Fathead minnow Test Report
Survival and Growth

Work Order Number: 205735
Sample Number: 9946

Test Conditions

Test Organism	: *Pimephales promelas*	Test Volume Per Replicate	: 300 mL
Source	: Stantec stock	Test Vessel	: 480 mL polypropylene beaker
Life Stage	: Larval (<24 h old)	Depth of test solution	: 8 cm
pH Adjustment	None	# Replicates	3
Sample Filtration	None	# Organisms per Replicate	: 10
Hardness Adjustment	None	Renewal Method	Syphon
Test Aeration	None	Renewal Period	24 h intervals
Photoperiod (h) light/dark	16/8	Feeding Rate	1500-2250 nauplii
Control/Dilution Water	: Undiluted well water	Feeding Frequency	3 times daily
Test Type	Static renewal	Test Duration	7 days

Control/Dilution Water: Well water with trace NaCl (29.6 mg

Renewal Method: Three subsamples were used for testing. Subsample 1 was used for day 0, 1 and 2 renewals, subsample 2 was used for day 3 and 4 renewals, and subsample 3 was used for day 5 and 6 renewals. Approximately 80 - 85% of test solution removed by syphon. New solution added to achieve desired test volume.

Test Protocol: Biological Test Method: Test of Growth and Survival using fathead minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 (including November 1997 amendments).

Test Organisms: No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test. All test organisms were from the same culture.

Comments

Test conducted using three subsamples from a single sampling. There were no unusual conditions or deviations from the test protocol. The results reported relate only to the sample tested.

Work Order Number: 205735
Sample Number: 9946

Reference Toxicant Data

Substance	Potassium Chloride
Test Date	2004-07-12
IC25 Survival (g	0.94
Lower 95% Confidence Limit	0.90
Upper 95% Confidence Limit	1.01
Test Duration	7 days
Historical Mean IC25 (g/L)	1.04
Upper Warning Limit (−2SD)	1.31
Lower Warning Limit (-2 SD)	0.84
Statistical Method	Linear Interpolation (Toxstat 3.5)[1]
Fathead minnow Batch Number	Fm04-07
Test Conducted By	N. Kreager/T.Gardiner

Reference toxicant test was conducted under conditions identical to the test.

References

[1] Stephan, C. E. 1977. Methods for calculating an LC50. P. 65-84 In: P.L. Mayer and J. L. Hamelink (eds.). Aquatic Toxicology and Hazard Evaluation. Amer. Soc. Testing and Materials. Philadelphia PA. ASTM STP 634.

West, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A.

Date: 2004-07-16

Approved By: K Holtze

Keith Holtze, Director, Laboratory Operations

Larval Fathead Minnow Survival

Work Order Number : 205735
Sample Number : 9946
Industry : Nanisivik Mine (a Division of CanZinco Ltd
Time Start : 15:20
Fathead Batch Number : fm04-07
Previous 7d Stock Mort. : 0.0%

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7 Completion Date
Start Date:	2004-07-27	2004-07-28	2004-07-29	2004-07-30	2004-07-31	2004-08-01	2004-08-02	2004-08-03
Technician:		JG	NK/TG	TG	NK/TG	TG	JL/TB	SW

Conc (%)	Rep	Mortality							Mean Mortality (%)	Standard Deviation
0	A	0	0	0	0	0	0	0	0.0	0.00
	B	0	0	0	0	0	0	0		
	C	0	0	0	0	0	0	0		
6	A	0	0	0	0	0	0	0	6.7	1.15
	B	0	0	0	0	0	0	[illegible]		
	C	0	0	0	0	0	1	[illegible]		
13	A	[illegible]			0	0	0	0	3.3	0.58
	B	0	0	0	[illegible]	1	1	1		
	C	0	0	0	0	0	0	0		
25	A	0	0	0	0	0	0	0	10.0	1.00
	B	0	0	0	0	0	1	2		
	C	0	0	0	0	0	1	1		
[illegible]	A	0	0	0	0	0	0	0	6.7	0.58
	B	0	0	0	0	0	1	1		
	C	0	0	0	0	1	1	1		
100	A	0	0	0	0	0	0	0	3.3	0.58
	B	0	0	0	0	0	0	0		
	C	0	0	0	0	0	1	1		

Aberrant behaviour or swimming impairment noted during test: None

Test Data Reviewed By: [illegible]
Date: 2004-08-[illegible]

