APPENDIX B

1 - Norwest Labs QC Reports for Aug 4 and Sept 22, 2004

2 - INAC (Taiga Environmental Laboratory) 925-14 Analysis, July 14, 2004

3 - Norwest Labs Ltd. Analytical and QC Reports 2005

4 - 2005 Bioassay Results and QC Data

EP Laboratories
Ecotoxicology Laboratory
Environment Canada
5320 122 Street
Edmonton, Alberta
T6H 3S5

Report of Toxicity Testing

Using Rainbow Trout

Lupin Mines, NT

Received: June 30, 2005

Anne Wilson
Environment Canada
EPB / Northern Division
Suite 301
5204 - 50th (Franklin) Avenue
Yellowknife, Northwest Territories
X1A 1E2

File Number: 4390-9
Report Number: 01746
Sample Number: 05-00612

July 27, 2005

Authorization: Garth Elliott

Garth Elliott
Head, Ecotoxicology Laboratory

ABSTRACT

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

On June 30, 2005, EP Laboratories received 1 sample submitted by Anne Wilson, Environment Canada, EPB / Northern Division. The sample was analyzed for the following parameters:

To examine the test material to determine its toxicity to Rainbow Trout.

Deviation from "MUST" requirements: None.

Sample Not Frozen.
Receipt Temp. =10.6°C

Access to the laboratory testing area is controlled. More than one authorized analyst may have access to the sample(s).

For further information please contact: Garth Elliott, Head, Ecotoxicology Laboratory, at (780) 435-7242.

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

SAMPLE INFORMATION:

LAB SAMPLE NO. 05-00612

RESULT: <u>No Mortality at 100% Concentration.</u>

SAMPLE COLLECTED BY:	Mike Tansey
DATE/TIME SAMPLED:	June 29, 2005 09:00 h
DATE/TIME RECEIVED:	June 30, 2005 10:45 h
SAMPLE TYPE:	liquid
SAMPLE POINT:	Pond 2, Station 102.
SAMPLING METHOD:	Grab
SAMPLE CONTAINER:	6 x10L White Plastic Buckets. ~60L Total Volume.
TRANSPORTATION INFORMATION:	Arrived Via Courier.
STORAGE INFORMATION:	B048 Locked Walkin Cooler

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

TEST CONDITIONS:

SPECIES: ***Oncorhynchus mykiss***

FISH PER TEST VESSEL: 10

TEST VESSEL: 76 L Aquarium

TEST VOLUME (L): 56

SAMPLE DEPTH (cm): 31

PHOTO PERIOD: 16h Light, 8h Dark

DILUTION WATER: Treated Edmonton City Water

Fish Not Fed ~24 h Prior to Test

No sample pH adjustment required. All Tests Initiated Are Reported.

Aeration Continuous Throughout Test at: 6.5 ± 1.0 ml/min/L Measured with a flow meter.

PHYSICOCHEMICAL CONDITIONS:

SAMPLE APPEARANCE: Clear and Colourless.

INITIAL PHYSICOCHEMICAL CONDITIONS: **Just Prior to Setup**

INITIAL	TEMPERATURE (° C)	DISSOLVED OXYGEN (% saturation)	CONDUCTIVITY (µmhos/cm)	pH
100% SAMPLE	15.0	105	750	6.0

PREAERATION: (Oil-Free Compressed) at a Rate of 6.5 ± 1.0 ml/min/L for 120 minutes.

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

TEST PHYSICOCHEMICAL CONDITIONS:

TEST CONCENTRATIONS	TEMPERATURE (°C)					DISSOLVED OXYGEN (mg/L)		CONDUCTIVITY (µmhos/cm)		pH		LUX
	0 h	24 h	48 h	72 h	96 h	0 h	96 h	0 h	96 h	0 h	96 h	0 h
CONTROL	14.5	15.2	15.4	15.4	15.4	9.3	9.0	429	435	8.2	8.3	220
100%	15.0	15.0	14.9	14.9	14.8	9.4	9.1	749	764	6.4	7.0	145

TEST DATA:

TEST START DATE/TIME: June 30, 2005 15:20 h

	CUMULATIVE MORTALITY/SUBLETHAL EFFECT				
TEST CONCENTRATIONS	24 h	48 h	72 h	96 h	% MORTALITY
CONTROL	0	0	0	0	0.0
100%	0	0	0	0	0.0

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

TROUT LENGTHS AND WEIGHTS
Single Concentration

	CONTROL	CONTROL	100%	100%
	LENGTH (cm)	WEIGHT (g)	LENGTH (cm)	WEIGHT (g)
1	4.5	0.95	4.3	0.77
2	4.8	1.11	4.8	1.15
3	4.9	1.16	5.0	1.18
4	5.4	1.65	5.2	1.43
5	5.4	1.76	5.4	1.63
6	5.4	1.55	5.3	1.54
7	5.5	1.78	5.4	1.59
8	5.5	1.85	5.7	1.76
9	5.7	1.99	5.7	1.88
10	6.1	2.38	6.3	2.26
AVERAGE	5.3	1.62	5.3	1.52
STD DEV	0.5	0.44	0.5	0.42
RANGE	4.5 - 6.1	0.95 - 2.38	4.3 - 6.3	0.77 - 2.26
VOL (L)		56		56
TOT WT (g)		16.2		15.2
LOADING DENSITY (g/L)		0.3		0.3

QUALITY CONTROL RESULTS

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

TEST ORGANISM: Oncorhynchus mykiss **Rainbow Trout Fingerlings**

Source: Sun Valley Trout Farm

Lot#: SVTF042705 **Tank#: 7** **Arrival Date: April 27, 2005**

Mortality of Trout Stock 7 Days Prior to Test: 1.8%

Acclimation for >= 2 Weeks at Temp: 15°C ± 2°C

Approximate No. Of Trout Acclimated: 295

Flow of Water Through Tank (L/g of trout per day): 4.5

Litres in Tank per 10g of Trout: 6.3

CONFORMANCE: Control Mortality within Acceptable Limits.
Less Than 2% Fish Stock Mortality in 7 Days Prior to Test.
Method "Must" Requirements Followed.

QUALITY CONTROL: Reference Toxicant

Reference Toxicant: Phenol **Reference Toxicant Test # 05-0005-T**

Date of Test: June 06, 2005 **Reference Toxicant Analyst: L.M., N.K.**

LC_{50}-96 h = 9.71 ppm **95% Confidence Limits: 8.64-10.9 ppm**

HISTORIC GEOMETRIC MEAN:

LC_{50}-96 h = 11.1 ppm **Warning Limits(2SD): 9.04-13.5 ppm**

CONFORMANCE: Control Mortality within Acceptable Limits.
Reference Toxicant within Warning Limits.
Less Than 2% Fish Stock Mortality in the 7 days Prior to Test.
Method "Must" Requirements followed.

TEST ANALYST(S): **Wendy Antoniolli** **Initial:** WA

Lisa Mitchelmore **Initial:** LM

Jody Klassen **Initial:** JK

GLOSSARY

Set Name: Lupin Mines, NT
Client: Anne Wilson
Report Number: 01746 Sample Number: 05-00612

°C - degree(s) Celsius
CL - control limits
cm - centimetre(s)
cnt - count of number of colonies
d - day(s)
DO - dissolved oxygen (concentration)
EC_{50} - median effective concentration
g - gram(s)
h - hour(s)
H_20 - water
IC_{50} - 50% inhibiting concentration
LC_{50} - median lethal concentration
L - litre(s)
mg - milligram(s)
min - minute(s)
mL - millilitre(s)
mm - millimetre(s)
mS - millisiemens
NaCl - sodium chloride
N/A - non applicable
OAS - Osmotic Adjustment Solution
ppm - parts per million
TNTC - too numerous to count
µg - microgram
µmhos - micromhos
µL - microlitre
> - greater than
< - less than
≥ - greater than or equal to
≤ - less than or equal to
± - plus or minus

REFERENCES

Set Name: Lupin Mines, NT
Report Number: 01746 Sample Number: 05-00612

Client: Anne Wilson

EP Laboratories SOP# 810.0 Revision 5, for Trout Testing in Compliance with 2nd edition, December 2000: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, December 2000, EPS 1/RM/13. Single Concentration Procedure.

EP Laboratories
Ecotoxicology Laboratory
Environment Canada
5320 122 Street
Edmonton, Alberta
T6H 3S5

Report of Toxicity Testing

Using *Daphnia magna*

Lupin Mines, NT

Received: June 30, 2005

Anne Wilson
Environment Canada
EPB / Northern Division
Suite 301
5204 - 50th (Franklin) Avenue
Yellowknife, Northwest Territories
X1A 1E2

File Number: 4390-9
Report Number: 01747
Sample Number: 05-00613

July 27, 2005

Authorization: Garth Elliott

Garth Elliott
Head, Ecotoxicology Laboratory

ABSTRACT

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

On June 30, 2005, EP Laboratories received 1 sample submitted by Anne Wilson, Environment Canada, EPB / Northern Division. The sample was analyzed for the following parameters:

To examine the test material to determine its toxicity to *Daphnia magna*

There were no deviations from "MUST" requirements for this test.

Sample Not Frozen.
Receipt Temp. =10.6°C

Access to the laboratory testing area is controlled. More than one authorized analyst may have access to the sample(s).

For further information please contact: Garth Elliott, Head, Ecotoxicology Laboratory, at (780) 435-7242.

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

SAMPLE INFORMATION:

LAB SAMPLE NO. 05-00613

RESULT: **96.7 % Mortality at 100 % Concentration.**

SAMPLE COLLECTED BY:	Mike Tansey
DATE/TIME SAMPLED:	June 29, 2005 09:00 h
DATE/TIME RECEIVED:	June 30, 2005 10:45 h
SAMPLE TYPE:	liquid
SAMPLE POINT:	Pond 2, Station 102.
SAMPLING METHOD:	Grab
SAMPLE CONTAINER:	6 x 10L White Plastic Buckets. ~60L Total Volume.
TRANSPORTATION INFORMATION:	Sample arrived via courier.
STORAGE INFORMATION:	B048 Locked Walkin Cooler
STATISTICS:	N/A

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

TEST CONDITIONS:

SPECIES: ***Daphnia magna <= 24 h old***

DAPHNIA PER TEST VESSEL: 10

TEST VESSEL: 200 mL plastic container

TEST VOLUME (mL): 150

PHOTO PERIOD: 16h Light, 8h Dark **LUX:** 760

DILUTION WATER: Treated Edmonton City Water

No sample pH adjustment required. All Tests Initiated Are Reported.

PHYSICOCHEMICAL CONDITIONS:

SAMPLE APPEARANCE: Clear and colourless.

INITIAL PHYSICOCHEMICAL CONDITIONS: **Just Prior to Setup**

INITIAL	TEMPERATURE (° C)	DISSOLVED OXYGEN (%saturation)	CONDUCTIVITY (µmhos/cm)	pH	Hardness (mg/L as CaCO3)
100 % SAMPLE	20.0	101	753	6.1	198

PREAERATION: (Oil-Free Compressed) at a Rate of 25-50 ml/min/L for 15 minutes.

REPORT OF TOXICITY TESTING

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

TEST PHYSICOCHEMICAL CONDITIONS:

TEST	TEMPERATURE (°C)		DISSOLVED OXYGEN (mg/L)		CONDUCTIVITY (µmhos/cm)		pH		HARDNESS (mg/L as CaCO3)
CONCENTRATIONS	0 h	48 h	0 h	48 h	0 h	48 h	0 h	48 h	0 h
CONTROL A	20.4	21.5	8.4	7.6	426	423	8.2	8.1	143
CONTROL B	20.3	21.8	8.4	7.7	427	424	8.3	8.3	143
CONTROL C	20.3	21.8	8.4	7.7	427	424	8.3	8.3	143
100% A	20.1	21.6	8.3	7.6	746	745	7.1	6.4	198
100% B	20.5	21.6	8.3	7.7	753	751	6.6	6.6	198
100% C	20.1	21.7	8.3	7.7	752	752	6.6	6.7	198

TEST DATA:

TEST START DATE/TIME: June 30, 2005 15:25 h

	CUMULATIVE MORTALITY/SUBLETHAL EFFECT			
TEST CONCENTRATION	24 h # observed/immobile	48 h # observed/immobile/dead	% IMMOBILE	% MORTALITY
CONTROL A	10/0	10/0/0	0.0	0.0
CONTROL B	10/0	10/0/0	0.0	0.0
CONTROL C	10/0	10/0/0	0.0	0.0
100% A	10/8	10/9/9	90.0	90.0
100% B	10/10	10/10/10	100	100.0
100% C	10/10	10/10/10	100	100.0

Overall Results

Mean % Immobilized = 29/30 = 96.7 %

Mean % Dead = 29/30 = 96.7 %

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

TEST ORGANISM: Daphnia magna <= 24 h old

Stock neonates used for Testing: J Neonates - June 3, 2005

Most Recent Estimate of Time to First Brood: 7.3 days

Average Neonates per Brood: 28.5

Frequency of ephippia from Adults of Neonates: None

Mortality in Brood Stock 7 days prior to test: 1.2%

Any special handling during test: Checked under microscope to confirm mortality.

