NWB Annual Report **Year being reported:** 2008

License No: 3BC-EUR0611 **Issued Date:** February 6, 2006
Expiry Date: January 30, 2011

Project Name: Eureka Weather Station

Licensee: Environment Canada

Mailing Address:
355 River Road,
Ottawa, ON, K1A 0H3
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 Canada

General Background Information on the Project (*optional):

Licence Requirements: the licensee must provide the following information in accodance with
Part B Item 2

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

Water Source(s): Station Creek

Water Quantity:		
	10,000	Quantity Allowable Domestic (cu.m)
	2,966	Actual Quantity Used Domestic (cu.m)
	0	Quantity Allowable Drilling (cu.m)
	0	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal
- [x] Solid Waste Disposal
- [x] Sewage
- [x] Drill Waste
- [x] Greywater
- [ ] Hazardous
- [ ] Other:

Additional Details:

Appendix A: Quantity of Raw Drinking Water Obtained
Appendix B: Quality of Raw Water Obtained
Appendix C: Quantity of Drinking Water Consumed
Appendix D: Quality of Drinking Water Consumed
Appendix E: Quantity of Waste Discharged
Appendix F: Quality of Waste Discharged
Appendix G: INAC Inspector Report
Appendix H: GPS Coordinates
Appendix I: West Airstrip Landfill Report
Appendix J: Disposal of Hazardous Wastes
Appendix K: On Site Facility Summary

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 of any type during 2008.

Revisions to the Spill Contingency Plan

Other: (see additional details)

Additional Details:

Spill Contingency Plan amended and forwarded to Water Board under separate cover.

Revisions to the Abandonment and Restoration Plan

Other: (see additional details)

Additional Details:

A draft Interim Abandonment and Restoration Plan was sent to the Nunavut Water Board for approval under separate cover.

Progressive Reclamation Work Undertaken

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

Reference to part B.2.v of license:

Work completed in 2008

a. Incinerator replaced
b. Contaminated soil landfarms tilled
c. A summary of all on-site facilities (past, present and proposed) (See App K)
c. Generator replaced
d. Warehouse Roof Recapitalization
e. Repaired some deficiencies in main complex

Work planned for 2009

a. Potable water tank replacement
b. Sewage disposal options analysis
c. Phases 2 & 3 of Environmental Site Assessments
d. Federal Heritage Review of > 40 year old Eureka Buildings
e. Reconnaissance Testing Program of contaminated sites
f. Runway upgrade study

Results of the Monitoring Program including:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;

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

No additional sampling requested by an Inspector or the Board

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

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

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

Additional Details: (Attached or provided below)

Reference t license Part B.2.xi:
The Department of National Defense carried out a sampling and analysis of the water and bottom sediments in the sewage lagoon in 2007. EC and DND are continuing their investigation into the reasons for elevated concentrations of selected elements contained therein. At the same time, EC is exploring other options for sewage waste disposal (see Eureka Sludge Disposal Plan and Eureka Abandonment and Restoration Plan)

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

Inspection and Compliance Report received by the Licensee (Date):

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

Appendix G: EC follow-up actions respecting inspector's direction as outlined in Water License Inspection report dated November 27th, 2007.

Any additional comments or information for the Board to consider

Date Submitted:	March 17, 2009	
Submitted/Prepared by:	Natalie Boulanger	
Contact Information:	**Tel:**	(613) 949-8555
	Fax:	(613) 949-9017
	email:	Natalie.Boulanger@ec.gc.ca

Appendix A: Quantity of Raw Drinking Water Obtained

QUANTITIES OF FRESH WATER OBTAINED

EUREKA, 2008

Fresh Water: Fresh Water Lagoon

1. 2 Pump capacities: Tsurmi Pumps Model LB2-400 with a 20′ head ~ 19.5 gal/min
2. Pump time*: 2 pumps x 11.5 days x 24 hours x 60 min x 19.5 gal/min = ~ 650,000 gal or ~ 3,000 m^3

*Pumping began on July 2, 2008
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 Obtained

EUREKA RAW/TREATED WATER ANALYSIS 2007 2008

N.B. Per the following comparison both raw water and treated water sample test results are well within both Canadian and US EPA guidelines.

	RAW WATER Lagoon		GUIDELINES (mg/l)				TREATED WATER Reverse Osmosis	
			CANADIAN[i]		US EPA[ii]			
			MAC[1]	OG[2]/AO[3]	MCL[4]	MCLG[5]		
Parameter	**2007**	**2008**					**2007**	**2008**
Organic Carbon	61.2	40.8					<0.5	0.5
Hardness	1300	1330					1.7	1.2
Coliforms, Total		<1.0	0/100 ml		100/100ml	0		<1.0
Escherichia coli		<1.0	0/100 ml			0		<1.0
Aluminum	<0.030	0.0092		0.2	0.05-0.2		0.0009	0.0019
Barium	0.0781	0.0657	1		2	2	<0.0001	0.0027
Beryllium	<0.0001	<0.0001			0.004		<0.0001	<0.0001
Boron	0.233	0.103	5				0.149	0.092
Cadmium	0.0003	<0.00005	0.005		0.005	0.005	<0.00005	<0.00005
Chromium	0.0003	0.0002	0.05		0.1	0.1	<0.0001	0.001
Cobalt	0.0006	0.0004					<0.0001	<0.0001
Copper	0.0016	0.022		<1.0		1.3	<0.010	0.0297
Iron	0.0536	<0.050		<0.3	0.3		<0.050	<0.05
Lead	0.0002	<0.0001	0.01		0.015	0	0.0003	0.0057
Manganese	0.0182	0.0347		<0.05	0.05		<0.0001	0.0001
Molybdenum	0.0006	0.0006					<0.0001	0.0003
Nickel	0.0035	0.003					0.0034	0.0013
Silver	<0.0001	<0.0001			0.1		<0.0001	0.0001
Strontium	1.34	1.18					0.0004	0.0007
Thallium	<0.0001	<0.0001					<0.0001	<0.0001
Titanium	0.0014	0.001					<0.0001	<0.0001
Vanadium	0.0003	<0.0001					<0.0001	<0.0001
Zinc	0.01	0.0039		<5.0	5		0.413	0.109
Silicon	2.51	2.27					0.00007	<0.00005
*Bromodicholormethane			0.016					0.001
*Bromoform								0.004
*Dibromochloromethane								0.003
*Trihalomethane	0.005		0.1		0.08		0.107	0.008

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

[i]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

[ii]US Environmental Protection Agency Drinking Water Standards
http://www.epa.gov/safewater/contaminants/index.html

[1]Maxiumum Acceptable Concentration

[2]Aesthetic Objectives

[3]Operational Guidance Values

[4]Maximum Contaminant Level

[5]Maximum Contaminant Level Goal

RAW WATER: WATER LAGOON: 2008

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

Taiga Batch No.: 280154

- FINAL REPORT -

Prepared For: Environment Canada
Eureka Weather Station

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

Attn: Harvey Pukin **Facsimile:**

Final report has been reviewed and approved by:

Helene Harper
A/Laboratory Manager

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL) as a testing laboratory for specific tests registered with CAEAL.
- 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.