Larval Fathead Minnow Weights

Work Order Number : 2057
Sample Number : 9946

Concentration (%)	Replicate	# of Larvae Weighed	Mean Dry Wt. Of Larvae (mg)	Mean Dry Wt. (mg)	Standard Deviation
Control	A	10	0.588	0.604	0.014
	B	10	0.611		
	C	10	0.612		
6	A	10	0.626	0.676	0.082
	B	10	0.631		
	C	8	0.771		
13	A	10	0.646	0.620	0.080
	B	9	0.683		
	C	10	0.530		
25	A	10	0.691	0.697	0.031
	B	8	0.730		
	C	9	0.669		
50	A	10	0.653	0.704	0.045
	B	9	0.738		
	C	9	0.721		
100	A	10	0.631	0.623	0.011
	B	10	0.627		
	C	9	0.610		

Larval Fathead Minnow Survival and Growth
Water Chemistry Data

Work Order Number : 205735
Sample Number : 9946

Initial Parameters:	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)	Hardness (mg/L as $CaCO_3$)
	25.0	9.3	7.4	1503	690

		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Initial Temp. (°C):		25.0	25.0	24.0	25.0	25.0	25.0	25.0
Initial D.O. (mg/L):		9.3	8.7	9.2	9.0	9.4	9.1	9.1
% Sat. of 100% Effluent*		117	107	114	113	113	113	110
Aeration (mm) @ 100 bubbles/min)		20	20	20	20	20	20	20
		Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
Technician	Initial:	JG	SW	JG	NK/TG	NK/TG	AK(TG)	AK(TG)
	Final:	SW	JG	JG	AK/TG	AK(TG)	AK(TG)	AS
Control	**0%**							
Temp. (°C)	Initial:	25.0	24.5	25.0	25.0	25.0	25.0	24.0
	Final:	25.5	25.0	25.0	25.0	25.0	24.5	25.0
D.O. (% Sat.	Initial:	100	99	100	98	99	101	100
D.O. (mg/L)	Initial:	8.1	7.9	8.1	7.9	7.9	8.1	8.0
	Final:	7.8	7.8	7.5	7.6	7.2	7.1	6.8
pH	Initial:	8.4	8.4	8.3	8.4	8.5	8.3	8.3
	Final:	8.3	8.3	8.4	8.3	8.3	8.3	8.1
Conductivity	Initial:	488	493	565	516	490	581	522
Low	**6%**							
Temp. (°C)	Initial:	25.0	24.5	25.0	25.0	25.0	25.0	24.0
	Final:	25.5	25.0	25.0	25.0	25.0	24.5	25.0
D.O. (mg/L)	Initial:	8.1	7.9	8.1	7.9	7.9	8.0	7.9
	Final:	7.4	7.2	7.4	7.0	7.4	7.0	6.9
pH	Initial:	8.3	8.4	8.3	8.4	8.3	8.3	8.3
	Final:	8.3	8.2	8.3	8.2	8.3	8.3	8.0
Conductivity	Initial:	563	566	628	573	552	641	591
Middle	**25%**							
Temp. (°C)	Initial:	25.0	24.5	25.0	25.0	25.0	25.0	24.0
	Final:	25.5	25.0	25.0	25.0	25.0	24.5	25.0
D.O. (mg/L)	Initial:	8.3	8.2	8.1	8.0	7.8	8.0	8.1
	Final:	7.8	7.3	6.8	6.9	7.2	6.6	6.6
pH	Initial:	8.2	8.3	8.3	8.3	8.2	8.3	8.2
	Final:	8.2	8.1	8.0	8.0	8.1	8.0	7.9
Conductivity	Initial:	775	778	828	790	770	848	795
High	**100%**							
Temp. (°C)	Initial:	25.0	24.5	25.0	25.0	25.0	25.0	24.0
	Final:	25.5	25.0	25.0	25.0	25.0	24.5	25.0
D.O. (mg/L)	Initial:	8.5	7.1	8.2	8.4	8.1	8.1	8.4
	Final:	7.3	7.1	6.4	5.7	6.8	6.6	6.7
pH	Initial:	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	Final:	7.6	7.3	7.0	6.7	6.7	6.7	6.6
Conductivity	Initial:	1510	1516	1516	1514	1516	1519	1[illegible]

* saturation adjusted for actual temperature and barometric pressure

Stantec Consulting Ltd.
(18 Nicholas Beaver Road
Guelph ON N1H 6H9
Tel: (519) 763-4412 Fax: (519) 763-4619
stantec.com)

