

NWB Annual Report

Year being reported:

2015

License No: 3BC-EUR1116

Issued Date: June 7, 2011

Expiry Date: 2016-06-07 renewal pending at NWB

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

1 812

0

0

Quantity Allowable Domestic (cu.m)

Actual Quantity Used Domestic (cu.m)

Quantity Allowable Drilling (cu.m)

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

Other: (see additional details)

Additional Details:

Will be done as soon as possible. Revision is currently underway.

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 2015/16

- a. Runway recapitalization project has been delayed because the contractor couldn't find the required aggregates. The problem should now be solved and the construction is scheduled to start in year 2017/18 for 3 years.
- b. Sewage treatment plant and New Water Lagoon design is complete. Construction scheduled to begin in year 2018/19
- c. New multipurpose support building construction is underway
- d. Permafrost Study has been suspended for this year.
- e. Domestic Hot Water Plate Heat Exchanger project is underway. New Exchanger will be installed in fall 2016.

Work Planned for 2016/17

- a. Multipurpose building construction will continue next year.
- b. Permafrost Study is scheduled to start next year
- c. Planning phase for PEARL HVAC Recapitalization project to start

Results of the Monitoring Program including:

Details attached



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

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Date Submitted:

July 14, 2016

Submitted/Prepared by:

Jean-Philippe Cloutier-Dussault

Contact Information:

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Appendix A
Quantity of Raw Water

QUANTITIES OF
FRESH WATER OBTAINED
Eureka 2015

Fresh Water: Fresh Water Lagoon

2 pump capacities: Tsurmi Pumps Model LB2-400 with a 30’ head at
~ 19 gal/min:

Pumping began on June 24th and ended July 18th
=Estimate 656,640 gal

Pumping resumed August 5th and ended August 8th
=Estimate 82,080 gal

Total water pumped = ~738,720 gallons or ~2,796 m3

Actual consumption of water from January to December 2014 indicated by the water meter readings, as per the Eureka December Month end report, is 1,811.9 m3 of total water was used.

Intake hose screen has ¼” diameter holes.

1st Pumping took place after initial rush of stream had taken place and the amount of silt/mud had diminished.

2nd pumping took place once second melt runoff occurred, in order to top up the lagoon before winter freeze up.

Appendix B

Quality of Raw Water

EUREKA RAW WATER ANALYSIS 2007-2015

RAW WATER									
Lagoon									
Parameter	2007	2008	2009	2010	2011	2012	2013	2014	2015
TDS			256	482	2150	1130	3170	2910	Please refer to lab results provided below
Organic Carbon	61,2	40,8	0,9	<0.5	3,2	4,9	4,0	2,0	
Hardness	1300	1330	132	292	1240	563	1600	155	
Coliforms, Total		<1.0		<1.0	4,1	<1.0	47,3	<1.0	
Escherichia coli		<1.0		<1.0	<1.0	<1.0	<1.0	<1.0	
Aluminum	<0.030	0,0092	0,964	0,0044	0,036	0,039	0,049	68,5	
Antimony			0,0002	<0.0001	<0.0001	0,0001	0,0002	0,5	
Arsenic			<0.0002	<0.0002	0,0003	0,0142	0,0004	0,4	
Barium	0,0781	0,0657	0,0064	0,0190	0,0687	0,0247	0,0642	0,0486	
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Boron	0,233	0,103							
Cadmium	0,0003	<0.00005	<0.0001	<0.00005	<0.00005	<0.0005	<0.00005	<0.0001	
Chromium	0,0003	0,0002	0,0002	<0.0001	0,0001	0,0007	0,0001	0,0012	
Cobalt	0,0006	0,0004	<0.0001	<0.0001	0,0007	0,0004	<0.0001	<0.0001	
Copper	0,0016	0,022	0,0066	0,0282	0,0012	0,0066	0,0164	0,0035	
Iron	0,0536	<0.050	0,151	<0.050	0,009	0,09	0,032	0,152	
Lead	0,0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0,0002	<0.0001	
Lithium			0,0041	0,0094	0,0368	0,0184	0,0479	0,0059	
Manganese	0,0182	0,0347	0,0051	0,0071	0,0282	0,023	0,0031	0,0088	
Molybdenum	0,0006	0,0006	0,0001	0,0001	0,0004	0,0005	0,001	0,0003	
Nickel	0,0035	0,003	0,0006	0,0007	0,0061	0,0035	0,0027	0,0009	
Selenium			<0.0005	0,0006	0,0022	<0.0005	0,0031	<0.0005	
Silver	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0,0007	0,0002	
Strontium	1,34	1,18	0,112	0,288	1,11	0,55	1,38	0,159	
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Titanium	0,0014	0,001	0,0013	0,0001	0,0003	0,0012	0,0032	0,0014	
Uranium			0,0002	0,0003	0,0001	0,0009	0,0025	0,0002	
Vanadium	0,0003	<0.0001	0,0003	<0.0001	<0.0001	0,0107	0,0002	0,0002	
Zinc	0,01	0,0039	<0.0005	0,0019	0,0021	<0.005	0,0092	0,0059	
Bromodicholormethane			<0.005	<0.005	n/a	<0.001	N/A	<0.005	
Bromoform			<0.005	<0.005	n/a	<0.001	N/A	<0.005	
Dibromochloromethane			<0.005	<0.005	n/a	<0.001	N/A	<0.005	
Trihalomethanes	0,005		<0.005	<0.005	n/a	<0.001	N/A	<0.005	

*Laboratory equipment / supply failure & unable to repeat measurement

Appendix B
Quality of Raw Water



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: LAGOON - EULAG0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-1
Matrix: Water

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
THM by headspace						
Total THMs	<0.0010		mg/L	0.1		01-MAR-16
VOC plus F1 by GCMS						
Bromodichloromethane	<0.00050		mg/L			26-FEB-16
Bromoform	<0.00050		mg/L			26-FEB-16
Chloroform	<0.00050		mg/L			26-FEB-16
Dibromochloromethane	<0.00050		mg/L			26-FEB-16
Surr: 4-Bromofluorobenzene (SS)	90.4		%			26-FEB-16
Surr: 1,4-Difluorobenzene (SS)	99.8		%			26-FEB-16
Hardness (as CaCO3)	487		mg/L		500	25-FEB-16
Total Dissolved Solids	902		mg/L		500	26-FEB-16
Total Organic Carbon	1.78		mg/L			24-FEB-16
*Turbidity	1.23		NTU			23-FEB-16
Total Metals by ICP-MS						
Aluminum (Al)-Total	0.144		mg/L		0.1	24-FEB-16
Antimony (Sb)-Total	<0.0010		mg/L	0.006		24-FEB-16
Arsenic (As)-Total	<0.0010		mg/L	0.01		24-FEB-16
Barium (Ba)-Total	0.0228		mg/L	1		24-FEB-16
Beryllium (Be)-Total	<0.0010		mg/L			24-FEB-16
Bismuth (Bi)-Total	<0.00050		mg/L			24-FEB-16
Boron (B)-Total	0.097		mg/L	5		24-FEB-16
Cadmium (Cd)-Total	0.00022		mg/L	0.005		24-FEB-16
Calcium (Ca)-Total	113		mg/L			24-FEB-16
Cesium (Cs)-Total	<0.00050		mg/L			24-FEB-16
Chromium (Cr)-Total	<0.0020		mg/L	0.05		24-FEB-16
Cobalt (Co)-Total	<0.00050		mg/L			24-FEB-16
Copper (Cu)-Total	0.0080		mg/L		1.0	24-FEB-16
Iron (Fe)-Total	0.22		mg/L		0.3	24-FEB-16
Lead (Pb)-Total	<0.0010		mg/L	0.01		24-FEB-16
Lithium (Li)-Total	0.0190		mg/L			24-FEB-16
Magnesium (Mg)-Total	49.9		mg/L			24-FEB-16
Manganese (Mn)-Total	0.0157		mg/L		0.05	24-FEB-16
Molybdenum (Mo)-Total	<0.00050		mg/L			24-FEB-16
Nickel (Ni)-Total	0.0028		mg/L			24-FEB-16
Phosphorus (P)-Total	<0.50		mg/L			24-FEB-16
Potassium (K)-Total	7.03		mg/L			24-FEB-16
Rubidium (Rb)-Total	0.00218		mg/L			24-FEB-16
Selenium (Se)-Total	<0.0050		mg/L	0.05		24-FEB-16
Silicon (Si)-Total	0.31		mg/L			24-FEB-16
Silver (Ag)-Total	<0.0010		mg/L			24-FEB-16
Sodium (Na)-Total	127		mg/L		200	24-FEB-16
Strontium (Sr)-Total	0.479		mg/L			24-FEB-16

