SAMPLE									
COB-B-SW	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	DRY - NO SAMPLE									
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
COB-4-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
COB-6-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
WB-1-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15 ^D	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
NSE Tier 1 EQS Marine Water ¹		2.1	0.77	0.32	0.33	-	-	-	-	1.5 (Gas) 0.1 (Fuel) 0.1 (Lube)	-
CCME MAL ²		0.11	0.215	0.025	-	-	-	-	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-
BP-1-SW	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
NARROWS	12/22/14	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	07/27/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA
	11/18/15	<0.0010	<0.0010	<0.0010	<0.0020	<0.010	<0.050	<0.050	<0.10	<0.10	NA

NOTES:

- D - Field Duplicate
- NM - Not Measured or not analyzed
- NA - Not Applicable
- mg/L - milligrams per liter
- UCL - Upper Concentration Limit
- No applicable guideline criteria
- 1 - Nova Scotia Environment Tier 1 Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2015
- 2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014

Bold	Concentration exceeds Tier 1 EQS for surface water (freshwater)
<u>Underline</u>	Concentration exceeds Tier 1 EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
<u><u>Double Underline</u></u>	Concentration exceeds Upstream Calculated 95% UCL
Dashed Border	Concentration exceeds Battery Point/Narrows Calculated 95% UCL
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% UCL

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - NOVEMBER 2015

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
NSE Tier 1 EQS Fresh Water ¹		5.8	4.6	0.012	0.018	0.015	0.48	0.17	-	0.48	1.4	0.26	0.04	3	0.21	2	2	1.1	-	0.4	0.025
CCME FWAL ²		5.8	-	0.012	0.018	0.015	-	-	-	-	-	-	0.04	3	-	-	-	1.1	-	0.4	0.025
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	1.8	-	-	-
CB-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	0.028	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.012
	07/27/15	0.066	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	0.039	<0.010	<0.050	<0.050	<0.20	<0.010	0.017	0.016
	11/18/15	0.049	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.025	0.027	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.019
NRC-1-SW	07/23/13	0.022	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.025	0.015	<0.010	<0.20	<0.050	<0.05	<0.010	0.025	0.019
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	11/18/15	0.022	<0.010	0.037	0.075	0.068	0.068	0.039	0.038	0.032	0.091	0.017	0.18	0.021	0.041	<0.050	<0.050	<0.20	0.017	0.13	0.14
SRC-1-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14 ^D	<0.010	<0.010	<0.010	<0.010	0.013	0.013	0.010	<0.010	<0.010	0.011	<0.010	0.021	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.012	0.018
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15 ^D	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-A-SW	07/23/13	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.20	<0.050	<0.05	<0.010	<0.010	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.01
	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-B-SW	07/27/15	DRY - NO SAMPLE																			
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
COB-4-SW	12/22/14	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	07/27/15	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.010	0.012
	11/18/15	0.14	0.027	0.12	0.43	0.39	0.33	0.24	0.20	0.19	0.48	0.073	0.88	0.078	0.22	<0.050	<0.050	<0.20	0.10	0.48	0.74

TABLE B-2
SURFACE WATER ANALYTICAL RESULTS - PAHs
LTMM SURFACE WATER QUALITY MONITORING PROGRAM - NOVEMBER 2015

Sample Location	Sample Date	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(j)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Perylene	Phenanthrene	Pyrene
Units		µg/L																			
COB-6-SW	07/23/13	0.073	0.025	0.015	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.034	0.034	<0.010	<0.20	<0.050	<0.05	<0.010	0.048	0.026
	12/22/14	0.089	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	0.026	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	0.013
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	0.016	<0.010	<0.010	0.015	0.015	0.016	0.019	<0.010	<0.010	0.018	<0.010	0.030	<0.010	0.016	<0.050	<0.050	<0.20	<0.010	0.014	0.030
WB-1-SW	07/23/13	0.11	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.018	0.054	<0.010	<0.20	<0.050	<0.05	<0.010	0.066	<0.010
	12/22/14	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	0.011	<0.010
	07/27/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15 ^D	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
	11/18/15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.050	<0.050	<0.20	<0.010	<0.010	<0.010
NSE Tier 1 EQS Marine Water ¹		6	6	-	-	0.01	-	-	-	-	0.1	-	11	12	-	1	2	1.4	-	4.6	0.02
CCME MAL ²		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.4	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	0.02	<0.03	<0.010	<0.010	<0.010	<0.010	<0.010	NM	<0.010	<0.010	<0.010	0.012	0.025	<0.010	<0.20	<0.050	<0.05	<0.03	0.034	0.01
	12/22/14	0.069	0.10	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.041	0.083	<0.010	0.094	<0.050	<0.20	<0.010	0.065	<u>0.036</u>
	07/27/15	0.014	0.018	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.050	<0.050	<0.20	<0.010	0.015	<0.010
	11/18/15	0.052	0.067	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.018	0.058	<0.010	0.057	<0.050	<0.20	<0.010	0.042	<u>0.022</u>
NARROWS	12/22/14	0.10	0.11	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.089	<0.010	0.013	<0.050	0.22	<0.51	0.065	<u>0.030</u>
	07/27/15	0.035	0.037	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	0.033	<0.010	<0.050	<0.050	<0.20	<0.010	0.026	0.014
	11/18/15	0.074	0.099	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.023	0.071	<0.010	0.068	<0.050	<0.20	<0.010	0.041	0.019

- NOTES:**
D - Field Duplicate
NM - Not Measured or not analyzed
mg/L - milligrams per liter
UCL - Upper Concentration Limit
- No applicable guideline criteria
- 1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013
2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014
- Bold** Concentration exceeds Tier I EQS for surface water (freshwater)
Underline Concentration exceeds Tier I EQS for surface water (marine)
Shading Concentration exceeds CCME FWAL
Shading Concentration exceeds CCME MAL
Double Underline Concentration exceeds Upstream Calculated 95% Upper Concentration Limit
Dashed Border Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

TABLE B-3
 SURFACE WATER ANALYTICAL RESULTS - PCBs
 LTMM SURFACE WATER QUALITY MONITORING PROGRAM - NOVEMBER 2015

Sample Location	Sample Date	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1248	Aroclor 1242	Aroclor 1254	Aroclor 1260	Calculated Total PCB
Units		ug/L							
NSE Tier 1 EQS Fresh Water ¹		-	-	-	-	-	-	-	-
CCME FWAL ²		-	-	-	-	-	-	-	-
Upstream Calculated 95% UCL		-	-	-	-	-	-	-	-
Pre-Construction/Baseline Calculated 95% UCL		-	-	-	-	-	-	-	-
CB-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
NRC-1-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
SRC-1-SW	12/22/14 ^D	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15 ^D	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
COB-A-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	DRY - NO SAMPLE							
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
COB-B-SW	07/27/15	DRY - NO SAMPLE							
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
COB-4-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
COB-6-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
WB-1-SW	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15 ^D	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
NSE Tier 1 EQS Marine Water ¹		-	-	-	-	-	-	-	-
CCME MAL ²		-	-	-	-	-	-	-	-
Battery Point/Narrows Calculated 95% UCL		-	-	-	-	-	-	-	-
BP-1-SW	07/23/13	NM	NM	NM	NM	NM	NM	NM	<0.050
	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
NARROWS	12/22/14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	07/27/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	11/18/15	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050

NOTES:

- D - Field Duplicate
- NM - Not Measured or not analyzed
- mg/L - milligrams per liter
- UCL - Upper Concentration Limit
- No applicable guideline criteria

1 - Nova Scotia Environment Tier I Environmental Quality Standards (EQS) for surface water (freshwater and marine) 2013
 2 - Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life (freshwater and marine) 2014

