

ENVIRONMENTAL DYNAMICS INC.

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Date Received: 26-FEB-14

Report Date: 29-APR-14 17:28 (MT)

Version: FINAL

Client Phone: 867-393-4882

Certificate of Analysis

Lab Work Order #: L1426336

Project P.O. #: NOT SUBMITTED

Job Reference:

C of C Numbers: 1

Legal Site Desc:

Comments: Bioassay toxicity analysis was subcontracted to Nautilus Environmental Ltd. located in Burnaby, BC.

Refer to their report appended for detail.

Can Dang

Senior Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID			
Grouping	Analyte			

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Version:

Reference Information

Test Method References:

ALS Test Code Matrix Test Description Method Reference**

** 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 analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.



Toxicity testing of L1426336-1 (R10), L1426336-2 (NF1), L1426336-3 (NF2), L1426336-4 (X1), L1426336-5 (X14), L1426336-6 (X3A) and L1426336-7 (R3)

Samples collected February 25, 2014

Final Report

Report date:

April 29, 2013

Submitted to:

ALS Environmental

Burnaby, BC

8664 Commerce Court Burnaby, BC V5A 4N7

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SIGNATURE PAGE

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This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted acute and sub-lethal toxicity tests for ALS Environmental on seven samples identified as L1426336-1 (R10), L1426336-2 (NF1), L1426336-3 (NF2), L1426336-4 (X1), L1426336-5 (X14), L1426336-6 (X3A) and L1426336-7 (R3). All samples were collected on February 25, 2014 and delivered to the laboratory in Burnaby, BC on February 27, 2014. Samples were transported in two 20-L plastic containers per sample. The samples were received at temperatures ranging from $2.8 - 4.3^{\circ}$ C and were stored in the dark at $4 \pm 2^{\circ}$ C prior to testing. The following toxicity tests were performed on all samples:

- Ceriodaphnia dubia survival and reproduction
- 7-d *Lemna minor* growth inhibition
- 72-h *Pseudokirchneriella subcapitata* growth inhibition
- 96-h rainbow trout (*Oncorhynchus mykiss*) LC50

This report describes the results of these toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses for each test are provided in Appendices A to D. The chain-of-custody form is provided in Appendix E.

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 1 to 4. Testing was conducted according to procedures described by the Environment Canada protocols (2000, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 1. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism *Ceriodaphnia dubia*Test organism source In-house culture

Test organism age <24 h old neonates produced within 12 h

Test type Static-renewal Test duration 7 ± 1 day

Test vessel 20 mL test tube

Test volume 15 mL

Test replicates 10 test replicates per treatment

No. of organisms 1 per replicate

Control water 20% Perrier water

Test solution renewal Daily
Test temperature $25 \pm 1^{\circ}$ C

Feeding Pseudokirchneriella subcapitata and YCT

Light intensity 100 to 600 lux at water surface Photoperiod 16 hours light/8 hours dark

Aeration None

Test protocol Environment Canada (2007a), EPS 1/RM/21

Statistical software CETIS (2013)

Test endpoint Survival and reproduction

≥80% survival; ≥15 young per surviving control producing

Test acceptability criteria for controls three broods; ≥60% of controls producing three or more

broods

Reference toxicant Sodium chloride

Table 2. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism Lemna minor, CPCC#490

In-house culture, obtained from Canadian Phycological

Test organism source Culture Centre, and originally isolated from Wainfleet,

Stinking Barn, Niagra Peninsula, Ontario, Canada.

Test organism age 7 to 10 day old

Test type Static
Test duration 7 days

Test vessel 250-mL glass containers

Test volume 100 mL

Test replicates 4 per treatment

No. of organisms Two 3-frond plants per replicate

Control water Deionized water with supplemented nutrients

Test solution renewal None
Test temperature $25 \pm 2^{\circ}$ C
Feeding None

Light intensity 4000 to 5600 lux full spectrum light

Photoperiod 24 h light
Aeration None

Test protocol Environment Canada (2007b), EPS 1/RM/37

Statistical software CETIS (2013)

Test endpoint Number of fronds and dry weight Test acceptability criteria for controls ≥ 8 -fold increase in number of fronds

Reference toxicant Potassium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism Pseudokirchneriella subcapitata, strain UTCC #37

In-house culture, obtained from Canadian Phycological

Test organism source Culture Centre, and originally isolated from Nitelva River,

Norway.

Test organism age 3-to 7-day old culture in logarithmic growth phase

Test type Static
Test duration 72 hours
Test vessel Microplate
Test volume 220 μ L

Test replicates 4 replicates per treatment; 8 replicates for control

No. of organisms 10, 000 cells/mL

Control water Deionized water with supplemented nutrients

Test solution renewal None
Test temperature $24 \pm 2^{\circ}$ C
Feeding None

Light intensity 3600 to 4400 lux Photoperiod 24 hours light

Aeration None

Test protocol Environment Canada (2007c), EPS 1/RM/25

Statistical software CETIS (2013)

Test endpoint Algal cell growth inhibition

Test acceptability criteria for controls ≥ 16-fold increase in number of algal cells; CV ≤20%; no trend

when analyzed using Mann-Kendall test

Reference toxicant Zinc

Table 4. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) LC50 test.

Test organism Oncorhynchus mykiss
Test organism source Commercial hatchery

Test organism age Juvenile
Test type Static
Test duration 96 hours

Test vessel 20 L glass aquarium

Test volume 10 to 20 L (dependent on size of fish)

Test replicates 1 test replicate per treatment

No. of organisms 10 per replicate

Control water Municipal dechlorinated water

Test solution renewal None Test temperature $15 \pm 1^{\circ}$ C Feeding None

Light intensity 100 to 500 lux

Photoperiod 16 hours light/8 hours dark

Aeration $6.5 \pm 1 \text{ mL/min/L}$

Test protocol Environment Canada (2000), EPS 1/RM/13

Statistical software CETIS (2013)

Test endpoint LC50

Test acceptability criteria for controls Survival $\geq 90\%$ Reference toxicant Sodium nitrite

3.0 RESULTS

The results of toxicity tests conducted on samples R10, NF1, NF2, X1, X14, X3A and R3 are provided in Tables 5 to 26. For samples R10 and NF1, no adverse effects were observed in any species tested. In addition, stimulation was observed in the *P. subcapitata* tests in most concentrations (Tables 19 and 20). For samples NF2, X1, X14, X3A and R3 all species tested were adversely effected, with the exception of *L. minor* dry weight and rainbow trout survival. The LC50 value for rainbow trout was >100% in all samples tested.

Table 5. Results: *Ceriodaphnia dubia* survival and reproduction test with sample R10.

Concentration	Survival	Reproduction	
(% v/v)	(%)	(mean ± SD)	
Control	100	16.7 ± 2.4	
5	100	16.5 ± 3.1	
10	100	15.0 ± 4.1	
20	100	17.5 ± 3.0	
40	90	13.5 ± 6.0	
60	90	15.2 ± 5.5	
80	90	13.7 ± 6.8	
100	100	16.8 ± 4.3	
Test endpoint (% v/v)			
LC50	>100	-	
IC25	-	>100	
IC50	-	>100	

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test with sample NF1.

Concentration	Survival	Reproduction	Stimulation
(% v/v)	(%)	(mean ± SD)	(%)
Control	100	$14.4 \pm 5.1^*$	-
5	100	16.8 ± 2.6	16.7
10	100	15.3 ± 4.5	6.2
20	100	17.1 ± 4.3	18.8
40	100	17.2 ± 3.2	19.4
60	90	15.5 ± 2.9	7.6
80	100	15.7 ± 5.7	9.0
100	100	17.8 ± 2.1	23.6
Test endpoint (% v/v)			
LC50	>100	-	-
IC25	-	>100	-
IC50	-	>100	-

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration.

Table 7. Results: *Ceriodaphnia dubia* survival and reproduction test with sample NF2.

Concentration	Survival	Reproduction
(% v/v)	(%)	(mean ± SD)
Control	90	14.1 ± 5.0 *
5	100	15.4 ± 2.0
10	100	14.8 ± 1.9
20	30	2.2 ± 3.3
40	0	0.0 ± 0.0
60	0	0.0 ± 0.0
80	0	0.0 ± 0.0
100	0	0.0 ± 0.0
Test endpoint (% v/v)		
LC50 (95% CL)	17.5 (14.3 - 21.5)	-
IC25 (95% CL)	-	12.3 (11.3 - 12.7)
IC50 (95% CL)	-	15.1 (14.0 - 16.2)

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration, CL= Confidence Limits.

^{*}This result met the Environment Canada criterion of ≥15 young per adult female based on surviving organisms that had produced three broods, which was 15.8 young per adult.

^{*}This result met the Environment Canada criterion of ≥15 young per adult female based on surviving organisms that had produced three broods, which was 15.7 young per adult.

 Table 8.
 Results: Ceriodaphnia dubia survival and reproduction test with sample X1.

Concentration	Survival	Reproduction
(% v/v)	(%)	(mean ± SD)
Control	100	15.2 ± 1.5
5	80	15.1 ± 3.2
10	90	14.1 ± 5.5
20	100	14.3 ± 1.8
40	0	0.0 ± 0.0
60	0	0.0 ± 0.0
80	0	0.0 ± 0.0
100	0	0.0 ± 0.0
Test endpoint (% v/v)		
LC50 (95% CL)	27.2 (25.1 – 29.5)	-
IC25 (95% CL)	-	23.0 (20.6 – 23.6)
IC50 (95% CL)	-	27.7 (25.8 – 28.2)

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration, CL= Confidence Limits.

Table 9. Results: *Ceriodaphnia dubia* survival and reproduction test with sample X14.

Concentration	Survival	Reproduction	
(% v/v)	(%)	(mean ± SD)	
Control	100	26.0 ± 11.4	
1.56	100	31.2 ± 5.2 †	
3.13	100	32.4 ± 4.7 †	
6.25	90	$30.7 \pm 10.0 \dagger$	
12.5	100	34.6 ± 3.0 †	
25	100	20.5 ± 10.3	
50	100	16.9 ± 8.8	
100	70	2.7 ± 3.1	
Test endpoint (% v/v)			
LC50	>100	-	
IC25 (95% CL)	-	30.4 (7.8 – 52.0)	
IC50 (95% CL)	-	60.5 (37.1 - 67.6)	

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration, CL= Confidence Limits.

 $^{^{\}dagger}$ = The hormesis model was conducted but the data did not fit the model; therefore reproduction was adjusted to that of the control value for analysis.

Table 10. Results: *Ceriodaphnia dubia* survival and reproduction test with sample X3A.

Concentration	Survival	Reproduction
(% v/v)	(%)	(mean ± SD)
Control	100	25.0 ± 10.8
1.56	100	25.1 ± 7.6
3.13	100	30.5 ± 3.3 †
6.25	100	$28.9 \pm 4.0 ^{\dagger}$
12.5	100	24.2 ± 10.7
25	100	22.6 ± 10.3
50	30	0.0 ± 0.0
100	0	0.0 ± 0.0
Test endpoint (% v/v)		
LC50 (95% CL)	43.5 (35.6 – 53.2)	-
IC25 (95% CL)	-	28.2 (5.4 – 29.8)
IC50 (95% CL)	-	34.1 (27.3 – 35.4)

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration, CL= Confidence Limits.

 Table 11.
 Results: Ceriodaphnia dubia survival and reproduction test with sample R3.

Concentration	Survival	Reproduction
(% v/v)	(%)	(mean ± SD)
Control	100	28.9 ± 9.0
1.56	100	19.8 ± 8.3
3.13	100	19.2 ± 10.3
6.25	90	24.6 ± 13.0
12.5	100	29.9 ± 4.5
25	100	25.6 ± 7.7
50	90	22.6 ± 10.8
100	80	11.8 ± 7.9
Test endpoint (% v/v)		
LC50	>100	-
IC25 (95% CL)	-	70.7 (n/a - 100)
IC50 (95% CL)	-	97.4 (71.9 - 100)

SD = Standard Deviation, LC= Lethal Concentration, IC= Inhibition Concentration, CL= Confidence Limits.

^{† =} The hormesis model was conducted but the data did not fit the model; therefore reproduction was adjusted to that of the control value for analysis.

 Table 12.
 Results: Lemna minor growth inhibition test with sample R10.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	70.5 ± 6.5	-	5.7 ± 0.6	-
1.5	85.5 ± 22.6	21.3	7.3 ± 2.2	27.7
3.0	68.0 ± 17.7	-	5.4 ± 1.5	-
6.1	61.0 ± 16.2	-	5.1 ± 1.4	-
12.1	88.0 ± 14.0	24.8	7.2 ± 1.0	26.8
24.2	86.5 ± 5.8	22.7	7.7 ± 0.6	35.3
48.5	91.2 ± 21.4	29.4	8.6 ± 2.0 *	51.0
97	69.5 ± 21.6	-	6.3 ± 1.8	10.7
Test endpoint (% v/v)				
IC25	>97	-	>97	-
IC50	>97	-	>97	-

SD = Standard Deviation, IC = Inhibition Concentration.

Table 13. Results: *Lemna minor* growth inhibition test with sample NF1.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	71.2 ± 14.6	-	6.9 ± 1.1	-
1.5	85.0 ± 11.2	19.3	7.7 ± 0.9	11.0
3.0	68.5 ± 5.8	-	6.9 ± 0.8	-
6.1	85.0 ± 23.6	19.3	7.8 ± 1.5	12.5
12.1	80.2 ± 11.1	12.6	7.6 ± 1.2	9.9
24.2	80.0 ± 21.3	12.3	7.7 ± 2.0	11.2
48.5	71.8 ± 10.3	0.7	7.2 ± 1.0	3.4
97	66.8 ± 14.0	-	6.8 ± 1.4	-
Test endpoint (% v/v)				
IC25	>97	-	>97	-
IC50	>97	-	>97	-

SD = Standard Deviation, IC = Inhibition Concentration.

^{*}Indicates concentrations that are significantly greater than the control.

Table 14. Results: *Lemna minor* growth inhibition test with sample NF2.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	67.8 ± 11.9	-	6.0 ± 0.9	-
1.5	66.5 ± 4.5	-	6.1 ± 0.9	1.8
3.0	64.2 ± 11.4	-	5.9 ± 0.8	-
6.1	83.0 ± 20.6†	22.5	$7.7 \pm 1.4^{\dagger}$	28.1
12.1	77.5 ± 15.4†	14.4	$7.3 \pm 0.9^{\dagger}$	22.3
24.2	54.0 ± 1.2	-	5.5 ± 0.3	-
48.5	50.2 ± 3.3	-	5.3 ± 0.7	-
97	45.5 ± 2.6	-	4.8 ± 0.4	-
Test endpoint (% v/v)				
IC25 (95% CL)	43.7 (7.6 - 87.6)	-	>97	-
IC50	>97		>97	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 15. Results: *Lemna minor* growth inhibition test with sample X1.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	71.2 ± 20.4	-	5.7 ± 1.3	-
1.5	79.5 ± 9.0	11.6	6.7 ± 1.0	18.0
3.0	70.2 ± 10.5	-	6.2 ± 0.9	8.9
6.1	63.8 ± 5.9	-	5.5 ± 0.7	-
12.1	69.2 ± 9.5	-	6.2 ± 0.8	9.7
24.2	63.8 ± 17.8	-	5.9 ± 1.0	5.1
48.5	52.8 ± 7.8	-	5.4 ± 0.4	-
97	48.8 ± 4.6	-	5.2 ± 0.6	-
Test endpoint (% v/v)				
IC25 (95% CL)	48.5 (24.5 - 85.6)	-	>97	-
IC50	>97	-	>97	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

[†] The hormesis model was conducted but the data did not fit the model; therefore the number of fronds was adjusted to that of the control value for analysis.

Table 16. Results: *Lemna minor* growth inhibition test with sample X14.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	91.8 ± 9.6	-	8.2 ± 0.9	-
1.5	91.0 ± 19.8	-	9.1 ± 1.8	10.9
3.0	101.3 ± 27.4	10.4	9.6 ± 2.4	16.2
6.1	87.2 ± 13.9	-	8.7 ± 0.9	5.3
12.1	91.0 ± 15.9	-	8.8 ± 1.1	6.7
24.2	91.8 ± 3.6	-	9.2 ± 0.2	12.3
48.5	59.8 ± 9.4	-	8.3 ± 0.9	0.5
97	45.0 ± 6.6	-	7.7 ± 1.3	-
Test endpoint (% v/v)				
IC25 (95% CL)	37.5 (25.8 – 53.2)	-	>97	-
IC50 (95% CL)	87.0 (48.0 - 97)	-	>97	

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 17. Results: *Lemna minor* growth inhibition test with sample X3A.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	65.2 ± 9.8	-	5.5 ± 0.7	-
1.5	57.0 ± 8.3	-	5.6 ± 0.9	0.5
3.0	64.0 ± 7.8	-	6.2 ± 0.6	12.5
6.1	61.5 ± 15.4	-	6.1 ± 1.8	10.0
12.1	60.2 ± 13.1	-	6.1 ± 1.3	10.9
24.2	58.8 ± 17.5	-	6.0 ± 1.7	8.8
48.5	47.8 ± 2.5	-	5.8 ± 0.4	4.4
97	48.2 ± 10.0	-	5.7 ± 0.9	3.9
Test endpoint (% v/v)				
IC25 (95% CL)	90.0 (25.5 – 97)	-	>97	-
IC50	>97	-	>97	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 18. Results: *Lemna minor* growth inhibition test with sample R3.

Concentration (% v/v)	Frond Growth (No. of Fronds) (mean ± SD)	Stimulation (%)	Dry Weight (mg) (mean ± SD)	Stimulation (%)
Control	66.8 ± 10.6	-	5.9 ± 0.7	-
1.5	78.0 ± 18.4	16.8	6.5 ± 1.4	11.2
3.0	62.8 ± 2.6	-	5.4 ± 0.4	-
6.1	63.8 ± 7.4	-	5.7 ± 0.6	-
12.1	63.5 ± 5.4	-	5.8 ± 0.6	-
24.2	51.5 ± 7.9	-	5.2 ± 1.0	-
48.5	50.0 ± 5.0	-	5.4 ± 0.4	-
97	33.8 ± 2.5	-	4.6 ± 0.2	
Test endpoint (% v/v)				
IC25 (95% CL)	36.0 (26.5 - 47.0)	-	>97	-
IC50	>97	-	>97	

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 19. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample R10.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	46.8 ± 7.2	-
1.5	49.8 ± 6.8	6.4
3.0	55.0 ± 7.1	17.6
6.0	68.5 ± 2.4 *	46.5
11.9	86.2 ± 10.9 *	84.5
23.8	155.8 ± 9.9*	233.2
47.6	162.3 ± 18.5 *	247.1
95.2	148.8 ± 8.5 *	218.2
Test endpoint (% v/v)		
IC25	>95.2	-
IC50	>95.2	-

SD = Standard Deviation, IC = Inhibition Concentration.

^{*}Indicates concentrations that are significantly greater than the control.

Table 20. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample NF1.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	49.1 ± 6.8	-
1.5	49.0 ± 4.1	-
3.0	62.2 ± 6.5 *	26.7
6.0	79.5 ± 7.0 *	61.8
11.9	$67.0 \pm 8.9*$	36.4
23.8	84.0 ± 6.3 *	71.0
47.6	112.5 ± 14.6 *	129.0
95.2	132.3 ± 11.0 *	169.2
Test endpoint (% v/v)		
IC25	>95.2	-
IC50	>95.2	-

SD = Standard Deviation, IC = Inhibition Concentration.

Table 21. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample NF2.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	42.5 ± 2.6	-
1.5	$50.0 \pm 9.0 $ †	17.6
3.0	$55.8 \pm 4.8 \dagger$	31.2
6.0	$44.5 \pm 5.7 ^{\dagger}$	4.7
11.9	21.5 ± 5.4	-
23.8	0.8 ± 1.0	-
47.6	0.0 ± 0.0	-
95.2	0.0 ± 0.0	-
Test endpoint (% v/v)		
IC25 (95% CL)	8.5 (7.5 – 9.7)	-
IC50 (95% CL)	12.0 (9.5 - 14.5)	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

^{*}Indicates concentrations that are significantly greater than the control.

 $^{^{\}dagger}$ The hormesis model was conducted but the data did not fit the model; therefore the cell yield was adjusted to that of the control value for analysis.

Table 22. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample X1.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	48.1 ± 5.7	-
1.5	47.0 ± 8.8	-
3.0	$53.8 \pm 2.9 ^{\dagger}$	11.7
6.0	$51.0 \pm 6.5^{\dagger}$	6.0
11.9	32.8 ± 2.6	-
23.8	9.2 ± 1.7	-
47.6	0.2 ± 0.5	-
95.2	1.0 ± 1.4	-
Test endpoint (% v/v)		
IC25 (95% CL)	10.2 (7.9 – 11.8)	-
IC50 (95% CL)	15.4 (13.2 – 16.6)	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 23. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample X14.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	50.0 ± 4.8	• ,
		-
1.5	54.8 ± 6.1 †	9.5
3.0	$59.8 \pm 5.0 $ †	19.5
6.0	84.0 ± 14.4 †	68.0
11.9	$55.5 \pm 3.7^{\dagger}$	11.0
23.8	32.0 ± 3.8	-
47.6	11.8 ± 3.4	-
95.2	0.0 ± 0.0	-
Test endpoint (% v/v)		
IC25 (95% CL)	19.3 (16.8 – 21.8)	-
IC50 (95% CL)	30.3 (26.4 – 33.6)	<u>-</u>

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

 $^{^{\}dagger}$ The hormesis model was conducted but the data did not fit the model; therefore the cell yield was adjusted to that of the control value for analysis.

[†] The hormesis model was conducted but the data did not fit the model; therefore the cell yield was adjusted to that of the control value for analysis.

Table 24. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample X3A.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	54.1 ± 4.4	-
1.5	51.5 ± 4.5	-
3.0	56.5 ± 6.1	4.4
6.0	45.0 ± 12.2	-
11.9	33.5 ± 4.2	-
23.8	23.2 ± 1.9	-
47.6	0.8 ± 1.5	-
95.2	0.0 ± 0.0	-
Test endpoint (% v/v)		
IC25 (95% CL)	7.8 (3.6 – 11.1)	-
IC50 (95% CL)	18.4 (13.4 – 22.2)	<u>-</u>

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

Table 25. Results: *Pseudokirchneriella subcapitata* growth inhibition test with sample R3.

Concentration	Cell Density (x 10 ⁴ cells/mL)	Stimulation
(% v/v)	(mean ± SD)	(%)
Control	44.6 ± 4.2	-
1.5	$50.0 \pm 6.4^{\dagger}$	12.0
3.0	86.5 ± 10.0 †	93.8
6.0	105.0 ± 5.5 †	135.3
11.9	85.0 ± 5.1 †	90.5
23.8	59.8 ± 6.4 †	33.9
47.6	25.8 ± 7.0	-
95.2	4.8 ± 2.2	-
Test endpoint (% v/v)		
IC25 (95% CL)	35.8 (30.1 – 44.9)	-
IC50 (95% CL)	53.1 (38.5 – 63.4)	-

SD = Standard Deviation, IC = Inhibition Concentration, CL= Confidence Limits.

[†] The hormesis model was conducted but the data did not fit the model; therefore the cell yield was adjusted to that of the control value for analysis.

 Table 26.
 Results: 96-h rainbow trout (Oncorhynchus mykiss) LC50 test.

	Survival (%)												
Concentration(% v/v)	R10	NF1	NF2	X1	X14	X3A	R3						
Control	100	100	100	100	100	90	100						
6.25	100	100	100	100	100	100	100						
12.5	100	100	100	100	100	100	100						
25.0	100	100	90	100	100	100	100						
50	100	100	80	90	100	100	100						
100	100	100	60	100	100	60	100						
Test endpoint													
(% v/v)													
LC50	>100	>100	>100	>100	>100	>100	>100						

LC= Lethal Concentration.

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

In the rainbow trout test, the 100% (v/v) treatment of sample X14 had 11 fish instead of ten. The addition of an extra fish did not impact results since there were no mortalities observed in the test.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 27. Results for these tests fell within the range for organism performance of mean and range, based on historical results obtained by the laboratory with these tests. Thus, the sensitivities of the organisms evaluated in the reference toxicant tests were appropriate.

Table 27. Reference toxicant results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
		(= 0.2 1	(/0)	
C. dubia	Survival (LC50): 1.4 g/L NaCl	1.7 (1.2 – 2.5)	21	February 21, 2014
(Nautilus)	Reproduction (IC50): 1.3 g/L NaCl	1.2 (0.8 - 1.6)	Februar (0.8 – 1.6) 18 (3.1 – 3.4) 5 Februar	1 ebituary 21, 2014
C. dubia	Survival (LC50): 3.3 g/L NaCl	3.3 (3.1 - 3.4)	5	E 1 40 2014
(IRC)	Reproduction (IC50): 3.1 g/L NaCl	3.1 (2.9 - 3.3)	.8 - 1.6) 18 .1 - 3.4) 5 .9 - 3.3) 6	February 19, 2014
L. minor	No. Fronds (IC25): 3.6 g/L KCl	4.4 (3.5 – 5.5)	12	February 20, 2014
P. subcapitata	Growth (IC50): 24.7 μg/L Zn	22.7 (15.2 – 33.8)	22	February 21, 2014
O. mykiss	Survival (LC50): 4.7 mg/L NaNO ₂	5.4 (2.2 - 13.4)	57	February 19, 2014

SD = Standard Deviation, CV = Coefficient of Variation, IC = Inhibition Concentration, LC = Lethal Concentration.

5.0 REFERENCES

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Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.4.29 Tidepool Scientific Software, McKinleyville, CA. 222 pp.



Ceriodaphnia dubia Summary Sheet

Client: Work Order No.:	ALS Environmental		
Sample ID. LI4 Sample Date: Date Received: Sample Volume:	126336-1 (P10) Feb 2504 Feb 27/14 2×201	2) At least 60% of controls have 3) An average of ≥15 five your control solutions during the firs 4) Invalid if ephippia observed WQ Ranges:	re produced three broods within 8 days g produced per surviving female in the st three broods. In any control solution at any time.
Set up by: Thin / Y/C Sample Information: Test Validity Criteria: 1) Mean survival of first generation controls is ≥80 % Sample ID. LI426336-1 (DIC) Sample Date: Frib 25714 Date Received: Frib 27714 Set up by: Thin / Y/C Test Validity Criteria: 1) Mean survival of first generation controls is ≥80 % 2) At least 60% of controls have produced three broads within 8 days 3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broads. Sample Volume: 2×20. 4) Invalid if ephippia observed in any control solution at any time.			
Stock Solution ID:	13 Na-03		
•			
Test Results:	IC25 % (v/v) (95% CL)		>105
Peniewod hu	Jou	Date revie	ower March 26/14

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Client:	AL		11	-0:		_			& Time:			114		00		
Sample ID:	RI	0 (1476	336	-()	_	Sto		& Time:		ch + /		1310 h.			
Nork Order #:	141	076				-		Test S	pecies:	Cerroa	aphnia d	lubia				
																1
	-	T	4		^	1		ays			_	I	•		-	8
Concentration	0	Treditions or main tree	1	4004	2		3		4		5		6	dd 7	2011)	
control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	new	Final
Temperature (°C)	24.0	25.0	24.0	2670	240		NA	245	240	245	24.0	7	24.0	25.0	24.0	
DO (mg/L)	8.2	7.8	8.0	74	7.9	74	8,1	7.4	8.1	77	7.9	7.4	8.0	6.9	9.2	7.2
pH	8.0	7.7	7.9	28	79	79	20	7.7	7.9	7.7	17.9	7.7	8-0	7.5	7.9	7.5
Cond. (µS/cm)	210		0		21-		211	211		211		21		1	116	212
Initials	EMM	EM	VM		-		•	En	200	En	100	Em	M	210	Emm	MC
(VIV)							Da	ays				-				
Concentration	0		1		2		3 4				5		6	old 7 em	-	8
5%	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	new	final
Temperature (°C)	24.0	25.0	24.0	2570	240	25/2	240	24.5	-	14.5	74.0	250	24.0	25.0	24.0	29.0
DO (mg/L)	7.8	7.8	8.0	26	7.9	74	20	71	8.0	7.6	80	7.5	8.0	7.0	7.8	7.3
pH	7.7	7.8	7.8	78	79	78	79	7.6		22	7.9	7.7	7.8	7.6	7.7	7.6
Cond. (µS/cm)	213	21	U		16	21,		25		21	7	216		27	-	
	EMM	Au	m				*	EMY		FM	NA	FM		JW	EMM	211
Initials	Color	CIT	141)		M	100		Ciriy	V	TIM	WV)	T.V.	VII	000	Eller	300
(VIV)							Da	ays								
Concentration	0		1		2		3		4		5		6	eno 7		8
40%	init.	old	new	old	new	old	new	old	new	old	new	old	new	-final	new	Final
Temperature (°C)	24.0	25.0	24.5	250	2410	250		24.5	24.5	24.5	24.0	25.0	245	25.0	24.0	25.0
DO (mg/L)	7.6	8.4	7.9	子干	7.9	754		7,6	8.0	7.6	7.8	7.4	8.1	6.9	7.8	7.2
pH	7.7	8.F	7.8	7.9	7.9	7,8	79	7.7	7.8	7.8	7.8	7.7	7.8	4.5	7.6	7.6
Cond. (µS/cm)	245	24	0	2	51	2	48	24	8	250	5	24	7	26	0	244
Initials	thim	EM	M	,	N>	/	45	EM	n	FM	m	EM	m	JW	FMM	WC
(UlV)							D	ays								
Concentration	0		1		2		3	1	4		5		6	7		8
100 %	init	old	new	old	new	old	new	old	new	old	new	old	new		new	Anal
Temperature (°C)	25.5	29.0	26.0				24,0	24.5			24.0		245	25-0		250
	8,1		7.8	78	20	75	78	7.5	8.1	7.3	8.2	7.6	-	6.9	7.7	7.2
DO (mg/L)	7.3		7.6	8.0		79	78	7.7	7.7		7.5		-	7.7		
pH	_				201			_		7.7		7.6	7.5		7.6	7.6
Cond. (µS/cm)	304	30		-			79	30		308		30		300	1	290
Initials	EMM	Em	(1)		M			- dv	11/1	Em	(V)	Em	(1/)	JW	FMN	MC
			1()	- 1 \					٦							
Handwaca*	Col	ntrol	100%	(UV)					-	Analys	sts:	ALUK	2,EMY	MC, IN		
Hardness*	18		148						-	Davis	and been	AAL	161			
Alkalinity* mg/L as CaCO3	0	1	1	7							wed by:		166	120	1110	
WQ Ranges: T (°C)	= 25 + 1	DO (m	n/l \ = 2	3 to 8	1 (mall) · nH =	6 to 9 5			Date rev	viewed:		lard	260	14	
Sample Description		, 50 (111	CLE		· (mg/L	, pri -	0 10 0.5									
		-	0.		11.4			-								
Comments:	Brood	board L	lsed:	0219	14											

Chronic Freshwater Toxicity Test C. dubia Reproduction Data

18 Fann M AMP 2 3 30 3 Init 30 Init 30 1 Start Date & Time: Feb 2714 (2013/20) Stop Date & Time: 3W Pe Morch 7 / 14 @ 1310h 22 2 0 7 00 > > I > 6 > 0 1 I I S 00 7 4 g O 1 G 0 > 00 L 1 4 L L. 9 8 Set up by: Emm / VIII 2 D ш S ш U > 60 2 2 ۵ 0 > > 8 EN O 20 O V 10 7mm 16 17 19 Concentration: Concentration: Concentration: 2 AB B 8 00 0 V 17 thm 19 THE 子でを NE NE 30 3 Init SE SM 30 30 30 2 30 Init JInit 30 るの 4 3 9 4 50 > > 11 00 > > 15 _ 1 5 0 00 > I 2 9 I 2 7 1 619 S I > 年18 yn 9 n Q > > 9 0 > 0 > > O 0 ш > 4 1 L 4 (VIV > > tin X D 4 ш ш > 7 4 0 ۵ 0 15/16/21 6 S 0 \ m \ 2 17 12 20 ပ 3 Concentration: O > 00 Concentration: 9 0 2 Concentration: > > 7 5 8 > J > をある 23 4 > 4 日本中日 V e > 大多 clear 30 世子っ SW SW MIC 300 30 # men The STATE OF 3 M Init 3 3 JINI 3 30 4 B 8 3 0 日は t ma > 7 17 0 > > ○世 3 Q > > MI N 11476336-1 H D No 52 I I > > > 00 > 0 M O 9 > 0 It 2 > 2 CDEF 2 4 4 > 0 IT. + щ O 9 0 13 Ш ш > 3 0 1 N 00 00 0 <u>ی</u> d 17 17 18 ی 9 ٥ 0 > 00> 90 8 V Total 7 15 16 Concentration: > Days Concentration: BC 3 4 2 Concentration: U > Notes: X = mortality. 8 3 > 0 > 9 > 3 3 00 Nork Order: Sample ID: 4 4 Į > 2 Total 19 V > 4 R 0 Client: Total ro. 7 9

Yetal # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count. Sample Description: Comments:

76th Reviewed by:

Version 2.1 Issued July 29, 2009

Nautilus Environmental

March 26/14

Date reviewed:

Report Date: Test Code: 25 Mar-14 08:08 (p 1 of 2) 14076b | 15-0790-2632

Nautilus Environmentai Ceriodaphnia 7-d Survival and Reproduction Test CETISv1.8.7 Endpoint: 7d Survival Rate **CETIS Version:** 06-2151-9487 Analysis ID: Linear Interpolation (ICPIN) Official Results: 25 Mar-14 8:07 Analysis: Analyzed: 06-2588-9811 Reproduction-Survival (7d) Analyst: **Emma Marus** Batch ID: **Test Type: EC/EPS 1/RM/21** Diluent: 20% Perrier Water 27 Feb-14 13:00 Protocol: Start Date: Ceriodaphnia dubia Brine: **Ending Date:** 07 Mar-14 13:10 Species: <24h In-House Culture **Duration:** 8d 0h Source: Age: 00-4133-3542 276B326 Client: ALS Code: Sample ID: Sample Date: 25 Feb-14 15:00 Material: Effluent Project: Receive Date: 27 Feb-14 10:30 ALS Source: Station: L1426336-1(R10) Sample Age: 46h (3.6 °C) **Linear Interpolation Options** X Transform Y Transform Seed Resamples Exp 95% CL Method Linear 1827371 200 Yes Two-Point Interpolation Log(X+1) **Point Estimates** Level % 95% LCL 95% UCL TU 95% LCL 95% UCL EC5 31.8 25.25 N/A 3.144 3.961 NA NA **EC10** >100 N/A N/A <1 NA NA **EC15** >100 N/A N/A <1 <1 NA NA EC20 >100 N/A N/A N/A N/A NA NA **EC25** >100 <1 NA NA >100 N/A N/A **EC40** <1 NA **EC50** >100 N/A N/A <1 NA Calculated Variate(A/B) 7d Survival Rate Summary Min Max Std Err Std Dev CV% %Effect B C-% **Control Type** Count Mean A 0 0.0% 10 10 10 1 1 0 0.0% 0 **Negative Control** 1 10 1 1 0 0 0.0% 0.0% 10 10 5 1 10 1 1 1 0 0 0.0% 0.0% 10 10 10 10 1 1 0 0 0.0% 0.0% 10 10 1 20 0.9 0 0.1 0.3162 35.14% 10.0% 9 10 40 10 1 10 0.9 0 1 0.1 0.3162 35.14% 10.0% 9 10 60 10 0.9 0 1 0.1 0.3162 35.14% 10.0% 9 10 80 1 0 0 0.0% 0.0% 10 10 100 10 1 1 7d Survival Rate Detail C-% **Control Type** Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 Rep 6 Rep 7 Rep 8 Rep 9 Rep 10 **Negative Control** 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 5 1 1 1 1 1 1 1 1 1 1 10 1 1 1 1 1 1 1 1 1 1 20 1 1 1 0 1 1 1 1 1 40 1

1

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Report Date: Test Code:

25 Mar-14 08:08 (p 2 of 2) 140765 | 15-0790-2632

Nautilus Environmental

Ceriodaphnia 7-d Survival and Reproduction Test

Analysis ID: Analyzed:

06-2151-9487 25 Mar-14 8:07 Endpoint: 7d Survival Rate

Apalysis:

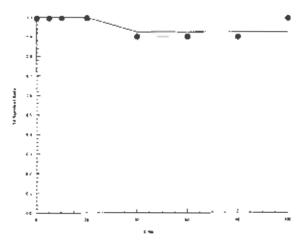
Linear Interpolation (ICPIN)

CETIS Version: CETI\$v1 8.7

Official Results: Yes

7d Surviv	ral Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	454	1/1	1/1	1/1	1/1	1/1	1/1
5		1/1	171	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
10		1/1	171	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
20		1/1	1/1	1/3	1/1	1/1	1/1	1/1	1/1	1/1	1/1
40		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
6Ô		1/1	1/1	1/1	1/1	1/1	1/1	1/1	171	1/1	0/1
8C		1/1	1/1	1/1	1/1	171	1/1	0/1	171	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Report Date: Test Code: 25 Mar-14 08:08 (p 1 of 2) 14076b | 15-0790-2632

Ceriod	aphnia	7-d Survival an	d Reprod	uction To	est					Na	autilus Env	rironmental
Analys	is ID:	10-1090-1897	En	dpoint:	Reproduction			CE	TIS Version:	CETISV	1.8.7	
Analyz	ed:	25 Mar-14 8:08	An	alysis:	Linear Interpola	tion (ICPIN)	Off	ficial Results	Yes		
Batch	ID:	06-2588-9811	Te	st Type:	Reproduction-S	Survival (7d)		An	na Marus			
Start D	ate:	27 Feb-14 13:0	0 Pr	otocol:	EC/EPS 1/RM/	21		Dil	uent: 20%	Perrier W	ater	
Ending	Date:	07 Mar-14 13:1	0 Sp	ecies:	Ceriodaphnia d	ubia		Bri	ne:			
Duratio	on:	8d 0h	So	urce:	In-House Cultu	re		Ag	e: <24	h		
Sampl	e ID:	00-4133-3542	Co	de:	276B326			Cli	ent: ALS			
Sampl	e Date:	25 Feb-14 15:0	0 Ma	aterial:	Effluent			Pre	oject:			
Receiv	e Date:	27 Feb-14 10:3	0 Sc	urce:	ALS							
Sampl	e Age:	46h (3.6 °C)	St	ation:	L1426336-1(R1	10)						
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	n Se	ed	Resamples	Exp 95%		thod				
Log(X+	-1)	Linear	74	627	200	Yes	Two	o-Point Inte	rpolation			
Point B	Estimate	es										
Level	%	95% LCL	95% UC	L TU	95% LCL	95% UCL						
IC5	24.08	0.8414	N/A	4.152	NA	118.8						
IC10	35.87	2.391	N/A	2.788		41.83						
IC15	>100	N/A	N/A	<1	NA	NA						
IC20	>100	N/A	N/A	<1	NA	NA						
IC25	>100	N/A	N/A	<1	NA	NA						
IC40	>100	N/A	N/A	<1	NA	NA						
IC50	>100	N/A	N/A	<1	NA	NA						
Repro	duction	Summary				Ca	culated V	ariate				
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect		
0	N	egative Control	10	16.7	13	22	0.7608	2.406	14.41%	0.0%		
5			10	16.5	11	20	0.969	3.064	18.57%	1.2%		
10			10	15	5	19	1.291	4.082	27.22%	10.18%		
20			10	17.5	12	23	0.9339	2.953	16.88%	-4.79%		
40			10	13.5	0	21	1.91	6.042	44.75%	19.16%		
60			10	15.2	0	19	1.744	5.514	36.27%	8.98%		
80			10	13.7	0	24	2.14	6.767	49.39%	17.96%		
100			10	16.8	10	24	1.348	4.264	25.38%	-0.6%		
Repro	duction	Detail										
C-%	C	ontrol Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 6	Rep 9	Rep 10
0	N	egative Control	14	16	18	16	13	17	17	17	17	22
5			17	12	20	19	11	19	16	19	15	17
10			19	15	18	16	5	16	17	12	14	18
20			19	17	12	18	14	19	18	23	18	17
40			14	15	16	21	0	17	18	16	8	10
60			16	17	19	18	18	17	17	14	16	0
80			7	15	16	11	19	16	0	24	18	11

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Report Date: Test Code: 25 Mar-14 08:08 (p 2 of 2) 14076b | 15-0790-2632

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

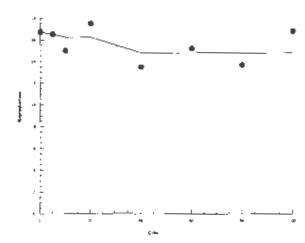
Analysis ID: Analyzed: 10-1090-1897 25 Mar-14 8:08 Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

CETISv1.8.7

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Work Order No.:	ALS Environmenta 14076	Start Date/Time: _ Set up by	Fob 27/14 as 1300 Ehnry
Sample Information	- >	Test Validity Criteria: 1) Mean survival of first genera	
Sample ID:	1426336-2 (NFI) Feb 25/14	1	re produced (hree broods within 8 days ig produced per surviving female in the
Date Received: Sample Volume:	Feb 27/14 2x261	control solutions during the firs 4) Invalid if ephippia observed	if three broods. in any control solution at any time.
- Common	Fn /AU	WQ Ranges:	
Test Organism Info	ormation:	T (°C) = 25 ± 1; DO (mg/L) = 3	.3 to 8 4 , pH = 5.0 to 8 5
Mortality (%) in previ Individual female # c NaCl Reference To: Reference Toxicant Stock Solution ID: Date Initiated: 7-d LC50 (95% CL): 7-d IC50 (95% CL): 7-d LC50 Reference	st 3 broods of previous 7 d: ious 7 d; ised ≥8 young on test day xicant Results: 10:	g/L NaCL g/L NaCL Range: 1.7((.2.2.5) g	
Test Results:		Survival	Reproduction
	LC50 % (v/v) (95% CL.)	710つ	Reproduction
	IC25 % (v/v) (95% CL)		2100
	1C50 % (v/v) (95% CL)		7100
Reviewed by:	.16h	Date revie	wed: March 27/14

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Client: Sample ID:	NFI (L1426336-2) Stop Date & Time: March 7/14 @ 1215h											500				
Work Order #:	140	10						lest S	pecies:	Cenoa	арппіа (Judia				
							De	ays					-			1
Concentration	0		1		2		3	1	4		5	1	6	7.0	4	8
1	init.	old	new	old	new	old	new	old	new	old	new	old	new	firtal	new	Anal
Temperature (°C)	24.0	25.0	0 /3	150	240	250	240	245	240	24.5	24.0	250	140	250	24.0	25.0
	8.2	7.2	8.0	7.84	73	74	2.	7.4	8.1	77	29	76	8.6	73	82	7.1
DO (mg/L) pH	8.0	7.9	7.9	7.8	79	28	23	7.9	7.9	7.7	10	77	8.0	7.8	7.9	7.5
Cond. (µS/cm)	210		0	/	1160		211	21	17.	21	1	213		1	216	211
	mm	FMY			A		11	EW	NA	EW	m	FM		/	Emm	JW
muais	HIMI	CIIII	,		7.		7		11/1	1 (11	N. I	-EAL	7	1.	IC. I.	300
CUIV)							Da	ays								
Concentration	0		1		2		3		4		5		6	w271		8
5%	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	new	Final
Temperature (°C)	24.5	25.0	24.5	250	24.0	250	140	24.5		245	24.0		24.0	2500	24.0	25.0
DO (mg/L)	8.2	7.7	7.9	77	79	カヤ	K.1	7-8	8.0	76	8.0	7.5	8.0	74	7.9	7.0
рН	7.9	7.9	7.9	29	79	78	80	7.8	7.4	7.8	7.9	1.7	7.8	7.8	7.9	7.6
Cond. (µS/cm)	212	21	1	2	18	2	16	2F	7	21	1	211	0	/	220	217
Initials	+mm	EM	m	1	>	A		EMI	m	FMY	M	FW	(M)	/	HMM	WC
(viv)							Da	ays								
Concentration	0	1	1		2		3		4		5		6	7010		8
40 %	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	new	Final
Temperature (°C)	25.0	25.0	25.0	200	210	250	WO	24.5	240	245	25.0	250	24,5	25.0	24.0	
DO (mg/L)	8.1	7.6	7.8	28	79	25	20	7.7	181	H.6	7.9	7.6	81	7.4	7.9	7.0
рН	7.8	8.0	7.7	7.9	78	7,8	79	7.6	7.9	77		1.7	7.6	7.8	7.6	7.6
Cond. (µS/cm)	248	25		2	48		31	25		24		25		/	261	249
Initials	thm.	EM	M	1	4-6	^		EW	nn	EW	111	Th	1117	/	FMM	MC
(11)	T						D	ays							1	
(VV) Concentration	0		1		2		3	ays	4		5		6	11.7 d		8
100%	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	new	
Temperature (°C)		25.0	25.5		WA				24.0			250	24.5		24.0	
DO (mg/L)	8.2	41	7.8	29	20	74	20	177	01	21	7.9	7.4	81	75	29	7.0
pH	73	7.4	7.6	78	27	77	7,8	7.6	7.2	17	1-	7.8	75	78	14	7.8
	315	7. 21		_	06		10	311		31	7.5		2	100	321	303
Cond. (µS/cm)	EMM	FM	-	0				th		EW	100	FW		/	FINW	- Marie Mari
Initials	61.11	17111	ANI		h		<u></u>	dy	187	1 1.40	IVV	1111	WP	/	1-Citar	11, 000
	0-		Ti access	C. 1. 3	V					Anaku	-4	Aut	0 -10-14	A		
Hardness*		ntrol	15		(UIV)					Analys	513.	_nwi	PEMY	11/10	SITYL	-
Alkalinity*	8		137	7						Revie	wed by	10	u		-	
mg/L as CaCO3		1											rch	26/14	1	
WQ Ranges: T (°C) Sample Description Comments:	n:		ng/L) = 3 Slightl Jsed:	44	ella											

Chronic Freshwater Toxicity Test C. dubia Reproduction Data

17 FMY YMK 7KK Init THE PERSON 30 JINIT 2 300 5 0 16 1472 4112 80 I 1215T I 0 I (J O O O 2 10 21 Feb 7/14 a) March = /14 (a) L 7 Hard L ш 3 4 D ш ш to 4 > Set up by: From 10 2 ۵ 15 thm 17 17 15 rt 0 17 Brim 21 10 12 11 O O U Concentration: Concentration: Concentration: Start Date & Time: Stop Date & Time: 2 Date reviewed: 0 8 B 8 - Mary 5 V 4 The me 至 EE 3 E E Init M Init 273 30 JInit 8 2 4 0 9 2 N 0 19 4W 19 61107 > 2 I I 1720 15 18 21 I 0 19 21 0 N 0 G 1 9 Ø 0 L b1 +1 70 L ш 2 % (U/V) 00 121 H H E 91 81 MC LTWK ш 2 ш > ш otion: SIIGHTU GILLO COOK COOK TO TO TO THE SUbsequent broads not included in total count. + 0 ۵ ٥ ٥ 0 5 7 0 14 116 20 1727 16 116 116 119 115 78MM 18 10 19 4 O Concentration: Ç 9 0 O Concentration: 1+ Concentration 46 9 1 3 2 17 8 8 8 3 15 W Q α 4 S WW MAC SEE SEE m NA. Init 30 12/20 10 10 17 Frim Init 30 MA Sur Charle 古石 THE STATE OF THE S TAKE 3 3 HIM. ると J Init MM 4 CU421.336-2 3 1 £ Ł 3 Ku ac 200 7 > 7 9 2 N > M I 2 2 I > H 9 4 O 0 世 100 0 0 P 12 07 19 10 15 u 80 L ш NEI Control 80 20 2 1 ш 7 ш 4 2 ш 00 0 3 ۵ ٥ ナ F M Version 2.1 Issued July 29, 2009 26 51 U 4 Days Concentration: U Days Concentration: 2 Sample Description: M U 00 Concentration: O Notes: X = mortality. 8 18 8 1 2 m 00 Reviewed by: Comments: Nork Order: Total 65 Sample ID: 4 4 C 7 Client: Total Total Days 80 r) 40 7 1 9 7 3

Nautilus Erwironmenta

Report Date: Test Code: 25 Mar-14 07:55 (p 1 of 2) 14076a | 07-6558-8075

								162	t Code:		140/0a 0	-0000-007
Ceriod	aphnia	7-d Survival and	d Reproduc	tion To	est appro-					Na	utilus Env	ironmenta
Analys	is ID:	15-1663-2841	End	point:	36 Survival Rate	9		CEI	1S Version	: CETISv1	.8.7	
Analyz		25 Mar-14 7:50		lysis:	Linear Interpola				cial Result			
Batch	ID:	20-9586-2233	Tes	Type:	Reproduction-S	urvival (7d)		Ana	lyst: En	nma Marus		
Start D	-	27 Feb-14 13:00		locol:	EC/EPS 1/RM/2			Dilu	ent: 20	% Perrier Wa	iter	
	Date:	07 Mar-14 12:1	5 Spe	cies:	Ceriodaphnia di	ubia		Brin	ne:			
Duratio		7d 23h	•	rce:	In-House Cultur			Age	: <2	4h		
Sample	e ID:	17-8615-7390	Cod	le:	6A76994E			Clie	nt: AL	S		
		25 Feb-14 14:3	5 Mat	erial:	Effluent			Pro	ject:			
		27 Feb-14 10:3		rce:	ALS							
Sampl	e Age:	46h (4.3 °C)	Stat	ion:	L1426336-2(NF	1)						
Linear	Interpo	lation Options										
X Tran		Y Transform			Resamples	Exp 95%		thod				
Log(X+	-1)	Linear	517	29	200	Yes	Two	-Point Inter	polation			
Point E	Estimate	es										
Level	%	95% LCL	95% UCL		95% LCL	95% UCL						
EC5	>100	N/A	N/A	<1	NA	NA						
EC10	>100	N/A	N/A	<1	NA	NA						
EC15	>100	N/A	N/A	<1	NA	NA						
EC20	>100	N/A	N/A	<1	NA	NA						
EC25	>100	N/A	N/A	<1	NA	NA						
EC40	>100	N/A	N/A	<1	NA	NA						
EC50	>100	N/A	N/A	<1	NA	NA						
7d Sur	vival Ra	ate Summary				Calcu	lated Vari	ate(A/B)				
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	В
0	N	egative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
5			10	1	1	1	0	0	0.0%	0.0%	10	10
10			10	1	1	1	0	0	0.0%	0.0%	10	10
20			10	1	1	1	0	0	0.0%	0.0%	10	10
					A					0.00/		40
40			10	1	1	1	0	0	0.0%	0.0%	10	10
			10	0.9	0	1	0.1	0 0.3162	0.0% 35.14%	10.0%	9	10
40 60 80					-							
60			10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
60 80 100	vival Ra	ate Detail	10 10	0.9	0	1	0.1	0.3162 0	35.14% 0.0%	10.0% 0.0%	9	10 10
60 80 100 7d Sur C-%	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 1	1 1 1 Rep 4	0.1 0 0	0.3162 0 0	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 10 Rep 10
60 80 100 7d Sur C-%	С		10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0%	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10
60 80 100 7d Sur C-% 0	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 1	1 1 1 Rep 4	0.1 0 0	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 10 Rep 10
60 80 100 7d Sur C-% 0	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 Rep 10
60 80 100 7d Sur C-% 0 5	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 Rep 10
60 80 100 7d Sur C-% 0 5 10	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 Rep 10
60 80 100	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 Rep 10
60 80 100 7d Sur C-% 0 5 10 20	С	ontrol Type	10 10 10 Rep 1	0.9 1 1	0 1 1 2 Rep 3	1 1 1 Rep 4	0.1 0 0 Rep 5	0.3162 0 0 Rep 6	35.14% 0.0% 0.0% Rep 7	10.0% 0.0% 0.0% Rep 8	9 10 10	10 10 10 10 Rep 10

Report Date: Test Code:

25 Mar-14 07:55 (p 2 of 2)

14078a | 07-6558-8075

Cerlodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: 15-1663-2841 Analyzed:

25 Mar-14 7:50

Endpoint: -76 Survival Rate

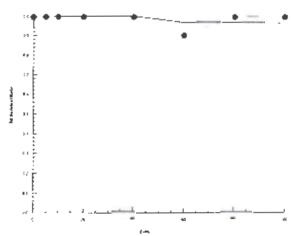
Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official R

CETISv1 8.7

Results: '	res.
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7d Surviv	ral Rate Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5		1/1	1/1	1/1	171	1/1	1/1	1/1	1/1	1/1	1/1
10		1/1	171	1/1	171	1/1	1/1	1/1	1/1	1/1	1/1
20		1/1	171	1/1	171	1/1	1/1	1/1	1/1	1/1	1/1
40		1/1	1/1	1/1	171	1/1	1/1	1/1	1/1	1/1	1/1
60		1/1	1/1	1/1	1/1	1/1	171	1/1	0/1	1/1	171
80		1/1	171	1/1	1/1	1/1	1/1	1/1	1/1	1/1	171
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	171



Report Date: Test Code: 25 Mar-14 07:55 (p 1 of 2) 14076a | 07-6558-8075

Ceriod	laphnia	7-d Survival and	d Reprodu	ction T	est						Na	utilus Env	ironmenta
Analys Analyz		18-5388-6492 25 Mar-14 7:51		dpoint: alysis:	Reproduction Linear Interpola	tion (ICPIN))		CETIS Ver Official Re		CETISv1 Yes	.8.7	
Batch	ID:	20-9586-2233	Tes	t Type:	Reproduction-S	urvival (7d)			Analyst:	Emm	a Marus	-	
Start D	ate:	27 Feb-14 13:0	0 Pro	tocol:	EC/EPS 1/RM/2	21			Diluent:	20%	Perrier Wa	iter	
Ending	Date:	07 Mar-14 12:1	5 Spe	ecies:	Ceriodaphnia d	ubia			Brine:				
Duratio		7d 23h		urce:	In-House Cultur	re			Age:	<24h			
Sample	e ID:	17-8615-7390	Cod	de:	6A76994E				Client:	ALS			
Sample	e Date:	25 Feb-14 14:3	5 Mai	terial:	Effluent				Project:				
Receiv	e Date:	27 Feb-14 10:3	0 Sou	urce:	ALS								
Sample	e Age:	46h (4.3 °C)	Sta	tion:	L1426336-2(NF	1)							
Linear	Interpo	lation Options											
X Tran	sform	Y Transform	See	ed	Resamples	Exp 95%	CL N	Method					
Log(X+	-1)	Linear	211	9951	200	Yes	T	wo-Point I	nterpolatio	1			
Point E	Estimate	es											
Level	%	95% LCL	95% UCL	. TU	95% LCL	95% UCL							
IC5	>100	N/A	N/A	<1	NA	NA							
IC10	>100	N/A	N/A	<1	NA	NA							
IC15	>100	N/A	N/A	<1	NA	NA							
IC20	>100	N/A	N/A	<1	NA	NA							
IC25	>100	N/A	N/A	<1	NA	NA							
IC40	>100	N/A	N/A	<1	NA	NA							
IC50	>100	N/A	N/A	<1	NA	NA							
Reproc	duction	Summary				Cal	culated	Variate					
C-%	C	ontrol Type	Count	Mean	Min	Max	Std E	rr Std [Dev CV9	6	%Effect		
0	N	egative Control	10	14.4	2	19	1.6	5.06	35.1	4%	0.0%		
5			10	16.8	13	21	0.8138	2.573	15.3	2%	-16.67%		
10			10	15.3	10	21	1.438	4.547	29.7	2%	-6.25%		
20			10	17.1	11	27	1.354	4.28	25.0	3%	-18.75%		
40			10	17.2	10	21	1.009	3.19	18.5	5%	-19.44%		
60			10	15.5	10	21	0.9098	2.877	18.5	6%	-7.64%		
80			10	15.7	10	26	1.808	5.716	36.4	1%	-9.03%		
100			10	17.8	15	21	0.6633	3 2.098	11.7	8%	-23.61%		
Reproc	duction	Detail	,										
C-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep 5				Rep 8	Rep 9	Rep 10
0	N	egative Control	2	18	14	19	10	14	17		16	17	17
5			18	16	17	14	14	19	21		13	19	17
10			21	10	12	11	13	10	21		19	19	17
20			11	14	16	20	17	27	16		16	19	15
40			18	10	19	17	20	15	18		21	19	15
60			17	17	17	15	14	10	16		14	21	14
				11	26	12							
80			23		20	12	16	12	20		10	10	17

Analyst: QA: JGL 97/1

Report Date: Test Code:

25 Mar-14 07:55 (p 2 of 2) 14076a | 07-6558-6075

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: 18-5388-6492 Analyzed:

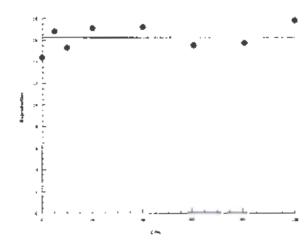
25 Mar-14 7.51

Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results: Yes

CETISy1.8.7



Report Date:

31 Mar-14 12:55 (p.1 of 2)

Test Code: 14076a | 07-6558-8075

Ceriodaphnia	a 7-d Survival and	Repro	duction Te	est							Na	utilus Env	ronment
Analysis ID:	07-0267-5219		Endpoint:	Repr	oduction				CET	IS Version	: CETISv1	8 7	
Analyzed:	25 Mar-14 7:57		Analysis:	-	metric-Con	trol vs T	rea	Iments		ial Result			
Batch ID:	20-9586-2233	7	Test Type:	Repr	oduction-S	urvivat (7d)		Ana	lyst: Em	ima Marus		
Start Date:	27 Feb-14 13:00) (Protocol:	EC/E	PS 1/RM/2	21			Dilu	ent: 201	% Perrier Wa	iter	
Ending Date:	07 Mar-14 12:15	5 5	Species:	Cerio	daphnia di	ubia			Brin	e:			
Duration:	7d 23h	;	Source:	In-Ho	ouse Cultur	·e			Age	< 2	4h		
Sample ID:	17-8615-7390	-	Code:	6A76	6994E				Clie	nt: AL	.\$		
Sample Date:	: 25 Feb-14 14 35	5 1	Material:	Efflu	ent				Proj	ect:			
Receive Date	; 27 Feb-14 10.30) ;	Source:	ALS									
Sample Age:	46h (4.3 °C)		Station:	L142	6336-2(NF	1)							
Data Transfo	rrin	Zeta	Alt H	ур	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransforme	d	NA	C < T		NA	NA			29.5%	100	>100	NA	1
Dunnett Mult	tiple Comparison	Test											
Control	vs C-%		Test :	Stat	Critical	MSD	DF	P-Value	P-Type	Decision	n(a:5%)		
Negative Cont			1 348		2.386			0.3199	CDF		nificant Effect	:	
•	10		0 505	6	2.386	4.248	18	0.7041	CDF		nificant Effect		
	20		1.517		2 386	4.248	18	0.2533	CDF		nificant Effect		
	40		1.573		2 386	4.248	18	0 2329	CDF		nificant Effect		
	60		0.617	9	2.386	4.248	18	0.6557	CDF	_	nificant Effect		
	80		0.730	3	2.386	4.248	18	0.6047	CDF	Non-Sign	nificant Effect		
	100		1.91		2.386	4.248	18	0 1325	CDF	_	rificant Effect		
ANOVA Table	,												
Source	Sum Squa	res	Mean	Squa	ire	DF		F Stat	P-Value	Decision	n(a:5%)		
Between	95.15		13.59	286		7		0.8579	0.5439	Non-Sign	nficant Effect		
Error	1140.8		15.84	444		72							
Total	1235.95					79							
Distributiona	l Tests												
Attribute	Test				Test Stat	Critica	1_	P-Value	Decision	(a:1%)			
Variances	Bartlett Ed	quality 0	f Variance		14.09	18.48		0.0497	Equal Va	riances			
Distribution	Shapiro-W	/ilk W/N	lormality		0.9845	0.9579	l	0.4477	Normal D	istribution			
Reproduction	n Summary												
C-%	Control Type		Mean		95% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effec
0	Negative Control		14.4		10.78	18.02		16.5	2	19	1.6	35.14%	0.0%
5		10	16.8		14.96	18.64		17	13	21	0.8138	15.32%	-16.67%
10		10	15.3		12.05	18.55		15	10	21	1 438	29.72%	-6.25%
20		10	17.1		14.04	20.16		16	11	27	1.354	25 03%	-18 75%
40		10	17.2		14.92	19.48		18	10	21	1.009	18.55%	-19.44%
60		10	15.5		13 44	17.56		15.5	10	21	0.9098	18.56%	-7.64%
60		10	15.7		11 61	19.79		14	10	26	1.808	36 41%	-9 03%
100		10	17.8		163	19.3		18	15	21	0.6633	11 78%	-23,619
Reproduction	n Detail												
C-%	Control Type	Rep 1	Rep 2	!	Rep 3	Rep 4		Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 1
Ó	Negative Control	2	18		14	19		10	14	17	16	17	17
5		18	16		17	14		14	19	21	13	19	17
10		21	10		12	11		13	10	21	19	19	17
20		11	14		16	20		17	27	16	16	19	15
40		18	10		19	17		20	15	18	21	19	15
		17	17		17	15		14		16			
60									10		14	21	14
80		23	11		26	12		16	12	20	10	10	17
100		15	21		15	17		17	19	16	20	19	19

Report Date:

31 Mar-14 12 55 (p 2 of 2)

Test Code: 14076a | 07-6558-8075

Ceriodaphnia 7-d Survival and Reproduction Test

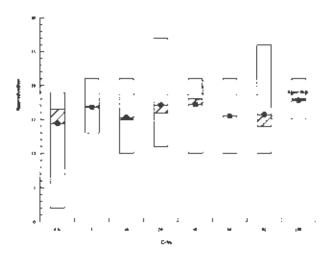
Nautilus Environmental

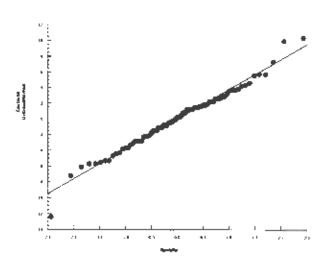
Analysis ID: Analyzed: 07-0267-5219 25 Mar-14 7:57 Endpoint: Reproduction

Analysis: Parametric-Control vs Treatments

CETIS Version: CET Official Results: Yes

CETISVI 8.7





Ceriodaphnia dubia Summary Sheet

Client: Work Order No.:	ALS Environmental	Start Date/Time: <u>FCIS 28/14 (2) 1100 h</u> Set up by: <u>FIMIN</u>
Sample Information Sample ID: Long Sample Date. Date Received: Sample Volume: Test Organism In	142(336-3 (NFZ) Feb 25/14 Feb 27/14 2×20L	Test Validity Criteria: 1) Mean survival of first generation controls is ≥80 % 2) At least 60% of controls have produced three broods within 8 days 3) An average of >15 live young produced per surviving female in the control solutions during the first three broods 4) Invalid if ephippra observed in any control solution at any time WQ Ranges: T (*C) = 25 x 1; DO (mg/L) = 3.3 to 8.4 , pH = 6.0 to 8.5
Mortality (%) in pro Individual female i	first 3 broads of previous 7 d:	021914 <24-h (within 12-h) 17 0 2,4,5,6,1,6,9,11,14,16,17,16,19, 22,23,25,26,24,32,33,36,37
Reference Toxical Stock Solution ID: Date Initiated: 7-d LC50 (95% CI 7-d IC50 (95% CL	13 N203 13 N203 FCB 2 1/14 L): 14 (1.1 - 1.8) 1: 13(1.0 - 1.8)	9/L NaCL 9/L NaCL Pange: 17/ + 7- / 5) all NaCl (CV (%): 7.1
	pe Toxicant Mean and Historical I	Range: 1.7 (+ 2-1/5) git NaCt
Reviewed by:	<u> 164</u>	Date reviewed: March 27/14

Jan 26, 2011; Ver. 2.0 Nautilus Environmental

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

DO (mg/L)	0 init.													
CONTYC Temperature (°C) DO (mg/L)	init.				2		3	ays	4		5		6	.7
Temperature (°C) DO (mg/L)		- A C C C C C C C C C C C C C C C C C C			2	old		old	4		-	old	new	-final
DO (mg/L)		old	new	old	new	0.1.	24.0	245	24.0	25.0	24 O	25.0	24.6	25.0
	8.0	24	79	24	81	7.6	8.1	77	10	7.3	8.0	7.7	8.2	7.4
an L	7.9	78	79	28	21	77	7.9	7.6	29	7.7	8.0	7.7	7.9	7.8
	210		2160		4	211	1.	211	171	213)	21		7.0
	mm		R	-	M7	FMW	1	FM	M	Em	W	EM		
IIIdaio	MIN.				-	1 (11111		TIVI			,			
Culv).							D	ays						
Concentration	0		1		2		3		4		5		6	0870
5%	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
	24.0	2500		2570	24,5	24.5	24.0	245	24.0	25.6	24.0	25.0	24,0	25.0
	3.0	75	79	75	20	2.6	8	7.7	79	7.2	8.0	7.3	8.0	7.4
	7.9	7.8	7.8	79	78	7.6	7.9	77	7.8	7.t	1.0	7.6	17.7	7.8
	215	27	0	21	18	210		211	0	311		22		_
Initials	Emm	1	b	A		EM	M	EM	M	Em	m	Ehr	M	
(vlv)					*1911		D	ays						
Concentration	0	-	1		2	Final			4		5		6	7
40%	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
	24.0	2570		100	24.0	24.5	1	-	11011				11011	
	81	25	7 ?	76	20	7,4								
	7.7	79	78	7,9	78	7.6								
	15+		5	2	59	26	9							
	FMM	1	n	0	_	Emy								
(VLV)			4					ays	4		_		•	1 -
Concentration	O tunts		1		2	old	3	old	4	old	5	old	6	7
	init. 24.5	old	new	old	new	Old	new	Oid	new	Old	new	Old	new	final
	81		/			1		/				1		
pH	7.5		/		/		1					/	/	
	327	/	/		/			1			/	1	1	
Cond. (µS/cm)				-/		1		/		1				-

Final

2573 75 79

208 10

Final 2573 Chronic Freshwater Toxicity Test C. dubia Reproduction Data

Client: Sample ID: Work Order:	A	ALS		NFS	2	H	nach	(5-9557	-3								Sta	rt Date p Date	Start Date & Time: Stop Date & Time: Set up by:		Feb.	Feb 26/14	1/-	32	000	13251	5	
		10	mul	-					Concontration	offeetin		10 (CILV	21/2					-	Concentration.	ration	1.		2					Г
Days Concer	A B C	0	EF	0	I	-	7	Init	A	B	C	E	4	9	I	-	٦	Init	AB	O	0	П	<u>L</u>	9	I	-	1 1	Init
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3 ×	1	11	1	1	1	1	1	thir	1	1	1	1	1	/	1	1	H	Thilly	1	1	1	1	1	1		7	8	#NO
4	1	1	1	1	1	- 1	1	Phin	-	1	1	1	1	1	1	1	1	my	1	/		1	1	1	1	1	V	TO THE
2	4 3	3 4	. 2	9	W	2	8	Pr	M	7		3	5	M	M	7	5	- MA	1 3	2	2	3	3	2	5	7	1	Emp
	4	2	1	7	9	+	5	A P	9	4	S	1	7	7	00	9	十世界	nn	7	>	7	N		2	4	0	1	3
7	1	9	00		1	1	1	Por P	1	1	2	1	2	4	1	1	S	Thin		0	7		to	1	1	7	-	Jan
8	4	4	و	4	0	~	y	4	4	to.		N	0	\rightarrow	4	4	/	3	5	7	6	-	٩	0	4	1	1	7
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1	1		X	1	A	1	1	-	1	1	1	X		^		1	1	4	1	1	1	1	1	1	X	1	1	
	1	1	1	7	7	1	1		1	1	-		1	-	1	7				1	1	-	7	7	~	X	5	1
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4			1	-	+	+	+	-		+	+	+	-		V		T	+	+	+	+	+	+			+	+	Т
2		-	1	+	+	+	+	+			+	1	1				1	+	+	+	+	+	+	1		t	+	T
9	-		1	+	-	+	+	+			1	1	+				1	+	+	+	+	+	+	1		t	+	T
7	-	-	+	+	+	+	+	-	1	1	+	+	+	-			T	+		+	+	+	-			+	+	Т
80	-		-	-	~		-	>		1	+	+	-	4				1	+	+	+	+	4	1		+	+	T
Total		H	H	H	+	4	1	N.				-	_						-	-	-	-					-	
Notes: X = mortality.	ortality.																											
		10	1000	-																								
Comments: Total	спри	Total # Young only b	11	in the fire	on the first 3 Broods. Fourth and sub-	de. Fourt	th and so	- Inneed	t broads	not inclu	ded in to	ed in total count.																
			1	-																		3	June	0	11 3	4		
Reviewed by:			5	3														Date r	Date reviewed:	:pe		3	3	2	March 26/17			

Nautijus Environmental

Date reviewed:

Version 2.1 Issued July 29, 2009

Reviewed by:

Report Date: Test Code: 25 Mar-14 08:20 (p 1 of 2) 14076c | 11-8877-8198

Ceriodaphn	la 7-d Survival and	Reprodu	uction Te	est enem					Na	utilus Env	ironment
Analysis ID:			dpoint:	7d Survival R	ate		CET	IS Version:	CETISv1	.8.7	
Analyzed:	25 Mar-14 8:17	An	alysis:	Untrimmed Sp	pearman-Kä	rber	Offic	ial Results:	Yes		
Batch ID:	14-3157-7400	Te	st Type:	Reproduction	-Survival (7d	i)	Anal	yst: Emm	a Marus		
Start Date:	28 Feb-14 11:00) Pro	otocol:	EC/EPS 1/RM	1/21		Dilu	ent: 20%	Perrier Wa	ter	
Ending Date	e: 08 Mar-14 13:25	Sp Sp	ecies:	Ceriodaphnia	dubia		Brin	e:			
Duration:	8d 2h	So	urce:	In-House Cult	ure		Age	<24h			
Sample ID:	07-0729-5812	Co	de:	2A287A44			Clie	nt: ALS			
Sample Dat	e: 25 Feb-14 13:05	5 Ma	terial:	Effluent			Proj	ect:			
Receive Dat	te: 27 Feb-14 10:30	So	urce:	ALS							
Sample Age	: 70h (3.3 °C)	Sta	ation:	L1426336-3(N	NF2)						
Spearman-F	Kärber Estimates										
Threshold C	Option Th	reshold	Trim	Mu	Sigma		EC50	95% LCL	95% UCL		
Control Thre	shold 0.	1	0.00%	6 1.244	0.04404		17.54	14.32	21.48		
7d Survival	Rate Summary				Caio	ulated Varia	ate(A/B)				
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	В
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
5		10	1	1	1	0	0	0.0%	-11.11%	10	10
10		10	1	1	1	0	0	0.0%	-11.11%	10	10
20		10	0.3	0	1	0.1528	0.483	161.0%	66.67%	3	10
40		10	0	0	0	0	0		100.0%	0	10
60		10	0	0	0	0	0		100.0%	0	10
80		10	0	0	0	0	0		100.0%	0	10
100		10	0	0	0	0	0		100.0%	0	10
7d Survival	Rate Detail										
C-%	Control Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 1
0	Negative Control	0	1	1	1	1	1	1	1	1	1
5		1	1	1	1	1	1	1	1	1	1
10		1	1	1	1	1	1	1	1	1	1
20		0	0	0	0	0	0	1	0	1	1
40		0	0	0	0	0	0	0	0	0	0
60		0	0	0	0	0	0	0	0	0	0
80		0	0	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0
7d Survival	Rate Binomials										
C-%	Control Type	Rep 1	Rep 2		Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 1
0	Negative Control		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
10		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
20		0/1	0/1	0/1	0/1	0/1	0/1	1/1	0/1	1/1	1/1
40		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
60		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
80		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
		0/1									

nalyst:_____ QA: 164

Report Data: Test Code: 25 Mar-14 08.20 (p 2 of 2)

