

Appendix A
Quantity of Raw Water

**QUANTITIES OF
FRESH WATER OBTAINED
Eureka 2012**

Fresh Water: Fresh Water Lagoon

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

Pumping began on June 1st and ended July 29th
= 56 days x 24 hrs x 60 min x 19 gal/min = 1,614,240 gallons
Pumping resumed Aug 5th to Sept 5th with 1 pump
= 30 days x 24 hrs x 60 min x 19 gal/min = 820,800 gallons

Total water pumped = ~2,435,040 gallons or ~9217.63 m³

Actual consumption from water meter in Powerhouse from Sept 2011 to Aug 2012 = 850,501.9 gal or 3219.5 m³

(Lagoon water holding capacity is estimated at approximately 2,500m³. It is believed that the balance of water pumped was in order to maintain a full lagoon until freeze up which was complicated by water loss due to 2 separate breeches of the water lagoon's north side culvert and further reduced by the amount of water that was used during summer operations.)

Intake hose screen has ¼" diameter holes.

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

Appendix B Quality of Raw Water

EUREKA RAW WATER ANALYSIS 2007-2012

RAW WATER

Lagoon

Parameter	2007	2008	2009	2010	2011	2012
TDS			256	482	2150	1130
Organic Carbon	61.2	40.8	0.9	<0.5	3.2	4.9
Hardness	1300	1330	132	292	1240	563
Coliforms, Total		<1.0		<1.0	4.1	<1.0
Escherichia coli		<1.0		<1.0	<1.0	<1.0
Aluminum	<0.030	0.0092	0.964	0.0044	0.036	0.039
Antimony			0.0002	<0.0001	<0.0001	0.0001
Arsenic			<0.0002	<0.0002	0.0003	0.0142
Barium	0.0781	0.0657	0.0064	0.0190	0.0687	0.0247
Beryllium	<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
Chromium	0.0003	0.0002	0.0002	<0.0001	0.0001	0.0007
Cobalt	0.0006	0.0004	<0.0001	<0.0001	0.0007	0.0004
Copper	0.0016	0.022	0.0066	0.0282	0.0012	0.0066
Iron	0.0536	<0.050	0.151	<0.050	0.009	0.09
Lead	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium			0.0041	0.0094	0.0368	0.0184
Manganese	0.0182	0.0347	0.0051	0.0071	0.0282	0.023
Molybdenum	0.0006	0.0006	0.0001	0.0001	0.0004	0.0005
Nickel	0.0035	0.003	0.0006	0.0007	0.0061	0.0035
Selenium			<0.0005	0.0006	0.0022	<0.0005
Silver	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Strontium	1.34	1.18	0.112	0.288	1.11	0.55
Thallium	<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
Uranium			0.0002	0.0003	0.0001	0.0009
Vanadium	0.0003	<0.0001	0.0003	<0.0001	<0.0001	0.0107
Zinc	0.01	0.0039	<0.0005	0.0019	0.0021	<0.005
*Bromodichloromethane			<0.005	<0.005	n/a	<0.001
*Bromoform			<0.005	<0.005	n/a	<0.001
*Dibromochloromethane			<0.005	<0.005	n/a	<0.001
*Trihalomethanes	0.005		<0.005	<0.005	n/a	<0.001

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

Appendix B

Quality of Raw Water



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- FINAL REPORT -

Prepared For: Environment Canada
Eureka Weather Station

Address: 123 Main Street
Suite 150
Winnipeg, MB
R3C 4W2

Attn: Rai LeCotey

Facsimile:

Final report has been reviewed and approved by:


Helene Harper
Manager

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
 - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF,
 - Environment Canada
 - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

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Appendix B

Quality of Raw Water



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU FW 0912

Taiga Sample ID: 001

Client Project

Sample Type: Freshwater
Received Date: 13-Sep-12
Sampling Date: 13-Sep-12
Sampling Time: 7:00
Location: Eureka, NU
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Solids, Total Dissolved	1130	10	mg/L	24-Sep-12	SM2540:C	
Turbidity	2.79	0.05	NTU	14-Sep-12	SM2130:B	
<u>Inorganics - Nutrients</u>						
Organic Carbon, Total	4.9	0.5	mg/L	17-Sep-12	SM5310:B	
<u>Major Ions</u>						
Calcium	124	0.1	mg/L	14-Sep-12	SM4110:B	
Hardness	563	0.7	mg/L	14-Sep-12	SM2340:B	
Magnesium	61.5	0.1	mg/L	14-Sep-12	SM4110:B	
Potassium	6.4	0.1	mg/L	14-Sep-12	SM4110:B	
Sodium	141	0.1	mg/L	14-Sep-12	SM4110:B	
<u>Microbiology</u>						
Coliforms, Total	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223:B	
Escherichia coli	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223:B	
<u>Trace Metals, Total</u>						

Report Date: Friday, September 28, 2012
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Appendix B

Quality of Raw Water



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 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU FW 0912

Taiga Sample ID: 001

Aluminum	39	5	µg/L	24-Sep-12	EPA 200.8
Antimony	0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Arsenic	14.2	0.2	µg/L	24-Sep-12	EPA 200.8
Barium	24.7	0.1	µg/L	24-Sep-12	EPA 200.8
Beryllium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Cadmium	< 0.5	0.5	µg/L	24-Sep-12	EPA 200.8
Cesium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Chromium	0.7	0.1	µg/L	24-Sep-12	EPA 200.8
Cobalt	0.4	0.1	µg/L	24-Sep-12	EPA 200.8
Copper	6.6	0.2	µg/L	24-Sep-12	EPA 200.8
Iron	90	5	µg/L	24-Sep-12	EPA 200.8
Lead	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Lithium	18.4	0.2	µg/L	24-Sep-12	EPA 200.8
Manganese	20.3	0.1	µg/L	24-Sep-12	EPA 200.8
Molybdenum	0.5	0.1	µg/L	24-Sep-12	EPA 200.8
Nickel	3.5	0.1	µg/L	24-Sep-12	EPA 200.8
Rubidium	1.9	0.1	µg/L	24-Sep-12	EPA 200.8
Selenium	< 0.5	0.5	µg/L	24-Sep-12	EPA 200.8
Silver	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Strontium	550	0.1	µg/L	24-Sep-12	EPA 200.8
Thallium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Titanium	1.2	0.1	µg/L	24-Sep-12	EPA 200.8
Uranium	0.9	0.1	µg/L	24-Sep-12	EPA 200.8
Vanadium	10.7	0.1	µg/L	24-Sep-12	EPA 200.8
Zinc	< 5	5	µg/L	24-Sep-12	EPA 200.8

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Appendix B

Quality of Raw Water



Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3

Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:

120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU FW 0912

Taiga Sample ID: 001

Subcontracted Organics

Bromodichloromethane	< 0.001	0.001	mg/L	21-Sep-12	EPA8260B
Bromoform	< 0.001	0.001	mg/L	21-Sep-12	EPA8260B
Chloroform	< 0.001	0.001	mg/L	21-Sep-12	EPA8260B
Dibromochloromethane	< 0.001	0.001	mg/L	21-Sep-12	EPA8260B
Trihalomethanes, Total	< 0.001	0.001	mg/L	21-Sep-12	EPA8260B

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Appendix C Quality of Tap Water

EUREKA WATER ANALYSIS 2008-2012: TAP WATER

TAP WATER

GUIDELINES (mg/l)