Bold	Concentration exceeds Tier I EQS for surface water (freshwater)
<u>Underline</u>	Concentration exceeds Tier I EQS for surface water (marine)
Shading	Concentration exceeds CCME FWAL
Shading	Concentration exceeds CCME MAL
<u>Double Underline</u>	Concentration exceeds Upstream Calculated 95% Upper Concentration Limit
- - - - -	Concentration exceeds Battery Point/Narrows Calculated 95% Upper Concentration Limit
Red	Concentration exceeds Pre-Construction/Baseline Calculated 95% Upper Concentration Limit

This summary is to be used in conjunction with, not as a replacement of, the Laboratory Certificates of Analysis

APPENDIX C
LABORATORY CERTIFICATES

Attention:Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
B1P 1C6

Report Date: 2015/11/26
Report #: R3782655
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5N6801

Received: 2015/11/18, 16:12

Sample Matrix: Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide (1)	11	N/A	2015/11/23	N/A	SM 22 4500-CO2 D
Alkalinity (1)	11	N/A	2015/11/24	ATL SOP 00013	EPA 310.2 R1974 m
Chloride (1)	11	N/A	2015/11/24	ATL SOP 00014	SM 22 4500-Cl- E m
Colour (1)	11	N/A	2015/11/24	ATL SOP 00020	SM 22 2120C m
Conductance - water (1)	11	N/A	2015/11/23	ATL SOP 00004	SM 22 2510B m
TEH in Water (PIRI) (1)	5	2015/11/23	2015/11/23	ATL SOP 00113	Atl. RBCA v3 m
TEH in Water (PIRI) (1)	7	2015/11/23	2015/11/24	ATL SOP 00113	Atl. RBCA v3 m
Hardness (calculated as CaCO3) (1)	11	N/A	2015/11/24	ATL SOP 00048	SM 22 2340 B
Mercury - Total (CVAA,LL) (1)	11	2015/11/23	2015/11/23	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Total MS (1)	4	2015/11/23	2015/11/23	ATL SOP 00058	EPA 6020A R1 m
Metals Water Total MS (1)	7	2015/11/23	2015/11/24	ATL SOP 00058	EPA 6020A R1 m
Ion Balance (% Difference) (1)	11	N/A	2015/11/25		Auto Calc.
Anion and Cation Sum (1)	11	N/A	2015/11/25		Auto Calc.
Nitrogen Ammonia - water (1)	11	N/A	2015/11/24	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite (1)	11	N/A	2015/11/25	ATL SOP 00016	USGS SOPINCF0452.2 m
Nitrogen - Nitrite (1)	11	N/A	2015/11/24	ATL SOP 00017	SM 22 4500-NO2- B m
Nitrogen - Nitrate (as N) (1)	11	N/A	2015/11/25	ATL SOP 00018	ASTM D3867
PAH in Water by GC/MS (SIM) (1)	10	2015/11/24	2015/11/24	ATL SOP 00103	EPA 8270D 2007 m
PAH in Water by GC/MS (SIM) (1)	1	2015/11/24	2015/11/25	ATL SOP 00103	EPA 8270D 2007 m
PCBs in water by GC/ECD (1)	11	2015/11/24	2015/11/25	ATL SOP 00107	EPA 8082A m
PCB Aroclor sum (water) (1)	11	N/A	2015/11/25		Auto Calc.
pH (1, 2)	11	N/A	2015/11/23	ATL SOP 00003	SM 22 4500-H+ B m
Phosphorus - ortho (1)	11	N/A	2015/11/25	ATL SOP 00021	EPA 365.2 m
VPH in Water (PIRI) (1)	12	N/A	2015/11/23	ATL SOP 00118	Atl. RBCA v3 m
Sat. pH and Langelier Index (@ 20C) (1)	11	N/A	2015/11/25	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C) (1)	11	N/A	2015/11/25	ATL SOP 00049	Auto Calc.
Reactive Silica (1)	11	N/A	2015/11/24	ATL SOP 00022	EPA 366.0 m
Sulphate (1)	11	N/A	2015/11/24	ATL SOP 00023	EPA 375.4 R1978 m
Total Dissolved Solids (TDS calc) (1)	11	N/A	2015/11/25		Auto Calc.
Organic carbon - Total (TOC) (1, 3)	11	N/A	2015/11/25	ATL SOP 00037	SM 22 5310C m

Your Project #: 4104251070
Your C.O.C. #: 537265

Attention:Nadine Wambolt

Dillon Consulting Limited
275 Charlotte St
Sydney, NS
B1P 1C6

Report Date: 2015/11/26
Report #: R3782655
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5N6801

Received: 2015/11/18, 16:12

Sample Matrix: Water
Samples Received: 12

Analyses	Date		Laboratory Method	Reference
	Quantity	Extracted		
ModTPH (T1) Calc. for Water (1)	12	N/A	2015/11/24 N/A	Atl. RBCA v3 m
Turbidity (1)	11	N/A	2015/11/23 ATL SOP 00011	EPA 180.1 R2 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

- (1) This test was performed by Maxxam Bedford
- (2) The APHA Standard Method require pH to be analyzed 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.
- (3) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Natalie MacAskill, Sr. Project Manager
Email: NMacAskill@maxxam.ca
Phone# (902)567-1255 Ext:17

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.

RESULTS OF ANALYSES OF WATER

Maxxam ID		BJK050		BJK079		BJK080		BJK081		
Sampling Date		2015/11/18		2015/11/18		2015/11/18		2015/11/18		
COC Number		537265		537265		537265		537265		
	UNITS	COB-4-SW	RDL	COB-6-SW	RDL	CB-SW	RDL	SRC-1-SW	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	2.96	N/A	3.51	N/A	3.17	N/A	4.22	N/A	4278273
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	58	1.0	69	1.0	72	1.0	93	1.0	4278269
Calculated TDS	mg/L	190	1.0	210	1.0	180	1.0	240	1.0	4278277
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4278269
Cation Sum	me/L	3.51	N/A	3.38	N/A	2.92	N/A	3.90	N/A	4278273
Hardness (CaCO ₃)	mg/L	100	1.0	110	1.0	84	1.0	120	1.0	4276642
Ion Balance (% Difference)	%	8.50	N/A	1.89	N/A	4.11	N/A	3.94	N/A	4278272
Langelier Index (@ 20C)	N/A	-0.540		-0.0230		-0.271		0.0500		4278275
Langelier Index (@ 4C)	N/A	-0.790		-0.273		-0.521		-0.200		4278276
Nitrate (N)	mg/L	0.18	0.050	0.16	0.050	0.12	0.050	0.076	0.050	4276643
Saturation pH (@ 20C)	N/A	8.10		7.98		8.08		7.82		4278275
Saturation pH (@ 4C)	N/A	8.35		8.23		8.33		8.07		4278276
Inorganics										
Total Alkalinity (Total as CaCO ₃)	mg/L	58	5.0	70	5.0	72	5.0	94	5.0	4280686
Dissolved Chloride (Cl)	mg/L	33	1.0	42	1.0	43	1.0	51	1.0	4280691
Colour	TCU	14	5.0	10	5.0	20	5.0	13	5.0	4280709
Nitrate + Nitrite (N)	mg/L	0.18	0.050	0.16	0.050	0.12	0.050	0.076	0.050	4280714
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	4280717
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	<0.050	0.050	<0.050	0.050	<0.050	0.050	4282700
Total Organic Carbon (C)	mg/L	9.3 (1)	5.0	3.7	0.50	5.3	0.50	5.0	0.50	4285938
Orthophosphate (P)	mg/L	0.012	0.010	0.012	0.010	0.048	0.010	<0.010	0.010	4280712
pH	pH	7.56	N/A	7.96	N/A	7.81	N/A	7.87	N/A	4282544
Reactive Silica (SiO ₂)	mg/L	7.5	0.50	7.6	0.50	7.6	0.50	5.7	0.50	4280707
Dissolved Sulphate (SO ₄)	mg/L	41	10	44	10	24	2.0	43	10	4280699
Turbidity	NTU	140	1.0	4.9	0.10	2.1	0.10	4.4	0.10	4282695
Conductivity	uS/cm	310	1.0	360	1.0	320	1.0	430	1.0	4282535
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Reporting limit was increased due to turbidity.										

