

**Natural Energy Laboratory of Hawaii Authority
Hawaii Ocean Science and Technology Park
OUTFALL SSW-28 Sump**

Chronic Biomonitoring Report

98982

Americamysis bahia
Menidia beryllina

December 18, 2025

Approved by: Johnny Reed
Lab director

TABLE OF CONTENTS

TOXICITY TEST REPORT	3
SURVIVAL TEST SUMMARY	6
STATISTICAL & CHEMICAL ANALYSIS	Appendix A
REFERENCE TOXICANTS	Appendix B
LITERATURE REFERENCES	Appendix C
CHAIN-OF-CUSTODY SHEETS	Appendix D
REGULATORY AGENCY TABLES	Appendix E

Unless otherwise noted in the body of the report, all data reported in this document are in compliance with TNI standards and apply only to the samples referenced within. This report document may not be edited or reproduced in part or in full by any other entity, unless Eurofins Environment Testing Bio-Aquatics issues written approval.

***HAND-WRITTEN RAW DATA TABLES ARE AVAILABLE UPON REQUEST**

Eurofins Environment Testing Bio-Aquatics

2501 Mayes Road, Suite 100
Carrollton, Texas 75006
Tel: (972) 242-7750
Fax: (972) 242-7749

TOXICITY TEST REPORT - Chronic

Client: Natural Energy Laboratory of Hawaii Authority
Facility: Hawaii Ocean Science and Technology Park
Permit No. N/A

Sample: SSW-28 Sump
Laboratory Number: 98982
Date: December 18, 2025

Americamysis bahia **passed** survival and growth testing requirements. *Menidia beryllina* **passed** survival and growth testing requirements.

SAMPLE COLLECTION: A grab effluent sample from the Natural Energy Laboratory of Hawaii Authority, Hawaii Ocean Science and Technology Park, was transported to by Eurofins Environment Testing Bio-Aquatics on December 18, 2025. The effluent sample was collected from the SSW-28 Sump by facility personnel.

The effluent sample was analyzed for total residual chlorine using the Hanna Ion Specific Meter #711 and contained <0.10 mg/L. Effluent and laboratory dilution water pH, temperature, salinity, and dissolved oxygen data were collected daily.

TEST PROCEDURES:
Americamysis bahia

EPA METHOD: 1007
The seven-day Chronic *Americamysis bahia* survival and growth test was initiated at 16:41 hours on December 18, 2025. One effluent concentration of 100% effluent was prepared utilizing synthetic water as dilution water. The test was set up with 266mL plastic cups containing 200mL of test solution or control dilution water. Each concentration consisted of five replicate cups with five organisms each, giving a total of 25 (twenty-five) per treatment. The control was run concurrently with the test. Test organisms were 7-day old laboratory cultured juveniles. Juveniles were randomly introduced into test solutions and controls. The number of surviving organisms, and water quality parameters in the old test solutions, were recorded after each 24-hour period. Water quality parameters were again measured after the test was renewed with fresh solutions. Surviving organisms in each test chamber were fed freshly hatched brine shrimp two times per day. The test proceeded for seven days.

At the end of the test, all organisms were sacrificed, dried, and weighed. The test ended at 15:40 hours on December 25, 2025. Survival and growth (weight) data were statistically ($p=0.05$) analyzed according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL:*Americamysis bahia*

The Equal and Unequal variance t-test performed on survival test data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)**NOEC: 100%****GROWTH:***Americamysis bahia*

The *Americamysis bahia* growth data were normally distributed at the alpha level of 0.01 (13.277) using the Chi-square test for normality. Growth data were shown to be homogeneous using Bartlett's test at the alpha level of 0.01 (15.09) without data transformations. Using the Equal and Unequal variance t-test on *Americamysis bahia* growth data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)**NOEC: 100%****TEST PROCEDURES:***Menidia beryllina***EPA METHOD: 1006**

The seven-day Chronic *Menidia beryllina* survival and growth test was initiated at 16:11 hours on December 18, 2025. One effluent concentration of 100% effluent was prepared utilizing synthetic water as dilution water. The test was set up with 650mL plastic cups containing 600mL of test solution as test chambers. The test organisms were initiated in synthetic lab water 24 hours before the test began. Each concentration consisted of three replicate chambers containing eight laboratory-cultured larvae each, giving a total of 24 (twenty-four) per treatment. The control was run concurrently with the test. Test organisms were laboratory cultured *Menidia beryllina* between seven and eleven days old. Juveniles were randomly introduced into test solutions and controls. The number of surviving juveniles, and water quality parameters in the old test solutions were recorded after each 24-hour period. Water quality parameters were again measured after the test was renewed with fresh solutions. Surviving organisms in each test chamber were fed freshly hatched brine shrimp two times per day. The test proceeded for seven days.

At the end of the test, all organisms were sacrificed, dried, and weighed. The test ended at 15:50 hours on December 25, 2025. Survival and growth (weight) were statistically ($p=0.05$) analyzed according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL:

Menidia beryllina

The Equal and Unequal variance t-test performed on *Menidia beryllina* survival data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)

NOEC: 100%

GROWTH:

Menidia beryllina

The *Menidia beryllina* growth data were normally distributed at the alpha level of 0.01 (0.900) using Shapiro Wilk's test for normality. Growth data were shown to be homogeneous using Bartlett's test at the alpha level of 0.01 (15.09) without data transformations. Using the Equal and Unequal variance t-test on *Menidia beryllina* growth data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)

NOEC: 100%

Eurofins Environment Testing Bio-Aquatics**TOXICITY TEST****Chronic *Americamysis bahia***Client: Natural Energy Laboratory of Hawaii Hawaii Ocean Science and Technology Park**Lab ID: 98982**

Permit Number: N/A

Test Temperature (oC): 25 ± 1

Sample Type: Grab

Outfall Name: SSW-28 Sump

Photo Period: 16 Hours Light
8 Hours Dark

Receiving Water Name:

Test Start Time: **16:41**Test End Time: **15:40****Begin Date:** 12/18/2025**End Date:** 12/25/2025**SURVIVAL**

Effluent Con. %		Number of Alive								Avg% Surv.
		12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	
Control	A	5	5	5	5	5	5	5	4	88.0%
	B	5	5	5	5	5	4	4	4	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	4	
100	A	5	5	5	5	5	5	5	5	92.0%
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	5	4	
	D	5	5	5	5	5	5	5	5	
	E	5	5	5	5	5	5	5	4	
	A									
	B									
	C									
	D									
	E									
	A									
	B									
	C									
	D									
	E									

Eurofins Environment Testing Bio-Aquatics

Effluent

Con.

9%

12/18 12/19 12/20 12/21 12/22 12/23 12/24 12/25

Avg%

Surv.

