INAC, Nunavut District Office
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Your file Votre référence

Our file Notre référence
(unlicenced)

September 14, 2001.

Art Stewart
Senior Administrative Officer
Municipality of Cape Dorset
P.O. Box 30
Cape Dorset, NU X0A 0C0

June 10, 2001 Municipal Water Use Inspection - Report

Firstly, I wish to thank Jeff MacMunn 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 June 10, 2001 inspection; concerns still stem from the state of the waste disposal facilities. Consequently, the following considerations were underlined:

- **Water supply:** There were no concerns noted regarding the well-kept truckfill station, whereas the major conveyance line replacement work to have been undertaken this summer should represent a welcomed improvement of the water supply system. Further, the attached analytical results indicate that the water at the truckfill station meets the *Guidelines for Canadian Drinking Water Quality*, save for a slight exception: a turbidity value of 2.3 Nephelometric Turbidity Unit (NTU), which rests above the 1 NTU maximum acceptable concentration but below the 5 NTU aesthetic objective.

- **Sewage waste disposal:** At the time of the inspection, the new sewage disposal facility did not appear (figure 1), and reportedly was not, utilized. However, flow was noted at the decant culvert of the first lagoon cell, and sewage effluent was observed following the same discharge path (figure 2) as had been observed during the previous inspection. The attached analytical results relating to a sample taken just below the first cell's discharge culvert reveal that levels of ammonia (2.39 mg/L vs 2.2 mg/L) and phenols (20 μg/L vs 4 μg/L) faintly exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Due to weather delays, bacteriological parameters could not be analysed. In parallel, the old sewage lagoon serves as the main sewage truck discharge point. In light of its limited size (figure 3), the old lagoon is likely overtaxed and cannot provide sufficient retention time prior to the release of its contents to the environment.

The attached analytical results relating to a sample taken about twenty metres along the main seepage vein below the access road (figure 4) indicate that ammonia (23.0 mg/L) and phenols (36 µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Nonetheless, as was the case for the new sewage lagoon, the microtox sample did not attribute toxicity to the effluent. This being said, the Inspector acknowledges that consultants have been retained by Community Government and Transportation to complete a *Sewage Treatment Facility Planning Study in Cape Dorset, Nunavut*.

- **Solid waste disposal:** It was mentioned that the municipality hoped to fence the solid waste disposal facility before fall, however in the meantime a notable quantity of windblown garbage is scattered around the site. Further, runoff along the cliff face of the waste disposal valley poses concerns in regards to leachate production from the solid waste disposal facility (figure 5). As such, the attached analytical results reveal that ammonia (2.41 mg/L), cadmium (0.3 µg/L vs 0.017 µg/L), copper (16 µg/L vs 4 µg/L), iron (1.17 mg/L vs 0.3 mg/L), and zinc (95 µg/L vs 30 µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Hazardous materials are still disposed of haphazardly at the bulky waste disposal site, and it was again suggested that a sealift container be used to store hazardous materials and thus minimise the chances of release of contaminants to the environment. In addition, significant runoff was flowing through the bulky waste disposal area before reaching the highwater mark at the toe of the dump. The attached analytical results reveal that cadmium (0.5 µg/L), copper (5 µg/L), and zinc (114 µg/L) exceed the *Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life*. Nevertheless, neither of the microtox samples from the solid waste disposal sites attribute toxicity to the sampled leachates.

- **Non-compliance of Act:** Although the community's water use and waste disposal are still unlicenced, the Inspector wishes to commend the municipality for submitting to the Nunavut Water Board an application for a Water licence which should be processed shortly.

