

NWB Annual Report

Year being reported: 2016

License No: 8BC-EUR1621 Issued Date: August 11, 2016
Expiry Date: August 10, 2021

Project Name: Eureka Weather Station

Licensee: Environment Canada

Mailing Address: 160 Chemin Tour-de-l'isle
Montréal, Qc H3C 4G8
for Eureka Weather Station, Eureka, NU, X0A 0G0

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):

Environment and Climate Change Canada

General Background Information on the Project (*optional):

Licence Requirements: the licensee must provide the following information in accordance with

Part B Item 1

A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s):	Station Creek	
Water Quantity:	10 000	Quantity Allowable Domestic (cu.m)
	1 717	Actual Quantity Used Domestic (cu.m)
	0	Quantity Allowable Drilling (cu.m)
	0	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal

- ☒ Solid Waste Disposal
☒ Sewage
☐ Drill Waste
☒ Greywater
☐ Hazardous
☐ Other:

Additional Details:

Appendix A: Quantity of Raw Water
Appendix B: Quality of Raw Water
Appendix C: Quality of Tap (non-drinking) Water
Appendix D: Quantity of Drinking Water Consumed
Appendix E: Quality of Drinking Water Consumed
Appendix F: Quantity of Waste Water Discharged
Appendix G: Quality of Waste Water Discharged
Appendix H: GPS Coordinates
Appendix K: Quality of Surface Water at monitoring stations EUR3 & EUR4

A list of unauthorized discharges and a summary of follow-up actions taken.

Spill No.: (as reported to the Spill Hot-line)

Date of Spill:

Date of Notification to an Inspector:

Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

There were no unauthorized discharges reported

Revisions to the Spill Contingency Plan

SCP submitted and approved - no revision required or proposed ▼

Additional Details:

Revisions to the Abandonment and Restoration Plan

N/A - not applicable ▼

Additional Details:

Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

Work Completed in 2016/17

- a. Runway recapitalization project. Archeologic study will be conducted in summer 2017
- b. Sewage treatment plant and New Water Lagoon design is complete. Project suspended until year 2018/19
- c. New multipurpose support building construction is underway and will be complete in summer 2017
- d. Permafrost Study has been suspended for this year. It could be restarted in 2017/2018 depending on available funds.
- e. Domestic Hot Water Plate Heat Exchanger project is underway. New Exchanger will be installed in fall 2017.

Work Planned for 2017/18

- a. Multipurpose building construction will finish in summer 2017
- b. Permafrost Study might start in 2017/2018
- c. Planning phase for PEARL HVAC Recapitalization project might start in 2017/2018
- d. Runway recapitalization project: Archeologic study will be conducted in summer 2017. Authorizations will also be obtained. Construction of a road to Remus Creek would start in 2018.
- e. Indoor and outdoor lighting will progressively be converted to LED
- f. Various equipment will be recommissioned
- g. A study on alternative energies could be conducted
- h. ECCC plans to optimize Eureka's energy consumption

Additional Details:

See Appendix H for GPS Co-ordinates of each location where sources of water are utilized

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;

Details attached



Additional Details:

See Appendix H for GPS Co-ordinates of each location where wastes associated with the licence are deposited.

Results of any additional sampling and/or analysis that was requested by an Inspector

Additional sampling requested by an Inspector or the Board (See below)



Additional Details: (date of request, analysis of results, data attached, etc)

See Appendix K for the results of the additional surface water runoff sample analysis required at the landfill area monitoring station EUR4 .

Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

No additional sampling requested by an Inspector or the Board



Additional Details: (Attached or provided below)

Any responses or follow-up actions on inspection/compliance reports

No compliance report issued by INAC



Additional Details: (Dates of Report, Follow-up by the Licensee)

Any additional comments or information for the Board to consider

Date Submitted:	April 3, 2017
Submitted/Prepared by:	Jean-Philippe Cloutier-Dussault
Contact Information:	Tel: 514-283-4045
	Fax: 514-283-3020
	email: jean-philippe.cloutier-dussault@canada.ca

Appendix A
Quantity of Raw Water

QUANTITIES OF
FRESH WATER OBTAINED
Eureka 2016

Fresh Water: Fresh Water Lagoon

Fresh Water
Pump: Tsurmi Pump Model LB2-400 with a 30’ head approx. 8.5 gal/minute
First intake June 11 to Jul 01
25 days x 24 hr x 60 minutes x 8.5 gal = 306,000 gal 1158 cubic metres
19 days x 24 x 60 x 8.5 = 232,560 gal 880 cubic metres

Total 2038 cubic metres

Initial runoff captured and pumped until flow stopped. Second intake was of
permafrost melt, which causes a second flow in the creek.

Waste
Pump: Monarch Pump Model TT30 Type E with attached hose
approx. 150 gal/minute

First decant June 25 to June 27 44 hrs x 60 min x 150 396,000 gal
1499 cubic metres
Second decant July 27 to July 28 21 x 60 x 1 189,000 gal
715 cubic metres

Total 2214 cubic metres

Appendix B
Quality of Raw Water

EUREKA RAW WATER ANALYSIS 2011-2016

Parameter	2011	2012	2013	2014	2015	2016
TDS	2150	1130	3170	2910	Please refer to 2015 lab results	2410,0
Organic Carbon	3,2	4,9	4,0	2,0		3,7
Hardness	1240	563	1600	155		1180,0
Coliforms, Total	4,1	<1.0	47,3	<1.0		0,0
Escherichia coli	<1.0	<1.0	<1.0	<1.0		0,0
Aluminum	0,036	0,039	0,049	68,5		<0.02
Antimony	<0.0001	0,0001	0,0002	0,5		<0.001
Arsenic	0,0003	0,0142	0,0004	0,4		<0.001
Barium	0,0687	0,0247	0,0642	0,0486		0,0501
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001		<0.001
Boron						0,217
Cadmium	<0.00005	<0.0005	<0.00005	<0.0001		<0.0002
Chromium	0,0001	0,0007	0,0001	0,0012		<0.02
Cobalt	0,0007	0,0004	<0.0001	<0.0001		<0.0005
Copper	0,0012	0,0066	0,0164	0,0035		0,002
Iron	0,009	0,09	0,032	0,152		<0.1
Lead	<0.0001	<0.0001	0,0002	<0.0001		<0.001
Lithium	0,0368	0,0184	0,0479	0,0059		0,0464
Manganese	0,0282	0,023	0,0031	0,0088		0,015
Molybdenum	0,0004	0,0005	0,001	0,0003		0,00062
Nickel	0,0061	0,0035	0,0027	0,0009		0,0052
Selenium	0,0022	<0.0005	0,0031	<0.0005		<0.005
Silver	<0.0001	<0.0001	0,0007	0,0002		<0.001
Strontium	1,11	0,55	1,38	0,159		1,14
Thallium	<0.0001	<0.0001	<0.0001	<0.0001		<0.005
Titanium	0,0003	0,0012	0,0032	0,0014		<0.001
Uranium	0,0001	0,0009	0,0025	0,0002		0,00199
Vanadium	<0.0001	0,0107	0,0002	0,0002		<0.002
Zinc	0,0021	<0.005	0,0092	0,0059		<0.02
Bromodicholormethane	n/a	<0.001	N/A	<0.005		<0.0005
Bromoform	n/a	<0.001	N/A	<0.005		<0.0005
Dibromochloromethane	n/a	<0.001	N/A	<0.005		<0.0005
Trihalomethanes	n/a	<0.001	N/A	<0.005		<0.01

*Laboratory equipment / supply failure & unable to repeat measurement

Appendix B
Quality of Raw Water

EUREKA WEATHER STATION

L1897703 CONTD....
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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-1 LAGOON - EULAG0510							
Sampled By: CLIENT on 05-MAR-17 @ 07:35							
Matrix: water							
Miscellaneous Parameters							
Hardness (as CaCO3)	1180	HTC	0.54	mg/L		10-MAR-17	
Total Dissolved Solids	2410		20	mg/L		10-MAR-17	R3673991
Total Organic Carbon	3.73		0.50	mg/L		08-MAR-17	R3672916
Turbidity	0.83		0.10	NTU		06-MAR-17	R3668782
Total Coliform and E.coli							
Total Coliforms	0		0	MPN/100mL		06-MAR-17	R3668848
Escherichia Coli	0		0	MPN/100mL		06-MAR-17	R3668848
Total Metals by ICP-MS							
Aluminum (Al)-Total	<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Antimony (Sb)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Arsenic (As)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Barium (Ba)-Total	0.0501		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Beryllium (Be)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Bismuth (Bi)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Boron (B)-Total	0.217		0.030	mg/L	09-MAR-17	09-MAR-17	R3673037
Cadmium (Cd)-Total	<0.00020		0.00020	mg/L	09-MAR-17	09-MAR-17	R3673037
Calcium (Ca)-Total	272		0.20	mg/L	09-MAR-17	09-MAR-17	R3673037
Cesium (Cs)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Chromium (Cr)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Cobalt (Co)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Copper (Cu)-Total	0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Iron (Fe)-Total	<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Lead (Pb)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Lithium (Li)-Total	0.0464		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Magnesium (Mg)-Total	121		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Manganese (Mn)-Total	0.0150		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Molybdenum (Mo)-Total	0.00062		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Nickel (Ni)-Total	0.0052		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Phosphorus (P)-Total	<0.50		0.50	mg/L	09-MAR-17	09-MAR-17	R3673037
Potassium (K)-Total	15.7		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Rubidium (Rb)-Total	0.00398		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Selenium (Se)-Total	<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Silicon (Si)-Total	1.63		0.30	mg/L	09-MAR-17	09-MAR-17	R3673037
Silver (Ag)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Sodium (Na)-Total	287		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Strontium (Sr)-Total	1.14		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Tellurium (Te)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Thallium (Tl)-Total	<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Thorium (Th)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tin (Sn)-Total	<0.00060		0.00060	mg/L	09-MAR-17	09-MAR-17	R3673037
Titanium (Ti)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tungsten (W)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Uranium (U)-Total	0.00199		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Vanadium (V)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zinc (Zn)-Total	<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zirconium (Zr)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
THM by headspace							
Total Trihalomethanes (THMs)							
Total THMs	<0.0010		0.0010	mg/L		09-MAR-17	
VOC plus F1 by GCMS							
Bromodichloromethane	<0.00050		0.00050	mg/L		09-MAR-17	R3672598

