

Chronic Toxicity Testing Results for Wyckoff Eagle Harbor Groundwater Treatment Plant

Monitoring Period: April 2020

Prepared for:

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Prepared by:

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Date Submitted: June 1, 2020

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.

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Results verified by:

Eric Green, Project Manager

Introduction

A toxicity test was performed using a groundwater composite sample collected on April 14, 2020 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). 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.

Sample ID	041420
Enthalpy Log-in Number	20-0416
Collection Date; Time	4/14/2020; 0857h
Receipt Date; Time	4/15/2020; 0930h
Receipt Temperature (°C)	2.4
Dissolved Oxygen (mg/L)	8.9
рН	7.54
Conductivity (µS/cm)	11,880
Salinity (ppt)	7.1
Alkalinity (mg/L CaCO ₃)	452
Total Chlorine (mg/L)	< 0.02
Total Ammonia (mg/L as N)	1.1

Table 1. Sample Information

NM = not measured

Test Methods

Chronic toxicity testing was conducted according to the method set forth in USEPA (1995). This method is summarized in Table 2.

Table 2. Summary of Methous for th	
Test Period	4/15/2020, 1325h to 4/17/2020, 1525h
Test Organism	Mytilus galloprovincialis
Test Organism Source	Taylor Shellfish (Shelton, WA)
Test Organism Age	4 hours post fertilization
Test Duration	48 ± 2 hours
Test Type	Static
Test Chamber, Test Solution Volume	30 mL glass vial, 10 mL
Test Temperature	15 ± 1°C
Dilution Water	Laboratory Seawater (Source: Scripps Institution of Oceanography [SIO] intake) diluted with de-ionized water
Additional Control	Brine Control (de-ionized water and hypersaline brine)
Test Salinity	30 ± 2 ppt
Source of Salinity	Hypersaline brine made by freezing seawater to a salinity of 94.1 ppt
Test Concentrations (% sample)	75.1 ^a , 35, 18, 9, 4, and 2%, lab and brine controls
Number of Replicates	5
Photoperiod	16 hours light/8 hours dark
Test Protocol	EPA/600/R-95/136
Test Acceptability Criteria for Controls	\geq 50% mean survival, \geq 90% mean development rate
Reference Toxicant	Copper chloride ^b
Statistical Software	CETIS™ 1.8.7.20

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

^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.

Results

There were no statistically significant effects observed 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 75.1 (the highest concentration tested) and a chronic toxic unit (TU_c) of less than 1.33 for both endpoints.

Results for the chronic toxicity test are summarized in Tables 3 and 4. 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.

Species	Endpoint	NOECLOEC(% effluent)(% effluent)		Toxic Unit (TU _c)	EC ₂₅ (% effluent)	
Bivalvo	Normal Development	75.1	> 75.1	< 1.33	> 75.1	
Bivalve	Survival	75.1	> 75.1	< 1.33	> 75.1	

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. Effect Concentration 25 (IC_{25}) = Concentration expected to cause an effect to 25% of the organisms

Concentration (% Effluent)	Mean Survival (%)	Mean Normal Development (%)
0 (Brine Control)	100	98.2
0 (Lab Control)	100	97.4
2	99.9	97.2
4	98.9	97.8
9	100	98.0
18	100	98.2
35	99.1	98.8
75.1 ^a	99.1	97.1

Table 4. Detailed Results for the Bivalve Development Chronic Toxicity Test

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

Quality Assurance

The sample was received within the required 36-hour holding time, in good condition, and within the appropriate temperature range of 0-6°C. 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. Dose-response relationships were reviewed to ensure the reliability of the results. Based on the dose response observed, the calculated effects concentrations were deemed reliable. 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 5. 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 test were within the acceptable range of the mean historical test results plus or minus two standard deviations. The reference toxicant statistical summaries and laboratory bench sheets are provided in Appendix E.

Species and Endpoint	NOEC (%)	EC₅₀ (μg/L copper)	Historical mean ± 2 SD (μg/L copper)	CV (%)
Bivalve Normal Development	5	11.7	8.94 ± 6.42	35.9
Bivalve Survival Rate	20	30.0	29.6 ± 5.09	8.60

Table 5. Reference Toxicant Test Results

NOEC = No Observed Effect Concentration

Effect Concentration 50 (EC_{50}) = Concentration expected to cause an effect to 50% of the organisms 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.
- 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

27 May-20 14:03 (p 1 of 2) 2004-S085 | 14-6973-7134

								Test ooue.		200		
Bivalve Larva	I Survival and D	evelopmen	t Test						_	Nautilus	Environm	ental (CA)
Batch ID: Start Date: Ending Date: Duration:	07-0492-5892 15 Apr-20 13:25 17 Apr-20 15:25 50h	i Prot	cies:	Development-S EPA/600/R-95/ ² Mytilus gallopro M-Rep, Carlsba	136 (1995) vincialis			Analyst: Diluent: Brine: Age:		luted Natural Seawater ozen Seawater		
Receive Date:	03-1250-2921 14 Apr-20 08:57 15 Apr-20 09:30) Sou	erial: rce:	20-0416 Effluent Sample Jacobs		50		Client: Project:	Jacobs			
Sample Age:		Stat	ion:	Wyckoff (04142		muent						
Comparison S	-											
Analysis ID	Endpoint		NOEL		TOEL	PMSD	TU	Meth				
14-2587-1171	Development R	ate	75.1	>75.1	NA	1.68%	< 1.332				parison Tes	st
18-6051-8845	Survival Rate		75.1	>75.1	NA	1.32%	<1.332	2 Steel	Many-C	One Rank	Sum Test	
Point Estimat	e Summary						_		_			
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	. TU	Meth	od			
03-0901-5666	Development R	ate	EC25	>75.1	N/A	N/A	<1.3	32 Linea	r Interpo	olation (IC	PIN)	
			EC50	>75.1	N/A	N/A	<1.3	32				
08-9188-7387	Survival Rate		EC25	>75.1	N/A	N/A	<1.3	32 Linea	r Interpo	olation (IC	CPIN)	
			EC50	>75.1	N/A	N/A	<1.3	32				
Test Acceptat	oility											
Analysis ID	Endpoint		Attrib	ute	Test Stat	TAC Lim	nits	Overl	lap D	ecision		
03-0901-5666	Development R	ate	Contr	ol Resp	0.9818	0.9 - NL		Yes	P	asses Ac	ceptability	Criteria
14-2587-1171	Development R	ate	Contr	ol Resp	0.9818	0.9 - NL		Yes	P	asses Ac	ceptability	Criteria
08-9188-7387	Survival Rate		Contr	ol Resp	1	0.5 - NL		Yes	P	asses Ac	ceptability	Criteria
18-6051-8845	Survival Rate		Contr	ol Resp	1	0.5 - NL		Yes	P	asses Ac	ceptability	Criteria
Development	Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Мах	Std E	irr S	td Dev	CV%	%Effect
0	Brine Control	5	0.981	8 0.9702	0.9934	0.9722	0.99	12 0.004	181 0	.00935	0.95%	0.0%
0	Lab Control	5	0.973	8 0.96	0.9877	0.9583	0.98	65 0.004	988 0	.01115	1.15%	0.81%
2		5	0.972		0.9912	0.9575	0.99			.01524	1.57%	0.97%
4		5	0.978		0.988	0.9707	0.99			.007795	0.8%	0.35%
9		5	0.979		0.9876	0.9717	0.98			.006398	0.65%	0.21%
18		5	0.982		0.9922	0.9703	0.99			.007884		-0.06%
35		5	0.988		0.9993	0.9801	1	0.003		.008934	0.9%	-0.65%
75.1		5	0.970	6 0.9624	0.9787	0.9652	0.98	15 0.002	943 0	.00658	0.68%	1.14%
Survival Rate												
C-%	Control Type	Count	Mean		95% UCL	Min	Max			td Dev	CV%	%Effect
0	Brine Control	5	1	1	1	1	1	0	0		0.0%	0.0%
0	Lab Control	5	1	1	1	1	1	0	0		0.0%	0.0%
2		5	0.999		1	0.9953	1	0.000		.002119	0.21%	0.09%
4		5	0.988		1	0.9621	1	0.007		.01696	1.72%	1.14%
9		5	1	1	1	1	1	0	0		0.0%	0.0%
18		5	1	1	1	1	1	0	0		0.0%	0.0%
35		5	0.990		1	0.9526	1	0.009		.02119	2.14%	0.95%
75.1		5	0.990	5 0.9642	1	0.9526	1	0.009	479 0	0.02119	2.14%	0.95%

Analyst: JU QA: 52-120/61/20

CETIS Summary Report

Bivalve Larval Survival and Develo	pment Test
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Report Date: Test Code:

27	May-20	14	:03	(p	2	of	2)
20	04-S085		14-6	597	73	-71	34

Nautilus	Environmental (CA)	

Developmer	nt Rate Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Brine Control	0.9722	0.9911	0.9727	0.9912	0.9817					
0	Lab Control	0.9802	0.9583	0.9769	0.9671	0.9865					
2		0.9762	0.9954	0.9575	0.9729	0.9595					
4		0.9737	0.9903	0.9816	0.9754	0.9707					
9		0.9828	0.9717	0.9825	0.9745	0.9871					
18		0.9703	0.9906	0.9836	0.9877	0.9797					
35		0.9831	0.9822	0.9801	0.9955	1					
75.1		0.9658	0.9712	0.9815	0.9652	0.9692					
Survival Rate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Brine Control	1	1	1	1	1					
0	Lab Control	1	1	1	1	1					
2		0.9953	1	1	1	1					
4		1	0.981	1	0.9621	1					
9		1	1	1	1	1					
18		1	1	1	1	1					
35		1	1	0.9526	1	1					
75.1		1	1	1	0.9526	1					
Developmer	nt Rate Binomials	;			<u> </u>		· · · · · ·				
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Brine Control	210/216	223/225	214/220	226/228	214/218					
0	Lab Control	248/253	207/216	211/216	235/243	220/223					
2		205/210	215/216	203/212	215/221	237/247					
4		222/228	205/207	213/217	198/203	232/239					
9		229/233	240/247	224/228	229/235	229/232					
18		229/236	210/212	240/244	240/243	241/246					
35		233/237	221/225	197/201	220/221	217/217					
75.1		226/234	236/243	212/216	194/201	220/227					
	te Binomials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Brine Control	211/211	211/211	211/211	211/211	211/211					
0	Lab Control	211/211	211/211	211/211	211/211	211/211					
2	245 0011101	210/211	211/211	211/211	211/211	211/211					
4		211/211	207/211	211/211	203/211	211/211					
9		211/211	211/211	211/211	203/211	211/211					
18		211/211	211/211	211/211	211/211	211/211					
35		211/211	211/211	201/211	211/211	211/211					
75.1		211/211	211/211	211/211	201/211	211/211					