Work Order : 205735
Sample Number : 9946

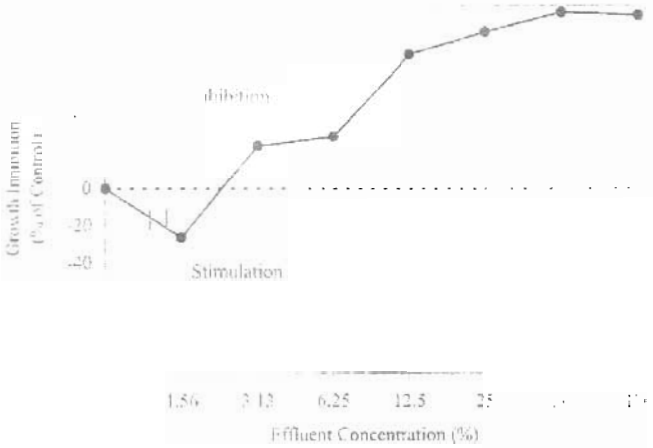
Sample Identification

Company	Nanisivik Mine (a Division of CanZinco Ltd.)		
Location :	Nanisivik NU	Date Collected :	2004-07-24
Substance	159-4	Time Collected :	11:30
Sampling Method :	Grab	Date Received :	2004-07-27
Sampled By :	M. Markle	Time Received :	08:00
Shipped By:	First Air/Air + ATS/Rd	Date Tested :	2004-07-27
Temp. on arrival :	9.5°C	Lab Storage:	4±2 °C
Sample Description	Clear, yellow, odourless		

Test Results*

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	3.9%	2.3-6.6	Linear Interpolation (Toxstat 3.5) a

Selenastrum capricornutum Growth Inhibition



*Note: The test results have not been adjusted for the 0.9091 dilution factor (see 'Concentrations' section on page 2).

Work Order Number: 205735
Sample Number: 9946

Test Conditions

Test Organism	: *Selenastrum capricornutum*	Control/Dilution Water[c]	: Millipore Milli Q™
Batch Number	: Sel04-07	Test Type	: Static
Organism Origin	: UTCC37	Test Volume Per Replicate	: 220 µL
Source	: In-house culture	Test Vessel	: U-shaped polystyrene microplate
Organism Age (days)	: 4 (in exponential growth	# Test Concentrations[d]	: 10 + control
Initial Algal Inoculum	: 9727 cells/mL	# Control Replicates	: 10
pH Adjustment	: None	# Test Replicates	: 2
Sample Filtration[b]	: 0.45 µm	Test Duration	: 72 hours
Hardness Adjustment	: None	Lighting	: 24 hrs. 4000+10% lux
Sample Aeration	: None		

Sample Filtration: A 10 mL sub-sample was filtered through a preconditioned 0.45 µm filter prior to dilution

[c] Control/Dilution Water: No chemicals added.

Number of Concentrations: A total of ten concentrations were prepared and inoculated with algae. A minimum of five concentrations were enumerated at test completion.

Concentrations: Concentrations are prepared by making up a series of dilutions such as: 0.195, 0.39, 0.78, 1.56, 3.13, 6.25, 12.5, 25, 50, and 100%. The actual concentrations are slightly diluted by the addition of 10 µL of enrichment medium and 10 µL of algal inoculum. Therefore, the concentrations for the above series are actually 0.18, 0.35, 0.71, 1.42, 2.85, 5.68, 11.36, 22.73, 45.45, and 90.91% (a multiplication factor of 0.9091%). This multiplication factor has not been applied to the results.

Test Organisms: No unusual appearance or treatment of culture prior to testing

Test Protocol: Biological Test Method. Growth Inhibition Test Using the Freshwater Alga *Selenastrum capricornutum*. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS1/RM/25 (including November 1997 amendments)

Work Order Number: 205735
Sample Number: 9946

Comments

No inhibitory gradient was detected in the control group using the Mann-Kendall Trend test (α=0.05).

Negative cell yield indicates no growth. Prior to statistical analyses, any negative numbers for cell yield were replaced with zero values.

In test concentrations where cell yield was stimulated (greater than the control), data were replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2003).

There were no unusual conditions or deviations from the test protocol. The results reported relate only to the sample tested.

Reference Toxicant Data

Substance		Sodium Chloride
Test Date	:	2004-07-20
IC25 Growth (mg/L)	:	219.3
Lower 95% Confidence Limit	:	186.6
Upper 95% Confidence Limit	:	237.6
Test Duration	:	72 hours
Historical Mean IC25 (mg/L)	:	175.3
Upper Warning Limit (+2SD)	:	356.8
Lower Warning Limit (-2 SD)	:	88.2
Statistical Method	:	Linear Interpolation (Toxstat 3.5)[a]
Selenastrum Batch Number		Sel04-07
Test Conducted By	:	H.Roshon/A.Mistry

Reference toxicant test was conducted under conditions identical to the test.

References

est, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A.

Environment Canada. 2003. Guidance Document on Statistical Methods for Environmental Toxicity Tests. Environment Canada. Method Development and Application Section, Environmental Technology Centre, Environmental Protection Service. Ottawa, Ontario. Fifth Draft, March 2003.