ReportDate: Thursday, May 01, 2008
Print Date: Thursday, May 01, 2008

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

Taiga Batch No.: 280154

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TOC 07-EU10 Water Lagoon **Taiga Sample ID: 001**

Client Project:
Sample Type: Unknown Water
Received Date: 16-Apr-08
Sampling Date: 15-Apr-08
Sampling Time: 7:15
Location: Water Lagoon
Report Status: **FINAL**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Nutrients						
Organic Carbon, Total	40.8	0.5	mg/L	17-Apr-08	SM5310:B	
Major Ions						
Hardness	1330	0.7	mg/L	23-Apr-08	SM2340:B	

ReportDate: Thursday, May 01, 2008
Print Date: Thursday, May 01, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Water Lagoon **Taiga Sample ID: 003**

Client Project:
Sample Type: Unknown Water
Received Date: 10-Apr-08
Sampling Date: 10-Apr-08
Sampling Time: 7:30
Location:
Report Status: **FINAL**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Total	< 1.0	1.0	MPN/100mL	10-Apr-08	SM9223:B	
Escherichia coli	< 1.0	1.0	MPN/100mL	10-Apr-08	SM9223:B	
Trace Metals, Total						
Aluminum	9.2	0.6	µg/L	20-Apr-08	EPA200.8	
Barium	65.7	0.1	µg/L	20-Apr-08	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8	
Boron	103	0.9	µg/L	20-Apr-08	EPA200.8	
Cadmium	< 0.05	0.05	µg/L	20-Apr-08	EPA200.8	
Chromium	0.2	0.1	µg/L	20-Apr-08	EPA200.8	
Cobalt	0.4	0.1	µg/L	20-Apr-08	EPA200.8	
Copper	22.0	0.3	µg/L	20-Apr-08	EPA200.8	
Iron	< 50	50	µg/L	20-Apr-08	EPA200.8	
Lead	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8	
Manganese	34.7	0.1	µg/L	20-Apr-08	EPA200.8	
Molybdenum	0.6	0.1	µg/L	20-Apr-08	EPA200.8	

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Water Lagoon **Taiga Sample ID: 003**

Nickel	3.0	0.1	µg/L	20-Apr-08	EPA200.8
Silver	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Strontium	1180	0.1	µg/L	20-Apr-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Titanium	1.0	0.1	µg/L	20-Apr-08	EPA200.8
Vanadium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Zinc	3.9	0.4	µg/L	20-Apr-08	EPA200.8
Subcontracted Metals					
Silicon	2.27	0.05	mg/L	17-Apr-08	SM3120B
Subcontracted Organics					
1,1,1,2-Tetrachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,1-Trichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,2,2-Tetrachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,2-Trichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1-Dichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1-Dichloropropene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,3-Trichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,3-Trichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,4-Trichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,4-Trimethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dibromo-3-Chloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dibromoethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Water Lagoon **Taiga Sample ID: 003**

1,2-Dichloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethene(cis)	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethene(trans)	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,3,5-Trimethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropene(cis)	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropene(trans)	< 1	1	ug/L	17-Apr-08	EPA8260
1,4-Dichloro-2-Butene (trans)	< 25	25	ug/L	17-Apr-08	EPA8260
1,4-Dichloro-2-Butene(cis)	< 25	25	ug/L	17-Apr-08	EPA8260
1,4-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
2,2-Dichloropropane	< 10	10	ug/L	17-Apr-08	EPA8260
2-Butanone (MEK)	< 25	25	ug/L	17-Apr-08	EPA8260
2-Chloroethyl Vinyl Ether	< 1	1	ug/L	17-Apr-08	EPA8260
2-Chlorotoluene	< 1	1	ug/L	17-Apr-08	EPA8260
2-Hexanone	< 25	25	ug/L	17-Apr-08	EPA8260
4-Chlorotoluene	< 1	1	ug/L	17-Apr-08	EPA8260
4-Methyl-2-Pentanone	< 25	25	ug/L	17-Apr-08	EPA8260
Acetone	< 25	25	ug/L	17-Apr-08	EPA8260
Acetonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Acrylonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Allyl Chloride	< 25	25	ug/L	17-Apr-08	EPA8260
Benzene	< 1	1	ug/L	17-Apr-08	EPA8260
Bromobenzene	< 1	1	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Water Lagoon **Taiga Sample ID: 003**

Bromochloromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Bromodichloromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Bromodichloromethane	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Bromoform	< 1	1	ug/L	17-Apr-08	EPA8260
Bromoform	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Bromomethane	< 10	10	ug/L	17-Apr-08	EPA8260
Carbon Tetrachloride	< 1	1	ug/L	17-Apr-08	EPA8260
Chlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Chloroethane	< 10	10	ug/L	17-Apr-08	EPA8260
Chloroform	< 1	1	ug/L	17-Apr-08	EPA8260
Chloroform	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Chloromethane	< 10	10	ug/L	17-Apr-08	EPA8260
Dibromochloromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Dibromochloromethane	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Dibromomethane	< 1	1	ug/L	17-Apr-08	EPA8260
Dichlorodifluoromethane	< 10	10	ug/L	17-Apr-08	EPA8260
Ethyl Methacrylate	< 25	25	ug/L	17-Apr-08	EPA8260
Ethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Hexachlorobutadiene	< 1	1	ug/L	17-Apr-08	EPA8260
Hexachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
Iodomethane	< 1	1	ug/L	17-Apr-08	EPA8260
iso-Propylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Methacrylonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Methy t-Butyl-Ether	< 1	1	ug/L	17-Apr-08	EPA8260
Methyl Methacrylate	< 25	25	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: Water Lagoon **Taiga Sample ID: 003**

