

Toxicity testing on NWTPH-Dx

Environmental Assessment Program (EAP)

Final Report

January 23, 2018

Submitted to: Washington Department of Ecology

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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.



SUMMARY

Sample Information and Test Type

Sample ID	NWTPH-Dx			
Sample information	Custom Diesel Fuel #2 Composite Standard No. 572563, Lot# A0127308, 50,000 μg/mL each in acetone, 5 mL ampoules			
Sample manufacturer	Restek Corporation 110 Benner Circle • Bellefonte, PA 16823			
Sample supplier	Chromatographic Specialties Inc. 300 Laurier Blvd. Brockville, ON. K6V 5W1			
Sample receipt date	May 19, 2017			
Sample receipt temperature	N/A			
Sample storage temperature	Store at 25 °C nominal			
	Fathead minnow (Pimephales promelas) survival and growth			
Tast types	Topsmelt (Atherinops affinis) survival and growth			
lest types	Ceriodaphnia dubia survival and reproduction			
	Echinoderm (Strongylocentrotus purpuratus) fertilization			

Summary of Results

Endpoint *	mg/L diesel (95% CL)	NOEC	LOEC
Fathead minnow			
survival LC50	1.87 (1.43 – 2.45)	1.30	2.70
biomass IC25	0.87 (0.70 – 1.23)	0.05	1 20
biomass IC50	1.39 (1.03 – 1.84)	0.05	1.30
Topsmelt			
survival LC50	0.68 (0.55 – 0.83)	0.26	0.57
biomass IC25	0.74 (0.37 – 0.80)	0.57	1.60
biomass IC50	0.99 (0.76 – 1.04)	0.57	1.60
Ceriodaphnia dubia			
survival LC50	0.23 (0.20 – 0.26)	0.22	0.34
reproduction IC25	0.17 (0.16 – 0.19)	0.15	0.22
reproduction IC50	0.20 (0.19 – 0.24)	0.15	0.22
Echinoderm			
fertilization IC25	0.19 (0.12 – 0.22)	-0.05	0.05
fertilization IC50	0.34 (0.29 – 0.38)	< 0.05	0.05

LC = Lethal Concentration, IC = Inhibition Concentration, NOEC = No Observed Effect Concentration,

LOEC = Lowest Observed Effect Concentration, * = result was calculated using the solvent control as the negative control



1.0 INTRODUCTION

Nautilus Environmental Company Inc. conducted toxicity tests for the Washington Department of Ecology's (WDOE) Environmental Assessment Program (EAP) as part of a study to determine environmental effects-based concentrations of total petroleum hydrocarbons (TPHs) associated with diesel fuel #2 for aquatic organisms. Customized Diesel samples were ordered by the WDOE and provided by Chromatographic Specialties Inc. These diesel fuel #2 samples were specially prepared in acetone rather than dichloromethane to provide maximum solubility in water for the toxicity tests. The diesel fuel standards were received at the Nautilus laboratory in Burnaby, BC on May 19, 2017. The following toxicity tests were performed on the Custom Diesel Fuel #2 Composite Standards:

- Fathead minnow survival and growth (EPA-821-R-02_013)
- Topsmelt survival and growth (EPA/600/R-95/136)
- *Ceriodaphnia dubia* survival and reproduction (EPA-821-R-02-013)
- Echinoderm fertilization (EPA/600/R-95/136)

This report describes the results of these toxicity tests conducted on the diesel fuel #2 composite standard sample. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to E. The chain-of-custody form is provided in Appendix F.

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 1 to 4. Testing was conducted according to procedures described by the US EPA (1995, 2002) and the Washington Department of Ecology (WDOE, 2016). To determine an appropriate concentration series that would capture NOEC and LOEC values, range-finding tests were performed for each test species prior to initiation of the definitive tests. Definitive tests using Fathead minnow, Topsmelt and *C. dubia* were initiated on July 6, 2017. Tests using Echinoderms were initiated on July 7, 2017.



Test species	Pimephales promelas				
Organism source	Commercial supplier				
Organism age	<24 hours post-hatch				
Test type	Static-renewal				
Test duration	7 days				
Test vessel	375-mL glass container with lid				
Test volume	375 mL				
Test concentrations	Six concentrations, plus laboratory and methanol control				
Test replicates	4 per treatment				
Number of organisms	10 per replicate				
Control/dilution water	Moderately-hard reconstituted water				
Test solution renewal	Daily (80% renewal)				
Test temperature	25 ± 1°C				
Fooding	Twice a day with approximately 1500-2250 newly hatched brine				
recurry	shrimp nauplii (Artemia sp.) in each test container				
Light intensity	100 to 500 lux				
Photoperiod	16 hours light / 8 hours dark				
Aeration	None, unless dissolved oxygen falls to <40% saturation				
	Temperature, dissolved oxygen, pH and conductivity measured				
Test measurements	daily; hardness and alkalinity of undiluted sample measured at				
	test initiation; survival checked daily				
Test protocol	EPA-821-R-02_013				
Statistical software	CETIS Version 1.8.7				
Test endpoints	Survival and biomass				
Test acceptability criteria for controls	≥80% survival; ≥250 µg mean dry weight				
Reference toxicant	Sodium chloride (NaCl)				

Table 1.Summary of test conditions: 7-d fathead minnow (*Pimephales promelas*)
survival and growth test.



growth test.					
Test species	Atherinops affinis				
Organism source	Commercial supplier				
Organism age	9-to 15-days post-hatch				
Test type	Static-renewal				
Test duration	7 days				
Test vessel	500-mL glass container with lid				
Test volume	500 mL				
Test concentrations	Six concentrations, plus laboratory and methanol control				
Test replicates	5 per treatment				
Number of organisms	5 per replicate				
Control/dilution water	Natural seawater				
Test solution renewal	Daily (80% renewal)				
Test temperature	20 ± 1°C				
Test salinity	30 \pm 2 ppt; sample salinity adjusted by addition of H ₂ Ocean Pro+ marine salts				
Feeding	Twice a day with newly hatched brine shrimp nauplii (<i>Artemia sp</i> .)				
Light intensity	Ambient laboratory lighting				
Photoperiod	16 hours light / 8 hours dark				
Aeration	None, unless dissolved oxygen falls below 4.0 mg/L				
Test measurements	Temperature, dissolved oxygen, pH and salinity measured daily; survival checked daily				
Test protocol	EPA/600/R-95/136				
Statistical software	CETIS Version 1.8.7				
Test endpoints	Survival and biomass				
Test acceptability criteria for controls	≥80% survival; ≥0.85 mg mean dry weight				
Reference toxicant	Copper (added as CuCl ₂)				

Table 2.Summary of test conditions: 7-d topsmelt (Atherinops affinis) survival and
growth test.



test.	
Test species	Ceriodaphnia dubia
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 8 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube with snap cap
Test volume	20 mL
Test concentrations	Six concentrations, plus laboratory and methanol control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 $\mu g/L$ Se and 2 $\mu g/L$ vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with Pseudokirchneriella subcapitata and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	EPA-821-R-02-013
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no enhine present
Reference toxicant	Sodium chloride (NaCl)

Table 3. Summary of test conditions: Ceriodaphnia dubia survival and reproduction test.



9					
Test species	Strongylocentrotus purpuratus				
Organism source	Commercial supplier				
Organism age	< 3 hours post gamete collection				
Test type	Static				
Test duration	10 minutes sperm exposure; 10 minutes egg fertilization				
Test vessel	30-mL glass vials with snap cap				
Test volume	30 mL				
Test concentrations	Six concentrations, plus laboratory and methanol control				
Test replicates	4 per treatment				
Number of organisms	2000 eggs per replicate				
Control/dilution water	Natural seawater				
Test solution renewal	None				
Test temperature	12 ± 1°C				
Tost salinity	30 ± 2 ppt; sample salinity adjusted by addition of H ₂ Ocean				
Test samily	Pro+ marine salts				
Feeding	None				
Light intensity	Ambient laboratory lighting				
Photoperiod	None				
Aeration	None				
Test measurements	Temperature, dissolved oxygen, pH and salinity measured at				
	test initiation				
Test protocol	EPA/600/R-95/136				
Statistical software	CETIS Version 1.8.7				
Test endpoint	Fertilization				
Test acceptability criterion for controls	≥60% and <98% mean fertilization				
Reference toxicant	Copper (added as CuCl ₂)				

Table 4. Summary of test conditions: 40-min echinoderm fertilization test.

2.1 Preparation of Stock Dilution Series

The nominal concentration series that was used for the definitive tests with Topsmelt and Echinoderms was 16, 8.0, 4.0, 2.0, 1.0, 0.5 mg diesel/L. The nominal concentration series for fathead minnows was 30, 15, 7.5, 3.8, 1.9, 0.9 mg diesel/L and for *C. dubia* was 6, 3, 1.5, 0.75, 0.38, 0.19, 0.09, 0.045 mg diesel/L. A stock solution of 50 mg diesel/mL was prepared first and used to prepare the dilutions. The stock was prepared by using approximately 1.77 to 1.79 mL of the diesel standard in approximately 5.53 to 5.58 L of dilution water. Stock solutions were made separately for each test species with respective control water. The 50 mg diesel/mL stock solutions in the



aspirator bottles were stirred overnight and allowed to settle for 1 hour prior to use in preparing dilutions. Aspirator bottles were capped with rubber stoppers covered with aluminum foil to prevent evaporation. 5-L bottles were filled close to the top to avoid loss of the diesel from volatilization. Some space was left to avoid adsorption of the diesel to the foil covered stopper. Aspirator bottles were drained using the port at the bottlem of the bottle to avoid using the undissolved fraction at the top of the vessels. Stock solutions for the *C. dubia* tests were prepared in 2L Erlenmeyer flasks and were siphoned using hydrocarbon resistant tubing.

Samples of test solutions were taken immediately after dilutions were prepared and were collected in 40-mL sample vials provided by the Manchester Environmental Laboratory, MEL, with no head space.

2.2 Subsampling Test Solutions

Subsamples of the fresh stock water were taken during the filling of the test chambers. Subsamples of the stale test chamber solutions were collected as a composite of the chamber replicates prior to renewal or at the end of the tests.

Test solutions were prepared by the addition of diesel to achieve a range of test concentrations in laboratory control water specific to each test species. Test solutions were prepared and renewed daily for tests with Fathead minnow, Topsmelt and *C. dubia*; the 40 minute echinoderm test did not require renewal of test solution. In addition, an acetone control was tested concurrently with all four tests. The acetone control was used to calculate all test endpoints.

2.3 Acetone Control

An acetone control was prepared as a solution of acetone in dilution water. Each set of tests had a separate acetone control based on the amount of acetone used in the top concentration of the test. For Topsmelt and Echinoderms tests, a 0.036% acetone solution was used. For fathead minnow and *C. dubia*, the percentage of acetone used in the solvent control solution was 0.067 and 0.012% acetone, respectively. The acetone control was prepared in separate containers on the day that the tests were set up and for all test solution renewals.

2.4 Statistical Analysis

Statistical analyses were performed using the acetone control as the negative control with CETIS (Tidepool Scientific Software, 2013).



2.5 Test Lighting

Natural lighting was provided to the toxicity tests using full spectrum UV fluorescent light tubes, Ushio 3000417, F32T8/960 - 32W T8 Fluorescent 6000K 95CRI. Full spectrum fluorescent tubes were purchased from Top Bulb 5204 Indianapolis Blvd. East Chicago, IN 46312.

3.0 RESULTS

3.1 Analytical Results

Samples of the fresh and "stale" test solutions were analyzed by the Manchester Environmental Laboratory. The nominal and measured concentrations are presented in Tables 5 to 8.

	diesel	/L).								
	Measured (mg/L)									
Nominal (mg/L)	t=0	t=	24	t=48	t=72	t=	=96	t=120	t=144	t=168
	fresh	stale	fresh	fresh	fresh	stale	fresh	fresh	fresh	stale
30	3.03	0.74	3.26	1.75	1.79	0.59	2.86	2.72	3.68	1.37
15	-	-	-	-	-	-	-	-	-	-
7.5	0.29	0.18	0.48	0.37	0.42	0.19	0.57	0.62	1.05	0.42
7.5 dupl.	0.49	-	-	-	0.43	-	0.54	-	1.05	-
3.8	-	-	-	-	-	-	-	-	-	-
1.9	0.13	0.06	0.12	0.13	0.18	0.18	0.17	0.14	0.21	0.28
0.9	0.08	0.06	0.11	0.14	0.10	0.15	0.10	0.10	0.12	0.29
0	0.05	-	-	-	-	-	-	-	-	-
0	0.05	-	-	-	-	-	-	-	-	-
0	0.05	-	-	-	-	-	-	-	-	-

Table 5.Results: Fathead minnow nominal and measured test concentrations (mg
diesel/L).

t = time, Detection Limit = 0.05



	Measured (mg/L)									
Nominal (mg/L)	t=0	t=	-24	t=48	t=72	t=	96	t=120	t=144	t=168
	fresh	stale	fresh	fresh	fresh	stale	fresh	fresh	fresh	stale
16	0.62	0.58	2.02	3.31	0.96	х	х	х	х	х
8	-	-	-	-	-	-	-	-	-	-
4	0.07	0.14	0.38	0.31	0.32	0.15	0.17	0.20	0.29	0.20
4 dupl.	0.29	-	0.40	-	0.31	-	0.14	-	0.32	-
2	-	-	-	-	-	-	-	-	-	-
1	0.07	0.05	0.13	0.10	0.11	0.16	0.11	0.18	0.18	0.16
0.5	0.05	0.05	0.07	0.06	0.06	0.12	0.13	0.14	0.13	0.17
0	0.05	-	-	-	-	-	-	-	-	-
0	0.05	-	-	-	-	-	-	-	-	-
0	0.06	-	-	-	-	-	-	-	-	-

Table 6. Results: Topsmelt nominal and measured test concentrations (mg diesel/L).

* Result of reanalysed sample, t = time, Detection Limit = 0.05, x = sample not taken due to 100% mortality in test concentration.



	Measured (mg/L)							
Nominal (mg/L)	t = 0	t=24	t=48	t=72	t = 96	t = 120	t=144	
	fresh	fresh	fresh	fresh	fresh	fresh	fresh	
6	1.19	х	х	х	х	х	х	
3	0.55	x	х	х	x	х	х	
3 dupl.	0.24	x	х	х	x	х	х	
1.5	0.29	1.22	0.36	0.53	x	х	х	
0.75	0.11	0.52	0.23	0.15	0.40	0.19	0.42	
0.38	0.08	0.24	0.14	0.14	0.21	0.10	0.21	
0.19	0.05	-	0.08	-	0.12	-	0.14	
0.09	-	-	-	-	-	-	-	
0.045	-	-	-	-	-	-	-	
0	0.05	-	-	-	-	-	-	
0	0.05	-	-	-	-	-	-	
0	0.06	-	-	-	-	-	-	

Table 7.Results: Ceriodaphnia dubia nominal and measured test concentrations
(mg diesel/L).

*Result of reanalysed sample, t = time, Detection Limit = 0.05, x = sample not taken due to 100% mortality in test concentration.



	Measured (mg/L)
Nominal (mg/l)	t=0
(fresh
16	0.62
8	-
4	0.07
4 dupl.	0.29
2	-
1	0.07
0.5	0.05
0	0.05
0	0.05
0	0.06

Table 8.Results: Echinoderm nominal and measured test concentrations
(mg diesel/L).

t = time

3.2 Calculation of Test Solution Concentrations

Due to the poor solubility of diesel in water, the majority of the measured concentrations were >20% lower than nominal concentration. The nominal and measured test concentrations are presented in Tables E-1 - E-3 in Appendix E. The nominal concentrations therefore, could not be used to calculate test endpoints. In order to calculate the average measured test concentrations over the duration of the test and to estimate non-measured test concentrations, nominal and measured concentrations were plotted and linear regression lines were fitted for each test. Test concentrations were calculated from the nominal concentrations using the equation of the regression lines plotted for each definitive test.

Figures 1 to 4 show the regression lines and equations used to calculate the test concentrations, which were used to calculate the test endpoints for the Fathead minnow, Topsmelt, *C. dubia*, and echinoderm tests. For the fathead minnow and Topsmelt test concentrations, two regression lines were fit to provide the best estimate of the average measured concentrations. Concentrations that



were not measured were calculated from the regression equations. Table 9 provides a summary of the calculated diesel test concentrations from the regression equations.

	, ,:						
Fathead I	minnow	Тор	osmelt	Echin	oderm	С.	dubia
Nominal	Calculated	Nominal	Calculated	Nominal	Calculated	Nominal	Calculated
30	2.7	16	1.6	16	0.62	6	0.75
15	1.3	8	0.57	8	0.33	3	0.50
7.5	0.65	4	0.26	4	0.18	1.5	0.34
3.8	0.31	2	0.16	2	0.11	0.75	0.22
1.9	0.13	1	0.12	1	0.07	0.38	0.15
0.9	0.04	0.5	0.10	0.5	0.05	0.19	0.10
						0.09	0.07
						0.045	0.04

Table 9.Results: Summary of nominal and calculated diesel test concentrations (mg
diesel/L).









Figure 2. Polynomial Regression of Nominal vs. Measured Concentrations – Topsmelt





Figure 3. Power Regression of Nominal vs. Measured Concentrations – C. dubia





Figure 4. Linear Regression of Nominal vs. Measured Concentrations – Echinoderm

3.3 Toxicity Test Results

The results of the toxicity tests are summarized in Tables 10 to 13. All endpoints were calculated in CETIS using the solvent control as the negative control.

The results of the 7-day Fathead minnow test are shown in Table 10. The median lethal concentration (LC50) estimate for survival was 1.87 mg diesel/L, and the 25% inhibitive concentration (IC25) estimate for biomass was 0.87 mg diesel/L. The resulting LOEC for survival and biomass was 2.70 and 1.30 mg diesel/L, respectively.

The results of the 7-day Topsmelt test are shown in Table 11. The LC50 estimate for survival was 0.68 mg/L diesel and the IC25 estimate for biomass was 0.74 mg diesel/L. The resulting LOEC estimate for survival and biomass was 0.57 and 1.60 mg diesel/L, respectively.

The results of the *C. dubia* survival and reproduction test are shown in Table 12. Adverse effects were observed on survival, resulting in an LC50 estimate of 0.23 mg diesel/L and an LOEC of



0.34 mg diesel/L. An inhibitory effect was observed on reproduction, resulting in an IC25 estimate of 0.17 mg diesel/L, and an LOEC of 0.22 mg/L diesel.

The results of the Echinoderm fertilization test are shown in Table 13. The IC25 estimate was 0.34 mg diesel/L, and a resulting LOEC of 0.05 mg diesel/L.

Diesel Conce	ntrations	Summinal (9/)	Piomoce (mg)	Dm (Moight (mg)
Nominal (mg/l)	Nominal Test solutions (mg/L) (mg/L)		(Mean ± SD)	(Mean ± SD)
Laboratory control	0	100 ± 0.0	0.7 ± 0.1	0.7 ± 0.1
Acetone control	0	100 ± 0.0	0.6 ± 0.0 ¹	0.6 ± 0.0^{-1}
0.9	0.04	97.5 ± 5.0	0.6 ± 0.1	0.6 ± 0.1
1.9	0.13	100 ± 0.0	0.6 ± 0.1	0.6 ± 0.1
3.8	0.31	97.5 ± 5.0	0.6 ± 0.1	0.6 ± 0.0
7.5	0.65	97.5 ± 5.0	0.6 ± 0.0	0.6 ± 0.0
15	1.3	77.5 ± 17.1	0.3 ± 0.1	0.4 ± 0.1
30	2.7	22.5 ± 5.0	0.0 ± 0.0	0.2 ± 0.1
Test endpoint	t (mg/L) *			
LC50 (959	% CL)	1.87 (1.43 – 2.45)		
IC25 (95% CL)			0.87 (0.70 – 1.23)	1.19 (0.99 – 1.39)
IC50 (95% CL)			1.39 (1.03 – 1.84)	2.02 (1.79 – 2. 29)
NOEC		1.30	0.65	0.65
LOEC	2.70		1.30	1.30

Table 10.	Results: Fathead minnow 7-day survival and growth test.

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits, N/A = Not Available, NOEC = No Observed Effect Concentration, LOEC = Lowest Observed Effect Concentration 1 = result was significantly different than the laboratory control, * = result was calculated using the solvent control as the negative control



Diesel Concentrations		Summing (%)	Piomoss (mg)	Dury Maight (mg)	
Nominal Test solutions		(Mean ± SD)	(Mean ± SD)	(Mean ± SD)	
(mg/L)	(mg/L)			(,	
Laboratory control	0	100 ± 0.0	1.3 ± 0.1	1.3 ± 0.1	
Acetone control	0	100 ± 0.0	1.1 ± 0.1 ¹	$1.1 \pm 0.1 \ ^{1}$	
0.5	0.1	96.0 ± 8.9	1.0 ± 0.1	1.1 ± 0.1	
1.0	0.12	92.0 ± 11.0	1.2 ± 0.2	1.3 ± 0.2	
2.0	0.16	96.0 ± 8.9	1.2 ± 0.2	1.3 ± 0.1	
4.0	0.26	80.0 ± 28.3	1.1 ± 0.3	1.3 ± 0.2	
8.0	0.57	76.0 ± 16.7	1.1 ± 0.3	1.4 ± 0.2	
16.0	1.6	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	
Test endpoint	t (mg/L) *				
LC50 (959	% CL)	0.68 (0.55 – 0.83)			
IC25 (95% CL)			0.74 (0.37 – 0.80)	>0.57	
IC50 (95% CL)			0.99 (0.76 – 1.04)	>0.57	
NOEC		0.26	0.57	0.57	
LOEC	2	0.57	1.60	>0.57	

Table 11.	Results: T	opsmelt	7-day	/ survival a	and gr	owth te	est.
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SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits, NOEC = No Observed Effect Concentration, LOEC = Lowest Observed Effect Concentration

¹ = result was significantly different than the laboratory control, * = result was calculated using the solvent control as the negative control



Diesel Con	centrations		Denneduction
Nominal	Test solutions	Survival (%)	(Mean + SD)
(mg/L)	(mg/L)		(Wear ± 5D)
Laboratory control	0	100	20.2 ± 2.1
Acetone control	0	100	16.8 ± 4.4 ¹
0.045	0.04	100	17.9 ± 2.5
0.09	0.07	100	18.6 ± 2.4
0.19	0.10	100	18.2 ± 1.5
0.38	0.15	100	17.1 ± 2.8
0.75	0.22	60	6.4 ± 6.4
1.5	0.34	0	0.0 ± 0.0
3.0	0.50	0	0.0 ± 0.0
6.0	0.75	0	0.0 ± 0.0
Test endpo	int (mg/L) *		
LC50 (9	95% CL)	0.23 (0.20 – 0.26)	
IC25 (95% CL)			0.17 (0.16 – 0.19)
IC50 (95% CL)			0.20 (0.19 – 0.24)
NOEC		0.22	0.15
LOEC		0.34	0.22

Table 12.	Results: C. dubia survival and reproduction te	st.
-----------	--	-----

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits, NOEC = No Observed Effect Concentration, LOEC = Lowest Observed Effect Concentration

¹ = result was significantly different than the laboratory control, * = result was calculated using the solvent control as the negative control



Diesel Co	ncentrations	- Fortilized eggs (%)		
Nominal	Test solutions	(Mean + SD)		
(mg/L)	(mg/L)	(Mean ± 5D)		
Laboratory control	0	78.0 ± 2.6		
Acetone control	0	72.5 ± 1.0		
0.5	0.05	64.8 ± 5.1		
1.0	0.07	58.0 ± 2.7		
2.0	0.11	58.8 ± 4.1		
4.0 0.18 56.0 ± 4.3		56.0 ± 4.3		
8.0	0.33	37.2 ± 4.3		
16.0	0.62	12.2 ± 3.3		
Test endp	oint (mg/L) *			
IC25 ((95% CL)	0.19 (0.12 – 0.22)		
IC50 (95% CL)		0.34 (0.29 – 0.38)		
N	OEC	<0.05		
L	OEC	0.05		

Table 13.	Results: Echinoderm (Strongylocentrotus purpuratus) fertilization test.
-----------	---

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits, NOEC = No Observed Effect Concentration, LOEC = Lowest Observed Effect Concentration, * = result was calculated using the solvent control as the negative control



4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the US EPA protocols. There was a statistically significant difference between the laboratory control and the solvent control for most of the growth endpoints in the tests. Therefore, the solvent control was used for statistical analyses to calculate endpoints in all tests.

Water quality parameters remained within ranges specified in the protocol throughout the tests and 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.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 13. Results for these tests fell within the range for organism performance of the mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the tests.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Number1	Test Date
P prometas	Survival (EC50): 4.6 g/L NaCl	5.0 (3.7 – 6.8)	16	124	July 6, 2017
F. prometos	Growth (IC50): 4.7 g/L NaCl	4.7 (2.9 – 7.5)	27	124	July 0, 2017
	Sunvival (EC50): 91.2 ug/L Cu	99.9	25		
A affinis	Sulvival (LC50). 91.2 µg/L Cu	(64.1 – 155.6)	25	30	July 6, 2017
A. ujjuns	Growth (IC50): 87.7 ug/L Cu	93.5	26	50	July 0, 2017
	Glowin (1030). 87.7 µg/2 Cu	(58.6 – 149.2)	20		
C dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.8 – 2.2)	5	161	July 21 2017
C. UUDIU	Reproduction (IC50): 1.8 g/L NaCl	1.5 (1.1 – 2.1)	18	101	July 21, 2017
S. <i>purpuratus</i> Fertilization (IC50): 16.4 µg/L Cu		18.9 (7.7 – 46.0)	56	5	July 7, 2017

Table 14.Reference toxicant test results.

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration, 1= number of tests used to calculate historical mean and standard deviation



5.0 REFERENCES

- USEPA. 2002. Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA-821-R-02-014.
- USEPA. 1995. Short-Term Method for Estimating the Chronic Toxicity of Effluents and Receiving Waters to the West Coast Marine and Estuarine Organisms. EPA-600-R-95-136.
- Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 275 pp.
- WDOE. 2016. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised June 2016.



APPENDIX A – Fathead minnow Toxicity Test Data

Fathead Minnow Test Summary Sheet

Client:	WPCE	
Work Order No.:	170513B	Test Species: <u>Pimephales promelas</u>
Sample Information	:	
Sample ID: Sample Date: Date Received: Sample Volume:	NWTPH - DX May 19/A May 19/A 50 x5mL	- · · · · · · · · · · · · · · · · · · ·
Dilution Water:		
Type: Hardness (mg/L CaC Alkalinity (mg/L CaC(O_3): O_3): O_3): O_3): O_3	l water
Test Organism Info	rmation:	
Batch No.: Source: Loading Density:	070617 Aquatic BioSyster 10 fish/250ML	ms, CO
NaCl Reference Tox	cicant Results:	
Reference Toxicant I Stock Solution ID: Date Initiated: 7-d EC50 (95% CL): 7-d IC50 (95% CL): Survival: Reference Toxicant M Biomass	D: $\frac{PP124}{NaCl}$ $-\frac{JUly GAF}{4.6(3.9-5)}$ $-\frac{4.7(4.1-5)}{4.7(4.1-5)}$ Mean ± 2 SD: $5.0(3.7)$	<u>4) gil bach</u> <u>5) gil bach</u> <u>7-68)gil bech</u> cv (%): <u>16</u>
Reference Toxicant N	Mean ± 2 SD: <u>4.7 C</u>	29-7:5)gil NEC (V(%): 27-
Test Results:		
	NOEC % (v/v) LOEC % (v/v) EC25 % (v/v) (95% CL) EC50 % (v/v) (95% CL)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	IC25 % (v/v) (95% CL) IC50 % (v/v) (95% CL)	1.39(1.03-1.84) $7.02(1.79-7.31)$
Reviewed by:	jûn	Date reviewed:

Reviewed by:

Nautilus Environmental

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7-d Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Client:	WDOE	Start Date & Time: July 6117 12004
Sample ID:	NWTPH-DX	Stop Date & Time: July 13117 (3156
Work Order #:	1705136	Test Species: Pimephales promelas

marl Diesel		Days												
Concentration	0		1	2		;	3	4		5		6		7
(ontro)	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	25.0	25.0	2013	240	245	240	245	24.0	245	24-5	24-5	24.0
DO (mg/L)	8.3	72	8-2	3.3	22	56	8-1	5.2	80	57-	21	60	8.0	6.2
pH	ナナ	7.4	75	7.2	7,5	7.4	76	13	1.3	7.2	76	70	74	6.5
Cond. (µS/cm)	733	33	2	Z	,31		3.32	32	21	3	32	3	75	329
Initials	676	K.	20		A		A	T V	w	10	h		ie i	KIL

•		Days												
Concentration	0		1	2		3		4		5		6		7
acetone control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	74-0	24.9	24.0	25 ·D	24.0	240	245	240	245	24.0	240	24-5	24-0	24.0
DO (mg/L)	7.4	6.3	79	5.3	RI	52	61	5.5	7.9	5.4	1-9	4.7	7.8	5.7
рН	7.9	74	1.4	3.2	7.4	7.4	76	1.3	7.8	7-1	76	6.9	76	6.8
Cond. (µS/cm)	331	3	<u>}</u>	3	31	3	32	33	2	31	,6	33	6	372
Initials	10-	(4)	<u>ر</u>		١		<u>a</u> _	NN.	K	IC	7~	K		1636

		Days												
Concentration	0		1	:	3 4		4	5		6		7		
0-9	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	UP	240	240	24.0	245	24.0	240	24-5	24.0	2400
DO (mg/L)	7-9	7.0	8-0	5.7	SI,	5.4	82	54	79	4.6	79	4.5	23	4.5
рН	2.9	7-4	7.5	7.2	r:7	7.4	75	1.2	78	2-0	26	5 G	7.6	6.8
Cond. (µS/cm)	338	37	>1	3	32	3	33	3	37	3	56	24	(2	347
Initials	474	K)L		A		1	1 M	W	K	フレ	V.	70	KJL

		Days												
Concentration	0		1	2	2		3		4		5	6		7
1.9	init.	old	new	old	new	old	new	old	new	old	new	blo	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	UP	240	24,2	740	245	24.0	2400	24-5	24.0	Zie.
DO (mg/L)	7-8	6.8	79	5.8	F.1	53	81	5.1	19	4.5	29	4.4	23	4.6
pH	79	7-5	7.6	7.2	7.5	7.4	25	13	7.8	7.0	26	6.9	76	6.1
Cond. (µS/cm)	335	73	S	3	33	. 3	31	23	4	7	76	31	17	378
Initials	*7~	10	10		2		A-	MI	N	k	7 <u>~</u>	ić	52	KSU

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L); pH = 6.5 to 8.5

DO meter:	ч.,	pH meter: ¥	Conductivity meter:	4
	Control		Analysts:	KOL, AND, YYL
Hardness*	<u>45</u>			
Alkalinity*	80		Reviewed by:	Jou
* mg/L as CaCO3			Date reviewed:	Ane. 1/17
Sample Description:	Diesels	standard in Moderat	heir hard wat	er
Comments: _	 			·

Version 1.1; Issued February 17, 2011

7-d Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Client:	LDOE	Start Date & Time: Tuly 6/12 17 006
Sample ID:	NWTPH-DX	Stop Date & Time: 544 13/17 13154
Work Order #:	1705136	Test Species: Pimephales promelas

mg/L Diese		Days												
Concentration	0		1	2		3		4		5		6		7
3-8	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	240	64.0	25.6	290	240	24,2	240	240	240	1400	24-5	74.0	2400
DO (mg/L)	7.8	6.9	8-0	6.0	8.1	5-1	20	49	7.8	4.4	29	4.3	28	4.1
рН	7.9	7.5	7.6	7.3	3-5	2.5	25	7.3	79	7.0	76	69	76	68
Cond. (µS/cm)	371	37	51	3:	35	33	4	3	33	3	35	2	25	336
Initials	14%	ik:	76		A-		À.	N V	re		on	1C	JU	1-1

		Days												
Concentration	0		1		2		3		4		5	6		7
7-5	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24-0	24.0	25.0	240	240	24,3	240	240	24.0	7.4.0	242	24.0	W.
DO (mg/L)	78	6.9	8-1	6.0	8.	5.2	f,I	4.9	19	4.5	72	4.7	22	4.2
рН	7-9	7.5	76	7.2	75	25	75	13	7.9	7.0	76	68	26	68
Cond. (µS/cm)	370	3	31	3	35	3	31	2	33	. 7.	27	7	76	507
Initials	KA	K	JC	A	-		<u>ک</u>	1 V	uC .	10	76	15	<u>-</u>	VCTL

		Days														
Concentration	0	1	1		1		2		3		4		5	6		7
15	init.	old	new	old	new	old	new	old	new	old	new	old	new	final		
Temperature (°C)	24.0	24.0	びい	26.D	240	240	24,0	240	24.0	24.0	24.0	24-5	74.0	24-0		
DO (mg/L)	79	6.9	8-1	6.3	F.)	5.3	21	5.0	78	4.7	78	4.2	72	2,		
рН	7.8	7.5	7.6	3.2	3.5	7.5	26	7.2	79	2.0	71	66	1.6	60		
Cond. (µS/cm)	370	3]	7	3	33	2	31-	3	33	23	Y .	77	5	558		
Initials	127L	K7	Ľ	٨	e e e e e e e e e e e e e e e e e e e		4	- YV	Al) Y \$, . 1	K	2	- 30 V.JL		