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Appendix B
Quality of Raw Water

EUREKA WEATHER STATION

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-1 LAGOON - EULAG0510 Sampled By: CLIENT on 05-MAR-17 @ 07:35 Matrix: water VOC plus F1 by GCMS	Bromoform	<0.00050		0.00050	mg/L		09-MAR-17	R3672598
	Chloroform	<0.00050		0.00050	mg/L		09-MAR-17	R3672598
	Dibromochloromethane	<0.00050		0.00050	mg/L		09-MAR-17	R3672598
	Surrogate: 4-Bromofluorobenzene (SS)	91.4		70-130	%		09-MAR-17	R3672598
	Surrogate: 1,4-Difluorobenzene (SS)	99.5		70-130	%		09-MAR-17	R3672598
L1897703-2 REVERSE OSMOSIS EURO0510 Sampled By: CLIENT on 05-MAR-17 @ 07:05 Matrix: water Miscellaneous Parameters	Hardness (as CaCO3)	<0.54	HTC	0.54	mg/L		10-MAR-17	
	Total Dissolved Solids	53		13	mg/L		10-MAR-17	R3673991
	Total Organic Carbon	<0.50		0.50	mg/L		08-MAR-17	R3672916
	Turbidity	<0.10		0.10	NTU		06-MAR-17	R3668782
	Total Coliform and E.coli							
	Total Coliforms	0		0	MPN/100mL		06-MAR-17	R3668848
	Escherichia Coli	0		0	MPN/100mL		06-MAR-17	R3668848
	Total Metals by ICP-MS							
	Aluminum (Al)-Total	<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Antimony (Sb)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Arsenic (As)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Barium (Ba)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Beryllium (Be)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Bismuth (Bi)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Boron (B)-Total	0.124		0.030	mg/L	09-MAR-17	09-MAR-17	R3673037
	Cadmium (Cd)-Total	<0.00020		0.00020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Calcium (Ca)-Total	<0.20		0.20	mg/L	09-MAR-17	09-MAR-17	R3673037
	Cesium (Cs)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Chromium (Cr)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Cobalt (Co)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Copper (Cu)-Total	0.0272		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Iron (Fe)-Total	<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
	Lead (Pb)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Lithium (Li)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Magnesium (Mg)-Total	<0.050		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Manganese (Mn)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Molybdenum (Mo)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Nickel (Ni)-Total	0.0059		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
	Phosphorus (P)-Total	<0.50		0.50	mg/L	09-MAR-17	09-MAR-17	R3673037
	Potassium (K)-Total	<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
	Rubidium (Rb)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Selenium (Se)-Total	<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Silicon (Si)-Total	<0.30		0.30	mg/L	09-MAR-17	09-MAR-17	R3673037
	Silver (Ag)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Sodium (Na)-Total	14.9		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Strontium (Sr)-Total	<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Tellurium (Te)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Thallium (Tl)-Total	<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
	Thorium (Th)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Tin (Sn)-Total	<0.00060		0.00060	mg/L	09-MAR-17	09-MAR-17	R3673037
	Titanium (Ti)-Total	<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
	Tungsten (W)-Total	<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Appendix C
Quality of Tap Water
EUREKA WATER ANALYSIS 2011-2016: TAP WATER

TAP WATER					GUIDELINES (mg/l)					
Parameter	2011	2012	2013	2014	2015	2016	CANADIAN ⁱ		US EPA ⁱⁱ	
							MAC ⁺	OG ⁺ /AO ^o	MCL ⁺	MCLG ^o
TDS	1920	1290	2270	936	Please refer to 2015 lab results	1670				
Organic Carbon	2,7	3,3	3,2	4,2		2,86				
Hardness	664	15,3	55,3	47,8		11,4				
Coliforms, Total	<1.0	<1.0	<1.0	<1.0		0	0/100 ml		100/100ml	0
Escherichia coli	<1.0	<1.0	<1.0	<1.0		0	0/100 ml			0
Aluminum	0,0291	0,024	0,0035	0,0033		<0.02		0,2	0.05-0.2	
Antimony	<0.0001	0,0001	0,0001	0,0001		<0.001				
Arsenic	0,0003	0,0007	0,0004	0,0004		<0.001				
Barium	0,0213	0,0004	0,0015	0,0015		0,00061	1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001		<0.001			0,004	
Boron						0,152	5			
Cadmium	<0.00005	<0.0005	<0.00005	<0.00005		<0.0002	0,005		0,005	0,005
Chromium	0,0001	<0.0001	<0.0001	0,0002		<0.002	0,05		0,1	0,1
Cobalt	0,0005	<0.0001	<0.0001	<0.0001		<0.0005				
Copper	0,101	0,0447	0,0709	0,104		0,0661		<1.0		1,3
Iron	0,008	0,023	0,009	0,011		<0.1		<0.3	0,3	
Lead	<0.0001	<0.0001	<0.0001	<0.0001		<0.001	0,01		0,015	0
Lithium	0,0421	0,0013	0,0026	0,0571		0,0027				
Manganese	0,0188	0,0018	0,0012	0,0008		<0.001		<0.05	0,05	
Molybdenum	0,0003	0,0006	0,0007	0,0007		<0.0005				
Nickel	0,0037	0,0009	0,0003	0,0007		<0.002				
Selenium	0,0018	0,0007	0,0026	0,0029		<0.005				
Silver	<0.0001	0,0005	<0.0001	<0.0001		<0.001			0,1	
Strontium	0,363	0,0041	0,003	0,0467		0,0116				
Thallium	<0.0001	<0.0001	<0.0001	<0.0001		<0.005				
Titanium	0,0004	0,0032	0,0001	<0.0001		<0.001				
Uranium	0,0015	0,001	0,0018	0,0021		0,00132				
Vanadium	<0.0001	0,0005	<0.0001	<0.0001		<0.002				
Zinc	0,0549	0,009	0,0222	0,0178		<0.02		<5.0	5	
Bromodicholormethane	n/a	<0.005	0,005	<0.005		0,0529	0,016			
Bromoform	n/a	0,036	0,183	0,126		0,11				
Dibromochloromethane	n/a	0,02	0,038	0,026		0,125				
Trihalomethanes	n/a	0,062	0,227	0,155		0,328	0,1		0,08	

*Subcontracted organics are in concentrations less than detectable levels except for those listed immediately above

ⁱGuidelines for Canadian Drinking Water Quality Summary Table, May 2008
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/chemical-chimiques-eng.php#tbl6

ⁱⁱUS Environmental Protection Agency Drinking Water Standards
<http://www.epa.gov/safewater/contaminants/index.html>

⁺Maxiumum Acceptable Concentration

⁺Aesthetic Objectives

^oOperational Guidance Values

⁺Maximum Contaminant Level

^oMaximum Contaminant Level Goal

Appendix C
Quality of Tap Water

EUREKA WEATHER STATION

L1897703 CONTD....

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-2 REVERSE OSMOSIS EURO0510								
Sampled By: CLIENT on 05-MAR-17 @ 07:05								
Matrix: water								
Total Metals by ICP-MS								
Uranium (U)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Vanadium (V)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zinc (Zn)-Total		0.091		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zirconium (Zr)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
THM by headspace								
Total Trihalomethanes (THMs)								
Total THMs		0.0304		0.0010	mg/L		09-MAR-17	
VOC plus F1 by GCMS								
Bromodichloromethane		0.00912		0.00050	mg/L		09-MAR-17	R3672598
Bromoform		0.00208		0.00050	mg/L		09-MAR-17	R3672598
Chloroform		0.0142		0.00050	mg/L		09-MAR-17	R3672598
Dibromochloromethane		0.00500		0.00050	mg/L		09-MAR-17	R3672598
Surrogate: 4-Bromofluorobenzene (SS)		91.3		70-130	%		09-MAR-17	R3672598
Surrogate: 1,4-Difluorobenzene (SS)		99.4		70-130	%		09-MAR-17	R3672598
L1897703-3 TAP EUTAP0510								
Sampled By: CLIENT on 05-MAR-17 @ 07:00								
Matrix: water								
Miscellaneous Parameters								
Hardness (as CaCO3)		11.4	HTC	0.54	mg/L		10-MAR-17	
Total Dissolved Solids		1670		20	mg/L		10-MAR-17	R3673991
Total Organic Carbon		2.86		0.50	mg/L		08-MAR-17	R3672916
Turbidity		0.45		0.10	NTU		06-MAR-17	R3668782
Total Coliform and E.coli								
Total Coliforms		0		0	MPN/100mL		06-MAR-17	R3668848
Escherichia Coli		0		0	MPN/100mL		06-MAR-17	R3668848
Total Metals by ICP-MS								
Aluminum (Al)-Total		<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Antimony (Sb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Arsenic (As)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Barium (Ba)-Total		0.00061		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Beryllium (Be)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Bismuth (Bi)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Boron (B)-Total		0.152		0.030	mg/L	09-MAR-17	09-MAR-17	R3673037
Cadmium (Cd)-Total		<0.00020		0.00020	mg/L	09-MAR-17	09-MAR-17	R3673037
Calcium (Ca)-Total		2.80		0.20	mg/L	09-MAR-17	09-MAR-17	R3673037
Cesium (Cs)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Chromium (Cr)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Cobalt (Co)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Copper (Cu)-Total		0.0661		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Iron (Fe)-Total		<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Lead (Pb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Lithium (Li)-Total		0.0027		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Magnesium (Mg)-Total		1.07		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Manganese (Mn)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Molybdenum (Mo)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Nickel (Ni)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Phosphorus (P)-Total		<0.50		0.50	mg/L	09-MAR-17	09-MAR-17	R3673037
Potassium (K)-Total		3.53		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Rubidium (Rb)-Total		0.00101		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Selenium (Se)-Total		<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Silicon (Si)-Total		0.97		0.30	mg/L	09-MAR-17	09-MAR-17	R3673037

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Appendix C

Quality of Tap Water

EUREKA WEATHER STATION

L1897703 CONTD....

