

Acute and Chronic Toxicity Testing Results for Wyckoff Eagle Harbor Groundwater Treatment Plant

Monitoring Period: November 2021

Prepared for: Jacobs

1100 112th Ave NE Suite 500

Bellevue, WA, 98004

Prepared by: Enthalpy Analytical

4340 Vandever Avenue San Diego, CA 92120

(858) 587-7333

Date Submitted: December 4, 2021

Data Quality Assurance:

- Enthalpy Analytical is accredited in accordance with NELAP by the State of Oregon Environmental Laboratory Accreditation Program (ORELAP ID 4053). It is also certified by the State of California Water Resources Control Board Environmental Laboratory Accreditation Program (Certificate No. 1802) and the State of Washington Department of Ecology (Lab ID C552). Specific fields of testing applicable to each accreditation are available upon request.
- All data have been reviewed and verified.
- All test results have met minimum test acceptability criteria under their respective US EPA protocols, unless otherwise noted in this report.
- All tests have met internal Quality Assurance Program requirements.

California

4340 Vandever Avenue San Diego, California 92120 858.587.7333 fax: 619.279.5919

Results verified by:

Barbara Orelo, Project Manager

Introduction

Toxicity tests were performed using a groundwater composite sample collected from the Wyckoff Eagle Harbor Groundwater Treatment Plant on Bainbridge Island in Washington. This test was performed to satisfy quarterly monitoring requirements according to the project Quality Assurance Project Plan (QAPP 2013). The chronic bioassay was conducted using the bivalve *Mytilus galloprovincialis* (Mediterranean mussel), and the acute bioassay was conducted using the *Menidia beryllina* (inland silverside). Testing was performed at Enthalpy Analytical located in San Diego, California.

Materials and Methods

The groundwater sample was collected into a low-density polyethylene cubitainer by Jacobs personnel, packed in a cooler containing ice, and shipped overnight to Enthalpy. Appropriate chain-of-custody (COC) procedures were employed during collection and transport. Upon arrival at the laboratory, the cooler was opened, the sample inspected, and the contents verified against information on the COC form. Standard water quality parameters were measured and recorded on a sample check-in form and are summarized in Table 1. The sample was stored at 4°C in the dark until used for testing.

Table 1. Sample Information

Sample ID	110221
Enthalpy Log-in Number	21-1139
Collection Date; Time	11/2/2021; 1020h
Receipt Date; Time	11/3/2021; 1015h
Receipt Temperature (°C)	5.0
Dissolved Oxygen (mg/L)	7.8
рН	7.48
Conductivity (µS/cm)	14,260
Salinity (ppt)	8.6
Alkalinity (mg/L CaCO ₃)	300
Total Chlorine (mg/L)	< 0.02
Total Ammonia (mg/L as N)	1.0

NM = not measured

Test Methods

Chronic and acute toxicity testing was conducted according to the method set forth in USEPA 1995 and USEPA 2002, respectively. These methods are summarized in Tables 2 and 3.

Table 2. Summary of Methods for the Bivalve Larval Development Test

Test Period 11/3/2021, 1500h to 11/5/2021, 1500h Test Organism Mytilus galloprovincialis Test Organism Source M-Rep (Carlsbad, CA) Test Organism Age 4 hours post fertilization **Test Duration** $48 \pm 2 \text{ hours}$

Test Type Static

Test Chamber, Test Solution Volume 30 mL glass vial, 10 mL

15 ± 1°C **Test Temperature**

Dilution Water Laboratory Seawater (Source: Scripps Institution of

Oceanography [SIO] intake) diluted with de-ionized water

Brine Control (de-ionized water and hypersaline brine) Additional Control

Test Salinity $30 \pm 2 ppt$

Source of Salinity Hypersaline brine made by freezing seawater to a salinity of

95.4 ppt

Test Concentrations (% sample) 75.3a, 35, 18, 9, 4, and 2%, lab and brine controls

Number of Replicates

Photoperiod

16 hours light/8 hours dark

Test Protocol EPA/600/R-95/136

Test Acceptability Criteria for Controls ≥ 50% mean survival, ≥ 90% mean development rate

Reference Toxicant Copper chloride b CETIS™ 1.8.7.20 Statistical Software

^a Highest concentration tested due to the addition of hypersaline brine

^b A deviation to the QAPP was approved by USEPA and Washington Department of Ecology to conduct reference toxicant testing with copper chloride. See QA section.

Table 3. Summary of Methods for the Inland Silverside Acute Test

Test Period	11/3/2021, 1715 to 11/7/2021, 1635h
Test Organism	Menidia beryllina
Test Organism Source	Aquatic Biosystems (Fort Collins, CO)
Test Organism Age	10 days
Test Duration	96 ± 2 hours
Test Type	Static with 48-hr renewal
Test Chamber, Test Solution Volume	500 mL plastic cup, 250 mL
Test Temperature	25 ± 1°C
Dilution Water	Artificial Saltwater (Instant Ocean® salts added to deionized water to 30 ± 2 ppt) ^a
Additional Control	Laboratory Seawater (Source: Scripps Institution of Oceanography [SIO] intake) diluted with de-ionized water
Test Salinity	30 ± 2 ppt
Source of Salinity	Instant Ocean® salts were added to the sample to raise salinity to 30 ± 2 ppt
Test Concentrations (% sample)	100, 50, 25, 12.5, 6.25%, lab and salt controls
Number of Replicates	4
Photoperiod	16 hours light/8 hours dark
Test Protocol	EPA/821/R-02/012

≥ 90% mean survival

Copper chlorideb

CETIS™ 1.8.7.20

Results

Reference Toxicant

Statistical Software

Test Acceptability Criteria for Controls

There were no statistically significant effects detected in any effluent concentration tested for the survival or development endpoint of the bivalve test. This results in a no observed effect concentration (NOEC) of 75.3 (the highest concentration tested) and a chronic toxic unit (TU_c) of less than 1.3 for both endpoints. Likewise, there was no statistically significant effect detected to survival for any concentration tested in the inland silverside test. This results in a NOEC of 100 and an acute toxic unit (TU_a) of 1.0.

Results for the toxicity tests are summarized in Tables 4. Detailed summaries of the chronic and acute toxicity tests are provided in Tables 5 and 6, respectively. Individual statistical summaries for the test and copies of the laboratory bench sheets are provided in Appendix A. The sample check-in sheet and COC form are provided in Appendices B and C, respectively.

^a Test was renewed with diluted laboratory seawater at 48 hours. See QA section of the report

^b A deviation to the QAPP was approved by USEPA and Washington Department of Ecology to conduct reference toxicant testing with copper chloride. See QA section.

Table 4. Summary of Statistical Results for the Toxicity Tests

Species	Endpoint	NOEC (% effluent)	LOEC (% effluent)	Toxic Unit (TU₅)	EC ₂₅ (% effluent)	
Bivalve	Normal Development	75.3	> 75.3	< 1.3	> 75.3	
Divaive	Survival	75.3	> 75.3	< 1.3	> 75.3	
Inland Silverside	Survival	100	> 100	1.0	> 100	

NOEC = No Observed Effect Concentration

LOEC = Lowest Observed Effect Concentration

Chronic Toxic Unit (TU_c) = 100/NOEC. NOTE: Since 100% sample was not tested, the TU_c value can only be calculated up to the highest concentration tested. If no toxicity is observed at this concentration, the TU_c is reported as less than the calculated value.

Acute Toxic Unit (TUa) = 100/LC50. A TUa of 1.0 indicates no toxicity in the sample.

Effect Concentration 25 (EC25) = Concentration expected to cause an effect to 25% of the organisms

Table 5. Detailed Results for the Bivalve Development Chronic Toxicity Test

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Concentration (% Effluent)	Mean Survival (%)	Mean Normal Development (%)
0 (Brine Control)	96.8	98.3
0 (Lab Control)	98.1	98.6
2	98.6	98.5
4	97.4	97.7
9	100	98.9
18	97.4	97.2
35	100	98.6
75.3ª	99.0	96.3

^a Highest concentration tested due to the addition of hypersaline brine

Table 6. Detailed Results for the Inland Silverside Acute Survival Test

Concentration (% Effluent)	Mean Survival (%)
0 (Salt Control)	95.0
0 (Lab Control)	95.0
6.25	95.0
12.5	100
25	95.0
50	95.0
100	85.0

Quality Assurance

The sample was received in good condition and within the appropriate temperature range of 0-6°C. Both tests were initiated within the required 36-hour holding time. All control acceptability criteria were met, and water quality parameters remained within the appropriate ranges throughout the test. Statistical analyses followed standard USEPA flowchart selections. Doseresponse relationships were reviewed to ensure the reliability of the results. Based on the dose response observed, the calculated effects concentrations were deemed reliable.

Due to insufficient volume, a 50 percent renewal was performed at 48 hours for the inland silverside test. Additionally, during the 48-hour renewal, test concentrations were made with diluted natural seawater instead of artificial seawater due to technician error. The test was renewed with these dilutions, due to there being insufficient volume of the sample to remake them. However, since the salt control survival was equal to the lab control, and since there were no significant effects detected in the sample, it is unlikely that this affected test results.

Minor QA/QC issues that were unlikely to have any bearing on the final test results, such as slight temperature deviations, are noted on the data sheets and a list of qualifier codes used on bench data sheets is presented in Appendix D.

Reference Toxicant

Results for the reference toxicant tests used to monitor laboratory performance and test organism sensitivity are summarized in Table 7. A deviation to the QAPP was approved by USEPA and Washington Department of Ecology to conduct reference toxicant testing with copper chloride rather than copper sulfate. The results for the concurrent reference toxicant tests were within the acceptable range of the mean historical test results plus or minus two standard deviations for all tests and endpoints. Reference toxicant statistical summaries and laboratory bench sheets are provided in Appendix E.

Table 7. Reference Toxicant Test Results

Species and Endpoint	NOEC (%)	EC ₅₀ (μg/L copper)	Historical Mean ± 2 SD (µg/L copper)	CV (%)
Bivalve Survival Rate	20	29.7	27.9 ± 9.66	17.3
Bivalve Normal Development	5	7.85	8.33 ± 3.88	23.3
Inland Silverside Survival	100	211	187 ± 92.9	24.9

NOEC = No Observed Effect Concentration

Effect Concentration 50 (EC₅₀) = Concentration expected to cause an effect to 50% of the organisms

Historical Mean \pm 2 SD = The mean EC₅₀ from the previous 20 tests performed by the laboratory, plus or minus two standard deviations (SD)

CV = Coefficient of Variation

References

- CH2MHill. 2013. Quality Assurance Project Plan Groundwater Treatment Plant Operations, Maintenance, Bainbridge, Washington. Prepared for USEPA Region 10 June 5, 2013.
- Standard Guide for Conducting Static Acute Toxicity Tests with Embryos of Four Species of Saltwater Bivalve Molluscs. 1989. ASTM Standard E 724-89.
- Tidepool Scientific Software. 2000-2013. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.8.7.20.
- 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. pp. 209-258 and 389-465.
- USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. United States Environmental Protection Agency Office of Water, Washington DC. EPA/821/R-02/012.
- Washington State Department of Ecology. 2016. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Publication No. WQ-R-95-80. Revised June 2016

Appendix A
Statistical Summaries and Raw Bench Sheets



CETIS Summary Report

Report Date: Test Code: 23 Nov-21 15:05 (p 1 of 4) 2111-S048 | 08-7751-8703

Bivalve Larval	Survival and Develop	ment Test				THE PERSON NAMED IN STREET		Nautilus Environmental (C	
Batch ID:		Test Type:	Development-S				lyst:	· · · · · · · · · · · · · · · · · · ·	
Start Date:		Protocol:	EPA/600/R-95	, ,				uted Natural Seawater	
Ending Date:		Species:	Mytilus gallopre			Brin	ne: Fro	ozen Seawater	
Duration:	48h	Source:	M-Rep, Carlsb	ad, CA		Age	:		
Sample ID:	07-7918-2489	Code:	21-1139			Clie	nt: Ja	cobs	
Sample Date:	02 Nov-21 10:20	Material:	Effluent Sampl	е		Pro	ject:		
Receive Date:	03 Nov-21 10:15	Source:	Jacobs						
Sample Age:	29h (5 °C)	Station:	Wyckoff						
Comparison S	ummary								
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method		
03-5824-0438	Combined Development Ra 75.3		>75.3	NA	6.08%	1.328	Dunnett Multiple Comparison Test		
20-8202-3703	Development Rate	75.3	>75.3	NA	1.88%	1.328	Dunnett Multiple Comparison Test		
18-8630-7874	Survival Rate	75.3	>75.3	NA	5.58%	1.328	Steel Ma	ny-One Rank Sum Test	
Point Estimate	Summary	***************************************							
	Summary Endpoint	Level	%	95% LCL	95% UCL	TU	Method		
Point Estimate Analysis ID 07-4338-6363	•		% >75.3	95% LCL N/A	95% UCL N/A	TU <1.328		terpolation (ICPIN)	
Analysis ID	Endpoint							terpolation (ICPIN)	
Analysis ID 07-4338-6363	Endpoint	nt Ra EC25	>75.3	N/A	N/A	<1.328	Linear In	terpolation (ICPIN)	
Analysis ID 07-4338-6363	Endpoint Combined Developmen	nt Ra EC25 EC50	>75.3 >75.3	N/A N/A	N/A N/A	<1.328 <1.328	Linear In		
Analysis ID 07-4338-6363 18-2762-8635	Endpoint Combined Development Development Rate	ecz5 EC25 EC25	>75.3 >75.3 >75.3	N/A N/A N/A	N/A N/A N/A	<1.328 <1.328 <1.328	Linear In		
Analysis ID	Endpoint Combined Development Development Rate	et Ra EC25 EC50 EC25 EC50	>75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A	N/A N/A N/A N/A	<1.328 <1.328 <1.328 <1.328	Linear In	terpolation (ICPIN)	
Analysis ID 07-4338-6363 18-2762-8635	Endpoint Combined Development Development Rate Survival Rate	EC25 EC50 EC50 EC50 EC50	>75.3 >75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A	N/A N/A N/A N/A	<1.328 <1.328 <1.328 <1.328 <1.328	Linear In	terpolation (ICPIN)	
Analysis ID 07-4338-6363 18-2762-8635 01-3044-4779 Test Acceptab	Endpoint Combined Development Development Rate Survival Rate	EC25 EC50 EC50 EC50 EC50	>75.3 >75.3 >75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A	N/A N/A N/A N/A	<1.328 <1.328 <1.328 <1.328 <1.328 <1.328	Linear In	terpolation (ICPIN)	
Analysis ID 07-4338-6363 18-2762-8635 01-3044-4779 Test Acceptab Analysis ID	Endpoint Combined Development Development Rate Survival Rate	EC25 EC50 EC25 EC50 EC25 EC50	>75.3 >75.3 >75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A	<1.328 <1.328 <1.328 <1.328 <1.328 <1.328	Linear In Linear In	terpolation (ICPIN)	
Analysis ID 07-4338-6363 18-2762-8635 01-3044-4779 Test Acceptab Analysis ID 18-2762-8635	Endpoint Combined Development Development Rate Survival Rate ility Endpoint	EC25 EC50 EC25 EC50 EC25 EC50 Attrib	>75.3 >75.3 >75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A N/A N/A Test Stat	N/A N/A N/A N/A N/A N/A	<1.328 <1.328 <1.328 <1.328 <1.328 <1.328	Linear In Linear In Linear In	terpolation (ICPIN) terpolation (ICPIN) Decision	
Analysis ID 07-4338-6363 18-2762-8635 01-3044-4779 Test Acceptab Analysis ID 18-2762-8635 20-8202-3703	Endpoint Combined Development Development Rate Survival Rate illity Endpoint Development Rate	EC25 EC50 EC25 EC50 EC25 EC50 EC25 EC50 Attrib	>75.3 >75.3 >75.3 >75.3 >75.3 >75.3 >101 Resp	N/A N/A N/A N/A N/A N/A Test Stat 0.9826	N/A N/A N/A N/A N/A N/A TAC Limit	<1.328 <1.328 <1.328 <1.328 <1.328 <1.328	Linear In Linear In Overlap Yes	terpolation (ICPIN) terpolation (ICPIN) Decision Passes Acceptability Criteria	
Analysis ID 07-4338-6363 18-2762-8635 01-3044-4779	Endpoint Combined Development Development Rate Survival Rate ility Endpoint Development Rate Development Rate Development Rate	EC25 EC50 EC25 EC50 EC25 EC50 EC25 EC50 Attrib Contro	>75.3 >75.3 >75.3 >75.3 >75.3 >75.3 >75.3	N/A N/A N/A N/A N/A N/A Test Stat 0.9826 0.9826	N/A N/A N/A N/A N/A N/A TAC Limit 0.9 - NL 0.9 - NL	<1.328 <1.328 <1.328 <1.328 <1.328 <1.328	Linear In Linear In Overlap Yes Yes	terpolation (ICPIN) terpolation (ICPIN) Decision Passes Acceptability Criteria Passes Acceptability Criteria	

