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**N5L4-1447** (expired)

September 20, 2001.

Brenda Belair  
Senior Administrative Officer  
Hamlet of Pangnirtung  
P.O. Box 253  
Pangnirtung, NU    X0A 0R0



**July 16, 2001 Water Licence Inspection - Report**

Firstly, I wish to thank Mosesee Nowdlak for the much appreciated time and assistance provided during the tour of the Hamlet's water use and waste disposal facilities. Attached for your records is the Municipal Water Use Inspection Report pertaining to the July 16, 2001 inspection; the state of the waste disposal facilities, and their impact on receiving waters, pose definite concerns. Therefore, the following considerations were noted, and will need to be addressed:

- **Water supply:** During the previous inspection, concern was raised over the proximity of new housing developments to the intake facility at the Duval River (figure 1), and its potential negative impact on the quality of the Hamlet's water supply. This being said, the attached analytical results relating to a sample collected at the intake facility indicate that the raw water meets the *Guidelines for Canadian Drinking Water Quality*, save for a slight exception: a field pH value of 8.9, which rests slightly above the 8.5 aesthetic objective.
- **Sewage disposal:** The state of the sewage disposal facility represents an outstanding concern which needs to readily be addressed. Indeed, the facility is essentially nothing but a discharge point (figure 2), providing little in terms of retention time and treatment prior to the release of sewage effluent to receiving waters (figure 3). As such, the attached analytical results relating to a sample taken about 10 metres from the point of discharge reveal that the levels of faecal coliform (1.4 million CFU/100ml vs 1.0 million CFU/100ml), of the biological oxygen demand (387 mg/L vs 100mg/L), and of total suspended solids (254 mg/L vs 120 mg/L) breach the effluent quality standards set under the now expired Water licence N5L4-1447. In addition, concentrations of ammonia (161 mg/L vs 2.2 mg/L) and phenols (410 µg/L vs 4.0µg/L) substantially exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*.

Moreover, 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 2.8%, whereas 50% and over is considered non-toxic. Consequently, by copy of this letter to Community Government and Transportation (CG&T), the Inspector, once again, underlines the dire need of an effective and viable sewage treatment/disposal facility for the Hamlet.


- **Solid wastes disposal:** Due to the almost totally dismantled perimeter fence, a considerable amount of windblown garbage, which may enter waters, was noted beyond the solid wastes disposal facility. However, it was mentioned during the inspection that fence replacement material was awaited on the summer's sealift. Although waste appears well segregated, the household wastepile spans a vast area (figure 4), and therefore would require some extent of compaction and fill material coverage. Furthermore, the attached analytical results relating to a sample taken from the discharge culvert (figure 5) reveal that levels of ammonia (170 mg/L), phenol (820 mg/L), arsenic ( $5.4 \mu\text{g/L}$  vs  $5.0 \mu\text{g/L}$ ), cadmium ( $1.3 \mu\text{g/L}$  vs  $0.017 \mu\text{g/L}$ ), copper ( $150 \mu\text{g/L}$  vs  $4.0 \mu\text{g/L}$ ), iron (142 mg/L vs 0.3 mg/L), and zinc ( $3.26 \text{ mg/L}$  vs 0.03 mg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Likewise, the Microtox sample indicates high toxicity, with a  $IC_{50}$  of 17.1% versus the 50% non-toxic threshold. Accordingly, efforts should be taken to contain the leachate, or limit its extent.

In parallel, the state of the waste oil storage site (figure 6) has not been improved upon since the previous inspection, nor has the spillage been acknowledged through the 24-hour spill report line as an unauthorized discharge of waste. Yet, since the hydrocarbon contamination can potentially migrate into waters, mitigation measures ought to be undertaken in a timely manner. In this regards, it was related during the inspection that the hamlet plans to ship out the accumulated waste oil in a bulk container, on this summer's sealift backhaul.

