

TRE Environmental Strategies, LLC

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**TRE** Environmental  
Strategies

March 15, 2023

Ms. Rikki Larson  
Environmental Advisor  
BP Cherry Point Refinery  
4519 Grandview  
Blaine, WA 98230

**Subject: Results of chronic *Americamysis bahia* 2023 WET test – Q1**


Ms. Larson:

Enclosed is a copy of the report for the chronic *Americamysis bahia* toxicity test conducted in February / March 2023.

We appreciate the opportunity to complete this study for BP Cherry Point. Please do not hesitate to call if you have any questions.

Sincerely,

  
Whitney Naddy  
Data Analyst  
[naddywm.tre@gmail.com](mailto:naddywm.tre@gmail.com)

  
Rami B. Naddy, Ph.D.  
Manager / Environmental Toxicologist  
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Attachment:

14001-056-239

# BP Cherry Point Refinery Blaine, WA

## **Chronic Toxicity of Effluent from BP's Cherry Point Refinery to *Americamysis bahia* Under Static-Renewal Test Conditions**

Prepared by:



**TRE Environmental Strategies, LLC**  
100 Racquette Drive, Unit A  
Fort Collins, CO 80524

**Document No. 14001-056-239**

March 2023

## Report of Short-term Chronic Toxicity Testing using Mysids (*Americamysis bahia*)

**Project ID: 14001-056-239**  
**February / March 2023**

### Sponsor and Laboratory Information

Sponsor	BP Cherry Point Refinery 4519 Grandview Blaine, WA 98230
Project Officer	Rikki Larson (360) 812-4056
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972 Washington DOE Laboratory ID: C566
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: <a href="mailto:naddyrb.tre@gmail.com">naddyrb.tre@gmail.com</a>
Report Author	Erin Nace (970) 416-0916 email: <a href="mailto:naceec.tre@gmail.com">naceec.tre@gmail.com</a>

### Test Information

Test Basis	Short-Term Chronic under Static-Renewal Conditions USEPA (2002), method 1007.0 and Washington Department of Ecology (2016)
Test Dates and Time	February 23, 2023 @ 1445 to March 2, 2023 @ 1405
Test Length	7 days
Species	<i>Americamysis bahia</i>
Test Material	Effluent (Grab)
Facility	Cherry Point Refinery
Permit Number	WA-002290-0
Receiving Water	Strait of Georgia
Dilution Water	Synthetic Sea Water (Crystal Sea; target 25‰)
Concurrent Control Water	None
Test Concentrations	0 (control), 0.8, 2.4, 3.6, 7.2, and 10.8% effluent
Permit Compliance	<u>  X  </u> Pass <u>      </u> Fail

- Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report
- Test results comply with The NELAC Institute (TNI) standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report
- This report contains 7 pages plus 2 appendices

## Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	NA	02/22/23 @ 0810 – 0814	37472	02/23/23	0.1	
2	NA	02/24/23 @ 0845 – 0847	37479	02/25/23	1.7	
3	NA	02/27/23 @ 0810 – 0815	37491	02/28/23	2.0	

Note: See Appendix A for chain of custody records

## Sample Characterization (as Received)

Sample No.	pH	Hard. (mg/L) <sup>HA</sup>	Alk. (mg/L) <sup>HA</sup>	Salinity (‰)	TRC (mg/L) <sup>G</sup>	NH <sub>3</sub> -N (mg/L)
1	7.4	132	131	8	0.05	<1.0
2	7.5	148	121	9	0.11	<1.0
3	7.7	118	169	9	0.08	<1.0

## Sample Characterization (after Salt Addition)

Sample No.	pH	Hard. (mg/L) <sup>HA</sup>	Alk. (mg/L) <sup>HA</sup>	Salinity (‰)	TRC (mg/L) <sup>G</sup>	NH <sub>3</sub> -N (mg/L)
1	7.9	3,600	194	26	NM	NM
2	7.9	4,160	115	26	NM	NM
3	8.0	2,680	198	26	NM	NM

NM = not measured

## Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L) <sup>HA</sup>	Alk. (mg/L) <sup>HA</sup>	Salinity (‰)	TRC (mg/L) <sup>G</sup>	NH <sub>3</sub> -N (mg/L)
14901	8.1	4,500	116	28	<0.02	<1.0

Note: The dilution water was prepared by adding Crystal Sea salts to deionized (Milli-Q) water to a target salinity of 25‰

