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Your file / Votre référence

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NWB1CUL9902

November 13, 2001.

Vernon Betts, Manager of Environmental Affairs
Homestake Canada Inc.
Suite 1100 - 1055 West Georgia Street
Vancouver, BC V6E 3P3

August 26, 2001 Water Licence Inspection - Report

Firstly, I wish to thank Bill Millward for the much appreciated time and assistance provided during the tour of the minesite's waste disposal facilities and reclamation operations. Attached for your records is the Industrial Water Use Inspection Report pertaining to the August 26, 2001 inspection; abandonment and restoration (A&R) work undertaken appears to adequately address the previously noted areas of concerns. Nevertheless, the following considerations were outlined during the inspection:

- **Tailings disposal:** Despite the minor slumping of some sections of its impoundment structures, the overall integrity of the TCA (figure 1) appears unlikely to constitute a cause for concern. Further, the attached analytical results relating to samples collected at the discharge points from Tailings Pond 1(figure 2) and Tailings Pond 2 (figure 3) indicate that all tested parameters meet both licenced requirements (part C, item 2) and the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. In addition, the same can be said for the area of seepage at Surveillance Network Program (SNP) station 940-22, in the northeastern corner of Tailings Pond 1. Likewise, the respective Microtox samples, which constitute reliable toxicity indicators(IC_{50}), did not attribute toxicity to any of the above effluents.

- **Solid waste disposal:** Although a significant proportion of the material on-site was buried in the quarry, there nonetheless remains a noteworthy open pit which was at the time of the inspection nearly filled with recent rainwater (figure 4). In this regards, the attached analytical results relating to a sample taken from SNP station 940-23, while complying with the licenced thresholds, exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life* for arsenic (arsenic (5.6 μg/L vs 5 μg/L), copper (6 μg/L vs 4 μg/L), iron (2.48 mg/L vs 0.3 mg/L), and zinc (70 μg/L vs 30 μg/L). However, the associated Microtox sample did not denote toxicity. In light of this and the presumable amount of bulky metal wastes buried at the quarry, the site ought to be monitored to ensure that the drainage indeed leads towards Tailings Pond 1 as intended, thus providing additional retention and treatment time to the runoff from the pit.

- **Ore and waste rock stockpiles:** While it encroaches on the shoreline of Shear Lake, the waste rock piled in the area does not appear to significantly impact the water body. Indeed, the attached analytical results relating to a sample collected at the toe of the waste rock pile (figure 5) indicate that all tested parameters meet the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*, save for copper (5 µg/L) and iron (756 µg/L). Also, the related Microtox sample did not denote toxicity.

However, dead vegetation was noted in the location the higher grade waste rock dump occupied prior to its burial. Accordingly, the attached analytical results relating to a sample collected from pooled water in the area (figure 6) reveal that the field pH (3.2 vs 6.0-9.5) breaches the effluent quality requirements set under Water licence NWB1CUL9902. Furthermore, concentrations of cadmium (4.5 µg/L vs 0.017 µg/L), copper (210 µg/L), iron (3.14 mg/L), nickel (268 µg/L vs 150 µg/L), and zinc (420 µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Moreover, the relevant Microtox sample shows that half of light-producing bacteria were inhibited by a sample concentration of 5.0%, whereas 50% and over is considered non-toxic.

This being said, especially considering the fact that drainage from the surroundings flows towards Shear creek and/or lake, it is the Inspector's belief that the reclamation of the area cannot be deemed complete before further monitoring assesses that runoff from the site no longer implies potential for the deposit of waste into waters. In addition, the burial site of the high grade waste rock relocated from the above area ought to be equally monitored in order to ensure that sufficient cover material has been applied to effectively seal in the underlying waste rock. Lastly, since the burial of the waste rock did not constitute the Licensee's preferred disposal option and was consequently not fully developed in submitted A&R documents, more details regarding the work would be welcomed in follow-up abandonment documentation.

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
- EC Environmental Protection, Yellowknife (Anne Wilson)
- DFO Habitat Management, Iqaluit (Jordan DeGroot)

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

INDUSTRIAL WATER USE INSPECTION REPORT

Date: 2001/08/26 **Company Rep.** (Name/Title): Bill Millward / Project Manager

Licensee: **Homestake Canada Inc.**, Cullaton Lake **Licence No.:** **NWB1CUL9902**

WATER SUPPLY

Source(s): Shear Lake **Quantity used:** Not inspected **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:** NI

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

Comments: Minimal water use supporting temporary A&R camp installations.

