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Your file / Votre référence

Our file / Notre référence

N4L3-1561 (expired)

September 28, 2001.

Bob Mulhern
Manager, Transportation Programs
CG&T, Government of Nunavut
P.O. Box 330
Cape Dorset, NU X0A 0C0

July 23, 2001 Municipal Water Use Inspection - Report

Firstly, I wish to thank Rick Gaulton for the much appreciated time and assistance provided during the tour of the airport's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report pertaining to the July 23, 2001 inspection; while the condition of the water supply proved satisfactory, concerns were noted with the neglected status of the sewage disposal facility and of the water licence itself. The following considerations will need to be addressed:

- **Water supply:** No concerns were noted at the Strip Lake water intake facility, which serves as direct truckfill station since the conveyance line failure in 1996. Further, the attached analytical results relating to a sample collected from Surveillance Network Station (SNP) station 1561-1 (figure 1) indicate that the raw water readily meets the *Guidelines for Canadian Drinking Water Quality* for all tested parameters.

- **Sewage disposal:** At the time of the inspection, significant erosion of the outer retention berms of both the upper (figure 2), and the lower (figure 3), lagoon cells was observed. In addition, it was related that since the content of the upper lagoon cell freezes and spills over, the discharge of raw sewage into the lower lagoon cell occurs annually during wintertime. Further, the presence of both dried sewage solids along the outer berm of the lower lagoon cell and of frozen sewage effluent immediately downslope of the cell (figure 4) implies that the lower lagoon cell also overflows. As such, the attached analytical results relating to a sample taken downslope of the lower lagoon cell (figure 5) reveal that the level of total suspended solids (135 mg/L vs 35 mg/L) breaches the effluent quality standards set for SNP station 1561-4 of the now expired Water licence N4L3-1561, and that concentrations of ammonia (30.4 mg/L vs 2.2 mg/L) and phenols (35 µg/L vs 4.0µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*.

Likewise, the Microtox sample, which constitutes a reliable toxicity indicator (IC_{50}), shows that half of light-producing bacteria were inhibited by a sample concentration of 16.97%, whereas 50% and over is considered non-toxic; however, due to flight schedules limitations, bacteriological parameters could not be analysed. Consequently, in order to increase effluent treatment and prevent the discharge of raw sewage to receiving waters, efforts ought to be undertaken to increase the retention time and capacity of the sewage disposal facility. Furthermore, any subsequent overflows of raw sewage from the facility are to be reported to the 24-hour spill reporting line.

- **Non-compliance of Act or Licence:** Although a reminder has been provided by the NWB, the Licensee has yet to produce a 2000 Annual Report. Moreover, by allowing its Water licence to lapse into expiry since 2001/04/30, the airport's water use and waste disposal are currently unlicenced, contrary to requirements of both the *Northwest Territories Waters Act* and the *Nunavut Land Claims Agreement*. This being said, upon contacting your office today the Inspector has been advised that licence renewal procedures have already been set into motion. The Inspector commends the initiative, and underlines that in this regards INAC and/or other implicated agencies can provide assistance, if required.

Please feel free to contact me at (867) 975-4298 or lavalleep@inac.gc.ca should any questions/comments arise.

Sincerely,

Philippe Lavallée
Water Resources Officer
INAC, Nunavut District

c.c. - Nunavut Water Board, Gjoa Haven
- Narwhal Arctic Services, Resolute (Rick Gaulton)
- Baffin Health & Social Services, Iqaluit (Shaun Mackie)
- EC Environmental Protection, Yellowknife (Anne Wilson)
- DFO Habitat Management, Iqaluit (Jordan DeGroot)

Indian and Northern Affairs Canada | Affaires Indiennes et du Nord Canada

MUNICIPAL WATER USE INSPECTION FORM

Date: 2001/07/23 **Licensee Rep.** (Name/Title)**:** Rick Gaulton / Site Supervisor

Licensee: **Government of Nunavut**, Arctic Airports **Licence No.:** **N4L3-1561** (expired)

WATER SUPPLY

Source(s): Strip Lake **Quantity used:** recorded @ delivery

Owner:/Operator: GN/Narwhal Arctic Services

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Intake Facilities: A **Storage Structure:** NI **Treatment Systems:** A **Chemical Storage:** A

Flow Meas. Device: NA **Convey. Lines:** NA **Pumping Stations:** NA

Comments: Since the 1996 conveyance line break, water trucks pump directly from the Strip Lake intake facility. Chlorination in use. Minimal water consumption.

WASTE DISPOSAL

Sewage: **Sewage Treatment System** (Prim./Sec/Ter.)**:** primary; discharge overland to ocean

Natural Water Body: **Continuous Discharge** (land or water)**:**

Seasonal Discharge: x **Wetlands Treatment:** limited **Trench:**

Solid Waste: **Owner/Operator:**

Landfill: **Burn & Landfill:** **Other:**

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Discharge Quality: sampled	**Decant Structure:** U	**Erosion:** U
Discharge Meas. Device: none	**Dyke Inspection:** NA	**Seepages:** A
Dams, Dykes: NA	**Freeboard:** U	**Spills:** none reported
Construction: NA	**O&M Plan:** A	**A&R Plan:** NA

Periods of Discharge: A **Effluent Discharge Rate:** not measured

Comments: Sewage disposal facility is undersized; evident signs of overflow from the upper and lower lagoon cells. Significant erosion of the outer berms of both lagoon cells; fill was added in 2000 in an attempt to reinforce the upper berm. Dried sewage solids noticeable along the top of the lower lagoon's outer berm, and in the area immediately downslope of the facility. No flow observed from the lower lagoon cell's decant pipe, but thawed sewage effluent was discharging alongside the toe of the abandoned airport landfill. Solid wastes are directed to the municipal solid waste disposal facility.