Parameter	2008	2009	2010	2011	2012	CANADIAN ⁱ		US EPA ⁱⁱ	
						MAC ⁺	OG ⁺ /AO ³	MCL ⁺	MCLG ³
TDS		524	1510	1920	1290				
Organic Carbon		1.5	1.8	2.7	3.3				
Hardness		112	26.7	664	15.3				
Coliforms, Total	<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	0/100 ml			0
Aluminum	0.0053	0.046	0.007	0.0291	0.024		0.2	0.05-0.2	
Antimony		0.0002	<0.0001	<0.0001	0.0001				
Arsenic		<0.0002	0.0003	0.0003	0.0007				
Barium	0.0165	0.0054	0.0027	0.0213	0.0004	1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			0.004	
Boron	0.0992					5			
Cadmium	<0.00005	<0.0001	<0.00005	<0.00005	<0.0005	0.005		0.005	0.005
Cesium		<0.0001	<0.0001	<0.0001					
Chromium	0.0003	0.0002	0.0002	0.0001	<0.0001	0.05		0.1	0.1
Cobalt	0.0001	<0.0001	<0.0001	0.0005	<0.0001				
Copper	0.134	0.0652	0.371	0.101	0.0447		<1.0		1.3
Iron	<0.050	0.101	0.012	0.008	0.023		<0.3	0.3	
Lead	0.0012	0.0001	0.0003	<0.0001	<0.0001	0.01		0.015	0
Lithium		0.0037	0.0317	0.0421	0.0013				
Manganese	0.0092	0.0036	0.0037	0.0188	0.0018		<0.05	0.05	
Molybdenum	0.0008	0.0002	0.0003	0.0003	0.0006				
Nickel	0.0015	0.0007	0.0024	0.0037	0.0009				
Selenium		0.0005	0.0012	0.0018	0.0007				
Silver	<0.0001	<0.0001	<0.0001	<0.0001	0.0005			0.1	
Strontium	0.28	0.0898	0.0393	0.363	0.0041				
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				
Titanium	0.0008	<0.0001	0.0004	0.0004	0.0032				
Uranium		0.0003	0.0009	0.0015	0.001				
Vanadium	<0.0001	0.0002	<0.0001	<0.0001	0.0005				
Zinc	0.109	0.047	0.0656	0.0549	0.009		<5.0	5	
Bromodichloromethane		0.01	0.006	n/a	<0.005	0.016			
Bromoform		0.052	0.068	n/a	0.036				
Dibromochloromethane		0.027	0.026	n/a	0.02				
Trihalomethanes		0.092	0.101	n/a	0.062	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

³Operational Guidance Values

⁺Maximum Contaminant Level

³Maximum Contaminant Level Goal

Appendix C

Quality of Tap Water



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU TAP 0912

Taiga Sample ID: 003

Client Project:
Sample Type: Tap Water
Received Date: 13-Sep-12
Sampling Date: 13-Sep-12
Sampling Time: 7:00
Location: Eureka, NU
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Solids, Total Dissolved	1040	10	mg/L	24-Sep-12	SM2540.C	
Turbidity	1.92	0.05	NTU	14-Sep-12	SM2130.B	
<u>Inorganics - Nutrients</u>						
Organic Carbon, Total	5.4	0.5	mg/L	17-Sep-12	SM5310.B	
<u>Major Ions</u>						
Calcium	6.9	0.1	mg/L	14-Sep-12	SM4110.B	
Hardness	26.5	0.7	mg/L	14-Sep-12	SM2340.B	
Magnesium	2.3	0.1	mg/L	14-Sep-12	SM4110.B	
Potassium	0.5	0.1	mg/L	14-Sep-12	SM4110.B	
Sodium	361	0.1	mg/L	14-Sep-12	SM4110.B	
<u>Microbiology</u>						
Coliforms, Total	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223.B	
Escherichia coli	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223.B	
<u>Trace Metals, Total</u>						

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Appendix C

Quality of Tap Water



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU TAP 0912

Taiga Sample ID: 003

Aluminum	45	5	µg/L	24-Sep-12	EPA 200.8
Antimony	0.2	0.1	µg/L	24-Sep-12	EPA 200.8
Arsenic	11.2	0.2	µg/L	24-Sep-12	EPA 200.8
Barium	3.1	0.1	µg/L	24-Sep-12	EPA 200.8
Beryllium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Cadmium	< 0.5	0.5	µg/L	24-Sep-12	EPA 200.8
Cesium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Chromium	0.7	0.1	µg/L	24-Sep-12	EPA 200.8
Cobalt	0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Copper	136	0.2	µg/L	24-Sep-12	EPA 200.8
Iron	91	5	µg/L	24-Sep-12	EPA 200.8
Lead	0.3	0.1	µg/L	24-Sep-12	EPA 200.8
Lithium	16.8	0.2	µg/L	24-Sep-12	EPA 200.8
Manganese	8.4	0.1	µg/L	24-Sep-12	EPA 200.8
Molybdenum	0.5	0.1	µg/L	24-Sep-12	EPA 200.8
Nickel	1.5	0.1	µg/L	24-Sep-12	EPA 200.8
Rubidium	0.3	0.1	µg/L	24-Sep-12	EPA 200.8
Selenium	< 0.3	0.3	µg/L	24-Sep-12	EPA 200.8
Silver	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Strontium	21.4	0.1	µg/L	24-Sep-12	EPA 200.8
Thallium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Titanium	0.9	0.1	µg/L	24-Sep-12	EPA 200.8
Uranium	0.8	0.1	µg/L	24-Sep-12	EPA 200.8
Vanadium	13.1	0.1	µg/L	24-Sep-12	EPA 200.8
Zinc	46	5	µg/L	24-Sep-12	EPA 200.8

Report Date: Friday, September 28, 2012

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Appendix C

Quality of Tap Water



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Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU TAP 0912

Taiga Sample ID: 003

Subcontracted Organics

Bromodichloromethane	0.024	0.001	mg/L	21-Sep-12	EPA 8260B
Bromoform	0.069	0.001	mg/L	21-Sep-12	EPA 8260B
Chloroform	0.013	0.001	mg/L	21-Sep-12	EPA 8260B
Dibromochloromethane	0.056	0.001	mg/L	21-Sep-12	EPA 8260B
Trihalomethanes, Total	0.162	0.001	mg/L	21-Sep-12	EPA 8260B

Report Date: Friday, September 28, 2012

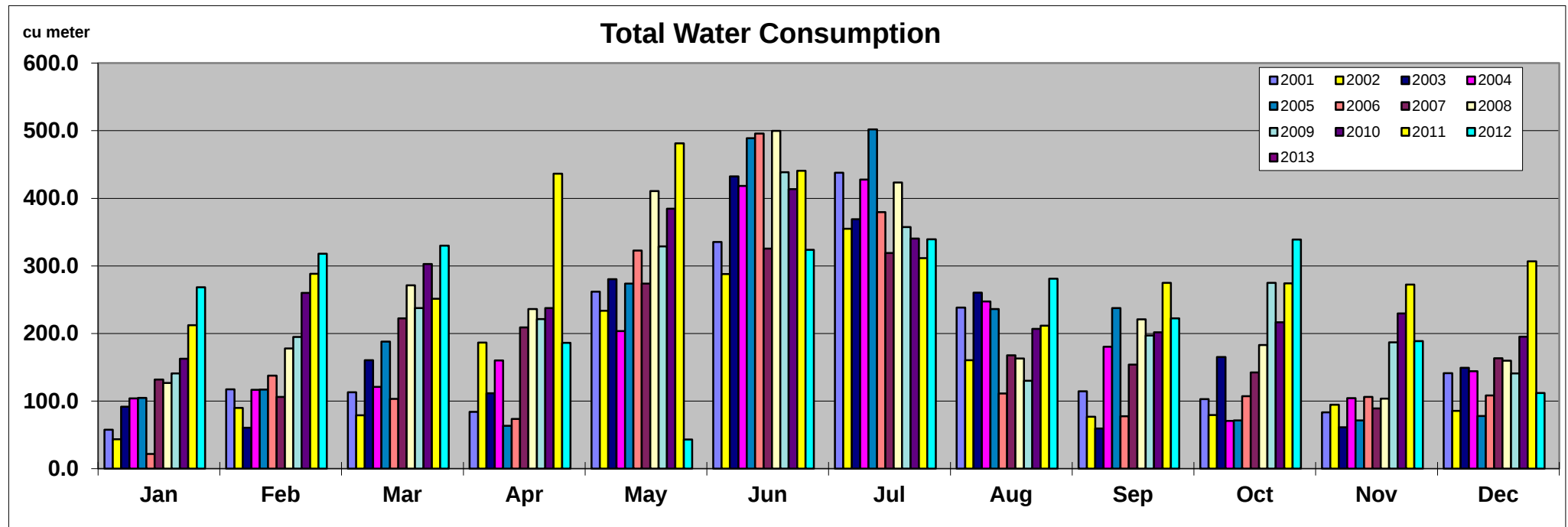
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APPENDIX D