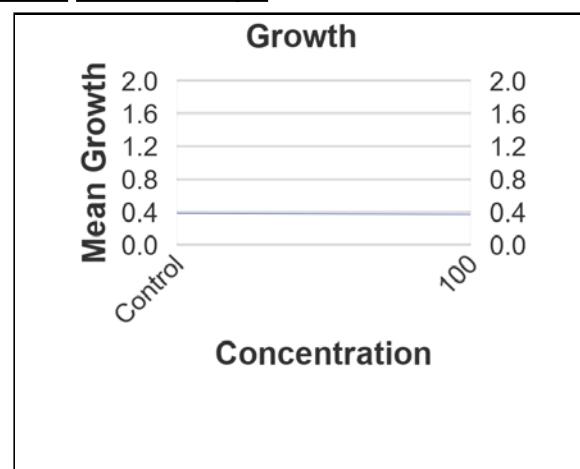
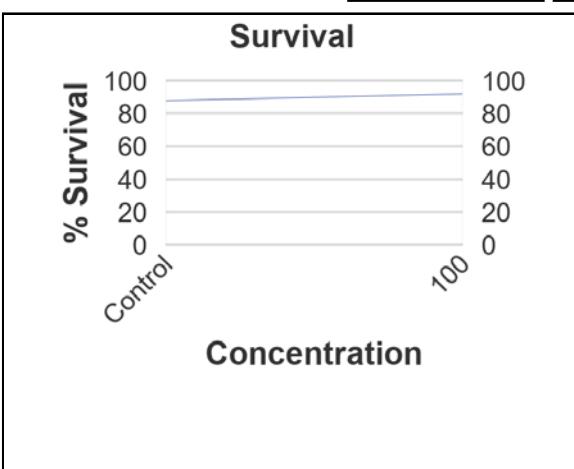
A							
B							
C							
D							
E							

A							
B							
C							
D							
E							

A							
B							
C							
D							
E							

A							
B							
C							
D							
E							

Concentration Response Relationships



Eurotins Environment Testing Bio-Aquatics

Chronic

Americamysis bahia SURVIVAL

Lab ID: **98982**

Client: Natural Energy Laboratory of Hawaii Facility Hawaii Ocean Science and Technology Outfall: SSW-28 Sump
Sample Type Grab

TEST INSTRUCTIONS: Mysid test is Abbreviated Reps (only need 5 NOT 8)

Culture No. : Myf 25-345 Photo Period: 16hr light, 8hr dark **RANDOMIZATION:** **SC-5** **2**

Dilution: Control

100

DATE/TIME/TECHNICIAN	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
12-18-25 07641	5					5														
12-19-25 86 0920	5					5														
12-20-25 1153 65	5					5														
12-21-25 CAP 0040	5					5														
12-22-25 CCC 1625	5					5														
12-23-25 5-1440	5	4	5			5														
12-24-25 0816 1M	5	4	5	—		5														
12-25-25 5-1540	4	4	5	5	4	5	5	4	5	4										

Dilution:

	A	B	C	D	E
0Hr					
24Hr					
48Hr					
72Hr					
96Hr					
5 days					
6 days					
7 days					

	A	B	C	D	E
0Hr					
24Hr					
48Hr					
72Hr					
96Hr					
5 days					
6 days					
7 days					

	A	B	C	D	E
0Hr					
24Hr					
48Hr					
72Hr					
96Hr					
5 days					
6 days					
7 days					

	A	B	C	D	E
0Hr					
24Hr					
48Hr					
72Hr					
96Hr					
5 days					
6 days					
7 days					

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable s:

Eurofins Environment Testing Bio-Aquatics

Chronic

Americamysis bahia SURVIVAL

Lab ID: **98982**

Client: Natural Energy Laboratory of Hawaii Facility Hawaii Ocean Science and Technology Outfall: SSW-28 Sump
Sample Type Grab

TEST INSTRUCTIONS: Mysid test is Abbreviated Reps (only need 5 NOT 8)

Test Temperatures

	0Hr	24Hr	48Hr	72Hr	96Hr	5 days	6 days	7 days
Control	new 25.3	old / new 25.8 25.3	old / new 25.8 25.6	old / new 26.0 25.1	old / new 25.9 26.2	old / new 25.2 25.2	old / new 25.5 25.0	old 25.1
100								
TIME/DATE TECH	12-11-25 -164	12-19-25 160 0928	12-20-25 1153 65	12-21-25 CAP 0410	12-22-25 CCC 1025	12-23-25 DM 1440	12-24-25 0810 1m	12-25-25 1540
IR GUN ID #	013	013	013	013	013	013	013	013

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

Chronic *Americamysis bahia*Client: Natural Energy Laboratory of Hawaii Ocean Science and Technology Park

Lab ID: 98982

Permit Number: N/A

Sample Type: Grab

Outfall Name: SSW-28 Sump

Receiving Water Name:

Synthetic

	ON	SN	Wt.	Avg.	Avg.
A	5	4	1.77	0.354	0.443
B	5	4	1.97	0.394	0.493
C	5	5	1.89	0.378	0.378
D	5	5	2.11	0.422	0.422
E	5	4	1.89	0.378	0.473

Mean	C.V. %
0.385	6.50

100

	ON	Wt.	Avg.
A	5	1.82	0.364
B	5	1.83	0.366
C	5	1.93	0.386
D	5	1.82	0.364
E	5	1.89	0.378

Mean	C.V. %
0.372	2.67

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

SN Mean	SN C.V. %
0.442	10.1

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

* = spilled cup

Note: ON stands for original number per replicate, while SN refers to the number surviving after test completion.

Eurofins Environment Testing Bio-Aquatics TOXICITY TEST

Chronic

Americamysis bahia

Lab ID: **98982**

Balance: BAL-010

Client: Natural Energy Laboratory of Hawaii - Hawaii Ocean Science and

Begin Date: 12/18/2025 End Date: 12/25/2025

Organism: Americamysis bahia

Analyst: JH

Weigh Date: 12-27-25

Date/Time placed in Oven: 12-25-25 1630

Date/Time removed from Oven: 12-26-25 1630

Control

Qty.	Wt.
A	4
B	4
C	5
D	5
E	7
F	
G	
H	

100 %

Qty.	Wt.
A	5
B	5
C	4
D	5
E	4
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Qty.	Wt.
A	
B	
C	
D	
E	
F	
G	
H	

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

TOXICITY TEST**Eurofins Environment Testing Bio-Aquatics****Chronic *Menidia beryllina***Client: Natural Energy Laboratory of Hawaii Hawaii Ocean Science and TechnologyLab ID: **98982**