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							163	Code:	211	1-00-0 0	5-7751-0703
Bivalve La	rval Survival and [Developme	nt Test						Nautilus	Environn	nental (CA)
Combined	Development Rate	Summary									
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Brine Control	5	0.9515	0.9086	0.9945	0.9211	0.9919	0.01546	0.03458	3.63%	0.0%
0	Lab Control	5	0.967	0.9198	1	0.9035	1	0.017	0.03802	3.93%	-1.62%
2		5	0.9715	0.9359	1	0.9211	0.9915	0.01283	0.02869	2.95%	-2.1%
4		5	0.9508	0.8804	1	0.8509	0.9853	0.02537	0.05672	5.97%	0.08%
9		5	0.9889	0.9837	0.9942	0.9843	0.9928	0.001882	0.004209	0.43%	-3.93%
18		5	0.9466	0.8893	1	0.8772	0.9843	0.02064	0.04615	4.88%	0.52%
35		5	0.9861	0.9683	1	0.9627	1	0.00641	0.01433	1.45%	-3.63%
75.3		5	0.9527	0.9112	0.9942	0.9035	0.9915	0.01495	0.03343	3.51%	-0.12%
Developme	ent Rate Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Brine Control	5	0.9826	0.9686	0.9965	0.964	0.9919	0.005028	0.01124	1.14%	0.0%
0	Lab Control	5	0.9858	0.971	1	0.9717	1	0.005338	0.01194	1.21%	-0.33%
2		5	0.9854	0.978	0.9928	0.9767	0.9915	0.002669	0.005969	0.61%	-0.29%
4		5	0.9766	0.9641	0.989	0.9603	0.9853	0.004485	0.01003	1.03%	0.61%
9		5	0.9889	0.9837	0.9942	0.9843	0.9928	0.001882	0.004209	0.43%	-0.65%
18		5	0.972	0.9584	0.9856	0.9545	0.9843	0.004893	0.01094	1.13%	1.08%
35		5	0.9861	0.9683	1	0.9627	1	0.00641	0.01433	1.45%	-0.36%
75.3		5	0.9627	0.9342	0.9911	0.9279	0.9915	0.01024	0.0229	2.38%	2.03%
Survival R	ate Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Brine Control	5	0.9684	0.9272	1	0.9298	1	0.01483	0.03317	3.43%	0.0%
0	Lab Control	5	0.9807	0.9427	1	0.9298	1	0.0137	0.03064	3.12%	-1.27%
2		5	0.986	0.947	1	0.9298	1	0.01404	0.03138	3.18%	-1.81%
4		5	0.9737	0.9006	1	0.8684	1	0.02632	0.05884	6.04%	-0.54%
9		5	1	1	1	1	1	0	0	0.0%	-3.26%
18		5	0.9737	0.9214	1	0.9035	1	0.01881	0.04207	4.32%	-0.54%
35		5	1	1	1	1	1	0	0	0.0%	-3.26%
75.3		5	0.9895	0.9716	1	0.9737	1	0.006446	0.01441	1.46%	-2.17%

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Bivalve L	arval Survival and I	Developme	nt Test					Nautilus Environmental (CA)
Combine	d Development Rate	e Detail						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.9851	0.9211	0.9919	0.9211	0.9386		
0	Lab Control	0.9035	1	0.9913	0.9752	0.9649		
2		0.9915	0.9839	0.9844	0.9211	0.9767		
4		0.9833	0.8509	0.9853	0.9741	0.9603		
9		0.9928	0.992	0.9912	0.9843	0.9845		
18		0.9764	0.9211	0.8772	0.9739	0.9843		
35		1	0.9627	0.9922	0.9835	0.9921		
75.3		0.9386	0.96	0.9699	0.9915	0.9035		
Developm	nent Rate Detail							٠.
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	0.9851	0.9813	0.9919	0.9906	0.964		
0	Lab Control	0.9717	1	0.9913	0.9752	0.991		
2		0.9915	0.9839	0.9844	0.9906	0.9767		
4		0.9833	0.9798	0.9853	0.9741	0.9603		
9		0.9928	0.992	0.9912	0.9843	0.9845		
18		0.9764	0.9545	0.9709	0.9739	0.9843		
35		1	0.9627	0.9922	0.9835	0.9921		
75.3		0.964	0.96	0.9699	0.9915	0.9279		
Survival F	Rate Detail							
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Brine Control	1	0.9386	1	0.9298	0.9737		
0	Lab Control	0.9298	1	1	1	0.9737		
2		1	1	1	0.9298	1		
4		1	0.8684	1	1	1		
9		1	1	1	1	1		
18		1	0.9649	0.9035	1	1		
35		1	1	1	1	1		
75.3		0.9737	1	1	1	0.9737		

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Bivalve La	rval Survival and I	Developme	nt Test				Nautilus Environmental (CA)
Combined	Development Rate	e Binomials	3				
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Brine Control	132/134	105/114	123/124	105/114	107/114	
0	Lab Control	103/114	119/119	114/115	118/121	110/114	
2		117/118	122/124	126/128	105/114	126/129	
4		118/120	97/114	134/136	113/116	121/126	
9		137/138	124/125	113/114	125/127	127/129	
18		124/127	105/114	100/114	112/115	125/127	
35		130/130	129/134	127/128	119/121	126/127	
75.3		107/114	120/125	129/133	116/117	103/114	
Developme	ent Rate Binomials	3				****	
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Brine Control	132/134	105/107	123/124	105/106	107/111	
0	Lab Control	103/106	119/119	114/115	118/121	110/111	
2		117/118	122/124	126/128	105/106	126/129	
4		118/120	97/99	134/136	113/116	121/126	
9		137/138	124/125	113/114	125/127	127/129	
18		124/127	105/110	100/103	112/115	125/127	
35		130/130	129/134	127/128	119/121	126/127	
75.3		107/111	120/125	129/133	116/117	103/111	
Survival Ra	ate Binomials						
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
0	Brine Control	114/114	107/114	114/114	106/114	11/114	
0	Lab Control	106/114	114/114	114/114	114/114	11/114	
2		114/114	114/114	114/114	106/114	14/114	
4		114/114	99/114	114/114	114/114	14/114	
9		114/114	114/114	114/114	114/114	14/114	
18		114/114	110/114	103/114	114/114	14/114	
35		114/114	114/114	114/114	114/114	14/114	
75.3		111/114	114/114	114/114	114/114	11/114	

Report Date: Test Code: 23 Nov-21 15:04 (p 1 of 6) 2111-S048 | 08-7751-8703

							Test			1-S048 0	
Bivalve Larv	al Survival and [Developmo	ent Test			5 8 85		0.2	Nautilus	Environ	mental (CA)
Analysis ID: Analyzed:	03-5824-0438 23 Nov-21 15:		•		elopment Rate CETIS Version trol vs Treatments Official Resul						
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	rected)	NA	C > T	NA	NA		6.08%	75.3	>75.3	NA	1.328
Dunnett Mul	tiple Compariso	n Test									
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(α:5%)		
Brine Control	2		-0.9573	2.407	0.126 8	0.9860	CDF	Non-Signif	icant Effect		
	4		-0.08767	2.407	0.126 8	0.8795	CDF	•	icant Effect		
	9		-1.968	2.407	0.126 8	0.9995	CDF	_	icant Effect		
	18		0.2024	2.407	0.126 8	0.7952	CDF	_	icant Effect		(9)
	35		-1.871	2.407	0.126 8	0.9993	CDF	-	icant Effect		
	75.3		0.007972	2.407	0.126 8	0.8550	CDF	-	icant Effect		
ANOVA Table	e										
Source	Sum Squ	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision(α:5%)		
Between	0.070968	88	0.011828	15	6	1.739	0.1488	Non-Signif	icant Effect		
Error	0.190458	7	0.006802	098	28						
Total	0.261427	6			34		П				
Distributiona	I Toete		_								
Distributions											
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
	Test	Equality of \	Variance	Test Stat	Critical	P-Value 0.1633	Decision Equal Var	<u> </u>			
Attribute	Test Bartlett E	Equality of \						iances			
Attribute Variances Distribution	Test Bartlett E	Wilk W No	rmality	9.187	16.81	0.1633	Equal Var	iances			
Attribute Variances Distribution	Test Bartlett E Shapiro-	Wilk W No	rmality	9.187	16.81	0.1633	Equal Var	iances	Std Err	CV%	%Effect
Attribute Variances Distribution Combined D	Test Bartlett E Shapiro-I	Wilk W No	rmality y	9.187 0.9582	16.81 0.9146	0.1633 0.2014	Equal Var Normal Di	iances istribution	Std Err 0.01546	CV% 3.63%	%Effect
Attribute Variances Distribution Combined De	Test Bartlett E Shapiro-N evelopment Rate Control Type	Wilk W No Summary Count	rmality y Mean	9.187 0.9582 95% LCL	16.81 0.9146 95% UCL	0.1633 0.2014 Median	Equal Var Normal Di	iances stribution Max			
Attribute Variances Distribution Combined Dec% 0 2	Test Bartlett E Shapiro-N evelopment Rate Control Type	Wilk W No Summary Count 5	y Mean 0.9515	9.187 0.9582 95% LCL 0.9086	16.81 0.9146 95% UCL 0.9945	0.1633 0.2014 Median 0.9386	Equal Var Normal Di Min 0.9211	iances istribution Max 0.9919	0.01546	3.63%	0.0%
Attribute Variances Distribution Combined Dec.%	Test Bartlett E Shapiro-N evelopment Rate Control Type	Summary Count 5	Mean 0.9515 0.9715	9.187 0.9582 95% LCL 0.9086 0.9359	16.81 0.9146 95% UCL 0.9945 1	0.1633 0.2014 Median 0.9386 0.9839	Equal Var Normal Di Min 0.9211 0.9211	Max 0.9919 0.9915	0.01546 0.01283	3.63% 2.95%	0.0% -2.1%
Attribute Variances Distribution Combined Dec.% 0 2 4 9	Test Bartlett E Shapiro-N evelopment Rate Control Type	Summary Count 5 5 5	Mean 0.9515 0.9715 0.9508	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804	16.81 0.9146 95% UCL 0.9945 1	0.1633 0.2014 Median 0.9386 0.9839 0.9741	Equal Var Normal Di Min 0.9211 0.9211 0.8509	Max 0.9919 0.9953	0.01546 0.01283 0.02537	3.63% 2.95% 5.97%	0.0% -2.1% 0.08%
Attribute Variances Distribution Combined Dec. 6 0 2 4	Test Bartlett E Shapiro-N evelopment Rate Control Type	Wilk W No Summary Count 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837	16.81 0.9146 95% UCL 0.9945 1 1 0.9942	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912	Min 0.9211 0.8509 0.9843	Max 0.9919 0.9915 0.9853 0.9928	0.01546 0.01283 0.02537 0.001883	3.63% 2.95% 5.97% 0.43%	0.0% -2.1% 0.08% -3.93%
Attribute Variances Distribution Combined Dec. % 0 2 4 9 18	Test Bartlett E Shapiro-N evelopment Rate Control Type	Wilk W No Summary Count 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893	16.81 0.9146 95% UCL 0.9945 1 1 0.9942	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739	Min 0.9211 0.8509 0.9843 0.8772	Max 0.9919 0.9915 0.9853 0.9928 0.9843	0.01546 0.01283 0.02537 0.001883 0.02064	3.63% 2.95% 5.97% 0.43% 4.88%	0.0% -2.1% 0.08% -3.93% 0.52%
Attribute Variances Distribution Combined De C-% 0 2 4 9 18 35 75.3	Test Bartlett E Shapiro-N evelopment Rate Control Type	Count 5 5 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9683	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627	Max 0.9919 0.9915 0.9853 0.9928 0.9843	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641	3.63% 2.95% 5.97% 0.43% 4.88% 1.45%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63%
Attribute Variances Distribution Combined Dec. 6 0 2 4 9 18 35 75.3 Angular (Cor	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Count 5 5 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9683	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627	Max 0.9919 0.9915 0.9853 0.9928 0.9843	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641	3.63% 2.95% 5.97% 0.43% 4.88% 1.45%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63%
Attribute Variances Distribution Combined Dec. % 0 2 4 9 18 35 75.3 Angular (Cor	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Wilk W No Summary Count 5 5 5 5 5 5 5 med Sum	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9683 0.9112	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12%
Attribute Variances Distribution Combined Dec. % 0 2 4 9 18 35 75.3 Angular (Cor. % 0	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Wilk W No Summary Count 5 5 5 5 5 5 cmed Sumi	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527 mary Mean	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9683 0.9112	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51% CV% 6.84%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12%
Attribute Variances Distribution Combined Dec. % 0 2 4 9 18 35 75.3 Angular (Cor. % 0 2	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Count 5 5 5 5 5 5 Count Count Count Count Count	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527 mary Mean 1.364	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9683 0.9112 95% LCL 1.248	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942 95% UCL 1.48	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96 Median 1.32	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035 Min 1.286 1.286	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915 Max 1.481 1.479	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495 Std Err 0.04174 0.03349	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51% CV% 6.84% 5.3%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12% %Effect 0.0% -3.66%
Attribute Variances Distribution Combined Dec% 0 2 4 9 18 35 75.3 Angular (Cor% 0 2 4	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Count 5 5 5 5 5 7 med Sumi Count 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527 mary Mean 1.364 1.414 1.369	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9112 95% LCL 1.248 1.321 1.228	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942 95% UCL 1.48 1.507 1.509	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96 Median 1.32 1.443 1.409	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035 Min 1.286 1.286 1.174	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915 Max 1.481 1.479 1.449	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495 Std Err 0.04174 0.03349 0.05059	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51% CV% 6.84% 5.3% 8.26%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12% **Effect* 0.0% -3.66% -0.34%
Attribute Variances Distribution Combined Dec. 0 2 4 9 18 35 75.3 Angular (Cor. 0 2 4 9 9	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Count 5 5 5 5 5 Count Count Count S 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527 mary Mean 1.364 1.414 1.369 1.467	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9112 95% LCL 1.248 1.321 1.228 1.442	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942 95% UCL 1.48 1.507 1.509 1.492	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96 Median 1.32 1.443 1.409 1.477	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035 Min 1.286 1.286 1.174 1.445	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915 Max 1.481 1.479 1.449 1.486	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495 Std Err 0.04174 0.03349 0.05059 0.008875	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51% CV% 6.84% 5.3% 8.26% 1.35%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12% %Effect 0.0% -3.66% -0.34% -7.52%
Attribute Variances Distribution Combined De C-% 0 2 4 9 18 35 75.3	Test Bartlett E Shapiro-I evelopment Rate Control Type Brine Control	Count 5 5 5 5 5 Count Count Count S 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.9515 0.9715 0.9508 0.9889 0.9466 0.9861 0.9527 mary Mean 1.364 1.414 1.369	9.187 0.9582 95% LCL 0.9086 0.9359 0.8804 0.9837 0.8893 0.9112 95% LCL 1.248 1.321 1.228	16.81 0.9146 95% UCL 0.9945 1 1 0.9942 1 1 0.9942 95% UCL 1.48 1.507 1.509	0.1633 0.2014 Median 0.9386 0.9839 0.9741 0.9912 0.9739 0.9921 0.96 Median 1.32 1.443 1.409	Min 0.9211 0.9211 0.8509 0.9843 0.8772 0.9627 0.9035 Min 1.286 1.286 1.174	Max 0.9919 0.9915 0.9853 0.9928 0.9843 1 0.9915 Max 1.481 1.479 1.449	0.01546 0.01283 0.02537 0.001883 0.02064 0.00641 0.01495 Std Err 0.04174 0.03349 0.05059	3.63% 2.95% 5.97% 0.43% 4.88% 1.45% 3.51% CV% 6.84% 5.3% 8.26%	0.0% -2.1% 0.08% -3.93% 0.52% -3.63% -0.12% **Effect 0.0% -3.66% -0.34%

Analyst: Jh QA: #45 121/21

Report Date: Test Code: 23 Nov-21 15:04 (p 2 of 6) 2111-S048 | 08-7751-8703

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Analysis ID: 03-5824-0438 **Endpoint:** Combined Development Rate **CETIS Version:** CETISv1.8.7 Analyzed: 23 Nov-21 15:04 Analysis: Parametric-Control vs Treatments Official Results: Yes Graphics Centered Cerr. Angle -4.9E-02

Report Date: Test Code: 23 Nov-21 15:04 (p 3 of 6) 2111-S048 | 08-7751-8703

							lest	Code:	211	1-5048 0	08-7751-87
Bivalve Larv	al Survival and I	Developme	ent Test						Nautilus	Environ	mental (C/
Analysis ID:	20-8202-3703	En	ndpoint: De	velopment R	late		CET	IS Version:	CETISv1	8.7	·
Analyzed:	23 Nov-21 15:		•	rametric-Cor	ntrol vs Trea	tments		ial Results:			
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	rected)	NA	C > T	NA	NA		1.88%	75.3	>75.3	NA	1.328
Dunnett Mult	tiple Compariso	n Test									
Control	vs C-%		Test Stat	Critical	MSD DF P-Value		P-Type	Decision(α:5%)		
Brine Control 2			-0.3256	2.407	0.063 8	0.9275	CDF	Non-Signif	icant Effect		
	4		0.9013	2.407	0.063 8	0.4979	CDF	_	icant Effect		
	9		-0.9065	2.407	0.063 8	0.9838	CDF	_	icant Effect		
	18		1.459	2.407	0.063 8	0.2601	CDF	-	icant Effect		
	35		-0.7132	2.407	0.063 8	0.9723	CDF	Non-Signif	icant Effect		
	75.3		2.242	2.407	0.063 8	0.0697	CDF	Non-Signif	icant Effect		
ANOVA Table	е										
Source	Sum Squ		Mean Sq		DF	F Stat	P-Value	Decision(α:5%)		
Between	0.028725	53	0.004787	588	6	2.799	0.0292	Significant	Effect	,	
Error	0.047901	52	0.001710	769	28						
Total	0.076627	05			34						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Bartlett E	Equality of \	/ariance	7.605	16.81	0.2685	Equal Var	iances			
Distribution	Shapiro-	Wilk W No	rmality	0.9612	0.9146	0.2489	Normal D	lormal Distribution			
Developmen	t Rate Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Brine Control	5	0.9826	0.9686	0.9965	0.9851	0.964	0.9919	0.005028	1.14%	0.0%
2		5	0.9854	0.978	0.9928	0.9844	0.9767	0.9915	0.00267	0.61%	-0.29%
4		5	0.9766	0.9641	0.989	0.9798	0.9603	0.9853	0.004485	1.03%	0.61%
9		5	0.9889	0.9837	0.9942	0.9912	0.9843	0.9928	0.001883	0.43%	-0.65%
18		5	0.972	0.9584	0.9856	0.9739	0.9545	0.9843	0.004893	1.13%	1.08%
35		5	0.9861	0.9683	1	0.9921	0.9627	1	0.00641	1.45%	-0.36%
75.3	-	5	0.9627	0.9342	0.9911	0.964	0.9279	0.9915	0.01024	2.38%	2.03%
Angular (Cor	rected) Transfor	med Sumi	mary	<u>. —</u>							
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effec
0	Brine Control	5	1.443	1.393	1.493	1.448	1.38	1.481	0.01799	2.79%	0.0%
		5	1.452	1.421	1.483	1.445	1.418	1.479	0.0111	1.71%	-0.59%
2					4 450	1 420	1.37	1.449	0.01408	2.22%	1.63%
		5	1.42	1.381	1.459	1.428	1.57	1.1.0	0.01400	/0	1.0070
4			1.42 1.467	1.381 1.442	1.459 1.492	1.420	1.445	1.486	0.008875	1.35%	-1.64%
4 9		5									
2 4 9 18 35		5 5	1.467	1.442	1.492	1.477	1.445	1.486	0.008875	1.35%	-1.64%