Date: 2004-07-16

Approved By:

Keith Holtze, Director, Laboratory Operations

Selenastrum capricornutum Growth Inhibition

Work Order Number :	205735	***Selenastrum* Batch #** :	Sel04-0
Sample Number :	994o		
Industry :	Nam[illegible]	tion of CanZinco Ltd	
Start Date :	2004-07-27	**Inoculum Preparation Time** :	[illegible]
Start Time :	14:35	**Initial Cell Innoculum (cells/ml)** :	0.9727 x10000
Setup Technician :	HR/AM	**Control Cell Density Increase Factor** :	75.496
Completion Date :	2004-07-30		
Takedown Technician :	AM/JG		
Technique :	Hemacytometer		

Test Day :	0 (Start)	1	2	3 (End)
Date :	2004-07-27	2004-07-28	2004-07-29	2004-07-30
Temp. (°C) :	25.0	25.0	25.0	25.0

72 Hour Cell Counts (x10 000)

Conc. (%)		1	2	3	4	5	6	7	8	9	10	Mean	St. Dev.	%CV
Control	*Count*	68.50	77.50	83.00	74.00	*	*	90.50	71.50	46.50	76.00	73.44	12.87	17.53
	Yield	67.53	76.53	82.03	73.03	*	*	89.53	70.53	45.53	75.03	72.46	12.87	17.76
0.195	*Count*	-	-	-								-	-	-
	Yield	-	-	-								-	-	-
0.39	*Count*	-	-	-								-	-	-
	Yield	-	-	-								-	-	-
0.78	*Count*			-								-	-	-
	Yield	-	-	-								-	-	-
1.56	*Count*	84.00	92.00	97.00								92.67	7.51	8.10
	Yield	83.03	96.03	96.03								91.69	7.51	8.19
	Count	49.50	55.50	64.50								56.50	7.55	13.36
	Yield	48.53	54.53	63.53								55.53	7.55	13.60
	Count	49.50	57.00	51.50								52.67	3.88	7.37
	Yield	48.53	56.03	50.53								51.69	3.88	7.51
	Count	19.00	21.00	20.50								20.17	1.04	5.16
	Yield	18.03	20.03	19.53								19.19	1.04	5.42
	Count	11.50	9.50	13.00								11.33	1.76	15.49
	Yield	10.53	8.53	12.03								10.36	1.76	16.95
	Count	4.00	3.50	3.00								3.50	0.50	14.29
	Yield	3.03	2.53	2.03								2.53	0.50	19.78
	Count	4.50	4.50	5.00								4.67	0.29	6.19
	Yield	3.53	3.53	4.03								3.69	0.29	7.81

"*" - not counted

*replicates 5 and 6 used for pH measurement

Sample pH at start of test
Initial Control pH
Final Control pH

Test Data Reviewed By: AK
Date: 2004-08-31

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Work Order : 205735
Sample Number : 9946

Sample Identification

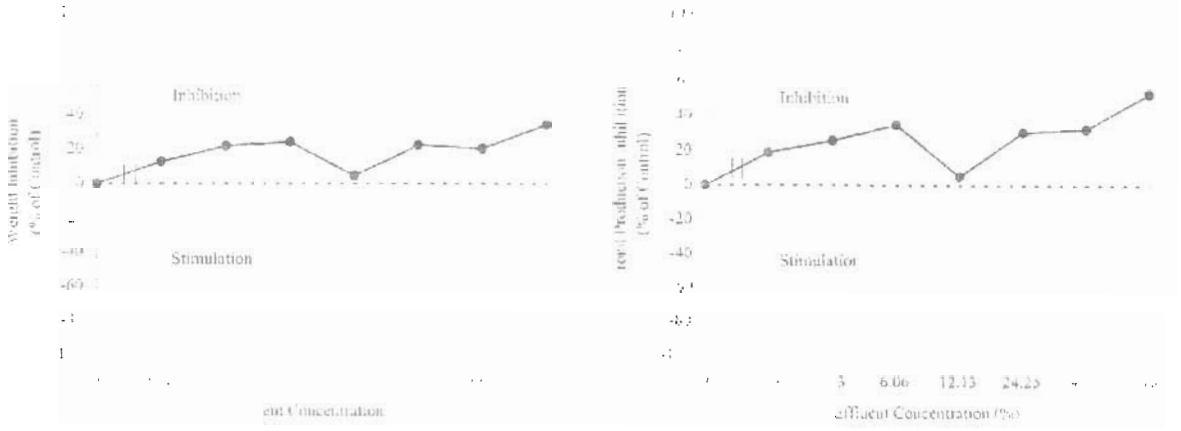
Company :	Nanisivik Mine (a Division of CanZinco Ltd.)		
Location :	Nanisivik NU	Date Collected :	2004-07-24
Substance :	159-4	Time Collected :	11:30
Sampling Method	Grab	Date Received :	2004-07-27
Sampled By :	M. Markle	Time Received :	08:00
Shipped By :	First Air Air – ATS/Rd	Date Tested :	2004-07-27
Temp. on arrival :	9.5°C	Lab Storage:	4±2 °C
Sample Description:	Clear, yellow, odourless		