Permit Number: N/A

Test Temperature (oC): **25 ± 1**

Outfall Name: SSW-28 Sump

Sample Type: Grab

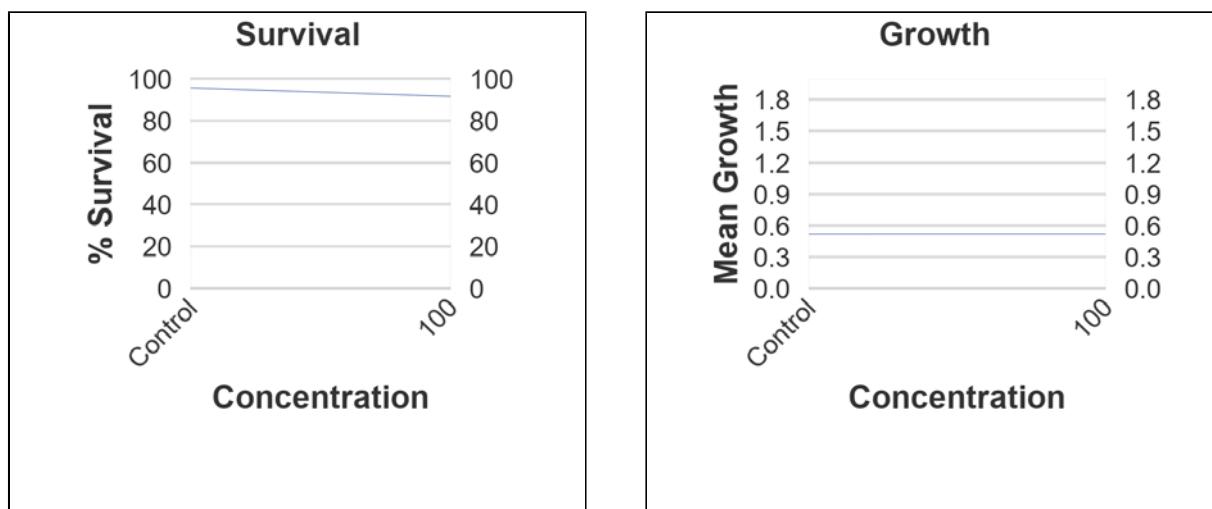
Photo Period: 16 Hours Light
8 Hours Dark

Receiving Water Name:

Test Start Time: **16:11**Test End Time: **15:50**Begin Date: **12/18/2025**End Date: **12/25/2025****SURVIVAL**

Effluent Concentration	Number Of Alive								Avg% Surv.
	12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	
Control	A	8	8	8	8	8	8	8	95.8%
	B	8	8	8	8	8	8	7	
	C	8	8	8	8	8	8	8	
	D								
	E								
100	A	8	8	8	7	7	7	6	91.7%
	B	8	8	8	8	8	8	8	
	C	8	8	8	8	8	8	8	
	D								
	E								
	A								
	B								
	C								
	D								
	E								
	A								
	B								
	C								
	D								
	E								

Effluent Concentration	Number Of Alive								Avg% Surv.
	12/18	12/19	12/20	12/21	12/22	12/23	12/24	12/25	
A									
B									
C									
D									
E									
A									
B									
C									
D									
E									
A									
B									
C									
D									
E									

Concentration Response Relationships

Eurofins Environment Testing Bio-Aquatics

Chronic

Menidia beryllina SURVIVAL

Lab ID: **98982**

Client: **Natural Energy Laboratory of Hawaii** Facility **Hawaii Ocean Science and**

Outfall: SSW-28 Sump
Sample Type: Grab

TEST INSTRUCTIONS: Mysid test is Abbreviated Reps (only need 5 NOT 8)

Culture No. : 11.25.342

Photo Period: 16hr light, 8hr dark

RANDOMIZATION:

Dilution: Control

100

DATE/TIME/TECHNICIAN		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
0Hr	12-19-25 ~1611	8					8														
24Hr	12-19-25 86 0932	8					8														
48Hr	12-20-25 1155 6J	8					8														
72Hr	12-21-25 CAP 0950	8					7	8													
96Hr	12-22-25 CCC 1630	8					7	8													
5 days	12-23-25 ~1430	8					7	8	8												
6 days	12-24-25 0805 m	8					7	8													
7 days	12-25-25 31550	8	7	8			6	8	8												

Dilution:

	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
0Hr																				
24Hr																				
48Hr																				
72Hr																				
96Hr																				
5 days																				
6 days																				
7 days																				

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable sp

Eurofins Environment Testing Bio-Aquatics

Chronic

Menidia beryllina SURVIVAL

Lab ID: **98982**

Client: Natural Energy Laboratory of Hawaii Facility Hawaii Ocean Science and

Outfall:SSW-28 Sump
Sample Type:Grab

TEST INSTRUCTIONS: Mysid test is Abbreviated Reps (only need 5 NOT 8)

Test Temperatures

	0Hr	24Hr	48Hr	72Hr	96Hr	5 days	6 days	7 days	
	new	old / new	old / new	old / new	old / new	old / new	old / new	old	
Control	25.2 ✓	15.9 ✓	25.4 ✓	25.6 ✓	25.0 ✓	25.8 ✓	26.0 ✓	25.2 ✓	
100	✓	✓	✓	✓	✓	✓	✓	✓	
TIME/DATE TECH	12-19-25 ✓ 1601	12-19-25 16 1932	12-20-25 163 GJ	12-21-25 CAP 0950	12-22-25 CCC 1630	✓	12-23-25 0 1430	12-24-25 0808 AM	12-25-25 0 1550
IR GUN ID #	013	013	013	013	013	013	013	013	
	1155								

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

Chronic *Menidia beryllina*Client: Natural Energy Laboratory of Hawaii Ocean Science and Technology

Lab ID: 98982

Permit Number: N/A

Sample Type: Grab

Outfall Name: SSW-28 Sump

Receiving Water Name:

Synthetic**100**

	ON	SN	Wt.	Avg.	SN Avg.
A	8	8	4.32	0.540	0.540
B	8	7	3.83	0.479	0.547
C	8	8	4.34	0.543	0.543
D					
E					

	ON	Wt.	Avg.
A	8	4.04	0.505
B	8	4.01	0.501
C	8	4.45	0.556
D			
E			

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean**C.V. %**

0.520

6.9

Mean**C.V. %**

0.521

5.9

Mean**C.V. %****Mean****C.V. %****SN Mean****SN C.V. %**

0.543

0.7

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Note: ON stands for original number per replicate, while SN refers to the number surviving after test completion.

Chronic

Menidia beryllina

Lab ID:

98982

Client: Natural Energy Laboratory of Hawaii - Hawaii Ocean Science and

Balance: BAL-010

Begin Date: 12/18/2025

End Date: 12/25/2025

Organism: Menidia beryllina

Analyst: JHDate/Time placed in Oven: 12-25-25 1630Weigh Date: 12-27Date/Time removed from Oven: 12-26-25 1630
JH 12-26-25**Control**

	Qty.	Wt.
A	8	4.32
B	7	3.83
C	8	4.34
D		4.1400
E		

100 %

	Qty.	Wt.
A	6	4.04
B	8	4.01
C	8	4.45
D		
E		

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

APPENDIX A

STATISTICS SUMMARY

Both the lethal and sub-lethal endpoints were statistically calculated according to their respective EPA guidelines. The Chronic Freshwater organisms were calculated according to EPA-821-R-02-013, October 2002 Fourth Edition. The Chronic Marine and Estuarine organisms were calculated according to EPA-821-R-02-014, October 2002 Third Edition. The Acute Freshwater and Marine organisms were calculated according to EPA-821-R-02-012, October 2002 Fifth Edition. The fertilization organisms were calculated according to EPA-600-R-95-136 or EPA-600-R-12-022, dependent upon the species. Listed below are the basic principles of these guidelines. If you would like a copy of the raw statistical calculations for your test then please contact us.