Analyst: The QA: STURIOG 6/1/20

CETIS Ana	alytical Rep	ort					-	ort Date: Code:		•	54 (p 3 of 6) 4-6973-7134
Bivalve Larva	al Survival and	Developn	nent Test						Nautilus	Environ	mental (CA)
Analysis ID: Analyzed:	14-2587-1171 27 May-20 8:5			/elopment R ametric-Cor		tments		IS Version: cial Results		.8.7	
Data Transfo		Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corre		NA	C > T	NA	NA		1.68%	75.1	>75.1	NA	1.332
	iple Compariso	n Test	<u> </u>								
Control	vs C-%	111031	Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(a:5%)		
Brine Control	2		1.216	2.407	0.056 8	0.3561	CDF		ificant Effect		
Dime Control	4		0.6004	2.407	0.056 8	0.6365	CDF	0	ificant Effect		
	9		0.434	2.407	0.056 8	0.7080	CDF	-	ificant Effect		
	18		-0.03696	2.407	0.056 8	0.8669	CDF	-	ificant Effect		
	35		-1.297	2.407	0.056 8	0.8059	CDF	÷	ificant Effect		
	75.1		1.721	2.407	0.056 8	0.9951	CDF	-	ificant Effect		
ANOVA Table	•										
Source	Sum Squ	lares	Mean Squ	are	DF	F Stat	P-Value	Decision	(a:5%)		
Between	0.015315		0.0025526		6	1.893	0.1172		ificant Effect		
Error	0.037750		0.0013482		28	1.000	0.1172	Non-Oign			
Total	0.053066		0.0010402	.20	34						
Distributiona	i Tests					<u> </u>					
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a-1%)			
Variances		Equality of	f Variance	5.973	16.81	0.4263	Equal Var				
Distribution		Wilk W N		0.9482	0.9146	0.4203	Normal Di				
Development	Rate Summary			·····							
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Brine Control	5	0.9818	0.9702	0.9934	0.9817	0.9722	0.9912	0.004181	0.95%	0.0%
2	Driffe Control	5	0.9723	0.9534	0.9934	0.9729	0.9722	0.9912	0.004181	0.95% 1.57%	0.0%
4		5	0.9783	0.9687	0.988	0.9754	0.9707	0.9903	0.003486	0.8%	0.35%
9		5	0.9797	0.9718	0.9876	0.9825	0.9717	0.9871	0.002862	0.65%	0.21%
18		5	0.9824	0.9726	0.9922	0.9836	0.9703	0.9906	0.003526	0.8%	-0.06%
35		5	0.9882	0.9771	0.9993	0.9831	0.9801	1	0.003996	0.9%	-0.65%
75.1		5	0.9706	0.9624	0.9787	0.9692	0.9652	0.9815	0.002943	0.68%	1.14%
Angular (Cor	rected) Transfo	rmed Sur	nmary			<u> </u>					
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Brine Control	5	1.439	1.394	1.484	1.435	1.403	1.477	0.01627	2.53%	0.0%
2		5	1.411	1.341	1.481	1.405	1.363	1.503	0.02508	3.97%	1.96%
4		5	1.425	1.389	1.462	1.413	1.399	1.472	0.01314	2.06%	0.97%
9		5	1.429	1.401	1.457	1.438	1.402	1.457	0.01014	1.59%	0.7%
18		5	1.44	1.404	1.477	1.442	1.398	1.474	0.01313	2.04%	-0.06%
35		5	1.469	1.41	1.529	1.441	1.429	1.537	0.02145	3.26%	-2.09%
75.1		5	1.399	1.374	1.425	1.394	1.383	1.434		1.48%	2.78%
		<u> </u>		1.014	1.720	1.007	1.000	1.707	0.003202	1	2.1070

Analyst: Ja QA: 37710/6/1/20

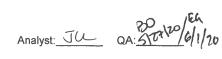
CETIS Analytic	al Report				Report Date: Test Code:	27 May-20 08:54 (p 4 of 6) 2004-S085 14-6973-7134
Bivalve Larval Surv	ival and Deve	lopment Test				Nautilus Environmental (CA)
	587-1171 ay-20 8:53	Endpoint: Analysis:	Development Rate Parametric-Control vs	s Treatments	CETIS Version: Official Results:	CETISv1.8.7 Yes
Graphics	 2 4	р 3 13 С-%	Rejet file	0.100 0.005 00000000		



CETIS Ana	alytical Rep	ort							ort Date: Code:		•	54 (p 5 of 6 4-6973-7134
Bivalve Larva	al Survival and [Developm	nent Test				_	_		Nautilus	Environ	mental (CA)
Analysis ID: Analyzed:	18-6051-8845 27 May-20 8:5		ndpoint: Sur nalysis: Nor	vival Rate	Control v	Treatm	nents		IS Version: ial Results	CETISv1. : Yes	.8.7	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	ected)	NA	C > T	NA	NA			1.32%	75.1	>75.1	NA	1.332
Steel Many-C	Dne Rank Sum T	est										
Control	vs C-%		Test Stat	Critical	Ties I	DF P-Va	alue	P-Type	Decision(a:5%)		
Brine Control	2		25	16	1 8			Asymp		ficant Effect		
	4		22.5	16	1 8			Asymp	•	ficant Effect		
	9		27.5	16	1 8			Asymp	U	ficant Effect		
	18		27.5	16	1 8			Asymp	-	ficant Effect		
	35		25	16	1 8			Asymp	-	ficant Effect		
	75.1		25	16	1 8			Asymp	-	ficant Effect		
ANOVA Table	9											
Source	Sum Squ	ares	Mean Squ	are	DF	F Sta	at	P-Value	Decision(a:5%)		
Between	0.015185		0.0025308		6	0.90		0.5070		ficant Effect		
Error	0.078506		0.0028037		28	0.00/	21	0.0070	Non-Olym			
Total	0.093691		0.0020001	00	34							
Distributiona	l Tests											
Attribute	Test			Test Stat	Critical	D Va	alue	Decision(a.1%)			
variances	Mod Lev	ene Equa	lity of Variance	0 9291								
Variances Variances		-	lity of Variance		3.812	0.494	46	Equal Var	iances			
Variances Variances Distribution	Levene E	-	Variance	0.9291 6.054 0.7259			46 04	Equal Var Unequal V	iances /ariances	n		
Variances Distribution	Levene E Shapiro-	Equality of	Variance	6.054	3.812 3.528	0.494	46 04	Equal Var Unequal V	iances	on		
Variances	Levene E Shapiro-	Equality of	Variance	6.054	3.812 3.528	0.494 0.000 <0.00	46 04 001	Equal Var Unequal V	iances /ariances		CV%	%Effect
Variances Distribution Survival Rate	Levene E Shapiro-Y Summary	Equality of Wilk W N	² Variance ormality	6.054 0.7259	3.812 3.528 0.9146	0.494 0.000 <0.00	46 04 001	Equal Var Unequal V Non-norm	iances /ariances al Distributio	on Std Err	CV%	%Effect
Variances Distribution Survival Rate C-%	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No Count	Variance ormality Mean	6.054 0.7259 95% LCL	3.812 3.528 0.9146 95% UC	0.494 0.000 <0.00	46 04 001	Equal Var Unequal V Non-norm Min	iances /ariances al Distributio Max	Std Err	CV% 0.0% 0.21%	%Effect 0.0% 0.09%
Variances Distribution Survival Rate C-% 0	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No Count 5	Variance ormality Mean 1	6.054 0.7259 95% LCL 1	3.812 3.528 0.9146 95% UC 1	0.494 0.000 <0.00 L Med	46 04 001	Equal Var Unequal V Non-norm Min 1	iances /ariances al Distributio Max 1	Std Err 0	0.0%	0.0%
Variances Distribution Survival Rate C-% 0 2	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No Count 5 5	^r Variance ormality Mean 1 0.9991	6.054 0.7259 95% LCL 1 0.9964	3.812 3.528 0.9146 95% UC 1 1	0.494 0.000 <0.00 L Med	46 04 001	Equal Var Unequal V Non-norm Min 1 0.9953	iances /ariances al Distributio Max 1 1	Std Err 0 0.000948	0.0% 0.21%	0.0% 0.09%
Variances Distribution Survival Rate C-% 0 2 4	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No Count 5 5 5 5	Variance prmality Mean 1 0.9991 0.9886	6.054 0.7259 95% LCL 1 0.9964 0.9676	3.812 3.528 0.9146 95% UC 1 1 1	0.494 0.000 <0.00 L Med	46 04 001	Equal Var Unequal V Non-norm Min 1 0.9953 0.9621	iances /ariances al Distributio Max 1 1 1	Std Err 0 0.000948 0.007583	0.0% 0.21% 1.72%	0.0% 0.09% 1.14%
Variances Distribution Survival Rate C-% 0 2 4 9	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No 5 5 5 5 5	Variance prmality Mean 1 0.9991 0.9886	6.054 0.7259 95% LCL 1 0.9964 0.9676	3.812 3.528 0.9146 95% UC 1 1 1 1	0.494 0.000 <0.00 L Med	46 04 001	Equal Var Unequal V Non-norm Min 1 0.9953 0.9621 1	iances /ariances al Distributio Max 1 1 1 1	Std Err 0 0.000948 0.007583 0	0.0% 0.21% 1.72% 0.0% 0.0%	0.0% 0.09% 1.14% 0.0% 0.0%
Variances Distribution Survival Rate C-% 0 2 4 9 18	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No 5 5 5 5 5 5 5	^f Variance ormality <u>Mean</u> 1 0.9991 0.9886 1 1	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.494 0.000 <0.00 1 1 1 1 1 1 1 1	46 04 001	Equal Var Unequal V Non-norm Min 1 0.9953 0.9621 1 1	iances /ariances al Distributio Max 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0	0.0% 0.21% 1.72% 0.0% 0.0% 2.14%	0.0% 0.09% 1.14% 0.0%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1	Levene E Shapiro-V Summary Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5	Mean 1 0.9991 0.9886 1 1 0.9905 0.9905	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1	46 04 001	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526	iances /ariances al Distributio Max 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0 0.009479	0.0% 0.21% 1.72% 0.0% 0.0% 2.14%	0.0% 0.09% 1.14% 0.0% 0.0% 0.95%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1	Levene E Shapiro-N e Summary Control Type Brine Control	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5	Mean 1 0.9991 0.9886 1 1 0.9905 0.9905	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1	46 04 001	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526	iances /ariances al Distributio Max 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0 0.009479	0.0% 0.21% 1.72% 0.0% 0.0% 2.14%	0.0% 0.09% 1.14% 0.0% 0.0% 0.95%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr	Levene E Shapiro-N Source Summary Control Type Brine Control	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 7 med Sun	Mean 1 0.9991 0.9886 1 1 0.9905 0.9905 0.9905	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 Min	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 Std Err	0.0% 0.21% 1.72% 0.0% 0.0% 2.14% 2.14%	0.0% 0.09% 1.14% 0.0% 0.0% 0.95% 0.95%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr C-%	Levene E Shapiro-V Source Summary Control Type Brine Control Frected) Transfor Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 1 0.9991 0.9886 1 1 0.9905 0.9905 1 mary Mean	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642 0.9642 95% LCL	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 9 5% UC	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian 6	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 Min 1.536	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 0.009479 0.009479	0.0% 0.21% 1.72% 0.0% 0.0% 2.14% 2.14% CV% 0.0%	0.0% 0.09% 1.14% 0.0% 0.0% 0.95% 0.95% %Effect 0.0%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr C-% 0	Levene E Shapiro-V Source Summary Control Type Brine Control Frected) Transfor Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Variance prmality Mean 1 0.9991 0.9886 1 1 0.9905 0.9905 0.9905 mmary Mean 1.536 1.529	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642 0.9642 95% LCL 1.536 1.51	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 55% UC 1.537 1.549	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian 6 6	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 Min 1.536 1.502	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 0.009479 0.00945	0.0% 0.21% 1.72% 0.0% 0.0% 2.14% 2.14% CV% 0.0% 1.01%	0.0% 0.09% 1.14% 0.0% 0.95% 0.95% 0.95% %Effect 0.0% 0.45%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr C-% 0 2	Levene E Shapiro-V Source Summary Control Type Brine Control Frected) Transfor Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Variance prmality Mean 1 0.9991 0.9886 1 1 0.9905 0.9905 0.9905 mmary Mean 1.536	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642 0.9642 95% LCL 1.536	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 95% UC 1.537	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian 6 6 6 6	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 Min 1.536	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 0.009479 0.009479	0.0% 0.21% 1.72% 0.0% 0.0% 2.14% 2.14% CV% 0.0% 1.01% 5.09%	0.0% 0.09% 1.14% 0.0% 0.95% 0.95% 0.95% %Effect 0.0% 0.45% 3.45%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr C-% 0 2 4	Levene E Shapiro-V Source Summary Control Type Brine Control Frected) Transfor Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Variance prmality Mean 1 0.9991 0.9886 1 1 0.9905 0.9905 0.9905 0.9905 mmary Mean 1.536 1.529 1.483	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642 0.9642 95% LCL 1.536 1.51 1.39	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 537 1.537 1.549 1.577	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian 6 6 6 6 6	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 0.9526 Min 1.536 1.536 1.536	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 0.009479 0.009479 0.009479 0.009479 0.009479	0.0% 0.21% 1.72% 0.0% 2.14% 2.14% 2.14% CV% 0.0% 1.01% 5.09% 0.0%	0.0% 0.09% 1.14% 0.0% 0.95% 0.95% %Effect 0.0% 0.45% 3.45% 0.0%
Variances Distribution Survival Rate C-% 0 2 4 9 18 35 75.1 Angular (Corr C-% 0 2 4 9 9	Levene E Shapiro-V Source Summary Control Type Brine Control Frected) Transfor Control Type	Equality of Wilk W No 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Mean 1 0.9991 0.9886 1 0.9905 0.9905 nmary Mean 1.536 1.529 1.483 1.536	6.054 0.7259 95% LCL 1 0.9964 0.9676 1 1 0.9642 0.9642 0.9642 95% LCL 1.536 1.51 1.39 1.536	3.812 3.528 0.9146 95% UC 1 1 1 1 1 1 1 1 1 1 537 1.537 1.537	0.494 0.000 <0.00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	46 04 001 lian 6 6 6 6 6 6 6 6	Equal Var Unequal V Non-norm 1 0.9953 0.9621 1 1 0.9526 0.9526 0.9526 Min 1.536 1.502 1.375	iances /ariances al Distributio Max 1 1 1 1 1 1 1 1 1 1 1 1 1	Std Err 0 0.000948 0.007583 0 0.009479 0.009479 0.009479 0.009479 0.009479 0.009479 0.009475 0 0.003375 0	0.0% 0.21% 1.72% 0.0% 0.0% 2.14% 2.14% CV% 0.0% 1.01% 5.09%	0.0% 0.09% 1.14% 0.0% 0.95% 0.95% 0.95% %Effect 0.0% 0.45% 3.45%