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Appendix B
Quality of Raw Water



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: LAGOON - EULAG0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-1
Matrix: Water

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Total Metals by ICP-MS						
Tellurium (Te)-Total	<0.0010		mg/L	0.02	5.0	24-FEB-16
Thallium (Tl)-Total	<0.0050		mg/L			24-FEB-16
Thorium (Th)-Total	<0.0010		mg/L			24-FEB-16
Tin (Sn)-Total	<0.00060		mg/L			24-FEB-16
Titanium (Ti)-Total	0.0010		mg/L			24-FEB-16
Tungsten (W)-Total	<0.0020		mg/L			24-FEB-16
Uranium (U)-Total	0.00077		mg/L			24-FEB-16
Vanadium (V)-Total	<0.0020		mg/L			24-FEB-16
Zinc (Zn)-Total	<0.020		mg/L			24-FEB-16
Zirconium (Zr)-Total	<0.0010		mg/L			24-FEB-16
Total Coliform and E.coli						
Total Coliforms	0	MBHT	MPN/100mL	0		22-FEB-16
Escherichia Coli	0	MBHT	MPN/100mL	0		22-FEB-16
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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Appendix C
Quality of Tap Water

EUREKA WATER ANALYSIS 2008-2014: TAP WATER

TAP WATER							GUIDELINES (mg/l)				
Parameter	2009	2010	2011	2012	2013	2014	2015	CANADIAN ⁱ		US EPA ⁱⁱ	
								MAC ⁺	OG ⁺ /AO ⁺	MCL ⁺	MCLG ⁺
TDS	524	1510	1920	1290	2270	936	Please refer to lab results provided below				
Organic Carbon	1,5	1,8	2,7	3,3	3,2	4,2					
Hardness	112	26,7	664	15,3	55,3	47,8					
Coliforms, Total	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		0/100 ml		100/100ml	0
Escherichia coli	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		0/100 ml			0
Aluminum	0,046	0,007	0,0291	0,024	0,0035	0,0033			0,2	0.05-0.2	
Antimony	0,0002	<0.0001	<0.0001	0,0001	0,0001	0,0001					
Arsenic	<0.0002	0,0003	0,0003	0,0007	0,0004	0,0004					
Barium	0,0054	0,0027	0,0213	0,0004	0,0015	0,0015		1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				0,004	
Boron							5				
Cadmium	<0.0001	<0.00005	<0.00005	<0.0005	<0.00005	<0.00005	0,005		0,005	0,005	
Chromium	0,0002	0,0002	0,0001	<0.0001	<0.0001	0,0002	0,05		0,1	0,1	
Cobalt	<0.0001	<0.0001	0,0005	<0.0001	<0.0001	<0.0001					
Copper	0,0652	0,371	0,101	0,0447	0,0709	0,104		<1.0		1,3	
Iron	0,101	0,012	0,008	0,023	0,009	0,011		<0.3	0,3		
Lead	0,0001	0,0003	<0.0001	<0.0001	<0.0001	<0.0001	0,01		0,015	0	
Lithium	0,0037	0,0317	0,0421	0,0013	0,0026	0,0571					
Manganese	0,0036	0,0037	0,0188	0,0018	0,0012	0,0008		<0.05	0,05		
Molybdenum	0,0002	0,0003	0,0003	0,0006	0,0007	0,0007					
Nickel	0,0007	0,0024	0,0037	0,0009	0,0003	0,0007					
Selenium	0,0005	0,0012	0,0018	0,0007	0,0026	0,0029					
Silver	<0.0001	<0.0001	<0.0001	0,0005	<0.0001	<0.0001			0,1		
Strontium	0,0898	0,0393	0,363	0,0041	0,003	0,0467					
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					
Titanium	<0.0001	0,0004	0,0004	0,0032	0,0001	<0.0001					
Uranium	0,0003	0,0009	0,0015	0,001	0,0018	0,0021					
Vanadium	0,0002	<0.0001	<0.0001	0,0005	<0.0001	<0.0001					
Zinc	0,047	0,0656	0,0549	0,009	0,0222	0,0178		<5.0	5		
Bromodicholormethane	0,01	0,006	n/a	<0.005	0,005	<0.005	0,016				
Bromoform	0,052	0,068	n/a	0,036	0,183	0,126					
Dibromochloromethane	0,027	0,026	n/a	0,02	0,038	0,026					
Trihalomethanes	0,092	0,101	n/a	0,062	0,227	0,155	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>

⁺Maximum Acceptable Concentration

⁺Aesthetic Objectives

⁺Operational Guidance Values

⁺Maximum Contaminant Level

⁺Maximum Contaminant Level Goal

Appendix C
Quality of Tap Water



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: TAP EUTAP0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-3
Matrix: Water

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
THM by headspace						
Total THMs	0.420		mg/L	0.1		01-MAR-16
VOC plus F1 by GCMS						
Bromodichloromethane	0.0222		mg/L			26-FEB-16
Bromoform	0.267		mg/L			26-FEB-16
Chloroform	0.00510		mg/L			26-FEB-16
Dibromochloromethane	0.125		mg/L			26-FEB-16
Surr: 4-Bromofluorobenzene (SS)	87.5		%			26-FEB-16
Surr: 1,4-Difluorobenzene (SS)	98.3		%			26-FEB-16
Hardness (as CaCO3)	23.2		mg/L		500	25-FEB-16
Total Dissolved Solids	1530		mg/L		500	26-FEB-16
Total Organic Carbon	2.92		mg/L			24-FEB-16
*Turbidity	0.10		NTU			23-FEB-16
Total Metals by ICP-MS						
Aluminum (Al)-Total	<0.020		mg/L		0.1	24-FEB-16
Antimony (Sb)-Total	<0.0010		mg/L	0.006		24-FEB-16
Arsenic (As)-Total	<0.0010		mg/L	0.01		24-FEB-16
Barium (Ba)-Total	0.00089		mg/L	1		24-FEB-16
Beryllium (Be)-Total	<0.0010		mg/L			24-FEB-16
Bismuth (Bi)-Total	<0.00050		mg/L			24-FEB-16
Boron (B)-Total	0.161		mg/L	5		24-FEB-16
Cadmium (Cd)-Total	<0.00020		mg/L	0.005		24-FEB-16
Calcium (Ca)-Total	5.85		mg/L			24-FEB-16
Cesium (Cs)-Total	<0.00050		mg/L			24-FEB-16
Chromium (Cr)-Total	<0.0020		mg/L	0.05		24-FEB-16
Cobalt (Co)-Total	<0.00050		mg/L			24-FEB-16
Copper (Cu)-Total	0.235		mg/L		1.0	24-FEB-16
Iron (Fe)-Total	<0.10		mg/L		0.3	24-FEB-16
Lead (Pb)-Total	<0.0010		mg/L	0.01		24-FEB-16
Lithium (Li)-Total	<0.0020		mg/L			24-FEB-16
Magnesium (Mg)-Total	2.08		mg/L			24-FEB-16
Manganese (Mn)-Total	<0.0010		mg/L		0.05	24-FEB-16
Molybdenum (Mo)-Total	0.00055		mg/L			24-FEB-16
Nickel (Ni)-Total	<0.0020		mg/L			24-FEB-16
Phosphorus (P)-Total	<0.50		mg/L			24-FEB-16
Potassium (K)-Total	4.73		mg/L			24-FEB-16
Rubidium (Rb)-Total	0.00122		mg/L			24-FEB-16
Selenium (Se)-Total	<0.0050		mg/L	0.05		24-FEB-16
Silicon (Si)-Total	0.72		mg/L			24-FEB-16
Silver (Ag)-Total	<0.0010		mg/L			24-FEB-16
Sodium (Na)-Total	557		mg/L		200	24-FEB-16
Strontium (Sr)-Total	0.0217		mg/L			24-FEB-16

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Appendix C
Quality of Tap Water



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: TAP EUTAP0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-3
Matrix: Water