The chronic and acute *Pimephales promelas* and *Menidia beryllina* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts (parametric). If the data fails Shapiro Wilks Test or Bartlett's Test then Steel's Many One Test (non-parametric) is used. The chronic *Pimephales promelas* and *Menidia beryllina* growth data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test and Bartlett's Test then Steel's Many One Test is used. Point estimation may also be used.

The chronic *Mysidopsis bahia* survival data is analyzed using Chi-square test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test or Bartlett's Test then Steel's Many One Test is used. *Mysidopsis bahia* growth data is analyzed using Chi-square test and Bartlett's Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test and Bartlett's Test then Steel's Many One Test is used. Point estimation may also be used.

The acute *Mysidopsis bahia* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test or Bartlett's Test then Steel's Many One Test is used. Point estimation may also be used.

The chronic *Ceriodaphnia dubia* survival data are analyzed using the Fisher's Exact Test. The chronic *Ceriodaphnia dubia* reproduction are analyzed using the Chi-square test and Bartlett Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test and Bartlett's Test then Steel's Many One Test is used. Point estimation may also be used.

The acute *Daphnia pulex* and *Ceriodaphnia dubia* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test or Bartlett's Test then Steel's Many One Test is used. Point estimation may also be used.

The fertilization data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test or Bartlett's Test then Steel's Many One Test is used. Point estimation or TST methodology may also be used.

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	0.670	2.420	3.820	2.420	0.670
OBSERVED	0	4	3	3	0

Calculated Chi-Square goodness of fit test statistic = 2.6866
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

F-Test for equality of two variances

GROUP	IDENTIFICATION	VARIANCE	F
1	con	0.001	
2	100	0.000	6.348

Critical F = 23.20 (P=0.01, 4, 4)

Since F <= Critical F, FAIL TO REJECT Ho: Equal Variances.

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 2.68

Table Chi-square value = 6.63 (alpha = 0.01, df = 1)
Table Chi-square value = 3.84 (alpha = 0.05, df = 1)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	1	0.000	0.000	1.274
Within (Error)	8	0.003	0.000	
Total	9	0.003		

Critical F value = 5.32 (0.05,1,8)
Since F < Critical F FAIL TO REJECT Ho: All equal

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED		MEAN CALCULATED IN		T STAT	SIG
		MEAN	ORIGINAL UNITS				
1	con	0.385		0.385			
2	100	0.372		0.372		1.129	

2 Sample t table value = 1.86 (1 Tailed Value, P=0.05, df=8,1)

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED		MEAN CALCULATED IN		T STAT	SIG
		MEAN	ORIGINAL UNITS				
1	con	0.385		0.385			
2	100	0.372		0.372		1.129	

2 Sample t table value = 2.01 (1 Tailed Value, P=0.05, df=5,1)

mysid growth
File: 98982.myg Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	con	5			
2	100	5	0.022	5.8	0.014

UNEQUAL VARIANCE t-TEST Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	con	5			
2	100	5	0.024	6.3	0.014

menidia growth

File: 98982.meg

Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.004

W = 0.923

Critical W (P = 0.05) (n = 6) = 0.788

Critical W (P = 0.01) (n = 6) = 0.713

Data PASS normality test at P=0.01 level. Continue analysis.

menidia growth

File: 98982.meg

Transform: NO TRANSFORMATION

F-Test for equality of two variances

GROUP	IDENTIFICATION	VARIANCE	F
1	con	0.001	
2	100	0.001	1.387

Critical F = 199.00 (P=0.01, 2, 2)

Since F <= Critical F, FAIL TO REJECT Ho: Equal Variances.

menidia growth
File: 98982.meg Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 0.04

Table Chi-square value = 6.63 (alpha = 0.01, df = 1)
Table Chi-square value = 3.84 (alpha = 0.05, df = 1)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

menidia growth
File: 98982.meg Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	1	0.000	0.000	0.000
Within (Error)	4	0.004	0.001	
Total	5	0.004		

Critical F value = 7.71 (0.05,1,4)
Since F < Critical F FAIL TO REJECT Ho: All equal

menidia growth
File: 98982.meg Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED	MEAN CALCULATED IN	T STAT	SIG
		MEAN	ORIGINAL UNITS		
1	con	0.521	0.521		
2	100	0.521	0.521	-0.000	

2 Sample t table value = 2.13 (1 Tailed Value, P=0.05, df=4,1)

UNEQUAL VARIANCE t-TEST

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED		MEAN CALCULATED IN		T STAT	SIG
		MEAN	ORIGINAL UNITS				
1	con	0.521		0.521			
2	100	0.521		0.521		-0.000	

2 Sample t table value = 2.35 (1 Tailed Value, P=0.05, df=3,1)

menidia growth

File: 98982.meg

Transform: NO TRANSFORMATION

EQUAL VARIANCE t-TEST - TABLE 2 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig	Diff	% of	DIFFERENCE
			(IN ORIG. UNITS)		CONTROL	FROM CONTROL
1	con	3				
2	100	3		0.058	11.2	-0.000

UNEQUAL VARIANCE t-TEST

Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig	Diff	% of	DIFFERENCE
			(IN ORIG. UNITS)		CONTROL	FROM CONTROL
1	con	3				
2	100	3		0.064	12.4	-0.000

Eurofins Environment Testing Bio-Aquatics

SALT WATER TEST SETUP FORM

Client: Natural Energy Laboratory of HawaiiPermit N/AFacility: Hawaii Ocean Science andLab Number 98982Outfall Name: SSW-28 SumpNumber of samples 1Dilution Water: Synthetic Lab

Sx #	Rcvd Date	Rcvd Time	Sampling Dates		Sampling Times	
			Begin Date	End Date	Start	End
1	12/18/25	17:00	12/15/25	12/15/25	07:39	07:39

Receiving Water: _____

Dechlorinate Sample: _____

Type of Test(s)

<u>Americamysis bahia</u>	<u>Chronic</u>
<u>Menidia beryllina</u>	<u>Chronic</u>

Start Sx # 1 Date: 12/18/2025
 Renew Sx # 1 Date: 12/19/2025
 Renew Sx # 1 Date: 12/20/2025
 Renew Sx # 1 Date: 12/21/2025
 Renew Sx # 1 Date: 12/22/2025
 Renew Sx # 1 Date: 12/23/2025
 Renew Sx # 1 Date: 12/24/2025

Controls: Synthetic

pH Match: _____

Hardness Match: _____

Test Start Date: 12/18/2025 Test End Date: 12/25/2025

Americamysis Test Set Up: 5 Reps & 5 Organisms per RepMenidia beryllina Test Set Up: 3 Reps & 8 Organism per RepConcentrations: 100 %Test Chemistry on these dilutions: 100

Samples received by: Express Delivery UPS Next Day via Air Cargo DHL
 Federal Express the Client Bio-Aquatic personnel

Other: _____

Eurofins Environment Testing Bio-Aquatics

Hardness, Alkalinity, Residual Chlorine, Specific Conductivity, and Salinity Analysis Data