## Test Conditions

Type	Static-Renewal Short-term Chronic	
Test Endpoints	Survival and growth	
Test Chambers	384-ml plastic cups	
Test Solution Volume	200 ml	
Replicates per Treatment	8	
Organisms per Replicate	5	
Test Temperature	25 ± 1°C (≤ 3°C differential)	
Lighting	Fluorescent, 16 hours light:8 hours dark	
Chamber Placement	Random according to computer-generated chart	
Aeration?	<input checked="" type="checkbox"/> X No	<input type="checkbox"/> Yes
Test Solution Renewal	Daily	

### Test Organism

Species	<i>Americamysis bahia</i>
Age	7 days
Source	Aquatic BioSystems, Inc. (ABS); Fort Collins, CO (TRE Lot # 23-005)
Acclimation	None
Feeding	Fed 0.1 ml brine shrimp nauplii per test chamber 2x daily AM & noon; Fed 0.2ml brine shrimp nauplii per test chamber 1x daily in PM
Reference Toxicant Testing	Initiated February 23, 2023 using potassium chloride (KCl)

### TEST RESULTS

#### Biological Data – Survival

Treatment (% Effluent)	Percent Survival of <i>Americamysis bahia</i>						
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0 (Control)	100	100	100	97.5	97.5	97.5	97.5
0.8	100	100	100	100	100	100	100
2.4	100	95	95	95	95	95	95
3.6	100	100	100	100	100	100	97.5
7.2	100	100	97.5	95	95	90	90
10.8	100	100	97.5	97.5	97.5	97.5	97.5

Note: See Appendix B for copies of laboratory data sheets

#### Biological Data – Growth (Dry Weight)

Treatment (% Effluent)	Mean Dry Weight/Original Organism (mg) <sup>W1</sup>	Significant Reduction Relative to the Dilution Water Control?	Mean Dry Weight/ Surviving Organism (mg) <sup>W2</sup>	Signification Reduction Relative to the Dilution Water Control?
0 (Dilution Water Cont.)	0.310	NA	0.316	NA
0.8	0.277	No	0.277	No
2.4	0.320	No	0.338	No
3.6	0.238	No <sup>V1</sup>	0.245	No <sup>V1</sup>
7.2	0.288	No	0.322	No
10.8	0.288	No	0.294	No
Percent Minimum Significant Difference (PMSD)	17.6	NA	17.0	NA

Note: See Appendix B for copies of laboratory data sheets

### Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)	Endpoint < CCEC?
Survival	NOEC	10.8	No
	LOEC	>10.8	---
	IC <sub>25</sub>	>10.8	No
Growth (per original organism)	NOEC	10.8	No
	LOEC	>10.8	---
	ChV	>10.8	---
	IC <sub>25</sub>	>10.8	No
Growth (per surviving organism)	NOEC	10.8	No
	LOEC	>10.8	---
	ChV	>10.8	---

NOEC = No Observed Effect Concentration

LOEC = Lowest Observed Effect Concentration

ChV = Chronic Value

IC<sub>25</sub> = 25% Inhibition Concentration

Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014).

### Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Salinity (‰)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (Control)	7.6	8.1	5.3	6.7	25	29	22	25	T1
10.8	7.8	8.1	5.4	6.6	25	29	22	25	T1
All Treatments	7.6	8.1	≥5.2		NA		22	25	T1,T3
							23	26	T4

### Reference Toxicant Test Results for *A. bahia*

7-day IC <sub>25</sub> (g KCl/L)	TRE Historical 95% Control Limits (g KCl/L)	
	Low	High
0.55	0.107	0.66

### **Power Standards Calculation**

The power standard criterion for the WET test was met for this study (Appendix D).

### **References**

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to marine and estuarine organisms. Third Edition, EPA-821-R-02-014.

WDOE. 2016. Whole effluent toxicity testing guidance and test review criteria. Washington State Department of Ecology, Publication #WQ-R-95-80. Revised December 2016.

## Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6°C or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as CaCO <sub>3</sub> .
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3°C differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3°C differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4 <sup>th</sup> or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male <i>C. dubia</i> were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤ 4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤ 4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically ( $\alpha=0.05$ or $0.01$ , as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically ( $\alpha=0.05$ or $0.01$ , as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

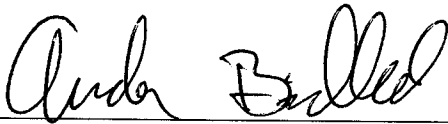


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### Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of TNI standards. This report is an accurate reflection of the raw data.