CONFORMANCE: Control Mortality within Acceptable Limits.
Ephippia must not be Present in the Culture.
Less Than 25% of Brood Stock Mortality in the 7 days prior to a Test.
Method "Must" Requirements Followed.

QUALITY CONTROL: Reference Toxicant

Reference Toxicant: Sodium Chloride

Reference Toxicant Test # 05-0008-D

Date of Test: June 28, 2005

Reference Toxicant Analyst: C.L.H, L.M.

LC_{50}-48 h = 5,920 ppm

95% Confidence Limits: 5,640 ppm - 6,210 ppm

HISTORIC GEOMETRIC MEAN:

LC_{50}-48 h = 6,000 ppm

Warning Limits(2SD): 5,560 ppm - 6,480 ppm

CONFORMANCE: Control Mortality within Acceptable Limits.
Ephippia must not be Present in the Culture.
Less Than 25% of Brood Stock Mortality in the 7 days prior to a Test.
Method "Must" Requirements Followed.

TEST ANALYST(S): **Jody Klassen** **Initial:** JK

Christi Horne **Initial:** ChA

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

°C - degree(s) Celsius
CL - control limits
cm - centimetre(s)
cnt - count of number of colonies
d - day(s)
DO - dissolved oxygen (concentration)
EC_{50} - median effective concentration
g - gram(s)
h - hour(s)
H_20 - water
IC_{50} - 50% inhibiting concentration
LC_{50} - median lethal concentration
L - litre(s)
mg - milligram(s)
min - minute(s)
mL - millilitre(s)
mm - millimetre(s)
mS - millisiemens
NaCl - sodium chloride
N/A - non applicable
OAS - Osmotic Adjustment Solution
ppm - parts per million
TNTC - too numerous to count
µg - microgram
µmhos - micromhos
µL - microlitre
> - greater than
< - less than
≥ - greater than or equal to
≤ - less than or equal to
± - plus or minus

REFERENCES

Set Name: Lupin Mines, NT
Report Number: 01747 Sample Number: 05-00613

Client: Anne Wilson

EP Laboratories SOP# 820.0 Revision 4, for *Daphnia magna* Testing in Compliance with 2nd edition, December 2000: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna,* December 2000, EPS 1/RM/14. Single Concentration Procedure.

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122

Client

Client: Norwest Labs
Address: 7217 Roper Road
City: Edmonton
Country: Canada
Billing: Lot # 398418
Tel: 780-438-5522

Operation: Edmonton
Prov./State: Alberta
Postal/ZIP Code: T6B 3J4
Contact: Linda LeGroix/ Darlene Lintott
Fax: 780-438-0396

Sample

type: water method: grab
collected: 2005/07/27 at not given by not given
shipped: 2005/07/27 by First Air/Air Canada
received: 2005/07/29 at 1100 by L.Fantin
signed-in: 2005/07/29 at 1100 by L.Fantin
container: 12 x 10L containers - containers composited and split for testing
seals present: no initials on seals no sample condition good
storage: 4 ± 2°C in darkness initial temperature (°C) 23
Samples are disposed following Supporting Work Instruction 4.3.1.4.3

Physical and Chemical Measurements at Sample Receipt

lab code	-1
client code	398418

water/effluent/pore water

pH	7.1
EC (uS/cm)	868
DO (mg/L)	7.3
temp (°C)	22
alkalinity	not done
hardness	157
NH4 (mg/L)	not done
TRC (mg/L)	not done
colour	clear
odour	odourless

soil/sediment

moisture (%)	na
sand:silt:clay	na
TOC (%)	na

Test Log

type	TR-S	DA-S	LM-D	AG-D	CD-D	FM-D
number	20053127	20053126	20053129	20053130	20053128	20053131
started	2005/07/29	2005/07/29	2005/07/30	2005/07/29	2005/07/29	2005/07/29
ended	2005/08/02	2005/07/31	2005/08/06	2005/08/01	2005/08/05	2005/08/05
reported	2005/08/15	2005/08/15	2005/08/15	2005/08/15	2005/08/15	2005/08/15
faxed	2005/08/03	2005/08/01	na	na	na	na

Notes: D, definitive; S, single treatment; EC, electrical conductivity; DO, dissolved oxygen; TRC, total residual chlorine; TOC, total organic carbon; na, not applicable

HydroQual Laboratories Ltd.

#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client: NOR239	Sample: 20051122	Test: 20053126

Method Reference: *Daphnia* 48h Static Acute Test (undiluted sample plus a control) (HQ 4.4.3.1)
Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 1990. Environ. Can., EPS 1/RM/14. (amended 1996 and 2000)

Client: Norwest Labs Operation: Edmonton

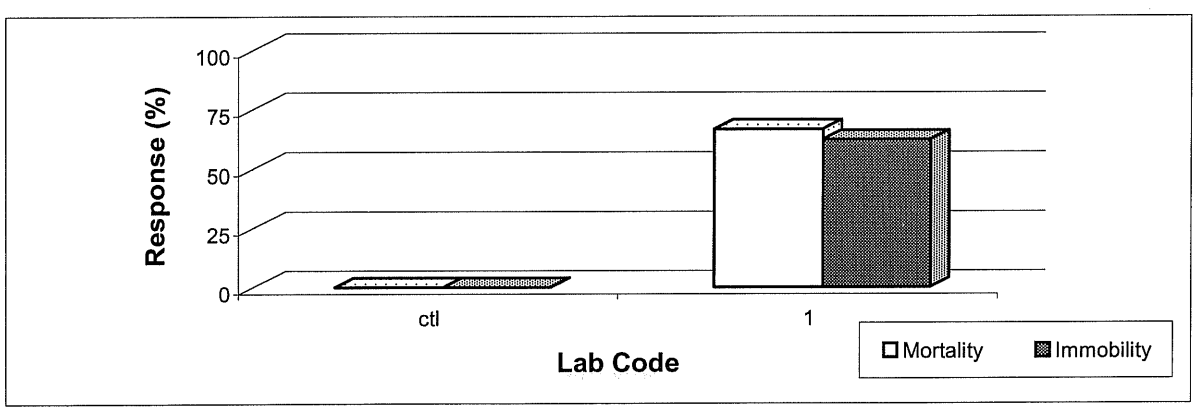
Sample:
description: 398418, location 925-10
collected: 2005/07/27 at not given by not given
received: 2005/07/29 at 1100 by L.Fantin

Test:
started: 2005/07/29 at 1300 by L. Fantin
ended: 2005/07/31 at 1050 by K. de Windt
reported: 2005/08/15 by G. Diaz

Result:

Lab Code	Client Code	Mortality (%) mean	sd	cv(%)	Immobility (%) mean	sd	cv(%)	Comment
ctl	lab control	0	0	0	0	0	0	
1	398418	67	15	23	62	21	33	toxic as tested

Notes: sd, sample standard deviation; cv, coefficient of variance
Mortality is calculated as percent of total daphnids per treatment at test initiation
Immobility is calculated as percent of live daphnids on day 2



HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client:	NOR239	Sample:	20051122	Test:	20053126

Day	Time	Technician	Comment/Observation
0	1300	L. Fantin	Test *Daphnia* appear normal.
1	1300	K. de Windt	Test *Daphnia* appear normal.
2	1050	K. de Windt	Test *Daphnia* appear normal.

lab code	ctl			1		
replicate	a	b	c	a	b	c
day	**pH (units)**					
0	8.4	8.4	8.4	7.3	7.3	7.3
2	8.4	8.5	8.5	7.3	7.3	7.4
	EC (uS/cm)					
0	423	423	423	902	902	902
2	417	401	398	880	891	886
	DO (mg/L)					
0	8.1	8.1	8.1	7.9	7.9	7.9
2	7.8	7.9	7.8	7.6	7.7	7.7
	Temperature (°C)					
0	19	19	19	21	21	21
2	19	20	20	20	20	20
	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)					
1	10	10	10	10(3I)	10(1D,5I)	12(1I)
2	10	10	10	2(2I)	3 (2I)	5(1I)

Notes: EC, electrical conductivity; DO, dissolved oxygen; nd, not done; na, not applicable

Comments:

Organism: <24 h old *Daphnia magna;* in-house culture; mortality 7 days before test (%): 13
Culture's time to first brood (d): 9 Brood size (neonates per brood): 26
Adjustments prior to testing: pH: none hardness (mg CaCO3/L): none
The duration of pre-aeration, at a rate of 37.5 ± 12.5 mL/min·L^{-1}, was (min): 0
The hardness of the lab dilution water was (mg $CaCO_3$/L): 161
The test was conducted in 385 mL plastic vessels containing 150 mL of test solution and ten daphnids (loading density of 15 mL per daphnid or neonate).
One of the 100% test vessels was loaded with 12 neonates.

The test data and results are verified correct. K. Steele

Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client: NOR239	Sample: 20051122	Test: 20053127

Method Trout 96h Static Acute Test (undiluted sample plus a control) (HQ 4.4.4.1)
Reference: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environ. Can., EPS 1/RM/13. (amended 1996 and 2000)

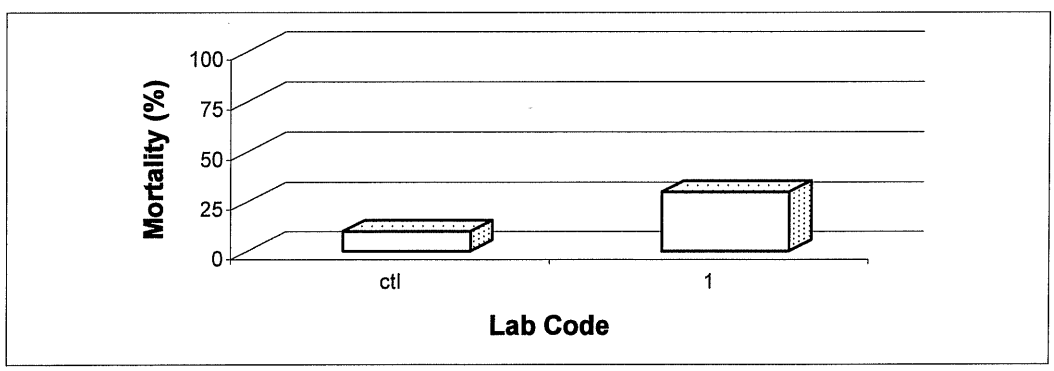
Client: Norwest Labs Operation: Edmonton

Sample:
description: 398418, location 925-10
collected: 2005/07/27 at not given by not given
received: 2005/07/29 at 1100 by L.Fantin

Test:
started: 2005/07/29 at 1600 by L.Fantin/A.Corbett
ended: 2005/08/02 at 1600 by L.Fantin/A.Corbett
reported: 2005/08/15 by G. Diaz

Result:

Lab Code	Client Code	Mortality (%)	Comment
ctl	lab control	10	
1	398418	30	not toxic as tested



HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client:	NOR239	Sample:	20051122	Test:	20053127

Day	Time	Technician	Comment/Observation
0	1600	L.Fantin/A.Corbett	test fish loaded at 1600 h
1	1330	K.Steele/M.Luong	all test fish appear normal
2	1030	K. de Windt/M.Luong	all test fish appear normal
3	1415	K.Steele/M.Luong	all test fish appear normal
4	1600	L.Fantin/A.Corbett	all test fish appear normal

Preaeration (6.5 mL/min/L)	0.5	1.0	1.5	2 (h)
DO (mg/L)	8.5			

lab code	ctl	1						

day								
	pH (units)							
0	8.0	6.8						
1	8.4	7.0						
2	8.4	7.4						
3	8.4	7.1						
4	8.3	7.3						
	EC (uS/cm)							
0	415	938						
1	395	877						
2	391	882						
3	401	885						
4	380	884						
	DO (mg/L)							
0	8.5	8.5						
1	8.3	8.4						
2	8.4	8.2						
3	8.4	8.6						
4	8.5	8.7						
	Temperature (°C)							
0	16	16						
1	16	16						
2	16	16						
3	16	16						
4	16	16						
	Number Alive							
0	10	10						
1	10	8						
2	10	8						
3	10	7						
4	9	7						
	Mortality (%)							
	10	30						

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client:	NOR239	Sample:	20051122	Test:	20053127

Control Fish	Length (cm)	Weight (g)
1	3.1	0.2
2	3.6	0.3
3	3.5	0.4
4	3.2	0.2
5	3.2	0.2
6	3.2	0.2
7	3.4	0.3
8	3.3	0.2
9	3.2	0.2
10	3.6	0.3
average	3.3	0.3
sd	0.2	0.1
cv(%)	5.5	22.7

Lab Code	Group Weight (g)
ctl	2.7
1	2.8

Ammonium (mg NH_4^+-N/L) initial	final
0.2	0.6
2.5	2.7

Test Information

Organism: *Oncorhynchus mykiss* from Trout Lodge Inc.
Age and condition: The fish were held 14 days before testing (batch 20050714TR).