- **Non-compliance of Act or licence:** Although reminders and assistance have been provided by both the Nunavut water Board (NWB) and this office, the hamlet has yet to produce an Operation and Management (O&M) plan for the its municipal waste disposal facilities, as well as 1998, 1999, and 2000 Annual Reports. Moreover, since allowing its Water licence to lapse into expiry, the hamlet's municipal water use and waste disposal are currently unlicensed, contrary to requirements of both the *Northwest Territories Waters Act* and the *Nunavut Land Claims Agreement*. Lastly, no noticeable efforts have been undertaken in order to improve effluent quality at the sewage disposal facility, and so fall within compliance of now expired Water licence N5L4-1447; samples collected during the last two inspections, 2000/08/23 and 2001/07/16, breached the licenced thresholds.

Please feel free to contact me at (867) 975-4298 or [lavalleep@inac.gc.ca](mailto: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)
  - DFO Habitat Management, Iqaluit (Jordan DeGroot)



## MUNICIPAL WATER USE INSPECTION FORM

Date: 2001/07/16 Licensee Rep. (Name/Title): Mosese Nowdlak / acting-Foreman  
Licensee: Hamlet of Pangnirtung Licence No.: N5L4-1447 (expired)

### WATER SUPPLY

Source(s): Duval River / Reservoir Quantity used: meter @ 463 818 700 L  
Owner:/Operator: Hamlet

Indicate: A - Acceptable U - Unacceptable NA - Not Applicable NI - Not Inspected  
Intake Facilities: A Storage Structure: A Treatment Systems: A Chemical Storage: A  
Flow Meas. Device: A Convey. Lines: NI Pumping Stations: A

Comments: No concerns with the tidy truckfill station at the fenced reservoir. Chlorination in use. Fluoride added once per year during the recharge of the reservoir; to occur at a later time during the summer.

### WASTE DISPOSAL

Sewage: Sewage Treatment System (Prim./Sec/Ter.): practically none; discharge overland to ocean  
Natural Water Body: Continuous Discharge (land or water): x  
Seasonal Discharge: Wetlands Treatment: none Trench:

Solid Waste: Owner/Operator: GN/Hamlet

Landfill: Burn & Landfill: x Other:  
Indicate: A - Acceptable U - Unacceptable NA - Not Applicable NI - Not Inspected  
Discharge Quality: sampled Decant Structure: NA Erosion: U  
Discharge Meas. Device: none Dyke Inspection: NA Seepages: A  
Dams, Dykes: NA Freeboard: NA Spills: none reported  
Construction: NA O&M Plan: U A&R Plan: NA  
Periods of Discharge: A Effluent Discharge Rate: not measured

Comments: Considerable erosion and slumping in the vicinity of the sewage discharge area. Sewage disposal facility is practically dry; barely any retention time and/or effluent treatment provided. Perimeter fence of the solid wastes disposal facility is now almost totally dismantled; significant quantity of windblown garbage noted. Wastepile is relatively sprawled, and in need of compaction/coverage. No particular storage/disposal area for hazardous materials, but batteries are neutralized at the hamlet garage prior to disposal. Obvious signs of hydrocarbon contamination at the waste oil storage site. Overdue Operation and Maintenance (O&M) plan.

### 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 (1447-1), sewage discharge (1447-5), dump leachate (1447-7)

Signs Posted SNP: none @ waste disposal Warning: yes

Records & Reporting: no 1998, 1999, 2000 Annual Reports; no O&M Plan

Geotechnical Inspection: none required

Non-Compliance of Act or Licence: O&M plan, 1998, 1999, 2000 Annual Reports not submitted; respectively due by 1991/07/01, 1999/03/01, 2000/03/01, and 2001/03/01. Water licence N5L4-1447 lapsed into expiry on 2000/12/31; renewal application not yet provided to the Nunavut Water Board. Sewage discharge effluent quality standards of now expired Water licence exceeded for a second year in a row.