RESULTS OF ANALYSES OF WATER

Maxxam ID		BJK082		BJK084		BJK085		BJK087		
Sampling Date		2015/11/18		2015/11/18		2015/11/18		2015/11/18		
COC Number		537265		537265		537265		537265		
	UNITS	NRC-1-SW	RDL	NARROWS	RDL	COB-A-SW	RDL	WB-1-SW	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	1.51	N/A	21.6	N/A	6.88	N/A	1.32	N/A	4278273
Bicarb. Alkalinity (calc. as CaCO ₃)	mg/L	25	1.0	55	1.0	120	1.0	23	1.0	4278269
Calculated TDS	mg/L	95	1.0	1200	1.0	420	1.0	77	1.0	4278277
Carb. Alkalinity (calc. as CaCO ₃)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	4278269
Cation Sum	me/L	1.54	N/A	19.9	N/A	6.56	N/A	1.24	N/A	4278273
Hardness (CaCO ₃)	mg/L	38	1.0	240	1.0	270	1.0	31	1.0	4276642
Ion Balance (% Difference)	%	0.980	N/A	4.13	N/A	2.38	N/A	3.13	N/A	4278272
Langelier Index (@ 20C)	N/A	-1.49		-0.398		0.505		-1.54		4278275
Langelier Index (@ 4C)	N/A	-1.74		-0.643		0.257		-1.79		4278276
Nitrate (N)	mg/L	0.10	0.050	0.15	0.050	0.25	0.050	0.11	0.050	4276643
Saturation pH (@ 20C)	N/A	8.86		8.26		7.44		8.99		4278275
Saturation pH (@ 4C)	N/A	9.11		8.50		7.69		9.24		4278276
Inorganics										
Total Alkalinity (Total as CaCO ₃)	mg/L	25	5.0	55	5.0	120	25	23	5.0	4280686
Dissolved Chloride (Cl)	mg/L	25	1.0	640	5.0	33	1.0	24	1.0	4280691
Colour	TCU	15	5.0	21	5.0	<5.0	5.0	30	5.0	4280709
Nitrate + Nitrite (N)	mg/L	0.10	0.050	0.15	0.050	0.25	0.050	0.11	0.050	4280714
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	<0.010	0.010	4280717
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.050	0.053	0.050	<0.050	0.050	<0.050	0.050	4282700
Total Organic Carbon (C)	mg/L	4.2	0.50	3.7	0.50	2.6	0.50	4.3	0.50	4285938
Orthophosphate (P)	mg/L	<0.010	0.010	0.016	0.010	0.013	0.010	0.012	0.010	4280712
pH	pH	7.37	N/A	7.86	N/A	7.95	N/A	7.45	N/A	4282544
Reactive Silica (SiO ₂)	mg/L	5.7	0.50	5.8	0.50	12	0.50	3.9	0.50	4280707
Dissolved Sulphate (SO ₄)	mg/L	15	2.0	110	10	170	10	8.3	2.0	4280699
Turbidity	NTU	21	0.10	1.7	0.10	0.25	0.10	0.67	0.10	4282695
Conductivity	uS/cm	160	1.0	2400	1.0	640	1.0	140	1.0	4282535
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
N/A = Not Applicable										

RESULTS OF ANALYSES OF WATER

Maxxam ID		BJK088		BJK090		BJK091		
Sampling Date		2015/11/18		2015/11/18		2015/11/18		
COC Number		537265		537265		537265		
	UNITS	BP-1-SW	RDL	COB-B-SW	RDL	FD-010	RDL	QC Batch
Calculated Parameters								
Anion Sum	me/L	38.8	N/A	7.13	N/A	1.36	N/A	4278273
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	57	1.0	110	1.0	23	1.0	4278269
Calculated TDS	mg/L	2200	1.0	430	1.0	77	1.0	4278277
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	4278269
Cation Sum	me/L	37.4	N/A	6.71	N/A	1.20	N/A	4278273
Hardness (CaCO3)	mg/L	420	1.0	280	1.0	29	1.0	4276642
Ion Balance (% Difference)	%	1.80	N/A	3.03	N/A	6.25	N/A	4278272
Langelier Index (@ 20C)	N/A	-0.189		0.393		-1.59		4278275
Langelier Index (@ 4C)	N/A	-0.432		0.144		-1.84		4278276
Nitrate (N)	mg/L	0.14	0.050	0.35	0.050	0.098	0.050	4276643
Saturation pH (@ 20C)	N/A	8.19		7.46		9.01		4278275
Saturation pH (@ 4C)	N/A	8.44		7.71		9.26		4278276
Inorganics								
Total Alkalinity (Total as CaCO3)	mg/L	58	5.0	110	25	23	5.0	4280686
Dissolved Chloride (Cl)	mg/L	1200	15	35	1.0	26	1.0	4280691
Colour	TCU	25	5.0	<5.0	5.0	30	5.0	4280709
Nitrate + Nitrite (N)	mg/L	0.14	0.050	0.35	0.050	0.098	0.050	4280714
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	<0.010	0.010	4280717
Nitrogen (Ammonia Nitrogen)	mg/L	0.064	0.050	<0.050	0.050	<0.050	0.050	4282700
Total Organic Carbon (C)	mg/L	3.3	0.50	2.4	0.50	4.5	0.50	4285938
Orthophosphate (P)	mg/L	0.015	0.010	0.013	0.010	0.012	0.010	4280712
pH	pH	8.00	N/A	7.86	N/A	7.42	N/A	4282544
Reactive Silica (SiO2)	mg/L	5.4	0.50	11	0.50	3.9	0.50	4280707
Dissolved Sulphate (SO4)	mg/L	190	10	190	10	8.3	2.0	4280699
Turbidity	NTU	1.0	0.10	<0.10	0.10	0.18	0.10	4282706
Conductivity	uS/cm	4200	1.0	670	1.0	140	1.0	4282535
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		BJK050	BJK079	BJK080	BJK081	BJK082	BJK084	BJK085		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265	537265	537265	537265		
	UNITS	COB-4-SW	COB-6-SW	CB-SW	SRC-1-SW	NRC-1-SW	NARROWS	COB-A-SW	RDL	QC Batch

Metals										
Total Mercury (Hg)	ug/L	0.082	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	4282581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		BJK087	BJK088	BJK090	BJK091		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265		
	UNITS	WB-1-SW	BP-1-SW	COB-B-SW	FD-010	RDL	QC Batch