Quality Assurance Unit

March 15, 2023

Date



Data Analyst

March 15, 2023

Date

**APPENDIX A**  
**Chain of Custody Records**

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

[illegible]

Serial No. 07961



Page 1 of 1

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

[illegible]

**Effective Date: 02/13/19**

Serial No. 07959

## **APPENDIX B**

### **Test Data**

QA: 15 3/13/23

# TOXICITY DATA PACKAGE COVER SHEET

Test Type: Chronic

Project Number: 14001-056-239

Test Substance: Effluent

Species: Americamysis bahia

Dilution Water Type: Salt water @ 25 ‰ ± 2 ppt

Organism Lot or Batch Number: 23-005

Concurrent Control Water Type: NA

Age: 7 days (7 days) Supplier: ABS

Date and Time Test Began: 02/23/23 @ 1445

Date and Time Test Ended: 3/2/23 @ 1405

Protocol Number: USEPA 2002, method 1007.0

Investigator(s): LM/WT/HA/HP/DI/an/PA

## Background Information

Type of Test: Static-Renewal

pH control?: Yes No

If yes, give % CO<sub>2</sub>: N/A

Test Temperature: 26 ± 1 °C

Env. Chmbr/Bath #: 1

Test Chmbrs: 384-ml plastic cups

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50 -- 100 ft.-c

Test Solution Vol.: 150 ml

Number of Replicates per Treatment: 8

Length of Test: 7 days

Number of Organisms per Replicate: 5

Type of Food and Quantity per Chamber: 0.10 ml B.S. AM+NOON Feeding Frequency: 3 x Daily  
0.20 ml B.S. PM

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH<sub>3</sub>: Sx Receipt TRC: Sx Receipt

pH: Daily Salinity: Daily

Test Concentrations (Volume:Volume): Control, 0.8, 2.4 3.6, 7.2, and 10.8% effluent

Agency Summary Sheet(s)?: NA

Reference Toxicant Data: Test Dates: 2/23/23 to 3/2/23 IC<sub>25</sub>: 0.55

Hist. 95% Control Limits: 0.107 to 0.66 Method for Determining Ref. Tox. Value: Linear Interpolation

## Special Procedures and Considerations:

D.O. maintained ≥ 4.0 mg/L

Study Director Initials: AE Date: 2/13/23

QA-M 3/13/23

### TEST SUBSTANCE USAGE LOG

Project Number:

14001-056-239

	Sample 1	Sample 2	Sample 3	
Test Substance Number	37472	37479	37491	
Test Substance Collection	From: 2/22/23	From: 02/24/23	From: 2/27/23	
Date and Time	@ 10810	@ 0845	@ 0810	
	To: 2/22/23	To: 02/24/23	To: 2/27/23	
	@ 0814	@ 0847	@ 0815	
Sample Type (Grab or Comp)	Grab	Grab	Grab	
Date Test Substance Received	2/23/23	02/25/23	2/28/23	
Dilution Water Number	14901	14901	14901	
RW# or TRE#, circle one				
Concurrent Control Water RW#	NA	NA	NA	
Date(s) Used	02/23/23	02/25/23	2/28/23	
	2/24/23	2/26/23	3/12/23	
		2/27/23		

### Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
Control	0	0	1200						
0.8%	10	1190	1200						
2.4%	29	1171.2	1200						
3.6%	43	1156.8	1200						
7.2%	86	1113.6	1200						
10.8%	130	1070	1200						
Total	298	5702	7200						
Initials / Date	LM 02/23/23 mixed MC								
Initials / Date	TA 2/24/23 " "								
Initials / Date	LM 02/25/23 " "								
Initials / Date	TA 2/26/23 " "								
Initials / Date	WT 2/27/23 " "								
Initials / Date	TA 2/28/23 " "								
Initials / Date	WT 3/12/23 " "								
Initials / Date									

OWT 3/11/23!E



**MYSID (AMERICAMYSIS BAHIA)  
 CHRONIC BIOLOGICAL DATA**

QA 13 3/14/23

Project Number: 14001-056-239

%Conc.	Test Replicate	Number of Surviving Organisms								Remarks
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Control	A	5	5	5	5	5	5	5	5	97.5
	B	5	5	5	5	5	5	5	5	
	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	5	
	F	5	5	5	5+	4	4	4	4	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	5	
0.8%	A	5	5	5	5	5	5	5	5	100
	B	5	5	5	5	5	5	5	5	
	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	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	5	
2.4%	A	5	5	5	5	5	5	5	5	95
	B	5	4	4	4	4	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	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	4	4	4	4	4	4	
Date:		2/23/23	2/24/23	2/25/23	2/26/23	2/27/23	2/28/23	2/29/23	3/1/23	
Time:		1445	1240	1400	1450	1630	1610	1555	1405	
Initials:		LM/WT	TA	LM	TA	WT	TA	WT	WT/TA	