Test Results

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Weight)	59.9%	23.0-78.7	Linear Interpolation (Toxstat 3.5) a
IC25 (Frond Production)*	15.6%	0.4-81.8	Linear Interpolation (Toxstat 3.5) a

*Note: The lower 95% confidence limit for frond production was less than the lowest concentration tested.

Lemna minor Growth Inhibition



ified by The Canadian Association of Environmental Analytical Laboratories (CAEAL
Accredited by Standards Council of Canada (SCC)

Work Order Number: 205735
Sample Number: 9946

Test Conditions

Test Organism	*Lemna minor* L., Strain 7730	Media Preparation Water[5]	: Millipore Super Q™
Organism Origin	UTCC 492	Control/Dilution Water[5]	: Modified APHA
Source	In-house culture	Test Type	: Static
Organism Age (days)	7	Test Volume Per Replicate	100 mL
Test Culture Frond # Increase	>8	Test Vessel	250 mL Erlenmeyer flask
Initial Plant Inoculum	6 fronds (2 plants)	Depth of Test Solution	: 4.0 cm
Acclimation Time (h)	20:00	# Test Concentrations	: 7
Medium Sterilization	No	# Control Replicates	3
Sample pH Adjustment	None	# Test Replicates	: 3
Sample Hardness Adjustment	None	Test Duration	7 days
Preaeration(≤100 bubbles/min)	: 20 min	Test Temperature	: 25 ± 2°C
Sample Filtration (µm)	: 1 (Whatman GF/C)	Lighting	: 24 hrs; 4200 – 4800 lux

Media Preparation Water: Water used to prepare the liquid growth medium (Modified APHA). Obtained from the University of Guelph. No chemicals added.

Control/Dilution Water: Millipore Super Q™ enriched with 10 mL/L nutrient stock solutions A, B, and C as described in EPS 1/RM/

Environment Canada. 1999. Biological Test Method: Test for Measuring the Inhibition of Growth using the Freshwater Macrophyte, *Lemna minor*. Method Development and Application Section. Environmental Technology Centre. Environment Canada. Ottawa, ON. EPS 1/RM/37.

Test Organisms: No unusual appearance or treatment of culture prior to testing. Test culture was axenic.

Comments

Test sample was enriched with 10 mL/L Modified APHA nutrient stock solutions A, B, and C as described in EPS 1/RM/37. This diluted the test substance to 97% of the original sample

Test dilutions were prepared and then allowed to equilibrate for one hour before plants were added.

Control plants showed the required minimum growth of >8 times.

There were no unusual conditions or deviations from the test protocol. The results reported relate only to the sample tested.

Work Order Number: 205735
Sample Number: 9946

Reference Toxicant Data

Substance	Potassium Chloride
Test Date	2004-07-22
IC25 Frond Production (g/L)	2.55
Lower 95% Confidence Limit	0.51
Upper 95% Confidence Limit	3.32
Test Duration	7 days
Historical Mean IC25 (g/L)	2.45
Upper Warning Limit (+2SD)	3.66
Lower Warning Limit (-2 SD)	1.65
Statistical Method	Linear Interpolation (Toxstat 3.5)
Lemna minor Batch Number	: Lm04-07
Test Conducted By	: A.Mistry/K.Olaveson

Reference toxicant test was conducted under conditions identical to the test.

References

West, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A

Date: 2004-07-26

Approved By: _____
Keith Holtze, Director, Laboratory Operations

7 Day *Lemna minor* Growth Inhibition Test

Work Order Number: 205735
Sample Number: 9946

Lemna Batch #: Lm04-1
Culture Age (days): 7
Culture Health: Increase Factor (in APHA medium): 1.5

Light Intensity: 4200-4800 lux
Sample Pre-Aeration Time (min): 20
Sample Filtration (um): 1

Acclimation of plants to APHA medium: Date: 2004-07-20 Time: 17:20
Start Date: 2004-07-27 3:20 Technician: HR/AM
Completion Date: 2004-08-03

Initial sample temperature:

Daily Temperature		
Date	Temp (°C)	Initials
2004-07-27	25.0	HR
2004-07-28	25.0	HR
2004-07-29	25.0	HR
2004-07-30	25.0	AM
2004-07-31	25.0	HR
2004-08-01	25.0	HR
2004-08-02	25.0	HR
2004-08-03	25.0	HR

pH		
Conc. (%)	Day 0	Day 7
Control	8.3	8.3
1.52	8.3	8.3
3.03	8.3	8.3
6.06	8.3	8.3
12.13	8.2	8.3
24.25	8.1	8.2
48.5	8.0	8.3
97.0	7.9	8.2

Frond Counts at Day 7

Technician: HR/AS/KO

Conc. (%)	Rep A				Rep B				Rep C			
	Plant		Frond		Plant		Frond		Plant		Frond	
	# Live	# Dead	# Live	# Dead	# Live	# Dead	# Live	# Dead	# Live	# Dead	# Live	# Dead
Control	8	0	93	0		0	95	1	18	0	95	0
1.52	12	0	78	0		0	76	0	18	0	80	0
3.03	15	0	81	1		0	66	1	11	0	67	0
6.06	10	0	55	5		0	64	0	11	0	67	0
12.13	18	0	100	2		0	84	0	14	0	84	0
24.25	11	0	73	0		0	69	1	5	0	60	0
48.5	5	0	52	0		0	69	1	7	0	70	0
97.0	3	0	48	0	2	0	47	2	7	0	46	0

Summary (includes initial plant and frond numbers)

Conc. (%)	Average				Standard Deviation				Observations
	Plant		Frond		Plant		Frond		Frond/Root appearance
	# Live	# Dead	# Live	# Dead	# Live	# Dead	# Live	# Dead	
Control	26.0	0.0	94.3	0.3	3.5	0.0	1.2	0.6	fronds healthy, appearance normal
1.52	15.0	0.0	78.0	0.0	3.0	0.0	2.0	0.0	fronds healthy, appearance normal
3.03	12.3	0.0	71.2	0.7	2.3	0.0	8.4	0.6	fronds healthy, appearance normal
6.06	10.0	0.0	62.0	1.7	1.0	0.0	6.2	2.9	fronds healthy, appearance normal
12.13	15.7	0.0	89.3	0.7	2.1	0.0	9.2	1.2	fronds healthy, appearance normal
24.25	8.0	0.0	67.3	0.3	3.0	0.0	6.7	0.6	fronds healthy, appearance normal
48.5	5.0	0.0	65.7	0.3	2.6	0.0	12.3	0.6	large colonies
97.0	4.0	0.0	47.0	0.7	2.6	0.0	1.0	1.2	large colonies

Notes: Small amounts of light brown/light green debris observed in all concentration flasks plus Control B.

Test Data Reviewed By: [signature]
Date: 2004-08-31

7 Day *Lemna minor* Growth Inhibition Test

Work Order No
Sample Number 9946

Increase in Frond Numbers

Conc. (%)	Rep A	Rep B	Rep C	Average	Standard Deviation	%CV	% Inhibition
Control	87	90	89	88.7	1.5	1.7	0.0
[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
3.03		61	61	66.0	[illegible]	13.1	25.6
6.06	54	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
12.13	96		78	84.0	10.4	12.4	5.3
24.25	67		54	61.7	6.8	11.0	30.5
48.5	46	64	50	60.0	12.5	20.8	32.3
97.0		43	40	41.7	1.5	[illegible]	53.0

Increase in control frond count: 15.8 fold

Lemna minor Weights

Concentration	Replicate	Total Replicate Biomass (mg)	Mean Treatment Biomass (mg)	Standard Deviation	%CV	% Inhibition
Control	A	7.95	7.93	0.17	2.1	0.0
	B	7.76				
	C	8.09				
1.52	A	6.99	6.93	0.42	6.1	12.6
	B	6.48				
	C	7.32				
3.03	A	6.67	6.23	0.64	10.3	21.4
	B	5.50				
	C	[illegible]				
6.06	A	6.08	6.03	0.24	4.0	23
	B	[illegible]				
	C	6.25				
12.13	A	8.12	7.58	0.47	6.2	4.5
	B	7.28				
	C	7.32				
24.25	A	6.26	6.18	0.39	6.3	22.1
	B	6.52				
	C	[illegible]				
48.5	A	4.63	6.34	1.53	24.2	20.1
	B	6.78				
	C	7.69				
97.0	A	4.76	5.24	0.54	10.3	33.9
	B	5.14				
	C	5.83				

Test Data Reviewed By: [illegible]
Date: 2004-08-31

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REPORT SUMMARY
ACUTE LETHALITY

