

Site Location: EUREKA, NV

Attention: MATT AITCHISON

ENVIRONMENT CANADA
WINNIPEG, MB
Canada R3C4W2

Report Date: 2016/07/11

Report #: R2213104

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B651848

Received: 2016/06/27, 08:00

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity in Water by PC Titrator	1	N/A	2016/06/29	WIN SOP-00063	Based on SM-2320B
BTEX/F1 in Water by HS GC/MS	1	N/A	2016/06/29	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
Chloride by Automated Colourimetry (1)	1	N/A	2016/06/28	BBY6SOP-00011	SM 22 4500-Cl- E m
Conductivity in Water by PC Titrator	1	N/A	2016/06/29	WIN SOP-00063	Based on SM-2510B
CCME Hydrocarbons (F2-F4 in water)	1	2016/06/28	2016/06/29	WINSOP-00056	CCME PHC-CWS
Hardness Total (calculated as CaCO3) (1)	1	N/A	2016/06/29	BBY WI-00033	Auto Calc
Mercury (Total) by CVAf (1)	1	2016/07/11	2016/07/11	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	1	2016/06/27	2016/06/29	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total) (1)	1	2016/06/28	2016/06/28	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
Nitrogen (Total) (1)	1	2016/06/30	2016/07/05	BBY6SOP-00016	SM 22 4500-N C m
Ammonia-N (Preserved) (1)	1	N/A	2016/06/28	BBY6SOP-00009	SM 22 4500-NH3- G m
Nitrate + Nitrite (N) - Preserved (1)	1	N/A	2016/06/29	BBY6SOP-00010	SM 22 4500-NO3- I m
pH in Water by PC Titrator (2)	1	N/A	2016/06/29	WIN SOP-00063	SM4500 H+B
Phenols (4-AAP) (1)	1	N/A	2016/06/29	BBY6SOP-00008	SM 22 5530 D m
Sulphate by Automated Colourimetry (1)	1	N/A	2016/06/29	BBY6SOP-00017	SM 22 4500-SO42- E m
Carbon (Total Organic) (1, 3)	1	N/A	2016/06/29	BBY6SOP-00003	SM 22 5310 C m
Total Oil and Grease (1)	1	N/A	2016/06/29	BBY8SOP-00004	BCMOE BCLM Sep2011 m
Total Suspended Solids	1	N/A	2016/06/29	WIN SOP-00042	Based on SM2540 D

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 Vancouver

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

(3) TOC present in the sample should be considered as non-purgeable TOC.

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CERTIFICATE OF ANALYSIS

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Encryption Key

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

Amanda Hung, B.Sc., Project Manager

Email: AHung@maxxam.ca

Phone# (204)772-7276 Ext:2215

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Maxxam Job #: B651848
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ENVIRONMENT CANADA
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BTEX/F1-F4 IN WATER (WATER)

Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Ext. Pet. Hydrocarbon				
F2 (C10-C16 Hydrocarbons)	mg/L	<0.15	0.15	8313009
F3 (C16-C34 Hydrocarbons)	mg/L	<0.15	0.15	8313009
F4 (C34-C50 Hydrocarbons)	mg/L	<0.15	0.15	8313009
Volatiles				
Benzene	ug/L	<0.40	0.40	8313308
Toluene	ug/L	<0.40	0.40	8313308
Ethylbenzene	ug/L	<0.40	0.40	8313308
o-Xylene	ug/L	<0.40	0.40	8313308
m & p-Xylene	ug/L	<0.80	0.80	8313308
Xylenes (Total)	ug/L	<0.80	0.80	8313308
Methyl-tert-butylether (MTBE)	ug/L	<4.0	4.0	8313308
F1 (C6-C10) - BTEX	ug/L	<300	300	8313308
F1 (C6-C10)	ug/L	<300	300	8313308
Surrogate Recovery (%)				
4-Bromofluorobenzene (sur.)	%	100		8313308
D4-1,2-Dichloroethane (sur.)	%	113		8313308
D8-TOLUENE (sur.)	%	100		8313308
O-TERPHENYL (sur.)	%	117		8313009
RDL = Reportable Detection Limit				