Methylene Chloride	< 5	5	ug/L	17-Apr-08	EPA8260
Naphthalene	< 5	5	ug/L	17-Apr-08	EPA8260
n-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
n-Propylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Pentachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
p-Isopropyltoluene	< 1	1	ug/L	17-Apr-08	EPA8260
Propionitrile	< 25	25	ug/L	17-Apr-08	EPA8260
sec-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Styrene	< 1	1	ug/L	17-Apr-08	EPA8260
tert-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Tetrachloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
Toluene	< 1	1	ug/L	17-Apr-08	EPA8260
Trichloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
Trichlorofluoromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Trihalomethanes, Total	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Vinyl Chloride	< 2	2	ug/L	17-Apr-08	EPA8260
Xylenes	< 1	1	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

Appendix C: Quantity of Drinking Water Consumed

Actual Water Consumption at Eureka

2001	2002	2003	2004	2005	2006	2007	2008	
57.8	43.8	91.7	104.0	104.9	22.0	131.9	126.9	**Jan**
117.5	90.0	60.6	116.7	117.0	137.9	106.3	178.0	**Feb**
113.0	79.2	160.6	121.2	188.2	103.5	222.6	271.4	**Mar**
84.1	186.8	111.7	160.1	63.7	73.6	209.2	236.3	**Apr**
261.8	233.8	280.3	203.7	273.9	322.8	273.8	410.7	**May**
335.3	287.9	432.5	418.2	489.0	495.7	325.6	499.7	**Jun**
438.0	354.8	369.1	427.6	501.8	379.6	319.3	423.3	**Jul**
238.5	160.6	260.3	247.4	236.3	111.3	167.7	163.0	**Aug**
114.5	77.1	59.4	180.3	237.8	77.8	153.9	221.1	**Sep**
103.1	79.6	165.3	70.8	71.5	107.4	142.6	183.1	**Oct**
83.5	94.6	61.5	104.6	71.5	106.4	89.2	103.9	**Nov**
141.5	85.5	149.5	144.2	78.1	108.6	163.6	159.9	**Dec**
2088.6	1773.7	2202.5	2298.8	2433.7	2046.6	2305.7	2977.3	**Total (cu M)**

EUREKA RAW/TREATED WATER ANALYSIS 2007/08

N.B. Per the following comparison both raw water and treated water sample test results are well within both Canadian and US EPA guidelines.

	RAW WATER Lagoon		GUIDELINES (mg/l)				TREATED WATER Reverse Osmosis	
			CANADIAN[i]		US EPA[ii]			
			MAC[1]	OG[2]/AO[3]	MCL[4]	MCLG[5]		
Parameter	**2007**	**2008**					**2007**	**2008**
Organic Carbon	61.2	40.8					<0.5	0.5
Hardness	1300	1330					1.7	1.2
Coliforms, Total		<1.0	0/100 ml		100/100ml	0		<1.0
Escherichia coli		<1.0	0/100 ml			0		<1.0
Aluminum	<0.030	0.0092		0.2	0.05-0.2		0.0009	0.0019
Barium	0.0781	0.0657	1		2	2	<0.0001	0.0027
Beryllium	<0.0001	<0.0001			0.004		<0.0001	<0.0001
Boron	0.233	0.103	5				0.149	0.092
Cadmium	0.0003	<0.00005	0.005		0.005	0.005	<0.00005	<0.00005
Chromium	0.0003	0.0002	0.05		0.1	0.1	<0.0001	0.001
Cobalt	0.0006	0.0004					<0.0001	<0.0001
Copper	0.0016	0.022		<1.0		1.3	<0.010	0.0297
Iron	0.0536	<0.050		<0.3	0.3		<0.050	<0.05
Lead	0.0002	<0.0001	0.01		0.015	0	0.0003	0.0057
Manganese	0.0182	0.0347		<0.05	0.05		<0.0001	0.0001
Molybdenum	0.0006	0.0006					<0.0001	0.0003
Nickel	0.0035	0.003					0.0034	0.0013
Silver	<0.0001	<0.0001			0.1		<0.0001	0.0001
Strontium	1.34	1.18					0.0004	0.0007
Thallium	<0.0001	<0.0001					<0.0001	<0.0001
Titanium	0.0014	0.001					<0.0001	<0.0001
Vanadium	0.0003	<0.0001					<0.0001	<0.0001
Zinc	0.01	0.0039		<5.0	5		0.413	0.109
Silicon	2.51	2.27					0.00007	<0.00005
*Bromodicholormethane			0.016					0.001
*Bromoform								0.004
*Dibromochloromethane								0.003
*Trihalomethane	0.005		0.1		0.08		0.107	0.008

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

[i] 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

[ii] US Environmental Protection Agency Drinking Water Standards
http://www.epa.gov/safewater/contaminants/index.html

[1] Maxiumum Acceptable Concentration

[2] Aesthetic Objectives

[3] Operational Guidance Values

[4] Maximum Contaminant Level

[5] Maximum Contaminant Level Goal

DRINKING WATER: REVERSE OSMOSIS: 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: R.O. Tap Wx Office **Taiga Sample ID:** 002

Client Project:
Sample Type: Unknown Water
Received Date: 10-Apr-08
Sampling Date: 10-Apr-08
Sampling Time: 7:30
Location:
Report Status: **FINAL**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Microbiology						
Coliforms, Total	< 1.0	1.0	MPN/100mL	10-Apr-08	SM9223:B	
Escherichia coli	< 1.0	1.0	MPN/100mL	10-Apr-08	SM9223:B	
Trace Metals, Total						
Aluminum	1.9	0.6	µg/L	20-Apr-08	EPA200.8	
Barium	2.7	0.1	µg/L	20-Apr-08	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8	
Boron	92.0	0.9	µg/L	20-Apr-08	EPA200.8	
Cadmium	< 0.05	0.05	µg/L	20-Apr-08	EPA200.8	
Chromium	1.0	0.1	µg/L	20-Apr-08	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8	
Copper	29.7	0.3	µg/L	20-Apr-08	EPA200.8	
Iron	< 50	50	µg/L	20-Apr-08	EPA200.8	
Lead	5.7	0.1	µg/L	20-Apr-08	EPA200.8	
Manganese	0.1	0.1	µg/L	20-Apr-08	EPA200.8	
Molybdenum	0.3	0.1	µg/L	20-Apr-08	EPA200.8	

