



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

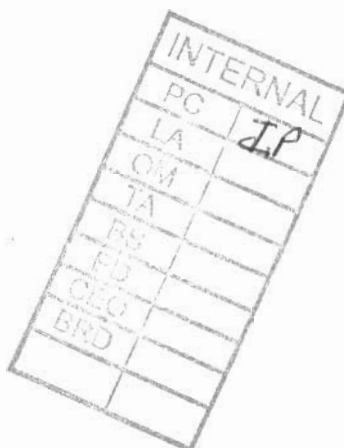
tel.: (867) 975-4275
fax.: (867) 979-6445
Your file Votre référence

Our file Notre référence

NWB1BOS9801

October 11, 2001.

Hugh Wilson
Manager, Environmental Affairs
Hope Bay Joint Venture
331 West First Street
North Vancouver, BC V7M 1B5



OCT 21 2001

Public Registry

August 12, 2001 Industrial Water Use Inspection - Report

Firstly, I wish to thank Ted Mahoney and yourself for the much appreciated time and assistance provided during the tour of the camp's water use and waste disposal facilities. Attached for your records is the Industrial Water Use Inspection Report pertaining to the August 12, 2001 inspection; as the camp was inactive, operational matters could not be assessed. However, the following considerations were noted and will need to be addressed:

- **Sewage disposal:** At the time of the inspection, the camp was unoccupied and the facilities therefore inactive. However, a substantial amount of dried matter could be observed in the immediate vicinity of the sewage effluent discharge point, Surveillance Network Program (SNP) station 1652-3 (figure 1). Therefore, the Licensee may wish to ensure that the effluent discharged contains as little solids as possible in order to limit the extent of the impacted area along the path of discharge, and its potential effect on receiving waters. In parallel, the Inspector points out that SNP stations 1652-4 and 1652-5 correspond to the effluent discharged into the lake, and not to the receiving waters at the point of effluent discharge.

In related matters, it was mentioned during the inspection that sewage sludges had in the past been disposed into the lined sump in the middle of the ore pad (figure 2). With this in mind, coupled to the fact that the sump has required emptying for the last two consecutive years, the Inspector recommends that the Nunavut Water Board (NWB) add a SNP sampling requirement prior to discharge. Considering the general location of the sump and its past contents, analysis requirements should combine those of SNP stations 1652-2 and 1652-3. This being said, the attached analytical results relating to the contents of the central pond meet the licence thresholds but exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life* in regards to concentrations of ammonia (41.8 mg/L vs 2.2 mg/L), arsenic (468 µg/L vs 5 µg/L), cadmium (0.4 µg/L vs 0.017 µg/L), copper (19 µg/L vs 4 µg/L), iron (666 µg/L vs 300 µg/L), nickel (723 µg/L vs 150 µg/L), and zinc (188 µg/L vs 30 µg/L).

In addition, the Microtox sample, which constitutes a reliable toxicity indicator (IC_{50}), did not attribute toxicity to the sump's contents. Concerning the Licensee's plans to dispose of sewage sludge over impacted sites along the airstrip, the Inspector reiterates the need for NWB prior approval.

- **Solid waste disposal:** Contrary to directions given to the Licensee during the previous year, the disposal of solid wastes into the unlined sump in periphery of the ore storage pad does not appear to have been discontinued (figure 3). Moreover, past assessments of the area have pointed out that the sumps in periphery of the ore storage pad were never intended to be used as disposal sites. Consequently, in light of the potential of leachate from a solid waste disposal facility to reach waters, the Inspector again points out that licenced terms and conditions (part E, item 4) outline the need for NWB prior approval of solid waste disposal.

In related matters, a notable volume of water pooled within the drill cuttings impoundment structure was noted beyond its ineffective retention berms (figure 4). In fact, a conspicuous path of runoff from the facility was noted (figure 5). As such, although at first glimpse an on land drill cuttings disposal site can appear to strictly be a land use issue, a concrete potential for the deposit of waste into waters arises from this particular facility. Indeed, the attached analytical results relating to a sampled collected downslope of the facility reveal elevated levels of calcium, chloride and conductivity, as well as concentrations of arsenic ($23.1 \mu\text{g/L}$ vs $5 \mu\text{g/L}$), copper ($6 \mu\text{g/L}$ vs $4 \mu\text{g/L}$), and mostly iron (14.5 mg/L vs 0.3 mg/L) exceeding the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*, but nonetheless meeting licenced thresholds; the Microtox sample did not denote toxicity. Accordingly, the Inspector requests that the Licensee provide the NWB with plans relating to the drill cuttings impoundment structure, and await their approval before proceeding with further deposit of drill cuttings.