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)
- DFO Habitat Management, Iqaluit (Jordan DeGroot)

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

MUNICIPAL WATER USE INSPECTION FORM

Date: 2001/06/10 **Licensee Rep.** (Name/Title): Jeff MacMunn / Airport Maintainer

Licensee: **Municipality of Cape Dorset** **Licence No.:** **unlicenced**

WATER SUPPLY

Source(s): Tee Lake / Dead Dog Lake **Quantity used:** recorded @ truck delivery

Owner:/Operator: Municipality

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

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

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

Comments: No concerns noted with well-kept truckfill station. Conveyance line replacement work scheduled for the summer. 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:** very limited **Trench:**

Solid Waste: **Owner/Operator:** Municipality

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:** U

Dams, Dykes: U **Freeboard:** NA **Spills:** none reported

Construction: NA **O&M Plan:** NA **A&R Plan:** NA

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

Comments: New sewage disposal facility is not utilized, but effluent was still observed from the decant culvert of the first lagoon cell. Sewage effluent flows above the facility until it mixes, above the outer berm of the lower lagoon cell, with the runoff from the solid waste disposal site. The old lagoon serves as the main sewage truck discharge point; effluent discharges at the culvert and seeps through the base of the road. Solid waste disposal facility still unfenced. Large amounts of garbage in and around the wastepile; household wastes rarely burnt in winter. Leachate discharges down the far side of the waste disposal valley until it flows into the breached inner lagoon cell. Hazardous materials are haphazardly disposed of. Runoff flows through the sprawled bulky wastes disposal site. Second waste oil furnace incoming on summer's sealift and is to be installed at the airport garage.

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, new/old sewage lagoon discharges, dump/metal dump leachates

Signs Posted **SNP:** not applicable **Warning:** none

Records & Reporting: not applicable

Geotechnical Inspection: none required

Non-Compliance of Act or Licence: Community is currently unlicenced, however the Nunavut Water Board acknowledged receipt of a Water Licence application on 2001/04/23. Pending review.

Philippe Lavallée

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

figure 1. First cell of the new sewage disposal facility; 2001/06/10.

figure 2. Path of discharge from the first cell of the new sewage disposal site; 2001/06/10.

figure 3. Old sewage disposal facility; 2001/06/10.

figure 4. Path of discharge from the old sewage disposal facility; 2001/06/10.

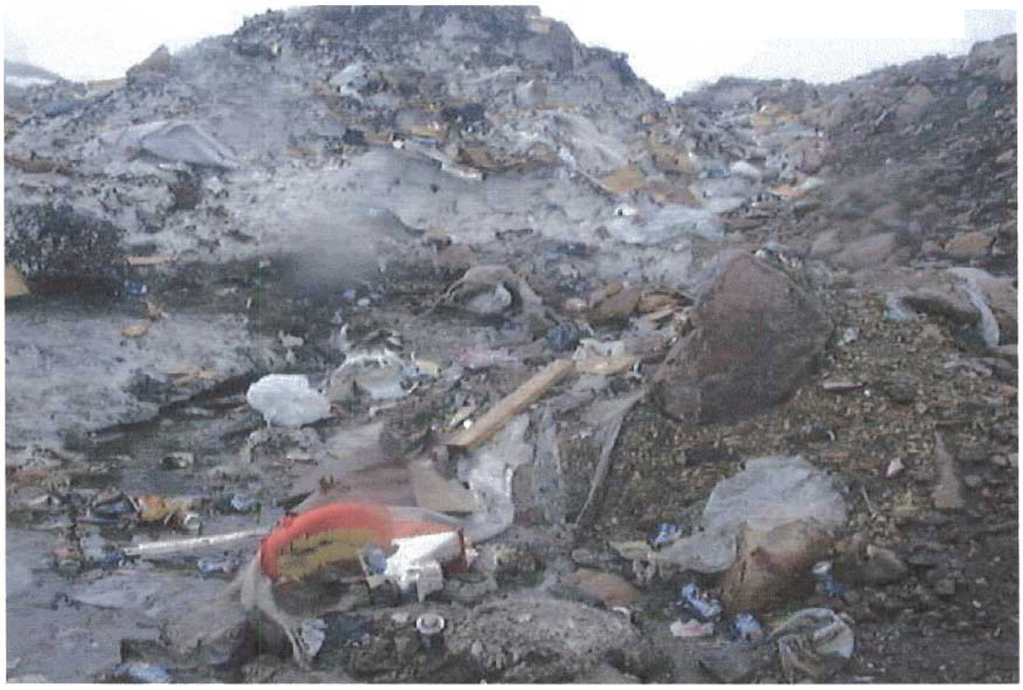

figure 5. Leachate from the solid waste disposal facility; 2001/06/10.

figure 6. Runoff flowing through the bulky wastes disposal facility; 2001/06/10.