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Total Metals by ICP-MS						
Tellurium (Te)-Total	<0.0010		mg/L			24-FEB-16
Thallium (Tl)-Total	<0.0050		mg/L			24-FEB-16
Thorium (Th)-Total	<0.0010		mg/L			24-FEB-16
Tin (Sn)-Total	<0.00060		mg/L			24-FEB-16
Titanium (Ti)-Total	<0.0010		mg/L			24-FEB-16
Tungsten (W)-Total	<0.0020		mg/L			24-FEB-16
Uranium (U)-Total	0.00132		mg/L	0.02		24-FEB-16
Vanadium (V)-Total	<0.0020		mg/L			24-FEB-16
Zinc (Zn)-Total	0.057		mg/L		5.0	24-FEB-16
Zirconium (Zr)-Total	<0.0010		mg/L			24-FEB-16
Total Coliform and E.coli						
Total Coliforms	0	MBHT	MPN/100mL	0		22-FEB-16
Escherichia Coli	0	MBHT	MPN/100mL	0		22-FEB-16
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 corventional 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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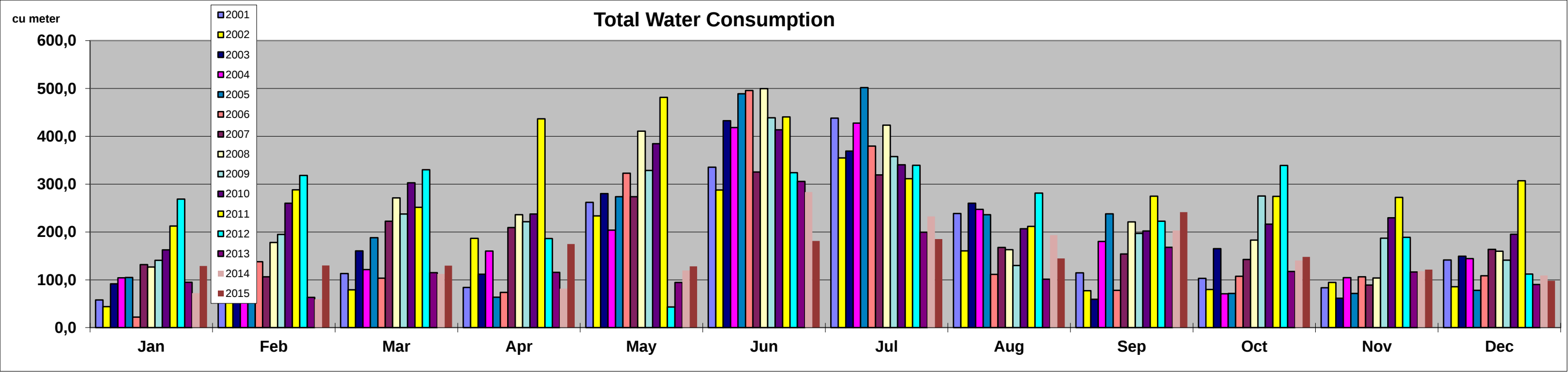


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APPENDIX D
QUANTITY OF DRINKING WATER

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
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	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	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	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	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	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	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	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	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	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	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	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	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	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	Monthly Avg



Appendix E
Quality of Drinking Water Consumed
EUREKA WATER ANALYSIS 2007-2014 - REVERSE OSMOSIS

REVERSE OSMOSIS DRINKING WATER								GUIDELINES (mg/l)				
Parameter	2008	2009	2010	2011	2012	2013	2014	2015	CANADIAN ⁱ	OG ^c /AO ^o	US EPA ⁱⁱ	MCLG ^p
									MAC ⁺		MCL ⁺	
TSS		208	<10	40	<10	18	83	Please refer to lab results provided below				
Organic Carbon		0,5	<0.5	<0.5	<0.5	<0.5	0,7					
Hardness		11,1	2,1	3,2	<0.7	0,0027	5,3					
Coliforms, Total	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		0/100 ml		100/100ml	0
Escherichia coli	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		0/100 ml			0
Aluminum	0,0019	0,017	0,0012	<0.6	<0.0005	<0.0006	0,0017			0,2	0.05-0.2	
Antimony		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					
Arsenic		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002					
Barium	0,0027	0,0022	0,0003	<0.0001	<0.0001	<0.0001	0,0002		1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				0,004	
Boron	0,0092								5			
Cadmium	<0.00005	<0.00005	0,00009	<0.00005	<0.0005	<0.00005	<0.00005		0,005		0,005	0,005
Chromium	0,001	<0.0001	0,0001	<0.0001	<0.0001	<0.0001	<0.0001		0,05		0,1	0,1
Cobalt	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					
Copper	0,0297	0,0133	0,0096	0,0026	0,0072	0,0335	0,0299			<1.0		1,3
Iron	<0.050	0,01	<0.050	<0.005	<0.005	<0.005	0,006			<0.3	0,3	
Lead	0,0057	0,0001	0,0007	<0.0001	0,0003	0,0003	<0.0001		0,01		0,015	0
Lithium		0,0009	0,0006	0,0014	<0.0002	0,0002	0,0093					
Manganese	0,0001	0,0005	0,0002	<0.0001	<0.0001	<0.0001	0,0004			<0.05	0,05	
Molybdenum	0,0003	<0.0001	0,0002	<0.0001	0,0001	<0.0001	0,0002					
Nickel	0,0013	0,0016	0,0005	0,0002	0,0002	0,0002	0,0005					
Selenium		0,0003	<0.0003	<0.0003	<0.0005	<0.0003	0,0009					
Silver	0,0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			0,1		
Strontium	0,0007	0,0072	0,0022	0,0015	0,0001	0,0002	0,0039					
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					
Titanium	<0.0001	0,0003	0,0001	<0.0001	<0.0001	<0.0001	<0.0001					
Uranium		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0,0002					
Vanadium	<0.0001	<0.0001	0,0001	<0.0001	<0.0001	<0.0001	<0.0001					
Zinc	0,819	0,0588	0,07	0,0175	0,111	0,123	0,0796		<5.0	5		
*Bromodichloromethane		<0.005	<0.005	n/a	<0.005	0,002	n/a	0,016				
Bromoform		<0.005	0,01	n/a	<0.005	0,012	n/a					
Dibromochloromethane		<0.005	0,008	n/a	<0.005	0,006	<0.005					
Trihalomethanes		<0.005	0,024	n/a	0,012	0,02	<0.005	0,1		0,08		

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

Guidelines 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

¹¹US Environmental Protection Agency Drinking Water Standards
<http://www.epa.gov/safewater/contaminants/index.html>

[†]Maximum Acceptable Concentration

⁴Aesthetic Objectives

³Operational Guidance Values⁴Maximum Contaminant Level^aMaximum Contaminant Level

Appendix E
Quality of Drinking Water Consumed



Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: REVERSE OSMOSIS EURO0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-2
Matrix: Water