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: R.O. Tap Wx Office **Taiga Sample ID: 002**

Nickel	1.3	0.1	µg/L	20-Apr-08	EPA200.8
Silver	0.1	0.1	µg/L	20-Apr-08	EPA200.8
Strontium	0.7	0.1	µg/L	20-Apr-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Titanium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Vanadium	< 0.1	0.1	µg/L	20-Apr-08	EPA200.8
Zinc	819	0.4	µg/L	20-Apr-08	EPA200.8
Subcontracted Metals					
Silicon	< 0.05	0.05	mg/L	17-Apr-08	SM3120B
Subcontracted Organics					
1,1,1,2-Tetrachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,1-Trichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,2,2-Tetrachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1,2-Trichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1-Dichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,1-Dichloropropene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,3-Trichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,3-Trichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,4-Trichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2,4-Trimethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dibromo-3-Chloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dibromoethane	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethane	< 1	1	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: R.O. Tap Wx Office **Taiga Sample ID: 002**

1,2-Dichloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethene(cis)	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloroethene(trans)	< 1	1	ug/L	17-Apr-08	EPA8260
1,2-Dichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,3,5-Trimethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropane	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropene(cis)	< 1	1	ug/L	17-Apr-08	EPA8260
1,3-Dichloropropene(trans)	< 1	1	ug/L	17-Apr-08	EPA8260
1,4-Dichloro-2-Butene (trans)	< 25	25	ug/L	17-Apr-08	EPA8260
1,4-Dichloro-2-Butene(cis)	< 25	25	ug/L	17-Apr-08	EPA8260
1,4-Dichlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
2,2-Dichloropropane	< 10	10	ug/L	17-Apr-08	EPA8260
2-Butanone (MEK)	< 25	25	ug/L	17-Apr-08	EPA8260
2-Chloroethyl Vinyl Ether	< 1	1	ug/L	17-Apr-08	EPA8260
2-Chlorotoluene	< 1	1	ug/L	17-Apr-08	EPA8260
2-Hexanone	< 25	25	ug/L	17-Apr-08	EPA8260
4-Chlorotoluene	< 1	1	ug/L	17-Apr-08	EPA8260
4-Methyl-2-Pentanone	< 25	25	ug/L	17-Apr-08	EPA8260
Acetone	< 25	25	ug/L	17-Apr-08	EPA8260
Acetonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Acrylonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Allyl Chloride	< 25	25	ug/L	17-Apr-08	EPA8260
Benzene	< 1	1	ug/L	17-Apr-08	EPA8260
Bromobenzene	< 1	1	ug/L	17-Apr-08	EPA8260

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: R.O. Tap Wx Office **Taiga Sample ID: 002**

Bromochloromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Bromodichloromethane	0.001	0.001	mg/L	17-Apr-08	EPA8260B
Bromodichloromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Bromoform	0.004	0.001	mg/L	17-Apr-08	EPA8260B
Bromoform	< 1	1	ug/L	17-Apr-08	EPA8260
Bromomethane	< 10	10	ug/L	17-Apr-08	EPA8260
Carbon Tetrachloride	< 1	1	ug/L	17-Apr-08	EPA8260
Chlorobenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Chloroethane	< 10	10	ug/L	17-Apr-08	EPA8260
Chloroform	< 0.001	0.001	mg/L	17-Apr-08	EPA8260B
Chloroform	< 1	1	ug/L	17-Apr-08	EPA8260
Chloromethane	< 10	10	ug/L	17-Apr-08	EPA8260
Dibromochloromethane	0.003	0.001	mg/L	17-Apr-08	EPA8260B
Dibromochloromethane	3	1	ug/L	17-Apr-08	EPA8260
Dibromomethane	< 1	1	ug/L	17-Apr-08	EPA8260
Dichlorodifluoromethane	< 10	10	ug/L	17-Apr-08	EPA8260
Ethyl Methacrylate	< 25	25	ug/L	17-Apr-08	EPA8260
Ethylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Hexachlorobutadiene	< 1	1	ug/L	17-Apr-08	EPA8260
Hexachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
Iodomethane	< 1	1	ug/L	17-Apr-08	EPA8260
iso-Propylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Methacrylonitrile	< 25	25	ug/L	17-Apr-08	EPA8260
Methy t-Butyl-Ether	< 1	1	ug/L	17-Apr-08	EPA8260
Methyl Methacrylate	< 25	25	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

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

Taiga Batch No.: 280148

- CERTIFICATE OF ANALYSIS -

Client Sample ID: R.O. Tap Wx Office **Taiga Sample ID: 002**

Methylene Chloride	< 5	5	ug/L	17-Apr-08	EPA8260
Naphthalene	< 5	5	ug/L	17-Apr-08	EPA8260
n-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
n-Propylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Pentachloroethane	< 1	1	ug/L	17-Apr-08	EPA8260
p-Isopropyltoluene	< 1	1	ug/L	17-Apr-08	EPA8260
Propionitrile	< 25	25	ug/L	17-Apr-08	EPA8260
sec-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Styrene	< 1	1	ug/L	17-Apr-08	EPA8260
tert-Butylbenzene	< 1	1	ug/L	17-Apr-08	EPA8260
Tetrachloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
Toluene	< 1	1	ug/L	17-Apr-08	EPA8260
Trichloroethene	< 1	1	ug/L	17-Apr-08	EPA8260
Trichlorofluoromethane	< 1	1	ug/L	17-Apr-08	EPA8260
Trihalomethanes, Total	0.008	0.001	mg/L	17-Apr-08	EPA8260B
Vinyl Chloride	< 2	2	ug/L	17-Apr-08	EPA8260
Xylenes	< 1	1	ug/L	17-Apr-08	EPA8260

ReportDate: Wednesday, April 23, 2008
Print Date: Wednesday, April 23, 2008

Appendix E: Quantity of Waste Discharged

QUANTITIES OF

WASTE WATER DISCHARGED

EUREKA, 2008

Waste Water: Sewage Lagoon

1. Pump capacity: Monarch Pump Model TT30 Type E – 280 gal/min
2. Pump time*: 20 hours x 60 min x 280 gal/min = ~ 336,000 gal or ~ 1527 m^3
   *Discharge commenced and ended on July 02, 2008

Appendix F: Quality of Waste Discharged

ANALYSIS OF EUREKA SEWAGE PARAMETERS

Wastewater effluent at Eureka is governed by three guidelines: CCME's Canada-wide Strategy for the Management of Municipal Wastewater Effluent, 2009; Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments 1976; 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 Federal Guidelines apply to all effluents discharged from land based establishments under the direct authority of the Federal Government. 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 in 2007 and 2008 to determine the level of compliance with CCME, Federal and NWT guidelines for wastewater (Table 1). Six parameters were identified as exceeding suggested levels. This report discusses each exceeding parameters, potential causes of exceedance, and identifies corrective solutions if applicable.