Conditions

The test volume was: 20 (L)
The test was conducted in 22 L plastic pails with polyethylene liners.
One replicate per treatment.
Ten fish per replicate with a loading density of: 0.1 (g/L)
Stock mortality 7 days prior to testing: 0.1 (%)
All treatments aerated at: 6.5 (±1 mL/min/L)
The sample was not pH adjusted.

Comments

none

The test data and results are verified correct. K. Steele
Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.

#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122	Test:	20053128

Method: *Ceriodaphnia* Survival and Reproduction Test (five treatments plus a control) (HQ 4.4.3.2)
reference: Biological Test Method: Test of Reproduction and Survival Using the Cladoceran *Ceriodaphnia dubia*, 1992. Environ.Can., EPS 1/RM/21. (amended November, 1997)

Client: Norwest Labs Operation: Edmonton

Sample:
description: 398418, location 925-10
collected: 2005/07/27 at not given by not given
received: 2005/07/29 at 1100 by L.Fantin

Test:
started: 2005/07/29 at 1200 by B. Denny
ended: 2005/08/05 at 1200 by B. Denny
reported: 2005/08/15 by G.Diaz

Result:

	Endpoint	Value	Confidence Limits	Units	Method Calculated
Acute: (mortality)	LC25	>100		%	estimated
	LC50	>100		%	estimated
	NOEC	100		%	estimated
	LOEC	> 100		%	estimated
	MSD	could not be calculated		ceriodaphnid	
Chronic: (fecundity)	IC25	>100		%	estimated
	IC50	>100		%	estimated
	NOEC	100		%	estimated
	LOEC	>100		%	estimated
	MSD	could not be calculated		young	

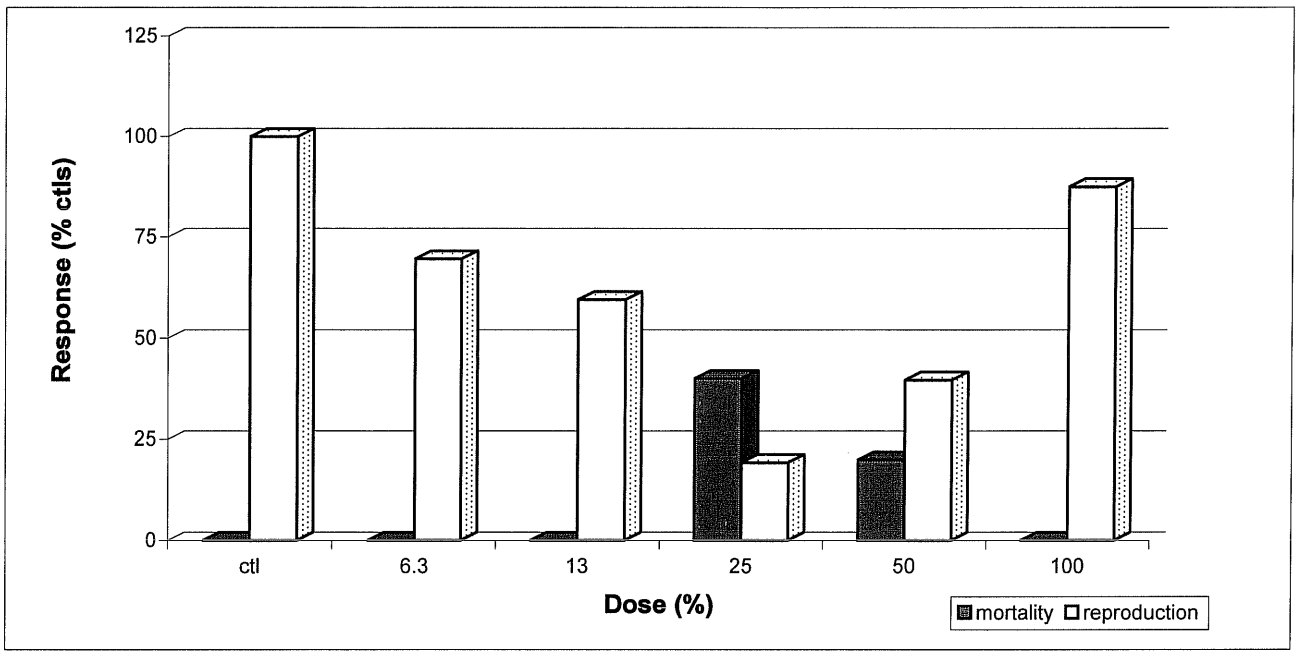
Notes: LCx & ICx, concentrations lethal or inhibitory to 'x' percent of the test population; NOEC & LOEC, no and lowest observed effect concentrations; fecundity, reproduction as the number of young produced

Comments: The test results are plotted on page 2 of the report.
No unusual behaviour, appearance, or treatment of the test organisms was noted prior to or during the conduct of the test. All test organisms came from a brood source that are all the same age.
The numbers in bold print under the "Biology (#, young produced . . .) section refers to the number of young the test organism had the day it died.
Our liability is limited to the cost of the test requested. No liability is assumed for the application and or interpretation of the test results.

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122	Test:	20053128



Test Design

Organism: *Ceriodaphnia dubia* Source: in-house cultures Age: <24 h; released within 12 h
The number of young produced by each brood organism in the last complete brood before use was 7
No ephippia were noted in the cultures 7 days before test initiation. Culture mortality wa 0%
during this period and the mean number of surviving young per adult was 15
The dilution water was a mixture of moderately hard reconstituted water and Bow River Water (50:50).
Chemicals added to dilution water: 0.96 g $NaHCO_3$, 0.60 g $CaSO_4$, 0.60 g $MgSO_4$, 0.04 g KCl per 20L
The tests were conducted in 30 mL plastic vessels containing 15 mL of solution (2cm depth).
The test organisms were fed daily a mixture of fermented trout chow, yeast, alfalfa powder, and the green alga *Raphidocelis subcapitata*. food expiration: 2005/07/30, 2005/08/14

Sample Information

The test was conducted with three subsamples. Samples a, b, and c were for days 0 to 2, 3 to 4, and 5 to 7.
The sample was not aerated, filtered or pH adjusted prior to testing or during testing.
The dissolved oxygen concentration (mg/L) was 7.1 The sample pH was 7.0

Test Log

Date	Day	Time	Technicians	Comments
2005/07/29	0	1200	B. Denny	Test *Ceriodaphnia* appear normal.
2005/07/30	1	1230	K. de Windt	Test *Ceriodaphnia* appear normal.
2005/07/31	2	0915	K. de Windt	Test *Ceriodaphnia* appear normal.
2005/08/01	3	1130	K. de Windt	Test *Ceriodaphnia* appear normal.
2005/08/02	4	1145	B. Denny	Test *Ceriodaphnia* appear normal.
2005/08/03	5	1045	B. Denny	Test *Ceriodaphnia* appear normal.
2005/08/04	6	1115	B. Denny	Test *Ceriodaphnia* appear normal.
2005/08/05	7	1200	B. Denny	Test *Ceriodaphnia* appear normal.

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client: NOR239	Sample: 20051122	Test: 20053128

Chemistry

New Solutions

Dose (%) / day	ctl	6.3	13	25	50	100	
				pH (units)			
0	8.3	8.3	8.3	8.2	8.0	7.0	
1	8.5	8.5	8.5	8.4	8.2	7.5	
2	8.4	8.4	8.3	8.3	8.1	7.7	
3	8.4	8.4	8.3	8.2	8.1	7.1	
4	8.4	8.4	8.3	8.3	8.1	7.3	
5	8.3	8.3	8.3	8.2	8.0	7.2	
6	8.3	8.3	8.3	8.2	8.0	7.3	
7							
8							
				conductance (uS/cm)			
0	378	397	429	497	628	877	
1	367	381	408	476	605	840	
2	371	385	415	480	613	858	
3	365	384	416	477	597	857	
4	353	379	410	479	603	851	
5	364	397	420	491	620	863	
6	382	407	430	496	630	880	
7							
8							
				dissolved oxygen (mg/L)			
0	7.1	7.1	7.1	7.1	7.1	7.1	
1	6.8	6.9	7.0	7.0	7.1	7.1	
2	7.1	7.1	7.1	7.1	7.1	7.1	
3	7.3	7.3	7.3	7.2	7.3	7.4	
4	7.0	7.0	7.0	7.0	7.0	7.0	
5	7.3	7.3	7.3	7.3	7.3	7.3	
6	7.4	7.3	7.3	7.3	7.3	7.3	
7							
8							
				temperature (°C)			
0	25	25	25	25	25	25	
1	25	25	25	25	25	25	
2	25	25	25	25	25	25	
3	25	25	25	25	25	25	
4	25	25	25	25	25	25	
5	25	25	25	25	25	25	
6	25	25	25	25	25	25	
7							
8							

Old Solutions

ctl	6.3	13	25	50	100	
			pH (units)			
8.4	8.4	8.3	8.2	8.1	7.4	
8.3	8.3	8.3	8.2	8.1	7.7	
8.3	8.2	8.2	8.2	8.1	7.4	
8.2	8.3	8.2	8.2	8.1	7.5	
8.3	8.2	8.2	8.2	8.1	7.3	
8.3	8.2	8.2	8.2	8.1	7.4	
8.3	8.2	8.2	8.2	8.0	7.5	
			conductance (uS/cm)			
375	438	443	499	631	890	
368	415	432	494	634	886	
370	401	439	500	640	887	
364	393	423	489	635	885	
380	418	448	512	652	892	
377	412	435	508	655	900	
380	410	432	506	646	880	
			dissolved oxygen (mg/L)			
6.5	6.6	6.5	6.4	6.6	6.5	
6.7	6.7	6.7	6.7	6.8	6.8	
6.9	6.9	6.9	7.0	7.0	7.0	
6.4	6.4	6.4	6.6	6.7	6.8	
6.9	6.9	6.9	6.9	6.9	6.9	
6.9	6.9	6.9	6.9	6.9	6.9	
6.8	6.8	6.8	6.8	6.8	6.8	
			temperature (°C)			
25	25	25	25	25	25	
25	25	25	25	25	25	
25	25	25	25	25	25	
25	25	25	25	25	25	
25	25	25	25	25	25	
25	25	25	25	25	25	
24	24	24	24	24	24	

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data | Client: NOR239 | Sample: 20051122 | Test: 20053128

Biology (#, young produced; 0, no young; blank, dead)

Dose (%)	ctl	6.3	13	25	50	100		ctl	6.3	13	25	50	100	
replicate	day 1							day 5						
1	0	0	0	0	0	0		6	6	0			0	
2	0	0	0	0	0	0		7	6	6		2	5	
3	0	0	0	0	0	0		6	0	5	0	3	6	
4	0	0	0	0	0	0		0	0	6		3	7	
5	0	0	0	0	0	0		7	5	0	0	0	6	
6	0	0	0	0	0	0		0	0	0	0	2	0	
7	0	0	0	0	0	0		7	5	0	0	2	6	
8	0	0	0	0	0	0		6	5	6	3	0	0	
9	0	0	0	0	0	0		7	0	5		0	5	
10	0	0	0	0	0	0		0	6	0	0		6	
	day 2							day 6						
1	0	0	0		0	0		0	7	4			6	
2	0	0	0		0	0		0	0	0		5	7	
3	0	0	0	0	0	0		8	6	8	4	6	0	
4	0	0	0	0	0	0		8	7	7		5	8	
5	0	0	0	0	0	0		10	0	0	0	3	8	
6	0	0	0	0	0	0		6	6	6	4	0	6	
7	0	0	0	0	0	0		8	0	5	0	0	0	
8	0	0	0	0	0	0		9	0	0	0	0	0	
9	0	0	0	0	0	0		0	6	0		0	7	
10	0	0	0	0	0	0		7	0	0	3		0	
	day 3							day 7						
1	0	0	0			0		9	0	6			9	
2	0	0	0		0	0		9	8	8		0	9	
3	0	0	0	0	0	0		10	8	0	0	8	10	
4	0	0	0		0	1		9	9	0		9	0	
5	0	0	0	0	0	0		0	10	0	5	9	10	
6	0	0	0	0	0	0		8	0	8	6	6	9	
7	0	0	0	0	0	0		10	7	0	4	5	8	
8	0	0	0	0	0	0		9	8	8	5	6	9	
9	0	0	0		0	0		9	0	9		8	10	
10	0	0	0	0	0	0		0	9	9	6		10	
	day 4							day 8						
1	4	2	0			2								
2	4	3	2		0	0								
3	3	3	3	0	0	2								
4	3	3	3		0	0								
5	3	2	2	0	0	0								
6	3	0	0	0	0	2								
7	4	2	3	0	0	0								
8	3	2	2	0	0	3								
9	2	3	2		0	2								
10	3	0	0	0		2								