Client: Natural Energy Laboratory of

Lab ID: 98982

Facility: Hawaii Ocean Science and

Dilution Water(s): Synthetic Lab

Outfall: SSW-28 Sump

Test Date: December 18, 2025

EFFLUENT PARAMETERS

Effluent Sample #	Received		Residual Cl ₂ (mg/L)	DeChlor (ml/L) ¹	Ammonia (mg/L)	Analyst Initials	Temp. Received
	Date	Time					
1	12/18/25	17:00	<0.10	N/A	<0.25	DT	2.9

¹**Dechlorination Reagent:** 0.025 N Sodium Thiosulfate

Effluent Sample #	pH	DO (mg/L)	Init. Salinity (ppt)	Adjusted Salinity	Analyst Initials
1	8.2	6.8	40.1	N/A	DT

Analysis Methods: Chlorine: Hanna Colorimeter #HI711, Ammonia: Hanna Colorimeter #HI733, Hardness: Hanna Photometer #HI97735, Alkalinity: Hanna Colorimeter #HI775, pH, DO, Conductivity: Thermo Versa Star Benchtop Meter

Eurofins Environment Testing Bio-Aquatics

pH, Dissolved Oxygen, Salinity

Chronic

Americamysis bahia

Client: Natural Energy Laboratory of Hawaii

Lab Number: 98982

Facility: Hawaii Ocean Science and

Dilution Water(s): Synthetic Lab

Outfall: SSW-28 Sump

Test Begin Date: December 18, 2025

NR indicates that the test was not renewed

ANALYST	DATE	TIME	SX#	UNIT	%	Concentration									
						Control	100								
JP	12/18	Start	1	pH	8.2	8.2									
		25 ± 1		DO (mg/L)	7.3	6.7									
				Salinity (ppt)	24.7	28.9									
CAP	12/19	24 Hr	1	pH	8.0	8.0									
		25 ± 1		DO (mg/L)	7.6	6.4									
				Salinity (ppt)	24.0	43.2									
GJ	12/20	Renew	1	pH	8.2	8.3									
		48 Hr		DO (mg/L)	7.6	6.9									
		25 ± 1		Salinity (ppt)	21.4	39.0									
SG	12/21	Renew	1	pH	7.8	7.7									
		72 Hr		DO (mg/L)	7.1	6.4									
		25 ± 1		Salinity (ppt)	22.2	40.4									
CCC	12/22	Renew	1	pH	7.9	8.0									
		96 Hr		DO (mg/L)	7.7	7.9									
		25 ± 1		Salinity (ppt)	24.7	43.2									
JP	12/23	Renew	1	pH	8.0	8.1									
		120 Hr		DO (mg/L)	7.1	6.8									
		25 ± 1		Salinity (ppt)	19.1	36.2									
TM	12/24	Renew	1	pH	7.7	7.7									
		144 Hr		DO (mg/L)	6.5	5.7									
		25 ± 1		Salinity (ppt)	23.8	42.6									
MV	12/25	Renew	1	pH	7.8	8.1									
		168 Hr		DO (mg/L)	7.2	6.9									
		25 ± 1		Salinity (ppt)	18.4	36.0									

Eurofins Environment Testing Bio-Aquatics

pH, Dissolved Oxygen, Salinity

Chronic

Menidia beryllina

Client: Natural Energy Laboratory of

Lab Number: 98982

Facility: Hawaii Ocean Science and

Dilution Water(s): Synthetic Lab

Outfall: SSW-28 Sump

Test Begin Date: December 18, 2025

NR indicates that the test was not renewed

ANALYST	DATE	TIME	SX#	UNIT	%	Concentration									
						Control	100	100	100	100	100	100	100	100	100
JP	12/18	Start 25 ± 1	1	pH		8.2	8.2								
				DO (mg/L)		7.3	6.7								
				Salinity (ppt)		24.7	28.9								
CAP	12/19	24 Hr 25 ± 1	1	pH		8.2	8.1								
				DO (mg/L)		7.6	6.9								
				Salinity (ppt)		22.4	32.7								
		Renew	1	pH		8.2	8.3								
				DO (mg/L)		7.6	6.9								
				Salinity (ppt)		21.4	39.0								
GJ	12/20	48 Hr 25 ± 1	1	pH		7.8	7.7								
				DO (mg/L)		7.7	6.9								
				Salinity (ppt)		21.0	32.4								
		Renew	1	pH		7.9	8.0								
				DO (mg/L)		7.7	7.4								
				Salinity (ppt)		19.5	36.7								
SG	12/21	72 Hr 25 ± 1	1	pH		7.9	7.8								
				DO (mg/L)		7.2	6.4								
				Salinity (ppt)		22.4	37.3								
		Renew	1	pH		7.5	7.9								
				DO (mg/L)		7.4	7.1								
				Salinity (ppt)		20.4	36.7								
CCC	12/22	96 Hr 25 ± 1	1	pH		7.9	7.8								
				DO (mg/L)		6.6	6.0								
				Salinity (ppt)		20.5	35.6								
		Renew	1	pH		8.0	8.1								
				DO (mg/L)		7.1	6.8								
				Salinity (ppt)		19.1	36.2								
JP	12/23	120 Hr 25 ± 1	1	pH		7.8	7.7								
				DO (mg/L)		6.6	6.0								
				Salinity (ppt)		20.6	36.4								
		Renew	1	pH		7.8	8.1								
				DO (mg/L)		7.2	6.9								
				Salinity (ppt)		18.4	36.0								
TM	12/24	144 Hr 25 ± 1	1	pH		8.0	7.6								
				DO (mg/L)		6.7	5.6								
				Salinity (ppt)		20.6	37.5								
		Renew	1	pH		7.5	7.8								
				DO (mg/L)		7.3	7.0								
				Salinity (ppt)		19.0	35.6								
MV	12/25	168 Hr 25 ± 1	1	pH		8.0	7.9								
				DO (mg/L)		6.7	5.9								
				Salinity (ppt)		20.2	36.4								