Metals							
Total Mercury (Hg)	ug/L	<0.013	0.070	<0.013	<0.013	0.013	4282581

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		BJK050	BJK079	BJK080	BJK081	BJK082	BJK084	BJK085		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265	537265	537265	537265		
	UNITS	COB-4-SW	COB-6-SW	CB-SW	SRC-1-SW	NRC-1-SW	NARROWS	COB-A-SW	RDL	QC Batch
Metals										
Total Aluminum (Al)	ug/L	7100	220	130	240	1500	76	5.1	5.0	4282327
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	1.0	4282327
Total Arsenic (As)	ug/L	13	<1.0	<1.0	<1.0	3.5	<1.0	<1.0	1.0	4282327
Total Barium (Ba)	ug/L	77	21	29	16	29	15	15	1.0	4282327
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Boron (B)	ug/L	<50	<50	<50	57	<50	180	<50	50	4282327
Total Cadmium (Cd)	ug/L	0.29	0.018	0.011	0.023	0.14	0.012	<0.010	0.010	4282327
Total Calcium (Ca)	ug/L	33000	37000	28000	41000	12000	38000	88000	100	4282327
Total Chromium (Cr)	ug/L	8.0	<1.0	<1.0	1.2	1.9	<1.0	<1.0	1.0	4282327
Total Cobalt (Co)	ug/L	4.6	<0.40	<0.40	<0.40	1.5	<0.40	<0.40	0.40	4282327
Total Copper (Cu)	ug/L	17	<2.0	<2.0	2.2	5.0	<2.0	<2.0	2.0	4282327
Total Iron (Fe)	ug/L	14000	490	280	310	3800	320	82	50	4282327
Total Lead (Pb)	ug/L	37	1.5	<0.50	0.75	9.5	<0.50	<0.50	0.50	4282327
Total Magnesium (Mg)	ug/L	4600	3700	3800	4600	1800	36000	13000	100	4282327
Total Manganese (Mn)	ug/L	1500	79	140	230	1100	45	74	2.0	4282327
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Nickel (Ni)	ug/L	9.5	<2.0	<2.0	<2.0	3.3	<2.0	<2.0	2.0	4282327
Total Phosphorus (P)	ug/L	390	<100	110	<100	130	<100	<100	100	4282327
Total Potassium (K)	ug/L	2800	2100	1700	2700	1000	15000	3700	100	4282327
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4282327
Total Sodium (Na)	ug/L	21000	27000	27000	32000	14000	330000	24000	100	4282327
Total Strontium (Sr)	ug/L	150	180	140	150	36	370	260	2.0	4282327
Total Thallium (Tl)	ug/L	0.18	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4282327
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Titanium (Ti)	ug/L	200	4.0	4.3	5.3	34	<2.0	<2.0	2.0	4282327
Total Uranium (U)	ug/L	0.53	0.22	0.12	0.33	0.14	0.22	0.42	0.10	4282327
Total Vanadium (V)	ug/L	14	<2.0	<2.0	<2.0	3.0	<2.0	<2.0	2.0	4282327
Total Zinc (Zn)	ug/L	96	<5.0	6.1	<5.0	27	63	<5.0	5.0	4282327
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		BJK087	BJK088	BJK090	BJK091		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265		
	UNITS	WB-1-SW	BP-1-SW	COB-B-SW	FD-010	RDL	QC Batch
Metals							
Total Aluminum (Al)	ug/L	63	140	7.9	63	5.0	4282327
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Barium (Ba)	ug/L	15	16	18	15	1.0	4282327
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Boron (B)	ug/L	<50	330	<50	<50	50	4282327
Total Cadmium (Cd)	ug/L	<0.010	0.014	<0.010	<0.010	0.010	4282327
Total Calcium (Ca)	ug/L	9600	52000	89000	9200	100	4282327
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	4282327
Total Copper (Cu)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Iron (Fe)	ug/L	200	410	<50	200	50	4282327
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	4282327
Total Magnesium (Mg)	ug/L	1600	71000	13000	1600	100	4282327
Total Manganese (Mn)	ug/L	43	57	21	41	2.0	4282327
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	100	4282327
Total Potassium (K)	ug/L	760	27000	3800	760	100	4282327
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	4282327
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	4282327
Total Sodium (Na)	ug/L	14000	650000	25000	14000	100	4282327
Total Strontium (Sr)	ug/L	73	580	250	70	2.0	4282327
Total Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	4282327
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Uranium (U)	ug/L	<0.10	0.29	0.42	<0.10	0.10	4282327
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	4282327
Total Zinc (Zn)	ug/L	<5.0	41	<5.0	<5.0	5.0	4282327
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		BJK050	BJK079	BJK080	BJK081	BJK082	BJK084	BJK085		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265	537265	537265	537265		
	UNITS	COB-4-SW	COB-6-SW	CB-SW	SRC-1-SW	NRC-1-SW	NARROWS	COB-A-SW	RDL	QC Batch
Polyaromatic Hydrocarbons										
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.068	<0.050	0.050	4283921
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283921
Acenaphthene	ug/L	0.14	0.016	0.049	<0.010	0.022	0.074	<0.010	0.010	4283921
Acenaphthylene	ug/L	0.027	<0.010	<0.010	<0.010	<0.010	0.099	<0.010	0.010	4283921
Anthracene	ug/L	0.12	<0.010	<0.010	<0.010	0.037	<0.010	<0.010	0.010	4283921
Benzo(a)anthracene	ug/L	0.43	0.015	<0.010	<0.010	0.075	<0.010	<0.010	0.010	4283921
Benzo(a)pyrene	ug/L	0.39	0.015	<0.010	<0.010	0.068	<0.010	<0.010	0.010	4283921
Benzo(b)fluoranthene	ug/L	0.33	0.016	<0.010	<0.010	0.068	<0.010	<0.010	0.010	4283921
Benzo(g,h,i)perylene	ug/L	0.24	0.019	<0.010	<0.010	0.039	<0.010	<0.010	0.010	4283921
Benzo(j)fluoranthene	ug/L	0.20	<0.010	<0.010	<0.010	0.038	<0.010	<0.010	0.010	4283921
Benzo(k)fluoranthene	ug/L	0.19	<0.010	<0.010	<0.010	0.032	<0.010	<0.010	0.010	4283921
Chrysene	ug/L	0.48	0.018	<0.010	<0.010	0.091	<0.010	<0.010	0.010	4283921
Dibenz(a,h)anthracene	ug/L	0.073	<0.010	<0.010	<0.010	0.017	<0.010	<0.010	0.010	4283921
Fluoranthene	ug/L	0.88	0.030	0.025	<0.010	0.18	0.023	<0.010	0.010	4283921
Fluorene	ug/L	0.078	<0.010	0.027	<0.010	0.021	0.071	<0.010	0.010	4283921
Indeno(1,2,3-cd)pyrene	ug/L	0.22	0.016	<0.010	<0.010	0.041	<0.010	<0.010	0.010	4283921
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	4283921
Perylene	ug/L	0.10	<0.010	<0.010	<0.010	0.017	<0.010	<0.010	0.010	4283921
Phenanthrene	ug/L	0.48	0.014	0.026	<0.010	0.13	0.041	<0.010	0.010	4283921
Pyrene	ug/L	0.74	0.030	0.019	<0.010	0.14	0.019	<0.010	0.010	4283921
Surrogate Recovery (%)										
D10-Anthracene	%	77	81	73	83	73	74	86		4283921
D14-Terphenyl	%	77 (1)	82	69	80	76	77	88		4283921
D8-Acenaphthylene	%	75	78	70	79	72	73	84		4283921
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) PAH sample contained sediment.										

SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		BJK087	BJK088	BJK090	BJK091		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265		
	UNITS	WB-1-SW	BP-1-SW	COB-B-SW	FD-010	RDL	QC Batch
Polyaromatic Hydrocarbons							
1-Methylnaphthalene	ug/L	<0.050	0.057	<0.050	<0.050	0.050	4283921
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283921
Acenaphthene	ug/L	<0.010	0.052	<0.010	<0.010	0.010	4283921
Acenaphthylene	ug/L	<0.010	0.067	<0.010	<0.010	0.010	4283921
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Dibenz(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Fluoranthene	ug/L	<0.010	0.018	<0.010	<0.010	0.010	4283921
Fluorene	ug/L	<0.010	0.058	<0.010	<0.010	0.010	4283921
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	4283921
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	4283921
Phenanthrene	ug/L	<0.010	0.042	<0.010	<0.010	0.010	4283921
Pyrene	ug/L	<0.010	0.022	<0.010	<0.010	0.010	4283921
Surrogate Recovery (%)							
D10-Anthracene	%	78	75	83	77		4283921
D14-Terphenyl	%	79	76	82	79		4283921
D8-Acenaphthylene	%	77	74	82	76		4283921
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		BJK050	BJK079	BJK080	BJK081	BJK082	BJK084		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265	537265	537265		
	UNITS	COB-4-SW	COB-6-SW	CB-SW	SRC-1-SW	NRC-1-SW	NARROWS	RDL	QC Batch
Petroleum Hydrocarbons									
Benzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	4282416
Toluene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	4282416
Ethylbenzene	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	4282416
Total Xylenes	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	4282416
C6 - C10 (less BTEX)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	4282416
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4282342
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4282342
>C21-<C32 Hydrocarbons	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4282342
Modified TPH (Tier1)	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	4276378
Reached Baseline at C32	mg/L	NA	NA	NA	NA	NA	NA	N/A	4282342
Hydrocarbon Resemblance	mg/L	NA	NA	NA	NA	NA	NA	N/A	4282342
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	102	107	107	107	91	107		4282342
n-Dotriacontane - Extractable	%	88 (1)	98	93	89	81	94		4282342
Isobutylbenzene - Volatile	%	95	94	99	96	93	97		4282416
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) TEH sample contained sediment.									

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		BJK085		BJK087	BJK088		BJK090		
Sampling Date		2015/11/18		2015/11/18	2015/11/18		2015/11/18		
COC Number		537265		537265	537265		537265		
	UNITS	COB-A-SW	QC Batch	WB-1-SW	BP-1-SW	QC Batch	COB-B-SW	RDL	QC Batch
Petroleum Hydrocarbons									
Benzene	mg/L	<0.0010	4282416	<0.0010	<0.0010	4282416	<0.0010	0.0010	4282416
Toluene	mg/L	<0.0010	4282416	<0.0010	<0.0010	4282416	<0.0010	0.0010	4282416
Ethylbenzene	mg/L	<0.0010	4282416	<0.0010	<0.0010	4282416	<0.0010	0.0010	4282416
Total Xylenes	mg/L	<0.0020	4282416	<0.0020	<0.0020	4282416	<0.0020	0.0020	4282416
C6 - C10 (less BTEX)	mg/L	<0.010	4282416	<0.010	<0.010	4282416	<0.010	0.010	4282416
>C10-C16 Hydrocarbons	mg/L	<0.050	4282342	<0.050	<0.050	4282345	<0.050	0.050	4282342
>C16-C21 Hydrocarbons	mg/L	<0.050	4282342	<0.050	<0.050	4282345	<0.050	0.050	4282342
>C21-<C32 Hydrocarbons	mg/L	<0.10	4282342	<0.10	<0.10	4282345	<0.10	0.10	4282342
Modified TPH (Tier1)	mg/L	<0.10	4276378	<0.10	<0.10	4276378	<0.10	0.10	4276378
Reached Baseline at C32	mg/L	NA	4282342	NA	NA	4282345	NA	N/A	4282342
Hydrocarbon Resemblance	mg/L	NA	4282342	NA	NA	4282345	NA	N/A	4282342
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	105	4282342	100	98	4282345	107		4282342
n-Dotriacontane - Extractable	%	87	4282342	108	103	4282345	90		4282342
Isobutylbenzene - Volatile	%	95	4282416	96	99	4282416	91		4282416
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		BJK091	BJK105		
Sampling Date		2015/11/18	2015/11/18		
COC Number		537265	537265		
	UNITS	FD-010	TB-011	RDL	QC Batch
Petroleum Hydrocarbons					
Benzene	mg/L	<0.0010	<0.0010	0.0010	4282416
Toluene	mg/L	<0.0010	<0.0010	0.0010	4282416
Ethylbenzene	mg/L	<0.0010	<0.0010	0.0010	4282416
Total Xylenes	mg/L	<0.0020	<0.0020	0.0020	4282416
C6 - C10 (less BTEX)	mg/L	<0.010	<0.010	0.010	4282416
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	0.050	4282345
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	0.050	4282345
>C21-<C32 Hydrocarbons	mg/L	<0.10	<0.10	0.10	4282345
Modified TPH (Tier1)	mg/L	<0.10	<0.10	0.10	4276378
Reached Baseline at C32	mg/L	NA	NA	N/A	4282345
Hydrocarbon Resemblance	mg/L	NA	NA	N/A	4282345
Surrogate Recovery (%)					
Isobutylbenzene - Extractable	%	99	93		4282345
n-Dotriacontane - Extractable	%	109	107		4282345
Isobutylbenzene - Volatile	%	98	99		4282416
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable					

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		BJK050	BJK079	BJK080	BJK081	BJK082	BJK084	BJK085		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265	537265	537265	537265		
	UNITS	COB-4-SW	COB-6-SW	CB-SW	SRC-1-SW	NRC-1-SW	NARROWS	COB-A-SW	RDL	QC Batch
PCBs										
Aroclor 1016	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1221	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1232	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1248	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1242	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1254	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1260	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Calculated Total PCB	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	4276429
Surrogate Recovery (%)										
Decachlorobiphenyl	%	69 (1)	85	70	71	72	83	88		4283900
RDL = Reportable Detection Limit QC Batch = Quality Control Batch (1) PCB sample contained sediment.										

Maxxam ID		BJK087	BJK088	BJK090	BJK091		
Sampling Date		2015/11/18	2015/11/18	2015/11/18	2015/11/18		
COC Number		537265	537265	537265	537265		
	UNITS	WB-1-SW	BP-1-SW	COB-B-SW	FD-010	RDL	QC Batch
PCBs							
Aroclor 1016	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1221	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1232	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1248	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1242	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1254	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Aroclor 1260	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4283900
Calculated Total PCB	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	4276429
Surrogate Recovery (%)							
Decachlorobiphenyl	%	70	73	78	76		4283900
RDL = Reportable Detection Limit QC Batch = Quality Control Batch							

GENERAL COMMENTS

Sample BJK050-01 : Poor RCap Ion Balance due to sample matrix. Excess cations due to presence of turbidity.