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Version: FINAL

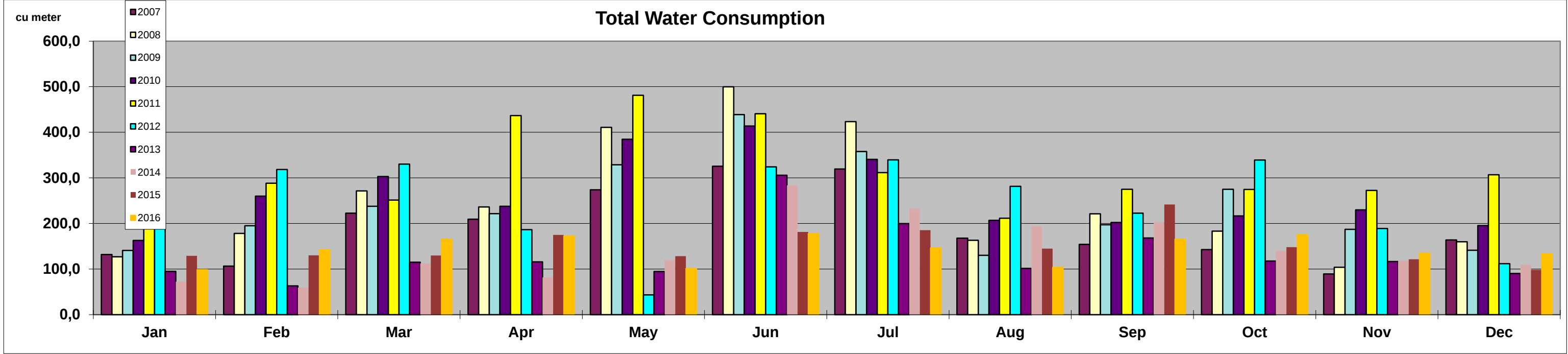
ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-3	TAP EUTAP0510							
Sampled By:	CLIENT on 05-MAR-17 @ 07:00							
Matrix:	water							
Total Metals by ICP-MS								
Silver (Ag)-Total	<0.0010			0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Sodium (Na)-Total	587			0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Strontium (Sr)-Total	0.0116			0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Tellurium (Te)-Total	<0.0010			0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Thallium (Tl)-Total	<0.0050			0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Thorium (Th)-Total	<0.0010			0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tin (Sn)-Total	<0.00060			0.00060	mg/L	09-MAR-17	09-MAR-17	R3673037
Titanium (Ti)-Total	<0.0010			0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tungsten (W)-Total	<0.0020			0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Uranium (U)-Total	0.00132			0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Vanadium (V)-Total	<0.0020			0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zinc (Zn)-Total	<0.020			0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zirconium (Zr)-Total	<0.0010			0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
THM by headspace								
Total Trihalomethanes (THMs)								
Total THMs	0.328			0.0010	mg/L		09-MAR-17	
VOC plus F1 by GCMS								
Bromodichloromethane	0.0529			0.00050	mg/L		09-MAR-17	R3672598
Bromoform	0.110			0.00050	mg/L		09-MAR-17	R3672598
Chloroform	0.0410			0.00050	mg/L		09-MAR-17	R3672598
Dibromochloromethane	0.125			0.00050	mg/L		09-MAR-17	R3672598
Surrogate: 4-Bromofluorobenzene (SS)	87.5			70-130	%		09-MAR-17	R3672598
Surrogate: 1,4-Difluorobenzene (SS)	98.5			70-130	%		09-MAR-17	R3672598

* Refer to Referenced Information for Qualifiers (if any) and Methodology

APPENDIX D
QUANTITY OF DRINKING WATER

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
57,8	43,8	91,7	104,0	104,9	22,0	131,9	126,9	140,9	162,7	212,5	268,6	95,0	72,4	128,9	98,7	Jan
117,5	90,0	60,6	116,7	117,0	137,9	106,3	178,0	194,9	260,0	288,2	318,2	63,1	59,3	130,0	142,1	Feb
113,0	79,2	160,6	121,2	188,2	103,5	222,6	271,4	237,7	302,9	251,4	330,1	114,9	112,5	129,7	165,5	Mar
84,1	186,8	111,7	160,1	63,7	73,6	209,2	236,3	221,5	237,5	436,6	186,3	115,6	81,7	174,8	172,6	Apr
261,8	233,8	280,3	203,7	273,9	322,8	273,8	410,7	328,8	384,5	481,3	43,1	94,6	119,4	128,3	101,2	May
335,3	287,9	432,5	418,2	489,0	495,7	325,6	499,7	438,7	413,7	440,6	323,9	305,7	283,4	181,4	177,7	Jun
438,0	354,8	369,1	427,6	501,8	379,6	319,3	423,3	357,6	340,4	311,4	339,4	199,5	232,6	185,3	146,5	Jul
238,5	160,6	260,3	247,4	236,3	111,3	167,7	163,0	130,0	206,9	211,6	281,2	101,3	193,4	144,7	104,0	Aug
114,5	77,1	59,4	180,3	237,8	77,8	153,9	221,1	197,2	202,0	274,9	222,4	167,9	203,3	241,4	165,4	Sep
103,1	79,6	165,3	70,8	71,5	107,4	142,6	183,1	275,1	216,5	274,4	339,1	117,4	140,2	147,9	175,5	Oct
83,5	94,6	61,5	104,6	71,5	106,4	89,2	103,9	187,0	229,6	272,4	188,8	116,5	118,3	121,5	134,7	Nov
141,5	85,5	149,5	144,2	78,1	108,6	163,6	159,9	141,0	195,3	307,0	111,9	90,3	109,3	98,0	133,4	Dec
2088,6	1773,7	2202,5	2298,8	2433,7	2046,6	2305,7	2977,3	2850,4	3152,0	3762,3	2953,0	1581,8	1725,8	1811,9	1717,3	Total (cu M)
174,1	147,8	183,5	191,6	202,8	170,6	192,1	248,1	237,5	262,7	313,5	246,1	131,8	143,8	151,0	143,1	Monthly Avg



Appendix E

Quality of Drinking Water Consumed

EUREKA WATER ANALYSIS 2011-2016 - REVERSE OSMOSIS

GUIDELINES (mg/l)

Parameter	2011	2012	2013	2014	2015	2016	CANADIAN ¹		US EPA ²	
							MAC ³	OG ⁴ /AO ⁵	MCL ⁶	MCLG ⁷
TDS	40	<10	18	83	Please refer to 2015 lab results	53				
Organic Carbon	<0.5	<0.5	<0.5	0,7		<0.5				
Hardness	3,2	<0.7	0,0027	5,3		<0.54				
Coliforms, Total	<1.0	<1.0	<1.0	<1.0		0	0/100 ml		100/100ml	0
Escherichia coli	<1.0	<1.0	<1.0	<1.0		0	0/100 ml			0
Aluminum	<0.6	<0.0005	<0.0006	0,0017		<0.02		0,2	0.05-0.2	
Antimony	<0.0001	<0.0001	<0.0001	<0.0001		<0.01				
Arsenic	<0.0002	<0.0002	<0.0002	<0.0002		<0.01				
Barium	<0.0001	<0.0001	<0.0001	0,0002		<0.0005	1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001		<0.001			0,004	
Boron						0,124	5			
Cadmium	<0.00005	<0.0005	<0.00005	<0.00005		<0.0002	0,005		0,005	0,005
Chromium	<0.0001	<0.0001	<0.0001	<0.0001		<0.002	0,05		0,1	0,1
Cobalt	<0.0001	<0.0001	<0.0001	<0.0001		<0.0005				
Copper	0,0026	0,0072	0,0335	0,0299		0,0272		<1.0		1,3
Iron	<0.005	<0.005	<0.005	0,006		<0.10		<0.3	0,3	
Lead	<0.0001	0,0003	0,0003	<0.0001		<0.0010	0,01		0,015	0
Lithium	0,0014	<0.0002	0,0002	0,0093		<0.0020				
Manganese	<0.0001	<0.0001	<0.0001	0,0004		<0.0010		<0.05	0,05	
Molybdenum	<0.0001	0,0001	<0.0001	0,0002		<0.0005				
Nickel	0,0002	0,0002	0,0002	0,0005		0,0059				
Selenium	<0.0003	<0.0005	<0.0003	0,0009		<0.005				
Silver	<0.0001	<0.0001	<0.0001	<0.0001		<0.0010			0,1	
Strontium	0,0015	0,0001	0,0002	0,0039		<0.0005				
Thallium	<0.0001	<0.0001	<0.0001	<0.0001		<0.005				
Titanium	<0.0001	<0.0001	<0.0001	<0.0001		<0.0010				
Uranium	<0.0001	<0.0001	<0.0001	0,0002		<0.0005				
Vanadium	<0.0001	<0.0001	<0.0001	<0.0001		<0.0020				
Zinc	0,0175	0,111	0,123	0,0796		0,091		<5.0	5	
*Bromodicholormethane	n/a	<0.005	0,002	n/a		0,00912	0,016			
Bromoform	n/a	<0.005	0,012	n/a		0,00208				
Dibromochloromethane	n/a	<0.005	0,006	<0.005		0,005				
Trihalomethanes	n/a	0,012	0,02	<0.005		0,0304	0,1		0,08	