QUANTITY OF DRINKING WATER

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
57.8	43.8	91.7	104.0	104.9	22.0	131.9	126.9	140.9	162.7	212.5	268.6		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		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		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		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		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		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		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		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		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		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		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		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	0.0	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	#DIV/0!	Monthly Avg



Appendix E

Quality of Drinking Water Consumed

EUREKA WATER ANALYSIS 2007-2012: REVERSE OSMOSIS REVERSE OSMOSIS DRINKING WATER

Parameter	2007	2008	2009	2010	2011	2012	CANADIAN ¹		US EPA ²	
							MAC ⁴	OG ⁵ /AO ³	MCL ⁴	MCLG ³
TSS			208	<10	40	<10				
Organic Carbon	<0.5		0.5	<0.5	<0.5	<0.5				
Hardness	1.7		11.1	2.1	3.2	<0.7				
Coliforms, Total		<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	0/100 ml			0
Aluminum	0.0009	0.0019	0.017	0.0012	<0.6	<0.0005		0.2	0.05-0.2	
Antimony			<0.0001	<0.0001	<0.0001	<0.0001				
Arsenic			<0.0002	<0.0002	<0.0002	<0.0002				
Barium	<0.0001	0.0027	0.0022	0.0003	<0.0001	<0.0001	1		2	2
Beryllium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			0.004	
Boron	0.149	0.0092					5			
Cadmium	<0.00005	<0.00005	<0.00005	0.00009	<0.00005	<0.0005	0.005		0.005	0.005
Chromium	<0.0001	0.001	<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				
Copper	0.0101	0.0297	0.0133	0.0096	0.0026	0.0072		<1.0		1.3
Iron	<0.050	<0.050	0.01	<0.050	<0.005	<0.005		<0.3	0.3	
Lead	0.0003	0.0057	0.0001	0.0007	<0.0001	0.0003	0.01		0.015	0
Lithium			0.0009	0.0006	0.0014	<0.0002				
Manganese	<0.0001	0.0001	0.0005	0.0002	<0.0001	<0.0001		<0.05	0.05	
Molybdenum	<0.0001	0.0003	<0.0001	0.0002	<0.0001	0.0001				
Nickel	0.0034	0.0013	0.0016	0.0005	0.0002	0.0002				
Selenium			0.0003	<0.0003	<0.0003	<0.0005				
Silver	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001			0.1	
Strontium	0.0004	0.0007	0.0072	0.0022	0.0015	0.0001				
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				
Titanium	<0.0001	<0.0001	0.0003	0.0001	<0.0001	<0.0001				
Uranium			<0.0001	<0.0001	<0.0001	<0.0001				
Vanadium	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001				
Zinc	0.413	0.819	0.0588	0.07	0.0175	0.111		<5.0	5	
*Bromodichloromethane			<0.005	<0.005	n/a	<0.005	0.016			
Bromoform			<0.005	0.01	n/a	<0.005				
Dibromochloromethane			<0.005	0.008	n/a	<0.005				
Trihalomethanes			<0.005	0.024	n/a	0.012	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



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT: X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU ROW 0912

Taiga Sample ID: 004

Client Project
Sample Type: Osmosis Water
Received Date: 13-Sep-12
Sampling Date: 13-Sep-12
Sampling Time: 7:00
Location: Eureka, NU
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Solids, Total Dissolved	< 10	10	mg / L	24-Sep-12	SM2540:C	
Turbidity	0.16	0.05	NTU	14-Sep-12	SM2130:B	
<u>Inorganics - Nutrients</u>						
Organic Carbon, Total	< 0.5	0.5	mg / L	17-Sep-12	SM5310:B	
<u>Major Ions</u>						
Calcium	0.5	0.1	mg / L	14-Sep-12	SM4110:B	
Hardness	2.0	0.7	mg / L	14-Sep-12	SM2340:B	
Magnesium	0.2	0.1	mg / L	14-Sep-12	SM4110:B	
Potassium	< 0.1	0.1	mg / L	14-Sep-12	SM4110:B	
Sodium	5.2	0.1	mg / L	14-Sep-12	SM4110:B	
<u>Microbiology</u>						
Coliforms, Total	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223:B	
Escherichia coli	< 1.0	1.0	MPN/100mL	13-Sep-12	SM9223:B	
<u>Trace Metals, Total</u>						

Report Date: Friday, September 28, 2012
Print Date: Friday, September 28, 2012

Appendix E

Quality of Drinking Water Consumed



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU ROW 0912

Taiga Sample ID: 004

Aluminum	< 0.6	0.6	µg/L	24-Sep-12	EPA 200.8
Antimony	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Arsenic	0.4	0.2	µg/L	24-Sep-12	EPA 200.8
Barium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Beryllium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Cadmium	< 0.05	0.05	µg/L	24-Sep-12	EPA 200.8
Cesium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Chromium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Cobalt	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Copper	0.2	0.2	µg/L	24-Sep-12	EPA 200.8
Iron	< 5	5	µg/L	24-Sep-12	EPA 200.8
Lead	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Lithium	< 0.2	0.2	µg/L	24-Sep-12	EPA 200.8
Manganese	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Molybdenum	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Nickel	0.2	0.1	µg/L	24-Sep-12	EPA 200.8
Rubidium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Selenium	< 0.5	0.5	µg/L	24-Sep-12	EPA 200.8
Silver	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Strontium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Thallium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Titanium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Uranium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Vanadium	0.6	0.1	µg/L	24-Sep-12	EPA 200.8
Zinc	8.6	0.4	µg/L	24-Sep-12	EPA 200.8

Report Date: Friday, September 28, 2012

Print Date: Friday, September 28, 2012

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Appendix E

Quality of Drinking Water Consumed



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120826

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU ROW 0912

Taiga Sample ID: 004

Subcontracted Organics

Bromodichloromethane	0.015	0.001	mg/L	21-Sep-12	EPA 8260B
Bromoform	0.016	0.001	mg/L	21-Sep-12	EPA 8260B
Chloroform	0.007	0.001	mg/L	21-Sep-12	EPA 8260B
Dibromochloromethane	0.027	0.001	mg/L	21-Sep-12	EPA 8260B
Trihalomethanes, Total	0.065	0.001	mg/L	21-Sep-12	EPA 8260B

Report Date: Friday, September 28, 2012
Print Date: Friday, September 28, 2012

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Appendix F
Quantity of Waste Water Discharged

**QUANTITIES OF
WASTE WATER DISCHARGED**

Eureka 2012

Waste Water: Sewage Lagoon

1. 1 pump capacity:
 - Monarch Pump Model TT30 Type E with attached hose ~ 150 gal/min
2. Pump time*:
 - July decanting began on July 3 and lasted to July 5 = 48 hours total
48 hours x 60 min x 150 gal/min = ~432,000 gal or ~1635.3 m³
 - Second decanting started Sep 5th and lasted to Sep 6th = 11 hours
11 hours x 60 min x 150 gal/min = ~99,000 gal or ~374.8 m³
 - Total for both decanting was = ~2011 m³

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 2007 through to 2012 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 and possible causes

1. Total suspended solids (TSS)

Effluent total suspended solids averaged approximately 109 mg/L for the first decant in 2012 which is below Territorial Guidelines, and 244mg/L for the second decant, which is above Territorial guidelines of 120 mg/L. The first and second decanting process utilizes a modified method of suspending the pump towards the top of the lagoon during pumping, with the use of a floatation device. This modified decantation process has led to lower TSS levels for the first decant. The higher TSS levels and Trace Metals on the second decant might also result from the shorter settling times between discharges due to the need to obtain maximum lagoon capacity before freeze up. Other factors that may lead to higher TSS levels include the presence of;

- a. Suspended bacterial solids¹;
- b. Algae growth during warmer summer temperatures between decantings.
Indicators of algae growth are as follows:
 - i. Biological demand (BOD) > 30mg/L (Eureka is consistently above this level)
 - ii. pH > 9 (Eureka is consistently at or above this level)
 - iii. TSS/BOD ratio > 2 (Eureka is consistently above this level)
- c. Silt, clay, cell debris, and bottom solids suspended from lagoon pumping.
(There has been above normal levels of silt in our water system which is evident in our water system tanks and by the increased frequency of filter changes required in the last few years.)