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:** 211161

Client Project: **Sample Type:** water **Received Date:** 14-Jun-01

Location: Cape Dorset **Sampling Date:** 10-Jun-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Major Ions	Chloride	8.2	mg/L	0.2	15-Jun-01
	Fluoride	< 0.03	mg/L	0.03	26-Jun-01
	Sodium	4.54	mg/L	0.02	14-Jun-01
	Sulphate	< 3	mg/L	3	29-Jun-01
Nutrients	Ammonia as N	< 0.005	mg/L	0.005	28-Jun-01
	Nitrate+Nitrite as N	0.021	mg/L	0.008	19-Jun-01
	Phosphorous, Total	< 0.004	mg/L	0.004	27-Jun-01
Physicals	Colour	5		5	15-Jun-01
	Solids, Total Suspended	< 3	mg/L	3	25-Jun-01
	Turbidity	2.3	NTU	0.1	14-Jun-01
Total Metals	Arsenic	< 1.0	µg/L	1.0	19-Jun-01
	Cadmium	< 0.3	µg/L	0.3	20-Jun-01
	Chromium	< 3	µg/L	3	20-Jun-01
	Cobalt	< 1	µg/L	1	20-Jun-01

Report Date: July 5, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: raw water **Taiga Sample ID:** 211161

Total Metals	Copper	< 2	µg/L	2	20-Jun-01
	Iron	100	µg/L	30	15-Jun-01
	Lead	< 1	µg/L	1	20-Jun-01
	Manganese	< 1	µg/L	1	20-Jun-01
	Mercury	< 0.01	µg/L	0.01	21-Jun-01
	Nickel	< 1	µg/L	1	20-Jun-01
	Zinc	< 10	µg/L	10	20-Jun-01

Field Data (01/06/10) **raw water**
Temperature: 9.5 °C
Conductivity: 59 µS
pH: 7.5 **Time:** 14:43

Report Date: July 5, 2001

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- CERTIFICATE OF ANALYSIS -

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

Sample ID: new lagoon **Taiga Sample ID:** 211158

Client Project: **Sample Type:** sewage **Received Date:** 14-Jun-01

Location: Cape Dorset **Sampling Date:** 10-Jun-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	2.39	mg/L	0.005	28-Jun-01
	Nitrate+Nitrite as N	0.647	mg/L	0.008	19-Jun-01
	Phosphorous, Total	0.184	mg/L	0.004	27-Jun-01
Organic	Phenols	20	µg/L	2	03-Jul-01
Physicals	Solids, Total Suspended	10	mg/L	3	25-Jun-01

Field Data (01/06/10) new lagoon
Temperature: 4.5 °C
Conductivity: 19 520 µS
pH: 7.8 Time: 13:44

Report Date: July 5, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Cape Dorset Sewage Discharge**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: June 10 , 2001

Date/Time Received: N/A

Date/Time Test Start: June 15, 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: — (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: June 15, 2001 / 12:51 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold - EPB

Date of Test: June 15, 2001

Reagent Lot #: ACV022-2

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

IC_{50} Confidence Range: 2.3 to 5.0 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 Lavalllee

Sample ID: old lagoon **Taiga Sample ID:** 211157

Client Project: **Sample Type:** sewage **Received Date:** 14-Jun-01

Location: Cape Dorset **Sampling Date:** 10-Jun-01

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

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	23.0	mg/L	0.005	28-Jun-01
	Nitrate+Nitrite as N	0.073	mg/L	0.008	19-Jun-01
	Phosphorous, Total	1.72	mg/L	0.004	27-Jun-01
Organic	Phenols	36	µg/L	2	03-Jul-01
Physicals	Solids, Total Suspended	16	mg/L	3	25-Jun-01

Field Data (01/06/10) old lagoon
Temperature: 4.0 °C
Conductivity: 424 µS
pH: 7.2 Time: 14:00