PAGE 3 of 8

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
THM by headspace						
Total THMs	0.0127		mg/L	0.1		01-MAR-16
VOC plus F1 by GCMS						
Bromodichloromethane	0.00288		mg/L			26-FEB-16
Bromoform	0.00392		mg/L			26-FEB-16
Chloroform	0.00187		mg/L			26-FEB-16
Dibromochloromethane	0.00399		mg/L			26-FEB-16
Surr: 4-Bromofluorobenzene (SS)	90.1		%			26-FEB-16
Surr: 1,4-Difluorobenzene (SS)	99.1		%			26-FEB-16
Hardness (as CaCO3)	<0.30		mg/L		500	25-FEB-16
Total Dissolved Solids	38		mg/L		500	26-FEB-16
Total Organic Carbon	<0.50		mg/L			24-FEB-16
*Turbidity	<0.10		NTU			23-FEB-16
Total Metals by ICP-MS						
Aluminum (Al)-Total	<0.020		mg/L		0.1	24-FEB-16
Antimony (Sb)-Total	<0.0010		mg/L	0.006		24-FEB-16
Arsenic (As)-Total	<0.0010		mg/L	0.01		24-FEB-16
Barium (Ba)-Total	<0.00050		mg/L	1		24-FEB-16
Beryllium (Be)-Total	<0.0010		mg/L			24-FEB-16
Bismuth (Bi)-Total	<0.00050		mg/L			24-FEB-16
Boron (B)-Total	0.123		mg/L	5		24-FEB-16
Cadmium (Cd)-Total	<0.00020		mg/L	0.005		24-FEB-16
Calcium (Ca)-Total	<0.20		mg/L			24-FEB-16
Cesium (Cs)-Total	<0.00050		mg/L			24-FEB-16
Chromium (Cr)-Total	<0.0020		mg/L	0.05		24-FEB-16
Cobalt (Co)-Total	<0.00050		mg/L			24-FEB-16
Copper (Cu)-Total	0.0165		mg/L		1.0	24-FEB-16
Iron (Fe)-Total	<0.10		mg/L		0.3	24-FEB-16
Lead (Pb)-Total	<0.0010		mg/L	0.01		24-FEB-16
Lithium (Li)-Total	<0.0020		mg/L			24-FEB-16
Magnesium (Mg)-Total	<0.050		mg/L			24-FEB-16
Manganese (Mn)-Total	<0.0010		mg/L		0.05	24-FEB-16
Molybdenum (Mo)-Total	<0.00050		mg/L			24-FEB-16
Nickel (Ni)-Total	<0.0020		mg/L			24-FEB-16
Phosphorus (P)-Total	<0.50		mg/L			24-FEB-16
Potassium (K)-Total	0.12		mg/L			24-FEB-16
Rubidium (Rb)-Total	<0.00050		mg/L			24-FEB-16
Selenium (Se)-Total	<0.0050		mg/L	0.05		24-FEB-16
Silicon (Si)-Total	<0.30		mg/L			24-FEB-16
Silver (Ag)-Total	<0.0010		mg/L			24-FEB-16
Sodium (Na)-Total	14.5		mg/L		200	24-FEB-16
Strontium (Sr)-Total	<0.00050		mg/L			24-FEB-16

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Appendix E

Quality of Drinking Water Consumed



**Environment Canada
Eureka Weather Station
Eureka NU
ATTN: JOHN MACIVER**

Date: 01-MAR-16
PO No.:
WO No.: L1736660
Project Ref: EUREKA WEATHER STATION
Sample ID: REVERSE OSMOSIS EURO0510
Sampled By:
Date Collected: 21-FEB-16
Lab Sample ID: L1736660-2
Matrix: Water

PAGE 4 of 8

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Total Metals by ICP-MS						
Tellurium (Te)-Total	<0.0010		mg/L			24-FEB-16
Thallium (Tl)-Total	<0.0050		mg/L			24-FEB-16
Thorium (Th)-Total	<0.0010		mg/L			24-FEB-16
Tin (Sn)-Total	<0.00060		mg/L			24-FEB-16
Titanium (Ti)-Total	<0.0010		mg/L			24-FEB-16
Tungsten (W)-Total	<0.0020		mg/L			24-FEB-16
Uranium (U)-Total	<0.00050		mg/L	0.02		24-FEB-16
Vanadium (V)-Total	<0.0020		mg/L			24-FEB-16
Zinc (Zn)-Total	0.078		mg/L		5.0	24-FEB-16
Zirconium (Zr)-Total	<0.0010		mg/L			24-FEB-16
Total Coliform and E.coli						
Total Coliforms	0	MBHT	MPN/100mL	0		22-FEB-16
Escherichia Coli	0	MBHT	MPN/100mL	0		22-FEB-16
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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**QUANTITIES OF
WASTE WATER DISCHARGED**

Eureka 2015

Waste Water: Sewage Lagoon

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

First decant June 24 to June 27	333,000 gal	1514 cubic metres
Second decant Aug 9 to 14, Aug 17	225,000 gal	1023 cubic metres

This summer, second decant was larger than normal due to the layer of ice at the
bottom of the lagoon having melted allowing a complete discharge

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. Still, the BOD has returned to normal after 2014's higher values.

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. Construction phase is set to begin in 2018/19 fiscal year.

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.

Appendix G

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.

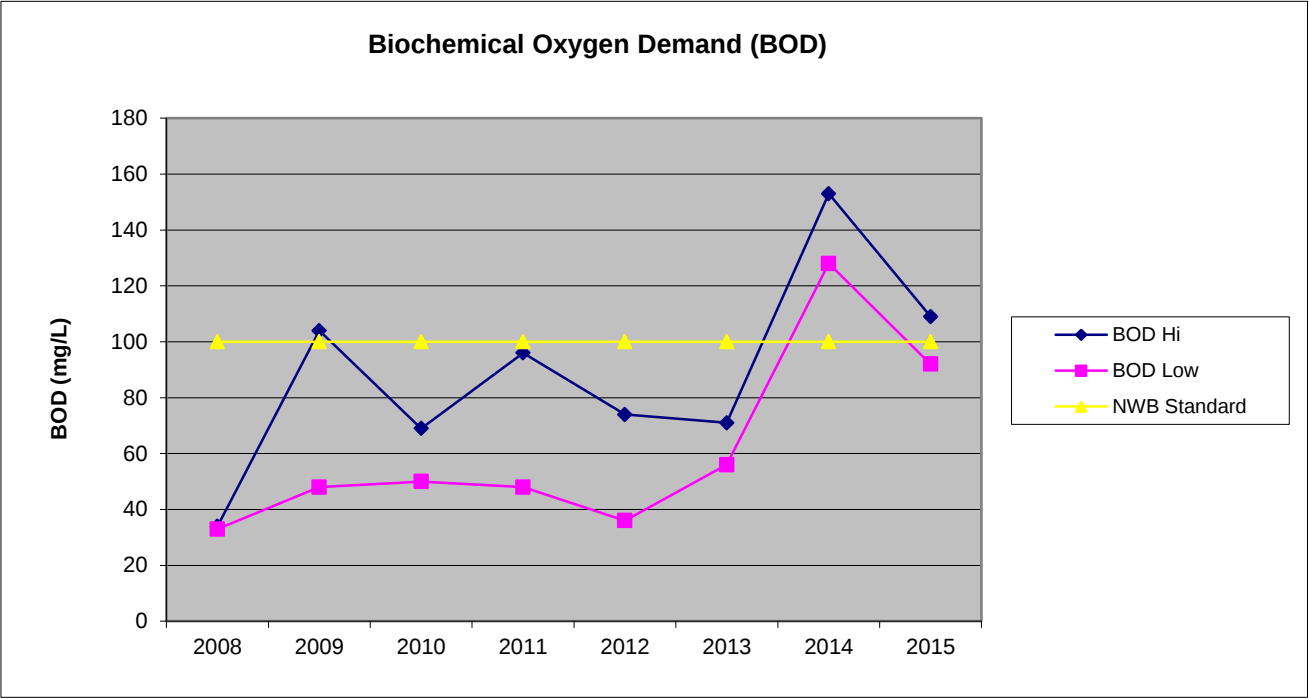
¹Richard, Michael, Microbiological and Chemical Testing for Troubleshooting Lagoons. 2003

²Tillman, Glenn, Wastewater Treatment: Troubleshooting and Problem Solving.