Appendix B

Americamysis bahia

EUROFINS ENVIRONMENT TESTING BIO-AQUATICS

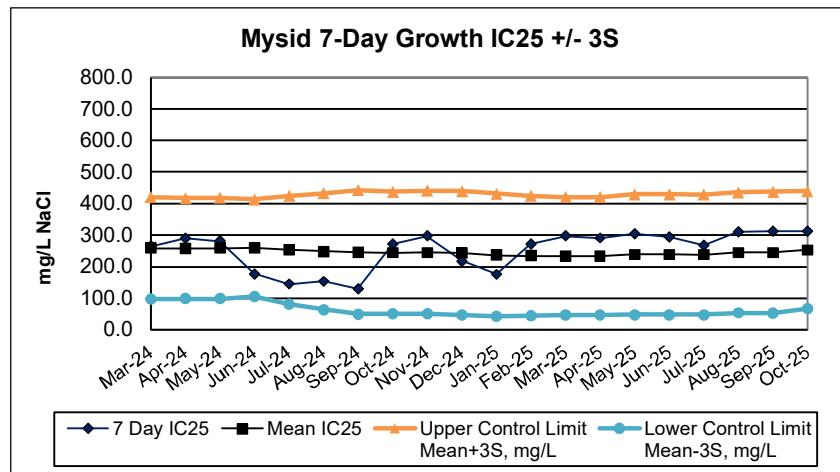
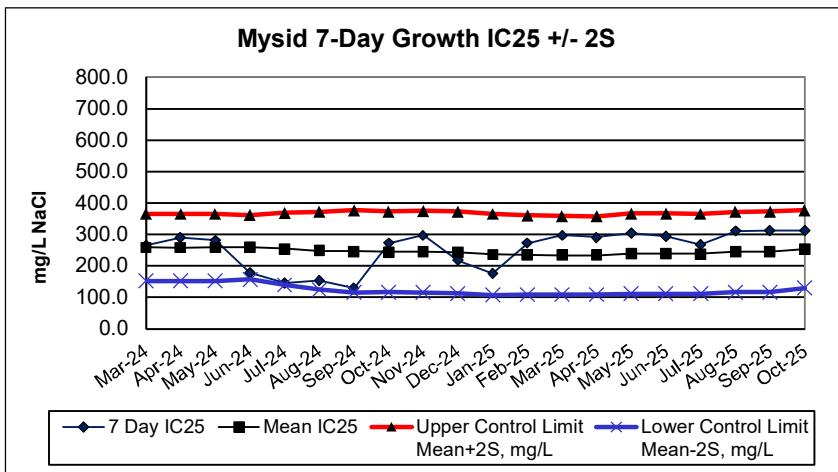
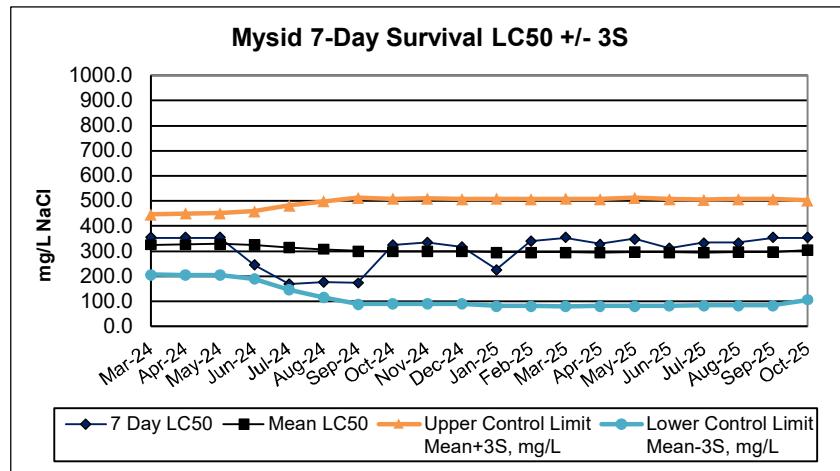
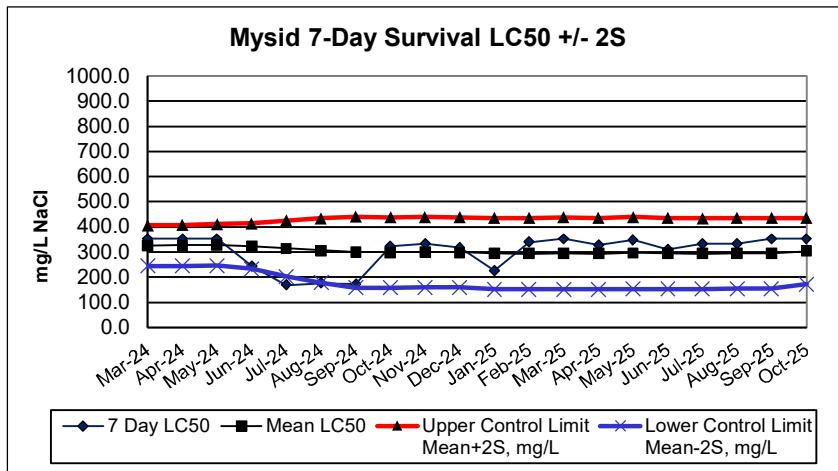
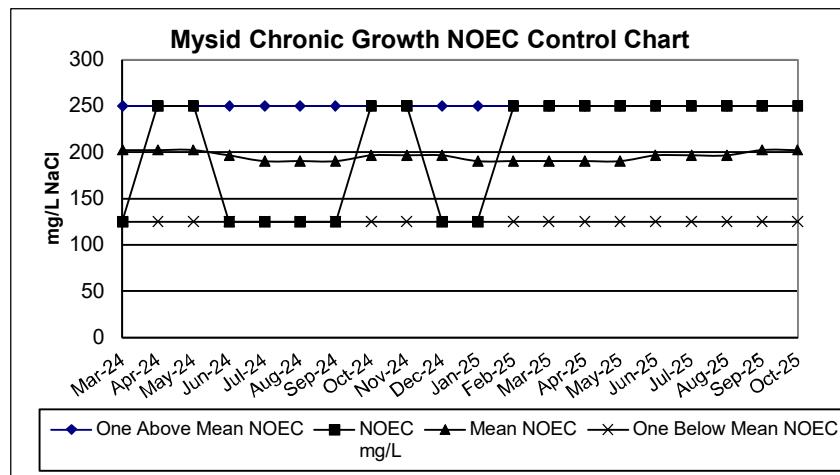
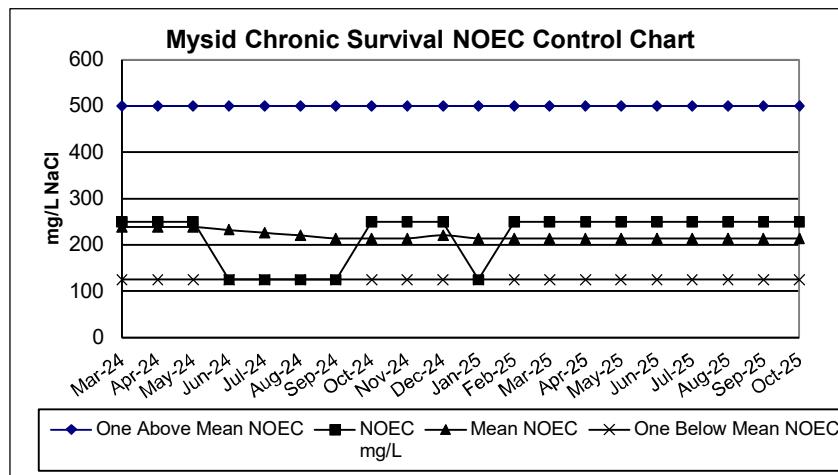
Carrollton, TX

REFERENCE TOXICANTS

Eurofins Environment Testing Bio-Aquatics conducts reference toxicant testing monthly for organisms cultured in-house. For studies requiring purchased organisms, reference toxicant testing is performed simultaneously. Reference toxicant testing validates data and measures organism consistency. Only reagent grade chemicals are used of the following choices: sodium laurel sulfate (SLS), copper sulfate, copper chloride, potassium chloride, and sodium chloride. Organism responses are tracked with control charts for each reference toxicant/organism combination. The data are examined for sensitivity trends and to determine if results are within EPA described limits.

CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Saltwater						
CHEMICAL:	Potassium Chloride						
DURATION:	7 Days						
TEST NUMBER:	172						
PROJECT NUMBER:	98700						
START DATE:	10/29/2025						
START TIME:	11:27						
TOTAL NUMBER EXPOSED:	40 organisms per concentration						
CONCENTRATIONS (mg/L):	CON	25	50	125	250	500	1000
NUMBER DEAD PER CONCENTRATION:	2	2	0	2	0	40	40
TEST METHODS:	Method 1007.0 As listed in EPA-821-R-02-014						
STATISTICAL METHODS:	SURVIVAL: Steel's Many-One Rank Test GROWTH: ANOVA w/Dunnett's Test FECUNDITY: Not Applicable						
NOEC FOR SURVIVAL:	250	mg/L					
LOEC FOR SURVIVAL:	500	mg/L					
NOEC FOR GROWTH:	250	mg/L					
LOEC FOR GROWTH:	500	mg/L					
PMSD:	19.0						



Appendix B

Menidia beryllina

EUROFINS ENVIRONMENT TESTING BIO-AQUATICS

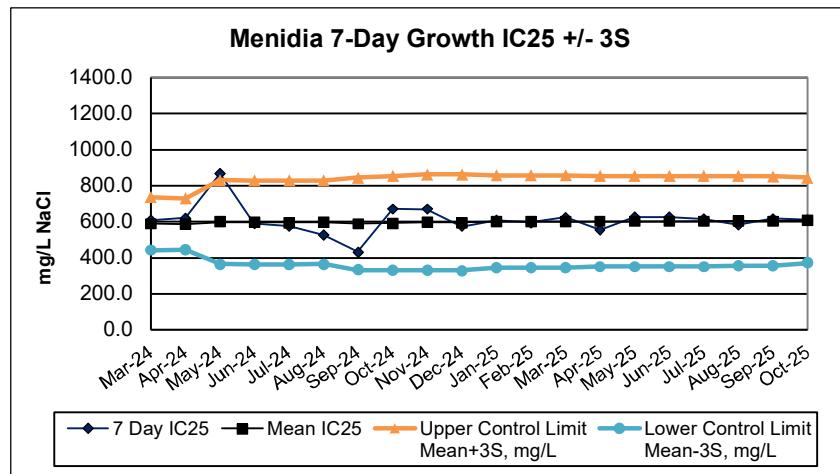
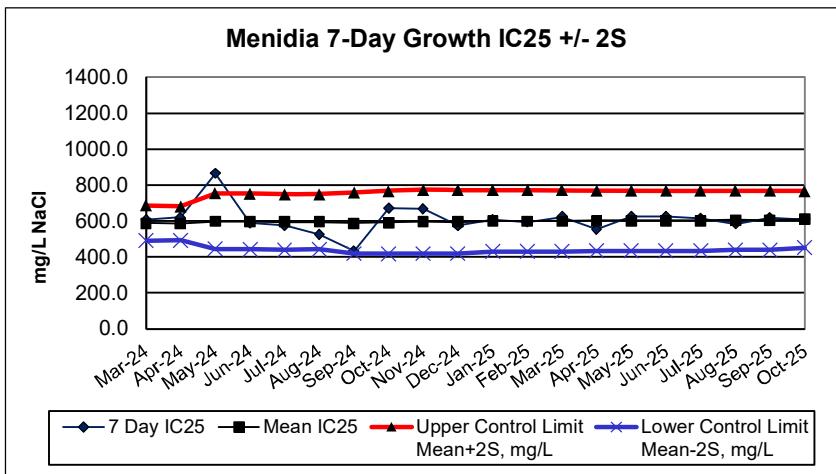
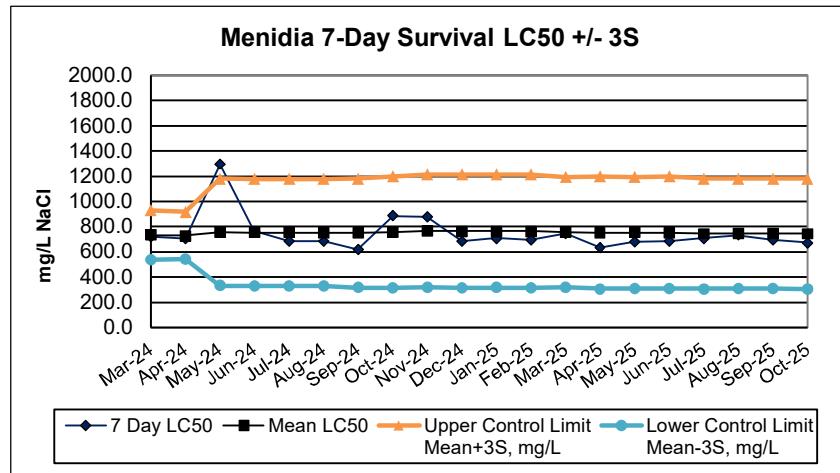
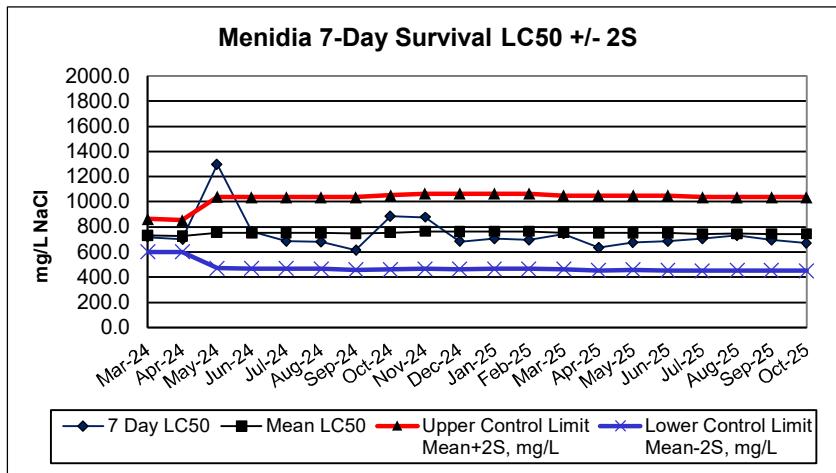
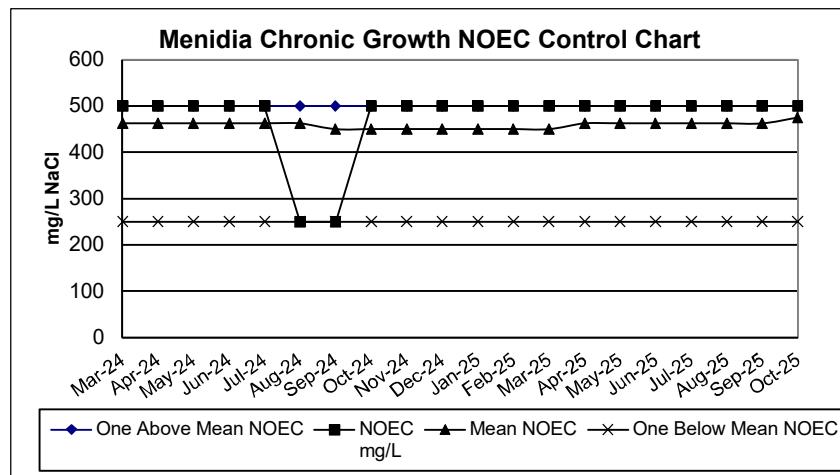
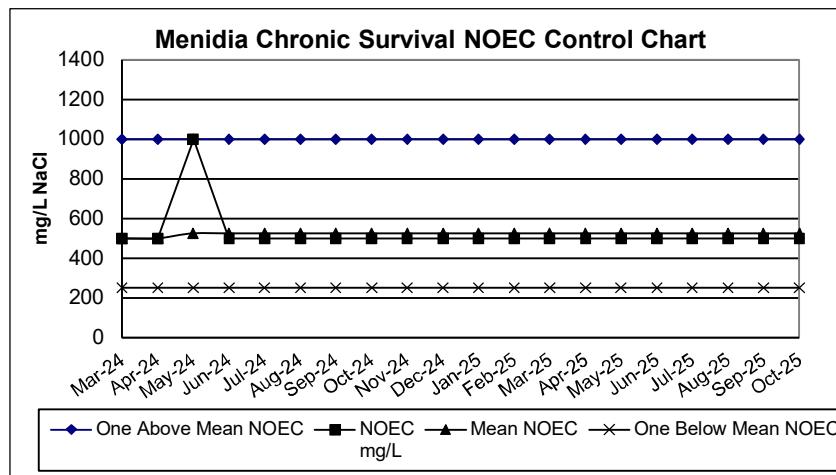
Carrollton, TX