Analyst: JU QA:5127120/6/1/20

CETIS Ana	lytical Report			Report Date: Test Code:	27 May-20 08:54 (p 6 of 6) 2004-S085 14-6973-7134
Bivalve Larva	Survival and Devel	opment Test			Nautilus Environmental (CA)
Analysis ID: Analyzed:	18-6051-8845 27 May-20 8:53	Endpoint: Analysis:	Survival Rate Nonparametric-Control vs Treatmen	CETIS Version: s Official Results:	CETISv1.8.7 Yes
Graphics		9 18 	Page 1 1 1 1 1 1 1 1 1 1 1 1 1 1	• • • • • • • • • • • • • • • • • • •	



CETIS	S Anal	ytical Repo	ort					-	rt Date: Code:		•	54 (p 2 of 3 4-6973-713
Bivalve	Larval	Survival and D	evelopmen	t Test						Nautilus	s Environ	mental (CA
Analysi Analyze		03-0901-5666 27 May-20 8:53		point: lysis:	Development R Linear Interpola				S Version: ial Results:	CETISv1 Yes	.8.7	· · ·
Linear	Interpol	ation Options										
X Trans	sform	Y Transform	See	d	Resamples	Exp 95% C	L Meth	od				
Linear		Linear	1052	2937	1000	Yes	Two-I	Point Interpo	olation			
Point E	stimate	s			· · · · · · · · · · · · · · · · · · ·							
Level	%	95% LCL	95% UCL	τu	95% LCL	95% UCL						
EC25	>75.1	N/A	N/A	<1.33		NA						
EC50	>75.1	N/A	N/A	<1.33	2 NA	NA						
Develo	pment F	Rate Summary				Calcula	ted Variat	e(A/B)				
C-%	Co	ontrol Type	Count	Mean	Min	Max 3	Std Err	Std Dev	CV%	%Effect	Α	в
0	Br	ine Control	5	0.981	8 0.9722	0.9912	0.004181	0.009349	0.95%	0.0%	1087	1107
2			5	0.972	3 0.9575	0.9954	0.006815	0.01524	1.57%	0.97%	1075	1106
4			5	0.978	3 0.9707	0.9903	0.003486	0.007796	0.8%	0.35%	1070	1094
9			5	0.979	7 0.9717	0.9871	0.002862	0.006399	0.65%	0.21%	1151	1175
18			5	0.982	4 0.9703	0.9906	0.003526	0.007884	0.8%	-0.06%	1160	1181
35			5	0.988	2 0.9801	1 (0.003996	0.008934	0.9%	-0.65%	1088	1101
75.1			5	0.970	6 0.9652	0.9815	0.002943	0.00658	0.68%	1.14%	1088	1121
Graphic	cs					·····						
	^{1.0} 900											
	E	00			0							
	0.9											
	0.8											
	0.7											
nt Rate	0.6											
uamqa	Ē											
Devel	0.5											
	0.4											
	03											
	02											
	Ē											
	0.1											
	00 E	10 20 3	0 40	50	60 70 80							
			C-%									



Divelue		Pumikusland D		4 Taat				Test	Code:			4-6973-71
		Survival and D	evelopmen	tlest						Nautilus	s Environ	mental (C/
Analysi Analyze		08-9188-7387 27 May-20 8:53			Survival Rate Linear Interpola	ition (ICPIN)			S Version: ial Results:	CETISv1 Yes	.8.7	
Linear I	nterpola	ation Options			·							
X Trans	form	Y Transform	See	d	Resamples	Exp 95%	CL Meth	od				
Linear		Linear	4704	160	1000	Yes	Two-l	Point Interp	olation			
Point E	stimates	5										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
EC25	>75.1	N/A	N/A	<1.332	2 NA	NA						
EC50	>75.1	N/A	N/A	<1.332	2 NA	NA						
Surviva	I Rate S	ummary				Calcul	ated Variat	e(A/B)				
C-%	Co	ntrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Α	в
0	Bri	ne Control	5	1	1	1	0	0	0.0%	0.0%	1055	1055
2			5	0.9991	0.9953	1	0.000948	0.00212	0.21%	0.09%	1054	1055
4			5	0.9886	0.9621	1	0.007583	0.01696	1.72%	1.14%	1043	1055
9			5	1	1	1	0	0	0.0%	0.0%	1055	1055
18			5	1	1	1	0	0	0.0%	0.0%	1055	1055
35			5	0.9905	0.9526	1	0.009479	0.0212	2.14%	0.95%	1045	1055
75.1			5	0.9905	0.9526	1	0.009479	0.0212	2.14%	0.95%	1045	1055
Graphic	s					· · · · · · · · · · · · · · · · · · ·						
	0.9	• •	0		•							
Survival Rate	0.7											
	0.4											

CETIS Test Data Worksheet

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date: End Date: Sample Date:	17 A	Apr-20 Apr-20 Apr-20			Mytilus galloprovi EPA/600/R-95/13 Effluent Sample			Sample Code: Sample Source: Sample Station:	
C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal		Notes
			31			221	215	RT <	5/6/20
		-	32			243	235		4
		1	33			216	210		
			34			216	215		
			35		·	216	212		
			36			212	203		
			37			216	211		
			38			243	236		
			39			228	224		
		-	40			220	214		
			41			246	241		
			42			228	222		
			43			210	205		
			44			223	220		
			45			225	221		
			46			237	233		
			47			217	217		
			48			227	220		
			49			247	240		
			50			201	197		
			51			225			
			52				223		
			53			217 234	213		
			54			228	226 226		
			55			218			
			56				214		
			57			Z44	240		
			58			239	232		
			59			201	194		
			60			203	198		1
			61			247	237		
			62			216	207	RT 5	5/26/20
			63			232 233 236	229 229 229	1	
			64			021	227		
			65			4.56	Z20		í.
			66			Z21			
			67			253	248		
			68			Z12	210		
						235	229		
			69 70			243 207	240		
			70			207	205	\vee	