*Subcontracted organics are in concentrations less than detectable levels except for those listed immediately above

¹Guidelines for Canadian Drinking Water Quality Summary Table, May 2008
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/chemical-chimiques-eng.php#tbl6

²US Environmental Protection Agency Drinking Water Standards
<http://www.epa.gov/safewater/contaminants/index.html>

³Maximum Acceptable Concentration

⁴Aesthetic Objectives

⁵Operational Guidance Values

⁶Maximum Contaminant Level

⁷Maximum Contaminant Level Goal

Appendix E

Quality of Drinking Water Consumed

EUREKA WEATHER STATION

L1897703 CONTD...

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-1	LAGOON - EULAG0510							
Sampled By:	CLIENT on 05-MAR-17 @ 07:35							
Matrix:	water							
VOC plus F1 by GCMS								
Bromoform		<0.00050		0.00050	mg/L		09-MAR-17	R3672598
Chloroform		<0.00050		0.00050	mg/L		09-MAR-17	R3672598
Dibromochloromethane		<0.00050		0.00050	mg/L		09-MAR-17	R3672598
Surrogate: 4-Bromofluorobenzene (SS)		91.4		70-130	%		09-MAR-17	R3672598
Surrogate: 1,4-Difluorobenzene (SS)		99.5		70-130	%		09-MAR-17	R3672598
L1897703-2	REVERSE OSMOSIS EURO0510							
Sampled By:	CLIENT on 05-MAR-17 @ 07:05							
Matrix:	water							
Miscellaneous Parameters								
Hardness (as CaCO3)		<0.54	HTC	0.54	mg/L		10-MAR-17	
Total Dissolved Solids		53		13	mg/L		10-MAR-17	R3673991
Total Organic Carbon		<0.50		0.50	mg/L		08-MAR-17	R3672916
Turbidity		<0.10		0.10	NTU		06-MAR-17	R3668782
Total Coliform and E.coli								
Total Coliforms		0		0	MPN/100mL		06-MAR-17	R3668848
Escherichia Coli		0		0	MPN/100mL		06-MAR-17	R3668848
Total Metals by ICP-MS								
Aluminum (Al)-Total		<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Antimony (Sb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Arsenic (As)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Barium (Ba)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Beryllium (Be)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Bismuth (Bi)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Boron (B)-Total		0.124		0.030	mg/L	09-MAR-17	09-MAR-17	R3673037
Cadmium (Cd)-Total		<0.00020		0.00020	mg/L	09-MAR-17	09-MAR-17	R3673037
Calcium (Ca)-Total		<0.20		0.20	mg/L	09-MAR-17	09-MAR-17	R3673037
Cesium (Cs)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Chromium (Cr)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Cobalt (Co)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Copper (Cu)-Total		0.0272		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Iron (Fe)-Total		<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Lead (Pb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Lithium (Li)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Magnesium (Mg)-Total		<0.050		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Manganese (Mn)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Molybdenum (Mo)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Nickel (Ni)-Total		0.0059		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Phosphorus (P)-Total		<0.50		0.50	mg/L	09-MAR-17	09-MAR-17	R3673037
Potassium (K)-Total		<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Rubidium (Rb)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Selenium (Se)-Total		<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Silicon (Si)-Total		<0.30		0.30	mg/L	09-MAR-17	09-MAR-17	R3673037
Silver (Ag)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Sodium (Na)-Total		14.9		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Strontium (Sr)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Tellurium (Te)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Thallium (Tl)-Total		<0.0050		0.0050	mg/L	09-MAR-17	09-MAR-17	R3673037
Thorium (Th)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tin (Sn)-Total		<0.00060		0.00060	mg/L	09-MAR-17	09-MAR-17	R3673037
Titanium (Ti)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Tungsten (W)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037

* Refer to Referenced Information for Qualifiers (if any) and Methodology

Appendix E

Quality of Drinking Water Consumed

EUREKA WEATHER STATION

L1897703 CONTD....

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Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1897703-2	REVERSE OSMOSIS EURO0510							
Sampled By: CLIENT on 05-MAR-17 @ 07:05								
Matrix: water								
Total Metals by ICP-MS								
Uranium (U)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Vanadium (V)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zinc (Zn)-Total		0.091		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Zirconium (Zr)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
THM by headspace								
Total Trihalomethanes (THMs)								
Total THMs		0.0304		0.0010	mg/L		09-MAR-17	
VOC plus F1 by GCMS								
Bromodichloromethane		0.00912		0.00050	mg/L		09-MAR-17	R3672598
Bromoform		0.00208		0.00050	mg/L		09-MAR-17	R3672598
Chloroform		0.0142		0.00050	mg/L		09-MAR-17	R3672598
Dibromochloromethane		0.00500		0.00050	mg/L		09-MAR-17	R3672598
Surrogate: 4-Bromofluorobenzene (SS)		91.3		70-130	%		09-MAR-17	R3672598
Surrogate: 1,4-Difluorobenzene (SS)		99.4		70-130	%		09-MAR-17	R3672598
L1897703-3	TAP EUTAP0510							
Sampled By: CLIENT on 05-MAR-17 @ 07:00								
Matrix: water								
Miscellaneous Parameters								
Hardness (as CaCO3)		11.4	HTC	0.54	mg/L		10-MAR-17	
Total Dissolved Solids		1670		20	mg/L		10-MAR-17	R3673991
Total Organic Carbon		2.86		0.50	mg/L		08-MAR-17	R3672916
Turbidity		0.45		0.10	NTU		06-MAR-17	R3668782
Total Coliform and E.coli								
Total Coliforms		0		0	MPN/100mL		06-MAR-17	R3668848
Escherichia Coli		0		0	MPN/100mL		06-MAR-17	R3668848
Total Metals by ICP-MS								
Aluminum (Al)-Total		<0.020		0.020	mg/L	09-MAR-17	09-MAR-17	R3673037
Antimony (Sb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Arsenic (As)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Barium (Ba)-Total		0.00061		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Beryllium (Be)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Bismuth (Bi)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Boron (B)-Total		0.152		0.030	mg/L	09-MAR-17	09-MAR-17	R3673037
Cadmium (Cd)-Total		<0.00020		0.00020	mg/L	09-MAR-17	09-MAR-17	R3673037
Calcium (Ca)-Total		2.80		0.20	mg/L	09-MAR-17	09-MAR-17	R3673037
Cesium (Cs)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Chromium (Cr)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Cobalt (Co)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Copper (Cu)-Total		0.0661		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Iron (Fe)-Total		<0.10		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Lead (Pb)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Lithium (Li)-Total		0.0027		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Magnesium (Mg)-Total		1.07		0.050	mg/L	09-MAR-17	09-MAR-17	R3673037
Manganese (Mn)-Total		<0.0010		0.0010	mg/L	09-MAR-17	09-MAR-17	R3673037
Molybdenum (Mo)-Total		<0.00050		0.00050	mg/L	09-MAR-17	09-MAR-17	R3673037
Nickel (Ni)-Total		<0.0020		0.0020	mg/L	09-MAR-17	09-MAR-17	R3673037
Phosphorus (P)-Total		<0.50		0.50	mg/L	09-MAR-17	09-MAR-17	R3673037
Potassium (K)-Total		3.53		0.10	mg/L	09-MAR-17	09-MAR-17	R3673037
Rubidium (Rb)-Total		0.00101		0.00050	mg/L	09-MAR-17	09-MAR-17	R36730

* Refer to Referenced Information for Qualifiers (if any) and Methodology

QUANTITIES OF WASTE WATER DISCHARGED

Eureka 2016

Waste Water: Sewage Lagoon

Pump: Monarch Pump Model TT30 Type E with attached hose approx. 150
gal/minute

First decant June 25 to June 27	44 hrs x 60 min x 150
396,000 gal	1499 cubic metres
Second decant July 27 to July 28	21 x 60 x 150
189,000 gal	715 cubic metres

Total 2214 cubic metres

This summer, second decant was smaller due to the lagoon melting to bottom
and most of the load pumped during first decant.

Appendix G

Quality of Waste Water Discharged

ANALYSIS OF EUREKA SEWAGE PARAMETERS

Wastewater effluent at Eureka is governed by two guidelines: CCME's Canada-wide Strategy for the Management of Municipal Wastewater Effluent, 2009; and Guidelines for the Discharge of Municipal Wastewater in the Northwest Territories (NWT), 1992. The CCME guidelines address municipal wastewater facilities (owned by municipalities, communities, federal and other government entities, and facilities on federal and aboriginal lands) discharging effluent into surface water, including combined and sanitary sewer overflows. The NWT guidelines are also applicable to the Eureka lagoon. Under Eureka's water licence with the Nunavut Water Board, the NWT guidelines are referenced as the criteria to be used to assess compliance.