							Da	ays						
Concentration	0		1		2		3		4	1	5		6	7
30	init.	old	new	old	new	old	new	old	new	blo	new	old	now	final
Temperature (°C)	24.0	24.0	40	25.0	U.>	240	2402	24-	24.5	24.0	240	234.5	24.0	24
DO (mg/L)	79	69	8-1	6.8	RI	50	8-1	4.9	78	4.4	29	4	29	11-
рН	29	7.5	7.6	7.U	75	75	35	1,2	72	3.2	2.6		71	<u>4.5</u>
Cond. (µS/cm)	329	3	29		322	2	29 29	2	271	7.0	12	4	1.6	277
Initials	just	K	ど				<u></u>			1ª	~		₹ <u>₹</u>	<u> </u>
							-4	-1	-1-				, -	10 50

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L); pH = 6.5 to 8.5

DO meter:	4		pH meter:	Ч	Conductivity meter:	4
	Control	<u></u>			Analyste	KAL. A. IN VUL.
Hardness*					Analysis.	<u>10-1100/170</u>
Alkalinity*						- the
* mg/L as CaCO3					Date reviewed by:	Aug-1/17
Sample Description:			·.		-	
Comments:						
Version 1.1; Issued February 17, 201	1					· · · · · · · · · · · · · · · · · · ·

Nautilus Environmental

7-d Fathead Minnow Toxicity Test Daily Survival

Client:	WDC	っと					Start Dat	e & Time:	July 6/17 12002
Sample ID:	NW	TPH-	ЭX			 -	Stop Dat	e & Time:	Tulu1211715h
Work Order #:	170	<u>5135</u>				 _	Test	Species:	Pimephales promelas
						-		-	
Concentration				Day of T	est - No.	of Survi	vors		
Mail	Rep	1	2	3	4	5	6	7	Comments
(antrol	A	10	10	()	10	10	10	10	
Cont	В	10	1		to	10	1	10	
	С	10			10	10		10	
	D	60			10	0	\checkmark	.10	
aretone	A	10			(0)	to	io	lo	
(anto)	В	10			13	6)		lə	
	<u> </u>	0]			10	10		10	·
	D	10		<u> </u>	P	0		10	
0.5	A	10		<u> </u>	10	10	10	lv	
0-1	В	10		<u> </u>	10	10		10	
	C	10	1			10	2	10	
	D	9 pin	19	7	1 4	9	7	9	
1_9	A	(0	10	10		10	10	10	
	В		<u> </u>	+ +			1	10	······································
					10	10			
		10	<u> </u>	<u> </u>	10	10		12	
5-8	B	to			10	$\frac{w}{10}$		10	
	c	355				1X	1		
	D	lo			9	1 g	4	a	
7 6	A	10			10	16		i D	
7-5	В	10		1	10	(0	10	10	
	С	â,	9	9	9	4	Ğ	G	
	D	LO I	10	10	10	10	1D	<u>í</u> °	
15	Α	10			10	10	10	C¥	
	В	10			10	13	9	8	······································
	С	10			10	10	7	7	
	D	\mathcal{O}		1	9	R	8	6	
30	Α	6	ŀ	9	5	3	2	V	
	В	1	9	9	8	6	4	3	
	С	£	F	7	3	n	2	2	
	D	(2	10	F	$\lfloor 0 \rfloor$	3	3	2	
lech Initials		1434	<u></u>	A-	MU	1012	472	KN	
Comments:									
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			· · · · · ·						
Reviewed by:		JU	h					Date re	viewed: Ang. Un
						•			

Generated: April 9, 2008

Nautilus Environmental

Fathead Minnow Toxicity Test Data Sheet Dry Weight Data

Client:	<u></u>	5		•		Start Date & Time:	July FIL-	7 12004
Sample ID:	TO	5 NW	TPH-D)	< <	Te	mination Date & Time:	July 12/1	7 13154
Work Order No.	: 170	5136						
Sample ID	Rep	D Pan No. Black	No. alive	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	Α	1	10	jusi	1016-44	1023,98	10	VE/NY
	в	2	63	1	1021.32	1028,99	10	
	с	3	10		* TOILOIT.N	1024,19	10	
	D	4	10		1023-15	1029.51	10	
aceton	Α	5	(0		994.35	1001,20	10	
Control	в	d	10		1000.04	1006,52	10	
	с	7	10		983.34	989,78	10	
	D	8	CJ		1017.00	1022.96	-10	
0.9	Α	9	10		1014.671	1021.84	10	
7	В	ره	10		1023.35	1030,20	10	
	С	ł	61		192.13	1017,55	10	
	D	12	9	ACCOMPANY.	999.71	1004.93	9	
1.9	А	13	10		986.30	992.24	10	
, .	В	14	10		990.5th	996,03	10	
	C	15	10		103.69	1030,34	10	
	D	(b	10		1029-63	1035,41	10	
38	A	17	(0		1023.23	1029,26	10	
/-3	В	18	10		1001.83	1008.48	10	
	с	19	10		1030.25	1036.3!	10	
	D	20	G		1031.46	1036,76	9	
7-5	A	21	is		1026.84	1032.59	10	
	В	22	(0)		1024-01	1029,41	10	
	с	23	9		991.72	997,15	9	
	D	24	is	V	990.13	996,14	10	V
Comments:	an #	igh pou 2 - 10 1 - 10	N (mg) 28.99 17.52): 19 26	- 1036 - 995	,23 ,77		· · · · · · · · · · · · · · · · · · ·
Reviewed by:	10 2009	ીલ				Date Reviewed:	Aug. 1	17

1/2

Client: 1-70536 W.O.#. 1705136

Hardness and Alkalinity Datasheet

	-		Alkali	initv				Hardnoe		
									2	
• • •		· · · ·	Sample	(mL) 0.02N	(mL) of 0.02N		Samole	Volume of		
Sample ID	Subsample Date	Date Measured	Volume (mL)	HCL/H ₂ SO ₄ used to pH 4.5	HCL/H ₂ SO ₄ used to pH 4.2	Total Alkalinity (mg/LCaCO ₃)	Volume (mL)	EDTA Used (mL)	Hardness (mg/L CaCO ₃)	Technician
070417	Ju(6/12	Jular	5	42	4.2	J.J.	2	2,2	98	hr
WHW WHA								-		
	-									
		-								
-		-			ł					
				· · ·						-
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				-					-	
									*	
Notes:										
Reviewed by:		Jur				Date Reviewe	. .	hua (41/	

Nautilus Environmental Company Inc.

Version 1.1 Issued July 28, 2016

CETIS Sun	nmary Report						Report Dat Test Code	te: :	22 Dec-17 10:13 (p 1 of 3) 170513b 17-5063-4392
Fathead Minn	ow 7-d Larval Surviva	and Growt	h Test						Nautilus Environmental
Batch ID: Start Date: Ending Date: Duration:	19-7015-5488 06 Jul-17 12:00 13 Jul-17 13:15 7d 1h	Test Type: Protocol: Species: Source:	Growth-Surviv EPA/821/R-02 Pimephales pr Aquatic Biosys	al (7d) 2-013 (2002) romelas stems, CO			Analyst: Diluent: Brine: Age:	Karer Mod-l <24h	h Lee ⊣ard Synthetic Water
Sample ID: Sample Date: Receive Date: Sample Age:	07-6142-9744 19 May-17 11:15 19 May-17 11:15 48d 1h	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx				Client: Project:	WDO	E
Comparison S	Summary	······		· · · · · · · · · · · · · · · · · · ·	· · ·				
Analysis ID	Endpoint	NOEL	LOEL	TOFL	PMSD	TU	Meti	hod	
20-5662-2302 15-9677-8465 09-2509-3875 14-4325-9303 20-7342-9890 17-4909-5625	7d Survival Rate 7d Survival Rate Mean Dry Biomass-mg Mean Dry Biomass-mg Mean Dry Weight-mg Mean Dry Weight-mg	1.3 0 0 0 0.65 0 0.65	2.7 >0 >0 1.3 >0 1.3	1.873 0.9192 0.9192	11.0% NA 10.5% 17.3% 10.5% 14.1%		Stee Wilc Equa Duni Equa Duni	el Many oxon R al Varia nett Mu al Varia nett Mu	One Rank Sum Test ank Sum Two-Sample Test nce t Two-Sample Test Itiple Comparison Test nce t Two-Sample Test Itiple Comparison Test
Point Estimat	e Summary					- ,- · · ·			
Analysis ID	Endpoint	Level	ma/l	95% I CI	95% UCI	тн	Meth	bod	
15-5811-1680	7d Survival Rate	EC50	1 873	1 432	2 451		Trim	mod Sr	pearman Kärber
17-7609-5240	Mean Dry Biomass-mg	IC5 IC10 IC15 IC20 IC25 IC40 IC50	0.06182 0.4949 0.6956 0.7802 0.8691 1.163 1.39	N/A N/A 0.02384 0.6203 0.6962 0.8999 1.032	0.7039 0.846 0.8734 1.022 1.234 1.666 1.844		Line	ar Inter	oolation (ICPIN)
10-2749-7402	Mean Dry Weight-mg	IC5 IC10 IC15 IC20 IC25 IC40 IC50	0.487 0.699 0.8743 1.035 1.189 1.663 2.023	0.2248 0.4793 0.662 0.8283 0.9885 1.463 1.787	0.6587 0.8795 1.065 1.231 1.389 1.878 2.29		Nonl	inear R	egression
Test Acceptab	ility								
Analysis ID	Endpoint	Attrib	ute	Test Stat	TAC Limit	ts	Over	lap	Decision
15-5811-1680 15-9677-8465 20-5662-2302	7d Survival Rate 7d Survival Rate 7d Survival Rate 7d Survival Rate	Contro Contro Contro Contro	ol Resp ol Resp ol Resp ol Resp	1 1 1 1	0.8 - NL 0.8 - NL 0.8 - NL 0.8 - NL		Yes Yes Yes Yes		Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria
09-2509-3875 14-4325-9303	Mean Dry Biomass-mg Mean Dry Biomass-mg Mean Dry Biomass-mg	Contro Contro	l Resp I Resp	0.6433 0.7162 0.6433	0.25 - NL 0.25 - NL		Yes	1	Passes Acceptability Criteria Passes Acceptability Criteria
17-7609-5240	Mean Dry Biomass-mg	Contro	l Resp	0.6433	0.25 - NL 0.25 - NL		Yes Yes	I	-asses Acceptability Criteria Passes Acceptability Criteria
14-4325-9303	Mean Dry Biomass-mg	PMSD PMSD		0.105 0.1729	0.12 - 0.3 0.12 - 0.3		Yes Yes	l I	Below Acceptability Criteria Passes Acceptability Criteria

164 . Jan-11/18 Analyst:<u>KJL</u>QA:_

CETIS S	ummary Repo	rt					Rep Tes	oort Date: st Code:	22 1	Dec-17 10: 70513b 1	13 (p 2 of 3) 7-5063-4392
Fathead M	linnow 7-d Larval Si	urvival an	d Growth T	est					Na	utilus Env	ironmental
7d Surviva	al Rate Summary							· · · ·		·	
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	4	1	1	1	1	1	0	0	0.0%	0.0%
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
0.04		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	2.5%
0.13		4	1	1	1	1	1	0	0	0.0%	0.0%
0.31		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	2.5%
0.65		4	0.975	0.8954	.1	0.9	1	0.025	0.05	5.13%	2.5%
1.3		4	0.775	0.5032	1	0.6	1	0.08539	0.1708	22.04%	22.5%
2.7		4	0.225	0.1454	0.3046	0.2	0.3	0.025	0.05	22.22%	77.5%
Mean Dry	Biomass-mg Summ	ary									
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	4	0.6433	0.5852	0.7013	0.596	0.685	0.01825	0.03651	5.68%	0.0%
0	Negative Control	4	0.7162	0.6221	0.8104	0.636	0.767	0.02959	0.05919	8.26%	-11.35%
0.04		4	0.6155	0.4605	0.7705	0:522	0.713	0.04872	0.09744	15.83%	4.32%
0.13		4	0.5948	0.5126	0.6769	0.542	0.665	0.02582	0.05163	8.68%	7.54%
0.31		4	0.601	0.5131	0.689	0.53	0.665	0.02764	0.05527	9.2%	6.57%
0.65		4	0.5648	0.5188	0.6107	0.54	0.601	0.01445	0.02889	5.12%	12.2%
1.3		4	0.3455	0.1755	0.5155	0.255	0.5	0.05343	0.1069	30.93%	46.29%
2.7		4	0.049	0.03309	0.06491	0.038	0.062	0.004999	0.009999	20.4%	92.38%
Mean Dry N	Neight-mg Summar	у									
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	4	0.6433	0.5852	0.7013	0.596	0.685	0.01825	0.03651	5.68%	0.0%
0	Negative Control	4	0.7162	0.6221	0.8104	0.636	0.767	0.02959	0.05919	8.26%	-11.35%
0.04		4	0.63	0.4996	0.7604	0.542	0.713	0.04099	0.08197	13.01%	2.06%
0.13		4	0.5948	0.5126	0.6769	0.542	0.665	0.02582	0.05163	8.68%	7.54%
0.31		4	0.6157	0.5621	0.6693	0.5889	0.665	0.01684	0.03368	5.47%	4.28%
0.65		4	0.5798	0.5329	0.6268	0.54	0.6033	0.01475	0.0295	5.09%	9.86%
1.3		4	0.4416	0.3611	0.522	0.3812	0.5	0.02528	0.05055	11.45%	31.35%
2.7		4	0.2242	0.1241	0.3243	0.1667	0.31	0.03146	0.06292	28.06%	65.15%

Solvent blank = acetone control

Jan. 11/18 QA:__

CETIS™ v1.8.7.16

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test

Report Date	e:
Test Code:	

22 Dec-17 1	0:13 (p 3 of	3)
170513b	17-5063-43	92

Nautilus Environmental

7d Surviva	l Rate Detail				
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Solvent Blank	1	1	1	1
0	Negative Control	1	1	1	1
0.04		1	1	1	0.9
0.13		1	1	1	1
0.31		1	1	1	0.9
0.65		1	1	0.9	1
1.3		1	0.8	0.7	0.6
2.7		0.2	0.3	0.2	0.2

Mean Dry Biomass-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Solvent Blank	0.685	0.648	0.644	0.596
0	Negative Control	0.754	0.767	0.708	0.636
0.04		0.713	0.685	0.542	0.522
0.13		0.594	0.542	0.665	0.578
0.31		0.603	0.665	0.606	0.53
0.65		0.575	0.54	0.543	0.601
1.3		0.5	0.305	0.322	0.255
2.7		0.04601	0.05	0.038	0.062

Mean Dry Weight-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Solvent Blank	0.685	0.648	0.644	0.596	
0	Negative Control	0.754	0.767	0.708	0.636	
0.04		0.713	0.685	0.542	0.58	
0.13		0.594	0.542	0.665	0.578	
0.31		0.603	0.665	0.606	0.5889	
0.65		0.575	0.54	0.6033	0.601	
1.3		0.5	0.3812	0.46	0.425	
2.7		0.23	0.1667	0.19	0.31	

7d Survival Rate Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Solvent Blank	10/10	10/10	10/10	10/10	
0	Negative Control	10/10	10/10	10/10	10/10	
0.04		10/10	10/10	10/10	9/10	
0.13		10/10	10/10	10/10	10/10	
0.31		10/10	10/10	10/10	9/10	
0.65		10/10	10/10	9/10	10/10	
1.3		10/10	8/10	7/10	6/10	
2.7		2/10	3/10	2/10	2/10	

solvent blank = acetone control

ЭGи Analyst:_____ QA: Tan 11/18
CETIS Analy	tical Repo	ort					Rep Test	ort Date: Code:	22	Dec-17 1 170513b	10:08 (p 1 of 2 17-5063-4392
Fathead Minnow	7-d Larval S	urvival ar	d Growt	h Test					N	autilus E	nvironmental
Analysis ID: 18 Analyzed: 22	5-5811-1680 2 Dec-17 10:0	En)8 An	dpoint: alysis:	7d Survival Ra Trimmed Spea	ate arman-Kärb	per	CET	IS Version: cial Results	CETISv [.] : Yes	1.8.7	<u></u>
Batch ID: 19	9-7015-5488	Те	st Type:	Growth-Surviv	al (7d)		Ana	lyst: Kar	en Lee		
Start Date: 06	5 Jul-17 12:00	Pr	otocol:	EPA/821/R-02	-013 (2002)	Dilu	ent: Moo	I-Hard Synt	hetic Wat	ter
Ending Date: 13	3 Jul-17 13:15	5 Sp	ecies:	Pimephales pr	omelas		Brin	e:			
Duration: 70	1 1h	So	urce:	Aquatic Biosys	stems, CO		Age	: <24	h		
Sample ID: 07	7-6142-9744	Co	de:	2D627EF0			Clie	nt: WD	OE		
Sample Date: 19	May-17 11:1	5 Ma	terial:	Diesel			Proj	ect:			
Receive Date: 19	9 May-17 11:1	5 So	urce:	WDOE							
Sample Age: 48	3a 1n	Sta	tion:	NWTPH-Dx				· · · · · · · · · · · · · · · · · · ·	<u> </u>		
Trimmed Spearm	an-Kärber E	stimates									
Inreshold Option		nreshold	Trim	Mu	Sigma	····	EC50	95% LCL	95% UCL	•	
			22.50	% 0.2727	0.05839		1.873	1.432	2.451		
Test Acceptabilit	y Criteria										
Attribute	Test Stat	TAC Lim	its	Overlap	Decisio	n ·					
Control Resp	1	0.8 - NL		Yes	Passes	Acceptability	Criteria				
7d Survival Rate	Summary				Calc	ulated Varia	ate(A/B)				
C-mg/L Cont	trol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	в
0 Solve	ent Blank	4	1	1	1	0	0	0.0%	0.0%	40	40
0.04		4	0.975	0.9	1	0.025	0.05	5.13%	2.5%	39	40
0.13		4	1	1	1	0	0	0.0%	0.0%	40	40
0.51		4	0.975	0.9	1	0.025	0.05	5.13%	2.5%	39	40
1.3		4 1	0.975	0.9	1	0.025	0.05	5.13%	2.5%	39	40
2.7		4	0.225	0.0	0.3	0.06539	0.1708	22.04%	22.5% 77.5%	31	40 40
7d Survival Rate	Detail										+0
C-mg/L Cont	rol Type	Rep 1	Rep 2	Rep 3	Rep 4						
0 Solve	ent Blank	1	1	1	1						
0.04		1	1	1	0.9						
0.13		1	1	1	1						
0.31		1	1	1	0.9						
0.65		1	1	0.9	1						
1.3		1	0.8	0.7	0.6						
2.7		0.2	0.3	0.2	0.2						
7d Survival Rate	Binomials										
C-mg/L Co	ntrol Type	Rep 1	Rep 2	Rep 3	Rep 4						
0 Sol	vent Blank	10/10	10/10	10/10	10/10				·····		
0 Neg	gative Control	10/10	10/10	10/10	10/10						
0.04		10/10	10/10	10/10	9/10						
0.13		10/10	10/10	10/10	10/10						
0.31		10/10	10/10	10/10	9/10						
0.65		10/10	10/10	9/10	10/10	÷					
1.3		10/10	8/10	7/10	6/10						
2.7		2/10	3/10	2/10	2/10						
_ 1		k .									
solver	it blav	nk:	aleta	one cont	nol						

QA: Jan. 9/18

CETIS Ana	alytical Report			Report Date: Test Code:	22 Dec-17 10:08 (p 2 of 2) 170513b 17-5063-4392
Fathead Minn	now 7-d Larval Survi	val and Grow	th Test		Nautilus Environmental
Analysis ID: Analyzed:	15-5811-1680 22 Dec-17 10:08	Endpoint: Analysis:	7d Survival Rate Trimmed Spearman-Kärber	CETIS Version: Official Results:	CETISv1.8.7 Yes
Graphics					
0.3		15 20			

نـــــا 3.0

2.5

2.0

0.5

1.5 C-mg/L

1.0



Report Date:11 JaTest Code:170

Fathead Minn	ow 7-0	I Larval Si	urviva	I and Growt	h Tes	st						Nau	ıtilus Envi	ronmental
Analysis ID:	20-56	62-2302		Endpoint:	7d S	urvival Rate	;			CETI	S Versior	: CETISv1.	8.7	
Analyzed:	22 D	ec-17 10:1	2	Analysis:	Non	parametric-(Control	vs Ti	reatments	Offic	ial Result	s: Yes		
Batch ID:	19-70)15-5488		Test Type:	Grov	wth-Survival	(7d)			Anal	yst: Ka	iren Lee		
Start Date:	06 Ju	ıl-17 12:00		Protocol:	EPA	/821/R-02-0	13 (200)2)		Dilue	ent: Mo	od-Hard Synth	etic Water	
Ending Date:	13 Ju	ıl-17 13:15		Species:	Pime	ephales pro	melas			Brine	e:			
Duration:	7d 1	h		Source:	Aqu	atic Biosyste	ems, CO	2		Age:	<2	4h		
Sample ID:	07-61	142-9744		Code:	2D6	27EF0	,			Clier	nt: W	DOE		
Sample Date:	19 M	ay-17 11:1	5	Material:	Dies	el				Proje	ect:			
Receive Date:	19 M	ay-17 11:1	5 ·	Source:	WD	ЭE							•	
Sample Age:	48d	1h		Station:	NW	TPH-Dx								
Data Transfor	m		Zeta	Alt H	ур	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)		NA	C > T		NA	NA			11.0%	1.3	2.7	1.873	
Steel Many-O	ne Rai	nk Sum Te	st											
Control	vs	C-mg/L		Test	Stat	Critical	Ties	DF	P-Value	Р-Туре	Decisio	n(α:5%)		
Solvent Blank		0.04		16		10	1	6	0.6451	Asymp	Non-Sig	nificant Effect		
,		0.13		18		10	1	6	0.8571	Asymp	Non-Sig	nificant Effect		
		0.31		16		10	1	6	0.6451	Asymp	Non-Sig	nificant Effect		
		0.65		16		10	1	6	0.6451	Asymp	Non-Sig	nificant Effect		
		1.3		12		10	1	6	0.1598	Asymp	Non-Sig	nificant Effect		
		2.7*		10		10	0	6	0.0480	Asymp	Significa			
Test Acceptal	bility C	riteria												
Attribute		Test Stat	TAC	Limits		Overlap	Decis	ion						
Control Resp		1	0.8 -	NL		Yes	Passe	s Ac	ceptability	Criteria				
ANOVA Table	•													
Source		Sum Squa	ares	Mean	Squ	are	DF		F Stat	P-Value	Decisio	n(α:5%)		
Between		2.744149		0.457	3582		6		42.71	<0.0001	Significa	ant Effect		
Error		0.2248609) ¹ .	0.010	7076	6	21		_					
Total		2.96901					27		•			·		
Distributional	l Tests	÷ -												
Attribute		Test				Test Stat	Critica	al	P-Value	Decision	(α:1%)			
Variances		Mod Leve	ne Eq	uality of Vari	ance	1.879	3.812		0.1320	Equal'Var	iances			
Variances		Levene E	quality	of Variance		3.511	3.812		0.0145	Equal Var	iances			
Distribution		Shapiro-V	Vilk W	Normality		0.8258	0.8975	5	0.0003	Non-norm	al Distribu	tion		
7d Survival R	ate Su	mmary							• •					
C-mg/L	Cont	ol Type	Cou	nt Mean	I	95% LCL	95% U	ICL	Median	Min	Max	Std Err	CV%	%Effect
0	Solve	nt Blank	4	1		1	1		1	1	1	0	0.0%	0.0%
0.04			4	0.975	i	0.8954	1		1	0.9	1	0.025	5.13%	2.5%
0.13			4	1		1	1		1	1	1	0	0.0%	0.0%
0.31			4	0.975	i	0.8954	1		1.	0.9	1	0.025	5.13%	2.5%
0.65			4	0.975	i	0.8954	1		1	0.9	1	0.025	5.13%	2.5%
1.3			4	0.775)	0.5032	1		0.75	0.6	1	0.08539	22.04%	22.5%
<u> </u>			4	0.225)	0.1454	0.3046	0	0.2	0.2	0.3	0.025	22.22%	//.5%
Angular (Corr	rected	Transfor	ned S	ummary										
C-mg/L	Cont	rol Type	Cou	nt Mean	1	95% LCL	95% L	ICL	Median	Min	Max	Std Err	CV%	%Effect
0	Solve	nt Blank	4	1.412		1.412	1.412		1.412	1.412	1.412	0	0.0%	0.0%
0.04			4	1.371		1.242	1.501		1.412	1.249	1.412	0.04074	5.94%	2.89%
0.13			4	1.412		1.412	1.412		1.412	1.412	1.412	0	0.0%	0.0%
0.31			4	1.371		1.242	1.501		1.412	1.249	1.412	0.04074	5.94%	2.89%
1100			4	1.371		1.242	1.501		1.412	1.249	1.412	0.04074	5.94%	2.89%

.

4

4

1.099

0.4926

0.7374

0.4004

1.3

2.7

1.049

0.4636

0.8861

0.4636

1.412

0.5796

1.461

0.5849

Analyst: <u>ÉMM</u>

0.1137

0.029

20.68% 22.16%

11.77% 65.11%

QA:

Jan- 11/18

CETIS Ana	alytical Repo	rt							Report Date: Test Code:		11 Jan-18 09:35 (p 2 of 2) 170513b 17-5063-4392
Fathead Minn	now 7-d Larval Su	irvival an	d Growth ⁻	Test							Nautilus Environmental
Analysis ID: Analyzed:	20-5662-2302 22 Dec-17 10:12	En 2 An	dpoint: 7 alysis: N	d Survival Ra lonparametric	te -Control v	s Trea	atmen	ts	CETIS Version: Official Results:	CET Yes	ISv1.8.7
7d Survival R	ate Detail										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						4
0	Solvent Blank	1	1	1	1				······································		
0.04		1	1	1	0.9						
0.13		1	1	1	1						
0.31		1	1	1	0.9						
0.65		1	1	0.9	. 1						
1.3		1	0.8	0.7	0.6						
2.7		0.2	0.3	0.2	0.2						
Angular (Cor	rected) Transform	ned Detai	1								
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4					_	
0 `	Solvent Blank	1.412	1.412	1.412	1.412						
0.04		1.412	1.412	1.412	1.249						
0.13		1.412	1.412	1.412	1.412						
0.31		1.412	1.412	1.412	1.249						
0.65		1.412	1.412	1.249	1.412		1				
1.3		1.412	1.107	0.9912	0.8861						
2.7		0.4636	0.5796	0.4636	0.4636						
7d Survival F	ate Binomials	,									
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Solvent Blank	10/10	10/10	10/10	10/10						
0	Negative Control	10/10	10/10	10/10	10/10						
0.04		10/10	10/10	10/10	9/10						
0.13		10/10	10/10	10/10	10/10						
0.31		10/10	10/10	10/10	9/10						
0.65		10/10	10/10	9/10	10/10						,
1.3		10/10	8/10	7/10	6/10						,
2.7		2/10	3/10	2/10	2/10						·.
Graphics	N										
1.0						Centered Corr. Angle	3.1E-01 2.3E-01 1.6E-01 7.8E-02 		00000000 000 000 000		•

0\$

0.13

0.31

C-mg/L

0.65

1.3

2.7

0.04

Analyst: <u>Analyst:</u> QA:_____

0.5 1.0 1.5 2.0

-1.5 -1.0 -0.5 0.0

___] 2.5

> JGL-1 an-11/18

CETIS Ana	alytical Repo	ort						Rep	ort Date:	22	Dec-17 10	D:11 (p 1 of 2)
								Tes	t Code:		170513b	17-5063-4392
Fathead Minr	ow 7-d Larval S	urvival	and Growt	h Test						N	autilus Er	nvironmental
Analysis ID:	15-9677-8465	0	Endpoint:	7d Survival Ra	ate		- ·	CET	'IS Versio	n: CETISv	1.8.7	
Analyzeu.	22 Dec-17 10.1	0	Allalysis.	Nonparametric	c-1wo Sar	npi	e	Um	cial Resul	ts: res		
Batch ID:	19-7015-5488		Test Type:	Growth-Surviv	al (7d)			Ana	lyst: K	aren Lee		
Start Date:	13 Jul 17 12:00		Protocol:	EPA/821/R-02	2-013 (200)2)		Dilu	ent: M	lod-Hard Syn	thetic Wate	er
Ending Date:	7d 1h		Species:	Pimephales pi	romelas			Brir	ie:	0.45		
Duration.	70 m		Source:	Aquatic biosys	stems, CC	, 		Age		24n		
Sample ID:	07-6142-9744		Code:	2D627EF0				Clie	nt: V	/DOE		
Sample Date:	19 May-17 11:1	5	Material:	Diesel			•	Pro	ect:			
Receive Date	: 19 May-17 11:1	5	Source:	WDOE								
Sample Age:	48d 1h		Station:	NWTPH-Dx			•					
Data Transfor	m	Zeta	Alt H	yp Trials	Seed				Test Re	sult		
Angular (Corre	ected)	NA	C > T	NA	NA				Passes	7d survival ra	ate	
Wilcoxon Rai	nk Sum Two-San	nple Te	st	· · · · · · · · · · · · · · · · · · ·	·,							
Control	vs Control		Toet	Stat Critical	Tion	ne		P Turno	Desisia	m(mE9/)		
Solvent Blank	Negative	Control	18	NA	1	6	1 0000	Exact	Non-Sic	nificant Effe		
Test Accepta	bility Criteria				•	<u> </u>						
Attribute	Test Stat	TACI	imite	Overlan	Decisi	<u></u>						
Control Resp	1	0.8 - 1	JI	Yes	Passed			Criteria				
Control Resp	1	0.8 - N	IL.	Yes	Passes	s Ac	ceptability	Criteria				
ANOVA Table												
Source	Sum Saus	roc	Moon	Causan	DE		F 04+4	DValar				
Between	0	163	niean 0	Square	1		F Stat	P-value	Decisio	n(α:5%)		
Error	0		0		6		05540	<0.000 i	Signinca			
Total	0				7		_					
7d Survival R	ate Summary	• • ••							<u> </u>			
C-mg/L	Control Type	Count	Mean	95% LCL	95% U	CI	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	4	1	1	1		1	1	1	0	0.0%	0.0%
0	Negative Control	4	1	1	1		1	1	1	0	0.0%	0.0%
Angular (Corr	ected) Transform	ned Su	mmanı				· · · ·					· · · · · · · · · · · ·
C mail	Control Turns	October 1	ininiary									
	Solvent Blank	Count	Mean	95% LCL	95% 00		Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	4	1.412	1.412	1.412		1.412	1.412	1.412	0	0.0%	0.0%
7d Survival R	ate Detail			1.712	1.412		1.412	1.412	1.412		0.0%	0.0%
C-ma/L	Control Type	Ren 1	Ren 2	Don 3	Pop 1							
0	Solvent Blank	1	1	1	1							
0	Negative Control	1	1	1	1							
Angular (Corr	ected) Transform	ned Det	tail		•							
C-ma/l	Control Type	Don 4	Ban 0	De- A	De 4							
0	Solvent Blank	1 412	1 /12	1 410	1 410		· · ·					
0	Negative Control	1 412	1 <u>4</u> 12	1.412	1.412							
710			1.712	1.712	1.712							
/d Survival Ra	ate Binomials											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
0	Solvent Blank	10/10	10/10	10/10	10/10							
v	Negative Control	10/10	10/10	10/10	10/10							

solvent blank = aletone control

Jou QA: Jan. 9/13

CETIS Ana	alytical Report					Repo Test (rt Date: Code:	22 Dec 1705	-17 10:11 (p 2 of 3 13b 17-5063-439	2) 32
Fathead Minr	ow 7-d Larval Survi	val and Growt	h Test			<u> </u>		Nautil	us Environmenta	ıl
Analysis ID: Analyzed:	15-9677-8465 22 Dec-17 10:10	Endpoint: Analysis:	7d Survival Ra Nonparametric	ite -Two Sample	· · · · ·	CETIS	Version: al Results:	CETISv1.8.7 Yes		
Graphics										
1.0 0.9 0.8	6		•		1.0E+00					
7d Survival Mar 20 90 - 20				Centored Corr. Angle	S.0E-01					
0.4					2.5E-01					
0.1	0N C-1		ōS .	_1	0.0E+00 -0.5	-1.0	0.5 0.0 Rankits	0.5	ایا ۵۰ 1.5	
					•					

Analyst:_____

164 <u>19n. 9</u>/18

QA:

CETIS	6 Ana	lytical Repo	ort						R T	eport Dat est Code:	te: :		22 Dec- 1705	-17 10:09 13b 17-) (p 1 of 2 5063-4392
Fathea	d Minne	ow 7-d Larval S	urvival a	nd Growt	h Test								Nautil	us Envir	onmental
Analysi Analyze	s ID: ed:	17-7609-5240 22 Dec-17 10:0	E1 09 A1	ndpoint: nalysis:	Mean Dry Bio Linear Interpo	mass-mg lation (ICPI	N)		С 0	ETIS Vers fficial Re	sion: sults:	CETI Yes	Sv1.8.7		
Batch I Start Da Ending Duratio	D: ate: Date: n:	19-7015-5488 06 Jul-17 12:00 13 Jul-17 13:15 7d 1h	Te) Pr 5 Sp So	est Type: rotocol: pecies: ource:	Growth-Surviv EPA/821/R-02 Pimephales p Aquatic Biosy	/al (7d) 2-013 (2002 romelas stems, CO)	10.00	A D B A	nalyst: iluent: rine: ge:	Kare Mod- <24h	n Lee Hard S	synthetic	Water	
Sample Sample Receive Sample	Date: Date: Date: Age:	07-6142-9744 19 May-17 11:1 19 May-17 11:1 48d 1h	Co 15 M 15 So St	ode: aterial: ource: tation:	2D627EF0 Diesel WDOE NWTPH-Dx	, ,			C P	lient: roject:	WDC	DE			· · · · · ·
Linear	nterpo	lation Options													
X Trans	form	Y Transform	n Se	ed	Resamples	Exp 95	% CL	Meth	od						
Log(X+*	1)	Linear	17	765519	200	Yes		Two-	Point Int	erpolation					
Test Ac	ceptab	ility Criteria						•					, .		
Attribut	e	Test Stat	TAC Lin	nits	Overlap	Decisio	n								
Control	Resp	0.6433	0.25 - N	L	Yes	Passes	Accepta	ability	Criteria						
Point E	stimate	s		a									· · · · ·		<u></u>
Level	mg/L	95% LCL	95% UC	L											
IC5	0.0618	32 N/A	0.7039											· · · · · · · ·	
IC10	0.4949	9 N/A	0.846												
IC15	0.6956	6 0.02384	0.8734												
IC20	0.7802	2 0.6203	1.022												
1025	0.8691	0.6962	1.234												
1C40 1C50	1.103	0.8999	1.666												
Moan D	n Pion				<u> </u>										
	гу Біоп	lass-mg Summ	ary			C	alculat	ed Var	riate						
0		hvent Blank	Count	Mean	Min	Max	Std	Err	Std De	v CV%		%Effe	ct		
0.04	00	Nent Diank	4	0.645	5 0.596	0.085	0.01	825 970	0.0365	1 5.68	% >0/	0.0%			
0.13			4	0.5948	3 0.522	0.665	0.04	582	0.0974	4 10.00 3 8.690	070 V.	4.32%			
0.31			4	0.601	0.53	0.665	0.02	764	0.0510	7 0.00, 7 0.00,	/0	6 57%			
0.65			4	0.5648	3 0.54	0.601	0:01	445	0.0288	9 5 1 2 9	6	12.2%			
1.3			4	0.3455	0.255	0.5	0.05	343	0.1069	30.93	3%	46.29%	6		
2.7			4	0.049	0.038	0.062	0.00	49 <u>9</u> 9	0.00999	99 20.4%	6	92.38%	6		
Mean D	ry Biom	ass-mg Detail											<u>.</u>		
C-mg/L	Co	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4									
0	So	lvent Blank	0.685	0.648	0.644	0.596	<u> </u>								
0.04			0.713	0.685	0.542	0.522									
0.13			0.594	0.542	0.665	0.578									
0.31			0.603	0.665	0.606	0.53									
0.65			0.575	0.54	0.543	0.601		·							
1.3			0.5	0.305	0.322	0.255									
2.7			0.04601	0.05	0.038	0.062									
	561	ivent bl	ank	≥ ac	etone	contr	اً ا								

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CETIS Ana	lytical Report			Report Date: Test Code:	22 Dec-17 10:09 (p 2 of 2) 170513b 17-5063-4392
Fathead Minr	low 7-d Larval Survi	val and Grow	th Test		Nautilus Environmental
Analysis ID: Analyzed:	17-7609-5240 22 Dec-17 10:09	Endpoint: Analysis:	Mean Dry Biomass-mg Linear Interpolation (ICPIN)	CETIS Version: Official Results:	CETISv1.8.7 Yes



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000-469-187-2

Analyst:_____C)__

Jbu Tan 18 QA:

CETIS Ana	lytical Repo	ort						Repo Test	ort Date: Code:	11 J	lan-18 09:3 70513b 13	35 (p 1 of 2) 7-5063-4392
Fathead Minn	ow 7-d Larval S	urvival	and Growth	Test						Na	utilus Env	ironmental
Analysis ID: Analyzed:	14-4325-9303 22 Dec-17 10:1	E 2 /	Endpoint: M Analysis: P	lean Dry Biom arametric-Con	ass-mg itrol vs Tr	reat	ments	CET	S Version:	CETISv1. : Yes	8.7	
Batch ID:	19-7015-5488	1	Test Type: G	rowth-Surviva	l (7d)			Anal	yst: Kar	en Lee		
Start Date:	06 Jul-17 12:00	F	Protocol: E	PA/821/R-02-0	013 (200)	2)	•	Dilue	ent: Moo	d-Hard Synth	etic Water	
Ending Date:	7d 1h). 3 g	Source: A	mephales pro quatic Biosyst	meias ems CO	,	÷	Ade.	e. <24	h		
Sample ID:	07-6142-9744	(5 1	Code: 2	D627EF0				Clier	nt: VV⊔ oot:	OE		
Sample Date: Receive Date:	19 May-17 11.1	5 6	Naterial. L					FIU				
Sample Age:	48d 1h	° (Station: N	WTPH-Dx					1			
Data Transfor	m	Zeta	Alt Hyr	Trials	Seed			PMSD	NOFL	LOFL	TOEL	ти
Untransformed	1	NA	C > T	NA	NA		<u>.</u>	17.3%	0.65	1.3	0.9192	
Dunnett Multi	ple Comparison	Test				·						
Control	vs C-ma/L		Test St	at Critical	MSD	DF	P-Value	P-Type	Decision	(α:5%)		
Solvent Blank	0.04		0.6109	2.448	0.111	6	0.6325	CDF	Non-Sign	ificant Effect		
	0.13		1.068	2.448	0.111	6	0.4233	CDF	Non-Sign	ificant Effect		
	0.31		0.9299	2.448	0.111	6	0.4860	CDF	Non-Sign	ificant Effect		
	0.65		1.728	2.448	0.111	6	0.1783	CDF	Non-Sign	ificant Effect		
	1.3*		6.553	2.448	0.111	6	<0.0001	CDF	Significar	t Effect		
	2.7*		13.08	2.448	0.111	6	<0.0001	CDF	Significar	t Effect		
Test Acceptal	bility Criteria											
Attribute	Test Stat	TAC L	imits	Overlap	Decisio	on						•
Control Resp	0.6433	0.25 -	NL	Yes	Passes	s Ac	ceptability	Criteria				
PMSD	0.1729	0.12 -	0.3	Yes	Passes	s Ac	ceptability	Criteria				
ANOVA Table	l.											
Source	Sum Squa	ares	Mean S	quare	DF		F Stat	P-Value	Decision	(α:5%)		
Between	1.13376	70	0.18896	050	6		45.77	<0.0001	Significar	t Effect		
Total	1 22046	6	0.00412	856	21							
Diotributional				· · · · ·								
Attributo	Toot			Toot Stat	Critical		D Value	Decision	(au 49/)			
Variances	Bartlett F	quality c	f Variance	14.21	16.81		0.0274	Equal Var	(a:1%)			
Distribution	Shapiro-V	Wilk W N	formality	0.9571	0.8975		0.2963	Normal D	istribution			
Mean Dry Bio	mass-mg Summ	narv									<u></u>	
C-ma/L	Control Type	Count	Mean	95% LCL	95% U(CI.	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	4	0.6433	0.5852	0.7013	-	0.646	0.596	0.685	0.01825	5.68%	0.0%
0.04		4	0.6155	0.4605	0.7705		0.6135	0.522	0.713	0.04872	15.83%	4.32%
0.13		4	0.5948	0.5126	0.6769		0.586	0.542	0.665	0.02582	8.68%	7.54%
0.31		4	0.601	0.5131	0.689		0.6045	0.53	0.665	0.02764	9.2%	6.57%
0.65		4	0.5648	0.5188	0.6107		0.559	0.54	0.601	0.01445	5.12%	12.2%
1.3		4	0.3455	0.1755	0.5155		0.3135	0.255	0.5	0.05343	30.93%	46.29%
2.7		4	0.049	0.03309	0.0649	1	0.048	0.038	0.062	0.004999	20.4%	92.38%

Mean Dry Biomass-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Solvent Blank	0.685	0.648	0.644	0.596	· · ·			•
0.04		0.713	0.685	0.542	0.522				
0.13		0.594	0.542	0.665	0.578		-		
0.31		0.603	0.665	0.606	0.53				
0.65		0.575	0.54	0.543	0.601				
1.3		0.5	0.305	0.322	0.255				
2.7		0.04601	0.05	0.038	0.062	·			В. ф
000-469-187-2	2				CETIS™ v	1.8.7.16	. 1	Analyst: <u>EMM</u>	JGh QA: <u>1an</u> 11/18

CETIS Ana	lytical Report			• .	Report Date: Test Code:	11 Jan-18 09:36 (p 2 of 2) 170513b 17-5063-4392
Fathead Minn	ow 7-d Larval Surv	ival and Grow	th Test	····		Nautilus Environmental
Analysis ID: Analyzed:	14-4325-9303 22 Dec-17 10:12	Endpoint: Analysis:	Mean Dry Biomass-mg Parametric-Control vs Treatme	nts	CETIS Version: Official Results:	CETISv1.8.7 Yes
Graphics						
0.8 0.7 0.7 0.7 0.7 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5			Contract Con	1.2E-01		e e e e e eeeee

-0-

2.7

1,3

0.65

0,13

0.31

C-mg/L

0,04

-7.7E-02

-1.2E-01

-2.5

-2,0 -1.5

0.0 0.5

Rankit

-1.0 -0.5

Analyst: EMM C



2,5

1.5 2,0

1.0

0.2

0.1

. 0.0

0 S

CETIS™ v1.8.7.16

CETIS And	alytical Rep	ort				·	Rep Tes	ort Date: t Code:	2	2 Dec-17 10 170513b):11 (p 1 of 2) 17-5063-4392
Fathead Mini	now 7-d Larval S	Surviva	I and Grow	th Test					· ·	Nautilus En	vironmental
Analysis ID: Analyzed:	09-2509-3875 22 Dec-17 10:	11	Endpoint: Analysis:	Mean Dry Bior Parametric-Tw	nass-mg o Sample		CET	TIS Versio cial Resul	n: CETIS Its: Yes	v1.8.7	
Batch ID: Start Date: Ending Date: Duration:	19-7015-5488 06 Jul-17 12:00 13 Jul-17 13:18 7d 1h) 5	Test Type: Protocol: Species: Source:	Growth-Surviv EPA/821/R-02 Pimephales pr Aquatic Biosys	al (7d) -013 (2002) omelas items_CO		Ana Dilu Brir Age	llyst: K lent: M ne:	aren Lee lod-Hard Syl 24h	nthetic Wate	er
Sample ID:	07-6142-9744		Code:	2D627EF0			Clie	nt: V	VDOE		
Sample Date Receive Date Sample Age:	: 19 May-17 11: : 19 May-17 11: 48d 1h	15 15	Material: Source: Station:	Diesel WDOE NWTPH-Dx		·	Proj	ject:			
Data Transfo	rm	Zeta	Alt H	yp Trials	Seed		PMSD	Test Re	esult		
Untransforme	d	NA	C > T	NA	NA		10.5%	Passes	mean dry b	iomass-mg	
Equal Varian	ce t Two-Sample	e Test		14.1	••••••••••••••••••••••••••••••••••••••						
Control	vs Control		Test	Stat Critical	MSD D	F P-Value	P-Type	Decisio	on(α:5%)		
Solvent Blank	Negative	Contro	l -2.099	9 1.943	0.068 6	0.9597	CDF	Non-Sig	gnificant Effe	ect	
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC	Limits	Overlap	Decision						
Control Resp	0.6433	0.25 -	- NL	Yes	Passes A	cceptability	Criteria				
Control Resp	0.7162	0.25 -	- NL	Yes	Passes A	cceptability	Criteria				
PMSD	0.105	0.12 -	0.3	Yes	Below Ac	ceptability C	riteria				
ANOVA Table	,										
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decisio	on(α:5%)		
Between	0.0106565	54	0.010	65654	1	4.407	0.0805	Non-Sig	nificant Effe	ct	
Error	0.0145076	5	0.002	417933	6	<u> </u>					
I otal	0.0251641	4			7						
Distributional	Tests									· ·	·····
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a·1%)			
Variances	Variance	Ratio F		2.628	47.47	0 4485	Equal Va	riances			
Distribution	Shapiro-V	Vilk W I	Normality	0.9227	0.6451	0:4518	Normal D	istribution			
Mean Dry Bio	mass-mg Summ	ary								±	
C-mg/L	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	4	0.643	3 0.5852	0.7013	0.646	0.596	0.685	0.01825	5.68%	0.0%
0	Negative Contro	14	0.7162	2 0.6221	0.8104	0.731	0.636	0.767	0.02959	8.26%	-11.35%
Mean Dry Bio	mass-mg Detail				we /						
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Solvent Blank	0.685	0.648	0.644	0.596						·
0	Negative Control	0.754	0.767	0.708	0.636						

Solvent blank = acetone control

Analyst: KJV

Ju Yan

QA:

9/18



000-469-187-2

CETIS™ v1.8.7.16

Analyst: 143

JGL 1an.

QA:

Report Date: Test Code:

Fathead	l Minnov	v 7-d Larval S	urvival ar	d Growth	ı Test					Nautil	us Environmental
Analysis	s ID: 1	0-2749-7402	En	dpoint:	Mean Dry Weig	ght-mg		CET	IS Versio	n: CETISv1.8.7	
Analyze	d: 2	22 Dec-17 10:0	09 A n	alysis:	Nonlinear Regr	ression		Offi	cial Resul	ts: Yes	
Batch ID): 1	9-7015-5488	Te	st Type:	Growth-Surviva	al (7d)		Ana	lyst: Ka	aren Lee	
Start Da	ite: ()6 Jul-17 12:00) Pr	otocol:	EPA/821/R-02-	013 (2002)		Dilu	ient: M	od-Hard Synthetic	: Water
Ending	Date: 1	13 Jul-17 13:15 7d 1h	o Sp	ecies:	Pimephales pro	omelas		Brir	ne:	24h	
Comple								Aye			
Sample	Date: 1	9 May-17 11	_CC 15 Ma	de: terial				Clie	nt: VV	DOE	
Receive	Date: 1	9 May-17 11.	15 No		WDOF			FIU	1001.		
Sample	Age: 4	18d 1h	St	ation:	NWTPH-Dx						
Non-Lin	ear Reg	ression Optic	ons	TRANSLESS			· · · · ·				
Model F	unction					X Trans	form Y Tr	ansform \	Neighting	Function	PTBS Function
3P Log-L	_ogistic I	EV [Y=A/(1+(X	/D)^C)]			None	Non	e I	Normal [W=	=1]	Off [Y*=Y]
Regress	ion Sur	nmary									
Iters	Log LL	AICc	BIC	Adj R	2 Optimize	F Stat	Critical	P-Value	Decisio	n(α:5%)	
5	71.4	-135.8	-132.8	0.8889	Yes	0.4628	2.84	0.7622	Non-Sig	nificant Lack of Fi	it
Point Es	stimates						·····.				
Level	mg/L	95% LCL	95% UC	L							
IC5	0.487	0.2248	0.6587								
IC10	0.699	0.4793	0.8795								
IC15	0.8743	0.662	1.065								
IC20	1.035	0.8283	1.231								
IC25	1.189	0.9885	1.389								
1040	1.663	1.463	1.878					4.			
	2.025	1.707	2.29					· · · · ·			
Regress	ion Para	ameters									
Paramet	er	Estimate	Std Erro	r 95% L(CL 95% UCL	t Stat	P-Value	Decision	(α:5%)		
A C		0.6259	0.01335	0.5997	0.652	46.88	<0.0001	Significar	nt Paramete	er	
D		2.008	0.3089	1.462	2.673	6.693	<0.0001	Significar	nt Paramete	ər	
		2.020	0.1372	1.754	2.292	14.75	<0.0001	Significar	it Paramete	er	
ANOVA	lable	• •		-							
Source		Sum Squa	ares Me	an Squar	e DF	F Stat	P-Value	Decision	(α:5%)		
	- 14	0.54/49//	0.5	4/49/7	1	218	<0.0001	Significar	nt		
Pure Frm	n nr	0.0050676		012719	4	0.4628	0.7622	Non-Sign	ificant		
Residual		0.0627985	5 0.0 5 0.0	025119	21						
Residua	Analys	is				a					
Attribute)	Method			Toet Stat	Critical	P.Volue	Desisi	(~~===/)		
Variance	s	Bartlett En	uality of V	ariance	4 265	12 59	0.6409	Found Vo	iances	,	
		Mod Lever	ne Equality	of Varian	ce 1.606	2 573	0.1947	Equal Va	iances		
Distributi	on	Shapiro-W	ilk W Norr	nalitv	0 9717	0.9264	0.6256	Normal D	istribution		
		Anderson-	Darling A2	Normality	0.2537	2.492	0.7589	Normal D	istribution	÷	
Mean Dr	y Weigh	t-mg Summa	ry			Cal	culated Va	riate			
C-mg/L	Cor	trol Type	Count	Mean	Min	Max	Std Frr	Std Dev	CV%	%Effect	
0	Solv	ent Blank	4	0.6433	0.596	0.685	0.01825	0.03651	5 68%		
0.04			4	0.63	0.542	0.713	0.04099	0.08197	13 01%	2.06%	
0.13			4	0.5948	0.542	0.665	0.02582	0.05163	8 68%	7 54%	
0.31			4	0.6157	0.5889	0.665	0.01684	0.03368	5 47%	4 28%	
0.65			4	0.5798	0.54	0.6033	0:01475	0.0295	5.09%	9.86%	
1.3			4	0.4416	0.3812	0.5	0.02528	0.05055	11 45%	31.35%	
2.7			4	0.2242	0.1667	0.31	0.03146	0.06292	28.06%	65 15%	
						···- •				00.1070	<u>J</u> Gu
000-469-1	87-2				C	ETIS™ v1.8	3.7.16			Analyst: <u>F</u> JL	QA:

CETIS An	alytical Rep	ort					Report Date: Test Code:	22 Dec-17 10:09 (p 2 of 2) 170513b 17-5063-4392
Fathead Mir	now 7-d Larval	Survival a	and Growth T	est				Nautilus Environmental
Analysis ID: Analyzed:	10-2749-7402 22 Dec-17 10	E:09	Endpoint: Me Analysis: No	ean Dry Wei onlinear Reg	ght-mg ression		CETIS Version: Official Results:	CETISv1.8.7 Yes
Mean Dry W	eight-mg Detail						***************************************	, den bredente - ,
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4			
0	Solvent Blank	0.685	0.648	0.644	0.596			and a second and a s
0.04		0.713	0.685	0.542	0.58			
0.13		0.594	0.542	0.665	0.578			
0.31		0.603	0.665	0.606	0.5889			
0.65		0.575	0.54	0.6033	0.601			
1.3		0.5	0.3812	0.46	0.425			
2.7		0.23	0.1667	0.19	0.31			
Graphics				3P Log-Log	gistic EV [Y=	A/(1+(X/D)^C)]		
°.8 E						^{0.10} F		/



Solvent blank = aletone control



JGa Jan-9/18 QA:_

Analyst: HJL

Report Date: Test Code:

Code:	17	001

Fathead Minno	ow 7-d Larval Su	urvival	and Growt	h Test	•			N	autilus Envi	ronmenta
Analysis ID: Analyzed:	17-4909-5625 22 Dec-17 10:1	E 2	Endpoint: Analysis:	Mean Dry W Parametric-C	eight-mg Control vs Treatments	CET	'IS Version cial Result	: CETISv s: Yes	1.8.7	
Batch ID: Start Date: Ending Date: Duration:	19-7015-5488 06 Jul-17 12:00 13 Jul-17 13:15 7d 1h	T I S S	Test Type: Protocol: Species: Source:	Growth-Surv EPA/821/R-0 Pimephales Aquatic Bios	ival (7d))2-013 (2002) promelas ystems, CO	Ana Dilu Brin Age	lyst: Ka lent: Mo ne: : <2	ren Lee od-Hard Syn 4h	thetic Water	
Sample ID: Sample Date: Receive Date: Sample Age:	07-6142-9744 19 May-17 11:1 19 May-17 11:1 48d 1h	5 I 5 S	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx		Clie Proj	nt: Wi ject:	DOE		
Data Transform	n	Zeta NA	Alt ∙ H C > T	yp Trials NA	Seed NA	PMSD 14.1%	NOEL 0.65	LOEL 1.3	TOEL 0.9192	TU

Dunnett Multiple Comparison Test

Control	vs	C-mg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Solvent Blank		0.04	0.3576	2.448	0.091	6	0.7388	CDF	Non-Significant Effect
		0.13	1.308	2.448	0.091	6	0.3207	CDF	Non-Significant Effect
		0.31	0.7426	2.448	0.091	6	0.5727	CDF	Non-Significant Effect
		0.65	1.711	2.448	0.091	6	0.1830	CDF	Non-Significant Effect
		1.3*	5.441	2.448	0.091	6	<0.0001	CDF	Significant Effect
		2.7*	11.31	2.448	0.091	6	<0.0001	CDF	Significant Effect
ANOVA Table									
Source		Sum Squares	Mean Squ	lare	DF		F Stat	P-Value	Decision(a:5%)
Between		0.5525855	0.0920975	68	6		33.51	<0.0001	Significant Effect
Error		0.05771077	0.0027481	32	21				
Total		0.6102962			27				

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.265	16.81	0.6409	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.973	0.8975	0.6625	Normal Distribution

Mean Dry Weight-mg Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Мах	Std Err	CV%	%Effect
0	Solvent Blank	4	0.6433	0.5852	0.7013	0.646	0.596	0.685	0.01825	5.68%	0.0%
0.04		4	0.63	0.4996	0.7604	0.6325	0.542	0.713	0.04099	13.01%	2.06%
0.13	· .	4	0.5948	0.5126	0.6769	0.586	0.542	0.665	0.02582	8.68%	7.54%
0.31		4	0.6157	0.5621	0.6693	0.6045	0.5889	0.665	0.01684	5.47%	4.28%
0.65		4	0.5798	0.5329	0.6268	0.588	0.54	0.6033	0.01475	5.09%	9.86%
1.3		4	0.4416	0.3611	0.522	0.4425	0.3812	0.5	0.02528	11.45%	31.35%
2.7		4	0.2242	0.1241	0.3243	0.21	0.1667	0.31	0.03146	28.06%	65.15%

Mean Dry Weight-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Solvent Blank	0.685	0.648	0.644	0.596
0.04		0.713	0.685	0.542	0.58
0.13		0.594	0.542	0.665	0.578
0.31		0.603	0.665	0.606	0.5889
0.65		0.575	0.54	0.6033	0.601
1.3		0.5	0.3812	0.46	0.425
2.7		0.23	0.1667	0.19	0.31

A Larval Survival and Growth Test Nautilus Environmental 4909-5625 Endpoint: Mean Dry Weight-mg CETIS Version: CETISV1.8.7. Dec-17 10:12 Analysis: Parametric-Control vs Treatments Official Results: Yes	• · · · · · · · · · · · · · · · · · · ·						Test Code:	170513b	17-5063-4392	
4909-5625 Endpoint: Mean Dry Weight-mg Dec-17 10:12 Analysis: Parametric-Control vs Treatments CETIS Version: CETISV1.8.7 Official Results: Yes	Fathead Minn	ow 7-d Larval Surv	vival and Growt	h Test	•		Nautilus Envi			
Image: state of the state	Analysis ID: Analyzed:	17-4909-5625 22 Dec-17 10:12	Endpoint: Analysis:	Mean Dry Weig Parametric-Col	ght-mg ntrol vs Treatr	nents	CETIS Version: Official Results	CETISv1.8.7 : Yes		
Image: state in the state i	Graphics									
2262 0.04 0.13 0.31 0.65 1.3 2.7 c-mg/L C-mg/L C-mg/L	0.8			Kojeci Vali	Contered Contered	8.85-02 6.65-02 4.45-02 2.25-02		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
-8.8€2	0.2					-4.45-02				
	0.0	5 0.04 0.13	0.31 0.65 C-mg/L	1.3 2.7		-8.82-02 -2.5 -2.0	-1.5 -1.0 -0.5 0.0 Rankits	0.5 1.6 1.5 2.0	2.5	
						• •				
				•		•				
								,	·	





CETIS Analytical Report	
Fathead Minnow 7-d Larval Survival and Growth Test	

22 Dec-17 10:11 (p 1 of 1) 170513b | 17-5063-4392

Report Date:

Test Code:

Fathead Minn	iow 7-d Larval S	urviva	l and Growt	h Tes	t							Na	utilus En	vironmental
Analysis ID:	20-7342-9890		Endpoint:	Mea	n Dry Weig	ght-mg			CETI	S Versi	on: C	ETISv1	.8.7	
Analyzed:	22 Dec-17 10:1	11	Analysis:	Para	metric-Two	o Sample			Official Results: Yes					
Batch ID:	19-7015-5488		Test Type:	Grov	vth-Surviva	ıl (7d)	-		Analy	yst:				
Start Date:	06 Jul-17 12:00)	Protocol:	EPA	/821/R-02-	013 (2002)			Dilue	nt:	Mod-Har	d Synth	netic Wate	r
Ending Date:	13 Jul-17 13:15	5	Species:	Pime	phales pro	omelas			Brine:					
Duration:	7d 1h		Source:	Aqua	atic Biosyst	tems, CO			Age: <24h					
Sample ID:	07-6142-9744		Code:	2D62	27EF0				Client: WDOE					
Sample Date:	19 May-17 11:1	15	Material:	Dies	el				Project:					
Receive Date:	19 May-17 11:1	15	Source:	WDC	DE									
Sample Age:	48d 1h		Station:	NWT	PH-Dx									
Data Transfor	m	Zeta	Alt H	ур	Trials	Seed		PMS	D	Test R	Result			
Untransformed	l	NA	C > T		NA	NA		10.5	%	Passe	s mean	dry wei	ght-mg	
Equal Variance	e t Two-Sample	e Test												
Control	vs Control		Test S	Stat	Critical	MSD DF	P-Value	P-Ty	pe	Decisi	ion(α:5%	6)		
Solvent Blank	Negative	Control	-2.099)	1.943	0.068 6	0.9597	CDF	DF Non-Significant Effect				•	
ANOVA Table														
Source	Sum Squ	ares	Mean	Squa	re	DF	F Stat	P-Va	lue	Decisi	ion(α:5%	6)		
Between	0.0106565	54	0.0106	65654		1	4.407	0.080)5	Non-S	ignifican	t Effect		
Error	0.0145076	3	0.0024	41793	3	6					0			
Total	0.0251641	4	_			7								
Distributional	Tests													
Attribute	Test				Test Stat	Critical	P-Value	Decis	sion(d	a:1%)				
Variances	Variance	Ratio F	•		2.628	47.47	0.4485	Equa	l Varia	ances				
Distribution	Shapiro-V	Vilk W I	Normality		0.9227	0.6451	0.4518	Norm	al Dis	stribution	n			
Mean Dry Wei	ght-mg Summa	ry						,						
C-mg/L	Control Type	Coun	t Mean	!	95% LCL	95% UCL	Median	Min		Мах	Std	Err	CV%	%Effect
0	Solvent Blank	4	0.6433	3	0.5852	0.7013	0.646	0.596	;	0.685	0.0	1825	5.68%	0.0%
0	Negative Contro	4	0.7162	2 (0.6221	0.8104	0.731	0.636	5	0.767	0.0	2959	8.26%	-11.35%
Mean Dry Wei	ght-mg Detail													
C-mg/L	Control Type	Rep 1	Rep 2	I	Rep 3	Rep 4								
0	Solvent Blank	0.685	0.648	(0.644	0.596								
0	Negative Control	0.754	0.767	(0.708	0.636								
Graphics	·													



Analyst: Kov

QA



APPENDIX B - Topsmelt Toxicity Test Data

Topsmelt Test Summary Sheet

Client:	WDOE	Start Date & Time:	July 6, 2017 @ 1500h	
Work Order No.:	170515b	Test Species:	Atherinops affinis	
Sample Information	:			
Sample ID:	NWTPH-Dx		а 	
Sample Date:	19-May-17	-		
Date Received:	19-May-17	- .		
Sample Volume:	50x 5mL	• -		
Dilution Water		-		
Dilution water.				
Tuna	Natural October 1			
Type.	Natural Seawater			
Source.	vancouver Aquarium, va	ancouver, BC		
Test Organism Info	rmation:			
9				
Batch No.:	070617	· .		
Source:	Aquatic Biosystems CO	• ·		
Age:	10-days	-		
•		•		
Copper Reference 1	Foxicant Results:			
Peference Tovicent I	D: 0.0020			
Stock Solution ID:	D. <u>AACSU</u>			· .
Date Initiated:	6 Jul 17			
7 d EC50 (05% CL)	0.12(70.7, 104.4)			
7-d IC50 (95% CL).	91.2 (79.7 - 104.4)			
7-01000 (9978.0E).	07.7 (79.0 - 97.1)			
EC50 Reference Tox	icant Mean (Accentable Range)	. 00 0 (6/ 1 155 6)	CV (0(); 25	
IC50 Reference Toxi	cant Mean (Acceptable Range)	93.5 (58.6 140.2)	CV (%). <u>25</u>	· ·
	cant mean (Neochtable Mange) .	<u> </u>	CV (70). <u></u> 20	
t Denski s				
Test Results:				•
1. N. N. S. L. S. L.		Suprival	Dry Pierrage	DecMainht
	NOEC		Dry Biolitass	
		0.21 0.10	100 (). 1	- 4.80 0.5-1
		10.000	<u>10 1.607</u>	2 30.80 703 1
	EC23 % (V/V) (95% CL)	0.68 0.55 0.83		
		<u>- 0.81 (0.85 - 1.01)</u> - 1	074(037-08)
e provide a second de la companya d	1C25 % (V/V) (95% CL)		- 0.95 (0.55 - 1.01)	er >0,8 70.5+
	IC50 % (v/v) (95% CL)		<u>-1.18 (0.97 - 1.22)</u>	10.8 >0.57
	S PLA		0.44(0.46-1.0	
Reviewed by:		Date revie	ewed: /tug. 28/	17
			• . /	

Issued August 17, 2008; Version 1.0

Chronic Marine Toxicity Test Initial and Final Water Quality Measurements

	۴	12 12					`				¢	, • _			
Client:	k-	Hours	e	WDO	5	_	Star	t Date	& Time:	Jul.	y 61	17 1	5000	١	-
Sample ID:	Cu	Kafto	X	NWI	(PH-C)X	Sto	p Date	& Time:	Jal	4 131	17 1	16000		-
Work Order #:	Xa			705	156			Test S	pecies:	Atherir	nops affii	niś			
MGIL Diesel															1
ugit form							Da	ays		,					
Concentration	0		1		2		3		4		5		6	7	
Control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	19.0	19.5	200	20.0	203	20-2	196	19.5	195	20.0	20,0	193	20.0	19.5	
DO (mg/L)	1.7e	n & S	673	6.1	7.4	4.5	7.5	5.0	7.6	5.0	7.4	C.T	24	5.6	
рН	76	77	7-8	7.5	78	2.6	28	2.4	7.988	7.5	7.8	7.4	73	23	
Salinity (ppt)	28.	2	8	2	8	1	18 0	2	x ·	2	8	Ż	F.	28	
Initials	1032	K	n		A		P	441		M	4	42	<u> </u>	1450	
	•			· · · · · · · · · · · · · · · · · · ·	<u></u>						-	·			
							Da	ays							I .
Concentration	0		1		2		3		4		5	· · ·	6	7	
acetone control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	(9.0	19.5	20.0	20.0	20.0	220	196	19.5	195	20.0	20.0	19.5	Te on	(9.5	
DO (mg/L)	7-5	to to	5725	5.9	7.9	5.5	25	4.5	1.5	4.6	7.4	5.3	7.5	5.3	
рН	76	27	28	7.6	3.8	7.6	38	7.5	28	7.5	7.8	7.4	28	2.3	
Salinity (ppt)	28	2	-8	2	8	n,	8	2	28	2	8	2	-8	28	
Initials	PSC.	¥3	ř.	4	4		A	441	i	A	NEI	K	~~	1676	
				·		L	<u>N</u>	<u> </u>							J
							Da	iys					. <u>.</u> .		
Concentration	0	· .	1		2		3	<u> </u>	4		5		6	7	
0.5	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	19.0	19.5	20.0	20.0	22,0	220	195	19.5	195	20,0	20.0	19-5	20.0	19-1	ł
DO (mg/L)	74	5-6	7.3	5.8	7-14	5.1	75	4.9	75	43	7.4	46	75	52	47
рН	7.6	77	78	7.6	38	26	25	2.6	78	7.5	7.8	7.4	78	72	
Salinity (ppt)	25	7	s.	2	F	2	8	2	6		28	23		22	
Initials	10r	163	ľ		4		A	441	1		MUT	IL	\sim	lex	

							Da	ays							
Concentration	0		1		2		3		4		5		6	7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	(9.0	195	209	20.0	202	20-0	195	19.5	195	20.0	20.D	19-5	710-1	192	
DO (mg/L)	74	5.6	72	S·8	24	5.7	7.5	49	7.4	4.2	3.4	4.5	7.51	54	عدة
рН	76	77	78	7.6	3.8	rb	28	76	23	7.5	7.8	23	28	72	
Salinity (ppt)	25	7	e -	2	8	2	8	2	87		28	2	5	23	
Initials	KUL	E	s.	A			<u>n</u> -	446			MG	10		Ics.	