Sample BJK091-01 : RCap Ion Balance acceptable. Anion/cation agreement within 0.2 meq/L.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4280686	ARS	Matrix Spike [BJK091-01]	Total Alkalinity (Total as CaCO ₃)	2015/11/24		NC	%	80 - 120
4280686	ARS	Spiked Blank	Total Alkalinity (Total as CaCO ₃)	2015/11/24		111	%	80 - 120
4280686	ARS	Method Blank	Total Alkalinity (Total as CaCO ₃)	2015/11/24	<5.0		mg/L	
4280686	ARS	RPD [BJK091-01]	Total Alkalinity (Total as CaCO ₃)	2015/11/24	NC		%	25
4280691	ARS	Matrix Spike [BJK091-01]	Dissolved Chloride (Cl)	2015/11/24		NC	%	80 - 120
4280691	ARS	QC Standard	Dissolved Chloride (Cl)	2015/11/24		107	%	80 - 120
4280691	ARS	Spiked Blank	Dissolved Chloride (Cl)	2015/11/24		107	%	80 - 120
4280691	ARS	Method Blank	Dissolved Chloride (Cl)	2015/11/24	<1.0		mg/L	
4280691	ARS	RPD [BJK091-01]	Dissolved Chloride (Cl)	2015/11/24	5.1		%	25
4280699	ARS	Matrix Spike [BJK091-01]	Dissolved Sulphate (SO ₄)	2015/11/24		107	%	80 - 120
4280699	ARS	Spiked Blank	Dissolved Sulphate (SO ₄)	2015/11/24		98	%	80 - 120
4280699	ARS	Method Blank	Dissolved Sulphate (SO ₄)	2015/11/24	<2.0		mg/L	
4280699	ARS	RPD [BJK091-01]	Dissolved Sulphate (SO ₄)	2015/11/24	NC		%	25
4280707	ARS	Matrix Spike [BJK091-01]	Reactive Silica (SiO ₂)	2015/11/24		100	%	80 - 120
4280707	ARS	Spiked Blank	Reactive Silica (SiO ₂)	2015/11/24		100	%	80 - 120
4280707	ARS	Method Blank	Reactive Silica (SiO ₂)	2015/11/24	<0.50		mg/L	
4280707	ARS	RPD [BJK091-01]	Reactive Silica (SiO ₂)	2015/11/24	0.21		%	25
4280709	ARS	Spiked Blank	Colour	2015/11/24		94	%	80 - 120
4280709	ARS	Method Blank	Colour	2015/11/24	<5.0		TCU	
4280709	ARS	RPD [BJK091-01]	Colour	2015/11/24	1.1		%	20
4280712	ARS	Matrix Spike [BJK091-01]	Orthophosphate (P)	2015/11/25		99	%	80 - 120
4280712	ARS	Spiked Blank	Orthophosphate (P)	2015/11/25		100	%	80 - 120
4280712	ARS	Method Blank	Orthophosphate (P)	2015/11/25	<0.010		mg/L	
4280712	ARS	RPD [BJK091-01]	Orthophosphate (P)	2015/11/25	NC		%	25
4280714	MCN	Matrix Spike [BJK091-01]	Nitrate + Nitrite (N)	2015/11/25		104	%	80 - 120
4280714	MCN	Spiked Blank	Nitrate + Nitrite (N)	2015/11/25		107	%	80 - 120
4280714	MCN	Method Blank	Nitrate + Nitrite (N)	2015/11/25	<0.050		mg/L	
4280714	MCN	RPD [BJK091-01]	Nitrate + Nitrite (N)	2015/11/25	NC		%	25
4280717	MCN	Matrix Spike [BJK091-01]	Nitrite (N)	2015/11/24		101	%	80 - 120
4280717	MCN	Spiked Blank	Nitrite (N)	2015/11/24		105	%	80 - 120
4280717	MCN	Method Blank	Nitrite (N)	2015/11/24	<0.010		mg/L	
4280717	MCN	RPD [BJK091-01]	Nitrite (N)	2015/11/24	NC		%	25
4282327	MLB	Matrix Spike	Total Aluminum (Al)	2015/11/24		97	%	80 - 120
			Total Antimony (Sb)	2015/11/24		97	%	80 - 120
			Total Arsenic (As)	2015/11/24		93	%	80 - 120
			Total Barium (Ba)	2015/11/24		99	%	80 - 120
			Total Beryllium (Be)	2015/11/24		98	%	80 - 120
			Total Bismuth (Bi)	2015/11/24		97	%	80 - 120
			Total Boron (B)	2015/11/24		101	%	80 - 120
			Total Cadmium (Cd)	2015/11/24		98	%	80 - 120
			Total Calcium (Ca)	2015/11/24		98	%	80 - 120
			Total Chromium (Cr)	2015/11/24		93	%	80 - 120
			Total Cobalt (Co)	2015/11/24		96	%	80 - 120
			Total Copper (Cu)	2015/11/24		94	%	80 - 120
			Total Iron (Fe)	2015/11/24		99	%	80 - 120
			Total Lead (Pb)	2015/11/24		97	%	80 - 120
			Total Magnesium (Mg)	2015/11/24		100	%	80 - 120
			Total Manganese (Mn)	2015/11/24		95	%	80 - 120
			Total Molybdenum (Mo)	2015/11/24		98	%	80 - 120
			Total Nickel (Ni)	2015/11/24		97	%	80 - 120
			Total Phosphorus (P)	2015/11/24		102	%	80 - 120
			Total Potassium (K)	2015/11/24		100	%	80 - 120
			Total Selenium (Se)	2015/11/24		96	%	80 - 120
			Total Silver (Ag)	2015/11/24		95	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			Total Sodium (Na)	2015/11/24		NC	%	80 - 120
			Total Strontium (Sr)	2015/11/24		NC	%	80 - 120
			Total Thallium (Tl)	2015/11/24		96	%	80 - 120
			Total Tin (Sn)	2015/11/24		96	%	80 - 120
			Total Titanium (Ti)	2015/11/24		97	%	80 - 120
			Total Uranium (U)	2015/11/24		100	%	80 - 120
			Total Vanadium (V)	2015/11/24		98	%	80 - 120
			Total Zinc (Zn)	2015/11/24		94	%	80 - 120
4282327	MLB	Spiked Blank	Total Aluminum (Al)	2015/11/23		99	%	80 - 120
			Total Antimony (Sb)	2015/11/23		99	%	80 - 120
			Total Arsenic (As)	2015/11/23		93	%	80 - 120
			Total Barium (Ba)	2015/11/23		99	%	80 - 120
			Total Beryllium (Be)	2015/11/23		98	%	80 - 120
			Total Bismuth (Bi)	2015/11/23		98	%	80 - 120
			Total Boron (B)	2015/11/23		99	%	80 - 120
			Total Cadmium (Cd)	2015/11/23		100	%	80 - 120
			Total Calcium (Ca)	2015/11/23		99	%	80 - 120
			Total Chromium (Cr)	2015/11/23		94	%	80 - 120
			Total Cobalt (Co)	2015/11/23		97	%	80 - 120
			Total Copper (Cu)	2015/11/23		97	%	80 - 120
			Total Iron (Fe)	2015/11/23		99	%	80 - 120
			Total Lead (Pb)	2015/11/23		97	%	80 - 120
			Total Magnesium (Mg)	2015/11/23		101	%	80 - 120
			Total Manganese (Mn)	2015/11/23		96	%	80 - 120
			Total Molybdenum (Mo)	2015/11/23		99	%	80 - 120
			Total Nickel (Ni)	2015/11/23		97	%	80 - 120
			Total Phosphorus (P)	2015/11/23		101	%	80 - 120
			Total Potassium (K)	2015/11/23		99	%	80 - 120
			Total Selenium (Se)	2015/11/23		95	%	80 - 120
			Total Silver (Ag)	2015/11/23		96	%	80 - 120
			Total Sodium (Na)	2015/11/23		100	%	80 - 120
			Total Strontium (Sr)	2015/11/23		97	%	80 - 120
			Total Thallium (Tl)	2015/11/23		98	%	80 - 120
			Total Tin (Sn)	2015/11/23		98	%	80 - 120
			Total Titanium (Ti)	2015/11/23		96	%	80 - 120
			Total Uranium (U)	2015/11/23		100	%	80 - 120
			Total Vanadium (V)	2015/11/23		98	%	80 - 120
			Total Zinc (Zn)	2015/11/23		97	%	80 - 120
4282327	MLB	Method Blank	Total Aluminum (Al)	2015/11/23	<5.0		ug/L	
			Total Antimony (Sb)	2015/11/23	<1.0		ug/L	
			Total Arsenic (As)	2015/11/23	<1.0		ug/L	
			Total Barium (Ba)	2015/11/23	<1.0		ug/L	
			Total Beryllium (Be)	2015/11/23	<1.0		ug/L	
			Total Bismuth (Bi)	2015/11/23	<2.0		ug/L	
			Total Boron (B)	2015/11/23	<50		ug/L	
			Total Cadmium (Cd)	2015/11/23	<0.010		ug/L	
			Total Calcium (Ca)	2015/11/23	<100		ug/L	
			Total Chromium (Cr)	2015/11/23	<1.0		ug/L	
			Total Cobalt (Co)	2015/11/23	<0.40		ug/L	
			Total Copper (Cu)	2015/11/23	<2.0		ug/L	
			Total Iron (Fe)	2015/11/23	<50		ug/L	