Effluent exceedances and possible causes

1. Total suspended solids (TSS)

Effluent total suspended solids averaged approximately 135 mg/l in 2008 which is below Territorial guidelines, but above Federal levels. The elevated levels could be caused by[1]:

- **a.** Suspended bacterial solids;[1]
- **b.** Algae growth. Indicators of algae growth are as follows:
  - i. Biological demand (BOD) > 30 mg/l (Eureka's is ~ 35 mg/l);
  - ii. pH > 9 (Eureka's is 8.9 – 9.03); and
  - iii. TSS/BOD ratio > 2 (Eureka's is 2 – 2.7).
- **c.** Silt, clay, cell debris, and bottom solids suspended from lagoon pumping.

2. pH

pH results averaged 8.99 in 2008. This result exceeds the CCME and Federal guidelines. High pH values are typically caused by excessive algae growth[1].

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

3. Phosphorus

Phosphorous samples average 4.48 mg/l in 2008, which exceeds the Federal guidelines. Raw municipal wastewaters typically contain 5 to 20 mg/l of total phosphorous[2].

4. Iron (Fe)

Effluent iron averaged 0.5 mg/l which exceeded Territorial guidelines. The possible sources of iron (Fe) are[3]:

a. Natural sources (land, water)

b. Iron sediments or deposits in the lagoon which are being dissolved; and

c. Industrial processes (either onsite or from DND) which are producing Fe waste streams.

5. Manganese (Mn)

Manganese has been found at levels averaging 0.06 mg/l, which slightly exceeds Territorial guidelines. Possible sources of manganese include[4]:

a. Natural sources (soils, rocks, and water). Manganese can be found naturally in water in levels as high as 1.0 mg/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.

6. Total and fecal coliforms

Total and fecal coliforms have been found in levels ranging from 9,000 to 80,000 CFUs. Both parameters exceed Federal guidelines. Coliforms are naturally present in wastewater.

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 2009 season:

---

[2] Sedlack, Richard. Phosphorous and Nitrogen Removal from Municipal Wastewater.

[3] Tillman, Glenn. Wastewater Treatment: Troubleshooting and Problem Solving.

[4] Connecticut Department of Public Health. Fact Sheet: Manganese in Drinking Water. 2001

a. Collect and analyze the undisturbed effluent (before pumping) in the lagoon to determine TSS, Fe, and Mn concentrations. The previous results may be elevated by sediments and are therefore not an accurate reflection of actual wastewater conditions.

b. Collect and analyze waste samples before they reach the lagoon to determine TSS, Fe and Mn concentrations as levels may be a result of natural systems or other pollution sources.

c. Suspend the foot valve of the pumping system above the bottom sediments to limit contamination of effluent from bottom sediments. This practice may be particularly detrimental to TSS concentrations.

d. Analyze the effluent TSS to determine if the nature of the particles:

    i. Sludge

    ii. Filamentous bacteria

    iii. Sulphur bacteria

    iv. Algae

2. Phosphorous

Phosphorous removal is achieved through chemical pH adjustment. As no chemicals are used in the Eureka lagoon, phosphorous removal targets will be difficult to achieve at Eureka.

3. Total and fecal coliforms

Coliform, like other bacteria, can be killed by treating with chlorine or UV disinfection. Wastewater is monitored for coliforms to protect the health of the general public who may be using the water for drinking water or recreation. As neither of these practices are used in Eureka, treatment of coliforms is likely not required.

TABLE 1: ANALYSIS OF EUREKA WASTEWATER EFFLUENT					
Parameter	2008 Results (mg/l)	2007 Results (mg/l)	GUIDELINES FOR THE DISCHARGE OF TREATED MUNICIPAL WASTEWATER NORTHWEST TERRITORIES	GUIDELINES FOR EFFLUENT QUALITY AND WASTEWATER TREATMENT AT FEDERAL ESTABLISHMENTS 1976	CCME GUIDELINES FOR THE PROTECTION OF MARINE AQUATIC LIFE
Aluminum	0.274 - 0.284		2		
Antimony	0.0019 - 0.0021				
Arsenic	0.0009 - 0.001		0.05		0.0125
Barium	0.0233 - 0.0239		1		
Beryllium	<0.0001				
Cadmium	<0.0001		0.005		0.00012
Cesium	<0.0001				
Chromium	0.0011 - 0.0012		0.01		
Cobalt	0.0009 - 0.001		0.1		
Copper	0.03		0.2		
Iron	0.539 - 0.543		0.3		
Lead	0.0013 - 0.0015		0.5		
Lithium	0.0273 - 0.0274				
Manganese	0.0545 - 0.0648		0.05		
Molybdenum	0.0006 - 0.0007		0.2		
Nickel	0.0054- 0.0061		0.3		
Rubidium	0.0135 - 0.0136				
Selenium	0.0008		0.05		0.05
Silver	<0.0001		0.1		0.1
Strontium	0.606 - 0.612				
Thallium	<0.0001				
Titanium	0.0132 - 0.0134				
Uranium	0.0008				
Vanadium	0.0008				
Zinc	0.051				
Phenols, Total	0.023 - 0.044	0.04 - 0.055		0.020	
Conductivity, Specific	5370 - 5440				
pH	8.95, 9.03			6.0 - 9.0	7.0 - 8.7
Total Suspended Solids (TSS)	128, 143	71 - 89	70	25	
Biochemical Oxygen Demand	33 - 34	35 - 37	80	20	
Nitrate+Nitrite as Nitrogen	1.1, 1.80	<0.01 - 1.11			
Phosphorous, Total	4.45, 4.51	0.24 - 4.13	Flexible	1	
Kjeldahl Nitrogen, Total	30.6, 33.7	42.7 - 43.7			
Coliforms, Fecal	9,200, 10,200	<10,000 - 80,000		400/100 (after disinfection)	
Coliforms, Total	19,200 - 30,800	379,000 - 650,000			
Hexane Extractable Material	2.8 - 7				

EUREKA SEWAGE LAGOON: ANALYSIS RESULTS: 2008

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

Taiga Batch No.: 280324

- FINAL REPORT -

Prepared For: Environment Canada
Eureka Weather Station

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

Attn: **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 of Environmental Analytical Laboratories (CAEAL) as a testing laboratory for specific tests registered with CAEAL.
- 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.