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Summary Tables

Client: NOR239	Sample: 20051122	Test: 20053128

Biology

Mortality (%)

Dose (%) / day	ctl	6.3	13	25	50	100	
0	0	0	0	0	0	0	
1	0	0	0	0	0	0	
2	0	0	0	20	0	0	
3	0	0	0	40	10	0	
4	0	0	0	40	20	0	
5	0	0	0	40	20	0	
6	0	0	0	40	20	0	
7	0	0	0	40	20	0	
8							
totals	0	0	0	40	20	0	

Daily Young Production

ctl	6.3	13	25	50	100	
0	0	0	0	0	0	
0	0	0	0	0	0	
0	0	0	0	0	0	
0	0	0	0	0	1	
32	20	17	0	0	13	
46	33	28	3	12	41	
56	32	30	11	19	42	
73	59	48	26	51	84	
207	144	123	40	82	181	

average young per adult

21	14	12	4	8	18	

young production as a percent of controls

100	70	59	19	40	87	

Total Young Produced by Each Adult

replicate						
1	19	15	10	0	0	17
2	20	17	16	0	7	21
3	27	17	16	4	17	18
4	20	19	16	0	17	16
5	20	17	2	5	12	24
6	17	6	14	10	8	17
7	29	14	8	4	7	14
8	27	15	16	8	6	12
9	18	9	16	0	8	24
10	10	15	9	9	0	18

Chemistry

New Solutions

Dose (%)	ctl	6.25	12.5	25	50	100	

Old Solutions

ctl	6.25	12.5	25	50	100	

Average Values

pH	8.4	8.4	8.3	8.3	8.1	7.3	
EC	369	390	418	485	614	861	
DO	7.1	7.1	7.2	7.1	7.2	7.2	
temp	25	25	25	25	25	25	

pH	8.3	8.3	8.2	8.2	8.1	7.5	
EC	373	412	436	501	642	889	
DO	6.7	6.7	6.7	6.8	6.8	6.8	
temp	25	25	25	25	25	25	

Variance (%)

pH	1	1	1	1	1	3	
EC	3	3	2	2	2	2	
DO	3	2	2	2	2	2	
temp	0	0	0	0	0	0	

pH	1	1	1	0	0	2	
EC	2	3	2	2	1	1	
DO	3	3	3	3	2	2	
temp	2	2	2	2	2	2	

The test data and results are verified correct. K. Steele

Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client: NOR239	Sample: 20051122	Test: 20053129

Method Reference: *Lemna* 7d Static Acute Test (five treatments plus a control) (HQ 4.4.2.3)
Biological Test Method: Test for Measuring the Inhibition of Growth Using the Freshwater Macrophyte, Lemna minor, 1999. Environment Canada, EPS 1/RM/37.

Client: Norwest Labs Operation: Edmonton

Sample:
description: 398418, location 925-10
collected: 2005/07/27 at not given by not given
received: 2005/07/29 at 1100 by L.Fantin

Test:
started: 2005/07/30 at 1330 by K. de Windt
ended: 2005/08/06 at 1130 by B. Denny
reported: 2005/08/15 by G. Diaz

Result:

	Endpoint	Value	Confidence Limits		Units	Method Calculated
Chronic:	IC25	<6.1			%	Linear Interpolation
(frond #)	IC50	24	could not be calculated		%	Linear Interpolation
	NOEC	<6.1			%	Dunnett's
	LOEC	6.1			%	Dunnett's
	MSD	4.6			fronds	Dunnett's
Chronic:	IC25	10	3.5	71	%	Linear Interpolation
(biomass)	IC50	>97			%	Linear Interpolation
	NOEC	6.1			%	estimated
	LOEC	12			%	estimated
	MSD	could not be calculated			mg	estimated

Notes: ICx, concentrations lethal or inhibitory to 'x' percent of the test population; NOEC & LOEC, no and lowest observed effect concentrations; MSD, minimum significant difference

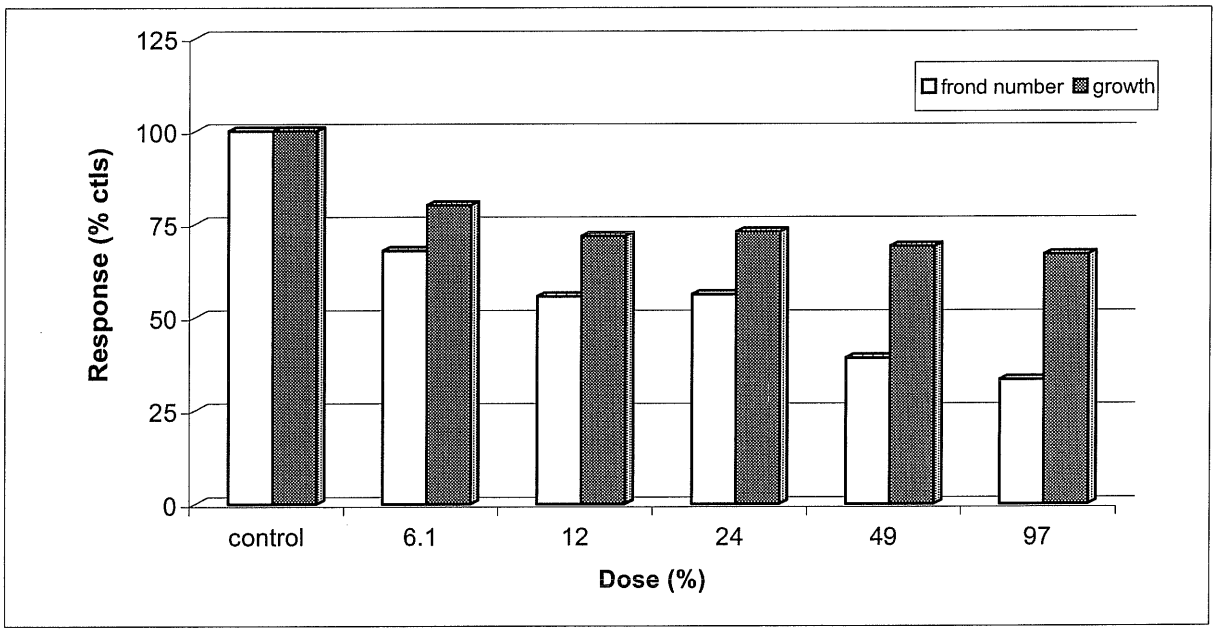
Comments:

No unusual behaviour or appearance or treatment of test organisms was noted prior to testing or during testing. There was not growth stimulation observed during the test. Only three replicates were weighted in the 49% concentration.

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client: NOR239	Sample: 20051122	Test: 20053129



Test Information

Organism: The test organism was Lemna minor from in-house cultures. It was originally obtained from the University of Toronto Culture Collection (492). The fronds were acclimated in test media for 24 h prior to test initiation.The test culture was axenic prior to testing.
The fronds are 9 days old at test initiation.
The mean increase in frond number of culture over last 7 days: 25 fold increase: 8

Test Design: The test was a static test conducted in 200 mL polyethylene plastic containers with clear lids. The test volume was 150 mL. There were four replicates per treatment. The test was initiated with two 3 frond daughter plants per replicate.

Test Media: The test media was deionized water spiked with nutrients (Environment Canada EPS 1/RM/37, 1999). No other chemicals were added to the test media. The media aerated for two hours and pH adjusted to 8.3±0.1 with 6N HCl or NaOH. The test media was not filtered. The control and dilution water was test media.

					Temperature (°C)		
Date	Day	Time	Technicians	Rotate	Control	24%	97%
2005/07/30	0	1330	K. de Windt	na	25	25	25
2005/07/31	1	0850	M. Luong	yes	25	25	25
2005/08/01	2	0900	M. Luong	yes	25	25	25
2005/08/02	3	0900	C.A. Martens	yes	25	25	25
2005/08/03	4	0800	C.A. Martens	yes	25	25	25
2005/08/04	5	0830	C.A. Martens	yes	25	25	25
2005/08/05	6	0820	C.A. Martens	yes	25	25	25
2005/08/06	7	1130	B. Denny	na	24	24	24

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client:	NOR239	Sample:	20051122	Test:	20053129

Biology

Frond Number

	replicate	Dose (%) control	6.1	12	24	49	97	
day 0	a	6	6	6	6	6	6	
	b	6	6	6	6	6	6	
	c	6	6	6	6	6	6	
	d	6	6	6	6	6	6	
day 7	a	51	34	31	26	25	16	
	b	54	36	27	31	16	19	
	c	48	30	28	29	20	16	
	d	52	39	28	29	19	17	
	average	51	35	29	29	20	17	
	sd	3	4	2	2	4	1	
	cv	5	11	6	7	19	8	
	% ctls	100	68	56	56	39	33	

Dry Weights (mg)

day 7	a	3.8	2.8	3.2	2.9	not done	3.0	
	b	4.2	3.5	2.6	2.7	2.6	2.3	
	c	3.9	2.9	3.2	3.4	3.1	2.6	
	d	4.1	3.7	2.6	2.8	2.6	2.9	
	average	4.0	3.2	2.9	2.9	2.8	2.7	
	sd	0.2	0.4	0.3	0.3	0.3	0.3	
	cv	5	13	11	11	12	11	
	%ctls	100	80	72	73	69	67	

Chemistry

day 0	pH	8.2	8.1	8.1	8.1	8.2	8.2	
	EC	951	908	945	10.5	1209	1556	
	DO	7.3	7.2	7.3	7.3	7.3	7.3	
	temp	23	23	23	23	23	23	
day 7	pH	8.4	8.8	8.8	9.0	8.9	8.8	
	EC	915	931	965	1076	1340	1624	
	DO	7.3	8.3	8.2	9	8.4	8.3	
	temp	24	24	24	24	24	24	

Notes: pH, units; EC, electrical conductance (uS/cm); DO, dissolved oxygen (mg/L); temp, temperature (°C); sd, standard deviation; cv, coefficient of variance; %ctls, percent of controls

HydroQual Laboratories Ltd.

#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client: NOR239	Sample: 20051122	Test: 20053129

Comments (day 7)

Dose	
control	light green, long roots
6.1	light green, long roots
12	light green, medium roots, slight gib, slight chl
24	light green, medium roots,slight chl
49	light green, short roots, slight chl
97	light green, short roots, slight chl

Notes: chl, chlorotic; nec, necrotic; asf, abnormally sized fronds; gib, gibbosity; cd, colony destroyed; rd, roots destroyed; lb, loss of bouyancy

Comments

The effluent was spiked with nutrients (Environment Canada EPS 1/RM/37, 1999).
The sample was not pH adjusted or filtered prior to testing.
The sample was pre-aerated for at least 20 minutes with oil free filtered compressed air from a 1 mL glass pipette attached to an air pump at a rate of 2-3 bubbles per second.
Date of effluent preparation: 2005/07/30

The light levels (lux) were measured at the sample surface, at three locations on the testing bench, during testing:

left: 4465 center: 4750 right: 4465

The mean number of fronds in the controls have increased b 9 fold.

The test data and results are verified correct. K. Steele

Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122	Test:	20053130

Method: 72h Algal Growth Inhibition Test (HQ 4.4.2.7)
reference: Biological Test Method: Growth Inhibition Test Using the Freshwater Alga *Selenastrum capricornutum*, 1992. Environment Canada, EPS 1/RM/25. (ammended November 1997)

Client: Norwest Labs Operation: Edmonton

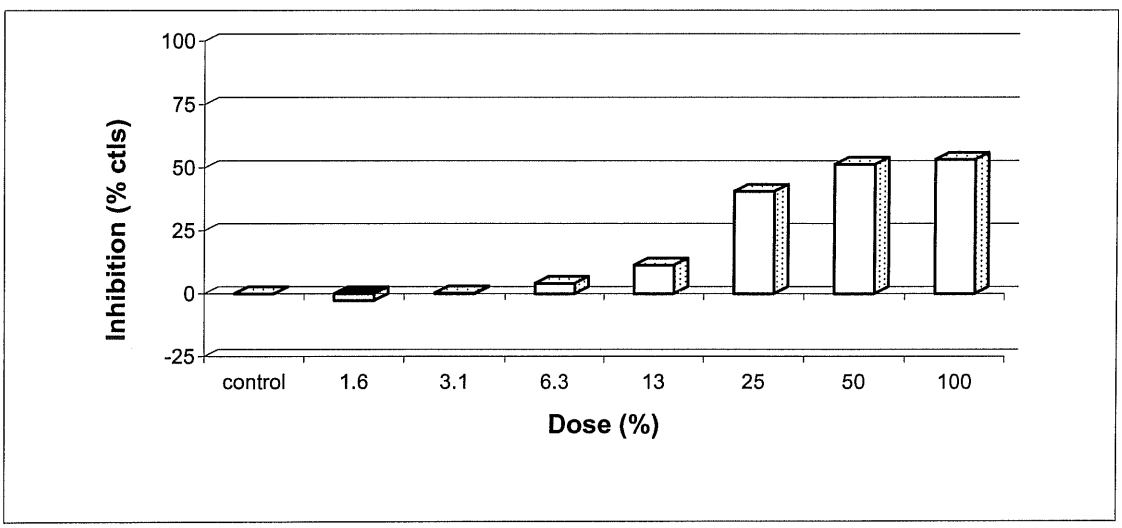
Sample:
description: 398418, location 925-10
collected: 2005/07/27 at not given by not given
received: 2005/07/29 at 1100 by L.Fantin

