INAC, Nunavut District Office
P.O. Box 100
Iqaluit, NU
X0A 0H0

tel.: (867) 975-4275
fax.: (867) 979-6445

Your file Votre référence

Our file Notre référence
unlicenced

November 16, 2001.

Cecil Marshall
Senior Administrative Officer
Municipality of Arctic Bay
P.O. Box 150
Arctic Bay, NU X0A 0A0

July 24, 2001 Municipal Water Use Inspection - Report

Firstly, I wish to thank Sam Willie for the much appreciated time and assistance provided during the tour of the Municipality's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report pertaining to the July 24, 2001 inspection; although the overall operations seem well managed, outstanding concerns were noted. Accordingly, the following considerations were outlined and will need to be addressed:

- **Water supply:** Whereas the condition of the generator feeding the intake pump remains questionable, no other concerns regarding the well-kept water intake and supply facility were noted during the inspection. Further, the attached analytical results relating to a sample taken in the vicinity of the intake station indicate that all tested parameters meet the *Guidelines for Canadian Drinking Water Quality*, save for turbidity: recorded value of 6.2 Nephelometric Turbidity Unit (NTU) versus the 5 NTU aesthetic objective. Unfortunately, due to flight scheduling limitations, bacteriological parameters could not be analysed.

- **Sewage disposal:** At the time of the inspection, the sewage disposal facility was almost entirely emptied of its contents (figure 1). In fact, due to the severe erosion of the facility's decant structure (figure 2), the discharge of effluent is essentially unhindered. Moreover, although abundant vegetation growth is noticeable along the path of discharge, the lack of retention and treatment time provided by the sewage disposal facility likely impacts negatively on the overall treatment efficiency. Accordingly, the attached analytical results relating to a sample taken five metres below the decant structure (figure 3), while revealing elevated levels of suspended solids (223 mg/L), indicate that both ammonia (91.2 mg/L vs 2.2 mg/L) and phenols (300 μg/L vs 4 μg/L) significantly exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Regardless, the Microtox sample, which constitutes a reliable toxicity indicator (IC_{50}), did not attribute toxicity to the sewage effluent discharge. Again, bacteriological parameters could not be analysed. In light of this, the Inspector is glad to hear that third party assistance on the matter was slated for the summer.

- **Solid waste disposal:** Adequate compaction and coverage of combustible wastes are maintained at the solid waste disposal facility (figure 4). Nevertheless, a trickling flow of leachate was noticeable along the toe of the wastepile (figure 5). However, the associated Microtox sample did not denote toxicity. In regards to the bulky metal wastes disposal site, the inspector acknowledges that considerable improvements have been made and that only the finishing touches to the consolidation and burial work remain to be undertaken. In spite of this, the attached analytical results relating to a runoff sample collected along the roadside downslope of the site (figure 6) reveal that the concentrations of copper (7 µg/L vs 4 µg/L) and zinc (123 µg/L vs 30 µg/L) slightly exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. On a side note, it was mentioned during the inspection that the Municipality intends to install a perimeter fence around the waste disposal facilities once the ongoing/pending work at the bulky metal wastes disposal site and at the sewage disposal facility are completed.

- **Non-compliance of Act or Licence:** The Municipality still does not hold the Water licence it requires under both the *Northwest Territories Waters Act* and the *Nunavut Land Claims Agreement* for its municipal water use and waste disposal. This being said, it would appear that the Municipality has not been able to come to a common understanding with the owner of the facilities it operates. Notwithstanding, the Inspector reiterates the benefits to all parties involved in having the Municipality posses a valid Water licence regulating its water uses and waste disposals, and trusts that genuine efforts will be made to shortly tackle this outstanding issue without the need for further prompting.

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
- CG&T, Iqaluit (Doug Sitland)
- Baffin Health & Social Services, Iqaluit (Shaun Mackie)
- EC Environmental Protection, Yellowknife (Anne Wilson)

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

MUNICIPAL WATER USE INSPECTION FORM

Date: 2001/07/24 **Licensee Rep.** (Name/Title): Sam Willie / Foreman

Licensee: Municipality of Arctic Bay **Licence No.:** unlicenced

WATER SUPPLY

Source(s): Water Lake **Quantity used:** meter @ 68 141.2 m^3

Owner:/Operator: GN/Municipality

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

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

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

Comments: Well-kept facility. Generator activating the intake pump still in an unreliable state; exterior assistance awaited at a later time during the summer. Water use reportedly leveled off despite additional housing units; consumption measured at truck delivery. Chlorination in use.

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:** GN/Municipality

Landfill: **Burn & Landfill:** x **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:** NA **A&R Plan:** NA

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

Comments: Sewage disposal facility's decant structure severely eroded; discharge of sewage effluent is essentially unhindered. Facility reportedly once again overflowed during springtime; third party assistance scheduled for the summer. Minor erosion also noted at the truck dumping point. Considerable vegetation noted growing along the path of discharge from the facility. Combustible wastes well managed at the unfenced solid waste disposal facility; wastepile adequately compacted and covered. Work on bulky metal wastes site nearing completion; only finishing and covering efforts remain. Batteries stored in sealift container until proper disposal; awaiting plastic drums from a third party in order to undertake neutralization. Waste oil storage and disposal properly handled. Trickling leachate flow noticeable along the toe of the wastepile. Runoff from the bulky metal wastes disposal site is channeled alongside the access road.

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 @ intake, sewage discharge, dump leachate, metal dump runoff

Signs Posted **SNP:** not applicable **Warning:** to be reinstalled once work @ dump completed

Records & Reporting: not applicable

Geotechnical Inspection: not applicable

Non-Compliance of Act or Licence: Community is unlicenced.