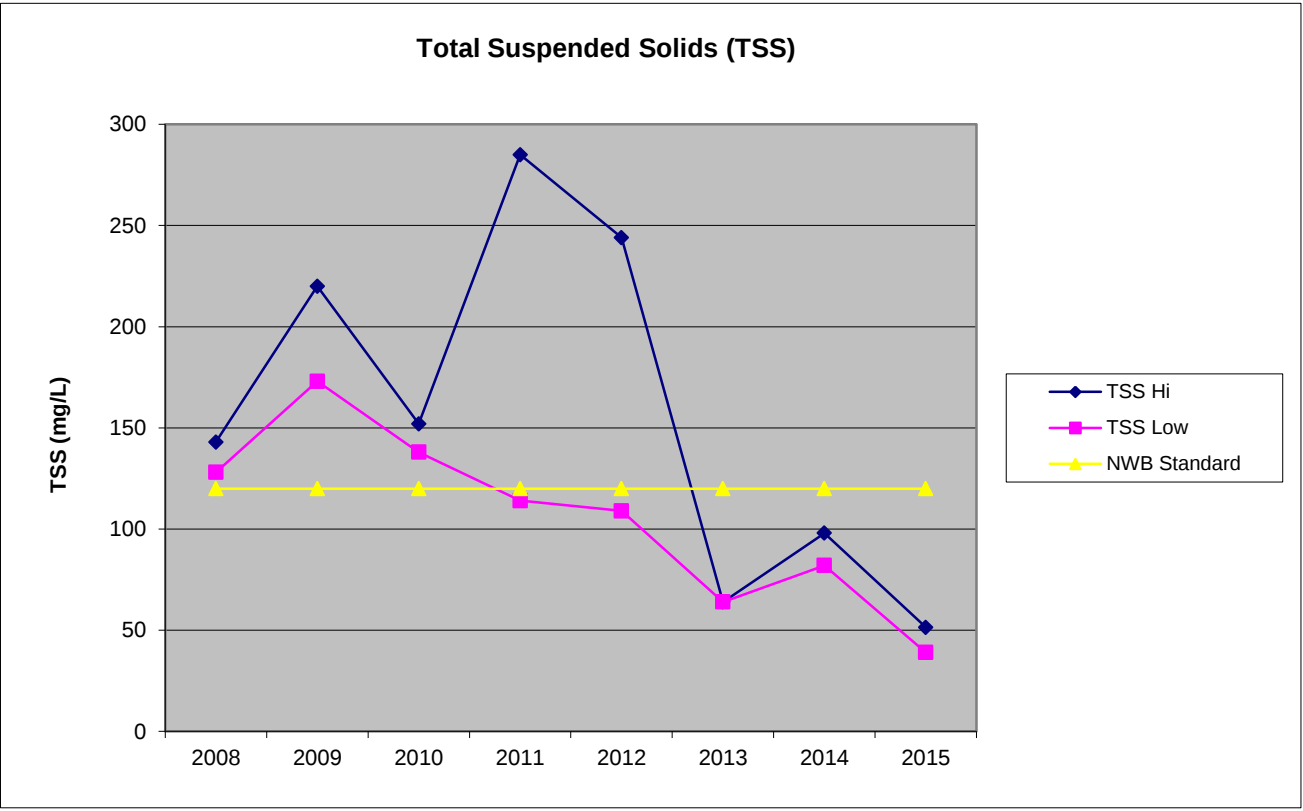
³Connecticut Department of Public Health, Fact Sheet: Manganese in Drinking Water. 2001