Philippe Lavallée

Inspector's Name

Inspector's Signature





**figure 1.** Duval River at water intake facility; 2001/07/16.



**figure 2.** Sewage disposal facility; 2001/07/16.



**figure 3.** Path of discharge from the sewage disposal facility; 2001/07/16.





**figure 4.** Solid wastes disposal facility; 2001/07/16.



**figure 5.** Leachate from the solid wastes disposal facility; 2001/07/16.



**figure 6.** Hydrocarbon contamination at the waste oil storage site; 2001/07/16.

RECEIVED

SEP 05 2001



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

D.I.A.N.D.  
DIAND

- CERTIFICATE OF ANALYSIS -

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

Sample ID: Raw Water 1447-1 **Taiga Sample ID: 211654**

Client Project: Sample Type: sewage Received Date: 22-Jul-01  
Location: Pangnirtung Sampling Date: 16-Jul-01  
Report Status: Final Approved by: *[Signature]*

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Chloride	0.5	mg/L	0.2	01-Aug-01
	Sodium	0.26	mg/L	0.02	26-Jul-01
	Sulphate	<3	mg/L	3	08-Aug-01
Microbiology	Coliforms, Fecal	<1	CFU/100mL	1	22-Jul-01
Nutrients	Ammonia as N	<0.005	mg/L	0.005	01-Aug-01
	Biological Oxygen Demand	<2	mg/L	2	22-Jul-01
	Nitrate+Nitrite as N	0.011	mg/L	0.008	03-Aug-01
Physicals	Colour	<5		5	25-Jul-01
	Solids, Total Dissolved	<10	mg/L	10	07-Aug-01
	Turbidity	0.2	NTU	0.1	25-Jul-01
Total Metals	Arsenic	<1.0	µg/L	1.0	30-Jul-01
	Cadmium	<0.3	µg/L	0.3	26-Jul-01
	Chromium	<3	µg/L	3	26-Jul-01



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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND District Office : Nunavut DIAND Operations

Attn: Philippe Lavallee

Sample ID: Raw Water 1447-1

Taiga Sample ID: 211654

Total Metals	Cobalt	<1	µg/L	1	26-Jul-01
	Copper	<2	µg/L	2	26-Jul-01
	Iron	<30	µg/L	30	27-Jul-01
	Lead	<1	µg/L	1	26-Jul-01
	Manganese	1	µg/L	1	26-Jul-01
	Mercury	<0.01	µg/L	0.01	03-Aug-01
	Nickel	<1	µg/L	1	26-Jul-01
	Zinc	<10	µg/L	10	26-Jul-01

Field Data (01/07/16) 1447-1  
Temperature: 12.0 °C  
Conductivity: 8 µS/cm  
pH: 8.9 Time: 09:38





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**- CERTIFICATE OF ANALYSIS -**

Prepared For: DIAND District Office : Nunavut DIAND Operations

Attn: Philippe Lavallee

Sample ID: Lagoon Discharge 1447-5

Taiga Sample ID: 211656

Client Project:

Sample Type: sewage

Received Date: 22-Jul-01

Location: Pangnirtung

Sampling Date: 16-Jul-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Microbiology	Coliforms, Fecal	1400000	CFU/100mL	1	22-Jul-01
Nutrients	Ammonia as N	161	mg/L	0.005	01-Aug-01
	Biological Oxygen Demand	387	mg/L	2	22-Jul-01
	Nitrate+Nitrite as N	0.016	mg/L	0.008	03-Aug-01
	Phosphorous, Total	18.4	mg/L	0.004	31-Jul-01
Organic	Phenols	410.0	µg/L	0.5	22-Aug-01
Physicals	Solids, Total Suspended	254	mg/L	3	02-Aug-01

Field Data (01/07/16) 1447-5  
 Temperature: 20.0 °C  
 Conductivity: 1 463 µS/cm  
 pH: 7.9 Time: 10:30

# REPORT OF TOXICITY USING MICROTOX

**COMPANY/LOCATION:** Pangnirtung Lagoon Discharge - 1447-5

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 16, 2001

Date/Time Received: N/A

Date/Time Test Start: July 24, 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<sub>50</sub> Concentration: 2.8% (Toxic 0 to 50%)