- **Ore and waste rock stockpiles:** In response to potential acid rock drainage (ARD) concerns raised by various parties, three (3) samples were taken during the inspection of surface water in the area downslope of the ore storage pad (figure 6). While the attached analytical results show that the northernmost (pad 1 sample) and central (pad 2 sample) samples proved comparable and relatively benign, the sample collected in the vicinity of the unlined sump (pad 3 sample) warrants additional attention. Thus, the attached analytical results reveal elevated levels of calcium, chloride and conductivity, as well as concentrations of arsenic (2.4 mg/L vs 1.0 mg/L) and particularly nickel (47.2 mg/L vs 1.0 mg/L) breaching the waste discharge effluent quality standards (part D, item 7) of Water licence NWB1BOS9801. This would seem to substantiate past assessments of the site coming to the conclusion that arsenic and nickel were expected to leach out preferentially from Boston rock under neutral conditions, and that measures should be undertaken to minimize infiltration and to prevent local drainage from reaching Aimoaktak Lake. Therefore, the Inspector suggests that the NWB consider establishing additional measures and/or SNP station(s) in order to minimize runoff from the ore storage pad area, and ensure that the leachate still produced can be collected and monitored.

- **Spills:** The following represents a summary of the nine (9) open Spill Report files on record, and outlines either recommended closure or planned/expected additional follow-up measures to be undertaken. As mentioned at the time of the inspection, the Licensee could significantly ease the file closure process by keeping accurate descriptions/coordinates of the spill events.

- 98-115: unknown quantity of diesel and jet-B @ old storage site. The inspection of the site could not be fully undertaken, as the Licensee could not precisely pinpoint the location of the spill. Cannot recommend file closure before sampling results confirm the effectiveness of remediation measures, as per follow-up report recommendations.

- 00-109: 20 L of diesel @ crusher building. No signs of hydrocarbon contamination noted at the site. Recommend file closure.

- 00-118: unknown quantity of diesel @ incinerator. No contamination noted beyond what can reasonably be expected at an incineration facility. Recommend file closure.

- 00-123: 10 L of motor oil @ crusher. No signs of contamination noted in the area. Recommend file closure.

- 00-147: 205 L of drill oil @ bulk fuel tanks. Location of spill uncertain, but no evidence of contamination noted in the vicinity of the bulk fuel storage facility. Recommend file closure.

- 00-148: 205 L of jet-B @ helicopter pad. Site regrettably omitted during the inspection. Cannot recommend file closure at this time.

- 01-047: 50 L of hydraulic fluid @ drill collar 501-264. No contamination noted during flyby of general area. Recommend file closure.

- 01-054: 2 L of diesel @ generator. Signs of hydrocarbon staining noted in the immediate surroundings of the generator fuel tank. Cannot recommend file closure before contaminated soil is removed from the area.

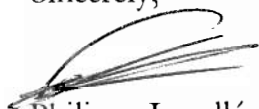
- 01-055: 1 L of diesel @ drill collar 501-264. As above, recommend file closure.

- **Non-compliance of Act or Licence:** A surface water sample in the likely path of runoff from the unlined sump in the periphery of the ore storage pad breached the licenced effluent quality standards (part D, item 7) for arsenic and nickel. Accordingly, the Inspector recommends that drainage prevention and leachate collection measures be undertaken at the site.

In addition, solid waste is being deposited in the unlined sump in periphery of the ore storage pad without prior NWB approval, contrary to licenced conditions (part E, item 4) and to the Inspector's 2000/12/20 recommendation. The Inspector trusts that the Licensee will not require further prompting before complying with this clause relating to the potential deposit of waste into waters. Lastly, although Water licence NWB1BOS9801 has lapsed into expiry since 2001/07/31, the Inspector acknowledges that the Licensee has provided the NWB with a licence renewal application.

