Certificate of Analysis

OZ MINERALS CANADA RESOURCES INC.
ATTN: ANDREW MITCHELL
200 - 1159 ALLOY DRIVE
THUNDER BAY ON P7B 6M8

Report Date: 10-SEP-09 11:24 (MT)
Version: FINAL

Lab Work Order #: L806858 **Date Received:** 18-AUG-09

Project P.O. #: 09-00623
Job Reference:
Legal Site Desc:
CofC Numbers: 08-011425

Other Information:

Comments:

MAUREEN OLINEK
Senior Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L806858-1 LUP-10							
Sampled By: AM on 17-AUG-09 @ 11:54							
Matrix: WATER							
Total Metals - CCME							
Mercury (Hg) - Total							
Mercury (Hg)-Total	<0.00010		0.00010	mg/L		19-AUG-09	R912827
Total Metals in Water by ICPMS (Low)							
Aluminum (Al)-Total	0.044		0.010	mg/L		21-AUG-09	R914206
Antimony (Sb)-Total	<0.00040		0.00040	mg/L		21-AUG-09	R914206
Arsenic (As)-Total	0.00422		0.00040	mg/L		21-AUG-09	R914206
Barium (Ba)-Total	0.0146		0.0030	mg/L		21-AUG-09	R914206
Beryllium (Be)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Boron (B)-Total	0.088		0.050	mg/L		21-AUG-09	R914206
Cadmium (Cd)-Total	0.000260		0.000050	mg/L		21-AUG-09	R914206
Chromium (Cr)-Total	<0.0050		0.0050	mg/L		21-AUG-09	R914206
Cobalt (Co)-Total	0.0396		0.0020	mg/L		21-AUG-09	R914206
Copper (Cu)-Total	0.0026		0.0010	mg/L		21-AUG-09	R914206
Lead (Pb)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Lithium (Li)-Total	0.031		0.010	mg/L		21-AUG-09	R914206
Molybdenum (Mo)-Total	<0.0050		0.0050	mg/L		21-AUG-09	R914206
Nickel (Ni)-Total	0.0780		0.0020	mg/L		21-AUG-09	R914206
Selenium (Se)-Total	<0.0020	DLM	0.0020	mg/L		21-AUG-09	R914206
Silver (Ag)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Thallium (Tl)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Tin (Sn)-Total	<0.050		0.050	mg/L		21-AUG-09	R914206
Titanium (Ti)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Uranium (U)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Vanadium (V)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Zinc (Zn)-Total	0.244		0.0040	mg/L		21-AUG-09	R914206
Total Metals in Water by ICPOES (Low)							
Calcium (Ca)-Total	69.8		0.50	mg/L		21-AUG-09	R917946
Iron (Fe)-Total	0.090		0.010	mg/L		21-AUG-09	R917946
Magnesium (Mg)-Total	7.38		0.10	mg/L		21-AUG-09	R917946
Manganese (Mn)-Total	0.822		0.0020	mg/L		21-AUG-09	R917946
Potassium (K)-Total	5.79		0.10	mg/L		21-AUG-09	R917946
Sodium (Na)-Total	68.7		1.0	mg/L		21-AUG-09	R917946
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	5.3		5.0	mg/L		18-AUG-09	R911889
Ammonia-N	0.476		0.050	mg/L		19-AUG-09	R912448
Cyanide, Total	<0.0020		0.0020	mg/L	19-AUG-09	19-AUG-09	R912617
Daphnia Magna	See Attached					20-AUG-09	R939351
Hardness (as CaCO3)	205			mg/L		24-AUG-09	
Special Request	See Attached					19-AUG-09	R939351
Special Request	See Attached					20-AUG-09	R938901
Total Suspended Solids	<3.0		3.0	mg/L		19-AUG-09	R912700
Trout Bioassay	See Attached					24-AUG-09	R920583
pH	6.82		0.10	pH		18-AUG-09	R911889
NO2, NO3, & (NO2+NO3) in Water							
Nitrate as N by IC							
Nitrate (as N)	4.15		0.050	mg/L		18-AUG-09	R911887
Nitrate+Nitrite							
Nitrate and Nitrite as N	4.15		0.071	mg/L		19-AUG-09	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		18-AUG-09	R911887

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L806858-2 LUP-10D (DUPLICATE)							
Sampled By: AM on 17-AUG-09 @ 11:54							
Matrix: WATER							
Total Metals - CCME							
Mercury (Hg) - Total							
Mercury (Hg)-Total	<0.00010		0.00010	mg/L		19-AUG-09	R912827
Total Metals in Water by ICPMS (Low)							
Aluminum (Al)-Total	0.041		0.010	mg/L		21-AUG-09	R914206
Antimony (Sb)-Total	<0.00040		0.00040	mg/L		21-AUG-09	R914206
Arsenic (As)-Total	0.00413		0.00040	mg/L		21-AUG-09	R914206
Barium (Ba)-Total	0.0147		0.0030	mg/L		21-AUG-09	R914206
Beryllium (Be)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Boron (B)-Total	0.084		0.050	mg/L		21-AUG-09	R914206
Cadmium (Cd)-Total	0.000295		0.000050	mg/L		21-AUG-09	R914206
Chromium (Cr)-Total	<0.0050		0.0050	mg/L		21-AUG-09	R914206
Cobalt (Co)-Total	0.0406		0.0020	mg/L		21-AUG-09	R914206
Copper (Cu)-Total	0.0028		0.0010	mg/L		21-AUG-09	R914206
Lead (Pb)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Lithium (Li)-Total	0.031		0.010	mg/L		21-AUG-09	R914206
Molybdenum (Mo)-Total	<0.0050		0.0050	mg/L		21-AUG-09	R914206
Nickel (Ni)-Total	0.0793		0.0020	mg/L		21-AUG-09	R914206
Selenium (Se)-Total	<0.0020	DLM	0.0020	mg/L		21-AUG-09	R914206
Silver (Ag)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Thallium (Tl)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Tin (Sn)-Total	<0.050		0.050	mg/L		21-AUG-09	R914206
Titanium (Ti)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Uranium (U)-Total	<0.00010		0.00010	mg/L		21-AUG-09	R914206
Vanadium (V)-Total	<0.0010		0.0010	mg/L		21-AUG-09	R914206
Zinc (Zn)-Total	0.253		0.0040	mg/L		21-AUG-09	R914206
Total Metals in Water by ICPOES (Low)							
Calcium (Ca)-Total	0.92		0.50	mg/L		19-AUG-09	R912805
Iron (Fe)-Total	0.010		0.010	mg/L		19-AUG-09	R912805
Magnesium (Mg)-Total	0.48		0.10	mg/L		19-AUG-09	R912805
Manganese (Mn)-Total	0.0025		0.0020	mg/L		19-AUG-09	R912805
Potassium (K)-Total	0.41		0.10	mg/L		19-AUG-09	R912805
Sodium (Na)-Total	<1.0		1.0	mg/L		19-AUG-09	R912805
Miscellaneous Parameters							
Alkalinity, Total (as CaCO3)	<5.0		5.0	mg/L		18-AUG-09	R911889
Ammonia-N	0.475		0.050	mg/L		19-AUG-09	R912448
Cyanide, Total	<0.0020		0.0020	mg/L	19-AUG-09	19-AUG-09	R912617
Hardness (as CaCO3)	4.3			mg/L		20-AUG-09	
Total Suspended Solids	<3.0		3.0	mg/L		19-AUG-09	R912700
pH	6.84		0.10	pH		18-AUG-09	R911889
NO2, NO3, & (NO2+NO3) in Water							
Nitrate as N by IC							
Nitrate (as N)	4.13		0.050	mg/L		18-AUG-09	R911887
Nitrate+Nitrite							
Nitrate and Nitrite as N	4.13		0.071	mg/L		19-AUG-09	
Nitrite as N by IC							
Nitrite (as N)	<0.050		0.050	mg/L		18-AUG-09	R911887

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLM	Detection Limit Adjustment For Sample Matrix Effects

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TOT-ED	Water	Alkalinity, Total	APHA 2320 B-Auto-Pot. Titration
CN-TOT-WT	Water	Cyanide, Total	APHA 4500CN C E-STRONG ACID DIST COLORIM
ETL-HARDNESS-TOT-ED	Water	Hardness (from Total Ca and Mg)	APHA 2340 B-Calculation
HG-T-CVAA-ED	Water	Mercury (Hg) - Total	EPA 245.7 / EPA 245.1
MET-T-L-ICP-ED	Water	Total Metals in Water by ICPOES (Low)	APHA 3120 B-ICP-OES
MET-T-L-MS-ED	Water	Total Metals in Water by ICPMS (Low)	SW 846 - 6020-ICPMS
NH4-ED	Water	Ammonia-N	APHA4500NH3F Colorimetry
NO2+NO3-CALC-ED	Water	Nitrate+Nitrite	CALCULATION
NO2-IC-ED	Water	Nitrite as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
NO3-IC-ED	Water	Nitrate as N by IC	APHA 4110 B-ION CHROMATOGRAPHY
PH-ED	Water	pH	APHA 4500 H-Electrode
SOLIDS-TOTSUS-ED	Water	Total Suspended Solids	APHA 2540 D-Gravimetric
SPECIAL REQUEST-HQ	Misc.	Special Request HydroQual	SEE SUBLET LAB RESULTS
SPECIAL REQUEST-SR	Misc.	Special Request SRC	SEE SUBLET LAB RESULTS

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS LABORATORY GROUP - WATERLOO, ONTARIO, CANADA
SR	Saskatchewan Research Council - Saskatoon, Saskatchewan, Can
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA
HQ	HydroQual Laboratories Ltd. - Calgary, Alberta, Canada

Chain of Custody Numbers:

08-011425

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mk/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

HydroQual Laboratories Ltd.

Algae Test Report

Client: ALS106
Reference: 09-1501-01-AGD

Result Summary

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

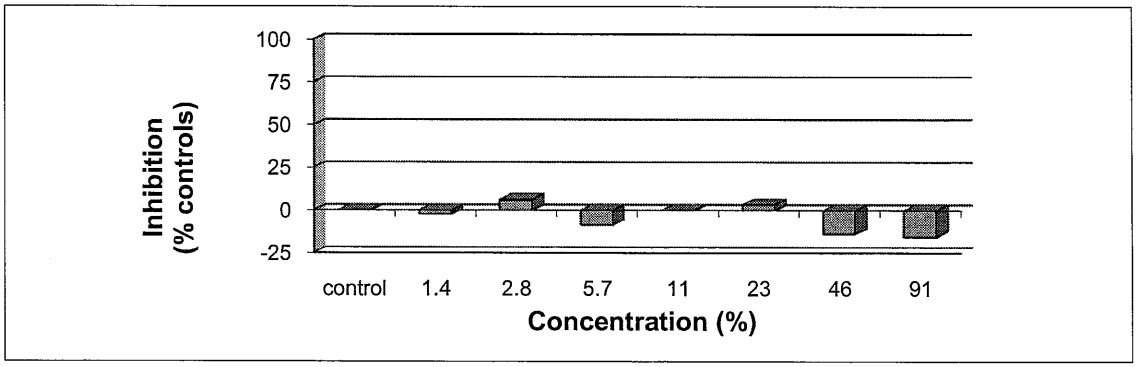
Test: started on 2009/08/19 ; ended on 2009/08/22

Contents

Result:

	Endpoint (72-hour)	Value	Confidence Limits (95%) lower	upper		Method Calculated
Chronic:	IC25	>91%			%	could not be calculated
(growth)	IC50	>91%			%	could not be calculated

Notes: ICx, concentrations inhibiting growth by 'x' percent relative to controls; CV, coefficient of variation (%); SD, standard deviation



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Test Conditions

Client: ALS106
Reference: 09-1501-01-AGD

Method: Biological Test Method: Growth Inhibition Test Using a Freshwater Alga *Pseudokirchneriella subcapitata (formerly Selenastrum capricornutum)*. Environment Canada, EPS 1/RM/25, 2nd Edition, March 2007

Test type: Algal Growth Inhibition Test (HQ 4.4.2.7)
Species: *Pseudokirchneriella subcapitata (formerly Selenastrum capricornutum* and *Raphidocelis subcapitata*)
Organism source: In-house culture (original source: UTCC 37; strain: LB37)
Culture age: The test was started with 5 day old, exponentially growing cells determined with an algal growth curve. This culture was initiated on 2009/06/05. Algal cultures are regrown every 2 months from slants made from a new culture purchased annually.
Culture observations: No unusual appearance or treatment of the algae was noted prior to or during the conduct of the test.

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 2 days (must be ≤ 3 days)
Sample storage: 4 ± 2°C in darkness

Test concentrations: 7 effluent concentrations (1.4, 2.8, 5.7, 11, 23, 46 and 91% (v/v) plus a negative control)
Test vessel: The test was conducted in 96 well microplates. Three replicate plates were run (a, b and c).
Test replicates: Three replicate microplates were run. Per plate there were 5 replicate wells per concentration and 10 replicate wells per control.
Test volume: 220 µL final volume in each well with 200 µL of sample; 10µL of enrichment medium and 10µL of algal inoculum.
Inoculum: The initial cell density of the inoculum was 9910 (cells/mL), it was prepared less than ≤2-3 hours before test initiation.
Control/dilution water: Made up with deionized City of Calgary water spiked with nutrients as per EPS 1/RM/25 (made by adding 1mL of each of the 5 stock solutions to 10mL of DRO).
Sample Filtration: 100 mL filtered through a 0.45 µm pore diameter membrane.
Sample treatment: Sample spiked with nutrients as per EPS 1/RM/25; no other chemicals added.
Measurements: 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 14322 with a coefficient of variation of 21 %.
Aeration: Not required
pH Adjustment: Not required
Lighting: The plates were incubated under continuous light: 3700 lux
(cool white fluorescent bulbs) 51.8 µmol/(m^2•S)
Test temperature: 24 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: ALS106
Reference: 09-1501-01-AGD

Endpoint: Growth, 72-h IC25 (with 95% confidence limits)
Test endpoint was bracketed by at least 1 test concentration (except for <1.4% or >91 %)
No outliers were observed within the data set.