2. pH

Ph results averaged 8.9 in 2012 which is slightly below the NWB guidelines of 6-9.

Appendix G

Quality of Waste Water Discharged

3. Iron (Fe)

Effluent iron averaged 0.222 mg/L on the first decant which is within Territorial guidelines. The effluent iron level was higher at 0.955 mg/L on the second decant which is higher than the Territorial guidelines but much lower than that of 2011. The Sewage Treatment System Recapitalization Project is entering the Design Phase in 2013/14 fiscal year and solutions to minimize such exceedances will be incorporated into the design. 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.

4. Manganese (Mn)

Manganese has been found at a level averaging 0.183 mg/L on the first decant which is slightly above Territorial guidelines. The Manganese level was at 0.089 mg/L on the second decant which is also slightly above Territorial guidelines. Possible sources of manganese include³:

- 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.;
- b. Sources of pollution rich in organic matter (e.g. runoff from landfills, compost, brush or silage piles, or chemicals such as gasoline) can add to the background level by increasing manganese release from soil or bedrock into the surface water.

Next steps for elevated parameters

1. TSS, pH, iron, manganese

For all of these parameters, it is critical to identify the causes of elevated levels before identifying possible solutions. The following steps are proposed for the 2013 season:

- a. Collect and analyze the undisturbed effluent (before pumping) in the lagoon to determine TSS, Fe, and Mn concentration. The previous results may be elevated by sediments and are therefore not an accurate reflection of actual wastewater conditions.
- b. Collect and analyze the sewage lagoon sludge after decantation of effluent in order to identify elevated parameters and to quantify the suitability of the sludge for future disposal.
- c. Continue to collect and analyze waste samples before they reach the lagoon to determine and trend TSS, Fe, and Mn concentrations over time, as levels may be a result of natural systems or other pollution sources.
- d. Continue with attempts to increase the amount of time between decantation in order to allow maximum settling of solids and minerals present in the effluent.

Additional Parameters for Analysis

The additional parameters to be analyzed as per the Nunavut Water Board recommendations include Sulphate (SO₄ Individual Anion), all the Major Cations, Ammonia – N, and Visible Oil & Grease.

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

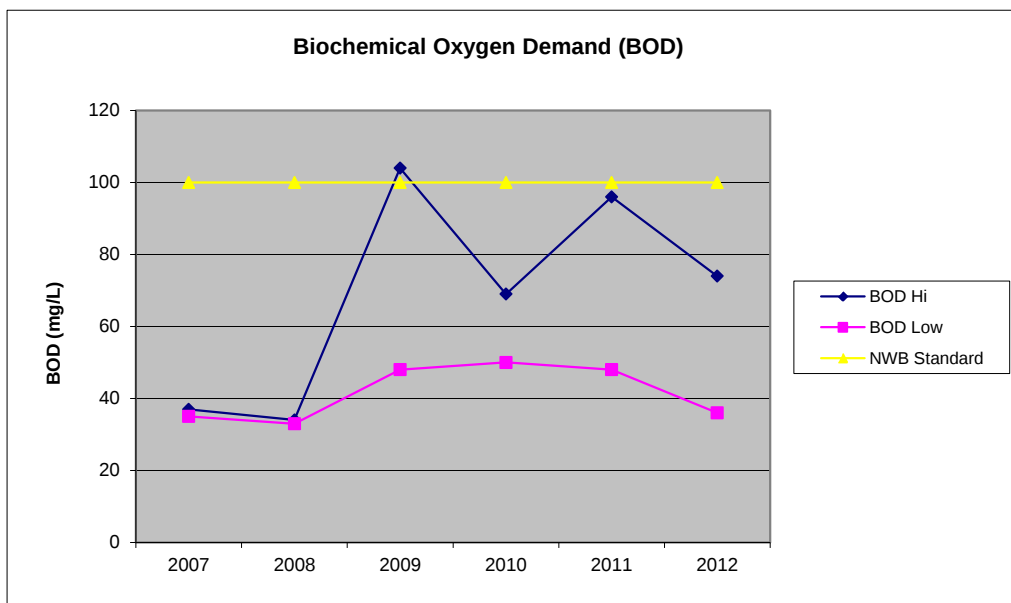
²Tillman, Glenn. Wastewater Treatment: Troubleshooting and Problem Solving.