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ENVIRONMENT CANADA
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RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Misc. Inorganics				
Alkalinity (Total as CaCO ₃)	mg/L	52.0	0.50	8312886
Conductivity	uS/cm	500	1.0	8312883
Total Organic Carbon (C)	mg/L	3.78	0.50	8314628
pH	pH	7.88		8312874
Bicarbonate (HCO ₃)	mg/L	63.4	0.50	8312886
Carbonate (CO ₃)	mg/L	<0.50	0.50	8312886
Hydroxide (OH)	mg/L	<0.50	0.50	8312886
Anions				
Dissolved Sulphate (SO ₄)	mg/L	68.8	0.50	8315352
Dissolved Chloride (Cl)	mg/L	70	0.50	8313674
Nutrients				
Total Ammonia (N)	mg/L	0.035	0.0050	8313959
Nitrate plus Nitrite (N)	mg/L	0.099	0.020	8315488
Total Nitrogen (N)	mg/L	0.356	0.020	8316497
OIL & GREASE				
Total Oil and grease	mg/L	<1.0	1.0	8314350
Misc. Organics				
Phenols	mg/L	0.0025	0.0010	8314844
Physical Properties				
Total Suspended Solids	mg/L	899	16	8314287
RDL = Reportable Detection Limit				

Maxxam Job #: B651848
Report Date: 2016/07/11

ENVIRONMENT CANADA
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CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO ₃)	mg/L	161	0.50	8311596
Elements				
Total Mercury (Hg)	ug/L	0.030	0.010	8325607
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	9750	3.0	8313471
Total Antimony (Sb)	ug/L	<0.50	0.50	8313471
Total Arsenic (As)	ug/L	8.04	0.10	8313471
Total Barium (Ba)	ug/L	88.4	1.0	8313471
Total Beryllium (Be)	ug/L	0.94	0.10	8313471
Total Bismuth (Bi)	ug/L	<1.0	1.0	8313471
Total Boron (B)	ug/L	203	50	8313471
Total Cadmium (Cd)	ug/L	0.108	0.010	8313471
Total Chromium (Cr)	ug/L	21.2	1.0	8313471
Total Cobalt (Co)	ug/L	10.3	0.50	8313471
Total Copper (Cu)	ug/L	23.2	0.50	8313471
Total Iron (Fe)	ug/L	25500	10	8313471
Total Lead (Pb)	ug/L	10.9	0.20	8313471
Total Lithium (Li)	ug/L	29.8	5.0	8313471
Total Manganese (Mn)	ug/L	225	1.0	8313471
Total Molybdenum (Mo)	ug/L	<1.0	1.0	8313471
Total Nickel (Ni)	ug/L	23.5	1.0	8313471
Total Selenium (Se)	ug/L	0.50	0.10	8313471
Total Silicon (Si)	ug/L	17200	100	8313471
Total Silver (Ag)	ug/L	0.050	0.020	8313471
Total Strontium (Sr)	ug/L	221	1.0	8313471
Total Thallium (Tl)	ug/L	0.126	0.050	8313471
Total Tin (Sn)	ug/L	<5.0	5.0	8313471
Total Titanium (Ti)	ug/L	209	5.0	8313471
Total Uranium (U)	ug/L	1.55	0.10	8313471
Total Vanadium (V)	ug/L	44.2	5.0	8313471
Total Zinc (Zn)	ug/L	73.4	5.0	8313471
Total Zirconium (Zr)	ug/L	3.61	0.50	8313471
Total Calcium (Ca)	mg/L	39.0	0.050	8311599
Total Magnesium (Mg)	mg/L	15.4	0.050	8311599
Total Potassium (K)	mg/L	5.97	0.050	8311599
RDL = Reportable Detection Limit				

Maxxam Job #: B651848
Report Date: 2016/07/11

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CCME TOTAL METALS IN WATER (WATER)

Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Total Sodium (Na)	mg/L	48.7	0.050	8311599
Total Sulphur (S)	mg/L	24.8	3.0	8311599
RDL = Reportable Detection Limit				

Maxxam Job #: B651848
Report Date: 2016/07/11

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GENERAL COMMENTS

Sample OX5883-01 : Due to the presence of higher than normal particulate levels, the sample was filtered to prevent interference during analysis for the following: pH, Conductivity and Alkalinity.