Test validity: Control growth was a 19 fold increase over the inoculum.
The cv of the standard control wells was 10 %.
(must be ≥ 16 fold increase with a cv of ≤ 20%)

Statistics: See Data Analysis section.
Mann-Kendall Trend analysis ($p>0.05$) indicates there was no volatility in the sample.

Reference toxicant: 72-h test with Zinc ($ZnSO_4$*7H2O) initiated August 11, 2009;
(must be within 14 days of the test initiation)
current results: (72-h IC25 and 95% confidence limits) = 1.38 (1.23-1.49) log (µg Zn^{2+}/L)
The reference toxicant test was performed under the same conditions as those used during this test.

Note: Outlined sections are protocol deviations explained on the comment page

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HydroQual Laboratories Ltd.

Algae Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-AGD

Test Log:

Date	Day	Technician	Time	Rotated	Temperature (°C)
2009/08/19	0	J. Amyotte/S. Ehman	1420	no	23
2009/08/20	1	N. Lavoie	0815	yes	23
2009/08/21	2	J. Amyotte	0815	yes	23
2009/08/22	3	S. Ehman	1105	no	24

Absorbance and Direct Cell Data:

Concentration (%)	Absorbance (430 nm)	Direct Cell Counts(/0.5 mL)
ctl	0.01	2350
11	0.01	2550
91	0.02	1917

pH Measurements:

Concentration	Initial Value
control	6.5
91%	6.5

Concentration	Final Mean	% CV
control (well D6)	6.5	0
control (well D7)	6.5	0

Average Absorbance Control Data:

Column Well	2b	2c	2e	2f	2g
Absorbance (430 nm)	0.01	0.01	0.01	0.01	0.01
Column Well	11b	11c	11e	11f	11g
Absorbance (430 nm)	0.01	0.02	0.01	0.01	0.01

Standard Control Wells:

Average	199
SD	20
CV%	10

Test Results at 72 hours:

Concentration (%)	Cell Yield Densities ($x10^3$ / mL) Well Replicate					Average	SD	CV	Percent Controls	Inhibition (%)	Stimulation (%)
	a	b	c	d	e						
control	174	200	205	198	181	191	13	7	100	0	0
1.4	193	231	183	183	188	196	20	10	102	-2	2
2.8	174	183	198	169	174	179	11	6	94	6	-6
5.7	217	241	231	169	181	208	31	15	108	-8	8
11	221	217	221	164	136	192	40	21	100	0	0
23	207	202	212	150	155	185	30	16	97	3	-3
46	241	226	245	193	183	218	28	13	114	-14	14
91	202	224	241	224	214	221	14	6	115	-15	15

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-AGD

Test Result Comments:
None

Data Analysis:
Endpoints for growth inhibition and stimulation could not be calculated. Significant effects did not occur.

Protocol Deviations:
None

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HydroQual Laboratories Ltd.

Warning Chart
Algae

Test Method: 72 hours Algal Growth Inhibition Test (IC25, 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*, 2007. Environment Canada, EPS 1/RM/25.

Test Organism:

test species:	*Pseudokirchneriella subcapitata*
culture:	20090804AG
original source/strain:	UTCC 37 / LB37
culture vessels:	2L Erlenmeyer flask
water source:	deionized water
growth medium:	nutrient solution
cultivation method:	batch as per test conditions
culture condition at start of test:	normal
culture age:	3-7 days
growth phase:	exponentially growing

Test Design:

test type:	static
toxicant:	zinc
test vessel:	96 well flat bottom microplate
test volume (µL):	220
no. of replicate plates:	3
no. of replicate wells / treatment per plate (control, sample):	10, 5
mean temperature (°C):	24 ± 2°C
photoperiod:	continuous light
light level:	4200 lux ± 5%
contol/dilution water:	deionized water and nutrients: prepared as per EPS1/RM/25

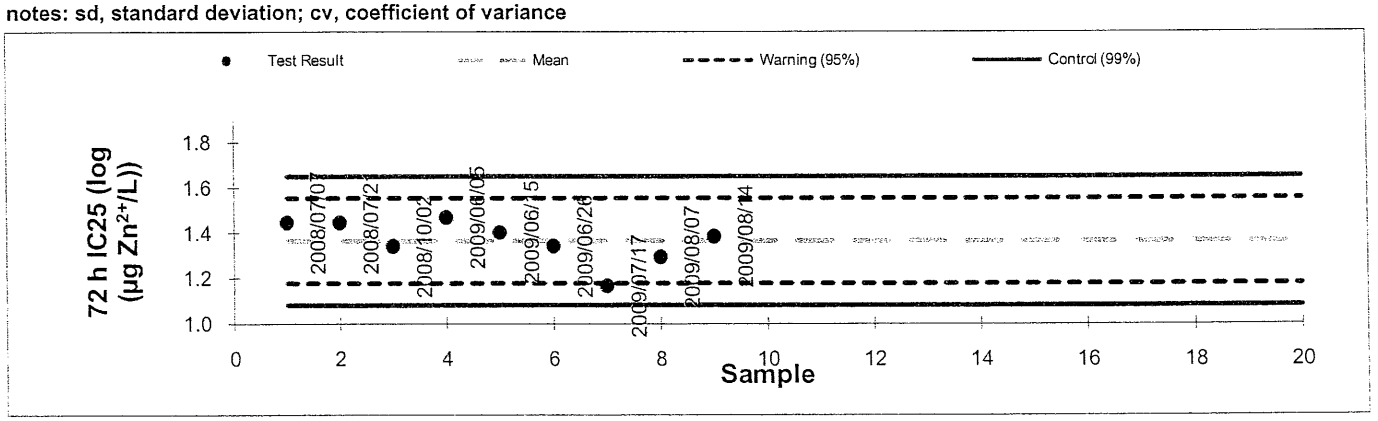
Current Test

toxicant	Zinc ($ZnSO_4$*$7H_2O$)				
started on	2009/08/11	ended on	2009/08/14		
Result (IC25 @ 72h)	1.38	log (µg $Zn2^+$/L); geometric mean			
Confidence Limits (95%)	lower	1.23	upper	1.49	

Historical Values

mean	1.37	sd	0.09	cv(%):	7
	lower	upper			
warning limits (±2 sd)	1.18	1.56	(95% confidence limits)		
control limits (±3 sd)	1.08	1.65	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance



na; could not be calculated

Qualty Assurance Unit:

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Ceriodaphnia (6-8d LC50/IC25) Test Report

Client: ALS106
Reference: 09-1501-01-CDD

Result Summary

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

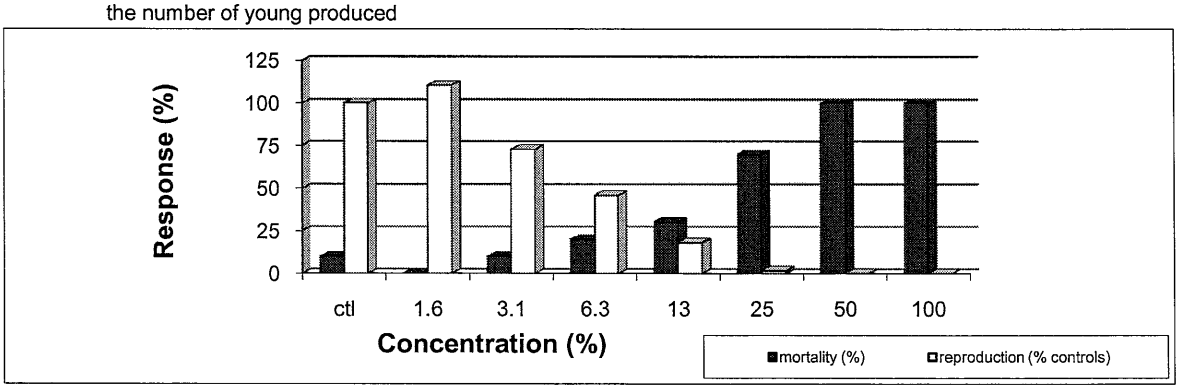
Test: started on 2009/08/19 ; ended on 2009/08/25

Contents

Result:

	Endpoint (6-day)	Value	Confidence Limits (95%) lower	upper	Units	Method Calculated
Acute:	LC25	12	3.5	17	%	Log-Normal
(survival)	LC50	18	9.2	26	%	Log-Normal
Chronic:	IC25	2.8	1.8	4.7	%	Linear Interpolation
(fecundity)	IC50	5.5	2.8	8.2	%	Linear Interpolation

Notes: LCx & ICx, concentrations lethal or inhibitory to 'x' percent of the test population; fecundity, reproduction as the number of young produced



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

L. Henson for S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Test Conditions

Client: ALS106
Reference: 09-1501-01-CDD

Method: Biological Test method: Test of Reproduction and Survival Using the Cladoceran *Ceriodaphnia dubia*, 2007. Environment Canada, EPS 1/RM/21.

Test type: *Ceriodaphnia* 6-day Survival and Reproduction Static Renewal Test (HQ 4.4.3.2)
Species: *Ceriodaphnia dubia*
Age: <24 hours old; all from same brood source within 12 hours of the same age.
Organism source: in-house cultures; cultures from a single brood organism to provide test organisms.
Culture health: Culture mortality was 12% (must be ≤ 20%).
7-d prior to test initiation: No ephippia were noted in the cultures at any time.
Average young produced per adult in the first three broods was 22 (must be ≥ 15)
Number of young produced by each brood organism in the last complete brood before use was 10 (must be ≥ 8).
Organism observations: No unusual behavior, appearance or treatment of test organisms was noted prior to or during the test. All first-generation mortality was recorded on the day it was observed.
Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 2 days (must be ≤ 3 days); The test was conducted with three subsamples, samples a, b, and c were for days 0 to 2, 3 to 5, and 6 to 8.
Sample storage: 4 ± 2°C in darkness

Test vessel: The tests were conducted in 30 mL plastic vessels (2 cm depth).
Test volume: 15 mL of solution (1 cm depth); replenished daily.
Control/dilution water: The control and dilution water was a mixture of moderately hard reconstituted water and Bow River Water (50:50). Chemicals added to dilution water: 0.96 g NaHCO3, 0.60 g CaSO4, 0.60 g MgSO4, 0.04 g KCl per 20L.
Test concentrations: 7 effluent concentrations (1.6, 3.1, 6.3, 13, 25, 50, 100% (v/v) plus a negative control)
Test replicates: One neonate <24 hours old was loaded per test vessel; 10 replicates/concentration
Feeding: The test organisms were fed daily a mixture of fermented trout chow, yeast, alfalfa powder, and the green alga *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum* and *Raphidocelis subcapitata*).
Food expiration date: 2009/08/30; 2009/09/13
Measurements: pH, conductivity, dissolved oxygen and temperature were measured daily.
Sample pre-treatment: The sample was not aerated, filtered or pH adjusted prior or during testing.
The dissolved oxygen concentration (mg/L) was: 6.8
The sample pH was: 7.6
Lighting: Overhead full spectrum fluorescent lights; 100-600 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 25 ± 1°C

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: ALS106
Reference: 09-1501-01-CDD

Endpoints: Survival, 6-d LC50 (with 95% confidence limits)
Reproduction, 6-d IC25 (with 95% confidence limits)
Test endpoints were bracketed by at least 1 test concentration (except for <1.6% or >100 %)
No outliers were observed within the data set.

Test completion: 70% of the control organisms had ≥ 3 broods on day 6 (must be ≥ 60% within 8 days) Any neonates produced after third brood were not included in the mean young per adult calculation.

Test validity: The control had 90% survival (must ≥ 80%)
Number of young produced by each surviving control adult within the first three broods was 15 (must be ≥ 15).

Reference toxicant: 6-d test with NaCl initiated on August 15, 2009;
(must be within 14 days of test initiation)
current results: (6-d LC50 and 95% confidence limits) =
3.39 (3.31-3.47) log (mg/L NaCl)
current results: (6-d IC50 and 95% confidence limits) =
2.75 (2.63-2.86) log (mg/L NaCl)
The reference toxicant test was performed under the same conditions as those used during this test.

Note: Outlined sections are protocol deviations explained on the comment page

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Test Data

Client: ALS106
Reference: 09-1501-01-CDD

Test Log:

Date	Day	Time	Technicians	Temperature (°C) Control	Sample
2009/08/19	0	1045	H. Stewart	24	25
2009/08/20	1	0920	N. Lavoie	25	25
2009/08/21	2	0925	J. Amyotte	25	25
2009/08/22	3	1130	N. Lavoie	25	25
2009/08/23	4	1020	N. Lavoie	25	25
2009/08/24	5	1035	N. Lavoie	25	25
2009/08/25	6	0845	E. Vinish	na	na

Chemistry Summary Tables:

New Solutions

Conc. %	ctl	1.6	3.1	6.3	13	25	50	100

Old Solutions

ctl	1.6	3.1	6.3	13	25	50	100

Average Values

pH	8.1	8.1	8.1	8.1	8.1	8.0	8.0	7.7	8.1	8.1	8.1	8.0	8.0	8.0	7.8	7.5
cond.	395	385	392	407	433	482	566	755	445	429	429	439	491	552	619	824
DO	7.3	7.2	7.0	7.1	7.1	7.0	6.9	7.2	7.4	7.1	7.0	7.0	6.9	6.9	7.3	7.4
temp.	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

Coefficients of Variation (%)

pH	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
cond.	7	10	9	10	8	7	8	9	6	4	4	4	6	11	6	2
DO	7	6	6	6	6	6	5	7	4	4	4	5	5	5	6	6
temp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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HydroQual Laboratories Ltd.