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

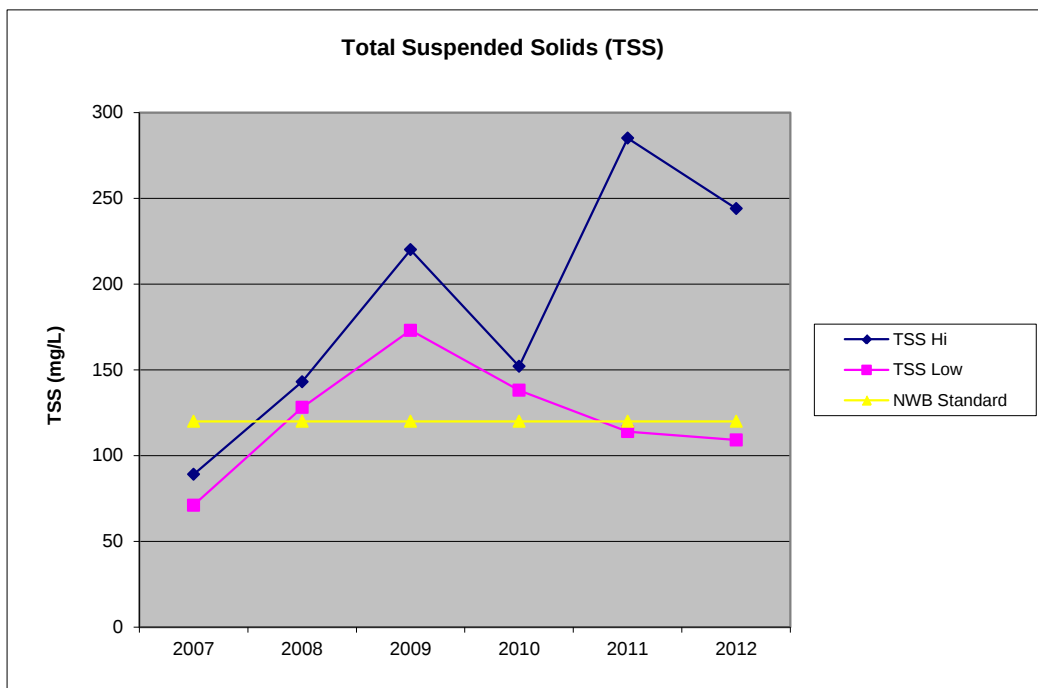
Appendix G

Quality of Waste Water Discharged

BOD Results for Eureka Wastewater Lagoon Effluent



TSS Results for Eureka Wastewater Lagoon Effluent

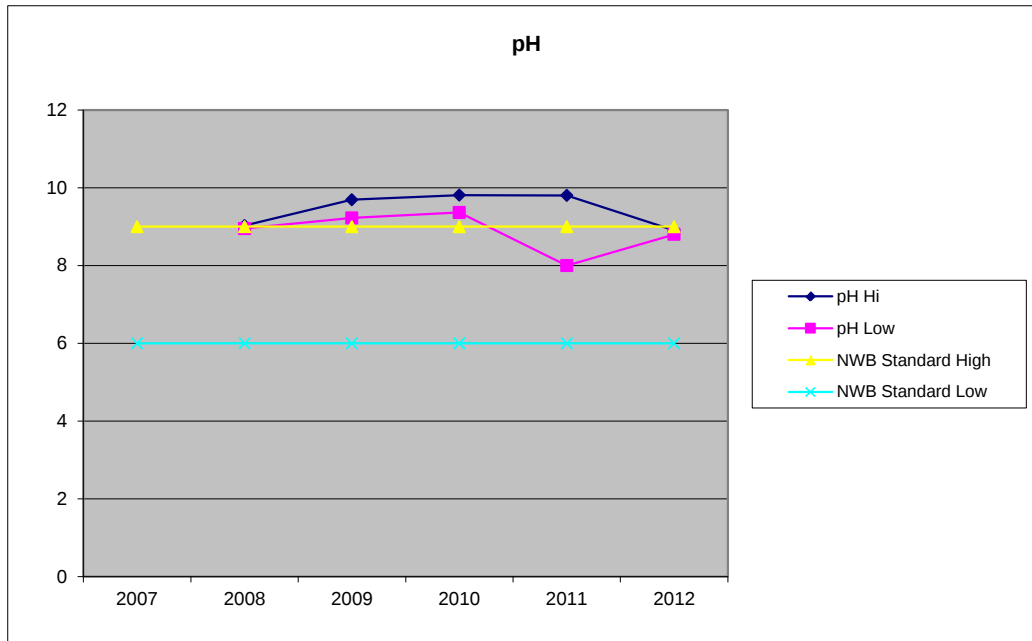


Note: the hi TSS of 244 mg/L occurred on the second decant. Reduced settling time of solids between decants may be the cause. 2012 attempt to maximize settling time between decants in order to minimize TSS levels did not prove advantageous as settling times did not increase substantially. Sewage volumes were high in 2012 due to excessive humidifier and water softener backwashes during winter. Next seasons backwashes will be greatly reduced in an effort to minimize sewage lagoon volumes and possibly further increasing time period available between decantations in order to minimize TSS levels on second decant.

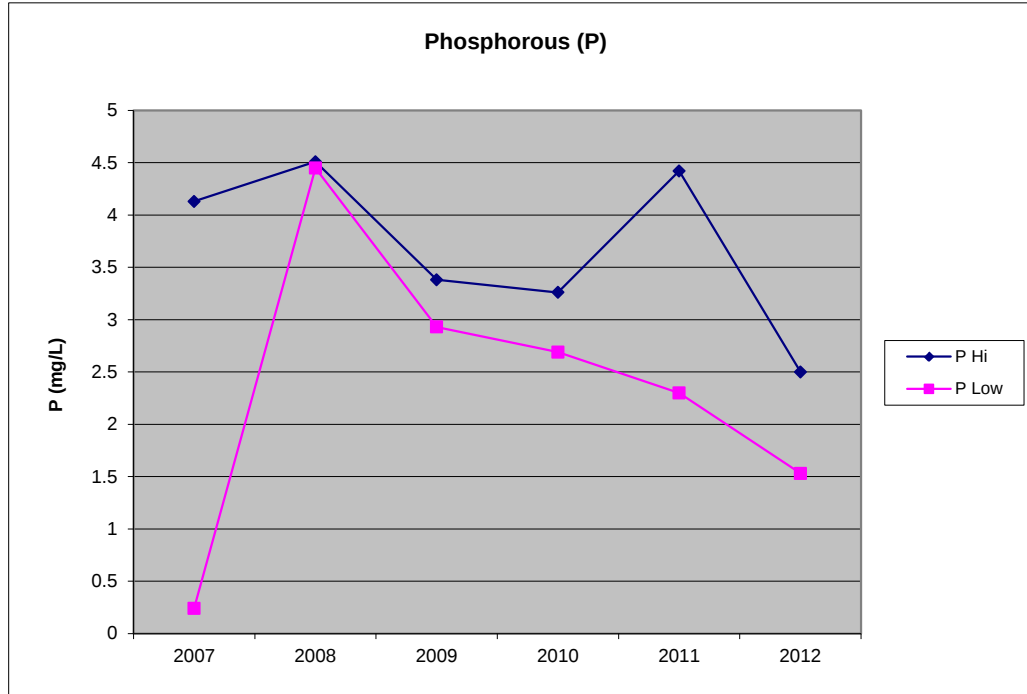
Appendix G

Quality of Waste Water Discharged

pH Results for Eureka Wastewater Lagoon Effluent



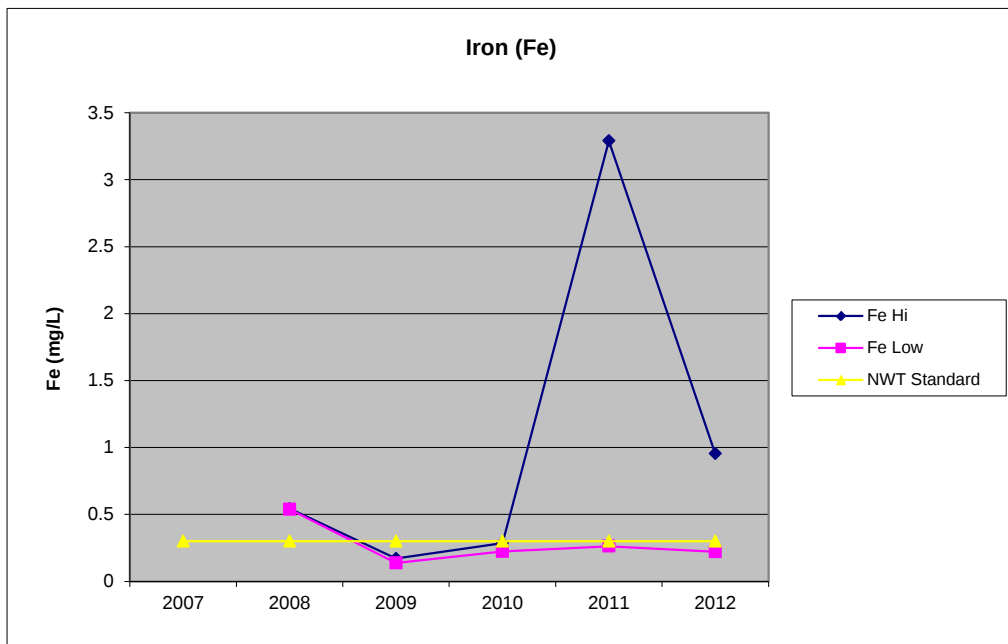
Phosphorous Results for Eureka Wastewater Lagoon Effluent



Appendix G

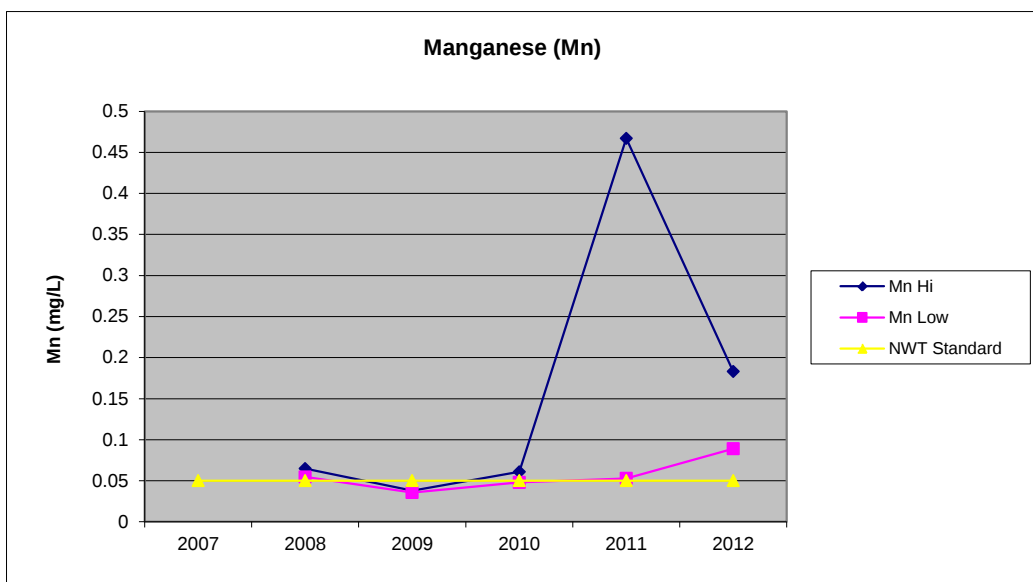
Quality of Waste Water Discharged

Iron Results for Eureka Wastewater Lagoon Effluent



Note: Both incidences of elevated iron levels occurred in the second decantations of 2011 and 2012. The settling time between decantation periods increased slightly in 2012 allowing more iron to settle out before decantation occurred. Next year will see an effort to further maximize settling time between decantations.

