

November 2, 2004

Environment Canada
Prairie and Northern Region
123 Main Street, Suite 150
Winnipeg, Manitoba
R3C 4W2

Attn: Steve Smith

Re: Eureka Surveillance Network Program 2004

In accordance with the requirements of Water License NWB4EUR9904, issued by the Nunavut Water Board on March 29, 1999, please find attached the results of the Surveillance Network Program (SNP). As part of the SNP, one water samples was collected from the fresh water reservoir (prior to chlorination) and two sewage lagoon effluent samples were collected. A surface water runoff sample from the solid waste disposal facility could not be collected due to lack of water.

Laboratory results from the collected samples identified concentrations of fecal coliforms in the effluent samples which exceeded the Guidelines for the Discharge of Domestic Wastewater in Nunavut. However, these exceedances do not likely pose a significant risk since the recommended hold time of the sample was exceeded by the laboratory. All other effluent parameters were either below the applicable guideline or below the laboratory's minimum detection limit. No exceedances were identified from the fresh water reservoir sample.

Environment Canada is currently in the process of obtaining a new water five-year water license for the facility. Additional details regarding the sampling and the results obtained are provided below.

Fresh Water Reservoir (Prior to Treatment)

One water sample was collected from the water reservoir on July 10, 2004 at 19:00. The sample was analyzed for nitrate, nitrite, potassium, total dissolved solids (TDS), pH, conductivity, benzene, toluene, ethylbenzene and xylenes (BTEX). The results were compared to the Canadian Drinking Water Quality Guidelines (CDWQG).

All of the parameters analyzed were either below the applicable guideline or below the laboratory's minimum detection limits. The laboratory results are attached to this letter.

Table 1: Fresh Water Lagoon Analytical Results

Parameter	CDWQG*	Reservoir
Benzene	0.005 MAC	<0.0005
Toluene (mg/L)	≤0.024 AO	<0.0005
Ethylbenzene (mg/L)	≤0.0024 AO	<0.0005
Xylene (mg/L)	--	<0.0005
Meta/para Xylene	--	<0.0005
Ortho-Xylene	--	<0.0005
Total Xylene	≤0.3 AO	<0.001
Volatile Hydrocarbons (C ₆ – C ₁₀)	--	<0.1
VPH	--	<0.1
Nitrite/Nitrate/Nitrogen (mg/L)	45**	<0.1
Total Kjeldahl Nitrogen	--	<0.1
Potassium	--	1.4
Conductivity (uS/cm)	--	273
pH	--	7.9
TDS	--	146

* Canadian Drinking Water Quality Guidelines (April 2003)

** - Equivalent to 10mg/L as nitrate-nitrogen

AO – Aesthetic Objectives

MAC – Maximum Acceptable Concentrations

Pond at Toe of Treatment Cell

No surface water was collected at site during the July 2004 visit.

Runoff from the Solid Waste Disposal Facilities

Runoff from this location is to be sampled annually during periods of melt water flow. Site personnel at the Eureka weather station were unsuccessful in acquiring the samples in 2004 due to minimal water available. Weather station staff will attempt to collect the necessary samples in 2005.

Discharge from the Sewage Lagoon (Prior to Entering the Ocean)

The annual discharge from the sewage lagoon occurred on July 9th and 10th, 2004. Approximately 1500 m³ was discharged from the lagoon over the two day period. Two effluent samples were collected during the discharge; the first (Effluent 1) was collected at 14:30 on July 9th after approximately 33% of the effluent had been released. The second sample (Effluent 2) was collected at 08:30 on July 10th after approximately 66% of the effluent had been released. The samples were sent to Enviro-Test Laboratory for analysis of biochemical oxygen demand (BOD), total suspended solids (TSS), pH, nitrate, nitrite, total nitrogen, total phenols, sodium, magnesium, total silver, fecal coliforms, conductivity, ammonia, sulfate, potassium, and calcium.

A visual inspection of the sample for oils and grease was completed at the time of sample collection.

The laboratory results obtained identified concentrations of fecal coliforms in excess of the Guideline. However, the laboratory misplaced the sample and was not analyzed until well after the recommended hold time of 24 hours. Consequently the reported fecal coliform concentrations are likely much higher than what the concentrations were at the time of discharge.

Due to the remote nature of the facility, it can be difficult to get wastewater samples to the laboratory and analyzed within the recommended 24 hour period. To address this limitation, the use of an on-site, portable test kit could be used to evaluate the wastewater for fecal coliforms. The estimated cost for a kit to complete this type of analysis is approximately \$6,000. Should elevated fecal coliform concentrations persist in the effluent, additional wastewater treatment options may have to be explored.

All other parameters tested for were either below the Guidelines for the Discharge of Domestic Wastewater in Nunavut or below the laboratory's minimum detection limit. The laboratory results are summarized in Table 2 below. Also included in Table 2 is the 2003 effluent data for comparative purposes. Of particular significance is the reduction of TSS in the effluent between 2003 and 2004. Following the exceedances reported in 2003, a sump area was excavated in the lagoon. This allowed the pump intake to remain above the base of the lagoon and prevented it from drawing in solids off of the base of the lagoon.

Table 2: Analytical Results For Sewage Lagoon Discharge

Parameter	Nunavut Guideline ¹	Federal Discharge Guidelines ²		2004 Results		2003 Effluent Results
		Criteria mg/L	Guideline	Effluent 1	Effluent 2	
BOD	100	30	Open Coast Line ³	84	88	74
pH	6-9	6-9	Guideline 4	7.8	7.8	9.06
Total Suspended Solids	120	30	Open Coast Line ³	43	53	174
Nitrate	--	10	Guideline 5	<0.1	<0.1	<0.05
Nitrite	--	--		<0.05	<0.05	<0.01
Total Nitrogen	--	--		39.8	42.9	24.1
Total Phenols	--	0.02	Guideline 5	0.106	0.067	0.078
Sodium	--	--	--	163	176	359
Magnesium	--	--	--	47.0	48.6	64.0
Total Silver	0.1	0.1	Guideline 6	<0.005	<0.005	<0.0001
Fecal Coliform (CFU/100ml)	--	200/100mL	Guideline 7	27000	19000	2
Conductivity (µS/cm)	--			1840	1890	2580
Ammonia Nitrogen	--			40.3	34.2	0.26
Oil and Grease (visual)	No visual sheen	5		No visible sheen	No visible sheen	No visible sheen

Sulfate	--			258	267	242
Potassium	--			19.7	20.5	26
Calcium	--			93.8	99.0	54.9

- 1 As outlined in the water license
- 2 **BOLD values indicate that the analytical results are above the Nunavut Guidelines.**
- 3 No guidelines available for discharge
- 4 Federal Discharge Guidelines for Wastewater at Point of Discharge
- 5 Nova Scotia Sewage Treatment Plant Effluent Discharge Policy
- 6 Guidelines for Effluent Quality from Federal Establishments, 1976
- 7 Guidelines for the Discharge of Treated Municipal Waste Water in the NWT
- 8 Manitoba Surface Water Quality Guidelines

Should you require any additional information regarding the 2004 SNP, please do not hesitate to contact me at 780-497-3886.

Sincerely,

Jared Buchko
Senior Environmental Engineer
Environmental Services

Appendix A:

Analytical Results