Ceriodaphnia (6-8d LC50/IC25) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-CDD

Biology (number of young produced):

Day	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Replicate	Control								13%							
1	0	0	0	4	7	9			0	0	0	2	0	2		
2	0	0	0	3	9	10			0	0	0	0	2	2		
3	0	0	3	2	6	-			0	0	2	0	2	**0**		
4	0	0	3	0	8	11			0	0	0	0	0	0		
5	0	0	0	0	0	0			0	0	0	0	0	0		
6	0	0	0	4	8	10			0	0	0	0	**0**	X		
7	0	**0**	X	X	X	X			0	0	0	0	**0**	X		
8	0	0	0	0	0	6			0	0	0	2	0	4		
9	0	0	0	3	6	9			0	0	0	0	2	0		
10	0	0	0	2	2	8			0	0	0	2	2	0		
	1.6%								25%							
1	0	0	0	2	6	0			0	0	0	0	0	0		
2	0	0	4	6	0	10			**0**	X	X	X	X	X		
3	0	0	4	6	0	11			0	0	0	0	0	0		
4	0	0	2	0	6	0			0	**0**	X	X	X	X		
5	0	0	0	3	6	8			**0**	X	X	X	X	X		
6	0	0	0	4	7	8			0	0	0	0	0	2		
7	0	0	0	2	7	9			**0**	X	X	X	X	X		
8	0	0	0	2	6	0			**0**	X	X	X	X	X		
9	0	0	2	0	4	12			0	**0**	X	X	X	X		
10	0	0	3	0	7	0			0	0	0	**0**	X	X		
	3.1%								50%							
1	0	0	0	3	4	0			**0**	X	X	X	X	X		
2	0	0	0	3	7	9			**0**	X	X	X	X	X		
3	0	0	0	3	5	9			**0**	X	X	X	X	X		
4	0	0	4	4	0	10			0	0	0	**0**	X	X		
5	0	0	0	0	3	0			**0**	X	X	X	X	X		
6	**0**	X	X	X	X	X			0	**0**	X	X	X	X		
7	0	0	0	3	6	0			0	**0**	X	X	X	X		
8	0	0	0	0	2	4			**0**	X	X	X	X	X		
9	0	0	0	5	7	0			0	**0**	X	X	X	X		
10	0	0	0	0	0	6			0	**0**	X	X	X	X		

Notes: #, young produced; 0, no young; X, dead; bold #, number of young the test organism had the day it died; —, young produced after third brood

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HydroQual Laboratories Ltd.

Ceriodaphnia (6-8d LC50/IC25) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-CDD

Biology (number of young produced):

Day	1	2	3	4	5	6	7	8

Replicate	6.3%							
1	0	0	0	3	2	0		
2	0	0	2	0	5	3		
3	0	0	0	0	6	6		
4	0	0	0	0	5	**0**		
5	0	0	0	2	2	0		
6	0	0	0	2	2	2		
7	0	0	**0**	X	X	X		
8	0	0	0	0	4	0		
9	0	0	0	0	6	0		
10	0	0	0	0	6	3		

1	2	3	4	5	6	7	8
100%							
0	**0**	X	X	X	X		
0	0	**0**	X	X	X		
0	**0**	X	X	X	X		
0	**0**	X	X	X	X		
0	**0**	X	X	X	X		
0	X	X	X	X	X		
0	**0**	X	X	X	X		
0	**0**	X	X	X	X		
0	0	0	0	**0**	X		
0	**0**	X	X	X	X		

Notes: #, young produced; 0, no young; X, dead; bold #, number of young the test organism had the day it died; —, young produced after third brood

Biology Summary Tables:

Conc. %	ctl	1.6	3.1	6.3	13	25	50	100

Day	Number of Organism Alive							
0	10	10	10	10	10	10	10	10
1	10	10	9	10	10	6	5	9
2	9	10	9	10	10	4	1	2
3	9	10	9	9	10	4	1	1
4	9	10	9	9	10	3	0	1
5	9	10	9	9	8	3	0	0
6	9	10	9	8	7	3	0	0
7								
8								

	Percent Mortality (%)							
mean	10	0	10	20	30	70	100	100

Replicate	Total Young Produced by Each Adult							
1	20	8	7	5	4	0	0	0
2	22	20	19	10	4	0	0	0
3	11	21	17	12	4	0	0	0
4	22	8	18	5	0	0	0	0
5	0	17	3	4	0	0	0	0
6	22	19	0	6	0	2	0	0
7	0	18	9	0	0	0	0	0
8	6	8	6	4	6	0	0	0
9	18	18	12	6	2	0	0	0
10	12	10	6	9	4	0	0	0

	ctl	1.6	3.1	6.3	13	25	50	100

Day	Daily Young Production							
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	6	15	4	2	2	0	0	0
4	18	25	21	7	6	0	0	0
5	46	49	34	38	8	0	0	0
6	63	58	38	14	8	2	0	0
7								
8								
Total	133	147	97	61	24	2	0	0

	Young Per Adult (within first three broods)							
mean	13	15	10	6	2	0	0	0
sd	8.87	5.48	6.57	3.45	2.27	0.63	0	0
cv(%)	66.7	37.3	67.7	56.5	94.6	316	na	na

Young Production as a Percent of Controls							
100	111	73	46	18	2	0	0

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Ceriodaphnia (6-8d LC50/IC25) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-CDD

Chemistry:

Day	New Solutions								Old Solutions							
Conc. %	ctl	1.6	3.1	6.3	13	25	50	100	ctl	1.6	3.1	6.3	13	25	50	100
	pH (units)								pH (units)							
0	8.4	8.3	8.3	8.3	8.3	8.2	8.1	7.6								
1	8.1	8.1	8.1	8.1	8.1	8.0	8.0	7.8	8.1	8.1	8.1	8.0	8.0	7.9	7.7	7.5
2	8.0	8.0	8.0	8.0	8.0	7.9	7.8	7.6	8.0	8.0	8.0	7.9	7.9	7.9	7.8	7.6
3	8.3	8.3	8.2	8.2	8.2	8.2	8.1	7.8	8.2	8.2	8.2	8.2	8.2	8.2	8.1	7.8
4	8.0	8.0	8.0	8.0	7.9	7.9	-	7.5	7.8	7.9	7.9	7.9	7.9	7.9	7.7	7.2
5	7.9	8.0	8.0	8.0	8.0	7.9	-	-	7.9	8.0	8.0	8.0	7.9	7.9	-	7.6
6									8.3	8.3	8.3	8.2	8.2	8.2	-	-
7																
8																
	Conductivity (µS/cm)								Conductivity (µS/cm)							
0	392	394	398	434	438	487	590	781								
1	383	396	402	415	437	492	589	780	420	432	434	442	480	567	649	833
2	444	414	420	425	454	500	591	780	435	433	426	437	475	565	629	837
3	382	311	321	330	368	415	495	637	425	397	400	402	449	431	634	830
4	406	413	419	432	462	499	-	797	441	427	444	452	507	576	562	792
5	362	381	390	404	438	499	-	-	470	451	444	454	514	592	-	826
6									481	435	428	447	518	580	-	-
7																
8																
	Dissolved Oxygen (mg/L)								Dissolved Oxygen (mg/L)							
0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.8								
1	8.0	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.5	7.2	7.2	7.2	7.1	7.1	7.1	7.1
2	7.0	6.9	6.8	6.7	6.8	6.7	6.8	6.7	6.9	6.6	6.6	6.5	6.5	6.5	6.7	6.8
3	7.5	7.5	7.2	7.1	7.0	7.0	7.0	7.0	7.1	7.1	6.8	6.6	6.5	6.6	7.6	7.6
4	7.1	7.0	6.7	7.0	7.1	7.1	-	7.9	7.4	7.0	6.9	6.9	6.9	6.9	7.7	8.0
5	7.6	7.6	7.6	7.6	7.6	7.5	-	-	7.7	7.5	7.4	7.4	7.3	7.3	-	7.7
6									7.5	7.4	7.2	7.1	7.1	7.1	-	-
7																
8																
	Temperature (°C)								Temperature (°C)							
0	25	25	25	25	25	25	25	25								
1	25	25	25	25	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	25	25	25	25
3	25	25	25	25	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	25	25	25
5	25	25	25	25	25	25	-	-	25	25	25	25	25	25	-	25
6									25	25	25	25	25	25	-	-
7																
8																

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-CDD

Test Result Comments:
None

Data Analysis:
Endpoints for mortality were calculated using a linear regression model (Log-Normal Probit) with CETIS v. 1.7.0 rev Q.

Regression analysis was attempted on the data, but the assumptions of normality and equal variance were not met. Therefore, endpoints for reproduction were calculated using a Linear Interpolation model using CETIS v. 1.7.0 rev Q.

Protocol Deviations:
None

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Quality Assurance Information

Culture history for adults used in the test for reference 09-1501:

Number of young produced per brood adult:
(Note: The third brood per adult may be on the day the test is set)

	row/replicate	C1	C3	C5	D3	D4	E2	E4	C2			
	number of young											
	number of adults											
		C1	C3	C5	D3	D4	E2	E4	C2			
	number of young											
	number of adults											
		C1	C3	C5	D3	D4	E2	E4	C2			
	number of young											
	number of adults											
		C1	C3	C5	D3	D4	E2	E4	C2			
	number of young	8	4	8	7	6	6	2	5			
	number of adults	1	1	1	1	1	1	1	1			
		C1	C3	C5	D3	D4	E2	E4	C2			
	number of young	10	3	4	8	10	11	9	8			
	number of adults	1	1	1	1	1	1	1	1			
		C1	C3	C5	D3	D4	E2	E4	C2			
	number of young	8	9	10	7	13	8	9	2			
	number of adults	1	1	1	1	1	1	1	1			
		C1	C3	C5	D3	D4	E2	E4	C2			
DAY USED	number of young	8	8	9	9	10	12	9	15			
2009/08/19	number of adults	1	1	1	1	1	1	1	1			
		C1	C3	C5	D3	D4	E2	E4	C2			
totals (# of young in first 3 broods)	number of young	26	16	22	22	29	25	20	15			

Number of young produced per organism in the last brood before use: 10

Mean number of surviving young per adult over the first three broods: 22

Culture mortality over the last seven days: 12

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Warning Chart
Ceriodaphnia

Test Method: *Ceriodaphnia* Survival and Reproduction Test (6 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*, 2007. Environment Canada, EPS 1/RM/21

Test Organism:

test species:	*Ceriodaphnia dubia*
culture source:	in-house
original culture source:	Environment Canada
ephippia in stock culture:	none
food type:	YAT:Algae
frequency of feeding:	daily
age of test organisms:	<24 hours
culture mortality 7 days prior:	0
culture fecundity 7 days prior within the first three broods:	22
young produced in previous brood:	9
culture condition prior to test initiation:	normal
culture water:	50:50 water

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

*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.

Control/Dilution Water:

source:	equal volumes of Bow River water and moderately hard reconstituted water (50:50 water)
pH (units):	8.2
conductance (uS/cm):	370
dissolved oxygen (mg/L):	7.3
NH_4^+ (mg/L):	<0.1
hardness (mg $CaCO_3$/L):	127
alkalinity (mg $CaCO_3$/L):	128
total residual chlorine (mg/L):	<0.01

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

Comments: There were no protocol deviations during the conduct of this test.

Quality Assurance Unit: L. Denson for
Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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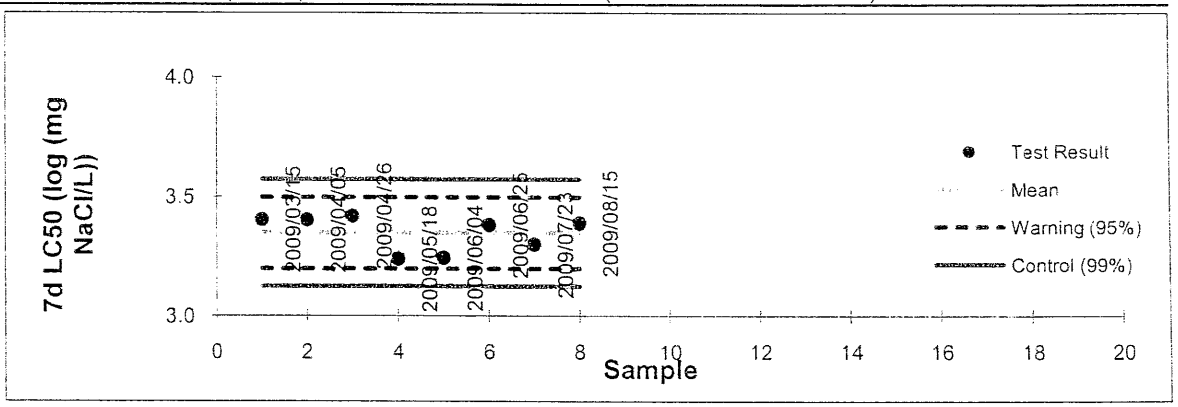
Mortality

Current Test

toxicant Sodium chloride (NaCl)
started on 2009/08/15 ended on 2009/08/21

Result (6d LC50):	3.39	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	3.31	upper	3.47	
Historical Values					
mean	3.35	sd	0.07	cv(%):	2
	lower	upper			
warning limits (±2 sd)	3.20	3.50	(95% confidence limits)		
control limits (±3 sd)	3.12	3.57	(99% confidence limits)		

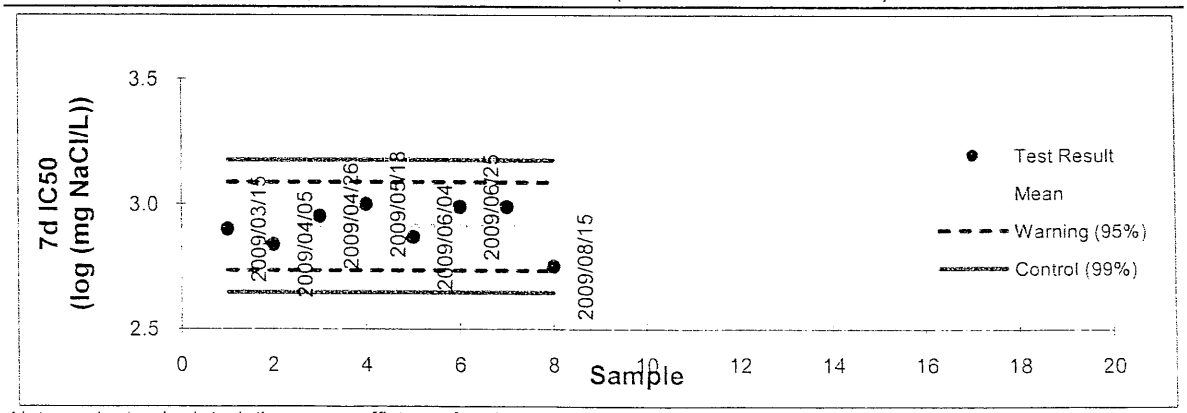


Reproduction

Current Test

toxicant Sodium chloride (NaCl)
started on 2009/08/15 ended on 2009/08/21

Result (6d IC50):	2.75	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.63	upper	2.86	
Historical Values					
mean	2.91	sd	0.09	cv(%):	3
	lower	upper			
warning limits (±2 sd)	2.73	3.09	(95% confidence limits)		
control limits (±3 sd)	2.65	3.18	(99% confidence limits)		