## TEST ORGANISMS:

Species: Vibrio fisheri (Photobacterium phosphoreum)

Test Apparatus: Model 500 Analyzer

## TEST SUBSTANCE/CONDITIONS

pH of Sample: 7.9 (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 24, 2001 / 12:10 PM

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

## QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: RB

Date of Test: July 24, 2001

Reagent Lot #: ACV023-3

IC<sub>50</sub> - 15 minutes mg/L: 2.7 mg/L

IC<sub>50</sub> Confidence Range: 1.8 to 3.9 mg/L

**TEST ANALYST:** Ron Bujold

**INITIAL:** RB



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**- CERTIFICATE OF ANALYSIS -**

Prepared For: DIAND District Office : Nunavut DIAND Operations

Attn: Philippe Lavallee

Sample ID: Dump Leachate 1447-7

Taiga Sample ID: 211655

Client Project:

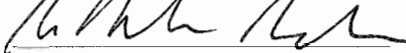
Sample Type: sewage

Received Date: 22-Jul-01

Location: Pagnirtung

Sampling Date: 16-Jul-01

Report Status: Final

Approved by: 

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Calcium	278	mg/L	0.05	26-Jul-01
	Magnesium	184	mg/L	0.02	26-Jul-01
	Potassium	141	mg/L	0.03	26-Jul-01
	Sodium	654	mg/L	0.02	26-Jul-01
	Sulphate	641	mg/L	3	08-Aug-01
Nutrients	Ammonia as N	170	mg/L	0.005	01-Aug-01
	Nitrate+Nitrite as N	0.022	mg/L	0.008	03-Aug-01
	Phosphorous, Total	1.88	mg/L	0.004	03-Aug-01
Organic	Oil and Grease	4.7	mg/L	0.2	07-Aug-01
	Phenols	820.0	µg/L	0.5	22-Aug-01
Physicals	Solids, Total Suspended	294	mg/L	3	02-Aug-01
Total Metals	Arsenic	5.4	µg/L	1.0	30-Jul-01
	Cadmium	1.3	µg/L	0.3	26-Jul-01





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- CERTIFICATE OF ANALYSIS -

Prepared For: DIAND District Office : Nunavut DIAND Operations

Attn: Philippe Lavallee

Sample ID: Dump Leachate 1447-7

Taiga Sample ID: 211655

Total Metals	Chromium	8	µg/L	3	26-Jul-01
	Cobalt	127	µg/L	1	26-Jul-01
	Copper	150	µg/L	2	26-Jul-01
	Iron	142000	µg/L	30	27-Jul-01
	Lead	5	µg/L	1	26-Jul-01
	Manganese	8660	µg/L	1	26-Jul-01
	Mercury	0.01	µg/L	0.01	03-Aug-01
	Nickel	57	µg/L	1	26-Jul-01
	Zinc	3260	µg/L	10	26-Jul-01

Field Data (01/07/16) 1447-7  
Temperature: 6.0 °C  
Conductivity: 5 090 µS/cm  
pH: 6.9 Time: 10:11

# REPORT OF TOXICITY USING MICROTOX

**COMPANY/LOCATION:** Pangnirtung Dump Leachate

Sample Collected By: Philippe Lavallee

Date/Time Sampled: July 16, 2001

Date/Time Received: N/A

Date/Time Test Start: July 24, 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<sub>50</sub> Concentration: 17.7% (Toxic 0 to 50%)

## TEST ORGANISMS:

Species: Vibrio fisheri (Photobacterium phosphoreum)

Test Apparatus: Model 500 Analyzer

## TEST SUBSTANCE/CONDITIONS

pH of Sample: 7.0 (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 24, 2001 / 12:35 PM

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

## QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: RB

Date of Test: July 24, 2001

Reagent Lot #: ACV023-3

IC<sub>50</sub> - 15 minutes mg/L: 2.7 mg/L

IC<sub>50</sub> Confidence Range: 1.8 to 3.9 mg/L

**TEST ANALYST:** Ron Bujold

**INITIAL:** RB