Report Date: July 5, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Cape Dorset Old Lagoon Discharge**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: June 10, 2001

Date/Time Received: N/A

Date/Time Test Start: June 19, 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: _N/A_ (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: June 19, 2001 / 03:27 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold

Date of Test: June 19, 2001

Reagent Lot #: ACV022-2

IC_{50} - 15 minutes mg/L: 2.6 mg/L

IC_{50} Confidence Range: 1.7 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 Lavalllee

Sample ID: dump **Taiga Sample ID:** 211159

Client Project: **Sample Type:** sewage **Received Date:** 14-Jun-01

Location: Cape Dorset **Sampling Date:** 10-Jun-01

Report Status: **Amended** ***Approved by:***

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Nutrients	Ammonia as N	2.41	mg/L	0.005	28-Jun-01
Organic	Oil and Grease	4.1	mg/L	0.2	21-Jun-01
Physicals	Solids, Total Suspended	12	mg/L	3	25-Jun-01
Total Metals	Arsenic	1.7	µg/L	1.0	19-Jun-01
	Cadmium	0.3	µg/L	0.3	20-Jun-01
	Chromium	<3	µg/L	3	20-Jun-01
	Cobalt	2	µg/L	1	20-Jun-01
	Copper	16	µg/L	2	20-Jun-01
	Iron	1170	µg/L	30	15-Jun-01
	Lead	3	µg/L	1	20-Jun-01
	Manganese	391	µg/L	1	20-Jun-01
	Mercury	<0.01	µg/L	0.01	21-Jun-01
	Nickel	8	µg/L	1	20-Jun-01
	Zinc	95	µg/L	10	20-Jun-01

Report Date: July 5, 2001

Field Data (01/06/10) dump
Temperature: 2.5 °C
Conductivity: 943 µS
pH: 8.3 Time: 13:25

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Cape Dorset Leachate**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: June 10 , 2001

Date/Time Received: N/A

Date/Time Test Start: June 15, 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: — (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: June 15, 2001 / 12:51 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold - EPB

Date of Test: June 15, 2001

Reagent Lot #: ACV022-2

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

IC_{50} Confidence Range: 2.3 to 5.0 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 Lavalllee

Sample ID: metal dump **Taiga Sample ID:** 211160

Client Project: **Sample Type:** sewage **Received Date:** 14-Jun-01

Location: Cape Dorset **Sampling Date:** 10-Jun-01

Report Status: **Amended** ***Approved by:***

Lab Section	Test Parameter	Result	Units	Detection Limit	Analysis Date
Total Metals	Arsenic	<1.0	µg/L	1.0	19-Jun-01
	Cadmium	0.5	µg/L	0.3	20-Jun-01
	Chromium	<3	µg/L	3	20-Jun-01
	Cobalt	<1	µg/L	1	20-Jun-01
	Copper	5	µg/L	2	20-Jun-01
	Lead	5	µg/L	1	20-Jun-01
	Manganese	31	µg/L	1	20-Jun-01
	Mercury	<0.01	µg/L	0.01	21-Jun-01
	Nickel	3	µg/L	1	20-Jun-01
	Zinc	114	µg/L	10	20-Jun-01

Field Data (01/06/10) metal dump
Temperature: 4.5 °C
Conductivity: 190 µS
pH: 7.4 Time: 14:19

Report Date: July 5, 2001

REPORT OF TOXICITY USING MICROTOX

COMPANY/LOCATION: **Cape Dorset Metal Dump**

Sample Collected By: Philippe Lavallee

Date/Time Sampled: June 10, 2001

Date/Time Received: N/A

Date/Time Test Start: June 19, 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: _N/A_ (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: June 19, 2001 / 03:34 PM

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

QUALITY CONTROL

Reference Toxicant: Zinc Sulfate Standard

Analyst: Ron Bujold

Date of Test: June 19, 2001

Reagent Lot #: ACV022-2

IC_{50} - 15 minutes mg/L: 2.6 mg/L

IC_{50} Confidence Range: 1.7 to 3.9 mg/L

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