Analyst: 080 FT QA: 5127/20/6/1/20

CETIS Test Data Worksheet

								•
Start Date: End Date:	17 A	Apr-20 Apr-20			Mytilus galloprov EPA/600/R-95/13			Sample Code: 20- 6416 Sample Source: Jacobs
Sample Date				Material:	Effluent Sample			Sample Station: Wyckoff
C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	BC	1	33					
0	BC	2	51					
0	BC	3	40					
0	BC	4	54					
0	BC	5	55			222	218	Ars 4/12/2020
0	LC	1	66			0		
0	LC	2	61					
0	LC	3	37					
0	LC	4	32			249	244	ACS 4/19/2020
0	LC	5	44					
2		1	43					
2		2	34					
2		3	36			217	210	A(S 1/19/2020
2		4	31					
2		5	60					
4	1	1	42					
4		2	70			209	206	AS 4/19/2020
4		3	52				000	
4		4	59					
4	1	5	57					
9		1	63			241	236	Acs 4/19/2020
9	1	2	49			~[]	~)6	
9	1	3	39					
9		4	68					
9	-	5	62					
18		1	64					
18		2	67					
18	-	3	56					
18		4	69					
18		5	41			245	241	Ars 1/19/2020
35	+	1	46			775	211	
35		2	45					
35		3	50			198	195	A(S 4/19/2020
35		4	65			120	VIJ	
35		5	47					
73. B		1	53					
73.3	+	2	38					
78.3		2	35					
1 0.3	-	4	58			202	198	ALS 4/19/2020

15.1

73.3 AIG MCS U/19/205

QC=BO

48

Analyst: RT QA: STURTO 61/20

Marine Chronic Bioassay DM-014

Client: Jacobs

Sample ID: Wyckoff GWTP Effluent

Sample Log No.: 20-0416

Test No.: 2004-5085

Water Quality Measurements

 Test Species:
 M. galloprovincialis

 Start Date/Time:
 4/15/2020
 1325

 End Date/Time:
 4/17/2020
 1525

Concentration		Salinity		Т	emperatu	re	Diss	solved Ox	ygen		рН	
(% sample)		(ppt)			(°C)			(mg/L)			(pH units))
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	30.3	30.3	30.1	15.2	15.i	15.2	8.9	8.6	8.6	8.06	8.02	
Brine Control	30,6	30.5	305	15.6	14.9	14.9	8.4	8.6	0.6	8.33	8.10	6.66
2	30.4	30.4	30.5	15.4	14.8	14.8	8.8	8.6	8.6	8.10	8.04	8.67
4	30.5	30.4	30.4	15.4	15.1	15.0	8.8	8.6	9.6	8.09	8.05	8.10
9	30.5	30.4	30.5	15.1	14.9	14.9	8.9	8.6	°6,6	8.02	8.05	8.14
18	30.5	30.4	30.4	15.3	14.9	14.9	8.8	8.6	8.5	794	8.07	8.19
35	30.5	30.5	30.7	15.6	14.9	15.0	8.7	8.6	8.6	7.81	8.12	8.20
75.1	30.2	30.0	30.0	15.8	15.0	15.0	8.2	85	8.5	7.68	8.12	6.32

Technician Initials:	02448WQ Readings:BORTKLDilutions made by:BOImage: Control of the second seco	Environmental Chamber:
Comments:	0 hrs: 24 hrs: 48 hrs:	
QC Check:	BO 5/27/20	Final Review: EG 6/120

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

Marine Chro DC-010	onic Bioassay			Brine Dilution Worksheet
Project:	JACOBS		Analyst:	во
Sample ID:	Wyckoff GWM	P Effluent	Test Date:	4/15/2020
Test No:	2004-SD85		Test Type:	Mussel Development
Salinity of Effl	uent	7.1		
Salinity of Brin	ne .	99.2	Date of Brine used:	1/14/2020
Target Salinity		30	Alkalinity of Brine Control:	mg/L as CaCO3
Test Dilution \	/olume	250		
		Effluent	Brine Control	
Salinity Adjust (TS - SE)/(SB - TS = target SE = salinit	TS) =	0.33	0.43	

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	1.7	250
4	10.0	0.33	3.3	250
9	22.5	0.33	7.4	250
18	45.0	0.33	14.9	250
35	87.5	0.33	29.0	250
75.1	187.8	0.33	62.2	250

	DI Volume			
Brine Control	143.4	0.43	62.2	250

Total Brine Volume Required (ml): 180.6

QC Check: BO 5 27 20

Final Review: En 6/1/20

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

Marine Chronic Bioassay DM-013

Client/Sample:	Jacobs / Wyckoff GWTP Effluent
Test No.:	2004-5085
Test Species:	Mytilus galloprovincialis
Animal Source/Batc	h Tank: MREP 12B
Date Received:	313 120
Test Chambers:	30 mL glass shell vials
Sample Volume:	10 mL

09.55

Larval Development Worksheet

Start Date/Time:	4/15/2020	1325	
End Date/Time:	4/17/2020	1525	
Technician Initials:	BO		

Spawn Information

Gamete Selection

First	Gamete	Release	Time:	

Sex	Number Spawning
Male	3
Female	2

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	1,23	good motility, good density
Female 1	j	yellow color, round shape play density
Female 2	2	White color, rand shape, low density
Female 3	-	

Egg Fertilization Time: 100

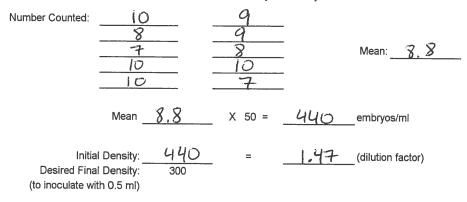
Stock(s) chosen for testing:

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	j00
Female 2	
Female 3	-

Embryo Inoculum Preparation

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



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

TØ Vial No.	No. Dividing	Total 203	% Dividing	Mean % Dividing
TØ A	+74C	-175-@	100	
TØ B	198	199	99.5	
тøс	206	208	99.0	99.5
TØ D	219	220	99.5	11.5
TØ E	220	220	100	
TØ F	212	214	99.1	
<u>x</u> =	211			

48-h QC: 204/208 = 98.1%

Comments:

QC Check:

AC4/28/20

@@18B0 4/16/20

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

Final Review: BO5127/20/E4 61/20

Appendix B Sample Check-In Information

Enthalpy Analytical	Client: _	JAC	OBS		Sample	Check-In In	nformation
1340 Vandever Avenue	Sample ID: _	WYCRO	ft (01	11420)			
San Diego, CA 92120	Test ID No(s).: _	2604	- 5085		Sample Description: A: colorles, clear, r	no odor, n	odebhis
Sample (A, B, C	: A						
Log-in No. (20-xxxx	0416				••••••		
Sample Collection Date & Time	: 4/14/20 DBS7				COC Complete (Y/N)?		
Sample Receipt Date & Time					A B C		
Number of Containers & Container Type							
Approx. Total Volume Received (L)					Filtration? Y		
Check-in Temperature (°C)	2.4				\cup	C)	
Temperature OK?		Y N	Y N	Y N	Pore Size:		-
DO (mg/L)	8.9				Organisms _A or	Debris	
pH (units)	7.54	· · · · · · · · · · · · · · · · · · ·			Salinity Adjustment? (Y) N		
Conductivity (µS/cm)	1880		-		Test: MV54C Source:	Brine Tara	et pot: 30
Salinity (pp					Test: Source:		et ppt:
Aikalinity (mg/L)					Test: Source:		et ppt:
Hardness (mg/L) ^{2,}					pH Adjustment? Y (N)	1018	or ppr.
Total Chlorine (mg/L)	10.02				A	в	С
Technician Initials	EL.				Initial pH:		
	TU			J]	Amount of HCI added:		
Test Performed Monic Mussel Deven	apmont						
Test Performed: VVVVVIC TW) A gette	Control/Dilution Wa	ater: 8:2 / Lal	b SW / Lab ART	Other:	Final pH:		
Additional Control?	Alkalinity: 10		r Salinity: 3017	Dation Sand	Cl ₂ Adjustment? Y (N)		0
Additional Control? (Y) N		Alkalinity: <u> </u>	Hardness or a		Initial Free Cl ₂ :	B	<u>с</u>
Test Destaura de				Other	STS added:		
Test Performed:	Control/Dilution Wa		r Salinity:		Final Free Cl ₂ :		
Additional Control? Y N							
				Samily	Sample Aeration? Y 🔊		
Test Performed:	Control/Dilution Wa	nter 8·2 / lai	hSW / LabART	Other:		В	с
Test renomed.	Alkalinity:				Initial D.O.		
Additional Control? Y N			Hardness or §	Salinity:	Duration & Rate		
					Final D.O.		
Notes: ¹ Temperature of sample shou	ld be 0-6°C, if received	I more than 24 hou	urs past collection tir	ne.			
² mg/L as CaCO3, ³ Measured					Subsamples for Additional Che	mistry Requir	ed?
	- 0			•	NH3 Other		
Additional Comments: (A) Q 1842 4115 20	(B) performed	a 1:2 dè	which due to	not enoughs	Tech Initials AHB	C	
_	- 1	•				heck: BO L	118/20
					QC C	neck: W	1.000

Final Review:	56	6	10	
Final Review:	Y A	9	100	

Total Ammonia Analysis Freshwater

DC-001					
	: JACOBS				
	: Wyckoff				
Test Type	: Mussel Dev	elopment			
DI Blank Test Start Date	: <u>0.</u> 0 : <u>4/15/2020</u>	-	An	Analyst: alysis Date:	PM 4/16/20
					N x 1.22
Sample ID	Nautilus ID	Sub-Sample Date	Test Day	NH3-N (mg/L)	Ammonia (mg/L)
Blank Spike (10 mg/L NH ₃)		NA	NA	7.6	9.3
Wyckoff	20-0416	4/15/2020	Check In	1.1	1.3
Spike Check (10 mg/L NH3)		NA	NA	76	9.)
Batch QA Sumple	20-0421	4/3/20	Check-in	0.5	0.6
Sample Duplicate ^a	20-0421	NA	NA	0.4	<0.5
Sample Duplicate + Spike ^a		NA	NA	8.1	9.9
Spike Check (10 mg/L NH ₃)		NA	NA	7.6	9.3

Relative Percent Difference (RPD) = [sample] (mg/L) - [sample duplicate] (mg/L) x 100 [average ammonia] (mg/L)

Acceptable Range: 0-20%

Acceptable Range: 80-120%^b

Percent Recovery = [spiked sample] (mg/L) - [sample] (mg/L) x 100 nominal [spike] (mg/L)

Measured Nominal [Spike] QC Sample ID [NH₃] [Sample Dup] [Spike] RPD % Recovery 0.0 93 93 Blank NA 10 NA C 0.5 9.9 Batch QA Sample 0.6 93 10 C

Comments:

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.