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
 - KIA lands, Kugluktuk (Jack Kaniak)
 - DFO Habitat Management, Iqaluit (Jordan DeGroot)
 - EC Environmental Protection, Yellowknife (Anne Wilson)



INDUSTRIAL WATER USE INSPECTION REPORT

Date: 2001/08/12 Company Rep. (Name/Title): Hugh Wilson / Manager, Environmental Affairs
Ted Mahoney / Project Manager

Licensee: Miramar Hope Bay / Hope Bay Gold, Boston Licence No.: NWB1BOS9801

WATER SUPPLY

Source(s): Aimoaktak (Spyder) Lake Quantity used: inactive Meter Reading: Not inspected

Indicate: A - Acceptable U - Unacceptable NA - Not Applicable NI - Not Inspected
Intake Facilities: NI Storage Structure: NI Treatment Systems: NI Recycling: NA

Flow Meas. Device: NI Conveyance Lines: NI Pumping Stations: NA Modifications: NA

Comments: Due to logistical complications, limited time was spent on-site; water supplies facilities were not inspected. However, the camp was unoccupied and facilities were shutdown.

WASTE DISPOSAL

Tailings: Tailings Pond: Natural Lake: Underground:
Sewage: Sewage Treatment System: RBC Tailings Pond: Natural Water Body:
Continuous Discharge: Intermittent Discharge: x
Solid Waste: Open Dump: Landfill: Burn & Bury: Underground:

Indicate: A - Acceptable U - Unacceptable NA - Not Applicable NI - Not Inspected
Discharge Quality: NA Decant Structure: NA Dyke Inspections: NA
Conveyance Lines: NA Pond Treatment: NA Runoff Diversion: NA
Discharge Meas. Device: NA Dams, Dykes: NA Erosion: A
Freeboard: NA Seepages: U Spills: 98/115, 00-109/118/123/147/148,
01-047/054/055

Effluent Discharge Rate: NA Samples Collected: 3 below ore pad, central pond, drill cuttings sump

Comments: Sewage disposal system shutdown at the time of the inspection; however a notable amount of dried matter was noticeable in proximity of the sewage discharge point. Lined sump in the middle of the ore pad practically empty. Solid wastes, along with signs of past burns, noted in the unlined sump in periphery of the ore storage pad. Contents of the new drill cuttings impoundment structure observed seeping beyond the site.

GENERAL CONDITIONS

Indicate: A - Acceptable U - Unacceptable NA - Not Applicable NI - Not Inspected
Ore & Waste Rock Stockpiles: U Records & Reporting: A SNP: A
Geotechnical Inspection: NA Posting/Signage: A Contingency Plan: A
Restoration Activities: A New Construction: A Fuel Storage: A
Mine Water Discharge: NA Chemical Storage: A Annual Report: A

Comments: Areas of pooled water present downslope of the exposed ore storage pad; no visible runoff/drainage diversion efforts. New bulk fuel storage facility built within lined berms.

Violations of Act or Licence: Waste discharge effluent quality standards (part D, item 7) breached in regards to apparent runoff downslope of the exposed ore storage pad. Continued deposit of solid waste in the unlined sump in the periphery of the ore storage pad, without prior Nunavut Water Board (NWB) approval (part E, item 4). Water licence NWB1BOS9801 expired on 2001/07/31; however, the Licensee has provided the NWB with a licence renewal application which is currently undergoing review.

General Comments: The Licensee is again reminded of the requirement for the NWB to review, and approve prior to its inauguration, any undertaking which potentially leads to the deposit of waste into water.

Philippe Lavallée

Inspector's Name

Inspector's Signature



figure 1. Sewage effluent discharge point, SNP station 1652-3; 2001/08/12.



figure 2. Lined sump in the ore pad area, dubbed central holding pond; 2001/08/12.



figure 3. Unlined sump in the periphery of the ore storage pad; 2001/08/12.



figure 4. Drill cuttings impoundment structure by the airstrip; 2001/08/12.



figure 5. Runoff from the drill cuttings impoundment structure; 2001/08/12.



figure 6. Pooled water downslope of the ore storage pad; 2001/08/12.