Workorder No: 206060

Stantec

Murray Markle
Nanisivik Mine (a Division of CanZinco Ltd.)
P.O. Box 225
Nanisivik NU
X0A 0X0

RESULTS

Substance	Date Collected	Date Tested	Species / Test	% Mortality at 100% Effluent Concentration
159-4	2004-09-19	2004-09-22	Dm Single Concentration	13.3
	2004-09-19	2004-09-22	RBT Single Concentration	0

RBT – rainbow trout
Dm – *Daphnia magna*

Test Protocols

Environment Canada.1990. Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna. Environment Canada, Conservation and Protection. Ottawa, Ontario. Reference Method EPS1/RM14 (including Dec.2000 amendments)

Environment Canada.1990. Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout. Environment Canada, Conservation and Protection. Ottawa,Ontario. Reference Method EPS1/RM/13 (including Dec.2000 amendments).

Certified by the Canadian Association of Environmental Analytical Laboratories (CAEAL)
Accredited by Standards Council of Canada (SCC)

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TOXICITY TEST REPORT
Daphnia magna

Work Order : 206060
Sample Number : 10471

SAMPLE IDENTIFICATION

Company :	Nanisivik Mine (a Division of CanZinco Ltd.)	Time Collected :	12:00
Location :	Nanisivik NU	Date Collected :	2004-09-19
Substance :	159-4	Date Received :	2004-09-22
Sampling Method :	Grab	Date Tested :	2004-09-22
Sampled By :	M. Markle	Temp. on arrival :	20.0° C
Sample Description:	Clear, colourless, odourless		

Test Method : *Daphnia magna* Acute Lethality Toxicity Test Protocol EPS 1/RM/14. Environment Canada. 1990 (including December, 2000 amendments)

TEST RESULTS

**** 13.3 % mortality at 100% effluent concentration. ****

The results reported relate only to the sample tested

SODIUM CHLORIDE REFERENCE TOXICANT DATA

Daphnia Batch # :	Dm04-18		
Date Tested (y/m/d) :	2004-09-14	Historical Mean LC50 :	5.5 g/L
LC50 (95% Confidence Limits) :	6.0 g/L (4.0 - 10.0)	Warning Limits (= 2SD) :	4.3 - 7.2 g/L
Statistical Method :	Non-linear Interpolation	Analyst(s):	J. Pickett

Daphnia magna CULTURE HEALTH DATA

Time to First Brood (days) :	9.3	Avg. # Young Per Brood :	42.5
Culture Mortality (prev. 7 d) (%):	3.5		

TEST CONDITIONS

Sample Treatment :	None	# Replicates :	3
pH Adjustment :	None	# Animals / Replicate :	10
Test Aeration :	None	Total # Animals / Test Level :	30
Daphnia Batch # :	Dm04-18	*Daphnia* Loading Rate :	15.0 mL/organism

Date: 2004-10-18

Approved by: K Holtze
Keith Holtze, Director, Laboratory Operations

Daphnia magna TOXICITY TEST REPORT

Work Order: 206060
Sample Number: 10471

	Temp. (°C)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Cond. (µs/cm)	Hardness (mg/L as $CaCO_3$)	Hardness Adjustment	Total Pre-Aeration Time (h) @30 mL/min/L
Initial Water Chemistry:	20.0	[illegible]	[illegible]	106	2645	>1000	None	0:30

0 hours

Date & Time: 2004-09-22 13:40
Technician: JP

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O_2 Sat. (%)*	Hardness
100A	0	0	8.5	9.0	2649	20.5	103	>1000
100B	0	0	8.5	9.0	2649	20.5		
100C	0	0	8.5	9.0	2649	20.5		
Control A	0	0	8.5	8.5	389	21.5		
Control B	0	0	8.5	8.5	389	21.5		
Control C	0	0	8.5	8.5	389	21.5	100	200

Notes:

24 hours

Date & Time: 2004-09-23 13:40
Technician: JP

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100A	0	0	–	–	-	20.0
100B	0	1	-	–		20.0
100C	0	0			--	20.0
Control A	0	0			–	20.0
Control B	0	0				20.0
Control C	0	-				20.0

Notes:

48 hours

Date & Time: 2004-09-24 13:40
Technician: MR

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100A	1	3	7.9	8.5	2645	20.0
100B	2	1	8.0	8.5	2625	20.0
100C	1	2	8.0	8.6	2659	20.0
Control A	0	0	8.6	8.6	389	20.0
Control B	0	0	8.6	8.6	386	20.0
Control C	-	-	8.6	8.6	384	20.0

Notes:

# of control organisms showing stress: -
Daphnia Batch #: Dm04-18

Number immobile does not include number of mortalities

– = not measured

* adjusted for actual temp. & barometric pressure

Test Data Reviewed By: JL
Date: 2004-09-30

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Work Order : 206060
Sample Number : 10471