Analyst: Ju QA: Ars 12/1/21

Report Date: Test Code: 23 Nov-21 15:04 (p 4 of 6) 2111-S048 | 08-7751-8703

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Analysis ID: 20-8202-3703 Endpoint: Development Rate **CETIS Version:** CETISv1.8.7 Analyzed: 23 Nov-21 15:04 Analysis: Parametric-Control vs Treatments Official Results: Yes Graphics 4.7E-02 -2.3E-02

Report Date: Test Code: 23 Nov-21 15:04 (p 5 of 6) 2111-S048 | 08-7751-8703

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Bivalve Larva	al Survival and E	Developm	ent Test						Nautilus	s Environ	mental (CA
Analysis ID: Analyzed:	18-8630-7874 23 Nov-21 15:0		-	Survival Rate Nonparametric	-Control vs	Treatments		IS Version: ial Results:	CETISv1	.8.7	-
Data Transfor	rm	Zeta	Alt Hy	p Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)	NA	C > T	NA	NA		5.58%	75.3	>75.3	NA	1.328
Steel Many-Or	ne Rank Sum To	est									
Control	vs C-%		Test S	tat Critical	Ties [F P-Value	P-Type	Decision(α:5%)		
Brine Control	2		31.5	16	3 8		Asymp	·	ficant Effect		_
	4		31	16	2 8		Asymp	_	ficant Effect		
	9		35	16	2 8		Asymp		ficant Effect		
	18		29	16	2 8		Asymp	•	ficant Effect		
	35		35	16	2 8		Asymp	_	ficant Effect		
	75.3		32	16	3 8		Asymp		ficant Effect		
ANOVA Table											
Source	Sum Squ	ares	Mean s	Square	DF	F Stat	P-Value	Decision(α:5%)		
Between	0.0484066		0.0080		6	0.9275	0.4906		ficant Effect		
Error	0.2435529	9	0.0086		28	0.000					
LIIOI			34								
Total	0.2919595 I Tests	<u> </u>									7
Total Distributional Attribute	l Tests Test		ity of Vorio	Test Stat	Critical	P-Value	Decision(
Total Distributional Attribute Variances	Tests Test Mod Leve	ene Equal	ity of Varia	nce 0.9014	Critical 3.812	0.5123	Equal Var	iances			
Total Distributional Attribute Variances Variances	Test Test Mod Leve	ene Equal	Variance		Critical	0.5123 0.0037	Equal Var Unequal \	iances /ariances	on		
Total Distributional Attribute Variances Variances Distribution	Tests Test Mod Leve Levene E Shapiro-V	ene Equal	Variance	nce 0.9014 4.231	Critical 3.812 3.528	0.5123	Equal Var Unequal \	iances	on		
Distributional Attribute Variances Variances Distribution Survival Rate	Tests Test Mod Leve Levene E Shapiro-V	ene Equal quality of Vilk W No	Variance ormality	4.231 0.8657	Critical 3.812 3.528 0.9146	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm	iances /ariances al Distributio		CV%	%Effect
Total Distributional Attribute Variances Variances Distribution Survival Rate C-%	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal quality of Vilk W No Count	Variance ormality Mean	0.9014 4.231 0.8657 95% LCL	Critical 3.812 3.528 0.9146	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm	iances /ariances al Distributio	Std Err	CV%	
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0	Tests Test Mod Leve Levene E Shapiro-V	ene Equal Equality of Wilk W No Count	Variance ormality Mean 0.9684	95% LCL 0.9272	Critical 3.812 3.528 0.9146	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm Min 0.9298	iances /ariances al Distributio	Std Err 0.01483	3.43%	0.0%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal Equality of Wilk W No Count 5	Mean 0.9684 0.986	95% LCL 0.9272 0.947	Critical 3.812 3.528 0.9146 95% UC 1 1	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm Min 0.9298 0.9298	iances /ariances al Distributio Max 1	Std Err 0.01483 0.01404	3.43% 3.18%	0.0% -1.81%
Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal Equality of Wilk W No Count 5 5 5	Mean 0.9684 0.986 0.9737	95% LCL 0.9272 0.947 0.9006	Critical 3.812 3.528 0.9146 95% UC 1 1 1	0.5123 0.0037 0.0005	Equal Var Unequal V Non-norm Min 0.9298 0.9298 0.8684	iances /ariances al Distributio Max 1 1	Std Err 0.01483 0.01404 0.02632	3.43% 3.18% 6.04%	-1.81% -0.54%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal Equality of Wilk W No Count 5 5 5 5	Mean 0.9684 0.9737	95% LCL 0.9272 0.947 0.9006	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm Min 0.9298 0.9298 0.8684 1	iances /ariances al Distributio Max 1 1 1	Std Err 0.01483 0.01404 0.02632 0	3.43% 3.18% 6.04% 0.0%	0.0% -1.81% -0.54% -3.26%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal Equality of Wilk W No Count 5 5 5 5 5	Mean 0.9684 0.986 0.9737 1 0.9737	95% LCL 0.9272 0.947 0.9006 1 0.9214	Critical 3.812 3.528 0.9146 95% UC 1 1 1	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm Min 0.9298 0.9298 0.8684 1 0.9035	Max 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881	3.43% 3.18% 6.04% 0.0% 4.32%	0.0% -1.81% -0.54% -3.26% -0.54%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal Equality of Wilk W No Count 5 5 5 5	Mean 0.9684 0.9737	95% LCL 0.9272 0.947 0.9006 1 0.9214	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1	0.5123 0.0037 0.0005	Equal Var Unequal \ Non-norm Min 0.9298 0.9298 0.8684 1	iances /ariances al Distributio Max 1 1 1	Std Err 0.01483 0.01404 0.02632 0	3.43% 3.18% 6.04% 0.0%	0.0% -1.81% -0.54% -3.26%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type	ene Equal equality of Wilk W No Count 5 5 5 5 5 5	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895	95% LCL 0.9272 0.947 0.9006 1 0.9214	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1	Min 0.9298 0.8684 1 0.9035	Max 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0	3.43% 3.18% 6.04% 0.0% 4.32% 0.0%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26%
Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	ene Equal equality of Wilk W No Count 5 5 5 5 5 5	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895	95% LCL 0.9272 0.947 0.9006 1 0.9214	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1	Min 0.9298 0.8684 1 0.9035	Max 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0	3.43% 3.18% 6.04% 0.0% 4.32% 0.0%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	ene Equal Equality of Wilk W No Count 5 5 5 5 5 5 med Sum	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1	Equal Var Unequal V Non-norm Min 0.9298 0.9298 0.8684 1 0.9035 1 0.9737	iances /ariances al Distributio Max 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	ene Equal Equality of Wilk W No Count 5 5 5 5 5 5 med Sum	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895 mary Mean 1.416	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1 1 1 1 1 1 1	Min 0.9298 0.9298 0.9298 0.8684 1 0.9035 1 0.9737 Min 1.303	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446 Std Err 0.04762	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46% CV%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17% %Effect 0.0%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	ene Equal Equality of Wilk W No Count 5 5 5 5 5 count Count Count 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895 mary Mean 1.416 1.48	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716 95% LCL 1.284 1.357	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Min 0.9298 0.9298 0.8684 1 0.9035 1 0.9737 Min 1.303 1.303	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446 Std Err 0.04762 0.04425	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46% CV% 7.52% 6.69%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17% %Effect 0.0% -4.52%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	count Count S S Count Count Count Count Count S S S S S S S S S S S S S	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895 mary Mean 1.416 1.48 1.459	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716 95% LCL 1.284 1.357 1.279	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1 1 1 1 1	Min 0.9298 0.9298 0.9298 0.8684 1 0.9035 1 0.9737 Min 1.303 1.303 1.2	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446 Std Err 0.04762 0.04425 0.06487	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46% CV% 7.52% 6.69% 9.94%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17% %Effect 0.0% -4.52% -3.06%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	Count 5 5 5 5 Count Count 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895 mary Mean 1.416 1.48 1.459 1.524	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716 95% LCL 1.284 1.357 1.279 1.524	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Min 0.9298 0.9298 0.9298 0.9035 1 0.9737 Min 1.303 1.303 1.2 1.524	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446 Std Err 0.04762 0.04425 0.06487 0	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46% CV% 7.52% 6.69% 9.94% 0.0%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17% %Effect 0.0% -4.52% -3.06% -7.64%
Total Distributional Attribute Variances Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.3 Angular (Corre C-% 0 2 4 9	Tests Test Mod Leve Levene E Shapiro-V Summary Control Type Brine Control	count Count S S Count Count Count Count Count S S S S S S S S S S S S S	Mean 0.9684 0.986 0.9737 1 0.9737 1 0.9895 mary Mean 1.416 1.48 1.459	95% LCL 0.9272 0.947 0.9006 1 0.9214 1 0.9716 95% LCL 1.284 1.357 1.279	Critical 3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.5123 0.0037 0.0005 - Median 0.9737 1 1 1 1 1 1 1 1	Min 0.9298 0.9298 0.9298 0.8684 1 0.9035 1 0.9737 Min 1.303 1.303 1.2	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.01483 0.01404 0.02632 0 0.01881 0 0.006446 Std Err 0.04762 0.04425 0.06487	3.43% 3.18% 6.04% 0.0% 4.32% 0.0% 1.46% CV% 7.52% 6.69% 9.94%	0.0% -1.81% -0.54% -3.26% -0.54% -3.26% -2.17% %Effect 0.0% -4.52% -3.06%

Report Date: Test Code: 23 Nov-21 15:05 (p 6 of 6) 2111-S048 | 08-7751-8703

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Analysis ID: 18-8630-7874 Endpoint: Survival Rate CETISv1.8.7 **CETIS Version:** Analyzed: 23 Nov-21 15:04 Nonparametric-Control vs Treatments Analysis: Official Results: Yes Graphics 6.5E-02 Centrered Cerr. Angle -6.5E-02 -1.3E-01 -1.9E-01

Report Date:

23 Nov-21 15:05 (p 1 of 3)

Test Code:

2111-S048 | 08-7751-8703

ı	Bivalve	Larval	Survival	and	Developme	ent Test	
ı							_

Nautilus Environmental (CA)

Analysis ID: 07-4338-6363 Analyzed: 23 Nov-21 15:04

Endpoint: Combined Development Rate Linear Interpolation (ICPIN) Analysis:

CETISv1.8.7 **CETIS Version:** Official Results: Yes

Linear	Interpolation	Options
ł		

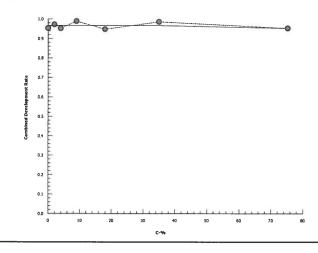
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1034442	1000	Vec	Two Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>75.3	N/A	N/A	<1.328	NA	NA
EC50	>75.3	N/A	N/A	<1.328	NA	NA

Combine	ed Development Rat	Calculated Variate(A/B)									
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Brine Control	5	0.9515	0.9211	0.9919	0.01546	0.03458	3.63%	0.0%	572	600
2		5	0.9715	0.9211	0.9915	0.01283	0.02869	2.95%	-2.1%	596	613
4		5	0.9508	0.8509	0.9853	0.02537	0.05672	5.97%	0.08%	583	612
9		5	0.9889	0.9843	0.9928	0.001883	0.004211	0.43%	-3.93%	626	633
18		5	0.9466	0.8772	0.9843	0.02064	0.04615	4.88%	0.52%	566	597
35		5	0.9861	0.9627	1	0.00641	0.01433	1.45%	-3.63%	631	640
75.3		5	0.9527	0.9035	0.9915	0.01495	0.03343	3.51%	-0.12%	575	603

Graphics



Report Date:

23 Nov-21 15:05 (p 2 of 3)

Test Code:

2111-S048 | 08-7751-8703

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID: 18-2762-8635 Analyzed: 23 Nov-21 15:04 Endpoint: Development Rate Analysis:

Linear Interpolation (ICPIN)

CETIS Version: Official Results:

CETISv1.8.7 Yes

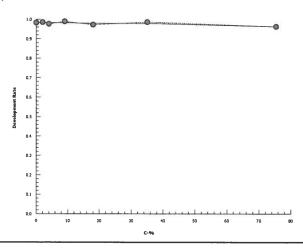
Linear Interpolation Options									
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method				
Linear	Linear	524309	1000	Yes	Two-Point Interpolation				

Point	Estim	ates
I OIIIL	L 301111	ates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>75.3	N/A	N/A	<1.328	NA	NA
EC50	>75.3	N/A	N/A	<1.328	NA	NA

Develop	ment Rate Summary	/		Calculated Variate(A/B)							
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Brine Control	5	0.9826	0.964	0.9919	0.005028	0.01124	1.14%	0.0%	572	582
2		5	0.9854	0.9767	0.9915	0.00267	0.00597	0.61%	-0.29%	596	605
4		5	0.9766	0.9603	0.9853	0.004485	0.01003	1.03%	0.61%	583	597
9		5	0.9889	0.9843	0.9928	0.001883	0.004211	0.43%	-0.65%	626	633
18		5	0.972	0.9545	0.9843	0.004893	0.01094	1.13%	1.08%	566	582
35		5	0.9861	0.9627	1	0.00641	0.01433	1.45%	-0.36%	631	640
75.3		5	0.9627	0.9279	0.9915	0.01024	0.0229	2.38%	2.03%	575	597

Graphics



Bivalve Larval Survival and Development Test

Report Date:

23 Nov-21 15:05 (p 3 of 3) 2111-S048 | 08-7751-8703

Test Code:

Nautilus Environmental (CA)

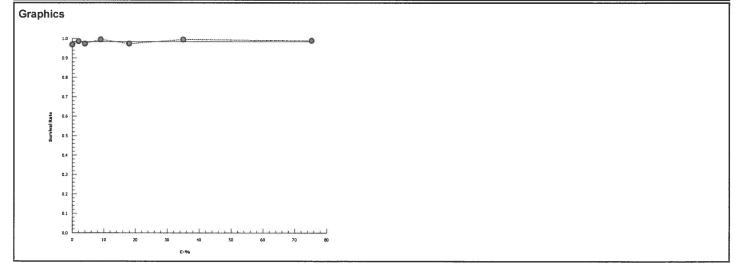
Analysis ID: 01-3044-4779 Endpoint: Survival Rate CETIS Version: CETISv1.8.7

Analyzed: 23 Nov-21 15:04 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Linear Interpola	Linear Interpolation Options								
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method				
Linear	Linear	2044335	1000	Yes	Two-Point Interpolation				

Point	Estimates					
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>75.3	N/A	N/A	<1.328	NA	NA
EC50	>75.3	N/A	N/A	<1.328	NA	NA

Survival Rate Summary			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Brine Control	5	0.9684	0.9298	1	0.01483	0.03317	3.43%	0.0%	552	570
2		5	0.986	0.9298	1	0.01404	0.03138	3.18%	-1.81%	562	570
4		5	0.9737	0.8684	1	0.02632	0.05884	6.04%	-0.54%	555	570
9		5	1	1	1	0	0	0.0%	-3.26%	570	570
18		5	0.9737	0.9035	1	0.01881	0.04207	4.32%	-0.54%	555	570
35		5	1	1	1	0	0	0.0%	-3.26%	570	570
75.3		5	0.9895	0.9737	1	0.006446	0.01441	1.46%	-2.17%	564	570



Report Date:

29 Oct-21 14:21 (p 1 of 1)

 $\textbf{Test Code:} \textbf{2lil-5048} \hspace{0.1cm} \textbf{08-7751-8703/344DDF6F}$

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date:	03 Nov-21	Species:	Mytilus galloprovincialis	Sample Code:	21- (139
End Date:	05 Nov-21	Protocol:	EPA/600/R-95/136 (1995)	Sample Source:	Jacobs
Sample Date:	02 Nov-21	Material:	Effluent Sample	Sample Station:	Wyckoff

-%	te: 02 N				Effluent Sample	# Counted	# Novemen	Sample Station: Wyckoff
y-70	Code	кер	Pos 1	Initial Density	Final Density	# Counted	# Normal	Notes
						99	97	RT 11/23/21
			2		-	110	105	
			3			115	114	
			4			106	105	
	_		5			125	120	
			6			111	110	
			7			124	123	
			8			117	116	
			9			111	107	
			10			136	134	
			11			128	127	
			12			124	122	
			13			126	121	
			14			115	112	
			15			128	126	
			16			127	126	
			17			120	118	
			18			107	105	
			19			116	113	3,100
			20			121	119	
			21			119	119	
			22			138	137	
			23			(11)	103	
			24			127	125	
			25			121	118	
			26			129	127	
			27			129	126	
			28			106	105	
			29			134	129	
			30			114	113	
			31			106	103	
			32			103	100	
			33			130	130	
			34			133	129	
			35			127	125	
			36			118	117	
			37			125	124	
			38			111	107	
			39			127	124	
			40			134	132	•

CETIS Test Data Worksheet

Report Date:

29 Oct-21 14:21 (p 1 of 1)

Test Code: 2(11-504) 08-7751-8703/344DDF6F

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date:03 Nov-21Species:Mytilus galloprovincialisSample Code:21- i \30End Date:05 Nov-21Protocol:EPA/600/R-95/136 (1995)Sample Source:JacobsSample Date:02 Nov-21Material:Effluent SampleSample Station:Wyckoff	C 9/	Code Dan Dan	1-141-1 D14	Fig. 1 D 11		
Sample Sode. 21 (1)				·	•	Wyckoff
Start Date: 03 Nov-21 Species: Mytilus galloprovincialis Sample Code: 21- i \39	End Date:	05 Nov-21	Protocol:	EPA/600/R-95/136 (1995)	Sample Source:	Jacobs
	Start Date:	03 Nov-21	Species:	Mytilus galloprovincialis	Sample Code:	21-1139