WASTE DISPOSAL

Tailings: **Tailings Pond:** x **Natural Lake:** **Underground:**

Sewage: **Sewage Treatment System:** **Tailings Pond:** **Natural Water Body:**
Continuous Discharge: **Intermittent Discharge:**

Solid Waste: **Open Dump:** **Landfill:** **Burn & Bury:** **Underground:**

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

Discharge Quality: sampled	**Decant Structure:** A	**Dyke Inspections:** A
Conveyance Lines: NA	**Pond Treatment:** sampled	**Runoff Diversion:** A
Discharge Meas. Device: NA	**Dams, Dykes:** A	**Erosion:** A
Freeboard: A	**Seepages:** A	**Spills:** none reported
Effluent Discharge Rate: A	**Samples Collected:** pond 1 (940-18), seepage @ pond 1 (940-22), pond 2 (940-3), quarry (940-23), Shear Lake, waste rock @ Shear Lake	

Comments: Minor slumping of Tailings Containment Area (TCA) retention berms noted in a handful of areas; although unlikely to pose concerns regarding the integrity of the TCA impoundment structures. Quarry partially filled with recent rainfall; drainage is to be encouraged towards Tailings Pond 1. Pooled water in identified area of seepage, but no flow noticeable.

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: A	**Posting/Signage:** A	**Contingency Plan:** A
Restoration Activities: A	**New Construction:** NA	**Fuel Storage:** A
Mine Water Discharge: NA	**Chemical Storage:** NA	**Annual Report:** A

Comments: Demobilization scheduled for the first week of September. A good proportion of the material on site has been shred before burial in the quarry pit; remaining equipment stockpiled by the airstrip, awaiting airlift. Only standing structures noted consist of the temporary A&R camp by Shear Lake and some infrastructure by the airstrip. Higher grade rock dump in the vicinity of Shear Lake was not disposed of in Shear Lake as previously proposed, but buried in the area; pooled water and dead vegetation observed at the location of the waste rock prior to its removal.

Violations of Act or Licence: Effluent quality requirements (part C, item 2) set under Water licence NWB1CUL9902 breached in regards to the Shear Lake higher grade waste rock dump.

General Comments: Although reclamation work not yet completed at the time of the inspection, it appears to adequately address the previously underlined A&R issues of concern. Additional monitoring of the quarry pit and Shear Lake areas nonetheless recommended.

Philippe Lavallée
Inspector's Name

Inspector's Signature

figure 1. Aerial view of the Tailings Containment Area (TCA); 2001/08/26.

figure 2. Discharge from Tailings Pond 1 spillway, SNP station 940-18; 2001/08/26.

figure 3. Final discharge from Tailings Pond 2, SNP station 940-3; 2001/08/26.

figure 4. Quarry pit in vicinity of Tailings Pond 1, SNP station 940-23; 2001/08/26.

figure 5. Waste rock piled along the shoreline of Shear Lake; 2001/08/26.

figure 6. Location of the higher grade waste rock dump prior to its burial; 2001/08/26.

Taiga Environmental Laboratory
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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 1 Spillway G40-18 **Taiga Sample ID:** 212290

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Suspended	< 3	mg/L	3	11-Sep-01
Nutrients				
Ammonia as N	0.017	mg/L	0.005	07-Sep-01
Organic				
Cyanide, Total	< 0.003	mg/L	0.003	02-Oct-01
Metals, Total				
Arsenic	< 1.0	µg/L	1.0	13-Sep-01
Cadmium	< 0.3	µg/L	0.3	09-Sep-01
Chromium	< 3	µg/L	3	09-Sep-01
Cobalt	2	µg/L	1	09-Sep-01
Copper	< 2	µg/L	2	09-Sep-01
Iron	94	µg/L	30	08-Sep-01
Lead	< 1	µg/L	1	09-Sep-01
Manganese	20	µg/L	1	09-Sep-01
Mercury	< 0.01	µg/L	0.01	02-Oct-01

Report Date: Wednesday, October 17, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 1 Spillway G40-18 **Taiga Sample ID:** 212290

Nickel	7	µg/L	1	09-Sep-01
Zinc	<10	µg/L	10	09-Sep-01

Field Data (01/08/26) 940-18
Temperature: 13.5 °C
Conductivity: 697 µS/cm
pH: 8.9 **Time:** 14:40

Report Date: Wednesday, October 17, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Cullaton Lake 940-18 Pond 1 Spillway (212290)**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 26, 2001 / 14:40

Date/Time Received: September 04, 2001

Date/Time Test Start: September 04, 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.***

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 fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: Greenish, no colour adjustment

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: September 04, 2001 / 03:36 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 4.6 mg/L

IC_{50} Confidence Range: 3.8 to 5.5 mg/L

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

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 1 Seepage G40-20 **Taiga Sample ID:** 212291