			Total Lead (Pb)	2015/11/23	<0.50		ug/L	
			Total Magnesium (Mg)	2015/11/23	<100		ug/L	
			Total Manganese (Mn)	2015/11/23	<2.0		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Molybdenum (Mo)	2015/11/23	<2.0		ug/L	
			Total Nickel (Ni)	2015/11/23	<2.0		ug/L	
			Total Phosphorus (P)	2015/11/23	<100		ug/L	
			Total Potassium (K)	2015/11/23	<100		ug/L	
			Total Selenium (Se)	2015/11/23	<1.0		ug/L	
			Total Silver (Ag)	2015/11/23	<0.10		ug/L	
			Total Sodium (Na)	2015/11/23	<100		ug/L	
			Total Strontium (Sr)	2015/11/23	<2.0		ug/L	
			Total Thallium (Tl)	2015/11/23	<0.10		ug/L	
			Total Tin (Sn)	2015/11/23	<2.0		ug/L	
			Total Titanium (Ti)	2015/11/23	<2.0		ug/L	
			Total Uranium (U)	2015/11/23	<0.10		ug/L	
			Total Vanadium (V)	2015/11/23	<2.0		ug/L	
			Total Zinc (Zn)	2015/11/23	<5.0		ug/L	
4282327	MLB	RPD	Total Aluminum (Al)	2015/11/24	2.9		%	20
4282342	AJS	Matrix Spike [BJK084-05]	Isobutylbenzene - Extractable	2015/11/23		109	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		102	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23		92	%	70 - 130
			>C16-C21 Hydrocarbons	2015/11/23		104	%	70 - 130
			>C21-<C32 Hydrocarbons	2015/11/23		117	%	70 - 130
4282342	AJS	Spiked Blank	Isobutylbenzene - Extractable	2015/11/23		106	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		99	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23		91	%	70 - 130
			>C16-C21 Hydrocarbons	2015/11/23		104	%	70 - 130
			>C21-<C32 Hydrocarbons	2015/11/23		120	%	70 - 130
4282342	AJS	Method Blank	Isobutylbenzene - Extractable	2015/11/23		103	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		91	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2015/11/23	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2015/11/23	<0.10		mg/L	
4282342	AJS	RPD [BJK090-05]	>C10-C16 Hydrocarbons	2015/11/23	NC		%	40
			>C16-C21 Hydrocarbons	2015/11/23	NC		%	40
			>C21-<C32 Hydrocarbons	2015/11/23	NC		%	40
4282345	AJS	Matrix Spike	Isobutylbenzene - Extractable	2015/11/23		100	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		106	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23		70	%	70 - 130
			>C16-C21 Hydrocarbons	2015/11/23		87	%	70 - 130
			>C21-<C32 Hydrocarbons	2015/11/23		104	%	70 - 130
4282345	AJS	Spiked Blank	Isobutylbenzene - Extractable	2015/11/23		104	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		105	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23		74	%	70 - 130
			>C16-C21 Hydrocarbons	2015/11/23		91	%	70 - 130
			>C21-<C32 Hydrocarbons	2015/11/23		106	%	70 - 130
4282345	AJS	Method Blank	Isobutylbenzene - Extractable	2015/11/23		99	%	30 - 130
			n-Dotriacontane - Extractable	2015/11/23		104	%	30 - 130
			>C10-C16 Hydrocarbons	2015/11/23	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2015/11/23	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2015/11/23	<0.10		mg/L	
4282345	AJS	RPD	>C10-C16 Hydrocarbons	2015/11/23	NC		%	40
			>C16-C21 Hydrocarbons	2015/11/23	NC		%	40
			>C21-<C32 Hydrocarbons	2015/11/23	NC		%	40
4282416	MS3	Matrix Spike [BJK079-06]	Isobutylbenzene - Volatile	2015/11/23		101	%	70 - 130
			Benzene	2015/11/23		104	%	70 - 130
			Toluene	2015/11/23		104	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
4282416	MS3	Spiked Blank	Ethylbenzene	2015/11/23		103	%	70 - 130
			Total Xylenes	2015/11/23		105	%	70 - 130
			Isobutylbenzene - Volatile	2015/11/23		99	%	70 - 130
			Benzene	2015/11/23		99	%	70 - 130
			Toluene	2015/11/23		100	%	70 - 130
4282416	MS3	Method Blank	Ethylbenzene	2015/11/23		100	%	70 - 130
			Total Xylenes	2015/11/23		101	%	70 - 130
			Isobutylbenzene - Volatile	2015/11/23		95	%	70 - 130
			Benzene	2015/11/23	<0.0010		mg/L	
			Toluene	2015/11/23	<0.0010		mg/L	
4282416	MS3	RPD [BJK050-06]	Ethylbenzene	2015/11/23	<0.0010		mg/L	
			Total Xylenes	2015/11/23	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2015/11/23	<0.010		mg/L	
			Benzene	2015/11/23	NC		%	40
			Toluene	2015/11/23	NC		%	40
4282535	TMO	Spiked Blank	Ethylbenzene	2015/11/23	NC		%	40
			Total Xylenes	2015/11/23	NC		%	40
			C6 - C10 (less BTEX)	2015/11/23	NC		%	40
			Conductivity	2015/11/23		101	%	80 - 120
			Conductivity	2015/11/23	<1.0		uS/cm	
4282535	TMO	RPD [BJK081-01]	Conductivity	2015/11/23	0.23		%	25
4282544	TMO	QC Standard	pH	2015/11/23		100	%	97 - 103
4282544	TMO	RPD [BJK081-01]	pH	2015/11/23	0.13		%	N/A
4282581	ALG	Matrix Spike	Total Mercury (Hg)	2015/11/23		96	%	80 - 120
4282581	ALG	Spiked Blank	Total Mercury (Hg)	2015/11/23		108	%	80 - 120
4282581	ALG	Method Blank	Total Mercury (Hg)	2015/11/23	<0.013		ug/L	
4282581	ALG	RPD	Total Mercury (Hg)	2015/11/23	NC		%	20
4282695	TMO	QC Standard	Turbidity	2015/11/23		102	%	80 - 120
4282695	TMO	Method Blank	Turbidity	2015/11/23	<0.10		NTU	
4282695	TMO	RPD	Turbidity	2015/11/23	NC (1)		%	25
4282700	ARS	Matrix Spike [BJK079-03]	Nitrogen (Ammonia Nitrogen)	2015/11/24		99	%	80 - 120
4282700	ARS	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2015/11/24		100	%	80 - 120
4282700	ARS	Method Blank	Nitrogen (Ammonia Nitrogen)	2015/11/24	<0.050		mg/L	
4282700	ARS	RPD [BJK079-03]	Nitrogen (Ammonia Nitrogen)	2015/11/24	NC		%	20
4282706	TMO	QC Standard	Turbidity	2015/11/23		98	%	80 - 120
4282706	TMO	Method Blank	Turbidity	2015/11/23	<0.10		NTU	
4282706	TMO	RPD	Turbidity	2015/11/23	NC		%	25
4283900	LGE	Matrix Spike [BJK080-08]	Decachlorobiphenyl	2015/11/25		69	%	30 - 130
			Aroclor 1254	2015/11/25		86	%	30 - 130
4283900	LGE	Spiked Blank	Decachlorobiphenyl	2015/11/25		63	%	30 - 130
			Aroclor 1254	2015/11/25		90	%	30 - 130
4283900	LGE	Method Blank	Decachlorobiphenyl	2015/11/25		72	%	30 - 130
			Aroclor 1016	2015/11/25	<0.050		ug/L	
			Aroclor 1221	2015/11/25	<0.050		ug/L	
			Aroclor 1232	2015/11/25	<0.050		ug/L	
			Aroclor 1248	2015/11/25	<0.050		ug/L	
			Aroclor 1242	2015/11/25	<0.050		ug/L	
			Aroclor 1254	2015/11/25	<0.050		ug/L	
			Aroclor 1260	2015/11/25	<0.050		ug/L	
			Aroclor 1016	2015/11/25	NC		%	40
			Aroclor 1221	2015/11/25	NC		%	40
4283900	LGE	RPD [BJK079-08]	Aroclor 1232	2015/11/25	NC		%	40
			Aroclor 1248	2015/11/25	NC		%	40
			Aroclor 1242	2015/11/25	NC		%	40
			Aroclor 1242	2015/11/25	NC		%	40