Notes: sd, standard deviation; cv, coefficient of variance; NA, could not be calculated

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Ceriodaphnia Test Report

Quality Assurance Information

Culture history for adults used in the test for reference QA186:

Number of young produced per brood adult:
(Note: The third brood per adult may be on the day the test is set)

row/replicate	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young											
number of adults											

	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young											
number of adults											

	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young											
number of adults											

	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young	6	7	4	4	7	6	3	6	2		
number of adults	1	1	1	1	1	1	1	1	1		

	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young	5	7	11	3	8	10	10	11	9		
number of adults	1	1	1	1	1	1	1	1	1		

	A5	B2	C2	C3	D3	D4	D5	E2	E4		
number of young	7	9	8	9	7	13	8	8	9		
number of adults	1	1	1	1	1	1	1	1	1		

DAY USED 2009/08/15		A5	B2	C2	C3	D3	D4	D5	E2	E4		
	number of young	9	9	8	8	10	10	8	10	11		
	number of adults	1	1	1	1	1	1	1	1	1		

totals (# of young in first 3 broods)		A5	B2	C2	C3	D3	D4	D5	E2	E4		
	number of young	18	23	23	16	22	29	21	25	20		

Number of young produced per organism in the last brood before use	9
Mean number of surviving young per adult over the first three broods	22
Culture mortality over the last seven days	0

HydroQual Laboratories Ltd.

Fathead minnow (7-d LC50/IC25) Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-FMD

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

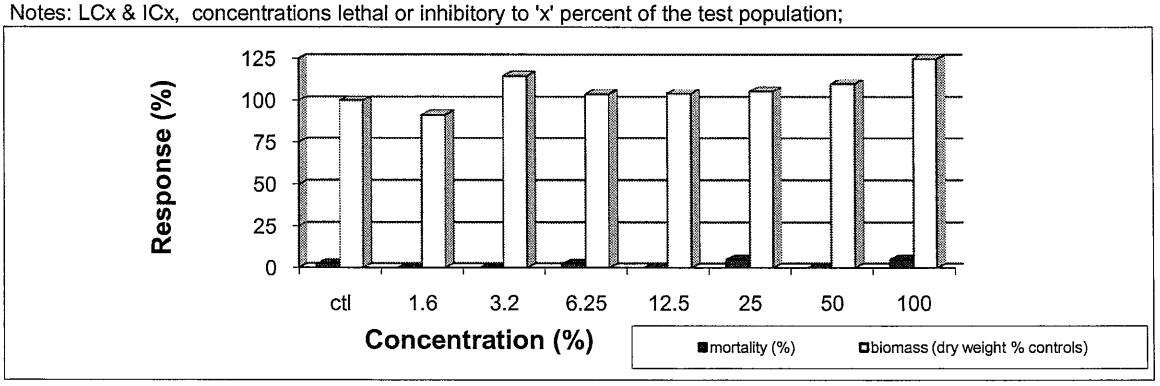
Test: started on 2009/08/20 ; ended on 2009/08/27

Contents

Result:

	Endpoint (7-day)	Value	Confidence Limits (95%) lower	upper	Units	Method Calculated
Acute:	LC25	>100			%	could not be calculated
(survival)	LC50	>100			%	could not be calculated
Chronic:	IC25	>100			%	could not be calculated
(growth)	IC50	>100			%	could not be calculated

Notes: LCx & ICx, concentrations lethal or inhibitory to 'x' percent of the test population;



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
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Test Conditions

Client: ALS106
Reference: 09-1501-01-FMD

Method: Biological Test Method: Test of Larval Growth and Survival Using Fathead minnows, 1992. Environment Canada, EPS 1/RM/22. (amended September 2008)

Test type: Fathead Minnow 7-d Survival and Growth Static Renewal Test (HQ 4.4.4.6)
Species: *Pimephales promelas*
Age: ≤ 24 hour post hatch
Organism source: Aquatox Inc., Hot Springs, Arkansas (Batch 20090820FM)
Culture conditions: temperature, 25 °C; dissolved oxygen, 95-100 % saturation
Shipped: 2009/08/19
Breeding Stock Mortality: < 1 % during the week prior to test initiation
Organisms upon receipt: mortality, < 1 %; temperature, 24°C: dissolved oxygen, 9.6 mg/L
No acclimation was necessary. Test organisms maintained at 25 ± 1°C until loaded
The EC guidance document on the importation of test organisms (1999) has been followed. Test organisms were received in good condition, with inflated swim bladders and normal feeding behaviour.
Organism observation: No unusual behaviour or appearance or treatment of test organisms was noted prior to shipping, upon arrival, preceding or during the test. Normal feeding behaviour was noted during the test.
Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 3 days (must be ≤3 days); The test was conducted with three subsamples; samples a, b, and c were for days 0 to 2, 3 to 5, and 6 to 8.
Sample storage: 4 ± 2°C in darkness

Test vessel: Tests were conducted in 500 mL plastic vessels
Test volume: 250 mL of solution (depth of 6.5 cm), replenished daily
Control/dilution water: The control and dilution water was dechlorinated City of Calgary water acclimated to the test conditions; no chemicals were added to the dilution/control water
Test concentrations: 7 effluent concentrations (1.6, 3.2, 6.3, 13, 25, 50, 100% (v/v) plus a negative control)
Test replicates: Ten fish ≤ 24 hours old were loaded per test vessel; 4 replicates/conc.
Feeding: The test organisms were fed twice daily newly-hatched brine shrimp nauplii
The fish are not fed during the final 12 hours of the test
Measurements: pH, conductivity, dissolved oxygen and temperature were measured daily
Sample pre-treatment: The sample was not aerated, filtered or pH adjusted prior or during testing
The dissolved oxygen concentration (mg/L) was: 7.5
The sample pH was: 7.8
Lighting: Overhead full spectrum fluorescent lights; 100-500 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 25 ± 1°C

Note: Outlined sections are protocol deviations explained on the comment page

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Client: ALS106
Reference: 09-1501-01-FMD

Test Conditions

Endpoint: Survival, 7-d LC50 (with 95% confidence limits)
Biomass, 7-d IC25 (with 95% confidence limits)
Test endpoints were bracketed by at least 1 test concentration (except for <1.6% or >100 %)
No outliers were observed within the data set

Test validity: Control had 97% survival (must ≥ 80%)
Control had 0% abnormal behaviour (must < 20%), e.g.atypical swimming, loss of equilibrium
The average dry weight of the control fish was 0.42 (must ≥ 0.25 mg)

Reference toxicant: 7-d test with NaCl initiated August 20, 2009;
current results: (7-d LC50 and 95% confidence limits) = 2.81 (2.73-2.88) log (mg/L NaCl)
current results: (7-d IC25 and 95% confidence limits) = 2.34 (2.00-2.59) log (mg/L NaCl)
The reference toxicant test was performed under the same conditions as those used during this test.

Note: Outlined sections are protocol deviations explained on the comment page

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HydroQual Laboratories Ltd.

Fathead minnow (7-d LC50/IC25) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-FMD

Test Log:

Date	Day	Time	Technicians	Temperature Before Use(°C) Control	Sample
2009/08/20	0	1450	N. Lavoie/S. Ehman	25	24
2009/08/21	1	1215	N. Lavoie	25	25
2009/08/22	2	1135	D. Lalonde	25	25
2009/08/23	3	1115	S. Ehman	25	25
2009/08/24	4	1410	N. Lavoie	25	25
2009/08/25	5	1530	E. Vinish	25	25
2009/08/26	6	1010	S. Ehman	25	25
2009/08/27	7	1305	T. Kloschinsky	na	na

Daily Swimming Behavior:

Day	ctl	1.6	3.2	6.3	12.5	25	50	100
0	normal	normal	normal	normal	normal	normal	normal	normal
1	normal	normal	normal	normal	normal	normal	normal	normal
2	normal	normal	normal	normal	normal	normal	normal	normal
3	normal	normal	normal	normal	normal	normal	normal	normal
4	normal	normal	normal	normal	normal	normal	normal	normal
5	normal	normal	normal	normal	normal	normal	normal	normal
6	normal	normal	normal	normal	normal	normal	normal	normal
7	normal	normal	normal	normal	normal	normal	normal	normal

Chemistry Summary Tables:

	New Solutions								Old Solutions							
Conc. (%)	ctl	1.6	3.2	6.25	12.5	25	50	100	ctl	1.6	3.2	6.25	12.5	25	50	100
Average Values																
pH	8.2	8.2	8.2	8.2	8.2	8.2	8.2	7.9	8.0	8.0	8.0	8.0	7.9	7.9	7.8	7.5
cond.	342	352	359	371	400	455	554	771	351	359	370	387	421	467	584	786
DO	7.7	7.6	7.5	7.4	7.4	7.4	7.5	7.6	7.0	6.9	6.7	6.6	6.5	6.6	6.6	6.6
temp	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Coefficients of Variation (%)																
pH	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3
cond.	4	3	3	3	3	4	2	1	4	1	2	2	3	3	3	1
DO	6	4	3	3	3	3	3	4	6	8	6	5	5	6	6	5
temp	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0

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HydroQual Laboratories Ltd.

Fathead minnow (7-d LC50/IC25) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-FMD

Biology (number alive):

Conc. (%)	ctl	1.6	3.2	6.25	12.5	25	50	100	ctl	1.6	3.2	6.25	12.5	25	50	100
Replicate	Day 1								Day 5							
a	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
b	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
c	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
d	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Day 2								Day 6							
a	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
b	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
c	10	10	10	10	10	10	10	9	10	10	10	10	10	9	10	9
d	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10
	Day 3								Day 7							
a	10	10	10	10	10	10	10	10	9	10	10	10	10	10	10	9
b	10	10	10	10	10	10	10	10	10	10	10	9	10	10	10	10
c	10	10	10	10	10	10	10	9	10	10	10	10	10	9	10	9
d	10	10	10	10	10	10	10	10	10	10	10	10	10	9	10	10
	Day 4								Unpreserved Dry Weights (mg)							
a	10	10	10	10	10	10	10	9	4.07	3.91	3.22	4.38	4.60	4.92	3.88	5.13
b	10	10	10	10	10	10	10	10	4.55	3.78	4.71	4.23	4.41	4.57	4.54	4.53
c	10	10	10	10	10	10	10	9	3.49	3.76	4.65	3.38	4.27	4.00	4.60	5.74
d	10	10	10	10	10	10	10	10	4.60	4.78	5.00	4.39	4.12	4.13	4.63	6.92

Biology Summary Tables:

	Mortality (%)								Biomass Data (mg per fish)							
a	10	0	0	0	0	0	0	10	0.41	0.39	0.32	0.44	0.46	0.49	0.39	0.51
b	0	0	0	10	0	0	0	0	0.46	0.38	0.47	0.42	0.44	0.46	0.45	0.45
c	0	0	0	0	0	10	0	10	0.35	0.38	0.46	0.34	0.43	0.40	0.46	0.57
d	0	0	0	0	0	10	0	0	0.46	0.48	0.50	0.44	0.41	0.41	0.46	0.69
mean	3	0	0	3	0	5	0	5	0.42	0.38	0.48	0.43	0.44	0.44	0.46	0.56
sd	5	0	0	5	0	6	0	6	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1
cv(%)	200	na	na	200	na	115	na	115	12	13	17	11	5	10	8	18

Average Dry Weight of Surviving Control Fish:	0.42

Biomass as a Percent of Controls							
100	91	115	104	104	105	110	134

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Test Data

Client: ALS106
Reference: 09-1501-01-FMD

Chemistry:

Conc. (%)	New Solutions ctl	1.6	3	6.25	12.5	25	50	100	Old Solutions ctl	1.6	3	6.25	12.5	25	50	100
Day	pH (units)								pH (units)							
0	8.2	8.3	8.3	8.3	8.3	8.2	8.2	7.8								
1	8.0	8.1	8.1	8.1	8.1	8.1	8.0	7.8	7.8	7.9	7.9	7.9	7.8	7.8	7.7	7.5
2	8.5	8.6	8.6	8.6	8.6	8.5	8.5	8.1	8.3	8.3	8.2	8.2	8.2	8.2	8.1	7.9
3	7.8	7.9	8.0	8.0	8.0	8.0	8.0	7.7	7.8	8.0	7.9	7.8	8.0	7.8	7.7	7.5
4	8.1	8.1	8.1	8.1	8.1	8.1	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.7	7.4
5	8.3	8.4	8.4	8.4	8.4	8.3	8.3	8.0	8.1	8.0	8.1	8.1	8.0	7.9	7.8	7.6
6	8.2	8.2	8.2	8.2	8.2	8.1	8.1	7.8	8.0	7.9	7.9	7.9	7.8	7.8	7.6	7.3
7									7.8	7.9	7.9	7.9	7.9	7.8	7.7	7.5
8																
	Conductivity (µS/cm)								Conductivity (µS/cm)							
0	335	338	342	356	386	440	549	768								
1	349	351	355	362	382	425	534	768	349	357	369	387	421	465	594	798
2	334	353	364	380	409	464	552	771	343	354	363	378	397	442	567	786
3	338	353	361	372	401	476	552	773	332	356	361	380	408	457	557	777
4	330	345	352	358	401	455	553	764	363	358	369	387	437	489	603	784
5	369	368	372	387	412	464	570	775	367	367	380	396	436	478	588	785
6	339	355	365	379	406	460	566	775	363	366	373	388	429	473	582	779
7									340	358	375	392	420	462	595	793
8																
	Dissolved Oxygen (mg/L)								Dissolved Oxygen (mg/L)							
0	7.7	7.7	7.7	7.6	7.6	7.6	7.7	7.5								
1	7.2	7.4	7.2	7.2	7.2	7.2	7.2	7.2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.5
2	7.6	7.5	7.4	7.3	7.3	7.3	7.3	7.5	7.2	6.8	6.8	6.6	6.4	6.4	6.7	6.6
3	8.4	8.2	7.4	7.8	7.8	7.6	7.8	8.2	7.5	8.0	7.4	7.2	6.9	7.2	7.2	7.0
4	8.0	7.9	7.8	7.7	7.7	7.7	7.6	7.7	7.4	7.2	7.0	7.0	6.9	7.0	6.9	7.0
5	7.2	7.4	7.3	7.2	7.2	7.2	7.2	7.5	6.6	6.5	6.4	6.3	6.2	6.3	6.1	6.1
6	7.5	7.4	7.4	7.3	7.3	7.3	7.4	7.6	6.7	6.5	6.3	6.3	6.3	6.3	6.3	6.2
7									7.1	6.9	6.7	6.6	6.7	6.6	6.6	6.5
8																
	Temperature (°C)								Temperature (°C)							
0	24	24	24	24	24	24	24	24								
1	25	25	25	25	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	25	25	25	25
3	25	25	25	25	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	25	25	25	25
5	25	25	25	25	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	25	25	25	25
7									25	25	25	25	25	25	25	25
8																

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-FMD

Test Result Comments:
The biomass data for replicates 1.6%D, 3.2%A, 6.3%C and 50%A were determined to be outliers using the Grubbs test (1969). These replicates were excluded from the calculations for mean biomass per fish.