14076c | 11-8877-8198

Ceriodaphnia 7-d Survival and Reproduction Test

8-1 2mm

Nautilus Environmental

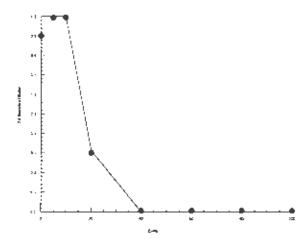
Analysis (0: 0 Analyzed: 2

00-5603-8265 25 Mar-14 8:17 Endpoint: 7d Survival Rate

Analysis: Untrimmed Spearman-Kärber

CETIS Version: Official Results:

CETISv1.8.7 Yes



Report Date: Test Code: 25 Mar-14 09:00 (p 1 of 2) 14076c | 11-8877-8198

									eat code.		14010011	1-00//-010
Ceriod	aphnia	7-d Survival an	d Reprodu	ction Te	est					N	autilus Env	vironmenta
Analys	is ID:	08-3838-3862	End	point:	Reproduction			C	ETIS Versio	n: CETISV	1.8.7	
Analyz	ed:	25 Mar-14 8:59	Ana	lysis:	Linear Interpola	ation (ICPIN	N)	C	official Resul	ts: Yes		
Batch	ID:	14-3157-7400	Tes	t Type:	Reproduction-S	Survival (7d)	A	nalyst: E	mma Marus		
Start D	ate:	28 Feb-14 11:0		tocol:	EC/EPS 1/RM/					0% Perrier W	ater	
Ending	Date:	08 Mar-14 13:2	5 Spe	cies:	Ceriodaphnia d	lubia		В	rine:			
Duratio	on:	8d 2h	Sou	ırce:	In-House Cultu	re		A	ge: <	24h		
Sample	e ID:	07-0729-5812	Cod	le:	2A287A44			C	lient: A	LS		
Sample	e Date:	25 Feb-14 13:0	5 Mat	erial:	Effluent			P	roject:			
Receiv	e Date:	27 Feb-14 10:3	Sou Sou	ırce:	ALS							
Sampl	e Age:	70h (3.3 °C)	Sta	tion:	L1426336-3(NF	F2)						
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	n See	d	Resamples	Exp 95%	6 CL I	Method				
Log(X+	1)	Linear	168	3215	200	Yes		Two-Point In	terpolation			
Point E	Estimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	10.43	2.711	10.5	9.591	9.527	36.89						
C10	10.87	8.221	11.02	9.201	9.077	12.16						
C15	11.33	10.32	11.56	8.828	8.651	9.694						
IC20	11.81	10.8	12.13	8.471	8.246	9.259						
IC25	12.3	11.26	12.72	8.129	7.862	8.883						
IC40	13.91	12.77	14.68	7.191	6.81	7.832						
IC50	15.08	14.01	16.19	6.63	6.178	7.139						
Reprod	duction	Summary				Ca	alculated	I Variate			_	
C-%		ontrol Type	Count	Mean		Max	Std E	rr Std De	ev CV%	%Effect		
0	N	egative Control	10	14.1	0	17	1.588	5.021	35.61%	0.0%		
5			10	15.4	12	18	0.618	2 1.955	12.7%	-9.22%		
10			10	14.8	12	18	0.611	1.932	13.06%	-4.97%		
20			10	2.2	0	9	1.052	3.327	151.2%	84.4%		
40			10	0	0	0	0	0		100.0%		
60			10	0	0	0	0	0		100.0%		
80			10	0	0	0	0	0		100.0%		
100			10	0	0	0	0	0		100.0%		
Reprod	duction	Detail										
C-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep 5			Rep 8	Rep 9	Rep 10
0	N	egative Control	0	15	17	16	16	16	16	14	16	15
5			16	16	12	12	17	16	16	18	15	16
10			12	16	14	18	13	14	16	17	13	15
20			0	3	0	0	0	0	9	0	3	7
40			0	0	0	0	0	0	0	0	0	0
60			0	0	0	0	0	0	0	0	0	0

Analyst: QA: JOU

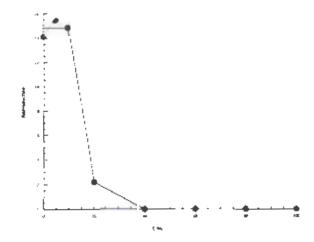
Report Date:

25 Mar-14 09:00 (p 2 of 2)

Test Code:

14076c | 11-8877-8198

Ceriodaphnia	7-d Survival and R	eproduction T	est		Nautilus Environmental
Analysis ID;	08-3838-3862	Endpoint:	Reproduction	CETIS Version	c CETISv1.8.7
Analyzed:	25 Mar-14 8:59	Analysis:	Linear Interpolation (ICPIN)	Official Result	s: Yes



Ceriodaphnia dubia Summary Sheet

Client: Work Order No.:	AUS Environmental	Start Date/Time:Set up by:	FEBZÁVIY OS HOSÍN
Sample Information Sample ID: L1 Sample Date: Date Received: Sample Volume: Test Organism Info	426336-4 (XI) Feb 25/14 Feb 23/14 2×20L	 An average of ≥15 live young control solutions during the first 	e produced three broods within 8 days g produced per surviving female in the I three broods in any control solution at any time
Broodstock No.: Age of young (Day (Avg No. young in fire Mortality (%) in prev	o); st 3 broods of previous 7 d. ious 7 d: used ⇒8 young on test day	022014 <24-h (within 12-h) 17 0 3,4,5,6,7,10,11	1,12,17,18
	131203 Fb2VI4	Toronto.	
Test Results:	LC50 % (v/v) (95% CL) .27. IC25 % (v/v) (95% CL) IC50 % (v/v) (95% CL)	Survival (2(25.1-24.5)	Reproduction 23.0 (20.5-23.6) 27.7 (25.8-282)
Reviewed by:	Joh	Date review	wed: March 27/14

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Concentration CONTY C					1)			lest St	& Time: pecies:		aphnia d	lubia		
Control Temperature (°C)							Da	ays						
Temperature (°C)	0	-	1	1	2		3		4		5		6	7 d
emperature (°C)	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
	24.0	2000	240	2510	WP	25.0	74.0	145	24.0	24.5	24.0	5.0	24.6	24.1
	8.0	74	79	24	81	76	8.1	7.8	7.9	8.0	8.0	7.3	8.2	7.9
рН	7.9	7.8	79	78	40	7.8	7.9	7.6	79	7.8	80	78	7.9	7.8
Cond. (µS/cm)	210	1	Ub	2	11	211		211		212		21		-
Initials	Emm		4	A		Emi	m	FMV	n	FMV	η	EN	m	Einn
% Cuty)							Da	ays				-		
Concentration	0		1		2		3		4		5		6	70
5	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
emperature (°C)	4 4-	2013	MA	1510	240	25.0	24.0	145	A		-	25.6	24.0	240
DO (mg/L)	8.2	75	79	25	81	7.5	8.2	7.8	2.9	86	8.0	7.3	7.9	80
pH	7.9	29	7.8	78	778	7.8	29	7.8	7.0	7.8	7.8	77	7.70	707
Cond. (µS/cm)	217	210		22		218	2	213		21	4	221)	219
Initials	Emm		A	4		FMI		FMV	n	FM	M	EM		EMM
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Chronic Freshwater Toxicity Test C. dubia Reproduction Data

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Nautilus Environmental

Version 2.1 leaved July 29, 2009

Report Date:

25 Mar-14 08:30 (p.1 of 2)

Test Code:

14076d | 03-3685-9732

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Analyzed:	25 Mar-14 8 28	A	nalysis:	Trimmed Spe	arman-Karb	er	Offic	ial Results:	Yes		
Batch ID:	07-6970-9125	Te	est Type:	Reproduction	·Survival (7d		Ana	yst: Emr	na Marus		_
Start Date:	28 Feb-14 11:00		rotocal:	EC/EPS 1/RM			Dilu		Perrier Wa	iter	
Ending Date:	08 Mar-14 14:00) S	pecies:	Ceriodaphnia	dubra		Brin	θ:			
Duration:	8d 3h	S	onice:	In-House Cul	ture		Age:	<24	h		
Sample ID:	19-2140-4869	C	ode:	72864FC5			Clier	nt: ALS			
Sample Date:	25 Feb-14 11:10) M	aterial:	Effluent			Proje	ect:			
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frimmed Spe	arman-Kärber Es	timates					<u> </u>				_
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Report Date:

25 Mar-14 08:30 (p 2 of 2)

Test Code:

14076d | 03-3685-9732

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

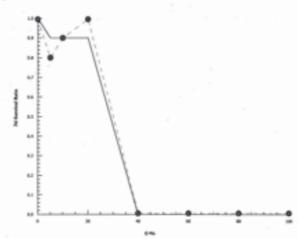
Analysis ID: Analyzed: 00-8120-2686 25 Mar-14 8:28 Endpoint: 7d Survival Rate

Analysis: Trimmed Spearman-Kärber

CETIS Version:

CETISv1.8.7

Official Results: Yes



Report Date: Test Code: 25 Mar-14 08:31 (p 1 of 2) 14076d | 03-3685-9732

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Ceriod	aphnia	7-d Survival an	d Reprodu	ction Te	est			-	1		Na	utilus Env	vironmenta
Analys Analyz		01-0863-1339 25 Mar-14 8:30		lpoint: lysis:	Reproduction Linear Interpola	ition (ICPIN)	,		CETIS V		CETISv1 Yes	1.8.7	
Batch I	D:	07-6970-9125	Tes	t Type:	Reproduction-S	Survival (7d)			Analyst:	Emn	na Marus	-	
Start D	ate:	28 Feb-14 11:0		tocol:	EC/EPS 1/RM/				Diluent:	20%	Perrier Wa	ater	
Ending	Date:	08 Mar-14 14:0		cies:	Ceriodaphnia d	ubia			Brine:				
Duratio		8d 3h		rce:	In-House Cultu	re			Age:	<24h	1		
Sample	D:	19-2140-4869	Cod	le:	72864FC5				Client:	ALS			
Sample	Date:	25 Feb-14 11:1	0 Mat	erial:	Effluent				Project:				
Receiv	e Date:	27 Feb-14 10:3	0 Sou	rce:	ALS								
Sample	Age:	72h (4 °C)	Sta	tion:	L1426336-4(X1)							
Linear	Interpo	lation Options					1,						
X Trans	sform	Y Transform	n See	d	Resamples	Exp 95%	CL M	Method					
Log(X+	1)	Linear	102	4824	200	Yes .	, 1	wo-Point	Interpolati	on -			
Point E	stimate	es											
Level	%	95% LCL			95% LCL	95% UCL							
IC5	8.358		20.51	11.96	4.877	78.28							
C10	20.52		21.25	4.873		23.88							
IC15	21.31		22.02	4.694	4.542	13.8							
C20	22.12		22.81	4.521	4.384	10.56							
C25	22.96		23.63	4.355	4.231	4.847							
C40	25.68		26.28	3.894	3.806	4.24							
C50	27.66	25.77	28.19	3.615	3.547	3.88							
Reprod	luction	Summary		-		Cal	culated	Variate					
C-%	С	ontrol Type	Count	Mean	Min	Max	Std E	rr Std	Dev C\	/%	%Effect		
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5			10	15.1	8	20	1.027	3.24	7 21	.5%	0.66%		
10			10	14.1	0	19	1.741	5.50	7 39	.05%	7.24%		
20			10	14.3	11	17	0.5783		9 12	.79%	5.92%		
ю			10	0	0	0	0	0			100.0%		
50			10	0	0	0	0	0			100.0%		
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)	N	egative Control	17	13	15	14	15	18	14		16	15	15 .
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20			17	15	11	15	15	13	14		12	16	15

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Report Date:

25 Mar-14 08:31 (p 2 of 2)

Test Code:

14076d | 03-3685-9732

Ceriodaphnia 7-d Survival and Reproduction Test

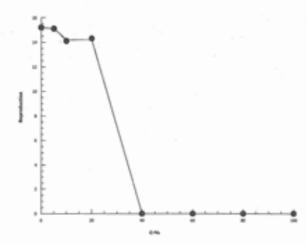
Nautilus Environmental

Analysis ID: Analyzed: 01-0863-1339 25 Mar-14 8:30 Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

CETISv1.8.7



Client ALS Environmental

WO# 14076

Hardness and Alkalinity Datasheet

			Alkalinity			\vdash		Hardness	ø	
			Tall land							
		Sample		(mL) of 0.02N		Ű	Sample	Volume of 0.01M	Total	
Sample ID	Sample Date		HCL/H ₂ SO ₄ used to pH 4.5	HCL/H ₂ SO₄ used to pH 4.2	Total Alkalinity (mg/LCaCO ₃)	<u>> 5</u>		EDTA Used (mL)	Hardness (mg/L CaCO ₃) Technician	Technician
LI426356-4(XI)		ဌ	<u>د</u>	£3	130	ч.	50	9.3	136	k.l.P
1426336-1 (C16)			.t.	ر ادار	30		,	7.4	- ৪৮)	<i>b</i> (<i>p</i>
1426334-218F			4.7	9	132	1		7.8	156	41g
1476363(NF2)			6.3	<u>[.</u> j	124			00	(9)	kiP
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CERIODAPHNIA DUBIA TOXICITY TESTING February 2014

Prepared for:

NAUTILUS ENVIRONMENTAL 8664 Commerce Court Burnaby, BC V5A 4N7

Prepared by:

IRC INTEGRATED RESOURCE CONSULTANTS INC.

160 - 14480 River Road Richmond, B.C. V6V 1L4 Tel: 604-278-7714

Tel: 604-278-7714 Fax: 604-278-7741





21 March 2014

Nautilus Environmental 8664 Commerce Court Burnaby, BC V5A 4N7

Attention: Krysta Pearcy

Reference: Ceriodaphnia dubia bioassay on the X14 sample received on 27 February 2014.

Dear Ms. Pearcy,

Enclosed please find the final report for the *Ceriodaphnia dubia* toxicity testing results, for Nautilus Environmental X14 sample dated 25 February 2014. This report includes *Ceriodaphnia dubia* test reproduction and survival data as well as daily water quality readings and reference toxicant results.

The result of the *Ceriodaphnia duhia* bioassay indicated that a concentration that would cause 50% mortality (LC50) was greater than 100%. The survival No Observed Effect Level (NOEL) was 100% and the Lowest Observed Effect Level (LOEL) was greater than 100%. The concentration that would cause a 50% inhibition in reproduction (IC50) in the culture tested was 53.58% with a 95% confidence interval between 24.92% and 62.32%, while the 25% inhibition value (IC25) was 20.91% with a 95% confidence interval between 17.52% and 32.90%. The reproduction No Observed Effect Level (NOEL) was 50% and the Lowest Observed Effect Level (LOEL) was 100%.

Should you have any questions regarding these results, please do not hesitate to call me at 604-278-7714.

Sincerely,

Ditty Chacko Kakkassery Laboratory Biologist

IRC Integrated Resource Consultants Inc.

Engl.

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P	age
Letter of Transmittal	
1.0 CERIODAPHNIA DUBIA BIOASSAY RESULTS 1.1 SAMPLE DESCRIPTION	. 3
1.3 RESULTS	4
APPENDICES	. 6

APPENDIX A - Ceriodaphnia dubia Bioassay Supporting Documents

Ceriodaphnia dubia Brood Stock Health Record

Test Brood Count and Solution Readings

Reference Toxicant Warning Charts

Calculation printouts

1.0 CERIODAPHNIA DUBIA BIOASSAY METHOD AND RESULTS

1.1 SAMPLE DESCRIPTION

IRC Sample ID No.:	1402154
Sample Name:	X14
Effluent type:	Effluent
Date collected:	25 February 2014
Date, time received:	27 February 2014; 1425 hrs
Collection Method:	Grab
Amount, Container:	6 x 1 L glass containers
Date, time test initiated:	27 February 2014; 1620 hrs.
Date, time test completed:	05 March 2014; 1230 hrs.
Physical description:	Translucent slightly yellow liquid

1.2 METHOD

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Ceriodaphnia dubia Testing and Culturing" CDver3. This procedure follows the "Biological Test Method: Test of Reproduction and Survival Using the Cladoceran Ceriodaphnia dubia" Report EPS 1/RMS/21Second Edition - February 2007. The NOEL and LOEL were calculated by Fisher Exact/Bonferroni-Holm method, IC50 and IC25 using Linear Interpolation method and LC50 by Spearman-Kärber or Linear Interpolation method with the CETIS, ver 1.6.6E (2008) software.

Ceriodaphnia dubia are cultured on site from an original culture obtained from Carolina Biological Supply Ltd. Organisms are maintained in 1 L mass cultures and in a series of 23 mL glass test tubes containing a single Ceriodaphnid from which test organisms are obtained. Culture, control and test dilution water was a mixture of 80% distilled water and 20% Perrier.

Tests were conducted in 23mL glass test tubes containing 20mL of test solution, at a depth of 12 cm. Ten replicates of each concentration (100%, 50%, 25%, 12.5%, 6.25%, 3.13% and 1.56%) and control were tested. Test temperature was maintained throughout the test period at $25^{\circ}\pm 1^{\circ}$ C, with a photoperiod of 16 hours light and 8 hours dark.

Initiation of the bioassay was carried out by placing a single neonate Ceriodaphnid of less than 24 hours, into each test vessel. New test solutions were prepared daily into which organisms were transferred. Daily measurements of the mortality and number of young produced in each replicate were recorded. Records were also maintained for daily readings of dissolved oxygen, pH, temperature and conductivity for each test concentration and control solution. The test was completed when ≥ 60% of control organisms had 3 broods.

On the day of test initiation, adult *Ceriodaphnia* were placed in test tubes at 0600 hours; young used in testing were pulled directly from these test tubes at 1600 hours, ranging in age from 0 to 1000 hours. There was no unusual appearance or behaviour noted in the test organisms prior to their use in the test. No ephippia were observed in brood cultures and mass cultures in the seven day period preceding the test.

Sample used for testing was collected on 25 February 2014. Sample containers were marked with the sample ID: 7 Day Chronic Ceriodaphnia. The sample arrival temperature was 10.5° C; nothing unusual was noted regarding the sample appearance. Sample in the 6 x 1 litre glass jugs received were stored in the dark at $4\pm1^{\circ}$ C until used for testing. The required volume of sample was poured out into a labeled beaker on each day of testing. The sample was not pH adjusted or filtered prior to being used in testing. The test was complete at day 6 as \geq 60% of control organisms had produced 3 broods at this time.

1.3 RESULTS

	Results	95% Confidence Interval
Ceriodaphnia dubia LC50	> 100%	•
NOEL (Survival)	100%	-
LOEL (Survival)	> 100%	-
Ceriodaphnia dubia IC25	20.91%	17.52% - 32.90%
Ceriodaphnia dubia IC50	53.58%	24.92% - 62.32%
NOEL (Reproduction)	50%	-
LOEL (Reproduction)	100%	-

LC₅₀= Concentration which would cause a 50% mortality

IC25 = Concentration which would cause a 25% inhibition in reproduction or growth.

IC₅₀= Concentration which would cause a 50% inhibition in reproduction or growth.

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

1.4 WATER QUALITY READINGS AND TEST DATA

Test set up technician was DB. Daily reading technicians were DB, DC, CW and MH. The initial dissolved oxygen level of the sample was 11.5 mg/L at $11.0 ^{\circ}\text{C}$, the initial conductivity was $795 \mu\text{S/cm}$ and the initial pH was 7.4. The sample was not pH adjusted or filtered prior to testing. For daily water quality readings, please see appendices.

Daily Initial Readings of Undiluted sample (after warming)

	Dissolved Oxygen (mg/L)	Temperature (°C)	pH	Conductivity (µS/cm)	PRE- AERATION*
DAY 0	11.3	25.0	7.3	795	20 minutes
DAY 1	10.9	25.0	7.4	787	20 minutes
DAY 2	11.4	25.5	7.3	789	20 minutes
DAY 3	11.2	24.0	7.4	793	20 minutes
DAY 4	11.3	25.5	7.3	791	20 minutes
DAY 5	11.5	25.0	7.4	790	20 minutes

^{*}Pre-aeration of the sample is carried out if the dissolved oxygen level is either less than 40% saturation or greater than 100% saturation. Pre-aeration is for a maximum of 20 minutes.

Daily 0 Hour Refresh Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (µS/cm)	Hardness (mg/L)
100%	9.5-10.0	7.4-7.6	773-791	410-424
50%	8.7-8.9	7.5-7.7	495-507	
25%	8.4-8.6	7.7-7.8	246-346	
12.5%	8.2-8.5	7.7-7.9	256-263	
6.25%	8.1-8.4	7.7-7.9	211-219	
3.13%	8.1-8.4	7.7-7.9	188-196	
1.56%	8.1-8.4	7.7-7.9	175-185	
Control	8.1-8.4	7.7-8.0	164-176	74-86

Daily 24 Hour Old Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (μS/cm)
100%	7.1-7.4	7.9-8.1	776-791
50%	6.9-7.4	7.9-8.1	500-509
25%	6.8-7.3	7.7-8.0	342-353
12.5%	6.7-7.2	7.6-7.9	260-269
6.25%	6.7-7.2	7.6-7.9	215-221
3.13%	6.7-7.4	7.6-7.9	192-200
1.56%	6.7-7.3	7.6-7.9	180-188
Control	6.9-7.4	7.6-7.8	171-180

REPRODUCTION AND SURVIVAL RESULTS:

Summary of Total Young Produced Per Ceriodaphnia

Concentration	Т	otal Y	oung			d per	<i>Ceriod</i> ods	laphn	<i>id</i> in	its	Mean Young in First 3 Broods	Standard Deviation
	1	2	3	4	5	6	7	8	9	10		
100%	5	D	8	1	7	0	D	D	3	3	2.7	3.1
50%	6	14	16	2	17	23	27	29	23	12	16.9	8.8
25%	25	27	2	30	8	36	13	25	20	17	20.5	10.3
12.5%	30	36	32	37	34	37	34	32	40	34	34.6	3.0
6.25%	35	38	33	38	29	39	D12	36	13	34	30.7	10.0
3.13%	34	-380	38	32	27	34	22	35	35	36	32.4	4.7
1.56%	31	22	34	25	31	35	41	33	30	30	31.2	5.2
Control	32	38	14	35	12	11	36	32	15	35	26.0	11.4

^{&#}x27;D' - Dead

031 emm

Summary of Ceriodaphnia Survival

	Percent Survival								
Concentration	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6			
100%	100	80	70	70	70	70			
50%	100	100	100	100	100	100			
25%	100	100	100	100	100	100			
12.5%	100	100	100	100	100	100			
6.25%	100	100	100	100	100	90			
3.13%	100	100	100	100	100	100			
1.56%	100	100	100	100	100	100			
Control	100	100	100	100	100	100			

Percent survival in each concentration is based on a single individual in each of ten replicates.

^{&#}x27;X' - Cerio lost due to technician error

1.5 QUALITY CONTROL

Test controls conducted concurrently with the test and reference toxicant bioassays affirmed the validity of the *Ceriodaphnia dubia* test. Testing of the reference toxicant was performed as per protocol requirements with no deviations and conditions were within testing limits for measured parameters as specified by the bioassay protocol.

The brood organisms used to supply neonates in the *Ceriodaphnia dubia* survival and reproductive bioassay maintained the requirements of mortality rates less than or equal to 20% prior to testing; with a minimum of 9 young produced in the previous brood and an average of 32.2 young produced per adult in its first 3 broods. The brood stock was challenged with a reference toxicant (reagent grade sodium chloride) within fourteen days of sample testing. The value obtained in this test was within warning limits (± 2 standard deviations) of the laboratory mean, established through repetitive testing with the reference toxicant and brood culture. Dilution water controls run concurrent with the test produced three broods per test organism in at least 60% of the control replicates with an average of greater than 15 live young per adult. Control mortalities were less than 20%.

Test Brood Stock Health Summary

	Actual	Required
Age of Neonates	0-1000 hours	≤24 hours
Age of brood adults	6 days	≤ 14 days
Mean % mortality in 7 days prior to testing	0%	≤20%
Average of number of young produced per adult in its first 3 broods	32.2	≥ 15
Minimum number of young produced in previous brood	9	≥8
Ephippia observations	None	None

Reference Toxicant Results

Chemical Used:	Sodium Chloride					
Date Tested:	19 February 2014					
7 day IC ₅₀ (Log Value):	3.147 mg/L, with a 95% confidence interval between 3.097 mg/L and 3.198 mg/L					
Lab Geometric Mean (Log Value):	$3.079 \text{ mg/L} \pm 0.189 \text{ mg/L}$ (two standard deviations) N = 31					
Warning Limits (Log Values):	2.890 mg/L to 3.268 mg/L					
7 day LC50 (Log Value):	3.327 mg/L, with a 95% confidence interval between 3.231 mg/L and 3.422 mg/L					
Lab Geometric Mean (Log Value):	$3.253 \text{ mg/L} \pm 0.166 \text{ mg/L}$ (two standard deviations) N = 31					
Warning Limits (Log Values):	3.087 mg/L to 3.419 mg/L					

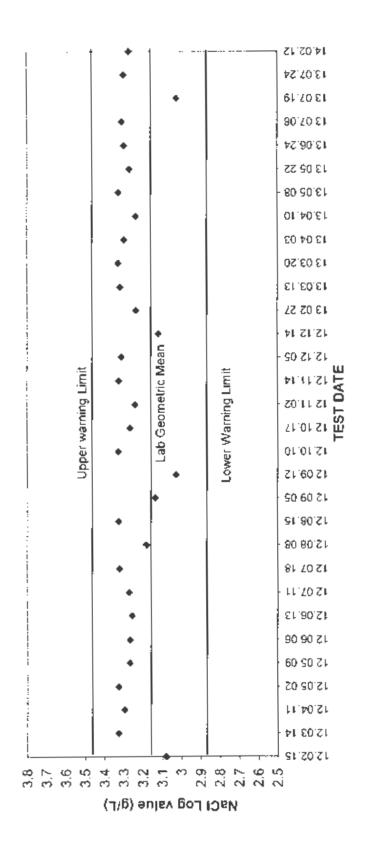
Ceriodaphnia dubia Brood Stock Health Record

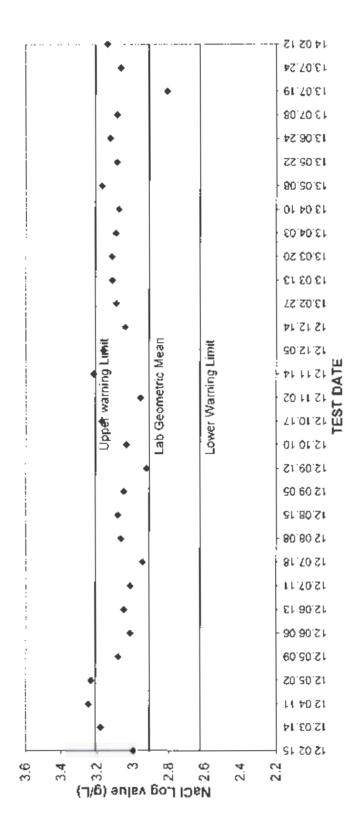
CERIODAPHNIA BROOD STOCK HEALTH RECORD

Client:	Nautilus Environ	mental		(4)							
IRC ID#:	1402154										
Sample Name:	X14										
Sample Date:	25-Feb-14										
Date Tested:	27-Feb-14										
STOCK BIRTH D	AY/DATES:	19-Feb-14				Mortality rate i	in 7 day pe	riod precedi	ng test:		
						# Dead:		0			
EPHIPPIA OBSEI	RVATIONS (yes/no):		No			Total organisms	S:	30			
						% Mortality:		0.0%			
						Required:		≤20%			
Young Produced	19-Feb-14									100	
		Organism #									
Date	Age (Days)	1	2	3	4	5	6	7	8	9	10
20-Feb-14	1	0	0	0	0	0	0	0	0	0	0
21-Feb-14	2	0	0	0	0	0	0	0	0	0	0
22-Feb-14	3	3	4	4	3	3	0	4	4	5	5
23-Feb-14	4	0	0	0	0	0	6	0	0	0	0
24-Feb-14	5	9	12	12	12	12	9	12	11	8	11
25-Feb-14	6	20	17	19	21	17	0	17	9	16	20
26-Feb-14	7	0	15	0	0	0	0	0	19	0	0
27-Feb-14	8	20	22	19	17	22	19	24	0	20	20
28-Feb-14	9	20	20	21	24	23	25	25	21	27	20
1-Mar-14	10	23	0	17	27	0	21	24	19	22	20
2-Mar-14	11	0	25	0	0	26	0	0	20	0	0
Total in first 3 br	oods:	32	33	35	36	32	15	33	24	29	36
Average in first 3				quired: ≥15 quired: ≥8							
Minimum brood	size on day of testing	y.	a Ket	quireu. 20							

Ceriodaphnia dubia Bioassay Reference Toxicant Warning Charts

CERIODAPHNIA REFERENCE TOXICANT LC50 WARNING CHART - LOG VALUES





Test Brood Count and Solution Readings

		CERIC	DAPHNIA	BROOD C	OUNT SU	JMMARY				
Client:	Nautilus Enviro	onmental								
IRC ID#:	1402154	Uninental								
Sample Name:	X14									
Sample Date:	25-Feb-14									
Date Tested:	27-Feb-14									
Date resteu.	2710074									
CONCENTRATION:	100%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	d	0]	0	0	0	d	d	0	0
4	0	d	0	0	0	0	d	d	0	0
5	5	d	0	1	0	0	d	d	0	3
6	0	d	8	0	7	0	d	d	3	. 0
TOTAL:	5	0	8	1	7	0	0	0	3	3
CONCENTRATION:	50%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	0	0	0	0	0	0	0	0
4	0	5	6	2	0	5	3	5	4	
5	5	9	10	0	6	8	9	10	6	4 8
6	1	0	0	0	11	10	15	14	13	0
TOTAL:	6	14	16	2	17	23	27	29	23	12
CONCENTRATION:	25%				-				-	4.5
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	5	0	0	5	0	5	0	3	0	0
4	0	0	0	0	2	0	7	1	0	5
5	6	10	0	9	6	12	8	10	5	12
6	14	17 27	2	16 30	0	19 36	15	11 25	15 20	17
TOTAL:	25	21	2	30	اه	36	15	25	20	17
CONCENTRATION:	12.50%			1						
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	0	4	4	5	0	5	0	5
4	4	4	6	0	0	0	5	0	7	0
5	11	13	12	14	13	14	11	11	10	11
6	15	19	14	19	17	18	18	16	23	18
TOTAL:	30	36	32	37	34	37	34	32	40	34
CONCENTRATION:	6.25%									- 10
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	3	5	6	6	0	5	0	5	0	7
4	1 15	15	11	0	11	12	12	12	9	13
5 6	16	18	16	18	17	22	d	19	0	14
TOTAL:	35	38	33	38	29	39	12	36	13	34
TOTAL.	30	30	001			001	121	001	101	
CONCENTRATION:	3.13%		T							
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	5	6	4	0	0	5	5	6	5
4	6	0	0	0	4	4	0	0	0	0
5	13	11	12	10	12	12	9	13	12	12
6	15	15	20	18	11	18	8	17	17	19
TOTAL:	34	31	38	32	27	34	22	35	35	36
CONCENTRATION	4 500/									
CONCENTRATION:	1.56%	2	3	4	5	6	7	8	9	10
Day# / Adult #:	0	0	0	0	6	4	6	5	4	3
4	5	3	5	3	0	0	6	0	0	0
5	11	8	13	11	11	11	13	10	8	9
6	15	11	16	11	14	20	16	18	18	18
TOTAL:	31	22	34	25	31	35	41	33	30	30
CONCENTRATION:	Control									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	4	0	0	0	0	0	0	5	0	0
4	0	5	5	4	4	3	5	0	6	6
5	10	14	9	14	8	8	11	9	9	12
6	18	19	0	17	0	0	20	18	0	17
TOTAL:	32	38	14	35	12	11	36	32	15	35
"d" - dead; "X" - Tecl	Error									
	100%	50%	25%	12.5%	6.25%	3.13%	1.56%	Control		
CONCENTRATION	71HF/n									
CONCENTRATION BROOD COUNT MEA		16.9	20.5	34.6	30.7	32.4	31.2	26.0		

0 9.9 8.6 8.5 8.4 8.4 8.4 7.5 7.7	1 9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	2 9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	3 10.0 8.9 8.4 8.2 8.2 8.1 8.2	4 9.6 8.7 8.4 8.3 8.2 8.2 8.2	5 9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	MIN 9.5 8.7 8.4 8.2 8.1 8.1 8.1	MAX 10.0 8.9 8.6 8.5 8.4 8.4 8.4	OLD SOLUTIO DISSOLVED O DAY 100 50 25 12.5 6.25 3.13 1.56 CONTROL	-	7.4 7.3 7.2 7.0 7.0	3 7.3 7.1 7.1 7.0 7.1	4 7.4 7.3 7.3 7.2 7.1	5 7.3 7.2 7.0 6.9	6 7.1 6.9 6.8 6.7	7	MIN 7.1 6.9 6.8 6.7	MAX 7.4 7.4 7.3 7.2
0 9.9 8.9 8.6 8.5 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
0 9.9 8.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
7-Feb-14 0 9.9 8.9 8.6 8.5 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
0 9.9 8.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
9.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
9.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DISSOLVED 0 DAY 100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
9.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3	6	9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	DAY 100 50 25 12.5 6.25 3.13 1.56	1 7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8	7	7.1 6.9 6.8	7.4 7.4 7.3
9.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	9.8 8.7 8.4 8.3 8.3 8.3 8.2 8.1	9.8 8.9 8.4 8.2 8.1 8.1 8.1 8.2	10.0 8.9 8.4 8.2 8.2 8.1 8.2 8.4	9.6 8.7 8.4 8.3 8.2 8.2 8.2	9.5 8.8 8.5 8.4 8.4 8.3 8.3		9.5 8.7 8.4 8.2 8.1 8.1	10.0 8.9 8.6 8.5 8.4 8.4 8.4	100 50 25 12.5 6.25 3.13 1.56	7.3 7.4 7.2 7.1 7.2 7.3	7.4 7.3 7.2 7.0 7.0	7.3 7.1 7.1 7.0 7.1	7.4 7.3 7.3 7.2	7.3 7.2 7.0 6.9	7.1 6.9 6.8		7.1 6.9 6.8	7.4 7.4 7.3
8.9 8.6 8.5 8.4 8.4 8.4 8.4 7.5	8.7 8.4 8.3 8.3 8.3 8.2 8.1	8.9 8.4 8.2 8.1 8.1 8.1 8.2	8.9 8.4 8.2 8.2 8.1 8.2 8.4	8.7 8.4 8.3 8.2 8.2 8.2	8.8 8.5 8.4 8.4 8.3 8.3		8.7 8.4 8.2 8.1 8.1 8.1	8.9 8.6 8.5 8.4 8.4	50 25 12.5 6.25 3.13 1.56	7.4 7.2 7.1 7.2 7.3	7.3 7.2 7.0 7.0	7.1 7.1 7.0 7.1	7.3 7.3 7.2	7.2 7.0 6.9	6.9		6.9	7.4
8.6 8.5 8.4 8.4 8.4 8.4 7.4	8.4 8.3 8.3 8.3 8.2 8.1	8.4 8.2 8.1 8.1 8.1 8.2	8.4 8.2 8.2 8.1 8.2 8.4	8.4 8.3 8.2 8.2 8.2	8.5 8.4 8.4 8.3 8.3		8.4 8.2 8.1 8.1 8.1	8.6 8.5 8.4 8.4 8.4	25 12.5 6.25 3.13 1.56	7.2 7.1 7.2 7.3	7.2 7.0 7.0	7.1 7.0 7.1	7.3 7.2	7.0 6.9	6.8		6.8	7.3
8.5 8.4 8.4 8.4 8.4 7.4 7.5	8.3 8.3 8.3 8.2 8.1	8.2 8.1 8.1 8.1 8.2	8.2 8.2 8.1 8.2 8.4	8.3 8.2 8.2 8.2	8.4 8.4 8.3 8.3		8.2 8.1 8.1 8.1	8.5 8.4 8.4 8.4	12.5 6.25 3.13 1.56	7.1 7.2 7.3	7.0	7.0 7.1	7.2	6.9				
8.4 8.4 8.4 8.4 7.4 7.5	8.3 8.3 8.2 8.1 1 7.5	8.1 8.1 8.1 8.2	8.2 8.1 8.2 8.4	8.2 8.2 8.2	8.4 8.3 8.3		8.1 8.1 8.1	8.4 8.4 8.4	6.25 3.13 1.56	7.2	7.0	7.1						
8.4 8.4 8.4 0 7.4 7.5	8.3 8.2 8.1 1 7.5	8.1 8.1 8.2	8.1 8.2 8.4	8.2	8.3 8.3		8.1 8.1	8.4 8.4	3.13 1.56	7.3			[[.]	0.0				
8.4 8.4 0 7.4 7.5	8.2 8.1 1 7.5	8.1 8.2	8.2	8.2	8.3		8.1	8.4	1.56		1.4		7.0	6.9	6.7		6.7	7.2
0 7.4 7.5	8.1 1 7.5	8.2	8.4							7.2			7.2	7.0	6.7		6.7	7.4
0 7.4 7.5	1 7.5	2		8.3	8.4		8.1	8.4	CONTROL		7.3	7.1	7.2	7.1	6.7		6.7	7.3
7.4 7.5	7.5								Januar	7.1	7.1	7.2	7.4	7.2	6.9		6.9	7.4
7.4 7.5	7.5		-						pH									
7.4 7.5	7.5		3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
7.5		7.4	7.5	7.4	7.6		7.4	7.6	100	7.9	8.1	8.1	8.0	8.0	8.0		7.9	8.1
	7.7	7.6	7.6	7.6	7.7		7.5	7.7	50	7.9	8.1	8.0	7.9	7.9	7.9		7.9	8.1
	7.7	7.7	7.8	7.7	7.8		7.7	7.8	25	7.8	8.0	7.9	7.8	7.8	7.7		7.7	8.0
7.7	7.8	7.8	7.8	7.8	7.9		7.7	7.9	12.5	7.7	7.9	7.8	7.7	7.7	7.6		7.6	7.9
			_	1														7.9
			-															7.9
													-		$\overline{}$			7.9
	7.9	8.0	7.9	7.9	7.9		7.7	8.0	CONTROL	7.7	7.8	7.8	7.7	7.7	7.6		7.6	7.8
0	1					6				_	-					7		MAX
775	773	791	773	785	786		773	791			780							791
499	502	507	495	504	503		495	507	50	500	509	506	505	509	506		500	509
343	343	346	246	346	345		246	346	25	342	348	345	353	350	349		342	353
258	256	258	263	262	259		256	263	12.5	260	261	261	269	265	263		260	269
214	213	211	219	218	215		211	219	6.25	216	216	215	221	221	218		215	221
192	190	188	195	196	192		188	196	3.13	194	192	193	198	200	195		192	200
180	175	176	181	185	181		175	185	1.56	182	180	181	184	188	183		180	188
171	168	164	174	176	168		164	176	CONTROL	175	171	173	176	180	175		171	180
0	1	2	3	4	5	6	MIN	MAX										
			_	_	_	-												
				-														
											-					-		
795	787	789	793	791	790		787	795			-							
20 min	20 min	20 min	20 min	20 min	20 min													
410	410	412	421	424	422		410	424										
86	74	80	76	80	76		74	86										
2	7.7 7.7 7.7 7.7 7.7 7.7 7.7 7.7 499 343 258 214 192 180 171 0 11.3 25.0 7.3 795	7.7 7.8 7.7 7.8 7.7 7.9 7.7 7.9 0 1 775 773 499 502 214 213 192 190 180 175 171 168 0 1 11.3 10.9 25.0 25.0 7.3 7.4 795 787	7.7 7.8 7.9 7.7 7.8 7.9 7.7 7.9 7.9 7.7 7.9 8.0 0 1 2 775 773 791 499 502 507 343 343 258 256 258 214 213 211 192 190 188 180 175 176 171 168 164 0 1 2 11.3 10.9 11.4 25.0 25.0 25.5 7.3 7.4 7.3 795 787 789 20 min 20 min 20 min	7.7 7.8 7.9 7.9 7.7 7.8 7.9 7.9 7.7 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.7 7.9 8.0 7.9 7.7 7.9 8.0 7.9 0 1 2 3 775 773 791 773 499 502 507 495 343 343 346 258 256 258 263 214 213 211 219 192 190 188 195 180 175 176 181 171 168 164 174 0 1 2 3 11.3 10.9 11.4 11.2 25.0 25.0 25.5 24.0 7.3 7.4 7.3 7.4 795 787 789 793 20 min 20 min 20 min 20 min	7.7 7.8 7.9 7.9 7.8 7.7 7.8 7.9 7.9 7.8 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.7 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.9 7.9 0 1 2 3 4 5 775 773 791 773 785 786 499 502 507 495 504 503 343 343 346 246 346 345 258 256 258 263 262 259 214 213 211 219 218 215 192 190 188 195 196 192 180 175 176 181 185 181 171 168 164 174 176 168 0 1 2 3 4 5 11.3 10.9 11.4 11.2 11.3 11.5 25.0 25.0 25.5 24.0 25.5 25.0 7.3 7.4 7.3 7.4 7.3 7.4 795 787 789 793 791 790 410 410 410 412 421 424 422	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.9 7.9 7.7 7.9 8.0 7.9 7.9 7.9 0 1 2 3 4 5 6 775 773 791 773 785 786 499 502 507 495 504 503 343 343 346 246 346 345 258 256 258 263 262 259 214 213 211 219 218 215 192 190 188 195 196 192 180 175 176 181 185 181 171 168 164 174 176 168 0 1 2 3 4 5 6 11.3 10.9 11.4 11.2 11.3 11.5 25.0 25.0 25.5 24.0 25.5 25.0 7.3 7.4 7.3 7.4 7.3 7.4 795 787 789 793 791 790 20 min 20 min 20 min 20 min 20 min 20 min	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.7 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.9 7.7 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 0 1 2 3 4 5 6 MIN 775 773 791 773 785 786 773 499 502 507 495 504 503 495 343 343 346 346 346 345 246 258 256 258 263 262 259 256 214 213 211 219 218 215 211 192 190 188 195 196 192 188 180 175 176 181 185 181 175 171 168 164 174 176 168 164 0 1 2 3 4 5 6 MIN 175 176 181 185 181 175 171 168 164 174 176 168 164 0 1 2 3 4 5 6 MIN 755 787 789 793 791 790 787 20 min 20 min 20 min 20 min 20 min 20 min	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.9 7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.9 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.7 7.9 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 7.9 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 8.0 0 1 2 3 4 5 6 MIN MAX 775 773 791 795 786 263 262 259 256 263 264 259 256 263 264 211 219 218 215 211 219 192 190 188 195 196 192 188 196 180 175 176 181 185 181 175 185 171 168 164 174 176 168 164 176 0 1 2 3 4 5 6 MIN MAX 795 786 773 791 795 787 789 793 791 790 787 795	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.8 7.9 7.9 7.9 7.8 7.9 7.7 7.9 3.13 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.7 7.9 1.56 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 8.0 CONTROL CONDUCTI	7.7 7.8 7.9 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.7 7.8 7.9 7.9 7.9 7.8 7.9 7.7 7.9 3.13 7.7 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.7 7.9 1.56 7.7 7.7 7.9 8.0 7.9 7.9 7.9 7.9 7.7 8.0 CONTROL 7.7	7.7 7.8 7.9 7.9 7.8 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.7 7.8 7.9 7.9 7.9 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.8 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.8 7.9 7.9 7.8 7.9 7.9 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.8 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.7 7.8 7.9 7.8 7.7 7.9 7.8 7.7 7.9 7.8 7.9 7.8 7.7 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.8 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.7 7.7 7.8 7.9 7.8 7.9 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.8 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.7 7.6 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.7 7.6 7.7 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9	7.7 7.8 7.9 7.9 7.9 7.8 7.9 7.7 7.9 6.25 7.7 7.9 7.8 7.7 7.7 7.6 7.8 7.7 7.7 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9

Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia IC_{25} and IC_{50}

Report Date:

18 Mar-14 16:11 (p 1 of 2)

04-6579-5047/1402154 **Test Code:**

Ceriod	aphnia 7	-d Survival and	d Repro	oduction Te	st					IRC In	tegrated Research Consultants
Analys		17-4870-5124		Endpoint:	Reproduction	otion (ICBINI			CETIS Vei		CETISv1.6.6
Analyz	ed:	18 Mar-14 16:0	19	Analysis:	Linear Interpol	ation (ICPIN))		Official Re	esults:	Yes
Test R	un No:	08-0175-3567		Test Type:	Reproduction-	Survival (7d)			Analyst:	Ditty	Chacko
Start D	ate:	27 Feb-14		Protocol:	EC/EPS 1/RM	/21			Diluent:	Labo	ratory Water
Ending	Date: (05 Mar-14		Species:	Ceriodaphnia	dubia			Brine:	Not A	Applicable
Duratio	on: 6	6d Oh		Source:	In-House Culti	nce			Age:		
Sample	e No:	02-1487-4161		Code:	214874161				Client:	Nauti	lus
Sample	Date:	18 Mar 14 10:0	5 ①	Material:	Unknown				Project:	Spec	ial Studies
Receiv	e Date: -	1 8 Mar-14 18.0	5(3)	Source:	X14						
Sample	e Age:	N/A	SWW	Station:							
Linear	Interpola	tion Options									
X Trans	sform	Y Transform	1	Seed	Resamples	Exp 95%	CL	Method			
Log(X +	+ 1)	Linear		57951	200	Yes		Two-Point	Interpolation	1	
Point E	stimates										
Level	Conc-%	6 95% LCL	95% L	JCL	TU	95% LCL	95%	UCL			
IC5	13.87	5.387	15.6		7.208	6.41	18.5	6			
IC10	15.39	13.79	19.42		6.499	5.15	7.25	2			
IC15	17.05	15.16	24.11		5.864	4.148	6.59	7			
IC20	18.89	16.38	29.3		5.294	3.413	6.10	6			
C25	20.91	17.52	32.9		4.782	3.04	5.70	7			
C40	36.19	21.75	55.54		2.764	1.801	4.59	8			

Reproduct	tion Summary				C	alculated Va	riate		
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Dilution Water	10	26	11	38	2.076	11.37	43.74%	0.0%
1.56		10	31.2	22	41	0.9576	5.245	16.81%	-20.0%
3.13		10	32.4	22	38	0.8658	4.742	14.64%	-24.62%
6.25		10	30.7	12	39	1.83	10.02	32.65%	-18.08%
12.5		10	34.6	30	40	0.5389	2.951	8.53%	-33.08%
25		10	20.5	2	36	1.88	10.3	50.24%	21.15%
50		10	16.9	2	29	1.607	8.8	52.07%	35.0%
100		10	2.7	0	8	0.5581	3.057	113.2%	89.62%

1.605

4.013

1.866

Reproduction Detail

53.58

24.92

IC50

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	32	38	14	35	12	11	36	32	15	35
1.56		31	22	34	25	31	35	41	33	30	30
3.13		34	31	38	32	27	34	22	35	35	36
6.25		35	38	33	38	29	39	12	36	13	34
12.5		30	36	32	37	34	37	34	32	40	34
25		25	27	2	30	8	36	15	25	20	17
50		6	14	16	2	17	23	27	29	23	12
100		5	0	8	1	7	0	0	0	3	3

() 25 Feb-14 09:00

62.32

@ 27 Feb-14 10:30

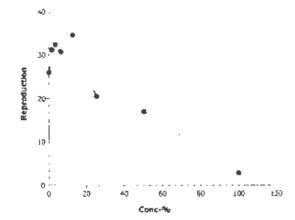
Report Date:

18 Mar-14 16.11 (p 2 of 2)

Test Code:

04-8579-5047/1402154

Ceriodaphnia	7-d Survival and Re	production Te	\$t	IRC Int	egrated Research Consultants
Analysis No: Analyzed:	17-4870-5124 18 Mar-14 16:09		Reproduction Linear Interpolation (ICPIN)	CETIS Version: Official Results:	



Report Date:

16 Apr-14 09:08 (p 1 of 2)

Test Code:

04-6579-5047/14 | 16-7175-0768

Cerioda	aphní a	7-d Survival and	d Reproduc	ction Te	est						Na	otilus Env	ironmenta
Analysi		10-4675-8167		point:	Reproduction			-	ETIS Versi	-	CETISv1	.8.7	
Analyze	ed:	16 Apr-14 9:08	Ana	lysis:	Linear Interpola	tion (ICPIN)	0	ifficial Resi	itta:	Yes		
Batch II	D:	19-7346-0589	Test	t Type:	Reproduction-S	urvival (7d)		A	inalyst:	Emma	Marus		
Start Da	ate:	27 Feb-14	Prof	tocol:	EC/EPS 1/RM/	21		D	iluent:	Laborá	itory Wat	er	
Ending	Date:	05 Mar-14	\$pe	cies:	Ceriodaphnia d	ubia		В	Irine:				
Duratio	n:	6d Dh	Sou	rce:	In-House Cultur	· e		A	ge:				
ample	ID:	18-2798-0256	Cod	le:	6CF4C3E0			C	lient:	ALS			
Sample	Date:	25 Feb-14 09:0	0 Mat	erial:	Effluent			P	roject:				
Receive	e Date:	27 Feb-14 10:3	0 Sou	rçe:	ALS								
Sample	Age:	39h (2.8 °C)	Stat	tion:	L1426336-5(X1	4)							
inear	Interpo	lation Options											
K Trans		Y Transform			Resamples	Exp 95%		thod					
Log(X+	1)	Linear	138	5258	200	Yes	Twi	o-Point In	terpolation				
Point E	stimate	ta .											
Level	%	95% LCL			95% LCL	95% UCL							
IC5	14.76		26.51	6.774		387							
C10	17 4	0.5836	30.01	5 746		171.3							
C15	20 49	-	34 2	4.881		100.7							
C20	24.09	1.508	44.39	4.152 3.295		66.32 12.82							
C25 Ç40	30.35 53.29	7 799 20.53	52 60.79	1 876		4.87							
C50	60 53	37.09	67.63	1.652		2.696							
Reprod		Summary				Ca	culated V	ariate					
C-%		ontrol Type	Count	Mean	Min	Max	Std Err	Std D	ev CV%	4	%Effect		
0		egative Control	10	26	11	R	3596	11.37	43.74		0.0%		
1.56			10	26	11	38	3 596	11.37	43.74	% (0.0%		
3.13			10	26	11	38	3.596	11.37	43.74	% (0.0%		
5.25			10	26	11	38	3.596	11.37	43.74		0.0%		
12.5			10	26	11	38	3 596	11.37	43.74		0.0%		
25			10	20.5	2	36	3.257	10.3	50.249		21.15%		
50			10 10	16.9 2.7	2 0	29 8	2.783 0. 96 87	8.8 3.057	52,079 113,29		35.0% 39.62%		
100	.2	D. s. II	10	2.7		<u> </u>	0.5001	3.037	113.2	ru (33.0270		
	luction			B		Dest 1	Dec 1	B 4			244.6	O	0:- 40
C-%	_	ontrol Type egative Control	Rep 1	Rep 2	! Rep 3	Rep 4 35	Rep 5	Rep 6	Rep 7		Rep 8 32	Rep 9	Rep 10 35
156	N	eganive control	32	38	14	35	12	11	36		32	15	35
3.13			32	38	14	35	12	11	36		32	15	35
3.13 6.25			32	38	14	35	12	11	36		32	15	35
12.5			32	38	14	35	12	11	36		32	15	35
146.00			25	27	2	30	8	36	15		25	20	17
75													
25 50			6	14	16	2	17	23	27		29	23	12

Report Date:

16 Apr-14 09 08 (p 2 of 2)

Test Code:

04-6579-5047/14 | 16-7175-0758

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

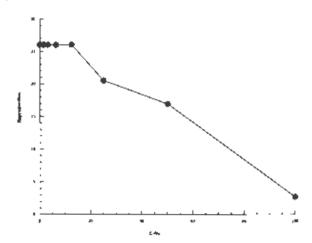
Analysis ID: Analyzed:

10-4675-8167 16 Apr-14 9:08 Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results: Yes

CETISy1.8.7



Report Date:

18 Mar-14 16:10 (p 1 of 2)

Test Code:

04-6579-5047/1402154

Ceriodaphnia	7-d Survival ar	nd Repr	oduction Te	est					IRC	Integrated I	Research (Consultant
Analysis No:	12-9097-9978		Endpoint:	Reprodu	ction			CE	TIS Version:	CETISV	1.6.6	
Analyzed:	18 Mar-14 16:	09	Analysis:	Nonpara	metric	-Control vs	Treatments	Off	icial Results	: Yes		
Test Run No:	08-0175-3567		Test Type:	Reprodu	ction-	Survival (7d)		Ana	alyst: Ditt	y Chacko		
Start Date:	27 Feb-14		Protocol:	EC/EPS	1/RM	/21			-	oratory Wat	ter	
Ending Date:	05 Mar-14		Species:	Ceriodar	ohnia (dubia		Bri	ne: Not	Applicable		
Duration:	6d Oh		Source:	In-House	e Cultu	ıre		Age	:			
Sample No:	02-1487-4161		Code:	2148741	61			Clie	ent: Na	utilus		
Sample Date:	18 Mar-14 16:	05	Material:	Unknow	n			Pro	ject: Spe	ecial Studies	5	
	18 Mar-14 16:		Source:	X14								
Sample Age:	N/A		Station:									
Data Transfor	m	Zeta	Alt H	lyp Mo	nte Ca	arlo	NOEL	LOEL	TOEL	TU	PMSD	
Untransformed	•		C > T	Not	Run		50	100	70.71	2	31.84%	
Steel Many-Or	ne Rank Test											
Control	vs Conc-%		Test	Stat Crit	tical	Ties	P-Value	Decision	1(5%)			
Dilution Water	1.56		108	74		1	0.9234	Non-Sign	nificant Effec	t		
	3.13		116	74		4	0.9851	Non-Sign	nificant Effec	t		
	6.25		119	74		4	0.9929	Non-Sigr	nificant Effec	t		
	12.5		123.5	74		2	0.9980	Non-Sigr	nificant Effec	t		
	25		91	74		2	0.4477	Non-Sigr	nificant Effect	t		
	50		83	74		2	0.1973	Non-Sigr	nificant Effect	t		
	100*		55	74		0	0.0005	Significa	nt Effect			
ANOVA Table												
Source	Sum Squ	ares	Mean	Square		DF	F Stat	P-Value	Decision	(5%)		
Between	7988.75		1141.	25		7	18.97	0.0000	Significan	t Effect		
Error	4332		60.16	667		72						
Total	12320.75		1201.	41666793	823	79						
ANOVA Assum	nptions											
Attribute	Test			Tes	t Stat	Critical	P-Value	Decision	1			
Variances	Bartlett E	quality	of Variance	29.9	93	18.48	0.0001	Unequal	Variances			
Distribution	Shapiro-	Wilk No	rmality	0.95	568		0.0086	Non-norm	nal Distribution	on		
Reproduction	Summary											
	Control Type	Coun			LCL		Min	Max	Std Err	Std Dev	CV%	Diff%
)	Dilution Water	10	26	21.6	67	30.33	11	38	2.112	11.37	43.74%	0.0%
1.56		10	31.2	29.2	2	33.2	22	41	0.974	5.245	16.81%	-20.0%
3.13		10	32.4	30.6	5	34.2	22	38	0.8806	4.742	14.64%	-24.62%
6.25		10	30.7	26.8	39	34.51	12	39	1.861	10.02	32.65%	-18.08%
12.5		10	34.6	33.4	18	35.72	30	40	0.5481	2.951	8.53%	-33.08%
25		10	20.5	16.5	8	24.42	2	36	1.912	10.3	50.24%	21.15%
50		10	16.9	13.5		20.25	2	29	1.634	8.8	52.07%	35.0%
			10.0	10.0	_		_			0.0	02.0170	00.070

113.2% 89.62%

0.5676

3.057

100

10

2.7

1.537

3.863

Report Date: Test Code: 18 Mar-14 16:10 (p 2 of 2) 04-6579-5047/1402154

IRC Integrated Research Consultants

Ceriodaphnia 7-d Survival and Reproduction Test

Analysis No: 12-9097-9978 Endpoint: Reproduction

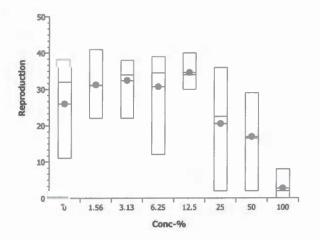
Analyzed: 18 Mar-14 16:09 A

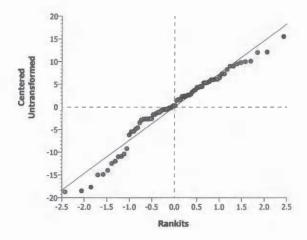
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.6.6

Official Results: Yes

Reproduct	ion Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	32	38	14	35	12	11	36	32	15	35
1.56		31	22	34	25	31	35	41	33	30	30
3.13		34	31	38	32	27	34	22	35	35	36
6.25		35	38	33	38	29	39	12	36	13	34
12.5		30	36	32	37	34	37	34	32	40	34
25		25	27	2	30	8	36	15	25	20	17
50		6	14	16	2	17	23	27	29	23	12
100		5	0	8	1	7	0	0	0	3	3





Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia LC₅₀

Report Date:

18 Mar-14 16:10 (p 1 of 2)

Kopk	nt Date.
Test	Code:

04-6579-5047/1402154

								I est	Code:		04-65/9-	5047/1402154
Ceriod	aphnia 7	-d Survival a	nd Reproc	duction Te	est				IRC I	ntegrated	Research	Consultants
Analys	is No:	19-9176-3377	7 E	ndpoint:	6d Survival Ra	ite		CET	IS Version:	CETIS	/1.6.6	
Analyz		18 Mar-14 16	:08 A	nalysis:	Linear Regress	sion (MLE)		Offic	cial Results:	Yes		
Test R	un No:	08-0175-3567	7 Т	est Type:	Reproduction-	Survival (7d)		Ana	lyst: Ditty	Chacko		
Start D	ate:	27 Feb-14	P	rotocol:	EC/EPS 1/RM	/21		Dilu	ent: Lab	oratory Wa	ater	
Ending	Date:	05 Mar-14	S	pecies:	Ceriodaphnia d	dubia		Brin	e: Not	Applicable	9	
Duratio	n:	6d 0h	S	ource:	In-House Cultu	ure		Age	:			
Sample	No:	02-1487-4161	1 0	ode:	214874161			Clie	nt: Nau	tilus		
Sample	Date:	18 Mar-14 16	:05 N	faterial:	Unknown			Proj	ect: Spe	cial Studie	es	
		18 Mar-14 16	:05 S	ource:	X14							
Sample	e Age:	N/A	S	tation:								
Linear	Regress	sion Options										
	Function				shold Option	Threshold			Het Corr	Weighte	∍d	
Log-No	rmal [NE	D=A+B*log(X)]	Contr	roi Threshold	0	Yes	Yes	No	Yes		
Regres	sion Su	mmary										
Iters	LL	AICc	Mu	Sigm		Chi-Sq	Critical	P-Value	Decision(
6	-13.07	33.14	2.085	1.007	1.239	7.853	11.07	0.1645	Non-Signi	ficant Hete	erogeneity	
Point E	stimate	\$										
Level	Conc-	% 95% LCI	L 95% U	CL	TU	95% LCL	95% UCL					
EC10	45.79	N/A	N/A		2.184	N/A	N/A					
EC15	80.85	N/A	N/A		1.237	N/A	N/A					
EC20	127	N/A	N/A		0.7872	N/A	N/A					
EC25	187.2	N/A	N/A		0.5342	N/A	N/A					
EC40	497.2	N/A	N/A		0.2011	N/A	N/A					
EC50	894.7	N/A	N/A		0.1118	N/A	N/A					
Regres	sion Pa	rameters										
Parame	eter	Estimate	e Std Err	or 95% l	LCL 95% UCL	t Stat	P-Value	Decision				
Slope		0.9927	0.5638	-0.11		1.761	0.1386	_	ficant Param			
Intercep	ot	2.07	0.9006	0.304	6 3.835	2.298	0.0699	Non-Signi	ficant Param	eter		
Residu	al Analy	sis										
Attribu		Method			Test Stat		P-Value	Decision				
Extreme			Extreme Va		1.838	2.02	0.1895		rs Detected			
Distribu	tion	Snapiro-	Wilk Norma	ality	0.8731		0.1977	Normal Di	istribution			
		te Summary					lated Variat				_	
Conc-%		ontrol Type	Count	Mean		Max	Std Err	Std Dev	CV%	Diff%	A 40	B
0	Dii	lution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56			10	1	1	1	0	0	0.0%	0.0%	10	10
3.13			10	1	1	1	0	0	0.0%	0.0%	10	10
6.25			10	0.9	0	1	0.05774	0.3162	35.14%	10.0%	9	10
12.5			10	1	1	1	0	0	0.0%	0.0%	10	10
25			10	1	1	1	0	0	0.0%	0.0%	10	10
-63			40				13	- 1	(1 (19/.			

10

10

10

0

0

0.08819 0.483

0.0%

69.01%

0.0%

30.0%

50

100

10

10

0.7

Report Date: **Test Code:**

18 Mar-14 16:10 (p 2 of 2) 04-6579-5047/1402154

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

Analysis No: 19-9176-3377 18 Mar-14 16:08 Endpoint: 6d Survival Rate

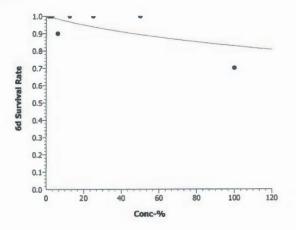
Analysis: Linear Regression (MLE)

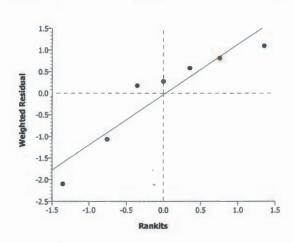
CETIS Version: Official Results: Yes

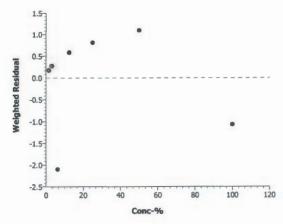
CETISv1.6.6

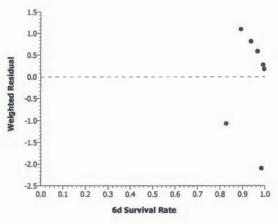
6d Surviva	Rate Detail
------------	-------------

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.13		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	0	1	1	1	1	0	0	1	1









Report Date:

18 Mar-14 16:09 (p 1 of 2)

Test Code:

04-6579-5047/1402154

								Test Code: 04-6579-5047/1402154			
Ceriodaphnia	7-d Survival	and Repre	oduction Te	st				IR	C Integrated	Research (Consultant
Analysis No: Analyzed:	18-5844-365 18 Mar-14 1		Endpoint: Analysis:	6d Surviva STP 2x2 (al Rate Contingency T	ables		TIS Version		/1.6.6	
Test Run No:	08-0175-356	7	Test Type:	Reproduct	ion-Survival (7d)	An	alyst:	Ditty Chacko		
Start Date:	27 Feb-14		Protocol:	EC/EPS 1		,		•	aboratory Wa	ater	
Ending Date:			Species:	Ceriodaph					lot Applicable		
Duration:	6d Oh		Source:	In-House	Culture		Ag				
Sample No:	02-1487-416	1	Code:	21487416	1		Cli	ent: N	lautilus		
Sample Date:	18 Mar-14 1	6:05	Material:	Unknown			Pro	oject: S	Special Studie	es	
Receive Date:	18 Mar-14 1	6:05	Source:	X14							
Sample Age:	N/A		Station:								
Data Transfor		Zeta	Alt H	71	e Carlo	NOEL	LOEL	TOEL	TU	PMSD	
Untransformed			C>T	Not F	Run	100	>100	N/A	1	N/A	
Fisher Exact/E	Bonferroni-Ho	Im Test									
Control	vs Conc-9	6	Test S	tat P-Val	ue Decisio	n(0.05)					
Dilution Water	1.56		1	1		nificant Effect					
	3.13		1	1		nificant Effect					
	6.25		0.5	1		nificant Effect					
	12.5		1	1	_	nificant Effect					
	25 50		1	1	-	nificant Effect					
	100		0.1053		-	nificant Effect					
Data Summan	y	***									
Conc-%	Control Type	No-Re	sp Resp	Total							
0	Dilution Wate	r 10	0	10							
1.56		10	0	10							
3.13		10	0	10							
6.25		9	1	10							
12.5		10	0	10							
25		10	0	10							
50		10	0	10							
100		7	3	10							
6d Survival Ra	te Detail										
	Control Type					Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
	Dilution Water		1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.13		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1

Report Date:

18 Mar-14 16:09 (p 2 of 2)

Test Code:

04-6579-5047/1402154

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

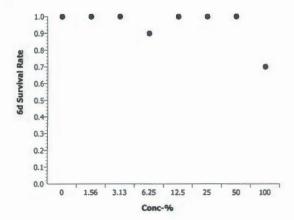
Analysis No: 18-5844-3650 18 Mar-14 16:08

Endpoint: 6d Survival Rate

Analysis: STP 2x2 Contingency Tables

CETIS Version: CETISv1.6.6

Official Results: Yes



Ceriodaphnia dubia Bioassay Calculation Printouts Reftox IC₅₀

Report Date:

18 Mar-14 16:28 (p 1 of 2)

Test Code:

12-0152-3261

										Tes	t Code:		12-0152-326
Ceriod	aphnia 7	-d S	urvival and	Reprodu	ction Tes	it					IRCI	ntegrated	Research Consultants
Analys	is No:	09-4	477-0338	End	lpoint:	Reproduction				CET	IS Version:	CETIS	v1.6.6
Analyz			lar-14 10:1			Nonlinear Reg	gression				cial Results		
Test R	un No: 2	20-2	489-0876	Tes	t Type:	Reproduction-	Survival (7d)		Ana	lyst:		
Start D	ate:	19 F	eb-14 13:2	7 Pro	tocol:	EC/EPS 1/RM/21				Dilu	ent: Lab	oratory W	/ater
Ending	Date: 2	25 F	eb-14 14:5	5 Spe	ecies:	Ceriodaphnia	dubia			Brin	e: Not	Applicabl	e
Duratio	on: (6d 1	h	Sou	ırce:	In-House Cult	ure			Age	:		
Sample	e No:	13-0	089-8086	Co	de:	1300898086				Clie	nt: Inte	mai Lab	
Sample	e Date: 2	27 F	eb-14 11:5	0 Ma	terial:	Sodium chloric	de			Proj	ect: Spe	cial Studi	es
Receiv	e Date: 2	27 F	eb-14 11:5	0 Soi	urce:	Reference To	xicant						
Sample	e Age:	N/A		Sta	tion:								
Non-Li	near Reg	ress	sion Optio	ns									
	Function						X Trans	sform	Y Tra	nsform V	Veighting F	unction	PTBS Function
3P Cun	nulative L	og-N	Iormal EV	[Y=A*(1- Φ	(log(X/D)	(C))]	None		None	١	Normal [W=1]	Off [Y*=Y]
Regres	sion Sur	nma	ry										
Iters	Log LL		AICc	Adj R2	Optim	ze F Stat	Critical	P-Va	lue	Decision	(5%)		
6	-87.09		180.9	0.6237	Yes	0.4101	4.113	0.526	60	Non-Sign	ificant Lack	of Fit	
Point E	stimates												
Level	Conc-g	jm/	95% LCL	95% UCL	,								
IC10	0.8703		N/A	1.124		-							
IC15	0.9536		N/A	1.215									
IC20	1.026		N/A	1.285									
IC25	1.091		0.7556	1.342									
IC40	1.277		1.089	1.474									
IC50	1.404		1.25	1.576									
Regres	sion Par	ame	ters										
Parame	eter		Estimate	Std Error	95% L	CL 95% UCL	_ t Stat	P-Va	lue	Decision	(5%)		
A			29.8	1.253	27.26	32.34	23.78	0.000	00	Significan	t Parameter		
С			0.3731	0.1463	0.0767	0.6695	2.551	0.015	50	-	t Parameter		
D			1.404	0.08842	1.225	1.583	15.88	0.000	00	Significan	t Parameter		
ANOVA	Table												
Source	•		Sum Squa	res Mea	n Squar	e DF	F Stat	P-Va	lue	Decision	(5%)		
Lack of	Fit		12.89863	12.8	39863	1	0.4101	0.526	60	Non-Signi			
Model			2063.101	103	1.551	2	33.33	0.000	00	Significan	it		
Pure Er	тог		1132.4	31.4	15555	36							
Residua	al		1145.299	30.9	5402	37							
Residu	al Analys	is											
Attribu	te	_	Method			Test Stat		P-Val		Decision			
Variano	es			uality of Va		3.027	7.815	0.387		Equal Var			
Distribu	ition			ne Equality filk Normalit		0.1617 0.9514	2.866	0.921		Equal Var Normal Di			
	luction S	umr					Ca	lculate					
	m/L Co			Count	Mean	Min	Max	Std E		Std Dev	CV%	Diff%	
0		_	Water	10	29	14	35	1.171		6.412	22.11%	0.0%	
0.375	Dill	20011	TAIGI	10	30.6	18	37	1.202		6.586	21.52%	-5.52%	
0.75				10	28.4	22	33	0.689		3.777	13.3%	2.07%	
1.5				10	12.8	7	23	0.949		5.203	40.65%	55.86%	

Report Date: **Test Code:**

18 Mar-14 16:28 (p 2 of 2)

12-0152-3261

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

Analysis No: 09-4477-0338 05 Mar-14 10:15

Endpoint: Reproduction

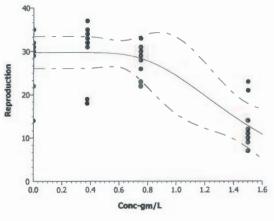
Analysis: Nonlinear Regression

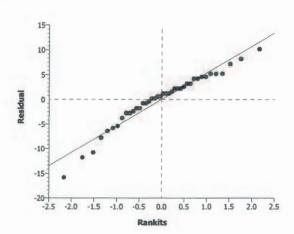
CETIS Version: CETISv1.6.6

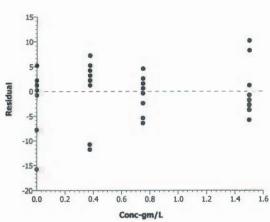
Official Results: Yes

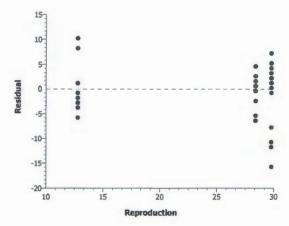
Reproc	luction	Detail
--------	---------	--------

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	32	14	32	22	30	35	31	29	35	30
0.375		37	31	32	33	34	34	19	35	33	18
0.75		33	28	29	31	30	33	22	29	23	26
1.5		9	10	11	10	7	11	23	12	21	14









 $\begin{array}{c} \textit{Ceriodaphnia dubia Bioassay Calculation Printouts} \\ \textit{Reftox } LC_{50} \end{array}$

Report Date:

18 Mar-14 16:27 (p 1 of 1)

Test Code:

12-0152-3261

Ceriodaphnia	7-d Survival and Re	production Te	st	IRC Integrated Research Consultants				
Analysis No: Analyzed:	00-3619-3653 05 Mar-14 10:14	Endpoint: Analysis:	6d Survival Rate Binomial Method	CETIS Ver Official Re	rsion: CETISv1.6.6 sults: Yes			
Test Run No:	20-2489-0876	Test Type:	Reproduction-Survival (7d)	Analyst:				
Start Date:	19 Feb-14 13:27	Protocol:	EC/EPS 1/RM/21	Diluent:	Laboratory Water			
Ending Date:	25 Feb-14 14:55	Species:	Ceriodaphnia dubia	Brine:	Not Applicable			
Duration:	6d 1h	Source:	In-House Culture	Age:				
Sample No:	13-0089-8086	Code:	1300898086	Client:	Internal Lab			
Sample Date:	27 Feb-14 11:50	Material:	Sodium chloride	Project:	Special Studies			
Receive Date:	27 Feb-14 11:50	Source:	Reference Toxicant					
Sample Age:	N/A	Station:						

Binomial/Graphical Estimates

Threshold (Threshold Option Threshold		Trim	Mu	Sigma		EC/LC50	95% LCL	95% UCL		
Control Thre	shold	0	0.00%	0.3266	0		2.121	1.704	2.641		
6d Survival Rate Summary				Calculated Variate(A/B)							
Conc-gm/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	В
0	Dilution Water	7	1	1	1	0	0	0.0%	0.0%	7	7
0.375		10	1	1	1	0	0	0.0%	0.0%	10	10
0.75		10	1	1	1	0	0	0.0%	0.0%	10	10
1.5		10	1	1	1	0	0	0.0%	0.0%	10	10
3		10	0	0	0	0	0		100.0%	0	10

0

100.0%

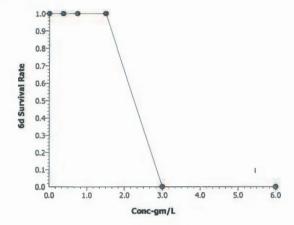
0

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6d Survival Rate Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1			
0.375		1	1	1	1	1	1	1	1	1	1
0.75		1	1	1	1	1	1	1	1	1	1
1.5		1	1	1	1	1	1	1	1	1	1
3		0	0	0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0	0	0

Graphics



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CERIODAPHNIA DUBIA TOXICITY TESTING February 2014

Prepared for:

NAUTILUS ENVIRONMENTAL 8664 Commerce Court Burnaby, BC V5A 4N7

Prepared by:

IRC INTEGRATED RESOURCE CONSULTANTS INC. 160 - 14480 River Road Richmond, B.C. V6V 1L4

Tel: 604-278-7714 Fax: 604-278-7741





22 March 2014

Nautilus Environmental 8664 Commerce Court Burnaby, BC V5A 4N7

Attention: Krysta Pearcy

Reference: Ceriodaphnia dubia bioassay on the X3A sample received on 27 February 2014.