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 1

Taiga Sample ID: 212042

Client Project:

Sample Type: water grab

Received Date: 13-Aug-01

Location: Boston

Sampling Date: 12-Aug-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Calcium	174	mg/L	0.05	15-Aug-01
	Magnesium	78.6	mg/L	0.02	15-Aug-01
	Potassium	28.8	mg/L	0.03	15-Aug-01
	Sodium	198	mg/L	0.02	15-Aug-01
Subcontract	Chloride	311	mg/L	0.1	30-Aug-01
	Sulphate	499	mg/L	0.3	30-Aug-01
Total Metals	Arsenic	79.9	µg/L	1.0	14-Aug-01
	Cadmium	<0.3	µg/L	0.3	21-Aug-01
	Chromium	<3	µg/L	3	21-Aug-01
	Cobalt	52	µg/L	1	21-Aug-01
	Copper	7	µg/L	2	21-Aug-01
	Iron	120	µg/L	30	20-Aug-01
	Lead	<1	µg/L	1	21-Aug-01
	Manganese	795	µg/L	1	21-Aug-01

Report Date: September 6, 2001



Page 1 of 2



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 1

Taiga Sample ID: 212042

Total Metals	Nickel	152	µg/L	1	21-Aug-01
	Zinc	< 10	µg/L	10	21-Aug-01

Field Data (01/08/12) Ore Pad 1
Temperature: 9.0 °C
Conductivity: 2 440 µS/cm
pH: 7.3 **Time:** 09:27

REPORT OF TOXICITY USING MICROTOX

COMP, //LOCATION: Boston Pad 1

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 12, 2001 / 09:27

Date/Time Received: August 13, 2001

Date/Time Test Start: August 13, 2001 / 11:30 AM

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.

Environment Canada has conducted testing on the material sampled according to its own Microtox standards and procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot be used for any other purpose. This data is provided on the condition that it not be used in any report that is intended for public or official use.

RESULTS: NON TOXIC at 45% concentration

TEST ORGANISMS:

Species: Vibrio fischeri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: N/A (No pH adjustment)

Lot # of Osmotic Adjusting Solution: OAS007

Sample Appearance: Clear, no colour adjustment

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: August 13, 2001 / 11:30 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC₅₀ - 15 minutes mg/L: 3.4 mg/L

IC₅₀ Confidence Range: 2.3 to 5.1 mg/L

TEST ANALYST: Ron Bujold

INITIAL: RB



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 2

Taiga Sample ID: 212043

Client Project:

Sample Type: sediment trap

Received Date: 13-Aug-01

Location: Boston

Sampling Date: 12-Aug-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Calcium	206	mg/L	0.05	15-Aug-01
	Magnesium	120	mg/L	0.02	15-Aug-01
	Potassium	26.9	mg/L	0.03	15-Aug-01
	Sodium	171	mg/L	0.02	15-Aug-01
Subcontract	Chloride	365	mg/L	0.1	30-Aug-01
	Sulphate	494	mg/L	0.3	30-Aug-01
Total Metals	Arsenic	49.8	µg/L	1.0	14-Aug-01
	Cadmium	<0.3	µg/L	0.3	21-Aug-01
	Chromium	<3	µg/L	3	21-Aug-01
	Cobalt	37	µg/L	1	21-Aug-01
	Copper	5	µg/L	2	21-Aug-01
	Iron	100	µg/L	30	20-Aug-01
	Lead	<1	µg/L	1	21-Aug-01
	Manganese	249	µg/L	1	21-Aug-01



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavalllee

Sample ID: Pad 2

Taiga Sample ID: 212043

Total Metals	Nickel	296	µg/L	1	21-Aug-01
	Zinc	<10	µg/L	10	21-Aug-01

Field Data (01/08/12) Ore Pad 2

Temperature: 9.0 °C

Conductivity: 2 900 µS/cm

pH: 6.9

Time: 09:43

REPORT OF TOXICITY USING MICROTOX

COMPASS /LOCATION: Boston Pad 2

Sample Collected By: Philippe Lavallee

Date/Time Sampled: **August 12, 2001 / 09:42**

Date/Time Received: **August 13, 2001**

Date/Time Test Start: **August 13, 2001 / 12:25 PM**

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.

Environment Canada has conducted testing on the material sampled according to its own Microtox standards and procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot be used for any other purpose. This data is provided on the condition that it not be used in any report that is intended for public or official use.