Appendix G
Quality of Waste Water Discharged

BOD Results for Eureka Wastewater Lagoon Effluent

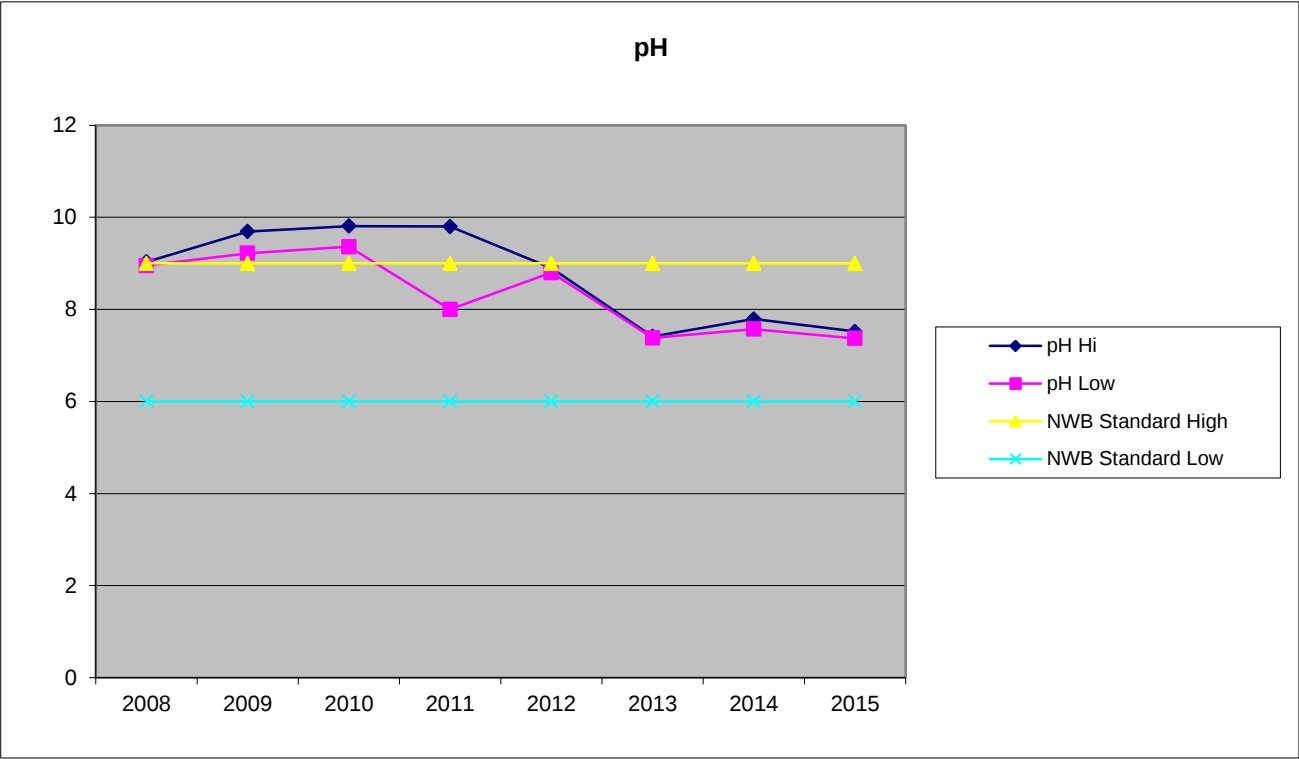


TSS Results for Eureka Wastewater Lagoon Effluent

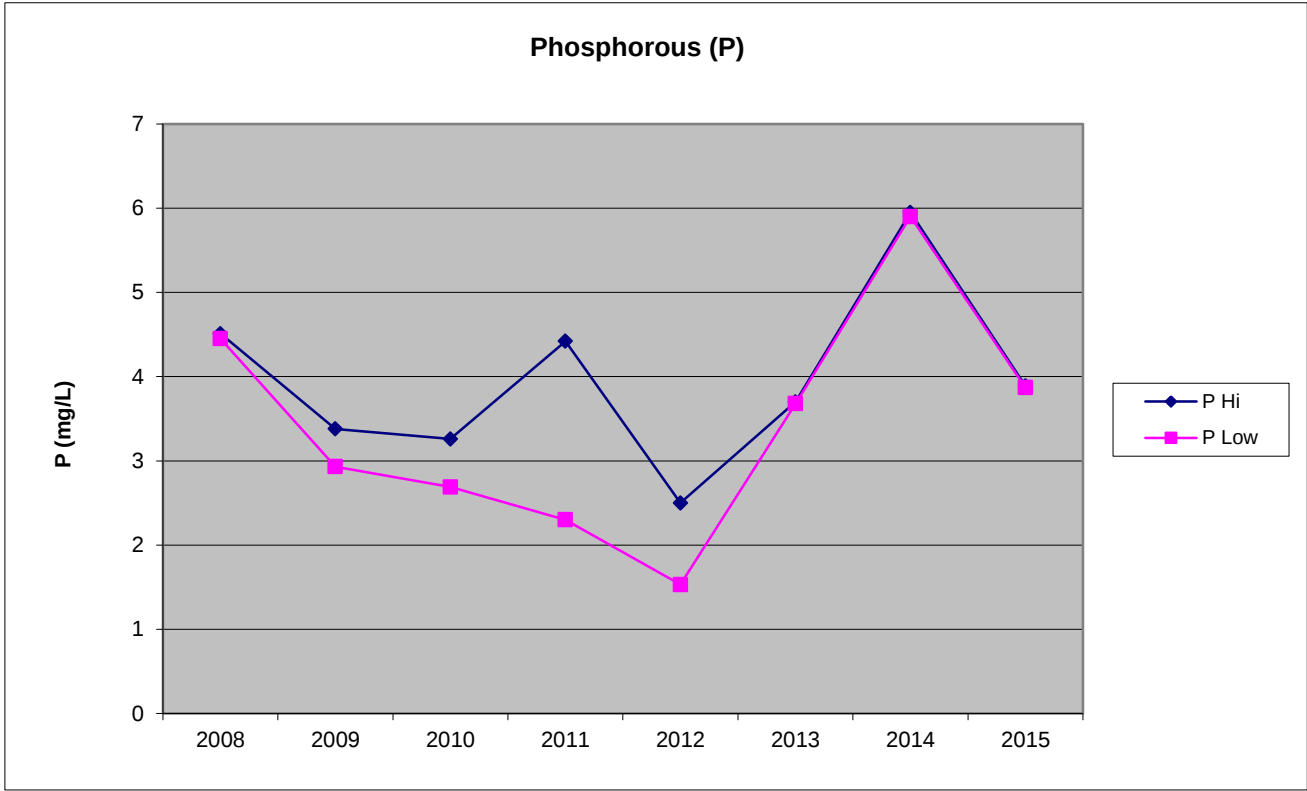


Appendix G
Quality of Waste Water Discharged

pH Results for Eureka Wastewater Lagoon Effluent

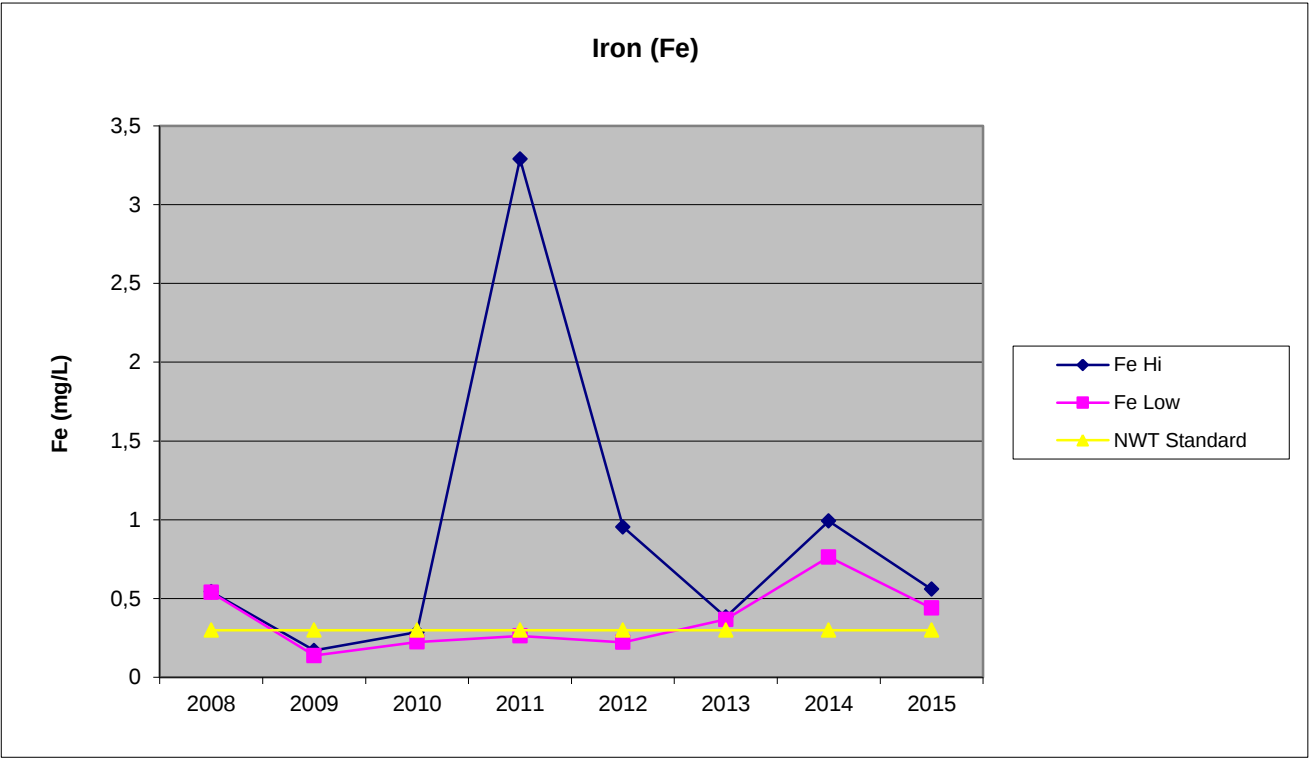


Phosphorous Results for Eureka Wastewater Lagoon Effluent

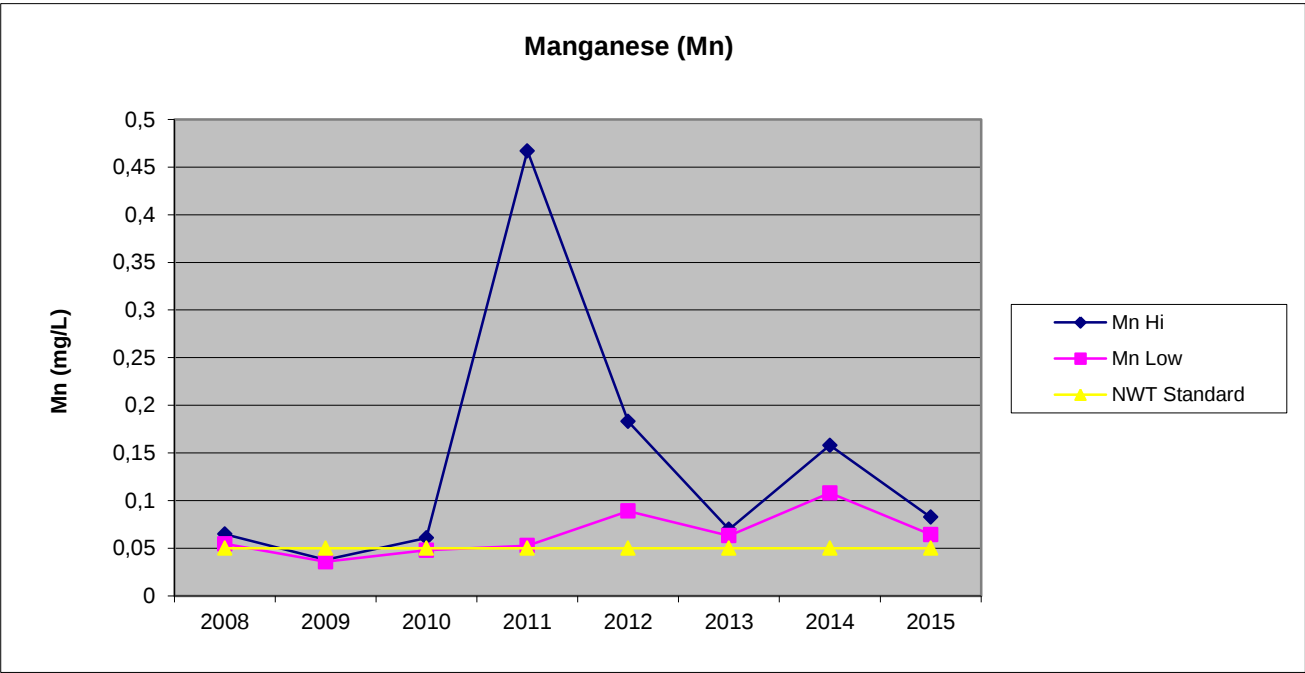


Appendix G
Quality of Waste Water Discharged

Iron Results for Eureka Wastewater Lagoon Effluent

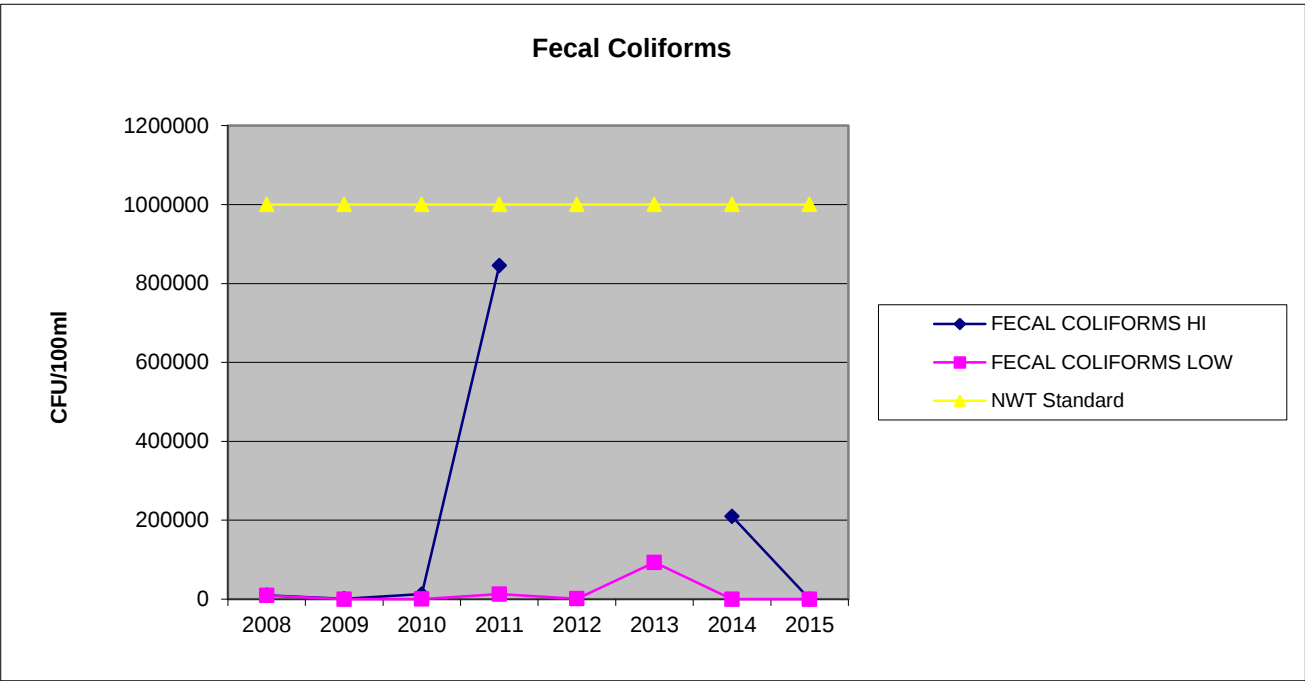


Manganese Results for Eureka Wastewater Lagoon Effluent



Appendix G
Quality of Waste Water Discharged

Fecal Coliform Results for Eureka Wastewater Lagoon Effluent



See Laboratory results for 2015 as they are smaller than 110 000.

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

Appendix G
Quality of Waste Water Discharged

EUREKA SEWAGE LAGOON: ANALYSIS RESULTS: 2015



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 1 of 7

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Alkalinity species as HCO3, CO3, OH						
Bicarbonate (HCO3)	348		mg/L			08-JUL-16
Carbonate (CO3)	<0.60		mg/L			08-JUL-16
Hydroxide (OH)	<0.34		mg/L			08-JUL-16
Alkalinity, Total (as CaCO3)						
Alkalinity, Total (as CaCO3)	284		mg/L			04-JUL-16
Nitrogen Total						
*Nitrate and Nitrite as N	<0.11		mg/L	10		08-JUL-16
Total Nitrogen	32.1		mg/L			08-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 Dissolved	2.36		mg/L			05-JUL-16
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 CaCO3)	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 Reactive	2.16		mg/L			29-JUN-16
Sulfate (SO4)	659		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

Appendix G
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

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	0.00064		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.:
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 * 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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Appendix G
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 26
Sampled By: John Maciver
Date Collected: 26-JUN-16
Lab Sample ID: L1789152-2
Matrix: Sewage/Waste Water

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
Alkalinity species as HCO ₃ , CO ₃ , 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 CaCO ₃)						
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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Appendix G
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 26
Sampled By: John MacIver
Date Collected: 26-JUN-16
Lab Sample ID: L1789152-2
Matrix: Sewage/Waste Water

Test Description	Result	Qualifier	Units of Measure	CDWQG 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	963		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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Date: 11-JUL-16
PO No.:
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

Test Description	Result	Qualifier	Units of Measure	CDWQG MAC	Aesthetic Objective	Date Analyzed
CDWQG = Health Canada Guideline Limits updated * 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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Appendix G
Quality of Waste Water Discharged

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 ratioidng cations to anions
Bicarbonate	See Alkalinity. Report as the anion HCO3-1
Carbonate	See Alkalinity. Reported at the anion CO3-2
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 lwt - 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.

Laboratory Group ANALYTICAL CHEMISTRY & TESTING SERVICES		12 - 1329 Niakwa 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																																													
FOR LAB: Sample ID: 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:		Rural Municipality/LGC/UVD:																																															
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		PLEASE PRINT & PRESS FIRMLY NON-DRINKING WATER ☒ Sewage/Waste Water ☐ Lake/River ☐ Swimming Pool ☐ Whirl Pool ☐ Other 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. SERVICE REQUESTED ☐ REGULAR ☐ PRIORITY ☐ EMERGENCY (50% SURCHARGE) (100% SURCHARGE)																																															