Data Analysis:
Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for biomass could not be calculated. No effect occurred.

Protocol Deviations:
None

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HydroQual Laboratories Ltd.

Warning Chart
Fathead minnow

Test Method: 7 days Fathead minnow Survival and Growth Test (five treatments plus a control)
HydroQual Test Method Manual, section: 4.4.4.6
Reference: Biological Test Method: Test of Larval Growth and Survival Using Fathead minnows, 1992. Environment Canada, EPS 1/RM/22. (amended September 2008)

Test Organism:

test species:	*Pimephales promelas*
culture source:	Aquatox Inc. (Arkansas, USA)
temp of breeding aquaria:	23 - 26 °C
food type:	frozen brine shrimp
frequency of feeding:	daily
breeding colony mortality:	<1% (last 7 days)
age of test organisms:	<24 hours
condition prior to test initiation:	normal
batch number:	20090820FM

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):	7.1
conductance (µS/cm):	381
dissolved oxygen (mg/L):	7.4
NH_4^+ (mg/L):	<0.1
hardness (mg $CaCO_3$/L):	161
alkalinity (mg $CaCO_3$/L):	162
total residual chlorine (mg/L):	<0.01

Comments: None.

Quality Assurance Unit: _____

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Warning Chart
Fathead minnow

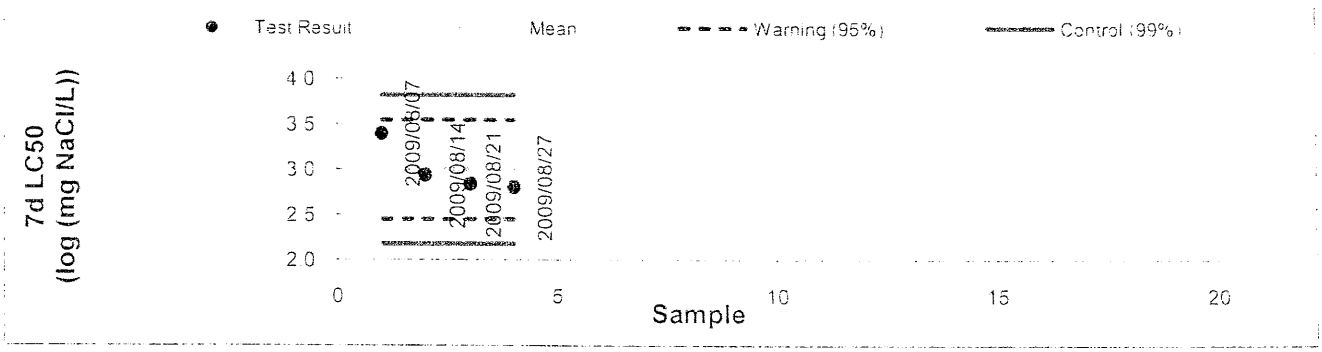
Mortality

Current Test

toxicant	Sodium Chloride (NaCl)				
started on	2009/08/20	ended on	2009/08/27		
Result (7 d LC50):	2 81	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.73	upper	2.88	

Historical Values

mean	3.00	sd	0.27	cv(%):	9
	lower	upper			
warning limits (±2 sd)	2.45	3.54	(95% confidence limits)		
control limits (±3 sd)	2.18	3.82	(99% confidence limits)		

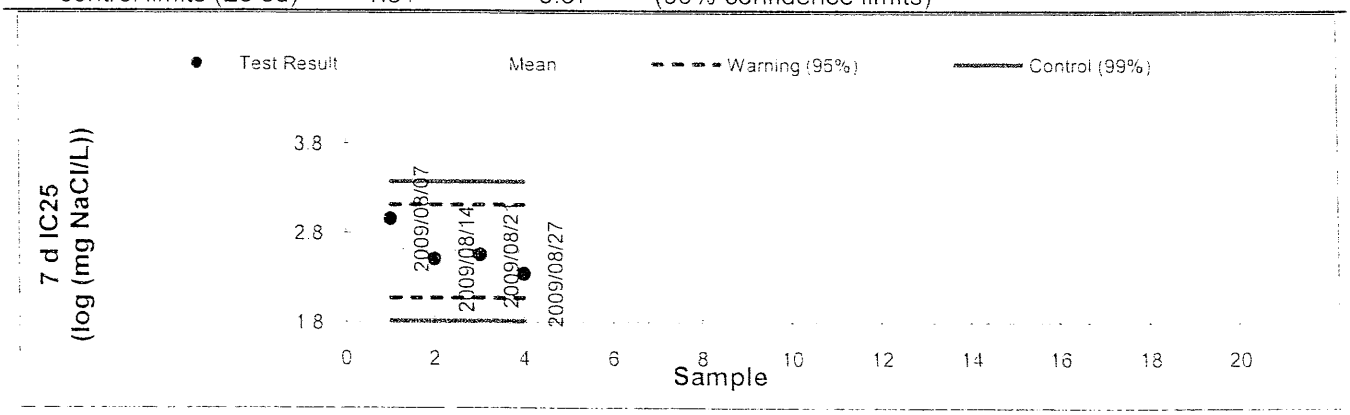


Biomass

started on	2009/08/20	ended on	2009/08/27		
Result (7 d IC25):	2.34	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.00	upper	2.59	

Historical Values

mean	2.59	sd	0 26	cv(%):	10
	lower	upper			
warning limits (±2 sd)	2.07	3.11	(95% confidence limits)		
control limits (±3 sd)	1.81	3.37	(99% confidence limits)		



notes: sd. standard deviation; cv, coefficient of variance; N/A, could not be calculated

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HydroQual Laboratories Ltd.

Lemna minor Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-LMD

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

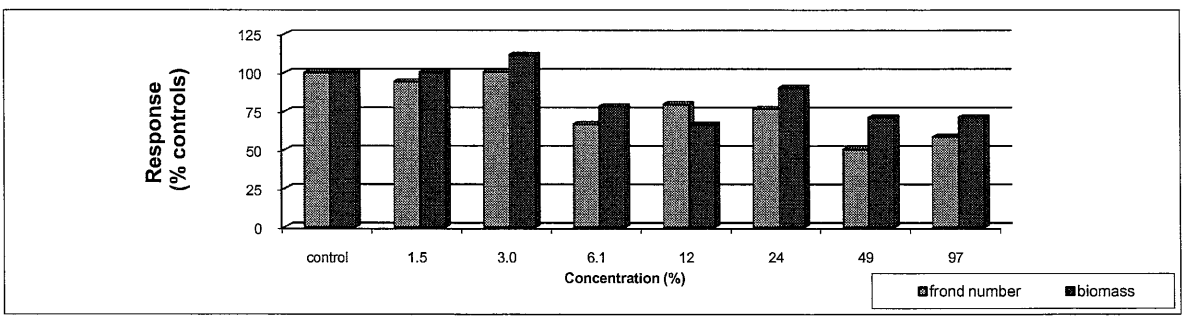
Test: started on 2009/08/19 ; ended on 2009/08/26

Contents

Result:

	Endpoint (7-day)	Value	Confidence Limits (95%) lower	upper	Units	Method Calculated
Chronic:	IC25	6.0	3.2	46	%	Linear Interpolation
(frond number)	IC50	>97	na	na	%	Linear Interpolation
Chronic:	IC25	25	na	na	%	Linear Interpolation
(biomass)	IC50	>97	na	na	%	Linear Interpolation

Notes: ICx, concentrations lethal or inhibitory to 'x' percent of the test population;



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
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Test Conditions

Client: ALS106
Reference: 09-1501-01-LMD

Method: Biological Test Method: Test for Measuring the Inhibition of Growth Using the Freshwater Macrophyte, *Lemna minor*. Environment Canada, EPS 1/RM/37 2nd Edition, January 2007

Test type: *Lemna* 7-d Inhibition of Growth Static Test (HQ 4.4.2.3)
Species: *Lemna minor*
Organism source: in-house culture, ≥ 3 weeks in age (original source: UTCC 492, clone 7730)
Culture health: The fronds were acclimated in test media for 24 hours prior to test initiation.
The test culture was axenic prior to testing.
There was a 9 fold increase in frond number of culture over last 7 days.
Test loaded with 3 frond daughter plants, all with light green fronds and short roots.
Culture age: The test was started with 9 day old fronds.
Culture media: modified Hoagland's E+ medium
Organism observation: No unusual behaviour, appearance or treatment of test organisms was noted prior to or during the test.

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 2 days (must be ≤ 3 days); 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.
Sample storage: 4 ± 2°C in darkness

Test vessel: The test was a static test conducted in 200 mL polyethylene plastic containers with clear lids.
Test volume: The test volume was 150 mL, depth of ≥ 4 cm
Test concentrations: 7 effluent concentrations (1.5, 3.0, 6.1, 12.1, 24, 49, 97% (v/v) plus a negative control)
Test replicates: There were four replicates per treatment with two 3 frond daughter plants per replicate; replicates are rotated daily.
Control/dilution water: Test media (modified APHA medium) made up with deionized City of Calgary water
water spiked with nutrients as per Environment Canada EPS 1/RM/37, 2007.
made by adding 60 mL of each of the three stock solutions to 5.82 L of DRO
The media aerated for 2 hours and was pH adjusted to 8.3±0.1 with 6N HCl or NaOH.
The test media was not filtered.
Elutriate preparation: 2009/08/19
Sample pre-treatment: 1455 mL of sample spiked with 15 mL of each of the three APHA stock solutions, no other chemicals added. The sample was not pH adjusted or filtered prior to testing.
Aeration: The sample was pre-aerated for 20 minutes at a rate of 100 bubbles/minute with oil free filtered compressed air from a 1 mL glass pipette attached to an air pump.

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: ALS106
Reference: 09-1501-01-LMD

Lighting: The cups were incubated under continuous full-spectrum light. The light levels were measured at the sample surface, at three locations on the testing bench, during testing:

left:	4520	lux	≈	72	µmol/m^2•S
centre:	5240	lux	≈	84	µmol/m^2•S
right:	4560	lux	≈	73	µmol/m^2•S

Measurements:
pH, conductivity, dissolved oxygen and temperature at test initiation and termination; temperature in the control, low, middle and high concentrations are recorded daily.

Test temperature: 25 ± 2°C

Endpoint: Growth (based on increase in frond number), 7-d IC25 (with 95% confidence limits)
Growth (based on dry weight), 7-d IC25 (with 95% confidence limits)
Test endpoints were bracketed by at least 1 test concentration.
(except for <1.6% or >97 %)
No outliers were observed within the data set

Test validity: The mean number of fronds in the controls have increased 10 times (must be ≥ 8 time increase). The average number attained at test termination was 57 (must be ≥48 fronds per test vessel).

Reference toxicant: 7-d test with Potassium Chloride (KCl) initiated August 25, 2009;
current results:
(Frond Number; 7-d IC25 and 95% confidence limits) = 3.37 (3.27-3.45) log(mg KCl/L)
current results:
(Biomass; 7-d IC25 and 95% confidence limits) = 3.53 (3.27-3.66) log (mg KCl/L)
The reference toxicant test was performed under the same conditions as those used during this test.

Note: Outlined sections are protocol deviations explained on the comment page

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HydroQual Laboratories Ltd.