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			Aroclor 1254	2015/11/25	NC		%	40
			Aroclor 1260	2015/11/25	NC		%	40
4283921	KBT	Matrix Spike [BJK079-04]	D10-Anthracene	2015/11/24		75	%	30 - 130
			D14-Terphenyl	2015/11/24		78	%	30 - 130
			D8-Acenaphthylene	2015/11/24		76	%	30 - 130
			1-Methylnaphthalene	2015/11/24		83	%	30 - 130
			2-Methylnaphthalene	2015/11/24		85	%	30 - 130
			Acenaphthene	2015/11/24		90	%	30 - 130
			Acenaphthylene	2015/11/24		84	%	30 - 130
			Anthracene	2015/11/24		84	%	30 - 130
			Benzo(a)anthracene	2015/11/24		92	%	30 - 130
			Benzo(a)pyrene	2015/11/24		89	%	30 - 130
			Benzo(b)fluoranthene	2015/11/24		90	%	30 - 130
			Benzo(g,h,i)perylene	2015/11/24		97	%	30 - 130
			Benzo(j)fluoranthene	2015/11/24		93	%	30 - 130
			Benzo(k)fluoranthene	2015/11/24		97	%	30 - 130
			Chrysene	2015/11/24		97	%	30 - 130
			Dibenz(a,h)anthracene	2015/11/24		96	%	30 - 130
			Fluoranthene	2015/11/24		91	%	30 - 130
			Fluorene	2015/11/24		89	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2015/11/24		94	%	30 - 130
			Naphthalene	2015/11/24		81	%	30 - 130
			Perylene	2015/11/24		90	%	30 - 130
			Phenanthrene	2015/11/24		86	%	30 - 130
			Pyrene	2015/11/24		89	%	30 - 130
4283921	KBT	Spiked Blank	D10-Anthracene	2015/11/24		85	%	30 - 130
			D14-Terphenyl	2015/11/24		90	%	30 - 130
			D8-Acenaphthylene	2015/11/24		86	%	30 - 130
			1-Methylnaphthalene	2015/11/24		92	%	30 - 130
			2-Methylnaphthalene	2015/11/24		100	%	30 - 130
			Acenaphthene	2015/11/24		103	%	30 - 130
			Acenaphthylene	2015/11/24		98	%	30 - 130
			Anthracene	2015/11/24		98	%	30 - 130
			Benzo(a)anthracene	2015/11/24		102	%	30 - 130
			Benzo(a)pyrene	2015/11/24		95	%	30 - 130
			Benzo(b)fluoranthene	2015/11/24		104	%	30 - 130
			Benzo(g,h,i)perylene	2015/11/24		98	%	30 - 130
			Benzo(j)fluoranthene	2015/11/24		99	%	30 - 130
			Benzo(k)fluoranthene	2015/11/24		104	%	30 - 130
			Chrysene	2015/11/24		107	%	30 - 130
			Dibenz(a,h)anthracene	2015/11/24		88	%	30 - 130
			Fluoranthene	2015/11/24		103	%	30 - 130
			Fluorene	2015/11/24		103	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2015/11/24		92	%	30 - 130
			Naphthalene	2015/11/24		93	%	30 - 130
			Perylene	2015/11/24		101	%	30 - 130
			Phenanthrene	2015/11/24		100	%	30 - 130
			Pyrene	2015/11/24		102	%	30 - 130
4283921	KBT	Method Blank	D10-Anthracene	2015/11/24		87	%	30 - 130
			D14-Terphenyl	2015/11/24		88	%	30 - 130
			D8-Acenaphthylene	2015/11/24		83	%	30 - 130
			1-Methylnaphthalene	2015/11/24	<0.050		ug/L	
			2-Methylnaphthalene	2015/11/24	<0.050		ug/L	
			Acenaphthene	2015/11/24	<0.010		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type		Analyzed				
			Acenaphthylene	2015/11/24	<0.010		ug/L	
			Anthracene	2015/11/24	<0.010		ug/L	
			Benzo(a)anthracene	2015/11/24	<0.010		ug/L	
			Benzo(a)pyrene	2015/11/24	<0.010		ug/L	
			Benzo(b)fluoranthene	2015/11/24	<0.010		ug/L	
			Benzo(g,h,i)perylene	2015/11/24	<0.010		ug/L	
			Benzo(j)fluoranthene	2015/11/24	<0.010		ug/L	
			Benzo(k)fluoranthene	2015/11/24	<0.010		ug/L	
			Chrysene	2015/11/24	<0.010		ug/L	
			Dibenz(a,h)anthracene	2015/11/24	<0.010		ug/L	
			Fluoranthene	2015/11/24	<0.010		ug/L	
			Fluorene	2015/11/24	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2015/11/24	<0.010		ug/L	
			Naphthalene	2015/11/24	<0.20		ug/L	
			Perylene	2015/11/24	<0.010		ug/L	
			Phenanthrene	2015/11/24	<0.010		ug/L	
			Pyrene	2015/11/24	<0.010		ug/L	
4283921	KBT	RPD [BJK050-04]	1-Methylnaphthalene	2015/11/24	NC		%	40
			2-Methylnaphthalene	2015/11/24	NC		%	40
			Acenaphthene	2015/11/24	7.7		%	40
			Acenaphthylene	2015/11/24	NC		%	40
			Anthracene	2015/11/24	13		%	40
			Benzo(a)anthracene	2015/11/24	19		%	40
			Benzo(a)pyrene	2015/11/24	18		%	40
			Benzo(b)fluoranthene	2015/11/24	20		%	40
			Benzo(g,h,i)perylene	2015/11/24	14		%	40
			Benzo(j)fluoranthene	2015/11/24	17		%	40
			Benzo(k)fluoranthene	2015/11/24	12		%	40
			Chrysene	2015/11/24	13		%	40
			Dibenz(a,h)anthracene	2015/11/24	14		%	40
			Fluoranthene	2015/11/24	17		%	40
			Fluorene	2015/11/24	11		%	40
			Indeno(1,2,3-cd)pyrene	2015/11/24	16		%	40
			Naphthalene	2015/11/24	NC		%	40
			Perylene	2015/11/24	24		%	40
			Phenanthrene	2015/11/24	15		%	40
			Pyrene	2015/11/24	17		%	40
4285938	SMT	Matrix Spike [BJK080-03]	Total Organic Carbon (C)	2015/11/25		NC	%	80 - 120
4285938	SMT	Spiked Blank	Total Organic Carbon (C)	2015/11/25		102	%	80 - 120
4285938	SMT	Method Blank	Total Organic Carbon (C)	2015/11/25	<0.50		mg/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
4285938	SMT	RPD [BJK080-03]	Total Organic Carbon (C)	2015/11/25	1.0		%	20

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.

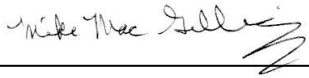
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

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).

(1) Duplicate results meet acceptance criteria for low level samples.

VALIDATION SIGNATURE PAGE

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



Mike MacGillivray, Scientific Specialist (Inorganics)



Rosemarie MacDonald, Scientific Specialist (Organics)

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.