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #1-08 **Taiga Sample ID: 001**

Client Project:
Sample Type: Wastewater
Received Date: 03-Jul-08
Sampling Date: 02-Jul-08
Sampling Time: 20:00
Location: Eureka Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Conductivity, Specific (@ 25°C)	5370	0.4	µS/cm	04-Jul-08	SM2510:B	
pH	9.03		pH units	03-Jul-08	SM4500-H:B	
Solids, Total Suspended	143	3	mg/L	15-Jul-08	SM2540:D	
Inorganics - Nutrients						
Biochemical Oxygen Demand	34	2	mg/L	04-Jul-08	SM5210:B	81
Nitrate+Nitrite as Nitrogen	1.10	0.01	mg/L	10-Jul-08	SM4110:B	
Phosphorous, Total	4.45	0.01	mg/L	15-Jul-08	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	30.6	0.06	mg/L	10-Jul-08	ISO 11905-2	
Microbiology						
Coliforms, Fecal	9200	100	CFU/100mL	03-Jul-08	SM9222:D	
Coliforms, Total	19200	100	MPN/100mL	03-Jul-08	SM9223:B	
Organics						
Hexane Extractable Material	7.0	2.0	mg/L	21-Jul-08	EPA1664A	

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #1-08 **Taiga Sample ID: 001**

Trace Metals, Total

Aluminum	284	5	µg/L	15-Jul-08	EPA200.8
Antimony	1.9	0.1	µg/L	15-Jul-08	EPA200.8
Arsenic	0.9	0.2	µg/L	15-Jul-08	EPA200.8
Barium	23.9	0.1	µg/L	15-Jul-08	EPA200.8
Beryllium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Cadmium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Cesium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Chromium	1.2	0.1	µg/L	15-Jul-08	EPA200.8
Cobalt	0.9	0.1	µg/L	15-Jul-08	EPA200.8
Copper	30.0	0.2	µg/L	15-Jul-08	EPA200.8
Iron	539	5	µg/L	15-Jul-08	EPA200.8
Lead	1.5	0.1	µg/L	15-Jul-08	EPA200.8
Lithium	27.3	0.2	µg/L	15-Jul-08	EPA200.8
Manganese	54.5	0.1	µg/L	15-Jul-08	EPA200.8
Molybdenum	0.7	0.1	µg/L	15-Jul-08	EPA200.8
Nickel	5.4	0.1	µg/L	15-Jul-08	EPA200.8
Rubidium	13.5	0.1	µg/L	15-Jul-08	EPA200.8
Selenium	0.8	0.5	µg/L	15-Jul-08	EPA200.8
Silver	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Strontium	612	0.1	µg/L	15-Jul-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Titanium	13.2	0.1	µg/L	15-Jul-08	EPA200.8
Uranium	0.8	0.1	µg/L	15-Jul-08	EPA200.8

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #1-08 **Taiga Sample ID: 001**

Vanadium	0.8	0.1	µg/L	15-Jul-08	EPA200.8
Zinc	51	5	µg/L	15-Jul-08	EPA200.8
Subcontracted Organics					
Phenols, Total	0.023	0.001	mg/L	11-Jul-08	APHA 5530D

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #2-08 **Taiga Sample ID: 002**

Client Project:
Sample Type: Wastewater
Received Date: 03-Jul-08
Sampling Date: 03-Jul-08
Sampling Time: 6:00
Location: Eureka Sewage Lagoon
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Conductivity, Specific (@ 25°C)	5440	0.4	µS/cm	04-Jul-08	SM2510:B	
pH	8.95		pH units	03-Jul-08	SM4500-H:B	
Solids, Total Suspended	128	3	mg/L	15-Jul-08	SM2540:D	
Inorganics - Nutrients						
Biochemical Oxygen Demand	33	2	mg/L	04-Jul-08	SM5210:B	81
Nitrate+Nitrite as Nitrogen	1.80	0.01	mg/L	10-Jul-08	SM4110:B	
Phosphorous, Total	4.51	0.01	mg/L	15-Jul-08	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	33.7	0.06	mg/L	10-Jul-08	ISO 11905-2	
Microbiology						
Coliforms, Fecal	10200	100	CFU/100mL	03-Jul-08	SM9222:D	
Coliforms, Total	30800	100	MPN/100mL	03-Jul-08	SM9223:B	
Organics						
Hexane Extractable Material	2.8	2.0	mg/L	21-Jul-08	EPA1664A	

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #2-08 **Taiga Sample ID: 002**

Trace Metals, Total

Aluminum	274	5	µg/L	15-Jul-08	EPA200.8
Antimony	2.1	0.1	µg/L	15-Jul-08	EPA200.8
Arsenic	1.0	0.2	µg/L	15-Jul-08	EPA200.8
Barium	23.3	0.1	µg/L	15-Jul-08	EPA200.8
Beryllium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Cadmium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Cesium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Chromium	1.1	0.1	µg/L	15-Jul-08	EPA200.8
Cobalt	1.0	0.1	µg/L	15-Jul-08	EPA200.8
Copper	30.0	0.2	µg/L	15-Jul-08	EPA200.8
Iron	543	5	µg/L	15-Jul-08	EPA200.8
Lead	1.3	0.1	µg/L	15-Jul-08	EPA200.8
Lithium	27.4	0.2	µg/L	15-Jul-08	EPA200.8
Manganese	64.8	0.1	µg/L	15-Jul-08	EPA200.8
Molybdenum	0.6	0.1	µg/L	15-Jul-08	EPA200.8
Nickel	6.1	0.1	µg/L	15-Jul-08	EPA200.8
Rubidium	13.6	0.1	µg/L	15-Jul-08	EPA200.8
Selenium	0.8	0.5	µg/L	15-Jul-08	EPA200.8
Silver	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Strontium	606	0.1	µg/L	15-Jul-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	15-Jul-08	EPA200.8
Titanium	13.4	0.1	µg/L	15-Jul-08	EPA200.8
Uranium	0.8	0.1	µg/L	15-Jul-08	EPA200.8