Dear Ms. Pearcy.

Enclosed please find the final report for the *Ceriodaphnia dubia* toxicity testing results, for Nautilus Environmental X3A sample dated 25 February 2014. This report includes *Ceriodaphnia dubia* test reproduction and survival data as well as daily water quality readings and reference toxicant results.

The result of the *Ceriodaphnia dubia* bioassay indicated that a concentration that would cause 50% mortality (1.C50) was 46.65% with 95% confidence interval between 37.64% and 57.83%. The survival No Observed Effect Level (NOEL) was 25% and the Lowest Observed Effect Level (LOEL) was 50%. The concentration that would cause a 50% inhibition in reproduction (1C50) in the culture tested was 32.91% with a 95% confidence interval between 27.14% and 35.41%, while the 25% inhibition value (1C25) was 26.65% with a 95% confidence interval between 9.852% and 29.77%. The reproduction No Observed Effect Level (NOEL) was 25% and the Lowest Observed Effect Level (LOEL) was greater than 25%.

Should you have any questions regarding these results, please do not hesitate to call me at 604-278-7714.

Sincerely,

Ditty Chacko Kakkassery Laboratory Biologist

IRC Integrated Resource Consultants Inc.

Encl.

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L1 SAMPLE DESCRIPTION
1.2 METHOD
1.3 RESULTS
1.4 WATER QUALITY READINGS AND TEST DATA4
1.5 QUALITY CONTROL

APPENDICES

APPENDIX A – Ceriodaphnia dubia Bioassay Supporting Documents
Ceriodaphnia dubia Brood Stock Health Record
Test Brood Count and Solution Readings
Reference Toxicant Warning Charls
Calculation printouts

1.0 CERIODAPHNIA DUBIA BIOASSAY METHOD AND RESULTS

1.1 SAMPLE DESCRIPTION

IRC Sample ID No.:	1402155	
Sample Name:	X3A	
Effluent type:	Effluent	
Date collected:	25 February 2014	
Date, time received:	27 February 2014; 1425 hrs	
Collection Method:	Grab	
Amount, Container:	7 x 1 L glass containers	
Date, time test initiated:	27 February 2014; 1640 hrs.	
Date, time test completed:	05 March 2014; 1115 hrs.	
Physical description:	Translucent slightly yellow liquid	

1.2 METHOD

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for *Ceriodaphnia dubia* Testing and Culturing" CDver3. This procedure follows the "Biological Test Method: Test of Reproduction and Survival Using the Cladoceran *Ceriodaphnia dubia*" Report EPS 1/RMS/21Second Edition - February 2007. The NOEL and LOEL were calculated by Fisher Exact/Bonferroni-Holm method, IC50 and IC25 using Linear Interpolation method and LC50 by Spearman-Kärber or Linear Interpolation method with the CETIS, ver 1.6.6E (2008) software.

Ceriodaphnia dubia are cultured on site from an original culture obtained from Carolina Biological Supply Ltd. Organisms are maintained in 1 L mass cultures and in a series of 23 mL glass test tubes containing a single Ceriodaphnid from which test organisms are obtained. Culture, control and test dilution water was a mixture of 80% distilled water and 20% Perrier.

Tests were conducted in 23mL glass test tubes containing 20mL of test solution, at a depth of 12 cm. Ten replicates of each concentration (100%, 50%, 25%, 12.5%, 6.25%, 3.13% and 1.56%) and control were tested. Test temperature was maintained throughout the test period at 25°± 1°C, with a photoperiod of 16 hours light and 8 hours dark.

Initiation of the bioassay was carried out by placing a single neonate Ceriodaphnid of less than 24 hours, into each test vessel. New test solutions were prepared daily into which organisms were transferred. Daily measurements of the mortality and number of young produced in each replicate were recorded. Records were also maintained for daily readings of dissolved oxygen, pH, temperature and conductivity for each test concentration and control solution. The test was completed when ≥ 60% of control organisms had 3 broods.

On the day of test initiation, adult *Ceriodaphnia* were placed in test tubes at 0600 hours; young used in testing were pulled directly from these test tubes at 1600 hours, ranging in age from 0 to 1000 hours. There was no unusual appearance or behaviour noted in the test organisms prior to their use in the test. No ephippia were observed in brood cultures and mass cultures in the seven day period preceding the test.

Sample used for testing was collected on 25 February 2014. Sample containers were marked with the sample ID: 7 Day Chronic Ceriodaphnia. The sample arrival temperature was 9.8°C; nothing unusual was noted regarding the sample appearance. Sample in the 7 x 1 litre glass jugs received were stored in the dark at 4 ± 1 °C until used for testing. The required volume of sample was poured out into a labeled beaker on each day of testing. The sample was not pH adjusted or filtered prior to being used in testing. The test was complete at day 6 as \geq 60% of control organisms had produced 3 broods at this time.

1.3 RESULTS

	Results	95% Confidence Interval
Ceriodaphnia dubia LC ₅₀	46.65%	37.64% - 57.83%
NOEL (Survival)	25%	•
LOEL (Survival)	50%	•
Ceriodaphnia dubia IC25	26.65%	9.852% - 29.77%
Ceriodaphnia dubia IC50	32.91%	27.14% - 35.41%
NOEL (Reproduction)	50%	
LOEL (Reproduction)	> 25%	•

LC₅₀= Concentration which would cause a 50% mortality

IC25 = Concentration which would cause a 25% inhibition in reproduction or growth.

IC50 = Concentration which would cause a 50% inhibition in reproduction or growth.

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

1.4 WATER QUALITY READINGS AND TEST DATA

Test set up technician was DB. Daily reading technicians were DB, DC, CW and MH. The initial dissolved oxygen level of the sample was 11.7 mg/L at 12.0 °C, the initial conductivity was 327 μ S/cm and the initial pH was 7.4. The sample was not pH adjusted or filtered prior to testing. For daily water quality readings, please see appendices.

Daily Initial Readings of Undiluted sample (after warming)

	Dissolved Oxygen (mg/L)	Temperature (°C)	pН	Conductivity (μS/cm)	PRE- AERATION*
DAY 0	11.6	25.0	7.4	330	20 minutes
DAY 1	11.0	25.0	7.4	329	20 minutes
DAY 2	11.7	25.0	7.4	334	20 minutes
DAY 3	11.1	24.0	7.5	332	20 minutes
DAY 4	11.2	24.5	7.5	331	20 minutes
DAY 5	11.5	24.5	7.5	331	20 minutes

^{*}Pre-aeration of the sample is carried out if the dissolved oxygen level is either less than 40% saturation or greater than 100% saturation. Pre-aeration is for a maximum of 20 minutes.

Daily 0 Hour Refresh Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (µS/cm)	Hardness (mg/L)
100%	9.6-10.1	7.5-7.6	324-335	164-190
50%	8.7-9.0	7.6-7.7	244-253	
25%	8.4-8.6	7.6-7.9	205-213	
12.5%	8.2-8.4	7.7-7.9	187-193	
6.25%	8.1-8.4	7.7-8.0	176-183	
3.13%	8.0-8.3	7.7-8.0	170-178	
1.56%	8.0-8.4	7.7-8.0	167-176	
Control	8.0-8.4	7.8-8.0	164-174	74-86

Daily 24 Hour Old Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (µS/cm)
100%	7.4	7.9	327
50%	7.1-7.6	7.8-8.0	249-255
25%	6.7-7.3	7.7-7.9	209-216
12.5%	6.6-7.2	7.6-7.9	190-196
6.25%	6.5-7.3	7.6-7.9	179-186
3.13%	6.5-7.4	7.6-7.9	174-181
1.56%	6.7-7.6	7.6-7.9	170-178
Control	6.7-7.3	7.6-7.8	170-176

REPRODUCTION AND SURVIVAL RESULTS:

Summary of Total Young Produced Per Ceriodaphnia

Concentration	То	tal Y	oung	Prod Fi	Mean Young in First 3 Broods	Standard Deviation						
	1	2	3	4	5	6	7	8	9	10		
100%	D	D	D	D	D	D	D	D	D	D	0.0	0.0
50%	D	D	0	D	0	D	D	D	0	D	0.0	0.0
25%	19	34	25	27	31	0	14	18	25	33	22.6	10.3
12.5%	13	33	27	2	36	28	X	31	22	26	24.2	12.6
6.25%	31	29	21	26	31	31	25	31	29	35	28.9	4.0
3.13%	24	33	30	28	35	32	30	28	31	34	30.5	3.3
1.56%	27	32	25	30	34	15	25	33	16	14	25.1	7.6
Control	33	37	6	28	34	13	30	18	35	16	25.0	10.8

^{&#}x27;D' - Dead

Summary of Ceriodaphnia Survival

	Percent Survival												
Concentration	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6							
100%	0	0	0	0	0	0							
50%	50	50	30	30	30	30							
25%	100	100	100	100	100	100							
12.5%	100	100	100	100	100	100							
6.25%	100	100	100	100	100	100							
3.13%	100	100	100	100	100	100							
1.56%	100	100	100	100	100	100							
Control	100	100	100	100	100	100							

Percent survival in each concentration is based on a single individual in each of ten replicates.

^{&#}x27;X' - Cerio lost due to technician error

1.5 QUALITY CONTROL

Test controls conducted concurrently with the test and reference toxicant bioassays affirmed the validity of the *Ceriodaphnia dubia* test. Testing of the reference toxicant was performed as per protocol requirements with no deviations and conditions were within testing limits for measured parameters as specified by the bioassay protocol.

The brood organisms used to supply neonates in the *Ceriodaphnia dubia* survival and reproductive bioassay maintained the requirements of mortality rates less than or equal to 20% prior to testing; with a minimum of 9 young produced in the previous brood and an average of 32.2 young produced per adult in its first 3 broods. The brood stock was challenged with a reference toxicant (reagent grade sodium chloride) within fourteen days of sample testing. The value obtained in this test was within warning limits (± 2 standard deviations) of the laboratory mean, established through repetitive testing with the reference toxicant and brood culture. Dilution water controls run concurrent with the test produced three broods per test organism in at least 60% of the control replicates with an average of greater than 15 live young per adult. Control mortalities were less than 20%.

Test Brood Stock Health Summary

	Actual	Required
Age of Neonates	0-1000 hours	≤24 hours
Age of brood adults	6 days	≤ 14 days
Mean % mortality in 7 days prior to testing	0%	≤20%
Average of number of young produced per adult in its first 3 broods	32.2	≥ 15
Minimum number of young produced in previous brood	9	≥8
Ephippia observations	None	None

TO C	FEET 9 4	TO II
Reference	OVICORT	L OCHITC

Chemical Used:	Sodium Chloride
Date Tested:	19 February 2014
7 day IC ₅₀ (Log Value):	3.147 mg/L, with a 95% confidence interval between 3.097 mg/L and 3.198 mg/L
Lab Geometric Mean (Log Value):	$3.079 \text{ mg/L} \pm 0.189 \text{ mg/L}$ (two standard deviations) N = 31
Warning Limits (Log Values):	2.890 mg/L to 3.268 mg/L
7 day LC50 (Log Value):	3.327 mg/L, with a 95% confidence interval between 3.231 mg/L and 3.422 mg/L
Lab Geometric Mean (Log Value):	$3.253 \text{ mg/L} \pm 0.166 \text{ mg/L}$ (two standard deviations) N = 31
Warning Limits (Log Values):	3.087 mg/L to 3.419 mg/L

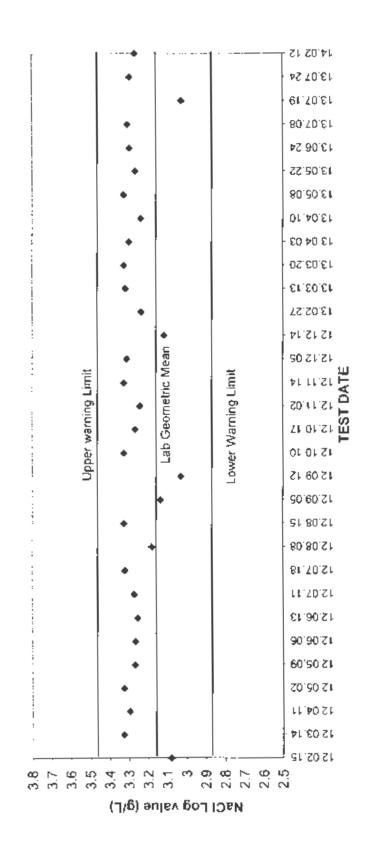
Ceriodaphnia dubia Brood Stock Health Record

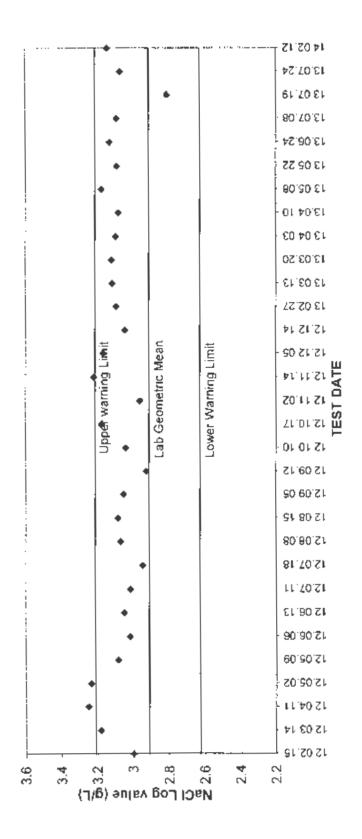
CERIODAPHNIA BROOD STOCK HEALTH RECORD

Client:	Nautilus Environ	mental									
IRC ID#:	1402155			- 2							
Sample Name:	X3A	1200	39								
	25-Feb-14			18							
	27-Feb-14			99							
STOCK BIRTH DA	Y/DATES:	19-Feb-14				Mortality rate i	n 7 day per	iod precedi	ng test:		
						# Dead:		0			
EPHIPPIA OBSER	VATIONS (yes/no):		No			Total organisms: 30					
						% Mortality:		0.0%			
						Required:		≤20%			
Young Produced	19-Feb-14					5-1					
	100	Organism #									
Date	Age (Days)		2	3	4	5	6	7	8	9	10
20-Feb-14	1	0	0	0	0	0	0	0	0	0	(
21-Feb-14	2	0	0	0	0	0	0	0	0	0	(
22-Feb-14	3	3	4	4	3	3	0	4	4	5	5
23-Feb-14	4	0	0	0	0	0	6	0	0	0	(
24-Feb-14	5	9	12	12	12	12	9	12	11	8	11
25-Feb-14	6	20	17	19	21	17	0	17	9	16	20
26-Feb-14	7	0	15	0	0	0	0	0	19	0	C
27-Feb-14	8	20	22	19	17	22	19	24	0	20	20
28-Feb-14	9	20	20	21	24	23	25	25	21	27	20
1-Mar-14	10	23	0	17	27	0	21	24	19	22	20
2-Mar-14	11	0	25	0	0	26	0	0	20	0	C
Total in first 3 bro	ods:	32	33	35	36	32	15	33	24	29	36
Average in first 3	proods:			quired: ≥15							
Minimum brood si	ze on day of testing	g:	9 Red	quired: ≥8							

Ceriodaphnia dubia Bioassay Reference Toxicant Warning Charts

CERIODAPHNIA REFERENCE TOXICANT LC50 WARNING CHART - LOG VALUES





Test Brood Count and Solution Readings

		CERIO	DAPHNIA	BROOD C	COUNT SU	JMMARY				
Client:	Nautilus Enviro	onmental								
IRC ID#:	1402155	onmental								
Sample Name:	X3A									
Sample Date:	25-Feb-14									
Date Tested:	27-Feb-14									
CONCENTRATION:	100%									4.0
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	d	d	d	d	d	d	d	d	d	d
4	d	d	d	d	d	d	d	d	d	d
5 6	d	d	d	d	d	d	d	d	d	d
TOTAL:	0	0	0	0	0	0	0	0	0	0
CONCENTRATION:	50%			1				T		
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	d	d	0	d	0	d	d	d	0	d
4	d	d	0	d	0	d	d	d	0	d
5	d	d	0	d	0	d	d	d	0	d
6	d	d	0	d	0	d	d	d	0	d
TOTAL:	0	0	0	0	0	0	0	0	0	0
CONCENTRATION:	25%				74					
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	2	5	0	0	0	3	0	0
4	4	5	0	0	4	0	5	0	4	5
5	8	11	7	6	9	0	7	8	8	12 16
6	7	18 34	16 25	16 27	18 31	0	14	7	13 25	33
TOTAL:	19	34	25	21	31	U	14	10	25	33
CONCENTRATION:	12.50%	T								
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	5	0	0	0	0	X	0	0	0
4	4	0	0	0	4	3	X	4	0	0
5	9	11	13	2	14	10	X	13	9	12
6	0	17	14	0	18	15	X	14	13	14
TOTAL:	13	33	27	2	36	28	0	31	22	26
CONCENTRATION:	6.25%		T							
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	5	0	4	4	0	6	0	5	2	4
4	3	0	0	0	4	0	0	1	0	12
5	10	12	7	14	11	10 15	11	10 15	11	19
6 TOTAL:	31	29	21	26	31	31	25	31	29	35
TOTAL:	31	29	21	20	31	31	20	311	20	
CONCENTRATION:	3.13%				_		_			40
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	3	4	0	5	6	0	6	3	5	5
5	9	13	11	9	11	10	10	7	12	11
6	12	16	19	14	18	18	14	18	14	18
TOTAL:	24	33	30	28	35	32	30	28	31	34
CONCENTRATION:	1.56%						_			40
Day# / Adult #:	1	2	3	4	5	6	7	8	9 0	10
3	5	6	3	0	6	0	0	5	4	3
5	8	10	11	12	11	0	8	10	11	11
6	14	16	11	16	17	11	13	18	1	0
TOTAL:	27	32	25	30	34	15	25	33	16	14
CONCENTRATION:	Control									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	0	3	6	0	0	0	6	0
4	5	7	0	0	0	4	6	6	0	5
5	10	12	6	11	12	9	9	12	11	11
6	18	18	0	14	16	0	15	0	18	0
TOTAL:	33	37	6	28	34	13	30	18	35	16
"d" - dead; "X" - Tech	Error									
CONCENTRATION	100%	50%	25%	12.5%	6.25%	3.13%	1.56%	Control		
CONTRACTOR										
BROOD COUNT MEAN	VS 0.0	0.0	22.6	24.2	28.9	30.5	25.1	25.0		

Client:	Nautilus En	vironmental				1													
IRC ID#:	1402155											1							
Sample Name:	X3A			1		-					-	+		-		-			1
Sample Date:	25-Feb-14			-				1					-	-					
Date Tested:	27-Feb-14			-		-					-	+	-	-		-		-	-
Date resteu.	27-1-0-14			-	-			1			-	-			-				-
FRESH SOLUTIONS										OLD SOLUTIO	ONS								
DISSOLVED OXYGEN										DISSOLVED	OXYGE	N							
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
100	10.0	9.9	10.0	10.1	9.7	9.6		9.6	10.1	100	7.4							7.4	7.4
50	9.0	8.8	8.9	8.8	8.7	8.8		8.7	9.0	50	7.2	7.6	7.5	7.4	7.5	7.1		7.1	7.6
25	8.6	8.5	8.4	8.4	8.4	8.5		8.4	8.6	25	7.2	7.3	7.0	7.2	7.3	6.7		6.7	7.3
12.5	8.3	8.3	8.2	8.3	8.3	8.4		8.2	8.4	12.5	7.2	7.1	6.9	7.1	7.2	6.6		6.6	7.2
6.25	8.1	8.2	8.1	8.2	8.1	8.4		8.1	8.4	6.25	7.3	7.1	7.0	7.2	7.3	6.5		6.5	7.3
3.13	8.1	8.2	8.0	8.2	8.1	8.3		8.0	8.3	3.13	7.4	7.4	7.1	7.2	7.2	6.5		6.5	7.4
1.56	8.2	8.2	8.0	8.2	8.1	8.4		8.0	8.4	1.56	7.3	7.6	6.9	7.3	7.3	6.7		6.7	7.6
CONTROL	8.3	8.3	8.0	8.4	8.2	8.4		8.0	8.4	CONTROL	7.3	7.2	7.1	7.3	7.3	6.7		6.7	7.3
CONTROL	0.3	0.5	0.0	0.4	0.2	0.4		0.0	0.4	CONTROL	7.3	1.2	7.1	7.0	7.5	0.7		0.7	1.3
pH										pН									
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
100	7.5	7.6	7.5	7.5	7.6	7.6		7.5	7.6	100	7.9							7.9	7.9
50	7.6	7.7	7.7	7.7	7.7	7.7		7.6	7.7	50	7.8	8.0	7.9	7.9	7.9	7.8		7.8	8.0
25	7.6	7.8	7.8	7.9	7.7	7.7		7.6	7.9	25	7.7	7.9	7.9	7.8	7.8	7.7		7.7	7.9
12.5	7.7	7.8	7.8	7.9	7.8	7.8		7.7	7.9	12.5	7.7	7.9	7.8	7.8	7.7	7.6		7.6	7.9
6.25	7.7	7.8	7.9	8.0	7.8	7.8		7.7	8.0	6.25	7.7	7.9	7.8	7.8	7.7	7.6		7.6	7.9
3.13	7.7	7.8	7.9	8.0	7.8	7.8		7.7	8.0	3.13	7.7	7.9	7.8	7.7	7.7	7.6		7.6	7.9
1.56	7.7	7.8	8.0	8.0	7.8	7.9		7.7	8.0	1.56	7.7	7.9	7.8	7.7	7.7	7.6		7.6	7.9
CONTROL	7.8	7.8	8.0	7.9	7.8	7.9		7.8	8.0	CONTROL	7.7	7.8	7.8	7.7	7.7	7.6		7.6	7.8
CONDUCTIVITY				-						CONDUCTI	VITY								
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
100	326	324	335	324	328	328	0	324	335	100	327	-	3	-4	3	0	-	327	327
50	248	244	250	249	253	249		244	253	50	249	252	251	255	254	251		249	255
25	209	205	208	209	213	209		205	213	25	211	210	209	214	216	212		209	216
12.5	189	187	187	191	193	188		187	193	12.5	190	191	190	194	196	191		190	196
			176					176	183									179	186
6.25	179	177		181	183	178		170	178	6.25 3.13	180	179	180	183	186	181		174	
3.13	173	171	170		178	172						174	-	179	181	176			181
1.56	171	168	167	172	176	170	_	167	176	1.56	173	170	173	177	178	174		170	178
CONTROL	169	169	164	171	174	166		164	174	CONTROL	175	170	172	176	176	172		170	176
AFTER WARMING	:																		
DAY	0	1	2	3	4	5	6	MIN	MAX										
Dissolved Oxygen	11.6	11.0	11.7	11.1	11.2	11.5		11	11.7										
Temperature	25.0	25.0	25.0	24.0	24.5	24.5		24	25										
рН	7.4	7.4	7.4	7.5	7.5	7.5		7.4	7.5										
Conductivity	330	329	334	332	331	331		329	334		7								
Aeration:	20 min	20 min	20 min	20 min	20 min	20 min													
HARDNESS:																			
Sample	164	164	164	190	172	166		164	190										
Dilution Water	86	74	80	76	80	76		74	86			1							

Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia IC₂₅ and IC₅₀

Report Date: Test Code: 22 Mar-14 15:28 (p 1 of 2) 06-5160-2182/1402155

0												
Ceriodaph	nia 7-d	Survival and	Reprod	fuction Te	st				IRO	C Integrated	Research C	onsultants
Analysis N	lo: 08-	-2456-1812	E	ndpoint:	Reproduction			CE	TIS Versio	n: CETISV	1.6.6	
Analyzed:	22	Mar-14 15:2	7 A	nalysis:	Linear Interpo	lation (ICPIN)	Off	ficial Resu	lts: Yes		
Test Run I	No: 13-	-5600-6431	Т	est Type:	Reproduction-	-Survival (7d)		An	alyst: D	itty Chacko		
Start Date	: 27	Feb-14	P	rotocol:	EC/EPS 1/RM	1/21		Dil	uent: L	aboratory Wa	ater	
Ending Da	te: 05	Mar-14	S	pecies:	Ceriodaphnia	dubia		Bri	ine: N	lot Applicable		
Duration:		0h	S	ource:	In-House Cult	ure		Ag	e:			
Sample No	o: 17-	-6399-0549		ode:	1763990549			Cli	ent: N	lautilus		
Sample Da	ate: 18	Mar 14 16:11	2(1) N	laterial:	Unknown			Pro	oject: S	pecial Studie	S	
Receive D	ate: 18	Mar 14 16:1:	2(2) 5	ource:	ХЗА							
Sample A	ge: N//	4 emm	S	tation:								
Linear Inte	erpolatio	on Options										
X Transfo	rm '	Y Transform	S	ieed	Resamples	Exp 95%	CL Met	hod				
Log(X + 1)		Linear	5	7951	200	Yes	Two	-Point Inte	rpolation			
Point Esti	mates											
Level C	onc-%	95% LCL	95% U	CL	TU	95% LCL	95% UCL					
IC5 8	.496	0.5744	25.89		11.77	3.862	174.1					
C10 1	1.44	1.479	26.81		8.742	3.73	67.63					
C15 1	8.84	6.793	27.76		5.307	3.602	14.72					
C20 2	5.55	8.46	28.75		3.914	3.478	11.82					
IC25 2	6.65	9.852	29.77		3.752	3.359	10.15					
IC40 3	0.26	23.08	33.04		3.305	3.026	4.332					
IC50 3	2.91	27.14	35.41		3.038	2.824	3.685					
Reproduc	tion Sur	nmary				Ca	culated Va	riate				
Conc-%	Cont	rol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%		
)	Dilutio	on Water	10	25	6	37	1.98	10.84	43.37%	0.0%		
1.56			10	25.1	14	34	1.394	7.637	30.43%			
3.13			10	30.5	24	35	0.5978	3.274	10.74%			
5.25			10	28.9	21	35	0.7224	3.957	13.69%			
12.5			9	24.22	2	36	1.949	10.67	44.07%			
25			10	22.6	0	34	1.884	10.32	45.66%			
50			10	0	0	0	0	0		100.0%		
100			10	0	0	0	0	0		100.0%		
Reproduct	tion Det	ail										
Conc-%	Cont	rol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10

(1) 25-Feb-14 11:35 (2) 27 Feb-14 10:30

1.56

3.13

6.25

12.5

Dilution Water

Report Date:

22 Mar-14 15:28 (p 2 of 2)

Test Code:

06-5160-2182/1402155

Ceriodaphnia 7-0	Survival and	Reproduction	Test
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IRC Integrated Research Consultants

Analyzed:

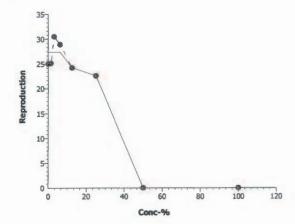
Analysis No: 08-2456-1812 22 Mar-14 15:27

Endpoint: Reproduction

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.6.6

Official Results: Yes



Report Date:

16 Apr-14 09:30 (p 1 of 2)

Test Cade: 06-5160-2182/14 | 01-4554-2479

								100	, edua.	42 4.42		10012110
Ceriod	aphnia	7-d Survival and	d Reproduc	tion T	est					Na	utilus Env	ironmental
Analysi	is ID;	11-8058-7376	End	point:					IS Version		.87	•
Analyz	ed:	16 Apr-14 9:30	Anal	lysis:	Linear Interpola	ition (ICPIN)	Offi	cial Results	s: Yes		
Batch I	D:	10-6454-5487	Test	Туре:	Reproduction-S	Survival (7d)		Ana	ilyat: Em	ıma Marus		
Start D	ate:	27 Feb-14	Prot	ocol:	EC/EPS 1/RM/	21		Ollo	jent: Lal	oratory Wal	ler	
Ending	Date:	05 Mar-14	Spe	cles:	Ceriodaphnia d	ubia		Brit	10;			
Duratk	n:	6d Oh	Sou	rce:	In-House Cultur	re		Age):			
Sample	a JD:	05-2872-4258	Cod	B:	1F83B120			Clie	int: AL	S		
		25 Feb-14 11:3		erial:	Effluent			Pro	ject:			
Receiv	e Date:	27 Feb-14 10:3	uo2 0	rce:	ALS							
Sample	Age:	36h (3.9 °C)	Stat	ion:	L1426336-6(X3	A)						
Linear	Interpo	iation Options										
X Trans		Y Transform		_	Resamples	Exp 95%		thod				
Ltg/X+	5)	Linear	2029	9D	200	Yes	Two	-Point Inter	polation			
Point B	stimate	98										
Level	%	95% LCL	95% UCL		95% LCL	95% UCL						
IC5	15.34		25 89	6.52	3.862	305.8						
IC10	25.08		26.81 27.76	3.988 3.836		131.4 74.82						
IC15 IC20	26.07 27.1	1.337 2.885	28.75	3.691		34.67						
IC25	28.16		29.77	3.551		18.39						
IC40	31.61		33.04	3.163		4.224						
IC50	34.13		35.41	2.93	2.824	3.659						
Reproc	tretion	Summary				Ca	culated V	ariate		·		
C-%	С	ontrol Type	Count	Mear	n Min	Max	Std Err	Std Dev	CV%	%Effect		
O.	N	egative Cortact	10	25	6	37	3 429	10.84	43.37%	0.0%		
1.56			10	25	6	37	3 429	10.84	43.37%	0.0%		
3.13			10	25	6	37	3.429	10.84	43.37%	0.0%		
6.25			10	25	6	37	3.429	10.84	43.37% 44.07%	0.0%		
12.5			9	24.22 22.6	2 0	36 34	3.558 3.263	10.67 10.32	45.66%	3 11% 9.6%		
25 50			10 10	0	0	0	0	0	43.0070	100 0%		
100			10	Ö	ō	0	0	0		100 0%		
Reproc	fuction	Detail					_			_		
C-%		ontrol Type	Rep 1	Rep	2 Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0		legative Control	33	37	6	28	34	13	30	18	35	16
1.56			33	37	6	28	34	13	30	18	35	16
3.13			33	37	6	28	34	13	30	18	35	16
6.25			33	37	6	28	34	13	30	18	35	16
12.5			13	33	27	2	36	28	31	22	25	
25			19	34	25	27	31	0	14	18	25	33
			_		Ò	^	^		0	0	0	0
50			0	0	0	0	0	0 0	o	٥	0	o o

Analyst: 0A: 366

Report Date:

16 Apr-14 09:30 (p.2 of 2)

Test Code:

06-5160-2182/14 | 01-4554-2479

Ceriodephnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: Analyzed:

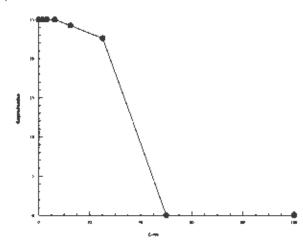
11-8058-7376 16 Apr-14 9:30 Endpoint: Reproduction

Analysis: Lit

Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

CETISv1.8.7



Report Date:

18 Mar-14 16:25 (p 1 of 2)

Test Code:

06-5160-2182/1402155

Ceriodaphnia '	7-d Surviva	l and Repr	oduction Te	st				IRC	Integrated F	Research C	onsultant
Analysis No: Analyzed:	18-8739-9 18 Mar-14		Endpoint: Analysis:	Reproduction Nonparametric	-Multiple Co	mparison		IS Version		.6.6	
Test Run No:	13-5600-64	131	Test Type:	Reproduction-S	Survival (7d)		Ana	lyst: Dit	y Chacko		
Start Date:	27 Feb-14		Protocol:	EC/EPS 1/RM/	21		Dilu	ent: Lal	poratory Wat	er	
Ending Date:	05 Mar-14		Species:	Ceriodaphnia o	lubia		Brin	e: No	t Applicable		
Duration:	6d 0h		Source:	In-House Cultu	ire		Age	:			
Sample No:	17-6399-0	549	Code:	1763990549			Clie	nt: Na	utilus		
Sample Date:	18 Mar-14	16:12	Material:	Unknown			Proj	ect: Spe	ecial Studies		
Receive Date:	18 Mar-14	16:12	Source:	X3A							
Sample Age:	N/A		Station:								
Data Transform	m	Zeta	Alt H	yp Monte Ca	rlo	NOEL	LOEL	TOEL	TU	PMSD	
Untransformed			C>T	Not Run		25	>25	N/A	4	35.81%	
Wilcoxon/Bon	ferroni Adj	Test									
Control	vs Cond	c-%	Test	Stat Critical	Ties	P-Value	Decision	(5%)			
Dilution Water	1.56		99		4	1.0000	Non-Sign	ificant Effec	t		
	3.13		113.5		5	1.0000	Non-Sign	ificant Effec	t		
	6.25		109.5		1	1.0000		ificant Effec			
	12.5		84.5		3	1.0000	9	ificant Effec			
	25		96.5		3	1.0000	Non-Sign	ificant Effec	t		
ANOVA Table											
Source	Sum	Squares	Mean	Square	DF	F Stat	P-Value	Decision	(5%)		
Between	448.3	207	89.66	415	5	1.288	0.2831	Non-Sign	ificant Effect		
Error	3690.	256	69.62		53						
Total	4138.	576324462	89 159.2	91610717773	58						
ANOVA Assum	nptions										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(1%)			
Variances	Bartk	ett Equality	of Variance	18.57	15.09	0.0023	Unequal \				
Distribution	Shap	iro-Wilk No	rmality	0.9359		0.0039	Non-norm	nal Distributi	оп		
Reproduction	Summary										
Conc-%	Control Typ	e Cour	nt Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	DIff%
0	Dilution Wat		25	20.88	29.12	6	37	2.013	10.84	43.37%	0.0%
1.56		10	25.1	22.2	28	14	34	1.418	7.637	30.43%	-0.4%
3.13		10	30.5	29.25	31.75	24	35	0.6081	3.274	10.74%	-22.0%
6.25		10	28.9	27.39	30.41	21	35	0.7347	3.957	13.69%	-15.6%
12.5		9	24.22	20.16	28.28	2	36	1.982	10.67	44.07%	3.11%
12.0					20:20	_	-				

Report Date:

18 Mar-14 16:25 (p 2 of 2)

Test Code:

06-5160-2182/1402155

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

Analysis No: 18-8739-9187 18 Mar-14 16:23 Endpoint: Reproduction

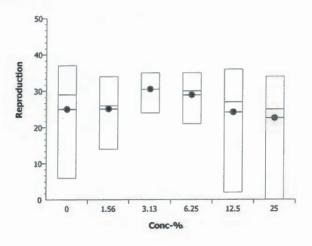
Analysis: Nonparametric-Multiple Comparison

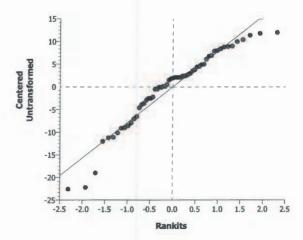
CETIS Version: Official Results: Yes

CETISV1.6.6

Reproducti	on Detail					
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	R
0	Dilution Water	33	37	6	28	34

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	33	37	6	28	34	13	30	18	35	16
1.56		27	32	25	30	34	15	25	33	16	14
3.13		24	33	30	28	35	32	30	28	31	34
6.25		31	29	21	26	31	31	25	31	29	35
12.5		13	33	27	2	36	28	31	22	26	
25		19	34	25	27	31	0	14	18	25	33





Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia LC₅₀

Report Date:

18 Mar-14 16:24 (p 1 of 1)

Test Code:

EC/LC50 95% LCL 95% UCL

06-5160-2182/1402155

Ceriodaphnia	7-d Survival and Re	production Te	st		IRC Integrated Research Consultants
Analysis No: Analyzed:	08-9346-4144 18 Mar-14 16:15	Endpoint: Analysis:	6d Survival Rate Untrimmed Spearman-Kärber	CETIS Ver Official Re	
Test Run No: Start Date: Ending Date: Duration:	13-5600-6431 27 Feb-14 05 Mar-14 6d 0h	Test Type: Protocol: Species: Source:	Reproduction-Survival (7d) EC/EPS 1/RM/21 Ceriodaphnia dubia In-House Culture	Analyst: Diluent: Brine: Age:	Ditty Chacko Laboratory Water Not Applicable
	17-6399-0549 18 Mar-14 16:12 18 Mar-14 16:12 N/A	Code: Material: Source: Station:	1763990549 Unknown X3A	Client: Project:	Nautilus Special Studies

Spearman-Kärber Estimates

Threshold

Threshold Option

Control Th	reshold	0	0.00%	1.669	0.04664		46.65	37.64	57.83		
6d Surviva	al Rate Summary				Calc	ulated Varia	rte(A/B)				
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	В
)	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.13		10	1	1	1	0	0	0.0%	0.0%	10	10
5.25		10	1	1	1	0	0	0.0%	0.0%	10	10
2.5		9	1	1	1	0	0	0.0%	0.0%	9	9
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0.4	0	1	0.09428	0.5164	129.1%	60.0%	4	10
100		10	0	0	0	0	0		100 0%	0	10

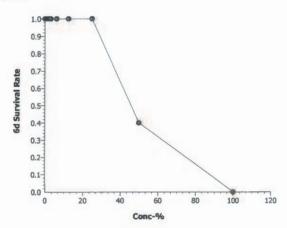
Sigma

Mu

Trim

6d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.13		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	
25		1	1	1	1	1	1	1	1	1	1
50		0	0	1	0	1	0	0	0	1	10 emm
100		0	0	0	0	0	0	0	0	0	0



Report Date:

18 Mar-14 16:24 (p 1 of 2)

Test Code:

06-5160-2182/1402155

								lest Code		06-5160-2	182/140215
Ceriodaphnia	7-d Survival a	nd Repr	oduction Te	st				IRC	Integrated	Research (Consultants
Analysis No: Analyzed:	13-8864-6600 18 Mar-14 16		Endpoint: Analysis:	6d Survival R STP 2x2 Con	ate tingency Tabl	es		TIS Version		v1.6.6	
Test Run No:	13-5600-6431	1	Test Type:	Reproduction	-Survival (7d)		Ana	alyst: D	tty Chacko		
Start Date:	27 Feb-14		Protocol:	EC/EPS 1/RM	1/21		Dile	ient: La	boratory Wa	ater	
Ending Date:	05 Mar-14		Species:	Ceriodaphnia	dubia		Bri	ne: N	ot Applicable	е	
Duration:	6d 0h		Source:	In-House Cult	ture		Age):			
Sample No:	17-6399-0549)	Code:	1763990549			Clie	ent: N	autilus		
Sample Date:	18 Mar-14 16	:12	Material:	Unknown			Pro	ject: S	pecial Studie	es	
Receive Date:	18 Mar-14 16	:12	Source:	ХЗА							
Sample Age:	N/A		Station:								
Data Transfor	m	Zeta	Alt H	yp Monte C	arlo	NOEL	LOEL	TOEL	TU	PMSD	
Untransformed			C>T	Not Run		25	50	35.36	4	N/A	
Fisher Exact/	Bonferroni-Ho	m Test									
Control	vs Conc-%		Test S	tat P-Value	Decision(0	0.05)					
Dilution Water	1.56		1	1	Non-Signifi	cant Effect					
	3.13		1	1	Non-Signifi	cant Effect					
	6.25		1	1	Non-Signifi	cant Effect					
	12.5		1	1	Non-Signifi	cant Effect					
	25		1	1	Non-Signifi	cant Effect					
	50		0.0054	18 0.03251	Significant	Effect					
	100		5.413E	-06 3.789E-0	5 Significant	Effect					
Data Summar	у										
Conc-%	Control Type	No-Re	sp Resp	Total							
0	Dilution Water	10	0	10							
1.56		10	0	10							
3.13		10	0	10							
6.25		10	0	10							
12.5		9	0	9							
25		10	0	10							
50		4	6	10							
100		0	10	10							
6d Survival Ra	te Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
)	Dilution Water	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.13		1	1	1	1	1	1	1	1	1	1

12.5

Report Date:

18 Mar-14 16:24 (p 2 of 2)

Test Code:

06-5160-2182/1402155

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

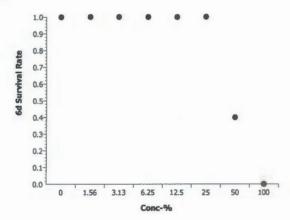
Analysis No: 13-8864-6600 18 Mar-14 16:15

Endpoint: 6d Survival Rate

Analysis: STP 2x2 Contingency Tables

CETISv1.6.6 **CETIS Version:**

Official Results: Yes



 $\begin{tabular}{ll} \textbf{Ceriodaphnia dubia Bioassay Calculation Printouts} \\ \textbf{Reflox } 1C_{50} \end{tabular}$

Report Date:

18 Mar-14 16:28 (p 1 of 2)

Test Code:

12-0152-3261

Ceriod	laphnia 7-	d Survival a	and Repr	roduc	tion Test					IRC In	tegrat	ted Research Consultant
Analys Analyz		9-4477-033 5 Mar-14 1			9	production nlinear Reg	ression			Version: al Results:		TSv1.6.6
Test R	un No: 2	0-2489-087	6	Test	t Type: Re	production-	Survival (7d)		Analy	st:		
Start D	Date: 1	9 Feb-14 13	3:27	Prot	tocol: EC	VEPS 1/RM	/21		Diluer	nt: Labo	oratory	Water
Ending	Date: 2	5 Feb-14 14	1:55	Spe	cies: Ce	riodaphnia d	dubia		Brine	: Not	Applica	able
Duratio	on: 6	d 1h		Sou	rce: In-	House Cultu	ıre		Age:			
Sample		3 -0089-8 08		Cod	le: 13	00898086			Client		nal Lai	b
		7 Feb-14 11				dium chlorid			Projec	ct: Spec	cial Stu	ıdies
	7	7 Feb-14 1	1:50	10.0		ference Tox	ricant					
Sample	e Age: N	I/A		Stat	ion:					-		
Non-Li	inear Regi	ession Opt	tions									
	Function					\-			ansform We			
3P Cun	nulative Lo	g-Normal E	V [Y=A*(1- Ф(і	log(X/D)/C))]	None	Non	e No	rmal [W=1]		Off [Y*=Y]
Regres	ssion Sum									_1.		
Iters	Log LL	AlCc	Adj		Optimize		Critical	P-Value	Decision(5		6 E4	
6	-87.09	180.9	0.623	3/	Yes	0.4101	4.113	0.5260	Non-Signific	Cant Lack o	T FIL	
Point E	Estimates											
Level		m/ 95% LC										
IC10	0.8703	N/A	1.124									
IC15	0.9536	N/A	1.215									
IC20	1.026	N/A	1.285									
IC25	1.091	0.7556	1.342									
IC40 IC50	1.277 1.404	1.089 1.25	1.474									
			1.070							1		
	sion Para				000/ 1 01	00/ 1101	4.04-4	D Malus	Declara (C			
Parame	eter	Estimat 29.8	1.253		95% LCL 27.26	95% UCL 32.34	23.78	P-Value 0.0000	Decision(5 Significant I	-		
A C		0.3731	0.146		0.07675	0.6695	2.551	0.0000	Significant i			
D		1.404	0.088		1.225	1.583	15.88	0.0000	Significant i			
ANOVA	Table											
Source		Sum Sq	uares	Mear	n Square	DF	F Stat	P-Value	Decision(5	%)		
ack of	Fit	12.8986		12.89	9863	1	0.4101	0.5260	Non-Signific			
Model		2063.10	1	1031	.551	2	33.33	0.0000	Significant			
Pure Er	тог	1132.4		31.45	5555	36						
Residua	al	1145.29	9	30.9	5402	37				1		
Residu	al Analysi	S										
Attribut	te	Method				Test Stat		P-Value	Decision(5	18		
Varianc	es		Equality of			3.027	7.815	0.3876	Equal Varia			
Distribu	ition		vene Equa	-	of Variance	0.1617 0.9514	2.866	0.9214	Equal Varia Normal Dist			
-17.11			- viii. (40)	anty		0.0017	Cal	culated Va				
	luction Su m/L Con		Coun		Mean	Min	Max	Std Err		CV%	Diff%	
conc-g		ion Water	10		29	14	35	1.171		22.11%	0.0%	
0.375	Dilui	TOTAL TRACE	10		30.6	18	37	1.202		21.52%	-5.529	
0.75			10		28.4	22	33	0.6896		13.3%	2.07%	
1.5			10		12.8	7	23	0.9499		40.65%	55.86	
.U			10		12.0	-	23	0.5499	3.203	4U.00%	33.00	70

Report Date: **Test Code:**

18 Mar-14 16:28 (p 2 of 2)

12-0152-3261

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analyzed:

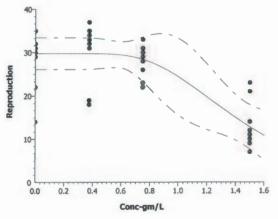
Analysis No: 09-4477-0338 05 Mar-14 10:15 Endpoint: Reproduction

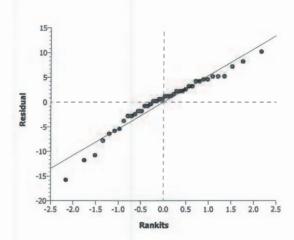
Analysis: Nonlinear Regression

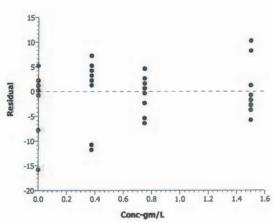
CETIS Version: CETISv1.6.6 Official Results: Yes

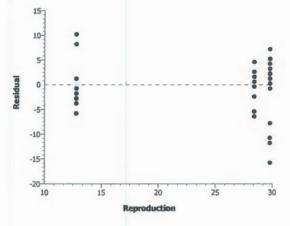
Reproduction Detail

Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	32	14	32	22	30	35	31	29	35	30
0.375		37	31	32	33	34	34	19	35	33	18
0.75		33	28	29	31	30	33	22	29	23	26
1.5		9	10	11	10	7	11	23	12	21	14









 $\begin{array}{c} \textit{Ceriodaphnia dubia Bioassay Calculation Printouts} \\ & \text{Reflox } LC_{50} \end{array}$

Report Date:

18 Mar-14 16:27 (p 1 of 1)

0.0%

0.0%

0.0%

100.0%

100.0%

Test Code:

12-0152-3261

Ceriodaphnia	7-d Survival a	nd Reproduc	tion Tes	st				IRC Ir	ntegrated F	Research	Consultants
Analysis No: Analyzed:	00-3619-3653 05 Mar-14 10			6d Survival Ra Binomial Meth				S Version: ial Results:	CETISv1	1.6.6	
Test Run No: Start Date: Ending Date: Duration:	19 Feb-14 13	:27 Prof	ocol: cles:	Reproduction- EC/EPS 1/RM Ceriodaphnia of In-House Cultu	/21 dubia)	Analy Dilue Brine Age:	nt: Labo	oratory Wat Applicable	er	
Sample No: Sample Date: Receive Date: Sample Age:	27 Feb-14 11	:50 Mate	erial: rce:	1300898086 Sodium chlorio Reference Tox			Clien Proje	-	mal Lab cial Studies		
Threshold Op		es Threshold	Trim	Mu	Sigma		EC/LC50	95% LCL	95% UCL		
Control Thresh	old	0	0.00%	0.3266	0		2.121	1.704	2.641		
6d Survival Ra	ate Summary				Calc	ulated Varia	nte(A/B)				
Conc-gm/L C	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	В
0 D	Dilution Water	7	1	1	1	0	0	0.0%	0.0%	7	7

0.0%

0.0%

0.0%

6d Survival Rate Detail

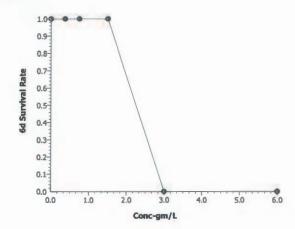
Conc-am/l	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	ropo	1000	1100 10
0.375		1	1	1	1	1	1	1	1	1	1
0.75		1	1	1	1	1	1	1	1	1	1
1.5		1	1	1	1	1	1	1	1	1	1
3		0	0	0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0	0	0

Graphics

0.375

0.75

1.5





CERIODAPHNIA DUBIA TOXICITY TESTING February 2014

Prepared for:

NAUTILUS ENVIRONMENTAL 8664 Commerce Court Burnaby, BC V5A 4N7

Prepared by:

IRC INTEGRATED RESOURCE CONSULTANTS INC.

160 - 14480 River Road Richmond, B.C. V6V 1L4 Tel: 604-278-7714

Tel: 604-278-7714 Fax: 604-278-7741





24 March 2014

Nautilus Environmental 8664 Commerce Court Burnaby, BC V5A 4N7

Attention: Krysta Pearcy

Reference: Ceriodophnia dubia bioassay on the R3 sample received on 27 February 2014.

Dear Ms. Pearcy,

Enclosed please find the final report for the *Ceriodaphnia dubia* toxicity testing results, for Nautilus Environmental R3 sample dated 25 February 2014. This report includes *Ceriodaphnia dubia* test reproduction and survival data as well as daily water quality readings and reference toxicant results.

The result of the *Ceriodophnia dubia* bioassay indicated that a concentration that would cause 50% mortality (LC50) was greater than 100%. The survival No Observed Effect Level (NOEL) was 100% and the Lowest Observed Effect Level (LOEL) was greater than 100%. The concentration that would cause a 50% inhibition in reproduction (IC50) in the culture tested was 97.39% with a 95% confidence interval between 71.93% and 131.9%, while the 25% inhibition value (IC25) was 70.72% with a 95% confidence interval between N/A and 100%. The reproduction No Observed Effect Level (NOEL) was 50% and the Lowest Observed Effect Level (LOEL) was 100%.

Should you have any questions regarding these results, please do not hesitate to call me at 604-278-7714.

Sincerely.

Ditty Chacko Kakkassery Laboratory Biologist

IRC Integrated Resource Consultants Inc.

Encl.

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1.0 CERIODAPHNIA DUBIA BIOASSAY METHOD AND RESULTS

1.1 SAMPLE DESCRIPTION

IRC Sample ID No.:	1402156	
Sample Name:	R3	
Effluent type:	Effluent	
Date collected:	25 February 2014; 1330 hrs	
Date, time received:	27 February 2014; 1530 hrs	
Collection Method:	Grab	Tiwar=
Amount, Container:	3 x 2L & 1 x 1L plastic containers	
Date, time test initiated:	27 February 2014; 1650 hrs.	
Date, time test completed:	05 March 2014; 1055 hrs.	
Physical description:	Translucent slightly yellow liquid	

1.2 METHOD

The method used for this test was as per the IRC laboratory "Standard Operating Procedure for Ceriodaphnia dubia Testing and Culturing" CDver3. This procedure follows the "Biological Test Method: Test of Reproduction and Survival Using the Cladoceran Ceriodaphnia dubia" Report EPS 1/RMS/21Second Edition - February 2007. The NOEL and LOEL were calculated by Fisher Exact/Bonferroni-Holm method, IC50 and IC25 using Linear Interpolation method and LC50 by Spearman-Kärber or Linear Interpolation method with the CETIS, ver 1.6.6E (2008) software.

Ceriodaphnia dubia are cultured on site from an original culture obtained from Carolina Biological Supply Ltd. Organisms are maintained in 1 L mass cultures and in a series of 23 mL glass test tubes containing a single Ceriodaphnid from which test organisms are obtained. Culture, control and test dilution water was a mixture of 80% distilled water and 20% Perrier.

Tests were conducted in 23mL glass test tubes containing 20mL of test solution, at a depth of 12 cm. Ten replicates of each concentration (100%, 50%, 25%, 12.5%, 6.25%, 3.13% and 1.56%) and control were tested. Test temperature was maintained throughout the test period at 25°± 1°C, with a photoperiod of 16 hours light and 8 hours dark.

Initiation of the bioassay was carried out by placing a single neonate Ceriodaphnid of less than 24 hours, into each test vessel. New test solutions were prepared daily into which organisms were transferred. Daily measurements of the mortality and number of young produced in each replicate were recorded. Records were also maintained for daily readings of dissolved oxygen, pH, temperature and conductivity for each test concentration and control solution. The test was completed when ≥ 60% of control organisms had 3 broods.

On the day of test initiation, adult *Ceriodaphnia* were placed in test tubes at 0600 hours; young used in testing were pulled directly from these test tubes at 1600 hours, ranging in age from 0 to 1000 hours. There was no unusual appearance or behaviour noted in the test organisms prior to their use in the test. No ephippia were observed in brood cultures and mass cultures in the seven day period preceding the test.

Sample used for testing was collected on 25 February 2014. Sample containers were marked with the sample ID: 7 Day Chronic Ceriodaphnia. The sample arrival temperature was 9.3°C; nothing unusual was noted regarding the sample appearance. Sample in the 3 x 2 litre and 1 x 1 litre plastic jugs received were stored in the dark at 4 ± 1 °C until used for testing. The required volume of sample was poured out into a labeled beaker on each day of testing. The sample was not pH adjusted or filtered prior to being used in testing. The test was complete at day 6 as \geq 60% of control organisms had produced 3 broods at this time.

1.3 RESULTS

	Results	95% Confidence Interval
Ceriodaphnia dubia LC50	> 100%	
NOEL (Survival)	100%	-
LOEL (Survival)	> 100%	
Ceriodaphnia dubia IC25	70.72%	N/A - 101.5%
Ceriodaphnia dubia IC50	97.39%	71.93% - 131.9%
NOEL (Reproduction)	50%	
LOEL (Reproduction)	100%	

LC₅₀= Concentration which would cause a 50% mortality

IC25 = Concentration which would cause a 25% inhibition in reproduction or growth.

IC₅₀ = Concentration which would cause a 50% inhibition in reproduction or growth.

NOEL = No Observed Effect Level

LOEL = Lowest Observed Effect Level

1.4 WATER QUALITY READINGS AND TEST DATA

Test set up technician was DB. Daily reading technicians were DB, CW and MH. The initial dissolved oxygen level of the sample was 11.7 mg/L at 9.5° C, the initial conductivity was 635μ S/cm and the initial pH was 7.5. The sample was not pH adjusted or filtered prior to testing. For daily water quality readings, please see appendices.

Daily Initial Readings of Undiluted sample (after warming)

	Dissolved Oxygen (mg/L)	Temperature (°C)	pН	Conductivity (µS/cm)	PRE- AERATION*
DAY 0	11.4	24.0	7.5	638	20 minutes
DAY 1	11.0	25.5	7.5	618	20 minutes
DAY 2	11.2	24.5	7.6	641	20 minutes
DAY 3	11.2	24.5	7.5	639	20 minutes
DAY 4	11.0	26.0	7.6	638	20 minutes
DAY 5	11.6	24.0	7.5	639	20 minutes

^{*}Pre-aeration of the sample is carried out if the dissolved oxygen level is either less than 40% saturation or greater than 100% saturation. Pre-aeration is for a maximum of 20 minutes.

Daily 0 Hour Refresh Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (µS/cm)	Hardness (mg/L)
100%	9.2-10.1	7.6-7.7	624-639	330-362
50%	8.6-9.0	7.7-7.8	414-419	
25%	8.2-8.6	7.7-7.9	296-301	
12.5%	8.1-8.6	7.7-7.9	229-238	
6.25%	8.1-8.5	7.8-8.0	198-206	
3.13%	8.1-8.5	7.8-8.0	181-190	
1.56%	8.1-8.4	7.8-8.0	172-183	
Control	8.1-8.5	7.8-8.0	165-176	74-86

Daily 24 Hour Old Solutions

Concentration	Dissolved Oxygen Range (mg/L)	pH Range	Conductivity Range (µS/cm)		
100%	7.0-7.5	8.0-8.1	628-641		
50%	6.8-7.4	7.8-8.0	419-426		
25%	6.8-7.3	7.8-8.0	301-305		
12.5%	6.7-7.3	7.8-7.9	234-242		
6.25%	6.8-7.4	7.7-7.9	201-209		
3.13%	6.7-7.4	7.7-7.9	185-193		
1.56%	6.7-7.4	7.6-7.9	176-184		
Control	6.9-7.4	7.6-7.8	171-180		

REPRODUCTION AND SURVIVAL RESULTS:

Summary of Total Young Produced Per Ceriodaphnia

Concentration	Tot	al Yo	oung	Prod		per (Cerioda _l ds	ohnid ii	ı its I	First	Mean Young in First 3 Broods	Standard Deviation
	1	2	3	4	5	6	7	8	9	10		
100%	25	10	D	9	6	7	21	D(6)	18	16	11.8	7.9
50%	24	33	20	27	26	30	D(1)	30	29	6	22.6	10.8
25%	28	33	32	16	19	28	17	33	34	16	25.6	7.7
12.5%	18	32	30	29	33	30	32	32	29	34	29.9	4.5
6.25%	12	32	30	34	31	D	35	35	30	7	24.6	13.0
3.13%	9	32	30	6	30	23	9	12	28	13	19.2	10.3
1.56%	15											8.3
Control	10	41	33	17	32	29	28	32	36	31	28.9	9.0

^{&#}x27;D' - Dead

Summary of Ceriodaphnia Survival

	Percent Survival									
Concentration	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6				
100%	100	100	90	90	90	80				
50%	100	100	100	90	90	90				
25%	100	100	100	100	100	100				
12.5%	100	100	100	100	100	100				
6.25%	100	100	100	90	90	90				
3.13%	100	100	100	100	100	100				
1.56%	100	100	100	100	100	100				
Control	100	100	100	100	100	100				

Percent survival in each concentration is based on a single individual in each of ten replicates.

^{&#}x27;X' - Cerio lost due to technician error

1.5 QUALITY CONTROL

Test controls conducted concurrently with the test and reference toxicant bioassays affirmed the validity of the *Ceriodaphnia dubia* test. Testing of the reference toxicant was performed as per protocol requirements with no deviations and conditions were within testing limits for measured parameters as specified by the bioassay protocol.

The brood organisms used to supply neonates in the *Ceriodaphnia dubia* survival and reproductive bioassay maintained the requirements of mortality rates less than or equal to 20% prior to testing; with a minimum of 9 young produced in the previous brood and an average of 32.2 young produced per adult in its first 3 broods. The brood stock was challenged with a reference toxicant (reagent grade sodium chloride) within fourteen days of sample testing. The value obtained in this test was within warning limits (± 2 standard deviations) of the laboratory mean, established through repetitive testing with the reference toxicant and brood culture. Dilution water controls run concurrent with the test produced three broods per test organism in at least 60% of the control replicates with an average of greater than 15 live young per adult. Control mortalities were less than 20%.