Test:
started: 2005/07/29 at 1430 by K. de Windt
ended: 2005/08/01 at 1315 by K. de Windt
reported: 2005/08/15 by G. Diaz

Result:

Endpoint	Value	Confidence Limits		Units	Method Calculated
IC25	17	15	19	%	Linear Interpolation
IC50	44	35	53	%	Linear Interpolation
NOEC	13			%	estimated
LOEC	25			%	estimated

Notes: ICx, concentrations inhibiting growth by 'x' percent relative to controls; NOEC & LOEC, no and lowest observed effect concentrations; MSD, minimum significant difference; cv, coefficient of variance (%); sd, standard deviation



HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client:	NOR239	Sample:	20051122	Test:	20053130

Sample Pretreatment:

pH adjustment	not required	preaeration	not required
turbidity	100 mL filtered through a 0.45um membrane filter		
other	sample spiked with nutrients as required by the method; no other chemicals added		

Final Cell Densities ($x10^3$ / mL)

Dose (%)	Plate a	Plate b	Plate c	Average	sd	cv (%)	Percent Controls	Inhibition (%)
control	461	438	427	442	17	4	100	0
1.6	479	450	434	454	23	5	103	-3
3.1	466	435	421	441	23	5	100	0
6.3	430	424	418	424	6	1	96	4
13	410	384	383	392	15	4	89	11
25	266	270	253	263	9	3	59	41
50	215	210	220	215	5	2	49	51
100	201	213	205	206	6	3	47	53

Note: The final cell densities for the controls are an average of 10 replicate well reading per plate. The final cell densities for each dose is an average of 5 replicate well readings per plate.

Comments

The test was conducted in 96 well microplates. Three replicate plates were run (a, b and c). On each plate 220 uL of sample was plated in 5 replicate wells per dose and 10 replicate wells per control.
The test species was *Raphidocelis subcapitata* (formerly *Selenastrum capricornutum*).
The test was started with 7 day old, exponentially growing cells from in-house cultures.
The plates were incubated under continuous light (4,000 lux).

Inoculum (cells/mL)	
a	10400
b	10600
c	11000
mean	10667
cv (%)	3

Daily Temperature	
0	25
1	25
2	25
3	25
mean	25
cv (%)	0

control pH: initial
final

100% pH: initial

Dose (%)	Absorbance (430nm)	Direct Cell Counts (/0.5mL)
ctl-a	0.14	6850
12.5-a	0.12	5700
100-a	0.06	1100
ctl-b	0.13	5550
12.5-b	0.11	4750
100-b	0.06	1300
ctl-c	0.13	5100
12.5-c	0.11	4750
100-c	0.06	1350

Final cell densities were determined from the absorbance at 430 nm calibrated against cell counts.
The conversion factor for absorbance to cells per millilitre was 3398 with a cv of 34 %
Control growth was a 41 fold increase over the inoculum with a cv of 4 %
No significant stimulatory or inhibitory trends were detected by Mann-Kendall Trend analysis (p=0.05).

The test data and results are verified correct.

K. Steele

Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.

#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122	Test:	20053131

Method: 7 d Fathead Minnow Survival and Growth Test (five treatments plus a control) (HQ 4.4.4.6)
reference: Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnow, 1992. Environment Canada, EPS 1/RM/22. (ammended 1997)

Client: Norwest Labs Operation: Edmonton

Sample:

description:	398418, location 925-10				
collected:	2005/07/27	at	not given	by	not given
received:	2005/07/29	at	1100	by	L.Fantin

Test:

started:	2005/07/29	at	1330	by	A. Corbett
ended:	2005/08/05	at	1350	by	L. Fantin
reported:	2005/08/15			by	G. Diaz

Result:

	Endpoint	Value	Confidence Limits	Units	Method Calculated
Acute:	LC25	>100		%	estimated
(mortality)	LC50	>100		%	estimated
	NOEC	100		%	estimated
	LOEC	>100		%	estimated
	MSD	could not be calculated		fish	
Chronic:	IC25	>100		%	estimated
(growth)	IC50	>100		%	estimated
	NOEC	100		%	estimated
	LOEC	>100		%	estimated
	MSD	could not be calculated		mg	

Notes: LCx & ICx, concentrations lethal or inhibitory to 'x' percent of the test population; NOEC & LOEC, no and lowest observed effect concentrations

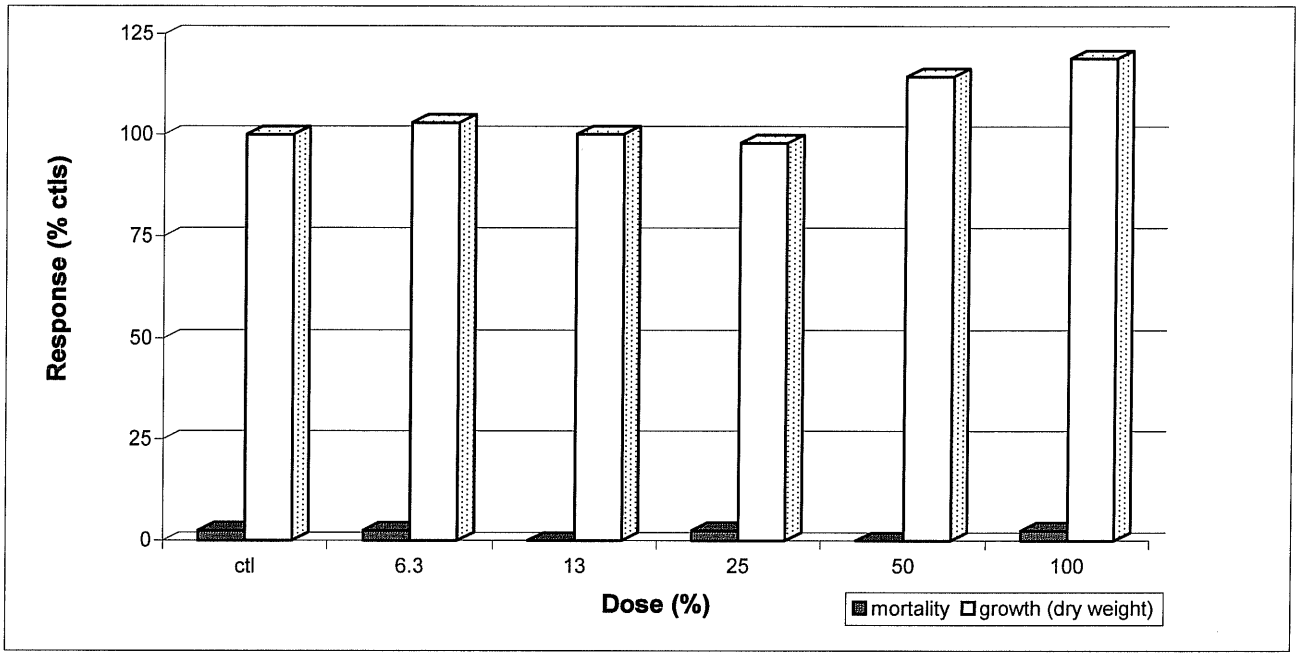
Comments: The EC guidance document on the importation of test organisms (1999) has been followed. No unusual behaviour or appearance or treatment of test organisms was noted prior to shipping, upon arrival or preceding the test. Test organisms were received in good condition, with inflated swim bladders. No acclimation of test organisms was required. The mortality of the test organisms was <2%upon arrival, and before test initiation.

Our liability is limited to the cost of the test requested. No liability is assumed for the application and or interpretation of the test results.

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Client:	NOR239	Sample:	20051122	Test:	20053131



Test Design

Organism: *Pimephales promelas* Source: Aquatox Inc. Age: < 24 hour post hatch
Breeding stock mortality was less than five percent during the week prior to test initiation.
The tests were conducted in 500 mL plastic vessels with 250 mL volumes (depth of 6.5 cm).
The sample was diluted with dechlorinated City of Calgary water acclimated to the test conditions.

Sample Information

The test was conducted with three samples. Samples a, b, and c were for days 0 to 2, 3 to 4, and 5 to 7.
The sample was not preaerated, filtered or pH adjusted prior to testing or during testing.
The dissolved oxygen concentration (mg/L) was 7.8 The sample pH was 7.2

Test Log

Date	Day	Time	Technicians	Comments
2005/07/29	0	1330	A. Corbett	Test organisms appear normal.
2005/07/30	1	1200	M. Luong	Test organisms appear normal.
2005/07/31	2	1230	M. Luong	Test organisms appear normal.
2005/08/01	3	1200	M. Luong	Test organisms appear normal.
2005/08/02	4	1350	A.Corbett	Test organisms appear normal.
2005/08/03	5	1330	A. Corbett	Test organisms appear normal.
2005/08/04	6	1400	L. Fantin	Test organisms appear normal.
2005/08/05	7	1350	L. Fantin	Test organisms appear normal.

The test data and results are verified correct. K. Steele

Authorized by K.Steele, B.Sc., Quality Assurance Officer

HydroQual Laboratories Ltd.

#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client: NOR239	Sample: 20051122	Test: 20053131

Chemistry

pH (units)

dose (%) / day	New Solutions ctl	6.3	13	25	50	100		Old Solutions ctl	6.3	13	25	50	100	
0	8.3	8.3	8.2	8.2	8.1	7.2								
1	8.4	8.3	8.3	8.2	8.1	7.4		8.4	8.4	8.4	8.3	8.3	7.6	
2	8.3	8.3	8.3	8.2	8.1	7.3		8.2	8.2	8.1	8.1	8.0	7.2	
3	8.3	8.3	8.3	8.2	8.1	7.3		8.2	8.2	8.1	8.1	7.9	7.3	
4	8.3	8.3	8.3	8.2	8.1	7.2		8.2	8.1	8.1	8.1	8.0	7.3	
5	8.3	8.3	8.3	8.2	8.1	7.3		8.2	8.1	8.1	8.0	8.0	7.4	
6	8.4	8.4	8.4	8.3	8.2	7.6		8.1	8.0	7.9	7.8	7.6	7.6	
7								8.2	8.1	8.1	8.1	7.9	7.7	
8														

conductance (uS/cm)

0	444	458	490	547	673	921								
1	409	421	455	520	634	870		398	408	429	483	593	845	
2	468	439	458	521	631	863		432	427	444	495	616	884	
3	400	417	450	505	623	852		410	415	462	515	601	887	
4	420	418	440	500	626	850		412	432	460	516	600	880	
5	418	418	423	500	620	852		420	455	480	486	550	910	
6	432	446	479	538	667	896		433	473	507	572	520	722	
7								457	465	501	555	693	934	
8														

dissolved oxygen (mg/L)

0	7.6	7.6	7.6	7.6	7.7	7.8								
1	7.6	7.7	7.7	7.7	7.7	7.7		7.3	7.3	7.3	7.4	7.5	7.5	
2	7.6	7.6	7.6	7.7	7.7	7.7		6.8	6.8	6.7	6.8	6.8	6.8	
3	7.4	7.4	7.5	7.5	7.6	7.7		6.8	6.8	6.8	6.8	6.8	6.8	
4	7.4	7.4	7.4	7.4	7.4	7.4		6.9	6.6	6.6	6.7	6.7	6.9	
5	7.4	7.3	7.3	7.3	7.6	7.3		6.8	6.8	6.8	6.7	6.4	6.5	
6	7.3	7.4	7.3	7.4	7.4	7.4		6.2	6.1	6.1	6.0	6.4	6.1	
7								6.6	6.7	6.7	6.7	6.7	6.8	
8														

temperature (°C)

0	25	25	25	25	25	25								
1	25	25	25	25	25	25		25	25	25	25	25	25	
2	25	25	25	25	25	25		25	25	25	25	25	25	
3	25	25	25	25	25	25		25	25	25	25	25	25	
4	25	25	25	25	25	25		25	25	25	25	25	25	
5	25	25	25	25	25	25		25	25	25	25	25	25	
6	25	25	25	25	25	25		25	25	25	25	25	25	
7								25	25	25	25	25	25	
8														

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE, Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 / Fax (403) 252-9363 www.hydroqual.ca