REFERENCE TOXICANTS

Eurofins Environment Testing Bio-Aquatics conducts reference toxicant testing monthly for organisms cultured in-house. For studies requiring purchased organisms, reference toxicant testing is performed simultaneously. Reference toxicant testing validates data and measures organism consistency. Only reagent grade chemicals are used of the following choices: sodium laurel sulfate (SLS), copper sulfate, copper chloride, potassium chloride, and sodium chloride. Organism responses are tracked with control charts for each reference toxicant/organism combination. The data are examined for sensitivity trends and to determine if results are within EPA described limits.

CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Saltwater						
CHEMICAL:	Potassium Chloride						
DURATION:	7 Days						
TEST NUMBER:	172						
PROJECT NUMBER:	98699						
START DATE:	10/29/2025						
START TIME:	11:10						
TOTAL NUMBER EXPOSED:	40 organisms per concentration						
CONCENTRATIONS (mg/L):	CON	125	250	500	1000	2000	4000
NUMBER DEAD PER CONCENTRATION:	0	0	2	1	40	40	40
TEST METHODS:	Method 1006.0 As listed in EPA-821-R-02-014						
STATISTICAL METHODS:	SURVIVAL: Steel's Many-One Rank Test GROWTH: Dunnett's Test						
NOEC FOR SURVIVAL:	500	mg/L					
LOEC FOR SURVIVAL:	1000	mg/L					
NOEC FOR GROWTH:	500	mg/L					
LOEC FOR GROWTH:	1000	mg/L					
PMSD:	16.1						



APPENDIX C

LITERATURE REFERENCES

U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To Freshwater Organisms (Fifth Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-012.

U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents and Receiving Water To Marine And Estuarine Organisms (Third Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-014.

U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To Freshwater Organisms (Fourth Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-013.

U.S.E.P.A., 2012. Tropical Collector Urchin, *Tripneustes gratilla* (First Edition) U.S. Environmental Protection Agency, Office of Research and Development and Region 9, EPA-600-R-12-022.

U.S.E.P.A., 1995. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To West Coast Marine and Estuarine Organisms (First Edition) U.S. Environmental Protection Agency, EPA-600-R-95-136.

U.S.E.P.A., 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document, U.S. Environmental Protection Agency, Office of Wastewater, Washington D.C., EPA-833-R-10-004.

U.S.E.P.A., 1991. Technical Support Document For Water Quality-Based Toxics Control, U.S. Environmental Protection Agency, EPA-505-2-90-001.

Zarr, Jerrold, H., 1984. Biostatistical Analysis, (Second Edition). Prentice-Hall, Inc., Englewood Cliffs, N.J.

CHAIN-OF-CUSTODY SHEETS

Appendix D



Environment Testing
Bio-Aquatics

2501 MAYES RD., STE. 100, CARROLLTON, TX 75006, PH: 972-242-7750

Client: Natural Energy Laboratory of Hawaii

Facility: Hawaii Ocean Science and Technology Park

Check Sample No.: _____ First, _____ Second, or _____ Third.

P.O. No. _____

CHAIN OF CUSTODY

Please Review & Complete Sections A, B, C, & D. Sample No: 98982 -

Reason 2: Effective date 6/25/2017

Bio Only No Sample Left

Permit No/A
Outfall SSW-28 Sump

Client Contact: *Paul MacLean*
Client Phone: 808-327-8524

A. REVIEW SCHEDULED TEST(s):

Chronic Americanysis bahia
Chronic Menidia beryllina

To Ship the 1st Sample on: 12/1/2025

Concentration: 100
(For TX) Setup separate 24hr Acute Test? No

C. Sample Type:
E = Effluent
RS = Rec. Stream
S = Sediment

Sample ID or Location:
(Outfall No. or Name)

1 SSW Sump
2
3

Relinquished By: *Paul MacLean*

Date: 12/1/25

Time: 12:00

By: *DT*

Received By: *Flex*

Date: 12/1/25

Time: 12:00

By: *DT*

Temperature: 74

Condition: Good

Alkalinity: 7.4

Conductivity: 1000

IR#:

Priority:

Comments:

Notes: Non-Routine/Specialty Testing for Information purpose

34 01 34

B. Use area below to make changes, if the Scheduled Test(s) in "A" are incorrect:

Freshwater Species		Saltwater Species	
Water flea	D. pullex	Water flea	P. promelas
Chronic	<input type="checkbox"/>	Chronic	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Menidia beryllina (minnow)	S. heterastylum (green algae)	M. beryllina (minnow)	Mysidopsis (shrimp)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. BAT sample personnel: Yes No
Dechlorinate Sample: Yes No

Time: 11:45 mg/l Ammonia: mg/l Hardness: mg/l Condition: Good

Dilution Water: mg/l Receiving Chlorine: mg/l Alkalinity: mg/l

Comments: *DT*

IR#:

Priority:

Comments:

Notes: Non-Routine/Specialty Testing for Information purpose

34 01 34

Bio-Aquatic Sample Login

bio-aquaticlab.com

Bio-Aquatic Lab ID: 98982