Test Brood Stock Health Summary

	Actual	Required
Age of Neonates	0-1000 hours	≤24 hours
Age of brood adults	6 days	≤ 14 days
Mean % mortality in 7 days prior to testing	0%	≤20%
Average of number of young produced per adult in its first 3 broods	32.2	≥ 15
Minimum number of young produced in previous brood	9	≥ 8
Ephippia observations	None	None

Reference Toxicant Results

Chemical Used:	Sodium Chloride
Date Tested:	19 February 2014
7 day IC ₅₀ (Log Value):	3.147 mg/L, with a 95% confidence interval between 3.097 mg/L and 3.198 mg/L
Lab Geometric Mean (Log Value):	$3.079 \text{ mg/L} \pm 0.189 \text{ mg/L}$ (two standard deviations) N = 31
Warning Limits (Log Values):	2.890 mg/L to 3.268 mg/L
7 day LC50 (Log Value):	3.327 mg/L, with a 95% confidence interval between 3.231 mg/L and 3.422 mg/L
Lab Geometric Mean (Log Value):	$3.253 \text{ mg/L} \pm 0.166 \text{ mg/L}$ (two standard deviations) N = 31
Warning Limits (Log Values):	3.087 mg/L to 3.419 mg/L

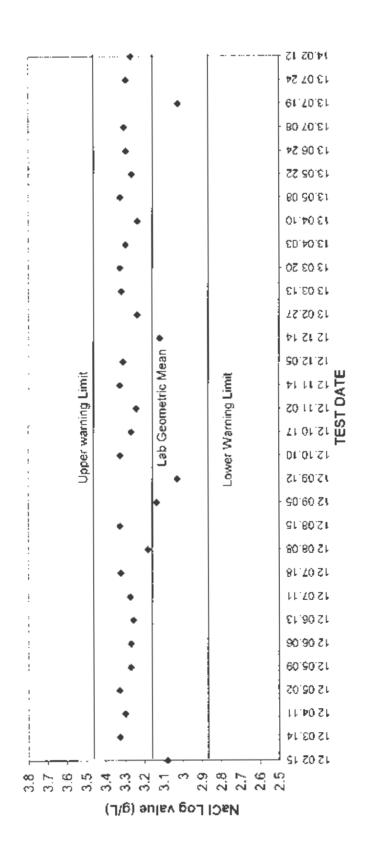
Ceriodaphnia dubia Brood Stock Health Record

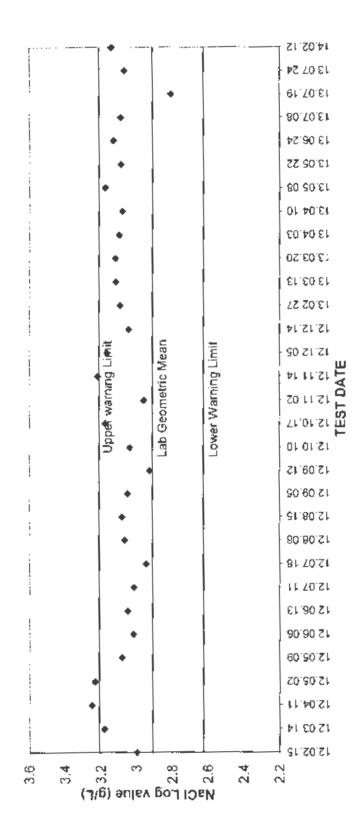
CERIODAPHNIA BROOD STOCK HEALTH RECORD

Client:	Nautilus Environ	mental									
IRC ID#:	1402156										
Sample Name:	R3										
Sample Date:	25-Feb-14										
Date Tested:	27-Feb-14										
STOCK BIRTH D	AY/DATES:	19-Feb-14				Mortality rate i	n 7 day per	riod precedi	ng test:	all the later	
						# Dead:		0	The state of		
EPHIPPIA OBSE	RVATIONS (yes/no):		No		1	Total organisms	3:	30			
						% Mortality:		0.0%			
						Required:		≤20%			
Young Produced	19-Feb-14		11000								
66		Organism #									
Date	Age (Days)	1	2	3	4	5	6	7	8	9	10
20-Feb-14	1	0	0	0	0	0	0	0	0	0	(
21-Feb-14	2	0	0	0	0	0	0	0	0	0	(
22-Feb-14	3	3	4	4	3	3	0	4	4	5	5
23-Feb-14	4	0	0	0	0	0	6	0	0	0	(
24-Feb-14	5	9	12	12	12	12	9	12	11	8	11
25-Feb-14	6	20	17	19	21	17	0	17	9	16	20
26-Feb-14	7	0	15	0	0	0	0	0	19	0	C
27-Feb-14	8	20	22	19	17	22	19	24	0	20	20
28-Feb-14	9	20	20	21	24	23	25	25	21	27	20
1-Mar-14	10	23	0	17	27	0	21	24	19	22	20
2-Mar-14	11	0	25	0	0	26	0	0	20	0	0
Total in first 3 br	otal in first 3 broods: 32 33 35				36	32	15	33	24	29	36
Average in first 3	broods:			uired: ≥15							
Minimum brood	size on day of testing	g:	9 Red	uired: ≥8							

Ceriodaphnia dubia Bioassay Reference Toxicant Warning Charts

CERIODAPHNIA REFERENCE TOXICANT LC50 WARNING CHART - LOG





Test Brood Count and Solution Readings

		CERIC	DAPHNIA	BROOD	COUNT S	UMMARY			-	
Client	Nautilus Enviro	onmental								
Client: IRC ID#:	1402156	onmental								
	R3									
Sample Name: Sample Date:	25-Feb-14									
Date Tested:	27-Feb-14									
Date resteu.	2110014									
CONCENTRATION:	100%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	d	0	0	0	0	0	0	0
4	4	5	d	3	1	2	3	0	5	3
5	7	5	d	6	5	5	6	6	8	7
6	14	0	d	0	0	0	12	d	5	6
TOTAL:	25	10	0	9	6	7	21	6	18	16
CONCENTRATION:	F09/									
and the second s	50%	2	3	4	5	6	7	8	9	40
Day# / Adult #:	0	5	0	0	6	5	0	0	0	10
4	4	0	3	5	0	0	d(1)	5	5	2
5	8	12	7	10	8	11	d	12	11	4
6	12	16	10	12	12	14	d	13	13	0
TOTAL:	24	33	20	27	26	30	1	30	29	6
CONCENTRATION:	25%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	5	0	0	0	0	4	0	5	5	0
4	0	6	6	6	0	0	6	0	0	5
5	9	12	12	10	7	10	11	12	14	11
6	14	15	14	0	12	14	0	16	15	0
TOTAL:	28	33	32	16	19	28	17	33	34	16
CONCENTRATION:	12.50%									
Day# / Adult #:	12.50%	2	3	4	5	6	7	8	9	10
3	0	6	4	0	5	5	0	0	0	0
4	7	0	0	5	0	0	5	6	4	5
5	11	10	11	11	12	10	10	10	11	11
6	0	16	15	13	16	15	17	16	14	18
TOTAL:	18	32	30	29	33	30	32	32	29	34
CONCENTRATION:	6.25%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	0	0	0	0	0	0	5	0
4	5	6	6	6	5	d	6	6	0	1
5	7 0	11	10	12 16	10	d	10	12	10	6
6 TOTAL:	12	32	30	34	31	0	35	35	30	7
TOTAL.	12	321	30]	34	3,	- 0	301	33]	301	-
CONCENTRATION:	3.13%									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	0	0	0	0	0	0	0	0	0
4	1	3	6	5	6	5	3	0	4	5
5	0	12	10	1	10	9	6	4	14	8
6	8	17	14	0	14	9	0	8	10	0
TOTAL:	9	32	30	6	30	23	9	12	28	13
CONCENTRATION	1.56%									
CONCENTRATION: Day# / Adult #:	1.56%	2	3	4	5	6	7	8	9	10
3	0	0	0	0	0	0	0	0	9 0	0
4	4	5	5	4	5	7	3	4	3	3
5	11	11	13	12	13	0	11	9	6	0
6	0	17	0	16	0	10	14	0	0	12
TOTAL:	15	33	18	32	18	17	28	13	9	15
CONCENTRATION:	Control									
Day# / Adult #:	1	2	3	4	5	6	7	8	9	10
3	0	5	4	0	0	0	0	4	5	0
4	3	0	0	4	0	5	6	0	0	5
5	7	12	12	13	11	8	9	10	12	9
6	0	24	17	0	21	16	13	18	19	17
TOTAL:	10	41	33	17	32	29	28	32	36	31
"d" - dead; "X" - Tech Er	ror									
CONCENTRATION	100%	50%	25%	12.5%	6.25%	3.13%	1.56%	Control		
BROOD COUNT MEANS		22.6	25.6	29.9	24.6	19.2	19.8	28.9		
SD SD	7.9	10.8	7.7	4.5	13.0	10.3	8.3	9.0		
	7.0	, 0.0	7.7	7.0	10.0	10.0	0.0	0.0		

Client:	Nautilus En	vironmental																	
IRC ID#:	1402156				1														
Sample Name:	R3					-					1				1				
Sample Date:	25-Feb-14																		
Date Tested:	27-Feb-14							_							-				-
Duto Footour	27 1 00 14			_					-			-			-				
FRESH SOLUTIONS					+					OLD SOLUTI	ONE	-	-		_		-	-	
DISSOLVED OXYGEN							_	+		DISSOLVED		M			-			-	
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5		7	MIN	BEAT
100	10.1	10.1	9.9	10.0	9.2	9.7	0	9.2	10.1	100	_		_			6	1		MA)
50	8.8	9.0	8.9	8.8		_	-	8.6			7.2	7.5	7.3	7.5	7.5	7.0	-	7.0	7.5
					8.6	8.8			9.0	50	7.2	7.4	7.2	7.3	7.2	6.8		6.8	7.4
25	8.4	8.6	8.5	8.2	8.3	8.6		8.2	8.6	25	7.3	7.2	7.2	7.1	7.2	6.8		6.8	7.3
12.5	8.2	8.6	8.4	8.1	8.2	8.4		8.1	8.6	12.5	7.3	7.0	7.2	7.0	7.2	6.7		6.7	7.3
6.25	8.2	8.5	8.2	8.1	8.1	8.3		8.1	8.5	6.25	7.4	72	7.2	7.2	7.3	6.8		6.8	7.4
3.13	8.1	8.5	8.2	8.1	8.1	8.3		8.1	8.5	3.13	7.4	7.2	7.2	7.1	7.2	6.7		6.7	7.4
1.56	8.2	8.4	8.1	8.1	8.2	8.4		8.1	8.4	1.56	7.4	7.4	7.3	7.2	7.2	6.7		6.7	7.4
CONTROL	8.3	8.4	8.1	8.3	8.3	8.5		8.1	8.5	CONTROL	7.4	7.1	7.3	7.4	7.2	6.9		6.9	7.4
pН										pH									
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
100	7.6	7.7	7.7	7.6	7.7	7.6		7.6	7.7	100	8.0	8.1	8.1	8.0	8.1	8.0		8.0	8.1
50	7.7	7.8	7.8	7.8	7.8	7.8		7.7	7.8	50	7.8	8.0	8.0	7.9	7.9	7.9		7.8	8.0
25	7.7	7.8	7.9	7.8	7.8	7.8		7.7	7.9	25	7.8	8.0	7.9	7.8	7.8	7.8		7.8	8.0
12.5	7.7	7.9	7.9	7.9	7.9	7.9		7.7	7.9	12.5	7.7	7.9	7.8	7.7	7.8	7.7		7.7	7.9
6.25	7.8	7.9	8.0	7.9	7.9	7.9		7.8	8.0	6.25	7.7	7.9	7.8	7.7	7.8	7.7		7.7	7.9
3.13	7.8	7.9	8.0	7.9	7.9	7.9		7.8	8.0	3.13	7.7	7.9	7.8	7.7	7.7	7.7		7.7	7.9
1.56	7.8	7.9	8.0	7.9	7.9	7.9		7.8	8.0	1.56	7.7	7.9	7.8	7.6	7.7	7.7		7.6	7.9
CONTROL	7.8	7.8	8.0	7.8	7.9	7.9		7.8	8.0	CONTROL	7.7	7.8	7.8	7.6	7.7	7.7		7.6	7.8
CONDUCTIVITY										CONDUCT	VITY	-			100000				
DAY	0	1	2	3	4	5	6	MIN	MAX	DAY	1	2	3	4	5	6	7	MIN	MAX
100	629	624	639	625	635	631		624	639	100	630	629	640	628	641	636		628	641
50	416	417	419	414	419	417		414	419	50	419	424	426	421	425	425		419	426
25	299	296	299	298	301	301		296	301	25	301	302	302	303	305	305		301	305
12.5	234	229	233	235	238	236		229	238	12.5	236	234	236	239	242	240		234	242
6.25	202	198	200	205	206	202		198	206	6.25	205	201	203	207	209	205		201	209
3.13	185	181	183	187	190	186		181	190	3.13	188	185	186	191	193	189		185	193
1.56	177	172	174	178	183	178		172	183	1.56	179	176	178	182	184	181		176	184
CONTROL	169	168	165	174	176	168		165	176	CONTROL	175	171	173	180	177	176		171	180
AFTER WARMING	1																		
DAY	0	1	2	3	4	5	6	MIN	MAX					-					
Dissolved Oxygen	11.4	11.0	11.2	11.2	11.0	11.6		11	11.6										
Temperature	24.0	25.5	24.5	24.5	26.0	24.0		24	26										
pH	7.5	7.5	7.6	7.5	7.6	7.5		7.5	7.6										
Conductivity	638	618	641	639	638	639		618	641										
Conductivity	030	010	041	003	000	003		010	041										
Aeration:	20 min	20 min	20 min	20 min	20 min	20 min													
HARDNESS:																			
Sample	330	330	330	362	332	338		330	362										
Dilution Water	86	74	80	76	80	76		74	86										
Dilution vvater	86	/4	80	10	80	76		/4	86										

Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia IC24 and IC50

Report Date:

18 Mar-14 16:04 (p 1 of 2)

copore	-
Test Co	ode:

10	IV	HEAT	-	,,	*	•	υ.	·	_	, A	۲	•	U	4	-,
	4	5.	A	7	Qf	.	1	Я	1	n/	1	41	121	15	8

	, ,	ucai itep						Test	Code:		15-6796-1810/1402156
Cerioda	aphnia 7-c	Survival an	d Reprod	uction Te	st				IRC	ntegrate	d Research Consultants
Analysi	s No: 12	2-0946-5570	E	ndpoint:	Reproduction			CET	S Version:	CETIS	Sv1.6.6
Analyze	ed: 1	8 Mar-14 16:0)1 A	nalysis:	Nonlinear Re	gression		Offic	ial Results	: Yes	
Test Ru	ın No: 1	3-1595-1917	Te	est Type:	Reproduction	-Survival (7d))	Anal	yst: Ditt	y Chacko	
Start Da	ate: 2	7 Feb-14	P	rotocol:	EC/EPS 1/RN	A/21		Dilu	ent: Lat	oratory V	/ater
Ending	Date: 0	5 Mar-14	S	pecies:	Ceriodaphnia	dubia		Brin	e: Not	Applicab	le
Duratio	n: 60	d Oh	S	ource:	In-House Cult	ture		Age			
Sample		9-0880-0885		ode:	908800885			Clie		utilus	
		8 Mar-14 15:5		aterial:	Unknown			Proj	ect: Spe	ecial Stud	es
		3 Mar-14 15:5		ource:	R3						
Sample	Age: N	/A	S	ation:							
Non-Lin	near Regn	ession Optio	ns								
	unction					X Trans	form Y Tra		Veighting F		PTBS Function
3P Cum	ulative Lo	g-Normal EV	[Y=A*(1-	Φ(log(X/D)/C))]	None	None	N	lormal [W=1]	Off [Y*=Y]
Regress	sion Sum	mary									
Iters	Log LL	AICc	Adj R2	Optin	nize F Stat	Critical	P-Value	Decision	5%)		
23	-219.7	445.8	0.1437	Yes	2.335	2.342	0.0506	Non-Signi	ficant Lack	of Fit	
Point Es	stimates										
Level	Conc-%	95% LCL	95% UC	L	TU	95% LCL	95% UCL				
IC10	53.03	N/A	82.79		1.886	1.208	N/A				
IC15	59.57	N/A	90.95		1.679	1.099	N/A				
IC20	65.33	N/A	96.89		1.531	1.032	N/A				
IC25	70.72	N/A	101.5		1.414	0.9853	N/A				
IC40	86.36	61.5	114.5		1.158	0.8731	1.626				
IC50	97.39	71.93	131.9		1.027	0.7584	1.39				
Regress	sion Para	meters									
Paramet	ter	Estimate	Std Erro	or 95% L	.CL 95% UC	L t Stat	P-Value	Decision(5%)		
Α		24.66	1.261	22.15	27.17	19.56	0.0000	_	Parameter		
С		0.4744	0.3017	-0.126		1.572	0.1200	9	ficant Parar		
D		97.39	14.24	69.03	125.7	6.838	0.0000	Significant	Parameter		
ANOVA	Table								1		
Source		Sum Squa		ean Squa		F Stat	P-Value	Decision(- 7		
Model		1418.375		9.1877	2	7.631	0.0009	Significant			
Lack of F		998.6246		9.7249	5	2.335	0.0506	Non-Signi	icant		
Pure Em		6157.8		.525	72						
Residual	1	7156.425	92	.94058	77				_		
Residua	al Analysis	8									
Attribute		Method		***	Test Sta		P-Value	Decision(
Variance		Mod Level			0.9523 0.9068	2.14	0.4725 0.0000	Equal Vari	ances al Distributio	an.	
Distributi		Shapiro-W	IIK NOITIA	iity	0.9000				al Distribution	011	
	uction Su			_			culated Var				_
Conc-%		trol Type	Count	Mean	Min	Max 41	Std Err	Std Dev	CV%	Diff%	
0 1.56	Diluti	on Water	10	28.9 19.8	10	41 33	1.652 1.508	9.049 8.257	31.31% 41.7%	0.0% 31.49%	
3.13			10	19.0	6	32	1.887	10.34	53.84%	33.56%	
6.25			10	24.6	0	35	2.382	13.05	53.04%	14.88%	
12.5			10	29.9	18	34	0.823	4.508	15.08%	-3.46%	
25			10	25.6	16	34	1.407	7.706	30.1%	11.42%	
50			10	22.6	1	33	1.963	10.75	47.57%	21.8%	
100			10	11.8	0	25	1.434	7.857	66.59%	59.17%	

Report Date:

18 Mar-14 16:04 (p 2 of 2)

Test Code:

15-6796-1810/1402156

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analysis No: 12-0946-5570 Analyzed:

18 Mar-14 16:01

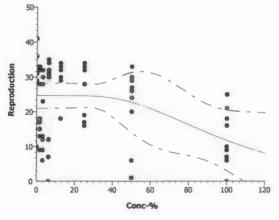
Endpoint: Reproduction

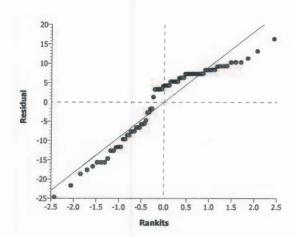
Analysis: Nonlinear Regression

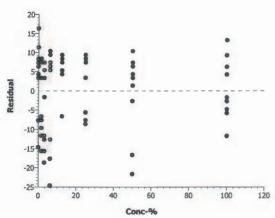
CETIS Version: CETISv1.6.6

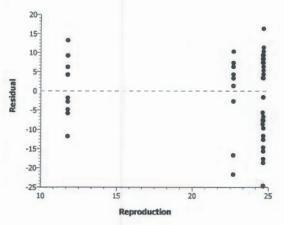
Official Results: Yes

Reproduc	tion Detail										
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	10	41	33	17	32	29	28	32	36	31
1.56		15	33	18	32	18	17	28	13	9	15
3.13		9	32	30	6	30	23	9	12	28	13
6.25		12	32	30	34	31	0	35	35	30	7
12.5		18	32	30	29	33	30	32	32	29	34
25		28	33	32	16	19	28	17	33	34	16
50		24	33	20	27	26	30	1	30	29	6
100		25	10	0	9	6	7	21	6	18	16









Report Date:

18 Mar-14 16:04 (p 1 of 2)

Test Code:

15-6796-1810/1402156

							Tes	t Code:		13-0780-1	B10/14021
Ceriodaphnia i	7-d Survival a	nd Repr	oduction Te	st				IRC	Integrated I	Research C	onsultant
Analysis No:	19-0206-185	3	Endpoint:	Reproduction			CET	IS Version	: CETISV	166	
Analyzed:	18 Mar-14 16		Analysis:	Nonparametri	c-Control vs	Treatments		cial Results			
Test Run No:	13-1595-191	7	Test Type:	Reproduction-	Survival (7d))	Ana	lyst: Dit	ty Chacko		
Start Date:	27 Feb-14		Protocol:	EC/EPS 1/RM			Dilu	•	boratory Wat	ter	
Ending Date:	05 Mar-14		Species:	Ceriodaphnia	dubia		Brin		t Applicable		
Duration:	6d 0h		Source:	In-House Cult			Age		r (ppiiodoio		
Sample No:	09-0880-088	5	Code:	908800885			Clie	nt: Na	utilus		
Sample Date:	18 Mar-14 15	:54	Material:	Unknown			Proj	ect: Sp	ecial Studies	5	
Receive Date:	18 Mar-14 15	:54	Source:	R3							
Sample Age:	N/A		Station:								
Data Transform	m	Zeta	Alt H	yp Monte C	arlo	NOEL	LOEL	TOEL	ΤU	PMSD	
Untransformed			C > T	Not Run		50	100	70.71	2	34.15%	
Steel Many-On	ne Rank Test										
Control	vs Conc-9	6	Test :	Stat Critical	Ties	P-Value	Decision	(5%)			
Dilution Water	1.56		79.5	74	4	0.1224	Non-Sign	ficant Effec	t		
	3.13		75.5	74	2	0.0647	Non-Signi	ificant Effec	t		
	6.25		98.5	74	2	0.7096	Non-Signi	ificant Effec	t		
	12.5		105.5	74	3	0.8843	Non-Signi	ificant Effec	t		
	25		94.5	74	4	0.5740	Non-Signi	ficant Effec	t		
	50		82	74	2	0.1735	Non-Signi	ficant Effec	t		
	100*		62.5	74	1	0.0041	Significan	t Effect			
ANOVA Table											
Source	Sum Sq	uares	Mean	Square	DF	F Stat	P-Value	Decision	(5%)		
Between	2417		345.2	357	7	4.037	0.0009	Significan	t Effect		
Error	6157.8		85.52	5	72						
Total	8574.79	804687	5 430.8	10707092285	79						
ANOVA Assum	nptions										
A 44-d b units											
Attribute	Test			Test Stat	Critical	P-Value	Decision(
Variances	Bartlett		of Variance	10.25	Critical 18.48	0.1751	Equal Var	iances			
Variances	Bartlett	Equality -Wilk No					Equal Var		on		
Variances Distribution	Bartlett Shapiro			10.25		0.1751	Equal Var	iances	on		
Variances Distribution Reproduction S Conc-%	Bartlett Shapiro Summary Contro! Type	-Wilk No	rmality	10.25 0.9544 95% LCL	18.48 95% UCL	0.1751 0.0062 Min	Equal Van Non-norm	iances al Distributio	Std Dev	CV%	Diff%
Variances Distribution Reproduction S Conc-% C	Bartlett Shapiro Summary	Coun	t Mean 28.9	10.25 0.9544 95% LCL 25.46	18.48 95% UCL 32.34	0.1751 0.0062 Min 10	Equal Van Non-norm Max 41	std Err	Std Dev 9.049	31.31%	0.0%
Variances Distribution Reproduction S Conc-% C 0	Bartlett Shapiro Summary Contro! Type	Coun	Mean 28.9 19.8	10.25 0.9544 95% LCL 25.46 16.66	18.48 95% UCL 32.34 22.94	0.1751 0.0062 Min	Max 41 33	iances al Distributio	Std Dev		
Variances Distribution Reproduction S Conc-% C 0	Bartlett Shapiro Summary Contro! Type	Coun	mality t Mean 28.9 19.8 19.2	10.25 0.9544 95% LCL 25.46	18.48 95% UCL 32.34	0.1751 0.0062 Min 10	Equal Van Non-norm Max 41	std Err	Std Dev 9.049	31.31%	0.0%
Variances Distribution Reproduction S Conc-% C 1.56 3.13	Bartlett Shapiro Summary Contro! Type	Coun	Mean 28.9 19.8	10.25 0.9544 95% LCL 25.46 16.66	18.48 95% UCL 32.34 22.94	0.1751 0.0062 Min 10 9	Max 41 33	Std Err 1.68 1.533	Std Dev 9.049 8.257	31.31% 41.7%	0.0% 31.49%
Variances Distribution Reproduction S Conc-% C 0	Bartlett Shapiro Summary Contro! Type	Coun 10 10 10	mality t Mean 28.9 19.8 19.2	10.25 0.9544 95% LCL 25.46 16.66 15.27	95% UCL 32.34 22.94 23.13	0.1751 0.0062 Min 10 9 6	Max 41 33 32	Std Err 1.68 1.533 1.919	Std Dev 9.049 8.257 10.34	31.31% 41.7% 53.84%	0.0% 31.49% 33.56%
Variances Distribution Reproduction S Conc-% C 1.56 3.13 6.25 12.5	Bartlett Shapiro Summary Contro! Type	Coun 10 10 10	28.9 19.8 19.2 24.6	95% LCL 25.46 16.66 15.27 19.64	95% UCL 32.34 22.94 23.13 29.56	0.1751 0.0062 Min 10 9 6	Max 41 33 32 35	Std Err 1.58 1.533 1.919 2.423	9.049 8.257 10.34 13.05 4.508	31.31% 41.7% 53.84% 53.04%	0.0% 31.49% 33.56% 14.88%
Variances Distribution Reproduction S Conc-%	Bartlett Shapiro Summary Contro! Type	Coun 10 10 10 10	mality t Mean 28.9 19.8 19.2 24.6 29.9	95% LCL 25.46 16.66 15.27 19.64 28.19	95% UCL 32.34 22.94 23.13 29.56 31.61	0.1751 0.0062 Min 10 9 6 0 18	Max 41 33 32 35 34	Std Err 1.58 1.533 1.919 2.423 0.8371	9.049 8.257 10.34 13.05	31.31% 41.7% 53.84% 53.04% 15.08%	0.0% 31.49% 33.56% 14.88% -3.46%

Report Date:

18 Mar-14 16:04 (p 2 of 2)

Test Cede:

15-6796-1810/1402156

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

Analysis No: Analyzed:

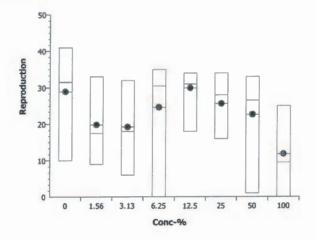
19-0206-1856 18 Mar-14 16:02 Endpoint: Reproduction

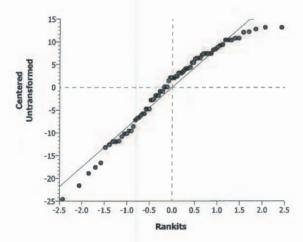
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.6.6
Official Results: Yes

Reproduction Detail Rep 4 Rep 5 Rep 6 Rep 7 Rep 8 Rep 9 Rep 10 Conc-% **Control Type** Rep 1 Rep 2 Rep 3 **Dilution Water** 1.56 3.13 6.25 12.5

Graphics





Ceriodaphnia dubia Bioassay Calculation Printouts 7 Day Chronic Ceriodaphnia LC₅₀

Report Date:

18 Mar-14 16:03 (p 1 of 2)

Test Code:

15-6796-1810/1402156

								Test	Code:		15-6796	1810/140215		
Cerioda	aphnia 7	-d Survival an	d Reproduc	ction Te	est				IRC In	tegrated	Research	Consultants		
Analys	is No:	10-2491-4294	End	point:	6d Survival Ra	te		CET	S Version:	CETIS	1.6.6			
Analyz		18 Mar-14 16:	01 Ana	lysis:	Linear Regress	sion (MLE)		Offic	ial Results:	Yes				
Test R	un No:	13-1595-1917	Tes	t Type:	Reproduction-S	Survival (7d)		Anal	yst: Ditty	st: Ditty Chacko				
Start D		27 Feb-14		tocol:	EC/EPS 1/RM/			Dilu		ratory Wa	ater			
Ending		05 Mar-14	Spe	cies:	Ceriodaphnia d	lubia		Brin		Applicable				
Duratio		6d 0h	•	ırce:	In-House Cultu			Age						
Sample	No:	09-0880-0885	Cos	ie:	908800885			Cile	nt: Nau	ilus				
		18 Mar-14 15:5	54 Mat	terial:	Unknown			Proj	ect: Spec	ial Studie	s			
		18 Mar-14 15:5		ırce:	R3									
Sample		N/A		tion:										
Linear	Regress	ion Options												
	Function			Thres	shold Option	Threshold	Optimized	Pooled	Het Corr	Weighte	ed			
Log-No	rmal [NE	D=A+B*log(X)]			ol Threshold	0	Yes	Yes	No	Yes				
Regres	sion Su	mmary												
Iters	LL	AICc	Mu	Sigma	a G Stat	Chi-Sq	Critical	P-Value	Decision(5%)				
5	-13.59	34.18	2.692	1.175		4.406	11.07	0.4926	Non-Signif		erogeneity			
Point E	stimates													
Level	Conc-		95% UCL		TU	95% LCL	95% UCL							
EC10	47.58	N/A	N/A		2,102	N/A	N/A		-					
EC15	92.35	N/A	N/A		1.083	N/A	N/A							
EC20	156.5	N/A	N/A		0.6392	N/A	N/A							
EC25	245.9	N/A	N/A		0.4067	N/A	N/A							
EC40	768.5	N/A	N/A		0.1301	N/A	N/A							
EC50	1525	N/A	N/A		0.08556	N/A	N/A							
Regres	sion Par	ameters												
Parame		Estimate	Std Error	95% L	CL 95% UCL	t Stat	P-Value	Decision(5%)					
Slope		0.851	0.5187	-0.165	6 1.868	1.641	0.1618	Non-Signi	ficant Param	eter				
Intercep	ot	2.291	0.8074	0.708	5 3.874	2.838	0.0364	Significant	Parameter					
Residua	al Analys	sis												
Attribut	te	Method			Test Stat	Critical	P-Value	Decision(5%)					
Extreme			xtreme Value	е	2.027	2.02	0.0468	Outlier De						
Distribu		Shapiro-V	Vilk Normalit	У	0.8586		0.1471	Normal Di	stribution					
6d Surv	rival Rate	Summary				Calcul	ated Variate	e(A/B)						
Conc-%	Co	ntrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	В		
0	Dili	ution Water	10	1	1	1	0	0	0.0%	0.0%	10	10		
1.56			10	1	1	1	0	0	0.0%	0.0%	10	10		
3.13			10	1	1	1	0	0	0.0%	0.0%	10	10		
6.25			10	0.9	0	1	0.05774	0.3162	35.14%	10.0%	9	10		
12.5			10	1	1	1	0	0	0.0%	0.0%	10	10		
25			10	1	1	1	0	0	0.0%	0.0%	10	10		
			40	0.9	0	4	0.05774	0.0400	25 4 40/	40 00/	0	40		
50			10	0.8	0	1	0.05774 0.07698	0.3162 0.4216	35.14% 52.7%	10.0%	9	10		

Report Date:

18 Mar-14 16:03 (p 2 of 2) 15-6796-1810/1402156

Test Code:

IRC Integrated Research Consultants

Ceriodaphnia 7-d Survival and Reproduction Test

Analyzed:

Analysis No: 10-2491-4294 18 Mar-14 16:01 Endpoint: 6d Survival Rate

Analysis: Linear Regression (MLE)

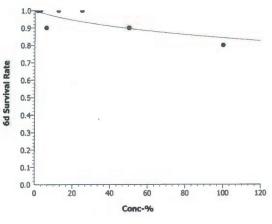
CETIS Version: Official Results: Yes

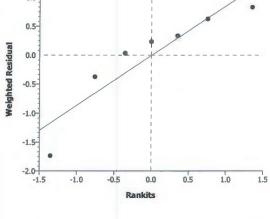
CETISv1.6.6

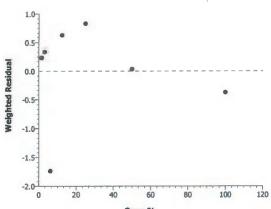
V	8	u	ł	v	141	ij

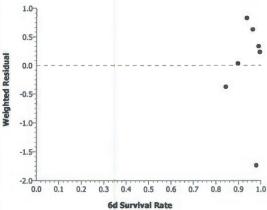
6d Survival	Rate	Detail
0	0	Aug I Trum

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.13		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	0	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	0	1	1	1
100		1	1	0	1	1	1	1	0	1	1









Report Date:

18 Mar-14 16:02 (p 1 of 2)

Test Code:

15-6796-1810/1402156

									Test Co	de:		15-6796-1	810/140215
Ceriodaphnia	7-d Survival a	nd Repr	oduction Te		1	RC In	tegrated	Research C	onsultants				
Analysis No: Analyzed:	18-0581-1198 18 Mar-14 16		Endpoint: Analysis:		urvival Ra 2x2 Cont	ate ingency Tai	bles		TIS Vers		CETISv Yes	1.6.6	
Test Run No:	13-1595-1917		Test Type:	Repr	roduction-	Survival (7	d)	Ana	alyst:	Ditty	Chacko		
Start Date:	27 Feb-14		Protocol:	EC/E	EPS 1/RM	/21		Dile	uent:	Labo	ratory Wa	iter	
Ending Date:	05 Mar-14		Species:	Cerio	odaphnia	dubia		Bri	ne:	Not A	pplicable		
Duration:	6d 0h		Source:	In-H	ouse Cult	ure		Age	9:				
Sample No:	09-0880-0885		Code:	9088	800885			Cli	ent:	Nauti	lus		
Sample Date:	18 Mar-14 15:	54	Material:	Unkr	nown			Pro	ject:	Spec	ial Studie	S	
Receive Date:	18 Mar-14 15:	54	Source:	R3									
Sample Age:	N/A		Station:						•				
Data Transfor	m	Zeta	Alt H	ур	Monte C	arlo	NOEL	LOEL	TOE	_	TU	PMSD	
Untransformed			C>T		Not Run		100	>100	N/A		1	N/A	
Fisher Exact/E	Bonferroni-Hol	m Test											
Control	vs Conc-%		Test S	tat I	P-Value	Decision	(0.05)						
Dilution Water	1.56		1	1	1	-	ificant Effect						
	3.13		1	1	•	_	ificant Effect						
	6.25		0.5	1	•	-	ificant Effect						
	12.5		1	1			ificant Effect						
	25		1	1			ificant Effect						
	50		0.5	1			ificant Effect						
	100		0.2368	3 1		Non-Sign	ificant Effect						
Data Summan	У												
	Control Type	No-Re			Total								
	Dilution Water	10	0		10								
1.56		10	0		10								
3.13		10	0		10								
6.25		9	1		10								
12.5		10	0		10								
25		10	0	1	10								
50		9	1	1	10								
100		8	2	1	10								
6d Survival Ra	te Detail												
	Control Type	Rep 1			Rep 3	Rep 4	Rep 5	Rep 6	Rep 7		Rep 8	Rep 9	Rep 10
	Dilution Water	1	1		1	1	1	1	1		1	1	1
1.56		1	1		1	1	1	1	1		1	1	1
3.13		1	1		1	1	1	1	1		1	1	1
6.25		1	1		1	1	1	0	1		1	1	1
12.5		1	1		1	1	1	1	1		1	1	1
					4	4		4	4		4		4

Report Date:

18 Mar-14 16:02 (p 2 of 2)

Test Code:

15-6796-1810/1402156

Ceriodaphnia 7-d Survival and Reproduction Test

IRC Integrated Research Consultants

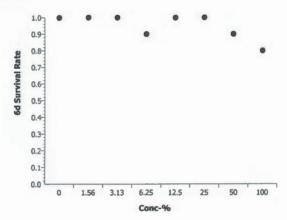
Analyzed:

Analysis No: 18-0581-1198 18 Mar-14 16:01 Endpoint: 6d Survival Rate

Analysis: STP 2x2 Contingency Tables

CETIS Version: CETISv1.6.6

Official Results: Yes



Report Date:

23 Apr-14 09:32 (p 1 of 2)

Test Code:

06-5160-2182/14 | 12-2209-7749

Ceriodaphnia	7-d Survival and	Reprodu	uction Te	est					Na	utilus Env	ironmenta						
Analysis ID:	10-2552-1083		dpoint:	6d Survival R			CETIS Version: CETISv1.8.7										
Analyzed:	23 Apr-14 9:31	An	alysis:	Untrimmed Sp	earman-Kärl	per	Offic	ial Results:	Yes								
Batch ID:	18-8869-1174	Te	st Type:	Reproduction-	Survival (7d)		Analyst: Emma Marus										
Start Date:	27 Feb-14	Pro	otocol:	EC/EPS 1/RM	1/21		Diluent: Laboratory Water										
Ending Date:	05 Mar-14	Sp	ecies:	Ceriodaphnia	dubia		Brin	9:									
Duration:	6d 0h	So	urce:	In-House Cult	ure		Age:										
Sample ID:	05-2872-4256		de:	1F83B120			Client: ALS										
	25 Feb-14 11:35		terial:	Effluent			Proj	ect:									
	27 Feb-14 10:30	So	urce:	ALS													
Sample Age:	36h (3.9 °C)	Sta	ation:	L1426336-6()	(3A)												
Spearman-Kär	ber Estimates																
Threshold Opt		reshold	Trim	Mu	Sigma		EC50	95% LCL									
Control Thresh	old 0		0.00%	1.639	0.04362		43.53	35.61	53.21								
6d Survival Ra	te Summary				Calcu	lated Varia	ate(A/B)										
C-% C	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	В						
0 N	egative Control	10	1	1	1	0	0	0.0%	0.0%	10	10						
3.13		10	1	1	1	0	0	0.0%	0.0%	10	10						
		10	1	1	1	0	0	0.0%	0.0%	10	10						
6.25	10 9		1	1	1	0	0	0.0%	0.0%	10	10						
12.5			1	1	1	0	0	0.0%	0.0%	9	9						
25		10	1	1	1	0	0	0.0%	0.0%	10	10						
50		10	0.3	0	1	0.1528	0.483	161.0%	70.0%	3	10						
100		10	0	0	0	0	0		100.0%	0	10						
6d Survival Ra	te Detail																
C-% C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10						
) Ne	egative Control	1	1	1	1	1	1	1	1	1	1						
1.56		1	1	1	1	1	1	1	1	1	1						
3.13		1	1	1	1	1	1	1	1	1	1						
6.25		1	1	1	1	1	1	1	1	1	1						
12.5		1	1	1	1	1	1	1	1	1							
25		1	1	1	1	1	1	1	1	1	1						
50		0	0	1	0	1	0	0	0	1	0						
100		0	0	0	0	0	0	0	0	0	0						
6d Survival Ra	te Binomials																
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10						
)	Negative Control		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1						
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1						
3.13		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1						
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1						
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1							
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1						
50		0/1	0/1	1/1	0/1	1/1	0/1	0/1	0/1	1/1	0/1						

Report Date:

23 Apr-14 09:32 (p 2 of 2)

Test Code:

06-5160-2182/14 | 12-2209-7749

Ceriodaphnia 7-d Surviv	al and Reproduction Test
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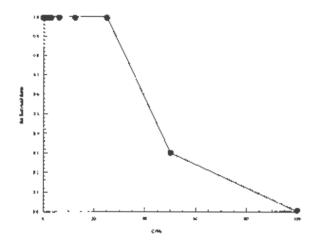
Nautilus Environmental

Analysis ID: Analyzed: 10-2552-1083 23 Apr-14 9 31 Endpoint: 6d Survival Rate

Analysis: Untrimmed Spearman-Karber

CETIS Version: CET Official Results: Yes

CETISv1.8.7



 $\begin{tabular}{ll} \textbf{Ceriodaphnia dubia Bioassay Calculation Printouts} \\ \textbf{Reftox $1C_{50}$} \end{tabular}$

Report Date:

18 Mar-14 16:28 (p 1 of 2)

Test Code:

12-0152-3261

								169	t Code.		12-0132-320
Ceriod	aphnia 7-d	Survival an	d Reprod	uction Tes	t				IRC In	tegrated	Research Consultants
Analys Analyz		-4477-0338 5 Mar-14 10:		•	Reproduction Nonlinear Reg	ression			TIS Version: cial Results:		Sv1.6.6
		-2489-0876			Reproduction-S				lyst:		
Start D		Feb-14 13:2			EC/EPS 1/RM/					ratory W	
		Feb-14 14:			Ceriodaphnia d n-House Cultu			Brin		Applicabl	le
Duratio	on: 60	1h	5	ource:	n-House Cult	ле		Age	1:		
Sample		-0089-8086		ode:	1300898086			Clie	nt: Inter	nal Lab	
		Feb-14 11:5			Sodium chlorid			Pro	ject: Spec	cial Studi	es
		Feb-14 11:5			Reference Tox	cicant					
Sample	e Age: N/	A	S	tation:							
		ession Optio	ons								
-	Function nulative Loc	-Normal EV	[Y=A*(1-	Φ(log(X/D)/	C))]	X Trans	form Y Tr		Weighting Fu Normal [W=1]		Off [Y*=Y]
	ssion Sum										
Iters	Log LL	AICc	Adj R2	Optimiz	ze F Stat	Critical	P-Value	Decision	(5%)		
6	-87.09	180.9	0.6237	Yes	0.4101	4.113	0.5260		ificant Lack o	f Fit	
Point E	stimates										
Level	Conc-arr	95% LCL	95% UC	L							
IC10	0.8703	N/A	1.124								
IC15	0.9536	N/A	1.215								
IC20	1.026	N/A	1.285								
IC25	1.091	0.7556	1.342								
IC40	1.277	1.089	1.474								
IC50	1.404	1.25	1.576								
Regres	sion Parar	neters									
Parame	eter	Estimate	Std Err	or 95% LC	L 95% UCL	t Stat	P-Value	Decision	(5%)		
A		29.8	1.253	27.26	32.34	23.78	0.0000		t Parameter		
С		0.3731	0.1463	0.07675		2.551	0.0150	_	t Parameter		
D		1.404	0.08842	1.225	1.583	15.88	0.0000	Significan	t Parameter		
ANOVA		0	44	6	DE	F Stat	P-Value	Decision	(59/)		
Source Lack of		Sum Squa 12.89863		ean Square .89863	DF 1	0.4101	0.5260	Non-Signi			
Model		2063.101		31.551	2	33.33	0.0000	Significan			
Pure Er	TOT	1132.4		.45555	36	00.00		9			
Residua		1145.299		.95402	37						
Residu	al Analysis										
Attribu	te	Method			Test Stat	Critical	P-Value	Decision	(5%)		
Varianc	:0S	Bartlett Ed			3.027	7.815	0.3876	Equal Var			
D'-4 "	4*			y of Variand		2.866	0.9214	Equal Var			
Distribu	tion	Shapiro-W	VIIK Norma	inty	0.9514		0.0844		istribution		
	luction Sur						culated Va				_
	m/L Cont		Count	Mean	Min	Max	Std Err	Std Dev	CV%	DHff%	
0	Dilutio	on Water	10	29	14	35	1.171	6.412	22.11%	0.0%	
0.375			10 10	30.6 28.4	18	37 33	1.202 0.6896	6.586 3.777	21.52% 13.3%	-5.52% 2.07%	
0.75 1.5			10	12.8	7	23	0.9499	5.203	40.65%	55.86%	
1.0			10	12.0	,	20	0.5455	0.200	40.0070	33.30 /6	

Report Date: Test Code:

18 Mar-14 16:28 (p 2 of 2)

12-0152-3261

Ceriodaphnia 7-d Survival and Reproduction Test

Analysis No: 09-4477-0338 05 Mar-14 10:15 Endpoint: Reproduction

Analysis: Nonlinear Regression

IRC Integrated Research Consultants

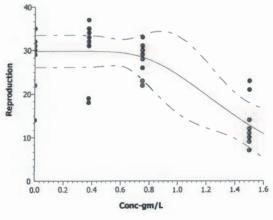
CETISv1.6.6 CETIS Version: Official Results: Yes

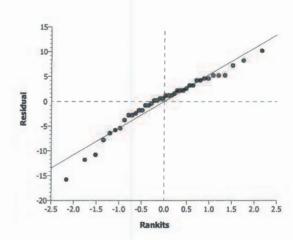
Reproc	iuction	Detail
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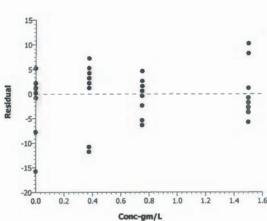
Conc-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	32	14	32	22	30	35	31	29	35	30
0.375		37	31	32	33	34	34	19	35	33	18
0.75		33	28	29	31	30	33	22	29	23	26
1.5		9	10	11	10	7	11	23	12	21	14

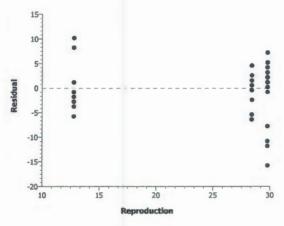
Graphics

Analyzed:









 $\begin{array}{c} \textit{Ceriodaphnia dubia Bioassay Calculation Printouts} \\ \textit{Reftox } LC_{80} \end{array}$

Report Date:

18 Mar-14 16:27 (p 1 of 1)

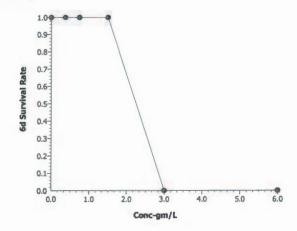
Test Code:

12-0152-3261

Ceriodaphnia	7-d Survival and Re	production Te	st			IRC In	tegrated Research Consultants					
Analysis No: Analyzed:	00-3619-3653 05 Mar-14 10:14	Endpoint: Analysis:	6d Survival Ra Binomial Meth			Version:	CETISv1.6.6 Yes					
Test Run No: Start Date: Ending Date: Duration:	20-2489-0876 19 Feb-14 13:27 25 Feb-14 14:55 6d 1h	Test Type: Protocol: Species: Source:	Reproduction- EC/EPS 1/RM Ceriodaphnia In-House Cult	I/21 dubia	Diluen	Analyst: Diluent: Laboratory Water Brine: Not Applicable Age:						
	13-0089-8086 27 Feb-14 11:50 27 Feb-14 11:50 N/A	Code: Material: Source: Station:	1300898086 Sodium chlori Reference To		Client: Projec		nal Lab ial Studies					
Binomial/Grap	hical Estimates											
Threshold Opt	tion Thres	hold Trim	Mu	Sigma	EC/LC50	95% LCL	95% UCL					
Control Thresh	old 0	0.00%	0.3266	0	2.121	1.704	2.641					
6d Survival Ra	te Summary			Calculated 1	Variate(A/B)							

6d Survival	Rate Summary										
Conc-gm/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	Α	В
0	Dilution Water	7	1	1	1	0	0	0.0%	0.0%	7	7
0.375		10	1	1	1	0	0	0.0%	0.0%	10	10
0.75		10	1	1	1	0	0	0.0%	0.0%	10	10
1.5		10	1	1	1	0	0	0.0%	0.0%	10	10
3		10	0	0	0	0	0		100.0%	0	10
6		10	0	0	0	0	0		100.0%	0	10

6d Survival Rate Detail Conc-gm/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 Rep 5 Rep 6 Rep 7 Rep 8 Rep 9 Rep 10 Dilution Water 0.375 0.75 1.5





Lemna minor Summary Sheet

			Cont Data. Foli	40 2011	
Client:	ALS		Start Date: Feb		
Work Order No.:	FFOLU		Set up by: _ <u>NW /</u>	7 JKA	
Sample Information	n:				
Sample (D:		R (0)			
Sample Date:	FRb 25 / 14 @ 1				
Date Received:	FRP 33 / 14 60 11	030h			
Sample Volume:	∴x 20L				
Test Organism Info		07 1914			
Age of culture (Day	•	9 days			
>8X growth in APH	A?:	<u> </u>			
KCI Reference Tox	(icant Results:				
Reference Toxicant	t ID:				
Date Initiated:	feb 20-1	2014			
7-d No. of Fronds IO	C50 (95% CL):	36 (32.42)			
7-d No. Fronds IC5	0 Reference Toxica	ant Mean (2 SD Range	e). 4 <u>4(35-55)</u>	_CV (%):	12

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v),(95% CL)	γ 47	747
	IC50 %(v/v) (95% CL)) 97	ን ባ ተ

Reviewed by: Date reviewed: Harch 24/14

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by:	IN /J	BF								
Sample ID:	RIO (L	1426336 - 1) (red))			114 @	1155h							
Work Order No.:	14077					Lemna min									
Culture Source:	CPCC #	490													
Test Culture Age:	9 10 days			> 8¥ Gro	wth? (Y/N):	Y									
Light Intensity Range:	11000	5600 IUX					1 14								
Light mensity range.	(000				measurea.	Feb 26 / 14									
Day	0	1	2	3	4	5	6	7							
Shelf Temp (°C)	25.0	26,0	2015	25.5	26.D	26.0	26.0	26.0							
Initials	JW	100	As	JBF	MC	MC	NC	SW							
Sample Characteristic Temperature (°C) DO (mg/L) pH Conductivity (µS)	9.8 7.3 310	Vater Quality		Aeration?: Nutrients added?:	20 min	→	Adjusted W 25.0 8.8 7.5	/ater Quality							
Concentra	tion	Temperat	ture (°C)	pl	Н		Conductivity	(µS)							
% (V/		Day 0	Day 7	Day 0	Day 7		0 h								
Control		24.0	25.0	8.4	8.4		878								
1.5		24.0	250	8.0	8-4		882								
3.0%		24.0	25.0	8.1	8-4		889								
6.1		24.0	25.0	8.1	8-5		896								
12.1		24.0	250	8.0	8-5		910								
24.2		24.0	250	8.0	8-6		940								
48.5		24.0	25.0	7.9	8.6		995								
97		25.0	25.0	JAPO 7.5	8.6		1)11								
Initials		JW/JBF	KJC	JW /JBF		JV									
		JW/JBF		JW /JBF		JW pH meter:	J/JBF								
Sample Description:	clear														
Reviewed:		Joh		_Date Review	ved:	Ha	rch 2	4/14							

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

																									_				
	Initials	7						\Box																	IJ				
	Ē	3					_	_	_	Ц	_					_				_	4	\dashv	Ц		4				
Start Date: Reb 78 / 14 ation Date: Motch 1 / 14 t set up by: 라이 1 28투	Соттепь																										- 1	ravan call	-
Start Date: Termination Date: Test set up by:	Loss of buoyancy															L												Dale Reviewed:	
S Terminat	Roof desiruction																											Dale F	
	Single																												
	Gibbosity																												
	Abnormal																												
	Yellow																												
(Red)	Necrosis																					Ŀ							
9	Chlarosis	L														Ľ													
	No. of fronds		<u> </u>	ī	8	19	88	E3	110	ઝુ	4	¥	53	82	똣	ģ	63	48	102	501	ትዜ	ජි	₽	8	8.1				
ALS R 10 (1.1476336 14076 7) } }	د	و.	و	Ç.	, a	S	s,ā	ب	د	-2	د.	9	ه.	ن	9	j.	ر	S	5	و	ت	ن	9		1	3	
ALS R 10 (1) 140367	Rep	⋖	ď	Ų	٥	4	മ	ب	٥	∢	m	ပ	0	<	m	U	۵	⋖	ம	၁	0	∢	80	O	۵				
Clent: Sample IO. Work Order#*	Concentration			conto-				:· -			Ŗ	8				.,				- 52				4 70		Comments		Reviewed by:	

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

1 1	(2)							\neg									_			\neg								
	Initials	ŝ		H			-	\dashv	>														ļ					
Start Date: Feb. 18 / 14 Test set up by: Div 7 28F	Соптеліѕ																											Maria 24/14
Start Date: ation Date: t set up by:	Lass of buoyency												L														i	Date Reviewed:
Start Date: Termination Date. Test set up by:	Root desloaction																											Dale R
	Single frands										L																	
	Gibbosity												Ĺ															
	Abnormal																											
	Yellow																											
Red)	Necrosis																											
	Chlorasis												i															
1 - 969	fronds Day 7	11.2	13	नुज्ञे	63	လို	(C.C.)	4€	63								Γ											
(1 1426336 · 1	No. of fronds Day 0 Day 7	.3	و	J	J	J	Ĵ	<u>ا</u> د	ړ																			15
ALS R 10 (1 R40313	Rep	∢	മ	ပ	0	۷	മ	U	۵	∢	æ	U	۵	∢	B	U	٥	₹	۵	U	D	⋖	8	Ų	۵			
Client: Sample ID. Work Order #	Concentration			़ <u>क</u>											_									_		Comments		Reviewed by:

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: Reb 28 / 14

Sample ID:

RID (L1426336 -1)

Termination Date: March 7/14

Work Order #:

FF041

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
	A	1	1226.70	1232. 78	NYISI
	В	2	1230.15	1235 · 74	
control	С	3	1250.72	1259 - 59	
	D	4	1232.33	1238. 58	- THE
(30%)	Α	5	1261.77	1266.11	
	В	6	1256.74	1263. 74	
1.5	С	7	1229.43	1238 · 17	
	D	8	1251.41	1260 · 43	2000
3827-20 ROMENTO	A	9	1245.20	1251 - 97	
JW	В	lo	1292.82	1297 . 93	
3. OK	С	11	1257.63	1264.06	
- Cate	D	12	1255.55	1258.96	
	A	13	1258.80	1265 - 50	
	В	14	1230.66	1234 . 24	
6.1	С	15	1244.97	1250 - 71	
00 1/2 1/2	D	llo	1267.45	1271.96	
	A	17	1249.89	1256 . 79	0.00
	В	18	126421	1272.27	
12.1	С	19	1244.09	1252.02	
	D	20	1250.86	1256 . 86	2012
	A	21	1254.30	1262 - 26	
	В	22	1231.23	1239 - 61	
24.2	С	23	1233,61	1240.99	
	D	24	1225.86	1233 • 42	Augustina de la compansión de la compans
52A4 An	Α	29	1237,05	1247 · 26	
	В	250	1212.28	1222.09	-
48.5	С	27	1228.74	1237 · 26	
V-7	D	28	1225.06	1230 - 93	1

Comments:	Reveighed gans	2-1235.83	11-1263.95	24-1233.24	
Reviewed by:	J64		Date Reviewed:	March 24/14	

7-d Lemna minor Weight Data Sheet

 Client:
 ALS
 Start Date:
 Feb 28 / 14

 Sample ID:
 R ID (L 1426336 - 1)
 Termination Date:
 March 7 / 14

 Work Order #:
 14077

Concentration % (V/V)	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
10 (17)	Α	29	1239.67	1244 . 39	NY1:
	В	30	1235.43	1244 . 33	
97	С	31	1234.41	1240.60	
	D	32	1264.15	1269.57	V-
1000	A				
	В				
	С				-
	D				
S SAY ITS	A	- mediates	DE MEHRO III BAN AN AV	2000	
	В				
	С				
205-000 SV6	D	5822			
	A		50504m285 10500 member	- 1800 DOM:	
	В				
	С				
- 1.	D	-	MANA NA XATE AT	S - 188 - 1884 - 18	F-12 1000000
	A				
	В				
	С				
- Valoria la de	D				NA MANAGEMENT
	A				
	В				
	С				
	D	10.000			
	A				
	В				
	С				
0.00	D				

Comments:				-
Reviewed by:	Jou	Date Reviewed:	March 24/19	f

Report Date: Test Code: 26 Mar-14 08:44 (p 1 of 2) 14077a | 00-2731-5173

								Test	Code:	14077	a 00-2731-5173
Lemna Gro	owth Inh	ibition Tes	t							Nautilus	Environmental
Analysis II Analyzed:		7897-2806 Mar-14 8 :42		dpoint: alysis:	Frond Count Nonlinear Reg	ression			IS Version		
Batch ID:	18-	7938-8836	Tes	st Type:	Lemna Growth			Anal	yst: Jes	slin Wijaya	
Start Date:	28 1	Feb-14		otocol:	EC/EPS 1/RM			Dilu	ent: AP	HA (modified)	
Ending Da	te: 07 l	Mar-14	Sp	ecies:	Lemna minor			Brin	e:		
Duration:	7d			urce:	CPCC#490			Age	9d		
Sample ID	. 00-	4133-3542	Co	de:	276B326			Clie	nt: AL	S	
-		Feb-14 15:0		terial:	Effluent			Proj		•	
		Feb-14 10:3		urce:	ALS			110	001.		
Sample Ag			- 10	tion:	L1426336-1(R	10)					
		sion Optio	ons				-		1		
Model Fun	_	•				X Trans	sform Y	Transform V	Veiahtina I	Function	PTBS Function
		Y=A*exp(lo	g(0.5)*X/D)]		None			Iormal [W=		Off [Y*=Y]
Regressio	n Summ	arv									
	og LL	AICc	BIC	Adj I	R2 Optimize	F Stat	Critica	l P-Value	Decision	n(a:5%)	
	08.7	221.8	224.4	, adj 1	Yes	2.157	2.508	0.0836		nificant Lack of Fit	
Point Estir							+		-3		
Level %		95% LCL	95% UCI	. TU	95% LCL	95% UCL					
	1670000		N/A		0031 NA	NA)		-			
	5060000		N/A		0015 NA	NA /					
	0030000		N/A		0009 NA	NA					
	3780000		NZA		0007 NA	NA >	>02	(V/V)			
	7760000		N/A		0005 NA	NA	777	Joh			
	1540000		N/A		0003 NA	NA					
	2800000		N/A		0002 NA	NA J					
			19/74	0.000	0002 144	147. 0	+		-		
Regression			0.15	0.000	01 050/1101	4.04-4	D1/-1	D. Island	. I mars		
Parameter		Estimate	Std Erro			18.53	P-Valu				
A D		77.19 4.28F+08	4.166 3.60E+14	69.02		1.19E-06	<0.000		t Paramete ficant Para		
ANOVA Ta	41-	4.20L 100	5.00L · 1-	7.12	7.002.14	1.132-00	1.0000	Hon-oigin	mount i dia	meter	
	DIE	Cum Cau	ome Me	an Squa	re DF	F Stat	P-Valu	e Decision	(m: 59/.)		
Source Model		Sum Squa	0	an oque	1	0	1.0000				
Lack of Fit		3682.963		3.8271	6	2.157	0.0836	-			
Pure Error		6830.75		.6146	24	2.137	0.0030	Non-Signi	licant		
Residual		10513.71).4571	30						
Residual A	nalvsis						+				
Attribute	yolo	Method			Test Stat	Critical	P-Valu	e Decision	(a:£%)		
Variances			uality of Va	ariance	7.67	14.07	0.3626				
			ne Equality			2.423	0.6732				
Distribution			/ilk W Nom		0.9598	0.9338	0.2709				
			Darling A2	-		2.492	0.2837		istribution		
Frond Cou	int Sumr	nary				Ca	lculated	Variate			
C-%		ol Type	Count	Mean	Min	Max	Std Er	r Std Dev	CV%	%Effect	
0		ve Control	4	70.5	65	79	3.227	6.455	9.16%	0.0%	
1.5	9-7-		4	85.5	55	104	11.27	22.55	26.37%	-21.28%	
3			4	68	47	90	8.841	17.68	26.0%	3.55%	
6.1			4	61	43	82	8.073	16.15	26.47%	13.48%	
12.1			4	88	68	99	6.988	13.98	15.88%	-24.82%	
24.2			4	86.5	81	92	2.901	5.802	6.71%	-22.7%	
48.5			4	91.25		107	10.73	21.45	23.51%	-29.43%	
40.5			4	60.5	52	107	10.73	21.40	24.00/	4 420/	

10.77

21.55

31.0%

1.42%

Analyst: JW

100

69.5

52

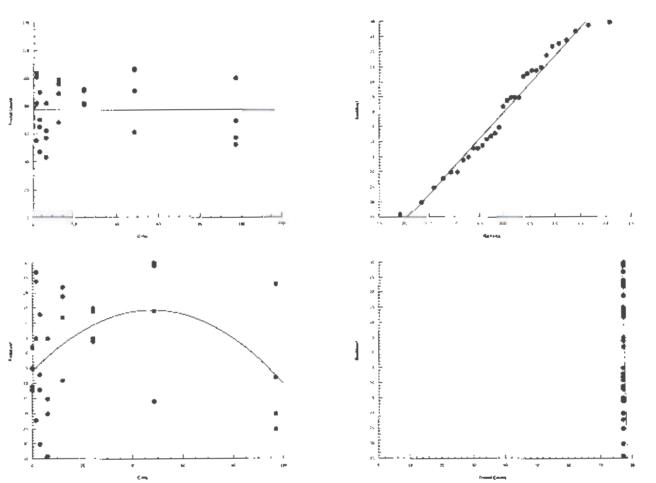
97

Report Date: Test Code: 26 Mar-14 08:44 (p 2 of 2) 14077a | 00-2731-5173

						1000000	110,10,100,000
Lemna Gro	wth Inhibition Tes	t					Nautilus Environmental
Analysis ID Analyzed:	: 17-7897-2806 26 Mar-14 8:42		dpoint: Fri alysis: No	ond Count onlinear Reg	gression	CETIS Version: Official Results:	CETISv1.8 7 Yes
Frond Cour	nt Detail						
C-%	Control Type	Rep.1	Rep 2	Rep 3	Rep 4		_
0	Negative Control	72	66	65	79		
15		55	82	101	104		
3		90	65	70	47		
61		82	43	62	57		
12 1		89	96	99	68		
24 2		92	91	82	81		
48.5		106	107	91	61		
97		52	100	69	57		

Graphics

2P Exponential EV [Y=A*exp(log(0.5)*X/D)]



Report Date: Test Code: 26 Mar-14 08:44 (p 1 of 2) 14077a | 00-2731-5173

Lemna Growth	n Inhibition Test										Na	autilus Env	ironmenta		
Analysis ID: Analyzed:	08-0763-0945 26 Mar-14 8:42		Endpoint: Analysis:		nd Count ametric-Con	itrol vs 1	rea	tments		S Version		1.8.7			
Batch ID: Start Date: Ending Date: Duration:	18-7938-8836 28 Feb-14 07 Mar-14 7d 0h		Test Type: Protocol: Species: Source:	Species: Lemna minor		37			Anal Dilu Brin Age	ent: AF	slin Wijaya PHA (Modi	iried)			
Sample ID:	00-4133-3542		Code:	276	B326				Clie	nt: AL	S				
•	25 Feb-14 15:00)	Material:		uent				Proj						
	27 Feb-14 10:30		Source:	ALS	3										
Sample Age:			Station:	L14	26336-1(R1	0)									
Data Transform	m	Zeta	Alt H	lyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU		
Untransformed		NA	C < T		NA	NA			42.0%	97	>97	NA	1.031		
Dunnett Multip	ple Comparison	Test													
Control	vs C-%		Test	Stat	Critical	MSD	DF	P-Value	P-Type	Decisio	n(α:5%)				
Negative Contr	ol 1.5		1.257		2.482	29.61	6	0.3649	CDF	Non-Sig	nificant Effect	t			
	3		-0.209	96	2.482	29.61	6	0.9197	CDF	Non-Sig	nificant Effect	t			
	6.1		-0.796	64	2.482	29.61	6	0.9821	CDF	Non-Sig	nificant Effect	t			
	12.1		1.467		2.482	29.61	6	0.2802	CDF	Non-Sig	nificant Effect	t			
	24.2		1.341		2.482	29.61	6	0.3297	CDF	Non-Sig	nificant Effect	t			
	48.5		1.739		2.482	29.61	6	0.1890	CDF	Non-Sig	nificant Effect	t			
	97		-0.083	383	2.482	29.61	6	0.8947	CDF	Non-Sig	nificant Effect	at			
ANOVA Table															
Source			Mean	Squ	are	DF		F Stat	P-Value	Decision	Decision(a:5%)				
Between	3679.219		525.6027		7		1.847	0.1241	Non-Sig	nificant Effect	t				
Error	6830.75		6830.75 284.61		284.6146					_					
Total	10509.97					31									
Distributional	Tests														
Attribute	Test				Test Stat	Critica	ıl	P-Value	Decision	(a:1%)					
Variances	Bartlett Ed	uality	of Variance		7.67	18.48		0.3626	Equal Va	riances					
Distribution	Shapiro-W	/ilk W	Normality		0.9766	0.9081		0.6962	Normal D	istribution					
Frond Count S	Summary														
C-%	Control Type	Coun	t Mean		95% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effect		
	Negative Control	4	70.5		60.23	80.77		69	65	79	3.227	9.16%	0.0%		
1.5		4	85.5		49.62	121.4		91.5	55	104	11.27	26.37%	-21.28%		
3		4	68		39.86	96.14		67.5	47	90	8.841	26.0%	3.55%		
6.1		4	61		35.31	86.69		59.5	43	82	8.073	26.47%	13.48%		
12.1		4	88		65.76	110.2		92.5	68	99	6.988	15.88%	-24.82%		
24.2		4	86.5		77.27	95.73		86.5	81	92	2.901	6.71%	-22.7%		
48.5		4	91.25		57.11	125.4		98.5	61	107	10.73	23.51%	-29.43%		
97		4	69.5		35.21	103.8		63	52	100	10.77	31.0%	1.42%		
Frond Count D	Detail														
C-%	Control Type	Rep 1	Rep 2	2	Rep 3	Rep 4		1							
0	Negative Control	72	66		65	79									
1.5		55	82		101	104									
3		90	65		70	47									
6.1		82	43		62	57									
12.1		89	96		99	68									
24.2		92	91		82	81									
		106	107		91	61									
48.5															
97		52	100		69	57									

Report Date: Test Code:

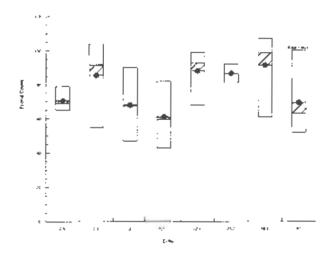
26 Mar-14 08:44 (p.2 of 2) 14077a | 00-2731-5173

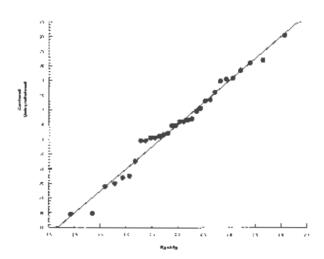
Nautilus Environmental Lemna Growth Inhibition Test

Analysis ID: 08-0763-0945 Endpoint: Frond Count CETIS Version: Parametric-Control vs Treatments Analyzed: 26 Mar-14 8:42 Analysis:

Official Results: Yes

CETISv1.8.7





Report Date: Test Code: 26 Mar-14 08:44 (p 1 of 2) 14077a | 00-2731-5173

emna	Growth	Inhibition Tes	t							Nautilus Environmenta
					Total Day Mais	iht		CE	TIC Varrian	
Analys Analyz		10-1135-1669 26 Mar-14 8:43		dpoint: Total Dry Weight-mg alysis: Linear Interpolation (ICPIN)		1		TIS Version icial Results		
Batch	ID:	18-7938-8836	Tes	st Type:	Lemna Growth EC/EPS 1/RM/37			Ana	alyst: Jes	slin Wijaya
Start D	ate:	28 Feb-14	Pro	otocol:				Dile	uent: AP	HA (modified)
Ending	Date:	07 Mar-14	Sp	ecies:	Lemna minor			Bri	ne:	
Duratio	on:	7d Oh	So	urce:	CPCC#490			Age	9d	
Sample	e ID:	00-4133-3542	Co	de:	276B326			Clie	ent: AL	S
Sample	e Date:	25 Feb-14 15:0	0 M a	terial:	Effluent			Pro	ject:	
Receiv	e Date:	27 Feb-14 10:3	so So	urce:	ALS					
Sample	e Age:	57h (3.6 °C)	Sta	tion:	L1426336-1(R	10)				
inear	Interpo	lation Options								
K Trans	sform	Y Transform	n Se	ed	Resamples	Exp 95%		thod		
Log(X+	1)	Linear	139	91191	200	Yes	Twe	o-Point Inter	polation	
Point E	Estimate	es								
Level	%	95% LCL	95% UCI	. TU	95% LCL	95% UCL				
C5	84.87	N/A	N/A	1.178	NA	NA				
C10	>97	N/A	N/A	<1.03	1 NA	NA				
C15	>97	N/A	N/A	<1.03	1 NA	NA				
C20	>97	N/A	N/A	<1.03	1 NA	NA				
C25	>97	N/A	N/A	<1.03	1 NA	NA				
C40	>97	N/A	N/A	<1.03	1 NA	NA				
C50	>97	N/A	N/A	<1.03	1 NA	NA				
Total D	ry Weig	ht-mg Summar	ry			Cal	culated V	'ariate		
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
)	N	egative Control	4	5.698	4.87	6.25	0.3093	0.6186	10.86%	0.0%
1.5			4	7.275	4.34	9.02	1.076	2.151	29.57%	-27.69%
3			4	5.43	3.41	6.77	0.7626	1.525	28.09%	4.7%
5.1			4	5.132		6.7	0.6846	1.369	26.68%	9.92%
2.1			4	7.223		8.06	0.4831	0.9662	13.38%	-26.77%
24.2			4	7.71	6.94	8.38	0.3064	0.6128	7.95%	-35.32%
18.5			4	8.602		10.21	0.9796	1.959	22.77%	-50.99%
97			4	6.307	4.72	8.9	0.9148	1.83	29.01%	-10.71%
	ry Weig	ht-mg Detail								
C-%		ontrol Type	Rep 1	Rep 2		Rep 4				
)	Ne	egative Control	6.08	5.59	4.87	6.25				
.5			4.34	7	8.74	9.02				
3			6.77	5.11	6.43	3.41				
3.1			6.7	3.58	5.74	4.51				
2.1			6.9	8.06	7.93	6				
24.2			7.96	8.38	6.94	7.56				
18.5			10.21	9.81	8.52	5.87				
97			4.72	8.9	6.19	5.42				

Lemna Growth Inhibition Test

Report Date:

26 Mar-14 08.44 (p 2 of 2) 14077a | 00-2731-5173

Test Code:

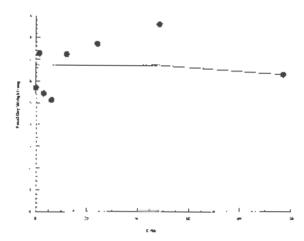
Nautilus Environmental

Analysis ID: Analyzed:

10-1135-1669 26 Mar-14 8:43

Endpoint: Total Dry Weight-mg Analysis: Linear Interpolation (ICPIN) CETIS Version: Official Results: Yes

CETISV1 8.7



Report Date:

26 Mar-14 08:44 (p 1 of 2)

Test Code: 14077a | 00-2731-5173

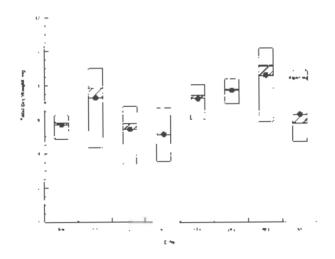
Leillia Olowa	h Inhibition Test									Na	autilus Env	ironmen				
			F-1l-4	Tet	al Day Mainh	4		CET	IS Version							
Analysis ID: Analyzed:	04-0148-6424 26 Mar-14 8:43		Endpoint: Analysis:		al Dry Weigh ametric-Con		tments		ial Result		1.0.7					
Batch ID:	18-7938-8836		Test Type:	Len	nna Growth			Anal	yst: Jes	slin Wijaya						
Start Date:	28 Feb-14		Protocol:	EC/	EPS 1/RM/3	37	Diluent: APHA (modified)									
Ending Date:	07 Mar-14		Species:	Len	nna minor			Brin	e:							
Duration:	7d Oh		Source:	CPO	CC#490			Age	9d							
Sample ID:	00-4133-3542		Code:	276	B326			Clie	nt: AL	S						
Sample Date:	25 Feb-14 15:00)	Material:	Efflu	uent			Proj	ect:							
Receive Date:	27 Feb-14 10:30)	Source:	ALS	3					ι						
Sample Age:	57h (3.6 °C)		Station:	L14	26336-1(R1	0)										
Data Transfor		Zeta	Alt H		Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU				
Untransformed	1	NA	C < T		NA	NA		45.8%	24.2	48.5	34.26	4.132				
Dunnett Multip	ple Comparison	Test														
Control	vs C-%		Test	Stat			P-Value	P-Type	Decision							
Negative Contr			1.5		2.482	2.611 6	0.2681	CDF	-	nificant Effect						
	3		-0.254		2.482	2.611 6	0.9275	CDF	_	nificant Effect						
	6.1		-0.537	71	2.482	2.611 6	0.9637	CDF		nificant Effect						
	12.1		1.45		2.482	2.611 6	0.2868	CDF	_	nificant Effect						
	24.2		1.913		2.482	2.611 6	0.1429	CDF		nificant Effect	t					
	48.5*		2.762		2.482	2.611 6	0.0280	CDF	Significa							
	97		0.579	8	2.482	2.611 6	0.6737	CDF	Non-Sign	nificant Effec	at .					
ANOVA Table																
Source	Sum Squares Mean		_	are	DF	F Stat	P-Value	Decision(α:5%)								
Between	41.86441					7	2.702	0.0325	Significa	nt Effect						
Error	53.11691									24	-					
Total	94.98132					31										
Distributional	Tests															
	Test				Test Stat	Critical	P-Value	Decision(
Attribute	Test Bartlett Eq		of Variance		Test Stat 7.484	Critical	P-Value 0.3803	Decision Equal Var		-						
Attribute Variances	Test								iances							
Attribute Variances Distribution	Test Bartlett Eq	/ilk W I			7.484	18.48	0.3803	Equal Var	iances							
Attribute Variances Distribution Total Dry Weig	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	/ilk W I	Normality t Mean		7.484 0.9799 95% LCL	18.48 0.9081 95% UCL	0.3803 0.7959 Median	Equal Var Normal Di	iances	Std Err	CV%					
Attribute Variances Distribution Total Dry Weig	Test Bartlett Eq Shapiro-W	/ilk W I	t Mean 5.698		7.484 0.9799 95% LCL 4.713	18.48 0.9081	0.3803 0.7959	Equal Var Normal Di Min 4.87	iances stribution Max 6.25	0.3093	10.86%	0.0%				
Attribute Variances Distribution Total Dry Weig C-%	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	/ilk W I	t Mean 5.698 7.275		7.484 0.9799 95% LCL 4.713 3.852	18.48 0.9081 95% UCL 6.682 10.7	0.3803 0.7959 Median 5.835 7.87	Equal Var Normal Di Min 4.87 4.34	max 6.25 9.02	0.3093 1.076		0.0%				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	County	t Mean 5.698 7.275 5.43		7.484 0.9799 95% LCL 4.713 3.852 3.003	18.48 0.9081 95% UCL 6.682 10.7 7.857	0.3803 0.7959 Median 5.835 7.87 5.77	Equal Var Normal Di Min 4.87	Max 6.25 9.02 6.77	0.3093	10.86% 29.57% 28.09%	0.0% -27.69° 4.7%				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	County 4	t Mean 5.698 7.275 5.43 5.132		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311	0.3803 0.7959 Median 5.835 7.87 5.77 5.125	Min 4.87 4.34 3.41 3.58	Max 6.25 9.02 6.77 6.7	0.3093 1.076 0.7626 0.6846	10.86% 29.57%	0.0%				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	County 4 4 4	t Mean 5.698 7.275 5.43 5.132 7.223		7.484 0.9799 95% LCL 4.713 3.852 3.003	18.48 0.9081 95% UCL 6.682 10.7 7.857	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415	Min 4.87 4.34 3.41 3.58 6	Max 6.25 9.02 6.77 6.7 8.06	0.3093 1.076 0.7626 0.6846 0.4831	10.86% 29.57% 28.09%	0.0% -27.69° 4.7% 9.92%				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	County 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311	0.3803 0.7959 Median 5.835 7.87 5.77 5.125	Min 4.87 4.34 3.41 3.58	Max 6.25 9.02 6.77 6.7	0.3093 1.076 0.7626 0.6846	10.86% 29.57% 28.09% 26.68%	0.0% -27.69° 4.7% 9.92% -26.77°				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	Count 4 4 4 4 4	t Mean 5.698 7.275 5.43 5.132 7.223		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831	10.86% 29.57% 28.09% 26.68% 13.38%	0.0% -27.69' 4.7% 9.92% -26.77' -35.32'				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5	Test Bartlett Eq Shapiro-W ght-mg Summary Control Type	Count 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76	Min 4.87 4.34 3.41 3.58 6 6.94	Max 6.25 9.02 6.77 6.7 8.06 8.38	0.3093 1.076 0.7626 0.6846 0.4831 0.3064	10.86% 29.57% 28.09% 26.68% 13.38% 7.95%	0.0% -27.69' 4.7% 9.92% -26.77' -35.32' -50.99'				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5	Test Bartlett Ed Shapiro-W ght-mg Summary Control Type Negative Control	Count 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69° 4.7% 9.92% -26.77° -35.32° -50.99°				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-%	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69' 4.7% 9.92% -26.77' -35.32' -50.99'				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-%	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69' 4.7% 9.92% -26.77' -35.32' -50.99'				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69 4.7% 9.92% -26.77 -35.32 -50.99				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307 Rep 2 5.59		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69 4.7% 9.92% -26.77 -35.32 -50.99				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307 Rep 2 5.59 7		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396 Rep 3 4.87 8.74	95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219 Rep 4 6.25 9.02	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69 4.7% 9.92% -26.77 -35.32 -50.99				
Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5 3 6.1	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 6.08 4.34 6.77 6.7	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307 Rep 2 5.59 7 5.11 3.58		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396 Rep 3 4.87 8.74 6.43 5.74	95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219 Rep 4 6.25 9.02 3.41	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69° 4.7% 9.92% -26.77° -35.32° -50.99°				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5 3 6.1 12.1 12.1	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 6 6 7 7 6 . 7 6 . 9	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307 Rep 2 5.59 7 5.11 3.58 8.06		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396 Rep 3 4.87 8.74 6.43 5.74 7.93	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219 Rep 4 6.25 9.02 3.41 4.51 6	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	0.0% -27.69° 4.7% 9.92% -26.77° -35.32° -50.99°				
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-%	Test Bartlett Eg Shapiro-W ght-mg Summary Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 6.08 4.34 6.77 6.7	Mean 5.698 7.275 5.43 5.132 7.223 7.71 8.602 6.307 Rep 2 5.59 7 5.11 3.58		7.484 0.9799 95% LCL 4.713 3.852 3.003 2.954 5.685 6.735 5.485 3.396 Rep 3 4.87 8.74 6.43 5.74	18.48 0.9081 95% UCL 6.682 10.7 7.857 7.311 8.76 8.685 11.72 9.219 Rep 4 6.25 9.02 3.41 4.51	0.3803 0.7959 Median 5.835 7.87 5.77 5.125 7.415 7.76 9.165	Min 4.87 4.34 3.41 3.58 6 6.94 5.87	Max 6.25 9.02 6.77 6.7 8.06 8.38 10.21	0.3093 1.076 0.7626 0.6846 0.4831 0.3064 0.9796	10.86% 29.57% 28.09% 26.68% 13.38% 7.95% 22.77%	-27.699 4.7%				

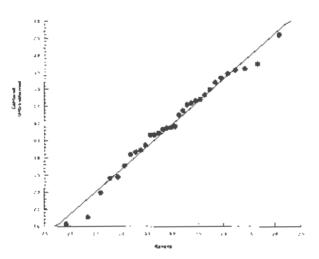
Report Date: Test Code: 26 Mar-14 08:44 (p 2 of 2) 14077a | 00-2731-5173

Lemna Growth Inhibition Test
Nautilus Environmental

Analysis ID: 04-0148-6424 Endpoint: Total Dry Weight-mg CETIS Version: CETIS v1 8.7

Analyzed: 26 Mar-14 8.43 Analysis: Parametric-Control vs Treatments Official Results: Yes





Lemna minor Summary Sheet

Client:	
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Sample Information:

Test Organism Information:

Culture Date:

Age of culture (Day 0):

>8X growth in APHA?:

KCI Reference Toxicant Results:

Reference Toxicant ID:

Date Initiated:

7-d No. of Fronds IC50 (95% CL):

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 44 (3 5 - 5 5) CV (%):





Test Results.