The Eureka wastewater lagoon effluent was sampled 2008 through to 2015 in order to determine the level of compliance with CCME and NWT guidelines for wastewater. This report discusses the exceeding parameters, their potential causes of exceedances, and identifies corrective solutions if applicable.

Effluent exceedances

1. Biochemical Oxygen Demand (BOD)

Effluent Biochemical Oxygen Demand averaged between 92 to 109 mg/L which is slightly above the Territorial standard of 100 mg/L.

2. Iron (Fe)

Effluent iron averaged between 0.44 to 0.56 mg/L which is slightly above the Territorial guidelines.

The possible sources of iron (Fe) are²:

- a. Natural sources (land, water)
- b. Iron sediments or deposits in the lagoon which are being dissolved; and
- c. Holding tank prior to evacuation to the lagoon.

Source 1.a noted above concerning natural sources is reinforced by the Franz Environmental report of 2012 entitled "2012 Supplemental Investigation Eureka High Arctic Weather Station, Nunavut" (Included with this Annual Report). Specifically as follows:

"....Chemical analysis of background surface water samples indicated naturally elevated concentrations of aluminum, cadmium, copper, lead, iron, manganese, and zinc in surface water..."

The Sewage Treatment System Recapitalization Project design phase is now complete. Project is currently suspended until year 2018/2019.

3. Manganese (Mn)

Manganese has been found at a level averaging between 0.0642 mg/L to 0.0826mg/l which is slightly above Territorial guidelines. Possible sources are natural sources which was reinforced, as indicated above, from the Franz Environmental report findings.

- a. Natural sources (soils, rocks, and water). Manganese can be found naturally in water in levels as high as 1.0mg/L. Manganese and iron are often found together in water.

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Quality of Waste Water Discharged

Additional Parameters for Analysis

Both monitoring stations EUR2 (Landfill Solid Waste Disposal Area) and EUR4 (Landfill area), as per the Nunavut Water Board recommendations, is to be analyzed for the same parameters currently being analyzed for EUR3 (Sewage Lagoon). Additional sampling for EUR2, EUR3, and EUR4 is to include analysis for Chloride, Total Hardness, Total Mercury, Total Alkalinity, and Total Organic Carbon. In addition, effluent discharge from EUR 4 is to be analyzed for Benzene, Toluene, and Ethylbenzene, as stated in the Water License Agreement.

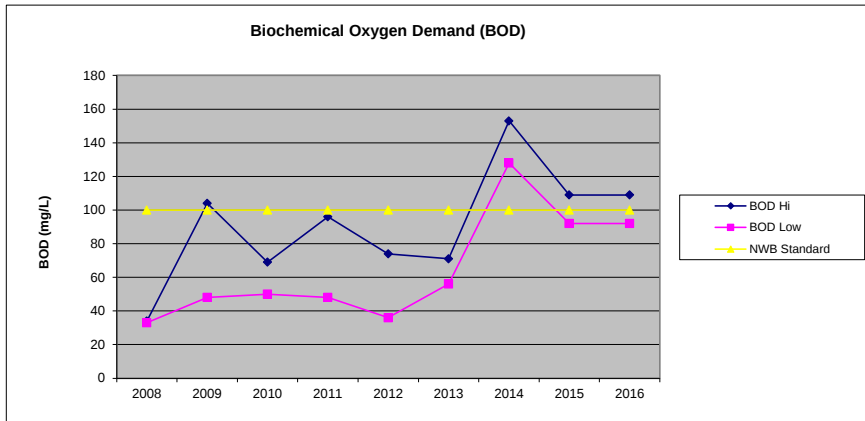
¹Richard, Michael, Microbiological and Chemical Testing for Troubleshooting lagoons. 2003
²Tillman, Glenn, Wastewater Treatment: Troubleshooting and Problem Solving.
³Connecticut, Department of Public Health, Fact Sheet: Manganese in Drinking Water. 2001

Appendix G

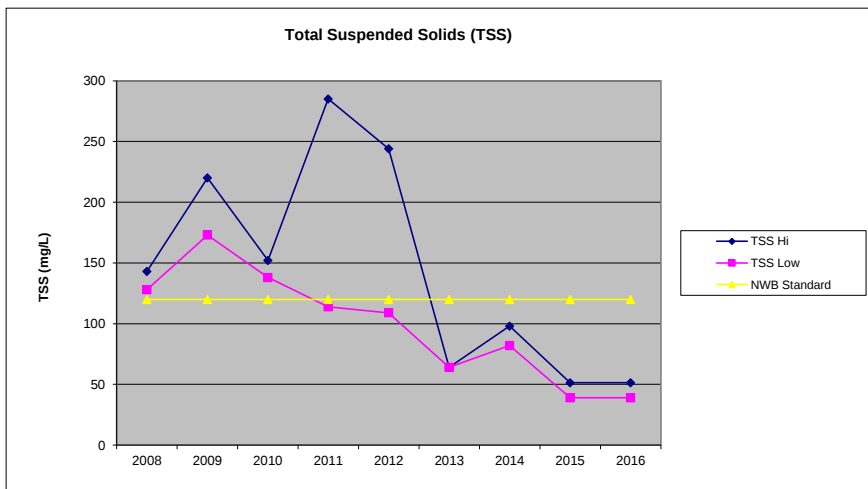
Quality of Waste Water Discharged

Note: Results are the same as the 2015 report that was filed in July 2016. The 2016 report was filed late and therefore contained the latest results from sampling done in June 2016. No newer results are available at this time.

BOD Results for Eureka Wastewater Lagoon Effluent

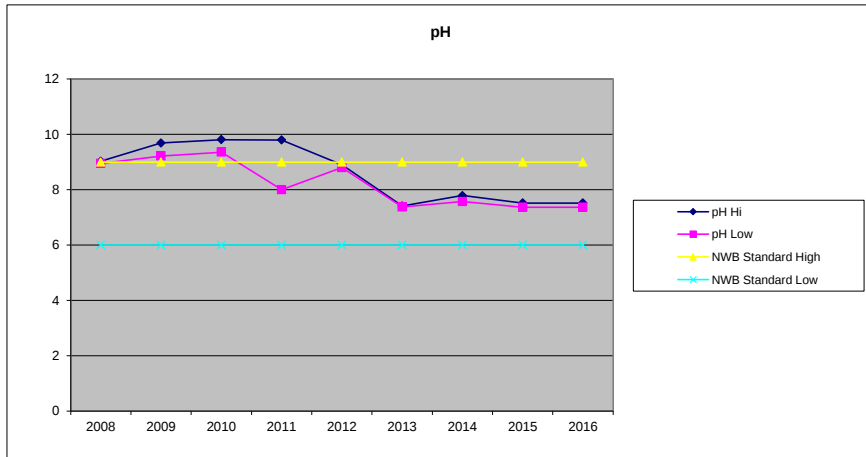


TSS Results for Eureka Wastewater Lagoon Effluent

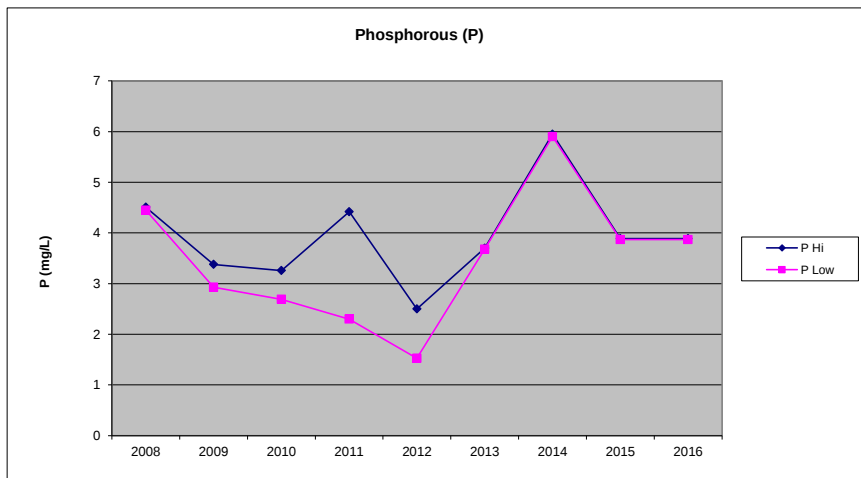


Appendix G Quality of Waste Water Discharged

pH Results for Eureka Wastewater Lagoon Effluent



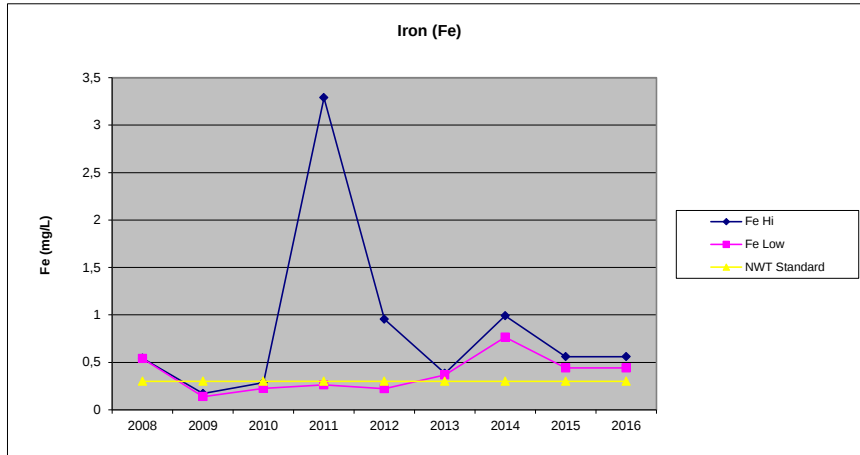
Phosphorous Results for Eureka Wastewater Lagoon Effluent