Diesel standard into seawater

YYL

Analysts: WIL, AND, YYL, MUT

Reviewed by: Date reviewed:

MUT

Sample Description:

Comments:

1/2

Chronic Marine Toxicity Test Initial and Final Water Quality Measurements

Client:	NDOE	Start Date & Time: July 6/12 15000
Sample ID:	NWTPH-DX	Stop Date & Time: July 13/17 16000
Work Order #:	170515h	Test Species: Atherinops affinis
Mail Diesel		Days

Concentration	0		1		2		3		4	4	5	e	5	7
2	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	(9.0	19.5	2.0	200	20.0	20.0	195	19.5	195	80'0	20'0	19-5	20.0	19.5
DO (mg/L)	7-4	\$3	7.2	5.9	7,3	5.3	30	5.0	7.4	4.5	7,4	42	7-1	A.6
pН	177	7-2	77	7.6	78	7.6	ng	3-6	18	7.5	7.8	27	75	Fr
Salinity (ppt)	25	2	z	2	s		28	2	8	25	le la	Z	2	28
Initials	167L	KI		,	A		2	442	•	N	15	Ŵ	~	KYL
										I	· · · · · ·			

							Da	ays						
Concentration	0		1		2		3		4		5		6	7
4	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	19.2	19-5	20.0	20.0	20,0	20.0	185	IS.S	195	20.0	20.0	19-1	1200	19.5
DO (mg/L)	73	5.4	チン	5.9	7,3	5.5	76	5.2	7.4	4.6	.7.3	42	7.5	4.3
pН	4 6	77	4F	д. Ь	78	7.7	2.8	2.5	18	7.5	7.8	7.1	7-8	72
Salinity (ppt)	28	7	P	4	28		28	28	6		28	2	F	28
Initials	KIL	Ľ Ľ	IL .	6	r		A	JYV	,	é	MU	K	'n	15L

							Da	ays						
Concentration	0		1		2		3		4		5		6	7
8	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	12.0	19.5	20.0	20.0	200	200	195	19.5	195	20.0	20.0	19.5	20.0	19.5
DO (mg/L)	71	56	チン	5.9	73	5.9	3~5	5.4	カン	4.7	7.3	42	25	4.3
рН	26	71	78	7.6	7.8	7,6	7.5	7.6	18	7.5	7.8	7.4	72	7.2
Salinity (ppt)	28	2	S.	2	f	e	28	2	ß	2	18	2	P	28
Initials	COL	47	L	A	`		A-	440		ſ	ND	ici	N/	KIL

		····					Da	ays				· · · · ·		
Concentration	0		1		2		3		4		5		6	7
16	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	19.0	19.5	vos	20.5	20.0	20.0	19.5	19.5	1					
DO (mg/L)	7.2	5.6	2.2	6.1	73	5.84	2.4	5.3	1					
рН	26	2-7	78	7.6	28	U	7.8 7.8	2-7					1	
Salinity (ppt)	28	**	y	2	8		28		1				<u> </u>	
Initials	KSI	¥	72	A	· · · · · · · · · · · · · · · · · · ·		s	442	/		ara			

Analysts:

(COL MO. YYL MET

Reviewed by: 1 Date reviewed:

Sample Description:

Comments:

7-d Topsmelt Toxicity Test Daily Survival

ample ID:	NW	TPH-	:DX			-	Stop Da	e & Time:	Jun 13/17 1600h 1	U s
Vork Order #:	17	0515	h			_	Tes	t Species:	Atherinops affinis	
Concentration		<u></u>	·	Dav of T	est - No	of Survi	vors			
	_				1			1	Comments	
m gicinesa	Rep	1	. 2	3	4	5	6	7.		Ì
(antro)	Α	5	5	5	5	15	5	2		
	В					1				
	С									
·	D						<u> </u>			
A	E		<u></u>							
tretore	A									.
(orto)	В									
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	В							1		
	С				V	2	V	7		
	D		4	4	4	4	4	Y		
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(Α	4	Ý	Ŷ	4	4	-y	U.		
	В	5	5	5	5	5	5	5		
	С		6	S.	Ś	5	5	5		
	D		4	Ŷ	j.	4	4	Y	· · · · · · · · · · · · · · · · · · ·	
	Е	U.	6	5	5	5	5	5	and the second se	
2	Α	4	4	4	ч	4	4	4	2	
	В	5	N N	.5	5	5	C	Ĵ		
	C			1	5/	5	1	J		
	D	,			5	5		5	an ann	
	E	Y	Y		Ś	5		5		
4	А	5	5	5	5	5		J.		
	В	5	5	5	<	5	J	F		
	С	4	3	. 3	3	3	3	3		
	D	Ś	5	5	5	5	5	5		
	E	3	2	2	2	2	2	2	· · · · · · · · · · · · · · · · · · ·	
A	Α	5	PSFS	4	1 4	3	3	3	· · · · · · · · · · · · · · · · · · ·	
	В	ſ	4	ÿ	4	4	4	ù	· · · · · · · · · · · · · · · · · · ·	
	С	Ŷ	5	5	5	5	F	5		
	D	4	3	3	2	3	Ĩ	3		
	E	4	4	Ÿ	4	¥	Y	ų		
16	A	Ø			·					
	В	3	0							
	С	z	0							
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ech Initials		in		Λ. ·	inin	AA1-7	KIL	1/23		
			M	15				1-2-1		

Reviewed by:

JOh

Aug. 2/17 Date reviewed:

Issued August 17, 2008; Version 1.0

لأستحا

Topsmelt Toxicity Test Data Sheet Dry Weight Data

Client:	by WOUE
Work Order # :	1705156
Sample ID:	NWTPH-DX

Var

Start Date & Time: July 6/17 1500h Termination Date & Time: July 13/17 1600h

TS Pan No. Pan mall Diesel Rep No. alive Initials weight Pan + organism (mg) No. weighed Initials purple (ma) 5 KL/ MY K3-1029.76 5 Control 1022.77 Α 1 5 1048,18 5 1041-96 в 2 5 1031,04 1025-15 С 3 ¢ Ê 5 1036,79 1030.48 D 4 ſ 5 1014,45 1007.52 Ε 5 5 ς 1032,77 1026.50 acetore А 6 5 Icotrol Ĵ 1007.06 1001.90 в 7 5 S 1006.29 (000.70 С 8 2 5 1008.08 (003-06 D 9 1017.84 5 1011.60 E 10 t6 190 5 1011,41 ſ 1006.36 A 11 5 1014.35 1019.32 5 0.5 12 в 5 10201-01 5 1026.61 С 13 4 4 1024,16 D 14 1019.56 5 1018-54 1024.11 Е 15 Ý 4 1021.59 1027,29 Α 16 (Selatana 1009-1010-03 5 ť 1015.32 в 17 Ĵ 1021,96 5 1014-91 С 18 C 1020.92 4 1016.25 D 19 1022.06 گ 5 1028,15 Е 20 ¥ 4 1037.19 1032.78 2 Α 21 5 5 1043,79 в 22 1037.50 ſ 1047.05 5 1040.94 С 23 5 1027.90 1034,60 5 D 24 1038.27 5 Ε 25 1031-04 5 Ž 1034.73 1040.17 Α 26 Ú 5 5 1023,31 в 1016.37 27 3 3 1039.61 С 1034.72 28 5 1026,08 5 D 1019-1455 29 2 Е 1026-57 1029.11 2 Ť 30 10% reweigh pans (mg): man # 5 - 1014.53 29-1026.06 Comments: - 1015.36 32-1028.52 17

Reviewed by:

19ch

Date Reviewed: Aug. 2/17

CETIS Sun	nmary Report						Report Dat Test Code	te: :	22 Dec-17 10:38 (p 1 of 3) 170515b 07-2010-6484
Pacific Topsm	elt 7-d Survival and G	Frowth Test							Nautilus Environmental
Batch ID: Start Date: Ending Date: Duration:	16-6555-7986 06 Jul-17 15:00 13 Jul-17 16:00 7d 1h	Test Type: Protocol: Species: Source:	Growth-Surviv EPA/600/R-98 Atherinops aff Aquatic Biosy	val (7d) 5/136 (1995) finis stems, CO			Analyst: Diluent: Brine: Age:	Karen Lee Natural se 10-d	e eawater
Sample ID: Sample Date: Receive Date: Sample Age:	07-6142-9744 19 May-17 11:15 19 May-17 11:15 48d 4h	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx				Client: Project:	WDOE	
Comparison S	Summary								
Analysis ID	Endpoint	NOEL	LOEL	TOFL	PMSD	ти	Meti	hod	
07-5014-2290 06-0433-8171 18-8308-1078 05-9686-4041 18-1870-0532	7d Survival Rate 7d Survival Rate Mean Dry Biomass-m Mean Dry Biomass-m Mean Dry Weight-mg	0 0.26 g 0 g 0.57 0	>0 0.57 >0 1.6 >0	0.385	NA 21.4% 11.1% 31.2% 11.1%		Wilc Duni Equa Duni	oxon Rank nett Multiple al Variance nett Multiple al Variance	Sum Two-Sample Test comparison Test t Two-Sample Test comparison Test t Two-Sample Test
19-9222-9790	Mean Dry Weight-mg	0.57	>0.57	NA	19.9%		Duni	nett Multinle	Comparison Test
Point Estimate	e Summary				10.070		Dum		
Analysis ID	Endpoint	l evel	ma/l	95% I CI	95% LICI	тн	Mati	hod	
07-6289-7116	7d Survival Rate	EC50	0.6779	0.5512	0.8337	10	Trim	mod Spoar	man Kärber
07-9187-0629	Mean Dry Biomass-m	n IC5	0.2395	N/A	0.0007		1 ine	ar Internola	
	X	IC10 IC15 IC20 IC25 IC40	0.6021 0.6458 0.6906 0.7367 0.8827	N/A 0.005465 0.02129 0.3741 0.6325	0.6758 0.7172 0.7597 0.8032 0.9402				
06 9204 4400	Mana Dav 18/21/	IC50	0.9868	0.765	1.037				
0-0034-4420	wean Diy Weight-Mg	IC5 IC10 IC15 IC20 IC25 IC40 IC50	>0.57 >0.57 >0.57 >0.57 >0.57 >0.57 >0.57	N/A N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A N/A		Line	ar interpola	IION (ICPIN)
Test Acceptab	ility								······
Analysis ID	Endpoint	Attrib	ute	Test Stat	TAC Limi	its	Ove	rlap Dec	ision
06-0433-8171	7d Survival Rate	Contro	ol Resp	1	0.8 - NL		Yes	Pas	ses Acceptability Criteria
07-5014-2290 07-6289-7116	7d Survival Rate 7d Survival Rate 7d Survival Rate	Contro	ol Resp ol Resp	1	0.8 - NL 0.8 - NL		Yes	Pas	ses Acceptability Criteria
05-9686-4041	Mean Dry Riomass m	T Contro	ol Resp	1 124			Yes	Pas	ses Acceptability Criteria
07-9187-0629	Mean Dry Biomass-Ing	a Contre	ol Resp	1.131			Yes	Pas	ses Acceptability Criteria
18-8308-1078	Mean Dry Biomass-me	g Contro	ol Resp	1.131	0.85 - NL		Yes	Pas	ses Acceptability Criteria

Mean Dry Biomass-mg

06-0433-8171 7d Survival Rate

05-9686-4041 Mean Dry Biomass-mg

18-8308-1078 Mean Dry Biomass-mg

Control Resp

PMSD

PMSD

PMSD

1.294

0.2139

0.3119

0.111

0.85 - NL

NL - 0.25

NL - 0.5

NL - 0.5

Yes

No

No

No

Analyst: KJC QA:

Passes Acceptability Criteria

Passes Acceptability Criteria

Passes Acceptability Criteria

Passes Acceptability Criteria

104 1/18

CETIS S	ummary Repo	rt			Rej Tes	port Date: st Code:	. 22	Dec-17 10:: 70515b 0	38 (p 2 of 3) 7-2010-6484		
Pacific Top	psmelt 7-d Survival	and Grov	vth Test		· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·	Na	utilus Env	ironmental
7d Surviva	I Rate Summary					e,ee	-			- <u> </u>	
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	5	1	1	1	1.	1	0	0	0.0%	0.0%
0	Negative Control	5	1	1	1	1	1	0	0	0.0%	0.0%
0.1		5	0.96	0.8489	1	0.8	1	0.04	0.08944	9.32%	4.0%
0.12		5	0.92	0.784	1	0.8	1	0.04899	0.1095	11.91%	8.0%
0.16		5	0.96	0.8489	1	0.8	1	0.04	0.08944	9.32%	4.0%
0.26		5	0.8	0.4488	1	0.4	1	0.1265	0.2828	35.36%	20.0%
0.57		5	0.76	0.5522	0.9678	0.6	1	0.07483	0.1673	22.02%	24.0%
1.6		5	0	0	0	0	0	0	0		100.0%
Mean Dry I	Biomass-mg Summ	ary									
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	5	1.131	0.9857	1.277	1.004	1.254	0.0524	0.1172	10.36%	0.0%
0	Negative Control	5	1.294	1.175	1.412	1.178	1.398	0.04258	0.0952	7.36%	-14.36%
0.1		5	1.032	0.926	1.137	0.92	1.12	0.03804	0.08505	8.25%	8.81%
0.12		5	1.152	0.9304	1.374	0.934	1.41	0.07982	0.1785	15.49%	-1.84%
0.16		5	1.23	0.9657	1.494	0.882	1.446	0.09506	0.2126	17.29%	-8.7%
0.26		5	1.054	0.6234	1.484	0.508	1.388	0.1549	0.3464	32.88%	6.86%
0.57		5	1.077	0.6527	1.501	0.648	1.556	0.1528	0.3416	31.72%	4.81%
1.6		5	0	0	0	0	0	0	0		100.0%
Mean Dry V	Neight-mg Summar	У									
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	5	1.131	0.9857	1.277	1.004	1.254	0.0524	0.1172	10.36%	0.0%
0	Negative Control	5	1.294	1.175	1.412	1.178	1.398	0.04258	0.0952	7.36%	-14.36%
0.1		5	1.078	0.99	1.165	0.994	1.15	0.03156	0.07058	6.55%	4.74%
0.12		5	1.256	1.059	1.453	1.058	1.425	0.07098	0.1587	12.64%	-11.01%
0.16		5	1.274	1.114	1.434	1.102	1.446	0.05758	0.1288	10.11%	-12.6%
0.26		5	1.336	1.091	1.582	1.088	1.63	0.08829	0.1974	14.77%	-18.14%
0.57		5	1.396	1.156	1.636	1.08	1.556	0.08648	0.1934	13.85%	-23.44%

Solvent blank = acetone control

1.556

ŝ

0.1934

13.85%

-23.44%

CETIS Summary Report

Report Date: Test Code:

22 Dec-17 10:38 (p 3 of 3) 170515b | 07-2010-6484

Nautilus Environmental

7d Surviva	I Rate Detail		
C-mg/L	Control Type	Rep 1	Rep 2

Pacific Topsmelt 7-d Survival and Growth Test

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Solvent Blank	1	1	1	1	1
0	Negative Control	1	1	1	1	1
0.1		1	1	1	0.8	1
0.12		0.8	1	1	0.8	1
0.16		0.8	1	1	1	1
0.26		1	1	0.6	1	0.4
0.57		0.6	0.8	1	0.6	0.8
1.6		0	0	0	0	0

Mean Dry Biomass-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Solvent Blank	1.254	1.032	1.118	1.004	1.248	
0	Negative Control	1.398	1.244	1.178	1.262	1.386	
0.1		1.01	0.994	1.12	0.92	1.114	
0.12		1.14	1.058	1.41	0.934	1.218	
0.16		0.882	1.258	1.222	1.34	1.446	
0.26		1.088	1.388	0.978	1.306	0.508	
0.57		0.648	1.212	1.556	0.89	1.078	
1.6		0	0	0	0	0	

Mean Dry Weight-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Solvent Blank	1.254	1.032	1.118	1.004	1.248
0	Negative Control	1.398	1.244	1.178	1.262	1.386
0.1		1.01	0.994	1.12	1.15	1.114
0.12		1.425	1.058	1.41	1.167	1.218
0.16		1.102	1.258	1.222	1.34	1.446
0.26		1.088	1.388	1.63	1.306	1.27
0.57		1.08	1.515	1.556	1.483	1.348
1.6						

7d Survival Rate Binomials

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Solvent Blank	5/5	5/5	5/5	5/5	5/5
0	Negative Control	5/5	5/5	5/5	5/5	5/5
0.1		5/5	5/5	5/5	4/5	5/5
0.12		4/5	5/5	5/5	4/5	5/5
0.16		4/5	5/5	5/5	5/5	5/5
0.26		5/5	5/5	3/5	5/5	2/5
0.57		3/5	4/5	5/5	3/5	4/5
1.6		0/5	0/5	0/5	0/5	0/5

solvent blank= acetone control

Analyst: VN QA:

an.9/18

Report Date: Test Code:

Pacific Tops	melt 7-d Survival	and Growt	h Test						Na	utilus En	vironmental
Analysis ID: Analyzed:	07-6289-7116 22 Dec-17 10:2	End 8 Ana	point: 7 lysis: T	d Survival Rat rimmed Spear	e man-Kärbe	r '	CETI	S Version: ial Results:	CETISv1 Yes	.8.7	
Batch ID:	16-6555-7986	Test	Type: G	rowth-Surviva	l (7d)		Anal	vst: Kare	n Lee		
Start Date:	06 Jul-17 15:00	Prot	ocol: E	PA/600/R-95/	136 (1995)		Dilue	ent: Natu	ral seawate	er	
Ending Date:	: 13 Jul-17 16:00	Spe	cies: A	therinops affir	is		Brine:				
Duration:	7d 1h	Sou	rce: A	quatic Biosyst	ems, CO		Age:	10-d			
Sample ID:	07-6142-9744	Cod	e: 2	D627EF0			Clier	it: WDC	DE		
Sample Date	: 19 May-17 11:1	5 Mate	erial: D	liesel		•	Proje	ect:			
Receive Date	2: 19 May-17 11:1	5 Sou	rce: W	VDOE							
Sample Age:	48d 4h	Stat	ion: N	WTPH-Dx						·	
Trimmed Spearman-Kärber Estimates											
Threshold O	ption Th	nreshold	Trim	Mu	Sigma		EC50	95% LCL	95% UCL		
Control Thres	hold 0		4.00%	-0.1689	0.04493		0.6779	0.5512	0.8337		
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC Limit	s	Overlap	Decision						
Control Resp	1	0.8 - NL		Yes	Passes A	cceptability	Criteria	X			
7d Survival F	Rate Summary				Calcu	lated Varia	te(A/B)				······································
C-mg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	в
0 :	Solvent Blank	5	1	1	1	0	0	0.0%	0.0%	25	25
0.1		5	0.96	0.8	1	0,04	0.08944	9.32%	4.0%	24	25
0.12		5	0.92	0.8	1	0.04899	0.1095	11.91%	8.0%	23	25
0.16		5	0.96	0.8	1	0.04	0.08944	9.32%	4.0%	24	25
0.26		5	0.8	0.4	1	0.1265	0.2828	35.36%	20.0%	20	25
0.57		5	0.76	0.6	1	0.07483	0.1673	22.02%	24.0%	19	25
1.6	·	5	0	0	0	0	0		100.0%	0	25
7d Survival F	Rate Detail			,							
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0 9	Solvent Blank	1	1	1	1	1					
0.1		1	1	1	0.8	1					
0.12		0.8	1	1	0.8	1					2
0.16		0.8	1	1	1	1					
0.26		1	1	0.6	1	0.4					
0.57		0.6	0.8	1	0.6	0.8					
1.6		0	0	0	0	0,					
7d Survival R	Rate Binomials					··· · · · · · · · · · · · · · · · · ·					
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Solvent Blank	5/5	5/5	5/5	5/5	5/5					
0	Negative Control	5/5	5/5	5/5	5/5	5/5					
0.1		5/5	5/5	5/5	4/5	5/5					
0.12		4/5	5/5	5/5	4/5	5/5					
0.16		4/5	5/5	5/5	5/5	5/5					
0.26		5/5	5/5	3/5	5/5	2/5					
0.57		3/5	4/5	5/5	3/5	4/5			,		
1.6		0/5	0/5	0/5	0/5	0/5					
Solve	nt blank	= = ac	etone	routo)Ì						

Analyst: KJ C QA:

Jou <u>Jan.</u>9/18

CETIS Ana	alytical Report		Report Date: Test Code:	22 Dec-17 10:28 (p 2 of 2) 170515b 07-2010-6484 Nautilus Environmental		
Pacific Topsr	melt 7-d Survival and	Growth Test				
Analysis ID:	07-6289-7116	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.8.7	
Analyzed:	22 Dec-17 10:28	Analysis:	Trimmed Spearman-Kärber	Official Results:	Yes	
Graphics						



Analyst: KJL

an. 9/18 QA

 Report Date:
 11 Jan-1

 Test Code:
 17051

Pacific Topsm	Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental										ironmentai
Analysis ID: Analyzed:	06-0433-8171 22 Dec-17 10:3	En 38 An	i dpoint: 7d i alysis: Pa	Survival Rat rametric-Cor	e itrol vs Trea	tments	CETI	S Version	: CETISv1 s: Yes	.8.7	
Batch ID:	16-6555-7986	Te	st Type: Gr	owth-Surviva	l (7d)		Anal	vst: Ka	ren Lee		
Start Date:	06 Jul-17 15:00) Pro	otocol: EP	A/600/R-95/	136 (1995)	· .	Dilue	ent: Nat	tural seawate	er	
Ending Date:	13 Jul-17 16:00) Sp	ecies: Ath	erinops affin	is		Brine	e:			
Duration:	7d 1h	So	urce: Aq	uatic Biosyst	ems, CO		Age:	10-	d	• •	
Sample ID:	07-6142-9744	Co	de: 2D	627EF0			Client: WDOE				
Sample Date:	19 May-17 11:1	5 Ma	aterial: Die	sel			Proje	ect:			
Receive Date:	19 May-17 11:1	5 So	urce: WI	DOE							
Sample Age:	48d 4h	Sta	ation: NV	VTPH-Dx							
Data Transfor	m	Zeta	Alt Hyp	Trials	Seed	•• .	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	cted)	NA	C > T	NA	NA		21.4%	0.26	0.57	0.385	
Dunnett Multi	ple Comparison	Test									
Control	vs C-mg/L		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	ı(α:5%)		
Solvent Blank	0.1		0.4405	2.362	0.255 8	0.6726	CDF	Non-Sign	ificant Effect		
	0.12		0.881	2.362	0.255 8	0.4737	CDF	Non-Sign	ificant Effect		
	0.16		0.4405	2.362	0.255 8	0.6726	CDF	Non-Sign	ificant Effect		
	0.26		2.071	2.362	0.255 8	0.0873	CDF	Non-Sign	ificant Effect		
•	0.57*		2.58	2.362	0.255 8	0.0320	CDF	Significar	nt Effect		
Test Acceptab	oility Criteria		•								
Attribute	Test Stat	TAC Lim	nits	Overlap	Decision						
Control Resp PMSD	sp 1 0.8 - NL 0.2139 NL - 0.25			Yes No	Passes Ad Passes Ad	cceptability	Criteria Criteria				
ANOVA Table											
Source	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision	ι(α:5%)		
Source Between	Sum Squa 0.3071862	ares	Mean Sq 0.061437	uare 25	DF 5	F Stat 2.102	P-Value 0.1001	Decision Non-Sign	i (α:5%) ificant Effect		
Source Between Error	Sum Squa 0.3071862 0.701349	ares ?	Mean Sq 0.061437 0.029222	uare 25 88	DF 5 24	F Stat 2.102	P-Value 0.1001	Decision Non-Sign	i (α:5%) iificant Effect		
Source Between Error Total	Sum Squa 0.3071862 0.701349 1.008535	ares	Mean Sq 0.061437 0.029222	uare 25 88	DF 5 24 29	F Stat 2.102	P-Value 0.1001	Decision Non-Sign	i (α:5%) ifficant Effect		
Source Between Error Total Distributional	Sum Squa 0.3071862 0.701349 1.008535 Tests	ares 2	Mean Sq 0.061437 0.029222	uare 25 88	DF 5 24 29	F Stat 2.102	P-Value 0.1001	Decision Non-Sign	ı (α:5%) ifficant Effect		
Source Between Error Total Distributional Attribute	Sum Squa 0.3071862 0.701349 1.008535 Tests Test	ares	Mean Sq 0.061437 0.029222	uare 25 88 Test Stat	DF 5 24 29 Critical	F Stat 2.102 P-Value	P-Value 0.1001 Decision(Decision Non-Sign (a:1%)	ı(α:5%) ificant Effect		
Source Between Error Total Distributional Attribute Variances	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve	ares 2 ene Equalit	Mean Sq 0.061437 0.029222	uare 25 88 Test Stat 25 1.39	DF 5 24 29 Critical 4.248	F Stat 2.102 	P-Value 0.1001 Decision(Equal Var	Decision Non-Sign (a:1%) iances	ι(α:5%) ificant Effect		
Source Between Error Total Distributional Attribute Variances Variances	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E	ares 2 ene Equalif quality of 1	Mean Sq 0.061437 0.029222 ty of Variance	uare 25 88 Test Stat ≥ 1.39 8.658	DF 5 24 29 Critical 4.248 3.895	F Stat 2.102 	P-Value 0.1001 Decision(Equal Var Unequal V	Decision Non-Sign (α:1%) iances /ariances	ι(α:5%) ificant Effect		
Source Between Error Total Distributional Attribute Variances Variances Distribution	Sum Squa 0.3071862 0.701349 1.008535 Tests Mod Leve Levene E Shapiro-V	ares 2 ene Equalit quality of ^v Vilk W Nor	Mean Sq 0.061437 0.029222 ty of Variance Variance rmality	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157	DF 5 24 29 Critical 4.248 3.895 0.9031	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di	Decision Non-Sign (a:1%) iances /ariances stribution	ı(α:5%) ificant Effect		
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E Shapiro-V ate Summary	ares 2 ene Equalii quality of ¹ Vilk W Nor	Mean Sq 0.061437 0.029222 ty of Variance Variance rmality	uare 25 38 Test Stat ≥ 1.39 8.658 0.9157	DF 5 24 29 Critical 4.248 3.895 0.9031	F Stat 2.102 	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di	Decision Non-Sign (α:1%) iances /ariances stribution	ı(α:5%) ificant Effect		· · ·
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type	ares 2 ene Equalit quality of ¹ Vilk W Nor Count	Mean Sq 0.061437 0.029222 ty of Variance Variance rmality Mean	uare 25 88 Test Stat 9 1.39 8.658 0.9157 95% LCL	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min	Decision Non-Sign (a:1%) iances /ariances stribution Max	ı(α:5%) ificant Effect Std Err	CV%	%Effect
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of V Wilk W Nor Count 5	Mean Sq 0.061437 0.029222 ty of Variance Variance rmality Mean 1	uare 25 88 Test Stat ≥ 1.39 8.658 0.9157 95% LCL 1	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1	F Stat 2.102 − − − − − − − − − − − − − − − − − − −	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1	Decision Non-Sign (α:1%) iances /ariances stribution Max 1	ı(α:5%) ificant Effect Std Err 0	CV% 0.0%	%Effect 0.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.42	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of ¹ Vilk W Nor Count 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.96	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.701	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1	(α:5%) ificant Effect Std Err 0 0.04 2.01222	CV% 0.0% 9.32%	%Effect 0.0% 4.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of V Vilk W Nor Vilk W Nor 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.92	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8462	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8 0.8 0.8	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1	std Err 0 0.04 0.04899	CV% 0.0% 9.32% 11.91% 0.20%	%Effect 0.0% 4.0% 8.0%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equali quality of ' Vilk W Nor Count 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.92	uare 25 38 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.4489	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 1	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.8 0.8 0.8 0.4	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1	std Err 0 0.04 0.04 0.04 0.04	CV% 0.0% 9.32% 11.91% 9.32% 25.2%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equali quality of ' Vilk W Nor Count 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.976	uare 25 88 Test Stat 9 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.4488 0.522	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 0.9678	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8 0.8 0.8 0.8 0.8 0.4 0.6	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1	(α:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 3 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.8 0.76 0	uare 25 88 Test Stat ≥ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1 1 0.9678 0	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8 0	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.8 0.8 0.8 0.8 0.4 0.6 0	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 0	(α:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corr	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 3 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance ty of Variance mality Mean 1 0.96 0.92 0.96 0.76 0	uare 25 88 Test Stat ≥ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 0.9678 0	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8 0	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Normal Di Min 1 0.8 0.8 0.8 0.4 0.6 0	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 1 0	(α:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corror C-mg/L	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of V Vilk W Nor 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance ty of Variance mainty Mean 1 0.96 0.92 0.96 0.8 0.76 0 mary Mean	uare 25 88 Test Stat 25 88 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0 95% LCL	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1 0.9678 0 95% UCI	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 1 0.8 0	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.8 0.8 0.8 0.8 0.8 0.4 0.6 0 Min	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 0	std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0%
Source Between Error Total Distributional Attribute Variances Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corror C-mg/L 0	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 3 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.76 0 mary Mean 1 345	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.4488 0.5522 0 95% LCL 1 345	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 0.9678 0 95% UCL 1 346	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 0.8 0 Median 1 345	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8 0.8 0.8 0.8 0.4 0.6 0 Min 1 345	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 0 0 Max 1 345	std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 5td Err 0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0% %Effect
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corror C-mg/L 0 0.1	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 3 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.8 0.76 0 mary Mean 1.345 1.298	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 0.9678 0 95% UCL 1.346 1.43	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 0.8 0 Median 1.345 1.345 1.345	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.6 0.8 0.4 0.6 0 Min 1.345 1.107	Decision Non-Sign ances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 4 5 1.345 1.345	std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 Std Err 0 0.04763	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corro C-mg/L 0 0.1 0.1 0.12	Sum Squa 0.3071862 0.701349 1.008535 Tests Test Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equali quality of ' Vilk W Nor Count 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.92 0.96 0.8 0.76 0 mary Mean 1.345 1.298 1.25	uare 25 38 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165 1.088	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 0.9678 0 95% UCL 1.346 1.43 1.412	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 1 1 0.8 0 Median 1.345 1.345 1.345 1.345	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.6 0.8 0.4 0.6 0 Min 1.345 1.107 1.107	Decision Non-Sign ances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 4 5 1.345 1.345 1.345	std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 5td Err 0 0.04763 0.05833	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21% 10.43%	%Effect 0.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54% 7.08%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corror C-mg/L 0 0.1 0.12 0.16 0.57 1.6	Sum Squa 0.3071862 0.701349 1.008535 Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 3 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance ty of Variance mainty Mean 1 0.96 0.92 0.96 0.8 0.76 0 mary Mean 1.345 1.298 1.25 1.298	uare 25 88 Test Stat ≥ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165 1.088 1.165	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 0.9678 0 95% UCL 1.346 1.43 1.412 1.43	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 0.8 0 Median 1.345 1.345 1.345 1.345 1.345 1.345	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.8 0.8 0.8 0.8 0.8 0.4 0.6 0 Min 1.345 1.107 1.107 1.107	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(α:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 Std Err 0 0.04763 0.05833 0.04763	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21% 10.43% 8.21%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54% 7.08% 3.54%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corro C-mg/L 0 0.1 0.12 0.16 0.26	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of V Vilk W Nor Count 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance ty of Variance mainty Mean 1 0.96 0.96 0.8 0.76 0 mary Mean 1.345 1.298 1.25 1.298 1.121	uare 25 88 Test Stat 25 88 Test Stat 25 88 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165 1.088 1.165 0.7304	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1 1 1 0.9678 0 95% UCL 1.346 1.43 1.412 1.43 1.512	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8 0 Median 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345	P-Value 0.1001 Decision(Equal Var Unequal Var Unequal Var Unequal Var 0.6 0.8 0.8 0.8 0.4 0.6 0 Min 1.345 1.107 1.107 1.107 0.6847	Decision Non-Sign (α:1%) iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	a(a:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 Std Err 0 0.04763 0.1408 0.1408	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21% 10.43% 8.21% 28.08%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54% 7.08% 3.54% 16.65%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corro C-mg/L 0 0.1 0.12 0.16 0.57	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 ene Equalit quality of V Vilk W Nor Count 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.92 0.96 0.8 0.76 0 mary Mean 1.345 1.298 1.25 1.298 1.121 1.066	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.784 0.8489 0.784 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165 1.088 1.165 0.7304 0.829	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1 1 0.9678 0 95% UCL 1.346 1.43 1.412 1.43 1.512 1.304	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8 0 Median 1.345 1.34	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8 0.8 0.8 0.8 0.8 0.4 0.6 0 Min 1.345 1.107 1.107 1.107 1.07 0.6847 0.8861	Decision Non-Sign iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	((a:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 Std Err 0 0.04763 0.05833 0.04765 0.04765 0.04765 0.04765 0.0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21% 10.43% 8.21% 10.43% 8.21% 28.08% 17.92%	%Effect 0.0% 4.0% 8.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54% 7.08% 3.54% 16.65% 20.73%
Source Between Error Total Distributional Attribute Variances Distribution 7d Survival Ra C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6 Angular (Corro C-mg/L 0 0.1 0.12 0.16 0.26 0.57 1.6	Sum Squa 0.3071862 0.701349 1.008535 Tests Tests Mod Leve Levene E Shapiro-V ate Summary Control Type Solvent Blank	ares 2 2 2 2 2 2 2 2 2 2 2 2 2	Mean Sq 0.061437 0.029222 ty of Variance variance rmality Mean 1 0.96 0.92 0.96 0.8 0.76 0 mary Mean 1.345 1.298 1.25 1.298 1.121 1.066 0.2255	uare 25 88 Test Stat ⇒ 1.39 8.658 0.9157 95% LCL 1 0.8489 0.4488 0.5522 0 95% LCL 1.345 1.165 1.088 1.165 0.7304 0.829 0.2255	DF 5 24 29 Critical 4.248 3.895 0.9031 95% UCL 1 1 1 1 1 0.9678 0 95% UCL 1.346 1.43 1.412 1.43 1.512 1.304 0.2256	F Stat 2.102 P-Value 0.2747 <0.0001 0.0208 Median 1 1 1 1 1 0.8 0 Median 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345 1.345	P-Value 0.1001 Decision(Equal Var Unequal V Normal Di Min 1 0.8 0.8 0.4 0.6 0 Min 1.345 1.107 1.107 1.107 1.107 0.6847 0.8861 0.2255	Decision Non-Sign iances /ariances stribution Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	((a:5%) ificant Effect Std Err 0 0.04 0.04899 0.04 0.1265 0.07483 0 Std Err 0 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.04763 0.0488 0	CV% 0.0% 9.32% 11.91% 9.32% 35.36% 22.02% CV% 0.0% 8.21% 10.43% 8.21% 10.43% 8.21% 10.43% 8.21% 0.0%	%Effect 0.0% 4.0% 20.0% 24.0% 100.0% %Effect 0.0% 3.54% 7.08% 3.54% 16.65% 20.73% 83.24%