Test Report

Test Data

Client: NOR239	Sample: 20051122	Test: 20053131

Biology (number alive)

dose (%)	ctl	6.3	13	25	50	100		ctl	6.3	13	25	50	100	
replicate	day 1							day 5						
a	10	10	10	10	10	10		10	10	10	10	10	10	
b	10	10	10	10	10	10		10	9	9	10	10	10	
c	10	10	10	10	10	10		10	10	10	10	10	9	
d	10	10	10	10	10	10		9	10	10	10	10	10	
	day 2							day 6						
a	10	10	10	10	10	10		10	10	10	10	10	10	
b	10	10	10	10	10	10		10	9	10	9	10	10	
c	10	10	10	10	10	9		10	10	10	10	10	9	
d	9	10	10	10	10	10		9	10	10	10	10	10	
	day 3							day 7						
a	10	10	10	10	10	10		10	10	10	10	10	10	
b	10	9	10	10	10	10		10	9	10	9	10	10	
c	10	10	10	10	10	9		10	10	10	10	10	9	
d	9	10	10	10	10	10		9	10	10	10	10	10	
	day 4							**dry weights (mg)**						
a	10	10	10	10	10	10		5.8	6.1	5.3	6.4	7.2	7.4	
b	10	9	10	10	10	10		5.6	5.6	6.1	5.3	7.1	8.1	
c	10	10	10	10	10	9		6.0	5.8	6.3	5.5	6.0	5.1	
d	9	10	10	10	10	10		5.4	6.0	5.8	5.2	6.5	6.8	

Summary Tables

	Mortality (%)						Growth Data (mg per fish)					
a	0	0	0	0	0	0	0.6	0.6	0.5	0.6	0.7	0.7
b	0	10	0	10	0	0	0.6	0.6	0.6	0.6	0.7	0.8
c	0	0	0	0	0	10	0.6	0.6	0.6	0.6	0.6	0.6
d	10	0	0	0	0	0	0.6	0.6	0.6	0.5	0.6	0.7
mean	3	3	0	3	0	3	0.6	0.6	0.6	0.6	0.7	0.7
sd	5	5	0	5	0	5	0.0	0.0	0.0	0.1	0.1	0.1
cv(%)	200	200	0	200	0	200	3	3	7	9	9	14

Growth as a Percent of Controls

100	103	100	98	114	119

Chemistry

dose (%)	New Solutions: ctl	6.3	13	25	50	100		Old Solutions: ctl	6.3	13	25	50	100	
	Average Values													
pH	8.3	8.3	8.3	8.2	8.1	7.3		8.2	8.2	8.1	8.1	8.0	7.4	
EC	427	431	456	519	639	872		423	439	469	517	596	866	
DO	7.5	7.5	7.5	7.5	7.6	7.6		6.8	6.7	6.7	6.7	6.8	6.8	
temp	25	25	25	25	25	25		25	25	25	25	25	25	
	Variance (%)													
pH	1	0	1	0	0	2		1	2	2	2	3	3	
EC	5	4	5	4	3	3		5	6	6	7	9	8	
DO	2	2	2	2	2	3		5	5	5	6	5	6	
temp	0	0	0	0	0	0		0	0	0	0	0	0	

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: *Daphnia* Static Acute Test (LC50, five or more treatments plus a control)
HydroQual Test Method Manual, section: 4.4.3.1

Reference: Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to *Daphnia magna,* 1990. Environment Canada, EPS 1/RM/14. including May 1996 and December 2000 ammendments.

Test Organism	
test species	*Daphnia magna*
culture source	in-house
original culture source	Environment Canada
days to first brood	9
mean brood size	26
ephippia in stock culture	no
age of test organisms	<24 hours old
culture mortality (%)	6.7

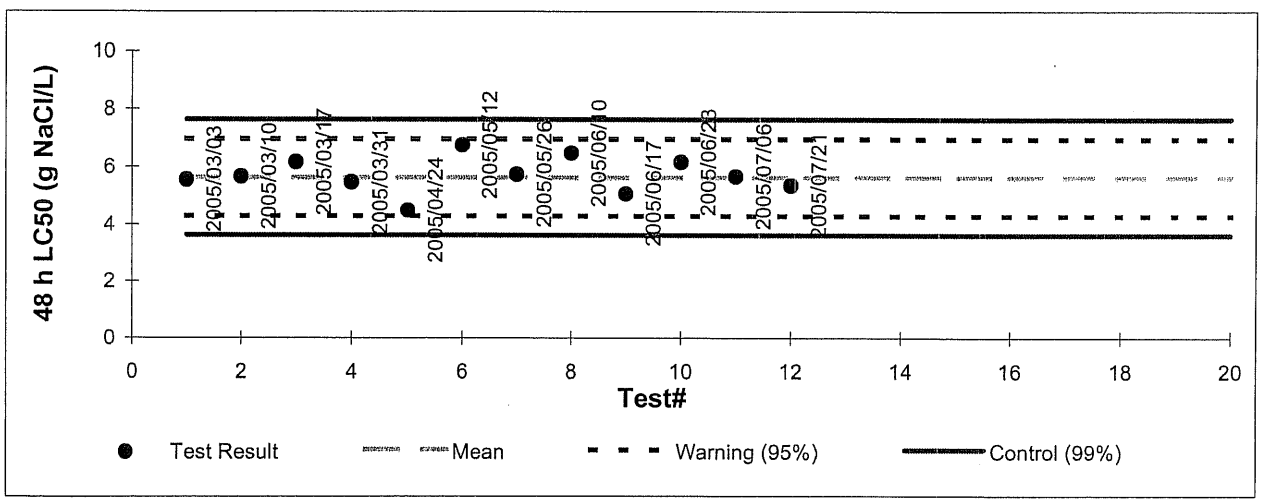
Test Design	
vol. of test vessel (mL)	500
toxicant	sodium chloride
test volume (mL)	150
replicates per treatment	1
neonates per replicate	10
volume per neonate (mL)	15
samples preaerated	no
hardness adjustment	no
temperature (°C)	20
photoperiod	16h light:8h dark
light level (water surface)	400-800 lux
control/dilution water	dechlorinated tap water

Quality Assurance Unit:
The test data and result are verified correct.

K. Steele 2005/07/25
Authorized by K. Steele

Warning Chart (mortality LC50 at 48 h)

Toxicant:	Sodium Chloride (NaCl)					
Current Test:	**started :** 2005/07/19		**ended:** 2005/07/21			
Result (48 h LC50):	5.4	(4.9-5.8)	g NaCl/L	95% confidence limits are in brackets		
Historical Mean:	5.6	**std. dev:**	0.7	**cv (%):**	12	
Chart Limits:	**warning:**	4.3	7.0	**control:**	3.6	7.6
	95% , two standard deviations			99%, three standard deviations		



HydroQual Laboratories Ltd.

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: Trout 96h Static Acute Test. (LC50, five or more treatments plus a control)
HydroQual Test Method Manual, section: 4.4.4.1

Reference: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13. including May 1996 and December 2000 amendments.

Test Organism		Test Design	
test species	*Oncorhyncus mykiss*	**vol. of test vessel (L)**	22
culture source	Rainbow Springs Trout Farms	**test volume depth**	>15 cm
temperature (°C)	15 ± 1	**replicates per treatment**	1
dissolved oxygen	saturated	**fingerlings per replicate**	10
stock mortality (last 7d)	<2%	**loading (g fish/L)**	<0.5
batch number	20050714TR	**temperature (°C)**	15 ± 1
		photoperiod	16h light: 8h dark
		light level (water surface)	100-500 lux
		control/dilution water	dechlorinated tap water

Qualty Assurance Unit:
The test data and result are verified correct.

K. Steele 2005/08/12
Authorized by K. Steele

Warning Chart (mortality LC50 at 96 h)

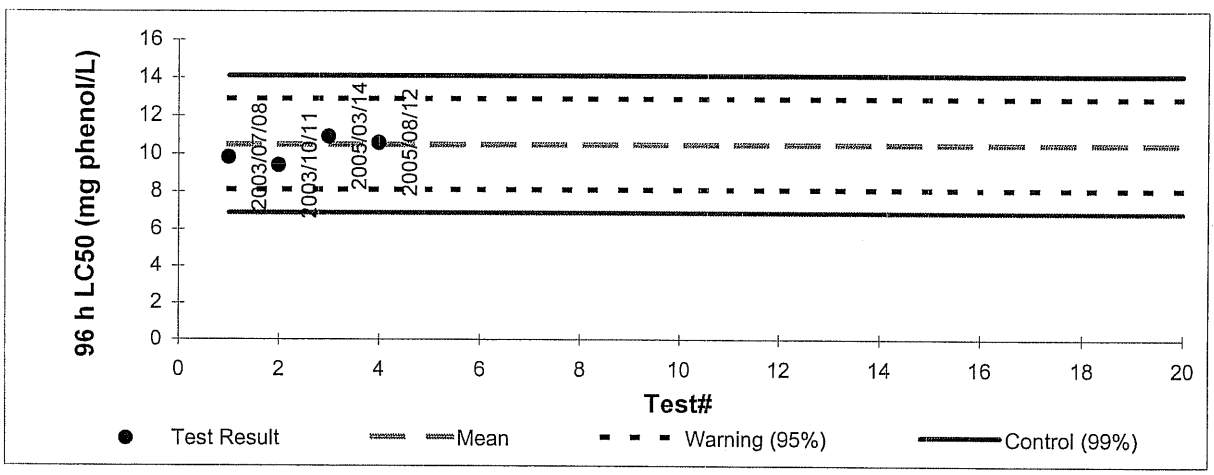
Toxicant: Phenol (C_6H_5OH)

Current Test: **started:** 2005/08/08 **ended:** 2005/08/12

Result (96 h LC50): 10.6 (8.0-16.0) mg/L 95% confidence limits are in brackets

Historical Mean: 10.5 **std.dev:** 1.2 **CV(%):** 11

Chart Limits: **warning:** 8.1 12.9 **control:** 6.9 14.1
95% , two standard deviations 99%, three standard deviations



HydroQual Laboratories Ltd.

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: *Ceriodaphnia* Survival and Reproduction Test (5 treatments plus a control)
HydroQual Test Method Manual, section: 4.4.3.2

Reference: Biological Test Method: Test of Reproduction and Survival Using the Cladoceran *Ceriodaphnia dubia*, 1992. Environment Canada, EPS 1/RM/21 including November, 1997 amendments.

Test Organism

test species	*Ceriodaphnia dubia*
culture source	in-house
original culture source	Environment Canada
ephippia in stock culture	none
mortality in culture	2
culture fecundity	18(mean young/adult)
young produced in previous brood	7
food type	YAT:Algae
frequency of feeding	daily
condition prior to test initiation	normal
age of test organisms	<24 hours

*note: there are 2 subcultures within this culture source, separated by one week in age.

The test is set with organisms from one subculture. The number of young a culture has is monitored daily.
If young are not used that day, they are discarded, therefore organisms in tests are <24h.

Test Design

test type	static renewal
toxicant	sodium chloride (NaCl)
test vessel	30 mL plastic cup
test volume (mL)	15
replicates per treatment	10
organisms per replicate	1
feeding	daily
temperature (°C)	24-26
photoperiod	16 hours light: 8 hours dark
light level (surface)	100-600 lux
hardness adjustment	no

Control/Dilution Water

source	equal volumes of Bow River water and moderately hard reconstituted water (50:50)
pH (units)	8.1
conductance (uS/cm)	352
dissolved oxygen (mg/L)	7.1
NH_4^+ (mg/L)	<0.1
hardness (mg $CaCO_3$/L)	120
alkalinity (mg $CaCO_3$/L)	119
total residual chlorine (mg/L)	<0.01

moderately hard reconstituted water prepared as per EPS 1/RM/21

Quality Assurance Unit:
The test data and results are verified correct. Kristi Steele 2005/07/25
Authorized by: K. Steele

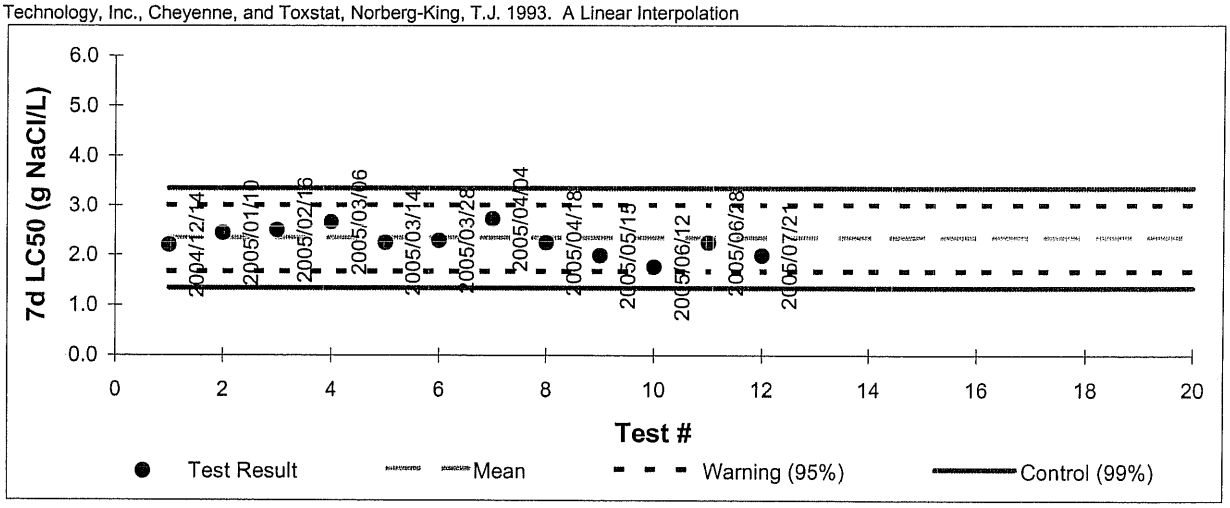
HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Ceriodaphnia dubia Warning Chart (Mortality: LC50 at 7 days)