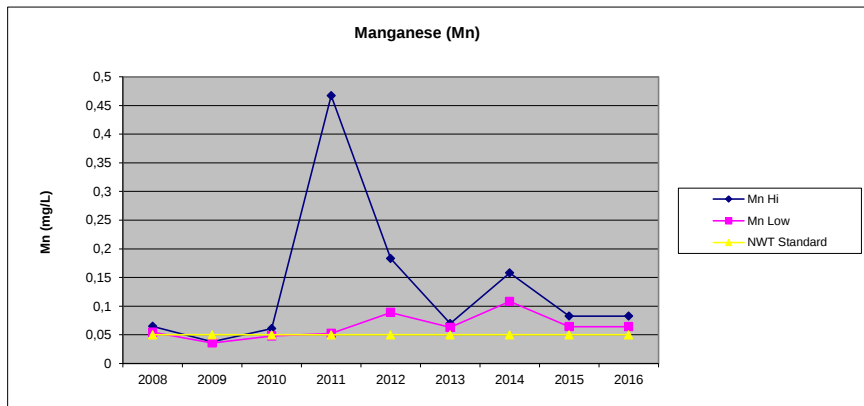
Appendix G

Quality of Waste Water Discharged

Iron Results for Eureka Wastewater Lagoon Effluent

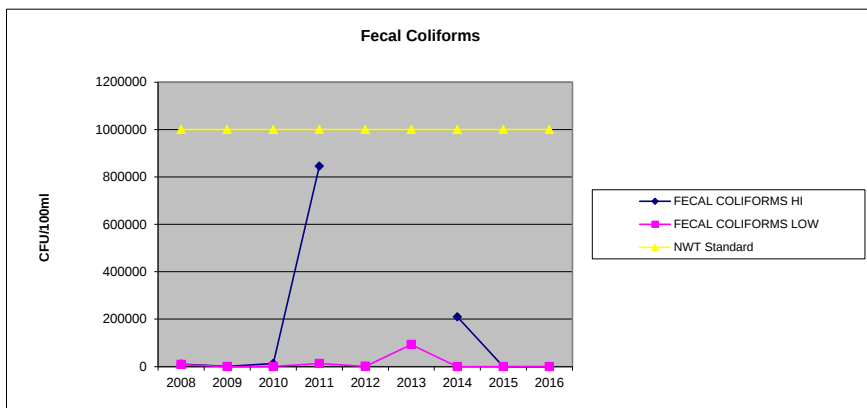


Manganese Results for Eureka Wastewater Lagoon Effluent



Appendix G Quality of Waste Water Discharged

Fecal Coliform Results for Eureka Wastewater Lagoon Effluent



See Laboratory results for 2016 as they are smaller than 110 000.

Note: CFU/100ml = Colony Forming Units/100ml

EUREKA SEWAGE LAGOON: ANALYSIS RESULTS: 2016



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.: L1789152
WO No.: EUREKA NU
Project Ref: EUWW 1-JUNE 25
Sample ID: John Maciver
Sampled By: 25-JUN-16
Date Collected: L1789152-1
Lab Sample ID: Sewage/Waste Water
Matrix:

PAGE 1 of 7

Test Description	Result	Qualifier	Units of Measure	CDWOG MAC	Aesthetic Objective	Date Analyzed
Alkalinity species as HCO₃, CO₃, OH						
Bicarbonate (HCO ₃)	346		mg/L			06-JUL-16
Carbonate (CO ₃)	<0.60		mg/L			06-JUL-16
Hydroxide (OH)	<0.34		mg/L			06-JUL-16
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	284		mg/L			04-JUL-16
Nitrogen Total						
*Nitrate and Nitrite as N	<0.11		mg/L	10		06-JUL-16
Total Nitrogen	32.1		mg/L			06-JUL-16
Total Kjeldahl Nitrogen						
Total Kjeldahl Nitrogen	32.1		mg/L			05-JUL-16
Nitrite in Water by IC						
*Nitrite (as N)	<0.050	DLM	mg/L	1		04-JUL-16
Nitrate in Water by IC						
*Nitrate (as N)	<0.10	DLM	mg/L	10		04-JUL-16
Total and Fecal Coliform by MPN						
Total Coliform						
Total Coliforms	>110000	PEHR	MPN/100mL	0		27-JUN-16
Fecal Coliform						
Fecal Coliforms	>110000	PEHR	MPN/100mL			27-JUN-16
Phosphorus (P)-Total	2.36		mg/L			05-JUL-16
Dissolved						
Mercury (Hg)-Total	<0.00020	DLM	mg/L	0.001		29-JUN-16
Phosphorus (P)-Total	3.85		mg/L			10-JUL-16
Ammonia, Total (as N)	20.3		mg/L			28-JUN-16
Biochemical Oxygen Demand	92		mg/L			27-JUN-16
Chloride (Cl)	1270		mg/L		250	04-JUL-16
Conductivity	5390		umhos/cm			04-JUL-16
Hardness (as CaCO ₃)	817		mg/L		500	29-JUN-16
Oil and Grease	8.6		mg/L			28-JUN-16
Phenols (4AAP)	0.0366		mg/L			29-JUN-16
Phosphorus (P)-Total	2.16		mg/L			29-JUN-16
Reactive						
Sulfate (SO ₄)	699		mg/L		500	04-JUL-16
Total Organic Carbon	37.7		mg/L			30-JUN-16
Total Suspended Solids	51.4		mg/L			28-JUN-16

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Quality of Waste Water Discharged



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.:
WO No.: L1789152
Project Ref: EUREKA NU
Sample ID: EUWW 1-JUNE 25
Sampled By: John Maciver
Date Collected: 25-JUN-16
Lab Sample ID: L1789152-1
Matrix: Sewage/Waste Water

PAGE 2 of 7

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
pH	7.52		pH units			04-JUL-16
Total Metals by ICP-MS						
Aluminum (Al)-Total	0.097		mg/L		0.1	28-JUN-16
Antimony (Sb)-Total	<0.0010		mg/L	0.006		28-JUN-16
Arsenic (As)-Total	<0.0010		mg/L	0.01		28-JUN-16
Barium (Ba)-Total	0.0282		mg/L	1		28-JUN-16
Beryllium (Be)-Total	<0.0010		mg/L			28-JUN-16
Bismuth (Bi)-Total	<0.00050		mg/L			28-JUN-16
Boron (B)-Total	0.287		mg/L	5		28-JUN-16
Cadmium (Cd)-Total	<0.00020		mg/L	0.005		28-JUN-16
Calcium (Ca)-Total	187		mg/L			28-JUN-16
Cesium (Cs)-Total	<0.00050		mg/L			28-JUN-16
Chromium (Cr)-Total	<0.0020		mg/L	0.05		28-JUN-16
Cobalt (Co)-Total	0.00084		mg/L			28-JUN-16
Copper (Cu)-Total	0.0880		mg/L		1.0	28-JUN-16
Iron (Fe)-Total	0.44		mg/L		0.3	28-JUN-16
Lead (Pb)-Total	<0.0010		mg/L	0.01		28-JUN-16
Lithium (Li)-Total	0.0292		mg/L			28-JUN-16
Magnesium (Mg)-Total	85.2		mg/L			28-JUN-16
Manganese (Mn)-Total	0.0642		mg/L		0.05	28-JUN-16
Molybdenum (Mo)-Total	0.00060		mg/L			28-JUN-16
Nickel (Ni)-Total	0.0054		mg/L			28-JUN-16
Phosphorus (P)-Total	3.87		mg/L			28-JUN-16
Potassium (K)-Total	23.4		mg/L			28-JUN-16
Rubidium (Rb)-Total	0.0116		mg/L			28-JUN-16
Selenium (Se)-Total	<0.0050		mg/L	0.05		28-JUN-16
Silicon (Si)-Total	1.19		mg/L			28-JUN-16
Silver (Ag)-Total	<0.0010		mg/L			28-JUN-16
Sodium (Na)-Total	903		mg/L		200	28-JUN-16
Strontium (Sr)-Total	0.754		mg/L			28-JUN-16
Tellurium (Te)-Total	<0.0010		mg/L			28-JUN-16
Thallium (Tl)-Total	<0.0050		mg/L			28-JUN-16
Thorium (Th)-Total	<0.0010		mg/L			28-JUN-16
Tin (Sn)-Total	0.00256		mg/L			28-JUN-16
Titanium (Ti)-Total	0.0037		mg/L			28-JUN-16
Tungsten (W)-Total	<0.0020		mg/L			28-JUN-16
Uranium (U)-Total	0.00123		mg/L	0.02		28-JUN-16
Vanadium (V)-Total	<0.0020		mg/L			28-JUN-16
Zinc (Zn)-Total	0.088		mg/L		5.0	28-JUN-16
Zirconium (Zr)-Total	0.0011		mg/L			28-JUN-16

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Appendix G Quality of Waste Water Discharged