Method Detection Limit = 0.5 mg/L

QC Check: BO 4/18/20

Final Review: EL6120

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

Appendix C Chain-of-Custody Form

Page 1 of 1	Page	1	of	1
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Enthalpy Analytical (REGION COPY)

DateShipped: 4/14/2020 CarrierName: FedEx AirbillNo: 7702 3407 2763

Jacobs, Wyckoff Wyckoff Eagle Harbor GWTP 2020/WA Project Code: WEH-029M Cooler #: 1 of 1

No: 10-041420-091921-0456

2020T10P000DD210W2LA00 Contact Name: Keith Allers Contact Phone: 206-780-1711

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	Sample Type
041420		Ground Water/ K.Allers	Composite	CHRTOX(8 Weeks)	(< 6 C) (1)	SP-11	04/14/2020 08:57	Field Sample
			¢.					

	Shipment for Case Complete? N
Special Instructions:	Samples Transferred From Chain of Custody #
Analysis Key: CHRTOX=Chronic Toxicity	

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Keepelles JACOBS	4-14-20210 0928	Alfara Nautilus	4/15/20	
				recipt	temp: 2.4°C

Nautilus ID: 20-0416

Appendix D List of Qualifier Codes

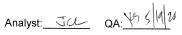


Glossary of Qualifier Codes:

- Q1 Temperatures out of recommended range; corrective action taken and recorded in Test Temperature Correction Log
- Q2 Temperatures out of recommended range; no action taken, test terminated same day
- Q3 Sample aerated prior to initiation or renewal due to dissolved oxygen (D.O.) levels below 6.0 mg/L
- Q4 Test aerated; D.O. levels dropped below 4.0 mg/L
- Q5 Test initiated with 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, 50% 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 $\leq 110\%$
- 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.
- 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.
- Q18 Incorrect Entry
- Q19 Illegible Entry
- Q20 Miscalculation
- Q21 Other (provide reason in comments section)
- Q22 Greater than 10% mortality observed upon receipt and/or in holding prior to test initiation. Organisms acclimated to test conditions at Nautilus and ultimately deemed fit to use for testing.
- Q23 Test organisms received at a <u>temperature</u> greater than 3°C outside the recommended test temperature range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.
- Q24 Test organisms received at <u>salinity</u> greater than 3 ppt outside of the recommended test salinity range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.

Appendix E Reference Toxicant Test Results

CETIS Sun	nmary Report						Report Date: Test Code:	: 01 May-20 10:07 (p 1 of 3) 200415msdv 16-4614-0901
Bivalve Larva	I Survival and Developm	ent Test						Nautilus Environmental (CA)
Batch ID: Start Date: Ending Date: Duration:	15 Apr-20 13:25 P 17 Apr-20 15:25 S	est Type: rotocol: pecies: ource:	Development- EPA/600/R-95 Mytilus gallopr M-Rep, Carist	/136 (1995) ovincialis				Diluted Natural Seawater Not Applicable
Sample ID: Sample Date: Receive Date: Sample Age:	15 Apr-20 M 15 Apr-20 So	ode: laterial: ource: tation:	200415msdv Copper chloric Reference Toy Copper Chloric	kicant			Client: I Project:	nternal
Comparison S	Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	τu	Metho	d
01-8577-8962 08-5737-8335 00-1254-4681	Combined Development Development Rate Survival Rate	Ra 5 5 20	10 10 40	7.071 7.071 28.28	3.45% 3.45% NA		Dunne	tt Multiple Comparison Test tt Multiple Comparison Test Many-One Rank Sum Test
Point Estimate	Summany							
Analysis ID	Endpoint	Level	μg/L	95% LCL	95% UCL	τu	Metho	d
11-3098-9850	Combined Development	Ra EC25 EC50	8.134 11.68	7.523 10.39	8.961 12.83		Linear	Interpolation (ICPIN)
19-2371-7781	Development Rate	EC25 EC50	8.134 11.68	7.514 10.35	8.851 12.7		Linear	Interpolation (ICPIN)
00-5465-8677	Survival Rate	EC25 EC50	25 30	25 30	25 30		Linear	Interpolation (ICPIN)
Test Acceptab	ility							
Analysis ID	Endpoint	Attrib	ute	Test Stat	TAC Limi	ts	Overla	p Decision
08-5737-8335 19-2371-7781 00-1254-4681 00-5465-8677	Development Rate Development Rate Survival Rate Survival Rate Combined Development	Contro Contro Contro	ol Resp ol Resp ol Resp ol Resp	0.967 0.967 1 1 0.03455	0.9 - NL 0.9 - NL 0.5 - NL 0.5 - NL	92 - 1994 - 1994 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1	Yes Yes Yes Yes	Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria Passes Acceptability Criteria



CETIS Summary Report

Report Date: Test Code: 01 May-20 10:07 (p 2 of 3) 200415msdv | 16-4614-0901

		alkonakasen beski törekeresiste	ulain a makana ang ang ang ang ang ang ang ang ang		a a fair a state a stat	Water Delivities de la chalance da sec	lesi	Code:	2004	15msav 16	5-4614-090
Bivalve La	rval Survival and I	Developme	nt Test						Nautilus	6 Environn	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	0.967	0.9551	0.9788	0.952	0.9779	0.004257	0.009519	0.98%	0.0%
2.5		5	0.9556	0.9166	0.9945	0.9031	0.9817	0.01403	0.03136	3.28%	1.18%
5		5	0.9796	0.9671	0.9921	0.9679	0.9917	0.004493	0.01005	1.03%	-1.31%
10		5	0.5804	0.4889	0.6719	0.4851	0.6736	0.03296	0.0737	12.7%	39.98%
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	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.967	0.9551	0.9788	0.952	0.9779	0.004257	0.009519	0.98%	0.0%
2.5		5	0.9556	0.9166	0.9945	0.9031	0.9817	0.01403	0.03136	3.28%	1.18%
5		5	0.9796	0.9671	0.9921	0.9679	0.9917	0.004493	0.01005	1.03%	-1.31%
10		5	0.5804	0.4889	0.6719	0.4851	0.6736	0.03296	0.0737	12.7%	39.98%
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	1	1	1	1	1	0	0	0.0%	0.0%
2.5		5	1	1	1	1	1	0	0	0.0%	0.0%
5		5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
20		5	1	1	1	1	1	0	0	0.0%	0.0%
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	0.9683	0.9779	0.971	0.9657	0.952					
2.5		0.9031	0.9524	0.9655	0.9817	0.9752					
5		0.9917	0.9679	0.9863	0.9809	0.9711					
10		0.4851	0.5625	0.6318	0.5489	0.6736					
20		0	0	0	0	0					
40		0	0	0	0	0					
			0	0	0	0		R			
•	ent Rate Detail										
С-µg/L 0	Control Type Lab Control	Rep 1 0.9683	Rep 2 0.9779	Rep 3	Rep 4	Rep 5		****			
-				0.971	0.9657	0.952					
2.5		0.9031	0.9524	0.9655	0.9817	0.9752					
5		0.9917	0.9679	0.9863	0.9809	0.9711					
10		0.4851	0.5625	0.6318	0.5489	0.6736					
20		0	0	0	0	0					
40		0	0	0	0	0					
Survival Ra	ite Detail					1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -					
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5					
0	Lab Control	1	1	1	1	1					
2.5		1	1	1	1	1	1				
5		1	1	1	1	1					
10		1	1	1	1	1					
		1	1	1	1						
20											
20 40		0	0	0	0	1 0					

CETIS Summary Report

Report Date: Test Code:

							 200110110001 10 4014 0001
Bivalve La	arval Survival and	Developme	ent Test				Nautilus Environmental (CA)
Combined	d Development Rat	e Binomia	ls				
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	214/221	221/226	234/241	225/233	238/250
2.5		205/227	220/231	252/261	215/219	236/242
5		240/242	211/218	216/219	257/262	235/242
10		114/235	135/240	163/258	129/235	161/239
20		0/217	0/227	0/221	0/238	0/228
40	-	0/211	0/211	0/211	0/211	0/211
Developmer	nt Rate Binomials					
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	214/221	221/226	234/241	225/233	238/250
2.5		205/227	220/231	252/261	215/219	236/242
5		240/242	211/218	216/219	257/262	235/242
10		114/235	135/240	163/258	129/235	161/239
20		0/217	0/227	0/221	0/238	0/228
40		0/1	0/1	0/1	0/1	0/1
Survival Rat	e Binomials			· · · · · · · · · · · · · · · · · · ·		
C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	211/211	211/211	211/211	211/211	211/211
2.5		211/211	211/211	211/211	211/211	211/211
5		211/211	211/211	211/211	211/211	211/211
10		211/211	211/211	211/211	211/211	211/211
20		211/211	211/211	211/211	211/211	211/211
40		0/211	0/211	0/211	0/211	0/211

CETIS An	alytical Rep	ort						ort Date: Code:			07 (p 1 of 3 6-4614-090
Bivalve Larv	al Survival and [Developm	ent Test						Nautilus	Environ	mental (CA)
Analysis ID: Analyzed:	01-8577-8962 01 May-20 10:			mbined Deve rametric-Cor				IS Version: al Results:		.8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Angular (Corr	rected)	NA	C > T	NA	NA		3.45%	5	10	7.071	
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	2.5		0.619	2.227	0.079 8	0.4921	CDF		ificant Effect		
	5		-1.172	2.227	0.079 8	0.9746	CDF	Non-Signi	ificant Effect		
	10*		14.66	2.227	0.079 8	<0.0001	CDF	Significan	t Effect		
ANOVA Tabl	e										
Source	Sum Squ	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision	(α:5%)		
Between	1.060375	_	0.353458		3	111.3	<0.0001	Significan	t Effect		
Error	0.050793	53	0.003174	596	16	0,4.8%					
Total	1.111168		7.010-10-10-10-10-10-10-10-10-10-10-10-10-		19						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	α:1%)			
Variances		Equality of		4.888	11.34	0.1801	Equal Var				
Distribution	Shapiro-	Wilk W No	rmality	0.975	0.866	0.8548	Normal Di	stribution			
Combined D	evelopment Rate	e Summar	у								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.967	0.9551	0.9788	0.9683	0.952	0.9779	0.004257	0.98%	0.0%
2.5		5	0.9556	0.9166	0.9945	0.9655	0.9031	0.9817	0.01403	3.28%	1.18%
5 10		5 5	0.9796	0.9671	0.9921	0.9809	0.9679	0.9917	0.004493	1.03%	-1.31%
20		5 5	0.5804 0	0.4889 0	0.6719 0	0.5625 0	0.4851 0	0.6736 0	0.03296 0	12.7%	39.98% 100.0%
40		5	0	0	0	0	0	0	0		100.0%
Angular (Cor	rrected) Transfor	med Sum	mary								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	C) /8/	
0	Lab Control	5	1.389	1.357	1.422	1.392	1.35	1.422		CV%	%Effect 0.0%
2.5		5	1.367	1.28	1.455	1.384	1.254	1.422	0.01167 0.03163	1.88% 5.17%	0.0% 1.59%
5		5	1.431	1.385	1.477	1.432	1.391	1.48	0.01656	2.59%	-3.01%
10		5	0.8669	0.7736	0.9602	0.8481	0.7705	0.9627	0.0336	8.67%	37.61%
20		5	0.03326	0.03254	0.03399	0.03319	0.03242	0.03395	0.000260	1.75%	97.61%
40		5	0.03443	0.03442	0.03444	0.03443	0.03443	0.03443	0	0.0%	97.52%
Graphics											
^{1.0} F =						0.10		1			/
0.9				Reject Null		0.08				/	
0.8						0.06					
nt Rate						0.04			9.8	6	
us 0.7					per						
combined Development Rate			₽z		Centered	0.00					
Combis						-0.02					
0.4						-					
0.3						-0.04					
0.2						-0.06					
-						-0.08					
0.1						-0.10					
0.0 E	0 LC 2 5	i 5	10 20	¹ 40	-1	-0.12	2.0 -1.5 -1.0	-0.5 0.0	0.5 1.0	1.5 2.0	J 2.5
							1.0	0.0	X-V	2.0	