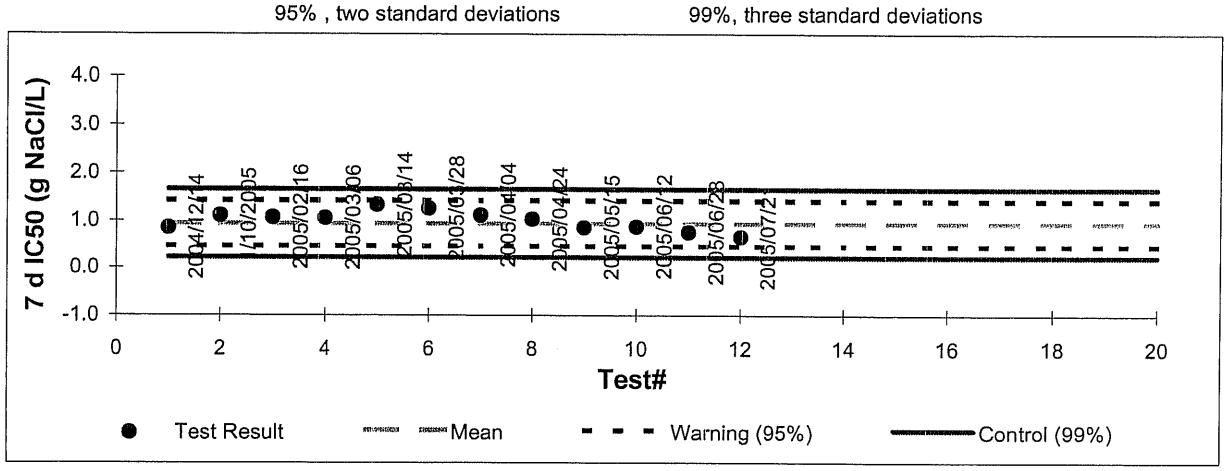
Toxicant:	Sodium Chloride (NaCl)					
Current Test:	**started:**	2005/07/15	**ended:**	2005/07/21		
Result (7 d LC50):	2.0	(0.8-2.5)	g NaCl/L	95% confidence limits are in brackets		
Historical Mean:	2.3	**std dev:**	0.3	**CV (%):**	14	
Chart Limits:	**warning:**	1.7	3.0	**control:**	1.3	3.3
	95% , two standard deviations			99%, three standard deviations		

Statistical analysis perfomed by ICPIN, West, Inc. and D. D. Gulley, 1994. Toxstat 3.4. Western Eco-Systems Technology, Inc., Cheyenne, and Toxstat, Norberg-King, T.J. 1993. A Linear Interpolation



Ceriodaphnia dubia Warning Chart (Reproduction: IC50 at 7 days)

Toxicant:	Sodium Chloride (NaCl)					
Current Test:	**started:**	2005/07/15	**ended:**	2005/07/21		
Result (7d IC50):	0.7	(0.4-0.8)	g NaCl/L	95% confidence limits are in brackets		
Historical Mean:	0.9	**std dev:**	0.2	**CV (%):**	26	
Chart Limits:	**warning:**	0.5	1.4	**control:**	0.2	1.7
	95% , two standard deviations			99%, three standard deviations		



HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Reference Toxicant
Ceriodaphnia Culture Log

Adults live	7 d ago	day used
	42	41

day prior to use	row/replicate	1	2	3	4	5	6	7	8	9	10	11	12
		A2	A4	B1	B2	C2							
7	number of young												
	number of adults												
		A2	A4	B1	B2	C2							
6	number of young												
	number of adults												
		A2	A4	B1	B2	C2							
5	number of young												
	number of adults												
		A2	A4	B1	B2	C2							
4	number of young	8	7	10	12	0							
	number of adults	2	2	2	2	2							
		A2	A4	B1	B2	C2							
3	number of young	0	0	0	0	8							
	number of adults	2	2	2	2	2							
		A2	A4	B1	B2	C2							
2	number of young	12	14	12	18	12							
	number of adults	2	2	2	2	2							
		A2	A4	B1	B2	C2							
DAY USED 2005/07/15	number of young	16	14	12	12	12							
	number of adults	2	2	2	2	2							
		A2	A4	B1	B2	C2							
totals		18	17.5	17	21	16							

number of young produced per organism in the last brood before use: 7

mean number of surviving young per adult over the last seven days: 18

culture mortality over the last seven days: 2

water type was equal mixture of moderately hard reconstituted water and Bow River Water (50:50)

less than 24 h organisms were used in the test with the reference toxicant

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Ceriodaphnia Culture Log

Adults live	7 d ago	day used
	42	42

Sample 20051122

day prior to use		row/replicate	#2 1 D1	2 E1	#3 3 A1	4 B1	5 B2	6	7	8	9	10	11
7	number of young number of adults												
			D1	E1	A1	B1	B2						
6	number of young number of adults												
			D1	E1	A1	B1	B2						
5	number of young number of adults												
			D1	E1	A1	B1	B2						
4	number of young number of adults												
			D1	E1	A1	B1	B2						
3	number of young number of adults		12 2	8 2	10 2	0 2	0 2						
			D1	E1	A1	B1	B2						
2	number of young number of adults		12 2	8 2	12 2	13 2	12 2						
			D1	E1	A1	B1	B2						
DAY USED 2005/07/29	number of young number of adults		13 2	14 2	14 2	12 2	13 2						
			D1	E1	A1	B1	B2						
totals			19	15	18	13	13						

number of young produced per organism in the last brood before use	7
mean number of surviving young per adult over the last seven days	15
culture mortality over the last seven days	0

water type was equal mixture of moderately hard reconstitued water and Bow River Water (50:50)

less than 24 h organisms were used in the test on the sample

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: 7 days Lemna Minor Survival and Growth Test (five treatments plus a control)
HydroQual Test Method Manual, section: 4.4.2.3

Reference: Biological Test Method: Test for Measuring the Inhibition of Growth Using the Freshwater Macrophyte, *Lemna minor*, 1999. Environment Canada, EPS 1/RM/37.

Test Organism

test species	*Lemna minor*
culture source	in-house
original source	UTCC - 492
culture vessels	250 mL Erlenmeyer flask
water source	deionized water
growth medium	Hoagland's E+ medium
cultivation method	as per test conditons
temp of breeding aquaria	25 ± 2°C
organism age	7-10 days old acclimated to test media for 18 to 24 hours
mean increase in frond #	32
(fold increase)	11

Test Design

test type	static
toxicant	potassium chloride
water source	deionized reverse osmosis water with nutrients as per EPS 1/RM/37
test vessel	8 oz polystyrene cups
test volume (ml)	150
test cover	clear plastic lids
replicates per treatment	4
organisms per replicate	two 3 frond plants
temperature (°C)	25 ± 2°C
photoperiod	24 hours light
light level (surface)	4, 500 ± 300 lux
light source	cool white fluorescent
hardness adjustment	no

Control/Dilution Water

water source deionized reverse osmosis water and nutirents as per EPS 1/RM/37

Quality Assurance Unit:
The test data and result are verified correct.

Authorized by: K. Steele 2005/08/04

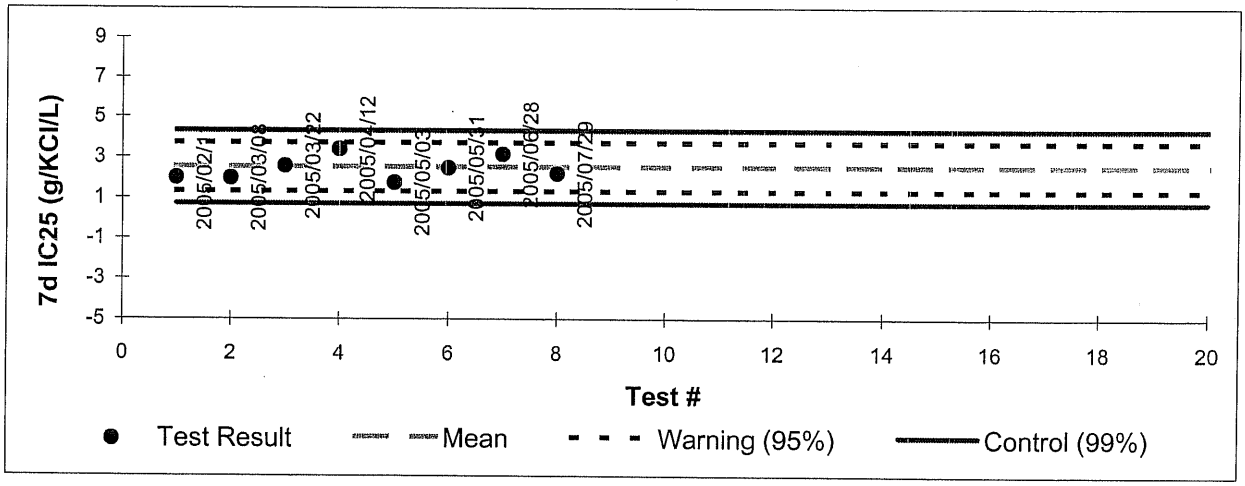
HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Lemna minor Warning Chart (Growth: frond number IC25 at 7 days)

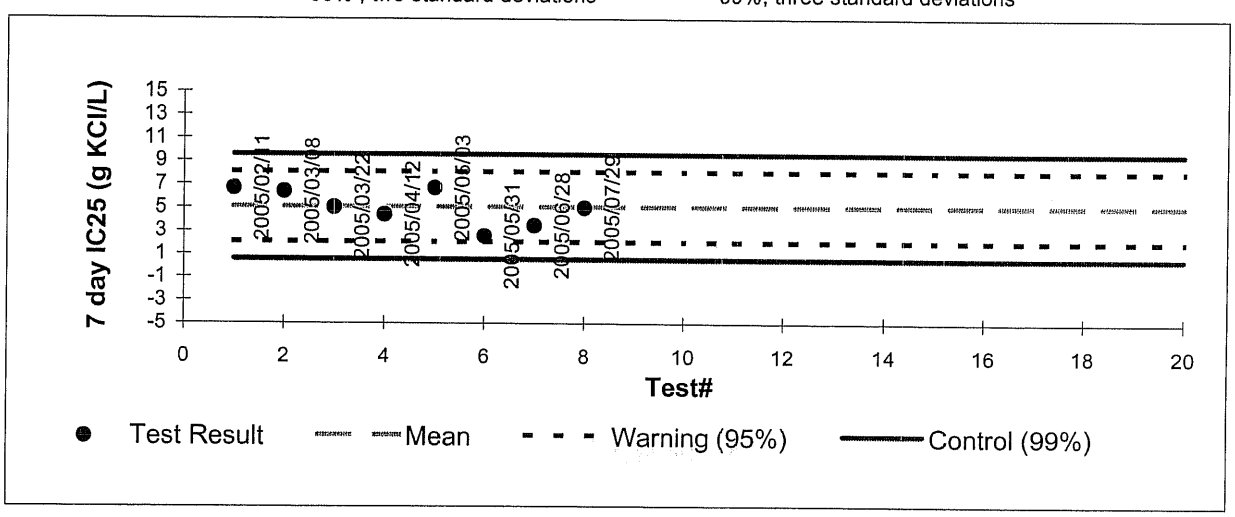
Toxicant:	potassium chloride (KCl)					
Current Test:	**started:**	2005/07/22	**ended:**	2005/07/29		
Result (7d IC25):	2.2	(1.5-3.0)	g KCl/L	95% confidence limits are in brackets		
Historical Mean:	2.5	**std dev:**	0.6	**CV (%):**	24	
Chart Limits:	**warning:**	1.3	3.7	**control:**	0.7	4.3
	95% , two standard deviations			99%, three standard deviations		

Statistical analysis perfomed by ICPIN, West, Inc. and D. D. Gulley, 1994. Toxstat 3.4. Western Eco-Systems Technology, Inc., Cheyenne, and Toxstat, Norberg-King, T.J. 1993. A Linear Interpolation



Lemna minor Warning Chart (Growth: biomass IC25 at 7 days)

Toxicant:	potassium chloride (KCl)					
Current Test:	**started:**	2005/07/22	**ended:**	2005/07/29		
Result (7d IC25):	5.0	(0.7-15.1)	g KCl/L	95% confidence limits are in brackets		
Historical Mean:	5.1	**std dev:**	1.5	**CV (%):**	30	
Chart Limits:	**warning:**	2.0	8.1	**control:**	0.5	9.6
	95% , two standard deviations			99%, three standard deviations		



HydroQual Laboratories Ltd.