Results relate only to the items tested.

Maxxam Job #: B651848
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QUALITY ASSURANCE REPORT

ENVIRONMENT CANADA
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QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8313009	O-TERPHENYL (sur.)	2016/06/28	106	50 - 130	126	50 - 130	118	%		
8313308	4-Bromofluorobenzene (sur.)	2016/06/29	103	60 - 140	104	60 - 140	100	%		
8313308	D4-1,2-Dichloroethane (sur.)	2016/06/29	111	60 - 140	104	60 - 140	117	%		
8313308	D8-TOLUENE (sur.)	2016/06/29	98	60 - 140	98	60 - 140	98	%		
8312883	Conductivity	2016/06/29			101	90 - 110	<1.0	uS/cm	0.69	20
8312886	Alkalinity (Total as CaCO ₃)	2016/06/29			96	80 - 120	<0.50	mg/L	NC	20
8312886	Bicarbonate (HCO ₃)	2016/06/29					<0.50	mg/L	NC	20
8312886	Carbonate (CO ₃)	2016/06/29					<0.50	mg/L	NC	20
8312886	Hydroxide (OH)	2016/06/29					<0.50	mg/L	NC	20
8313009	F2 (C10-C16 Hydrocarbons)	2016/06/30	94	50 - 130	102	70 - 130	<0.15	mg/L	NC	40
8313009	F3 (C16-C34 Hydrocarbons)	2016/06/30	123	50 - 130	118	70 - 130	<0.15	mg/L	NC	40
8313009	F4 (C34-C50 Hydrocarbons)	2016/06/30	90	50 - 130	99	70 - 130	<0.15	mg/L	NC	40
8313308	Benzene	2016/06/29	90	70 - 130	94	70 - 130	<0.40	ug/L	NC	40
8313308	Ethylbenzene	2016/06/29	97	70 - 130	97	70 - 130	<0.40	ug/L	NC	40
8313308	F1 (C6-C10) - BTEX	2016/06/29					<300	ug/L	NC	40
8313308	F1 (C6-C10)	2016/06/29	85	70 - 130	99	70 - 130	<300	ug/L	NC	40
8313308	m & p-Xylene	2016/06/29	98	70 - 130	99	70 - 130	<0.80	ug/L	NC	40
8313308	Methyl-tert-butylether (MTBE)	2016/06/29	116	70 - 130	120	70 - 130	<4.0	ug/L	NC	40
8313308	o-Xylene	2016/06/29	102	70 - 130	104	70 - 130	<0.40	ug/L	NC	40
8313308	Toluene	2016/06/29	90	70 - 130	92	70 - 130	<0.40	ug/L	NC	40
8313308	Xylenes (Total)	2016/06/29					<0.80	ug/L	NC	40
8313471	Total Aluminum (Al)	2016/06/28	98	80 - 120	107	80 - 120	3.7, RDL=3.0	ug/L		
8313471	Total Antimony (Sb)	2016/06/28	99	80 - 120	99	80 - 120	<0.50	ug/L		
8313471	Total Arsenic (As)	2016/06/28	NC	80 - 120	100	80 - 120	<0.10	ug/L	1.7	20
8313471	Total Barium (Ba)	2016/06/28	94	80 - 120	98	80 - 120	<1.0	ug/L		
8313471	Total Beryllium (Be)	2016/06/28	96	80 - 120	102	80 - 120	<0.10	ug/L		
8313471	Total Bismuth (Bi)	2016/06/28	94	80 - 120	94	80 - 120	<1.0	ug/L		
8313471	Total Boron (B)	2016/06/28	NC	80 - 120	98	80 - 120	<50	ug/L		
8313471	Total Cadmium (Cd)	2016/06/28	98	80 - 120	101	80 - 120	<0.010	ug/L		
8313471	Total Chromium (Cr)	2016/06/28	99	80 - 120	101	80 - 120	<1.0	ug/L		
8313471	Total Cobalt (Co)	2016/06/28	98	80 - 120	100	80 - 120	<0.50	ug/L		
8313471	Total Copper (Cu)	2016/06/28	99	80 - 120	102	80 - 120	<0.50	ug/L		