RESULTS: NON TOXIC at 45% concentration

TEST ORGANISMS:

Species: Vibrio fischeri (Photobacterium phosphoreum)

Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: **N/A** (No pH adjustment)

Lot # of Osmotic Adjusting Solution: OAS007

Sample Appearance: **Clear, no colour adjustment**

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: **August 13, 2001 / 12:25 PM**

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC₅₀ - 15 minutes mg/L: **3.4 mg/L**

IC₅₀ Confidence Range: **2.3 to 5.1 mg/L**

TEST ANALYST: Ron Bujold

INITIAL: _____



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 3

Taiga Sample ID: 212044

Client Project:

Sample Type: water grab

Received Date: 13-Aug-01

Location: Boston

Sampling Date: 12-Aug-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Calcium	892	mg/L	0.05	15-Aug-01
	Magnesium	176	mg/L	0.02	15-Aug-01
	Potassium	97.8	mg/L	0.03	15-Aug-01
	Sodium	420	mg/L	0.02	15-Aug-01
Subcontract	Chloride	2270	mg/L	0.1	30-Aug-01
	Sulphate	625	mg/L	0.3	30-Aug-01
Total Metals	Arsenic	2400	µg/L	1.0	14-Aug-01
	Cadmium	0.4	µg/L	0.3	21-Aug-01
	Chromium	<3	µg/L	3	21-Aug-01
	Cobalt	16900	µg/L	1	21-Aug-01
	Copper	6	µg/L	2	21-Aug-01
	Iron	80	µg/L	30	20-Aug-01
	Lead	<1	µg/L	1	21-Aug-01
	Manganese	4740	µg/L	1	21-Aug-01



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 3

Taiga Sample ID: 212044

Total Metals	Nickel	47200	µg/L	1	21-Aug-01
	Zinc	13	µg/L	10	21-Aug-01

Field Data (01/08/12) Ore Pad 3

Temperature: 8.5 °C

Conductivity: 8 850 µS/cm

pH: 6.6

Time: 09:55

REPORT OF TOXICITY USING MICROTOX

COMPASS /LOCATION: Boston Pad 3

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 12, 2001 / 09:53

Date/Time Received: August 13, 2001

Date/Time Test Start: August 13, 2001 / 1:11 PM

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.*

Environment Canada has conducted testing on the material sampled according to its own Microtox standards and procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot be used for any other purpose. This data is provided on the condition that it not be used in any report that is intended for public or official use.

RESULTS: NON TOXIC at 45% concentration

TEST ORGANISMS:

Species: Vibrio fischeri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: N/A (No pH adjustment)

Lot # of Osmotic Adjusting Solution: OAS007

Sample Appearance: Clear, no colour adjustment

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: August 13, 2001 / 1:11 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC₅₀ - 15 minutes mg/L: 3.4 mg/L

IC₅₀ Confidence Range: 2.3 to 5.1 mg/L

TEST ANALYST: Ron Bujold

INITIAL: RB



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Pad 4

Taiga Sample ID: 212045

Client Project:

Sample Type: water grab

Received Date: 13-Aug-01

Location: Boston

Sampling Date: 12-Aug-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Microbiology	Coliforms, Fecal	<2	CFU/100mL	2	13-Aug-01
Nutrients	Ammonia as N	41.8	mg/L	0.005	06-Sep-01
	Biological Oxygen Demand	10	mg/L	2	13-Aug-01
	Nitrate+Nitrite as N	41.6	mg/L	0.008	21-Aug-01
	Phosphorous, Total	0.301	mg/L	0.004	29-Aug-01
Physicals	Solids, Total Suspended	44	mg/L	3	04-Sep-01
Total Metals	Arsenic	468	µg/L	1.0	14-Aug-01
	Cadmium	0.4	µg/L	0.3	21-Aug-01
	Chromium	<3	µg/L	3	21-Aug-01
	Cobalt	478	µg/L	1	21-Aug-01
	Copper	19	µg/L	2	21-Aug-01
	Iron	666	µg/L	30	20-Aug-01
	Lead	4	µg/L	1	21-Aug-01
	Manganese	4730	µg/L	1	21-Aug-01