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Analyses required: See Attached Samples By: John MacTuer		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">BILLING ADDRESS</th> <th style="width: 50%;">SAME AS REPORT TO ☐</th> </tr> </thead> <tbody> <tr> <td colspan="2">NAME:</td> </tr> <tr> <td colspan="2">COMPANY:</td> </tr> <tr> <td colspan="2">ADDRESS:</td> </tr> <tr> <td colspan="2">CITY/TOWN: / PROV.:</td> </tr> <tr> <td colspan="2">POSTAL CODE:</td> </tr> </tbody> </table>				BILLING ADDRESS	SAME AS REPORT TO ☐	NAME:		COMPANY:		ADDRESS:		CITY/TOWN: / PROV.:		POSTAL CODE:																																	
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SAMPLING INSTRUCTIONS ON REVERSE SIDE Manitoba Technology Centre Ltd. Part of the ALS Laboratory Group 12 - 1329 Niakwa 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		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">PAYMENT PARTICULARS</th> </tr> </thead> <tbody> <tr> <td>☐ INVOICE NEEDED / CLIENT'S P.O. NO.</td> <td></td> </tr> <tr> <td>☐ INTERAC</td> <td></td> </tr> <tr> <td>☐ CASH</td> <td>Subtotal \$</td> </tr> <tr> <td>☐ CHEQUE</td> <td>G.S.T. \$</td> </tr> <tr> <td>☐ VISA / MASTERCARD</td> <td>Total \$</td> </tr> </tbody> </table>				PAYMENT PARTICULARS		☐ INVOICE NEEDED / CLIENT'S P.O. NO.		☐ INTERAC		☐ CASH	Subtotal \$	☐ CHEQUE	G.S.T. \$	☐ VISA / MASTERCARD	Total \$																																
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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 2015: 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	0,001
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	
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	0,02
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	
Benzene	Not required	Not required	
Toluene	Not required	Not required	
Ethylbenzene	Not required	Not required	

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 CVA F (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.

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				

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				

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				

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.



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

QUALITY ASSURANCE REPORT

ENVIRONMENT CAN.
Site Location: EUR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method
			% Recovery	QC Limits	% Recovery	QC Limits	Value
8313009	O-TERPHEYL (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
8312886	Alkalinity (Total as CaCO3)	2016/06/29			96	80 - 120	<0.50
8312886	Bicarbonate (HCO3)	2016/06/29					<0.50
8312886	Carbonate (CO3)	2016/06/29					<0.50
8312886	Hydroxide (OH)	2016/06/29					<0.50
8313009	F2 (C10-C16 Hydrocarbons)	2016/06/30	94	50 - 130	102	70 - 130	<0.15
8313009	F3 (C16-C34 Hydrocarbons)	2016/06/30	123	50 - 130	118	70 - 130	<0.15
8313009	F4 (C34-C50 Hydrocarbons)	2016/06/30	90	50 - 130	99	70 - 130	<0.15
8313308	Benzene	2016/06/29	90	70 - 130	94	70 - 130	<0.40
8313308	Ethylbenzene	2016/06/29	97	70 - 130	97	70 - 130	<0.40
8313308	F1 (C6-C10) - BTEX	2016/06/29					<300
8313308	F1 (C6-C10)	2016/06/29	85	70 - 130	99	70 - 130	<300
8313308	m & p-Xylene	2016/06/29	98	70 - 130	99	70 - 130	<0.80
8313308	Methyl-tert-butylether (MTBE)	2016/06/29	116	70 - 130	120	70 - 130	<4.0
8313308	o-Xylene	2016/06/29	102	70 - 130	104	70 - 130	<0.40
8313308	Toluene	2016/06/29	90	70 - 130	92	70 - 130	<0.40
8313308	Xylenes (Total)	2016/06/29					<0.80
8313471	Total Aluminum (Al)	2016/06/28	98	80 - 120	107	80 - 120	3.7, RDL=3.0
8313471	Total Antimony (Sb)	2016/06/28	99	80 - 120	99	80 - 120	<0.50
8313471	Total Arsenic (As)	2016/06/28	NC	80 - 120	100	80 - 120	<0.10
8313471	Total Barium (Ba)	2016/06/28	94	80 - 120	98	80 - 120	<1.0
8313471	Total Beryllium (Be)	2016/06/28	96	80 - 120	102	80 - 120	<0.10
8313471	Total Bismuth (Bi)	2016/06/28	94	80 - 120	94	80 - 120	<1.0
8313471	Total Boron (B)	2016/06/28	NC	80 - 120	98	80 - 120	<50
8313471	Total Cadmium (Cd)	2016/06/28	98	80 - 120	101	80 - 120	<0.010
8313471	Total Chromium (Cr)	2016/06/28	99	80 - 120	101	80 - 120	<1.0
8313471	Total Cobalt (Co)	2016/06/28	98	80 - 120	100	80 - 120	<0.50
8313471	Total Copper (Cu)	2016/06/28	99	80 - 120	102	80 - 120	<0.50