Analyst: HMM_ QA:_

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11 Jan-18 09:31 (p 2 of 2) 170515b | 07-2010-6484

Report Date:

Test Code:

Pacific Tops	Pacific Topsmelt 7-d Survival and Growth Test Nautilus Environmental										
Analysis ID: Analyzed:	06-0433-8171 22 Dec-17 10:3	End B Anal	point: 7d S ysis: Par	Survival Rat ametric-Cor	e ntrol vs Trea	tments	CETIS Version: Official Results:	CETISv1.8.7 Yes			
7d Survival R	ate Detail					. •					
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		•			
0	Solvent Blank	1	1	1	1	1					
0.1		1	1	1	0.8	1					
0.12		0.8	1	1	0.8	1					
0.16		0.8	1	1	1	1					
0.26		1	1	0.6	1	0.4		2			
0.57		0.6	0.8	1	0.6	0.8		· · · · · · · · · · · · · · · · · · ·			
1.6		0	0	0	0	0					
Angular (Cor	rected) Transforn	ned Detail						· · · · · · · · · · · · · · · · · · ·			
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Solvent Blank	1.345	1.345	1.345	1.345	1.345	•				
0.1		1.345	1.345	1.345	1.107	1.345					
0.12		1.107	1.345	1.345	1.107	1.345		_ ·			
0.16		1.107	1.345	1.345	1.345	1.345					
0.26	,	1.345	1.345	0.8861	1.345	0.6847					
0.57		0.8861	1.107	1.345	0.8861	1.107					
1.6		0.2255	0.2255	0.2255	0.2255	0.2255					
7d Survival R	ate Binomials										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Solvent Blank	5/5	5/5	5/5	5/5	5/5		,			
0	Negative Control	5/5	5/5	5/5	5/5	5/5					
0.1		5/5	5/5	5/5	4/5	5/5					
0.12		4/5	5/5	5/5	4/5	5/5					
0.16		4/5	5/5	5/5	5/5	5/5					
0.26		5/5	5/5	3/5	5/5	2/5					
0.57		3/5	4/5	5/5	3/5	4/5					
1.6		0/5	0/5	0/5	0/5	0/5					
Graphics					4. 4 .4.1.1		· · · ·				





Analyst: CMM <u>fan: 11/13</u> QA

CETIS An	alytical Repo	ort					Rep Tes	ort Date: t Code:	22	2 Dec-17 1 170515b	0:35 (p 1 of 2) 07-2010-6484
Pacific Tops	melt 7-d Surviva	l and G	Frowth Test					······································	N	lautilus E	nvironmental
Analysis ID: Analyzed:	07-5014-2290 22 Dec-17 10:	35	Endpoint: Analysis:	7d Survival Ra Nonparametric	ite -Two Samp	le	CET	IS Versior	: CETISv s: Yes	1.8.7	
Batch ID: Start Date: Ending Date Duration:	16-6555-7986 06 Jul-17 15:00 : 13 Jul-17 16:00 7d 1h)	Test Type: Protocol: Species: Source:	Growth-Surviv EPA/600/R-95 Atherinops affi Aquatic Biosys	al (7d) /136 (1995) nis stems, CO		Ana Dilu Brir Age	llyst: Ka lent: Na ne: : 10	ren Lee tural seawa -d	ter	
Sample ID: Sample Date Receive Date Sample Age:	07-6142-9744 19 May-17 11:1 19 May-17 11:1 48d 4h	5	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx			Client: WDOE Project:				
Data Transfo	rm	Zeta	Alt H	yp Trials	Seed			Test Res	sult		
Angular (Corr	ected)	NA	C > T	NA	NA			Passes	d survival r	ate	······
Wilcoxon Ra	nk Sum Two-Sar	nple T	est								
Control	vs Control	•	Test S	Stat Critical	Ties DI	F P-Value	P-Type	Decisio	(a.5%)		
Solvent Blank	Negative	Contro	1 27.5	NA	1 8	1.0000	Exact	Non-Sigi	nificant Effect	ct	
Test Accepta	bility Criteria			**							
Attribute	- Test Stat	TAC	imits	Overlan	Decision						
Control Resp	1	0.8 -	NL	Yes	Passes A	cceptability	Criteria				
Control Resp	[.] 1	0.8 -	NL	Yes	Passes A	cceptability	Criteria				
ANOVA Table	Э					•					
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decision	(a.5%)		
Between	0		0		1	65540	<0.0001	Significa	nt Effect		
Error	0		0		8						
Total	0				9						
7d Survival R	late Summary										· · · · · · · · · · · · · · · · · · ·
C-mg/L	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	5	1	1	1	1	1	1	0	0.0%	0.0%
0	Negative Control	5	1	1	1	1	1	1	0	0.0%	0.0%
Angular (Cor	rected) Transforr	ned Sı	Immary								
C-mg/L	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
0	Negative Contr	5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
7d Survival R	ate Detail										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Solvent Blank	1	1	1.	1	1					
0	Negative Control	1	1	1	1	1	,				
Angular (Corr	ected) Transforn	ned De	tail								
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Solvent Blank	1.345	1.345	1.345	1.345	1.345				·····	
0	Negative Control	1.345	1.345	1.345	1.345	1.345					
7d Survival R	ate Binomials										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Ren 4	Ren 5					
0	Solvent Blank	5/5	5/5	5/5	5/5	5/5					
0	Negative Control	5/5	5/5	5/5	5/5	5/5					

Solvent blank = alletone control

Analyst: KD QA: Jan.9/18

CETIS Ana	lytical Report	:		Report Date: Test Code:	22 Dec-17 10:35 (p 2 170515b 07-2010	2 of 2))-6484	
Pacific Topsn	nelt 7-d Survival an	nd Growth Test				Nautilus Environm	ental
Analysis ID: Analyzed:	07-5014-2290 22 Dec-17 10:35	Endpoint: Analysis:	7d Survival Rate Nonparametric-Two Sample		CETIS Version: Official Results:	CETISv1.8.7 Yes	
Graphics							
1.0 0.3 0.7 0.7 0.5 0.4 0.4 0.4 0.4 0.5 0.7 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	•		L.	+00 - - - - - - - - - - - - - - - - - - -			· .
0.0 E	0 N	I	0.0 05	+00 -2.0 ·1.5	-1.0 -0.5 0.0	@dai@i 0.5 1.0 1.S 2.0	
		C-mg/L	· · ·		Rankita		

Analyst: KOV QA:_

Jou-9/13

CETIS	S Ana	lytical Rep	ort						Rep Test	ort Date: Code:		22 Dec-17 10:28 (p 170515b 07-20	p 1 of 2))10-6484
Pacific	Topsm	elt 7-d Surviva	l and Gro	wth Test								Nautilus Environ	mental
Analysi Analyzo	is ID: ed:	07-9187-0629 22 Dec-17 10:	Ei 28 Ai	ndpoint: nalysis:	Mean Dry Bio Linear Interpo	mass-mg lation (ICPI	N)		CET Offic	CETIS Version: CETISv1.8.7 Official Results: Yes			
Batch I	D:	16-6555-7986	Τe	est Type:	Growth-Surviv	al (7d)			Ana	l vst: Ka	ren Lee		
Start D	ate:	06 Jul-17 15:00) Pr	otocol:	EPA/600/R-95	5/136 (1995	;)		Dilu	ent: Na	tural sea	water	
Ending	Date:	13 Jul-17 16:00) S I	pecies:	Atherinops aff	inis			Brin	e:			
Duratio	on:	7d 1h	So	ource:	Aquatic Biosys	stems, CO			Age	: 10-	-d		
Sample	D:	07-6142-9744	Co	ode:	2D627EF0				Clie	nt: WI	DOE	<u>,</u>	
Sample	e Date:	19 May-17 11:	15 M	aterial:	Diesel				Proj	ect:			
Receive	e Date:	19 May-17 11:	15 S o	ource:	WDOE								
Sample	e Age:	48d 4h	St	ation:	NWTPH-Dx								
Linear	Interpo	lation Options											
X Trans	sform	Y Transforn	n Se	ed	Resamples	Exp 95	% CL N	lethod					
Log(X+	1)	Linear	14	94352	200	Yes	Г	wo-Point	Interp	olation			
Test Ac	ceptab	ility Criteria											
Attribut	te	Test Stat	TAC Lin	nits	Overlap	Decisio	n						
Control	Resp	1.131	0.85 - N	L	Yes	Passes	Acceptab	ility Crite	ria				
Point E	stimate	s											
Level	mg/L	95% LCL	95% UC	L									
IC5	0.239	5 N/A	0.7954										
IC10	0.6021	1 N/A	0.6758										
IC15	0.6458	0.005465	0.7172										
IC20	0.6906	6 0.02129	0.7597										
IC25	0.7367	7 0.3741	0.8032										
1040	0.882	0.6325	0.9402										
1050	0.9000	0.765	1.037										
Mean D	ry Bion	nass-mg Sumn	nary			C	alculated	Variate					
C-mg/L	<u> </u>	ontrol Type	Count	Mean	Min	Max	Std E	rr Sto	Dev	CV%	%Effe	ect	
0	S	Divent Blank	5	1.131	1.004	1.254	0.0524	4 0.1	172	10.36%	0.0%		
0.1			5 5	1.032	0.92	1.12	0.0380	0.0	8505	8.25%	8.81%		
0.12			ย 5	1.102	0.934	1.41	0.0798	32 U.1	185	15.49%	-1.84%	/o	
0.26			5	1.25	0.802	1.440	0.0950	0 0.2	120	17.29%	-0./%		
0.57			5	1.00-	0.648	1.556	0,15-4	3 0.3 3 0.3	404	31 72%	1 81%		
1.6			5	0	0	0	0	0.0	+10	01.7270	100.0	%	
Mean D	ry Bion	ass-mg Detail						·					
C-mg/L	Co	ontrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
0	Sc	lvent Blank	1.254	1.032	1.118	1.004	1.248						
0.1			1.01	0.994	1.12	0.92	1.114						
0.12			1.14	1.058	1.41	0.934	1:218						
0.16			0.882	1.258	1.222	1.34	1.446						
0.26			1.088	1.388	0.978	1.306	0.508						
0.57			0.648	1.212	1.556	0.89	1.078						
1.6			0	0	0	0	0						

Solvent blank = alltone control

Analyst: KJV

1041. <u>Tan.9/18</u> QA:

CETIS Ana	alytical Report			Report Date: Test Code:	22 Dec-17 10:28 (p 2 of 2) 170515b 07-2010-6484
Pacific Topsr	nelt 7-d Survival and	Growth Test		Nautilus Environmental	
Analysis ID: Analyzed:	07-9187-0629 22 Dec-17 10:28	Endpoint: Analysis:	Mean Dry Biomass-mg Linear Interpolation (ICPIN)	CETIS Version: Official Results:	CETISv1.8.7 Yes



JGh Analyst: KJ2 QA: [an-9/18

Report Date: Test Code: 11 Jan-18 09:32 (p 1 of 2) 170515b | 07-2010-6484

Pacific Topsm	nelt 7-d Survival	and G	rowth Test							Na	utilus Env	vironmental
Analysis ID:	nalysis ID: 05-9686-4041 Endpoint: M			Mean Dry B	Mean Dry Biomass-mg			CETIS Version: CETISv1.8.7				
Analyzed:	22 Dec-17 10:3	8	Analysis:	Parametric-	Control vs	Trea	tments	Offic	ial Result	s: Yes		
Batch ID:	16-6555-7986		Test Type:	Growth-Surv	vival (7d)			Anal	yst: Ka	iren Lee		
Start Date:	06 Jul-17 15:00		Protocol:	EPA/600/R-	95/136 (19	95)		Dilue	ent: Na	tural seawate	er	
Ending Date:	13 Jul-17 16:00		Species:	Atherinops a	affinis	-		Brin	e:			
Duration:	7d 1h		Source:	Aquatic Bios	systems, C	0	-	Age:	10	-d		
Sample ID:	07-6142-9744		Code:	2D627EF0	/			Clier	nt: W	DOE		
Sample Date:	19 May-17 11:1	5	Material:	Diesel				Proje	ect:			
Receive Date:	19 May-17 11:1	5	Source:	WDOE				•				
Sample Age:	48d 4h		Station:	NWTPH-Dx								
Data Transfor	m	Zeta	Alt H	yp Trials	Seed		•	PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > T	NA	NA			31.2%	0.57	1.6	0.955	
Dunnett Multi	ple Comparison	Test										
Control	vs C-mg/L		Test	Stat Critica	I MSD	DF	P-Value	P-Type	Decisio	n(α:5%)		
Solvent Blank	0.1		0.666	8 2.362	0.353	8	0.5722	CDF	Non-Sig	nificant Effect		
	0.12		-0.139	2.362	0.353	8	0.8712	CDF	Non-Sig	nificant Effect	:	
	0.16		-0.658	37 2.362	0.353	8	0.9590	CDF	Non-Sig	nificant Effect	:	
	0.26	a.	0.519	5 2.362	0.353	8	0.6384	CDF	Non-Sig	nificant Effect	:	
· · · · · · · · · · · · · · · · · · ·	0.57		0.364	2 2.362	0.353	8	0.7043	CDF	Non-Sig	nificant Effect	:	
Test Acceptab	oility Criteria											·
Attribute	Test Stat	TAC	Limits	Overla	ip Decis	ion						
Control Resp	1.131	0.85	- NL	Yes	Passe	es Ac	cceptability	Criteria				
PMSD	0.3119	NL - (0.5	No	Passe	es Ao	cceptability	Criteria				
ANOVA Table												
Source	Sum Squa	ares	Mean	Square	DF		F Stat	P-Value	Decisio	n(α:5%)		
Between	0.1345526	1	0.026	91051	5		0.4824	0.7859	Non-Sig	nificant Effect		
Error	1.338785		0.055	78272	24							
Iotal	1.473338				29							
Distributional	Tests											
Attribute	Test			Test S	tat Critic	al	P-Value	Decision	(α:1%)			
Variances	Bartlett Equality of Variance		9,885	15.09		0.0786	Equal Var	Equal Variances				
Distribution	Shapiro-V	Vilk W	Normality	0.9718	0.903	1	0.5901	Normal Di	stribution			
Mean Dry Bio	mass-mg Summ	ary		,								
C-mg/L	Control Type	Cour	nt Mean	95% L	CL 95% l	JCL	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	5	1.131	0.9857	1.277		1.118	1.004	1.254	0.0524	10.36%	0.0%
0.1		5	1.032	0.926	1.137		1.01	0.92	1.12	0.03804	8.25%	8.81%
0.12		5	1.152	0.9304	1.374		1.14	0.934	1.41	0.07982	15.49%	-1.84%
0.16		5	1.23	0.9657	1.494		1.258	0.882	1.446	0.09506	17.29%	-8.7%
U.26		5	1.054	0.6234	1.484		1.088	0.508	1.388	0.1549	32.88%	6.86%
0.57 1 6		5	1.077	0.6527	1.501		1.078	0.648	1.556	0.1528	31.72%	4.81%
1.0		.5	0	0	0		0	0	0	0		100.0%
Mean Dry Bior	mass-mg Detail		-									
C-mg/L	Control Type	Rep	1 Rep 2	Rep 3	Rep 4		Rep 5			·		
U A	Solvent Blank	1,254	1.032	1.118	1.004		1.248					
).1		1.01	0.994	1.12	0.92		1.114					
0.12		1.14	1.058	1.41	0.934		1.218					
0.16		0.882	1.258	1.222	1.34		1.446					
0.26		1.088	1.388	0.978	1.306		0.508					
0.57		0.648	1.212	1.556	0.89		1.078					
1.6		0	0	0	0		0					
												41.
00 460 407 0											00000	106-
00-409-187-2					CETIST	[™] v1.	.8.7.16			Analyst:	IN IN C	A: <u>Jun</u> 1

CETIS Ana	lytical Report		Report Date: Test Code:	11 Jan-18 09:32 (p 2 of 2) 170515b 07-2010-6484		
Pacific Topsn	nelt 7-d Survival ar	d Growth Test	•	Nautilus Environmental		
Analysis ID: Analyzed:	05-9686-4041 22 Dec-17 10:38	Endpoint: Analysis:	Mean Dry Biomass-mg Parametric-Control vs Treatments	CETIS Version: Official Results:	CETISv1.8.7 Yes	
Graphics			· · · ·			
1.4 			5.55-01 4.16-01 2.75-01 1.46-01 8.6geet Hull 0.05+00 -1.46-01		e 60099999	
0.4	1	0.16 0.26	-2,7501 -4,1501 -0,57 1,6' 			
,				× .		
				. · · ·		



CETIS™ v1.8.7.16
Report Date:
 22 Dec

 Test Code:
 1705

22 Dec-17 10:36 (p 1 of 2) 170515b | 07-2010-6484

Pacific Topsn	nelt 7-d Surv	vival and (Growth Tes	t								Na	utilus Env	ironmental
Analysis ID: Analyzed:	18-8308-10 22 Dec-17	78 10:35	Endpoint: Analysis:	Mear Parai	n Dry Biom metric-Two	ass-mg Sample			CE Of	TIS Versio ficial Resu	on: C Ilts: Y	ETISv1 es	.8.7	
Batch ID:	16-6555-79	86	Test Type	: Grow	th-Surviva	l (7d)			An	alyst: I	Karen Le	e		
Start Date:	06 Jul-17 1	5:00	Protocol:	EPA/	600/R-95/ [.]	136 (199	5)		Dil	uent: N	Vatural s	seawate	er	
Ending Date:	13 Jul-17 1	6:00	Species:	Ather	rinops affin	is			Br	ine:				
Duration:	7d 1h		Source:	Aqua	itic Biosyst	ems, CO)		Ag	e: 1	10-d			
Sample ID:	07-6142-97	44	Code:	2D62	7EF0				Cli	ent: V	NDOE			
Sample Date:	19 May-17	11:15	Material:	Diese	el				Pr	oject:				
Receive Date:	19 May-17	11:15	Source:	WDC)E					-				
Sample Age:	48d 4h		Station:	NWT	PH-Dx									
Data Transfor	m	Zeta	Alt	Нур	Trials	Seed			PMSD	Test R	lesult			
Untransformed		NA	C > '	Г	NA	NA		• .	11.1%	Passe	s mean	dry bior	mass-mg	
Equal Variand	e t Two-San	nple Test												
Control	vs Cont	rol	Test	Stat	Critical	MSD	DF	P-Value	P-Type	Decisi	on(α:5%	6)		
Solvent Blank	Nega	tive Contro	ol -2.40)5	1.86	0.126	8	0.9786	CDF	Non-Si	ignifican	t Effect		
Test Acceptat	oility Criteria													
Attribute	Test S	tat TAC	Limits		Overlap	Decisio	on							
Control Resp	1.131	0.85	- NL		Yes	Passes	s Ac	ceptability	Criteria					
Control Resp	1.294	0.85	- NL		Yes	Passes	Ac	ceptability	Criteria					
PMSD	0.111	NL -	0.5		No	Passes	Ac	ceptability	Criteria					
ANOVA Table														
Source	Sum S	Squares	Mea	n Squa	re	DF		F Stat	P-Value	Decisi	on(a:5%	6)		
Between	0.0659	3832	0.06	593832		1		5.786	0.0428	Signific	cant Effe	ect		
Error	0.0911	7568	0.01	139696		8				-				
Total	0.1571	14				9								
Distributional	Tests													
Attribute	Test				Test Stat	Critical	[P-Value	Decisio	n(α:1%)				
Variances	Varia	nce Ratio	F		1.515	23.15		0.6972	Equal V	ariances				
Distribution	Shap	ro-Wilk W	Normality		0.8703	0.7411		0:1009	Normal	Distributior	า			
Mean Dry Bio	nass-mg Su	mmary												
C-mg/L	Control Typ	e Cou	nt Mea	n s	95% LCL	95% UC	CL	Median	Min	Мах	Sto	i Err	CV%	%Effect
0	Solvent Blar	ik 5	1.13	1 (0.9857	1.277		1.118	1.004	1.254	0.0	524	10.36%	0.0%
0	Negative Co	ntrol 5	1.29	4	1.175	1.412		1.262	1.178	1.398	0.0	4258	7.36%	-14.36%
Mean Dry Bio	nass-mg De	tail	,											
C-mg/L	Control Typ	e Rep	1 Rep	2 1	Rep 3	Rep 4		Rep 5						
0	Solvent Blan	k 1.25	4 1.03	2	1.118	1.004		1.248						
0	Negative Co	ntrol 1.39	8 1.24	4 ·	1.178	1.262		1.386						

Solvent blank = acetone control

<u>1an-9/18</u> Analyst: 101L

CETIS Ana	alytical Report				Report Date:	22 Dec-17 10:36 (p 2 of 2)
Pacific Tops	melt 7-d Survival and	Growth Test		· · · · ·	Test Code:	170515b 07-2010-6484
		Clowin rest		·		
Analysis ID: Analyzed:	18-8308-1078 22 Dec-17 10:35	Endpoint: Analysis:	Mean Dry Biomass-mg Parametric-Two Sample		CETIS Version: Official Results:	CETISv1.8.7 Yes
Graphics						
1.4	·····			0.16		
1.2				0.12		6
5 1.0			Reject Null	0.08		•
Eol8 Y10 nsat				Centered Cartansform		
0.6				-0.02 -0.04	•	
0.4				-0.06	•	
0.2				-0.12	•	
0.0	0 N		05	-0.16	-1.0 -0.5 0.0	0.5 1.0 1.5 2.0
	C-1	ng/L			Rankits	

Analyst: KTL QA:

CETIS	S Ana	lytical Repo	ort						Rep	ort Date: t Code:		22 Dec 1705	-17 11:11	(p 1 of 2)
Pacific	Topsm	elt 7-d Surviva	and G	rowth Test					103	100000		Nautil	us Enviro	onmental
Analysi Analyze	s ID: ed:	06-8394-4426 22 Dec-17 10:3	34	Endpoint: Analysis:	Mean Dry Wei Linear Interpol	ght-mg ation (ICPII	N)	, , , , , , , , , , , , , , , , , , , 	CE1 Offi	FIS Versio cial Resu	on: CE Its: Yes	TISv1.8.7 s		
Batch II Start Da Ending Duratio	D: ate: Date: n:	16-6555-7986 06 Jul-17 15:00 13 Jul-17 16:00 7d 1h)	Test Type: Protocol: Species: Source:	Growth-Surviva EPA/600/R-95 Atherinops affi Aquatic Biosys	al (7d) /136 (1995) nis tems, CO)	· .	Ana Dilu Brir Age	llyst: K lent: N ne: :: 1	(aren Lee latural se 0-d	eawater	· · · · ·	
Sample Sample Receive Sample	Date: Date: Date: Age:	07-6142-9744 19 May-17 11:1 19 May-17 11:1 48d 4h	5	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx		• <u>•</u>		Clie Proj	int: V ject:	VDOE			
Linear I	nterpo	lation Options												
X Trans	form	Y Transform	n ;	Seed	Resamples	Exp 95%	% CL	Metho	d					
Log(X+1	1)	Linear		1980132	200	Yes		Two-Po	pint Interp	olation				
Point E	stimate	es es					-							
Level IC5 IC10 IC15 IC20 IC25 IC40	mg/L >0.57 >0.57 >0.57 >0.57 >0.57 >0.57	95% LCL N/A N/A N/A N/A N/A N/A	95% L N/A N/A N/A N/A N/A N/A	JCL		· · ·		91999-1-1-2-01-2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-			·			
1C50	>0.57	N/A	N/A											
Mean D	ry Wei	ght-mg Summa	ry			Ca	alculat	ed Varia	ite '			<u> </u>		
C-mg/L	<u> </u>	ontrol Type	Count	Mean	Min	Max	Std	Err	Std Dev	CV%	%Ef	fect		

C-mg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	Solvent Blank	5	1.131	1.004	1.254	0.0524	0.1172	10.36%	0.0%	
0.1		5	1.078	0.994	1.15	0.03156	0.07058	6.55%	4.74%	
0.12		5	1.256	1.058	1.425	0:07098	0.1587	12.64%	-11.01%	
0.16		5	1.274	1.102	1.446	0.05758	0.1288	10.11%	-12.6%	
0.26		5	1.336	1.088	1.63	0.08829	0.1974	14.77%	-18.14%	
0.57		5	1.396	1.08	1.556	0.08648	0.1934	13.85%	-23.44%	

Mean Dry Weight-mg Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Solvent Blank	1.254	1.032	1.118	1.004	1,248
0.1		1.01	0.994	1.12	1.15	1.114
0.12		1.425	1.058	1.41	1.167	1.218
0.16		1.102	1.258	1.222	1.34	1.446
0.26		1.088	1.388	1.63	1.306	1.27
0.57		1.08	1.515	1.556	1.483	1.348

CETIS Ana	alytical Report			Report Date: Test Code:	22 Dec-17 11:11 (p 2 of 2) 170515b 07-2010-6484
Pacific Topsmelt 7-d Survival and		i Growth Test			Nautilus Environmental
Analysis ID:	06-8394-4426	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7
Analyzed:	22 Dec-17 10:34	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes
Graphics				······	



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. .

Analyst: KJ QA

 Report Date:
 11 Jan-18 0

 Test Code:
 170515b

11 Jan-18 09:32 (p 1 of 2) 170515b | 07-2010-6484

Pacific Topsm	elt 7-d Survival	and Gro	owth Test							Na	utilus Envi	ronmental
Analysis ID: Analyzed:	19-9222-9790 22 Dec-17 10:3	E 8 A	indpoint: Analysis:	Mean Dry Weig Parametric-Con	ht-mg trol vs T	reat	ments	CETI Offic	S Version ial Result	: CETISv1 s: Yes	.8.7	
Batch ID:	16-6555-7986	Т	est Type:	Growth-Survival	(7d)			Anal	yst: Ka	ren Lee		
Start Date:	06 Jul-17 15:00	P	rotocol:	EPA/600/R-95/1	136 (199	95)		Dilue	ent: Na	tural seawate	r	
Ending Date:	13 Jul-17 16:00	S	pecies:	Atherinops affin	is			Brine	ə:			
Duration:	7d 1h	S	ource:	Aquatic Biosyst	ems, CO)		Age:	. 10-	-d		
Sample ID:	07-6142-9744	c	Code:	2D627EF0				Clier	nt: WI	DOE		
Sample Date:	19 May-17 11:1	5 N	Aaterial:	Diesel				Proje	ect:			
Receive Date:	19 May-17 11:1	5 S	Source:	WDOE								
Sample Age:	48d 4h	S	station:	NWTPH-Dx								
Data Transfor	m	Zeta	Alt Hy	p Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > T	NA	NA			19.9%	0.57	>0.57	NA	
Dunnett Multi	ple Comparison	Test										
Control	vs C-mg/L		Test S	tat Critical	MSD	DF	P-Value	P-Type	Decision	n(α:5%)		
Solvent Blank	0.1		0.5611	2.362	0.226	8	0.6200	CDF	Non-Sigr	nificant Effect		
	0.12		-1.303	2.362	0.226	8	0.9931	CDF	Non-Sigr	nificant Effect		
	0.16		-1.492	2.362	0.226	8	0.9961	CDF	Non-Sigr	nificant Effect		
	0.26		-2.148	2.362	0.226	8	0.9996	CDF	Non-Sigr	nificant Effect		
	0.57		-2.776	2.362	0.226	8	0.9999	CDF	Non-Sigr	nificant Effect		
ANOVA Table												
Source	Sum Squ	ares	Mean	Square	DF		F Stat	P-Value	Decision	η(α:5%)		
Between	0.3658784	Ļ	0.0731	7568	5		3.208	0.0234	Significa	nt Effect		
Error Total	0.5474073	} 7	0.0228	0864	24							
Distributional					29							· · · · · · · · · · · · · · · · · · ·
Attribute	Test			Test Stat	Critica	d	P-Value	Decision	(a:1%)			
Variances	Bartlett E	quality o	f Variance	4.442	15.09		0.4876	Equal Var	iances			
Distribution	Shapiro-V	Vilk W N	lormality	0.9854	0.9031		0.9438	Normal Di	stribution			
Mean Dry Wei	ght-mg Summa	ry										
C-mg/L	Control Type	Count	Mean	95% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effect
0	Solvent Blank	5	1.131	0.9857	1.277		1.118	1.004	1.254	0.0524	10.36%	0.0%
0.1		5	1.078	0.99	1.165		1.114	0.994	1.15	0.03156	6.55%	4.74%
0.12		5	1.256	1.059	1.453		1.218	1.058	1.425	0.07098	12.64%	-11.01%
0.16		5	1.274	1.114	1.434		1:258	1.102	1.446	0.05758	10.11%	-12.6%
0.26		5	1.336	1.091	1.582		1.306	1.088	1.63	0.08829	14.77%	-18.14%
0.57		5	1.390	1.150	1.636		1.483	1.08	1.550	0.08648	13.85%	-23.44%
Mean Dry Wei	ght-mg Detail	_		·	_			•				
0-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4		Rep 5		· · · · · · · · · · · · · · · · · · ·			
0.1	CONCIL DIGHK	1.204	0.004	1.110	1.004		1.240					
0.12		1.01	1.994	1.12	1.10		1,114					
0.12		1.420	1.058	1.41	1.10/		1.218					
0.10		1.102	1.200	1.222	1.34		1.440					
0.20		1.000	1.300	1.03	1.300		1.27					
0.07		1.00	1.010	00001	1.403		1.348					

Analyst: EMM

CETIS Ana	lytical Repor	t	` .		Report Date: Test Code:	11 Jan-18 09:32 (p 2 of 2) 170515b 07-2010-6484	
Pacific Topsn	nelt 7-d Survival a	nd Growth Test	· · · · · · · · · · · · · · · · · · ·			Nautilus Environmental	
Analysis ID: Analyzed:	19-9222-9790 22 Dec-17 10:38	Endpoint: Analysis:	Mean Dry Weight-mg Parametric-Control vs Treatr	ments	CETIS Version: Cl Official Results: Ye	ETISv1.8.7	
Graphics			· · · · · · · · · · · · · · · · · · ·	<u>, , , , , , , , , , , , , , , , , , , .</u>			
1.6 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4	• 2	•	Contended Uttorationness Uttorationn	3.2E-01 2.4E-01 1.6E-01 7.7E-02 0.0E+00	949 ⁹⁹⁵	0.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
0.6 - 0.4 - 0.2 -	·			-7,96-02	0.035984		
	05 0.1 0	.12 0.16 C-mg/L	0.26 0.57	-3.26-01	1.5 -1.0 -0.5 0.0 0.5 Rankita	L0 1.5 2.0 2.5	
				•			
000-469-187-2		·	CETIS™ v1.8	.7.16	Anal	JGU ust: EMW QA: (Jan)	11/18

22 Dec-17 10:36 (p 1 of 1) 170515b | 07-2010-6484

Report Date:

Test Code:

Pacific Topsr	nelt 7-0	d Survival	and G	irowth	Test									Na	utilus Env	ironmental
Analysis ID: Analyzed:	18-18 22 D	370-0532 ec-17 10:3	5	Endp Analy	oint: sis:	Mea Para	n Dry Weig ametric-Two	ht-mg Sampl	е		C O	ETIS Ve	ersion: lesults:	CETISv1 Yes	.8.7	
Batch ID:	16-68	555-7986		Test	Гуре:	Grov	wth-Surviva	l (7d)			A	nalyst:	Kare	en Lee		
Start Date:	06 Ju	ıl-17 15:00		Proto	col:	EPA	/600/R-95/	136 (19	95)		D	iluent:	Natu	Iral seawate	er	
Ending Date:	13 Ju	ıl-17 16:00		Speci	ies:	Athe	rinops affin	is			В	rine:				
Duration:	7d 1	h		Sourc	ce:	Aqu	atic Biosyst	ems, C	0		Α	ge:	10-d			
Sample ID:	07-61	142-9744		Code	:	2D6	27EF0			· · · ·	С	lient:	WDO	DE		
Sample Date:	19 M	ay-17 11:1	5	Mater	ial:	Dies	el				Р	roject:				
Receive Date	: 19 M	ay-17 11:1	5	Sourc	ce:	WD	DE									
Sample Age:	48d -	4h		Static	on:	NW	TPH-Dx									
Data Transfor	rm		Zeta		Alt Hy	ур	Trials	Seed			PMSD	Tes	st Resu	ılt		
Untransformed	d		NA		C > T		NA	NĂ			11.1%	Pa	sses me	ean dry wei	ght-mg	
Equal Variand	ce t Tw	o-Sample	Test													
Control	vs	Control			Test S	Stat	Critical	MSD	DF	P-Value	P-Type	e De	cision(α:5%)		
Solvent Blank		Negative (Contro	l	-2.405		1.86	0.126	8	0.9786	CDF	No	n-Signif	icant Effect		
ANOVA Table																····
Source		Sum Squa	res		Mean	Squa	are	DF		F Stat	P-Valu	ie De	cision(a:5%)		
Between		0.0659383	2		0.0659	93832	2	1		5.786	0.0428	Sig	nificant	Effect		
Error		0.0911756	8		0.0113	39696	5	8								
Total		0.157114				-		9								
Distributional	Tests															
Attribute		Test					Test Stat	Critica	al	P-Value	Decisi	on(α:1%	6)			
Variances		Variance F	Ratio F				1.515	23.15		0.6972	Equal	Variance	s			
Distribution		Shapiro-W	/ilk W	Norma	ality		0.8703	0.741	1	0.1009	Norma	l Distribu	ution			
Mean Dry We	ight-m	g Summar	У												·	
C-mg/L	Contr	ol Type	Coun	t	Mean		95% LCL	95% L	ICL	Median	Min	Ма	x	Std Err	CV%	%Effect
0	Solver	nt Blank	5		1.131		0.9857	1.277		1.118	1.004	1.2	54	0.0524	10.36%	0.0%
0	Negat	ive Control	5		1.294		1.175	1.412		1.262	1.178	1.3	98	0.04258	7.36%	-14.36%
Mean Dry Wei	ight-m	g Detail														
C-mg/L	Contr	ol Type	Rep 1	I 1	Rep 2		Rep 3	Rep 4		Rep 5						
0	Solver	nt Blank	1.254		1.032		1.118	1.004	,	1.248						
0	Negati	ive Control	1.398		1.244	•	1.178	1.262		1.386						
Graphics																



Solvent blank: alletone control 000-469-187-2

CETIS™ v1.8.7.16

Analyst: 100 QA: Jan. 11/18

Report Date: Test Code:

Desifie Topsm	olt 7-c	I Survival a	nd G	rowth Test								Naut	ilus Enviro	onmental
					Mod	n Dry Weigh	-ma			CETIS	Version:	CETISv1.8	.7	
Analysis ID:	18-18	370-0532		Endpoint:	Dar	ametric-Two.	Sample			Officia	al Results:	Yes		
Analyzed:	22 D	ec-1/ 10:35		Analysis.	- F al		(7.1)			Analy	st: Kare	n Lee		
Batch ID:	16-65	555-7986		Test Type	Gro	wth-Survival	(70) 20 (400)	E)		Dilue	nt: Natu	ral seawater		
Start Date:	06 Ju	ıl-17 15:00		Protocol:	EP	A/600/R-95/1	30 (199	5)		Brine				
Ending Date:	13 Jı	16:00 17-ار		Species:	Ath	erinops attinis	s 	`		Age:	10-d			
Duration:	7d 1	h		Source:	Aqı	uatic Biosyste	ms, cc	,				<u> </u>		
Sample ID:	07-6	142-9744		Code:	2D	627EF0				Clien	t: WDC	JE		
Sample Date:	19 N	1ay-17 11:15	5	Material:	Die	sel				Proje	CT:			
Receive Date:	: 19 N	ay-17 11:1	5	Source:	WE	DOE								
Sample Age:	48d	4h		Station:	N۷	VTPH-Dx								
Data Transfor	m		Zeta	Alt	Нур	Trials	Seed			PMSD	Test Res	ult	h4 mg g	
Untransformed	4		NA	C >	Т	NA	NA			11.1%	Passes m	ean dry weig	nt-mg	
Equal Varian	ce t T\	wo-Sample	Test	<u></u>										
Control	ve	Control		Tes	t Staf	t Critical	MSD	DF	P-Value	Р-Туре	Decision	(α:5%)		
Solvent Blank		Negative	Contr	ol -2.4	.05	1.86	0.126	8	0.9786	CDF	Non-Sign	ificant Effect		
ANOVA Table		Cum Cau	aros	Me	an So	ware	DF		F Stat	P-Value	Decision	(α:5%)		. <u></u>
Source		0.0650383	22	0.0	65938	332	1		5.786	0.0428	Significar	nt Effect		
Between		0.00000000	,2 38	0.0	11396	596	8							
Total		0.157114					9							
Distributiona	al Test	ts				<u></u>	. <u></u>							
Attribute		Test				Test Stat	Critic	al	P-Value	Decision	(α:1%)			
Variances		Variance	Ratio	F		1.515	23.15		0.6972	Equal Va	riances			
Distribution		Shapiro-\	Wilk V	V Normality	r	0.8703	0.741	1	0.1009	Normal D	istribution			
Mean Dry W	eight-	mg Summa	ary											0/ - 554
C-ma/L	Cor	ntrol Type	Co	unt Me	ean	95% LCL	95%	UCL	Median	Min	Max	Std Err	CV%	%Eπect
0	Solv	vent Blank	5	1.1	131	0.9857	1.277	,	1.118	1.004	1.254	0.0524	7 26%	-14 36%
0	Neg	ative Contro	ol 5	1.1	294	1.175	1.412	2	1.262	1.178	1.398	0.04258	7.30%	-14.50 //
Mean Dry W	eight	mg Detail												
C-ma/L	Cor	ntrol Type	Re	p1 R	ep 2	Rep 3	Rep	4	Rep 5	·				
0	Sol	vent Blank	1.2	.54 1.	032	1.118	1.004	1	1.248					
0	Neg	jative Contr	ol 1.3	98 1.	244	1.178	1.262	2	1.386			~		
Graphics		<u></u>												
									1.3E-01			1		
14	ſ		٦						Ē				•/	



Analyst: MM

QA:<u></u>



APPENDIX C – Ceriodaphnia dubia Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

	Client: <u>WDGE</u> Work Order No.: 170516	Start Date/Time: <u>July G/A 1200</u> Set up by: <u>A</u> 9(/BM/M
	Sample Information:	Test Validity Criteria:
	Sample ID: <u>NUTPH - DX</u> Sample Date: <u>MQU 19/17</u> Date Received: <u>MQU 19/17</u>	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.
	Test Organism Information:	 4) Invalid if ephippia observed in any control solution at any time. WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 ; pH = 6.0 to 9.0
	Broodstock No.:	063017B
	Age of young (Day 0): Avg No. young in first 3 broods of previous 7 d: Mortality (%) in previous 7 d: Individual female # used ≥8 young on test day	$\frac{24-h \text{ (within 8-h)}}{20}$
	NaCl Reference Toxicant Results:	
-	Reference Toxicant ID:CalloStock Solution ID:June 21/17Date Initiated:17000000000000000000000000000000000000	
	7-d LC50 (95% CL): $2.1(1.5 - 3.6)$ 7-d IC50 (95% CL): $(.8C(.7 - 1.6))$	g/L NaCL
	7-d LC50 Reference Toxicant Mean and Historical 7-d IC50 Reference Toxicant Mean and Historical F	Range: 2.0 <u>(1.8-2.2) g/L NaCL</u> CV (%): 5 Range: 1.5 <u>(1.1-2.1) g/L NaCL</u> CV (%): 18
	Test Results: (Mg/LDieRL)	5.23(0.20-0.26) Survival ew Reproduction
	<u>1C25 %√√ (95% CL)</u> er	$\frac{0.14(0.13 - 0.15)}{0.14(0.13 - 0.15)} 0.17(0.16 - 0.19)$
	NOEC %	0.77-(0.15-0.26) 0.20(0.14-0.24) 0.18 0.77 - 0.47 0.15
	()endpoint calculated un	0.37 0.34 + O.TO 0.77
	Reviewed by:	_ Date reviewed: Ang · 25/17
	na ann an Aonaichtean ann an Aonaic Ann an Aonaichtean ann an Aonaichtean Ann an Aonaichtean ann an Aonaichtea	0

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

Olionti	sino	-			-		Stor	t Data S	Timos	1	1. 1	n.	170	ah
Sample ID:	NUC			fn	ral	•	Star	Date o	k Time: 2. Time:	-Ju Tu	M B	1120	$\frac{1}{2}$	
Work Order #:		VETI			<u>KRÍ</u>	•]	0.01	Test Sr	ecies:	Cerioda	aohnia (dubia		<u> </u>
			<u> </u>								-p			
(mgil her	21)				÷									
							Da	nys				-		
Concentration	0		1	:	2		3		4		5	6		7
control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	250	24.0	250	N4,2	2513	MP	250	24.0	25.0	24.0	25-0	<u>24.0</u>	25.0
DO (mg/L)	8.1	76.	80	8.F	8.0	73	S-D	+0	8.0	71	5.0	73	<u>8.0</u>	7.2
рН	8.1	77	80	7.7	8.F	7.6	77	76	0.8	75	8.0	7.6	<u>8.0</u>	26
Cond. (µS/cm)	206	2	10	21	25	20	4	20	M	20	8	20	<u>s</u>	an
Initials	<u>Emm</u>	Ĥ.	nn	<u>,</u>	W	A		En	<u>nn</u>	EM	M <u>)</u>	Emi	η	HM
			/											······
		1		T		· · · · · ·	Da	ays		T		1		
Concentration	0	-	1	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	2		3		4		5	6	a secondar est	7
acetone control	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	150	240	250	wo	200	24:0	250	<u>24.C</u>	<u>25 0</u>	<u>74.0</u>	15.0	<u>M0</u>	25.0
DO (mg/L)	8.1	16	Bo	7.9	8.1	72	\$79	<u> 13</u>	29	13	80	13	<u>82</u>	73
рН	8.1	46	<u>¢1</u>	7.87	8.0	75	78	26	80	45	<u> 19</u>	76	<u>+%</u>	46
Cond. (µS/cm)	206	$\frac{\partial Q^{c}}{\partial t}$	1	2	05	2	s4	20	5	20	14	20	8	211
Initials	<u>Emm</u>	tm	n	<u> </u>	Г 	Ø	~	E n	<u>1m</u>	EW.	<u>17 </u>	L th	<u>im</u>	ΘM
r														
		1		T		1	Da	ays		r		1		
Concentration	0		1 1:#1:#1:5:#10	- 27 28028 - 200 C	2 		3 ·	(Sector Sector)	4		5 1958/1958/19	6		7
0.045	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	<u>M.U</u>	150	<u>Ku</u>	1200	240	15.3	NP	15:0	<u>140</u>	h0	<u>K4.0</u>	5.0	LYD	15.0
DO (mg/L)	KI-	10	00	7.9	8.1	37	7.0	48	01	12	8	+-1	200	\$2
pH	01	1.0	0.0	7-70	5.0	75	18	140	20	45	T. J	100	51	20
Cond. (µS/cm)	100		1	121	+	L''U	М	200	1	<i>FI</i> ($\frac{1}{n}$	20	4	100
Initials	<u>tinn)</u>	T1/1	· • ·	A	-	L	<u>}-</u>	<u>L th</u>	<u> </u>	THI	/		<u></u>	HPPP /
· ·	1			· ·	· ·								· .	
Concentration		1	4				Da	ays I			-			
	0		1 1730-504-513		Z Constant V		3 1997-1972	2/1422/33	4 		5 1985-33-34	6		7
					new	DIO	new	old	new		new	old	<u>new</u>	tinal
	610	68	64.U	701	0.0	72	29	R20	01	H20	14.0	150	<u>01.0</u>	23.0
	81	TY	Rí-	17.5	8.0	25	78	$\frac{\pi o}{1}$	G1 Q0	5-	8	$\overline{\overline{n}}$	$\frac{0 - \alpha}{\alpha}$	+0
Cond (uS/cm)	DAD	300	2	215	1	1,50	116	1300	$\frac{ c \mathcal{L} }{1}$	1.0	10.0	1010	$\frac{1}{2}$	100
Initials	Linno	L'M	n	1	<u>Г</u>	A A	<u>11 80</u>	1 Dr	In	Dr	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- Am	m	Emm
Innais	Q ###7 }	<u> </u>	/					(a v .	<u> </u>			1 (17)		
Thermometer:	Ц		DO met	er: 2	-	n	H motor:	4		C 0	nductivi	ty motor:	2	
	3					. P	i i ineter.	<u> </u>	ň	_ 00	nuucuvi	ty meter.		
	Co	ntrol	1]	Analys	ts:	FMMA.	ЧИ	AND
Hardness*	10	0								· · · · · · · · · · · · · · · · · · ·		TI)	- 	- transp
Alkalinity*	9	8]	Review	ved by:	Ja	R	
* mg/L as CaCO3									1	Date rev	viewed:	An	2.21	17-
		•.		- *		1			,				l	
Sample Description	1:	(hesel	sta	ndar	0								
Commenter	Brood	board	lead -	$\Lambda \mathcal{D}$	Ain		5		7					
voninenta.	BIUUQ	uuaru (Jaeu:	<u>~</u>	JIT	> (7)	~ e~! .	3 30	9	• • • •	· · · · ·			
Version 1.3 Issued May	22, 2015										Nat	utilus Enviror	mental Co	ompany Inc.

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Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

· · ·								a 1
Client:	N 00	E ·		Star	t Date & Time:	July 6	117-01-20	ion -
Sample ID:	NW	TPH-DX	DIRE	_) Stoj	o Date & Time:	JULIE	11ta) 130	<u>Hoho</u> l
Work Order #:	i74	36		_	Test Species:	Ceriodaphnia d	lubia	
(mgil Diese	1)						· ·	1
				Da	ays		·-	.
Concentration	0	1	2	3	4	5	6	7
0.19	init.	old ne	w old new	old new	old new	old new	old new	final
Temperature (°C)	24.0	50 74.	0 200 240	2510 220	25.024.0	250 24.0	250740	<u>45.9</u>
DO (mg/L)	81	73.77	- 7.8 8.3	72 20	7281	7.1 8.1	428	4.
pH	81	78 81	7.6 8.1	25 77	7677	77 7.8	7779	7.6
Cond. (µS/cm)	208	208	217	215	208	209	208 '	211
Initials	HMM	+PMM	J.W	A	EMM	Emm	EMM	HM I
						/		
				D	ays			
Concentration	0	1	2	3	4	5	6	7
038	init.	old ne	w old new	old new	old new	old new	old new	final
Temperature (°C)	240	150 74	0 200 200	2613 213	25.6240	250240	25.014.0	125.0
DO (mg/L)	18.7	第3 年	7 7.8 8.3	71 76	7.180	7.1 81	7.2-81	17.1
Ha	21	7.8 81	7.6 8.0	25 27	4677	77 78	77-29	26
Cond. (uS/cm)	208	908	210	214	209	210	209	211
Initials	FMM	+mm	JW	ton	Emph	Emm	FMM	tim
	10.20.444 F			<i>ja</i>		<u></u>		
	1	· · · · · · · · · · · · · · · · · · ·		D	ays		ъ.,	
Concentration	0	1	25.0 2 24.0	257. 3 247	4	5	6	7
0.15	init.	old ne	w old new	old new	old new	old new	old new	final
Temperature (°C)	14.0	250 24	0 200 100	10010 177 30	250740	250740	25.074.0	175.6
DO (mg/L)	8.1	73 1-	7 7.8 8.3	3270	73 7.8	17.2 8.0	73 81	7.2
pH	81	7.28	7.8 8.1	35 77	7627	120 78	7679	26
Cond. (µS/cm)	209	209	216	215	210	211	209	210
Initials	Emm	Fmm	NC	A	EMM	+mn	EMM	AM
· · · · · · · · · · · · · · · · · · ·	<i>j</i>		· ·	· · · ·				
	1	· · · · · · · · · · · · · · · · · · ·		. D	avs		1.2	
Concentration	0	1	25.0 2 24.0	3	Quel 4	5	6	7
15	init	old	w old new		old	old new	old new	final
Temperature (°C)	140	200 94	0 200 700	2 7550 440	150746			
DO (mg/L)	21	14 10	0 7.7 8.2	72 75	1129			
Ha	181	29 8	1 7.7 8.0	35 77	7=27			+1
Cond. (uS/cm)	209	288	215	2.13	2071	1	<u> </u>	+
Initials	Ann	Emm	WC ·	A-	fmn .	<u></u>		+
•	-19.4 <u>4.49.4</u>			*	1 2 8 4 9 /			
Thermometer:	L	DO	meter: 2	nH meter		Conductiv	ity meter: J	-
	<u>»-</u>			pi + incee i			ity meter	
· · ·	Co	ntrol				Analysts:	FMM .MM	AND
Hardness*	10	0				•	itt	
Alkalinity*	9	8		·		Reviewed by	:16U	
* mg/L as CaCO3						Date reviewed	: Ang.2	1.12
			• • •	•			11	1
Sample Description	ו:	Dies	el Standa	rd	· · · · · · · · · · · · · · · · · · ·	·		
C						•		
comments:	Brood	board Used	: 00017	<u>K (#'21</u>	<u>→30)</u>			
Version 1.3 Issued May	22, 2015	·			F	Na	autilus Environmental (Company Inc.
1. A. A.								

2123

Chronic Freshwater Toxicity Test Initial and Final Water Quality Measurements

ample D: NULTEN- LX (URX) Stop Date & Time: LRA B/14-80, CTUS, Test Species: Cenced prime dubie (MQ/L, CASU) Concentration 0 1 2 3 4 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Client:	wp	Œ		٦		_	Star	t Date a	& Time:	kali	, Gr	tast	rah	<u> </u>
Vork Order #: If CSU- Test Species: Cencoapfinia dubia (MA/L_DASL) Days 5 6 7 Concentration 0 1 2 3 4 5 6 7 Do (mg/L) 2 3 4 5 6 7 Initials FMM9 Thirt old new final 0 0 1 2 Concentration 0 1 2 3 4 5 6 7 Initials FMM9 CP/Pn 1	Sample ID: NU	UTP-1		Dx	CDL	SU)		Stop	o Date a	& Time:	Ď	ills B	11ta	, CTV	17
(Magl: Gasci) Days Concentration 0 1 2 3 4 5 6 7 Temperature (*C) 100 (mg/L) 2/10 2/00 1 <td< td=""><td>Nork Order #:</td><td>He</td><td>36</td><td>- 1</td><td></td><td></td><td></td><td></td><td>Test Sp</td><td>pecies:</td><td>Ceriod</td><td>aphnia d</td><td>dubia</td><td></td><td>, در </td></td<>	Nork Order #:	He	36	- 1					Test Sp	pecies:	Ceriod	aphnia d	dubia		, در
Concentration 0 1 2 3 4 5 6 7 Temperature (°C) MUD DSS 1 2 3 4 5 6 7 Do (mg(L) D-1 23 1	(mail non	1)													
Concentration 0 1 2 3 4 5 6 7 Temperature (°c) 14,0 D5 1 <	(MGIL INSK	<u>(</u>)				· · ·				•					
Concentration 0 1 2 3 4 5 6 7 Temperature (°C) 74,0 250 new old new final old new final old new old new final old new final	• • •		1		T			Da	ays		T		· · · · · · · ·		
2 init old new old new old new old new finat DO (mg/L) B.1 F3	Concentration	0		1 10500302500		2	an a the second	3 Tanka asar		4 (Sec. 200, 000-0		5		6	7
Temperature (*C) PH B B-2 D0 (mgL) B-1 F2 Initials FMM) FMM Concentration 0 1 2 Concentration 0 1 2 D0 (mgL) CO Concentration 0 D0 (mgL) CO CO Concentration D0 (mgL) CO CO CO D0 (mgL) CO CO CO </td <td>2</td> <td>init.</td> <td>old</td> <td>new</td> <td>old</td> <td>new</td> <td>old</td> <td>new</td> <td>old</td> <td>new</td> <td>old</td> <td>new</td> <td> old</td> <td>new</td> <td>final</td>	2	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
DO (mg/L) B: FT3 Image: State of the state of th	Temperature (°C)	<u>RUD</u>	250	ļ	ļ										·
pH SI SI <thsi< th=""> SI SI <ths< td=""><td>DO (mg/L)</td><td>8.1</td><td><u>to</u></td><td>ļ</td><td>· ·</td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></ths<></thsi<>	DO (mg/L)	8.1	<u>to</u>	ļ	· ·			-							
Cond. (µS/cm) 210 210 210 Initials fW/3 fW/3 fW/3 fW/3 Concentration 0 1 2 3 4 5 6 7 Initials init. old new old new old new old new old new final Image: State of the state of	рН	81	89							<u> </u>					
Initials FM/D FM/D Concentration 0 1 2 3 4 5 6 7 Temperature (°C) MD 25 C Imit. old new final Concentration 0 1 2 3 4 5 6 7 Initials 01 new old new old new old new old new final DO (mgL) 0 1 2 3 4 5 6 7 Initials 0 1 2 3 4 5 6 7 DO (mgL	Cond. (µS/cm)	210	2	0				•							
Concentration 0 1 2 3 4 5 6 7 Temperature (°C) 1/0.025 O	Initials	FMM	5	mm											
Days Concentration 0 1 2 3 4 5 6 7 Temperature (°C) [H,D,25,0] 1							•								
Concentration 0 1 2 3 4 5 6 7 Concentration 0 1 2 3 4 5 6 7 De (mg/L) 0:0 1:0	Z CALLER		-					Da	ays						
G init old new old new old new old new final DO (mg/L) 0.0 1.	Concentration	0		1		2		3		4		5		6	7
Temperature (°C) 14.0 25.0 DO (mg/L) 8.2 83 pH 8.2 83 Initials 100 (mg/L) Cond. (µS/cm) 2.1 2 3 Initials 100 (mg/L) DO (mg/L) 0 1 2 2 3 4 5 6 7 initials 100 (mg/L) DO (mg/L) 1 1 2 3 4 5 6 7 7 Initials 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 1 1 2 1 1 1 1 1 1 <	6	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
DO (mg/L) 8.0 1.8 1.1 pH 8.2 93 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 2.3 4 5 6 7 Initials Imit. old new	Temperature (°C)	24.0	250									And a local division of the			
pH 2.2 2.3 1 Cond. (µS/cm) 2.12 2.13 1 <td>DO (ma/L)</td> <td>8.0</td> <td>18</td> <td>· · · · · · · · · · · · · · · · · · ·</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td>Constanting of the local division of the loc</td> <td></td> <td></td> <td></td> <td></td> <td></td>	DO (ma/L)	8.0	18	· · · · · · · · · · · · · · · · · · ·	1					Constanting of the local division of the loc					
Cond. (µS/cm) 212 213 1	pH	82	83		No. of Concession, Name	and the second	AND DESCRIPTION OF THE OWNER.			1	····				
Initials Image: State of the state of	Cond. (uS/cm)	5.2	50	2		1		I		1		L		1	
Days Concentration 0 1 2 3 4 5 6 7 Init old new	Initiale	Ennin		ma						· · · · ·					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	initials	<u> </u>		11-11			I		L				l <u></u>		,
Oncentration 0 1 2 3 4 5 6 7 Init. old new final old new old new final old final <t< td=""><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		1													
Concentration 0 1 2 3 4 5 6 7 init. old new final new old new final new fina	0		r			_		Da	iys		1				
init. old new old <t< td=""><td>Concentration</td><td>0</td><td>1077 av 2607 av</td><td>1 Exception</td><td>and writigitizhen.</td><td>2</td><td></td><td>3</td><td></td><td>4 1</td><td>-</td><td>5</td><td>Gorden and Artes</td><td>6</td><td>7 -</td></t<>	Concentration	0	1077 av 2607 av	1 Exception	and writigitizhen.	2		3		4 1	-	5	Gorden and Artes	6	7 -
Imperature (°C) Do (mg/L) Do (mg/L) Do (mg/L) pH Do (mg/L) Do (mg/L) Do (mg/L) Do (mg/L) Initials Do (mg/L) Do (mg/L) Do (mg/L) Do (mg/L) Concentration 0 1 2 3 4 5 6 7 Initials Do (mg/L) Do		init.	old	new	old	new	old	new	old	new	old	new	old	new	final
DO (mg/L) pH	emperature (°C)					ļ	·			<u> </u>					
pH	DO (mg/L)			ļ	ļ										
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Initials Days Concentration 0 1 2 3 4 5 6 7 init. old new final DO (mg/L)	Cond. (µS/cm)														
Concentration 0 1 2 3 4 5 6 7 Init. old new final DO (mg/L)	Initials				· .							-			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $															
Concentration 0 1 2 3 4 5 6 7 init. old new final DO (mg/L)								Da	iys						
Init. old new old new old new old new final Temperature (°C) Image: Condective of the second of	Concentration	0		1		2		3		4		5		6	7
Temperature (°C) Image: Constraint of the second secon		init.	old	new	old	new	old	new	old	new	old	new	old	new	final
DO (mg/L) pH pH pH pH pH pH pH pH Cond. (µS/cm) Initials pH meter: Y Conductivity meter: Y Initials pH meter: Y PH meter: Y Conductivity meter: Y Marciness* IOQ Analysts: IMM ML, Analysts: IMM ML, Hardness* IOQ Analysts: IMM ML, Analysts: IMM ML, MaxO; Mu IOQ IOQ IOQ IOQ IOQ Alkalinity* IQ IOQ IOQ IOQ IOQ IOQ ample Description: DIOXEL Standard IOC IOQ IOQ IOQ IOQ omments: Broodboard Used: OG3OI7B C# 21 730 IOQ IOQ IOQ	Temperature (°C)								<u></u>	·	of the other states of the states of			13	
pH Cond. (µS/cm) Initials D0 meter: 2 pH meter:	DO (mg/L)														
Cond. (µS/cm) Initials Initials D0 meter: 2 pH meter: 4 iermometer: Y D0 meter: 2 PH meter: 4 Hardness* I/O I/O Analysts: Image:	pH									<u> </u>					
Initials DO meter: 2 pH meter: 4 Conductivity meter: 2 hermometer:	Cond. (uS/cm)			L				L		L		I		L	· · ·
hermometer: <u><u><u></u></u><u>DO meter</u>. <u><u>2</u><u>pH meter</u>. <u><u>Conductivity meter</u></u>. <u><u>Analysts</u></u>. <u><u>Environal Analysts</u></u>. <u><u>Analysts</u></u>. <u><u>Environal Analysts</u></u>. <u><u>Analysts</u></u>. <u><u>Analysts</u>. <u><u>Analysts</u></u>. <u><u>Analysts</u></u>. <u><u>Analysts</u>. <u><u>Analysts</u></u>. <u><u>Analysts</u>. <u><u>Analysts</u></u>. <u><u>Analysts</u>. <u><u>Analysts</u></u>. <u><u>Analysts</u>. <u>Analysts</u>. <u><u>Analysts</u>. <u>Analysts</u>. <u><u>Analysts</u>. <u>Analysts</u>. <u><u>Analysts</u>. <u>Analysts</u>. <u><u>Analysts</u>. <u>Analysts</u>. <u><u>Analysts</u>. <u>Analysts</u>. <u>Analysts</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>	Initials														
Hardness* IOQ Analysts: EMM, ML; Alkalinity* 98 Alkalinity* 98 Alkalinity* Alka	iermometer:	4		DO mete	er:		pł	H meter:	4	 	Coi	nductivit	y meter:	2	
Alkalinity* QX mg/L as CaCO3 Reviewed by: ample Description: DIESEL StavAava omments: Broodboard Used: 063017B Gt 21730	Hardness*	1/1)								Analys	ts:	EWN	<u>ryn</u>	<u></u>
mg/L as CaCO3 Reviewed by: fdc mg/L as CaCO3 Date reviewed: fdc ample Description: DIBSEL Standard Date reviewed: omments: Broodboard Used: 063017B (# 21736)	Alkalinitv*	183	7			/	-				Daute		_HA	J.U	2
ample Description: <u>DIESEL Stavaava</u> omments: <u>Broodboard Used:</u> 063017B (# 21,336)	mg/L as CaCO3		9		\langle]	Review	ved by:	-10	n	12 -
omments: Broodboard Used: 063017B (# 21,736)	ample Description:			Diese	el si	GVA	nd			Ľ	ate rev	iewed:	/17	<u>y.</u> 2/	17
	omments:	Brood	board U	sed:	06	301-	HB 1	¥2	1.721	5)					
	Nordan Color Service					*		<u></u>	· I K	·)	·····				

Nautilus Environmental Company Inc.

Chronic Freshwater Toxicity Test C. <i>dubia</i> Reproduction Data
Client: UNDOF DESEL) NUTPH-DX DESEL) Start Date & Time: JULU 6/17-00 (200 h. Sample ID: NUTPH-DX 1201 (200 h. Stop Date & Time: JULU (3/17-00 (200 h. Work Order: DUTPH-DX 1201 h. Stop Date & Time: JULU (3/17-00 (200 h. Stop Date & Time: JULU (3/17-00 h. Stop Date & Time: JULU (3/17-00 h. Stop Date & Time: JULU (3/17-00 h. St
Days Concentration: COMT/CA CO Concentration: Concentration: O.O45 1 A B C D E F G H J Init A B C D E F G H J Init 2 V V V V V V V V V
3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
8 Total 9 20 2927 8 18 17 22 23 21 MMH 16 18 21 19 19 17 5 18 18 MM 19 20 18 18 17 21 20 12 17 17 14 MM
Days Concentration: O.O7 Concentration: O.O3 A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init J Init <
3 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
· · · · · · · · · · · · · · · · · · ·

Davs Concentration: 0.15 [Concentration: 3.0
A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init A B C D E F G H I J Init 1 ////////////////////////////////////
4 2 4 6 1 3 1 3 4 mm / / ~ / × 1 1 mm
TOTAL (1) 9 8 CX 0x 15 CX (1) 4 0x (1) 0x (CX 0x
Notes: X = mortality.
Sample Description: <u> </u>
Reviewed by: Jeff. Arg. 2/17
Version 2.1 Issued July 29, 2009

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Nautilus Environmental

	Chronic Freshwater Toxicity Te C. <i>dubia</i> Reproduction Data	of the second	C
Client: Sample ID: Work Order:	WORE A COLORED ACMINAL MANNAL MANNAL	Start Date & Time: Ulu 6/14 00 1300 N Stop Date & Time: Julu 13/14 00 2014 Stop	6
Concentration	on: 6.0 Iconcentration	Concentration	
	C D E F G H I J MI A B C D E F G H X X X X X X YMM A B C D E F G H	J Init A B C J A B C D E F G A B C D E F J	
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4 4			
ი <u></u>			
×			
	M CN CN CN CN CN (40)		
Concentration	n: Concentration:	Concentration	
Days A B C	C D E F G H I J Init A B C D E F G H	J Init A B C D E F G H I J Init	
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3 2			
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5			
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7			
8			
Total			
Dave Concentration	n: Concentration:	Concentration:	
A B C	C D E F G H I J Init A B C D E F G H I	J Init A B C D E F G H I J Init	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
4			
2			
9			
. 8			
Total			
Notes: X = mortality			
Sample Description:	" see water quality sheet		
COMMERCIS: Total	al # Young only based on the first 3 Broods. Fourth and subsequed t broods not included in total count.		
Reviewed by:	Store	Date reviewed: Aws. 2 / 17	

Nautitus Environmental

Version 2.1 Issued July 29, 2009

W.O.H. 17050

# Hardness and Alkalinity Datasheet

				Alkal	inity				Hardnes	ss	
(	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO ₄ used to pH 4.2	Total Alkalinity (mg/LCaCO ₃ )	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L CaCO ₃ )	Technician
Э	NWTPH-DX	maniquit	Photo 1911-	1		1		1	1	1	~~~~~
	JUI, RENUT	Th	₽ ₽	20.	S O	S.1	98	SC	S S	100	thm
	CHV			×							
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	Notes: (í) )¥	andara	Chemie	r 1							
-		-									
	Reviewed by:		Jer	)			Date Reviewe	ť	Ą	N. V. N	
								5			

Nautilus Environmental Company Inc.