CETIS™ v1.8.7.20

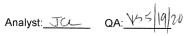
Analyst: Ja QA: 45 19 2

CETIS Ana	alytical Repo	ort		a daga sa	0000 000 000 000 000 000 000 000 000 0		-	ort Date: Code:		•	07 (p 2 of 3) 6-4614-0901
Bivalve Larv	al Survival and [Developme	nt Test						Nautilus	Environ	mental (CA)
Analysis ID: Analyzed:	08-5737-8335 01 May-20 10:		dpoint : De alysis: Pa	velopment R rametric-Cor		tments		IS Version: al Results:	CETISv1 Yes	.8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	τυ
Angular (Corr	rected)	NA	C > T	NA	NA		3.45%	5	10	7.071	
Dunnett Mulf	tiple Comparisor	n Test									
Control	vs C-µg/L		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(α:5%)		
Lab Control	2.5		0.619	2.227	0.079 8	0.4921	CDF		ficant Effect		
	5		-1.172	2.227	0.079 8	0.9746	CDF	Non-Signit	ficant Effect		
	10*		14.66	2.227	0.079 8	<0.0001	CDF	Significant	Effect		
ANOVA Table	e										
Source	Sum Squ	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision(α:5%)		
Between	1.060375		0.3534582		3	111.3	<0.0001	Significant	Effect		
Error	0.050793	53	0.003174	596	16						
Total	1.111168				19						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances		Equality of \		4.888	11.34	0.1801	Equal Var				
Distribution	Shapiro-V	Wilk W Nor	mality	0.975	0.866	0.8548	Normal D	istribution			
Developmen	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	0.967	0.9551	0.9788	0.9683	0.952	0.9779	0.004257	0.98%	0.0%
2.5 F		5	0.9556	0.9166	0.9945	0.9655	0.9031	0.9817	0.01403	3.28%	1.18%
5 10		5 5	0.9796 0.5804	0.9671 0.4889	0.9921 0.6719	0.9809	0.9679	0.9917	0.004493	1.03%	-1.31%
20		5	0.5804	0.4889 0	0.0719	0.5625 0	0.4851 0	0.6736 0	0.03296 0	12.7%	39.98% 100.0%
40		5	0	0	0	0	0	0	0		100.0%
Angular (Cor	rrected) Transfor	med Sumr	narv								
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.389	1.357	1.422	1.392	1.35	1.422	0.01167	1.88%	0.0%
2.5		5	1.367	1.28	1.455	1.384	1.254	1.435	0.03163	5.17%	1.59%
5		5	1.431	1.385	1.477	1.432	1.391	1.48	0.01656	2.59%	-3.01%
10		5	0.8669	0.7736	0.9602	0.8481	0.7705	0.9627	0.0336	8.67%	37.61%
20 40		5 5	0.03326 0.5236	0.03254 0.5234	0.03399 0.5238	0.03319 0.5236	0.03242 0.5236	0.03395	0.000260	1.75%	97.61%
Graphics		5	0.5250	0.5254	0.5258	0.5236	0.5236	0.5236	0	0.0%	62.32%
Graphics											
1.0 E				Ded at M.D	-	0.10 E				•	/
0.9	L			Reject Null		0.08					
0.8						0.06				6	
7.0 Kg		r				0.04					
Development Rate					Centered	0.02					
0.5						0.00		000000000	000		and the second se
0.4						-0.02		••			
						0.04	• • •	-			
0.3				۲		0.06					
0.2						-0.08					
0.1						-0.10	•				
0.0 E	I I I	I		I	L	-0.12	<u> </u>	l			
	0 LC 2.5	5 С-µg/L	10 20	40			2.0 -1.5 -1.0	-0.5 0.0 Rankits	0.5 1.0	1.5 2.0	2.5
-		- 1-24 m	SM CONTRACTOR OF CONTRACTOR CONTRACTOR	NATION BOX OF COMPANY AND AN ADDRESS				radikits	4410-7417938-866-864-864-864-864-864-864-864-864-86		

Analyst: Ja QA: 45/19/20

D:		-		nin an			103	Code:			6-4614-090
Bivalve Larv	al Survival and	Developm	ent Test	17. Aller and a subscription					Nautilu	s Environ	mental (CA
Analysis ID: Analyzed:	00-1254-4681 01 May-20 10:		-	vival Rate	-Control vs	Freatments		IS Version: cial Results		.8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed			NOEL	LOEL	TOEL	TU
Angular (Cori	rected)	NA	C > T	NA	NA			20	40	28.28	
Steel Many-0	One Rank Sum T	est									
Control	vs C-µg/L		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision	(a:5%)		
Lab Control	2.5		27.5	17	1 8	0.8000	Asymp		ificant Effect		
	5		27.5	17	1 8	0.8000	Asymp	-	ificant Effect		
	10		27.5	17	1 8	0.8000	Asymp	-	ificant Effect		
	20		27.5	17	1 8	0.8000	Asymp	-	ificant Effect		
Survival Rat	e Summary										
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1	1	1	1	1	1	0	0.0%	0.0%
2.5		5	1	1	1	1	1	1	0	0.0%	0.0%
5		5	1	1	1	1	1	1	0	0.0%	0.0%
10		5	1	1	1	1	1	1	0	0.0%	0.0%
20		5	1	1	1	1	1	1	0	0.0%	0.0%
40		5	0	0	0	0	0	0	0		100.0%
	rrected) Transfor	med Sun	nmary								
C-µg/L	Control Type	Count	Mean	95% LCL		Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.0%	0.0%
2.5		5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.0%	0.0%
						1.536	1.536	1.536	0	0.00/	0.0%
5		5	1.536	1.536	1.537					0.0%	
5 10		5 5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.0%	0.0%
5 10 20		5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40		5 5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.0%	0.0%
5 10 20 40		5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40	0 0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	• •	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	0 0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	0 0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	•	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	0 0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	0	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	•	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	9	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	•	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics	•	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰	•	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%
5 10 20 40 Graphics ¹⁰ ⁰⁹ ⁰⁸ ⁰⁷ ⁰⁸ ⁰⁷ ⁰⁸ ⁰⁷ ⁰³ ⁰⁴	 Image: Control of the second se	5 5 5	1.536 1.536	1.536 1.536	1.537 1.537 0.03444	1.536 1.536 0.03443	1.536 1.536	1.536 1.536	0 0	0.0% 0.0%	0.0% 0.0%

Analyzed: 01 May-20 10:06 Analysis: Linear Interpolation (ICPIN) C Linear Interpolation Options X Transform Y Transform Seed Resamples Exp 95% CL Method Linear Linear 423860 1000 Yes Two-Point Int Point Estimates Level µg/L 95% LCL 95% UCL EC25 8.134 7.523 8.961 EC50 11.68 10.39 12.83 Calculated Variate(A/B) Calculated Variate(A/B) C-µg/L Control Type Count Mean Min Max Std Err Std Dr 2.5 5 0.967 0.952 0.9779 0.004257 0.0952 2.5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 0 4	ev CV% 519 0.98% 36 3.28% 05 1.03%	CETISv7 : Yes ////////////////////////////////////		B 1171 1180 1183
Analyzed: 01 May-20 10:06 Analysis: Linear Interpolation (ICPIN) C Linear Interpolation Options X Transform Y Transform Seed Resamples Exp 95% CL Method Linear Linear 423860 1000 Yes Two-Point Int Point Estimates 423860 1000 Yes Two-Point Int EC25 8.134 7.523 8.961 EC50 11.68 10.39 12.83 Combined Development Rate Summary Calculated Variate(A/B) Calculated Variate(A/B) 0.04257 0.0095 2.5 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9566 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0 0 0 0 0 0 20 5 0 0 0 0 0 0 20 5	Official Results: terpolation ev CV% 519 0.98% 36 3.28% 05 1.03%	: Yes %Effect 0.0% 1.18% -1.31%	A 1132 1128	1171 1180
X Transform Y Transform Seed Resamples Exp 95% CL Method Linear 423860 1000 Yes Two-Point Integration IntegratioNetee Integrate Integration IntegratioNetee Integration Integratio	ev CV% 519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
Linear Linear 423860 1000 Yes Two-Point Internet Point Estimates 95% LCL 95% UCL 95% UCL Economic Calculated Variate(A/B) Economical Development Rate Summary Calculated Variate(A/B) Calculated Variate(A/B) C-µg/L Control Type Count Mean Min Max Std Err Std Do 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 0 40 5 0 0 0 0 0 0	ev CV% 519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
Linear Linear 423860 1000 Yes Two-Point Integration Point Estimates Point Estimates Point Integration Point Integration Point Integration Point Integration Level µg/L 95% LCL 95% UCL Point Integration	ev CV% 519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
Level μg/L 95% LCL 95% UCL EC25 8.134 7.523 8.961 EC50 11.68 10.39 12.83 Combined Development Rate Summary Calculated Variate(A/B) C-µg/L Control Type Count Mean Min Max Std Err Std Dr 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
Level μg/L 95% LCL 95% UCL EC25 8.134 7.523 8.961 EC50 11.68 10.39 12.83 Combined Development Rate Summary Calculated Variate(A/B) C-µg/L Control Type Count Mean Min Max Std Err Std D 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
EC25 8.134 7.523 8.961 EC50 11.68 10.39 12.83 Calculated Variate(A/B) Calculated Variate(A/B) Combined Development Rate Summary Calculated Variate(A/B) C-µg/L Control Type Count Mean Min Max Std Err Std Dr 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0 Graphics	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
EC50 11.68 10.39 12.83 Calculated Variate(A/B) Combined Development Rate Summary C-µg/L Control Type Count Mean Min Max Std Err Std Dr 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0 Graphics	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
C-µg/L Control Type Count Mean Min Max Std Err Std Dr 0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0952 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
0 Lab Control 5 0.967 0.952 0.9779 0.004257 0.0095 2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0	519 0.98% 36 3.28% 05 1.03%	0.0% 1.18% -1.31%	1132 1128	1171 1180
2.5 5 0.9556 0.9031 0.9817 0.01403 0.0313 5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0	36 3.28% 05 1.03%	1.18% -1.31%	1132 1128	1180
5 5 0.9796 0.9679 0.9917 0.004493 0.0100 10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 Graphics	05 1.03%	-1.31%		1180
10 5 0.5804 0.4851 0.6736 0.03296 0.0737 20 5 0 0 0 0 0 40 5 0 0 0 0 0 Graphics			1159	1183
20 5 0 0 0 0 0 40 5 0 0 0 0 0 Graphics	7 12.7%			
40 5 0 0 0 0 Graphics		39.98%	702	1207
Graphics		100.0%	0	1131
		100.0%	0	1055