Lemna minor Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-LMD

Test Log:

Date	Day	Time	Technicians	Rotate	Temperature (°C)			
					Control	3.0%	24%	97%
2009/08/19	0	1130	E. Vinish/T. Kloschinsky	no	24	24	24	24
2009/08/20	1	0820	N. Lavoie	yes	25	25	24	23
2009/08/21	2	0815	J. Amyotte	yes	23	23	24	24
2009/08/22	3	0915	S. Ehman	yes	24	23	23	23
2009/08/23	4	0910	S. Ehman	yes	23	23	23	23
2009/08/24	5	0915	H. Stewart	yes	24	23	24	25
2009/08/25	6	0820	H. Stewart	yes	26	24	24	26
2009/08/26	7	1210	E. Vinish/H. Stewart	no	24	24	24	24

Chemistry:

Conc.(%)	control	1.5	3.0	6.1	12	24	49	97	
				Day 0					
pH	8.2	8.3	8.3	8.2	8.2	8.2	8.1	8.0	
cond.	921	908	913	938	984	1069	1232	1594	
DO	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	
temp.	24	24	24	24	24	24	24	24	
				Day 7					
pH	8.5	8.6	8.7	8.8	8.8	8.9	8.8	8.7	
cond.	1295	1115	1093	1072	1159	1360	1573	1937	
DO	7.6	7.6	8.7	9.6	9.6	9.5	9.5	8.6	
temp.	24	24	24	24	24	24	24	24	

Notes: pH, units; cond., conductivity (µS/cm); DO, dissolved oxygen (mg/L); temp., temperature (°C)

Frond Appearance:

Concentration (%)	Day 0	Day 7
control	green, short roots, healthy	green, long roots, healthy
1.5	green, short roots, healthy	green, long roots, healthy, some algae
3.0	green, short roots, healthy	green, long roots, healthy, some algae
6.1	green, short roots, healthy	yellow, long roots, algae
12.1	green, short roots, healthy	yellow, long roots, algae
24	green, short roots, healthy	yellow, medium roots
49	green, short roots, healthy	yellow, medium roots, some chlorosis
97	green, short roots, healthy	yellow, medium roots, some chlorosis

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

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Test Data

Client: ALS106
Reference: 09-1501-01-LMD

Frond number:

Conc.(%)	control	1.5	3.0	6.1	12.1	24	49	97
Replicate				Day 0				
a	6	6	6	6	6	6	6	6
b	6	6	6	6	6	6	6	6
c	6	6	6	6	6	6	6	6
d	6	6	6	6	6	6	6	6
				Day 7				
a	61	62	55	37	49	48	31	35
b	68	61	57	42	53	40	34	30
c	51	43	63	42	43	43	28	44
d	49	51	55	40	42	50	34	35

Increase in Frond Number:

Conc.(%)	control	1.5	3.0	6.1	12.1	24	49	97
Replicate								
a	55	56	49	31	43	42	25	29
b	62	55	51	36	47	34	28	24
c	45	37	57	36	37	37	22	38
d	43	45	49	34	36	44	28	29
average	51	48	52	34	41	39	26	30
sd	9	9	4	2	5	5	3	6
cv	17	19	7	7	13	12	11	19
% ctls	100	94	100	67	80	77	50	59
% stim	0	-6	0	-33	-20	-23	-50	-41

Total Dry Weights (mg):

Conc.(%)	control	1.5	3.0	6.1	12.1	24	49	97
Replicate				Day 7				
a	5.0	4.4	4.6	3.2	3.6	4.1	2.9	3.1
b	4.3	5.1	4.9	3.4	3.3	3.6	3.3	2.6
c	3.9	3.3	5.2	3.3	2.0	3.7	2.4	3.7
d	3.9	4.3	4.4	3.5	2.5	4.1	3.6	2.9
				Day 7				
average	4.3	4.3	4.8	3.4	2.8	3.9	3.0	3.1
sd	0.5	0.8	0.3	0.1	0.8	0.2	0.5	0.5
cv	11	18	7	4	27	6	18	15
%ctls	100	100	111	78	66	90	71	71
% stim	0	0	11	-22	-34	-10	-29	-29

Notes: cv, coefficient of variation; %ctls, percent of controls; sd, standard deviation, % stim, percent stimulation

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-LMD

Test Result Comments:
None

Data Analysis:
Regression analysis was attempted on the data, but the assumptions of normality and equal variance were not met. Therefore, endpoints for frond number and biomass were calculated using a Linear Interpolation model using CETIS v. 1.7.0 rev Q.

Protocol Deviations:
None

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Warning Chart
Lemna

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*, 2007. Environment Canada, EPS 1/RM/37.

Test Organism:

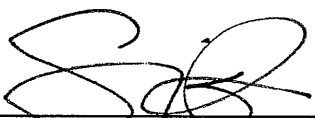
test species:	*Lemna minor*
culture source:	in-house
original culture source:	UTCC - 492 (clone 7730)
culture vessels:	250 mL Erlenmeyer flask
water source:	deionized water
growth medium:	Hoagland's E+ medium
cultivation method:	as per test conditons
temp of breeding aquaria:	25 ± 2°C
organism age:	7-10 days old acclimated to test media for 18 to 24 hours
mean increase in frond #:	
fold increase:	37

Test Design:

test type:	static
toxicant:	potassium chloride
water source:	deionized reverse osmosis water with nutrients as per EPS 1/RM/37
test vessel:	200mL polyethylene 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: City of Calgary tap water; deionized reverse osmosis water and nutrients as per EPS 1/RM/37

Comments: None.

Quality Assurance Unit: 

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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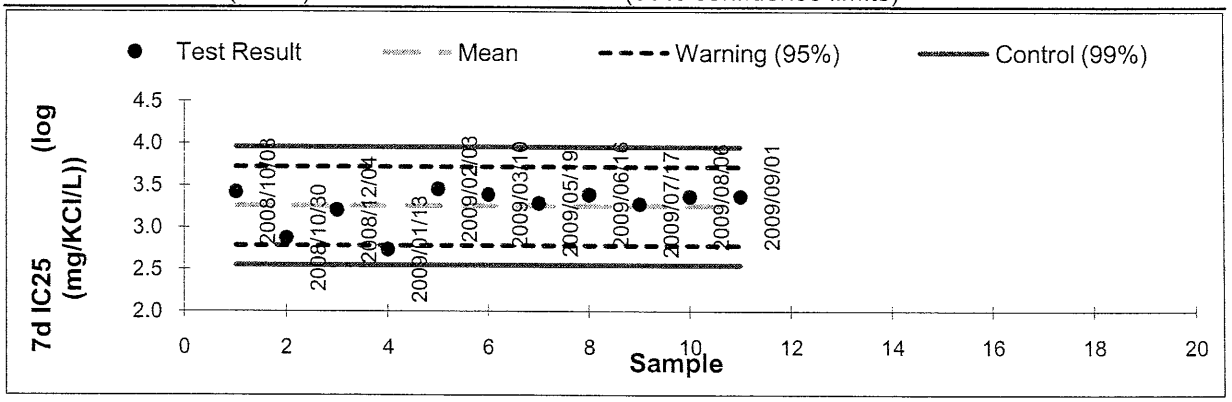
Frond Number

Current Test

toxicant	Potassium Chloride (KCl)				
started on	2009/08/25	ended on	2009/09/01		
Result (7 d IC25):	3.37	log (mg KCl/L); geometric mean			
Confidence Limits (95%)	lower	3.27	upper	3.45	

Historical Values

mean	3.25	sd	0.23	cv(%):	7
	lower	upper			
warning limits (±2 sd)	2.79	3.72	(95% confidence limits)		
control limits (±3 sd)	2.55	3.96	(99% confidence limits)		



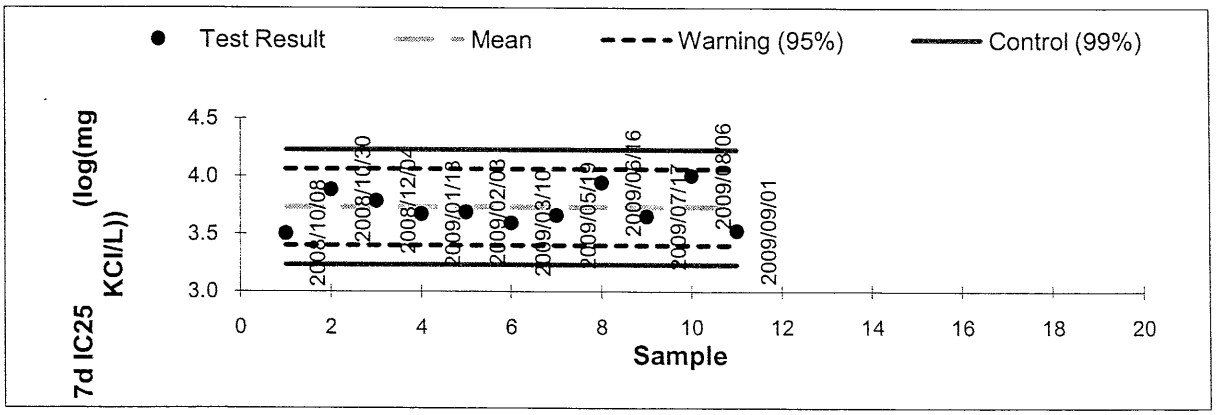
Biomass

Current Test

toxicant	Potassium Chloride (KCl)				
started on	2009/08/25	ended on	2009/09/01		
Result (7 d IC25):	3.53	log (mg KCl/L); geometric mean			
Confidence Limits (95%)	lower	3.27	upper	3.66	

Historical Values

mean	3.73	sd	0.17	cv(%):	4
	lower	upper			
warning limits (±2 sd)	3.40	4.06	(95% confidence limits)		
control limits (±3 sd)	3.23	4.23	(99% confidence limits)		



notes: sd, standard deviation; cv, coefficient of variance; NA, could not be calculated

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HydroQual Laboratories Ltd.

Trout (96-h LC50) Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-TRD

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

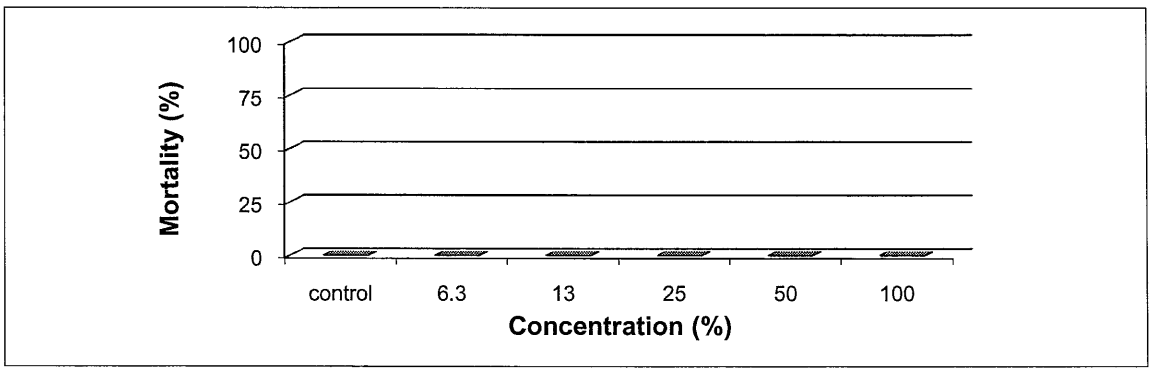
Contents

Test: started on 2009/08/20 ; ended on 2009/08/24

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%) lower	upper	Method Calculated
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

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Test Conditions

Client: ALS106
Reference: 09-1501-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (HQ 4.4.4.1)
Species: *Oncorhynchus mykiss*
Organism source: Sun Valley Trout Farms (Batch 20090716TR)
Acclimation: 35 days (must be ≥2 weeks)
Stock mortality: 0.96% (seven days preceeding testing)

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 3 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners
Test volume: 20 Litres (depth of solution in each test vessel ≥15cm)
Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L
Dissolved oxygen in 100 % sample was 8.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing
Loading density: 0.252 g/Litre (must be ≤ 0.5 g/Litre)
Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions
Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)
Test replicates: One replicate per treatment; 10 fish per replicate
Feeding: Fish are not fed 24 hours before test initiation and no feeding during test
Measurements: pH, conductivity, dissolved oxygen and temperature measured daily
Aeration: All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones
Lighting: Overhead full spectrum fluorescent lights; 100-500 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 15 ± 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)
Test validity: The control had 100% survival (must ≥ 90%)

Reference toxicant: 96-h test with Phenol (C_6H_5OH) initiated August 6, 2009; current results (96-h LC50 and 95% confidence limits) = 0.92 (0.79-1.01) log (mg/L Phenol)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

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HydroQual Laboratories Ltd.

Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-TRD

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/20	0	1215	N. Lavoie/S. Ehman	test fish loaded at 1215 h
2009/08/21	1	1030	J. Amyotte/N. Lavoie	all test fish appear normal
2009/08/22	2	1045	D. Lalonde/S. Ehman	all test fish appear normal
2009/08/23	3	1045	D. Lalonde/N. Lavoie	all test fish appear normal
2009/08/24	4	1005	E. Vinish/H. Stewart	all test fish appear normal

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
Day	pH (units)							
0	8.0	8.1	7.9	8.0	8.1	7.8		
1	8.0	7.9	7.8	7.8	7.7	7.2		
2	8.3	8.2	8.2	8.2	8.0	7.9		
3	8.1	8.1	8.1	8.0	7.9	7.7		
4	7.9	7.8	7.8	7.8	7.6	7.3		
	Conductivity (µS/cm)							
0	410	420	439	492	600	804		
1	390	420	442	492	599	809		
2	397	418	432	480	593	796		
3	400	415	419	482	594	793		
4	378	409	426	483	589	799		
	Dissolved Oxygen (mg/L)							
0	8.0	8.1	8.1	8.1	8.1	8.1		
1	8.2	8.2	8.2	8.3	8.2	8.3		
2	8.3	8.3	8.4	8.4	8.8	8.6		
3	9.1	9.1	9.3	9.4	9.4	9.4		
4	9.0	9.0	8.9	8.9	8.9	8.9		
	Temperature (°C)							
0	15	15	15	15	15	15		
1	15	15	15	15	15	15		
2	15	15	15	15	15	15		
3	15	15	15	15	15	15		
4	15	14	15	15	15	15		

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HydroQual Laboratories Ltd.

Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-TRD

Number Alive:

Conc. (%)	control	6.3	13	25	50	100		
Day								
0	10	10	10	10	10	10		
1	10	10	10	10	10	10		
2	10	10	10	10	10	10		
3	10	10	10	10	10	10		
4	10	10	10	10	10	10		
				Mortality (%)				
4	0	0	0	0	0	0		

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.4	0.5
2	3.5	0.4
3	3.7	0.6
4	3.9	0.6
5	3.4	0.6
6	3.9	0.5
7	3.2	0.2
8	3.1	0.3
9	4.5	0.9
10	3.5	0.4
average	3.6	0.5
sd	0.4	0.2
cv(%)	11.3	36.9

Notes: nd, not done; na, not applicable; sd, standard deviation; cv(%), coefficient of variation

Conc. (%)	Group Wet Weight (g)
control	5.0
6.3	4.0
13	3.8
25	3.8
50	4.0
100	3.4

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-TRD

Test Result Comments:
None

Data Analysis:
Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:
None

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HydroQual Laboratories Ltd.

Warning Chart
Trout

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 species: *Oncorhyncus mykiss*
culture source: Sun Valley
temperature (°C): 15 ± 1
dissolved oxygen: saturated
stock mortality (last 7d): 0.00%
batch number: 20090716TR

Test Design:

vol. of test vessel (L): 22
test volume depth: >15 cm
replicates per treatment: 1
fingerlings per replicate: 10
loading (g fish/L): <0.5
temperature (°C): 15 ± 1
photoperiod: 16h light: 8h dark
light level (water surface): 100-500 lux
control/dilution water: dechlorinated tap water

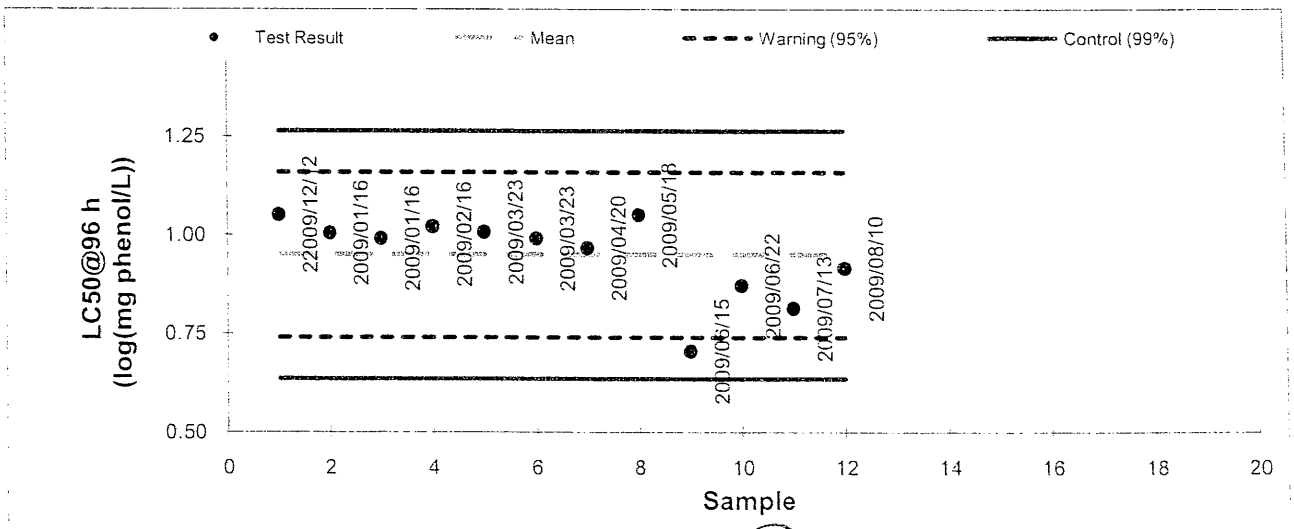
Current Test

toxicant	phenol (C_6H_5OH)				
started on	2009/08/06	ended on	2009/08/10		
Result (LC50 @ 96h)	0.92	log (mg phenol/L); geometric mean			
Confidence Limits (95%)	lower	0.79	upper	1.01	

Historical Values

mean	0.95	sd	0.10	cv(%):	11
	lower	upper			
warning limits (±2 sd)	0.74	1.16	(95% confidence limits)		
control limits (±3 sd)	0.63	1.26	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance



Qualty Assurance Unit:

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Trout (single concentration) Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-TRD

Client: ALS Laboratory Group; operation Edmonton

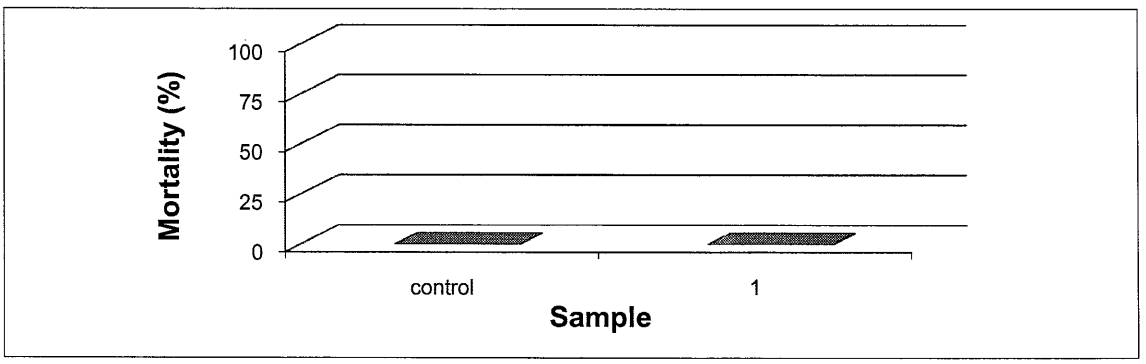
Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

Test: started on 2009/08/19; ended on 2009/08/23

Contents

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
1	L806858-1	0	not toxic as tested



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

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Test Conditions

Client: ALS106
Reference: 09-1501-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended 2007).

Test type: Trout 96-h Static Acute Test (HQ 4.4.4.1)
Species: *Oncorhynchus mykiss*
Organism source: Sun Valley Trout Farms (Batch 20090716TR)
Acclimation: 34 days (must be ≥ 2 weeks)
Stock mortality: 1.40% (seven days preceeding testing)

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 2 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners
Test volume: 20 Litres (depth of solution in each test vessel ≥15cm)
Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L
Dissolved oxygen in full strength sample was 7.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing
Loading density: 0.197 g/Litre (must be ≤ 0.5 g/Litre)
Control water: Dechlorinated City of Calgary water acclimated to test conditions
Test concentrations: Undiluted sample plus a negative control
Test replicates: One replicate per treatment; 10 fish per replicate
Feeding: Fish are not fed 24 hours before test initiation and no feeding during test
Measurements: pH, conductivity, dissolved oxygen and temperature measured daily
Aeration: All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones
Lighting: Overhead full spectrum fluorescent lights; 100-500 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 15 ± 1°C

Endpoint: Mortality, % mortality at 96-h
Test validity: The control had 100% survival (must ≥ 90%)

Reference toxicant: 96-h test with Phenol (C_6H_5OH) initiated August 6, 2009; current results (96-h LC50 and 95% confidence limits) = 0.92 (0.79-1.01) log (mg/L Phenol)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

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HydroQual Laboratories Ltd.

Trout (single concentration) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-TRD

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/19	0	1030	N. Lavoie/E. Vinish	test fish loaded at 1030 h
2009/08/20	1	1215	S. Ehman/N. Lavoie	all test fish appear normal
2009/08/21	2	1030	J. Amyotte/N. Lavoie	all test fish appear normal
2009/08/22	3	1045	D. Lalonde/S. Ehman	all test fish appear normal
2009/08/23	4	1050	D. Lalonde/N. Lavoie	all test fish appear normal

Chemistry:

Sample	control	1						

Day	pH (units)							
0	7.9	7.8						
1	8.3	7.6						
2	7.9	6.9						
3	8.1	7.8						
4	7.9	7.7						

	Conductivity (µS/cm)							
0	338	798						
1	338	801						
2	340	812						
3	398	780						
4	370	775						

	Dissolved Oxygen (mg/L)							
0	7.8	7.8						
1	8.0	8.1						
2	8.3	8.4						
3	8.4	8.4						
4	8.6	8.7						

	Temperature (°C)							
0	16	16						
1	15	15						
2	15	15						
3	15	15						
4	15	15						

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Test Data

Client: ALS106
Reference: 09-1501-01-TRD

Number Alive:

Sample	control	1						
Day								
0	10	10						
1	10	10						
2	10	10						
3	10	10						
4	10	10						
				Mortality (%)				
4	0	0						

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.4
2	3.5	0.4
3	3.2	0.3
4	3.3	0.3
5	3.4	0.3
6	3.7	0.4
7	4.5	0.8
8	3.7	0.4
9	3.5	0.3
10	3.3	0.3
average	3.5	0.4
sd	0.4	0.2
cv(%)	10.9	38.7

Notes: nd, not done; na, not applicable; sd, standard deviation; cv(%), coefficient of variation

Sample	Group Wet Weight (g)
control	3.9
1	3.8

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-TRD

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

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HydroQual Laboratories Ltd.

Warning Chart
Trout

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 species:	*Oncorhyncus mykiss*
culture source:	Sun Valley
temperature (°C):	15 ± 1
dissolved oxygen:	saturated
stock mortality (last 7d):	0.00%
batch number:	20090716TR

Test Design:

vol. of test vessel (L):	22
test volume depth:	>15 cm
replicates per treatment:	1
fingerlings per replicate:	10
loading (g fish/L):	<0.5
temperature (°C):	15 ± 1
photoperiod:	16h light: 8h dark
light level (water surface):	100-500 lux
control/dilution water:	dechlorinated tap water

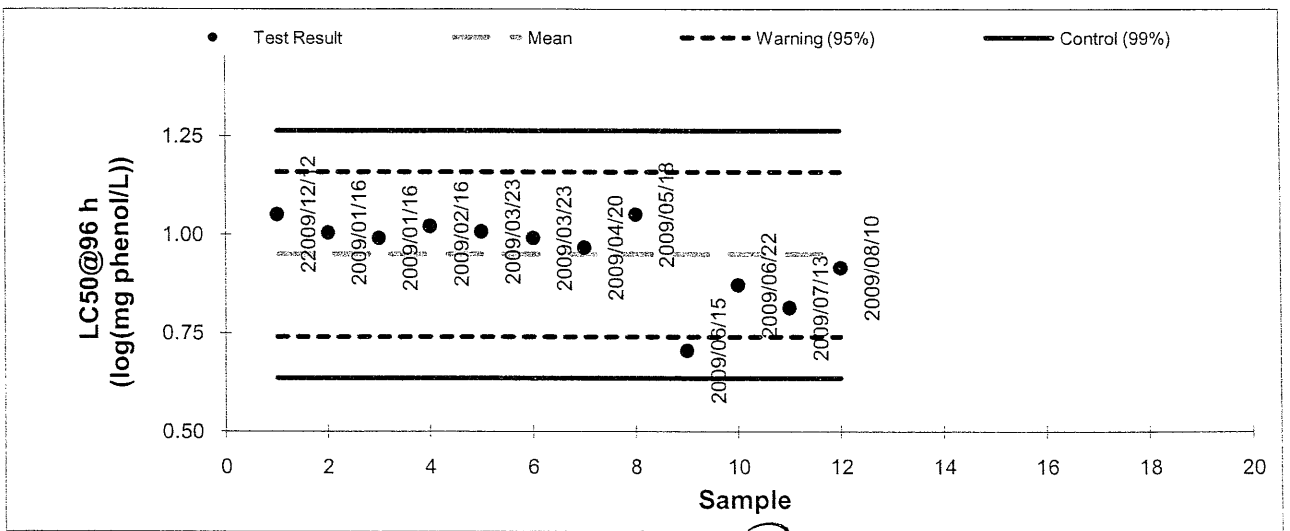
Current Test

toxicant	phenol (C_6H_5OH)				
started on	2009/08/06	ended on	2009/08/10		
Result (LC50 @ 96h)	0.92	log (mg phenol/L); geometric mean			
Confidence Limits (95%)	lower	0.79	upper	1.01	

Historical Values

mean	0.95	sd	0.10	cv(%):	11
	lower	upper			
warning limits (±2 sd)	0.74	1.16	(95% confidence limits)		
control limits (±3 sd)	0.63	1.26	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance



Qualty Assurance Unit:

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Daphnia (48-h LC50/EC50) Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-DAD

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

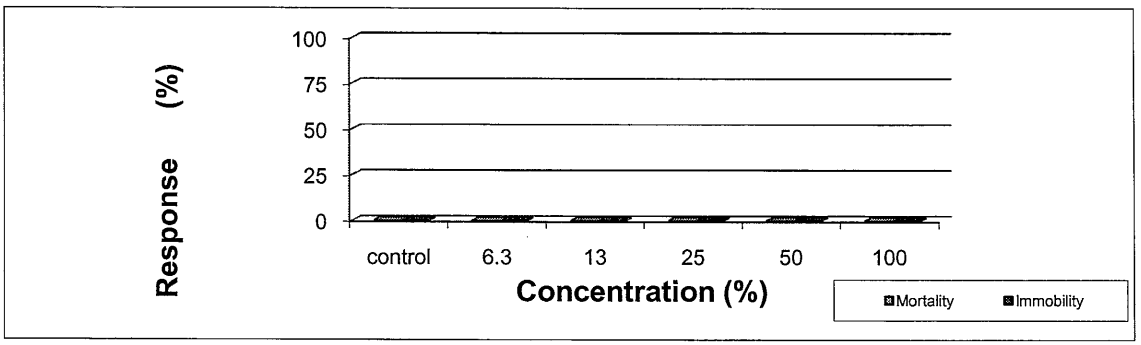
Test: started on 2009/08/20 ; ended on 2009/08/22

Contents

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower	upper	Method Calculated
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
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Test Conditions

Client: ALS106
Reference: 09-1501-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (HQ 4.4.3.1)
Species: *Daphnia magna*
Age: < 24 hours old
Organism source: in-house culture
Stock mortality: 7%
Culture brood data: 10 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 3 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: 385 mL plastic vessels
Test volume: 150 mL
Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L^{-1})
The hardness of the sample was not adjusted (mg $CaCO_3$/L) prior to or during testing
Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)
Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions
The hardness of the control/dilution water was 128 mg $CaCO_3$/L
Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)
Test replicates: One replicate per treatment, 10 daphnids per replicate
Feeding: None
Aeration: None
Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination
Lighting: Cool white fluorescent lights; 400-800 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 20 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: ALS106
Reference: 09-1501-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)

Test validity: The control had 100% survival (must ≥ 90%)
Control had 0 percent (%) abnormal behaviour (must ≤ 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated August 18, 2009; current results (48-h LC50 and 95% confidence limits) = 0.76 (0.72-0.80) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

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HydroQual Laboratories Ltd.