Manganese Results for Eureka Wastewater Lagoon Effluent

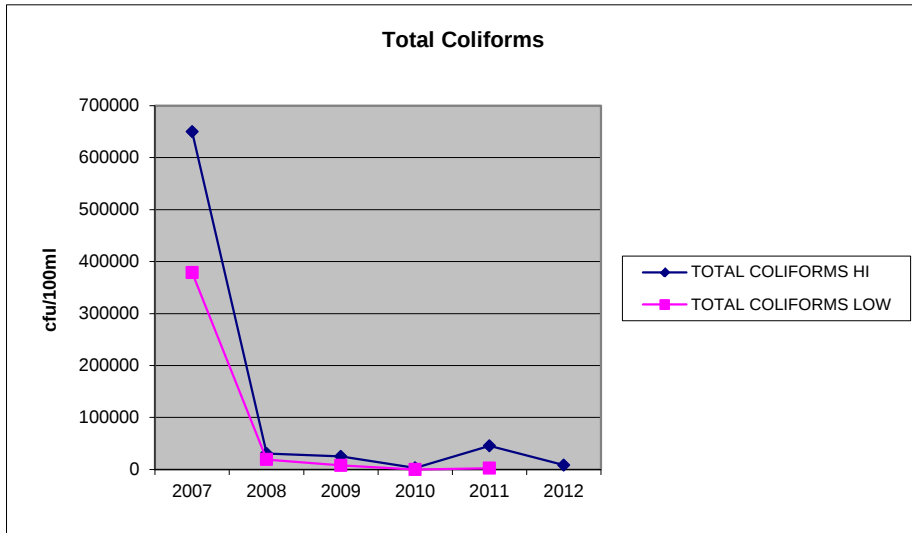


Note: Lower Manganese levels are slightly higher than NWT standards. The Mn Hi levels have decreased since 2011 as settling time between decantations has increased slightly. Next fiscal year will see an effort in increasing settling time between decantations in order to minimize Mn levels.

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Quality of Waste Water Discharged

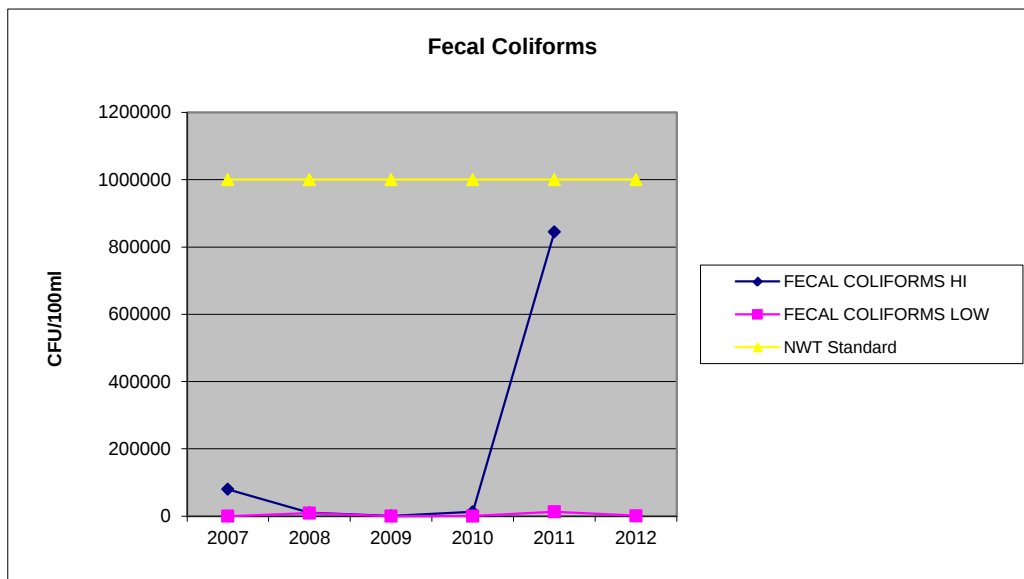
Total Coliform Results for Eureka Wastewater Lagoon Effluent



Note: cfu = colony forming units

Note: no analysis results were available/provided by Taiga Environmental Laboratory for the first decant of 2012. Results are from the second decant only

Fecal Coliform Results for Eureka Wastewater Lagoon Effluent



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

Note: No results for 2012 Second decantation as per Taiga Laboratory- "Too numerous to count. Unable to repeat analysis at higher dilution. Holding time exceeded"

Appendix G
Quality of Waste Water Discharged

EUREKA SEWAGE LAGOON: ANALYSIS RESULTS: 2012 (1st Decant)



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- AMENDED REPORT -

Prepared For: Environment Canada
Eureka Weather Station

Address: 123 Main Street
Suite 150
Winnipeg, MB
R3C 4W2

Attn: Rai LeCotey

Facsimile:

Final report has been reviewed and approved by:


Helene Harper
Manager

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
 - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - Environment Canada
 - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

Report Date: Thursday, July 19, 2012
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Quality of Waste Water Discharged



Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-2/3-12

Taiga Sample ID: 001

Client Project

Sample Type: Wastewater

Received Date: 05-Jul-12

Sampling Date: 04-Jul-12

Sampling Time: 18:00

Location: Eureka Sewage Lagoon

Report Status: Amended

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Conductivity, Specific (@ 25°C)	6830	0.4	µS/cm	05-Jul-12	SM2510:B	
pH	8.84		pH units	05-Jul-12	SM4500-H:B	
Solids, Total Suspended	96	3	mg/L	09-Jul-12	SM2540:D	
<u>Inorganics - Nutrients</u>						
Ammonia as Nitrogen	8.19	0.01	mg/L	16-Jul-12	SM4500-NH3:	
Biochemical Oxygen Demand	20	2	mg/L	05-Jul-12	SM5210:B	
Nitrate+Nitrite as Nitrogen	0.06	0.01	mg/L	06-Jul-12	SM4110:B	
<u>Major Ions</u>						
Calcium	266	0.1	mg/L	06-Jul-12	SM4110:B	
Magnesium	134	0.1	mg/L	06-Jul-12	SM4110:B	
Potassium	19.4	0.1	mg/L	06-Jul-12	SM4110:B	
Sodium	1030	0.1	mg/L	06-Jul-12	SM4110:B	
Sulphate	1110	1	mg/L	06-Jul-12	SM4110:B	

Microbiology

Report Date: Thursday, July 19, 2012

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Appendix G

Quality of Waste Water Discharged



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-2/3-12

Taiga Sample ID: 001

Coliforms, Fecal	1180	10	CFU/100mL	05-Jul-12	SM9222.D
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Organics

Hexane Extractable Material	3.6	2.0	mg/L	09-Jul-12	EPA1664A
Oil and Grease, visible	Non-visible			06-Jul-12	Visual Exam

Trace Metals, Total

Aluminum	24.4	0.6	µg/L	18-Jul-12	EPA200.8	19
Antimony	0.4	0.1	µg/L	18-Jul-12	EPA200.8	19
Arsenic	1.1	0.2	µg/L	18-Jul-12	EPA200.8	19
Barium	38.9	0.1	µg/L	18-Jul-12	EPA200.8	19
Beryllium	< 0.1	0.1	µg/L	18-Jul-12	EPA200.8	19
Cadmium	0.09	0.05	µg/L	18-Jul-12	EPA200.8	
Cesium	< 0.1	0.1	µg/L	18-Jul-12	EPA200.8	19
Chromium	0.5	0.1	µg/L	18-Jul-12	EPA200.8	
Cobalt	0.5	0.1	µg/L	18-Jul-12	EPA200.8	
Copper	24.6	0.2	µg/L	18-Jul-12	EPA200.8	
Iron	207	5	µg/L	18-Jul-12	EPA200.8	
Lead	0.3	0.1	µg/L	18-Jul-12	EPA200.8	
Lithium	34.9	0.2	µg/L	18-Jul-12	EPA200.8	19
Manganese	84.3	0.1	µg/L	18-Jul-12	EPA200.8	
Molybdenum	0.7	0.1	µg/L	18-Jul-12	EPA200.8	19
Nickel	6.1	0.1	µg/L	18-Jul-12	EPA200.8	
Rubidium	9.0	0.1	µg/L	18-Jul-12	EPA200.8	19
Selenium	3.0	0.3	µg/L	18-Jul-12	EPA200.8	19
Silver	0.3	0.1	µg/L	18-Jul-12	EPA200.8	19