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

QUALITY ASSURANCE REPORT(CONT'D)

ENVIRONMENT CAN.
Site Location: EUR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method
			% Recovery	QC Limits	% Recovery	QC Limits	Value
8313471	Total Iron (Fe)	2016/06/28	111	80 - 120	109	80 - 120	<1.0
8313471	Total Lead (Pb)	2016/06/28	92	80 - 120	94	80 - 120	<0.20
8313471	Total Lithium (Li)	2016/06/28	NC	80 - 120	97	80 - 120	<5.0
8313471	Total Manganese (Mn)	2016/06/28	101	80 - 120	98	80 - 120	<1.0
8313471	Total Molybdenum (Mo)	2016/06/28	100	80 - 120	95	80 - 120	<1.0
8313471	Total Nickel (Ni)	2016/06/28	97	80 - 120	102	80 - 120	<1.0
8313471	Total Selenium (Se)	2016/06/28	94	80 - 120	101	80 - 120	<0.10
8313471	Total Silicon (Si)	2016/06/28					<100
8313471	Total Silver (Ag)	2016/06/28	104	80 - 120	99	80 - 120	<0.020
8313471	Total Strontium (Sr)	2016/06/28	NC	80 - 120	100	80 - 120	<1.0
8313471	Total Thallium (Tl)	2016/06/28	94	80 - 120	93	80 - 120	<0.050
8313471	Total Tin (Sn)	2016/06/28	98	80 - 120	105	80 - 120	<5.0
8313471	Total Titanium (Ti)	2016/06/28	109	80 - 120	104	80 - 120	<5.0
8313471	Total Uranium (U)	2016/06/28	93	80 - 120	95	80 - 120	<0.10
8313471	Total Vanadium (V)	2016/06/28	94	80 - 120	101	80 - 120	<5.0
8313471	Total Zinc (Zn)	2016/06/28	NC	80 - 120	115	80 - 120	<5.0
8313471	Total Zirconium (Zr)	2016/06/28					<0.50
8313674	Dissolved Chloride (Cl)	2016/06/28			100	80 - 120	<0.50
8313959	Total Ammonia (N)	2016/06/28	101	80 - 120	99	80 - 120	<0.0050
8314287	Total Suspended Solids	2016/06/29			99	80 - 120	<4.0
8314350	Total Oil and grease	2016/06/29			95	70 - 130	<1.0
8314628	Total Organic Carbon (C)	2016/06/29	NC	80 - 120	113	80 - 120	<0.50
8314844	Phenols	2016/06/29	95	80 - 120	93	80 - 120	<0.0010
8315352	Dissolved Sulphate (SO4)	2016/06/29			96	80 - 120	0.51, RDL=0.5
8315488	Nitrate plus Nitrite (N)	2016/06/29	91	80 - 120	105	80 - 120	<0.020
8316497	Total Nitrogen (N)	2016/07/05	94	80 - 120	98	80 - 120	<0.020



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

QUALITY ASSURANCE REPORT(CONT'D)

ENVIRONMENT CAN.
Site Location: EUR

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method
			% Recovery	QC Limits	% Recovery	QC Limits	Value
8325607	Total Mercury (Hg)	2016/07/11	99	80 - 120	103	80 - 120	<0.010
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 sample was greater than 20%.							
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 (below 100 ng/L).							

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

ENVIRONMENT CANADA
Site Location: EUREKA, NV

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.

CHAIN OF CUSTODY RECORD

Page ____ of ____

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: <u>ENVIRONMENTAL CANADA</u>	Company Name:	Company Name:	Company Name:	Quotation #:		☒ Regular TAT (5-7 days) Most analyses	
Contact Name: <u>MATTHEW GITCHISON</u>	Contact Name:	Contact Name:	Contact Name:	P.O. #/ AFTER:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>EUREKA NU</u>	Address:	Address:	Address:	Project #:		Rush TAT (Surcharges will be applied)	
Phone: <u>204 983 8725</u> Fax:	Phone:	Phone:	Phone:	Site Location: <u>EUREKA NU</u>		☐ 1 Day ☐ 2 Days ☐ 3-4 Days	
Email: <u>matthew.gitchison@canada.ca</u>	Email:	Email:	Email:	Site #:		Data Required:	
MODE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY							
Regulation 153 ☐ Table 1 ☐ Res/Park ☐ Med/ Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agr/V Other ☐ Table ____ FOR RSC (PLEASE CIRCLE) Y / N		Other Regulations ☐ CCME ☐ Sanitary Sewer Bylaw ☐ MSA ☐ Storm Sewer Bylaw ☐ RWQD ☐ Region ☐ Other (Specify) ☐ REG 55B (MIN. 3 DAY TAT REQUIRED)		Analysis Requested REFER TO BACK OF DOC METALS: <u>As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, Zn</u> NON-METALS: <u>BOD, TOC, TSS, Hardness, pH, Conductivity, Nitrate-Nitrite, Phenols, Chloride, Ammonia</u> OTHER: <u>NO3-NITROGEN</u>		LABORATORY USE ONLY CUSTODY SEAL # (N) _____ COOLER TEMPERATURES Present: _____ Intact: _____ COOLING MEDIA PRESENT: ☒ Y ☐ N COMMENTS:	
SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM							
SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	NOF CONTAINERS SUBMITTED	NOF FILTRATES (CIRCLE) MAKE / NO. / VOL	NOF METALS (CIRCLE) MAKE / NO. / VOL	NOF NON-METALS (CIRCLE) MAKE / NO. / VOL
1 <u>FUR-2</u>	<u>2016/06/17</u>		<u>SL</u>				
2							
3							
4							
5							
6							
7							
8							
9							
10							
RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	MAXXAM JOB #	
<u>Matthew Gitchison</u>	<u>2016/06/18</u>		<u>Accepted LAURA GORREAU</u>	<u>2016/06/27</u>	<u>08:00</u>	<u>B646164 DV</u> <u>B651848</u>	

Page 1 of 2

6. The Licensee shall sample monthly at Monitoring Program Stations EUR-2, EUR-3, EUR-4, during periods of observed flow and annual discharges, to be analyzed for the following parameters:

- | | |
|--|------------------------------|
| - Biochemical Oxygen Demand – BOD ₅ | - Fecal Coliforms |
| - Total Suspended Solids | - pH |
| - Conductivity | - Nitrate-Nitrite |
| - Oil and Grease (visual) | - Total Phenols |
| - Magnesium | - Calcium |
| - Sodium | - Potassium |
| - Chloride | - Sulphate |
| - Total Hardness | - Total Alkalinity |
| - Ammonia Nitrogen | - Total Zinc |
| - Total Cadmium | - Total Iron |
| - Total Cobalt | - Total Manganese |
| - Total Chromium | - Total Nickel |
| - Total Copper | - Total Lead |
| - Total Aluminium | - Total Arsenic |
| - Total Mercury | - Total Organic Carbon (TOC) |

7. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board in writing.
8. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.
9. The Licensee shall annually review the QA/QC plan submitted under Part J, Item 10 and modify it as necessary. Revised plans shall be submitted to the NWB with an approval letter from an accredited lab that meets standards set in Part J, Item 8 and Part J, Item 9.
10. Modifications to the Monitoring Program may be made only upon written approval from the Board. Requests for changes to the Monitoring Program should be forwarded to the NWB in writing, and should include the justification and appropriate evidence to support the change.
11. The Licensee shall include in the Annual Report required under Part B, Item 1 all data, monitoring results and information required by this Part.