FUEL STORAGE

Owner/Operator:

Indicate: **A** - Acceptable **U** - Unacceptable **NA** - Not Applicable **NI** - Not Inspected

Berms & Liners:	**Water within Berms:**	**Evidence of Leaks:**
Drainage Pipes:	**Pump Station & Catchment Berm:**	
Pipeline Condition:	**Not Applicable:** x	**Condition of Tanks:**

SURVEILLANCE NETWORK PROGRAM (SNP)

Samples Collected **Hamlet:** none

INAC: raw water @ Strip Lake (1561-1), sewage discharge @ lagoon

Signs Posted **SNP:** yes @ Strip Lake **Warning:** none

Records & Reporting: no 2000 Annual Report

Geotechnical Inspection: not applicable

Non-Compliance of Act or Licence: 2000 Annual Report not submitted; due by 2001/03/31. Water licence N4L3-1561 expired since 2001/04/30; no renewal application submitted.

Philippe Lavallée

Inspector's Name **Inspector's Signature**

figure 1. Water intake facility at Strip Lake, SNP station 1561-1; 2001/07/23.

figure 2. Upper lagoon cell of the sewage disposal facility; 2001/07/23.

figure 3. Lower lagoon cell of the sewage disposal facility; 2001/07/23.

figure 4. Discharge from the sewage disposal facility; 2001/07/23.

figure 5. Path of discharge from the sewage disposal facility; 2001/07/23.

figure 6. Sewage effluent discharge along the toe of the old airport landfill; 2001/07/23.

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

- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: Raw Water 1561-1 **Taiga Sample ID: 211693**

Client Project: **Sample Type:** sewage **Received Date:** 26-Jul-01

Location: Resolute Bay Airport **Sampling Date:** 21-Jul-01

Report Status: **Final** *Approved by:*

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Chloride	6.3	mg/g	0.2	01-Aug-01
	Sodium	4.47	mg/L	0.02	26-Jul-01
	Sulphate	<3	mg/L	3	08-Aug-01
Nutrients	Ammonia as N	<0.005	mg/L	0.005	10-Aug-01
	Nitrate+Nitrite as N	<0.008	mg/L	0.008	09-Aug-01
Physicals	Colour	<5		5	27-Jul-01
	Solids, Total Dissolved	89	mg/L	10	21-Aug-01
	Turbidity	0.3	NTU	0.1	27-Jul-01
Total Metals	Arsenic	<1.0	µg/L	1.0	31-Jul-01
	Cadmium	<0.3	µg/L	0.3	01-Aug-01
	Chromium	<3	µg/L	3	01-Aug-01
	Cobalt	<1	µg/L	1	01-Aug-01
	Copper	<2	µg/L	2	01-Aug-01

Report Date: August 22, 2001

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Prepared For: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: Raw Water 1561-1 **Taiga Sample ID: 211693**

Total Metals	Iron	<30	µg/L	30	27-Jul-01
	Lead	<1	µg/L	1	01-Aug-01
	Manganese	<1	µg/L	1	01-Aug-01
	Mercury	<0.01	µg/L	0.01	03-Aug-01
	Nickel	<1	µg/L	1	01-Aug-01
	Zinc	<10	µg/L	10	01-Aug-01

Field Data (01/07/23) **1561-1**
Temperature: 12.5 °C
Conductivity: 164 µS/cm
pH: 7.6 **Time:** 14:46

Report Date: August 22, 2001

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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND District Office : Nunavut DIAND Operations *Attn:* Philippe Lavalllee

Sample ID: Sewage Discharge 1561-3 **Taiga Sample ID: 211694**

Client Project: **Sample Type:** sewage **Received Date:** 26-Jul-01

Location: Resolute Bay Airport (MOT) **Sampling Date:** 23-Jul-01

Report Status: **Final** ***Approved by:***

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	30.4	mg/L	0.005	22-Aug-01
	Nitrate+Nitrite as N	<0.008	mg/L	0.008	09-Aug-01
	Phosphorous, Total	6.62	mg/L	0.004	10-Aug-01
Organic	Phenols	35.0	µg/L	0.5	22-Aug-01
Physicals	Solids, Total Suspended	134	mg/L	3	13-Aug-01

Field Data (01/07/23) **1561-3**
Temperature: 6.0 °C
Conductivity: 516 µS/cm
pH: 8.1 Time: 14:12

Report Date: August 23, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Resolute Bay Sewage Discharge - 1561 - 3**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 23, 2001

Date/Time Received: July 26, 2001

Date/Time Test Start: July 26, 2001

Sample Type: Elutriate
Sampling Method: Grab

Method: ***Environment Canada Laboratories SOP#830.0 Revision 1, for Microtox Testing in Compliance with November 1992: Biological Test Method: Toxicity Test Using Luminescent Bacteria Photobacterium phosphoreum), November 1992, EPS 1/RM/24.***

RESULTS: **TOXIC - IC_{50} Concentration:16.97%** **(Toxic 0 to 50%)**

TEST ORGANISMS:
Species: Vibrio fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: 8.0 (No pH adjustment)

Sample Appearance: Clear, no colour adjustment

Lot # of OAS: OSA007
(Osmotic Adjusting Solution)

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: July 26, 2001 / 12:09 PM

Test Method: Basic 45% Test, 15 minute incubation.

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Wade Romanko - EPB

Date of Test: July 26, 2001

Reagent Lot #: ACV023-3

IC_{50} - 15 minutes mg/L: 3.8 mg/L

IC_{50} Confidence Range: 2.7 to 5.4 mg/L

TEST ANALYST: Wade Romanko **INITIAL:** WR