C-%		Rep		Initial Density	Final Density	# Counted	# Normal	Notes
0	ВС	1	40					
0	BC	2	18					
0	BC	3	7			103	101	RT 11/5/21
0	ВС	4	28					
0	ВС	5	38					
0	LC	1	31					
0	LC	2	21					
0	LC	3	3			119	118	WF 11/6/21
0	LC	4	25					W 1 11 0 1 2 1
0	LC	5	6					
2		1	36					
2		2	12					
2		3	15			123	122	WF 11/6/21
2		4	4				1 6	001 11 01 21
2		5	27					
4		1	17					
4		2	1					
4		3	10			138	133	WF 11/6/21
4		4	19			, , ,		- 1 11 0 (6 (
4		5	13					
9		1	22					
9		2	37					
9		3	30			128	129	WF 11/6/21
9		4	35			120	120	W1 11/6 21
9		5	26					
18		1	39					
18		2	2					
18		3	32			100	10-	
18		4	14			109	103	WE 11/6/21
18		5	24					
35		1	33					
35		2	29					
35		3	11			1 > -	. 77 ~	101/101
35		4	20			135	155	WF/1166/21
35		5						
			16					
5.3 76.1		1	9					
76/1		2	5					
75.1		3	34			130	127	WF 11/6/21
6.1		4	8					
76.1		5	23					

Q18 AT 11/3/21

DC= RT

Marine Chronic Bioassay

DC-010

Brine Dilution Worksheet

Project:

JACOBS

Analyst: RT

Sample ID:

Wyckoff

Test Date: 11/3/2021

Test No:

2111-S048

Test Type: Mussel Development

Salinity of Effluent

8.6

Salinity of Brine

95.4

Date of Brine used: 9/28/2021

Target Salinity

30

Alkalinity of Brine Control:

mg/L as CaCO3

Test Dilution Volume

250

Effluent

Brine Control

Salinity Adjustment Factor:

(TS - SE)/(SB - TS) =

0.33

0.46

TS = target salinity

SE = salinity of effluent

SB = salinity of brine

Concentration %	Effluent Volume (ml)	Salinity Adjustment Factor	Brine Volume (ml)	Dilute to: (ml)
Control	NA	NA	NA	250
2	5.0	0.33	1.6	250
4	10.0	0.33	«c 3.3	250
9	22.5	0.33	7.4	250
18	45.0	0.33	14.7	250
35	87.5	0.33	28.6	250
75.3	188.4	0.33	61.6	250

	DI Volume			
Brine Control	134.4	0.46	61.6	250

Total Brine Volume Required (ml): 178.9

QC Check: Ju 12/1/71

Final Review: AS 12/1/21

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120

Marine Chronic Bioassay DM-014

Water Quality Measurements

Test Species: M. galloprovincialis 1500

Sample ID: Wyckoff

Start Date/Time: 11/3/2021

Sample Log No.: 21- (13°)

End Date/Time: 11/5/2021 1500

Test No.: 2111-S048

Concentration (% sample)		Salinity (ppt)		(Â)	emperatu (°C)	re	Diss	olved Ox (mg/L)	ygen		pH (pH units)
	0	24	48	Ö	24	48	0	24	48	0	24	48
Lab Control	29.0	28.9	28.9	15.9	15.1	15.3	9.0	8.4	8.3	7.99	8.00	7.98
Brine Control	30.3	30.Z	30.0	15.9	15.5	15,2	9.0	8.3	8.1	8.21	8.07	7.98
2	29.2	29.2	29.1	15.9	14.9	15.1	9.0	8.4	8.0	8.00	7.98	7.97
4	29.2	29.1	29.1	15.9	14.9	15.1	89	8.3	7.9	7.96	7.98	7.98
9	291-2	29.3	29.1	15.9	15.0	15.1	8.8	8.2	8.1	791	7.98	8.00
18	29.4	29.4	29.3	15.9	15.0	15.1	88	8.3	8.1	7.84	7.99	8.02
35	29.6	29-7	29.6	15.9	14.9	15.2	8.7	8.3	7.9	7.77	8.02	8.07
75.3	30.6	30.6	30.4	15.9	15.0	15.3	8.4	8.2	8.0	7.67	8.02	8.12
,												

Technician Initials:	WQ Readings: HH RT KB Dilutions made by: RT	Environmental Chamber:
Comments:	0 hrs: OTOMORATURE measured using surgeste vial 24 hrs: 48 hrs:	
QC Check:	JU 11/9/21	Final Review: Ms 12/1/2

	1
Client/Sample:	JACOBS/Wyckoff
Test No.:	2111-5048
Test Species:	Mytilus galloprovincialis
Animal Source/Bato	h Tank: M-REP 5A
Date Received:	9111/21
Test Chambers:	30 mL glass shell vials
Sample Volume:	10 mL

Start Date/Time: 11/3/2021 1500

End Date/Time: 11/5/2021 1500

Technician Initials: RT

Spawn Information

First Gamete Release Time:

1140

Sex	Number Spawning
Male	(O+
Female	4+

Gamete Selection

Garriete Ocicetion		3.2
Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	3,4,5,6	good motility, good dusty
Female 1	2	good dusity, pale crange round
Female 2	3	good dusty pale armae round
Female 3		7 / / / / / / / / / / / / / / / / / / /

Egg Fertilization Time: 1230

Stock(s) chosen for testing:

Embryo Stock Selection

	0011011
Stock Number	% of embryos at 2-cell division stage
Female 1	99
Female 2	100
Female 3	

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

B13 15	@1521
19 19 19 19	@ 13 20
(A) 66 17	A 8 18
@ VZ 20	@ P 15
@ 13 18	@ 9T 15

Mean: 17.8

Mean 17.8 x 50 = 890 embryos/ml

Initial Density: 890
Desired Final Density: 300

2.97 (dilution factor)

(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Time Ze	TO COLLEGE COL	ints	20	
TØ Vial No.	No. Dividing	Total	% Dividing	Mean % Dividing
TØ A	100	106	(00	
TØ B	102	102	100	1
TØC	113	113	100	1000
TØD	130	130	(00)	1,00
TØE	109	109	100	
TØF	122	122	100	
<u>x</u> =	114			

48-h QC: 91/94 = 96.8%

Comments:

(A)Q18 RT 11/3/21

QC Check:

JU 11912

Final Review: ACS 12/1/21



15 Nov-21 09:32 (p 1 of 1) 2111-S056 | 12-4099-0755

								Test Code:	21	11-8056 12	2-4099-075
Inland Silvers	side 96-h Acute	Surviv	al Test						Nautilu	s Environn	nental (CA
Batch ID: Start Date: Ending Date: Duration:	18-5054-1892 03 Nov-21 17: 07 Nov-21 16: 95h		Test Type: Protocol: Species: Source:	Survival (96h) EPA/821/R-02 Menidia berylli Aquatic Biosys	na			Analyst: Av to Diluent: & Diluent: Albert Age: 10d	Applicable	cater or Dilli Seawater Instant O	
•	15-2531-1593 02 Nov-21 10:2 03 Nov-21 10:2 31h (5 °C)		Code: Material: Source: Station:	21-1139 Effluent Sampl Jacobs Wyckoff	e			Client: Jaco Project:	obs		
Comparison	Summary								·		
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Method			
06-3278-3288	96h Survival R	ate	100	>100	NA	19.9%	1	Steel Man	y-One Rani	k Sum Test	
Point Estimat	e Summary										····
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	ΤŮ	Method			
17-3636-8621	96h Survival R	ate	EC25	>100	N/A	N/A	<1	Linear Inte	erpolation (I	CPIN)	
			EC50	>100	N/A	N/A	<1				
Test Acceptal	bility										
Analysis ID	Endpoint		Attrib	oute	Test Stat	TAC Limi	its	Overlap	Decision		
06-3278-3288	96h Survival R	ate	Contr	ol Resp	0.95	0.9 - NL		Yes	Passes A	cceptability	Criteria
17-3636-8621	96h Survival R	ate	Contr	ol Resp	0.95	0.9 - NL		Yes	Passes A	cceptability	Criteria
96h Survival I	Rate Summary										
C-%	Control Type	Cour	nt Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
0	Salt Control	4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
6.25		4	0.95	0.7909	1	8.0	1	0.05	0.1	10.53%	0.0%
12.5		4	1	1	1	1	1	0	0	0.0%	-5.26%
25		4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	0.0%
50		4	0.95	0.7909	1	8.0	1	0.05	0.1	10.53%	0.0%
100		4	0.85	0.5453	1	0.6	1	0.09574	0.1915	22.53%	10.53%
96h Survival I	Rate Detail				· ·						
C-%	Control Type	Rep	1 Rep 2	Rep 3	Rep 4						
0	Lab Control	1	1	1	0.8						
0	Salt Control	1	1	0.8	1						
6.25		1	8.0	1	1						
12.5		1	1	1	1						
25		1	1	0.8	1						
50		1	1	1	0.8						
100		0.8	0.6	1	1						

1 Q18 ACS 12/1/24

Report Date: Test Code: 15 Nov-21 09:32 (p 1 of 2) 2111-S056 | 12-4099-0755

Inland Silver								lest	Code:	211	1-8056 12	2-4099-07
milana onver	side 96-h Acute	Survival	Test							Nautilus	Environn	nental (C
Analysis ID: Analyzed:	06-3278-3288 15 Nov-21 9:3			Survival Ra		/s Tı	reatments		IS Version		.8.7	
Data Transfo		Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre		NA	C > T	NA	NA			19.9%	100	>100	NA	1
												•
_	ne Rank Sum T	est										
Control	vs C-%		Test Stat	Critical	Ties		P-Value	P-Type	Decision	· · · · · · · · · · · · · · · · · · ·		
Salt Control	6.25		18	10	2	6	0.8333	Asymp	_	ificant Effect		
	12.5		20	10	1	6	0.9516	Asymp	_	ificant Effect		
	25		18	10	2	6	0.8333	Asymp	Non-Sign	ificant Effect		
	50		18	10	2	6	0.8333	Asymp	Non-Sign	ificant Effect		
	100		15.5	10	2	6	0.5438	Asymp	Non-Sign	ificant Effect		
ANOVA Table	•											
Source	Sum Squ	ıares	Mean Squ	ıare	DF		F Stat	P-Value	Decision	(α:5%)		
Between	0.064858	11	0.0129716	2	5		0.7386	0.6044	Non-Sign	ificant Effect		
Error	0.316130	8	0.0175628	2	18				•			
Total	0.380988	9			23		ř.					
Distributiona	l Tests											
Attribute	Test			Test Stat	Critical		P-Value	Decision	(α:1%)			
Variances	Mod Lev	ene Equa	ality of Variance	1.129	4.248		0.3806	Equal Var	iances			
	·											
Variances	Levene I	Equality of	of Variance	3.269	4.248		0.0283	Equal Var	iances			
Variances Distribution		≣quality o Wilk W N		3.269 0.8244	4.248 0.884		0.0283 0.0008	Equal Var Non-norm	iances al Distributi	ion		
Distribution								•		ion		
Distribution 96h Survival	Shapiro-		lormality					•		Std Err	CV%	%Effec
Distribution 96h Survival C-%	Shapiro- Rate Summary	Wilk W N	lormality	0.8244	0.884		0.0008	Non-norm	al Distributi		CV% 10.53%	%Effec
Distribution 96h Survival C-% 0	Shapiro- Rate Summary Control Type	Wilk W N	lormality Mean	0.8244 95% LCL	0.884 95% U		0.0008 Median	Min 0.8	al Distributi	Std Err		-
96h Survival C-% 0 6.25	Shapiro- Rate Summary Control Type	Count	Mean 0.95	0.8244 95% LCL 0.7909	0.884 95% UG		0.0008 Median 1	Non-norm	al Distributi Max 1	Std Err 0.05	10.53% 10.53%	0.0%
Distribution 96h Survival C-% 0 6.25 12.5	Shapiro- Rate Summary Control Type	Count	Mean 0.95 0.95	0.8244 95% LCL 0.7909 0.7909	0.884 95% UG		0.0008 Median 1	Min 0.8 0.8 1	Max 1	Std Err 0.05 0.05 0	10.53% 10.53% 0.0%	0.0% 0.0% -5.26%
Postribution 96h Survival C-% 0 6.25 12.5 25	Shapiro- Rate Summary Control Type	Count 4 4 4 4	Mean 0.95 0.95 1 0.95	0.8244 95% LCL 0.7909 0.7909 1 0.7909	0.884 95% UG		0.0008 Median 1 1 1	Min 0.8 0.8 1	Max 1 1 1	Std Err 0.05 0.05 0	10.53% 10.53% 0.0% 10.53%	0.0% 0.0% -5.26% 0.0%
Distribution	Shapiro- Rate Summary Control Type	Count 4 4 4	Mean 0.95 0.95	0.8244 95% LCL 0.7909 0.7909 1	95% U0	CL_	0.0008 Median 1 1 1	Min 0.8 0.8 1	Max 1 1 1 1	Std Err 0.05 0.05 0	10.53% 10.53% 0.0%	0.0% -5.26%
Distribution 96h Survival C-% 0 6.25 12.5 25 50 100	Shapiro- Rate Summary Control Type	Count 4 4 4 4 4 4	Mean 0.95 0.95 1 0.95 0.95 0.95 0.85	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.7909	95% UC 1 1 1 1	CL_	0.0008 Median 1 1 1 1 1	Min 0.8 0.8 1 0.8 0.8	Max 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05	10.53% 10.53% 0.0% 10.53% 10.53%	0.0% 0.0% -5.26% 0.0% 0.0%
Distribution 96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Core	Shapiro- Rate Summary Control Type Salt Control	Count 4 4 4 4 4 4	Mean 0.95 0.95 1 0.95 0.95 0.95 0.95	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.7909	95% UC 1 1 1 1 1 1	CL_	0.0008 Median 1 1 1 1 1 0.9	Min 0.8 0.8 1 0.8 0.8	Max 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05	10.53% 10.53% 0.0% 10.53% 10.53%	0.0% 0.0% -5.26% 0.0% 0.0%
Distribution 96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Corr	Shapiro- Rate Summary Control Type Salt Control	Count 4 4 4 4 4 4 7 med Sui	Mean 0.95 0.95 1 0.95 0.95 0.95 0.85 mmary Mean	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.5453 95% LCL	95% UC	DL DL	0.0008 Median 1 1 1 1 1 0.9	Min 0.8 0.8 1 0.8 0.8 0.6	Max 1 1 1 1 1 1 1 Max	Std Err 0.05 0.05 0 0.05 0.05 0.09574	10.53% 10.53% 0.0% 10.53% 10.53% 22.53%	0.0% 0.0% -5.26% 0.0% 0.0% 10.53%
Distribution 96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Core C-% 0	Shapiro- Rate Summary Control Type Salt Control rected) Transfor	Count 4 4 4 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Mean 0.95 0.95 1 0.95 0.95 0.85 mmary Mean 1.286	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.5453 95% LCL 1.096	95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CL_	0.0008 Median 1 1 1 1 1 0.9 Median 1.345	Min 0.8 0.8 1 0.8 0.8 0.6 Min 1.107	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05 0.05 0.09574 Std Err 0.05953	10.53% 10.53% 0.0% 10.53% 10.53% 22.53% CV% 9.26%	0.0% 0.0% -5.26% 0.0% 10.53% %Effec : 0.0%
Distribution 96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Corr C-% 0 6.25	Shapiro- Rate Summary Control Type Salt Control rected) Transfor	Count 4 4 4 4 4 4 Count Count 4	Mean 0.95 0.95 1 0.95 0.95 0.95 0.85 mmary Mean 1.286 1.286	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.5453 95% LCL 1.096 1.096	95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	DL DL	0.0008 Median 1 1 1 1 1 1 1 1 1 345 1.345	Min 0.8 0.8 1 0.8 0.8 0.6 Min 1.107 1.107	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05 0.09574 Std Err 0.05953 0.05953	10.53% 10.53% 0.0% 10.53% 10.53% 22.53% CV% 9.26% 9.26%	0.0% 0.0% -5.26% 0.0% 10.53% %Effec 0.0% 0.0%
96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Corr C-% 0 6.25 12.5	Shapiro- Rate Summary Control Type Salt Control rected) Transfor	Count 4 4 4 4 4 Count Count 4 4 4 4	Mean 0.95 0.95 1 0.95 0.95 0.85 mmary Mean 1.286 1.286 1.345	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.5453 95% LCL 1.096 1.096 1.345	95% UC 1 1 1 1 1 1 1 1 1 1 1.475 1.475 1.346	OL OL	0.0008 Median 1 1 1 1 1 1 1 1 3 Median 1.345 1.345 1.345	Min 0.8 0.8 1 0.8 0.8 0.6 Min 1.107 1.107 1.345	Max 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05 0.09574 Std Err 0.05953 0.05953 0	10.53% 10.53% 0.0% 10.53% 10.53% 22.53% CV% 9.26% 9.26% 0.0%	0.0% 0.0% -5.26% 0.0% 10.53% *Effect 0.0% 0.0% -4.63%
96h Survival C-% 0 6.25 12.5 25 50 100 Angular (Corr C-% 0 6.25	Shapiro- Rate Summary Control Type Salt Control rected) Transfor	Count 4 4 4 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Mean 0.95 0.95 1 0.95 0.95 0.95 0.85 mmary Mean 1.286 1.286	0.8244 95% LCL 0.7909 0.7909 1 0.7909 0.5453 95% LCL 1.096 1.096	95% UC 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	OL OL	0.0008 Median 1 1 1 1 1 1 1 1 1 345 1.345	Min 0.8 0.8 1 0.8 0.8 0.6 Min 1.107 1.107	Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0.05 0.05 0 0.05 0.05 0.09574 Std Err 0.05953 0.05953	10.53% 10.53% 0.0% 10.53% 10.53% 22.53% CV% 9.26% 9.26%	0.0% 0.0% -5.26% 0.0% 10.53% *Effec 0.0% 0.0%