Version 1.1 Issued July 28, 2016

# **CETIS Summary Report**

Report Date: Test Code: 22 Dec-17 10:58 (p 1 of 3) 170516c | 14-1572-3122

Ceriodaphnia	7-d Survival and Rep	roduction Te	st						Nautilus Environmental
Batch ID: Start Date: Ending Date: Duration:	17-4821-2249 06 Jul-17 12:00 13 Jul-17 07:45 6d 20h	Test Type: Protocol: Species: Source:	Reproduction EPA/821/R-02 Ceriodaphnia In-House Cult	-Survival (7d) 2-013 (2002) dubia ure			Analyst: Diluent: Brine: Age:	Emma Mai 20% Perrie <8h	rus or Water
Sample ID: Sample Date: Receive Date: Sample Age:	07-6142-9744 19 May-17 11:15 19 May-17 11:15 48d 1h	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-Dx				Client: Project:	WDOE	
Comparison S	ummary								
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	τU	Meth	od	
03-4172-7690	7d Survival Rate	0	>0		NA		Fishe	er Exact Tes	t
00-4799-0384	7d Survival Rate	0.22	0.34	0.2735	NA		Fishe	er Exact/Bor	ıferroni-Holm Test
04-4584-0796	Reproduction	0.15	0.22	0.1817	22.6%		Stee	I Many-One	Rank Sum Test
06-8611-0723	Reproduction	0	>0		15.8%		Wilco	oxon Rank S	um Two-Sample Test
Point Estimate	Summary								
Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Meth	od	
05-4281-5112	7d Survival Rate	EC50	0.2322	0.2046	0.2636		Spea	ırman-Kärbe	
19-2673-4690	Reproduction	IC5	0.1508	0.09271	0.1563		Linea	ar Interpolati	on (ICPIN)
		IC10	0.1564	0.1291	0.1635			•	
		IC15	0.1622	0.1478	0.1705				
		IC20	0.1679	0.1565	0.1797				
	,	IC25	0.1737	0.1632	0.1891				
		IC40	0.1912	0.1794	0.2219				
		IC50	0.203	0.1884	0.2408				
Test Acceptabi	ility								· · · · · · · · · · · · · · · · · · ·
Analysis ID	Endpoint	Attribu	ute	Test Stat	TAC Limit	ts	Over	lap Decis	sion
00-4799-0384	7d Survival Rate	Contro	l Resp	1	0.8 - NL		Yes	Pass	es Acceptability Criteria
03-4172-7690	7d Survival Rate	Contro	l Resp	1	0.8 - NL		Yes	Pass	es Acceptability Criteria
	7d Survival Rate	Contro	Resp	1	0.8 - NL		Yes	Pass	es Acceptability Criteria
05-4281-5112	7d Survival Rate	Contro	l Resp	1	0.8 - NL		Yes	Pass	es Acceptability Criteria
04-4584-0796	Reproduction	Contro	l Resp	16.8	15 - NL		Yes	Pass	es Acceptability Criteria
06-8611-0723	Reproduction	Contro	l Resp	16.8	15 - NL		Yes	Pass	es Acceptability Criteria
	Reproduction	Contro	Resp	20.2	15 - NL		Yes	Pass	es Acceptability Criteria
19-2673-4690	Reproduction	Contro	l Resp	16.8	15 - NL		Yes	Pass	es Acceptability Criteria
04-4584-0796	Reproduction	PMSD		0.2259	0.13 - 0.47		Yes	Pass	es Acceptability Criteria
06-8611-0723	Reproduction	PMSD		0.1581	0.13 - 0.47		Yes	Pass	es Acceptability Criteria

000-469-187-1



CETIS S	ummary Repo	rt	Re Te	port Date: st Code:	22	22 Dec-17 10:58 (p 2 of 3) 170516c   14-1572-3122					
Ceriodaphnia 7-d Survival and Reproduction Test Naut 7d Survival Rate Summary C-mg/L Control Type Count Mean 95% LCL 95% UCL Min Mean Std For Std For Std For											ironmental
7d Surviva	I Rate Summary										
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	10	1	1	1	1	1	0	0	0.0%	0.0%
0	Negative Contro	10	1	1	1	1 .	1	0	0	0.0%	0.0%
0.04		10	1	1	1	1	1	0	0	0.0%	0.0%
0.07		10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	1	1	1	1	1	0	0	0.0%	0.0%
0.15		10	1	1	1	1	1	0	0	0.0%	0.0%
0.22		10	0.6	0.2306	0.9694	0	1	0.1633	0.5164	86.07%	40.0%
0.34		10	0	0	0	0	0	0	0		100.0%
0.5		10	0	0	0	0	0	0	0		100.0%
0.75		10	0	0	0	0 .	0	0	0		100.0%
Reproduct	ion Summary	_									
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	10	16.8	13.68	19.92	5	21	1.381	4.367	25.99%	0.0%
0.04	Negative Control	10	20.2	18.7	21.7	17	23	0.6633	2.098	10.38%	-20.24%
0.04		10	17.9	16.1	19.7	12	21	0.7951	2.514	14.05%	-6.55%
0.07		10	10.0	10.87	20.33	14	23	0.763	2.413	12.97%	-10.71%
0.15		10	10.2	17.14	19.26	16	20	0.4667	1.4/6	8.11%	-8.33%
0.22		10	61	10.00	19.14	11	21	0.9	2.846	16.64%	-1.79%
0.34		10	0.4	1.625	10.96	0	15	2.023	0.398	99.97%	61.9%
0.5		10	0	0	0	0	0	0	0		100.0%
0.75		10	0	0	0	0.	0	0	0		100.0%
7d Surviva	I Rate Detail			-	-			· · · · · · · · · · · · · · · · · · ·			
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Ren 7	Ren 8	Ren 9	Ren 10
0	Solvent Blank	1	1	1	1	1	1	1	1	1	1
0	Negative Control	1	1	1	1	1	1	1	1	1	1
0.04	-	1	1	1	1	1	1	1	1	1	1
0.07		1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1 1	4	1	1	1	1
0.15		1	1	1	1	1	1	1	1	1	1
0.22		1	4	1	0	1 0	1	1	1	1	1
0.34		0	0	1	0	0	1	0	1	1	0
0.5		0	0	0	0	0	0	0	0	0	0
0.75		0	0	0	0	0	0	0	0	0	0
Reproducti	on Detail	<u></u>									
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Ren 7	Ren 8	Ren 9	Ren 10
0	Solvent Blank	17	16	18	21	19	19	17	5	18	18
0	Negative Control	19	20	23	22	18	18	17	~ ??	22	21
0.04	·	19	20	18	18	17	21	20	12	17	21 17
0.07		20	16	18	19	23	20	18	10	10	17
0.1		17	10	10	16	2J 16	10	10	19	19	14
0.15		18	18	16	20	10	10	20	18	19	20
0.22		14	0	0	20	19	17	21	16	15	11
0.34		0 0	9	0	0	0	15	0	14	4	0
0.5		0	0	0	U	υ.	0	0	0	0	0
0.75	*	0	U	0	U	0	0	0	0	0	0
0.10		U	U	U	0	0	0	0	0	0	0

Solvent blank = acetone Control

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7062 <u>Jan. 9</u>/18

# **CETIS Summary Report**

Report Date:	22 Dec-17 10
Test Code	170516011

Test Code:

:58 (p 3 of 3) 170516c | 14-1572-3122

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmenta	I
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7d Survival	Rate Binomials										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Solvent Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.04		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.07		1/1	1/1	1/1	1/1	1/1 ·	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.15		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.22		1/1	1/1	1/1	0/1	0/1	1/1	0/1	1/1	1/1	0/1
0.34		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
0.5		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
0.75		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

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1 an 9/18

Report Date:11 Jan-1Test Code:17051

Ceriodaphnia	a 7-d Survival and	d Reproduc	tion Te	st					Na	utilus Env	ironmental
Analysis ID: Analyzed:	05-4281-5112 22 Dec-17 10:5	End 5 Ana	point: ysis:	7d Survival Rate Untrimmed Spe	e arman-Kär	ber	CET Offi	'IS Version: cial Results:	CETISv1. Yes	8.7	
Batch ID:	17-4821-2249	Test	Type:	Reproduction-S	urvival (7d)	)	Ana	lyst: Emn	na Marus		
Start Date:	06 Jul-17 12:00	Prot	ocol:	EPA/821/R-02-0	)13 (2002)		Dilu	ent: 20%	Perrier Wa	ter	
Ending Date:	13 Jul-17 07:45	Spe	cies:	Ceriodaphnia du	ubia		Brin	ie:			
Duration:	6d 20h	Sou	rce:	In-House Cultur	e	•	Age	: <8h			
Sample ID:	07-6142-9744	Cod	e:	2D627EF0	,	· ·	Clie	nt: WD0	DE		
Sample Date:	19 May-17 11:1	5 Mate	erial:	Diesel			Proj	ect:			
Receive Date	: 19 May-17 11:1	5 <b>Sou</b>	rce:	WDOE							
Sample Age:	48d 1h	Stat	ion:	NWTPH-Dx		•					
Spearman-Ka	irber Estimates										
Threshold Op	otion Th	reshold	Trim	Mu	Sigma		EC50	95% LCL	95% UCL		
Control Thres	hold 0		0.00%	-0.6341	0.02753		0.2322	0.2046	0.2636		
Test Accepta	bility Criteria										
Attribute	Test Stat	TAC Limit	S	Overlap	Decision	l					
Control Resp	1	0.8 - NL		Yes	Passes A	cceptability	Criteria				
7d Survival R	ate Summary				Calcu	ulated Varia	te(A/B)				
C-mg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0 8	Solvent Blank	10	1	1	1	0	0	0.0%	0.0%	10	10
0.04		10	1	1	1	0	0	0.0%	0.0%	10	10
0.07		10	1	1	1	0	0	0.0%	0.0%	10	10
0.1		10	1	1	1	0	0	0.0%	0.0%	10	10
0.15		10	1	1	1	0	0	0.0%	0.0%	10	10
0.22		10	0.6	0	1	0.1633	0.5164	86.07%	40.0%	6	10
0.34		10	0	0	0	0	0		100.0%	0	10
0.5		10	0	0	0	0	0		100.0%	0	10
0.75	· · · · · ·	10		0	0	0 .	0		100.0%	0	10
7d Survival R	late Detail						_			÷	
	Sontrol Type	Kep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0 0	Solvent Blank	1	1	1	1.	1	1	1	1	1	1
0.04		1	1	1	1	1	1	1	1	1	1
0.07		1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	1
0.15		1	1	1	1	1	1	1	1	1	1
0.22		1	1	1	0	0	1	0	1	1.	. 0
0.34		0	0	. 0	0	0	0	0	0	0	0
0.5	•	0	0	0	0	0	0	0	0	0	0
0.75	·	0	0	0	0	0	0	0	0	0	0
7d Survival R	ate Binomials										
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Solvent Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	. 1/1	1/1	1/1	1/1
0.04		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.07		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.15		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.22		1/1	1/1	1/1	0/1	0/1	1/1	0/1	1/1	1/1	0/1
0.34		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
0.5		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
0.75		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
							• ·	•			

Analyst: EMM QA: JGL

CETIS Ana	alytical Report			Report Date: Test Code:	11 Jan-18 09:52 (p 2 of 2) 170516c   14-1572-3122
Ceriodaphnia	7-d Survival and Re	production T	est		Nautilus Environmental
Analysis ID:	05-4281-5112	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.8.7
Analyzed:	22 Dec-17 10:55	Analysis:	Untrimmed Spearman-Kärber	Official Results:	Yes
Graphics					



Analyst:<u>EMM</u>

<u> 166</u> <u>1an-</u>11/18 QA:

Report Date: Test Code:

11 Jan-18 09:50 (p 1 of 2) 170516c | 14-1572-3122

Ceriodaphnia	7-d Survival and Rep	roduction To	est		x		Nautilus E	nvironmen	ital
Analysis ID: Analyzed:	00-4799-0384 22 Dec-17 10:58	Endpoint: Analysis:	7d Surviva STP 2x2 C	l Rate contingency Tables	CETIS Vers Official Res	ion: Cl sults: Ye	ETISv1.8.7 es		
Batch ID: Start Date: Ending Date: Duration:	17-4821-2249 06 Jul-17 12:00 13 Jul-17 07:45 6d 20h	Test Type: Protocol: Species: Source:	Reproducti EPA/821/R Ceriodaphi In-House C	ion-Survival (7d) R-02-013 (2002) nia dubia Culture	Analyst: Diluent: Brine: Age:	Emma M 20% Peri <8h	arus rier Water		
Sample ID: Sample Date: Receive Date: Sample Age:	07-6142-9744 19 May-17 11:15 19 May-17 11:15 48d 1h	Code: Material: Source: Station:	2D627EF0 Diesel WDOE NWTPH-D	x	Client: Project:	WDOE			
Data Transform	m Zeta	Alt H	yp Trials	s Seed	NOEL	L LO	EL TOEL	TU	
Unitansformed		Ç > 1	NA	NA	0.22	0.3	4 0.2735		

#### Fisher Exact/Bonferroni-Holm Test

Control vs	C-mg/L	Test Stat	P-Value	P-Type	Decision(a:5%)
Solvent Blank	0.04	1	1.0000	Exact	Non-Significant Effect
	0.07	1	1.0000	Exact	Non-Significant Effect
	0.1	1	1.0000	Exact	Non-Significant Effect
	0.15	1	1.0000	Exact	Non-Significant Effect
	0.22	0.04334	0.2167	Exact	Non-Significant Effect
	0.34	5.413E-06	<0.0001	Exact	Significant Effect
	0.5	5.413E-06	<0.0001	Exact	Significant Effect
	0.75	5.413E-06	<0.0001	Exact	Significant Effect

#### **Test Acceptability Criteria**

Attribute	Test Stat	TAC Limi	ts	Overlap	Decision						
Control Resp	1	0.8 - NL		Yes	Passes Acceptability Criteria						
Data Summar	У										
C-mg/L	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	Solvent Blank	10	0	10	1	0	0.0%				
0.04	· · · · ·	10	0	10	1	0	0.0%				
0.07		10	0	10	1	0	0.0%				
0.1		10	0	10	1 ·	0	0.0%				
0.15		10	0	10	1	0	0.0%				
0.22		6	4	10	0.6	0.4	40.0%				
0.34		0	10	10	0	1	100.0%				
0.5		0	10	10	0	1	100.0%				
0.75		0	10	10	0.	1	100.0%				

#### 7d Survival Rate Detail

C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Solvent Blank	1	1	1	1	1	1	1	1	1	1
0.04		1	1	1	1	1.	1	1	. 1	1	1
0.07		1.	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1.	1	1	1	1	1
0.15		·1	1	1	1	1	1	1	1	1	1
0.22		1	1	1	0	0	1	0	1	1	0
0.34		0	0	0	0	0	0	0	0	0	0
0.5		0	0	0	0	0	0	0	0	0	0
0.75		0	0	0	0	0.	0	0	0	0	0

000-469-187-2



Report Date: Test Code:

#### 11 Jan-18 09:50 (p 2 of 2) 170516c | 14-1572-3122

#### Ceriodaphnia 7-d Survival and Reproduction Test

Ceriodaphnia	a 7-d Survival and	l Repr	oduction Te	est			N	autilus Env	/ironmental			
Analysis ID: Analyzed:	00-4799-0384 22 Dec-17 10:58	3	Endpoint: Analysis:	7d Survival R STP 2x2 Con	ate tingency Tal	oles	CETIS Version: CETISv1.8.7 Official Results: Yes					
7d Survival F	late Binomials											
C-mg/L	Control Type	Rep '	1 Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
0	Solvent Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
<b>O</b> ·	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
0.04		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
0.07		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
0.15		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
0.22		1/1	1/1	1/1	0/1	0/1	1/1	0/1	1/1	1/1	0/1	
0.34		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	
0.5		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	
0.75	1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	

Graphics



CETIS Ana	alytical Repo	ort							Report Da	ate:	22	2 Dec-17 10	:57 (p 1 of 1)
Ceriodaphnia	a 7-d Survival an	d Rep	roduction T	est					lest Code		١	lautilus En	vironmental
Analysis ID: Analyzed:	03-4172-7690 22 Dec-17 10:5	6	Endpoint: Analysis:	7d Sing	Survival Rat gle 2x2 Con	te itingency Ta	ble		CETIS Ve	rsion: esults:	CETIS	/1.8.7	· · · · · · · · · · · · · · · · · · ·
Batch ID: Start Date: Ending Date: Duration:	17-4821-2249 06 Jul-17 12:00 13 Jul-17 07:45 6d 20h	 	Test Type: Protocol: Species: Source:	Rep EP/ Cer In-H	oroduction-S A/821/R-02- iodaphnia d louse Cultu	Survival (7d) 013 (2002) lubia re			Analyst: Diluent: Brine: Age:	Emn 20% <8h	na Marus Perrier W	/ater	
Sample ID: Sample Date: Receive Date Sample Age:	07-6142-9744 19 May-17 11:1 19 May-17 11:1 48d 1h	5 5	Code: Material: Source: Station:	2D6 Dies WD NW	027EF0 sel OE TPH-Dx		. <u> </u>	(	Client: Project:	WDC	DE		
Data Transfor	rm	Zeta	Alt H	ур	Trials	Seed			Tes	t Resu	lt		
Fisher Exact Control Solvent Blank	Test vs Control	Control	C > T 	Stat	NA <b>P-Value</b>	NA P-Type	Decision	i(α:5%)	Pas	ses 7d	survival r	ate	
Test Acceptal Attribute	bility Criteria Test Stat	TAC	Limits		Overlap	Decision	Non-Sign						
Control Resp Control Resp	1 1	0.8 - 0.8 -	NL NL		Yes Yes	Passes Ad Passes Ad	cceptability cceptability	Criteria Criteria					-
Data Summar C-mg/L	y Control Type	NR	R		NR + R	Prop NR	Prop R	%Effe	ct	-		<u> </u>	, , , , , , , , , , , , , , , , , , ,
0	Solvent Blank Negative Contr	10 10	0 0		10 10	1	0	0.0% 0.0%					
7d Survival R	ate Detail												······
C-mg/L	Control Type	Rep 1	Rep 2		Rep 3	Rep 4	Rep 5	Rep 6	Rep	7	Rep 8	Rep 9	Rep 10
0	Solvent Blank Negative Control	1 1	1		1	1 1	1 1	1 1	1		1 1	1	1
7d Survival R	ate Binomials												
C-mg/L	Control Type	Rep 1	Rep 2		Rep 3	Rep 4	Rep 5	Rep 6	Rep	7	Rep 8	Rep 9	Rep 10
0	Solvent Blank Negative Control	1/1 1/1	1/1 1/1		1/1 1/1	1/1 1/1	1/1 1/1	1/1 1/1	1/1 1/1		1/1 1/1	1/1 1/1	1/1

Graphics



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CETIS	Ana	ytical Rep	ort						Repo Test	ort Date: Code:	2	2 Dec-17 10 170516c	:56 (p ⁻ 1 of 2) 14-1572-3122
Cerioda	aphnia	7-d Survival ar	d Reproduc	tion T	est							Nautilus En	vironmental
Analysi Analyze	s ID: ed:	19-2673-4690 22 Dec-17 10:	End 56 Ana	point: lysis:	Reproduction Linear Interpol	ation (ICP	'IN)		CETI	S Version: ial Results	CETIS : Yes	v1.8.7	
Batch II Start Da Ending Duratio	D: ate: Date: n:	17-4821-2249 06 Jul-17 12:00 13 Jul-17 07:44 6d 20h	Test Prot <b>Spe</b> Sou	Type: ocol: cies: rce:	Reproduction- EPA/821/R-02 Ceriodaphnia c In-House Cultu	Survival (7 -013 (200 lubia ire	7d) 2)		Analy Dilue Brine Age:	/st: Emi ent: 20% e: <8h	ma Marus 6 Perrier \	Water	
Sample Sample Receive Sample	ID: Date: Date: Age:	07-6142-9744 19 May-17 11: 19 May-17 11: 48d 1h	Cod 15 Mate 15 Sou Stat	e: erial: rce: ion:	2D627EF0 Diesel WDOE NWTPH-Dx				⁷ Clien Proje	t: WD ct:	OE		
Linear I	nterpol	ation Options											
X Trans	form	Y Transform	n See	4	Resamples	Exp 95	5% CL	Method					
Log(X+)	)	Linear	5475	535	200	Yes		Two-Poin	t Interpo	olation		·	
Test Ac	ceptabi	lity Criteria											
Attribut	e	Test Stat	TAC Limit	s	Overlap	Decisio	on						
Control	Resp	16.8	15 - NL		Yes	Passes	Accepta	ability Crite	ria				
Point E	stimate	s											
Level	mg/L	95% LCL	95% UCL										
IC5	0.1508	0.09271	0.1563				,						·
IC10	0.1564	0.1291	0.1635										
IC15	0.1622	0.1478	0.1705										
IC20	0.1679	0.1565	0.1797					·					
1025	0.1737	0.1632	0.1891										
1040	0.1912	0.1794	0.2219										
1050	0.203	0.1884	0.2408										
Reprodu	uction \$	Summary				c	Calculate	ed Variate					
C-mg/L	Co	ontrol Type	Count	Mean	Min	Max	Std	Err Sto	l Dev	CV%	%Effect	 t	
0	Sc	lvent Blank	10	16.8	5	21	1.38	1 4.3	67	25.99%	0.0%		
0.04			10	17.9	12	21	0.79	51 2.5	14	14.05%	-6.55%		
0.07			10	18.6	14	23	0.76	3 2.4	13	12.97%	-10.71%	, D	
0.1			10	18.2	16	20	0.46	67 1.4	76	8.11%	-8.33%		
0.15			10	17.1	11	21	0.9	2.8	46	16.64%	-1.79%		
0.22			10	6.4	0	15	2.02	3 6.3	98	99.97%	61.9%		
0.34			10	0	0	0	0.	0			100.0%		
0.5			10	0	0	0	0	0			100.0%		
0.75			10	0	0	0	0	· 0			100.0%		
Reprodu	uction [	Detail					•						
C-mg/L	Co	ntrol Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep	5 Rej	o 6	Rep 7	Rep 8	Rep 9	Rep 10

C-ing/L	Control Type	Rep 1	Rep 2	кер з	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Solvent Blank	17	16	18	21	19	19	17	5	18	18
0.04		19	20	18	18	17	21	20	12	17	17
0.07		20	16	18	19	23	20	18	19	19	14
0.1		17	19	19	16	16	18	20	18	19	20
0.15		18	18	16	20	19	17	21	16	15	11
0.22		14	9	8	0	0	15	0	14	4	0
0.34		0	0	0	0	0	0	0	0	0	0
0.5		0	0	0	0	0	0	0	0	0	õ
0.75		0	0	0	0	0	0	0	0	0	0

solvent blank: a retone control

CETIS Ana	lytical Report			Report Date: Test Code:	22 Dec-17 10:56 (p 2 of 2) 170516c   14-1572-3122
Ceriodaphnia	7-d Survival and Re	production T	est		Nautilus Environmental
Analysis ID: Analyzed:	19-2673-4690 22 Dec-17 10:56	Endpoint: Analysis:	Reproduction Linear Interpolation (ICPIN)	CETIS Version: Official Results:	CETISv1.8.7 Yes





Report Date: Test Code: 11 Jan-18 09:51 (p 1 of 2) 170516c | 14-1572-3122

Ceriodaphnia	7-d Survival an	d Repro	oduction Te	st					Na	utilus Env	ironment	
Analysis ID: Analyzed:	04-4584-0796 22 Dec-17 10:5	8 .	Endpoint: Analysis:	Reproduction Nonparametric	-Control vs	Treatments	CETIS Version: CETISv1.8.7 S Official Results: Yes					
Ratch ID:	17 4921 2240		Toot Typo	Poproduction	Survival (7d	<u></u>	Anal	vet: Er	nma Marue			
Start Data	06 101 17 12:00		Drotocolu		013 (2002)	()	Alla	yst. ∟≀ ant: 20	Milla Marus	tor		
Start Date:	12 Jul 17 07:45		Protocol:	Cariadanhaia	-013 (2002, Iubia		Dilu	ent: 20				
Ending Date:	13 JUL-17 07.40		Species:	Cenodaprinia d	lubia	•	Dritt	e: . 	) h			
Duration:	6d 20n		Source:	In-House Cultu	re		Age	<8	sn 			
Sample ID:	07-6142-9744		Code:	2D627EF0			Clie	nt: W	DOE			
Sample Date:	19 May-17 11:1	5	Material:	Diesel			Proj	ect:				
Receive Date:	19 May-17 11:1	5	Source:	WDOE								
Sample Age:	48d 1h	:	Station:	NWTPH-Dx								
Data Transfor	m	Zeta	Alt H	yp Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU	
Untransformed		NA	C > T	NA	NA		22.6%	0.15	0.22	0.1817		
Steel Many-Or	ne Rank Sum Te	est										
Control	vs C-mg/L		Test S	Stat Critical	Ties D	F P-Value	P-Type	Decisio	n(α:5%)			
Solvent Blank	0.04		111.5	75	4 1	8 0.9403	Asymp	Non-Sig	nificant Effect			
	0.07		120.5	75	3 1	8 0.9913	Asymp	Non-Sig	nificant Effect			
	0.1		114	75	4 1	8 0.9629	Asymp	Non-Sig	nificant Effect			
	0.15		100.5	75	51	8 0.7129	Asymp	Non-Sig	nificant Effect			
	0.22*		60	75	0 1	8 0.0016	Asymp	Significa	ant Effect			
Test Acceptab	oility Criteria		-									
Attribute	Test Stat	TAC L	.imits	Overlap	Decision	ı						
Control Resp	16.8	15 - N	L	Yes	Passes /	Acceptability	Criteria					
PMSD	0.2259	0.13 -	0.47	Yes	Passes /	Acceptability	Criteria					
ANOVA Table						· ··· · · · · · · · · · · · · · · · ·		~~~~~~~~				
Source	Sum Squa	ares	Mean	Square	DF	F Stat	P-Value	Decisio	n(α:5%)			
Between	1090.533		218.1	067	5	15.88	<0.0001	Significa	ant Effect			
Error	741.8		13.73	704	54			. –				
Total	1832.333				59							
Distributional	Tests			· ·	<u> </u>							
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)				
Variances	Bartlett E	quality o	of Variance	22.3	15.09	0.0005	Unequal	/ariances	· · · ·			
Distribution	Shapiro-V	Vilk W I	Vormality	0.9315	0.9459	0.0023	Non-norm	al Distribu	tion			
Reproduction	Summary						· .			, ,		
C-mg/L	Control Type	Count	t Mean	95% LCL	95% UCI	_ Median	Min	Max	Std Err	CV%	%Effec	
0 .	Solvent Blank	10	16.8	13.68	19.92	18	5	21	1.381	25.99%	0.0%	
0.04		10	17.9	16.1	19.7	18 .	12	21	0.7951	14.05%	-6.55%	
0.07	•	10	18.6	16.87	20.33	19	14	23	0.763	12.97%	-10.71%	
D.1		10	18.2	17.14	19.26	18.5	16	20	0.4667	8.11%	-8.33%	
0.15		10	17.1	15.06	19.14	17.5	11	21	0.9	16.64%	-1.79%	
0.00		10	6.4	1.823	10.98	6	0	15	2.023	99.97%	61.9%	
0.22		10	0	0	0	0	0	0	0		100.0%	
0.22 0.34		10	v	v	•	•						
0.22 0.34 0.5		10	0	° 0	0	0	0	0	0		100.0%	

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Analyst: EMM QA:

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CETIS Ana	alytical Report		· · · · · · · · · · · · · · · · · · ·	Report Date: Test Code:	11 Jan-18 09:51 (p 2 of 2) 170516c   14-1572-3122
Ceriodaphnia	7-d Survival and Re	production T	est		Nautilus Environmental
Analysis ID:	04-4584-0796	Endpoint:	Reproduction	CETIS Version:	CETISv1.8.7
Analyzed:	22 Dec-17 10:58	Analvsis:	Nonparametric-Control vs Treatments	trol vs Treatments Official Results: Yes	

Reproduction Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Solvent Blank	17	16	18	21	19	19	17	5	18	18
0.04		19	20	18	18	17	21	20	12	17	17
0.07		20	16	18	19	23	20	18	19	19	14
0.1		17	19	19	16	16	18	20	18	19	20
0.15		18	18	16	20	19	17	21 ·	16	15	11
0.22		14	. 9	8	0	0	15	0	14	4	0
0.34		0	0	0	0	0	0	0	0	0	0
0.5		0	0	0	0	0	0	0	0	0	0
0.75		0	0	0	0	0	0	0	0	0	0

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CETIS Ana	alytic	cal Repo	ort								Rej	port Da	te:	2	2 Dec-17 1	):57 (p 1 of 2)
		•									Tes	st Code	:		170516c	14-1572-3122
Ceriodaphnia	17-d S	Survival an	d Rep	roduc	tion Te	est									Nautilus Er	vironmental
Analysis ID: Analyzed:	06-8 22 [	3611-0723 Dec-17 10:5	57	Endı Anal	point: ysis:	Rep Non	roduction parametric	-Two San	nple	۱	CE Off	TIS Ver icial Re	sion: sults:	CETIS Yes	v1.8.7	
Batch ID: Start Date: Ending Date: Duration:	17-4 06 J 13 J 6d 3	1821-2249 Jul-17 12:00 Jul-17 07:45 20h	)	Test Prote Spec Sour	Type: ocol: cies: ce:	Rep EPA Ceri In-H	oroduction-S V821/R-02- iodaphnia d louse Cultu	Survival (7 013 (200) Iubia re	'd) 2)		Ana Dilu Bri Age	alyst: uent: ne: e:	Emn 20% <8h	na Marus Perrier V	Vater	
Sample ID: Sample Date: Receive Date Sample Age:	07-6 19 M : 19 M 48d	5142-9744 May-17 11:1 May-17 11:1 1h	5 5	Code Mate Sour Stati	e: erial: rce: on:	2D6 Dies WD NW	27EF0 sei OE TPH-Dx				Clie Pro	ent: oject:	WDC	DE		
Data Transfo	rm		Zeta		Alt H	ур	Trials	Seed			PMSD	Tes	t Resu	lt		
Untransforme	d		NA		C > T		NA	NA			15.8%	Pas	ses rej	oroductio	n	
Wilcoxon Rai	nk Su	m Two-Sar	nple T	est												
Control	vs	Control			Test S	Stat	Critical	Ties	DF	P-Value	P-Type	Dec	ision(	a:5%)		
Solvent Blank		Negative	Contro	bl	135.5		NA	4	18	0.9924	Exact	Non	-Signif	icant Effe	ect	
Test Accepta	bility (	Criteria														
Attribute		Test Stat	TAC	Limit	5		Overlap	Decisio	'n							
Control Resp	······································	16.8	15 - 1	NL			Yes	Passes	Ac	centability	Criteria					
Control Resp		20.2	15 - I	NL			Yes	Passes	Ac	ceptability	Criteria					
PMSD		0.1581	0.13	- 0.47			Yes	Passes	Aco	ceptability	Criteria					
ANOVA Table																
Source		Sum Squa	ares		Mean	Squ	are	DF		F Stat	P-Value	Dec	ision(d	x:5%)		
Between		57.8			57.8			1		4.926	0.0395	Sign	ificant	Effect		
Error		211.2			11.733	333		18				-				
Total		269						19		-						
Distributional	Tests	5														
Attribute		Test					Test Stat	Critical		P-Value	Decisior	ı(α:1%)				
Variances	•	Variance	Ratio F		••••••		4.333	6.541		0.0398	Equal Va	riances	·····			
Distribution		Shapiro-V	Vilk W	Norm	ality		0.7662	0.866		0.0003	Non-norr	nal Dist	ributio	n		
Reproduction	Sum	mary														
C-mg/L	Cont	rol Type	Cour	ıt	Mean		95% LCL	95% UC	L	Median	Min	Max		Std Err	CV%	%Effect
0	Solve	ent Blank	10		16.8		13.68	19.92		18	5	21		1.381	25.99%	0.0%
0	Nega	tive Control	10		20.2		18.7	21.7		20.5	17	23		0.6633	10.38%	-20.24%
Reproduction	Detai															i
C-mg/L	Cont	rol Type	Rep [•]	1	Rep 2		Rep 3	Rep 4		Rep 5	Ren 6	Ron	7	Ren 8	Ron Q	Ren 10
0	Solve	nt Blank	17		16		18	21		19	19	17		5	18	18
0.	Nega	tive Control	19		20		23	22		18	18	17		22	22	21

solvent

blank: acetone

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Analyst: KIL QA: 911 fan.

CETIS Ana	alytical Report		·.	Report Date: Test Code:	22 Dec-17 10:57 (p 2 of 2) 170516c   14-1572-3122			
Ceriodaphnia	a 7-d Survival and Rep	production T	est		Nautilus Environmenta			
Analysis ID: Analyzed:	06-8611-0723 22 Dec-17 10:57	Endpoint: Analysis:	Reproduction Nonparametric-Two Sample	CETIS Version: Official Results:	CETISv1.8.7 Yes			
Graphics			······································					
25 20 15 15 0			e outrained and a second and a	• • • • • • • • • • • • • • • • • • •				

Hu 7an 9/18 Analyst: KIV QA:



**APPENDIX D – Echinoderm Toxicity Test Data** 

# Echinoderm Fertilization Test Summary Sheet

Client:	WDOE	Start Date/Time: <u>7-July-17 @</u>	1600h
Work Order No.:	170514	Test Species: <u>S. purpuratu</u>	<u>IS</u>
Sample Informatio	n:		
Sample ID: Sample Date: Date Received:	NWTPH-Dx 19-May-17	-	
Sample Volume:	50 x 5 mL	<del>-</del> . 	
Dilution Water:			
Type: Source:	Natural Seawater Vancouver Aquarium		
Test Organism Info	prmation:		
Batch No.:	7-Jul-17	· · · · · · · · · · · · · · · · · · ·	
Source:	Nautilus Environmental San Di	ego	
Sperm:Egg Ratio:	2000 : 1		
Exposure Period:	20 min : 20 min	-	
Reference Toxicar	nt Results:		
Reference Toxicant	ID: <u>SpUS05</u>		
Stock Solution ID:	17Cu02		· · · · · · · · · · · · · · · · · · ·
Date Initiated:	7-Jul-17		
1C50 (95% CL):	16.4 (15.2 - 17.8)	ug/L Cu	
Reference Toxicant Reference Toxicant	Mean ± 2 SD: <u>18.9 (7.7 - 4</u> CV (%): <u>56</u>	46.0) ug/L Cu	
n an	F	· · · · · · · · · · · · · · · · · · ·	
lest Results:	mg/L	Fertilization Rate	
	NOEC	<0.05	
		0.05	
	IC25 (mg/L) (95% CL)	0.2 (0.1 - 0.2)	
	IC50 (mg/L) (95% CL)	0.3 (0.3 - 0.4)	
	301	. ·	r
Reviewed by:	Um	Date reviewed:	Jep. 19/17
ting and the second s			

# Echinoderm Fertilization WQ Data Sheet

Client : WDOE

## Analysts: JW

Sample ID: <u>NWTPH-Dx</u>

Test Date & Time: JUIY \$/17 @ 1600h

WO No: 170514

Test Species: <u>S. purpuratus</u>

	No.	mg/L		Water	Quality		
Initial Water Quality	1	Concentration	Temp.	DO	pH	Salinity	
	<u></u>	26-(V/V) JW	(°C)	(mg/L)		(ppt)	
100% sample	<b>;</b>	seawater control	13.0	8.2	7.8	28	
Temp (°C)		Acetone Control	13.0	8.0	7.0	28	
DO (mg/L)		0.5	13.0	8.1	Я. F	28	
рН		1	13.0	8.0	7.8	28	
Salinity		2	13.0	7.9	7.8	28	
Brine/Salt Adjusted Water Qu	ل بality	4	13.0	8.7	7.8	28	
% sample		8	13.0	8.5	8.F	28	
Temp (°C)		16	13.0	7.6	8 · F	28	
DO (mg/L)				,			
рН							
Salinity		Analyst					
·		Initials	JW	. JW	JN	JW	
Thermometer: CER # 2	DO met	er: 2	pH meter:	-1	Salinity:	2	
		·					
Sample Description:	Diesel	Standards.				- 	
Echinoderm Source:	Nautilu	is San Diego					
Seawater Source:	Vanco	uver Aquarium	Date Collected: July 5/17				
Comments:		· · · · · · · · · · · · · · · · · · ·					

**Reviewed:** 

Date Reviewed:

Issued May 6, 2016; Ver. 1.1

John

Nautilus Environmental Company Inc.