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	७ ०३	ን 97
IC50 %(v/v) (95% CL)	797	? प ्र ा

Reviewed by:

Date reviewed:

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14,	. r &.	26/14
	11 - 67	- 6 1 ide

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client:	ALS				Setup by:	JW / 31	BF	
Sample ID:	NF-1	(L 1426336	- 2) (pu	rple)	Test Date:	Feb 28	114 @	1200h
Work Order No.:	14077				st Species:			
Culture Source:	CPCC #	490						
	9 10 day	S		> 8X Gro	owth? (Y/N):	Y		
Light Intensity Range:		5600 lux			Measured:		/ 14	
Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	20,0	255	25.5	26.0	26.0	26.0	26.6
Initials	SW	An	B	JBF	JW	JW	JIN	JW
Sample Characteristics Temperature (°C) DO (mg/L) pH Conductivity (µS)	24.5 10.8 7.2 322	Water Quality		Aeration?: Nutrients added?:	20 min	·	8.9 7.5	later Quality
Concentrati	on	Tempera	ture (°C)	р	Н	(Conductivity	(µS)
% (V/V)		Day 0	Day 7	Day 0	Day 7		0 h	
Control		24.0	25.0	8.4	84		878	3
1.5		24.0	25.0	8.1	8-5		887	
3.08		24.0	25.0	8.1	8-4		889	
6.1		25.0	25.0	8.1	8-5		896	
12.1		25.0	25.0	8.1	8.3		910	
24.2		25.0	25.0	8.0	8.3		939	
48.5		25.0	25.0	7.9	8.5		998	
97		25.0	25.0	7.5	8.6	1	114	
Initials		JW / JBF	FJ.	JW /JBF			/JBF	
Thermometer: Sample Description: Comments:	Calibrated	Thermometer	Cond. Meter:	c-2		pH meter:	PH-2	
Reviewed:	(16h		Date Review	ved:	Ma	erch 25	-/14

Nautilus Environmental

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client	3									š	art Date:	Start Date: Reb 28 / Na	
<u></u>	T 芝	1 [1435336	336-2	_	(endina)					Termination Date:	on Date	WGYCF 7 / 14	
11	14033	,								Tests	Test set up by: Jw	JW / J&F	
						i							
noilespeadono	Den	\vdash	No. of fronds	Chloroeic	Necrosis	کارا عدالع	Abnormal	Gibboeik	Single	_	Loss of	Comments	initials
\$\psi (\sigma/\sigma) \\ \psi	<u> </u>	Day 0		5.50.0010	51501354		32 IS	o coccany	fronds	destruction	buoyanty		2
	⋖	ري ا	26.7			7							188
	æ	1				x							_
COMPO	ပ	J	57			×							
	٥	و	 40							ĺ			
	∢	c)	36										_
	a	9	25										
g.	O	Ç	65										
_	a	9	10.4										
	4	7	7.2			×							
3.5	Ф	C	20			Ķ							
3.04	ပ	.0	83										
	_	į į	73			×							
	∢	ى),3		×	×							
	8	c3	62		×	×							
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	∢	9	36										_
	В	9	57										_
24.2	O	S	.54			×		i					- ~
		0	67										>
Comments:							i						
		7										100	
Reviewed by:		3								Date R	Date Reviewed:	Maria 63/14	

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

			_		_	_					ŗ	_		_	_				_			_		_	_		ı	ı	
.	Initials	ķ	4			_		_	-																				
	<u> </u>		Н	Н	Н	H	H	_	-	_		H	H	_	_	H		H		\dashv	\dashv	\dashv	_	Н	Н			1	
Start Date: Reb 38 / 14 ation Date: March 7 / 14 tset up by: 31/2 / 38/F	Comments																											Man Gorles	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Start Date: Rev. 28 / 1 Termination Date: March 3 Test set up by: 110 / 138F	Loss of buoyancy									_										_								1	Dale Keviewed:
St Terminat Tests	Root destruction																												Calle 2
	Single Monds														_														
	Gibbosik																L												
	Abnormal																												
	Yellow		×	¥	4																								
(Ardynd)	Necrosis																												
	Chlorosis																												
1.988341)		84	7.	88	6.9	64	ರಿ	87	55																			ر [
1 1 1	No. of fronds Day 0 Day 7	و	ر.	ر،	,	د	Ş	i,	د								1											186	
ALS NF 1 14077	Rep	Ι.	8	S	٥	٩	00	O	۵	∢	ф	Ų	٥	Æ	8	O	۵	٩	Δ	U	٥	ধ	В	ပ	٥				
Client. Sample ID Work Order#:	Concentration			o gin				o+ o							_					_						e de la constant de l			Keviewed by.

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: Reb 28 / 14

Sample ID:

(L1426336 - 2) NF 1

Termination Date: March 7 / 14

Work Order #:

14077

Concentration O/D (V/V)	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
	A	1_	1024.59	1033 - 10	NY
	В	2	1001,77	1007.96	
control	С	3	1013.74	1019 . 81	
Marie A	D	4	1019 08	1025 - 97	
	A	G	1024,77	1032.61	
	В	6	1005.12	1011 - 76 66	
1.5	С	7	10 35,36	1042 - 85	
	D	8	1054.15	1062.98	
7)-	A	9	1061.60	1068 - 10	
WC	В	10	1020.91	1027 - 38	
3.0%	С	(1	1000,16	1008 - 19	
	D	12	1012.44	1018.99	
	A	13	1039,41	1046 - 76	
	В	14	10 43 , 15	1048.98	
6.1	С	15	1046.25	1055.75 65	
	D	16	1058,49	1067.02	
1000	A	17	1041,80	1050.45	
	В	18	1049,52	1056.11	
12.1	С	19	1046.20	1054.79	
The second secon	D	20	1051.72	1058 - 30	
	A	21	1048.60	1057.70	
	В	22	1003.51	1012.08	
24.2	С	23	1016.05	1020.74	
	D	24	1038.92	15. FUOI	
k 05-299	A	25	1044.52	1051 - 74	
	В	26	1000,91	1008.05	
48.5	С	27	991,20	999.60	
	D	28	995.43	1001 - 27	V

Comments:	Reweighood pans 4-1025.99	9-1067-66	19-1054.32
Reviewed by:	JGN	Date Reviewed:	March 25/14

7-d Lemna minor Weight Data Sheet

Client:	ALS	Start Date: R	eb 28/14
Sample ID:	NF 1 (L 1426336 - 2)	Termination Date: N	narch 7 / 14
Work Order #:	14077		

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
,	Α	29	1208.97	1215 . 07	NYI
97	В	30	1236.16	1243. 74	
77	С	31	1236.16 1226.97	1235 · 31	
7.97	D	32	12 45.36	1250 · 48	V
	Α			- 15: 2024/17-45	- Harandanach
	В				
	С				
	D				
	A				
	В				
	C	Bill Carrows	JILYON THE	10.	
SOFFEE TOWNAMED AND	D	se senter	at the Reference Assessed	Secretaria (Presidenti)	ou Ap
	Α				
	В				
	С				
	D				
	A				
	В				
	С				
- IV	D		40 ayor 600		
	A				
	В				
	С				
	D				20000
	Α				
	В				
	С				and the second
2000000	D		200 4-50		-

	D	
Comments:		
Reviewed by:	Jou	Date Reviewed: March 25/14

Report Date:

26 Mar-14 09:01 (p 1 of 2)

		y tioui itop						Test	t Code: 1407	7b 00-1835-0189
Lemna	Growth	Inhibition Tes	t						Nautilu	s Environmental
Analysi Analyz		16-2678-6901 26 Mar-14 9:00			rond Count Ionlinear Regr	ession			IS Version: CETISv1.8.7 cial Results: Yes	
Batch I		18-7938-8836 28 Feb-14		Test Type: L	emna Growth	37		Ana Dilu	A dimin al)
Ending		07 Mar-14		Species: L	emna minor			Brin		
Duratio		7d Oh			PCC#490			Age	- 17	
Sample	ID:	17-8615-7390		Code: 6	A76994E			Clie	nt: ALS	
		25 Feb-14 14:3	35		Effluent			Proj		•
		27 Feb-14 10:3			LS			rioj	GGL.	
		57h (4.3 °C)			1426336-2(NF	- 1)				
						-/				
		gression Optio	ons			V T	V.T.		Malabata - Parada	
	Function		-(0 E)*	V/D\1		X Trans			Veighting Function	PTBS Function
		EV [Y=A*exp(lo	og(U.5)"/	X/D)]		None	Non	e r	Normal [W=1]	Off [Y*=Y]
Regres	sion Su									
Iters	Log L		BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)	
4	-101	206.5	209	0.0297	Yes	0.8056	2.508	0.5755	Non-Significant Lack of Fit	
Point E	stimate	S								
Level	%	95% LCL	95% l	UCL TU	95% LCL	95% UCL				
IC5	32.85	N/A	80.82		1.237	NA				
IC10	67.47	N/A	153.4		0.6518	NA 16				
IC15	104.1	N/A	248.3	-	0.4027	NA 7				
IC20	142.9	N/A	359.7		0.278	NA	>97%	(V/V)		
IC25	184.2	N/A	490.4		0.2039		((/ /)	- /		
IC40	327.1	NTA	1109	0.3057	0.09014	NA				
IC50	443.9	8.947	2739	0.2253	0.03651	11.18/				
Regres	sion Pa	rameters								
Parame	ter	Estimate		rror 95% LC	L 95% UCL	t Stat	P-Value	Decision		
A		78.88	3.332		85.41	23.68	<0.0001	_	t Parameter	
D		443.9	332.8	-208.4	1096	1.334	0.1923	Non-Signi	ificant Parameter	
ANOVA	Table									
Source		Sum Squ	ares	Mean Square	DF	F Stat	P-Value	Decision	(a:5%)	
Model		422.6493		422.6493	1	1.948	0.1731	Non-Signi	ificant	
Lack of	Fit	1091.226		181.8709	6	0.8056	0.5755	Non-Signi	ificant	
Pure Er	ror	5418		225.75	24					
Residua	al	6509.226		216.9742	30					
Residua	al Analy	sis			***************************************					
Attribut	e	Method			Test Stat	Critical	P-Value	Decision	(α:5%)	
Variano		Bartlett Ed	quality o	f Variance	6.557	14.07	0.4764	Equal Var	riances	
		Mod Leve	ne Equa	ality of Variance	e 0.6925	2.423	0.6776	Equal Var	riances	
Distribut	tion	Shapiro-W	ilk W N	Iormality	0.9797	0.9338	0.7904	Normal Di	istribution	
		Andress	Dadina	A2 Normality	0.2895	2.492	0.6437	Normal Di	1 - 4 - 21	

Frond Co	ount Summary				C	alculated Va	riate		
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	71.25	57	90	7.284	14.57	20.45%	0.0%
1.5		4	85	73	98	5.583	11.17	13.14%	-19.3%
3		4	68.5	64	77	2.901	5.802	8.47%	3.86%
6.1		4	85	56	111	11.78	23.57	27.72%	-19.3%
12.1		4	80.25	72	96	5.543	11.09	13.82%	-12.63%
24.2		4	80	48	91	10.67	21.34	26.67%	-12.28%
48.5		4	71.75	59	82	5.17	10.34	14.41%	-0.7%
97		4	66.75	49	81	6.981	13.96	20.92%	6.32%

Report Date: Test Code: 26 Mar-14 09:01 (p 2 of 2) 14077b | 00-1835-0189

Lemna Growth Inhibition Test

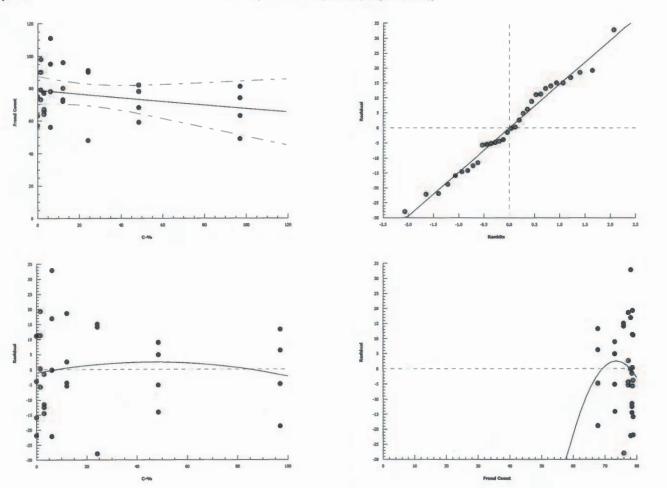
Nautilus Environmental

Analysis ID:	16-2678-6901	Endpoint:	Frond Count	CETIS Version:	CETISv1.8.7
Analyzed:	26 Mar-14 9:00	Analysis:	Nonlinear Regression	Official Results:	Yes

Frond	Count	Detail
LOUIG	Count	Douali

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	90	63	57	75
1.5		90	73	79	98
3		66	64	77	67
6.1		78	56	111	95
12.1		96	72	80	73
24.2		90	91	48	91
48.5		78	68	82	59
97		63	74	81	49

2P Exponential EV [Y=A*exp(log(0.5)*X/D)]



Report Date: Test Code: 26 Mar-14 09:01 (p 1 of 2) 14077b | 00-1835-0189

									1001	9000.		1.101.101	- 1000 01
Lemna Growth	h Inhibition Test										Na	utilus Env	ironment
Analysis ID:	03-7731-0487		Endpoint:	Frond C	ount	· · · · · ·			CET	IS Version	n: CETISV1	1.8.7	
Analyzed:	26 Mar-14 9:00		Analysis:			ntrol vs T	reat	tments		ial Resu			
Batch ID:	18-7938-8836		Test Type:	Lemna	Growth				Ana		eslin Wijaya		
Start Date:	28 Feb-14		Protocol:	EC/EPS	1/RM/	37			Dilu	ent: A	APHA (modit	ried)	
Ending Date:	07 Mar-14		Species:	Lemna	minor				Brin	e:			
Duration:	7d 0h		Source:	CPCC#	490				Age	9	d		
Sample ID:	17-8615-7390		Code:	6A7699	4E				Clie	nt: A	ALS		
	25 Feb-14 14:3	5	Material:	Effluent					Proj				
	27 Feb-14 10:30		Source:	ALS									
Sample Age:			Station:	L14263	36-2(NF	F1)							
Data Transform	m	Zeta	Alt H	vp Tri	als	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C < T	71		NA			37.0%	97	>97	NA	1.031
Dunnett Multip	ple Comparison	Test				-							
Control	vs C-%		Test S	Stat Cri	tical	MSD	DF	P-Value	P-Type	Decisi	on(a:5%)		
Negative Contr			1.294			26.37	_	0.3492	CDF		gnificant Effect	t	
30000	3		-0.258			26.37		0.9282	CDF		gnificant Effec		
	6.1		1.294			26.37		0.3492	CDF		gnificant Effec		
	12.1		0.847			26.37		0.5524	CDF		gnificant Effec		
	24.2		0.823			26.37		0.5634	CDF		gnificant Effect		
	48.5		0.047			26.37		0.8629	CDF		gnificant Effec		
	97		-0.423			26.37		0.9515	CDF		gnificant Effec		
ANOVA Table													
Source	Sum Squa	res	Mean	Square		DF		F Stat	P-Value	Decisi	on(a:5%)		
Between	1513.875		216.2	679		7		0.958	0.4828	Non-Si	gnificant Effec	t	
Error	5418		225.7	5		24							
Total	6931.875					31							
Distributional	Tests												
Attribute	Test			Tes	st Stat	Critica	ıl	P-Value	Decision	(a:1%)			
Variances	Bartlett Ed	quality	of Variance	6.5	57	18.48		0.4764	Equal Va	riances			
Distribution	Shapiro-W	Vilk W i	Normality	0.9	715	0.9081		0.5410	Normal D	istribution	1		
Frond Count S	Summary												
C-%	Control Type	Coun	t Mean	959	% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effec
0	Negative Control	4	71.25	48.	07	94.43		69	57	90	7.284	20.45%	0.0%
1.5		4	85	67.	23	102.8		84.5	73	98	5.583	13.14%	-19.3%
3		4	68.5	59.	27	77.73		66.5	64	77	2.901	8.47%	3.86%
6.1		4	85	47.	5	122.5		86.5	56	111	11.78	27.72%	-19.3%
12.1		4	80.25			97.89		76.5	72	96	5.543	13.82%	-12.639
24.2		4	80	46.		114		90.5	48	91	10.67	26.67%	-12.289
48.5		4	71.75			88.2		73	59	82	5.17	14.41%	-0.7%
97		4	66.75			88.97		68.5	49	81	6.981	20.92%	6.32%
Frond Count E	Detail												
C-%	Control Type	Rep 1	Rep 2	Re	р 3	Rep 4							
0	Negative Control	90	63	57		75							
1.5		90	73	79		98							
3		66	64	77		67							
6.1		78	56	111		95							
12.1		96	72	80		73							
24.2		90	91	48		91							
48.5		78	68	82		59							
97		63	74	81		49							

Analyst: JW QA: JOL March 26/14

Report Date: Test Code:

26 Mar-14 09:01 (p 2 of 2) 14077b | 00-1835-0189

Nautilus Environmental Lemna Growth Inhibition Test **CETISv1.87** Endpoint: Frond Count

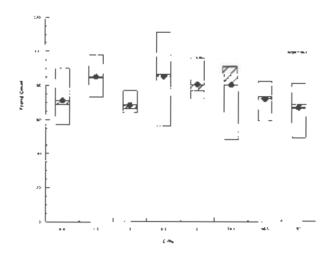
03-7731-0487 Analysis ID: Analyzed: 26 Mar-14 9.00

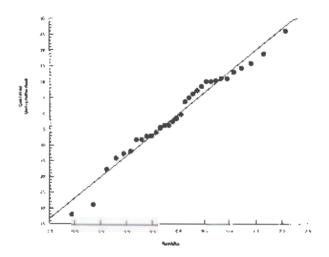
Analysis:

Parametric-Control vs Treatments

CET(S Version: Official Results:

Yes





CETIS	Analytica	Report
	, mindred and a	

Report Date: Test Code: 26 Mar-14 09:01 (p 1 of 2) 14077b | 00-1835-0189

Lemna	Growth	Inhibition Tes	t							Nautilus	Environmental
Analysi	is ID:	05-6300-6427	End	point:	Total Dry Weigh	nt-mg		CET	S Version:	CETISv1.8.7	
Analyz	ed:	26 Mar-14 9:01	Anal	ysis: 1	Nonlinear Regre	ession		Offic	ial Results:	Yes	
Batch I	D:	18-7938-8836	Test	Type: I	emna Growth			Anal	yst: Jeslin	Wijaya	
Start D	ate:	28 Feb-14	Prot	ocol: E	EC/EPS 1/RM/3	37		Dilu	ent: APHA	(modified)	
Ending	Date:	07 Mar-14	Spe	cies: l	emna minor			Brin	e:		
Duratio	on:	7d Oh	Sou	rce: (CPCC#490			Age:	9d		
Sample	D:	17-8615-7390	Cod	e: 6	6A76994E			Clie	nt: ALS		
Sample	Date:	25 Feb-14 14:3	S5 Mate	erial:	Effluent			Proj	ect:		
Receiv	e Date:	27 Feb-14 10:3	30 Sou	rce:	ALS						
Sample	e Age:	57h (4.3 °C)	Stat	ion:	L1426336-2(NF	1)					
Non-Li	near Re	gression Option	ons								
Model	Functio	n				X Trans	sform Y Tr	ansform V	Veighting Fu	nction	PTBS Function
3P Cun	nulative	Log-Normal EV	[Y=A*(1- Φ(log(X/D)/	(C))]	None	None	e N	lormal [W=1]		Off [Y*=Y]
Regres	sion Su	ımmary									
iters	Log L	L AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(c	1:5%)	
27	-21.39		53.17		Yes	0.401	2.621	0.8432	Non-Signifi	cant Lack of Fit	
Point F	Estimate	og ge									
	%	95% LCL	95% UCL	TU	95% LCL	95% UCI					
IC5	73.44	N/A	164.3	1.362	0.6086	NA					
IC10	104.7		227	0.9551	0.4406	NA)					
IC15	133	N/A	546.4	0.7518	- Andrews	NA					
IC20	160.9		N/A	0.6215		NA >	>97/06	(010			
IC25	189.4		N/A	0.5279		NA	. 11,0	, ,			
IC40	285.8	NIA	N/A	0.3499	NA	NA	,	JOA_			
IC50	366	N/A	N/A	0.2732		NA J					
Regres	sion Pa	rameters									
Parame		Estimate	Std Error	95% LC	CL 95% UCL	t Stat	P-Value	Decision	(a:5%)		
A		7.411	0.27	6.882	7.94	27.45	<0.0001	Significan	t Parameter		
С		0.9765	2.64	-4.197	6.15	0.3699	0.7141	Non-Signi	ificant Parame	eter	
D		366	1349	-2278	3010	0.2713	0.7881	Non-Sign	ificant Parame	eter	
ANOVA	Table										
Source		Sum Squ	ares Mea	n Squar	e DF	F Stat	P-Value	Decision	(a:5%)		
Model		1.407145		7145	1	0.9106	0.3478	Non-Sign	the state of the s		
Lack of	Fit	3.455154		1031	5	0.401	0.8432	Non-Sign	ificant		
Pure E	rror	41.35684		3202	24						
Residu		44.81199	1.54	5241	29						
Residu	ial Anal	ysis									
Attribu		Method			Test Stat	Critical	P-Value	Decision	(a:5%)		
Variand			quality of Va	riance	3.58	14.07	0.8267	Equal Va	· · · · · ·		
			ne Equality		ce 0.464	2.423	0.8508	Equal Va			
Distribu	ution		Vilk W Norm		0.9497	0.9338	0.1416	Normal D	istribution		

Report Date: Test Code:

26 Mar-14 09.01 (p.2 of 2) 14077b | 00-1835-0189

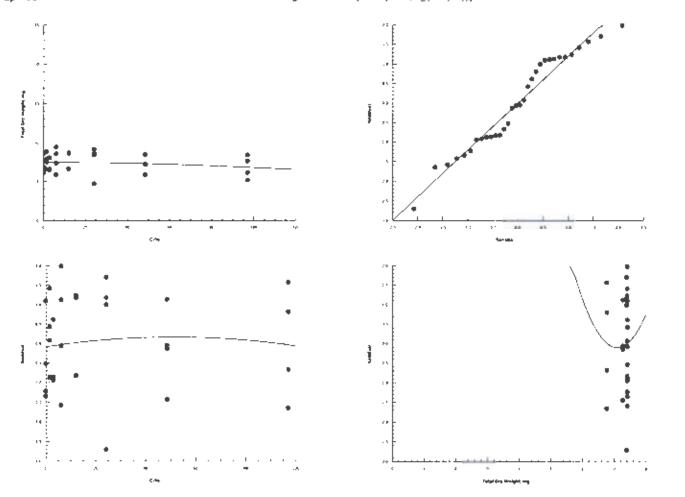
Lamna Gro	owth Inhibition Tes	ì							Nautilus Environ	mental
Analysis IC Analyzed:	05-6300-6427 25 Mar-14 9 01			Total Dry We Nonlinear Re	T . T			S Version:	CETISv1.8 7 Yes	
Total Dry V	Veight-mg Summar	y				Calculated Va	riate			
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	4	6.915	6.07	6 51	0 5616	1.123	16.24%	0.0%	
15		4	7.675	6.54	8.83	0.4729	0 9458	12 32%	-10.99%	
3		4	6.888	6.47	8.03	0.3812	0.7624	11 07%	0.4%	
61		4	7.777	5 83	9.4	0.7732	1.546	19.88%	-12 47%	
12.1		4	7.603	6 58	8.65	0.5876	1,175	15 46%	-9.94%	
24 2		4	7.688	4 69	9.1	1.01	2.021	26 29%	-11 17%	
48 5		4	7.15	5 84	8.4	0.5231	1.046	14 63%	-3.4%	
97		4	6 785	5 12	6 34	0.7241	1.448	21.34%	1.88%	

Total Dr	· Weight-mg	Detail
----------	-------------	--------

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Negative Control	8.51	6.19	6.07	6.89	
1.5		7.84	6.54	7.49.	8.83	
3		6.5	6.47	8 03	6 55	
61		7 35	5.83	9.4	8.53	
12.1		8.65	6.59	8.59	6.58	
24.2		9.1	8.57	4.69	8.39	
48 5		7 22	7.14	8.4	5.84	
97		61	7.58	6.34	5 12	

Graphics

3P Cumulative Log-Normal EV (Y=A*(1-Φ(log(X/D)/C))]



Report Date: Test Code: 26 Mar-14 09:01 (p 1 of 2) 14077b | 00-1835-0189

								rest	Code:		140770 00	F 1035-010
Lemna Growth	n Inhibition Test									Na	utilus Env	ironmenta
Analysis ID:	18-9090-8151		Endpoint:	Total	Dry Weigh	nt-ma		CET	S Version	: CETISv1	.8.7	
Analyzed:	26 Mar-14 9:00		Analysis:			trol vs Trea	tments	- Table	ial Result			
Batch ID:	18-7938-8836		Test Type:	Lemn	a Growth			Anal		slin Wijaya		
Start Date:	28 Feb-14	1	Protocol:	EC/E	PS 1/RM/3	37		Dilu	ent: AP	PHA (modif	fied)	
Ending Date:	07 Mar-14		Species:	Lemr	na minor			Brin	e:			
Duration:	7d 0h		Source:	CPC	C#490			Age	9d			
Sample ID:	17-8615-7390		Code:	6A76	994E			Clie	nt: AL	.S		
Sample Date:	25 Feb-14 14:35	5 1	Material:	Efflue	ent			Proj	ect:			
Receive Date:	27 Feb-14 10:30) :	Source:	ALS								
Sample Age:	57h (4.3 °C)	;	Station:	L142	6336-2(NF	1)						
Data Transfor	m	Zeta	Alt H	ур	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C < T		NA	NA		33.3%	97	>97	NA	1.031
Dunnett Multip	ple Comparison	Test										
Control	vs C-%		Test :		Critical		P-Value	P-Type	Decision			
Negative Contr	rol 1.5		0.818		2.482	2.304 6	0.5656	CDF	_	nificant Effect		
	3		-0.029		2.482	2.304 6	0.8822	CDF	-	nificant Effect		
	6.1		0.929		2.482	2.304 6	0.5140	CDF	_	nificant Effect		
	12.1		0.740		2.482	2.304 6	0.6018	CDF	-	nificant Effect		
	24.2		0.832	2	2.482	2.304 6	0.5593	CDF	Non-Sigi	nificant Effect	t	
	48.5		0.253	2	2.482	2.304 6	0.8006	CDF	Non-Sigi	nificant Effect	t	
	97		-0.14		2.482	2.304 6	0.9065	CDF	Non-Sigi	nificant Effect	t	
ANOVA Table												
Source	Sum Squa	res	Mean	Squa	re	DF	F Stat	P-Value	Decision	n(α:5%)		
Between	4.862298		0.694	6141		7	0.4031	0.8909	Non-Sign	nificant Effect	t	
Error	41.35684		1.723	202		24						
Total	46.21914					31						
Distributional	Tests											
Attribute	Test				Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Bartlett Ed	quality o	of Variance		3.58	18.48	0.8267	Equal Va	riances			
Distribution	Shapiro-W	-			0.9542	0.9081	0.1899	Normal Distribution				
Total Dry Weig	ght-mg Summar	у										
C-%	Control Type	Count	Mean		95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.915		5.128	8.702	6.54	6.07	8.51	0.5616	16.24%	0.0%
1.5		4	7.675		6.17	9.18	7.665	6.54	8.83	0.4729	12.32%	-10.99%
3		4	6.888		5.674	8.101	6.525	6.47	8.03	0.3812	11.07%	0.4%
6.1		4	7.777		5.317	10.24	7.94	5.83	9.4	0.7732	19.88%	-12.47%
12.1		4	7.603		5.733	9.472	7.59	6.58	8.65	0.5876	15.46%	-9.94%
24.2		4	7.688		4.472	10.9	8.48	4.69	9.1	1.01	26.29%	-11.179
48.5		4	7.15		5.485	8.815	7.18	5.84	8.4	0.5231	14.63%	-3.4%
97		4	6.785		4.481	9.089	6.84	5.12	8.34	0.7241	21.34%	1.88%
Total Dry Weig	ght-mg Detail											
C-%	Control Type	Rep 1	Rep 2	2	Rep 3	Rep 4						
0	Negative Control	8.51	6.19		6.07	6.89						
1.5		7.84	6.54		7.49	8.83						
3		6.5	6.47		8.03	6.55				1		
6.1		7.35	5.83		9.4	8.53						
12.1		8.65	6.59		8.59	6.58						
		9.1	8.57		4.69	8.39				70		
24.2												
48.5		7.22	7.14		8.4	5.84						
97		6.1	7.58		8.34	5.12						

Report Date: Test Code: 26 Mar-14 09:01 (p 2 of 2) 140776 | 00-1835-0189

Nautilus Environmental

Lemna Growth inhibition Test
Analysis ID: 18-9090-8151

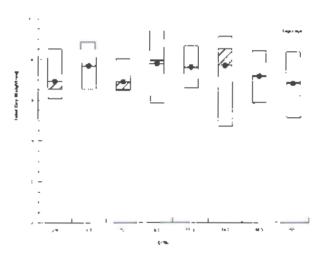
18-9090-8151 26 Mar-14 9:00 Endpoint: Total Dry Weight-mg

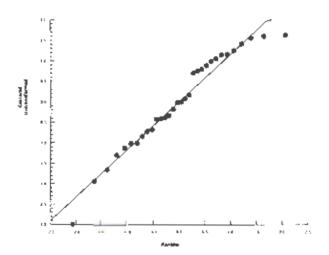
Analysis: Parametric-Control vs Treatments

CETIS Version: CET Official Results: Yes

ÇETISV1.8.7

Analyzed: Graphics





Lemna minor Summary Sheet

Client:	AC)	Start Date: Feb 28 (14
Work Order No.:	140 i i i	Set up by: 100 / 10%
0		
Sample Information	1;	
Sample ID:	11470596 - 3 (NF 3)	
Sample Date:	Feb 25 / 14 @ 1309h	_
Date Received:	Fen 57 /14 (6 1030h	_
Sample Volume:	7 x 20L	_
Test Organism Info	rmation:	
Culture Date:	ं ं।पण	
Age of culture (Day (व वक्ष	
>8X growth in APHA		
KCI Reference Tox	icant Results:	
Defended Towispet	ID: LM_160	
Reference Toxicant Date Initiated:	Feb 20- 3014	·
Date illidated.	(41) 20- 50-4	
7-d No. of Fronds IC	50 (95% CL): 0.0 (3.2	- 4-2)
7-d No. Fronds IC50	Reference Toxicant Mean (2.5	SD Range): 4.4 (25-95) CV (%): 12

		Number of Fronds	Dry Meight
Test Results	IC25 %(v/v) (95% CL)	437 (36-876)	19 C + 15 1 1 2 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
	IC50 %(v/v) (95% CL)	7 प्रम	> 47

Reviewed by July Date reviewed: March 27/14

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client:	ALS			Setup by: JIN / JBF						
Sample ID:	NF -2	(L1426336	-3) (Bro	wn) Test Date: <u>Feb 28 / 14</u>						
Work Order No.:	14077			Tes	t Species:	Lemna mino	or			
Culture Source:	CPCC # 490									
Test Culture Age:	9 10 days			> 8X Gro	wth? (Y/N):	Υ				
Light Intensity Range:	4000 - !	5600 lux		Date	Measured:	₹eb 26	/14			
Day	0	1	2	3	4	5	6	7		
Shelf Temp (°C)	25.0	20:00	25-5	25.5	26.0	26.0	26.0	26.0		
Initials	MC	And	m	JBF	UC	MC	NC	NC		
Sample Characteristics: Temperature (°C) DO (mg/L) pH Conductivity (μS)	25.5 10.0 7.1	Vater Quality		Aeration?: Nutrients added?:	20 min	→	Adjusted V 25.0 8.9 7.3	Vater Quality		
Concentration	on	Tempera	ture (°C)	pl	Н	(Conductivity	(µS)		
% (V/V)		Day 0	Day 7	Day 0	Day 7		0 h			
Control		24.0	25.0	8.4	8.2		878			
1.5		24.0	25,0	8.1	8-3		885			
3.0%		24.0	25.0	8.1	8-3		889			
6.1		24.0	250	8.1	83		895			
12.1		24.0	25.0	8.0	8.3		911			
24.2		24.0	25.0	7.9	8.2		942			
48.5		24.0	250	7.8	A-3		1006			
97		25.0	250	7.3	8-4		1127			
Initials		JW / JBF	KSL	JW/JBF	KJU	0(N/JBF			
Thermometer: Sample Description: Comments:	Calibrated	Thermometer	Cond. Meter			pH meter:	PH-2			
Reviewed:		Jou		Date Review	wed:	Han	ch 25	/14		

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

84 64 64 861 61 61 61
┤┋┋ ┩┩
4 8 0 0 4 8 0 0

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

	NA
Start Date: Peb 28 / Nt Termination Date: Molich 7 / Nt Test set up by No 1 304	Comments Anvid 26/14
Start Date: mination Date: Test set up by:	Truction buoyancy Truction buoyancy Truction buoyancy Truction buoyancy
S Yerminat Yest e	Roof destruction
	Single trond \$
	Gibbosity
	SIZE 81ZE
(Rown)	Necrosis
3)	Chlarosis
355 (1 (44)6.336	No. of fronds Day () Day 7 C 59 C 50 C
म् ।	──┸──┼┤╏╏┇┼╏╬╬╬╬╬╬╬ ┼╏┼ ╬╣╒╇╒╬┼╏╎ ╬┩
ALS NF - 3 14073	
Clent: Sample ID. Work Order#:	Concentration Section (1988)

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: Reb 28 / 14

Sample ID:

NF2 (14-3N L - 1426336 - 3)

Work Order #:

14077

Termination Date: March 1 / 14

Concentration % (V/V)	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
	A	1	991.56	996.26	NYIS
	В	2	1029.50	1035 - 81	
control	С	3	1044.13	1050. 93	
	D	4	1041-15	1047 - 24	
	A	5	1024 57	1029.40	024
	В	6	1037.20	1044. 04	
1.5	С	7	1019.92	1026.18	
CHAPTER WAY	D	8	1032.17	1038 - 57	
	A	9	1018.77	1024 - 63	
MC	В	(D	1040,24	1045 . 65	
3.08	С	11	1051.75	1058.84	
	D	12	1005.72	1010 - 92	6 30
40-5-X	A	13	102886	1038 51	
	В	14	1029.32	1036.10	
6.1	С	15	1015.85	1023.47	
204-170 5-70	D	16	1002.84	1009.41	
	Α	H	1036.80	1044 - 63 53	
	В	18	997.43	1003.70	
12.1	C	19	991.23	999 - 50	
85-77 E383000	D	20	1023.04	1029.99	
	Α	21	996.32	1001 - 94	
	В	22	10 05.39	1010 - 80	
24.2	С	23	1016.18	1021 . 39	
	D	24	991,94	997 - 85	
**	A	25	1002.93	1007 - 84	200
	В	26	1002.31	1007 - 37	
48.5	С	27	1012.44	1017 - 46	
	D	28	992.97	999.28	V .

Comments:	Reweighed pans	4-1047.22 12-1010.80	20-1029,77
Reviewed by:	JOL	Date Reviewed:	March 26/14

7-d Lemna minor Weight Data Sheet

 Client:
 ALS
 Start Date:
 Reb 28/14

 Sample ID:
 NF 2 (L 1426336 - 3)
 Termination Date:
 March 7/14

 Work Order #:
 14077

Concentration % (V/V)	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
	A	29	1017.34	1021.95	NYIS
97	В	30	1019.36	1023.90	
41	С	31	1019.55	1024 - 15	
	D	32	1033.55	1038.84	t .
4999	A	THE STATE OF THE S	200012800 2003 3200330	753 MODES 4301 SERVA 43 - In	36
	В				
	С				
	D				
	Α				
	В				
	С				
	D			A Vet exc sx	
	A	0 1/2	2000 200 2000 2000 0000 0000	The state of the s	
	В				-
	С				
	D				-
	Α				
	В				Contract Co.
	С				-
1986 28	D	11 - 01 -0300		90 - 100 - 1	
	A				-
	В				-
	C				
69.0		W. 3280	- 	8 88 AND SERVED THE TOTAL TO	
	A				
	С	10			
	D				

1-32-35	D		
Comments:			
Reviewed by:	JGu	Date Reviewed:	March 26/14

Report Date: Test Code: 26 Mar-14 09:15 (p 1 of 2) 14077c | 11-2740-7920

Lemna	Growth	Inhibition Test									Nautilus Er	nvironmental
Analys Analyz	ijolo ibi		Frond Count Linear Interpolation (ICPIN)				CETIS Version: CETISv1.8.7 Official Results: Yes					
Allalyz	· · · · · · · · · · · · · · · · · · ·											
Batch		18-7938-8836			Lemna Growth				Anal	-	in Wijaya	
Start D		28 Feb-14		ocol:	EC/EPS 1/RM/	37			Dilu		IA (modified)	
Ending	Date:	07 Mar-14		cies:	Lemna minor				Brin			
Duratio	on:	7d Oh	Sou	rce:	CPCC#490				Age:	9d		
Sample		07-0729-5812	Cod	e:	2A287A44				Clie	nt: ALS		
Sample	e Date:	25 Feb-14 13:0	5 Mate	erial:	Effluent				Proj	ect:		
Receiv	e Date:	27 Feb-14 10:3	O Sou	rce:	ALS							
Sample	e Age:	59h (3.3 °C)	Stat	ion:	L1426336-3(NF	-2)						
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL	Meth	od			
Log(X+	1)	Linear	9301	197	200	Yes		Two-F	Point Interp	olation		
Point E	Estimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	13.95		14.97	7.17	6.682	NA					***************************************	
IC10	16.06		18.43	6.228	5.426	9.198						
IC15	18.46	13.64	22.61	5.417	4.423	7.33						
IC20	21.21	17.01	30.85	4.715	3.241	5.879						
C25	24.89	19.55	72.35	4.018	1.382	5.116						
IC40	>97	N/A	N/A	<1.03	1 NA	NA						
IC50	>97	N/A	N/A	<1.03	1 NA	NA						
Frond	Count S	Summary				Cal	lculate	d Var	iate			
C-%	С	ontrol Type	Count	Mean	Min	Max	Std	Err	Std Dev	CV%	%Effect	
0		egative Control	4	67.75	50	75	5.93	5	11.87	17.52%	0.0%	
1.5			4	66.5	60	70	2.25	5	4.509	6.78%	1.85%	
3			4	64.25	56	81	5.72	1	11.44	17.81%	5.17%	
6.1			4	83	66	110	10.2	8	20.56	24.77%	-22.51%	
12.1			4	77.5	61	98	7.70	8	15.42	19.89%	-14.39%	
24.2			4	54	53	55	0.57	74	1.155	2.14%	20.3%	
48.5			4	50.25	47	54	1.65	2	3.304	6.58%	25.83%	
97			4	45.5	43	49	1.32	3	2.646	5.82%	32.84%	
Frond	Count [Detail										
C-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	egative Control	50	73	75	73						
1.5			60	70	69	67						
3			62	58	81	56						
6.1			110	66	88	68						
12.1			78	61	98	73						
12.1			, 0	01	00							

24.2

48.5 97 53

47

46

55

48

44

55

52

43

53

54

49

Report Date:

26 Mar-14 09 15 (p 2 of 2)

Test Code: 14077c | 11-2740-7920

Lemna Growth Inhibition Test Nautilus Environmental

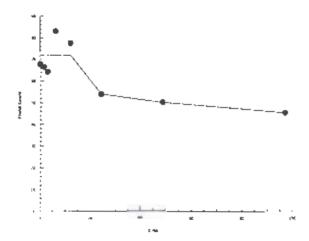
Analysis ID: Analyzed:

14-2784-6854 26 Mar-14 9:10 Endpoint: Frond Count

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7 Official Results: Yes

Graphics



Report Date: Test Code: 27 Mar-14 14:20 (p 1 of 2) 14077c-1 | 05-9886-5460

Nautilus Environmental Lemna Growth Inhibition Test Frond Count **CETIS Version:** CETISv1.8.7 Analysis ID: 20-4529-5790 Endpoint: Linear Interpolation (ICPIN) Official Results: Yes Analyzed: 27 Mar-14 14:20 Analysis: Batch ID: Test Type: Lemna Growth Jeslin Wijaya 07-7012-6724 Analyst: **EC/EPS 1/RM/37** Diluent: APHA (modified) Start Date: 28 Feb-14 Protocol: Species: 07 Mar-14 Lemna minor Brine: **Ending Date: Duration:** 7d Oh Source: **CPCC#490** Age: 41FFA658 ALS 11-0727-3304 Client: Code: Sample ID: Effluent Sample Date: 25 Feb-14 13:05 Material: Project: Receive Date: 27 Feb-14 10:30 ALS Source: Station: L1426336-3(NF2) Sample Age: 59h **Linear Interpolation Options** X Transform Y Transform Seed Resamples Exp 95% CL Method Linear 1457585 200 Yes Two-Point Interpolation Log(X+1) **Point Estimates** Level 95% LCL 95% UCL TU 95% LCL 95% UCL 13.69 15.75 7.304 6.349 NA IC5 N/A 5.022 NA IC10 16.52 N/A 19.91 6.052 26.24 5.024 3.811 NA IC15 19.91 N/A 8.992 63.24 4.177 1.581 11.12 IC20 23.94 43.73 13.15 7.605 87.63 2.287 1.141 **IC25** IC40 >97 N/A N/A <1.031 NA NA NA IC50 >97 N/A N/A <1.031 NA **Calculated Variate** Frond Count Summary CV% C-% Min Max Std Err Std Dev %Effect **Control Type** Count Mean 5.935 0 **Negative Control** 4 67.75 50 75 11.87 17.52% 0.0% 60 70 2.255 1.5 66.5 4.509 6.78% 1.85% 64.25 56 81 5.721 11.44 5.17% 4 17.81% 3 75 4 67.75 50 5.935 0.0% 6.1 11.87 17.52% 4 67.75 50 75 5.935 11.87 17.52% 0.0% 12.1 4 53 55 24.2 54 0.5774 1.155 2.14% 20.3% 4 50.25 47 54 48.5 1.652 3.304 6.58% 25.83% 97 4 45.5 43 49 1.323 2.646 5.82% 32.84% Frond Count Detail

C-%

0

3

1.5

6.1

12.1

24.2

48.5 97 **Control Type**

Negative Control

Rep 1

50

60

62

50

50

53 47

46

Rep 2

73

70

58

73

73

55

48

44

Rep 3

75

69

81 75

75

55

52

43

Rep 4

73

67

56

73

73

53

54

49

Report Date: Test Code: 27 Mar-14 14:21 (p 2 of 2) 14077c-1 | 05-9886-5460

Lemna Growth inhibition Test

Nautilus Environmental

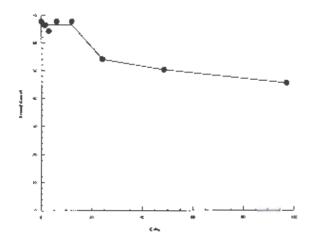
Analysis IO: Analyzed: 20-4529-5790 27 Mar-14 14:20 Endpoint: Frond Count

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

GET/Sv1.8.7

Graphics



T

26 Mar-14 09:15 (p 1 of 2)

Test Code:	14077c 11-2740-79
Report Date.	20 Mai-14 09.15 (p 1 0)

									1001	Joue.		140770 11-2740	
Lemna	Growth	n Inhibition Tes	t									Nautilus Environme	ental
Analys Analyz		08-7246-2597 26 Mar-14 9:10		lpoint:	Total Dry Weight Linear Interpola	_)			S Versio		CETISv1.8.7 Yes	
Batch		18-7938-8836			Lemna Growth				Analy			Wijaya	
Start D		28 Feb-14		tocol:	EC/EPS 1/RM/	37			Dilue		PHA	(modified)	
Ending	Date:	07 Mar-14		cies:	Lemna minor				Brine				
Duratio	on:	7d 0h	Sou	ırce:	CPCC#490				Age:	9	d		
Sample		07-0729-5812	Cod	de:	2A287A44				Client	t: A	LS		
		25 Feb-14 13:0		terial:	Effluent				Proje	ct:			
		27 Feb-14 10:3	Sou	ırce:	ALS								
Sample	e Age:	59h (3.3 °C)	Sta	tion:	L1426336-3(NF	-2)							
Linear	interpo	lation Options										-	
X Tran		Y Transform			Resamples	Exp 95%		Method					
Log(X+	1)	Linear	159	7636	200	Yes		Two-Point	Interpo	lation			
Point E	Estimate	es											
Level	%	95% LCL	95% UCL		95% LCL	95% UCL							
IC5	15.1	13.49	18.08	6.622		7.413							
IC10	18.79		26.53	5.323		6.53							
IC15	23.32	17.33	79.74	4.288	1.254	5.771							
IC20	52.21	5.336	112.7	1.915		18.74							
IC25	78.21	15.27	N/A	1.279		6.551							
IC40	>97	N/A	N/A	<1.03		NA							
IC50	>97	N/A	N/A	<1.03	1 NA	NA							
Total D	ry Weig	ght-mg Summa	ry			Ca	culate	d Variate					
C-%	C	ontrol Type	Count	Mean	Min	Max	Std E	err Std	Dev	CV%	•	%Effect	
0	N	egative Control	4	5.975		6.8	0.450	0.90	003	15.07%	6	0.0%	
1.5			4	6.083		6.84	0.435	0.87	708	14.32%	,	1.8%	
3			4	5.89	5.2	7.09	0.423			14.36%	,	1.42%	
6.1			4	7.655		9.65	0.702			18.36%		28.12%	
12.1			4	7.305		8.27	0.438			12.01%		-22.26%	
24.2			4	5.537		5.91	0.149			5.41%		7.32%	
48.5			4	5.325		6.31	0.329			12.39%		10.88%	
97			4	4.76	4.54	5.29	0.177	73 0.38	546	7.45%	- 2	20.34%	
		ht-mg Detail											
C-%		ontrol Type	Rep 1	Rep 2		Rep 4							
0	N	egative Control	4.7	6.31	6.8	6.09							
1.5			4.83	6.84	6.26	6.4							
3			5.86	5.41	7.09	5.2							
6.1			9.65	6.78	7.62	6.57							
12.1			7.73	6.27	8.27	6.95							
24.2			5.62	5.41	5.21	5.91							
			4.91	5.06	5.02	6.31							
48.5													

Report Date: **Test Code:**

26 Mar-14 09:15 (p 2 of 2) 14077c | 11-2740-7920

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed:

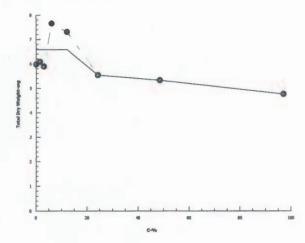
08-7246-2597 26 Mar-14 9:10 Endpoint: Total Dry Weight-mg

Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results: Yes

CETISv1.8.7

Graphics



Report Date:

27 Mar-14 15:22 (p 1 of 2)

	, , , , ,	y nour resp						Test	Code:	14077c-	1 05-9886-5460
Lemna	Growth	n Inhibition Tes	st							Nautilus	Environmental
Analys	is ID:	02-8991-5851	End	point:	Total Dry Weig	ht-mg		CETI	S Version:	CETISv1.8.7	
Analyz	ed:	27 Mar-14 15:	21 Ana	lysis:	Nonlinear Regr	ession		Offic	ial Results:	Yes	
Batch	ID:	07-7012-6724	Tes	t Type:	Lemna Growth			Analy		Wijaya	
Start D	ate:	28 Feb-14	Prof	tocol:	EC/EPS 1/RM/	37		Dilue	nt: APH	(modified)	
Ending	g Date:	07 Mar-14	Spe	cies:	Lemna minor			Brine):		
Duratio	on:	7d 0h	Sou	rce:	CPCC#490			Age:			
Sampl	e ID:	11-0727-3304	Cod	le:	41FFA658			Clier	t: ALS		
Sampl	e Date:	25 Feb-14 13:0	05 Mat	erial:	Effluent			Proje	ct:		
Receiv	e Date:	27 Feb-14 10:	30 Sou	rce:	ALS						
Sampl	e Age:	59h	Stat	tion:	L1426336-3(NF	-2)					
Non-Li	inear Re	gression Option	ons								
Model	Functio	on				X Trans	sform Y Tr	ansform W	eighting Fu	nction	PTBS Function
3P Cur	mulative	Log-Normal EV	Y=A*(1- Φ	(log(X/D)	/C))]	None	Non	e N	ormai [W=1]		Off [Y*=Y]
Regres	ssion Su	ummary									
Iters	Log L		BIC	Adj R	2 Optimize	F Stat	Critical	P-Value	Decision(c	1:5%)	
14	-2.612		15.62	0.2405		0.06666	2.621	0.9966		cant Lack of Fit	
Point I	Estimate	es									
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	20.42	N/A	49	4.896	2.041	NA					
IC10	40.22	12.49	75.09	2.486	1.332	8.009					
IC15	63.54	31.52	104.7	1.574	0.955	3.173					
IC20	91.38	40.79	164	1.094	0.6099	2.452					
IC25 J	N 124.8	40.08	274.2	0.8012	0.3646	2.495	7	D(()			
IC40	w 273.8	22	1508	0.3652	0.06633	4.546	4 > 97	% (1/1/1)			
IC50	W 439.2	13.3	14510	0.2277	0.006894	7.52	3				
Regres	ssion Pa	arameters									
Param	eter	Estimate	Std Error	95% L	CL 95% UCL	t Stat	P-Value	Decision(α:5%)		
A		6.014	0.2064	5.609	6.418	29.14	<0.0001	Significant	Parameter		
C		1.865	1.16	-0.407	6 4.138	1.609	0.1185	Non-Signi	ficant Param	eter	
D		439.2	476.3	-494.4	1373	0.922	0.3641	Non-Signi	ficant Param	eter	
ANOV	A Table										
Source	Ð	Sum Squ	ares Mea	n Squa	re DF	F Stat	P-Value	Decision(α:5%)		
Model		5.64683	5.64	683	1	11.82	0.0018	Significant			
Lack of	f Fit	0.189846	0.03	7969	5	0.06666	0.9966	Non-Signif	ficant		

Analyst: JW QA: JGh Harch 27/14

0.569562

0.477908

13.6695

13.85934

Method

Bartlett Equality of Variance

Shapiro-Wilk W Normality

Mod Levene Equality of Variance

Anderson-Darling A2 Normality

24

29

5.479

0.3557

0.9597

0.3783

Test Stat Critical

14.07

2.423

0.9338

2.492

P-Value

0.6017

0.9188

0.2689

0.4116

Decision(a:5%)

Equal Variances

Equal Variances

Normal Distribution

Normal Distribution

Pure Error

Residual Analysis

Residual

Attribute

Variances

Distribution

Analysis ID:

Analyzed:

02-8991-5851

27 Mar-14 15:21

Report Date: **Test Code:**

27 Mar-14 15:22 (p 2 of 2) 14077c-1 | 05-9886-5460

Nautilus Environmental

Lemna Growth Inhibition Test

CETISv1.8.7 Total Dry Weight-mg **CETIS Version:** Endpoint: Nonlinear Regression Analysis: Official Results: Yes

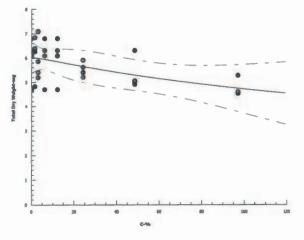
Total Dry Weight-mg Summary					(Calculated Va	ariate			
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	4	5.975	4.7	6.8	0.4502	0.9003	15.07%	0.0%	
.5		4	6.083	4.83	6.84	0.4354	0.8708	14.32%	-1.8%	
3		4	5.89	5.2	7.09	0.423	0.846	14.36%	1.42%	
3.1		4	5.975	4.7	6.8	0.4502	0.9003	15.07%	0.0%	
2.1		4	5.975	4.7	6.8	0.4502	0.9003	15.07%	0.0%	
24.2		4	5.537	5.21	5.91	0.1497	0.2995	5.41%	7.32%	
48.5		4	5.325	4.91	6.31	0.3299	0.6597	12.39%	10.88%	
97		4	4.76	4.54	5.29	0.1773	0.3546	7.45%	20.34%	

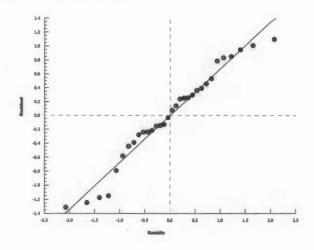
Total Dry Weight-mg Detail

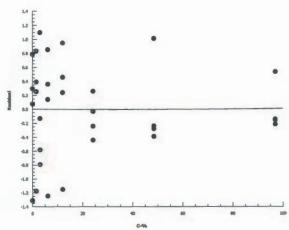
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.7	6.31	6.8	6.09
1.5		4.83	6.84	6.26	6.4
3		5.86	5.41	7.09	5.2
6.1		4.7	6.31	6.8	6.09
12.1		4.7	6.31	6.8	6.09
24.2		5.62	5.41	5.21	5.91
48.5		4.91	5.06	5.02	6.31
97		4.61	4.54	4.6	5.29

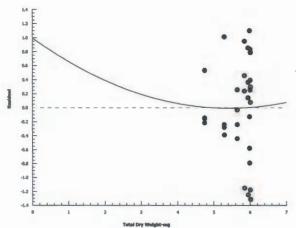
Graphics

3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









Lemna minor Summary Sheet

Client: ALS

Start Date: feb 28, 2014

Work Order No.: 14037 Set up by: Div 7 388

Sample Information:

Sample ID: £1420336 - 4 (X-1)

Sample Date: Feb 26 / In @ High
Date Received: Feb 27 / I4 @ Ic3oh

Sample Volume: 2 + 201

Test Organism Information:

Culture Date: 021914

Age of culture (Day 0):

>8X growth in APHA?:

Y

KCI Reference Toxicant Results:

Reference Toxicant ID: 6m ICC

Date Initiated: feb 30, 2014

7-d No. of Frands IC50 (95% CL): 3.6 (3.2 - 4.2)

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range). प्पाप (अ ५ - ५-५) CV (%): 12

 Number of Fronds
 Dry Weight

 Test Results:
 IC25 %(v/v) (95% CL)
 48 5 (24 5 - 85 - 6)
 7 93

 IC50 %(v/v) (95% CL)
 7 93
 7 93

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client:	ALS				Setup by:	JW /J	98				
Sample ID:	x-1 (L 1426336 - 1	t) (oran	ge)	Test Date:	feb 28	14				
Work Order No.:	FF041				t Species:	Lemna mino	or				
Culture Source:	CPCC #	490									
Test Culture Age:	9 15 days	5		> 8X Gro	wth? (Y/N)	. Y					
Light Intensity Range:	41,000	S600 IUX				1: feb 26/14					
Day	0	1	2	3	4	5	6	7			
Shelf Temp (°C)	25.0	26,0	25.5	25.5	26.0	26.D	26.0	26.0			
Initials	WC	As	<u>/h</u>	JBF	JW	JW	NC	MC			
Sample Characteristics Temperature (°C) DO (mg/L) pH Conductivity (µS)	25·5 10·3 7·2 349	Water Quality		Aeration?: Nutrients added?:	20 min	<u>-</u>	8.5 7.5	later Quality			
Concentral	tion	Tempera	ture (°C)	pl	Н	C	onductivity	(µS)			
% (V/V)		Day 0	Day 7	Day 0	Day 7		0 h				
Control		24.0	250	8.4	8.3		878				
1.5		24.0		8.1	8.3		898				
3.08		24.0	250	8.1	8-3		906				
6.1		24.0	2500	8.1	8.4		906				
12.1		24.5	25.0	8.1	8.4		919				
24.2		25.0	-	8.0	8-3		946				
48.5		25.0	250	7.9	8.4		1014				
97		24.5	25.0	7.5	8-4	1	141				
Initials		JW LJBF	4se	JW/JBF	Kr		/ JBF	-			
Thermometer: Sample Description: Comments:	Calibrated CIECIT	Thermometer	Cond. Meter	: c-2		_pH meter:	PH - 2				
Reviewed:		JGh		Date Review	ved:	<i>-</i>	larch	25/14			

Start Date: Pelo 28 / 14	Termination Date: Morch 3 / 14	Test set up by: John 7 DBF	
	Otange)		
	0		
	(L M26336 · 4)		
ARC.	- 1 ⊁	14033	-
Client	Sample ID:	Work Order #: 14033	

loitiale alcitiale	IIIIIdis	O.S.	_						- :				:	. I	j	_					. [-			÷
alaomad	COLUMNIA																								
Loss of	buoyancy																								
Roof	destruction																								
Single	frands																								
C. C	y isonasi y																								
Abnormal	8715									L															
y dellay	1610											y .		Х	×	×	×	×	>	ъ.	x	Ъ.	7-	×	K
al second	Necrosis											x													
Chlorone	Cilipiosis																								
No. of frands	Day 7	38	£±	ુ	POG	<u>5t</u>	£5	499	8	وي	88	છુ	87	42	40	99	44	96	89	& &	10 11	19	53	નેન	ī
No. of	Day 0	ؽ	ن	9		٥	.5	د	د	ن	J	.ي	J	.9	٥	J	د.	J	J	و	.5	J	,	9	د.
100	d E	¥	a	ပ	۵	⋖	8	ن	O	∢	æ	ပ	٥	∢	æ	ပ	٥	Ą	т	ن	٥	∢	Β	O	٥
Contradion	Concerniation (% 1000)			CMC			•				22	75 %								-				313	

	Have 35/14
	Date Reviewed:
!	Jóse
Comments:	Reviewed by:

(96vB): X1 (1.1476336.4) Work Order #: ND#4 Sample ID: Client

Slart Date: Feb 187/14 Termination Date: Morch 17/14 Test set up by: 3w / 38F

_		_								_	_	_				_	_	_		_		_	_		
- Initial		250	į		<i>-</i>		_		7																
1,000	Commence																								
Lossof																									
Root	destruction																								!
Single	fronds																								
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ciblodally	×		×																					
Abnormal	size																								
N	2	×	×	×	×	×	×	×	×																
1	5150000							:																	
i i	SIGNOR SIGNOR	Ś	8	SÉ.																					
No. of fronds	Day 7		Ž	K	앜	ي آ	8	543	S																
No. of	Day 0	ر	J	1₹,	J	J	ن	ŋ	د																
1 t	D V	∢	В	ပ	۵	⋖	8	U	٥	4	æ	ပ	D	4	В	ပ	٥	4	В	ပ	Δ	∢	В	၁	٥
1000	Sy n.v.)							5																	

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Reviewed by:

J64

Date Reviewed:

Maria

7-d Lemna minor Weight Data Sheet

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C	HE	ш	

ALS

Start Date: Reb 28/14

Sample ID:

XI (1426336 - 4) (orange)

Termination Date: March 7 /14

Work Order #:

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
10 (414)	A	1	1222.95	1227 - 76	N4/30
	В	2	1244.64	1250 . 51	1 1
control	С	3	1223,28	1227. 78	
	D	4	1250 64	1258 -09	W
	A	5	1218.00	1223 - 44	
	В	6	1230.65	1238 - 62	
1.5	С	7	1245.92	1252.55	
No. of the last of	D	8	1246.56	1253 - 23	
	A	9	1264.17	1269.51	
211	В	. 10	1232.70	1239 . 84	
3.0%	С	11	1234.79	1240.26	
MARKET WEST	D	12	1229.47	1236.16	1601 440
36	A	13	1245.32	1251 - 62	
	В	14	1247.10	1252.19	
6.1	С	15	1219.59	1224 . 26	
	D	16	123137	1237 · 25	
77-	Α	17	1229.68	1235 · 86	
	В	18	1239.35	1245 - 21 18	
12.1	С	19	1232.49	1239 - 79	
1124202 140004 W. CANNOT	D	20	1209.69	1215- 20	
	A	21	1224.78	1230 - 22	
	В	22	1217.25	1222.22	
24.2	С	23	1238.72	1246.03	
	D	24	1245.10	1251 . 17	
A	A	25	1251.74	1257 - 57	
	В	26	1230.18	1235 - 85	
48.5	С	27	1254.43	1259 - 62	
	D	28	1233.55	1238 - 58	1 1

Comments:	Reweighed pans - 8-1253:	28 12-1236.13	19-1229.77
Reviewed by:	JGu	Date Reviewed:	March 26/14

7-d Lemna minor Weight Data Sheet

Client: Sample ID: Work Order #:	ALS XI (L	1426336 - 4) Term	Start Date: F9b 28 / 14 Termination Date: March 7 / 14				
Concentration % (V/V)	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials			
70 (0)	A	29	1248.17	1254.02	NY/JW			
0.77	В	30	1241.45	1247-00				
97	-	2)	122/01	1220 (31)				

90 (V/V)	Keh	orange	r an weight (mg)	ran r plant (mg)	IIIIIais	
	A	29	1248-17	1254.02	NYB	
0.7	В	30	1241.45	1247-00		
97	С	31	1226.01	1230 - 94		
	D	32	1231.49	1236.03	t	
	A			Title samedin o		
	В					
	C					
	D					
······································	Α	2000	AND V. (800) A (0)	W) = A W		
	В					
	C					
Park St. William	D	ER-ENDWINES	to transport toward of	150	2)	
	Α					
	В					
	С					
	D					
	Α		97-000 (State of State of Stat	99-399 1079(33) 97-343		
	В					
	С					
	D			Y	20 (0)	
	A					
	В					
	C					
	D					
& W	A	1 22		THE PROPERTY OF THE PARTY OF TH		
	В					
	С					
	D				-	

Comments:			
Reviewed by:	Jou	Date Reviewed:	March 26/14

Report Date: Test Code: 26 Mar-14 09:22 (p 1 of 2) 14077d | 11-8240-3329

Lemna	Growth	Inhibition Test							Nautilus	Environmental
Analys		17-4325-8399 26 Mar-14 9:20			ond Count onlinear Regre	ession		CETIS Version Official Result		
Batch	D:	18-7938-8836	Test	Type: Le	mna Growth			Analyst: Je	slin Wijaya	
Start D	ate:	28 Feb-14	Prot	ocol: E	C/EPS 1/RM/	37		Diluent: AF	PHA (modified)	
Ending	Date:	07 Mar-14	Spec	cies: Le	mna minor			Brine:		
Duratio	on:	7d Oh	Sou	rce: Cl	PCC#490			Age: 9d		
Sample	e ID:	19-2140-4869	Cod	e: 72	2864FC5			Client: Al	.S	
Sample	e Date:	25 Feb-14 11:10	0 Mate	erial: E	fluent			Project:		
Receiv	e Date:	27 Feb-14 10:30	O Sou	rce: Al	LS					
Sample	e Age:	61h (4 °C)	Stat	ion: L1	1426336-4(X1)				
Non-Li	near Reg	ression Option	ns							
	Function					X Transf		nsform Weighting		PTBS Function
3P Cun	nulative L	.og-Normal EV	[Y=A*(1- Φ(log(X/D)/C	5))]	None	None	Normal [W	=1]	Off [Y*=Y]
Regres	sion Su	mmary								
Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical		n(a:5%)	
10	-92.56	192	195.5	0.3445	Yes	0.6124	2.621	0.6914 Non-Sig	nificant Lack of Fit	
Point E	Estimates	S								
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL				
IC5	5.115	N/A	15.56	19.55	6.429	NA				
IC10	11.88	1.618	28.72	8.42	3.481	61.82				
IC15	20.97	7.006	43.22	4.769	2.314	14.27				
IC20	32.94	15.11	60.25	3.036	1.66	6.618				
IC25	48.53	24.54	85.59	2.06	1.168	4.076				
IC40	128.9	42.79	342.8	0.7759	0.2917	2.337	> 97	((v/v)		
IC50	231.9	49.85	1079	0.4312	0.09268	2.006 J	('	0 - 1		
Regres	sion Par	rameters								
Param	eter	Estimate	Std Error			t Stat	P-Value	Decision(a:5%)		
Α		73.89	4.539	65	82.79	16.28	<0.0001	Significant Paramet		
C		2.319	1.129	0.1052	4.533	2.053	0.0492	Significant Paramet		
D		231.9	156.1	-74.05	537.9	1.486	0.1482	Non-Significant Par	ameter	
3,7722	Table									
Source)	Sum Squa		n Square	DF	F Stat	P-Value	Decision(a:5%)		
Model		2415.18	2415		1	18.29	0.0002	Significant		
Lack of		433.2885	86.6		5	0.6124	0.6914	Non-Significant		
Pure E		3396.25		5104	24					
Residu	al	3829.539	132.	0531	29					
Residu	al Analy	sis								
Attribu	rte	Method			Test Stat		P-Value	Decision(a:5%)		
Variand	ces		uality of Va		9.301	14.07	0.2317	Equal Variances		
			ne Equality			2.423	0.3606	Equal Variances		
Distribu	ution		ilk W Norm	_	0.9585	0.9338	0.2491	Normal Distribution		
	Anders		Darling A2	Normality	0.4328	2.492	0.3079	Normal Distribution		

Report Date:

26 Mar-14 09:22 (p 2 of 2) 14077d | 11-8240-3329

Test Code: 14077d | 11-8240-332

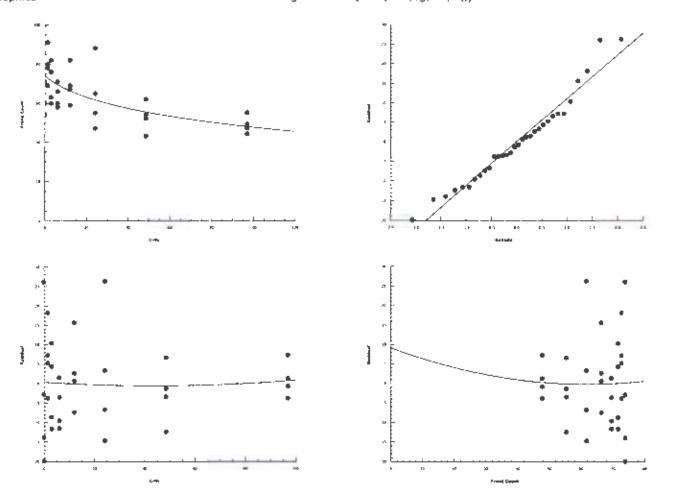
Lemna Gro	wth Inhibition Tes	t				Nautilus Environmental			
Analysis ID: Analyzed:	: 17-4325-8399 26 Mar-14 9:20			Frond Count Nonlinear Re				IS Version: ial Results:	CETISv1.8 7 Yes
Frond Cour	it Summary					Calculated Va	riate		
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	71 25	54	100	10 21	20.42	28 66%	0.0%
15		4	79.5	69	91	4.518	9 037	11.37%	-11 58%
3		4	70.25	60	82	5 234	10.47	14.9%	5.4%
6.1		4	63.75	58	71	2.955	5 909	9 27%	10.53%
12 1		4	69.25	59	82	4.768	9.535	13.77%	2.81%
24 2		4	63.75	47	88	8.88.2	17.76	27.87%	10.53%
4B.5		4	52.75	43	62	3 902	7.805	14 8%	25.96%
97		4	48 75	44	55	2 323	4.646	9.53%	31.58%

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Negative Control	60	71	54	100	
1.5		69	91	78	80	
3		60	82	63	76	
6.1		66	58	60	71	
12.1		69	59	82	67	
24.2		55	47	88	65	
48 5		54	62	52	43	
97		55	49	47	44	

Graphics

3P Cumulative Log-Normal EV (Y=A*(1- Φ(log(X/D)/C)))



Report Date:

26 Mar-14 09:22 (p 1 of 2) 14077d | 11-8240-3329

Test Code: 14077d |

ID: 19	hibition Test	End	noint.	Total Day Majal				- /2 /2		Environmental
		End	ooint:	Total Day Majal	4		and the same of	200 100		
1: 26			DOING.	Total Dry Weigh	nt-mg		CETI	S Version:	CETISv1.8.7	
	Mar-14 9:21	Anal	ysis:	Nonlinear Regn	ession		Offic	ial Results:	Yes	
: 18	-7938-8836	Test	Type:	Lemna Growth			Analy	yst: Jesli	n Wijaya	
e: 28	Feb-14		ocol:	EC/EPS 1/RM/	37		Dilue	nt: APH	A (modified)	
Date: 07	Mar-14	Spec	cies:	Lemna minor			Brine	e:		
	Oh	Sou	rce:	CPCC#490			Age:	9d		
D: 19	-2140-4869	Cod	e:	72864FC5			Clien	nt: ALS		
Date: 25	Feb-14 11:10) Mate	erial:	Effluent			Proje	ect:		
Date: 27	Feb-14 10:30	Sou	rce:	ALS						
Age: 61	h (4 °C)	Stati	ion:	L1426336-4(X1)					
ar Regre	ession Option	ns								
unction										PTBS Functio
ogistic E\	/ [Y=A/(1+(X/	D)^C)]			None	None	N	ormal [W=1]		Off [Y*=Y]
ion Sumi	mary									
Log LL	AICc	BIC	Adj R	2 Optimize	F Stat	Critical	P-Value			
-10.55	27.96	31.5	0.0494	Yes	0.9671	2.621	0.4574	Non-Signif	icant Lack of Fit	
timates										
%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
30.78	N/A	92.13	3.249	1.085	NA 1					
62.41	4.96	128.4	1.602	0.7787	20.16					
96.67	7.895	211.6	1.034	0.4727	12.67					
134.4	N/A	416.5	0.744	0.2401						
176.4	N/A	885	0.5668	0.113	NA (>	97%(V/V)			
339.9	N/A	N/A	0.2942	2 NA	NA }	11.5	,			
498.9	N/A	N/A	0.200	5 NA	NAJ					
ion Parar	meters									
er	Estimate	Std Error	95% L	CL 95% UCL	t Stat	P-Value			·	
	6.078	0.2748					_			
	1.057						_			
	498.9	1062	-1582	2580	0.4698	0.6420	Non-Signi	ficant Param	eter	
Table										
					F Stat	P-Value				
it					0.9671	0.4574	Non-Signi	ticant		
or										
		0.78	+904	23	-					
	Method									
s		-								
Mod Levene Equality of Variance		nce 0.7234	2.423	0.6536	Equal Var	rances				
on		ilk W Norm	- 124	0.9784	0.9338	0.7513	Normal Di	- Andle - At		
	D: 19 Date: 25 Date: 27 Age: 61 Par Regression Sumi Log LL 10.55 timates % 30.78 62.41 96.67 134.4 176.4 339.9 498.9 on Parailer Fable	19-2140-4869 D: 19-2140-4869 Date: 25 Feb-14 11:10 Date: 27 Feb-14 10:30 Age: 61h (4 °C) Dar Regression Option Distriction Dis	Total Oh Source	Total Oh Source:	Total	Test State	Test Stat Critical Source CPCC#490 Source CPCC#490	Total	Total Oh Source: CPCC#490 Age: 9d	Total Source CPCC#490 Age 9d