Report Date: Test Code: 15 Nov-21 09:32 (p 2 of 2) 2111-S056 | 12-4099-0755

Inland Silverside 96-h Acute Survival Test Nautilus Environmental (CA) Analysis ID: 06-3278-3288 Endpoint: 96h Survival Rate **CETIS Version:** CETISv1.8.7 Analyzed: 15 Nov-21 9:31 Analysis: Nonparametric-Control vs Treatments Official Results: Yes Graphics 2.1E-01 1.4E-01 -7.1E-02

Inland Silverside 96-h Acute Survival Test

Report Date: Test Code: 15 Nov-21 09:32 (p 1 of 1) 2111-S056 | 12-4099-0755

Neutilus Environmental (CA)

Nautilus Environmental (CA)

Analysis ID: 17-3636-8621 Endpoint: 96h Survival Rate CETIS Version: CETISv1.8.7

Analyzed: 15 Nov-21 9:31 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

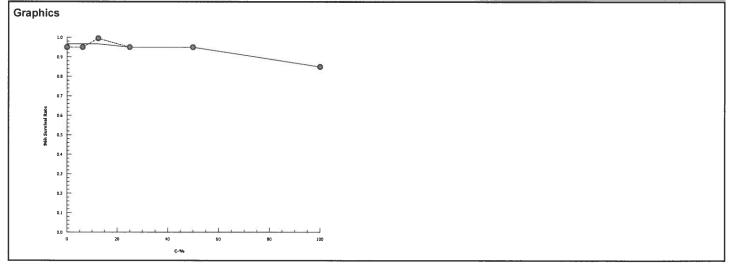
Linear Interpolation Options

X Transform Y Transform Seed Resamples Exp 95% CL Method

Linear Linear 1236349 1000 Yes Two-Point Interpolation

Point Estimates Level % 95% LCL 95% UCL TU 95% LCL 95% UCL EC25 >100 N/A N/A <1 NA NA EC50 >100 N/A N/A <1 NA NA

96h Sur	vival Rate Summary			Calculated Variate(A/B)							
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Salt Control	4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
6.25		4	0.95	8.0	1	0.05	0.1	10.53%	0.0%	19	20
12.5		4	1	1	1	0	0	0.0%	-5.26%	20	20
25		4	0.95	8.0	1	0.05	0.1	10.53%	0.0%	19	20
50		4	0.95	8.0	1	0.05	0.1	10.53%	0.0%	19	20
100		4	0.85	0.6	1	0.09574	0.1915	22.53%	10.53%	17	20



Tech Initials Client: JACOBS Test Species: M. beryllina Start Date/Time: 11/3/2021 17/5 24 72 96 Sample ID: Wyckoff 1635 MB KB Sample Log-in No.: 21- 1130 Counts: SWSP End Date/Time: 11/7/2021 KB KB Test No.: 2111-5056 Dilutions made by: (A) Number of Live Salinity Temperature Dissolved Oxygen На Concentration Organisms (ppt) (°C) (mg/L) (units) Rep (%) 48 72 24 48 72 96 0 24 48 96 48 96 Α 30. 304 29.5 80,2 20.4 25. 9246 24,224,3 24.46.762 7.917.867.947.897.74 6.6 5.7 **Lab Control** 5 В 5 5 5 5.3 7.73 5 30,4 24.5 S C 5 D H 4 5 Α 29.5/29.8 20.8 70.2 70.4 24.5/246 24.1 24.6 24.7 6.41 5.9 6.3 5.9 5.5 8.3 8018.0 7.92 7.87 Salt Control 5 5 5 В S 24.5 6 7.86 30,1 5 С 5 4 4 5 5 D 5 24.4 29.7 30.1 30.4 24.5 24.6 24.1 24.8 24.5 6.4 5.9 64 605.68018.048.007.897.897.89 6.25% В 4 5,4 24.5 7.91 0.2 С 5 5 5 5 D 5 p. 6 229 29.8 30,2 10.5 24.0 248 24,224.7 24.4 6.3 5-9 6.5 5.9 5.6 801 803 7.96 7.90 7.90 A 12.5% В S 30.1 5.2 7.96 24,6 3 С 5 5 5 5 D 5 Α 24. 9298 29. 930. 0 30.3 24.0 250 7.918.03 7.95 7.928.04 241 24.8 24.66.35.7 6,5 5.8 5.7 25% 5 5 В 5 25.0 5.3 30.1 5 3.01 4 С h 5 5 D 5 30.8 74 9450 6356 Α 6.4 5.8 5.7 50% XX 299 29,730.0 24,124.724.4 7.798.03 7.948.018.19 В 5 S 5 5.2 249 5 30.1 8,14 C 5 5 4 D 8 5 Α 19.729 29.730,119.4 24.0249 24,24,474.3 64 5.7 6,4 5.9 5.8 7.6 8047.928.048.39 100% В 8.23 3 30.7 24 5 C 5 5 5 5 5 D 5 Initial Counts QC'd by: Q8601/3/21BO **Environmental Chamber:** Feeding Times 11/2/21 Animal Source/Date Received: Age at Initiation: 0 24 96 Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / none AM: Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal Organisms fed prior to initiation, circle one (y) n) ratest renewal dilutions made with dilated natural schwater instead of artificial sepemater at 44 hrs ACS 12/1/21

duc to tech error ACS 12/1/21

Final Review:

QC Check:

JU 11 1914

Appendix B
Sample Check-In Information

Enthalpy 4340 Van San Diego

Analytical					
dever Avenue		Client:		HOBS	
o, CA 92120		Sample ID:	iv	vckoff	(110221)
		Test ID No(s).:	2111	-5048	+ 5056
	Sample (A, B, C):	A			
	Log-in No. (21-xxxx):	1129			

A			
1139			
11/2/21 1020			
11/3/21 1015			
1 x 4 c cubi			
246			
5.0			
N (X)	Y N	ΥN	Y N
7.8			
7.48			
14,260			
8.6			
300			
< 0.02			
KB			
	11/2/21 1020 11/3/21 1015 1×42 cubi ~42 5.0 N 7.8 7.48 14,260 8.6 300	11/2/21 1020 11/3/21 1015 1 x 4 L cubi ~ 4 C 5.0 9 N Y N 7.8 7.48 14,260 8.6 300	11/2/21 1020 11/3/21 1015 1 x 4 L cubi ~ 4 C 5.0 (9) N Y N Y N 7.8 7.48 14,260 8.6 300

Test Performed:	Acutemenidia	_Control/Dilution Water:			
		Alkalinity: 137	Hardness or Sali	nity: <u>3000</u> +	
	Additional Control? Y N	= LabSW_Alkalin	nity: 161 99	Hardness or Salinity:	30ppt
Test Performed:	development	Control/Dilution Water: Alkalinity: 99 232 =	Hardness or Sali	Lab ART Other:	30ppt
Test Performed:		_Control/Dilution Water:	8:2 / Lab SW	/ Lab ART Other:	
	20	Alkalinity:	Hardness or Salin	nity:	
	Additional Control? Y N	= Alkalir	nity:	Hardness or Salinity:	
	1-			1	D.
Notes:	¹ Temperature of sample should				
	² mg/L as CaCO3, ³ Measured	for freshwater samples only	y, NA = Not Applica	able	
Additional Comments:	E) Q18 A(5 12/1/21				

NORTHWEST CLIENTS

Sample Check-In Information DC-005

	Sample Des				.,
A.	color le	ss clear	(No odo)	, No del	pr15
	Cubaamala	_ £ A . . isi-	mal Chamin	- Demind	
		3)(always	nal Chemist	ry Kequirea	
		er (always	required)		
			KC B	C	
		on unuais A	KD p	<u> </u>	
	COC Comp	lete (Y/N)?			
	AY B				
	Filtration?	YN) Initials:		
		re Size:	,		
	Org	ganisms	or	Debris	
		an an			
		ustment? {		1.1	
	Test:	Menidia	Source:	ean Targe	et ppt:30
	Test:	mussel	Source: BY	Targe	et ppt: 30
	Test:		Source:	Targe	et ppt:
	pH Adjustm	ent? Y (R		
	pririajaotii	. (A	В	С
		Initial pH:			
	Amount of	HCI added:			
		l pH:			
	Cl ₂ Adjustm	nent? Y	N)		
			A	В	С
		Free Cl ₂ :			
		added:			
	Final	Free Cl ₂ :			
	Sample Aer	ation? Y			
	oumple Aci	anonii i yi	A	В	С
	Initial	D.O.	,		
	Durat	ion & Rate			
	Final	D.O.			

QC Check: 34 1/8/21
Final Review: 4(5 12/1/21

DC-001

Client:	Jacobs
Project:	Wyckoff
Test Type:	Mussel Development and acute menidia

DI Blank: <u>∅. ⊘</u>
Test Start Date: <u>41/2/2021</u> \\/3/2\

Analyst: BS
Analysis Date: 11/12/21

Q18 ACS 12/1/21

N x 1.22

	24/10/1/4				
Sample ID	Enthalpy ID	Sub-Sample Date	Test Day	NH3-N (mg/L)	Ammonia (mg/L)
Blank Spike (10 mg/L NH ₃)		NA	NA	8.1	9.9
Wyckoff Effluent	21-1139	11/3/2021	check in	1.0	1.2
Spike Check (10 mg/L NH ₃)		NA NA	NA		
Sample Duplicate ^a	21-1139			0.7	0.0
Sample Duplicate + Spike ^a	41 110-1	NA NA	NA NA	10.4	0.9
Spike Check (10 mg/L NH ₃)		NA NA	NA NA	8.2	10.0

 $\frac{\text{Relative Percent Difference (RPD) = [sample] (mg/L) - [sample duplicate] (mg/L)}}{[average ammonia] (mg/L)} \times 100$

Acceptable Range: 0-20%

 $\frac{Percent\ Recovery = [spiked\ sample]\ (mg/L) - [sample]\ (mg/L)}{nominal\ [spike]\ (mg/L)} \ \ x\ 100$

Acceptable Range: 80-120%b

QC Sample ID	[NH ₃]	[Sample Dup]	Measured [Spike]	Nominal [Spike]	RPD	% Recovery
Blank	0.0	NA	9.9	10	NA	99
21-1139	1.2	0.9	12.7	10	@ 28.6	115

	Reagent 1	Reagent 2	Test Tubes			
Standard Lot Number	A1189	A1197	A1240			
Comments: @PPD is Out of Yange due to low ammonia Values Notes: aUnless otherwise noted, the last sample listed on the datasheet is used for duplicate and duplicate + spike QC check. b Acceptable range for % recovery applies only to the blank spike. Spike recoveries in samples may vary based on sample matrix and are for information only.						
^c Calculation not performed due to one or both values below the method detection limit.						
HACH Ammonia Nitrogen Test Kit, Test 'N Tube™ Vials. Method 10031. Method Detection Limit = 0.5 mg/L						
QC Check: 1411/17/24	<u>-</u>	Final Review:	ACS 12/1/21			

Appendix C
Chain-of-Custody Form

Enthalpy Analytical (REGION COPY)

DateShipped: 11/2/2021 CarrierName: FedEx

AirbillNo:

Jacobs, Wyckoff-

Wyckoff Eagle Harbor GWTP 2020/WA Project Code: WEH-031F Cooler #: 1 of 1 No: 10-110221-112205-0570

2021T10P000DD210W2LA00 Contact Name: Daniel Baca Contact Phone: 206-871-8760

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
110221		Ground Water/ D. Baca	Composite	ACTOX-CHRTOX(8 Weeks)	(< 6 C) (1)	SP-11	11/02/2021 10:20	Field Sample
		5						l i
	W							

	Shipment for Case Complete? N
Special Instructions: 2021 Week 45 - 4th Quarter	Samples Transferred From Chain of Custody #
Analysis Key: ACTOX-CHRTOX=Acute Toxicity, Chronic Toxicity	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt	EA login
	DAMS JACOBS	21145	ROTT TA-SD	11/3/21	600d 5.0°C	21-1139
	01.02					

Appendix D
List of Qualifier Codes

Glossary of Qualifier Codes

- Q1 Temperature out of recommended range; corrective action taken and recorded in Test Temperature Correction Log
- Q2 Temperature out of recommended range; no action taken, test terminated same day
- Q3 Sample pH adjusted to within range of 6-9 with reagent grade NaOH or HCl, as needed
- Q4 Test aerated; D.O. levels dropped below 4.0 mg/L
- Q5 Test initiated with continuous aeration due to an anticipated drop in D.O.
- Q6 Airline obstructed or fell out of replicate and replaced; drop in D.O. occurred
- Q7 Salinity out of recommended range
- Q8 Spilled test chamber/ Unable to recover test organism(s)
- Q9 Inadequate sample volume remaining, partial renewal performed
- Q10 Inadequate sample volume remaining, no renewal performed
- Q11 Sample out of holding time; refer to QA section of report
- Q12 Replicate(s) not initiated; excluded from data analysis
- Q13 Survival counts not recorded due to poor visibility or heavy debris
- Q14 D.O. percent saturation was checked and was ≤ 110%
- Q15 Did not meet minimum test acceptability criteria. Refer to QA section of report.
- Q16 Percent minimum significant difference (PMSD) was <u>below</u> the lower bound limit for acceptability. This indicates that statistics may be over-sensitive in detecting a difference from the control due to low variability in the data set. Test results were reviewed and reported in accordance with guidance found in EPA-833-R-00-003, 2000 unless otherwise specified.
- Q17 Percent minimum significant difference (PMSD) was <u>above</u> the upper bound limit for acceptability. This indicates that statistics may be under-sensitive in detecting a difference from the control due to high variability in the data set. Test results were reviewed and reported in accordance with EPA-833-R-00-003, 2000 guidance unless otherwise specified.
- Q18 Incorrect or illegible Entry
- Q19 Miscalculation
- Q20 PMSD criteria do not apply to the test of significant toxicity (TST) analysis
- Q21 Other (provide reason in comments section)
- Q22 Greater than 10% batch <u>mortality</u> observed upon receipt and/or in holding prior to test initiation. Organisms acclimated to test conditions at Enthalpy and ultimately deemed fit to use for testing.
- Q23 Test organisms experienced a <u>temperature</u> shift greater than 3°C within 1 day or were received at a temperature greater than 3°C outside the recommended test temperature range and had minimal time to acclimate prior to test initiation. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate test(s). Organisms were ultimately deemed fit to use for testing.
- Q24 Test organisms experienced a <u>salinity</u> shift greater than 3 ppt within 1 day or were received at a salinity greater than 3 ppt outside the recommended test salinity range and had minimal time to acclimate prior to test initiation. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate test(s). Organisms were ultimately deemed fit to use for testing.

Version: 6/1/2021



Appendix E
Reference Toxicant Test Results

CETIS Summary Report

Report Date: Test Code: 24 Nov-21 12:20 (p 1 of 3) 211103msdv | 14-6395-1490

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Batch ID: 03-9630-7688 Test Type: Development-Survival Analyst: Start Date: 03 Nov-21 15:00 Protocol: EPA/600/R-95/136 (1995) Diluent: **Diluted Natural Seawater** Ending Date: 05 Nov-21 15:00 Species: Mytilus galloprovincialis Brine: Not Applicable **Duration:** Source: M-Rep, Carlsbad, CA Age: 07-7158-7375 Sample ID: 211103msdv Code: Client: Internal Sample Date: 03 Nov-21 Material: Copper chloride Project: Receive Date: 03 Nov-21 Source: Reference Toxicant Sample Age: 15h Station: Copper Chloride **Comparison Summary** Analysis ID **Endpoint** NOEL LOEL **TOEL PMSD** Method TU 16-1574-3505 Combined Development Ra 5 7.071 10 14.9% **Dunnett Multiple Comparison Test** 13-9419-9521 Development Rate 5 10 7.071 9.94% Steel Many-One Rank Sum Test 07-8853-6576 Survival Rate 20 40 28.28 7.57% **Dunnett Multiple Comparison Test Point Estimate Summary** Analysis ID **Endpoint** Level µq/L 95% LCL 95% UCL TU Method

06-4040-2968 Combined Development Ra EC25 6.215 5.427 6.849 Linear Interpolation (ICPIN) 11-9492-7222 Development Rate EC25 6.411 6.141 6.918 Linear Interpolation (ICPIN) EC50 7.85 7.359 8.933 03-1145-8832 Survival Rate EC25 24.56 23.3 25.22 Linear Interpolation (ICPIN) FC50 29.71 28.86 30.15	7 thaiyold 1B	Liidpoiiit	LCVCI	P9″⊏	30 / LOL	30 /0 OOL 10	Wediod
11-9492-7222 Development Rate EC25 6.411 6.141 6.918 Linear Interpolation (ICPIN) EC50 7.85 7.359 8.933 03-1145-8832 Survival Rate EC25 24.56 23.3 25.22 Linear Interpolation (ICPIN)	06-4040-2968	Combined Development Ra	EC25	6.215	5.427	6.849	Linear Interpolation (ICPIN)
EC50 7.85 7.359 8.933 03-1145-8832 Survival Rate EC25 24.56 23.3 25.22 Linear Interpolation (ICPIN)			EC50	7.733	7.033	8.816	
03-1145-8832 Survival Rate EC25 24.56 23.3 25.22 Linear Interpolation (ICPIN)	11-9492-7222	Development Rate	EC25	6.411	6.141	6.918	Linear Interpolation (ICPIN)
			EC50	7.85	7.359	8.933	
FC50 29.71 28.86 30.15	03-1145-8832	Survival Rate	EC25	24.56	23.3	25.22	Linear Interpolation (ICPIN)
2000 20.11 20.00 00.10			EC50	29.71	28.86	30.15	
	A lu-i- ID		A			~	

Test Acceptab	ility								
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision			
11-9492-7222	Development Rate	Control Resp	0.9828	0.9 - NL	Yes	Passes Acceptability Criteria			
13-9419-9521	Development Rate	Control Resp	0.9828	0.9 - NL	Yes	Passes Acceptability Criteria			
03-1145-8832	Survival Rate	Control Resp	0.9649	0.5 - NL	Yes	Passes Acceptability Criteria			
07-8853-6576	Survival Rate	Control Resp	0.9649	0.5 - NL	Yes	Passes Acceptability Criteria			
16-1574-3505	Combined Development Ra	PMSD	0.1491	NL - 0.25	No	Passes Acceptability Criteria			