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.: L1789152
WO No.: L1789152
Project Ref: EUREKA NU
Sample ID: EUWW 1-JUNE 25
Sampled By: John Maciver
Date Collected: 25-JUN-16
Lab Sample ID: L1789152-1
Matrix: Sewage/Waste Water

PAGE 3 of 7

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated DECEMBER 2015 * CDWQG for Nitrate-Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality. - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/ or Aesthetic Objective.						
Approved by:  Hua Wo Account Manager						

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Quality of Waste Water Discharged



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.:
WO No.: L1789152
Project Ref: EUREKA NU
Sample ID: EUWW 2-JUNE 28
Sampled By: John Maciver
Date Collected: 26-JUN-16
Lab Sample ID: L1789152-2
Matrix: Sewage/Waste Water

PAGE 4 of 7

Test Description	Result	Qualifier	Units of Measure	CDWGS MAC	Aesthetic Objective	Date Analyzed
Alkalinity species as HCO₃, CO₃, OH						
Bicarbonate (HCO ₃)	350		mg/L			06-JUL-16
Carbonate (CO ₃)	<0.60		mg/L			06-JUL-16
Hydroxide (OH)	<0.34		mg/L			06-JUL-16
Alkalinity, Total (as CaCO₃)						
Alkalinity, Total (as CaCO ₃)	287		mg/L			04-JUL-16
Nitrogen Total						
*Nitrate and Nitrite as N	<0.11		mg/L	10		06-JUL-16
Total Nitrogen	35.3		mg/L			06-JUL-16
Total Kjeldahl Nitrogen						
Total Kjeldahl Nitrogen	35.3		mg/L			05-JUL-16
Nitrite in Water by IC						
*Nitrite (as N)	<0.050	DLM	mg/L	1		04-JUL-16
Nitrate in Water by IC						
*Nitrate (as N)	<0.10	DLM	mg/L	10		04-JUL-16
Total and Fecal Coliform by MPN						
Total Coliform						
Total Coliforms	>110000		MPN/100mL	0		27-JUN-16
Fecal Coliform						
Fecal Coliforms	>110000		MPN/100mL			27-JUN-16
Phosphorus (P)-Total Dissolved	2.58		mg/L			05-JUL-16
Mercury (Hg)-Total	<0.00020	DLM	mg/L	0.001		29-JUN-16
Phosphorus (P)-Total	3.74		mg/L			10-JUL-16
Ammonia, Total (as N)	20.8		mg/L			28-JUN-16
Biochemical Oxygen Demand	109		mg/L			27-JUN-16
Chloride (Cl)	1370		mg/L		250	04-JUL-16
Conductivity	5660		umhos/cm			04-JUL-16
Hardness (as CaCO ₃)	832		mg/L		500	29-JUN-16
Oil and Grease	12.3		mg/L			28-JUN-16
Phenols (4AAP)	0.0413		mg/L			29-JUN-16
Phosphorus (P)-Total Reactive	2.48		mg/L			29-JUN-16
Sulfate (SO ₄)	654		mg/L		500	04-JUL-16
Total Organic Carbon	39.1		mg/L			30-JUN-16
Total Suspended Solids	39.0		mg/L			28-JUN-16

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Quality of Waste Water Discharged



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.: L1789152
WO No.: L1789152
Project Ref: EUREKA NU
Sample ID: EUWW 2-JUNE 26
Sampled By: John Maciver
Date Collected: 26-JUN-16
Lab Sample ID: L1789152-2
Matrix: Sewage/Waste Water

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Test Description	Result	Qualifier	Units of Measure	CDW/QG MAC	Aesthetic Objective	Date Analyzed
pH	7.37		pH units			04-JUL-16
Total Metals by ICP-MS						
Aluminum (Al)-Total	0.089		mg/L		0.1	28-JUN-16
Antimony (Sb)-Total	<0.0010		mg/L	0.006		28-JUN-16
Arsenic (As)-Total	<0.0010		mg/L	0.01		28-JUN-16
Barium (Ba)-Total	0.0297		mg/L	1		28-JUN-16
Beryllium (Be)-Total	<0.0010		mg/L			28-JUN-16
Bismuth (Bi)-Total	<0.00050		mg/L			28-JUN-16
Boron (B)-Total	0.302		mg/L	5		28-JUN-16
Cadmium (Cd)-Total	<0.00020		mg/L	0.005		28-JUN-16
Calcium (Ca)-Total	188		mg/L			28-JUN-16
Cesium (Cs)-Total	<0.00050		mg/L			28-JUN-16
Chromium (Cr)-Total	<0.0020		mg/L	0.05		28-JUN-16
Cobalt (Co)-Total	0.00074		mg/L			28-JUN-16
Copper (Cu)-Total	0.103		mg/L		1.0	28-JUN-16
Iron (Fe)-Total	0.56		mg/L		0.3	28-JUN-16
Lead (Pb)-Total	0.0010		mg/L	0.01		28-JUN-16
Lithium (Li)-Total	0.0304		mg/L			28-JUN-16
Magnesium (Mg)-Total	88.4		mg/L			28-JUN-16
Manganese (Mn)-Total	0.0826		mg/L		0.05	28-JUN-16
Molybdenum (Mo)-Total	0.00067		mg/L			28-JUN-16
Nickel (Ni)-Total	0.0060		mg/L			28-JUN-16
Phosphorus (P)-Total	3.89		mg/L			28-JUN-16
Potassium (K)-Total	24.3		mg/L			28-JUN-16
Rubidium (Rb)-Total	0.0128		mg/L			28-JUN-16
Selenium (Se)-Total	<0.0050		mg/L	0.05		28-JUN-16
Silicon (Si)-Total	1.19		mg/L			28-JUN-16
Silver (Ag)-Total	<0.0010		mg/L			28-JUN-16
Sodium (Na)-Total	983		mg/L		200	28-JUN-16
Strontium (Sr)-Total	0.781		mg/L			28-JUN-16
Tellurium (Te)-Total	<0.0010		mg/L			28-JUN-16
Thallium (Tl)-Total	<0.0050		mg/L			28-JUN-16
Thorium (Th)-Total	<0.0010		mg/L			28-JUN-16
Tin (Sn)-Total	0.00293		mg/L			28-JUN-16
Titanium (Ti)-Total	0.0015		mg/L			28-JUN-16
Tungsten (W)-Total	<0.0020		mg/L			28-JUN-16
Uranium (U)-Total	0.00131		mg/L	0.02		28-JUN-16
Vanadium (V)-Total	<0.0020		mg/L			28-JUN-16
Zinc (Zn)-Total	0.100		mg/L		5.0	28-JUN-16
Zirconium (Zr)-Total	0.0017		mg/L			28-JUN-16

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Appendix G Quality of Waste Water Discharged



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 11-JUL-16
PO No.: L1789152
WO No.: EUREKA NU
Project Ref: EUWW 2-JUNE 26
Sample ID: John Maciver
Date Collected: 26-JUN-16
Lab Sample ID: L1789152-2
Matrix: Sewage/Waste Water

PAGE 6 of 7

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated DECEMBER 2015 * CDWQG for Nitrate+Nitrite-N is the limit for nitrate only. If present as Nitrate then the limit is 10mg/L < or N.D. = less than detection limit. * Turbidity guideline based on membrane filtration. For guidelines on conventional treatment and slow sand or diatomaceous earth filtration please see Summary Table of Guidelines for Canadian Drinking Water Quality - A blank entry designates no known limit. - A shaded value in the Results column exceeds CDWQG MAC and/or Aesthetic Objective.						
Approved by:  Hua Wo Account Manager						

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Quality of Waste Water Discharged

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Guidelines & Objectives

Sample Parameter Qualifier key listed:

Qualifier	Description
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Health Canada MAC Health Related Criteria Limits

Nitrate/Nitrite-N*	Criteria limit is 10 mg/L (1.0 mg/L if present as all Nitrite-N). High concentrations may contribute to blue baby syndrome in infants.
Lead*	A cumulative body poison, uncommon in naturally occurring hard waters.
Fluoride*	Present in fluoridated water supplies at 0.8 mg/L to reduce dental caries. Elevated levels causes fluorosis (mottling of teeth).
Total Coliforms*	Criteria is 0 CFU/100mL. Adverse health effects.
E. Coli*	Criteria is 0 CFU/100 mL. Certain E. Coli bacteria can be life threatening.

*Health Canada Canadian Drinking Water Quality Guidelines (MAC limit)

Aesthetic Objective Concentration Levels

Alkalinity	Acid neutralizing capacity. Usually a measure of carbonate and bicarbonates and calculated and reported as calcium carbonate.
Balance	Quality control parameter relating cations to anions
Bicarbonate	See Alkalinity. Report as the anion HCO ₃ -1
Carbonate	See Alkalinity. Reported at the anion CO ₃ -2
Calcium	See Hardness. Common major cation of water chemistry.
Chloride	Common major anion of water chemistry.
Conductance	Physical test measuring water salinity (dissolved ions or solids)
Hardness	Classical measure or capacity of water to precipitate soap (chiefly calcium and magnesium ions). Causes scaling tendency in water if carbonates/bicarbonates are present (if >200 mg/L). For drinking water purposes waters with results <200 mg/L are considered acceptable, results >200 mg/L are considered poor but can be tolerated. Results >500 mg/L are unacceptable.
Hydroxide	See alkalinity
Magnesium	See hardness. Common major cation of water chemistry. Elevated levels (>125 mg/L) may exert a cathartic or diuretic action.
pH	Measure of water acidity/alkalinity. Normal range is 7.0-8.5.
Potassium	Common major cation of water chemistry.
Sodium	Common major cation of water chemistry. Measure of salinity (saltiness). The aesthetic objective (not related to health) for sodium in drinking water is 200 mg/L. However, where sodium concentration of the drinking water exceeds 20 mg/L, it is recommended that any person on a sodium restricted diet consult with his/her physician or Medical Officer of Health concerning the use of that water.
Sulphate	Common major anion of water chemistry. Elevated levels may exert a cathartic or diuretic action.
Total Dissolved Solids	A measure of water salinity.
Iron	Causes staining to laundry and porcelain and astringent taste. Oxidizes to red-brown precipitate on exposure to air.
Manganese	Elevated levels may cause staining of laundry and porcelain.
Heterotrophic	
Plate Count	Criteria is 500 cfu/mL. Measure of heterotrophic bacteria present.