Lemna Growth Inhibition Test

Report Date: **Test Code:**

26 Mar-14 09:22 (p 2 of 2) 14077d | 11-8240-3329

Nautilus Environmental

Analysis ID:	19-3306-0699	Endpoint:	Total Dry Weight-mg	CETIS Version:	CETISv1.8.7
Analyzed:	26 Mar-14 9:21	Analysis:	Nonlinear Regression	Official Results:	Yes

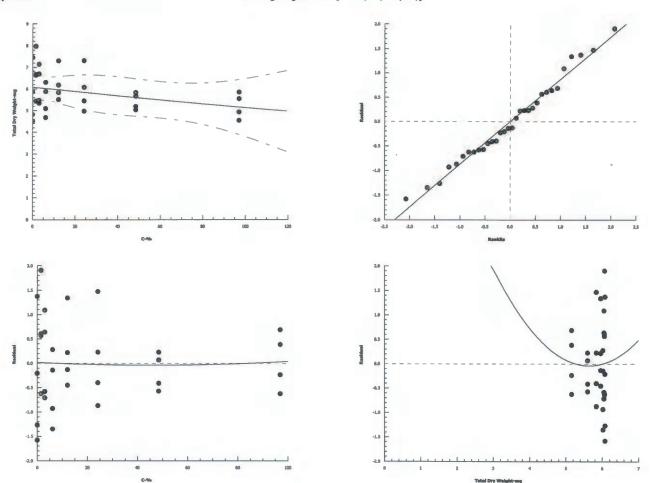
Total Dry Weight-mg Summary				Calculated Variate					
C-% Contro	I Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0 Negativ	e Control	4	5.658	4.5	7.45	0.6656	1.331	23.53%	0.0%
1.5		4	6.677	5.44	7.97	0.5167	1.033	15.48%	-18.03%
3		4	6.16	5.34	7.14	0.4463	0.8926	14.49%	-8.88%
6.1		4	5.485	4.67	6.3	0.3697	0.7395	13.48%	3.05%
12.1		4	6.205	5.51	7.3	0.3898	0.7796	12.56%	-9.68%
24.2		4	5.948	4.97	7.31	0.507	1.014	17.05%	-5.13%
48.5		4	5.43	5.03	5.83	0.1904	0.3809	7.02%	4.02%
97		4	5.217	4.54	5.85	0.2961	0.5922	11.35%	7.78%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Negative Control	4.81	5.87	4.5	7.45	
1.5		5.44	7.97	6.63	6.67	
3		5.34	7.14	5.47	6.69	
6.1		6.3	5.09	4.67	5.88	
12.1		6.18	5.83	7.3	5.51	
24.2		5.44	4.97	7.31	6.07	
48.5		5.83	5.67	5.19	5.03	
97		5.85	5.55	4.93	4.54	

Graphics

3P Log-Logistic EV [Y=A/(1+(X/D)^C)]



Lemna minor Summary Sheet

Client:	ALS	Start Date:	Feb 28 , 2014
Work Order No.:	14077	Set up by:	
Sample Information	1:		
Sample ID:	L 1426335 - 5 (X-14)		
Sample Date:	Feb 25/14 @ 0900h		
Date Received:	196 27 / 14 @ 1030h		
Sample Volume:	2 × 20L		
Test Organism Info	emation:		
rest Organism into	mation.		
Culture Date:	02191	4	
Age of culture (Day (
>8X growth in APHA			
J			
KCI Reference Tox	icant Results:		
Reference Toxicant	ID: Lm IOO		
Date Initiated:	F86 20, 2014		
7-d No. of Fronds IC	50 (95% CL): 3.6 (3.2-4.2)	
			=\
7-d No. Fronds IC50	Reference Toxicant Mear	ո (2 SD Range)։	S) CV (%): 12
		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	37.5 (25.8 - 53.2)	> 97
	IC50 %(v/v) (95% CL)	87.0 (48.0 - 97)	>97 -

Reviewed by:

16h

Date reviewed: March 27/14

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by: JW / JBF				
Sample ID:	X-14 (F	1426336 - 5) (black) 1	Test Date:	feь 28	/ 14		
Work Order No.:	FF049			Tes	t Species:	Lemna mino	r		
Culture Source:	cpcc #	490							
Test Culture Age:	10 days			> 8X Growth? (Y/N): _ Y					
Light Intensity Range:	4100 - 4	6co lux				Feb 26/	14		
,									
Day	0	1	2	3	4	5	6	. 7	
Shelf Temp (°C)	25.D	2000	25%	25.5	26.0	26.0	25.0	25.0	
Initials	- 210	As	As	JBF	SMC	MC	JW.	JW.	
Sample Characteristics: Temperature (°C) DO (mg/L) pH Conductivity (µS)	25.0 9.8 7.1 83	1.8 Nutrients added?: Y					Adjusted W 24.0 8.9 7.4 1952	ater Quality	
Concentration	Tempera	ture (°C)	pl	н	Conductivity (µS)				
% (٧/٧)	Day 0	Day 7	Day 0	Day 7					
Control		24.0	23.0	8-4	8.2	878			
1.5		24.0	23.0	8.1	8.4		894		
3.08 ^{DW}		24.0	23.0	8.1	8.5		906		
6-1			23.0	8.0	8.6	929			
12-1		24.0	23.0	8.0	8.5	974			
24 - 2		24.0	23.0	7.9	8.84		1060)	
48.5		24.0	23.0	7.7	8.4		122	2	
97		24.0	23.0	7.4	8.4	- 1	552		
Initials		JM / JBF	JW.	38C / MC	WC	MC	/ OBF		
Thermometer: Sample Description: Comments:	Calibrated 1	Thermometer	Cond. Meter:	c-3		pH meter:	H- 3		
Reviewed:		Joh		Date Review	wed:	- 1	March:	16/14	

Start Date: Feb 28 / 14 ALS Client:

Work Order #: 14077	_								Test	set up by:	Test set up by: JW / JBP	
-	No. of	No. of fronds	Oblomela	Mannels	Valleer	Abnormal	- dishonite	Single	Root	Loss of	Constitution	al a la la la
% (V/V)	Day 0	Day 7	CHOLOSIS	Nectoria	Tenow	size	Gibbosity	fronds	destruction	buoyancy	Comments	sieniui
٧	U	æ										300
m	9	ઝ					1					-
O	O	88										
۵	9	1/1										
A	و	d2										
В	9	901			×							-
O	9	115			×							
۵	و	유										
٧	٥	130			×							
В	9	18			×							-
O	٥	132			×							
۵	,s.	83			×							
۷	و	43		×	×							
В	9	ta B	×	×	×							
ပ	و	13		×	×							-
۵	9	83			×							
٧	و	넴			×							7
В	9	8		×	×							_
ပ	9	S			×							
۵	9	69			×							
A	و	101			×							
В	9	63			×							
O	9	000			×							-
0	و	d.p			×							1

Reviewed by: Comments:

Date Reviewed:

March 26/14

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Initials S Hanch 26/14 Comments Termination Date: March ₹ / 14 Start Date: Feb 28 / 14 1 38F Test set up by: JM Date Reviewed: Root Loss of destruction buoyancy Single × × × Gibbosity Abnormal size Yellow ×× Χ ×× ×. × × Necrosis (Black) ×× × × XX × × Chlorosis ALS X 14 (L1426336-5) Day 0 Day 7 No. of fronds 38.8 36 88 ş 1980 و ڡ ی ڡ ڡ ي ی و 14077 Rep ۵ 00 ပ m О ۵ ۵ A B ω ш О ⋖ m 0 ⋖ ⋖ ⋖ ⋖ Concentration 9/0 (v/v) Work Order #: Reviewed by: Comments: Sample ID: 48.5 ţ Client:

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: Reb 28 / 14

Sample ID:

X14 ([1426336 - 5)

Termination Date: March 7 / 14

Work Order #:

14077

Concentration	Rep	Pan No. Black	Pan weight (mg)	Pan + plant (mg)	Initials
10 (41-)	, A	1	997,24	1005 - 42	NYION
	В	2	1010,74	1018 . 13	1 1
Control	С	3	1003.90	1011 - 76	
	D	ч	984,66	994 . 13	
	TA.	9	1009.92	1018 . 40	
	В	6	995.48	1005 - 25	
1.5	С	7	999.39	1010 - 57	
	D	8	1002.88	1009 - 94	
	Α	٩	996.56	1008 - 98	
Sec	В	.10	1008.97	1016 - 35	
3.0%	С	11	1045.11	1056 - 30	
	D	12	995,21	1002 . 85	
	Α	13	1033.97	1042 - 44	
	В	. 14	1041.32	1049 - 56	
6.1	С	15	1001.57	1011 - 58	
	D	16	1002.19	010-10	
	Α	- 17	1005,53	1015 - 68	
	В	8	994.57	1002 - 11	
12.1	С	А	1007.01	1012 - 84	
	D	20	1008.29	1016 - 88	
	A	21	978.99	988.06	
	В	22	998.46	1007 . GO	
24.2	С	23	1031-25	FF . 0401	
	D	24	1021.68	1030 - 91	
	Α	29	1047.87	1056 . 04	
	В	26	1006.52	1013 - 80	
48.5	С	27	1015.05	1024 - 54	
	D	28	1022.77	1030 - 89	1 1

Comments:	Reweighed pans- 5-1018.24	17-1015.57	21-987.66
Reviewed by:	Jou	Date Reviewed:	March 26/14

7-d Lemna minor Weight Data Sheet

Client:	ALS	Start Date:	Feb 28 / (4	
Sample ID:	X 11 ((1.113 e 33 e - 2)	Termination Date:	March 7/14	
Work Order #:	FF041			

Concentration % (V/V)	Rep	Pan No. Black	Pan weight (mg)	Pan + plant (mg)	Initials
	Α	29	1011.53	38 - FIOI	NY/ov
	В	30	1020,63	1027 - 51	- 1 1
97	С	31	1003.88	1012.29	
	D	32	1020,63 1003.88 1009.06	1018.16.	4 1
	Α				7.
	В				
	С				
	D	-	, ,		
	Α				
	В			!	
	С				
	D	1			
	Α	: J			
	В				
	С				
	D	-			
	Α				
	В			2	
	С				
	D				
	Α			,	
	В				1
	С				
	D				
	Α			1.5	
	В	-	1		
	С				
	D				

Comments:		<u> </u>
Reviewed by:	 Date Reviewed:	March 26/14
riononou by:	 	

Report Date: Test Co

)3

t Date:	20 Mai-14 09.20 (p 1 01 2
ode:	14077e 03-2104-3103

Lemna	Growth	n Inhibition Tes	t								Nautilus	Environmenta
Analysi	is ID:	00-0534-3718	End	point:	Frond Count			C	ETIS Versi	ion:	CETISv1.8.7	
Analyz		26 Mar-14 9:27		lysis:	Linear Interpola	ation (ICPIN	l)	C	official Res	ults:	Yes	
Batch I	D:	18-7938-8836	Test	Type:	Lemna Growth			- A			Wijaya	
tart D	ate:	28 Feb-14	Prot	ocol:	EC/EPS 1/RM/	37		D	iluent:	APHA	(modified)	
inding	Date:	07 Mar-14	Spe	cies:	Lemna minor			В	rine:			
uratio	n:	7d 0h	Sou	rce:	CPCC#490			A	ge:	9d		
ample		18-2798-0256	Cod		6CF4C3E0					ALS		
		25 Feb-14 09:0		erial:	Effluent			P	roject:			
		27 Feb-14 10:3			ALS							
Sample	Age:	63h (2.8 °C)	Stat	ion:	L1426336-5(X1	4)						
		lation Options										
Trans		Y Transform			Resamples	Exp 95%		ethod	omolotica			
.og(X+		Linear	8061	1/0	200	Yes	14	vo-Point Int	erpolation	-		
	stimate											
.evel C5	24.24	95% LCL N/A	95% UCL 29.15	TU 4.126	95% LCL 3.43	95% UCL NA				_		
C10	27.05		33.64	3.697		NA NA						
C15	30.17		39.1	3.314		NA						
C20	33.65		45.84	2.972		4.519						
C25	37.51	25.77	53.2	2.666	1.88	3.88						
C40	55.75		84.58	1.794		2.873						
C50	86.96	48.05	N/A	1.15	NA	2.081						
Frond (Count S	Summary				Ca	lculated	Variate				
0-%		ontrol Type	Count	Mean		Max	Std Err				%Effect	
)	N	egative Control	4	91.75		105	4.802	9.605	10.47		0.0%	
.5			4	91	64	109	9.908	19.82	21.78		0.82%	
i.1			7	101.3 87.25		126 107	13.72 6.957	27.44 13.91	27.1% 15.95		-10.35% 4.91%	
2.1			4	91	75	113	7.958	15.92	17.49		0.82%	
4.2			4	91.75		95	1.797	3.594	3.92%		0.0%	
8.5			4	59.75		73	4.715	9.43	15.78		34.88%	
97			4	45	40	54	3.317	6.633	14.74	% !	50.95%	
rond (Count D	Detail										
2-%		ontrol Type	Rep 1	Rep 2		Rep 4		-				
)	N	egative Control	90	90	82	105						
-			89	102	109	64						
			124	78	126	77 77						
3			0.77			77						
3 3.1			87	78	107							
1.5 3 6.1 12.1			113	75	89	87						
3 5.1												

Report Date: Test Code: 26 Mar-14 09:28 (p 2 of 2)

14077e | 03-2104-3103

Lemna Growth Inhibition Test

Nautilus Environmental

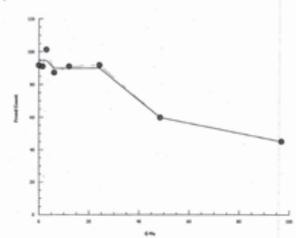
Analysis ID: Analyzed: 00-0534-3718 26 Mar-14 9:27 Endpoint: Frond Count

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

CETISv1.8.7

Graphics



Report Date: Test Ccde: 26 Mar-14 09:28 (p 1 of 2) 14077e | 03-2104-3103

Nautilus Environmental Lemna Growth Inhibition Test CETIS Version: CETISv1.8.7 19-1952-5350 Analysis ID: Endpoint: Total Dry Weight-mg Official Results: Yes Analyzed: 26 Mar-14 9:27 Analysis: Linear Interpolation (ICPIN) Test Type: Lemna Growth Jeslin Wijaya Batch ID: 18-7938-8836 Analyst: APHA (modified) Start Date: 28 Feb-14 Protocol: EC/EPS 1/RM/37 Diluent: Brine: Ending Date: 07 Mar-14 Species: Lemna minor CPCC#490 9d Duration: 7d 0h Source: Age: Sample ID: 18-2798-0256 Code: 6CF4C3E0 Client: ALS Sample Date: 25 Feb-14 09:00 Material: Effluent Project: Receive Date: 27 Feb-14 10:30 Source: ALS Station: L1426336-5(X14) Sample Age: 63h (2.8 °C) Linear Interpolation Options X Transform Y Transform Seed Resamples Exp 95% CL Method Log(X+1) Linear 274734 200 Yes Two-Point Interpolation Point Estimates Level % 95% LCL 95% UCL TU 95% LCL 95% UCL IC5 36.61 N/A N/A 2.731 NA IC10 61.05 N/A N/A 1.638 NA NA >97 N/A N/A <1.031 NA NΑ IC15 IC20 >97 N/A N/A <1.031 NA NA IC25 >97 N/A N/A <1.031 NA NA N/A NΑ IC40 >97 N/A <1.031 NA N/A <1.031 NA NA IC50 >97 N/A Calculated Variate Total Dry Weight-mg Summary %Effect Min Std Err Std Dev CV% C-% Control Type Count Mean Max 7.39 0.8912 10.83% 0.0% 0 Negative Control 8.225 9.47 0.4456 4 1.763 19.32% -10.91% 7.06 0.8813 1.5 4 9.123 11.18 -16.2% 2.391 25.01% 3 4 9.558 7.38 12.02 1.195 0.9305 10.75% -5.26% 6.1 4 8.658 7.91 10.01 0.4652 7.54 1.073 12.22% -6.72% 4 8.777 10.15 0.5364 12.1 -12.34% 24.2 4 9.24 9.07 9.52 0.09892 0.1978 2.14% 48.5 4 8.265 7.28 9.49 0.4565 0.9131 11.05% -0.49% 6.63% 4 7.68 6.33 9.1 0.6463 1.293 16.83% 97 Total Dry Weight-mg Detail Rep 4 Control Type Rep 1 Rep 2 Rep 3 9.47 0 Negative Control 8.18 7.39 7.86 1.5 8.48 9.77 11.18 7.06 7.38 11.19 7.64 12.02 3

6.1

12.1

48.5 97 8.47

10.15

9.07

8.17

6.33

8.24

7.54

9.14

7.28

6.88

10.01

8.83

9.52

9.49

8.41

7.91

8.59

9.23

8.12

9.1

Lemna Growth Inhibition Test

Report Date:

26 Mar-14 09:28 (p 2 of 2) 14077e | 03-2104-3103

Test Code:

Nautilus Environmental

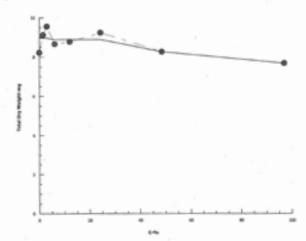
Analysis ID: Analyzed: 19-1952-5350 26 Mar-14 9:27 Endpoint: Total Dry Weight-mg

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CET Official Results: Yes

CETISv1.8.7

Graphics



Lemna minor Summary Sheet

Client:	ALS		Start Date:	feb 28, 20	744	
Work Order No.:	FF04/1		Set up by:	78C \ WC		-
Cample Information						
Sample Information	1:					
Sample ID:	L 1426336 - 6	(X3A)				
Sample Date:	Feb 25 / 14 @					
Date Received:	feb 27 /14 @	1030h				
Sample Volume:	2 × 20L					
Test Organism Info	rmation:					
Culture Date:		021914				
Age of culture (Day 0		9 days				
>8X growth in APHA	7:	Y				
KCI Reference Toxi	cant Results:					
Reference Toxicant I	D: Lm 100					
Date Initiated:	feb 20	2014				
7-d No. of Fronds IC	50 (95% CL):	3.6 (3.2 - 4.2)				
7 (No Free to 1955)	D-1					
r-a No. Fronds IC50	Reference Tox	icant Mean (2 SD Ran	ge): <u>4.4 (3.5 - 5-</u> 9	6) CV (%):	

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	90.0 (25.5 - 97)	7 97
	IC50 %(v/v) (95% CL)	7 97	797

Reviewed by: JGL Date reviewed: March 26/14

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by:	JW / J	BE .		
Sample ID:	X39 (L 1426336 - (6) (blue)	. ,	Test Date:	Feb 28/	44		
Work Order No.:	14077			Tes	t Species:	Lemna mino	or		
Culture Source:	cpcc # v	190							
Test Culture Age:	9 ps days			> 8X Growth? (Y/N): _ Y					
Light Intensity Range:	цосо -	200 KMX		Date	Measured:	feb 26/	/ 14		
Day	0	1	2	3	4	5	6	7	
Shelf Temp (°C)	25.0	U.0	255	25.5	26.0	26.0	26.0	26.0	
Initials	NC	A	m	JBF	JW	WC	WC	SW	
Sample Characteristics: Temperature (°C) DO (mg/L) pH Conductivity (µS)	Initial W 25-0 10-0 7-2 345	ater Quality		Aeration?: Nutrients added?:	20 min	\longrightarrow	Adjusted W. 24.0 9.0 7.5 1143	ater Quality	
Concentratio	on	Tempera	ture (°C)	pl	Н	0	onductivity ((μS)	
% (٧/٧)		Day 0	Day 7	Day 0	Day 7		0 h		
Control		24.0	25.0	8.4	8.1	- ;			
1.5		24.0	25.0	8,1	8.3		888	3	
3.0%		24.0	25.0	8.1	8.3		892	2	
6-1		24.0	25.0	8.1	8.2		899	•	
12.1		24.0	25.0	8.1	8.3		917		
24 - 2		24.0	25.0	8.0	8.2		946		
48.5		25,0	25.0	7.9	8.3		102	8	
97		24.0	25.0	7.5	8.5		1143		
Initials		JW / JBF		38C/NC		OV	78C \ U		
Thermometer: Sample Description: Comments:	Calibrated 1	Thermometer	Cond. Meter:	C- 2		pH meter:	PH - 2		
Reviewed:		JGL		Date Review	ved:	Ма	rely 26	/14	

Start Date: Rev 28 / 14 ALS Client:

		- dela	SIRBIL	300											,												>
	ľ			ñ	_															L	Ц	L	L	Ц		Ц	
Termination Date: Morch ₹ / 14	Test set up by: JW / J9F	Oceanoralia	Commens																								
tion Date:	set up by:	Loss of	buoyancy																								
Termina	Test	Root	destruction																								
		Single	fronds																								
		Ohbook	Gibbosity																								
		Abnormal	size																								
		Vollow	1.080.0						×	×		×	×	×		×	×		×		×		×	×			×
(Bine)		Macrosla	Necrosis						×					х							X						
		Phlomeia	CITICAGES																								
(1.1426336 - 6)		No. of fronds	Day 7	63	49	84	ht.	9	64	53	42	P	8	59	th9	63	3	88	59	82	52	14	9	*	82	44	ま
		No. of	Day 0	. 9	9	ى	9	9	9	9	9	و	9	و	بى	ی	و	ي	9	9	9	9	9	و	9	9	9
¥3A	14077	0	dav	A	В	ပ	۵	A	В	ပ	۵	A	æ	ပ	۵	A	В	ပ	۵	A	В	0	Q	A	В	ပ	۵
Sample ID:	#	Controller	% (v/v)			control				6.5		,	MC	30.6				-9				12.1				24.3	

		1
Comments		

Reviewed by:

Date Reviewed:

Initials

30

March 26/14 Comments Termination Date: March 7 / 44 Start Date: Feb 28 / 14 Test set up by: Jiv / J&F Date Reviewed: Loss of buoyancy Root Single fronds Gibbosity Abnormal Yellow × × ×× × Chlorosis Necrosis (enne) XXX × ALS X3A (1426336 - 6) Day 0 Day 7 No. of fronds ಭ ಭ ಸ ಭ ಭ ಭ ಭ 43 3 ٩ ۍ ڧ ی ۵ ۍ 14041 Rep œ ပ A B O D æ O മഠ ۵ ΑB O ۵ ⋖ ⋖ Ω ⋖ Concentration Work Order #: Reviewed by: Comments: Sample ID: O/O (V/V) IJ, ㅎ 48 Client:

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: Feb 28 / 14

Sample ID:

X3A (L1426336 - 6) (blue

Termination Date: March 7 / 14

Work Order #:

14077

Concentration	Rep	Pan No. Blue	Pan weight (mg)	Pan + plant (mg)	Initials
	Α	. 1	1240.05	1245 . 16	NY/s
	В	2	1250,74	1255.50	
COUNTOL	С	3	1234.78	1241 - 17	
	D	ц	1230.28	1236 . 12	1
	Α	5	1274,67	1279 . 66	
	В	6	1224.28	1230 - 46	
1.5	С	4	12 18,70	1223 . 35	
	D	8	1211.64	ON 128 1218.04	
	Α	9	1243.89	1250 - 34	
ηN	В	(0	1232,83	1239.81	
3.9x	С	Ш	1252.16	1257-95	
	D	12	1248,90	1254 - 57	2
	Α	13	1280.14	1284 - 45	
	В	14	1263.29	1269.66	
6-1	С	19	1242.26	1250 - 73	
	D	16	12.34.35	1239.50	
	Α	17	1249.55	1257 - 28	
	В	18	1274.71	1279.36	
12 -1	С	19	1234.75	1240 - 98	
	D	20	1253,51	1259.40	
	A	21	1239.03	1243. 57	
	В	22.	1242.78	1250 .53	
24.2	С	23	1231.72	1238 - 88	
	D	24	1232.77	1237 - 36	
	Α	25	1257,99	1264 . 16	
	В	26	1257.92	1263 - 20	
48.5	С	29	1240.57	1246.36	10
	D	28	1267.71	1273.54	V .

Comments:	Rewsigned	pans-	8-	1217.89	25-	263.86	31-1	235,36
Reviewed by:		m		Date R	eviewed:	М	arch	26/14

7-d Lemna minor Weight Data Sheet

Client:

ALS

Start Date: F66 28 / 14

Sample ID:

X3A (L M26336 - 6)

Termination Date: Morch 7/14

Work Order #:

FF041

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
	A	29	1217.08	1223 - 42	N4/31
27	В	30	1224.86	1231. 45	
97	С	31	1230,27	1235 - 65	
	D	32	1219.36	1224.02	1 1
	Α				-
	В				
	С				
	D		-, -		
	Α			la de la companya de	
	В				
	С			2	
	D				
	Α				
	В			6	7
	С				
	D				
	Α				
	В				
	С				
	D				1 1
	Α				
	В	-			
	С		,		
	D			1	
	Α				
	В		1 1 1		
	С		*		
	D				

Comments:			
Reviewed by:	Joh	Date Reviewed:	March 26/14

Report Date: Test Code: 26 Mar-14 09:33 (p 1 of 2) 14077f | 19-5941-2284

Lemna	Growth	Inhibition Tes	t	h .						Nautilus	Environmental
Analys		15-2065-3662			rond Count	assian .			S Version:	CETISv1.8.7 Yes	
Analyz	ed:	26 Mar-14 9:32			Ionlinear Regn	ession					
Batch I	D:	18-7938-8836			emna Growth			Anal		Wijaya	
Start D		28 Feb-14			C/EPS 1/RM/	37		Dilue		(modified)	
Ending		07 Mar-14			emna minor			Brin			
Duratio	on:	7d 0h	Sou	rce: C	PCC#490			Age:	9d		
Sample	e ID:	05-2872-4256	Cod	e: 1	F83B120			Clier	nt: ALS		
Sample	e Date:	25 Feb-14 11:3	5 Mate		ffluent			Proje	ect:		
Receiv		27 Feb-14 10:3	0 Sou		LS						
Sample	e Age:	60h (3.9 °C)	Stat	ion: L	1426336-6(X3	A)			-		
Non-Li	near Re	gression Optio	ens								
Model	Function	n				X Transf	form Y Tra	nsform V	Veighting Fur	nction	PTBS Function
3P Cun	nulative l	Log-Normal EV	[Y=A*(1-Φ(log(X/D)/(C))]	None	None	N	lomal [W=1]		Off [Y*=Y]
Regres	sion Su	mmary									
Iters	Log L	L AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(a	:5%)	
11	-90.72	188.3	191.8	0.1643	Yes	0.4234	2.621	0.8277	Non-Signific	ant Lack of Fit	
Point E	stimate	s									
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	10.26	N/A	35.9	9.75	2.785	NA					
IC10	23.13	0.1504	61.82	4.323	1.618	664.8					
IC15	40.04	11.5	86.57	2.498	1.155	8.694					
IC20	61.92	22.15	128.7	1.615	0.7769	4.516					
IC25	90.02	25.51	220.7	1.111	0.4531	3.92					
IC40	231.1	12.01	1747	0.4328	0.05723	8327164	>97%	(V/U)			
IC50	407.4	3.707	44770	0.2455	0.002234	26.98 J	/ (/			
Regres	sion Pa	rameters									
Parame	eter	Estimate	Std Error	95% LC	L 95% UCL	t Stat	P-Value	Decision(
A		62.9	3.887	55.29	70.52	16.18	<0.0001	-	t Parameter		
С		2.238	1.673	-1.04	5.517	1.338	0.1913		ficant Parame		
D		407.4	530.2	-631.8	1447	0.7684	0.4485	Non-Signi	ficant Parame	ter	
ANOVA	Table										
Source		Sum Squ		n Square	DF	F Stat	P-Value	Decision(
Model		952.7588		7588	1	8.094	0.0081	Significant			
Lack of		276.71		4199	5	0.4234	0.8277	Non-Signi	ficant		
Pure Er		3136.75		6979	24						
Residua	al	3413.46	117.	7055	29						
	al Analy				_			_			
Attribut		Method	- Ma - #11		Test Stat	Critical	P-Value	Decision(
Variano	es		quality of Var		8.803	14.07	0.2671	Equal Var			
Dietrib	tion		ne Equality of			2.423	0.0582	Equal Var			
Distribu	con		filk W Norma		0.9418	0.9338	0.0843	Normal Di Normal Di			
		Anderson-	Darling A2 N	vormainty	0.745	2.492	0.0521	Normal Di	scribution		

Lemna Growth Inhibition Test

Report Date: Test Code:

26 Mar-14 09:33 (p 2 of 2) 14077f | 19-5941-2284

Mountil		Environmental
reaccu	wa	ELIAN OUR BELIEF

Analysis ID:	15-2065-3662	Endpoint:	Frond Count	CETIS Version:	CETISv1.8.7
Analyzed:	26 Mar-14 9:32	Analysis:	Nonlinear Regression	Official Results:	Yes

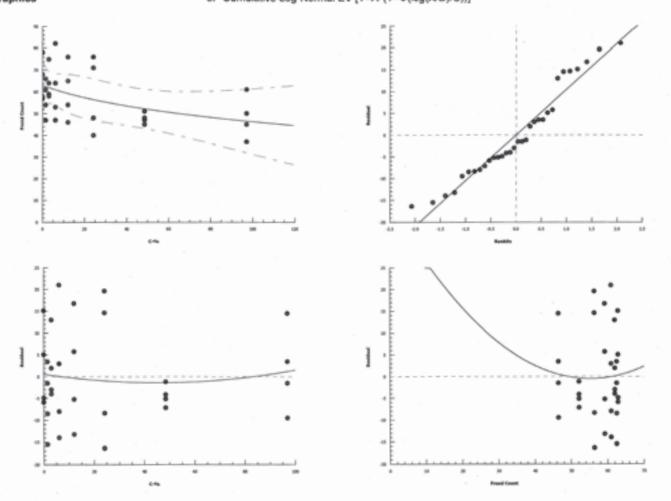
Frond Co	Frond Count Summary		Calculated Variate							
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	4	65.25	57	78	4.922	9.845	15.09%	0.0%	
1.5		4	57	47	66	4.143	8.287	14.54%	12.64%	
3		4	64	58	75	3.894	7.789	12.17%	1.92%	
6.1		4	61.5	47	82	7.687	15.37	25.0%	5.75%	
12.1		4	60.25	46	76	6.537	13.07	21.7%	7.66%	
24.2		4	58.75	40	76	8.731	17.46	29.72%	9.96%	
48.5		4	47.75	45	51	1.25	2.5	5.24%	26.82%	
97		4	48.25	37	61	5.023	10.05	20.82%	26.05%	

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Negative Control	57	58	78	68	
1.5		54	61	47	66	
3		64	75	59	58	
6.1		47	64	82	53	
12.1		76	46	65	54	
24.2		40	76	71	48	
48.5		51	47	45	48	
97		61	50	45	37	

Graphics

3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]



Report Date: Test Code: 26 Mar-14 09:34 (p 1 of 2)

14077f | 19-5941-2284

							10	st Code:		14077	1119-5941	-220
na Growth	h Inhibition Test	t								Nautilus	Environme	ental
ysis ID:	13-2665-5955	Endpo	oint: T	Total Dry Weigh	nt-mg		CE	TIS Versi	on:	CETISv1.8.7		
yzed:	26 Mar-14 9:33			inear Interpola	-	0		ficial Res		Yes		
h ID:	18-7938-8836	Test T	Type: L	emna Growth			Ar	nalyst:	Jeslin	Wijaya		
t Date:	28 Feb-14	Protoc		C/EPS 1/RM/3	37		Di	luent:	APHA	(modified)		
ing Date:	07 Mar-14	Specie	les: L	emna minor			Br	ine:				
ition:	7d 0h	Source	ce: C	CPCC#490			Ag	ge:	9d			
ple ID:	05-2872-4256	Code:	: 1	F83B120			CI	ient:	ALS			
ple Date:	25 Feb-14 11:3	5 Mater	rial: E	Effluent			Pr	oject:				
ive Date:	27 Feb-14 10:3	0 Sourc	ce: A	ALS								
ple Age:	60h (3.9 °C)	Statio	n: L	.1426336-6(X3	A)							
ar Interpo	olation Options											
ansform	Y Transform			Resamples	Exp 95%				-		-	
X+1)	Linear	12979	904 2	200	Yes	Two	-Point Inte	rpolation				
t Estimate	es											
st %	95% LCL		TU	95% LCL	95% UCL							
>97	N/A		<1.031	NA	NA							
>97	N/A		<1.031	NA	NA							
>97	N/A		<1.031	NA	NA							
>97 >97	N/A		<1.031	NA.	NA							
>97	N/A N/A		<1.031	NA NA	NA NA							
>97	N/A		<1.031	NA NA	NA.							
	ght-mg Summar		11.001	101		Iculated Va	rista					
-	Control Type		Mean	Min	Max	Std Err	Std De	v CV%	-	%Effect		
	legative Control		5.525	4.76	6.39	0.3657	0.7314	13.24		0.0%		
			5.555	4.65	6.4	0.4323	0.8646	15.57		-0.54%		
			6.215	5.67	6.98	0.3035	0.607	9.77%		-12,49%		
		4 (6.075	4.31	8.47	0.9034	1.807	29.74		-9.96%		
		4 (6.125	4.65	7.73	0.6336	1.267	20.69	% .	-10.86%		
		4 (6.01	4.54	7.75	0.843	1.686	28.05	γ.	-8.78%		
		4 .	5.768	5.28	6.17	0.1835	0.3671	6.36%	, ,	-4.39%		
		4 5	5.743	4.66	6.59	0.4452	0.8904	15.519	%,	-3.94%		
Dry Weig	ght-mg Detail											
	Control Type		Rep 2	Rep 3	Rep 4							
N	legative Control		4.76	6.39	5.84							
			6.18	4.65	6.4							
		6.42	6.98	5.79	5.67							
		4.31	6.37	8.47	5.15							
		7.73	4.65	6.23	5.89	4						
		4.54	7.75	7.16	4.59							
			5.28									
Co No	_	5.11 4.99 6 6.42 6 4.31 7.73 4 4.54 7	4.76 6.18 6.98 6.37 4.65 7.75	6.39 4.65 5.79 8.47 6.23	5.84 6.4 5.67 5.15 5.89							

Report Date: Test Code:

26 Mar-14 09:34 (p 2 of 2)

14077f | 19-5941-2284

Lemna Growth Inhibition Test

Nautilus Environmental

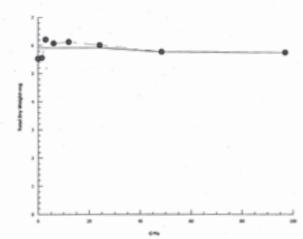
Analyzed:

Analysis ID: 13-2665-5955 26 Mar-14 9:33 Endpoint: Total Dry Weight-mg

Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7 Official Results: Yes

Graphics



Report Date: Test Code:

26 Mar-14 09:33 (p 1 of 2) 14077f | 19-5941-2284

							Test	0000		14077f 19	
Lemna Growt	h Inhibition Test								Na	utilus Envi	ironment
Analysis ID:	16-7179-8482	Er	ndpoint:	Total Dry Weigh	nt-mg		CET	IS Version	: CETISv1.	8.7	
Analyzed:	26 Mar-14 9:33	Ar		Parametric-Con	-	tments	Offic	ial Result	s: Yes		
Batch ID:	18-7938-8836	Te	st Type: I	emna Growth			Anal	yst: Je	slin Wijaya		
Start Date:	28 Feb-14	Pr	otocol: 6	EC/EPS 1/RM/3	37		Dilu	ent: AP	HA (modisi	ed)	
Ending Date:	07 Mar-14	Sp	pecies: l	Lemna minor			Brin	e:			
Duration:	7d 0h	Sc	ource: (CPCC#490			Age:	9d			
Sample ID:	05-2872-4256	Co	ode: 1	1F83B120			Clier	nt: AL	s		
Sample Date:	25 Feb-14 11:35	5 Ma	aterial: 8	Effluent			Proje	ect:			
Receive Date:	27 Feb-14 10:30) Sc	ource:	ALS							
Sample Age:	60h (3.9 °C)	St	ation: l	_1426336-6(X3	A)						
Data Transfor	m	Zeta	Alt Hy	p Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed	i	NA	C < T	NA	NA .		36.0%	97	>97	NA	1.031
Dunnett Multi	ple Comparison	Test									
Control	vs C-%		Test St	at Critical	MSD D	F P-Value	P-Type	Decision	n(a:5%)		
Negative Contr	rol 1.5		0.0374	2.482	1.991 6	0.8654	CDF		nificant Effect		
	3		0.8603	2.482	1.991 6	0.5462	CDF	-	nificant Effect		
	6.1		0.6858	2.482	1.991 6	0.6268	CDF	-	nificant Effect		
	12.1		0.7481	2.482	1.991 6	0.5983	CDF	_	nificant Effect		
	24.2		0.6047	2.482	1.991 6	0.6628	CDF	-	nificant Effect		
	48.5		0.3024	2.482	1.991 6	0.7836	CDF	_	nificant Effect		
	97		0.2712	2.482	1.991 6	0.7945	CDF	Non-Sigr	nificant Effect		
ANOVA Table											
Source	Sum Squa	res	Mean S		DF	F Stat	P-Value	Decision			
Between	1.961173		0.28016		7	0.2178	0.9776	Non-Sigr	nificant Effect		
Error	30.87512	_	1.2864	03	24 31	-					
Total	32.83629				31						
Distributional											
Attribute	Test			Test Stat	Critical	P-Value	Decision				
Attribute Variances	Test Bartlett Ed			9.24	18.48	0.2358	Equal Var	riances			
Attribute Variances	Test						Equal Var				
Attribute Variances Distribution Total Dry Wei	Test Bartlett Ed Shapiro-W	/ilk W No		9.24 0.982	18.48 0.9081	0.2358 0.8543	Equal Var	riances		-	
Attribute Variances Distribution Total Dry Weig	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	/ilk W No y Count	Mean	9.24 0.982 95% LCL	18.48 0.9081 95% UCL	0.2358 0.8543 Median	Equal Var Normal D	riances istribution Max	Std Err	CV%	
Attribute Variances Distribution Total Dry Weig C-% 0	Test Bartlett Ed Shapiro-W	/ilk W No y Count	Mean 5.525	9.24 0.982 95% LCL 4.361	18.48 0.9081 95% UCL 6.689	0.2358 0.8543 Median 5.475	Equal Var Normal D Min 4.76	max 6.39	0.3657	13.24%	0.0%
Attribute Variances Distribution Total Dry Well C-% 0 1.5	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	Count 4	Mean 5.525 5.555	9.24 0.982 95% LCL 4.361 4.179	18.48 0.9081 95% UCL 6.689 6.931	0.2358 0.8543 Median 5.475 5.585	Min 4.76 4.65	Max 6.39 6.4	0.3657 0.4323	13.24% 15.57%	0.0% -0.54%
Attribute Variances Distribution Total Dry Well C-% 0 1.5	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	/ilk W No y Count	Mean 5.525 5.555 6.215	9.24 0.982 95% LCL 4.361 4.179 5.249	18.48 0.9081 95% UCL 6.689 6.931 7.181	0.2358 0.8543 Median 5.475 5.585 6.105	Min 4.76 4.65 5.67	Max 6.39 6.4 6.98	0.3657 0.4323 0.3035	13.24% 15.57% 9.77%	0.0% -0.54% -12.49%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	Count 4	Mean 5.525 5.555 6.215 6.075	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95	0.2358 0.8543 Median 5.475 5.585 6.105 5.76	Min 4.76 4.65 5.67 4.31	Max 6.39 6.4 6.98 8.47	0.3657 0.4323 0.3035 0.9034	13.24% 15.57% 9.77% 29.74%	0.0% -0.54% -12.49% -9.96%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	Count 4	Mean 5.525 5.555 6.215 6.075 6.125	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109	95% UCL 6.689 6.931 7.181 8.95 8.141	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06	Min 4.76 4.65 5.67 4.31 4.65	Max 6.39 6.4 6.98 8.47 7.73	0.3657 0.4323 0.3035 0.9034 0.6336	13.24% 15.57% 9.77% 29.74% 20.69%	0.0% -0.54% -12.49% -9.96% -10.86%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	Count 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327	95% UCL 6.689 6.931 7.181 8.95 8.141 8.693	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875	Min 4.76 4.65 5.67 4.31 4.65 4.54	Max 6.39 6.4 6.98 8.47 7.73 7.75	0.3657 0.4323 0.3035 0.9034 0.6336 0.843	13.24% 15.57% 9.77% 29.74% 20.69% 28.05%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type	Count	Mean 5.525 5.555 6.215 6.075 6.125	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109	95% UCL 6.689 6.931 7.181 8.95 8.141	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06	Min 4.76 4.65 5.67 4.31 4.65	Max 6.39 6.4 6.98 8.47 7.73	0.3657 0.4323 0.3035 0.9034 0.6336	13.24% 15.57% 9.77% 29.74% 20.69%	0.0% -0.54% -12.49% -9.96% -10.86%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5	Test Bartlett Ed Shapiro-W ght-mg Summar, Control Type Negative Control	Count 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183	95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control	Count 4 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 5.11 4.99	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2 4.76 6.18	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3 6.39 4.65	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4 5.84 6.4	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.499 -9.96% -10.869 -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5 3	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 6 8 8 8 8 8 8	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2 4.76 6.18 6.98	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3 6.39 4.65 5.79	95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4 5.84 6.4 5.67	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.499 -9.96% -10.869 -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5 3 6.1	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2 4.76 6.18 6.98 6.37	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3 6.39 4.65 5.79 8.47	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4 5.84 6.4 5.67 5.15	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Attribute Variances Distribution Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig C-% 0 1.5 3 6.1 12.1 12.1	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 7 8 8 8 8 8 8 8 8 8 8	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2 4.76 6.18 6.98 6.37 4.65	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3 6.39 4.65 5.79 8.47 6.23	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4 5.84 6.4 5.67 5.15 5.89	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	0.0% -0.54% -12.49% -9.96% -10.86% -8.78% -4.39%
Total Dry Weig C-% 0 1.5 3 6.1 12.1 24.2 48.5 97 Total Dry Weig	Test Bartlett Ed Shapiro-W ght-mg Summar Control Type Negative Control ght-mg Detail Control Type	Count 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Mean 5.525 5.555 6.215 6.075 6.125 6.01 5.768 5.743 Rep 2 4.76 6.18 6.98 6.37	9.24 0.982 95% LCL 4.361 4.179 5.249 3.2 4.109 3.327 5.183 4.326 Rep 3 6.39 4.65 5.79 8.47	18.48 0.9081 95% UCL 6.689 6.931 7.181 8.95 8.141 8.693 6.352 7.159 Rep 4 5.84 6.4 5.67 5.15	0.2358 0.8543 Median 5.475 5.585 6.105 5.76 6.06 5.875 5.81	Min 4.76 4.65 5.67 4.31 4.65 4.54 5.28	Max 6.39 6.4 6.98 8.47 7.73 7.75 6.17	0.3657 0.4323 0.3035 0.9034 0.6336 0.843 0.1835	13.24% 15.57% 9.77% 29.74% 20.69% 28.05% 6.36%	-0.54% -12.49% -9.96% -10.86% -8.78% -4.39%

Report Date: Test Code:

26 Mar-14 09:33 (p 2 of 2)

14077f | 19-5941-2284

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed:

16-7179-8482 26 Mar-14 9:33

Analysis:

Endpoint: Total Dry Weight-mg

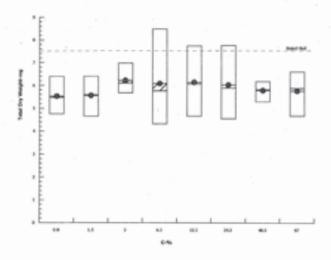
Parametric-Control vs Treatments

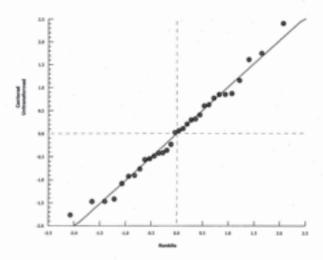
CETIS Version:

CETISv1.8.7

Official Results: Yes

Graphics





Lemna minor Summary Sheet

Client:

ALS

Start Date: feb 28 / 14

Work Order No.:

FF041

Set up by: JW / JBF

Sample Information:

Sample ID:

L1426336 - 7 (R3)

Sample Date:

Feb 25/14@ 1630h Feb 27/14 @ 1030h

Date Received: Sample Volume:

2 x 20 L

Test Organism Information:

Culture Date:

021914

Age of culture (Day 0):

days

>8X growth in APHA?:

KCI Reference Toxicant Results:

Reference Toxicant ID:

Lm 100

Date Initiated:

feb 20, 2014

7-d No. of Fronds IC50 (95% CL):

3.6 (3.2 - 4.2)

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.4 (3.5 - 5.5) CV (%):

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	36.0 (26.5 - 47.0)	797
IC50 %(v/v) (95% CL)	≠ ^{3N} > 97	797

Reviewed by:

J64

Date reviewed:

Plant Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by:	JW / JE	36	
Sample ID:	R3 (L140	(F - 96893	(green)	> 1	Test Date:	Feb 28 /	74	
Work Order No.:	FF041.			Tes	t Species:	Lemna mino	or	
Culture Source:	CPCC # 4	90						
Test Culture Age:	ayo days			> 8X Gro	wth? (Y/N):	۲		
Light Intensity Range:	4000 - S	300 (UX		Date	Measured:	Feb 26	/ 14	
					-			
Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	26.0	247	2515	25.5	26.40	36.0	26.0	26.0
Initials	WC		M	JBF	WC	JM	JM	JW.
Sample Characteristics: Temperature (°C) DO (mg/L)	24.0	ater Quality		Aeration?: Nutrients	20 min		9.	0
pH	1.3			added?:	٣		7.	
Conductivity (µS)	675						141	
Concentratio	n	Tempera	ture (°C)	pl	н	C	conductivity (µS)
% (V/V)		Day 0	Day 7	Day 0	Day 7		0 h	
Control		24.0	25.0	8.4	8-2		878	1
1.5		24.0	25-0	8.0	8-3		894	
3.0€		24.0	250	8.1	8.3		904	
6.1		24.0	25.0	8.1	8.3		919	
12.1		24.0	25.0	8.0	8.3		954	-
24.2		24.0	25.3	8.0	8.3	10	021	-
48.9		24.0	25.0	7.9	8.3	- 1	156	
97		24.0	25.0	7.6	8.2		1411	
Initials		78C / WC	KSU	78C \WC	YJU	WC	78F	
Thermometer: Sample Description:	Calibrated T	Thermometer	Cond. Meter:	c- 2	, , ,	pH meter:	PH- 2	-
Comments:								
Reviewed:		J64		Date Review	wed:		Yarch:	26/14

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Initials 3 Comments Start Date: Reb 28 / N4 Termination Date: Morch 3 / 14 Test set up by: JIM / JBR Loss of buoyancy Root destruction Single fronds X Gibbosity Abnormal size Yellow × × × ×× XX XX × × × X. × × × × Chlorosis Necrosis × (Green) R3 (1436336-7) Day 0 Day 7 No. of fronds 5 3834 36283 9 15 23 8 4 4 43 886 5 4 8 ی ی ŝ ی ۍ ڡ ی ی ڡ ڡ ی ی ی ڡ 14077 Rep ۵ A B O ADODA m 0 ۵ ш О ۵ ۵ ⋖ ⋖ ⋖ æ O Concentration %(v/v) Work Order #: 200 CONTROL Sample ID: 3.0% 24.2 ċ 12. 0 Client:

Comments:

Her

Reviewed by:

Date Reviewed:

March 26/14

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Initials 3 March 26/14 Comments Termination Date: March 7 / 19 Test set up by: JW / J&F Start Date: teb 28/14 Date Reviewed: Loss of buoyancy Root destruction Single fronds Gibbosity Abnormal size XX X Yellow XX × XXX × Chlorosis Necrosis × X × X × × (Green) × R3 (1.1426336-1) 4077 Day 0 Day 7 No. of fronds 20 63 388 유 JB. ٥ و ی ڡ Rep ۵ ⋖ m U a m 0 ⋖ Concentration Work Order #: Reviewed by: Comments: Sample ID: (n/n) % ø ç 8 Client:

7-d Lemna minor Weight Data Sheet

Client					
Client	_				
	$\overline{}$	187	-	-	
	٠.		ю	n	

ALS

Start Date: Peb 28 / 14

Sample ID:

R3 (L1426336 - 7)

Termination Date: March 7/14

Work Order #:

14077

Concentration	Rep	Pan No. Green	Pan weight (mg)	Pan + plant (mg)	Initials
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	A	(1008.54	1014 - 39	NYI
	В	- 2	1025.89	1031.12	1
COUNTE	С	3	1003.33	1008 - 85	
	D	ц	1051.05	2P · F201	
	Α	G	1018.53	1025 - 26	
	В	6	1015.29	1022 . 47	-
1.5	С	7	982.23	986.69	
	D	8	996.48	1004 - 23	
	Α	٩	998.41	1003.13	
4C	В	(D	1016.67	1022 . 40	
3.0%	С	11	1003.46	1088.97	
	D	12.	993.28	998.76	
	A	13	991,66	997 - 36	1
	В	14	1012.71	1019 - 11	
6.1	С	15	988.2 5	994.08	
	D	16	1004.38	1009 - 31	
	Α	FF	1000.21	1005 - 63	-
	В	IB	1008.93	1015 - 58	
12.1	С	19	1008.67	1013 - 99	-
	D	20	1001.58	1007 - 26	
	Α	2)	991.42	996.97	
	В	22	1009.93	1015 - 98	
24.2	С	23	1012.53	1016.25	
	D	24	1027.46	(033.03	
	Α	25	1032.88	1038.76	
	В	26	1033.72	1039.38	
48.5	С	27	1012.81	PF · F101	J.
	D	28	986.82	992.04	7

Comments:	Reweighed pans =	6- 1022.42 11-1008.30	22-1015.86
Reviewed by:	JOL	Date Reviewed:	March 26/14

7-d Lemna minor Weight Data Sheet

			•					
Client: Sample ID: Work Order #:	ALS R3 (L1	426336 - 7)	Term	Start Date: Peb 28 / 14 Termination Date: Morch 14 / 14				
Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials			
	A	29	1001,37	1005 - 88	NYION			
	В	30	1006.19	4F . 0101	. 1.1			
97	С	31	983.99	988 . 52				
	D	32	1019.10	1024 - 06	Δ 1			
	Α							

97	В	30	1006.19	1010 · 74	1.1.
97	С	3)	983.99	988 . 52	
	D	32	1006.19 983.99 1019.10	1024 - 06	₩ ↓
	Α				
	В				
	С				
	D				
	Α	-)
	В				
	С				
-	D				
	Α				
	В		X =	*	
	C -			*	
	D				
	Α				
	В				
	С				
	D		7		
*	Α				. ,
	В				
	С		*		
	D				
	Α				
	В				1
	С	-			
	D				7

	С		-				
	D						
	Α						
	В						
	С	-			-		
	D	-					,
Comments:		,					
Reviewed by:	J6L			Da	te Reviewed:	March	26/14
Version 4.0 leaved lunes	20.000					Noutiline	Fautroamont

CETIS Anal	ytical	Re	port
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Report Date: Test Code: 10 Apr-14 16:45 (p 1 of 2)

 -					M-			-,
1407	77g	ı	2	1-3	99	2	39	46

Lemna	Growth I	nhibition Tes	t						Nautilu	s Environmental
Analys	is ID: 1	8-9997-1101	End	point: Fro	nd Count			CET	IS Version: CETISv1.8.7	
Analyz	ed: 1	0 Apr-14 16:4	5 Anal	ysis: No	nlinear Regn	ession	-	Offic	ial Results: Yes	
Batch I	ID: 1	8-7938-8836	Test	Type: Ler	mna Growth			Anal		
Start D	ate: 2	8 Feb-14	Prot	ocol: EC	/EPS 1/RM/	37		Dilu	ent: APHA (modifi	ed)
Ending	Date: 0	7 Mar-14	Spec	cies: Le	mna minor			Brin	0:	/
Duratio	on: 7	'd Oh	Sou	rce: CP	CC#490			Age	9d	
Sample	e ID: 1	3-8828-3648	Cod	e: 52	BF8700			Clier	nt: ALS	
Sample	Date: 2	5 Feb-14 16:3	0 Mate	erial: Eff	luent			Proj	ect:	
Receiv	e Date: 2	7 Feb-14 10:3	0 Sou	rce: AL	S					
Sample	e Age: 5	6h (3.4 °C)	Stat	ion: L1	\$26336-7(R3)				
Non-Li	near Reg	ression Optio	ens							
	Function					X Transf	form YTra		Veighting Function	PTBS Function
3P Cun	nulative L	og-Normal EV	[Y=A*(1- Φ(log(X/D)/C))]	None	None) B	lox-Cox [W=Y*(2Z-2)]	Off [Y*=Y]
Regres	sion Sun	nmary								
Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(a:5%)	
13	-80.89	168.6	172.2	0.6834	Yes	2.295	2.621	0.0772	Non-Significant Lack of Fit	
Point E	stimates									
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL				
IC5	8.599	N/A	16.01	11.63	6.245	NA				
IC10	14.69	6.86	22.97	6.807	4.354	14.58				
IC15	21.09	12.59	30.7	4.742	3.258	7.943				
IC20	28.1	18.97	38.7	3.558	2.584	5.271				
IC25	35.96	26.48	47.01	2.781	2.127	3.776				
IC40	66.91	58.21	76.65	1.495	1.305	1.718				
IC50	97.21	85.29	110.8	1.029	0.9025	1.172				
Regres	sion Par	ameters								
Parame	eter	Estimate	Std Error	95% LCL		t Stat	P-Value	Decision		
A		68.3	3.291	61.85	74.75	20.75	<0.0001	-	t Parameter	
C		1.474	0.292	0.9022	2.047	5.05	<0.0001	-	t Parameter	
D Z		97.21 -1.24	10.35	76.93	117.5	9.394	<0.0001	Significan	t Parameter	
	Table									
ANOVA					DE	F Stat	P-Value	Decision	(a:5%)	
_		Sum Squ	ares Mea	n Square	DF					
Source		Sum Squa 5.78E-05	ares Mea 5.78	n Square E-05	DF 1					
Source Model			5.78			68.91 2.295	<0.0001 0.0772	Significan Non-Signi	t	
Source Model Lack of	Fit	5.78E-05	5.78	E-05 E-06	1 .	68.91	< 0.0001	Significan	t	
Source Model Lack of Pure Er	Fit	5.78E-05 7.87E-06	5.78 1.57	E-05 E-06 E-07	5	68.91	< 0.0001	Significan	t	
Source Model Lack of Pure Er Residua	Fit	5.78E-05 7.87E-06 1.65E-05 2.43E-05	5.78 1.57 6.86	E-05 E-06 E-07	1 5 24	68.91	< 0.0001	Significan	t	
Source Model Lack of Pure Er Residua Residua	Fit rror al	5.78E-05 7.87E-06 1.65E-05 2.43E-05	5.78 1.57 6.86	E-05 E-06 E-07	1 5 24	68.91	< 0.0001	Significan	t ificant	
Source Model Lack of Pure Er Residua Residua Attribut	Fit fror al al Analys	5.78E-05 7.87E-06 1.65E-05 2.43E-05 is	5.78 1.57 6.86	E-05 E-06 E-07 E-07	1 5 24 29	68.91 2.295	<0.0001 0.0772	Significan Non-Signi	t ficant (a:5%)	
Source Model Lack of Pure Er Residus Residus Attribus Variance	Fit fror al al Analys	5.78E-05 7.87E-06 1.65E-05 2.43E-05 is Method Bartlett Eq	5.78 1.57 6.86 8.39	E-05 E-06 E-07 E-07	1 5 24 29 Test Stat	68.91 2.295 Critical	<0.0001 0.0772 P-Value	Significan Non-Signi Decision	t ificant (a:5%) inances	
Source Model Lack of Pure Er Residua Residua Attribut	Fit mor al al Analys te	5.78E-05 7.87E-06 1.65E-05 2.43E-05 is Method Bartlett Eq Mod Level	5.78 1.57 6.86 8.39	E-05 E-06 E-07 E-07	1 5 24 29 Test Stat 8.702	68.91 2.295 Critical 14.07	<0.0001 0.0772 P-Value 0.2748	Significan Non-Signi Decisioni Equal Var	t ificant (a:5%) riances riances	

Report Date: Test Code: 10 Apr-14 16:45 (p 2 of 2) 14077g | 21-3992-3946

Nautilus Environmental

Analysis ID: 18-9997-1101 Analyzed: 10 Apr-14 16:45

Control Type

Negative Control

Frond Count Summary

0

3

6.1

12.1

24.2

48.5

1.5

Lemna Growth Inhibition Test

Endpoint: Frond Count Analysis: Nonlinear Re

Min

54

51

59

56

59

42

44

31

Mean

66.75

62.75

63.75

63.5

51.5

33.75

50

78

Nonlinear Regression

Max

80

90

65

73

71

59

56

37

1.25

2.5

CETIS Version: CETISv1.8.7 Official Results: Yes

7.41%

	Offic	ial Results	: Yes		
Calculated Va	ariate				
Std Err	Std Dev	CV%	%Effect		
5.313	10.63	15.92%	0.0%		
9.174	18.35	23.52%	-16.85%		
1.315	2.63	4.19%	5.99%		
3.705	7.411	11.62%	4.49%		
2.723	5.447	8.58%	4.87%		
3.969	7.937	15.41%	22.85%		
2.483	4.967	9.93%	25.09%		

49.44%

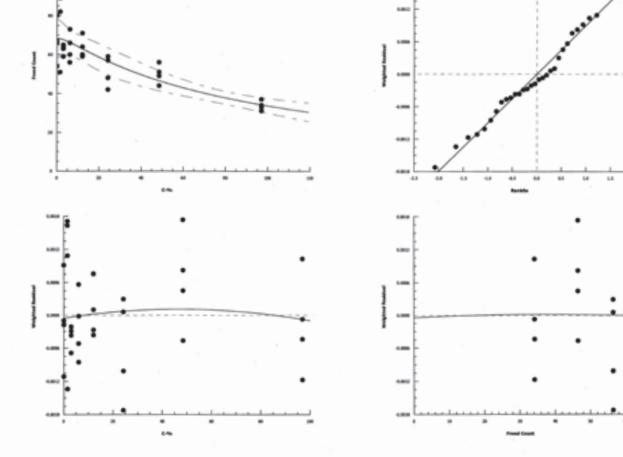
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	66	54	67	80
1.5		82	89	51	90
3		59	65	64	63
6.1		66	73	60	56
12.1		60	71	59	64
24.2		48	57	42	59
48.5		56	51	49	44
97		33	31	34	37

Count

Graphics

3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]



Report Date:

26 Mar-14 09:39 (p 1 of 2)

Test Code: 14077g | 21-3992-3946

								rest	Code:	14077	g 51-3995-3940
Lemna	Growth	Inhibition Tes	t				-			Nautilus	Environmental
Analysi	s ID:	15-1033-8830	End	point: 1	Total Dry Weig	ht-mg		CET	IS Version:	CETISv1.8.7	
Analyz		26 Mar-14 9:39	Ana	lysis: N	Nonlinear Regr	ession		Offic	cial Results:	Yes	
Batch I	D: 1	18-7938-8836	Tes	t Type: L	emna Growth		_	Ana		n Wijaya	
Start D	ate: 2	28 Feb-14			EC/EPS 1/RM/	37		Dilu	ent: APH	A (modified)	
Ending	Date: 0	07 Mar-14	Spe	cies: L	emna minor.			Brin	e: _		
Duratio	n: 7	7d 0h	Sou	rce: (CPCC#490			Age	: 9d		
Sample	ID:	13-8828-3648	Cod	le: 5	52BF8700			Clie	nt: ALS		
Sample	Date: 2	25 Feb-14 16:3	0 Mat	erial: E	Effluent			Proj	ect:		
Receiv	e Date: 2	27 Feb-14 10:3	0 Sou	rce: /	ALS						
Sample	Age:	56h (3.4 °C)	Stat	tion: L	.1426336-7(R3	3)					
Non-Li	near Reg	ression Optio	ins	1.7							
	Function					X Trans	sform Y Tra	ansform V	Veighting Fu	nction	PTBS Function
3P Log-	-Gompert	z EV [Y=A*exp	o(log(0.5)(X/	D)^C)]		None	None		lormal [W=1]		Off [Y*=Y]
Regres	sion Sur	nmary									
Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(c	1:5%)	
9	-6.474	19.8	23.34	0.1778	Yes	1.069	2.621	0.4022	Non-Signifi	cant Lack of Fit	
Point E	stimates										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	10.24	N/A	35.33	9.768	2.83	NA					
IC10	29.39	4.584	68.26	3.403	1.465	21.81					
IC15	55.45	19.88	105.2	1.803	0.9503	5.031					
IC20	88.23	27.21	180.4	1.133	0.5542	3.675	u				
IC25 IC40	128 296.9	20.87 N/A	326.2 1985	0.7812	0.3066	-4:793 ²⁰ NA	1 > a	7%(1/4)		
IC50	484-3	N/A	N/A	0.2154	NA.	NA.		1 10 -	. /		
	sion Para	ameters									
Parame		Estimate	Std Error	95% LC	L 95% UCL	t Stat	P-Value	Decision	(n:5%)		
A		5.991	0.3144	5.374	6.607	19.05	<0.0001		t Parameter		
С		0.6826	0.5376	-0.3711		1.27	0.2143	_	ificant Param	eter	
D		464.3	616.7	-744.5	1673	0.7528	0.4576	_	ificant Param		
ANOVA	Table										
Source		Sum Squa	ares Mea	n Square	DF	F Stat	P-Value	Decision	(a:5%)		
Model		5.296244	5.29	6244	1 :	8.706	0.0062	Significan	t		
Lack of		3.21248		2496	5	1.069	0.4022	Non-Signi	ficant		
Pure En		14.43046		1269	24						
Residua		17.64294	0.60	8377	29						
	al Analys										
Attribut		Method Region Fo	and the section	dana-	Test Stat	Critical	P-Value	Decision			
Variano	es .		uality of Var		11.39	14.07	0.1226	Equal Var			
Distribut	tion		ne Equality of filk W Norms		e 0.7097 0.9744	2.423 0.9338	0.6642	Equal Var Normal Di			
DIOU IOU			Darling A2 !			2.492	0.1971	Normal D			
				· · · · · · · · · · · · · · · · · · ·	0.0100	21402	0.1011	. Tommer D	231000011		

Lemna Growth Inhibition Test

Report Date: Test Code: 26 Mar-14 09:39 (p 2 of 2) 14077g | 21-3992-3946

Nautilus Environmental

Analysis ID:	15-1033-8830	Endpoint:	Total Dry Weight-mg	CETIS Version:	CETISv1.8.7
Analyzed:	26 Mar-14 9:39	Analysis:	Nonlinear Regression	Official Results:	Yes

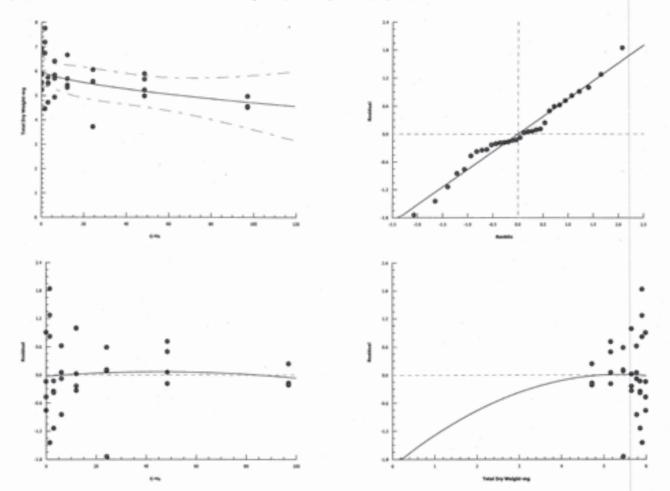
Total Dry	y Weight-mg Summa	ry	Calculated Variate							
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	4	5.875	5.23	6.9	0.3644	0.7287	12.4%	0.0%	
1.5		4	6.53	4.46	7.75	0.7209	1.442	22.08%	-11.15%	
3		4	5.36	4.72	5.73	0.2205	0.441	8.23%	8.77%	
6.1		4	5.715	4.93	6.4	0.3026	0.6052	10.59%	2.72%	
12.1		4	5.768	5.32	6.65	0.3038	0.6076	10.53%	1.83%	
24.2		4	5.223	3.72	6.05	0.514	1.028	19.68%	11.11%	
48.5		4	5.435	4.98	5.88	0.2045	0.409	7.53%	7.49%	
97		4	4.638	4.51	4.96	0.1078	0.2157	4.65%	21.06%	

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Negative Control	5.85	5.23	5.52	6.9			
1.5		6.73	7.18	4.46	7.75			
3		4.72	5.73	5.51	5.48			
6.1		5.7	6.4	5.83	4.93			
12.1		5.42	6.65	5.32	5.68			
24.2		5.55	6.05	3.72	5.57			
48.5		5.88	5.66	4.98	5.22			
97		4.51	4.55	4.53	4.96			

Graphics

3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]





Pseudokirchneriella subcapitata Summary Sheet

Client: Work Order No.:	ALS 14078	Start Date: Feb 27/14 Set up by: FMM
Sample Information	n:	
Sample ID: Sample Date: Date Received: Sample Volume:	L1426336-1 (R10) Feb 25/14 a) 1500h Feb 27/14 a) 1030h 2x20L	
Test Organism Info	ormation:	
Culture Date: Age of culture (Day	Feb 21/14 6d	
Zinc Reference To	xicant Results:	
Reference Toxicant Stock Solution ID: Date Initiated:	10: SC 105 1370 01 Feb 21/14	-em
72-h IC50 (95% CL)	24.7 (16.1-31.7) pg/L Zn
72-h IC50 Reference	e Toxicant Mean and Range: 22.7 (15.2	-33.8) jugit 2n CV (%): 22
Test Results:		Algal Growth
	IC25 %(v/v) (95% CL)	795.2
	IC50 %(v/v) (95% CL)	795.2
Reviewed by:	JGL	Date reviewed: March 13/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by:		EMM_			
Sample ID:	210	CLIY	1633 b	1)	Test Date	/Time:	Feb	2714	<u>a) 153</u>	0
Work Order No.:	1407	8			Test Species: Pseudokirchneriella subcapitata					
Culture Date:						Culture Hea		G000		10/h, L
		220,000 c	sells/ml x 575g	100	ml cells/ml	= 4h				
Time Zero Counts		124			Average:	22				
No. of Cells/mL:	2	2×10	1	Initial De	ensity:	# cells/mL -	+ 220 μL x 1	10 μL = [(0000	યાડ/ખો
Concentration	٧	Water Qua	ality Meas	urement	s	Micro	plates rota	ited 2X per	day?	
%(v/v)	pН		Temp				_			
Control	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h	1
	7.0	24.0	25.6	26)3	15.5	V	~			1
115	7.1	245		\perp	(V	L-			
3.0	7.2	245				V			/	
6.6	7.5	24.5				/				
11.9	7.4	24,5		7		/	1		/	
23.8	1.5	24.5				V	~			
47.6	7.5	14.5		1		/	<u></u>	/	/	
95.2	2.6	24.5	V	V	V	V	<i></i>	/	/	
7	,	-			,	4	<u>m</u>	_		
				1				-		
Initials	EMM	EMM	emm	M	Ann	€mm)	EMM>	^	A-	
Initial control pH:	Well 1:	6.8			Well 2:	68				
Final control pH:	Well 1:	6,0	5		Well 2:	6.5				
Light intensity (lux	g: 370	<u> </u>			Date mea	sured:	F	eb27/	14	
Sample Description	n:	Clea	W							
Comments:										. ,
Reviewed:	ं	16h			Dat	e reviewed:	Ма	rch 13	14	

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

	Client:	Al	S		Start Da	ate/Time:	Feb 271	400 1530 11400 1530			
	Work Order #:	140	78 (L142)		Terminat	tion Date:	march 2	14001530	5		
	Sample ID:	RIC	(L142)	BB(-1)	Test s	set up by:	Emmoti				
	%(v/v)								-		
I	Concentration	Rep		Count 2	Count 3	Count 4	Co	mments	1	niti	ials
I	Control	A	42						- 15	ħ,	ΔŴ
I		В	54						\rightarrow	+	_
I		С	56						\rightarrow	+	
I		D	47						\rightarrow	+	
I	-	E	43			-			\rightarrow	4	
ı		F	58			-			\rightarrow	4	_
ı		G	39			-			\rightarrow	4	
I		Н	43						\rightarrow	4	_
ı		Α.	55	-					\rightarrow	4	_
ı	1.5	В	57						\rightarrow	4	
ı	1.0	С	42						\rightarrow	4	
ı		D	49						\rightarrow	+	
ı		Α	47						\rightarrow	+	_
ı	3.0	В	60						\rightarrow	+	
I		С	63						\rightarrow	Ļ	
ı		D	54						\rightarrow	Ļ	
ı		A	67						\rightarrow	L	
I	6.0	В	7							L	
I		С	68						-	L	
Į		D	72							L	
I	,	A.	85							L	-
I	11.9	В	78							L	
I		С	83								
Į		D	102	100	-						
ı		Α	150	1							
	23.8	В	162								
	23.3	С	168								
l		D	147								-
		Α	175		х.			-			
	47.6	В	161								
		С	136	140					-		
ŀ		D	179						\rightarrow	H	
	050	A	158						\rightarrow	₽	
	95.2	B C	147						-	₽	_
		D	139						_	Ł	
•											
	Comments:										
		-	JOh				b.	rch 13/14			
	Reviewed by:		Jou		Date R	eviewed:	/14	100 10/14		_	
								1			

Pseudokirchneriella subcapitata Algal Counts

Client: WO#:	ALS 14078	0000 4)		Start Date/ Termination		27-Feb-14 02-Mar-14			
Sample ID:	R10 (L142	0330-1)		Initial Cell [Density:	10000	cell/mL		220000 0.22 0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10000
% v/v	,	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴) cell/mL		
Control	Α	42				42	41.0	mean	46.8
	В	54				54	53.0	SD	7.245688
	С	56				56	55.0	CV	15.4988
	D	47				47	46.0		
	E	43				43	42.0		
	F	58				58	57.0		
	G	39				39	38.0		
	н	43				43	42.0		
1.5	Α	55				55	54.0		
	В	57				57	56.0		
	C	42				42	41.0		
	D	49				49	48.0		
3	Α	47				47	46.0		
	В	60				60	59.0		
	С	63				63	62.0		
	D	54				54	53.0		
6	A	67				67	66.0		
	В	71				71	70.0		
	C	68				68	67.0		
	D	72				72	71.0		
11.9	Α	85				85	84.0		
	В	78				78	77.0		
	C	83				83	82.0		
	D	105	100			102.5	101.5		
23.8	A	150				150	149.0		
20.0	В	162				162	161.0		
	c	168				168	167.0		
	D	147				147	146.0		
47.6	A	175				175	174.0		
47.0	В	161				161	160.0		
	č	136	140			138	137.0		
	D	179		-		179	178.0		
95.2	Ä	158				158	157.0		
30.2	В	147				147	146.0		
	c	155				155	154.0		
	Ď	139				139	138.0		