Analyst: On QA: ACII/24/21

000-089-187-4 CETIS™ v1.8.7.20

Report Date: Test Code: 24 Nov-21 12:20 (p 2 of 3) 211103msdv | 14-6395-1490

							lest	Code:	21110)3msav 14	1-6395-1490
Bivalve La	rval Survival and I	Developme	nt Test						Nautilus	s Environm	nental (CA)
Combined	Development Rate	e Summary									
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9485	0.8824	1	0.886	0.9921	0.02384	0.0533	5.62%	0.0%
2.5		5	0.9802	0.9544	1	0.9568	1	0.009281	0.02075	2.12%	-3.33%
5		5	0.9144	0.7844	1	0.7368	0.9925	0.04685	0.1048	11.46%	3.6%
10		5	0.1288	0	0.3556	0	0.4386	0.08168	0.1826	141.8%	86.42%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%
Developme	ent Rate Summary										
C-µg/L	Control Type	Count	Mean	95% LCL		Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9828	0.9734	0.9922	0.9714	0.9921	0.003396	0.007593	0.77%	0.0%
2.5		5	0.9802	0.9544	1	0.9568	1	0.009281	0.02075	2.12%	0.27%
5		5	0.9777	0.9582	0.9971	0.9537	0.9925	0.007017	0.01569	1.61%	0.52%
10		5	0.1373	0	0.3863	0	0.4808	0.08971	0.2006	146.1%	86.03%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%
Survival Ra	ate Summary										
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9649	0.9048	1	0.9035	1	0.02167	0.04844	5.02%	0.0%
2.5		5	1	1	1	1	1	0	0	0.0%	-3.64%
5		5	0.9351	0.8068	1	0.7544	1	0.04622	0.1033	11.05%	3.09%
10		5	0.9789	0.9317	1	0.9123	1	0.01701	0.03803	3.89%	-1.46%
20		5	0.9544	0.8916	1	0.8684	0.9912	0.0226	0.05054	5.3%	1.09%
40		5	0	0	0	0	0	0	0		100.0%
Combined	Development Rate	e Detail	·				***************************************				
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	0.8947	0.9852	0.886	0.9847	0.9921					
2.5		1	1	0.9606	0.9833	0.9568					
5		0.7368	0.9035	0.9744	0.9925	0.9649					
10		0.1463	0	0.05036	0.4386	0.008772					
20		0.1400	0	0.03030	0.4300	0.000772					
			-								
40		0	0	0	0	0					
	ent Rate Detail										
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	0.9714	0.9852	0.9806	0.9847	0.9921					
2.5		1	1	0.9606	0.9833	0.9568					
5		0.9767	0.9537	0.9744	0.9925	0.991					
10		0.1463	0	0.05036	0.4808	0.008929					
20		0	0	0	0	0					
40		0	0	0	0	0					
Survival Ra	ate Detail				· · · · · · · · · · · · · · · · · · ·						
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	0.9211	1	0.9035	1	1					
2.5		1	1	1	1	1					
5		0.7544	0.9474	1	1	0.9737					
10		1	1	1	0.9123	0.9825					
20		0.9649	0.8684	0.9912							
40					0.9912	0.9561					
		0	0	0	0	0					

Report Date: Test Code: 24 Nov-21 12:20 (p 3 of 3) 211103msdv | 14-6395-1490

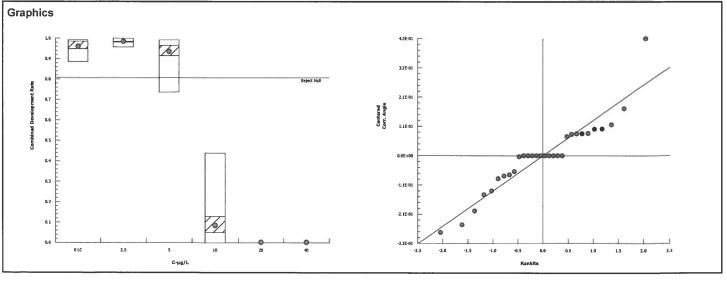
							rest code.	21110311130V 14-0333-1430
Bivalve La	rval Survival and I	Developme	nt Test					Nautilus Environmental (CA)
Combined	Development Rate	e Binomials	5		-			
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	102/114	133/135	101/114	129/131	126/127		
2.5		120/120	128/128	122/127	118/120	133/139		
5		84/114	103/114	114/117	133/134	110/114		
10		18/123	0/132	7/139	50/114	1/114		
20		0/114	0/114	0/114	0/114	0/114		
40		0/114	0/114	0/114	0/114	0/114		
Developme	ent Rate Binomials	5			······································			
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	102/105	133/135	101/103	129/131	126/127		
2.5		120/120	128/128	122/127	118/120	133/139		
5		84/86	103/108	114/117	133/134	110/111		
10		18/123	0/132	7/139	50/104	1/112		
20		0/110	0/99	0/113	0/113	0/109		
40		0/1	0/1	0/1	0/1	0/1		
Survival R	ate Binomials							
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5		
0	Lab Control	105/114	114/114	103/114	114/114	114/114		
2.5		114/114	114/114	114/114	114/114	114/114		
5		86/114	108/114	114/114	114/114	111/114		
10		114/114	114/114	114/114	104/114	112/114		
20		110/114	99/114	113/114	113/114	109/114		
40		0/114	0/114	0/114	0/114	0/114		

est Code:	211103msdv 14-6395-1490
report Date:	24 Nov-21 12:20 (p 1 of 4

Bivalve Larv	al Sur	vival and [Develo	pment T	est							Nautilus	s Environi	mental (CA
Analysis ID: Analyzed:		574-3505 Nov-21 12:	20	Endpo Analys		mbined Deve rametric-Cor	•				IS Version: cial Results:	CETISv1 Yes	.8.7	
Data Transfo	rm		Zeta	А	it Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	ected)		NA	С	> T	NA	NA			14.9%	5	10	7.071	
Dunnett Mul	tiple C	omparisoı	n Test							-				
Control	vs	C-µg/L		T	est Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)		
Lab Control		2.5		-(.6718	2.227	0.253	8	0.9226	CDF	Non-Signif	icant Effect		
		5	-34	0	4945	2.227	0.253	8	0.5472	CDF	Non-Signif	icant Effect		
		10*		9	453	2.227	0.253	8	<0.0001	CDF	Significant	Effect		
ANOVA Tabl	е													
Source		Sum Squ	ares	M	ean Sqı	uare	DF		F Stat	P-Value	Decision(α:5%)	= = =	
Between		4.414649		1.	47155		3		45.69	<0.0001	Significant	Effect		
Error		0.515285	3	0.	0322053	37	16							
Total		4.929935					19							
Distributiona	al Test	S					, ,		1181					
Attribute		Test				Test Stat	Critica	l	P-Value	ue Decision(α:1%)				
Variances		Bartlett E	quality	of Varia	nce	5.508	11.34		0.1382	Equal Va	iances			
Distribution		Shapiro-	Wilk W	Normali	ty	0.9385	0.866		0.2247	Normal D	istribution			
Combined D	evelop	ment Rate	Sumn	nary										
C-µg/L	Cont	rol Type	Cour	nt M	ean	95% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab (Control	5	0.	9485	0.8824	1		0.9847	0.886	0.9921	0.02384	5.62%	0.0%
2.5			5	0	9802	0.9544	1		0.9833	0.9568	1	0.009281	2.12%	-3.33%

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9485	0.8824	1	0.9847	0.886	0.9921	0.02384	5.62%	0.0%
2.5		5	0.9802	0.9544	1	0.9833	0.9568	1	0.009281	2.12%	-3.33%
5		5	0.9144	0.7844	1	0.9649	0.7368	0.9925	0.04685	11.46%	3.6%
10		5	0.1288	0	0.3556	0.05036	0	0.4386	0.08168	141.8%	86.42%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%

Angular (C	orrected) Transfor	med Sumn	nary								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.369	1.214	1.524	1.447	1.226	1.482	0.05572	9.1%	0.0%
2.5		5	1.445	1.346	1.544	1.441	1.362	1.527	0.03573	5.53%	-5.57%
5		5	1.313	1.093	1.533	1.382	1.032	1.484	0.07931	13.51%	4.1%
10		5	0.296	-0.04508	0.6371	0.2263	0.04353	0.7238	0.1229	92.8%	78.38%
20		5	0.04685	0.04684	0.04685	0.04685	0.04685	0.04685	0	0.0%	96.58%
40		5	0.04685	0.04684	0.04685	0.04685	0.04685	0.04685	0	0.0%	96.58%



Report Date: Test Code: 24 Nov-21 12:20 (p 2 of 4)

211103msdv | 14-6395-1490

							lest	Code:	21110	3msav 14	1-6395-149
Bivalve Larva	al Survival and [Developm	ent Test			-	a a		Nautilus	Environn	nental (CA
Analysis ID:	13-9419-9521	E	ndpoint: De	velopment R	ate		CET	S Version:	CETISv1.	8.7	
Analyzed:	24 Nov-21 12:	20 A	nalysis: No	nparametric-	Control vs 7	reatments	Offic	ial Results:	Yes		
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre	ected)	NA	C > T	NA	NA		9.94%	5	10	7.071	
Steel Many-O	ne Rank Sum T	est		77"							
Control	vs C-μg/L		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision(a:5%)		
Lab Control	2.5		27	17	0 8	0.7105	Asymp	Non-Signif	icant Effect		
	5		26	17	0 8	0.6242	Asymp	Non-Signif	icant Effect		
	10*		15	17	0 8	0.0123	Asymp	Significant	Effect		
ANOVA Table	9										
Source	Sum Squ	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision(a:5%)		
Between	4.821548		1.607183		3	67.76	<0.0001	Significant	Effect	-	
Error	0.379510	3	0.023719	39	16						
Total	5.201058				19						
Distributiona	l Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Bartlett E	quality of	Variance	19.81	11.34	0.0002	Unequal \	/ariances			
Distribution	Shapiro-	Wilk W N	ormality	0.8326	0.866	0.0028	Non-norm	al Distributio	n		
Development	t Rate Summary										
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9828	0.9734	0.9922	0.9847	0.9714	0.9921	0.003396	0.77%	0.0%
2.5		5	0.9802	0.9544	1	0.9833	0.9568	1	0.009281	2.12%	0.27%
5		5	0.9777	0.9582	0.9971	0.9767	0.9537	0.9925	0.007017	1.61%	0.52%
10		5	0.1373	0	0.3863	0.05036	0	0.4808	0.08971	146.1%	86.03%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%
Angular (Cor	rected) Transfor	med Sun	nmary								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.442	1.405	1.478	1.447	1.401	1.482	0.01318	2.04%	0.0%
2.5		5	1.445	1.346	1.544	1.441	1.362	1.527	0.03573	5.53%	-0.22%
5		5	1.428	1.362	1.495	1.418	1.354	1.484	0.02384	3.73%	0.94%
10		5	0.3046	-0.0569	0.6662	0.2263	0.04353	0.7662	0.1302	95.58%	78.87%
20		5	0.048	0.04635	0.04965	0.04769	0.04705	0.05027	0.0005943		96.67%
40		5	0.5236	0.5234	0.5238	0.5236	0.5236	0.5236	0	0.0%	63.69%
Graphics											
10 F ≡		-				4.6E-01		1		•	
۵.9						Ē					
a.e						3.5E-01					
<u>.</u> F						F					
# 0.7 E					2	2.3E-01					
0.6					Centarad	5 E 1.2E-01					
a.s E						Jacol F			/00	• •	
						0.0E+00			000		

Report Date: Test Code: 24 Nov-21 12:20 (p 3 of 4) 211103msdv | 14-6395-1490

								rest	Code:	21110	omsav į i	4-6395-14
Bivalve Larv	al Surv	vival and D	Developme	nt Test					-	Nautilus	Environr	mental (CA
Analysis ID:		853-6576		•	vival Rate				S Version		8.7	
Analyzed:	24 N	lov-21 12:2	20 An	alysis: Par	ametric-Cor	trol vs Trea	tments	Offic	ial Results	s: Yes		
Data Transfo	rm		Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	ected)		NA	C > T	NA	NA		7.57%	20	40	28.28	
Dunnett Mult	tiple C	omparisor	n Test									
Control	vs	C-µg/L		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	ι(α:5%)		
Lab Control		2.5		-1.25	2.305	0.187 8	0.9876	CDF	Non-Sign	ificant Effect		
		5		0.6546	2.305	0.187 8	0.5342	CDF	Non-Sign	ificant Effect		
		10		-0.4122	2.305	0.187 8	0.9062	CDF	Non-Sign	ificant Effect		
		20		0.5352	2.305	0.187 8	0.5880	CDF	Non-Sign	ificant Effect		
ANOVA Table	е										=	
Source		Sum Squ	ares	Mean Squ	are	DF	F Stat	P-Value	Decision	(α:5%)		
Between		0.0790306	66	0.0197576	7	4	1.202	0.3409	Non-Sign	ificant Effect		
Error		0.3288174	4	0.0164408	7	20						
Total		0.407848	1			24						
Distributiona	l Tests	3										
Attribute		Test			Test Stat	Critical	P-Value	Decision	α:1%)			
Variances		Mod Leve	ene Equalit	y of Variance	1.309	4.893	0.3114	Equal Var	iances			
Variances		Levene E	quality of \	/ariance	3.084	4.431	0.0394	Equal Var	iances			
Distribution		Shapiro-\	Nilk W Nor	mality	0.8939	0.8877	0.0136	Normal D	stribution			
Survival Rate	Sumr	nary										
C-μg/L	Cont	rol Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab C	Control	5	0.9649	0.9048	1	1	0.9035	1	0.02167	5.02%	0.0%
2.5			5	1	1	1	1	1	1	0	0.0%	-3.64%
5			5	0.9351	0.8068	1	0.9737	0.7544	1	0.04622	11.05%	3.09%
10			5	0.9789	0.9317	1	1	0.9123	1	0.01701	3.89%	-1.46%
20			5	0.9544	0.8916	1	0.9649	0.8684	0.9912	0.0226	5.3%	1.09%
40			5	0	0	0	0	0	0	0		100.0%
Angular (Cor	rected) Transfor	med Sumr	nary								
C-µg/L	Cont	rol Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab C	ontrol	5	1.423	1.25	1.595	1.524	1.255	1.524	0.06229	9.79%	0.0%
2.5			5	1.524	1.524	1.524	1.524	1.524	1.524	0	0.0%	-7.13%
5			5	1.369	1.128	1.61	1.408	1.052	1.524	0.08681	14.17%	3.73%
10			5	1.456	1.319	1.593	1.524	1.27	1.524	0.04936	7.58%	-2.35%
20			5	1.379	1.238	1.52	1.382	1.2	1.477	0.05088	8.25%	3.05%
40			_							_		

40

5

0.04685

0.04684

0.04685

0.04685

0.04685

0.04685

0

0.0%

96.71%

Report Date: Test Code:

24 Nov-21 12:20 (p 4 of 4)

211103msdv | 14-6395-1490 **Bivalve Larval Survival and Development Test** Nautilus Environmental (CA) Analysis ID: 07-8853-6576 Endpoint: Survival Rate **CETIS Version:** CETISv1.8.7 Analyzed: Official Results: 24 Nov-21 12:20 Analysis: Parametric-Control vs Treatments Yes Graphics Centered Corr. Angle .00

Report Date:

24 Nov-21 12:20 (p 1 of 3)

Test Code:

211103msdv | 14-6395-1490

Bivalve Larva	l Survival	and Develo	pment Test
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Nautilus Environmental (CA)

Analysis ID: 06-4040-2968 **Analyzed:** 24 Nov-21 12:20

Endpoint: Combined Development Rate
Analysis: Linear Interpolation (ICPIN)

CETIS Version: Official Results:

CETISv1.8.7 Yes

Linear	Interpolation	Options
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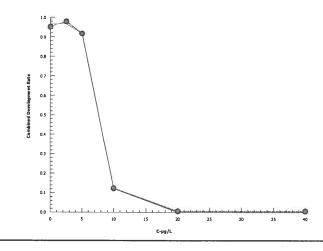
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1020017	1000	Yes	Two-Point Interpolation

Point Estimates

Level	μg/L	95% LCL	95% UCI
EC25	6.215	5.427	6.849
EC50	7.733	7.033	8.816

Combined	d Development Rat	Calculated Variate(A/B)									
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Lab Control	5	0.9485	0.886	0.9921	0.02384	0.0533	5.62%	0.0%	591	621
2.5		5	0.9802	0.9568	1	0.009281	0.02075	2.12%	-3.33%	621	634
5		5	0.9144	0.7368	0.9925	0.04685	0.1048	11.46%	3.6%	544	593
10		5	0.1288	0	0.4386	0.08168	0.1826	141.8%	86.42%	76	622
20		5	0	0	0	0	0		100.0%	0	570
40		5	0	0	0	0	0		100.0%	0	570

Graphics



Report Date: **Test Code:**

24 Nov-21 12:20 (p 2 of 3)

211103msdv | 14-6395-1490

Bivalve	Larval	Survival	and	Development	Test
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Nautilus Environmental (CA)

Analysis ID: 11-9492-7222 Analyzed:

24 Nov-21 12:20

Endpoint: Development Rate Analysis:

Linear Interpolation (ICPIN)

CETIS Version:

CETISv1.8.7

Official Results:

Yes

Linear	interpolation	Options

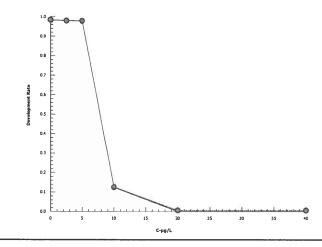
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	46101	1000	Yes	Two-Point Interpolation