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: 72 hours Algal Growth Inhibition Test (IC50, five or more treatments plus a control)
HydroQual Test Method Manual, section: 4.4.2.7

Reference: Biological Test Method: Growth Inhibition Test Using the Freshwater Alga *Selenastrum capricornutum*, 1992. Environment Canada, EPS 1/RM/25, with Nov., 1997 amendments

Test Organism		Test Design	
test species	*Raphidocelis subcapitata*	**test type**	static
(formerly)	*Selenastrum capricornutum* (strain LB37)	**toxicant**	zinc
		test vessel	96 well flat bottom microplate
original source	ATCC	**test volume (uL)**	220
culture vessels	2L Erlenmeyer flask	**no. of replicates**	3
water source	deionized water	**no. of replicate wells/treatment (per plate)**	5
growth medium	nutrient solution	**control**	10
cultivation method	batch as per test conditions	**mean temperature (°C)**	24 ± 2°C
culture condition at start of test	normal	**photoperiod**	continuous light
culture age	4-7 days	**light level**	4000 lux ± 10%
		contol/dilution water	deionized water and nutrients (prepared as per EPS1/RM/25)

Qualty Assurance Unit:
The test data and result are verified correct.

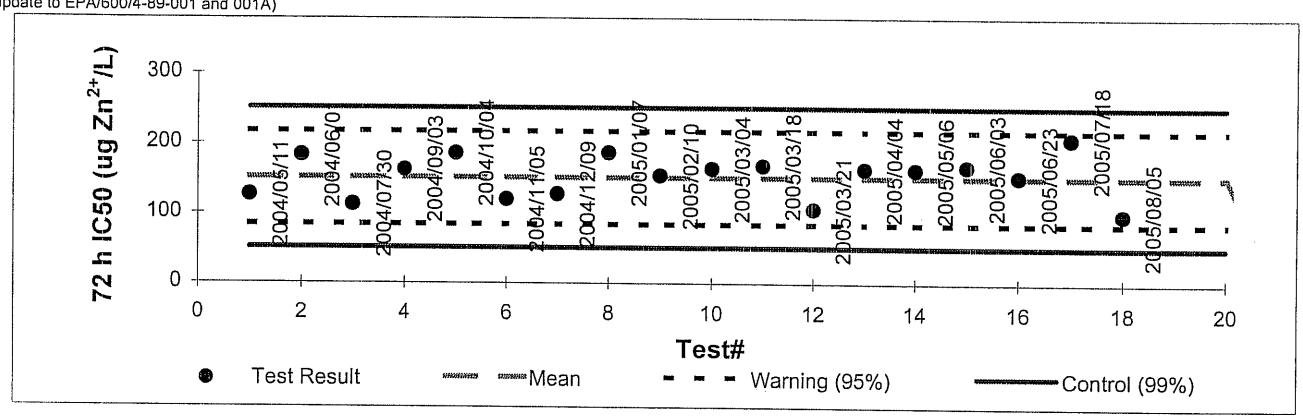
K. Steele 2005/08/11
Authorized by: K. Steele

Algae Warning Chart (growth IC50 at 72 hours)

Toxicant:	Zinc ($ZnSO_4*7H_2O$)					
Current Test:	**started:**	2005/08/02	**ended:**	2005/08/05		
Result (72 h IC50):	99	(85-108)	ug Zn^{2+}/L	95% confidence limits are in brackets		
Historical Mean:	151	**std.dev:**	33	**CV(%):**	22	
Chart Limits:	**warning:**	84	218	**control:**	51	251
	95% , two standard deviations			99%, three standard deviations		

Statistical analysis perfomed by ICPIN, West, Inc. and D. D. Gulley, 1994. Toxstat 3.4. Western Eco-Systems Technology, Inc., Cheyenne, and Toxstat, Norberg-King, T.J. 1993.

A Linear Interpolation. Method for Sublethal Toxicity: The Inhibition Concentration Approach (Ver. 2.0). National Effluent Toxicity Assessment Centre Technical Report 03-93. (update to EPA/600/4-89-001 and 001A)



HydroQual Laboratories Ltd.

#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Test Method: 7 days Fathead minnow Survival and Growth Test (five treatments plus a control)

Reference: HydroQual Test Method Manual, section: 4.4.4.6
Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnow, 1992. Environment Canada, EPS 1/RM/22, with Nov. 1997 amendments.

Test Organism

test species	*Pimephales promelas*
culture source	Aquatic Biological Systems (Arkansas, USA)
temp of breeding aquaria	23 - 26 °C
food type	frozen brine shrimp
frequency of feeding	daily
breeding colony mortality	<5% (last 7 days)
age of test organisms	<24 hours
condition prior to test initiation	normal
batch number	20050729FM

Test Design

test type	static renewal
toxicant	sodium chloride
test vessel	polypropelyene cups, 11x9 cm
volume of test vessel	450
test volume (ml)	250
depth of test solution	>3 cm
replicates per treatment	4 replicates
organisms per replicate	10
feeding	twice daily
temperature (°C)	24-26
photoperiod	16 hours light: 8 hours dark
light level (surface)	100-500 lux

Control/Dilution Water

source	dechlorinated City of Calgary tap water no chemicals were added to the dilution water
pH (units)	7.2
conductance (uS/cm)	391
dissolved oxygen (mg/L)	7.3
NH_4^+ (mg/L)	<0.1
hardness (mg $CaCO_3$/L)	157
alkalinity (mg $CaCO_3$/L)	120
total residual chlorine (mg/L)	<0.01

Quality Assurance Unit:
The test data and results are verified correct.

Authorized by: K. Steele [signature] as per 2005/08/16

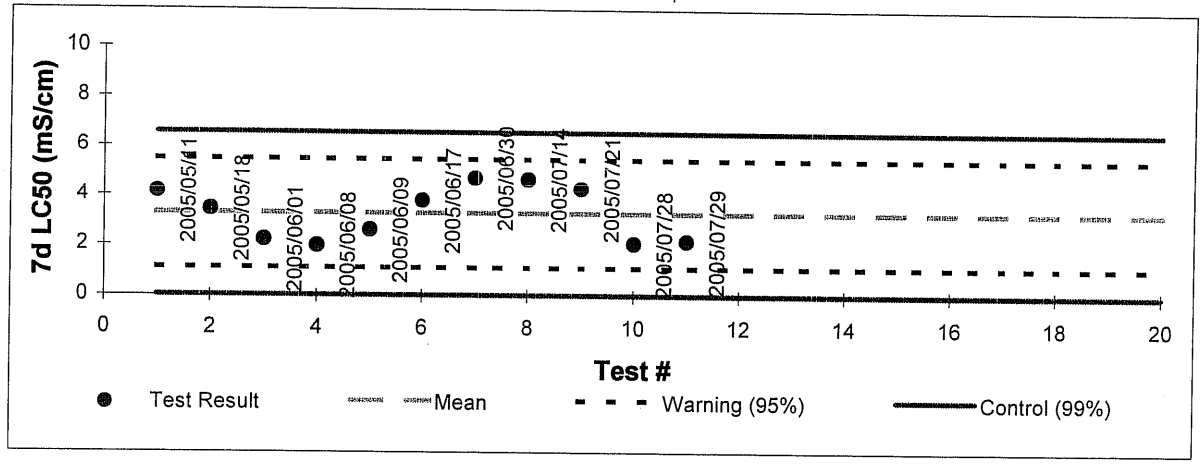
HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Quality Assurance Information

Fathead minnow Warning Chart (Mortality: LC50 at 7 days)

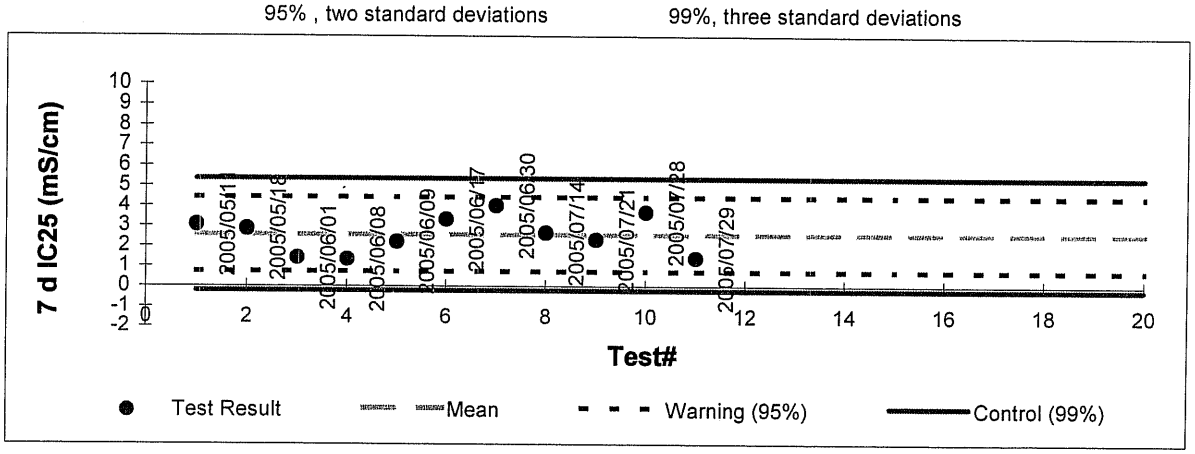
Toxicant:	Sodium Chloride (NaCl)					
Current Test:	**started:**	2005/07/29	**ended:**	2005/08/05		
Result (7 d LC50):	2.2	(2.0-2.5)	mS/cm	95% confidence limits are in brackets		
Historical Mean:	3.3	**std dev:**	1.1	**CV (%):**	33	
Chart Limits:	**warning:**	1.1	5.5	**control:**	0.0	6.6
	95% , two standard deviations			99%, three standard deviations		

Statistical analysis perfomed by ICPIN, West, Inc. and D. D. Gulley, 1994. Toxstat 3.4. Western Eco-Systems Technology, Inc., Cheyenne, and Toxstat, Norberg-King, T.J. 1993. A Linear Interpolation



Fathead minnow Warning Chart (Growth: IC25 at 7 days)

Toxicant:	Sodium Chloride (NaCl)					
Current Test:	**started:**	2005/07/29	**ended:**	2005/08/05		
Result (7d IC25):	1.4	(0.3-3.2)	mS/cm	95% confidence limits are in brackets		
Historical Mean:	2.6	**std dev:**	0.9	**CV (%):**	36	
Chart Limits:	**warning:**	0.7	4.4	**control:**	-0.2	5.4
	95% , two standard deviations			99%, three standard deviations		



AQUATOX, INC.

100 Springwood Drive #15
Hot Springs, Arkansas 71913
(501) 767-9120

TEST ORGANISM HISTORY

DATE SHIPPED 7-28-05 Hydroqual

SPECIES Pimephales promelas

QUANTITY SHIPPED 4000+

AGE/LIFE STAGE 48hrs 7/29 1500ct

BROODSTOCK SOURCE Anderson Hamsjta

CULTURE WATER Groundwater

ALKALINITY (Mg/l as $CaCO_3$) =180

HARDNESS (Mg/l as $CaCO_3$)/Salinity (ppt) =160

FEEDING Artemia

COMMENTS PO# 2005-136

pH: 7.9, EC: 478, DO: 8.1, Temp: 23.2

Alk: 151, Hard: 137

PACKAGED BY

BILL HALL PRINTERS 3171

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Test Summary

Client: NORWEST LABS Client #: NOR 839 Contact: Darlene Linfoot

Sample #: 20051182 Fax #: 780-438-0896 Date: 2005/08/05

Date Collected: 2005/07/27 Date Rec'd: 2005/07/29

HydroQual Contact: Ingrid Carleton-Dodds or Kim Steele

	Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Description: lot#398418	Control	0	0	0	10%	none
Method: IR (9)	100%	20%	20%	30%	30%	
Test #: 20053187						
Tester: AC						
Started: 2005/07/29						
Ended: 2005/08/02						

	Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Description:	Control					
Method:						
Test #:						
Tester:						
Started:						
Ended:						

HydroQual Laboratories Ltd.
#3, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Test Summary

Client: NORWEST Client #: NOR239 Contact: DARLENE LINTOTT

Sample #: 20051122 Fax #: 780-438-0396 Date: 2005/08/01

Date Collected: 2005/07/27 Date Rec'd: 2005/07/29

HydroQual Contact: Ingrid Carleton-Dodds or Kim Steele

Description: Lot#398418
Method: DA(S)
Test #: 20053126
Tester: LF
Started: 2005/07/29
Ended: 2005/07/31

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Control	0	0			
100%	0	70%			

Description:
Method:
Test #:
Tester:
Started:
Ended:

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Control					