John 13/14

Report Date: Test Code: 02 Mar-14 16:20 (p 1 of 2) 14078a | 14-6494-7294

EC Alg	a Grow	th Inhibition Te	est								Nauti	lus Environmenta
Analys Analyz		03-1865-4579 02 Mar-14 16:2		dpoint: alysis:	Cell Yield Linear Interpola	ation (ICPIN)			IS Version cial Results		7
Batch	D:	14-3179-1764	Te	st Type:	Cell Growth				Ana	lyst: Em	ma Marus	
Start D	ate:	27 Feb-14 15:3	0 Pr	otocol:	EC/EPS 1/RM/	25			Dilu	ent: De	onized Water	
Ending	Date:	02 Mar-14 15:3	10 Sp	ecies:	Pseudokirchne	riella subca	pitata		Brin	ne:		
Duratio	n:	72h	So	urce:	In-House Cultu	ire			Age	: 6d		
Sample	ID:	00-4133-3542	Co	de:	276B326				Clie	nt: AL	S	
Sample	Date:	25 Feb-14 15:0	00 Ma	terial:	Effluent				Pro	ect:		
		27 Feb-14 10:3	30 So	urce:	ALS							
Sample	Age:	49h (3.6 °C)	St	ation:	L1426336-1(R1	10)						
Linear	Interpo	lation Options										
X Trans	sform	Y Transform	n Se	ed	Resamples	Exp 95%	CL	Method				
Log(X+	1)	Linear	97	7764	200	Yes		Two-Po	int Interp	oolation		
Residu	al Analy	ysis										
Attribu	te	Method			Test Stat	Critical	P-V	alue D	Decision	(a:5%)		
Control	Trend	Mann-Ker	dall Trend	-			0.71	95 N	lon-sign	ificant Trend	I in Controls	
Point E	stimate	es										
Level	%	95% LCL	95% UC	L TU	95% LCL	95% UCL						
IC5	>95.2	N/A	N/A	<1.05	NA.	NA						
IC10	>95.2	N/A	N/A	<1.05	NA.	NA						
IC15	>95.2	N/A	N/A	<1.05	NA.	NA						
C20	>95.2	N/A	N/A	<1.05		NA						
C25	>95.2	N/A	N/A	<1.05		NA.						
C40	>95.2	N/A	N/A	<1.05		NA.						
C50	>95.2	N/A	N/A	<1.05	NA .	NA						
Cell Yie	ld Sum	mary				Cal	culate	ed Variat	te			
C-%		ontrol Type	Count	Mean		Max	Std		td Dev	CV%	%Effect	
)	N	egative Control	8	46.75		57	2.56		.246	15.5%	0.0%	
.5			4	49.75	41	56	3.37		.752	13.57%	-6.42%	
3			4	55	46	62	3.53		.071	12.86%	-17.65%	
			4	68.5	66	71	1.19		.38	3.48%	-46.52%	
1.9			4	86.25	77	102	5.45		0.9	12.64%	-84.49%	
3.8 7.6			4	155.8 162.3	146	167	4.95		.912	6.36%	-233.2%	
5.2			4	148.8	137 138	178 157	9.25		8.52 .539	11.41% 5.74%	-247.1% -218.2%	
	ld Deta	a .		140.0	100	107	4.61	-	.000	3.7470	-210.270	
-%		ontrol Type	Pen 1	Pan 2	Don 2	Don 4	Dan			D	D 0	
)		gative Control	Rep 1	53	Rep 3 55	Rep 4 46	Rep 42	5 K	ep 6	Rep 7	Rep 8	
1.5		-30010 0011001	54	56	41	48	42	3		50	46	
3			46	59	62	53						
3			66	70	67	71						
1.9			84	77	82	102						
3.8			149	161	167	146						
17.6			174	160	137	178						
95.2			157									
0.2			107	146	154	138						

Analyst: QA: JGL

Report Date:

02 Mar-14 16:20 (p 2 of 2)

Test Code: 14078a | 14-6494-7294

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed: 03-1865-4579 02 Mar-14 16:20 Endpoint: Cell Yield

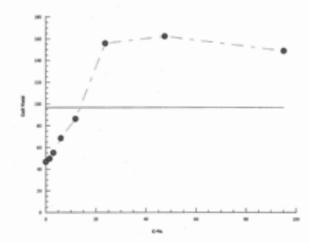
Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes

Graphics



Analyst:_

Report Date: Test Code: 02 Mar-14 16:20 (p 1 of 2)

14078a | 14-6494-7294

				_			_						
EC Alga Grov	wth Inhibition Test	t									Na	utilus Env	ironment
Analysis ID:	15-2090-6552	E	ndpoint:	Cell	Yield				CET	S Version	: CETISv1	.8.7	
Analyzed:	02 Mar-14 16:19	A	nalysis:	Para	ametric-Con	ntrol vs Tr	reat	tments	Offic	ial Result	s: Yes		
Batch ID:	14-3179-1764	Te	est Type:	Cell	Growth				Anal	yst: Em	ma Marus		
Start Date:	27 Feb-14 15:30	Pi	rotocol:	EC/I	EPS 1/RM/	25			Dilu	ent: De	ionized Wate	er	
Ending Date:	02 Mar-14 15:30	S	pecies:	Pse	udokirchner	riella sub	сар	itata	Brin	e:			
Duration:	72h	Se	ource:	In-H	louse Cultur	re			Age:	6d			
Sample ID:	00-4133-3542	C	ode:	276	B326				Clier	nt: AL	S		
Sample Date:			aterial:	Efflu					Proj				
	: 27 Feb-14 10:30	-	ource:	ALS					,				
Sample Age:	49h (3.6 °C)	St	tation:	L14	26336-1(R1	0)							
Data Transfor	rm	Zeta	Alt H	VD	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C < T		NA	NA.			31.7%	3	6	4.243	33.33
							_						
	iple Comparison	rest	_				_						
Control	vs C-%		Test S				-	P-Value	P-Type	Decision			
Negative Cont			0.5113		2.526			0.7787	CDF		ificant Effect		
	3 6*		1.406 3.707		2.526 2.526			0.3520	CDF	Significa	nificant Effect		
	11.9*		6.732		2.526			< 0.0030	CDF	Significa			
	23.8*		18.58		2.526		-	< 0.0001	CDF	Significa			
	47.6*		19.69		2.526			< 0.0001	CDF	Significa			
	95.2*		17.39		2.526			< 0.0001	CDF	Significa			
Auvillant Tool							_			-			
Auxiliary Test					T	0-14		B.1/-1	Bardalani				
Attribute Control Trend	Test Mann-Kend	fall Tran	wl	_	Test Stat	Critical	_	P-Value 0.7195	Decision Non-signi		d in Controls		
		Julie 1101		_				0.7155	reon-agiii	nount from	z iii Controla		
ANOVA Table				_									
Source	Sum Squar	res	Mean	_	are	DF		F Stat	P-Value	Decision			
Between	80186.5		11455			7		124.8	< 0.0001	Significa	nt Effect		
Error Fotal	2570.25 82756.75		91.794	464		28 35	-	-					
						30	_						
Distributional													
Attribute	Test				Test Stat	Critical		P-Value	Decision			_	
/ariances	Bartlett Equ	_			10.7	18.48		0.1522	Equal Var				
Distribution	Shapiro-Wi	ik W No	rmality		0.9648	0.9166		0.3001	Normal Di	stribution			
Cell Yield Sur	mmary												
C-%		Count	Mean		95% LCL	95% UC	L	Median	Min	Max	Std Err	CV%	%Effect
)	Negative Control		46.75		40.69	52.81		44	38	57	2.562	15.5%	0.0%
.5		4	49.75		39.01	60.49		51	41	56	3.376	13.57%	-6.42%
3		4	55		43.75	66.25		56	46	62	3.536	12.86%	-17.659
1.0		4	68.5		64.71	72.29		68.5	66	71	1.19	3.48%	-46.529
1.9		4	86.25		68.9	103.6		83	77	102	5.452	12.64%	-84.499
3.8		4	155.8		140	171.5		155	146	167	4.956	6.36%	-233.29
47.6		4	162.3		132.8	191.7		167	137	178	9.259	11.41%	-247.19
5.2		4	148.8		135.2	162.3		150	138	157	4.27	5.74%	-218.29

Report Date: Test Code: 02 Mar-14 16:20 (p 2 of 2)

14078a | 14-6494-7294

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed: 15-2090-6552 02 Mar-14 16:19 Endpoint: Cell Yield Analysis: Parametric

Parametric-Control vs Treatments

CETIS Version:

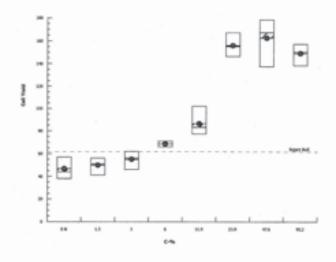
CETISv1.8.7

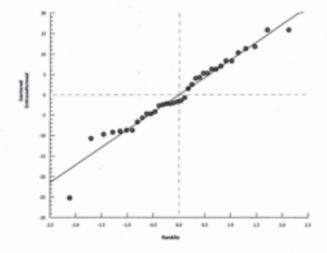
Official Results: Yes

Cell	I VI	le le	1 D	ort:	١ii
				-	

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
0	Negative Control	41	53	55	46	42	57	38	42	
1.5		54	56	41	48					
3		46	59	62	53					
6		66	70	67	71					
11.9		84	77	82	102					
23.8		149	161	167	146					
47.6		174	160	137	178					
95.2		157	146	154	138					

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Work Order No.:	ALS 14078	Start Date: FCb 27/14 Set up by: FMM	
Sample Information	n:		
Sample ID: Sample Date: Date Received: Sample Volume:	L1426336-2 (NFI) Feb 25/14 00 14:35 h Feb 27/14 00 1030h 2×20L		
Test Organism Info	ormation:		
Culture Date: Age of culture (Day	Feb21/14 6d		
Zinc Reference To	xicant Results:		
Reference Toxicant Stock Solution ID: Date Initiated:	137ngl Feb 21/14		
72-h IC50 (95% CL)	24.7 (15.7-33.8)	ig/L-7n	
72-h IC50 Reference	e Toxicant Mean and Range: 22.7(15.2	-33.8) pg/17x CV (%): 22	
Test Results:		Algal Growth	
	IC25 %(v/v) (95% CL)	795.2	
	IC50 %(v/v) (95% CL)	795.2	
Reviewed by:	JOL	Date reviewed: March 13/	14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS)			Setup by:	:	En	nn		
Sample ID:	VF1C	L1426	3362	2)	Test Date	/Time:	Feb	22/14	a) 16	50
Work Order No.:	140	18		. ,	Test Spe	cies:	Pseudokiro	chneriella su	ubcapitata	
						Culture Hea		<u>G0</u>	od_	
Culture Count:	1562	2589	Average:	575.5	Culture C	Cell Density	(c1): 5	15.5 X	104 cell	5(m)
	v1 =	220,000 c (c1)	ells/ml x	<u>= 100</u>	ml cells/ml	- (lm)			
Time Zero Counts	:	124	220		Average:	22				
No. of Cells/mL:	22	XIDY		Initial De	ensity:	# cells/mL	+ 220 μL x	!0 μL =	10 000	cells/m
Concentration		Water Qua	lity Meas	urement	s	Micro	oplates rota	rted 2X per	day?	
%(v/v)	pH	-		(°C)	min s			40.1	70.5	
Control	6.9	24.0	24 h 25.0	48 h	72 h	0 h	24 h	48 h	72 h	
1,5	7.0	24.5	1	25)>	16%	~	~	7		
3.0	7.0	24.5					V	/		
6.0	7.1	25.0				V	<u></u>			
11.9	7.2	26.0					<u></u>	/	/	
23.8	7.2	25.5				/				
47.6	7.3	25.5					~	/		
95.2	7.4	195	l	J'		1			/	41
	,									
Initials	EMM	<i>EMIN</i>	thm	M	h	EMM	€WW	۴	A	
Initial control pH:	Well 1:	<u>_6.8</u>	3		Well 2:	6.8				
Final control pH:	Well 1:	6,5	-		Well 2:	65				
Light intensity (lux	1:37	00			Date mea	sured:	Feb 2	7/14		
Sample Descriptio	n:	clea	(
Comments:										
Reviewed:		JON			Dat	e reviewed:	Ма	rch 13	14	

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	AL.	Š		Start D	ate/Time:	Feb27/14/	21600		
Work Order #:	140	518	_	Terminat			14001600		
Sample ID:	NFI	(4420	33(22)	Test:	set up by:	Emm/J	U		
%(v/v)						·			
Concentration	Rep		Count 2	Count 3	Count 4	Co	mments	In	itials
Control	A	44 54						E	MΜ
	В							+	
	С	52						+	
	D	60						+	
	E	42						+	
	F	45						+	
	G	58 46			1			+	
	Н	46						+	<u> </u>
	A	53						+	\vdash
1,5	В	46						+	_
,,,	С	54				-		+	_
	D	47						+	╙
	Α	66				17		+	\vdash
3.0	В	69						+	₩
	С	54						+	
	D	64						\perp	
	Α	96						\perp	\perp
6.0	В	જાં						\perp	
6. 0	C	74						\perp	
	D	77							
	Α	56	62						
11.9	В	64	62						
77.7	С	78	74		-				
	D	76	73					\top	
	Α	83						\top	
23.8	В	77			1.0			\top	
22.0	С	91						\top	\top
	D	89						\top	\top
	Α	117						\top	\top
47.6	В	92_						\top	\top
17.0	С	12-1						\top	\top
	D	124							
	Α	135			1 2			\perp	
95.2	В	148						+	\perp
	C	127						+	ᅪ
	D	123							
Comments:									_
Devienced by		JG		Data 5	handerer d	laborat	13/14		
Reviewed by:		00	~	Date R	teviewed:	Marci	13/17		

Pseudokirchneriella subcapitata Algal Counts

Client: WO#:	ALS 14078	6226 21		Start Date/ Termination		27-Feb-14 02-Mar-14	@1600h @1600h		
Sample ID:	NF1 (L142	0330-2)		Initial Cell (Density:	10000	cell/mL		220000 0.22 0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10000
% v/v	1100	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁶)	(x 10 ⁴) cell/mL		
Control	Α	44				44	43.0	mean	49.1
	В	54				54	53.0	SD	6.812541
	C	52				52	51.0	CV	13.86777
	D	60				60	59.0		
	E	42				42	41.0		
	F	45				45	44.0		
	G	58				58	57.0		
	н	46				46	45.0		
1.5	Α	53				53	52.0		
	В	46				46	45.0		
	C	54				54	53.0		
	D	47				47	46.0		
3	A	66				66	65.0		
	В	69				69	68.0		
	С	54				54	53.0		
	D	64				64	63.0		
5.9	A	90				90	89.0		
	В	81				81	80.0		
	С	74				74	73.0		
	D	77				77	76.0		
11.9	A	56	60			58	57.0		
	В	64	62			63	62.0		
	С	78	74			76	75.0		
	D	76	73			74.5	73.5		
23.8	A	83				83	82.0		
	В	77				77	76.0		
	C	91				91	90.0		
	D	89				89	88.0		
47.6	Α	117				117	116.0		
	В	92				92	91.0		
	C	121				121	120.0		
	D	124				124	123.0		
95.2	Α	135				135	134.0		
	В	148				148	147.0		
	С	127				127	126.0		
	D	123				123	122.0		

JOL March 13/14

Report Date:

02 Mar-14 16:29 (p 1 of 2)

14078b | 17-5330-0750 Test Code:

EC Alg	a Grow	th Inhibition Te	st								Naut	ilus Environmental
Analysi	is ID:	09-7802-2192	Enc	dpoint:	Cell Yield	7.			CET	S Version	: CETISv1.8	7
Analyze		02 Mar-14 16:2	8 Ana	alysis:	Linear Interpola	tion (ICPIN)		Offic	ial Result	s: Yes	
Batch I	D:	05-3776-6416	Tes	t Type:	Cell Growth				Anal	yst: Em	ıma Marus	
Start D	ate:	27 Feb-14 16:0	0 Pro	tocol:	EC/EPS 1/RM/2	25			Dilu	ent: De	ionized Water	
Ending	Date:	02 Mar-14 16:0	0 Spe	ecies:	Pseudokirchner	riella subcar	pitata		Brin	e:		
Duratio	n:	72h	So	urce:	In-House Cultur	re			Age:	6d		
Sample	ID:	17-8615-7390	Co	de:	6A76994E				Clier	nt: AL	S	
		25 Feb-14 14:3		terial:	Effluent				Proje	ect:		
Receiv	e Date:	27 Feb-14 10:3	0 So	urce:	ALS							
Sample	Age:	49h (4.3 °C)	Sta	tion:	L1426336-2(NF	1)						
Linear	Interpo	lation Options										
X Trans	sform	Y Transform	n See	ed	Resamples	Exp 95%	CL	Method				
Log(X+	1)	Linear	392	813	200	Yes		Two-Poi	int Interp	olation		
Residu	al Anal	ysis										
Attribut	te	Method			Test Stat	Critical	P-V	alue D	ecision	(a:5%)		
Control	Trend	Mann-Ken	dall Trend				0.90	49 N	lon-signit	ficant Trend	d in Controls	
Point E	stimate	es										
Level	%	95% LCL	95% UCL	. TU	95% LCL	95% UCL						
IC5	>95.2		N/A	<1.05		NA						
IC10	>95.2		N/A	<1.05		NA						
IC15	>95.2		N/A	<1.05		NA						
IC20	>95.2		N/A	<1.05		NA.						
IC25	>95.2		N/A	<1.05		NA.						
IC40 IC50	>95.2 >95.2		N/A N/A	<1.05 <1.05		NA NA						
			NA	<1.00	NO.							
	eld Sum			-				d Variat				
C-%		ontrol Type	Count	Mean		Max	2.40		td Dev	CV%	%Effect	
0 1.5	P4	egative Control	8	49.13 49	45	59		-	.813 .082	13.87%	0.0%	
3			4	62.25		53 68	3.25			8.33% 10,44%	0.25% -26.72%	
6 .			4	79.5	73	89	3.47		952	8.75%	-61.83%	
11.9			4	67	57	75	4.45	_	907	13.29%	-36.39%	
23.8			4	84	76	90	3.16		325	7.53%	-70.99%	
47.6			4	112.5		123	7.30		4.62	12.99%	-129.0%	
95.2			4	132.3		147	5.51		1.03	8.34%	-169.2%	
Cell Yie	eld Deta	il										
C-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep	5 R	ер 6	Rep 7	Rep 8	
0 -	N	egative Control	43	53	51	59	41	44	4	57	45	
1.5			52	45	53	46						
3			65	68	53	63						
6			89	80	73	76						
11.9			57	62	75	74						
			0.2	70	00	0.0						
23.8			82	76	90	88						
23.8 47.6			116	91	120	123						

Report Date: Test Code: 02 Mar-14 16:29 (p 2 of 2)

14078b | 17-5330-0750

EC Alga Growth Inhibition Test

Nautilus Environmental

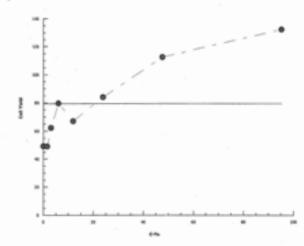
Analysis ID: Analyzed: 09-7802-2192 02 Mar-14 16:28 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Report Date: Test Code:

02 Mar-14 16:28 (p 1 of 2) 140786 | 17-5330-0750

Nautilus Environmental EC Alga Growth Inhibition Test 04-8432-7857 Endpoint: Cell Yield CETIS Version: CETISv1.8.7 Analysis ID: Analyzed: 02 Mar-14 16:28 Analysis: Parametric-Control vs Treatments Official Results: Yes Batch ID: 05-3776-6416 Test Type: Cell Growth Analyst: Emma Marus Deionized Water Protocol: EC/EPS 1/RM/25 Diluent: Start Date: 27 Feb-14 16:00 Ending Date: 02 Mar-14 16:00 Species: Pseudokirchneriella subcapitata Brine: Duration: 72h Source: In-House Culture Age: 6d

Sample ID: 17-8615-7390 Sample Date: 25 Feb-14 14:35 Receive Date: 27 Feb-14 10:30

Code: Material: Source:

6A76994E Effluent ALS

Project:

ALS Client:

Sample Age: 49h (4.3 °C) Station: L1426336-2(NF1)

Date Terroritory	 Waster.	A.10. S.D	West of the	04	-

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA.	C < T	NA	NA	26.7%	1.5	3 ,	2.121	66.67

Ontransionned	NA.	0 < 1	NA.	No.	20.776	1.0	3	
Dunnett Multiple Comparison	n Test							

Dunnett multiple	Ç	mparison resc							
Control v	s	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(a:5%)
Negative Control	Т	1.5	-0.02409	2.526	13.11	10	0.9313	CDF	Non-Significant Effect
		3*	2.529	2.526	13.11	10	0.0497	CDF	Significant Effect
		6*	5.854	2.526	13.11	10	< 0.0001	CDF	Significant Effect
		11.9*	3.445	2.526	13.11	10	0.0058	CDF	Significant Effect
		23.8*	6.721	2.526	13.11	10	< 0.0001	CDF	Significant Effect
		47.6*	12.21	2.526	13.11	10	< 0.0001	CDF	Significant Effect
		95.2*	16.02	2.526	13.11	10	< 0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat Critical	P-Value	Decision(a:5%)	
Control Trend	Mann-Kendall Trend		0.9049	Non-significant Trend in Controls	

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(a:5%)	
Between	28064.38	4009.197	7	55.84	< 0.0001	Significant Effect	
Error	2010.375	71.79911	28				
Total	30074.75		35				

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.108	18.48	0.5272	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9701	0.9166	0.4274	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	49.13	43.43	54.82	48	41	59	2.409	13.87%	0.0%
1.5		4	49	42.5	55.5	49	45	53	2.041	8.33%	0.25%
3		4	62.25	51.91	72.59	64	53	68	3.25	10.44%	-26.72%
6		4	79.5	68.44	90.56	78	73	89	3.476	8.75%	-61.83%
11.9		4	67	52.83	81.17	68	57	75	4.453	13.29%	-36.39%
23.8		4	84	73.94	94.06	85	76	90	3.162	7.53%	-70.99%
47.6		4	112.5	89.24	135.8	118	91	123	7.309	12.99%	-129.0%
95.2		4	132.3	114.7	149.8	130	122	147	5.513	8.34%	-169.2%

000-469-187-2

CETIS™ v1.8.7.16

EC Alga Growth Inhibition Test

Report Date: Test Code: 02 Mar-14 16:28 (p 2 of 2)

14078b | 17-5330-0750

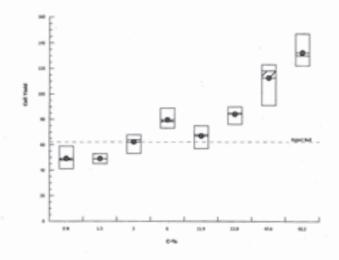
Nautilus Environmental

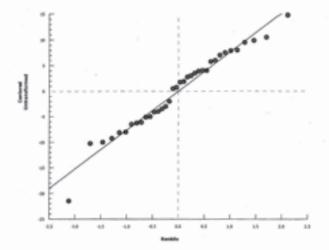
Analysis ID: 04-8432-7857 Endpoint: Cell Yield CETIS Version: CETISv1.8.7

Analyzed: 02 Mar-14 16:28 Analysis: Parametric-Control vs Treatments Official Results: Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
0	Negative Control	43	53	51	59	41	44	57	45	
1.5		52	45	53	46					
3		65	68	53	63					
5		89	80	73	76					
11.9		57	62	75	74					
23.8		82	76	90	88					
17.6		116	91	120	123					
95.2		134	147	126	122					





Pseudokirchneriella subcapitata Summary Sheet

Client:	ALS 14078	Start Date: Feb Set up by: EMh	
Sample Information:			
Sample Date: F	421336-3 (NF2) eb 25/14 as 1305h eb 27/14 a) 1030h x20L		
Test Organism Informa	ation:		
Culture Date: Age of culture (Day 0):	Feb 2V14		
Zinc Reference Toxica	nt Results:		
Reference Toxicant ID: Stock Solution ID: Date Initiated:	SC105 137001 FC62114		
72-h IC50 (95% CL):	24,7 (15.2-35.8) pu	3/LZn.	
72-h IC50 Reference To	exicant Mean and Range: 22.7-(15.2	-33.8)µg/1.22 CV (%):	_22
	25 %(v/v) (95% CL) 50 %(v/v) (95% CL)	Algal Gri 12.0 (9.5-14 12.0 (9.5-14.5	5)8.5(7.5-9.7)
Reviewed by:	Joh	Date reviewed:	March 17/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS	ALS NF2 (4142/63)			Setup by		_EM	<u>m</u>			
Sample ID:	NF	2 (L	1426	ઝલ્કે	rest Date	/Time:	Feb	2714	<u>a 160</u>	6	
Work Order No.:	140	18		. /	/ Test Spe	cies:	Pseudokiro	chneriella su	ubcapitata		
								C.	1		
						Culture Hea					
Culture Count:								575.52	(169 ce)	(S/m)	
	v1 =	220,000 c	sells/ml x 575.53	100 (104	ml cells/ml	- 4	m\				
Time Zero Counts:			220			22					
No. of Cells/mL: 22 × 10 ⁹ Initial Density: # cells/mL + 220 μL × 10 μL = 16000 cells							cells/41				
Concentration		Water Qua	lity Meas	urement	s	Micro	oplates rota	ited 2X per	164 cells/m)		
%(v/v)	pH		Temp		70.5		24.5	48 h	72 h		
Control	6.9	2475	24 h 25.0	48 h	72 h	06	24 h	40 N	/211		
16	7.0	245	25.0	25,3	165						
1,5		-	\vdash	\vdash	\vdash				-		
3.0	7.0	2415		H-	\vdash			-			
6.0	7.1	245	+	+	\rightarrow						
11.9	7.2	24.5	4	Ш	\vdash	V					
23.8	7.3	25.0		1		~	_				
47.6	7.3	25.6	-			1	-	/_			
95.2	7.4	25.0	ı	V	V	-					
		-									
									,		
Initials	Emm	EMM)	FINM	<u></u>	A	e mm	EMM	M	A	-	
Initial control pH:	Well 1:	68			Well 2:	68					
Final control pH:	Well 1:	6.5	_		Well 2:	65	1				
Light intensity (lux	1:38	00			Date mea		feb	27/14			
Sample Descriptio	ample Description:										
Comments:									-		
Reviewed:		JGL			Dat	e reviewed:	H	arch 1	4/14		

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	ALS:			Start D				
Work Order #:	146	18	_	Terminat	tion Date:	march 2/14 au 1600		
Sample ID:	NE2	(1142	6336-3	Test	set up by:	=mm/JW		
%(v/v)				/			-	
Concentration	Rep		Count 2	Count 3	Count 4	Comments	lr	nitials
Control	A	43					E	mm
	В	40					_	<u> </u>
	С	48					\perp	
	D	42	1				\perp	
	E	45						
	F	45					\top	
	G	44					Т	
	Н	41					Т	
	Α	52					\top	
122	В	56					\top	1
100	С	3.7	39				T	
	D	58	-				$^{+}$	
	Α	59					\top	
100	В	4					\top	
3.0	C	51					\top	
	D	62					+	
	A	48					+	
	В	39					+	
60	c	52					+	
	D	43					+	
	A	23					+	
11.0	В	28				,	+	
11.9	c	16	14				+	
	D	24	((+	
	A	4	2	2	-		+	
2 2 2	$\overline{}$						+	-
23.8	B C	7			-		+	
	D	 					+	_
		C/-				-	₩	
	A	&					₩	
47.6	B C	e					₩	
,	D	E					+	
	A	Ď					+	
95.2	В	ĩ					+	
10.2	C	Ø,					+	
	D	di					\top	V
Comments:								
Reviewed by:		JOU		Date P	eviewed:	March 14/14		
. corionou by.	_	0000		Date N	cvicweu.	11111	_	

Pseudokirchneriella subcapitata Algal Counts

Client: WO#:	ALS 14078			Start Date/ Termination		27-Feb-14 02-Mar-14			
Sample ID:	NF2 (L142	(6336-3)		Initial Cell (Density:	10000	cell/mL		220000 0.22
									0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10000
% v/v		(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴) cell/mL		
Control	Α	43				43	42.0	mean	42.5
	В	40				40	39.0	SD	2.56348
	С	48				48	47.0	CV	6.031717
	D	42				42	41.0		
	E	45				45	44.0		
	F	45				45	44.0		
	G	44				44	43.0		
	Н	41				41	40.0		
1.5	Α	52				52	51.0		
	В	56				56	55.0		
	C	37	39			38	37.0		
	D	58				58	57.0		
3	Ā	59				59	58.0		
•	В	55				55	54.0		
	C	51				51	50.0		
	D	62				62	61.0		
6	A	48				48	47.0		
-	В	39				39	38.0		
	C	52				52	51.0		
	D	43				43	42.0		
11.9	A	23				23	22.0		
	В	28				28	27.0		
	С	16	14			15	14.0		
	D	24				24	23.0		
23.8	Α	4	2	2		2.6666667	1.7		
	В	2				2	1.0		
	С	1				1	0.0		
	D	1				1	0.0		
47.6	A	0				0	-1.0		
	В	0				0	-1.0		
	C	0				0	-1.0		
	D	0				0	-1.0		
95.2	A	0				0	-1.0		
	В	1				1	0.0		
	В	0				0	-1.0		
	D	0				0	-1.0		

Jole 14/14 March 14/14

Report Date:

02 Mar-14 16:36 (p 1 of 2)

Test Code: 14078c | 13-3187-1210 Nautilus Environmental

EC Alg	a Growt	th Inhibition Te	st							Nautilu	s Environment
Analysi		11-4088-9740 02 Mar-14 16:3		point: lysis:	Cell Yield Linear Interpola	tion (ICPIN)			TIS Version: ficial Results	CETISv1.8.7 Yes	
Batch I	ID:	19-9503-0983	Tes	t Type:	Cell Growth			An	alyst: Emr	ma Marus	
Start D	ate:	27 Feb-14 16:0		tocol:	EC/EPS 1/RM/	25		Dil	uent: Deid	onized Water	
nding	Date:	02 Mar-14 16:0	0 Spe	cies:	Pseudokirchner	riella subcap	oitata	Br	ine:		
Duratio	on:	72h	Sou	rce:	In-House Cultur	re		Ag	e: 6d		
Sample	e ID:	07-0729-5812	Cod	le:	2A287A44			Cli	ent: ALS		
Sample	e Date:	25 Feb-14 13:0	5 Mat	erial:	Effluent			Pr	oject:		
Receiv	e Date:	27 Feb-14 10:3	0 Sou	rce:	ALS						
Sample	e Age:	51h (3.3 °C)	Stat	ion:	L1426336-3(NF	2)					
inear	Interpol	lation Options									
Trans	sform	Y Transform	n See	d	Resamples	Exp 95%	CL Met	hod			
Log(X+	1)	Linear	207	5691	200	Yes	Two	-Point Inte	rpolation		
Residu	al Analy	ysis									
Attribu	te	Method		-	Test Stat	Critical	P-Value	Decisio	n(a:5%)		
Control	Trend	Mann-Ken	dall Trend				0.9049	Non-sig	nificant Trend	in Controls	
Point E	stimate	15									
.evel	%	95% LCL	95% UCL		95% LCL	95% UCL					
	4.299	3.104	7.652	23.26	13.07	32.21					
C10	6.005	3.087	7.311	16.65	13.68	32.4					
C10 C15	6.005 6.48	3.946	7.809	15.43	12.81	25.34					
C10 C15 C20	6.005 6.48 6.988	3.946 4.944	7.809 8.354	15.43 14.31	12.81 11.97	25.34 20.23					
C10 C15 C20 C25	6.005 6.48 6.988 7.53	3.946 4.944 5.715	7.809 8.354 8.93	15.43 14.31 13.28	12.81 11.97 11.2	25.34 20.23 17.5					
C10 C15 C20 C25 C40	6.005 6.48 6.988 7.53 9.388	3.946 4.944 5.715 7.783	7.809 8.354 8.93 11.21	15.43 14.31 13.28 10.65	12.81 11.97 11.2 8.922	25.34 20.23 17.5 12.85					
C10 C15 C20 C25 C40 C50	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083	7.809 8.354 8.93	15.43 14.31 13.28	12.81 11.97 11.2	25.34 20.23 17.5 12.85 11.01	culated V	riata			,
C10 C15 C20 C25 C40 C50	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083	7.809 8.354 8.93 11.21 13.25	15.43 14.31 13.28 10.65 9.22	12.81 11.97 11.2 8.922 7.549	25.34 20.23 17.5 12.85 11.01	culated Va		, CV%	%Effect	
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25	15.43 14.31 13.28 10.65 9.22 Mean	12.81 11.97 11.2 8.922 7.549	25.34 20.23 17.5 12.85 11.01 Cal-	Std Err	Std Dev		%Effect	
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083	7.809 8.354 8.93 11.21 13.25	15.43 14.31 13.28 10.65 9.22	12.81 11.97 11.2 8.922 7.549	25.34 20.23 17.5 12.85 11.01	Std Err 0.9063		6.03%	0.0%	
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count	15.43 14.31 13.28 10.65 9.22 Mean 42.5	12.81 11.97 11.2 8.922 7.549 Min 39	25.34 20.23 17.5 12.85 11.01 Cal	Std Err	Std Dev 2.563			
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50	12.81 11.97 11.2 8.922 7.549 Min 39 37	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57	Std Err 0.9063 4.509	2.563 9.018	6.03% 18.04%	0.0% -17.65%	
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75	12.81 11.97 11.2 8.922 7.549 Min 39 37 50	25.34 20.23 17.5 12.85 11.01 Call Max 47 57 61	Std Err 0.9063 4.509 2.394	2.563 9.018 4.787	6.03% 18.04% 8.59%	0.0% -17.65% -31.18%	
C10 C15 C20 C25 C40 C50 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count 8 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27	9063 4.509 2.394 2.843	2.563 9.018 4.787 5.686	6.03% 18.04% 8.59% 12.78%	0.0% -17.65% -31.18% -4.71%	
C10 C15 C20 C25 C40 C50 Cell Yie 2-%	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14	25.34 20.23 17.5 12.85 11.01 Call Max 47 57 61 51	9063 4.509 2.394 2.843 2.723	2.563 9.018 4.787 5.686 5.447	6.03% 18.04% 8.59% 12.78% 25.33%	0.0% -17.65% -31.18% -4.71% 49.41%	
C5 C10 C15 C20 C25 C40 C50 Cell Yie 2-%) 1.5 3 1.9 3.8 (7.6	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787	2.563 9.018 4.787 5.686 5.447 0.9574	6.03% 18.04% 8.59% 12.78% 25.33%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24%	
C10 C15 C20 C25 C40 C50 Cell Yie C-% 1.5 3 1.9 23.8 47.6 55.2	6.005 6.48 6.988 7.53 9.388 10.85	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0	2.563 9.018 4.787 5.686 5.447 0.9574	6.03% 18.04% 8.59% 12.78% 25.33%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0%	
C10 C15 C20 C25 C40 C50 Cell Yie C50 C1.5 C3.8 C7.6 C5.2 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 7	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie 3.8 (7.6 (5.2 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0	2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0%	
C10 C15 C20 C25 C40 C50 Cell Yie 2.% 1.5 3.8 (7.6 3.8 (7.6 5.2 Cell Yie 2.%	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 4 4 4 4 51	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0 0 Rep 2	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0	25.34 20.23 17.5 12.85 11.01 Call Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie 2-% 1.5 3.8 (7.6 3.8 (7.6 3.8 (7.6 2.9)	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 4 4 4 51 58	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0 Rep 2	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0 0 Rep 3	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57 61	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie 3.8 7.6 5.2 Cell Yie	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 7 8 8 7 8 8 8 4 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0 Rep 2 39 55 54 38	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0 0 Rep 3 47 37 50 51	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57 61 42	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie C3.8 i7.6 i5.2 Cell Yie c5.2	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 4 4 4 51 58	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0 Rep 2	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0 0 Rep 3	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57 61	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie 5.% (7.6 (5.2 Cell Yie 5.2 Cell Yie 5.3.8 (7.6 (5.2 Cell Yie 5.2 Cell Yie 5.3.8	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 4 4 7 7 8 8 8 4 4 4 4	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0 Rep 2 39 55 54 38	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0 0 Rep 3 47 37 50 51	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57 61 42	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	
C10 C15 C20 C25 C40 C50 Cell Yie C3.8 i7.6 i5.2 Cell Yie c5.2	6.005 6.48 6.988 7.53 9.388 10.85 eld Sum Ne	3.946 4.944 5.715 7.783 9.083 mary ontrol Type egative Control	7.809 8.354 8.93 11.21 13.25 Count 8 4 4 4 4 4 4 4 4 4 7 7 22	15.43 14.31 13.28 10.65 9.22 Mean 42.5 50 55.75 44.5 21.5 0.75 0 0 Rep 2 39 55 54 38 27	12.81 11.97 11.2 8.922 7.549 Min 39 37 50 38 14 0 0 0 0 0 Rep 3 47 37 50 51 14	25.34 20.23 17.5 12.85 11.01 Cal Max 47 57 61 51 27 2 0 0 0 Rep 4 41 57 61 42 23	Std Err 0.9063 4.509 2.394 2.843 2.723 0.4787 0 0	Std Dev 2.563 9.018 4.787 5.686 5.447 0.9574 0	6.03% 18.04% 8.59% 12.78% 25.33% 127.7%	0.0% -17.65% -31.18% -4.71% 49.41% 98.24% 100.0% Rep 8	

Analyst:_

Report Date: Test Code: 02 Mar-14 16:36 (p 2 of 2) 14078c | 13-3187-1210

EC Alga Growth Inhibition Test

Nautilus Environmental

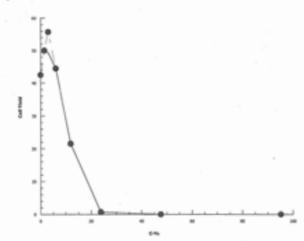
Analysis ID: Analyzed: 11-4088-9740 02 Mar-14 16:36 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Report Date: Test Code:

02 Mar-14 16:41 (p 1 of 2) 14078c(a) | 16-1132-3261

EC Alga Grov	vth Inhibition Test			Nautilus Environmental	
Analysis ID: Analyzed:	07-6181-9388 02 Mar-14 16:41	Endpoint: Analysis:	Cell Yield Linear Interpolation (ICPIN)	CETIS Ver Official Re	rsion: CETISv1.8.7 ssults: Yes
Batch ID:	05-6146-3800	Test Type:	Cell Growth	Analyst:	Emma Marus
Start Date:	27 Feb-14 16:00	Protocol:	EC/EPS 1/RM/25	Diluent:	Deionized Water
Ending Date:	02 Mar-14 16:00	Species:	Pseudokirchneriella subcapitata	Brine:	

Duration: 72h Sample ID: 07-0729-5812 Source: In-House Culture

Age:

6d Client: ALS

Code: 2A287A44 Sample Date: 25 Feb-14 13:05 Effluent Material:

ALS

Project:

Receive Date: 27 Feb-14 10:30 Source: Sample Age: 51h (3.3 °C)

Station: L1426336-3(NF2)

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	279983	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat Crit	tical P-Value	Decision(a:5%)	
Control Trend	Mann-Kendall Trend		0.9049	Non-significant Trend in Controls	

Point Estimates

r Oillie E	Sumaces						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	
IC5	6.348	5.826	6.659	15.75	15.02	17.16	
IC10	6.828	6.243	7.333	14.65	13.64	16.02	
IC15	7.34	6.721	8.051	13.62	12.42	14.88	
IC20	7.886	7.083	8.828	12.68	11.33	14.12	
IC25	8.467	7.468	9.692	11.81	10.32	13.39	
IC40	10.45	8.642	12.96	9.57	7.716	11.57	
IC50	12	9.474	14.49	8.332	6.9	10.55	

Cell Yiel	Il Yield Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Negative Control	8	42.5	39	47	0.9063	2.563	6.03%	0.0%	
1.5		4	42	42	42	0	0	0.0%	1.18%	
3		4	42	42	42	0	0	0.0%	1.18%	
6		4	42	42	42	0	0	0.0%	1.18%	
11.9		4	21.5	14	27	2.723	5.447	25.33%	49.41%	
23.8		4	0.75	0	2	0.4787	0.9574	127.7%	98.24%	
47.6		4	0	0	0	0	0		100.0%	
95.2		4	0	0	0	. 0	0		100.0%	

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
0	Negative Control	42	39	47	41	44	44	43	40	
1.5		42	42	42	42					
3		42	42	42	42					
6		42	42	42	42					
11.9		22	27	14	23					
23.8		2	1	0	0					
47.6		0	0	0	0					
95.2		0	0	0	0			1		

Analyst:

Report Date:

02 Mar-14 16:41 (p 2 of 2)

Test Code:

14078c(a) | 16-1132-3261

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed:

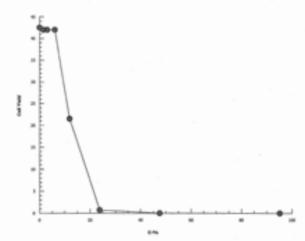
07-6181-9388 02 Mar-14 16:41 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Pseudokirchneriella subcapitata Summary Sheet

Client: ALS Work Order No.: 14078	Start Date: Feb 27/14 Set up by: FMM
Sample Information:	
Sample ID:	
Test Organism Information:	
Culture Date: Feb21/14 Age of culture (Day 0): 6d	
Zinc Reference Toxicant Results:	
Reference Toxicant ID: SCI 05	
72-h 1C50 (95% CL): 24.7(15.7=33.8)µg/L	.2n
72-h IC50 Reference Toxicant Mean and Range: 22.7-(15.2-	33.8) pg/(2n cv (%): 22
Test Results:	Algal Growth om 18 9.9 (8.4-11.0) 10.2 (7.9-11.8)
IC25 %(v/v) (95% CL) IC50 %(v/v) (95% CL)	15.01 (13.5-16.1) en 15.4(13.2-16.6)
Reviewed by: JGU	Date reviewed: March 17/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by: EMM					
Sample ID:	_ X	(44)	L6336	۶Y)	Test Dat	e/Time:	_Feb	27/14	a) 153	30
Work Order No.:	14	078		. "	Test Spe	cies:	Pseudokiro	chneriella su	bcapitata	
						Culture He			d X1040	ells/ml
$v1 = \frac{220,000 \text{ cells/ml x}}{(c1)} \frac{1.24 \times 10^{9} \text{ cells/ml}}{575.5 \times 10^{9} \text{ cells/ml}} = 4m$ Time Zero Counts: 1.24 \text{ 2.20} Average: 22										
Time Zero Counts:									4. 44.0	
No. of Cells/mL:	22	-x 10°	1	Initial D	ensity:	# cells/mL	+ 220 µL x	10 μL =	10000	cells/ml
Concentration		Water Qua	lity Meas	urement	s	Micro	oplates rota	ated 2X per	day?	
%(v/v)	pH	0 h	Temp		72 h	0 h	24 h	48 h	72 h	
Control	6.9		24 h 25.6	48 h		011	V	40 11	/211	
1,5	6.9	24.0	N3.0	2573 1	26\5	1		-	-/-	
3.0	6.9	24.6			\vdash		1/			
6.0	7.0	24.0	, I	\vdash	\top		1	1	6)	
11.9	7.0	240	1				1		1	
23.8	13	24.0	1			V	V	/		
47.60	7.5	240				-	-		/	
95.2	7.5	24.0		ソ	V		-		/	
				7	1			1		•
Initials	EMM	(mm	(mm	<u></u>	, p	a mm	£mM	m	m	
Initial control pH:	Well 1:	_6.8			Well 2:	68				
Final control pH:	Well 1:	(,5	5		Well 2:	65				
Light intensity (lux	1: 380	00			Date me	asured:	_feb	27/14		
Sample Descriptio	n:	А								
Comments:	_de	ar								
Reviewed:		JOL			Dat	te reviewed:	Mar	ch 14	14	

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	ALS			Start D	ate/Time:	Feb 27	1400 15	30		
Work Order #:	1407	8		Terminat	tion Date:	March	12/140	1530		
Sample ID:	XI (LIUZG	336-4) Test:	set up by:	FMM/	TW			
%(v/v)				,						
Concentration	Rep	Count 1	Count 2	Count 3	Count 4		Comment	\$	Init	tials
Control	A	43		-					Ø€	m
-	В	48							\vdash	—
	С	42							₩	_
	D	55							\sqcup	
*	E	56	-	1					Ш	
	F	44							Ш	
	G	54								
	Н	5								
	Α	42		1					П	
1_	В	28	60							
15	С	40							П	\neg
	D	51								\neg
	Α	5					= -		П	\neg
2 ^	В	58							\Box	- 1
3.0	С	22							\Box	\neg
	D	55						-	\vdash	\neg
	A	56						-	\vdash	\neg
1.0	В	59			-				\vdash	П
6.0	C	46		-					\vdash	\vdash
	D	47							\vdash	\dashv
	A	34							\vdash	-
1. 0	В	36							\vdash	\dashv
11.9	c	30							\vdash	-
,	Ď	35							\vdash	-
	A	11							\vdash	\dashv
_	В	8					-		\vdash	\dashv
23.8	C								\vdash	\dashv
	D	10							₩	\dashv
		B							H	\dashv
	A	2							₩	\dashv
47.6	B C	1							1	\dashv
	Ď	0							\mapsto	\dashv
	A	2	L				5		\vdash	\dashv
95.2	В	(-		3					\vdash	\dashv
10.2	C	0	2						н	
	D	2	2-						13	
Comments:									_	_
Reviewed by:		JOU		Date P	eviewed:	}-	1arch 14	114		
Noticited by.				Date	eviewed.			-		

Pseudokirchneriella subcapitata Algal Counts

WO#:	ALS 14078 X1 (L1426	336.4\		Start Date/ Termination		27-Feb-14 02-Mar-14			
Sample ID.	X1 (E1420			Initial Cell [Density:	10000	cell/mL		220000 0.22 0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10000
% v/v		(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴) cell/mL		
Control	Α	43				43	42.0	mean	48.1
	В	48				48	47.0	SD	5.667892
	С	42				42	41.0	CV	11.77744
	D	55				55	54.0		
	E	56				56	55.0		
	F	44				44	43.0		
	G	54				54	53.0		
	н	51				51	50.0		
1.5	A	42				42	41.0		
	В	58	60			59	58.0		
	С	40				40	39.0		
	D	51				51	50.0		
3	Α -	51				51	50.0		
	В	58				58	57.0		
	С	55				55	54.0		
	D	55				55	54.0		
6	Α	56				56	55.0		
	В	59				59	58.0		
	C	46				46	45.0		
	D	47				47	46.0		
11.9	Α	34				34	33.0		
	В	36				36	35.0		
	С	30				30	29.0		
	D	35				35	34.0		
23.8	A	11				11	10.0		
	В	8				8	7.0		
	С	10				10	9.0		
	D	12				12	11.0		
47.6	A	0				. 0	-1.0		
	B C	2				2	1.0		
		1				1	0.0		
	D	0				0	-1.0		
95.2	Α	2	0			1	0.0		
	В	6	2	3		3.6666667	2.7		
	C	0	0			0	-1.0		
	D	2	2			2	1.0		

JOL March 14/14

Report Date: Test Code:

02 Mar-14 16:51 (p 1 of 2)

14078d | 03-4486-3229

EC Alg	a Grow	th Inhibition Te	st							-		Nautilu	s Enviro	nmenta
Analysi Analyz		08-0057-9365 02 Mar-14 16:5		fpoint: ilysis:	Cell Yield Linear Interpola	ition (ICPIN	1)			TIS Version icial Result		TISv1.8.7		
Batch I	D:	15-1545-1848	Tes	t Type:	Cell Growth				An	alyst: Er	mma Ma	irus		
Start D	ate:	27 Feb-14 16:0	0 Pro	tocol:	EC/EPS 1/RM/2	25			Dil	uent: De	eionized	Water		
Ending	Date:	02 Mar-14 16:0	0 Spe	rcies:	Pseudokirchner	riella subca	pitata		Bri	ne:				
Duratio	n:	72h	Sou	ırce:	In-House Cultur	re			Ag	e: 60	i			
Sample		19-2140-4869	Cod		72864FC5				-		LS			
		25 Feb-14 11:1		terial:	Effluent				Pro	oject:				
		27 Feb-14 10:3		arce:	ALS									
Sample	Age:	53h (4 °C)	Sta	tion:	L1426336-4(X1)						-		-
Linear	Interpo	lation Options												
K Trans		Y Transform			Resamples	Exp 95%	CL	Meth						
Log(X+	1)	Linear	439	728	200	Yes		Two-F	Point Inter	polation				
Residu	al Anal	ysis												
Attribu	te	Method			Test Stat	Critical	P-Va	alue	Decisio	n(a:5%)				
Control	Trend	Mann-Ken	dall Trend				0.39	87	Non-sign	nificant Tren	nd in Co	ntrols		
Point E	stimate	rs												
Level	%	95% LCL		TU	95% LCL	95% UCL								
C5	6.649	2.431	6.782	15.04		41.14								
C10	7.359	5.37	7.651	13.59		18.62								
C15	8.134	6.299	8.616	12.29		15.88								
C20	8.981	7.355	9.687	11.13		13.6								
C25 C40	9.907	8.394 11.31	10.95 14.07	10.09 7.732		11.91 8.842								
C50	15.01	13.47	16.08	6.662		7.423								
	eld Sum						Iculate	ed Var	iate					
2-%		ontrol Type	Count	Mean	Min	Max	Std		Std Dev	CV%	96.69	ffect		
)		egative Control	8	48.13		55	2.00		5.668	11.78%				
1.5			4	47	39	58	4.37		8.756	18.63%	2.34			
3			4	53.75	50	57	1.43		2.872	5.34%	-11.	69%		
5			4	51	45	58	3.24		6.481	12.71%	-5.9	7%		
1.9			4	32.75	29	35	1.31	5	2.63	8.03%	31.9	15%		
3.8			4	9.25	7	11	0.85	39	1.708	18.46%	80.7	8%		
17.6			4	0.25	0	1	0.25		0.5	200.0%	99.4	8%		
5.2			4	1	0	3	0.70	71	1.414	141.4%	97.9	2%		
	eld Deta													
2-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep	5	Rep 6	Rep 7	Rep	8		
)	N	egative Control	42	47	41	54	55		43	53	50			
1.5			41	58	39	50								
3			50	57	54	54								
3			55	58	45	46								
11.9			33	35	29	34								
23.8			10	7	9	11								
17.6			0	1	0 ,	0								
5.2			0	3	0	1								

Report Date: Test Code: 02 Mar-14 16:51 (p 2 of 2)

14078d | 03-4486-3229

EC Alga Growth Inhibition Test

Nautilus Environmental

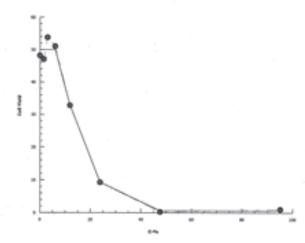
Analysis ID: Analyzed: 08-0057-9365 02 Mar-14 16:51 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Report Date: Test Code: 02 Mar-14 16:55 (p 1 of 2) 14078d(a) | 06-5207-0372

EC Alg	a Grow	th Inhibition Te	st								Nautilus	s Environmen
Analys	is ID:	06-5990-8232	End	point:	Cell Yield				CET	IS Version:	CETISv1.8.7	
Analyz		02 Mar-14 16:5		lysis:	Linear Interpola	tion (ICPIN)			cial Results		
-citaly 2		OE 18101-14 10.0	70 7110	.,,	Emedi morpon	roon (ron me						
Batch I	D:	16-0001-8244	Tes	t Type:	Cell Growth				Ana	,	ma Marus	
Start D	ate:	27 Feb-14 16:0	0 Pro	tocol:	EC/EPS 1/RM/	25			Dilu	ent: Dei	onized Water	
Ending	Date:	02 Mar-14 16:0	0 Spe	cies:	Pseudokirchne	riella subcap	pitata		Brin	e:		
Duratio	on:	72h	Sou	irce:	In-House Cultu	re			Age	: 6d		
Sample	ID:	19-2140-4869	Cod	ie:	72864FC5				Clie	nt: ALS	3	
Sample	e Date:	25 Feb-14 11:1	0 Mat	erial:	Effluent				Proj	ect:		
Receiv	e Date:	27 Feb-14 10:3	O Sou	irce:	ALS							
Sample	e Age:	53h (4 °C)	Star	tion:	L1426336-4(X1)						
Linear	Interpo	lation Options										
Trans		Y Transform	n See	d	Resamples	Exp 95%	CL	Metho	od			
.og(X+	1)	Linear	550	508	200	Yes		Two-P	Point Interp	oolation		
Residu	al Anal	veis										
Attribu		Method			Test Stat	Critical	p.v	alue	Decision	(a:5%)		
Control			dall Trend		rest Stat	Griddai	0.39			ficant Trend	in Controls	
			110110				0.00	,,,,	reon organ			
oint E	stimate	es										
.evel	%	95% LCL			95% LCL							
C5	6.582		6.947	15.19		NA						
C10	7.367		7.929	13.57		19.2						
C15	8.235		9.034	12.14		16.33						
C20	9.192		10.32	10.88		14.5						
C25	10.25		11.77	9.758		12.72						
C40	13.37		14.57	7.481	6.863	9.112						
C50	15.43	13.18	16.55	6.483	6.043	7.588						
Cell Yie	eld Sun	nmary				Cal	culat	ed Vari	ate			
2-%	C	ontrol Type	Count	Mean	Min	Max	Std	Err	Std Dev	CV%	%Effect	
)	N	legative Control	8	48.13		55	2.00		5.668	11.78%	0.0%	
.5			4	47	39	58	4.37	78	8.756	18.63%	2.34%	
}			4	48	48	48	0		0	0.0%	0.26%	
,			4	48	48	48	0		0	0.0%	0.26%	
1.9			4	32.75	29	35	1.31		2.63	8.03%	31.95%	
3.8			4	9.25	7	11	0.85		1.708	18.46%	80.78%	
7.6			4	0.25	0	1	0.25		0.5	200.0%	99.48%	
5.2			4	1	0	3	0.70)71	1.414	141.4%	97.92%	
Cell Yie	eld Deta	iil										
-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep		Rep 6	Rep 7	Rep 8	
)	N	egative Control	42	47	41	54	55		43	53	50	
1.5			41	58	39	50						
3			48	48	48	48						
3			48	48	48	48						
1.9			33	35	29	34						
23.8			10	7	9	11						
7.6			0	1	0	0						
				-								

Analyst:_

95.2

Report Date:

02 Mar-14 16:55 (p 2 of 2)

Test Code:

14078d(a) | 06-5207-0372

EC Alga Growth Inhibition Test

Nautilus Environmental

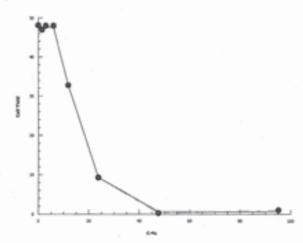
Analysis ID: Analyzed: 06-5990-8232 02 Mar-14 16:55 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Pseudokirchneriella subcapitata Summary Sheet

Client: Work Order No.:	ALS 14078	Start Date: _ Set up by: _	Feb 28/14 Emm
Sample Information	1:		
Sample ID: Sample Date: Date Received: Sample Volume:	L142(336-5 CX14) Feb 25/14 as 0900h Feb 27/14 as 1030h 2×20L		
Test Organism Info	rmation:		
Culture Date: Age of culture (Day 0	Feb 21/14 7d		
Zinc Reference Tox	cicant Results:		
Reference Toxicant Stock Solution ID: Date Initiated:	137nol Feb 21/14		
72-h IC50 (95% CL):	24,7 (15.2-33.8)	1/LZn	
72-h IC50 Reference	Toxicant Mean and Range: 22.7-(15.2	-33.8) pg/(2n)	CV (%): 22
Test Results:			Algal Growth
	IC25 %(v/v) (95% CL)	30,3(26.4	
	IC50 %(v/v) (95% CL)	30,36,26,7	- 33.07
Reviewed by:	Joh	Date revie	wed: March 17/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	ALS				Setup by		EMM			
Sample ID:	_x14	(44	16336	5)	Test Date	/Time:	Feb2	18/14	N 0830	>
Work Order No.:	_14	078			Test Spe	cies:	Pseudokin	chneriella s	subcapitata	
Culture Date:		٠.				Culture Hea		G000	l Un certis	(m)
	v1 =	(c1)	757	NИ	ml cells/ml	=3h	4			
Time Zero Counts:			227		Average:	24				
No. of Cells/mL:	24)	K 164		Initial D	ensity:	# cells/mL -	- 220 μL x	10 μL =	109090	ells/mi
Concentration	١	Water Qua	ality Meas	urement	8	Micro	plates rota	ated 2X pe	r day?	
%(v/v)	pН		Temp							
Control	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h	
	7.0	24.0	2510	2015	25.5	/	/	/_		
1.5	7.0			1		/				
3.0	7.1						/	/	/	
€.66.0	7.2					./			/	
11.9	7.4							/		
23.8	1.6							/	/	
47.6	7.8			١,			/	/		
95.2	7.8	4	\vee			1/	/	/		
						Ľ.				
Initials	emm	EMM	~	(h)	Emm	FMM	p	~	tmm	
Initial control pH:	Well 1:	68			Well 2:	68			,	
Final control pH:		67	5		Well 2:	6.5	-			
Light intensity (lux): 38	300			Date mea	sured:	Feb.	2/14		
Sample Description	n:	_cle	0/							
Comments:										
	-	-01-		-			1.	4 .	1	
Reviewed:		ou			Date	e reviewed:	Mar	ch 14	/14	

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	ALS			Start D	ate/Time:	Feb28	14 a	J 083G		
Work Order #:	4	1407	8	Terminal	tion Date:	march	3/14 a	0835		
Sample ID:	ΞXI	4 (44	263364	5) Test:	set up by:	EMM				
%(v/v)										
Concentration	Rep	Count 1	Count 2	Count 3	Count 4		Commer	nts	Ini	itials
Control	Α	ЧЬ 53 52							En	1M
	В	53							+	
	С	52							+	
	D	56							11	
-	E	49							\perp	
	F	43								
	G	57								
	Н	52	1 1							
	Α	чe							\top	
10	В	59							\Box	\Box
1.5	С	54							\vdash	1
	D	62							\top	
	- A	64							\vdash	\Box
	В	60							+	\neg
3.0	С	54							+	
	D	75							+	
	A	21		-					+	\vdash
/ ^		84							+	\vdash
60	С	80							+	\vdash
			11/2						+	\vdash
	D	101	110						+	Н
40	A	52							+	\vdash
11.9	В	4			-				+	\vdash
	С	56							+	\vdash
	D	57							+	Н
	Α	36							+	Н
23.8	В	28							\perp	Ш
25.0	С	32								Ш
	D	36								
	Α	13								
47.6	В	9	7							\Box
.,	С	16								
	D	19							\perp	\perp
0-	Α	0							\perp	\perp
95.2	В	0.			_	25.0			+	+
	C	0			-				+-	+
	U									la
Comments:										
		10.					. ,	1		
Reviewed by:		Jou		Date R	eviewed:	- /	March	14/14		
					-	-				

Pseudokirchneriella subcapitata Algal Counts

Client: WO#:	ALS 14078	10220 E)		Start Date/ Termination			@0830h @0830h		
Sample ID:	X14 (L142	(0330-0)		Initial Cell (Density:	10909	ell/mL		240000 0.22 0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10909.09
% v/v		(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴) cell/mL		
Control	Α	46				46	44.9	mean	49.9
	В	53				53	51.9	SD	4.780914
	С	52				52	50.9	CV	9.579246
	D	56				56	54.9		
	E	49				49	47.9		
	F	43				43	41.9		
	G	57				57	55.9		
	H	52				52	50.9		
1.5	A	48				48	46.9		
	В	59				59	57.9		
	C	54				54	52.9		
	D	62				62	60.9		
3	Α	64				64	62.9		
	В	60				60	58.9		
	C	54				54	52.9		
	D	65				65	63.9		
6	A	71				71	69.9		
	В	84				84	82.9		
	С	80				80	78.9		
	D	101	110			105.5	104.4		
11.9	Α	52				52	50.9		
	В	61				61	59.9		
	С	56				56	54.9		
	D	57				57	55.9		
23.8	Α.	36				36	34.9		
	В	28				28	26.9		
	С	32				32	30.9		
	D	36				36	34.9		
47.6	Α	13				13	11.9		
	B C	9	7			- 8	6.9		
		16				16	14.9		
	D	14				14	12.9		
95.2	A	0				0	-1.1		
	B C	0				0	-1.1		
		0				0	-1.1		
	D	0				0	-1.1		

JGh March 14/14

Report Date: Test Code: 04 Mar-14 16:48 (p 1 of 2)

14078e | 07-0869-5137

EC Alg	a Grow	th Inhibition Te	st								Nauti	us Environmen
Analys		14-2586-3492 04 Mar-14 16:4		dpoint: alysis:	Cell Yield Linear Interpola	ation (ICPIN)			TIS Version: icial Results	CETISv1.8.7	7
Batch I	D:	06-3545-2069	Te	st Type:	Cell Growth				Ana	lyst: Yvo	nne Lam	
tart D	ate:	28 Feb-14 08:3	0 Pr	otocol:	EC/EPS 1/RM/	25			Dilu	ent: Dek	onized Water	
Ending	Date:	03 Mar-14 08:3	10 Sp	ecies:	Pseudokirchne	riella subca	pitata		Brin	ne:		
Duratio	n:	72h	So	urce:	In-House Cultu	re			Age	: 7d		
ample	D:	18-2798-0256	Co	de:	6CF4C3E0				Clie	ent: ALS		
ample	Date:	25 Feb-14 09:0	0 Ma	terial:	Effluent				Pro	ject.		
Receiv	e Date:	27 Feb-14 10:3	0 So	urce:	ALS							
Sample	Age:	71h (2.8 °C)	St	ation:	L1426336-5(X1	4)						
inear	Interpo	lation Options										
Trans	sform	Y Transform	n Se	ed	Resamples	Exp 95%	CL	Metho	od			
.og(X+	1)	Linear	15	04063	200	Yes		Two-P	oint Inten	polation		
tesidu	al Analy	ysis								-		
Attribu	te	Method			Test Stat	Critical	P-Va	lue	Decision	n(a:5%)		
Control	Trend	Mann-Ken	dall Trend				0.90	49	Non-sign	ificant Trend	in Controls	
oint E	stimate	rs.										
evel	%	95% LCL	95% UC		95% LCL	95% UCL						
C5	8.323	6.873	14.42	12.01		14.55						
C10	11.42	7.743	14.26	8.758		12.91						
C15	12.9	10.13	15.17	7.75	6.591	9.871						
C20	14.16	11.91	16.57	7.063		8.396						
C25 C40	15.53	13.2 17.49	18.19 23.98	6.441 4.898		7.575 5.717						
C50	24.58	20.67	28.89	4.068		4.838						
_			20.00	1.000	0.402		culate	d Vori	ata			
	eld Sum	-	Count	Mana						CVW	N Effect	
:-%		ontrol Type egative Control	Count 8	Mean 50	Min 42	Max 56	1.69	Err	Std Dev 4.781	CV% 9.56%	%Effect 0.0%	
.5	N	egative Control	4	54.75		61	3.06	5.	6.131	11.2%	-9.5%	
			4	59.75		64	2.49		4.992	8.35%	-19.5%	
			4	84	70	104	7.2		14.4	17,14%	-68.0%	
1.9			4	55.5	51	60	1.84	В	3.697	6.66%	-11.0%	
3.8			4	32	27	35	1.91	5	3.83	11.97%	36.0%	
7.6			4	11.75		15	1.70		3.403	28.97%	76.5%	
5.2			4	0	0	0	0		0		100.0%	
ell Yie	ld Deta	il										
-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep	5	Rep 6	Rep 7	Rep 8	
	N	egative Control	45	52	51	55	48		42	56	51	
.5			47	58	53	61						
			63	59	53	64						
			70	83	79	104						
1.9			51	60	55	56						
3.8			35	27	31	35						
7.6			12	7	15	13						
5.2			0	0	0	0						

Report Date:

04 Mar-14 16:48 (p 2 of 2)

Test Code:

14078e | 07-0869-5137

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed: 14-2586-3492 04 Mar-14 16:47

Endp

Endpoint: Cell Yield

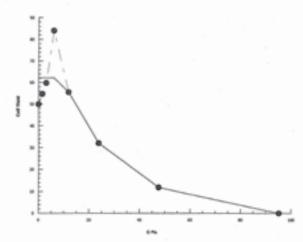
Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes

Graphics



Analyst:

Report Date: 04 Mar-14 16:53 (p 1 of 2)

		-
est Code:	14078e(a)	16-6598-674

EC Alg	a Grow	th Inhibition Te	st								Nautil	us Environment
knalysi knalyz		12-8245-3026 04 Mar-14 16:5		fpoint: ilysis:	Cell Yield Linear Interpola	ation (ICPIN	0			Version: Il Results:	CETISv1.8.7 Yes	
Batch I	D:	19-3933-4226	Tes	t Type:	Cell Growth				Analys	st: Yvon	ne Lam .	
tart D	ate:	28 Feb-14 08:3		tocol:	EC/EPS 1/RM/	25			Diluen	nt: Deior	nized Water	
inding	Date:	03 Mar-14 08:3	0 Spe	cles:	Pseudokirchne	riella subca	pitata		Brine:			
Duratio	n:	72h	Sou	irce:	In-House Cultu	ire			Age:			
ample	ID:	18-2798-0256	Co	de:	6CF4C3E0				Client	: ALS		
ample	Date:	25 Feb-14 09:0	0 Mat	terial:	Effluent				Projec	et:		
		27 Feb-14 10:3	0 Sou	irce:	ALS							
Sample	Age:	71h (2.8 °C)	Sta	tion:	L1426336-5(X1	14)						
inear	Interpo	lation Options										
Trans	sform	Y Transform			Resamples	Exp 95%		Method				
.og(X+	1)	Linear	211	7751	200	Yes	Т	wo-Point I	nterpol	ation		
Residu	al Anal	ysis										
Attribu	te	Method			Test Stat	Critical	P-Valu	ue Deci	sion(a	:5%)		
Control	Trend	Mann-Ken	dall Trend				0.9049	9 Non-	signific	ant Trend in	n Controls	
oint E	stimate	15										
evel	%	95% LCL	95% UCL		95% LCL							
C5	13.13		13.42	7.619		NA						
C10	14.47		15.13	6.912		8.283						
C15 C20	15.94 17.55	13.54 15.07	17.03 19.23	6.274 5.699		7.385 6.635						
C25	19.31	16.76	21.8	5.179		5.966						
C40	25.5	21.64	28.61	3.921		4.62						
C50	30.29		33.61	3.301		3.789						
ell Yie	eld Sum	mary				Cai	Iculated	Variate				
-%		ontrol Type	Count	Mean	Min	Max	Std Er		Dev	CV%	%Effect	
		egative Control	8	50	42	56	1.69	4.78		9.56%	0.0%	
.5			4	50	50	50	0	0		C.0%	0.0%	
			4	50	50	50	0	0		0.0%	0.0%	
			4	50	50	50	0	0		0.0%	0.0%	
1.9			4	50	50	50	0	0		0.0%	0.0%	
3.8			4	32	27	35	1.915	3.83		11.97%	36.0%	
7.6			4	11.75		15	1.702	3.40	3	28.97%	76.5%	
5.2			4	0	0	0	0	0			100.0%	
	eld Deta							-				
-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep 5			Rep 7	Rep 8	
_	N	egative Control	45	52	51	55	48	42		56	51	
.5			50	50	50	50						
			50	50	50	50						
			50	50	50	50						
1.9			50	50	50	50						
3.8			35	27	31	35						
7.6			12	7	15	13						
95.2			0	0	0	0						

Report Date: Test Code:

04 Mar-14 16:53 (p 2 of 2)

14078e(a) | 16-6598-6747

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed:

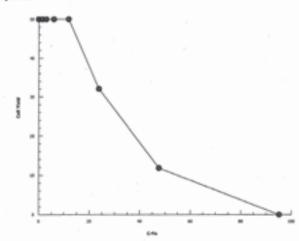
12-8245-3026 04 Mar-14 16:53 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Pseudokirchneriella subcapitata Summary Sheet

Client: Work Order No.:	ALS 14078	Start Date: Feb 28/14 Set up by: Emm
Sample Information	n:	
Sample ID: Sample Date: Date Received: Sample Volume:	1426336-6 (X3A) Feb 25/14 av 1135h Feb 23/14 av 1036h 2×20L	
Test Organism Info	ormation:	
Culture Date: Age of culture (Day	Feb21/14 7d	
Zinc Reference Tox	cicant Results:	
Reference Toxicant Stock Solution ID: Date Initiated:	132n 01 Feb 2114	_
72-h IC50 (95% CL)	24.7 (16-1-31.7) pg/	_ Zh
72-h IC50 Reference		3.2) yeli 20 (%): 22
Test Results:		Algal Growth
		7.8 (3.6-11.1) 8.4 (13.4-22.2)
Reviewed by:	John	Date reviewed: March 17/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	_ALS				Setup by:								
Sample ID:	_X3+	A cur	176336	-6)	Test Date	e/Time:	Feb.	28/14 a) 083 (5			
Work Order No.:	14	078			Test Spe	cies:	Pseudokin	chneriella s	ubcapitata				
Culture Date:	Feb2	ИЧ	Age of C	ulture:	70	Culture Hea	olth:	Good	L				
Culture Count:	1750	2714	Average:	757	Culture 0	Cell Density		757X	104 cel	S/lm\			
	v1 =		cells/ml x	100	ml cells/ml	. = 3							
Time Zero Counts: 12/27 Average: 24													
No. of Cells/mL: 24×10 ¹⁴ Initial Density: # cells/mL + 220 μL x 10 μL = 10 969 cells/w													
Concentration	١	Water Qua	lity Meas	urement	s	Micro	plates rota	ated 2X per	day?				
%(v/v)	pН		Temp										
Control	2 /2	24.U	24 h	48 h	72 h	0 h	24 h	48 h	72 h	-			
	7.0	-	2500	255	25:5	/	-	-					
1,5	7.0	24.0	-	\vdash	-								
3.0	7.2	24.0	\perp			/	_		/				
6.6	7.4	24.0	-			/			/				
11.9	73	24.0				/		/					
23.8	75	24.0					/		/				
47.6	7.5	24.0						//					
,	7.6	24.0	y	y	1	/	/		/				
									,*				
Initials	Өмм	€mm	A-	r	FMM	<i>EMM</i>	an .	M	tmm				
Initial control pH:	Well 1:	6.8			Well 2:	6.8							
Final control pH:	Well 1:	6.3	5		Well 2:	6.5							
Light intensity (lux	1: 390	0 0			Date mea	sured:	Feb2	114					
Sample Description: CLOC.													
Comments:													
Bardania di		Joh			D. 1	a andowed:	M	urch 14	/14				
Reviewed:	1	000			Dat	e reviewed:	,		/ / /				