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Quality of Waste Water Discharged



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-2/3-12

Taiga Sample ID: 001

Strontium	1350	0.1	µg/L	18-Jul-12	EPA200.8	19
Thallium	< 0.1	0.1	µg/L	18-Jul-12	EPA200.8	19
Titanium	0.5	0.1	µg/L	18-Jul-12	EPA200.8	19
Uranium	1.7	0.1	µg/L	18-Jul-12	EPA200.8	19
Vanadium	0.6	0.1	µg/L	18-Jul-12	EPA200.8	19
Zinc	35.8	0.4	µg/L	18-Jul-12	EPA200.8	

Subcontracted Organics

Phenols, Total	0.004	0.001	mg/L	17-Jul-12	APHA 5530D	
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Subcontracted Nutrients

Kjeldahl Nitrogen, Total	17.0	0.06	mg/L	12-Jul-12	ISO 11905-2	
Phosphorous, Total	1.53	0.003	mg/L	13-Jul-12	SM4500-P B,E	

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Quality of Waste Water Discharged



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-1/3-12

Taiga Sample ID: 002

Client Project:

Sample Type: Wastewater

Received Date: 05-Jul-12

Sampling Date: 05-Jul-12

Sampling Time: 5:00

Location: Eureka Sewage Lagoon

Report Status: Amended

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Conductivity, Specific (@ 25°C)	6840	0.4	µS/cm	05-Jul-12	SM2510:B	
pH	8.83		pH units	05-Jul-12	SM4500-H:B	
Solids, Total Suspended	122	3	mg/L	09-Jul-12	SM2540:D	
<u>Inorganics - Nutrients</u>						
Ammonia as Nitrogen	7.49	0.01	mg/L	16-Jul-12	SM4500-NH3:	
Biochemical Oxygen Demand	51	2	mg/L	05-Jul-12	SM5210:B	
Nitrate+Nitrite as Nitrogen	0.03	0.01	mg/L	06-Jul-12	SM4110:B	
<u>Major Ions</u>						
Calcium	269	0.1	mg/L	06-Jul-12	SM4110:B	
Magnesium	135	0.1	mg/L	06-Jul-12	SM4110:B	
Potassium	20.4	0.1	mg/L	06-Jul-12	SM4110:B	
Sodium	1030	0.1	mg/L	06-Jul-12	SM4110:B	
Sulphate	1110	1	mg/L	06-Jul-12	SM4110:B	

Microbiology

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Quality of Waste Water Discharged



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-1/3-12

Taiga Sample ID: 002

Coliforms, Fecal	1350	10	CFU/100mL	05-Jul-12	SM9222:D
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Organics

Hexane Extractable Material	77.4	2.0	mg/L	09-Jul-12	EPA1664A	20
Oil and Grease, visible	Non-visible			06-Jul-12	Visual Exam	

Trace Metals, Total

Aluminum	23.5	0.6	µg/L	18-Jul-12	EPA200.8	19
Antimony	0.3	0.1	µg/L	18-Jul-12	EPA200.8	19
Arsenic	1.1	0.2	µg/L	18-Jul-12	EPA200.8	19
Barium	39.3	0.1	µg/L	18-Jul-12	EPA200.8	19
Beryllium	< 0.1	0.1	µg/L	18-Jul-12	EPA200.8	19
Cadmium	0.08	0.05	µg/L	18-Jul-12	EPA200.8	
Cesium	< 0.1	0.1	µg/L	18-Jul-12	EPA200.8	19
Chromium	0.4	0.1	µg/L	18-Jul-12	EPA200.8	
Cobalt	0.5	0.1	µg/L	18-Jul-12	EPA200.8	
Copper	26.7	0.2	µg/L	18-Jul-12	EPA200.8	
Iron	237	5	µg/L	18-Jul-12	EPA200.8	
Lead	0.2	0.1	µg/L	18-Jul-12	EPA200.8	
Lithium	35.8	0.2	µg/L	18-Jul-12	EPA200.8	19
Manganese	93.0	0.1	µg/L	18-Jul-12	EPA200.8	
Molybdenum	0.7	0.1	µg/L	18-Jul-12	EPA200.8	19
Nickel	6.4	0.1	µg/L	18-Jul-12	EPA200.8	
Rubidium	9.4	0.1	µg/L	18-Jul-12	EPA200.8	19
Selenium	3.3	0.3	µg/L	18-Jul-12	EPA200.8	19
Silver	0.1	0.1	µg/L	18-Jul-12	EPA200.8	19

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Quality of Waste Water Discharged



Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-1/3-12

Taiga Sample ID: 002

Strontium	1380	0.1	µg/L	18-Jul-12	EPA 200.8	19
Thallium	< 0.1	0.1	µg/L	18-Jul-12	EPA 200.8	19
Titanium	0.5	0.1	µg/L	18-Jul-12	EPA 200.8	19
Uranium	1.7	0.1	µg/L	18-Jul-12	EPA 200.8	19
Vanadium	0.6	0.1	µg/L	18-Jul-12	EPA 200.8	19
Zinc	45.8	0.4	µg/L	18-Jul-12	EPA 200.8	

Subcontracted Organics

Phenols, Total	0.003	0.001	mg/L	17-Jul-12	APHA 5530D	
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Subcontracted Nutrients

Kjeldahl Nitrogen, Total	22.8	0.06	mg/L	12-Jul-12	ISO 11905-2	
Phosphorous, Total	2.50	0.003	mg/L	13-Jul-12	SM4500-P B,E	

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Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120452

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU-WW-1/3-12

Taiga Sample ID: 002

- DATA QUALIFIERS -

Data Qualifier Descriptions:

- 19 *Result has been amended; please see comment.*
20 *Possible matrix interference, reported result uncertain.*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater
EPA - United States Environmental Protection Agency

Comments *Report was amended to include results for ICP-MS for sample 001 and 002.*

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EUREKA SEWAGE LAGOON: ANALYSIS RESULTS: 2012 (2nd Decant)



Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3

Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:

120825

- AMENDED REPORT -

Prepared For: Environment Canada
Eureka Weather Station

Address: 123 Main Street
Suite 150
Winnipeg, MB
R3C 4W2

Attn: Rai LeCotey

Facsimile:

Final report has been reviewed and approved by:



Angelique Ruzindana
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) as a testing laboratory for specific tests registered with CALA.
- Routine methods are based on recognized procedures from sources such as
 - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
 - Environment Canada
 - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

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Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 1/3 SEP 12

Taiga Sample ID: 001

Client Project:
Sample Type: Wastewater 1/3
Received Date: 13-Sep-12
Sampling Date: 13-Sep-12
Sampling Time: 6:00
Location: Eureka Sewage Lagoon
Report Status: Amended

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Conductivity, Specific (@ 25°C)	9460	0.4	µS/cm	14-Sep-12	SM2510:B	
pH	8.91		pH units	14-Sep-12	SM4500-H:B	
Solids, Total Suspended	334	3	mg/L	20-Sep-12	SM2540:D	
<u>Inorganics - Nutrients</u>						
Ammonia as Nitrogen	0.076	0.005	mg/L	25-Sep-12	SM4500-NH3:	
Biochemical Oxygen Demand	76	2	mg/L	14-Sep-12	SM5210:B	
Phosphorous, Total	3.27	0.01	mg/L	25-Sep-12	SM4500-P:D	
<u>Major Ions</u>						
Calcium	172	0.1	mg/L	14-Sep-12	SM4110:B	
Magnesium	127	0.1	mg/L	14-Sep-12	SM4110:B	
Potassium	25.1	0.1	mg/L	14-Sep-12	SM4110:B	
Sodium	1680	0.1	mg/L	14-Sep-12	SM4110:B	
Sulphate	574	1	mg/L	14-Sep-12	SM4110:B	