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Suspended	<3	mg/L	3	11-Sep-01
Nutrients				
Ammonia as N	0.031	mg/L	0.005	07-Sep-01
Organic				
Cyanide, Total	<0.003	mg/L	0.003	02-Oct-01
Metals, Total				
Arsenic	<1.0	µg/L	1.0	13-Sep-01
Cadmium	<0.3	µg/L	0.3	09-Sep-01
Chromium	<3	µg/L	3	09-Sep-01
Cobalt	1	µg/L	1	09-Sep-01
Copper	3	µg/L	2	09-Sep-01
Iron	300	µg/L	30	08-Sep-01
Lead	<1	µg/L	1	09-Sep-01
Manganese	15	µg/L	1	09-Sep-01
Mercury	<0.01	µg/L	0.01	02-Oct-01

Report Date: Wednesday, October 17, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 1 Seepage G40-20 **Taiga Sample ID:** 212291

Nickel	3	µg/L	1	09-Sep-01
Zinc	<10	µg/L	10	09-Sep-01

Field Data (01/08/26) **940-22**
Temperature: 13.0 °C
Conductivity: 334 µS/cm
pH: 8.4 **Time:** 14:58

REPORT OF TOXICITY USING MICROTOX

COMP. Y/LOCATION: **Cullaton Lake 940-20 Pond 1 Seepage (212291)**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 26, 2001 / 14:58

Date/Time Received: September 04, 2001

Date/Time Test Start: September 04, 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.***

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 fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: Greenish, no colour adjustment

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: September 04, 2001 / 04:00 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 4.6 mg/L

IC_{50} Confidence Range: 3.8 to 5.5 mg/L

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

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 2 Discharge G40-3 **Taiga Sample ID:** 212293

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

Report Status: **Final** ***Approved by:*** Kathleen Ryder

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Suspended	<3	mg/L	3	11-Sep-01
Nutrients				
Ammonia as N	0.031	mg/L	0.005	07-Sep-01
Organic				
Cyanide, Total	0.003	mg/L	0.003	02-Oct-01
Metals, Total				
Arsenic	<1.0	µg/L	1.0	13-Sep-01
Cadmium	<0.3	µg/L	0.3	09-Sep-01
Chromium	<3	µg/L	3	09-Sep-01
Cobalt	<1	µg/L	1	09-Sep-01
Copper	3	µg/L	2	09-Sep-01
Iron	135	µg/L	30	08-Sep-01
Lead	2	µg/L	1	09-Sep-01
Manganese	26	µg/L	1	09-Sep-01
Mercury	<0.01	µg/L	0.01	02-Oct-01

Report Date: Wednesday, October 17, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Pond 2 Discharge G40-3 **Taiga Sample ID:** 212293

Nickel	4	µg/L	1	09-Sep-01
Zinc	<10	µg/L	10	09-Sep-01

Field Data (01/08/26) 940-3
Temperature: 13.5 °C
Conductivity: - µS/cm
pH: 7.9 **Time:** 15:51

Report Date: Wednesday, October 17, 2001

REPORT OF TOXICITY USING MICROTOX

COMF Y/LOCATION: **Cullaton Lake 940-3 Tailings Pond (212293)**
Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 26, 2001 / 15:??

Date/Time Received: September 04, 2001

Date/Time Test Start: September 04, 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.***

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 fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: Greenish, no colour adjustment

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: September 04, 2001 / 04:46 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 4.6 mg/L

IC_{50} Confidence Range: 3.8 to 5.5 mg/L

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

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Quarry Pt. G40-23 **Taiga Sample ID:** 212292

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Physicals				
Solids, Total Suspended	43	mg/L	3	11-Sep-01
Nutrients				
Ammonia as N	0.083	mg/L	0.005	07-Sep-01
Organic				
Cyanide, Total	< 0.003	mg/L	0.003	02-Oct-01
Metals, Total				
Arsenic	5.6	µg/L	1.0	13-Sep-01
Cadmium	< 0.3	µg/L	0.3	09-Sep-01
Chromium	7	µg/L	3	09-Sep-01
Cobalt	6	µg/L	1	09-Sep-01
Copper	6	µg/L	2	09-Sep-01
Iron	2480	µg/L	30	08-Sep-01
Lead	2	µg/L	1	09-Sep-01
Manganese	421	µg/L	1	09-Sep-01
Mercury	< 0.01	µg/L	0.01	02-Oct-01

Report Date: Wednesday, October 17, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Quarry Pt. G40-23 **Taiga Sample ID:** 212292