# Echinoderm Fertilization Toxicity Test Data Sheet Fertilized Egg Counts

		Fe	ertilized Egg Co	ounts							
Client:	WDOE	Ξ	Start Date/Time	7 JW 7 JW 6/17 @ 1600h							
Work Order #	17051	1									
	17031										
Sample ID:	NVVIE	'H-Dx	Test set up by:	JW							
			Test Duration:	20min : 20min	<u></u>						
mg/L	Rep	No. Fertilized Eggs	No. Unfertilized Eggs	Comments	Initials						
Seawater	Α	75	25		JW						
Control	В	77	23		i						
	С	81	19								
	D	79	- 21	······································							
Acetone	Α	72	28								
Control	В	72	28								
	С	72	28								
	D	74	26	· · · · · · · · · · · · · · · · · · ·							
0.5	A	64	36								
	В	72	28								
	С	60	40								
	D	63	37	······································							
1	A	59	41								
	В	59	. ųį								
	С	60	40	· · · · · · · · · · · · · · · · · · ·							
	D	54	46		@ 1600h         Comments       Initials         JW         Initials         JW         Initials         JW         Initials         JW         Initials         Initials						
2	A	56	JW & 44								
· · ·	В	55	45								
	С	60	40								
	D	64	36								
4	A	58	42								
• •	В	50	50								
	С	60	40								
	D	56	44 HE DW								
8	А	31	69								
	В	38	62								
	С	40	60								
	D	40	60	· · · · · · · · · · · · · · · · · · ·							
16	A	JW 87 13	FX SL NC	·····							
	В	1 84 16	1 15 84								

Reviewed by:

Comments:

Date Reviewed:

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CETIS Su	mmary Repo	ort						Report Date: Test Code:	. 19	Sep-17 09 170514b   (	:10 (p 1 of 2) )3-4856-7405
Purple Sea L	Jrchin Sperm Ce	ll Fertil	ization Test	· ·					N	autilus Env	vironmental
Batch ID: Start Date: Ending Date Duration:	18-1547-6078 07 Jul-17 16:00 07 Jul-17 16:40 40m (20:20	) )	Test Type: Protocol: Species: Source:	Fertilization EPA/600/R-95 Strongylocentr San Diego Lat	5/136 (1995) rotus purpura o	atus		Analyst: Je Diluent: Na Brine: Age:	slin Wijaya Itural seawat	er	· · ·
Sample ID:	07-6142-9744	····	Code:	2D627EF0				Client: W	DOE		
Sample Date	: 19 May-17 11:1	15	Material:	Diesel				Project:			
Receive Date	e: 19 May-17 11:1	15	Source:	WDOE							
Sample Age:	49d 5h		Station:	NWTPH-Dx	· .			·			
Comparison	Summary										-
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
17-9317-6247	Fertilization Ra	te to	<0	0		3.84%		Paired S	ample t Test		
			<0.05	0.05	NA	9.18%		Dunnett	Multiple Corr	iparison Te	st
Applyoic ID	te Summary							-			
14-6104-0146	Enupoint Entilization Day		Level	mg/L	95% LCL	95% UCL	TU	Method			
14-0104-014:	Fertilization Ra	le	105	0.02308	0.01095	0.06835		Linear In	terpolation (I	CPIN)	
			IC15	0.0407	0.02190	0.06441					
			IC20	0.1208	0.03378	0.2265	-				
			IC25	0.1923	0.124	0.2221					
	e All		IC40	0.278	0.2449	0.3095					
			IC50	0.3405	0.2928	0.3833					
Test Accepta	bility				· · · · · · · · · · · · · · · · · · ·						
Analysis ID	Endpoint		Attribu	ute	Test Stat	TAC Lim	its	Overlap	Decision		
08-5894-3439	Fertilization Rat	te	Contro	l Resp	0.725	0.7 - NL		Yes	Passes A	cceptability	Criteria
111	Fertilization Rat	te	Contro	Resp	0.78	0.7 - NL		Yes	Passes A	cceptability	Criteria
14-6104-0145	Fertilization Rat	te	Contro	Resp	0.725	0.7 - NL		Yes	Passes A	cceptability	Criteria
17-9317-6247	Fertilization Rat	e	Contro	l Resp	0.725	0.7 - NL		Yes	Passes A	cceptability	Criteria
08-5894-3439	Fertilization Rat	e	PMSD		0.03838	NL - 0.25		No	Passes A	cceptability	Criteria
17-9317-0247	Fenilization Rat	e	PMSD		0.09176	NL - 0.25		No	Passes A	cceptability	Criteria
Fertilization I	Rate Summary										
C-mg/L	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Solvent Blank	4	0.725	0.7091	0.7409	0.72	0.74	0.004999	0.009999	1.38%	0.0%
0.05	inegative Control	4	0.78	0.7389	0.8211	0.75	0.81	0.01291	0.02582	3.31%	-7.59%
0.07	na kana sa sa	4	0.64/5	0.566	0.729	0.6	0.72	0.02562	0.05123	7.91%	10.69%
0.11	andra a' a' status anna a' stàiteanna a' stàiteanna a' stàiteanna a' stàiteanna a' stàiteanna a' stàiteanna a' A' stàiteanna a' stàiteanna	4 1	0.00	0.5369	0.6231	0.54	0.6	0.01354	0.02708	4.67%	20.0%
0.18 /		4	0.56	0.5221	0.0029	0.55	0.64	0.02056	0.04113	7.0%	18.97%
0.33 🗸	a tar da	4	0.00	0.3045	0.0207	0.5	0.0	0.0216	0.0432	1.12%	22.76%
0.62 🧹		4	0.1225	0.06993	0.1751	0.08	0.4	0.02136	0.04272	11.47% 26.97%	48.62% 83.1%
Fertilization F	Rate Detail									20.07 /0	
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Solvent Blank	0.72	0.72	0.72	0.74						
0	Negative Control	0.75	0.77	0.81	0.79						
0.05		0.64	0.72	0.6	0.63						
0.07	ام الي محمد محمد الأس	0.59	0.59	0.6	0.54						
0.11	n da an	0.56	0.55	0.6	0.64						
0.18		0.58	0.5	0.6	0.56						
0.33		0.31	0.38	0.4	0.4						
0.62	antion (1997) Alta gine a tar	0.13	0.16	0.12	0.08	•					· · · ·
	e de la companya de La companya de la comp										
1					ν.						
1	n Alexandro da estas Alexandro da estas		•								

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Analyst: CMM

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## **CETIS Summary Report**

Purple Sea Urchin Sperm Cell Fertilization Test

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C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4		
0,1.	Solvent Blank	72/100	72/100	72/100	74/100		 
0 - 20 -	Negative Control	75/100	77/100	81/100	79/100		
0.05		64/100	72/100	60/100	63/100		
0.07	la ang sa	59/100	59/100	60/100	54/100		
0.11		56/100	55/100	60/100	64/100		
0.18	and a state the second s	58/100	50/100	60/100	56/100		
0.33		31/100	38/100	40/100	40/100		
0.62	<ul> <li>A State of State</li></ul>	13/100	16/100	12/100	8/100		

Report Date: Test Code:

#### 19 Sep-17 09:10 (p 2 of 2) 170514b | 03-4856-7405

Nautilus Environmental


CETIS	Analytical Rep	ort						Rep Test	ort Date: Code:	19	Sep-17 09  70514b	9:10 (p 1 of 2 03-4856-740
Purple	Sea Urchin Sperm Ce	ell Fertilizat	tion Test	t ·						Na	autilus Er	vironmental
Analysi	s ID: 14-6104-0145	En	dpoint:	Fertilization R	ate			CET	IS Versio	n: CETISv1	.8.7	
Analyze	ed: 19 Sep-17 9:0	7 An	alysis:	Linear Interpo	lation (ICPI	N)	,	Offic	cial Resul	ts: Yes		
Batch I	D: 18-1547-6078	Te	st Type:	Fertilization				Ana	lyst: Je	eslin Wijaya		
Start Da	ate: 07 Jul-17 16:0	0 Pro	otocol:	EPA/600/R-9	5/136 (1995	i)		Dilu	ent: N	atural seawate	er	
Ending	Date: 07 Jul-17 16:4	0 Sp	ecies:	Strongylocent	rotus purpu	iratus		Brin	e:			
Duratio	n: 40m (μ. μ.	/ So	urce:	San Diego La	b			Age	:			·
Sample	ID: 07-6142-9744	Co	de:	2D627EF0				Clie	nt: V	/DOE		
Sample	Date: 19 May-17 11:	15 Ma	terial:	Diesel				Proj	ect:			
Sample	Age: 19 May-17 11:	15 <b>50</b>	urce:									
							•					
Linear I	nterpolation Options											
X Trans	form Y Transform	n See	ed	Resamples	Exp 95	% CL	Method					
Log(X+1	) Linear	634	107	200	Yes		Two-Poi	nt Interp	olation			
Test Ac	ceptability Criteria		· · ·	· · ·								
Attribut	e Test Stat	TAC Lim	its	Overlap	Decisio	n						
Control	Resp 0.725	0.7 - NL		Yes	Passes	Acceptal	oility Crit	eria				
Point E	stimates		n in the second								-	
Level	mg/L 95% LCL	95% UCL	-			•						
IC5	0.02308 0.01095	0.06835	- e									····
IC10	0.0467 0.02196	0.06441										
	0.05976 0.0397	0.06918										
IC25	0.1208 0.03378	0.2200										
IC40	0.278 0.2449	0.3095										
IC50	0.3405 0.2928	0.3833										
Fertiliza	tion Rate Summary				Calc	ulated V	ariate(A	 V/B)	·····			
C-mg/L	Control Type	Count	Mean	Min	Max	Std E	rr S	td Dev	CV%	%Effect	۵	B
0	Solvent Blank	4	0.725	0.72	0.74	0.004	999 0.	009999	1.38%	0.0%	290	400
0.05	6.2 C	4	0.6475	5 0.6	0.72	0.025	62 0.	05123	7.91%	10.69%	259	400
0.07	a si prin i pan	4	0.58	0.54	0.6	0.013	54 0.	02708	4.67%	20,0%	230	400
0.11		4	0.5875	5 0.55	0.64	0.020	56 0.	04113	7.0%	18.97%	235	400
0.33		4 1	0.55	0.5	0.6	0.021	60.	0432	7.72%	22.76%	224	400
0.62		4	0.1225	5 0.51	0.4	0.021	36 U. 52 O	04272	11.47%	48.62%	149 40	400
Fertiliza	tion Rate Detail								20.97 70		49	400
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4							
0	Solvent Blank	0.72	0.72	0.72	0.74							*****
0.05	$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{i=1}^{n} \sum_{i$	0.64	0.72	0.6	0.63							
0.07	$\operatorname{dist}_{i \in \mathbb{N}} (x_i \in Y ) \neq i \in \mathbb{N}$	0.59	0.59	0.6	0.54							
0.11		0.56	0.55	0.6	0.64							· · ·
0.18		0.58	0.5	0.6	0.56		,					
0.33		0.31	0.38	0.4	0.4							
0.62	e de la traction Alexandre de la composition	0.13	0.16	0.12	0.08							
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CETIS /	Analytical Repo	ort						Report Date:	19 Sej	o-17 09:10	) (p 2 of 2)
i					-	•		Test Code:	170	514b   03-	4856-7405
Purple Se	ea Urchin Sperm Cell	Fertilizat	ion Test						Nauti	lus Envir	onmental
Analysis I	ID: 14-6104-0145	End	dpoint: Fe	ertilization R	ate			CETIS Version:	CETISv1.8.	7	
Analyzeu	. 19 Sep-17 9.07	Ana		near interpo	lation (ICPIN)	)		Official Results:	Yes	· ·	
Fertilizati	on Rate Binomials		a ¹	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.			·	- 78.0 / 201			
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Solvent Blank	72/100	72/100	72/100	74/100						
0	Negative Control	75/100	77/100	81/100	79/100						
0.05		64/100	72/100	60/100	63/100						
0.07		59/100	59/100	60/100	54/100						
0.11		56/100	55/100	60/100	64/100						
0.18		58/100	50/100	60/100	56/100						
0.33		31/100	38/100	40/100	40/100					*	
0.62		13/100	16/100	12/100	8/100						
Graphics			· · · ·								
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	' <b>F</b> aratan ang ang ang ang ang ang ang ang ang a										
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0.3

C-mg/L

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0.5

CETIS™ v1.8.7.16

Analyst: FMM QA: JOL

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CETIS Ana	lvtical Ren	ort					Rep	ort Date:	19	Sep-17 09	:09 (p 1 of 4
							Tes	t Code:	1	170514b   (	3-4856-7405
Purple Sea Ur	chin Sperm Ce	ell Ferti	lization Test						Na	autilus En	vironmental
Analysis ID: Analyzed:	17-9317-6247 19 Sep-17 9:0	8	Endpoint: Analysis:	Fertilization Ra Parametric-Co	ate ntrol vs Trea	atments	CET Offi	IS Versior	n: CETISv1 :s: Yes	1.8.7	• .
Batch ID:	18-1547-6078		Test Type:	Fertilization			Ana	lyst: Je	slin Wijaya		
Start Date:	07 Jul-17 16:0	0	Protocol:	EPA/600/R-95	/136 (1995)		Dilu	i <b>ent:</b> Na	atural seawate	er	
Ending Date:	07 Jul-17 16:4	0	Species:	Strongylocentr	otus purpura	atus	Brir	ne:			
Duration:	40m (20:2	<u>v)</u>	Source:	San Diego Lab	)		Age	:			
Sample ID:	07-6142-9744		Code:	2D627EF0			Clie	nt: W	DOE		
Sample Date:	19 May-17 11:	15	Material:	Diesel			Pro	ect:			
Receive Date: Sample Age:	19 May-17 11: 49d 5h	15	Source: Station:	WDOE NWTPH-Dx							
Data Transfor	m	Zeta	Alt H	vp Trials	Seed		PMSD	NOFI	I OFI	TOFI	 TU
Angular (Corre	cted)	NA	C > T	NA	NA		9.18%	<0.05	0.05	NA	
Dunnett Multi	ple Compariso	n Test									
Control	vs C-mg/L		Test S	Stat Critical	MSD DI	P-Value	P-Type	Decisio	n(a:5%)		
Solvent Blank	0.05*		2.814	2.448	0.072 6	0.0238	CDF	Significa	nt Effect		
	0.07*		5.189	2.448	0.072 6	0.0001	CDF	Significa	nt Effect		
	0.11*		4.925	2.448	0.072 6	0.0002	CDF	Significa	nt Effect		
	0.18*		5.872	2.448	0.072 6	<0.0001	CDF	Significa	nt Effect		
	0.33*		12.3	2.448	0.072 6	<0.0001	CDF	Significa	nt Effect		
	0.62*		22.51	2.448	0.072 6	<0.0001	CDF	Significa	nt Effect		
Test Acceptab	ility Criteria		•								
Attribute	Test Stat	TAC	Limits	Overlap	Decision						
Control Resp.	< 0.725	0.7 -	NL	Yes	Passes A	cceptability	Criteria				
PMSD	0.09176	NL - 1	0.25	No	Passes A	cceptability	Criteria				
ANOVA Table											
Source	Sum Squ	ares	Mean	Square	DF	F Stat	P-Value	Decisio	η(α:5%)		
Between	1.185588		0.197	598	6	113.6	<0.0001	Significa	nt Effect		
Error	0.036515	87	0.0017	738851	21	_					
	1.222104			· ·	27						
Distributional	Tests						•	•			
Variances	Test Bartlett F	quality	of Varianco	Test Stat	Critical	P-Value	Decision	(α:1%)			
Distribution	Shapiro-	Wilk W	Normality	0.013	10.01	0.4217	Equal Val	nances			
Fertilization R	ato Summany				0.0375	0.0091	NonnarD				
C-ma/l	Control Type	Cour	t Moon	05% 1.01	05% 1101	<b>NF</b> = -1 ¹ -					
0	Solvent Blank	4	0.725	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0.05		4	0.720	0.7091	0.7409	0.72	0.72	0.74	0.004999	1.38%	0.0%
0.07	e de la composición de la comp	4	0.58	0.5369	0.729	0.000	0.6	0.72	0.02562	7.91%	10.69%
0.11	an a	4	0.5875	5 · 0 5221	0.6529	0.58	0.54	0.0	0.01304	4.07%	20.0%
0.18	· · · · · · ·	4	0.56	0.4913	0.6287	0.57	0.55	0.04	0.02050	7.0%	10.97%
0.33		4	0.3725	0.3045	0.4405	0.39	0.31	0.0	0.02136	11 47%	48.62%
0.62		4	0.1225	0.06993	0.1751	0.125	0.08	0.16	0.01652	26.97%	40.02 % 83.1%
Angular (Corre	cted) Transfor	med Su	Immary	· · · · · · · · · · · · · · · · · · ·				•			
C-mg/L	Control Type	Coun	t Mean	95% LCL	95% UCL	Median	Min	Max	Std Frr	CV%	%Effect
0	Solvent Blank	4	1.019	1.001	1.037	1.013	1.013	1.036	0.005631	1.11%	0.0%
0.05	د را میکند. در اینکند	4	0.9359	0.8492	1.022	0.9221	0.8861	1.013	0.02722	5.82%	8.14%
0.07	Constantino de la constante	4	0.8658	0.8223	0.9093	0.8759	0.8254	0.8861	0.01367	3.16%	15.02%
0.11	na hada a ha	4	0.8736	0.8068	0.9403	0.8658	0.8355	0.9273	0.02097	4.8%	14.25%
U.18		4	0.8457	0.7765	0.9149	0.8556	0.7854	0.8861	0.02173	5.14%	16.99%
0.33		4	0.656	0.5848	0.7272	0.6745	0.5905	0.6847	0.02237	6.82%	35.61%
U.0Z		-4	0.3552	0.2728	0.4376	0.3613	0 2868	0 / 115	0 02590	11 500/	GE 120/

Analyst: FMM QA: Jole

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## CETIS Analytical Report

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Purple Se	ea Urchin Sperm Cel	Fertilizat	on lest					Nautilus	Environmental
Analysis Analyzed	ID: 17-9317-6247 : 19 Sep-17 9:08	Enc Ana	lpoint: F Ilysis: F	Fertilization Ra Parametric-Co	ate ontrol vs Treatme	nts	CETIS Version: Official Results:	CETISv1.8.7 Yes	
Fertilizati	ion Rate Detail								
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Solvent Blank	0.72	0.72	0.72	0.74				
0.05		0.64	0.72	0.6	0.63				
0.07		0.59	0.59	0.6	0.54				
0.11		0.56	0.55	0.6	0.64				
0.18	· A contraction	0.58	0.5	0.6	0.56	•			
0.33	a na an	0.31	0.38	0.4	0.4				
0.62		0.13	0.16	0.12	0.08				
Angular (	Corrected) Transform	ned Detail			·····				· · · · · · · · · · · · · · · · · · ·
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Solvent Blank	1.013	1.013	1.013	1.036				
0.05		0.9273	1.013	0.8861	0.9169				
0.07		0.8759	0.8759	0.8861	0.8254				
0.11		0.8455	0.8355	0.8861	0.9273				
0.18		0.8657	0.7854	0.8861	0.8455				-0
0.33		0.5905	0.6642	0.6847	0.6847				
0.62		0.3689	0.4115	0.3537	0.2868				
Fertilizati	on Rate Binomials		1. 1.		······································				······
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4				
0	Solvent Blank	72/100	72/100	72/100	74/100				
0	Negative Control	75/100	77/100	81/100	79/100			~	
0.05		64/100	72/100	60/100	63/100				
0.07		59/100	59/100	60/100	54/100				
0.11	A day: Suite	56/100	55/100	60/100	64/100				
0.18		58/100	50/100	60/100	56/100				
0.33		31/100	38/100	40/100	40/100				
0.62	12 Ali 14 Ali	13/100	16/100	12/100	8/100				, · ·







Analyst:<u>+MM</u>____QA:___

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19 Sep-17 09:09 (p 2 of 4)

170514b | 03-4856-7405

Report Date: Test Code:

## **CETIS Analytical Report**

Report Date:19 SepTest Code:1705

Purple Sea Urchin Sperm Cell	Fertilizatio	n Test	•					Na	utilus Env	vironmental
Analysis ID:         08-5894-3439           Analyzed:         19 Sep-17 9:08	End Anal	ooint: Fer ysis: Par	tilization Rat ametric-Pai	te red Sample	-	CET	S Version: al Results	CETISv1 Yes	.8.7	4
Batch ID: 18-1547-6078	Test	Type: Fer	tilization			Anal	yst: Jesi	in Wijaya		
Start Date: 07 Jul-17 16:00	Prot	ocol: EP/	4/600/R-95/	136 (1995)		Dilue	ent: Nati	iral seawate	er	
Ending Date: 07 Jul-17 16:40	Spec	cies: Stro	ongylocentro	otus purpura	itus	Brin	e: '			
Duration: 40m (30/30)	Sour	<b>ce:</b> Sar	i Diego Lab			Age:	,			
Sample ID: 07-6142-9744	Code	e: 2D6	27EF0			Clier	nt: WD	OE		
Sample Date: 19 May-17 11:15	Mate	rial: Die	sel			Proje	ect:			
Receive Date: 19 May-17 11:15	Sou	rce: WD	OE						· .	
Sample Age: 49d 5h	Stati	on: NW	TPH-Dx							
Data Transform	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	ılt		
Angular (Corrected)	NA	C > T	NA	NA		3.84%	Fails fertili	ization rate		
Paired Sample t Test		· · ·								
Control vs Control		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(	α:5%)		
Negative Control Solvent Bla	ank	4.222	2.353	0.036 3	0.0121	CDF	Significant	t Effect		
Test Acceptability Criteria										
Attribute Test Stat	TAC Limit	s	Overlap	Decision						
Control Resp 0.725	0.7 - NL		Yes	Passes Ad	cceptability	Criteria				
Control Resp 0.78	0.7 - NL		Yes	Passes Ad	cceptability	Criteria				
PMSD 0.03838	NL - 0.25		No	Passes Ad	cceptability	Criteria				
ANOVA Table		-							4	
Source Sum Squar	es	Mean Squ	are	DF	F Stat	P-Value	Decision(	α:5%)		
Between 0.00825793	5	0.0082579	35	1	14.99	0.0083	Significant	Effect		
Error 0.00330611	9	0.0005510	199	6			·			
Total 0.01156405				7						
Distributional Tests			en en de la composition anticipation							
Attribute Test			Test Stat	Critical	P-Value	Decision(	α:1%)			
Variances Variance R	atio F		7.686	47.47	0.1280	Equal Vari	iances			
Distribution Shapiro-Wi	ilk W Norm	ality	0.9563	0.6451	0.7746	Normal Di	stribution			
Fertilization Rate Summary		н. На 1	1. A							
C-mg/L Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0 Solvent Blank	4	0.725	0.7091	0.7409	0.72	0.72	0.74	0.004999	1.38%	0.0%
0 Negative Control	4	0.78	0.7389	0.8211	0.78	0.75	0.81	0.01291	3.31%	-7.59%
Angular (Corrected) Transform	ed Summa	iry		· · · ·						
C-mg/L Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0 Solvent Blank	4	1.019	1.001	1.037	1.013	1.013	1.036	0.005631	1.11%	0.0%
0 Negative Contr	4	1.083	1.033	1.133	1.083	1.047	1.12	0.01561	2.88%	-6.31%
Fertilization Rate Detail					•					
C-mg/L Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0 Solvent Blank	0.72	0.72	0.72	0.74						
0 Negative Control	0.75	0.77	0.81	0.79						
Angular (Corrected) Transform	ed Detail					······		,		
C-mg/L Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0 Solvent Blank	1.013	1.013	1.013	1.036						
0 Negative Control	1.047	1.071	1.12	1.095						

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Analyst:<u>(MM)</u>

QA:

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	alytical Repo	ort			· · · · · · · · · · · · · · · · · · ·	· · ·	Report Dat Test Code:	3:	19 Sep-1 170514	7 09:09 ( 4b   03-48	p 4 of 4) 856-7405
Purple Sea U	rchin Sperm Cell	Fertilizat	ion Test						Nautilus	Enviro	nmental
Analysis ID: Analyzed:	08-5894-3439 19 Sep-17 9:08	En An	dpoint: Fe alysis: Pa	rtilization Ra trametric-Pa	ite ired Sámple		CETIS Vers Official Res	ion: CET ults: Yes	ΓΙSv1.8.7 ·	ň	
Fertilization I	Rate Binomials				• • •		,				
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Solvent Blank Negative Control	72/100 75/100	72/100 77/100	72/100 81/100	74/100 79/100						
Graphics		· · · · · · · · · · · · · · · · · · ·	<u> </u>			•					
							÷.,				
10	11 : 11 : 12 : 13 : 14 : 14 : 14 : 14 : 14 : 14 : 14					0.040 E				۲	
0.9						0.030		-			:
0.8	•			Reject Null		0.025					
10.7 10.7 10.7 10.7						0.015			•		
Fertilita					Conte Corre	0.010					
0.5						- 0.000					
0.4						-0.010					
0.3			•		•	-0.015					
0.2						-0.025					
0.1					;	-0.030					
0.0 E	ON	<u></u>	05	<u> </u>		-0.040	-1.0 -0.5	0.0 0	II	i	
		C-mg/L					Ra	kits			
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Analyst: <u>HMM</u> QA: JUL



**APPENDIX E – Nominal and Measured Concentrations, Percent Difference** 



										Measu	ıred (n	ng/L)								
Nominal (mg/L)	t=	=0		t=2	24		t=	48	t=	72		t=	96		t=´	120	t=´	144	t	=168
	F	%D	S	%D	F	%D	F	%D	F	%D	S	%D	F	%D	F	%D	F	%D	S	%D
30	3.03	90%	0.74	98%	3.26	89%	1.75	94%	1.79	94%	0.59	98%	2.86	90%	2.72	91%	3.68	88%	1.37	95%
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.5	0.29	96%	0.18	98%	0.48	94%	0.37	95%	0.42	94%	0.19	97%	0.57	92%	0.62	92%	1.05	86%	0.42	94%
7.5 dupl.	0.49	93%	-	-	х	-	-	-	0.43	94%	-	-	0.54	93%	-	-	1.05	86%	-	-
3.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.9	0.13	93%	0.06	97%	0.12	94%	0.13	93%	0.18	91%	0.18	91%	0.17	91%	0.14	93%	0.21	89%	0.28	85%
0.9	0.08	91%	0.06	93%	0.11	88%	0.14	84%	0.10	89%	0.15	83%	0.10	89%	0.10	89%	0.12	87%	0.29	68%

## Table 1 (E-1).Fathead Minnow Nominal and Measured Concentrations with Percent Difference (mg diesel/L).

F = fresh, S= Stale, t = time, %D = percent difference



										Mea	sured (	mg/L)								
Nominal (mg/L)	t=	=0		t=	24		t=	48	t=	72		t=	96		t=	120	t=	144	t=1	168
	F	%D	S	%D	F	%D	F	%D	F	%D	S	%D	F	%D	F	%D	F	%D	S	%D
16	0.62	96%	0.58	96%	2.02	87%	3.31	79%	0.96	94%	х	-	х	-	х	-	х	-	х	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	0.07	98%	0.14	97%	0.38	91%	0.31	92%	0.32	92%	0.15	96%	0.17	96%	0.20	95%	0.29	93%	0.20	95%
4 dupl.	0.29	93%	-	-	0.40	90%	-	-	0.31	92%	-	-	0.14	97%	-	-	0.32	92%	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	0.07	93%	0.05	95%	0.13	87%	0.10	90%	0.11	89%	0.16	84%	0.11	89%	0.18	82%	0.18	82%	0.16	84%
0.5	0.05	90%	0.05	90%	0.07	86%	0.06	88%	0.06	88%	0.12	76%	0.13	74%	0.14	72%	0.13	74%	0.17	66%

 Table 2 (E-2).
 Topsmelt and Echinoderm Nominal and Measured Concentrations with Percent Difference (mg diesel/L).

F = fresh, S= Stale, t = time, %D = percent difference



							Measure	ed (mg/L)						
Nominal (mg/L)	t=	=0	t=	24	t=	48	t=	72	t=	96	t=	120	t=`	144
	F	%D	F	%D	F	%D	F	%D	F	%D	F	%D	F	%D
6	1.19	80%	х	-	x	-	x	-	x	-	x	-	х	-
3	0.55	82%	х	-	x	-	х	-	х	-	x	-	х	-
3 dupl.	0.24	92%	х	-	x	-	х	-	х	-	x	-	х	-
1.5	0.29	81%	1.22	19%	0.36	76%	0.53	65%	x	-	x	-	х	-
0.75	0.11	85%	0.52	31%	0.23	69%	0.15	80%	0.40	47%	0.19	75%	0.42	44%
0.38	0.08	79%	0.24	37%	0.14	63%	0.14	63%	0.21	45%	0.10	74%	0.21	45%
0.19	0.05	74%	-	-	0.08	58%	-	-	0.12	37%	-	-	0.14	26%
0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.045	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Table 3 (E-3). Ceriodaphnia dubia Nominal and Measured Concentrations with Percent Difference (mg diesel/L).

F = fresh, t = time, %D = percent difference



APPENDIX F Chain-of-Custody Form

Form 020; Version 1.2; Revised by CC 2016/10/06		contracted.	otherwise	Payment net 30 unless	le disposal or storage.	equired for samp	Additional costs may be r	
appication of interpretation of the test data of results in part of in whole.	DD/MM/YY and Time)	(Date		(Company)	(Date DD/MM/YY and Time		(Company)	
assumed for the collection, handling, or transport of the sample,								
Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is	(Signature)			(Printed Name)	(Signature		(Printed Name)	
		(LABORATORY)	CEIVED BY	RE	ENT)	QUISHED BY (CLIE	RELIN	
	Y/N	6. Initials Present on Seal?	Y/N	3. Good Condition?				
	Y/N	5. Seal Present?		2. Courier			7	
	Y / Z	4. Ice Present in Cooler?		1. Total No. of Containers				
SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)	RY)	ETAILS (LABORATO	RECEIPT DI	SAMPLE	ENTS (CLIENT)	JCTIONS/COMME	SPECIAL INSTRU	
					5			0
					Olar Co	XIO		9
					N X M			8
					NCU X			-1
2070								6
51								5
3 14			<b>_</b>					4
2			R)	(SOXSm	2			<u></u>
	pokeels	use USERA	red .	dieset stand	11:15 autore	LI/SO/LI	NWTPH-1X	<u> </u>
$\times$ $\times$ $\times$	PA producedo	- une USC	Ale vale	gasoline sta	11:26 methous	D1/h0/50	NWTPH-GX	
Fai Ecl Fat To Ceri	TS	COMMEN	0,L)	# OF CONTAINERS # VOLUME (e.g. 1 x 2	TIME MATRIX	DATE (DD/MM/YY)	SAMPLE ID	
the himi himi himi himi himi himi himi hi	0	DR <u>Gomposite</u>		sample lype: Gra	Jamos	JONN WWW	Sample Collection by:	
ceij	Mineridan		) 1 4	Stewaler 3h	11 node	the istory	Comple Collection B.	_
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mpe	ick i	inde Schi	w U in	Phone J	7-1512	360-40	Phone	
ratu	8504-7612	prix whA 9	Olym	Contact	SUMPH -	W. Miden	Contact	
	PE	box 47hol	P.0.	City/Prov/PC	ALLA A	Olympi	City/Prov/PC	
d lizah	10 malay	stment of E	Depa	Company	1049 1049	of Ecol	Company	
ANALYSES REQUIRED				Invoice To:	~ Repartment	Washingto	Report to:	
21 Date Call Page Lot L	^o hone 403.253.712			Phone 604.420.8773				
t se Canada	#4, סובל וב Street Calgary, Alberta, C רזע זעז		oia, Canada	Burnaby, British Columk 95A 4N7				
Chain of Custody	Calgary			Burnaby	<b>ト</b>			
		V (Please Circle)	OCATION	<b>TESTING L</b>			2	



**END OF REPORT**