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavalllee

Sample ID: Pad 4

Taiga Sample ID: 212045

Total Metals	Nickel	723	µg/L	1	21-Aug-01
	Zinc	188	µg/L	10	21-Aug-01

Field Data (01/08/12) Central Pond

Temperature: 9.5 °C

Conductivity: 3 780 µS/cm

pH: 6.9

Time: 10:06

REPORT OF TOXICITY USING MICROTOX

COMPASS //LOCATION: Boston Pond

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 12, 2001 / 10:06

Date/Time Received: August 13, 2001

Date/Time Test Start: August 13, 2001 / 1:13 PM

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.*

Environment Canada has conducted testing on the material sampled according to its own Microtox standards and procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot be used for any other purpose. This data is provided on the condition that it not be used in any report that is intended for public or official use.

RESULTS: NON TOXIC at 45% concentration

TEST ORGANISMS:

Species: Vibrio fischeri (Photobacterium phosphoreum)

Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: N/A (No pH adjustment)

Lot # of Osmotic Adjusting Solution: OAS007

Sample Appearance: Clear, no colour adjustment

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: August 13, 2001 / 1:11 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC₅₀ - 15 minutes mg/L: 3.4 mg/L

IC₅₀ Confidence Range: 2.3 to 5.1 mg/L

TEST ANALYST: Ron Bujold

INITIAL: RB



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Cuttings Pit

Taiga Sample ID: 212046

Client Project:

Sample Type: water grab

Received Date: 13-Aug-01

Location: Boston

Sampling Date: 12-Aug-01

Report Status: Final

Approved by:

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Calcium	1080	mg/L	0.05	15-Aug-01
	Magnesium	174	mg/L	0.02	15-Aug-01
	Potassium	56.9	mg/L	0.03	15-Aug-01
	Sodium	260	mg/L	0.02	15-Aug-01
Nutrients	Ammonia as N	0.421	mg/L	0.005	06-Sep-01
	Nitrate+Nitrite as N	6.24	mg/L	0.008	21-Aug-01
Organic	Oil and Grease (Visible)	non-visible			07-Sep-01
Physicals	Solids, Total Suspended	67	mg/L	3	04-Sep-01
Subcontract	Chloride	2940	mg/L	0.1	30-Aug-01
	Sulphate	70.0	mg/L	0.3	30-Aug-01
Total Metals	Arsenic	23.1	µg/L	1.0	14-Aug-01
	Cadmium	<0.3	µg/L	0.3	21-Aug-01
	Chromium	<3	µg/L	3	21-Aug-01

Report Date: Monday, September 17,

Page 1 of 2



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: Nunavut District Office

DIAND, Operations

Attn: Philippe Lavallee

Sample ID: Cuttings Pit

Taiga Sample ID: 212046

Total Metals	Cobalt	48	µg/L	1	21-Aug-01
	Copper	6	µg/L	2	21-Aug-01
	Iron	14500	µg/L	30	20-Aug-01
	Lead	<1	µg/L	1	21-Aug-01
	Manganese	15100	µg/L	1	21-Aug-01
	Nickel	86	µg/L	1	21-Aug-01
	Zinc	<10	µg/L	10	21-Aug-01

Field Data (01/08/12) Cuttings Pit

Temperature: 9.5 °C

Conductivity: 8 870 µS/cm

pH: 6.4

Time: 11:00

REPORT OF TOXICITY USING MICROTOX

COMP, /LOCATION: Boston Cutting Pit

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 12, 2001 / 11:00

Date/Time Received: August 13, 2001

Date/Time Test Start: August 13, 2001 / 1:47 PM

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.*

Environment Canada has conducted testing on the material sampled according to its own Microtox standards and procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot be used for any other purpose. This data is provided on the condition that it not be used in any report that is intended for public or official use.

RESULTS: NON TOXIC at 45% concentration

TEST ORGANISMS:

Species: Vibrio fischeri (Photobacterium phosphoreum)

Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

pH of Sample: N/A (No pH adjustment)

Lot # of Osmotic Adjusting Solution: OAS007

Sample Appearance: Yellowish, no colour adjustment

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: August 13, 2001 / 1:47 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC₅₀ - 15 minutes mg/L: 3.4 mg/L

IC₅₀ Confidence Range: 2.3 to 5.1 mg/L

TEST ANALYST: Ron Bujold

INITIAL: RB