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #2-08 **Taiga Sample ID: 002**

Vanadium	0.8	0.1	µg/L	15-Jul-08	EPA200.8
Zinc	51	5	µg/L	15-Jul-08	EPA200.8
Subcontracted Organics					
Phenols, Total	0.044	0.001	mg/L	11-Jul-08	APHA 5530D

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

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

Taiga Batch No.: 280324

- CERTIFICATE OF ANALYSIS -

Client Sample ID: EUWW #2-08 **Taiga Sample ID: 002**

- DATA QUALIFERS -

Data Qualifier Descriptions:

81 *Results are inconclusive due to insufficient depletion of sample, minimum 2 mg/L required over 5 days.*

*** 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

ReportDate: Tuesday, July 22, 2008
Print Date: Tuesday, July 22, 2008

Appendix G: INAC Inspector Report

ENVIRONMENT CANADA FOLLOW-UP ACTIONS ON NOV 27/2007 INSPECTION REPORT

Outstanding issue	EC Action	Reference
Part B: General Conditions		
1. Submission of Annual Reports	EC submitted 2007 & 2008 annual reports	Self-explanatory
2. Installation of proper signage at the water supply and waste disposal facilities and monitoring stations	Proper signage posted.	Self-explanatory
Part C: Conditions Applying Water Use		
1. Water supply facility has less than 1 m freeboard	EC monitored integrity of the water lagoon berm	Self-explanatory
Part D: Conditions Applying to Waste Disposal		
1. Erosion and seepage control measures at sewage lagoon.	EC shored up the berm separating sewage lagoon from Fjord.	Self-explanatory
2. Secondary containment of any drummed fuel	DND is currently testing portable containment and Polar Shelf has confirmed that they will be providing containment for their drums. EC is monitoring the solutions DND and PS are using to determine the best option.	Self-explanatory
3. Submission of proper spill reports	EC informed other tenants of Eureka of their responsibility to report spills to EC in writing and the report will be completed by the owner of the equiment that caused the spill. Spill is to be cleaned up immediately by the owner of the spill or by EC at the owner's expense. Cleanup is to be completed to the satisfaction of EC and final report is to be completed by the owner and submitted by EC to the Water Board.	Self-explanatory
4. Open burning	Open burning has ceased at Eureka	Self-explanatory
5. Deposit of hazardous materials in solid waste dump sites	EC has notified all Eurkea tenants that no hazardous materials or waste can be deposited in the solid waste landfills	Self-explanatory

6. Drum crushing and disposal	Used Drums are transferred to the crushing area where any remaining liquid is collected (see Appendix I: "Hazardous" for disposal of liquid) and the drums are crushed, placed in the disposal grounds designated for crushed barrels and covered with soil.	*Summary of Operations and Maintenance Procedures for Sewage, solid Waste Disposal and Waste Treatment Facilities - Eureka High Arctic Weather Station- November, 2007*
7. Shipment of hazardous materials	See Annex I: Hazardous	*Summary of Operations and Maintenance Procedures for Sewage, solid Waste Disposal and Waste Treatment Facilities - Eureka High Arctic Weather Station- November, 2007*
8. Installation of a new incinerator	EC has installed a new incinerator in 2008.	Self-explanatory
9. Sewage lagoon	EC has requested PWGSC to prepare an options analysis for sewage disposal at Eureka in 2009. The solutions to the issues surrounding the lagoon and its contents will be a function of the EC's decision on the PWGSC report.	Self-explanatory
10. Land Fill Strategy	EC has submitted a land fill strategy under separate cover	Self-explanatory
11. Location and treatment of hydrocarbon contaminated materials	The Old Tank Farm is the location of the hydrocarbon contaminated materials remediation area. A 3-year surveillance program was recently initiated whereby water samples are collected to assess any movement of hydrocarbons from the treatment area into the surrounding environment. The results of this program will be assessed in 2009 and included in the 2009 Annual Report. The site is cultivated annually to facilitate volatilization of hydrocarbons.	*Proposal for Revision and Update of the Surveillance Network Monitoring Program - Eureka High Arctic Weather Station - November 2007*
Part F: Conditions Applying to Modifications and Construction		
1. Board approval before upgrading water supply or sewage disposal systems	EC will provide the Board with any upcoming plans for changes or upgrades to the water supply or sewage treatment systems for its review and approval.	Self-explanatory
2. Historical plans and drawings	An extensive, but unsuccessful, effort was undertaken to locate historical plans and drawings.	Self-explanatory
Part G: Conditions Applying to Operations and Maintenance		
1. Timely and detailed reporting and response to any spills	EC formally advised Eureka tenants to follow the protocol for spills at Eureka.	*Oil Pollution Emergency Plan for Land Spills - Eureka*

2. Submission of geotechnical inspections	EC submits, under separate cover, a geotechnical report of Eureka facilities that contain fuel or waste.	*Eureka High Arctic Weathr Station Geophysical Investiagtion, Eureka, NU, EBA Engineering Consultants, Edmonton, May 2008*
Part I: Conditions Applying to Abandonment and Restoration		
1. Submission of and Abandonment and Restoration Plan in 2008	EC has prepared a preliminary A&R Plan for the Board's approval under separate cover.	Self-explanatory
2. Reclamation of the West Airstrip Landfill	EC prepared a Final Report on the Reclamation of the West Airstrip Landfill	See App H West Airstrip

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

FINAL REPORT ON THE RECLAMATION OF THE WEST AIRSTRIP LANDFILL
December-20-08

PREAMBLE

This report applies to the West Airstrip Landfill (latitude 79^0 59' 51" N, longitude 85^0 51' 8" W) located in Eureka, NU (latitude 79^0 59' 41" N, longitude 85^0 48' 48" W) and is a requirement of subsection I.7 of the Nunavut Water Board Licence No. **3BC-EUR0611.**

The following formal distribution will be made of this report:
Nunavut Water Board
Andrew Keim (Inspector, DIAND)

To request additional information, please contact:
Tim Rauch
Project Manager
Environment Canada
District 3 – Property Management
P.O. Box 14257
Lac Du Bonnet, MB R0E 1A0

INTRODUCTION

The West Airstrip Landfill is a located at the west end of the air strip. It is an abandoned (closed) landfill and its surface is capped. Based on observations of the site prior to full capping of the site and geophysical data, the site is believed to contain mostly domestic waste and fuel drums.