Daphnia (48-h LC50/EC50) Test Report

Test Data

Client: ALS106
Reference: 09-1501-01-DAD

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/20	0	1120	E. Vinish/S. Ehman	test *Daphnia* appear normal
2009/08/21	1	0930	T. Kloschinsky	test *Daphnia* appear normal
2009/08/22	2	0900	N. Lavoie	test *Daphnia* appear normal

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
Day	pH (units)							
0	8.2	8.2	8.2	8.2	8.2	7.7		
2	8.2	8.4	8.5	8.5	8.4	8.1		
	Conductivity (µS/cm)							
0	370	403	431	485	588	788		
2	390	409	438	489	593	810		
	Dissolved Oxygen (mg/L)							
0	7.6	7.7	7.6	7.6	7.6	7.6		
2	8.0	7.9	7.8	7.8	7.8	7.7		
	Temperature (°C)							
0	18	18	18	18	18	18		
2	18	18	18	18	18	18		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
Day	Number Alive and Behavior (behavior is in brackets)							
1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

	Mortality (%)							
2	0	0	0	0	0	0		
	Immobility (%)							
2	0	0	0	0	0	0		

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Comments/Statistics

Client: ALS106
Reference: 09-1501-01-DAD

Test Result Comments:
None

Data Analysis:
Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:
None

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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:	10
mean brood size:	23
ephippia in stock culture:	no
age of test organisms:	<24 hours old
culture mortality (%):	0%

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

Current Test

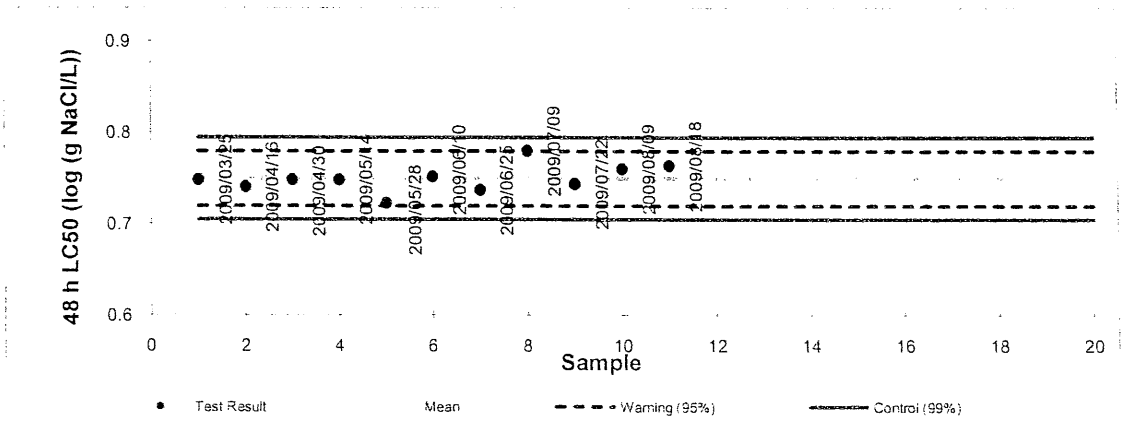
toxicant	Sodium Chloride (NaCl)				
started on	2009/08/18	ended on	2009/08/20		
Result (LC50 @ 48h)	0.76	log (g NaCl/L); geometric mean			
Confidence Limits (95%)	lower	0.72	upper	0.80	

Historical Values

mean	0.75	sd	0.01	cv(%):	2
	lower	upper			
warning limits (±2 sd)	0.72	0.78	(95% confidence limits)		
control limits (±3 sd)	0.70	0.79	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance

Comments: None



Quality Assurance Unit: L. Denson for

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Daphnia (single concentration) Test Report

Result Summary

Client: ALS106
Reference: 09-1501-01-DAD

Client: ALS Laboratory Group; operation Edmonton

Sample: L806858-1
LUP-10
Collection: collected on 2009/08/17 at not given by AM
Receipt: received on 2009/08/19 at 0910 by L. Henson
Containers: received 6 x 20L pails at 19 °C, in good condition with no seals and no initials
Description: type: water, collection method: not given

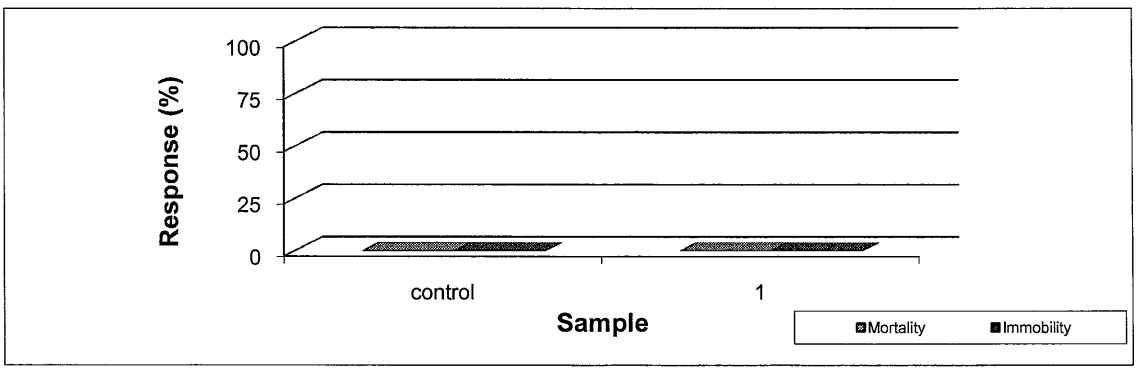
Test: started on 2009/08/19; ended on 2009/08/21

Contents

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
1	L806858-1	0	0	not toxic as tested

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
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Test Conditions

Client: ALS106
Reference: 09-1501-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (HQ 4.4.3.1)
Species: *Daphnia magna*
Age: < 24 hours old
Organism source: in-house culture
Stock mortality: 0%
Culture brood data: 10 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 8.0; EC: 777 (µS/cm); DO: 7.5 (mg/L); temperature: 17 °C
hardness (mg CaC03/L): 165; colour: colourless; odour: odourless
Sample holding time: 2 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: 385 mL plastic vessels
Test volume: 150 mL
Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L^{-1})
The hardness of the sample was not adjusted (mg $CaCO_3$/L) prior to or during testing
Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)
Control water: Dechlorinated City of Calgary water acclimated to test conditions
The hardness of the control/dilution water was 128 mg $CaCO_3$/L
Test concentrations: Undiluted sample plus a negative control
Test replicates: Three replicates per treatment, 10 daphnids per replicate
Feeding: None
Aeration: None
Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination
Lighting: Cool white fluorescent lights; 400-800 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 20 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: ALS106
Reference: 09-1501-01-DAD

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must ≥ 90%)
Control had 0% abnormal behaviour (must ≤ 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 18, 2009; current results
(48-h LC50 and 95% confidence limits) = 0.76 (0.72-0.80) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

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Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Test Data

Client: ALS106
Reference: 09-1501-01-DAD

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/19	0	1000	J. Amyotte	test *Daphnia* appear normal
2009/08/20	1	0915	S. Ehman	test *Daphnia* appear normal
2009/08/21	2	0920	T. Kloschinsky	test *Daphnia* appear normal

Chemistry:

Sample	control			1		
replicate	a	b	c	a	b	c
Day	pH (units)					
0	8.3	8.3	8.3	8.3	8.4	8.4
2	7.7	7.8	7.8	7.6	7.4	7.2
	Conductivity (µS/cm)					
0	358	361	361	776	798	797
2	367	369	373	771	799	802
	Dissolved Oxygen (mg/L)					
0	7.5	7.3	7.3	7.5	7.5	7.5
2	7.8	7.6	7.6	7.6	7.6	7.6
	Temperature (°C)					
0	18	18	19	19	19	19
2	20	20	20	20	20	20

Biology:

Sample	control			1		
replicate	a	b	c	a	b	c
Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10 (3F)	10	10	10	10
2	10	10	10	10	10	10
	Mortality (%)					
2	0	0	0	0	0	0
	Immobility (%)					
2	0	0	0	0	0	0

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Comments/Statistics

Client: ALS106
Reference: 09-1501-01-DAD

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
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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:	10
mean brood size:	23
ephippia in stock culture:	no
age of test organisms:	<24 hours old
culture mortality (%):	0%

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

Current Test

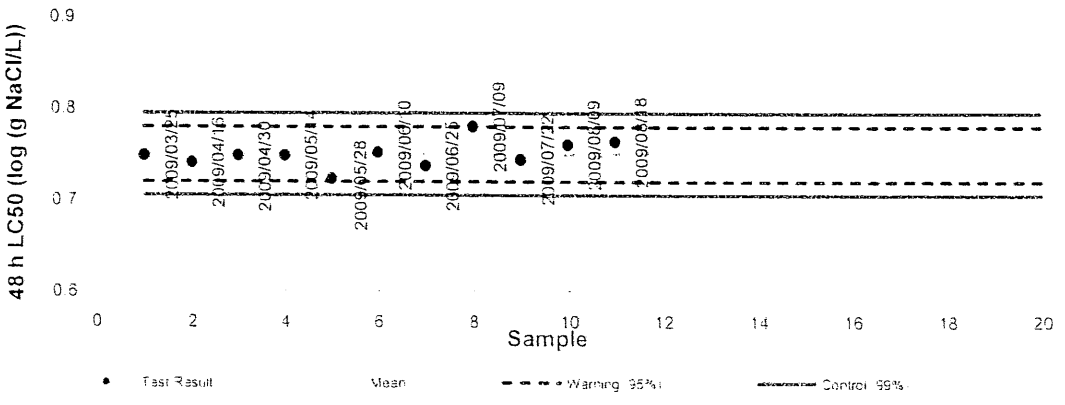
toxicant	Sodium Chloride (NaCl)				
started on	2009/08/18	ended on	2009/08/20		
Result (LC50 @ 48h)	0.76	log (g NaCl/L); geometric mean			
Confidence Limits (95%)	lower	0.72	upper	0.80	

Historical Values

mean	0.75	sd	0.01	cv(%):	2
	lower	upper			
warning limits (±2 sd)	0.72	0.78	(95% confidence limits)		
control limits (±3 sd)	0.70	0.79	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance

Comments: None



Quality Assurance Unit: L. Henson For

Authorized by S. Krishnappa, B Sc., Quality Assurance Coordinator
The test data and results are verified correct

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tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

SRC Group # 2009-7406

SRC ANALYTICAL

Sep 09, 2009

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

ALS
9936-67th Avenue
Edmonton, Alberta T6E 0P5
Attn: ALSED Reporting

Sample # **36366**
Date Sampled: **Aug 17, 2009**
Sample Matrix: **WATER**
Description: **L806858-1 LUP-10**

Client PO #: **L806858**
Date Received: **Aug 20, 2009**

Analyte	Units	Result	DL
Radio Chemistry			
Radium-226	Bq/L	0.008	0.005

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

L806858

COC # 08-011425

Page 1 of 1

Report to:	ANDREW MITCHELL
Company:	MMG RESOURCES INC.
Contact:	
Address:	
Phone:	Fax:
Invoice To:	Same as Report ? (Yes) No ?
Company:	
Contact:	
Address:	
Phone:	Fax:
Lab Work Order # (lab use only)	~~L806858~~

Report Format / Distribution
Standard: ✓ Other: ____
Select: PDF ✓ Excel ____ Digital ____
Email 1:
Email 2:

Client / Project Information:
Job #:
PO / AFE:
Legal Site Description:
Quote #:
ALS Contact: OLINEK Sampler: AM.

Service Requested: (rush - subject to availability)
- Regular (Default)
- Priority (2-3 Business Days) - 50% Surcharge
- Emergency (1 Business Day) - 100% Surcharge
- For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
(Indicate Filtered or Preserved, F/P)

Sample #	Sample Identification (This description will appear on the report)	Date	Time	Sample Type	pH, TSS	Alkalinity	Hardness	Metals	NH4	CN	NO3, NO2	Ra 226	Toxicity	Bacteriology	BOD5			Number of Containers
	~~LUP-20~~ ALS Q21390	16AUG09	3:30p	GRAB	✓	✓	✓	✓	✓	✓								
	~~LUP-21~~ ALS Q21391	16AUG09	4:00p	GRAB	✓	✓	✓	✓	✓	✓	✓	✓						
	~~LUP-22~~ Q21385	16AUG	4:26P	GRAB	✓	✓	✓	✓	✓	✓								
	~~LUP-24~~ ~~Q21386~~	16AUG	4:55p	GRAB	✓	✓	✓	✓	✓	✓								
	~~LUP-25~~ ~~Q21387~~	16AUG	5:20p	GRAB	✓	✓	✓	✓	✓	✓	✓	✓						
	~~LUP-24D (DUPLICATE)~~ ~~Q21389~~	16AUG	5:00p	GRAB	✓	✓	✓	✓	✓	✓								
	~~FIELD BLANK~~ ~~Q21390~~	16AUG	8:00p	GRAB	✓	✓	✓	✓	✓	✓								
	LUP-10 Q21388	16AUG	11:54a	GRAB	✓	✓	✓	✓	✓	✓	✓	✓	✓					
	~~LUP-11~~ ~~Q21391~~	17AUG	1:00pm	GRAB	✓	✓	✓	✓	✓	✓	✓			✓	✓			
	LUP-10 D (Duplicate) Q21388	17AUG	11:54a.	GRAB	✓	✓	✓	✓	✓	✓	✓							

Special Instructions / Regulations / Hazardous Details

~~Duplicate of sample LUP-10~~

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
		RS	18-Aug-09	9:21	5.5			