Microbiology

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Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 1/3 SEP 12

Taiga Sample ID: 001

Coliforms, Fecal	TNTC	10	CFU/100mL	13-Sep-12	SM9222:D	86
Coliforms, Total	10100	10.0	MPN/100mL	13-Sep-12	SM9223:B	

Organics

Hexane Extractable Material	7.1	2.0	mg/L	19-Sep-12	EPA1664A
Oil and Grease, visible	Non-visible			21-Sep-12	Visual Exam

Trace Metals, Total

Aluminum	241	5	µg/L	24-Sep-12	EPA200.8
Antimony	0.6	0.1	µg/L	24-Sep-12	EPA200.8
Arsenic	23.8	0.2	µg/L	24-Sep-12	EPA200.8
Barium	32.2	0.1	µg/L	24-Sep-12	EPA200.8
Beryllium	< 0.1	0.1	µg/L	24-Sep-12	EPA200.8
Cadmium	< 0.5	0.5	µg/L	24-Sep-12	EPA200.8
Cesium	< 0.1	0.1	µg/L	24-Sep-12	EPA200.8
Chromium	6.0	0.1	µg/L	24-Sep-12	EPA200.8
Cobalt	1.2	0.1	µg/L	24-Sep-12	EPA200.8
Copper	160	0.2	µg/L	24-Sep-12	EPA200.8
Iron	1140	5	µg/L	24-Sep-12	EPA200.8
Lead	1.8	0.1	µg/L	24-Sep-12	EPA200.8
Lithium	42.3	0.2	µg/L	24-Sep-12	EPA200.8
Manganese	262	0.1	µg/L	24-Sep-12	EPA200.8
Molybdenum	0.5	0.1	µg/L	24-Sep-12	EPA200.8
Nickel	9.2	0.1	µg/L	24-Sep-12	EPA200.8
Rubidium	11.5	0.1	µg/L	24-Sep-12	EPA200.8
Selenium	3.6	0.5	µg/L	24-Sep-12	EPA200.8

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Taiga Environmental Laboratory

4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3

Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:

120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 1/3 SEP 12

Taiga Sample ID: 001

Silver	0.1	0.1	µg/L	24-Sep-12	EPA200.8
Strontium	984	0.1	µg/L	24-Sep-12	EPA200.8
Thallium	< 0.1	0.1	µg/L	24-Sep-12	EPA200.8
Titanium	8.0	0.1	µg/L	24-Sep-12	EPA200.8
Uranium	0.7	0.1	µg/L	24-Sep-12	EPA200.8
Vanadium	16.5	0.1	µg/L	24-Sep-12	EPA200.8
Zinc	112	5	µg/L	24-Sep-12	EPA200.8

Subcontracted Organics

Phenols, Total	0.002	0.002	mg/L	25-Sep-12	APHA 5530D
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Subcontracted Nutrients

Kjeldahl Nitrogen, Total	19.6	0.06	mg/L	21-Sep-12	ISO 11905-2
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Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 2/3 SEP 12

Taiga Sample ID: 002

Client Project

Sample Type: Wastewater 2/3

Received Date: 13-Sep-12

Sampling Date: 13-Sep-12

Sampling Time: 6:00

Location: Eureka Sewage Lagoon

Report Status: Amended

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifier
<u>Inorganics - Physicals</u>						
Conductivity, Specific (@ 25°C)	9450	0.4	µS/cm	14-Sep-12	SM2510:B	
pH	8.92		pH units	14-Sep-12	SM4500-H:B	
Solids, Total Suspended	154	3	mg/L	20-Sep-12	SM2540:D	
<u>Inorganics - Nutrients</u>						
Ammonia as Nitrogen	0.069	0.005	mg/L	25-Sep-12	SM4500-NH3:	
Biochemical Oxygen Demand	71	2	mg/L	14-Sep-12	SM5210:B	
Phosphorous, Total	3.22	0.01	mg/L	25-Sep-12	SM4500-P:D	
<u>Major Ions</u>						
Calcium	172	0.1	mg/L	14-Sep-12	SM4110:B	
Magnesium	128	0.1	mg/L	14-Sep-12	SM4110:B	
Potassium	24.6	0.1	mg/L	14-Sep-12	SM4110:B	
Sodium	1670	0.1	mg/L	14-Sep-12	SM4110:B	
Sulphate	570	1	mg/L	14-Sep-12	SM4110:B	
<u>Microbiology</u>						

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Taiga Environmental Laboratory
 4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
 Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 2/3 SEP 12

Taiga Sample ID: 002

Coliforms, Fecal	TNTC	10	CFU/100mL	13-Sep-12	SM9222:D	86
Coliforms, Total	6910	10.0	MPN/100mL	13-Sep-12	SM9223:B	

Organics

Hexane Extractable Material	2.8	2.0	mg/L	19-Sep-12	EPA1664A
Oil and Grease, visible	Non-visible			21-Sep-12	Visual Exam

Trace Metals, Total

Aluminum	127	5	µg/L	24-Sep-12	EPA200.8
Antimony	0.6	0.1	µg/L	24-Sep-12	EPA200.8
Arsenic	24.8	0.2	µg/L	24-Sep-12	EPA200.8
Barium	28.7	0.1	µg/L	24-Sep-12	EPA200.8
Beryllium	< 0.1	0.1	µg/L	24-Sep-12	EPA200.8
Cadmium	< 0.5	0.5	µg/L	24-Sep-12	EPA200.8
Cesium	< 0.1	0.1	µg/L	24-Sep-12	EPA200.8
Chromium	5.4	0.1	µg/L	24-Sep-12	EPA200.8
Cobalt	1.0	0.1	µg/L	24-Sep-12	EPA200.8
Copper	227	0.2	µg/L	24-Sep-12	EPA200.8
Iron	769	5	µg/L	24-Sep-12	EPA200.8
Lead	1.1	0.1	µg/L	24-Sep-12	EPA200.8
Lithium	38.0	0.2	µg/L	24-Sep-12	EPA200.8
Manganese	238	0.1	µg/L	24-Sep-12	EPA200.8
Molybdenum	0.5	0.1	µg/L	24-Sep-12	EPA200.8
Nickel	8.3	0.1	µg/L	24-Sep-12	EPA200.8
Rubidium	10.7	0.1	µg/L	24-Sep-12	EPA200.8
Selenium	8.3	0.5	µg/L	24-Sep-12	EPA200.8

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Quality of Waste Water Discharged



Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 2/3 SEP 12

Taiga Sample ID: 002

Silver	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Strontium	915	0.1	µg/L	24-Sep-12	EPA 200.8
Thallium	< 0.1	0.1	µg/L	24-Sep-12	EPA 200.8
Titanium	7.0	0.1	µg/L	24-Sep-12	EPA 200.8
Uranium	0.7	0.1	µg/L	24-Sep-12	EPA 200.8
Vanadium	17.5	0.1	µg/L	24-Sep-12	EPA 200.8
Zinc	99	5	µg/L	24-Sep-12	EPA 200.8

Subcontracted Organics

Phenols, Total	0.003	0.002	mg/L	25-Sep-12	APHA 5530D
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Subcontracted Nutrients

Kjeldahl Nitrogen, Total	19.5	0.06	mg/L	21-Sep-12	ISO 11905-2
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Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.:
120825

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EU WW 2/3 SEP 12

Taiga Sample ID: 002

- DATA QUALIFIERS -

Data Qualifier Descriptions:

86 *Too numerous to count. Unable to repeat analysis at higher dilution. Holding time exceeded.*

* **Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

Comments *BOD results have been amended for both samples.*

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APPENDIX K
PROJECT SCHEDULE