	adaman kanala kata sa	ytical Repo			T1				ort Date: Code:			07 (p 2 of 3 6-4614-090
Bivalve	e Larval	Survival and D	evelopn	nent Test						Nautilu	s Environi	mental (CA
Analys Analyz		19-2371-7781 01 May-20 10:0		Endpoint: Analysis:	Development I Linear Interpol				S Version: al Results:	CETISv1 Yes	1.8.7	
Linear	Interpol	ation Options	99000005-1000000-200000-0000					a alla nome provide la substance de pe				225. i.i.e. 1. i.i.e
X Trans	sform	Y Transform	n S	Seed	Resamples	Exp 95% C	L Meth	bod				
Linear		Linear	1	236071	1000	Yes		Point Interp	olation			
Point E	Estimate	s										
Level	µg/L	95% LCL	95% U	CL								
EC25	8.134	7.514	8.851									
EC50	11.68	10.35	12.7									
Develo	pment R	ate Summary				Calcula	ted Varia	te(A/B)				
C-µg/L	Co	ontrol Type	Count	Mean	Min		Std Err	Std Dev	CV%	%Effect	Α	в
0	La	b Control	5	0.967	0.952	0.9779	0.004257	0.009519	0.98%	0.0%	1132	1171
2.5			5	0.9556	6 0.9031	0.9817 (0.01403	0.03136	3.28%	1.18%	1128	1180
5			5	0.9796		0.9917 (0.004493	0.01005	1.03%	-1.31%	1159	1183
10			5	0.5804			0.03296	0.0737	12.7%	39.98%	702	1207
20			5	0	0		C	0		100.0%	0	1131
40			5	0	0	0 ()	0		100.0%	0	5
Development falte												
	0.0 E	5 10 15	20 C-µg/L	25 3	1							

Analyst: Ja QA: 45 5/19/20

CETIS	S Ar	alytical Repo	ort						port Date: st Code:			07 (p 3 of 3 6-4614-090
Bivalv	e Lar	val Survival and D	evelopme	ent Test			Alan da kana da kana da kana da kana da ka	****	4	Nautilu	s Environ	mental (CA)
Analys Analyz		: 00-5465-8677 01 May-20 10:0		ndpoint: nalysis:	Survival Rate Linear Interpolation (ICPIN)				TIS Version: ficial Results:	CETISv1 Yes	.8.7	
Linear	Inter	polation Options					1750-1769-1899-1899-1899-1899-1899-1899-1899-18	inter die				
X Tran	sforn	n Y Transform	n Se	ed	Resamples	Exp 95	%CL M	lethod				
Linear		Linear	39	4465	1000	Yes	יד	wo-Point Inte	rpolation			
Point B	Estim	ates										
Level	μg/	L 95% LCL	95% UC	L								
EC25	25	25	25									
EC50	30	30	30									
Surviv	al Ra	te Summary				Calc	ulated Va	ariate(A/B)				
C-µg/L		Control Type	Count	Mean	Min	Max	Std Er		v CV%	%Effect	Α	в
0		Lab Control	5	1	1	1	0	0	0.0%	0.0%	1055	1055
2.5			5	1	1	1	0	0	0.0%	0.0%	1055	1055
5			5	1	1	1	0	0	0.0%	0.0%	1055	1055
10			5	1	1	1	0	0	0.0%	0.0%	1055	1055
20			5	1	1	1	0	0	0.0%	0.0%	1055	1055
40			5	0	0	0	0	0		100.0%	0	1055
Graphi		***										
	0.0 E.	5 10 15	<u>с-µg/L</u>	25	30 35 40							

Analyst: Ja QA: 15 5/19/20

CETIS QC Plot

Quality Control Data

Bivalve Larval Survival and Development Test Test Type: Development-Survival Organism: Mytilus galloprovincialis (Bay Mussel

Nautilus Environmental (CA)

Protocol: EPA/600/R-95/136 (1995)

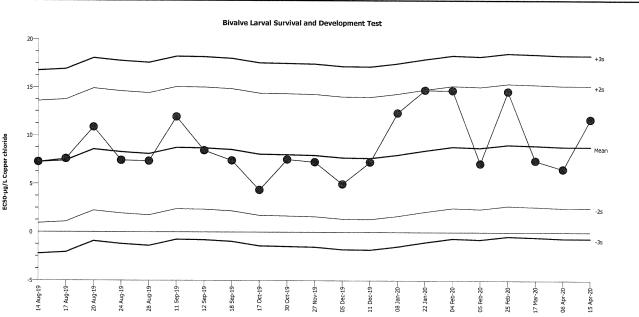
Endpoint: Combined Development Rate

Source:

Material:

Reference Toxicant-REF

Copper chloride



Mean:	8.848	Count:	20	-2s Warning Limit:	2.52	-3s Action Limit:	-0.6437
Sigma	3.164	CV:	35.80%	+2s Warning Limit:	15.18	+3s Action Limit:	18.34

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2019		14	14:15	7.255	-1.593	-0.5034			18-5609-6564	17-5885-5207
2			17	14:00	7.582	-1.266	-0.4001			15-9584-4385	11-8998-1524
3			20	14:15	10.86	2.014	0.6364			14-8361-1578	03-1832-9380
4			24	16:00	7.414	-1.434	-0.4531			19-4374-5817	01-6546-9581
5			28	14:30	7.348	-1.5	-0.4741			01-0546-0046	21-3090-7111
6		Sep	11	14:30	11.93	3.087	0.9755			09-2717-2159	04-2480-9094
7			12	14:25	8.444	-0.4036	-0.1275			19-6218-6352	07-5188-6358
8			18	13:20	7.4	-1.448	-0.4576			10-9359-1611	21-3838-7021
9		Oct	17	12:30	4.368	-4.48	-1.416			01-8239-7270	07-0806-0577
10			30	12:30	7.518	-1.33	-0.4204			07-8198-2858	11-8079-0492
11		Nov	27	20:00	7.249	-1.599	-0.5055			12-9914-0499	16-0529-7707
12		Dec	5	13:15	4.982	-3.866	-1.222			04-7411-4445	13-6587-0425
13			11	13:35	7.245	-1.603	-0.5066			10-8800-1613	10-7929-5811
14	2020	Jan	8	13:40	12.34	3.492	1.104			07-8444-5322	01-1422-4896
15			22	13:25	14.72	5.872	1.856			02-1152-2212	07-1224-7163
16		Feb	4	16:30	14.68	5.828	1.842			19-9078-6483	21-0369-4045
17			5	13:10	7.103	-1.745	-0.5515			06-6849-2235	04-8167-3886
18			25	14:15	14.58	5.733	1.812			09-2101-6353	02-3593-4650
19		Mar	17	14:20	7.408	-1.44	-0.4552			14-6169-3689	18-9939-7640
20		Apr	6	17:15	6.537	-2.311	-0.7304			02-0082-4673	13-2096-3831
21			15	13:25	11.68	2.835	0.896			16-4614-0901	11-3098-9850

Analyst:_____ QA:_____

CETIS QC Plot

Quality Control Data

Bivalve Larval Survival and Development Test Nautilus Environmental (CA) Test Type: Development-Survival Organism: Mytilus galloprovincialis (Bay Mussel Copper chloride Material: Protocol: EPA/600/R-95/136 (1995) Endpoint: Development Rate Source: Reference Toxicant-REF **Bivalve Larval Survival and Development Test** 20---+3s 15-+2s 10 EC50-µg/L Copper chloride 5--75 0 -3s 14 Aug-19 17 Aug-19-20 Aug-19-28 Aug-19-11 Sep-19-12 Sep-19-18 Sep-19-17 Oct-19-27 Nov-19-05 Dec-19--11 Dec-19--05 Feb-20-25 Feb-20--30 Oct-19-24 Aug-19 08 Jan-20 22 Jan-20 04 Feb-20 17 Mar-20-06 Apr-20-15 Apr-20-

Mean:	8.935	Count:	20	-2s Warning Limit:	2.513	-3s Action Limit:	-0.6975
Sigma:	3.211	CV:	35.90%	+2s Warning Limit:	15.36	+3s Action Limit:	18.57