Nickel	15	µg/L	1	09-Sep-01
Zinc	70	µg/L	10	09-Sep-01

Field Data (01/08/26) **940-23**
Temperature: 13.5 °C
Conductivity: 787 µS/cm
pH: 7.8 **Time:** 15:11

Report Date: Wednesday, October 17, 2001

REPORT OF TOXICITY USING MICROTOX

COMF Y/LOCATION: **Cullaton Lake 940-23 Quarry Pit (212292)**
Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 26. 2001 / 14:58

Date/Time Received: September 04, 2001

Date/Time Test Start: September 04, 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.***

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 fisheri (Photobacterium phosphoreum)
Test Apparatus: Model 500 Analyzer

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: Greenish, no colour adjustment

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: September 04, 2001 / 04:25 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 4.6 mg/L

IC_{50} Confidence Range: 3.8 to 5.5 mg/L

TEST ANALYST: Ron Bujold INITIAL: RB

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Shear Lake **Taiga Sample ID:** 212294

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Metals, Total				
Arsenic	1.1	µg/L	1.0	13-Sep-01
Cadmium	< 0.3	µg/L	0.3	09-Sep-01
Chromium	< 3	µg/L	3	09-Sep-01
Cobalt	4	µg/L	1	09-Sep-01
Copper	5	µg/L	2	09-Sep-01
Iron	765	µg/L	30	08-Sep-01
Lead	< 1	µg/L	1	09-Sep-01
Manganese	87	µg/L	1	09-Sep-01
Nickel	7	µg/L	1	09-Sep-01
Zinc	< 10	µg/L	10	09-Sep-01

Field Data (01/08/26) Shear Lake
Temperature: 14.0 °C
Conductivity: 56 µS/cm
pH: 7.9 Time: 16:34

Report Date: Friday, October 05, 2001

REPORT OF TOXICITY USING MICROTOX

COMP..Y/LOCATION: **Cullaton Lake, Shear Lake, (212294)**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: **August 26, 2001, 16:34**

Date/Time Received: **N/A**

Date/Time Test Start: **August 08, 2001 / 4:55 PM**

Sample Type: Elutriate
Sampling Method: Grab

Method: ***Environment Canada Laboratories SOP#830.0 Revision 1, for Microtox Testing in Compliance wit 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 an procedures. The data proceeding from that testing is intended as a preliminary screening tool only, and cannot b used for any other purpose. This data is provided on the condition that it not be used in any report that is intende for public or official use.

RESULTS: **NON TOXIC at 45% concentration**

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

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: **no colour adjustment**

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: **September 08, 2001 4:55 PM**

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: **2.8 mg/L**

IC_{50} Confidence Range: **1.9 to 4.2 mg/L**

TEST ANALYST: Ron Bujold

INITIAL: RB

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: Rock @ Shear **Taiga Sample ID:** 212295

Client Project: **Sample Type:** wastewater **Received Date:** 30-Aug-01

Location: Collaten Lake **Sampling Date:** 26-Aug-01

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

Test Parameter	Result	Units	Detection Limit	Analysis Date
Metals, Total				
Arsenic	1.8	µg/L	1.0	13-Sep-01
Cadmium	4.5	µg/L	0.3	09-Sep-01
Chromium	21	µg/L	3	09-Sep-01
Cobalt	306	µg/L	1	09-Sep-01
Copper	210	µg/L	2	09-Sep-01
Iron	3140	µg/L	30	08-Sep-01
Lead	3	µg/L	1	09-Sep-01
Manganese	9950	µg/L	1	09-Sep-01
Nickel	268	µg/L	1	09-Sep-01
Zinc	420	µg/L	10	09-Sep-01

Field Data (01/08/26) rock@Shear
Temperature: 13.0 °C
Conductivity: 1 519 µS/cm
pH: 3.2 Time: 16:48

Report Date: Friday, October 05, 2001

REPORT OF TOXICITY USING MICROTOX

COMP. Y/LOCATION: **Cullaton Lake, Dock @ Shear (212295)**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: August 26, 2001 / 16:48

Date/Time Received: September 04, 2001

Date/Time Test Start: September 04, 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.***

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: **TOXIC - IC_{50} Concentration: 5.0%** **(Toxic 0 to 50%)**

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

TEST SUBSTANCE/CONDITIONS

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

Sample Appearance: Clear, no colour adjustment

Lot # of Osmotic Adjusting Solution: OAS007

Lot # of Reconstitution Solution: RSN099Y

Lot # of Diluent: DIL034L

TEST METHODS AND CONDITIONS

Test Start Date/Time: September 04, 2001 / 5:09 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Reagent Lot #: ACV026-6

IC_{50} - 15 minutes mg/L: 4.6 mg/L

IC_{50} Confidence Range: 3.8 to 5.5 mg/L

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