Maxxam Job #: B651848
Report Date: 2016/07/11

QUALITY ASSURANCE REPORT(CONT'D)

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QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8313471	Total Iron (Fe)	2016/06/28	111	80 - 120	109	80 - 120	<10	ug/L		
8313471	Total Lead (Pb)	2016/06/28	92	80 - 120	94	80 - 120	<0.20	ug/L		
8313471	Total Lithium (Li)	2016/06/28	NC	80 - 120	97	80 - 120	<5.0	ug/L		
8313471	Total Manganese (Mn)	2016/06/28	101	80 - 120	98	80 - 120	<1.0	ug/L		
8313471	Total Molybdenum (Mo)	2016/06/28	100	80 - 120	95	80 - 120	<1.0	ug/L		
8313471	Total Nickel (Ni)	2016/06/28	97	80 - 120	102	80 - 120	<1.0	ug/L		
8313471	Total Selenium (Se)	2016/06/28	94	80 - 120	101	80 - 120	<0.10	ug/L		
8313471	Total Silicon (Si)	2016/06/28					<100	ug/L		
8313471	Total Silver (Ag)	2016/06/28	104	80 - 120	99	80 - 120	<0.020	ug/L		
8313471	Total Strontium (Sr)	2016/06/28	NC	80 - 120	100	80 - 120	<1.0	ug/L		
8313471	Total Thallium (Tl)	2016/06/28	94	80 - 120	93	80 - 120	<0.050	ug/L		
8313471	Total Tin (Sn)	2016/06/28	98	80 - 120	105	80 - 120	<5.0	ug/L		
8313471	Total Titanium (Ti)	2016/06/28	109	80 - 120	104	80 - 120	<5.0	ug/L		
8313471	Total Uranium (U)	2016/06/28	93	80 - 120	95	80 - 120	<0.10	ug/L		
8313471	Total Vanadium (V)	2016/06/28	94	80 - 120	101	80 - 120	<5.0	ug/L		
8313471	Total Zinc (Zn)	2016/06/28	NC	80 - 120	115	80 - 120	<5.0	ug/L		
8313471	Total Zirconium (Zr)	2016/06/28					<0.50	ug/L		
8313674	Dissolved Chloride (Cl)	2016/06/28			100	80 - 120	<0.50	mg/L		
8313959	Total Ammonia (N)	2016/06/28	101	80 - 120	99	80 - 120	<0.0050	mg/L	1.6	20
8314287	Total Suspended Solids	2016/06/29			99	80 - 120	<4.0	mg/L	NC	20
8314350	Total Oil and grease	2016/06/29			95	70 - 130	<1.0	mg/L		
8314628	Total Organic Carbon (C)	2016/06/29	NC	80 - 120	113	80 - 120	<0.50	mg/L	NC	20
8314844	Phenols	2016/06/29	95	80 - 120	93	80 - 120	<0.0010	mg/L	NC	20
8315352	Dissolved Sulphate (SO4)	2016/06/29			96	80 - 120	0.51, RDL=0.50	mg/L		
8315488	Nitrate plus Nitrite (N)	2016/06/29	91	80 - 120	105	80 - 120	<0.020	mg/L	NC	25
8316497	Total Nitrogen (N)	2016/07/05	94	80 - 120	98	80 - 120	<0.020	mg/L	NC	20

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QUALITY ASSURANCE REPORT(CONT'D)

ENVIRONMENT CANADA
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QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8325607	Total Mercury (Hg)	2016/07/11	99	80 - 120	103	80 - 120	<0.010	ug/L	NC	20
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency. NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration). NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).										

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VALIDATION SIGNATURE PAGE

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



Andy Lu, Ph.D., P.Chem., Scientific Specialist

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