Point Estimates

Level	μg/L	95% LCL	95% UC
EC25	6.411	6.141	6.918
EC50	7.85	7.359	8.933

Development Rate Summary			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Lab Control	5	0.9828	0.9714	0.9921	0.003396	0.007594	0.77%	0.0%	591	601
2.5		5	0.9802	0.9568	1	0.009281	0.02075	2.12%	0.27%	621	634
5		5	0.9777	0.9537	0.9925	0.007017	0.01569	1.61%	0.52%	544	556
10		5	0.1373	0	0.4808	0.08971	0.2006	146.1%	86.03%	76	610
20		5	0	0	0	0	0		100.0%	0	544
40		5	0	0	0	0	0		100.0%	0	5

Graphics



28.86

30.15

EC50

29.71

Report Date:

24 Nov-21 12:20 (p 3 of 3)

Test Code:

211103msdv | 14-6395-1490

Bivalve Larva	l Survival and Deve	lopment Test		Nautilus Environmental (CA)	
Analysis ID:	03-1145-8832	Endpoint:	Survival Rate	CETIS Version:	CETISv1.8.7
Analyzed:	24 Nov-21 12:20	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options									
X Tran	sform	Y Transform	Seed	Resamples	Exp 95% CL	Method			
Linear		Linear	401743	1000	Yes	Two-Point Interpolation			
Point E	Estimates	3							
Point E	Estimates µg/L		95% UCL						

Survival Rate Summary			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Lab Control	5	0.9649	0.9035	1	0.02167	0.04844	5.02%	0.0%	550	570
2.5		5	1	1	1	0	0	0.0%	-3.64%	570	570
5		5	0.9351	0.7544	1	0.04622	0.1033	11.05%	3.09%	533	570
10		5	0.9789	0.9123	1	0.01701	0.03803	3.89%	-1.46%	558	570
20		5	0.9544	0.8684	0.9912	0.0226	0.05054	5.3%	1.09%	544	570
40		5	0	0	0	0	0		100.0%	0	570

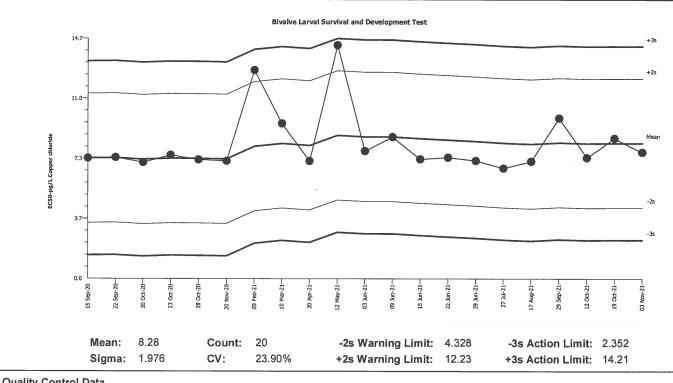
CETIS QC PlotReport Date: 24 Nov-21 12:21 (1 of 1)

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Test Type: Development-Survival Organism: Mytilus galloprovincialis (Bay Mussel) Material: Copper chloride

Protocol: EPA/600/R-95/136 (1995) Endpoint: Combined Development Rate Source: Reference Toxicant-REF



Qual	ity Con	trol Data	а								
Poin	t Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Sep	15	0:00	7.365	-0.9149	-0.463			19-9833-0655	18-5101-1090
2			22	14:40	7.405	-0.8751	-0.4428			04-0347-9113	09-6026-9613
3		Oct	20	14:25	7.1	-1.18	-0.597			08-8652-5764	17-2783-6415
4			23	13:45	7.548	-0.7315	-0.3702			09-8413-3498	19-3049-9702
5			28	15:50	7.269	-1.011	-0.5117			09-4043-4676	02-6542-7057
6		Nov	20	16:00	7.187	-1.093	-0.5531			13-7696-8009	10-4367-1427
7	2021	Feb	9	15:15	12.74	4.459	2.256	(+)		12-5648-6062	18-1503-3303
8		Mar	10	14:15	9.481	1.201	0.6077			13-7922-5399	10-0885-9755
9		Apr	20	16:15	7.185	-1.095	-0.5542			06-7450-9711	18-3353-6875
10		May	12	15:00	14.27	5.988	3.03	(+)	(+)	15-4594-3065	00-9727-8504
11		Jun	3	15:50	7.791	-0.4888	-0.2474			07-9391-2508	21-2212-7050
12			9	14:00	8.654	0.3735	0.189			18-5736-8495	04-4549-3405
13			15	15:40	7.302	-0.9783	-0.4951			00-2993-6780	17-7654-7354
14			22	13:45	7.404	-0.876	-0.4433			16-6840-3553	15-2803-6917
15			29	14:55	7.211	-1.069	-0.5409			07-2040-2693	08-8247-6801
16		Jul	27	16:30	6.748	-1.532	-0.7751			16-6019-6958	06-5859-7928
17		Aug	17	14:25	7.168	-1.112	-0.563			07-7298-7649	09-6648-5411
18		Sep	29	15:45	9.809	1.529	0.7739			12-3450-8829	18-2247-7613
19		Oct	12	15:00	7.395	-0.8848	-0.4478			14-7239-9185	01-1367-5722
20			19	17:00	8.581	0.3009	0.1523			17-5798-2248	09-1208-0351
21		Nov	3	15:00	7.733	-0.5475	-0.2771			14-6395-1490	06-4040-2968

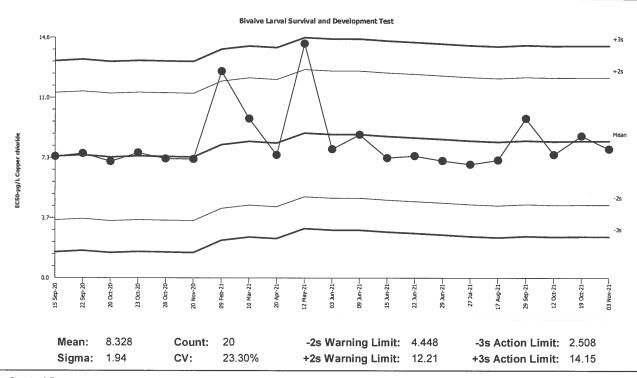
CETIS QC PlotReport Date: 24 Nov-21 12:21 (1 of 1)

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Test Type: Development-Survival Organism: Mytilus galloprovincialis (Bay Mussel) Material: Copper chloride

Protocol: EPA/600/R-95/136 (1995) Endpoint: Development Rate Source: Reference Toxicant-REF



Quality Control Data											
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Sep	15	0:00	7.397	-0.9308	-0.4798			19-9833-0655	03-7616-5506
2			22	14:40	7.576	-0.7517	-0.3875			04-0347-9113	01-0437-7711
3		Oct	20	14:25	7.089	-1.239	-0.6384			08-8652-5764	06-9681-8469
4			23	13:45	7.616	-0.712	-0.367			09-8413-3498	17-5257-3346
5			28	15:50	7.257	-1.071	-0.5521			09-4043-4676	12-0840-2779
6		Nov	20	16:00	7.23	-1.098	-0.5661			13-7696-8009	11-4264-3018
7	2021	Feb	9	15:15	12.58	4.255	2.193	(+)		12-5648-6062	01-5747-2564
8		Mar	10	14:15	9.694	1.366	0.7039			13-7922-5399	08-4869-7631
9		Apr	20	16:15	7.482	-0.8461	-0.4362			06-7450-9711	17-9210-1733
10		May	12	15:00	14.27	5.94	3.062	(+)	(+)	15-4594-3065	12-3891-6641
11		Jun	3	15:50	7.832	-0.4959	-0.2556			07-9391-2508	11-7075-1183
12			9	14:00	8.715	0.3874	0.1997			18-5736-8495	18-6125-5477
13			15	15:40	7.302	-1.026	-0.529			00-2993-6780	13-6998-5313
14			22	13:45	7.427	-0.9013	-0.4646			16-6840-3553	07-3347-2243
15			29	14:55	7.132	-1.196	-0.6166			07-2040-2693	17-0989-5973
16		Jul	27	16:30	6.912	-1.416	-0.7301			16-6019-6958	03-0913-6262
17		Aug	17	14:25	7.168	-1.16	-0.5982			07-7298-7649	11-4901-9823
18		Sep	29	15:45	9.718	1.39	0.7164			12-3450-8829	04-7958-3381
19		Oct	12	15:00	7.509	-0.8186	-0.422			14-7239-9185	04-3282-5514
20			19	17:00	8.648	0.3196	0.1647			17-5798-2248	05-0981-9303
21		Nov	3	15:00	7.85	-0.4777	-0.2462			14-6395-1490	11-9492-7222

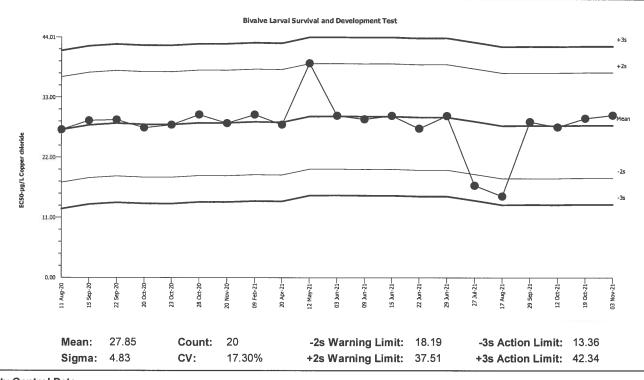
CETIS QC PlotReport Date: 24 Nov-21 12:22 (1 of 1)

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Test Type: Development-Survival Organism: Mytilus galloprovincialis (Bay Mussel) Material: Copper chloride

Protocol: EPA/600/R-95/136 (1995) Endpoint: Survival Rate Source: Reference Toxicant-REF



Quality	y Con	trol Data	a								
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Aug	11	14:30	27.06	-0.7912	-0.1638			21-4043-5119	16-7506-8565
2		Sep	15	0:00	28.73	0.8757	0.1813			19-9833-0655	01-9900-7404
3			22	14:40	28.86	1.014	0.2099			04-0347-9113	03-4439-9784
4		Oct	20	14:25	27.4	-0.4539	-0.09399			08-8652-5764	01-6350-7777
5			23	13:45	27.94	0.09165	0.01898			09-8413-3498	02-1232-2390
6			28	15:50	29.82	1.969	0.4078			09-4043-4676	15-7574-6891
7		Nov	20	16:00	28.24	0.3937	0.08152			13-7696-8009	21-0824-4197
8	2021	Feb	9	15:15	29.8	1.955	0.4047			12-5648-6062	08-9593-0094
9		Apr	20	16:15	27.97	0.1208	0.025			06-7450-9711	02-2099-4435
10		May	12	15:00	39.23	11.38	2.356	(+)		15-4594-3065	18-1677-8776
11		Jun	3	15:50	29.62	1.768	0.366			07-9391-2508	05-7225-1680
12			9	14:00	28.97	1.116	0.2311			18-5736-8495	17-4075-5383
13			15	15:40	29.61	1.761	0.3647			00-2993-6780	11-7676-4213
14			22	13:45	27.27	-0.583	-0.1207			16-6840-3553	00-7652-1305
15			29	14:55	29.58	1.735	0.3592			07-2040-2693	20-9452-4039
16		Jul	27	16:30	16.82	-11.03	-2.284	(-)		16-6019-6958	09-3317-6652
17		Aug	17	14:25	14.86	-12.99	-2.689	(-)		07-7298-7649	12-6822-1646
18		Sep	29	15:45	28.5	0.6489	0.1343			12-3450-8829	17-8563-2416
19		Oct	12	15:00	27.53	-0.3229	-0.06685			14-7239-9185	11-8743-4626
20			19	17:00	29.13	1.28	0.265			17-5798-2248	01-7668-6950
21		Nov	3	15:00	29.71	1.856	0.3842			14-6395-1490	03-1145-8832

Report Date: Test Code: 29 Oct-21 14:23 (p 1 of 1) 14-6395-1490/211103msdv

Nautilus Environmental (CA)

Bivalve Larval Survival and Development Test

Start Date:	03 Nov-21	Species:	Mytilus galloprovincialis	Sample Code:	211103msdv
End Date:	05 Nov-21	Protocol:	EPA/600/R-95/136 (1995)	Sample Source:	Reference Toxicant
Sample Date:	03 Nov-21	Material:	Copper chloride	Sample Station:	Copper Chloride

C-µg/L Code Rep F			Pos	Initial Density	Final Density	Notes			
- 69	-	Пор	41	middi Donoity	Time Denoity	# Counted	# Normal	RT 11/23/21	
			42	<u></u>		105	102	1	
			43			104	50	Warde	
			44			0	0		
			45			113	0		
			46			108	103		
			47			127	122		
			48			132	0		
			49	A STATE OF THE STA		127	126		
			50			117	114		
			51			128	128		
			52			120	120		
			53			(10	0		
			54			134	133		
			55			0	0		
			56			139	0		
			57			135	133		
			58			103	101		
			59			120	118		
			60			123	18		
			61			109	0		
			62			111	110		
			63			113	0		
			64			0	0		
			65			112	١		
			66			0	0		
			67			139	133		
			68			131	129		
			69			O	0		
			70			86	84	V	

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test

Report Date: Test Code: 29 Oct-21 14:23 (p 1 of 1) 14-6395-1490/211103msdv

Nautilus Environmental (CA)

Start Date:	03 Nov-21	Species:	Mytilus galloprovincialis	Sample Code:	211103msdv
End Date:	05 Nov-21	Protocol:	EPA/600/R-95/136 (1995)	Sample Source:	Reference Toxicant
Sample Date:	03 Nov-21	Material:	Copper chloride	Sample Station:	Copper Chloride

		U3 NOV-2 I			Copper chloride		Sample Station: Copper Chloride			
C-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes		
0	LC	1	42							
0	LC	2	57							
0	LC	3	58			99	98	11/6/21 WF		
0	LC	4	68					70		
0	LC	5	49							
2.5		1	52							
2.5		2	51							
2.5		3	47			122	116	11/6/21/WF		
2.5		4	59							
2.5		5	67		-					
5		1	70							
5		2	46							
5		3	50			115	110	11/6/21 UF		
5		4	54					v 1		
5		5	62							
10		1	60							
10		2	48							
10		3	56			135	7	11/6/21 WF		
10		4	43			1350	70	11/6/21 WF		
10		5	65							
20		1	53							
20		2	41							
20		3	45			108	0	11/6/21 WF		
20		4	63							
20		5	61							
40		1	66							
40		2	55							
40		3	69				0	11/6/21 WE		
40		4	64							
40		5	44							

QC-RT

@ Q 18 WF 11/6

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Internal	Test Species: M. galloprovincialis
Sample ID: CuCl ₂	Start Date/Time: 11/3/2021 \So\D
Test No.: 211103msdv	End Date/Time: 11/5/2021 \500

Concentration (μg/L)	Salinity (ppt)			Т	Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48	
Lab Control	32.1	31-8	31, 5	153	15.1	15,1	9.0	8.3	8.1	7.96	7.96	7.94	
2.5	32.2	32.2	32.0	15.3	15.0	15.1	8.9	8.3	8.0	1.95	7.95	7.92	
5	32.2	322	32.0	15.2	15.0	15.1	8.9	8.3	8.0	7.95	7-96	7.93	
10	32.2	32.1	32.0	15.3	15.0	15.2	8.9	8.3	8.0	7.96	7.96	7.94	
20	32.2	322	32.0	15.3	15.0	15,1	8.9	8.3	8.0	7.95	7.96	7.94	
40	32.2	32.1	32.0	15.4	15.0	15.1	8.9	8.3	8.0	795	7.96	7.94	

	_	0	24	48	High conc. made (μg/L):	40	
Technician Initials:	WQ Readings:	HM	RT	K13	Vol. Cu stock added (mL):	2.0	
	Dilutions made by:	DI			Final Volume (mL):	500	
	+				Cu stock concentration (μg/L):	10.000	
Environmental Cham	ber:	<u>) </u>					
_							
Comments:	0 hrs:						
	24 hrs:						
	48 hrs:						
QC Check:	JU 11/9/21				Final Review:	AC11/24/21	

Marine Chronic Bioassay DM-013

Client/Sample:	Internal / Cuclz
Test No.:	211103 msdv
Test Species:	Mytilus galloprovincialis
Animal Source/Batc	h Tank: M-REP 5A
Date Received:	914/21
Test Chambers:	30 mL glass shell vials
Sample Volume:	10 mL

Start Date/Time: 11/3/2021 1500 End Date/Time: 11/5/2021 1500 Technician Initials: RT

Spawn Information

First Gamete Release Time:

1140

Sex	Number Spawning
Male	(o+
Female	4+

Gamete Selection

Garriele Selection		
Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	3,4,5,6	good notify, good dusty
Female 1	2	good dusity, pale crange round
Female 2	3	good dust pare orange round
Female 3		

Egg Fertilization Time: 1230

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	99
Female 2	100
Female 3	

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

013 15	@1521
A 19	(A) 13 20
(A) 14 19 (A) 16 17	A 8 18
B 12 20	@ P 15
A 12 18	A 9 15

Mean: 17.8

Stock(s) chosen for testing:

Mean 17. 8 x 50 = 890 embr

Initial Density: 890

2.97 (dilution factor)

Desired Final Density: (to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

THIIC ZC	TO CONTRION COL	AIICO		
TØ Vial No.	No. Dividing	Total	% Dividing	Mean % Dividing
TØ A	106	106	(00)	
TØ B	102	102	WO]
TØC	113	113	100	1000
TØ D	130	130	100] \
TØ E	109	109	100]
TØ F	122	122	100	
<u>X</u> =	114			

48-h QC: 91/94 = 96.89"

Comments:

(A)018 RT 11/3/21

QC Check:

JU 11912

Final Review: AC 11/24/21

CETIS Summary Report

Report Date:

10 Nov-21 09:42 (p 1 of 1)

Test Code: 211103mbra | 01-2577-3416

0 Lab Control 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 100 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 100 4 0.85 0.6909 1 0.8 1 0.05 0.1 11.76% 10.53 200 4 0.65 0.3453 0.9547 0.4 0.8 0.09574 0.1915 29.46% 31.58 400 4 0 0 0 0 0 0 0 0 0 0 0 0 0 100.0 800 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									Test Code	•	2111	USITIDIA U	-2311-341
Sample Date Or Nov-21 16.10 Species EPA/821/R-02-012 (2002) Semilia Date Or Nov-21 16.10 Species Species	Inland Silvers	ide 96-h Acute S	urvival Te	st							Nautilu	s Environm	ental (CA)
Male	Start Date: Ending Date:	03 Nov-21 17:15 07 Nov-21 16:40	5 Pro Spe	Protocol: EPA/821/R-02-01 Species: Menidia beryllina					Diluent: Brine:	Not	Applicable	Seawater	
Analysis D	Sample Date: Receive Date:	03 Nov-21 03 Nov-21	Mat Sou	Material: Copper chloride Source: Reference Toxicant					Inte	rnal			
16-1931-6320 96h Survival Rate 100 200 141.4 20.6% Dunnett Multiple Comparison Test	Comparison S	Summary											
Point Estimaty Point Po	Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Met	hod			
Analysis ID	16-1931-6320	96h Survival Ra	te	100	200	141.4	20.6%		Dun	nett N	/lultiple Com	parison Tes	it
13-6085-8539 96h Survival Rate EC50 211.2 177.7 251.1 Spearmar-Kärber Fest Acceptability Fest Acceptability Fest Stat TAC Limits Overlap Decision Fest Stat Fest Stat	Point Estimate	e Summary					·						
13-6085-8539 96h Survival Rate EC50 211.2 177.7 251.1 Spearmar-Kärber Spearmar-Kärber Test Acceptability Spearmar-Kärber Test Stat TAC Limits Overlap Decision Spearmar-Kärber Sp	Analysis ID	Endpoint		Level	μg/L	95% LCL	95% UCL	TU	Met	hod			
Analysis ID Endpoint Control Res C	13-6085-8539	96h Survival Ra	te	EC50		177.7	251.1		Spe	armar	n-Kärber	·	
13-6085-8539 96h Survival Rate Control Resp 0.95 0.9 - NL Yes Passes Acceptability Criteria 16-1931-6320 96h Survival Rate Summary C-μg/L Control Type Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev CV% %Effection	Test Acceptab	oility			<u> </u>								
16-1931-6320 96h Survival Rate Summary C-μg/L Control Type Count Mean 95% LCL 95% UCL Min Max Std Dev CV% % Effe 0 Lab Control 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 50 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 100 4 0.85 0.6909 1 0.8 1 0.05 0.1 11.76% 10.53 200 4 0.65 0.3453 0.9547 0.4 0.8 0.09574 0.1915 29.46% 31.58 400 4 0 0 0 0 0 0 0 0 0 100.0 96h Survival Rep 2 Rep 3 Rep 4 Section Survival S	Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Lim	its	Ove	rlap	Decision		
Section State Summary State Summary State State	13-6085-8539	96h Survival Ra	te	Contro	ol Resp	0.95	0.9 - NL		Yes		Passes A	cceptability	Criteria
C-μg/L Control Type Count Mean 95% LCL 95% UCL Min Max Std Err Std Dev CV% %Effe 0 Lab Control 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 50 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 100 4 0.85 0.6909 1 0.8 1 0.05 0.1 11.76% 10.53 200 4 0.65 0.3453 0.9547 0.4 0.8 0.09574 0.1915 29.46% 31.58 400 4 0 0 0 0 0 0 0 0 29.46% 31.58 800 8 8 8 8 8 4 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0	16-1931-6320	96h Survival Ra	te	Contro	ol Resp	0.95	0.9 - NL		Yes		Passes A	cceptability	Criteria
0 Lab Control 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 50 4 0.95 0.7909 1 0.8 1 0.05 0.1 10.53% 0.0% 100 4 0.85 0.6909 1 0.8 1 0.05 0.1 11.76% 10.53 200 4 0.65 0.3453 0.9547 0.4 0.8 0.09574 0.1915 29.46% 31.58 400 4 0 0 0 0 0 0 0 0 100.0 800 4 0 0 0 0 0 0 0 0 0 0 100.0 96h Survival Rate Detail C-μg/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 Rep 4 1 1 1 1 0.8 1 1 1 1 1 1 <t< td=""><td>96h Survival F</td><td>Rate Summary</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	96h Survival F	Rate Summary											
50	C-μg/L	Control Type	Count	Mean	95% L	CL 95% UCL	. Min	Max	Std	Err	Std Dev	CV%	%Effect
100	0	Lab Control	4	0.95	0.7909	9 1	8.0	1	0.05	i	0.1	10.53%	0.0%
200	50		4	0.95	0.7909	9 1	8.0	1	0.05	;	0.1	10.53%	0.0%
400 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 100.0 800	100		4	0.85	0.6909	9 1	8.0	1	0.05	i	0.1	11.76%	10.53%
800 4 0 0 0 0 0 0 0 0 0 0 100.0 96h Survival Rate Detail C-μg/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 1 1 1 0.8 50 1 0.8 1 1 100 0.8 0.8 0.8 1 200 0.4 0.6 0.8 0.8 0.8 400 0 0 0 0 0 0	200		4							574		29.46%	31.58%
96h Survival Rate Detail C-μg/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 1 1 1 0.8 50 1 0.8 1 1 100 0.8 0.8 1 200 0.4 0.6 0.8 0.8 400 0 0 0 0			•										100.0%
C-μg/L Control Type Rep 1 Rep 2 Rep 3 Rep 4 0 Lab Control 1 1 0.8 50 1 0.8 1 1 100 0.8 0.8 1 200 0.4 0.6 0.8 0.8 400 0 0 0 0	800		4	0	0	0	0	0	0		0		100.0%
0 Lab Control 1 1 1 0.8 50 1 0.8 1 1 100 0.8 0.8 0.8 1 200 0.4 0.6 0.8 0.8 400 0 0 0 0	96h Survival F	Rate Detail											
50 1 0.8 1 1 100 0.8 0.8 0.8 1 200 0.4 0.6 0.8 0.8 400 0 0 0 0		Control Type	Rep 1	<u> </u>	<u>·</u> _	<u>·</u>							
100 0.8 0.8 0.8 1 200 0.4 0.6 0.8 0.8 400 0 0 0 0	_	Lab Control	1	1	1	0.8							
200 0.4 0.6 0.8 0.8 400 0 0 0 0	50		1	8.0	1	1							
400 0 0 0	100		8.0	0.8	0.8	1							
	200		0.4	0.6	0.8	0.8							
800 0 0 0 0	400		0	0	0	0							
	800		0	0	0	0							

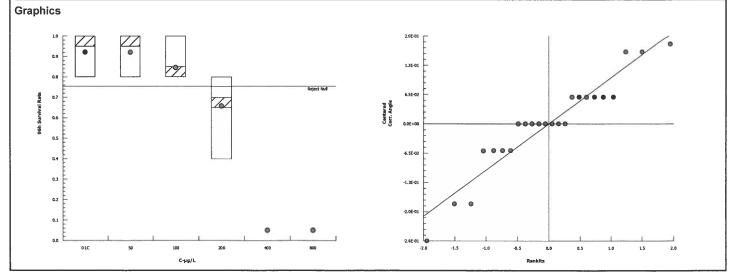
Report Date:

10 Nov-21 09:42 (p 1 of 1)

Test Code: 211103mbra | 01-2577-3416

Inland Silver	rside 96-h Acute	Survival	l Test						Nautilus	Environn	nental (CA)
Analysis ID: Analyzed:	16-1931-6320 10 Nov-21 9:4		Endpoint: 96h Analysis: Par	Survival Ra ametric-Cor		tments	CETIS Version: CETISv1 Official Results: Yes			8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	rected)	NA	C > T	NA	NA		20.6%	100	200	141.4	
Dunnett Mul	tiple Compariso	n Test									
Control	vs C-μg/L		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)		
Lab Control	50		0	2.287	0.234 6	0.7500	CDF	Non-Sign	ificant Effect		
	100		1.163	2.287	0.234 6	0.2753	CDF	Non-Sign	ificant Effect		
	200*		3.317	2.287	0.234 6	0.0080	CDF	Significan			
ANOVA Tabl	е								***		
Source	Sum Squ	ıares	Mean Squ	ıare	DF	F Stat	P-Value	Decision	(α:5%)		
Between	0.307421	8	0.1024739)	3	4.892	0.0190	Significan	t Effect		
Error	0.251388	7	0.0209490	06	12						
Total	0.558810	5			15						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Bartlett f	Equality o	of Variance	1.3	11.34	0.7291	Equal Var	iances			
Distribution	Shapiro-	Wilk W N	Normality	0.9137	0.8408	0.1334	Normal D	istribution			
96h Survival	Rate Summary										
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
50		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
100		4	0.85	0.6909	1	0.8	0.8	1	0.05	11.76%	10.53%
200		4	0.65	0.3453	0.9547	0.7	0.4	0.8	0.09574	29.46%	31.58%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%
Annulas (Car	rreated) Transfer		ma ma o m /								

Angulai (Co	rrected) i ransfor	meu Suim	пагу								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.0%
50		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.0%
100		4	1.167	0.9772	1.356	1.107	1.107	1.345	0.05953	10.21%	9.26%
200		4	0.9463	0.623	1.27	0.9966	0.6847	1.107	0.1016	21.47%	26.4%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	82.46%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	82.46%



Report Date: Test Code:

10 Nov-21 09:42 (p 1 of 1)

211103mbra | 01-2577-3416

							Test	Coue.	2111	Joinbia 1	01-2377-	-54 IC
Inland Silvers	side 96-h Ac	ute Survival Te	st						Nautilus	Environ	mental	(CA)
Analysis ID: Analyzed:	13-6085-8 10 Nov-21		•	6h Survival I ntrimmed S	Rate pearman-Kärb		IS Version: ial Results:	CETISv1. Yes	8.7			
Spearman-Kä	irber Estima	ites										
Threshold Op	otion	Threshold	Trim	Mu	Sigma		EC50	95% LCL	95% UCL			
Control Thresl	nold	0.05	0.00%	2.325	0.03749		211.2	177.7	251.1			
96h Survival	Rate Summa	ary			Calcul	ated Varia	te(A/B)					
0	3 t I T					04.15	04.1.0	0) (0)	0/ = 66 4	•	_	

96h Survival Rate Summary			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	В
0	Lab Control	4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
50		4	0.95	0.8	1	0.05	0.1	10.53%	0.0%	19	20
100		4	0.85	8.0	1	0.05	0.1	11.76%	10.53%	17	20
200		4	0.65	0.4	0.8	0.09574	0.1915	29.46%	31.58%	13	20
400		4	0	0	0	0	0		100.0%	0	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics

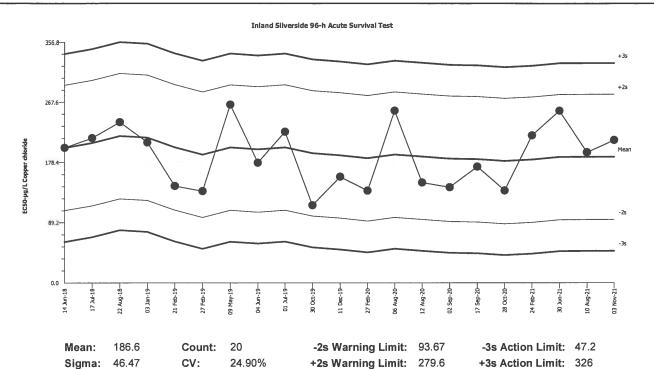
CETIS QC PlotReport Date: 10 Nov-21 09:44 (1 of 1)

Inland Silverside 96-h Acute Survival Test

Nautilus Environmental (CA)

Test Type: Survival (96h) Organism: Menidia beryllina (Inland Silverside) Material: Copper chloride

Protocol: EPA/821/R-02-012 (2002) Endpoint: 96h Survival Rate Source: Reference Toxicant-REF



Quali	ty Con	trol Data	а								
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Jun	14	14:35	200	13.4	0.2884			01-9952-0614	00-3575-1747
2		Jul	17	14:30	214.4	27.75	0.5973			11-1445-3115	12-3693-5336
3		Aug	22	16:25	237.8	51.24	1.103			08-6172-7555	12-4329-0617
4	2019	Jan	3	16:50	207.9	21.25	0.4573			16-0506-4055	11-1190-1934
5		Feb	21	16:05	143.5	-43.12	-0.9279			10-4228-2556	08-7111-9529
6			27	16:25	135.8	-50.83	-1.094			14-0947-0420	00-4247-8099
7		May	9	19:10	263.9	77.3	1.663			03-9779-6453	09-3747-7536
8		Jun	4	14:50	177.8	-8.845	-0.1903			00-2136-1210	01-4264-5145
9		Jul	1	15:55	223.6	37.02	0.7965			04-4319-5710	17-4098-1084
10		Oct	30	14:45	114.9	-71.73	-1.544			05-0159-0485	07-6888-5964
11		Dec	11	16:30	156.9	-29.68	-0.6388			11-0566-6524	14-4935-0865
12	2020	Feb	27	17:15	136.4	-50.24	-1.081			00-2639-4829	10-5059-8408
13		Aug	6	16:00	254.9	68.31	1.47			13-3377-6823	09-5433-0150
14			12	15:20	148.4	-38.24	-0.8229			02-5307-3356	11-5066-6205
15		Sep	2	15:25	141.4	-45.18	-0.9722			09-8373-9144	18-7650-2455
16			17	14:45	172	-14.64	-0.3151			07-8442-4358	02-9347-5784
17		Oct	28	16:35	136.6	-50	-1.076			10-9446-3954	10-4215-8111
18	2021	Feb	24	17:30	218.2	31.59	0.6798			11-4316-4077	02-1492-4727
19		Jun	30	16:05	254.9	68.31	1.47			01-4075-9626	19-2668-9340
20		Aug	10	14:30	193.2	6.587	0.1418			20-1130-3481	09-5748-8802
21		Nov	3	17:15	211.2	24.65	0.5304			01-2577-3416	13-6085-8539

Water Quality Measurements & Test Organism Survival

Client: Internal Sample ID: CuCl ₂ Test No.: 211103mbra	Test Species: M. beryllina			Te	ch Init	ials	
Sample ID: CuCl ₂	Start Date/Time: 11/3/2021 1715		0	24	48	72	96
Test No.: 211103mbra	End Date/Time: 11/7/2021 1640	Counts:	80	58	KB	KB	KI
	N.	Readings:	6M	SP	KB	KB	14
		Dilutions made by:		4153 Mary 1	92		
		High conc. made (μg/L):	000	-	400	10	100
		Vol. Cu stock added (mL):	17.0	-	9.5	25	-
	Cu stock concentration (µg/L): (1), 00 (Final Volume (mL):	2000	465030VD0A	2000	-	-

Concentration (μg/L)	Rand #		Numi Org	ber o ganis				\$	Salinit (ppt)	у			Ter	(°C)	ture				lved C (mg/L		pH (units)					
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	4	5	5	S	5	5.	2p.1	30.4	29.6	30.1	2,0.7	24.0	24.5	25	24,2	24.1	6.6	6.3	6.6	6.1	5.7	294	7.83	7.93	7.88	7.7
	10	5	5	5	5	\$			30,3					24,3				100	6.0					7.67		
	5	5	5	5	5	5																				
	9	5	4	Ч	4	4								Œ												
50	23	5	5	5	5	5	20.	30.5	29.4	30.2	30.2	24.0	246	23.3	24.4	24.6	6:7	6.2	6.5	6.0	5.7	7.43	7.85	7.94	7.91	7.7
	18	5	4	4	4	4			30.4					24.4					5.8					7.68		
	3	5	3	5	5	5																				
	6	5	5	5	5	5								0												
100	19	5	4	4	Ч	4	20.	30,4	29.6	90.0	30.0	24.0	24.8	23,4	24.5	24,6	6.7	6-1	6.7	6.1	5.6	7.91	17.85	7.95	7.88	7.7
	14	5	41	4	4	4			30,4				532574 (1.5)	24.5					5.4					4.71		
	2	5	4	4	4	4															1					
	17	5	3	5	5	5								211 9												6
200	20	5	3	2	2	2	30.	SOLE	29.5	27.8	בשה	245	24.7	233	24.0	24.3	6.6	60	6.7	67	6.0	7.94	7.84	7.95	7,92	9
	11	5	5	3	3	3			30.4					24,6					6.0					7.73		+01
	7	5	5	4	4	4											1		7/4							
	22	5	5	4	4	4								200								TO AN				
400	8	5	1	0	-	_	0,0	40.4	29.5	Į	-	243	24.G	283	-	_	6.7	1.3	6.7	_	_	7.94	7.83	7.9	-	-
	15	5	1	0	~	_			30.4					24,5					61					7.73		
	1	5	0	_	_	_																			100	
	21	5	0	-	_	-																				
800	13	5	0			,	290	30.0	1			240	246	1	/		6.7	6.3				7.97	7.84	1		/
	16	5	0	A	II				y .					/					1					-		912
	24	5	0			0													78							
	12	5	0	/	De	-0-		V 1																		

		_		_					U-			-		~				_		_	_	_			_
	15	5	1	0	~	_			30.4					2 4.5				61					7.73		
	1	5	0	-	_	_															1923			100	
	21	5	0	-	_	-																	2,6		
800	13	5	0			,	295	30.0	/			240	246	_ \	/	4.7	6.3				7.92	7.84			
	16	5	8	A	II.				1									1/			- 8				
	24	5	0			0		13										18							
	12	5	0	/	De	9																			
Rand # QC: Initial Counts QC'd by: Initiated by:			8				Ded on a		En	viron	menta	ıl Char	mber:		A		_								
Animal Source/Date R	eceive	d:		A	85		11/2	112	1		Age	at initia	ation:		10do	175						Feed	ding Ti	mes	
Animal Acclimation Qu	ualifier	s (cir	cle al	l that	appl	y):	•	•		(0	22	Q23), ,	224	/ none			_			0	24	48	72	96
																				AM:	11.8	0830	0845	1700	1690
Comments:	9	i = in	itial re	ading	in fre	sh te	st solu	tion, f	= final	readir	ng in te	est cha	mber	prior to	renewa	ıl				PM:	1700			806	
	5	Orga	inisms	s fed j	prior t	o initia	ation, c	ircle o	ne (y	<i>J</i> /n)					e 11/41							,		
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Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.												@ Qx6 cx 115k2 @ Qal RB 11/5/21 dijutions needed ACS 11/10/1-1													