Philippe Lavallée

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

figure 1. Sewage disposal facility; 2001/07/24.

figure 2. Decanting area of the sewage disposal facility; 2001/07/24.

figure 3. Path of effluent discharge from the sewage disposal facility; 2001/07/24.

figure 4. Solid waste disposal facility; 2001/07/24.

figure 5. Leachate flowing from the toe of the solid waste disposal facility; 2001/07/24.

figure 6. Bulky metal disposal site runoff channelled along the roadside; 2001/07/24.

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 **Taiga Sample ID:** 211791

Client Project: **Sample Type:** sewage **Received Date:** 28-Jul-01

Location: Arctic Bay **Sampling Date:** 24-Jul-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Chloride	1.7	mg/L	0.2	01-Aug-01
	Sodium	1.24	mg/L	0.02	07-Aug-01
	Sulphate	<3	mg/L	3	08-Aug-01
Nutrients	Ammonia as N	0.006	mg/L	0.005	14-Aug-01
	Nitrate+Nitrite as N	0.051	mg/L	0.008	09-Aug-01
Physicals	Colour	10		5	30-Jul-01
	Solids, Total Dissolved	12	mg/L	10	21-Aug-01
	Turbidity	6.2	NTU	0.1	30-Jul-01
Total Metals	Arsenic	<1.0	µg/L	1.0	10-Aug-01
	Cadmium	<0.3	µg/L	0.3	02-Aug-01
	Chromium	5	µg/L	3	02-Aug-01
	Cobalt	1	µg/L	1	02-Aug-01
	Copper	<2	µg/L	2	02-Aug-01

Report Date: August 24, 2001

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Sample ID: Raw Water **Taiga Sample ID:** 211791

Total Metals	Iron	184	µg/L	30	13-Aug-01
	Lead	4	µg/L	1	02-Aug-01
	Manganese	27	µg/L	1	02-Aug-01
	Mercury	< 0.01	µg/L	0.01	03-Aug-01
	Nickel	2	µg/L	1	02-Aug-01
	Zinc	< 10	µg/L	10	02-Aug-01

Field Data (01/07/24) raw water
Temperature: 12.0 °C
Conductivity: 26 µS/cm
pH: 8.5 **Time:** 14:46

Report Date: August 24, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: dump leachate **Taiga Sample ID: 211792**

Client Project: **Sample Type:** sewage **Received Date:** 28-Jul-01

Location: Arctic Bay **Sampling Date:** 24-Jul-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	0.011	mg/L	0.005	14-Aug-01
	Nitrate+Nitrite as N	<0.008	mg/L	0.008	09-Aug-01
Physicals	Solids, Total Suspended	3	mg/L	3	17-Aug-01
Total Metals	Arsenic	1.1	µg/L	1.0	10-Aug-01
	Cadmium	<0.3	µg/L	0.3	02-Aug-01
	Chromium	3	µg/L	3	02-Aug-01
	Cobalt	<1	µg/L	1	02-Aug-01
	Copper	7	µg/L	2	02-Aug-01
	Iron	212	µg/L	30	13-Aug-01
	Lead	<1	µg/L	1	02-Aug-01
	Manganese	57	µg/L	1	02-Aug-01
	Mercury	<0.01	µg/L	0.01	03-Aug-01
	Nickel	4	µg/L	1	02-Aug-01
	Zinc	123	µg/L	10	02-Aug-01

Report Date: August 24, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: dump leachate **Taiga Sample ID: 211792**

Field Data (01/07/24) **dump**
Temperature: 7.0 °C
Conductivity: 320 µS/cm
pH: 7.4 Time: 15:19

Report Date: August 24, 2001

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

- CERTIFICATE OF ANALYSIS -

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

Sample ID: lagoon discharge **Taiga Sample ID: 211793**

Client Project: **Sample Type:** sewage **Received Date:** 28-Jul-01

Location: Arctic Bay **Sampling Date:** 24-Jul-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Suspended	223	mg/L	3	17-Aug-01
Nutrients				
Ammonia as N	91.2	mg/L	0.005	21-Aug-01
Nitrate+Nitrite as N	0.057	mg/L	0.008	09-Aug-01
Phosphorous, Total	19.7	mg/L	0.004	29-Aug-01
Subcontracted Tests				
Phenols	300.0	µg/L	0.5	22-Aug-01

Field Data (01/07/24) sewage
Temperature: 19.5 °C
Conductivity: 1 495 µS/cm
pH: 7.5 Time: 15:28

Report Date: Monday, January 07, 2002

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Arctic Bay Lagoon Discharge T2**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 25, 2001

Date/Time Received: July 27, 2001

Date/Time Test Start: July 31, 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: **NON TOXIC at 45% concentration**

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

TEST SUBSTANCE/CONDITIONS

pH of Sample: 6.6 (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 31, 2001 / 02:29 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold

Date of Test: July 31, 2001

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 3.6 mg/L

IC_{50} Confidence Range: 3.0 to 4.4 mg/L

TEST ANALYST: Ron Bujold **INITIAL:** RB

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Arctic Bay Dump Leachate**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 24, 2001

Date/Time Received: July 27, 2001

Date/Time Test Start: July 30, 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: **NON TOXIC at 45% concentration**

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

TEST SUBSTANCE/CONDITIONS

pH of Sample: 7.7 (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 30, 2001 / 01:39 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold

Date of Test: July 30, 2001

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 3.3 mg/L

IC_{50} Confidence Range: 2.5 to 4.4 mg/L

TEST ANALYST: Ron Bujold **INITIAL:** R B