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample
 mg/kg wwt - milligrams per kilogram based on wet weight of sample
 mg/kg lw - milligrams per kilogram based on lipid-adjusted weight
 mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Appendix G
Quality of Waste Water Discharged

Laboratory Group A. Campbell & Testing Services 		12 - 1329 Nisakwa Rd. E. Winnipeg, Manitoba R2J 3T4 Tel: (204) 255-9720 Fax: (204) 255-9721 1 800 607 7555		Chain of Custody / Analytical Request Form CHEMISTRY INFO: (204) 255 9739 MICRO INFO: (204) 255 9740 OR (204) 255 9737	
Environmental FOR LAB: Sample C: L1789152-COFC ☐ Frozen COMMENT:		WORK ORDER NO: 16.4-6 LAB NO.: L1789152 DATE RECEIVED: 06-27-16 TIME RECEIVED: 8:35am BY: CW		☐ NON ACCEPTABLE ☐ Incorrect Sample Container	
Date Sampled: JUNE 25 Time: 20 45 A.M. ☒ P.M. ☐		Date Required:			
Location: EUREKA NU (Town, Community, City)		Submitter's Name Printed: John MacTuer			
Community Code Number:		Sample Submitted By:			
Rural Municipality/LGC/UVD:		PLEASE PRINT & PRESS FIRMLY			
SAMPLE TYPE DRINKING WATER ☐ Untreated Well ☐ Treated Well ☐ Treated Municipal ☐ Non-Treated Municipal ☐ Water-Surface-Raw ☐ Water-Surface-Treated PURPOSE OF TEST ☐ Private ☐ Real Estate ☐ Water Main		NON-DRINKING WATER ☒ Sewage/Waste Water ☐ Lake/River ☐ Swimming Pool ☐ Whirl Pool ☐ Other			
SERVICE REQUESTED ☐ REGULAR ☐ PRIORITY ☐ EMERGENCY (50% SURCHARGE) (100% SURCHARGE)		NOTES & CONDITIONS 1. Quote number must be provided to insure proper pricing. 2. Failure to properly complete all portions of this form may delay analysis. 3. ALS's liability limited to cost of analysis.			

LAB NUMBER	SAMPLE IDENTIFICATION	ALS CUSTOMER #:	QUOTE #:
	EU WW 1 = June 25 2016 20:45 PM		
	EU WW 2 = June 26 2016		
	EUREKA Weather Stn EUREKA NU XOM OGO		
	Waste Water decant samples for Munavut WATER BOARD		

Analyses required: See Attached

Samples By: John MacTuer

BILLING ADDRESS SAME AS REPORT TO ☐	
NAME:	
COMPANY:	
ADDRESS:	
CITY/TOWN: / PROV.:	
POSTAL CODE:	
PHONE:	
BY: MAIL ☐ FAX ☐	
PICKUP ☐ E-MAIL ☐	
CC	
NAME:	
ADDRESS:	
CITY/TOWN: / PROV.:	
POSTAL CODE:	
PHONE:	
BY: MAIL ☐ FAX ☐	
PICKUP ☐ E-MAIL ☐	

PAYMENT PARTICULARS ☐ INVOICE NEEDED / CLIENT'S P.O. NO. ☐ INTERAC ☐ CASH Subtotal \$ ☐ CHEQUE G.S.T. \$ ☐ VISA / MASTERCARD Total \$ * OUR POLICY IS NOT TO ACCEPT SAMPLES FROM THE PRIVATE CITIZEN WITHOUT PREPAYMENT	
--	--

SAMPLING INSTRUCTIONS ON REVERSE SIDE

Manitoba Technology Centre Ltd.
 Part of the **ALS Laboratory Group**
 12 - 1329 Nisakwa Rd. E., Winnipeg, MB Canada R2J 3T4
 Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com
 A Campbell Brothers Limited Company

SUBMITTER COPY

ENTERED IN LIMS BY:

Appendix H

GPS Coordinates

GPS Coordinates for water sources utilized

Source Description	Latitude			Longitude		
	° Deg	' Min	" Sec	° Deg	' Min	" Sec
Station Creek	79	59	21	85	57	4
Water Lagoon	79	59	20	85	56	46

GPS Locations of areas of waste disposal

Location Description (type)	Latitude			Longitude		
	° Deg	' Min	" Sec	° Deg	' Min	" Sec
Sewage Lagoon	79	59	23	85	50	11
East Landfill	79	59	29	85	46	20
Asbestos Landfill	79	59	17	85	46	50
Crushed Barrel Landfill	79	59	38	85	49	38
Ash Landfill	79	59	32	85	47	52
Contaminated Soil Pit	79	59	40	85	49	34
Land Farm	79	59	40	85	50	11
DND Sewage Lagoon	79	59	23	85	50	11

EUREKA WATER ANALYSIS 2016: Landfill EUR3 and Landfarm EUR4

Parameter	SAMPLE ANALYSIS (mg/L)		GUIDELINES (mg/L)
	LANDFILL EUR 2 2016*	LANDFARM EUR 4 2014**	NWB Guidelines for EUR 4
Conductivity (microS/cm)	500	956	NV
TDS	n/a	594	
PH (PH units)	7,88	7,79	
BOD	n/a	6	
Amonia as Nitrogen	0.035	<0.005	
Nitrate + Nitrite as Nitrogen	0.099	0,03	
Hardness	161	N/A	
Total Organic Carbon	3,78	N/A	
Total Alkalinity	52	N/A	
Calcium	39	74,1	
Chloride	n/a	N/A	
Potassium	5,97	N/A	
Sodium	48.7	70,4	
Sulphate	68.8	247	
Coliforms, Fecal (CFU/100ml)	n/a	<1	
Oil and Grease	<1.0	NV	0,001
Aluminum	9750	0,346	
Arsenic	8.04	0,0005	
Cadmium	0.108	<0,0001	
Chromium	21.2	0,0015	
Cobalt	10.3	0,0005	
Copper	23.2	0,0006	
Iron	25500	0,944	
Lead	10.9	0,0005	
Manganese	225	0,305	
Nickel	23.5	0,0016	
Zinc	73.4	0,0062	
Total Mercury	0.030	N/A	
Total Phenols	0.0025	0,0065	0,02
Benzene	Not required	Not required	0,37
Toluene	Not required	Not required	0,002
Ethylbenzene	Not required	Not required	0,09

TNTC: Too numerous to count. Unable to repeat analysis at higher dilution. Holding time exceeded
N/A: Parameter analysis not available

* Latest sampling was received by ECCC on July 13, 2016
** Data not available for 2016. Latest data available is from 2014

*Subcontracted organics are in concentrations less than detectable levels except for those listed immediately above

ⁱGuidelines for Canadian Drinking Water Quality Summary Table, May 2008
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/chemical-chimiques-eng.php#tbl6

ⁱⁱUS Environmental Protection Agency Drinking Water Standards
<http://www.epa.gov/safewater/contaminants/index.html>

¹Maxiumum Acceptable Concentration

²Aesthetic Objectives

³Operational Guidance Values

⁴Maximum Contaminant Level

⁵Maximum Contaminant Level Goal

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.



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

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

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



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

ENVIRONMENT CANADA
Site Location: EUREKA, NV

Success Through Science®

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				



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

ENVIRONMENT CANADA
Site Location: EUREKA, NV

Success Through Science®

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Misc. Inorganics				
Alkalinity (Total as CaCO3)	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 (HCO3)	mg/L	63.4	0.50	8312886
Carbonate (CO3)	mg/L	<0.50	0.50	8312886
Hydroxide (OH)	mg/L	<0.50	0.50	8312886
Anions				
Dissolved Sulphate (SO4)	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
Site Location: EUREKA, NV

Success Through Science®

CCME TOTAL METALS IN WATER (WATER)				
Maxxam ID		OX5883		
Sampling Date				
	UNITS	EUR-2	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO3)	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

ENVIRONMENT CANADA
Site Location: EUREKA, NV

Success Through Science®

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

ENVIRONMENT CANADA
Site Location: EUREKA, NV

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.

QUALITY ASSURANCE REPORT

ENVIRONMENT CANADA
Site Location: EUREKA, NV

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 CaCO3)	2016/06/29			96	80 - 120	<0.50	mg/L	NC	20
8312886	Bicarbonate (HCO3)	2016/06/29					<0.50	mg/L	NC	20
8312886	Carbonate (CO3)	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)

ENVIRONMENT CANADA
Site Location: EUREKA, NV

Success Through Science®

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

QUALITY ASSURANCE REPORT(CONT'D)

ENVIRONMENT CANADA
Site Location: EUREKA, NV

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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).										

ENVIRONMENT CANADA
Site Location: EUREKA, NV

Success Through Science®

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

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.