RECENT ACTIVITIES

- Additional cover material was placed on exposed areas in the summer of 2008

RECENT MONITORING ACTIVITIES

1995 (Detailed Site Characterization and Monitoring at the Abandoned Landfill, Eureka, NWT, PWGSC, November 1995)

- Samples were collected downgradient from the landfill and along the drainage channel leading from the landfill to the ocean
- Samples were analyzed for PCB's, PHC's and metals.

2007 (Eureka High Arctic Weather Station, Geophysical Investigation, Eureka, NU, May 2008, EBA Engineering Consultants Ltd, Edmonton, AB)

- Samples were collected from the landfill and analyzed.

2007 (Characterization of Contaminated Sites at CFS-Alert and CFS-Eureka, Nunavut, NRC, 2007)

- Two (2) soil samples were collected in 2006, from a depth of 40 cm and tested for metals and TPH.

RESULTS OF MONITORING ACTIVITY

1995

- Concentrations of parameters analyzed were all below DEW Line Tier I and II Criteria
- Concentrations of selenium were below the CCME Soil Remediation Criteria for commercial/industrial land use.
- West Landfill is located in a suitable, stable location with no evidence of contaminated leachate.
- Full closure of the landfill and monitoring of landfill cover freeze-back was recommended

2007 (EBA)

- The landfill is completely re-vegetated.
- Sampling showed no evidence that the west airstrip landfill is leaching contaminants.
- This landfill is located in a relatively stable location with limited receptors.
- Additional fill should be placed over the entire area.

2007 (NRC)

- No contaminants were found to exceed the CCME criteria.

LONG-TERM MONITORING NEEDS

The above results indicate that the site is no longer releasing contaminants and therefore, operational monitoring is no longer required.

Notwithstanding, EC will inspect the site yearly for

- settling of cover material
- cave-ins

and re-grade it, if necessary, to prevent the creation of standing water.

In addition, the vegetation will be monitored to ensure that it continues to grow and cover the site. Finally, the drainage path ways will be maintained if required.

Appendix J: Disposal of Hazardous Wastes

DISPOSAL OF HAZARDOUS WASTE

Types of Hazardous Waste

Jet Fuel A or B

- Used at Eureka to fuel incinerator.
- EC is currently seeking a waste fuel burner which is capable of burning fuel that contains water

Waste Oil

- Flown out on flights of "opportunity"
- Approximately 6 drums of waste oil are collected before being shipped for disposal

Batteries

- Flown out on flights of "opportunity" or sealifts
- 2-3 crates of batteries are collected before being shipped for disposal

Halocarbons & Glycol

- Shipped out on flights of opportunity or on sealifts

Manifests

Manifests indicating type, quantity, carrier and final location are kept on file at EC's Eureka office.

Disposal Sites

Waste Oil: Narwhal Arctic Service, Resolute Bay, NU

Waste Oil & Waste Glycol: Safety-Kleen (Quebec) Ltd. 85 rue de Hambourg Saint-Augustin-de-Desmaures, QC G3A 1S6

Refrigerant Gas R12: Certified Mechanical & Controls, Ltd. 9311-35 Ave. Edmonton, AB; Frosty Refrigeration, Iqaluit, NU

Waste Batteries: Miller Environmental Corporation, 1803 Hekla Avenue, Winnipeg, MB, R2R 0K3

Hazardous Waste Storage

Secondary containment for hazardous materials awaiting disposal is provided in the form of salvage drums, crates constructed with plastic lining or secondary containment pallets.

Appendix K: On Site Facility Summary

Eureka On Site Facility Summary

Building	Description	Year of Construction	Heritage Review Required?	Demolition Decision	Hazmat
New Operations Complex	Combined Weather Station, Dining and accommodation facility including sewage pump house	2005	No <40yrs	No	No
Warehouse	Dry goods storage building, exercise facility and communication room	1974	No <40yrs	No	No
Old Operations Complex	Decommissioned former Weather Station, Dining and accomodation facility	1963	Yes >40yrs	Yes	Asbestos, Lead Paint
Old Garage	Former vehicle maintenance garage now used for vehicle storage	1963	Yes >40yrs	No	Asbestos, Lead Paint
New Garage	Vehicle maintenance garage attached to Power house & Water Settling Tank Building	2002	No <40yrs	No	No
Power House & Water Settling Tank Building	Power house attached to New Garage & Water Settling Tank Building	1972	No <40yrs	No	No
Hydrogen Building	Hydrogen generation and balloon filling building	1963	Yes >40yrs	No	Lead Paint
Transient Barracks	Abandoned former transient barracks. Was used as staff barracks from 1947 to 1963	1947	Yes >40yrs	Yes	Asbestos, Lead Paint
Plumbing Building	Storage building for plumbing related parts etc. Was used as operations building from 1947 to 1963	1947	Yes >40yrs	TBD	Asbestos, Lead Paint, PCB Paint
Bunkhouse	Bunkhouse building for overflow accommodation (has no facilities)	1947	Yes >40yrs	Yes	Asbestos, Lead Paint
Carpentry Shop	Old carpentry shop now used for storage	1947	Yes >40yrs	TBD	Asbestos, Lead Paint
Greenhouse	Unused green house	1947	Yes >40yrs	TBD	No
Electrical Storage (Building 9)	Storage building for electrical related parts. Former food storage building moved from original site on beach in 1963	1947	Yes >40yrs	TBD	No
CWS Storage (Building 19)	This is one of the original Jamesway Huts erected in the first days of occupation of the Eureka site. It is presently used for storage by David Meech (CWS) in support of his arctic wolf studies.	1947	Yes >40yrs	TBD	Unkn
Eureka International (Strip Shack)	Small shed at airstrip with storage for flare pots and electrical service panel for north side of runway	1947	Yes >40yrs	TBD	Unkn