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	ALS	3		Start D	ate/Time:	Feb 28	3/14/20	236		
Work Order #:	140	118	ainm	Terminat	tion Date:	march	3/14/100	230		
Sample ID:			136 b	Test:	set up by:	amm				
%(v/v)		(L142	6336-	4/						
Concentration	Rep	Count 1	Count 2	Count 3	Count 4		Comments		Init	tials
Control	Α	54						- (Ţ	nn
	В	63						$\overline{}$	+	
	С	56							+	_
	D	55							+	
	E	54						-	1	
	F	59							1	
	G	49							-	
	Н	51								
	Α	52								
1.5	В	59					č.			
1.0	С	49								
	D	50								
	Α	53							\neg	
20	В	52-								
3.0	С	65							\neg	
	D	60						$\overline{}$	\neg	
	A	36	39				-	-	\neg	
10	В	38	44					-	\neg	
6.0	c	43	42					-		1
	D	62							_	-
	A	39	66						_	\vdash
		26							_	\vdash
11.9	В	36							_	-
11.7		37							_	\vdash
		32						_	_	\vdash
	A	27					-	-	_	-
23.8	В	23						-	_	\vdash
25.0	С	24								\vdash
1	D	23	4							\vdash
	Α	2	Ø						_	\perp
47.6	В	Ø	0	-,-					_	\perp
1.7.2	С	4	3	4				_	_	\vdash
	D	1	-	-				_	_	+
95.2	A B	4						$\overline{}$	_	-
45.6	C	7	6	15					_	+
	D	6 -	10	-					U	b
Comments:										
Deviews 41		IG		D-1	and an orași	Mari	ch 14/14			
Reviewed by:		000		Date R	eviewed:	/ (201	1117		_	

Pseudokirchneriella subcapitata Algal Counts

Client: WO#:	ALS 14078	6226.61		Start Date/ Termination		28-Feb-14 03-Mar-14			
Sample ID:	X3A (L142	0330-0)		Initial Cell Densi		10909	cell/mL		240000 0.22 0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		10909.09
% v/v	r.cp	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴)	(x 10 ⁴) cell/mL		
Control	Α	54				54	52.9	mean	54.0
	В	63				63	61.9	SD	4.389517
	C	56				56	54.9	CV	8.123606
	D	55				55	53.9		
	E	54				54	52.9		
	F	59				59	57.9		
	G	49				49	47.9		
	Н	51				51	49.9		
1.5	Α	52				52	50.9		
	В	59				59	57.9		
	C	49				49	47.9		
	D	50				50	48.9		
3	Α	53				53	51.9		
-	В	52				52	50.9		
	С	65				65	63.9		
	D	60				60	58.9		
6	A	36	39			37.5	36.4		
-	В	38	44			· 41	39.9		
	C	43	42			42.5	41.4		
	D	62	66			64	62.9		
11.9	Α	39				39	37.9		
	В	30				30	28.9		
	C	37				37	35.9		
	D	32				32	30.9		
23.8	A	27				27	25.9		
	В	23				23	21.9		
	С	24				24	22.9		
	D	23				23	21.9		
47.6	A	2	0			1 "	-0.1		
	В	0	0			0	-1.1		
	С	4	3	4		3.6666667			
	D	1	1			1	-0.1		
95.2	A	0				0	-1.1		
	В	0				0	-1.1		
	С	1	0	0		0.3333333			
	D	0				0	-1.1		

JGU March 14/14

Report Date: Test Code: 05 Mar-14 09:57 (p 1 of 2)

14078f | 04-5755-2077

EC Alg	a Grow	th Inhibition Te	est					111			Nautilus	Environment
knalys knalyz		15-1589-2421 05 Mar-14 9:57		fpoint: llysis:	Cell Yield Linear Interpola	ation (ICPIN)			IS Version: cial Results		
Batch	D:	12-1510-8147	Tes	t Type:	Cell Growth				Ana	lyst: Em	ma Marus	
tart D	ate:	28 Feb-14 08:3		tocol:	EC/EPS 1/RM/	25			Dilu	_	onized Water	
nding	Date:	03 Mar-14 08:3	0 Spe	cies:	Pseudokirchne	riella subca;	pitata		Brin	e:		
uratio	n:	72h	Sou	irce:	In-House Cultu	re			Age	7d		
ample	D:	05-2872-4256	Cod	de:	1F83B120				Clie	nt: ALS	;	
ample	Date:	25 Feb-14 11:3	35 Mat	terial:	Effluent				Proj	ect:		
leceiv	e Date:	27 Feb-14 10:3	30 Sou	irce:	ALS							
ample	Age:	69h (3.9 °C)	Sta	tion:	L1426336-6(X3	IA)						
inear	Interpo	lation Options										
	sform	Y Transform			Resamples	Exp 95%	CL	Method				
0g(X+	1)	Linear	390	736	200	Yes		Two-Poi	nt Interp	olation		
esidu	al Analy	rsis										
ttribu	te	Method			Test Stat	Critical	P-Va		ecision			
ontrol	Trend	Mann-Ken	ndall Trend				0.17	88 N	on-signi	ficant Trend	in Controls	
oint E	stimate	rs										
evel	%	95% LCL			95% LCL							
25	3.696	N/A	8.224	27.05		NA						
C10	4.557	2.59	8.788	21.94		38.61						
215	5.575 6.662	2.972	9.41 10.31	17.94		33.65						
20	7.848	3.267 3.599	11.06	15.01		30.61 27.78						
240	12.77	8.633	16.61	7.83	6.02	11.58						
250	18.45	13.38	22.15	5.421		7.474						
ell Yie	eld Sum	mary				Cal	culate	d Variate	0			
-%		ontrol Type	Count	Mean	Min	Max	Std I		td Dev	CV%	%Effect	
76		egative Control	8	54.13		62	1.552	_	39	8.11%	0.0%	
5			4	51.5	48	58	2.255		509	8.76%	4.85%	
			4 .	56.5	51	64	3.069		137	10.86%	-4.39%	
			4	45	36	63	6.096		2.19	27.1%	16.86%	
1.9			4	33.5	29	38	2.102	4.	203	12.55%	38.11%	
3.8			4	23.25	22	26	0.946	55 1.	893	8.14%	57.04%	
7.6			4	0.75	0	3	0.75	1.	5	200.0%	98.61%	
5.2			4	0	0	0	0	0			100.0%	
	eld Deta											
-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep		ep 6	Rep 7	Rep 8	
	No	egative Control	53	62	55	54	53	58	3	48	50	
5			51	58	48	49						
			52	51	64	59						
			36	40	41	63						
1.9			38	29	36	31						
3.8			26	22	23	22						
7.6			. 0	0	3	0						
5.2			0	0	0	0						

Report Date: Test Code: 05 Mar-14 09:57 (p 2 of 2)

14078f | 04-5755-2077

EC Alga Growth Inhibition Test

Nautilus Environmental

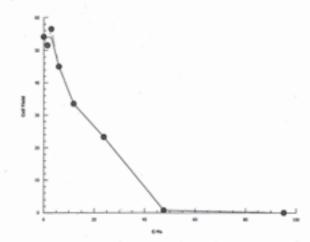
Analysis ID: Analyzed: 15-1589-2421 05 Mar-14 9:57 Endpoint: Cell Yield

Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes



Pseudokirchneriella subcapitata Summary Sheet

Client: Work Order No.:	ALS_ 14078	Start Date: Feb 28/19 Set up by: FMM
Sample Information:		
Sample Date: Date Received:	1426336-7 (23) Feb 25/14 av 1630h Feb 27/14 ev 1080h 2x20L	
Test Organism Inform	mation:	
Culture Date: Age of culture (Day 0)	Feb 21/14 7a	
Zinc Reference Toxic	cant Results:	
Reference Toxicant ID Stock Solution ID: Date Initiated:	32105 137101 Febally	
72-h IC50 (95% CL):	24.7 (16.1-31.7) pg	112
72-h IC50 Reference	Toxicant Mean and Range: 22.7 (15.2-	338)pg/(200 (%): 22
Test Results:		Algal Growth
Г	C25 %(v/v) (95% CL) C50 %(v/v) (95% CL)	35.8 (30.1 - 44.9) 53.1 (38.5 - 63.4)
Reviewed by:	Joh	Date reviewed: March 17/14

72-h Algal Growth Inhibition Toxicity Test Water Quality Measurements

Client :	_ALS				Setup by		EMP			
Sample ID:	230	L1426	336-	7)	Test Date	/Time:	Feb 28/14 a) 0830			
Work Order No.:	140	18			Test Spe	cies:	Pseudokiro	hneriella s	subcapitata	
Culture Date: Culture Count:	1750	2764	Average:	757	Culture C	Culture Hea		<u>600</u>	d 1104cel	Is/ml
	v1 =	220,000 c (c1)				= 3h	nl .			
Time Zero Counts			2 27		Average:	_24				
No. of Cells/mL:	74 ×	104		Initial D	ensity:	# cells/mL	- 220 μL x	10 μL =	10909ce	lls/m/
Concentration		Water Qua	ality Meas	urement	s	Micro	plates rot	nted 2X pe	er day?	
%(v/v)	pH		Temp				-			
Control	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h	
	7.6	2u.0	2010	2015	25.5	/		\angle	14	
1,5	7.1		1	L	1	/			/	
3.0	7.1					V				
6.0	7.3					~		/		
11.9	7.5					/		/	/_	
23.8	7.4							/		1
47.6	7.6						/	/		
95.2	7.6	1	1	V		1		/	/	1
10 1	-				-					
		-	-	7		7				
Initials	FMM	Emm	<i>P</i>	~	E mm	≠mm	h	~~	ann	
Initial control pH:	Well 1:	68				68				
Final control pH:		6:5				6.5				
Light intensity (lux): 3800				Date measured: Fcb 2V14						
Sample Description:										
Comments:										-
Reviewed:		ぴん			Dat	e reviewed:	/	larch	14/14	

Pseudokirchneriella subcapitata Toxicity Test Data Sheet 72-h Algal Cell Counts

Client:	ALS			Start D	ate/Time:	Feb28	14 a	0830h		
Work Order #: *	170 14078			Terminat	ion Date:	Feb 2814 au 0830h march 3/14 au 0830h				
Sample ID:	13	(41426	336-7) Test s	set up by:	FMM				
%(v/v)										
Concentration	Rep		Count 2	Count 3	Count 4		Commen	its		itials
Control	A	41							E	nm
	В	47							₩	
	С	45						-	H	
	D	50			_				Н	
	E	50							Н	
	F	48								
	G	46	7						\vdash	
	Н	38							⊢	\vdash
	Α	56							⊢	-
1.5	В	51							⊢	-
	С	42							⊢	\vdash
	D	55							⊢	\vdash
-	Α	94							⊢	\vdash
3.0	В	97							⊢	
	С		-						⊢	\vdash
	D	75						-	⊢	-
	Α	98							⊢	ш
6.0	В	167-							┡	Н
	С	109		-					╙	\vdash
	D	110	-						╙	Ш
	Α	91							⊢	\vdash
11.9	В	88			-				╙	Ш
7.7	С	79							╙	Ш
	D	86							⊢	Ш
2.00	Α	58							\vdash	Ш
23.8	В	69							Ш	-
	С	54							Ш	\Box
	D	62		-					Ш	Ш
1001	A	21	20						Ш	
47.6	В	2	23						Н	
	C	21 34 30	36 31						Н	-
	A	50	21						Н	\neg
95.2	В	Ž							H	\neg
15.2	С	8			-				H	\neg
	D	3	4						4	′
Comments:		_								_
Reviewed by:		Joh		Date P	eviewed-	Ma	rch 14	114		
toriomou by.		Jou		Date N	-	_				

Pseudokirchneriella subcapitata Algal Counts

Sample ID: R3 (L1426336-7) Initial Cell D=nsity: 10909 cell/mL 240000 0.22 0.01	Client: WO#: Sample ID:	ALS 14078	226.7\		Start Date/ Termination		28-Feb-14 03-Mar-14			
Concentration % v/v Rep % v/v Count 1 (x 10*) Count 2 (x 10*) Count 3 (x 10*) Count 4 (x 10*) Mean (x 10*) Cell Yield (x 10*) 10909.09 Control A 41 41 39.9 mean 44.5 44.5 43.9 CV 9.521999 Control B 47 45 43.9 CV 9.521999 44.5 43.9 CV 9.521999 E 50 50 48.9 46 44.9 46.9 44.9 46.9 44.9 46.9 44.9 46.9 44.9 46.9 44.9 46.9 44.9 46.9 47.9 47.9 47.9 47.9 47.9 47.9 47.9 47	Sample ID.	K3 (L1420	330-1)		Initial Cell (Density:	10909	cell/mL		0.22
% v/v (x 10 ⁴) (x	Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		
B 47		тер								
B 47	Control	Α	41				41	39.9		
C 45 D 50 S 50 A8.9 E 50 F 48 G 46 H 38 S 38 S 36.9 1.5 A 56 B 51 C 42 D 55 S 55 S 3.9 S A 94 B 97 C 84 B 97 C 84 B 107 C 84 B 107 C 109 D 110 D 107.9 D 109 D 86 B 88 C 79 D 86 B 88 B 88 C 79 D 86 B 69 C 54 D 62 C 34			47							
E 50			45						CV	9.521999
F 48 46 46 44.9 H 38 38 36.9 1.5 A 56 56 56 54.9 B 51 51 42 40.9 C 42 42 40.9 D 55 55 53.9 3 A 94 94 92.9 B 97 97 95.9 C 84 84 82.9 D 75 75 73.9 6 A 98 98 96.9 B 107 107 105.9 C 109 109 107.9 D 110 110 108.9 11.9 A 91 91 91 89.9 B 88 88 86.9 C 79 79 77.9 D 86 86 84.9 23.8 A 58 58 56.9 C 54 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 47.6 A 5 6 35 33.9 95.2 A 5 7 7 5.9 D 30 31 30.5 29.4 95.2 A 5 8 6.9		D								
1.5		E								
1.5 A 56 B 51 C 42 A2 40.9 D 55 S 55 S 53.9 B 97 C 84 B 98 B 96.9 C 109 D 110 D 107.9 D 86 B 88 B 88 B 88 B 86.9 C 79 C 7										
1.5										
B 51										
C 42	1.5									
3		В								
3 A 94 92.9 B 97 95.9 C 84 84 82.9 D 75 75 73.9 6 A 98 96.9 B 107 107 105.9 C 109 109 107.9 D 110 110 108.9 11.9 A 91 91 89.9 B 88 86.9 86.9 C 79 77.9 77.9 D 86 84.9 86.9 23.8 A 58 58.56.9 B 69 67.9 69.67.9 C 54 52.9 D 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9		С								
B 97 C 84 84 82.9 C 84 84 82.9 D 75 75 73.9 B 107 75 70.9 B 107 105.9 C 109 109 107.9 D 110 110 108.9 B 88 88 86.9 C 79 79 77.9 D 86 86 86 84.9 23.8 A 58 56.9 C 54 56 56.9 C 54 56 69 67.9 C 54 56 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 8 6.9		D								
C 84 82.9 D 75 75 73.9 B 98 96.9 B 107 107 105.9 C 109 109 107.9 D 110 110 108.9 11.9 A 91 91 89.9 B 88 86.9 C 79 79 77.9 D 86 86 84.9 23.8 A 58 58 56.9 B 69 69 67.9 C 54 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 7 7 5.9 C 8 6.9	3	A								
6										
6										
B 107	2									
C 109 D 110 D 110 D 110 D 110 D 110 D 110 D 108.9 D 89.9 B 88 86.9 C 79 D 86 D 86 B 69 C 54 D 62	6									
11.9		В								
11.9 A 91 B 88 C 79 D 86 C 79 D 86 B 69 C 54 D 62 D 62 C 54 D 62 C 34 B 21 C 33 C 34 B 21 C 33 C 34 B 21 C 34 B 36 B 35 B 30.5 B 7 C 8 B 7 C 8										
B 88 86.9 C 79 77.9 D 86 86 84.9 23.8 A 58 56.9 B 69 69 67.9 C 54 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 8 6.9										
C 79 77.9 D 86 86 84.9 23.8 A 58 58 56.9 B 69 67.9 C 54 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 C 8 6.9	11.9	A								
23.8		В								
23.8										
B 69 67.9 C 54 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 C 8 7 7 5.9 C 8 69 67.9 C 54 52.9 D 20.5 19.4 D 20	00.0									
C 54 52.9 D 62 62 60.9 47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 C 8 7 7 5.9 C 8 6 6.9	23.8									
47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 7 5.9 C 8 62 60.9										
47.6 A 21 20 20.5 19.4 B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 C 8 7 5.9 C 8 8 6.9										
B 21 23 22 20.9 C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 B 7 7 5.9 C 8 8 6.9	47.0			20						
C 34 36 35 33.9 D 30 31 30.5 29.4 95.2 A 5 5 3.9 B 7 7 5.9 C 8 8 6.9	47.0	6								
D 30 31 30.5 29.4 95.2 A 5 5 3.9 B 7 7 5.9 C 8 8 6.9										
95.2 A 5 5 3.9 B 7 7 5.9 C 8 8 6.9										
B 7 7 5.9 C 8 8 6.9	95.2			31						
C 8 8 6.9	JU.E.		7							
Ť .										
				4						

JOh March 14/14

Report Date: Test Code: 05 Mar-14 10:04 (p 1 of 2)

14078g | 21-2831-2742

EC Alg	ga Grow	th Inhibition Te	est									Nautilu	s Environmental
Analys Analyz		00-6843-9117 05 Mar-14 10:0		dpoint: alysis:	Cell Yield Linear Interpola	ation (ICPIN	1)			ETIS Ve		CETISv1.8.7 Yes	
Batch	ID:	03-0974-8538	Tes	st Type:	Cell Growth				Ar	nalyst:	Emm	na Marus	
Start D	ate:	28 Feb-14 08:3	30 Pro	tocol:	EC/EPS 1/RM/	25			Di	luent:	Deio	nized Water	
Ending	Date:	03 Mar-14 08:3	30 Sp	ecles:	Pseudokirchne	riella subca	pitata		Br	rine:			
Duratio	on:	72h	So	urce:	In-House Cultu	re			A	ge:	7d		
Sampl		13-8828-3648		de:	52BF8700				CI	ient:	ALS		
		25 Feb-14 16:3		terial:	Effluent				Pr	oject:			
		27 Feb-14 10:3		urce:	ALS								
Sampl	e Age:	64h (3.4 °C)	Sta	tion:	L1426336-7(R3	3)							
Linear	Interpo	lation Options											
X Tran		Y Transform			Resamples	Exp 95%		Meth					
Log(X+	1)	Linear	137	0559	200	Yes		Two-	Point Inte	rpolatio	n		
Residu	ial Anal	ysis											
Attribu	rte	Method			Test Stat	Critical	P-Va		Decisio	on(a:5%)		
Contro	Trend	Mann-Ken	ndall Trend				0.90	49	Non-sig	nificant	Trend i	n Controls	
Point 8	stimate	is								5			
Level	%	95% LCL			95% LCL	95% UCL							
IC5	14.25	13.13	16.52	7.016		7.616							
IC10	17.04	14.44	22.65	5.87	4.414	6.925							
IC15 IC20	20.33	15.83 17.43	27.04 27.52	4.92 4.17	3.699 3.634	6.318 5.738							
IC25	25.89	20.56	29.41	3.863		4.863							
IC40	32.51	28.33	36.81	3.076		3.53							
IC50	37.81	32.95	43.85	2.645		3.035							
Cell Yi	eld Sum	mary				Cal	culate	d Var	iate				
C-%		ontrol Type	Count	Mean	Min	Max	Std E		Std De	v CV	6	%Effect	
0		egative Control	8	44.63		49	1,499		4.241	9.59		0.0%	
1.5			4	50	41	55	3.189		6.377	12.7		-12.04%	
3			4	86.5	74	96	5.008	3	10.02	11.5	8%	-93.84%	
6			4	105	97	109	2.739	9	5.477	5.22	2%	-135.3%	
11.9			4	85	78	90	2.55		5.099	6.09		-90.48%	
23.8			4	59.75	53	68	3.198		6.397	10.7		-33.89%	
47.6			4	25.75	19	34	3.497		6.994	27.1		42.3%	
95.2			4	4.75	2	7	1.109)	2.217	46.6	8%	89.36%	
	eld Deta												
C-%		ontrol Type	Rep 1	Rep 2		Rep 4	Rep	5	Rep 6	Rep		Rep 8	
0	No	gative Control	40	46	44	49	49		47	45		37	
1.5			55 93	50 96	41	54							
6			97	106	83	74							
11.9			90	87	108	109							
23.8			57	68	78 53	85							
47.6			19	21	53 34	61 29							
95.2			4	6	7	29							
30.2			4	0	,	2							

- ON JOH March All

Report Date:

05 Mar-14 10:04 (p 2 of 2)

Test Code:

14078g | 21-2831-2742

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed: 00-6843-9117 05 Mar-14 10:04 Endpoint: Cell Yield

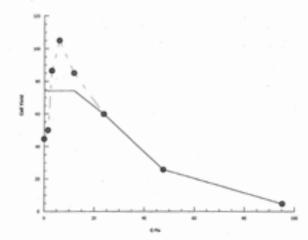
Analysis: Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results: Yes

Graphics



Report Date: 05 Mar-14 10:11 (p 1 of 2)

	Maurillus Equiposports
Test Code:	14078g(a) 06-7087-981
report bate.	00 mai-14 10:11 (p 1 01)

EC Alg	a Grow	th Inhibition Te	est									Nauti	ilus Environmenta
Analys	is ID:	11-4998-9586	Er	ndpoint:	Cell Yield					CETIS V	ersion:	CETISv1.8.	7
Analyz		05 Mar-14 10:1		nalysis:	Linear Interpola	ation (ICPIN)			Official F	Results:	Yes	
Batch	ID:	02-3145-7835	Te	et Tupo:	Cell Growth		_			Analyst:	Emn	na Marus	
Start D		28 Feb-14 08:3		otocol:	EC/EPS 1/RM/	26				Diluent:		nized Water	
	Date:	03 Mar-14 08:3		pecies:	Pseudokirchne		nitata			Brine:	Delo	HILLOU TVOIG	
Duratio		72h		ource:	In-House Cultu		pitata			Age:	7d		
Duratio	JII.	7211				10							
Sample		13-8828-3648		ode:	52BF8700					Client:	ALS		
		25 Feb-14 16:3		aterial:	Effluent					Project:			
		27 Feb-14 10:3		ource:	ALS								
Sample	e Age:	64h (3.4 °C)	St	ation:	L1426336-7(R3	3)							
Linear	Interpo	lation Options											
X Tran	sform	Y Transform	n Se	ed	Resamples	Exp 95%	CL	Meth	hod				
Log(X+	1)	Linear	14	36493	200	Yes		Two-	-Point Ir	nterpolati	on		
Residu	al Anal	ysis											
Attribu	te	Method			Test Stat	Critical	P-V	alue	Decis	sion(a:5	%)		
Control	Trend	Mann-Ken	dall Trend				0.9	049				in Controls	
Point E	stimate	95											
Level	%	95% LCL		L TU	95% LCL	95% UCL							
IC5	25.83	22.89	27.04	3.871		4.368							
IC10	28.03	24.92	30.67	3.567		4.013							
IC15 IC20	30.41	26.87	34.76	3.288		3.722							
IC25	35.77	28.35 30.06	39.51 44.9	3.032 2.795		3.527 3.326							
IC40	45.58	34.73	57.44	2.194		2.88							
IC50	53.07	38.53	63.45	1.884		2.596							
Cell Yie	eld Sum	mary					culat	ed Va	riate				
C-%		ontrol Type	Count	Mean	Min	Max	Std		Std D	Dev CV	10/	%Effect	
0		egative Control	8	44.63		49	1.49		4.241			0.0%	
1.5		oganie Comio	4	45	45	45	0	9-0	0	0.0		-0.84%	
3			4	45	45	45	0		0	0.0		-0.84%	
6			4	45	45	45	0		0	0.0		-0.84%	
11.9			4	45	45	45	0		0	0.0		-0.84%	
23.8			4	45	45	45	0		0	0.0	196	-0.84%	
47.6			4	25.75	19	34	3.49	97	6.994		16%	42.3%	
95.2			4	4.75	2	7	1.10	9	2.217	46	.68%	89.36%	
Cell Yie	eld Deta	il											
C-%	C	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep	5	Rep 6	Re	p 7	Rep 8	
0	Ne	egative Control	40	46	44	49	49		47	45		37	
1.5			45	45	45	45							
3			45	45	45	45							
6			45	45	45	45							
11.9			45	45	45	45							
23.8			45	45	45	45							
47.6			19	21	34	29							
95.2			4	6	. 7	2							

Analyst:_

Report Date: Test Code: 05 Mar-14 10:11 (p 2 of 2)

14078g(a) | 06-7087-9815

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: Analyzed: 11-4998-9586 05 Mar-14 10:11 Endpoint: Cell Yield

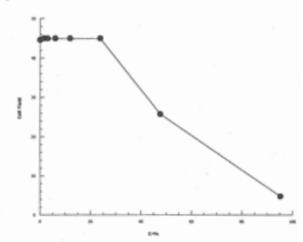
Analysis: Linear Interpolation (ICPIN)

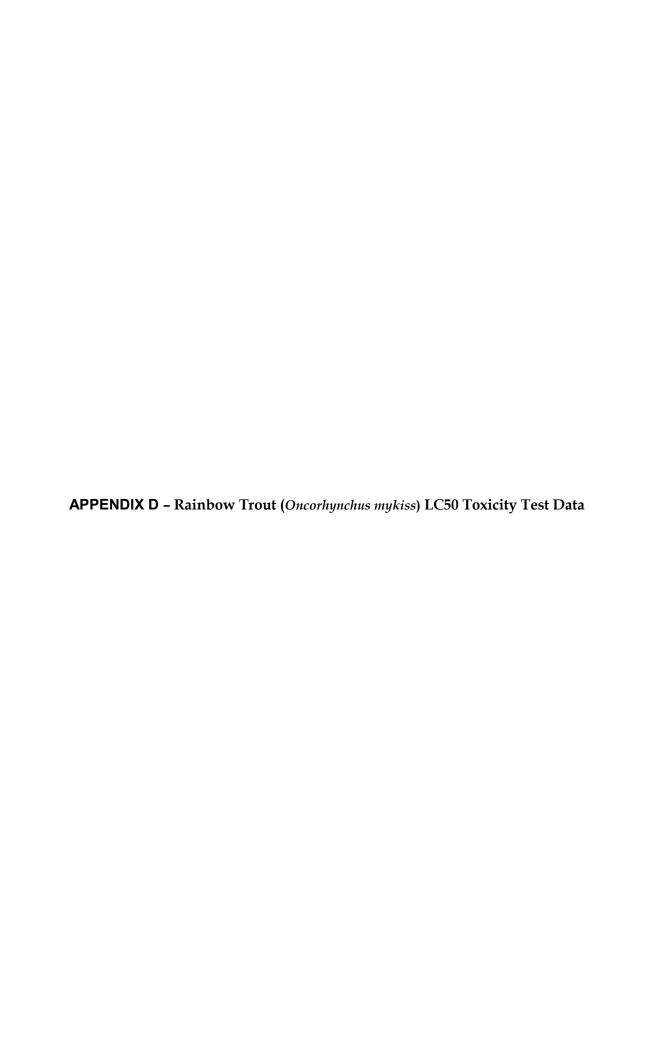
CETIS Version:

CETISv1.8.7

Official Results: Yes

Graphics





Client:	ALS	Start Date/Time: February 28/14 @ 1045
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information Sample ID: Sample Date: Date Received:	: L1426336-1 (R10) February 25/14 @ 1500 February 27/14@ 1030	Test Validity Criteria: ≥ 90% control survival WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Sample Volume: Other:	2 × 20L N/A	
Dilution Water:		
Type: Hardness (mg/L CaC Alkalinity (mg/L CaC		p Water
Test Organism Info	rmation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (r Mean Weight ± SD (r		Range: 33 - 42 Range: 0.30 - 0.65
NaNO2 Reference T	oxicant Results:	
Reference Toxicant I Stock Solution ID: Date Initiated: 96-h LC50 (95% CL)	13Nt02 February 19/14	
Reference Toxicant (Mean and Historical Range: 5.	4 (2.2 - 134) mg/L NaNoz
Test Results:	The 96-h LC50 is >	(00% (U/N).
Reviewed by:	Joh	Date reviewed: March 12/14

						Conductivity (µS/cm)	96	34	63	87	611	182	304			284		,				
0,121	g]	Condi (µS	0	33	56	8.	三年	114	299			1	. "					
	30 min WQ	14.0	4.4	2	279		96	0.7	7.3	7.5	7.7	7.8	8.28.2		į	38F 30F					Hard 12/14	ł
300 X/N):	90			ľ	7		72	1.7	7.4	9.7	1.7	77 24	8.2			38F					8	١
VL? (ent		П			표	48	6.9	16	7.3	,9°t	7.7	49			4					Mar	
	Adjustment		}	V	1		24	7.6	3.3	70 26	278	43	6,9	\perp	1	4						l
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins): Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):	₹	L	Ц	1	4	-	۰	9	3	57.0	~	7,7	•	\perp	4	157 LEC 157		۱ '	9		Date Reviewed:	
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins): Aeration rate adjusted to 6.5 ± 1	8	ľ		0		Dissolved Oxygen (mg/L)	96	9,5	19.6	$\overline{}$	_		386	\perp	- 1	28			96 h		e Rev	
me: Time	WQ Initial WQ	1	3	0.0	297	ygen	3 72	6.6	97 4.8	56 A.G	9.49.9	₹ 10.0	8.3 8.9	\dashv	4	\neg			Number of Stressed Fish at 96 h		Dat	
Nolu ity: ration adju	nple /	╀	٦	-	Ē	ŏ pa	48	76 3	9 6			A 9.7			-	£			sed F			
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Tim Aeration rate adjusted	Undiluted Sample WQ	Temp °C	됩	D.O. (mg/L)	Cond. (µS/cm)	ssolvi	0 24	10.1	9	1.98	86 V	1.90	199	\dashv	+	<u>}</u>	350		Stres			
d % N otal P eratio	ndilute	Tem	ľ	<u>.</u>	ond.	<u> </u>	96	01 (3.8)	M.5 10.1	1.01 P.Y	ુ ડુ	5.	0167	+	+	377	-02		per of			
Z ' F A	ા	_	ш		ق	(Ç)	72 8	19.0 [19	14.0 M		140 M.5 10.	14.0 14.5 lo.1	140 14510.	\dashv		38F 18F WW	3		N N			
$ \mathcal{G} $	M	1				Temperature (°C)	48	10'61	10'11	0°H 0'N	14.0	4,0,4	5/2	\forall	7	년 8.8 8.5	b, News		1			
RIO)	1045					ambed	24	(4,5)	14,0	0.14	1	14,0 14,0	9/2	\forall	\forall	5.5	7					
	9					Ĕ	0	14.0 T	14.0	-	4.0	140	14.0 Ja.0 14.0	\Box	1	SEIXDF WW/ A A S	Sicht.	ſ				
25/49	1						96	Ω	0	0)	0)	0	9	\neg	7	7.0 to 10.3; pl	7		e K			
1.10	28		3	J,			7.2	ō	0	0	0	0	0		9	절함	S		Ų			
ASSE	3		12	2	2	s s	48	10	0/	9/	10	/0	0/			48	digit		8			١
AL 11426336 14 19 19 19 19 19 19 19 19 19 19 19 19 19	February		ä	ä		# Survivors	24	01	6)	0/	6/	0/	61			₽ 0 E			All Sish appear		76h	
	77		٦	1		#	4									1:1:	ments		A		5	1
:							2								-	15	/Com		96 h			١
## :: ## ATI	ime: o Bv:					-	-		1						1	() () ()	ription		on at	ations		
Client/Project#: Sample I.D. W.O. # RBT Batch #: Date Collected/Time:	Date Setup/Time: Samole Setup By:		eter:		Cond. Meter:	Concentration	(2/	CONT	6.25	2		0	0			Initials	Sample Description/Comments:		Fish Description at 96 h	Other Observations:	Reviewed by:	
Client/Proje Sample I.D. W.O. # RBT Batch Date Collec	ate Se		D.O. meter:	pH meter:	ond.	oncer	(% A/V)	S	6	12.5	25	20	00			Initials VQ Range	ample		ish De	ther	eview	
0 0 2 2 0				ф (0	0	_			_		_		Ш			S		u.	0	OC.	ě

Version 2.2; Issued August 13, 2013.

Nautilus Erwironmental

Client: _	ALS	Start Date/Time: February 28/14 @ 1100
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information:		Test Validity Criteria: ≥ 90% control survival
Sample Date:	1426336-2 (NFI) Ebruary 25/14 @ 1435 Ebruary 27/14 @ 1030 2 x 20 L N/A	WQ Ranges: T (*C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Dilution Water:		
Type: Hardness (mg/L CaCO Alkalinity (mg/L CaCO ₃		Water
Test Organism Inform	nation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (mn Mean Weight ± SD (g):		Range: 30 - 39 Range: 0.21 - 0.63
NaNO2 Reference Tox	cicant Results:	
Reference Toxicant ID: Stock Solution ID: Date Initiated: 96-h LC50 (95% CL):	RTNE 55 13NE 02 February 19/14 4.7 (3.8-5.8) mg/L	
Reference Toxicant Me Reference Toxicant CV	an and Historical Range: <u>5.4</u> 7 (%): <u>5.7</u>	(2.2 - 134) mg/L NaNoz
Test Results:	The 96-L LC50 is > 1	20% (VV).
Reviewed by:	Jou	Date reviewed: March 12/14

										_	_	_	_	_		_	$\overline{}$		- 1			- 1		- 1
							Conductivity (µS/cm)	96	39 °	63	16	=	177	313			SEF							
30.15 1	1	ø	_		_	-	Condi (µS	0	33	95	10	105	170	307			JAK.						1110	_
\neg		30 min WQ	14,0	7,4	10,2	307		96	7.1	7.3	5.5	_	7.9	8.2			197 AP				1		2	- 1
(£		3				Ш		72	7.1	7.4	7.5	2.6	2.9	8.5			竔						4	2
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins): Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):		ent					핍	48	6.9	4	7.3	3,5	3.4	38	-		1						2	2
		Adjustment		}		Ш	1	54	F.	5.4	7.6	3.6	7.8	54			Ł		- 1			-		
, , <u>, </u> <u> </u>		Adj	П			М		0	25	0,	70	1,6	7.7	1.4			3			(0			Date Reviewed:
ins):		Н	Н	Н		Н	5	96	9.6	5	9.6	96		9.9			SE JOHN				ا ۔			eviev
E 9		Š	14.0	1.3	W	Ш	gm)	\vdash	~	1	a	28.	98	99	+	\dashv	군				96			ě
Tim ted	g	nitial WQ	7	ŕ	0	361	gen	72		6	5	6	94 9.9 9.8	79.9	-	_			-		sh a		-	Ö
folur f: tion idjus	ole V	_				Ш	ő	48	9.6	78	4.4	_		_			4				E D			
ish/\tality tality sera ate a	Samo	28	o		(T)	(cm)	Dissolved Oxygen (mg/L)	24	3.6	9.9	98	6'6	3.8	9.8			B		ķ		resse			
Mor Pre-	ted	Parameters	Temp °C	표	(mg	E)	Disso	0	ľa	10.1	10.2	10.2	10.2	Š			多		Colour		of St			
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins): Aeration rate adjusted to 6.5 ± 1	Undiluted Sample WQ	Para	Ē		D.O. (mg/L)	Cond. (µS/cm)		96	14.5	14.5	14.5	14.5		4.5 10.2							Number of Stressed Fish at 96 h			
ZKFK	Ŀ	_	_	Н	ш	0	(C)	72	_	140 14	_	140 14	14.0 14.5	14.0 ji	Н	\dashv	多場		SALANA		N N			
1 1 1 1/2	٧.	r	ı				nie (\vdash	01/10	_	_				Н	-		3.55	3		ı			
5 8	100						Temperature (°C)	48	0.67	α×	14.0	14,0	140 NO 140	145 140 140	Ц		¥	5 to	ئ ب)				
NFI W	٦-	1					Temi	24	A O F	3	40 142	14.0	ž	14.0			2	5.	5/10/15					
H Z	12	1					ľ	0	H C	3.	오	否	8	3			弘	3. PH	2					
70 Du	18						-	96	0	2	0	0	0	2	,		姎	to 10.3; pH = 5.5 to 8.5	-3		ě,			
2102	28	3						72	0	0	9	0/	0	0			38F DB 1/1/L		- 1					
3 7 7 1	L-	12			2/3	2/3	_	48	01	01	01	0)	61	6			8	-	clear		1			
142633	February			2/1 1/2/	/:	\rightarrow	# Survivors	24	0)		10 01	0	0)	0/	Н		,	(mg/			4			,
1.1426 5.000	١			۲	: Ho	હ	INS #	4	-	10	-	_	,	10	Н	-	4	9	suts:		8		10	ś
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9	i							2	H	H		-	_	-	Н		Н	(C)	on/Co		14 96 14	13		
# 5	ime	p B					_	٢	L	L		H	L				Н	ı,	ripti		ion	/atio		
Client/Project#: Sample I.D. W.O. # RBT Batch #:	Date Setup/Time:	Sample Setup By:		D.O. meter:	pH meter:	Cond. Meter:	Concentration	(% a/v)	CONT	6.25	12.5	52	20	00			Initials	WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0	Sample Description/Comments:		Fish Description at 96 h All Gish, appraise	Other Observations:		Reviewed by:

Nautilus Environmental

Client:	ALS	Start Date/Time: February 28/14 @ 1115
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information Sample ID: Sample Date: Date Received: Sample Volume: Other:	L1426336-3 (NF2) February 25/14@1305 February 27/14@1030 2x20L N/A	Test Validity Criteria: ≥ 90% control survival WQ Ranges: T (*C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Dilution Water:		
Type: Hardness (mg/L CaC Alkalinity (mg/L CaC		p Water
Test Organism Infor	rmation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (notes) Mean Weight ± SD (go		Range: 35 - 41
NaNO2 Reference T	oxicant Results:	
Reference Toxicant II Stock Solution ID: Date Initiated: 96-h LC50 (95% CL):	13Nt02 February 19/14	
Reference Toxicant (4 (2.2 - 134) mg/L NaNoz
Test Results:	The 96-h LCSO is >	100&(sp).
Reviewed by:	Joh	Date reviewed: March 12 14

10/121	7		ø	0		2		Conductiv (µS/cm)	0	33 3	62 6	83 9	120 12	186 19	323 36			S JAW					
30,00			30 min WQ	14.0	٦,	2101	323		96	1.2	17.5	57.5	57.6	~	181		,	OSF DBF					
	(Y/N	П	Н	Ļ	H	Н	Н	ī	3 72	17.1	7,4		92 3		%		_	₹ 88					
	nin/L?		tment		\			Æ	4 48	6.3		3.4	34 6	139	52 E0	_	Н	-					
111	Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):	Ш	Adjustment)	M		0 24	2	1.0 73	7.0 x	11/39	1:		_	Н	₹ }\			6		
ins):	5 ± 1	П	_		Н	Н	Н	5	96	24.8 10.0 7.0	9.9 7	19	æ	1.00	0.1 7.1	Н	7	SE SE SE					
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins):	d to 6		Initial WQ	4,0	G.	50	320	Dissolved Oxygen (mg/L)	72 8	218.6	9.8	9.9 9.9	9.9 9.	0:0) 0:01	9.4 10.1		Н	SF.			Number of Streeged Fieh at QR h	20	
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Tim	ijuste	Undiluted Sample WQ	Initi	-	7	Ğ	a	Oxyge	48	_	3.6			186	376			2			Fieh	19	
Number Fish/Vc 7-d % Mortality: Total Pre-aerati	ate ad	Sampl	9LS	o	П	(L)	(cm)	payed	24	4898	5.6	14,0 1229877	NO 102 9.9 9.6	4.897	86			¥		Colour	999	2000	
ber Fi	tion	uted 8	Parameters	Temp °C	표	D.O. (mg/L)	Cond. (µS/cm)	Disso	0	1.0		122	201	19.2	2.010.4			SA		9	7	5	
Num 7-d % Total	Aera	Undil	Par	Ţ		0.0	Conc	-	96	14.0	4.0 laz	14,0	N.0	14,0	14.0			SBFDBF MAL		Leins	mhar	5	
								Temperature (°C)	72	M.0	140	04)	Obl	(4,0	NO.			SP	22	3	ž	2	
	305	2						eratri	48	661	4014014	14,0	140 140 14.9	0/8/	14,0 (4,0 14,0			٤	50 8	4			
NF2	0	=						Temp	24	4.014.5	6,47	140 M	647	140 14,3	(4,0			£	= 5.6	slight) ;	\$	
M	14	14						_	٥	-		-		_		-		18F 13F W.	= 7.0 to 10.3; pH = 5.5 to 8.		}	200	
292	25	28/	YM						96	0	0	0		-	9			F 1/8	to 10	3		Troop expens	
46.5 36-		L 1	7		/3	3	3		72	ō	Q	10	9	æ	9			08	= 7.0	char	1	200	
63	0 5	5			28	1/2	1/2	ivors	48		01		01					7	mg/L)	٩			
L142633	01 February	February			8	Ho	Ü	# Survivors	24	10	9	10	10	10	12		\Box	B	00	uts:	-	The state of	
17	"	1						"	2 4	H	_		Н		Н	Н	_	Н	15±1	mme	ì	리 =	
	ime:		ä					-	1			H							= (0	on/Co	90	200	us:
roject#: I.D.	ch #: lected/T	up/Time	Setup B		ter:	·	eter:	ration	H	ţ	8				0			slis	ges: T (Sample Description/Comments:	noibujou	cubnon	Other Observations:
Client/Project#: Sample I.D. W.O. #	RBT Batch #: Date Collected/Time:	Date Setup/Time:	Sample Setup By:		D.O. meter:	pH meter:	Cond. Meter:	Concentration	(\psi_n\%)	CONT	6.25	12.5	25	20	100			Initials	WQ Ranges: T (°C) = 15 ± 1; DO (mg/L)	Sample	Flat Description of 08 h	FISH DE	Other O

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Nautilus Environmental

Client:	ALS	Start Date/Time: February 28/14 @ 1200
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information: Sample ID: Sample Date: Date Received: Sample Volume: Other:	L1426336-4 (X1) February 25/14@ 1110 February 27/14@ 1030 2×20L N/A	Test Validity Criteria: ≥ 90% control survival WQ Ranges: T (*C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Dilution Water:		
Type: Hardness (mg/L CaCo Alkalinity (mg/L CaCo		Water
Test Organism Infor	mation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (m Mean Weight ± SD (g		Range: 35 - 39
NaNO2 Reference To	oxicant Results:	
Reference Toxicant III Stock Solution ID: Date Initiated: 96-h LC50 (95% CL):	13Nt02 February 19/14	<u> </u>
Reference Toxicant M Reference Toxicant C		4 (2.2 - 134) mg/L NaNOz
Test Results:	The 96-h LC60 is >	100% (110).
Reviewed by:	Jou	Date reviewed: March 12/14

											tivity m)	96	39	19	90	114	140	345			78F					
121/	15					a					Conductivity (µS/cm)	0	33	55	15	107	183	339		\rightarrow	7					*
2	o	8	'			30 min WQ	14.0	7.3	2.0	339		96	7.1	2.6	2.6	5.2	2.8	8.2	П	$\overline{}$	_					hard Wyy
		,,	Y/N);			301			-			72	7.1	2.5	12	52		F.08.2			各各					rd
			JL 2 (ent	\			П	표	48	30	14	4.4	77	4.9	ያ			É.					ha
			Į.			Adjustment		\backslash			1	24	69	73	26	29	3	52			£					
		<u>::</u>	± 1 m			Ad		-	L'			0	7.0	7.1	7,1	デ	1.7	1.3	Ц		3			0		ewed
		Total Pre-aeration Time (mins):	Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):			g	0	a	2	0	mg/L)	96	-	9.4	9.8 8.8	9.8		9.6	Ц	- 1	をを			96 h		Date Reviewed:
ne:		Time	ted t		g	Initial WQ	14,	7.3	107	32%	gen (72	_	0.0)	-		9.9	9.9	Ц	_	*			sh at		Date
Volur	ä	ation	adjus		V aldr	_			L		d Oxy	8	9.6	4.6	4.6	16	19.3	4.61	Н	4	£			ed Fi		
Number Fish/Volume:	7-d % Mortality:	e-aera	rate		Undiluted Sample WQ	eters	၁့၄	Ļ	ng/L)	Cond. (µS/cm)	Dissolved Oxygen (mg/L)	24	36	29.8	2	3 9.8	29.9	1.84	Н	4	<u>₹</u>			Stress		
mber	1% W	tal Pr	ratior		dilute	Parameters	Temp °C	H	D.O. (mg/L)	nd. (s	ä	0	18	200	0 192	0 10.3	10.2	M.0 10.2	Н	4	神神			er of		
ž	7	ů	Ae	l	5	ш	L		_	ပိ	ç,	2 96	0 14.0	0.14.0	0'11 0	140 140	0,40	14.0 M.	Н	-	9715			Number of Stressed Fish at 96 h		
	حا			6	ما		l				Temperature (°C)	8 72	14,0 14,0	14,0 14,0	14,0 14,0	14	0/10	_	Н	-{	7	0.0		Ī		
	Ê		П	1//	28						npera	24 48	14.0	14,0	_	100	14,0 14,0	140 140	Н	\dashv	4	0,0		4		
	Č		Ш	40	e						Ē	0	140	140 11	40 142	140 H	140	1 C.H	Н	+	3	E E		Š		
	Ļ	_	4	Ž	7							96	10	10 14	2	δ z	<u>~</u>	0	\forall	+	200	10.3		appear		
S	1	079	-	2	28	3		~				72	-	01	0	2	6	(0)	Н	-	18F13F	5	ď	- 4		
A	336	Ы	10					12/3	12/3	2/3	50	48	10	Н	0/	0/	10	()	Н	Ť	٦ ا	(j) 	See	P:54		
	26.		П	25	202			<u>:</u> 8	4: 1	0:1	# Survivors	24	10		0	61	0	0	П		€ 2	E)		4		700
	11426336			February	202			Δ	Ø	1	₩ #	4				П			П		7		ents:	Cemainha	7,	7
		' '	' '	. '						' '		7			П	П		П	П	T	٦	10 10	Somn	6 h		
44				/Time	ne:	By:						-									5	5	ption/(n at 9	tions:	
Client/Project#:	Sample I.D.	W.O.#	RBT Batch #:	Date Collected/Time:	Date Setup/Time:	Sample Setup By:		D.O. meter:	pH meter:	Cond. Meter:	Concentration	(% %)	CONT	6.25	12.5	25	50	001			Initials	WQ Kanges: 1 (*C) = 15 ± 1; DQ (mg/L) = 7.0 to 10.3; pH = 5.5 to 6.5	Sample Description/Comments:	Fish Description at 96 h	Other Observations:	Reviewed by:

Nautilus Environmental

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Client:	AL5	Start Date/Time: February 28/14 @ 1430
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information Sample ID: Sample Date: Date Received: Sample Volume: Other:	L1426336-5 (X14) February 25/14@0900 February 27/14@1030 2x20L N/A	Test Validity Criteria: ≥ 90% control survival WQ Ranges: T (*C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Dilution Water:		
Type: Hardness (mg/L CaC Alkalinity (mg/L CaC		Water
Test Organism Infor	rmation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (no Mean Weight ± SD (so		Range: 35 - 42
NaNO2 Reference T	oxicant Results:	
Reference Toxicant II Stock Solution ID: Date Initiated: 96-h LC50 (95% CL):	13Nt02 February 19/14	<u> </u>
Reference Toxicant (Mean and Historical Range: 5.4	1 (2.2 - 134) mg/L NaNOz
Test Results:	The 96-h LC60 is >1	00% (4N).
Reviewed by:	Joh	Date reviewed: March 14/14

											163												
								Conductivity (µS/cm)	96	39	20hos	201	310	284	828			SBF			7		
0.15 1.			a				.*	Conductiv (µS/cm)	0	33	441	194	867	44	828			KINWE					114
30.00	.		30 min WQ	14.0	7,3	(0)	525		96	1	7.5	2.6	$\overline{}$	0,0	_			约场					Larch 14/14
100	(N/A		30	_			Ц		72	8,9	7.4	92.	2.8	8	8,3								taro
	75		ent	\			П	玉	48	_	ě	33	Ψ,	φ.				Ł					7
-	Aeration rate adjusted to 6.5 ± 1 mLmin/L? (Y/N):		Adjustment			N	П		24	69	7.	24	2	3	42			f			0		
ä	E		Ac				Ц		0	4	7	7.4	2		1.3			多多多			٩		Date Reviewed:
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Time (mins):	6.5		g		7	7	e	Dissolved Oxygen (mg/L)	96	-	93	8.8	9.8	9	9.5			충			96 h		Revi
ime :	Ded to	ø	Initial WQ	140	7.7	10.2	826	Jen (r	72	9.8		9.6	8.896	9.9	9.3 9.9		-	ğ			Number of Stressed Fish at 96 h		Date
olum /: tion]	sníp	M elc	드					Oxy	48	_	9%	4.3	34					÷			d Fis		
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Tim	ate	Undiluted Sample WQ	ters	ပ္		g/L)	Cond. (µS/cm)	olved	24	8.8		8.6	9.9	9.8	9.3			£		-	tresse	,	
% Mo	Log	luted	Parameters	Temp °C	H	D.O. (mg/L)	d. E	Diss	0	3	ē	(0.1	(o.	ò	10			3	S.		rofs		
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X	0	d						Temperature (°C)	24		0.7	0.7	0.51	14.0	14,0			è	pH = 5.5 to 8.5		-		
91	7	6	3						0	÷	14:0	14.0	14.0	5	140			¥\27	3; H	turbid, pale			
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AL 11426336	February	February			ä	: #	Ü	# Survivors	24	Ó	0	Q	2	0/	0			Ł	E 0	12	25		8
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Client/Project#: Sample I.D. W.O. #	RBT Batch #: Date Collected/Time:	Date Setup/Time:	Sample Setup By:		D.O. meter:	pH meter:	Cond. Meter:	Concentration	(% A/A)	COM	6.25	12.5	25	50	001			Initials	WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3;	Sample Description/Comments:	Fish Description at 96 h 州 学別 4ggwc CoK	Other Observations:	Reviewed by:

Version 2.2; Issued August 13, 2013.

Nautilus Environmental

Client	ALS	Start Date/Time: February 28/14@1435
Work Order No.:	<u> </u> #079	Test Species: Oncorhynchus mykiss
Sample Information		Test Validity Criteria: ≥ 90% control survival
Sample ID:	L1426336-6 (X3A)	WQ Ranges:
Sample Date:	February 25/14@ 1135	T (*C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5
Date Received:	February 27/14@ 1030	
Sample Volume:	2×20L	
Other:	N/A	
Dilution Water:		
Type: Hardness (mg/L Ca0 Alkalinity (mg/L Ca0		ap Water
Test Organism Info	ormation:	
Batch No.: Source: No. Fish/Volume (L) Loading Density: Mean Length ± SD (Mean Weight ± SD (0.36 (mm): 38 ± 1	Range: 37 - 40
NaNO2 Reference	Toxicant Results:	
Reference Toxicant Stock Solution ID: Date Initiated: 96-h LC50 (95% CL	13Nt02 February 19/14	2 Na NO
Reference Toxicant		5.4 (2.2 - 134) mg/L NaNOz
Test Results:	The 96-h LC50 is >	1002 (4/1).
Reviewed by:	JGL	Date reviewed: March 14/14

Client/Project#: Sample I.D.	_	17	A1 11426336	633	36-	0	\vdash	×	5		Numb	Number Fish/Volume: 7-d % Mortality:	h/Volt	:ewn						9%	10/121	_	
W.O. # RBT Batch #:	Limo		1 2	0 5	0 3	79	H/	9	F.		Total Aerati	Total Pre-aeration Time (mins): Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):	eration e adju	n Tim usted	e (mi to 6.	18): 5±1:	=	M22 (XIN):				
Date Setup/Time:	:90	1	February	Ser.	2	8	7	7	35	_	Undilu	Undiluted Sample WQ	mple	δW								_	
Sample Setup By:	By:		K	ドイン //	2						Para	Parameters	90	Initial WQ	Š	4	Adjustment	nent	30	30 min WQ	Q		
				-							Tel	Temp °C		7	40	H		\setminus	L	14,00		_	
D.O. meter:			8	200	13						1	Hd		5,5	3	Н				7.4		_	
pH meter:			PH:	1/2	3						D.O.	D.O. (mg/L)	~	10.7	2	Н				(0.2	\		
Cond. Meter:			Ü	1/2/	3					•	Cond.	Cond. (µS/cm)	m)	336	و	H			Ц	338		_	
Concentration	1		# Survivors	ivors				Temperature (°C)	eratur	(°C)		Dissolved Oxygen (mg/L)	op par	xygen	l/6m)	~		표	-	1	Su) Su)	Conductivity (µS/cm)	
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6.25		-	10	0/	0	0	1400	6,4	14.0	14,0	1501	10.01	o.	9.6 9.7	79.8	113	4	30	7.3	7.6	19	73	
12.5			0/	Q	2	9	14.0	64.014.0	140 [4.0	_	15,0 1	sion d	6 86	2.3 4.6	69.	711.5	724	32	1.7	7.5	ήt	di.	ã
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WQ Ranges: T ($^{\circ}$ C) = 15 ± 1; DO ($^{\circ}$ Mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5	(°C)	15 ±	1; 00	mg/L)	= 7.0	to 10	3; PH	= 5.5	to 8.5														
Sample Description/Comments:	D/Ion/C	omme	:suus:	3	claar	3	Nove	Colouriess															- 1
					((
Fish Description at 96 h	n at 96		All exercishes FISA	لأهداء	3	- 1	approx	OK	ا ا	Ž	nper	Number of Stressed Fish at 96 h	ssed F	ish at	96 h		9						
Other Observations: @ 9	ions:	60																					
		100	100	4						100		-								0	11.		
Reviewed by:			5	3										Dat	e Re	Date Reviewed:			200	March 15	2114		

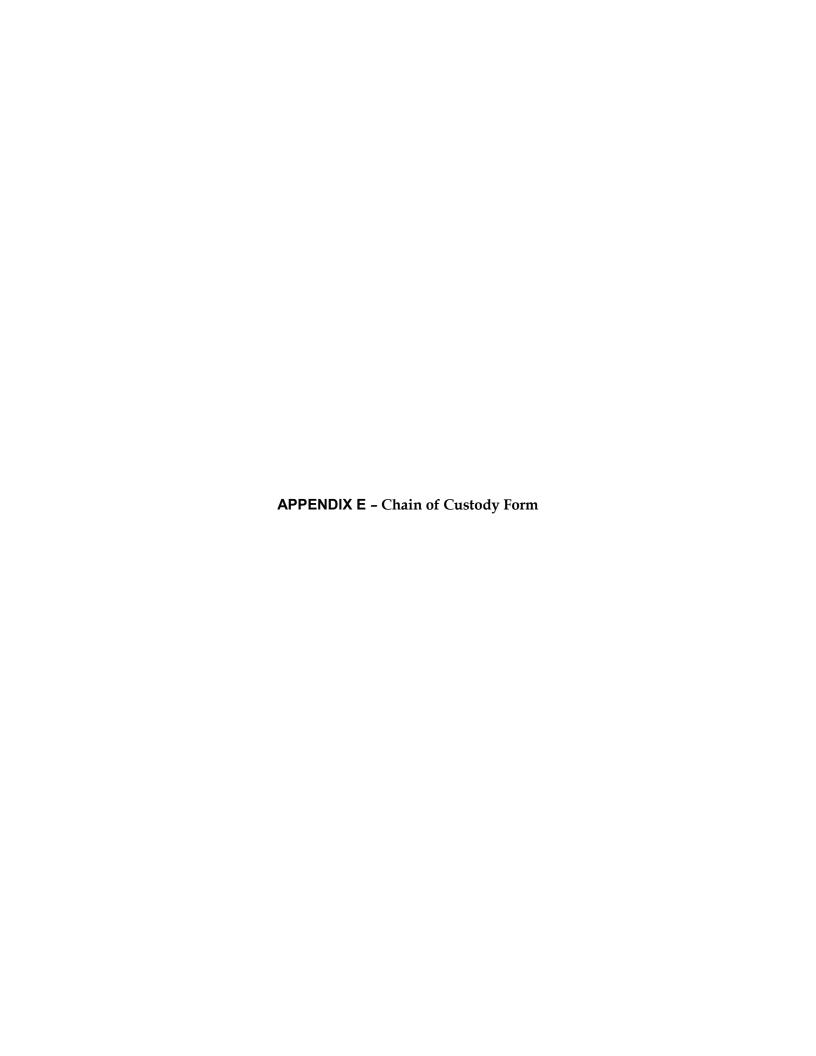
Naublus Environmental

Client:	ALS	Start Date/Time: February 28/14 @ 1440
Work Order No.:	14079	Test Species: Oncorhynchus mykiss
Sample Information Sample ID: Sample Date: Date Received: Sample Volume: Other:	L1426336-7 (R3) February 25/14 e 1630 February 27/14 e 1030 2×201 N/A	
Dilution Water:		
Type: Hardness (mg/L CaC Alkalinity (mg/L CaC		ap Water
Test Organism Info	rmation:	
Batch No.: Source: No. Fish/Volume (L): Loading Density: Mean Length ± SD (r Mean Weight ± SD (r)	0.42 nm): 38 ± 1	Range: 35 - 40
NaNO2 Reference T	oxicant Results:	
Reference Toxicant I Stock Solution ID: Date Initiated: 96-h LC50 (95% CL)	13Nt02 February 19/14	L Na NO
Reference Toxicant (5.4 (2.2 - 13.4) mg/L NaNOz
Test Results:	The 96-h LCBO is >	100% (410).
Reviewed by:	JGL	Date reviewed:

27		П		П			П	Conductiv (µS/cm)		8	4	1 15	226 2	S	3 66	Н		S JAN						
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3000			30 min Wa	14	r	.÷.	٥		96	7.	7.6	7.4	7 7.8	98.0	83 8.2			7 385						
16	Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N):		_	Н	Н		Н	玉	8 72	0 7.1	7.4	375	3 /2	0.00	F.383	Н		18F138F						
	nin/L'		Adjustment	Ν				<u> </u>	24 48	69 30	7.4	5,43	5 33	0.5	\$ 28	Н		W						
11	直		Adjus	П					0	3.16	4	3236	7	13 11	-	Н		+						
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e: me (n	od to	_	Initial WQ	7.0	74		0	Dissolved Oxygen (mg/L)	72	6,6	9.8	9,8	9.7		9.69.8			VF.			Number of Stressed Fish at 96 h			
Number Fish/Volume: 7-d % Mortality: Total Pre-aeration Tim	djuste	Undiluted Sample WQ	luit	-	4	1001	99	Oxyg	48	9.7	4.4	8'8 9'6	4.3	9.797	9/6			¥			d Fish			
Number Fish/Vo 7-d % Mortality: Total Pre-aerati	rate a	Samp	ters	ပ္		g/L)	3/cm)	olved	24	9.8	9.9	28	9.9	2.8	_			ę			fresse			
nber 8 % Mo al Pre	ation	illuted	Parameters	Temp °C	표	D.O. (mg/L)	Cond. (µS/cm)	Diss	0	10.0	150 10.1	Š	14.0 15.0 102	10.2	15,0 10,1			3			rofs	,		
Nur 7-d Tot	Aer	'n	ď			ď	ဝိ	6	96	150		150	0.51	15,0				3BF 38F			umpe			
1.1	1 10)I _ I	,	ı				Temperature (°C)	72	0,14,0	0.11	0.41	_	0,410	° 1₹0	Н			3.5		2	ı		
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1	7	11						-	96	5	(S	9/ 9/	0)	0)		Н		NF NA 1/1/1	= 7.0 to 10.3; pH = 5.5 to 8.5	Clear, colourles	ż	\$		
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Client/Project#: Sample I.D. W.O. #	RBT Batch #: Date Collected/Time:	Date Setup/Time:	Sample Setup By:		D.O. meter:	pH meter:	Cond. Meter:	Concentration	(% A/A)	CONT	6.25	12.5	25	50	001			Initials	WQ Ranges: T (°C) = 15 ± 1; DO (mg/L)	Sample Description/Comments:	Fish Description at 96 h	I let been principle	Other Observations:	

Version 2.2; Issued August 13, 2013.

Nautilus Environmental





Subcontract To:

NAUTILUS ENVIRONMENTAL

8664 COMMERCE COURT BURNABY, BC V5A 4N7

Subcontract Request Form

7d Cerio Survival - 14076

7d Lemma growth

72h P. Subcapitata growth 964 RBT LC50 1= 14

Please reference on final report and invoice: PO# ALS requires QC data to be provided with your final results.

Please see enclosed	Z	sample(s) in	14	Container(s)
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SAMPLE NUMBER	CLIENT	ID ANALYTICAL REQUIRED	DATE SAMPLED DUE DATE	Priority Flag
L1426336-1	R10	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/ 25/ 2014 <i>15:0</i> 0 3/5/2014	"T:3
L1426336-2	NF1	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/25/2014 14:35	- 'T:
L1426336-3	NF2	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/25/2014 /3:05 3/5/2014	r T:3
L1426336-4	X1	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/25/2014 /1:10 3/5/2014	T: 4
L1426336-5	X14	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/ 25/ 2014 09:00 3/5/2014	T: 2
L1426336-6	ХЗА	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/25/2014 11:35 3/5/2014	°T:3.
L1426336-7	R3	Special Request- Nautilus Environmental (SPECIAL REQUEST-NL 14)	2/25/2014 16:30 3/5/2014	r: 3

DX1, X14, X3A Subcontracted emm - sent wa hove x 7d.

Dagg 1 of 3

VANCOUVER



Subcontract Request Form

Subcontract To:

NAUTILUS ENVIRONMENTAL

8664 COMMERCE COURT BURNABY, BC V5A 4N7

Subcontract Info Contact:

Dorota Jamro (604) 253-4188

Analysis and reporting info contact:

Can Dang

8081 LOUGHEED HWY

SUITE 100

BURNABY, BC V5A 1W9

Phone: (604) 253-4188

Email: can.dang@alsglobal.com

Please email	confirmation of receipt to:	can.dang@alsglo	obal.com
Shipped By:		Date Shipped:	
Received By:	JBF/NY	Date Received:	Feb 27/14 - 10:30h.
Verified By:		Date Verified:	· _ · · · · · · · · · · · · · · · · · ·
Sample Integr	ity Issues: N/A	Temperature:	~ 3.5°

Chain of Custody (COC) / Analytical Request Form

(ALS) Environmental

	L1426336-COFC
Request Form	Canada Toll Free: 1 800 668 9878

L1426336-COFC

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Report To			Report Format / Distribution	Distribution		GENERAL WELLIST AND	welcow (Ruth Tumbround Time (TAT) is not	(f) is not available for all tests)	+ (638
Company:	EDI	Select Report Format	mat Por	DOCE1.	8	R Regular (Standan	Regular (Standard TAT if received by 3 pm - business days)	4)	
Contact	Meighan Keams	Quality Control (G	Quality Control (QC) Report with Report	port Yes	No.	P ☑ Priority (2-4 bus.	☑ Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT	t - contact ALS to confirm	TAT
Address:	2195 - 2nd Avenue Whitehorns VT V14 378	Criteria on Report -	Citeria on Report - provide details below if box checked Select Distribution:		Na C	E Emergency (1-2)	☐ Emergency (1-2 bus, days if natelyed by 3,am) 100% suitharge - contact ALS to confirm TAT ☐ Sume day or weekend remember - contact ALS to confirm TAT and suithars	harge - contact ALS to co in TAT and surcharse	ulirm TAT
Phone:	867-393-4882	Email 1 or Fax 1	ieams@e			1.75	for E2,E or P.		
		Email 2 B	adrienne Avrooffe@gov.yk.ca.	povykog			Analysis Request		
Invoice To	Same as Report To		Invoice Distribution	tribution		Indicate Filtered (indicate Filtered (F), Preserved (P) or Filtered and Preserved (FIP) below	ved (F/P) below	L
	Copy of Invoice with Report P Yes No	Select Invoice Bistribution:	stribution: EMAL	WI DWIL	_ PAX			* x	1
Company	EDI	Email 1 or Fax 3	sjenner@edynamics.com	03.00m	-	-			
Contact	Submer	Email 2							1
	Project Information	Oll a	Oil and Gas Required Fields (client use)	Fields (client ur					sveu
ALS Quote #:	Q38556	Approver ID:		Cost Center:		Ceriodaphnia du	Ceriodaphnia dubia survival and reproduction	duction	ietn
-# qor	13-Y-0452	GL Account		Routing Code:		Lemna growth inhibition	nhibition	THE PASSAGE AND ADDRESS OF THE PASSAGE AND ADDRE	001
PO/AFE:		Activity Code:				Dseudokirchner	Pseudokirchperiella subcapitata growth inhibition	th inhibition	0.10
:087		Location:				Painhoun trout acuta I CEO	Cuto I CEO	NAME AND PERSONS	qwn
ALS Lab W	ALS Lab Work Order # (lab use only)	ALS Contact:		Sampler:		- I			N.
ALS Sample # (lab use only)	Sample Identification andior Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time	Sample Type	f			1 .
	27		26-562.10	16,00	C. Ante lab	7			
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Polotic	1	Seerial Instructions / Spacifi	acily Critaria to add on recort (client Use)	a record fellant Us	,	SAM	SAMPLE CONDITION AS RECEIVED (lab use only)	O (lab use only)	
Drinks	(96)	do / suion	y offering to work or	an manni modali		Frozen	SIF Observations	. Yes No	D
Are samples	stem? Use CH2M	CEGUIS IN EDD.				Cooling Initiated	Custody	cf Yes No	79725
Are samples	Are samples for human drinking water use?	1				6.7 2.3 7.0		FINAL COCILEM TEMPENATURES TO	9
		MITTA	L SHIPMENT RECEPTION (lab use only)	NON (lab use on!	0	F	FINAL SHIPMENT RECEPTION (lab use only)	(Auo asa gei	
Released by:	Date: Time:	Received by:		24 -46 12	Do: 7	Received by:	Date	Time:	
REFER TO BA	REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION		WHI	WHITE - LABORATORY COPY	L	YELLOW - CLIENT COPY	ANAMAN ANAMANAN ANAMAN ANAMANAN ANAMAN ANAMA	a 400 Found M. Aerosey 2014	1

Nautilus Environmental

8664 Commerce Court Burnsby, British Columbia, Canada VSA 4103 Phone 604.420.8773 **British Columbia**

Chain of Custody

Date Feb 27/4 of 1

0.00 Receipt Temperature (°C) (Detec) Time RELINQUISHED BY (COURTER) RECEIVED BY (LABORATORY) M00135 ਜੁਣਾ ਵਧਾ ANALYSES REQUIRED À S. panins rollydopouso PE *× × FED STYLL OF 27 Feb 14 0081 (200 MA NOVER # 1425 RELINQUISHED BY (CLIENT) offort work 14676 emma@nautilusenvironmental.com COMMENTS RECEIVED BY (COURIER) Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted Nautilus Environmental Burnaby, BC, VSA 4N3 8664 Commerce Court ongeny) Nautilus Environmental Melissa Hebert Emma Marus 604-420-8773 Emma Marus A CONTAINERS ユ×ナ 三產 ナメド NO. OF City/State/Zip Company Invoice To: Address Contact Phone Email 0 CONTAINER broken Samplelost, TYPE 7 SAMPLE RECEIPT Received Good Condition? Matches Test Schedule? Total No. of Containers Sr × MATRIX water as per client emma@nautilusenvironmental.com container TIME \$8 哥 Nautilus Erwironmental Burnaby, BC, VSA 4N3 8664 Commerce Court 604-420-8773 Emma Marus Feb 25/4 SPECIAL INSTRUCTIONS/COMMENTS: DATE PROJECT INFORMATION sample Cance City/State/Zip Sample Collection By: SAMPLE ID request Company Address Report to: Contact Phone Email one/7 PO No.: Shipped Client: Š

Nautilus Environmental

British Columbia
8664 Commerce Court
Burnaty, British Columbia, Christon VSA 4N3
Phone 604,420,8773

Date FCD7 My

Chain of Custody

							2	ANALYSES REQUIRED	
Report to:				Invoice To:	To:		50		(၁۰)
Company	Nautilus Erwironmental	onmental		Compan		Nautilus Environmental	ıut		
Address	8664 Commerce Court	ce Court		Address		8664 Commerce Court	pl	-	
City/State/Zip	Burnaby, BC, VSA 4N3	/5A 4N3		City/	te/Zip	Burnaby, BC, VSA 4N3	רטו		
Contact	Emma Marus			Contact		Emme Marus	цг		
Phone	604-420-8773			Phone	-,	604-420-8773	1 0		
Email	emma@nautil	emma@nautilusenvironmental.com	al.com	Email	7	emma/@naufilusenvironmental.com	סח	-	
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER	NO. OF CONTAINERS	COMMENTS	ρŁ		
23	Feb25/14	1330	water	plastic	34 x2Ltx11	WOA 14046	X	1402156	9.30
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									100
PROJECT INFORMATION	IATION	S	SAMPLE RECEIPT	TPI	0	RELINQUISHED BY (CLIENT)	2	RELINQUISHED BY (COURIER)	COURTER)
Client:		Total No.	Total No. of Containers		(Squature)	(M) Kerist (M)	(auspedig)		(Time)
PO No.:		Received G	Received Good Condition?	n?	(Printed Name)		(Printed Name)	*	(Date)
Shipped Via:		Matches T	Matches Test Schedule?	3	(Company) Nautilus	yeary) Nautillus Environmental	(Company)		
SPECIAL INSTRUCTIONS/COMMENTS:	COMMENTS:	,3	4.			RECEIVED BY (COURIER)	•	RECEIVED BY (LABORATORY)	RATORY)
123 to replace sample XI to testing.	zie sa	× de	1 to 16	sung.	(Signature)	Nover	THE (personal)		27 Feb IM
					(Printed Name)	(inph())	(Printed Name)		1530 hrs
					(Company)		(Company) 112C	J	

ALS Environmental

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L1426336-COFC

COC Number:	14
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www.alsg	global.com					Distribution			ún. ~			_elaw	(Filush T	emanue	ሰላ፤ ፓኒክላ	± (TAT) &	доў акай	able for	ed te sta)	
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