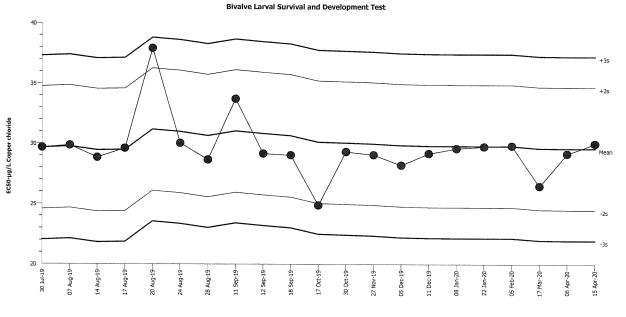
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2019	Aug	14	14:15	7.466	-1.469	-0.4575			18-5609-6564	14-6389-5644
2			17	14:00	7.563	-1.372	-0.4272			15-9584-4385	19-0402-2449
3			20	14:15	10.76	1.829	0.5695			14-8361-1578	12-0750-5104
4			24	16:00	7.521	-1.414	-0.4404			19-4374-5817	04-6745-5945
5			28	14:30	7.351	-1.584	-0.4934			01-0546-0046	10-3410-8075
6		Sep	11	14:30	11.98	3.048	0.9491			09-2717-2159	17-4622-9429
7			12	14:25	8.608	-0.3274	-0.102			19-6218-6352	06-5225-4823
8			18	13:20	7.546	-1.389	-0.4327			10-9359-1611	16-7089-5314
Э		Oct	17	12:30	4.375	-4.56	-1.42			01-8239-7270	19-1864-9270
10			30	12:30	7.481	-1.454	-0.4528			07-8198-2858	15-7183-3565
11		Nov	27	20:00	7.297	-1.638	-0.5101			12-9914-0499	01-7534-7240
12		Dec	5	13:15	5.087	-3.848	-1.198			04-7411-4445	10-0471-4567
13			11	13:35	7.32	-1.615	-0.5029			10-8800-1613	20-9346-8800
14	2020	Jan	8	13:40	12.43	3.494	1.088			07-8444-5322	06-2499-4329
15			22	13:25	14.68	5.746	1.79			02-1152-2212	04-4145-0874
16		Feb	4	16:30	15.01	6.073	1.891			19-9078-6483	06-3219-7963
17			5	13:10	7.132	-1.803	-0.5615			06-6849-2235	20-3119-3253
18			25	14:15	15	6.065	1.889			09-2101-6353	13-1093-9538
19		Mar	17	14:20	7.489	-1.446	-0.4504			14-6169-3689	12-6636-5212
20		Apr	6	17:15	6.609	-2.326	-0.7243			02-0082-4673	11-5300-1558
21			15	13:25	11.68	2.748	0.8558			16-4614-0901	19-2371-7781

Analyst: Jac QA: 155/19/20

CETIS QC Plot

Quality Control Data

Bivalve Lar	val Survival and Development	Test			Nautilus Environmental (CA)
	Development-Survival EPA/600/R-95/136 (1995)	-	Mytilus galloprovincialis (Bay Mussel Survival Rate	Material: Source:	



Mean:	29.6	Count:	20	-2s Warning Limit:	24.51	-3s Action Limit:	21.97
Sigma:	2.545	CV:	8.60%	+2s Warning Limit:	34.69	+3s Action Limit:	37.24

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2019	Jul	30	15:30	29.67	0.07303	0.0287	·······		15-3542-8276	20-8453-4017
2		Aug	7	15:30	29.85	0.2549	0.1002			01-2834-9487	07-4855-2818
3			14	14:15	28.85	-0.7545	-0.2965			18-5609-6564	13-1367-1354
4			17	14:00	29.6	0.00366	0.001438			15-9584-4385	20-0172-5237
5			20	14:15	37.92	8.319	3.269	(+)	(+)	14-8361-1578	02-5800-6574
5			24	16:00	30.04	0.4374	0.1719			19-4374-5817	17-7461-0750
7			28	14:30	28.66	-0.9354	-0.3676			01-0546-0046	13-4512-6481
3		Sep	11	14:30	33.71	4.115	1.617			09-2717-2159	01-1883-2964
9			12	14:25	29.16	-0.4359	-0.1713			19-6218-6352	02-6393-7831
10			18	13:20	29.04	-0.561	-0.2204			10-9359-1611	04-3365-2341
11		Oct	17	12:30	24.88	-4.718	-1.854			01-8239-7270	13-2801-3685
12			30	12:30	29.32	-0.2771	-0.1089			07-8198-2858	20-5233-5110
13		Nov	27	20:00	29.07	-0.5333	-0.2096			12-9914-0499	00-1104-7300
14		Dec	5	13:15	28.21	-1.386	-0.5445			04-7411-4445	20-5035-4724
15			11	13:35	29.18	-0.4207	-0.1653			10-8800-1613	02-9848-3585
16	2020	Jan	8	13:40	29.6	0.00106	0.000417			07-8444-5322	01-5655-1706
17			22	13:25	29.76	0.1556	0.06114			02-1152-2212	19-4150-8988
18		Feb	5	13:10	29.83	0.2263	0.08893			06-6849-2235	07-0404-6516
19		Mar	17	14:20	26.48	-3.118	-1.225			14-6169-3689	14-2151-4803
20		Apr	6	17:15	29.18	-0.4232	-0.1663			02-0082-4673	12-2147-8498
21			15	13:25	30	0.4	0.1572			16-4614-0901	00-5465-8677

Analyst: JU QA: 455/19/20

CETIS Test Data Worksheet

Nautilus Environmental (CA)

Start Date: End Date: Sample Date	17 A	\pr-20 \pr-20 \pr-20		Protocol:	Mytilus galloprovi EPA/600/R-95/13 Copper chloride			Sample Code: 200415msdv Sample Source: Reference Toxicant Sample Station: Copper Chloride
C-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			231	220	pm 4/20/20
			2			221	214	
			3			241	234	
			4			242	240	
			5			218	211	
			6			217	0	
			7			262	257	
			8			238	0	
			9			242	236 RA	
			10			235	114	
			11			0	0	cells Issed
			12			227	0	
			13			258	163	
			14			242	235	
			15			240	135	DM 4/27/20
			16			239	161	
			17			219	215	
			18			261	252	
			19			0	0	cells (seed
			20			0	0	cells lysed
			21		221	Q.B.C	82210	
			22			219	216	
			23			235	129	
			24			0	0	cells lysed
			25			226	221	
			26			233	225	
			27			227	205	
			28			0	0	cells (Ssec)
			29			250	238	
			30			228	0	

(A) Q13 DM 4/22/20 (B) Q18 AC OBO DM 4/28/20

CETIS Test Data Worksheet

Report Date:	11 Apr-20 15:53 (p 1 of 1)
Test Code:	16-4614-0901/200415msdv

Bivalve Larval Survival and Development Test
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Nautilus Environmental (CA)

itart Date: Ind Date: Iample Date	17 A	\pr-20 \pr-20 \pr-20		Species: Protocol: Material:	Mytilus galloprovi EPA/600/R-95/13 Copper chloride			Sample Code:200415msdvSample Source:Reference ToxicantSample Station:Copper Chloride
C-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	2			221	217	Ars 4/19/2020
0	LC	2	25					
0	LC	3	3					
0	LC	4	26					
0	LC	5	29					
2.5		1	27					
2.5		2	1	······································		23	225	ATS 4/19/2020
2.5		3	18			1	,	
2.5		4	17					
2.5		5	9					
5		1	4					
5		2	5					
5		3	22			227	223	AES 4/19/2020
5		4	7			0.0 /		
5		5	14					
10		1	10					
10		2	15					
10		3	13			59		
10		4	23			23233	17 4 132	445 4/19/2070
10		5	16				\odot	Ats 4/19/2020
20		1	6					
20		2	12					
20		3	21					
20		4	8			254	0	ALS 4/19/2020
20		5	30					
40		1	19					
40		2	28					
40		3	24					
40		4	20					1
40		5	11			57	0	ALS Y/19/2020 cells dissolved into lysis

ac=BO

@ GIAMTS 4/19/2020

Analyst: PT QA: A (4/28/20

Marine Chronic Bioassay

Test No.: 200415msdv

Client: Internal Sample ID: CuCl2

Water Quality Measurements

Test Species: M. galloprovincialis End Date/Time: <u>4/17/2020</u> Start Date/Time: <u>4/15/2020 (325</u>

Concentration		Salinity (nnt)		Ť	Temperature	e	Dise	Dissolved Oxygen	ygen		pH (nH units)	
(1.64)	0	24	48	0		48	0	24	48	0	24	48
Lab Control	31.3	31.2	21.4	15.4	IS 3	Att So	8.6	5.6	و. تې	8,001	8.00	8.03
2.5	31.5	31.5	13 V	15,3	IS.O	0.27	8.8	21	0.0	8.03	8.01	S.
5	31.5	31.5 31.5	21 S	15.4 isi	is I	15.0	8.8	8.6	0.6	8.03	8.02	S.S.
10	31.6	31.5	31.S	15.6 15.4	1 S.Y	12:51	8.6	SS	e.S	20.8	8.02	8.0S
20	31.5	31.4	31.4	15.8	IS3	IS, I	3.6	Sis	<u>e</u> .6	£0.8	20.8	8.06
40	31.4	31.3	3	15.8	15.2	is.l	8.6	85	6. 60	8.08	8.03	Q. 06
	an crasterine											
			0	24	48		High (High conc. made (µg/L):	te (μg/L):		40	
Technician Initials:	WQ F Dilutions	WQ Readings: Dilutions made by:	2,2	LT.	K		Vol. Cu F	Vol. Cu stock added (mL): Final Volume (mL):	ded (mL): me (mL):		1,9 500	
- - - - -		Ĺ				Cn	ı stock co	Cu stock concentration (µg/L):	:(J/gµ) uc	101	400	
Environmental Chamber:	Jer:		0									
Comments:	0 hrs:											
	24 hrs: 48 hrs:	(A)	orter yritho	110						L.		
				-								
QC Check:	Acyl	Ac4128120						Final	Final Review:		45 5/19/20	
											1	

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

Marine Chronic Bioassay DM-013

Client/Sample:	Internal /auch
Test No.:	200415MSdV
Test Species:	Mytilus galloprovincialis
Animal Source/Batc	h Tank: MREP 12B
Date Received:	313/20
Test Chambers:	30 mL glass shell vials
Sample Volume:	10 mL

0955

Larval Development Worksheet

Start Date/Time:	4/15/2020	1325
End Date/Time:	4/17/2020	1525
Technician Initials:	BO	

Spawn Information

First Gamete Release Time:

Gamete Selection

Sex	Number Spawning
Male	3
Female	2

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	1,23	good motility, good density
Female 1	i	yellow wolor, round shape , okay density
Female 2	2	white color, rand shape, low density
Female 3		, , , , , , , , , , , , , , , , , , ,

Egg Fertilization Time: 100

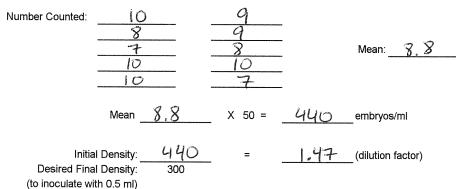
Embryo Stock Selection

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

Stock(s) chosen for testing:	1
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Embryo Inoculum Preparation

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



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

TØ Vial No.	No. Dividing	Total 203	% Dividing	Mean % Dividing	48-h QC: Z
TØ A	+74C	-175-0	100		
TØ B	198	199	99.5]	
тøс	206	208	99.0	99.5	
TØ D	219	220	99.5	11.5	
TØ E	220	220	100		
TØ F	212	214	99.1		
<u>X</u> =	211				
@@18	BO 4/16/2	0			

48-h QC: <u>204/20</u>3 = 98.1%

Comments:

QC Check:

AC4/28/20

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

Final Review: 19 5/9/20