SAMPLE IDENTIFICATION

Company :	Nanisivik Mine (a Division of CanZinco Ltd.)	Time Collected :	12:00
Location :	Nanisivik NU	Date Collected :	2004-09-19
Substance :	159-4	Date Received :	2004-09-22
Sampling Method :	Grab	Date Tested :	2004-09-22
Sampled By :	M. Markle	Temp. on arrival :	20.0°C
Sample Description :	Clear, colourless, odourless.		
Test Method :	Acute Lethality of Liquid Effluents to Fish EPS 1/RM/13, Environment Canada, 1990 (including December, 2000 amendments).		

TEST RESULTS

**** 0 % mortality at 100% effluent concentration. ****

The results reported relate only to the sample tested

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Trout Batch # :	T04-12		
Date Tested (y/m/d) :	2004-09-20	Historical Mean LC50 :	3963 mg/L
LC50 (95% Confidence Limits) :	3223 mg/L (2760 - 3719)	Warning Limits (± 2SD) :	3091 - 5090 mg/L
Statistical Method :	Probit	Analyst(s) :	AK/ATC

TEST FISH

Control Fish Sample Size :	10	Cumulative prev. 7d stock tank mortality:	0.2 %
Mean Fish Weight (g) (± 2 SD) :	0.47 (± 0.16)	Mean Fish Fork Length (mm) (± 2 SD) :	38.8 (± 4.8)
Range of Weights (g) :	0.37 - 0.60	Range of Fork Lengths (mm) :	36 - 43
Fish Loading Rate (g/L) :	0.23		

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	# Replicates :	1
Test Aeration :	Yes	# Animals Per Replicate :	10
Aeration Rate (mL/min/L) :	6.5 ± 1	Total # Animals Per Test Level :	10
Trout Batch # :	T04-12		

Date: 2004-10-18

Approved by: K Holtze
Keith Holtze, Director, Laboratory Operations

Work Order: 206060
Sample Number: 10471

	Temp. (°C)	pH	D.O. (mg/L)	O_2 Sat. (%)*	Cond. (umhos)	Total Pre-Aeration Time(h) @ 6.5 mL/min/L
Initial Water Chemistry:	15.0	8.5	9.3	–	2673	
Chemistry after 30min air:	15.0	8.5	9.4	98	2673	0:30

0 hours

Date & Time 2004-09-22 15:45
Technician: AK

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O_2 Sat. (%)*
100	0	0	8.5	9.4	2673	15.0	98
Control			8.3	9.6	590	15.0	100

Notes

24 hours

Date & Time 2004-09-23 15:45
Technician: TG

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100	0	0	–	–	–	14.0
Control						14.0

Notes:

48 hours

Date & Time 2004-09-24 15:45
Technician: TG

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100	0	0	–	–	–	16.0
Control						16.0

Notes:

72 hours

Date & Time 2004-09-25 15:45
Technician: ATC

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100	0	0	–	–	–	15.0
Control						15.0

Notes:

96 hours

Date & Time 2004-09-26 15:45
Technician: ATC

Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.
100	0	0	7.5	8.9	2696	15.0
Control		0	8.2	8.4	590	15.0

Notes:

# of control organisms showing stress 0
Trout Batch #: T04-12

"-" = not measured
Number immobile does not include number of mortalities.
* adjusted for actual temp. & barometric pressure

Test Data Reviewed By: JL
Date: 2004-09-29

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Work Order : 206060
Sample Number : 10471

Stantec

Sample Identification

Company :	Nanisivik Mine (a Division of CanZinco Ltd.)		
Location :	Nanisivik NU	Date Collected :	2004-09-19
Substance :	159-4	Time Collected :	12:00
Sampling Method :	Grab	Date Received :	2004-09-22
Sampled By :	M. Markle	Time Received :	09:30
Shipped By:	First Air/Air + ATS/Rd	Date Tested :	2004-09-22
Temp. on arrival :	20.0°C	Lab Storage:	4+2 °C
Sample Description:	Clear, colourless, odourless.		

Test Results

Effect	Value	95% Confidence Limits	Statistical Method
LC50 (Survival)	Indeterminate *	-	-
IC25 (Reproduction)	21.8%	8.7-28.5	Linear Interpolation (Toxstat 3.5) [b]

*A statistically valid LC50 could not be determined by Non-linear Interpolation (Stephan [a]) based on the mortality response in the effluent. Probit analysis (Stephan [a]) yielded an LC50 result of 80.4% with unreasonable 95% confidence limits.

Ceriodaphnia dubia Reproductive Inhibition