② WT 3/1/23: E

① E 2/24/23 TA

QAS AS 3/1/12

MYSID (AMERICAMYSIS BAHIA)  
 CHRONIC BIOLOGICAL DATA

Project Number: 14001-056-239

%Conc.	Test Replicate	Number of Surviving Organisms								Remarks
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
3.6%	A	5	5	5	5	5	5	5	5	97.5
	B	5	5	5	5	5	5	5	5	
	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	1 org WF
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	5	5	5	5	
7.2%	A	5	5	5	5	5	5	5	5	90
	B	5	5	5	5	5	5	5	4	
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	5	5	4	4	0 org not found
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	4	4	4	4	4	1 org WF
	H	5	5	5	5	4	4	4	4	
10.8%	A	5	5	5	5	5	5	5	5	97.5
	B	5	5	5	5	5	5	5	5	
	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	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	4	4	4	4	4	
Date:		2/23/13	2/24/13	2/25/13	2/26/13	2/27/13	2/28/13	3/1/13	3/2/13	
Time:		1445	1740	1400	1450	1630	1610	1155	1405	
Initials:		LM/LGT	TA	LM	TA	WT	TA	WT	LM/TA	

0 WT 2/24/13 E  
 3/1/13 E

OK - MS 3/13/27

CHRONIC CHEMICAL DATA (INITIAL)

Project Number:	14001-056-239
Test Species:	<i>Americamysis bahia</i>

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: Control									All Conc.	
pH	8.1	8.1	7.9	7.9	7.9	7.9	8.0		19	
D.O. (mg/L)	6.4	6.6	6.6	6.5	6.6	6.6	6.7		17	
Temp. (°C)	25.2	25	25	25	25	25	25		L-29	
Salt. (ppt)	28	26	25	26	26	27	26		#2	
Hard. (mg/L)	4500		3640			2540			Tit.	
Alk. (mg/L)	116		106			108			Tit.	
TRC (mg/L)	20.02	26.3	20.02		26.3	20.02			27	
NH <sub>3</sub> (mg/L)	<1.0		<1.0			<1.0			HA1	
Conc.: 0.8%										
pH	8.1	8.1	8.0	8.0	8.0	7.9	8.1			
D.O. (mg/L)	6.4	6.5	6.5	6.3	6.7	6.5	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	24	26	25	25	25	26	25			
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH <sub>3</sub> (mg/L)										
Conc.: 2.4%										
pH	8.1	8.1	8.0	8.0	8.0	7.9	8.1			
D.O. (mg/L)	6.4	6.4	6.5	6.4	6.8	6.6	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	24	26	25	25	26	25	25			
Conc.: 3.6%										
pH	8.1	8.1	8.0	8.0	8.0	8.0	8.1			
D.O. (mg/L)	6.4	6.4	6.5	6.4	6.8	6.6	6.6			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	25	26	24	25	26	26	26			
Date:	2/23/23	2/24/23	2/25/23	2/26/23	2/27/23	2/28/23	3/1/23			
Time:	1435	1730	1340	1400	1630	1555	1145			
Initials:	LM	TA	LM	TA	WT	TA	LM			

Note: Hardness, alkalinity, TRC, and NH<sub>3</sub> data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

\*Dilution/control water and effluent were brought to 20°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 20°C.

① LM, 02/23/23, E

CHRONIC CHEMICAL DATA (INITIAL)

21m  
3/15/23

Project Number: 14001-056-239

Test Species: *Americamysis bahia*

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 7.2%									All Conc.	
pH	8.1	8.1	8.0	8.1	8.0	8.0	8.1			
D.O. (mg/L)	6.4	6.5	6.5	6.3	6.5	6.6	6.5			
Temp. (°C)	X	X	X	X	X	X	X			
Salt. (ppt)	24	26	24	25	26	25	25			
Conc.: 10.8%										
pH	8.1	8.1	8.0	8.0	8.0	8.0	8.0			
D.O. (mg/L)	6.4	6.5	6.5	6.4	6.6	6.6	6.5			
Temp. (°C)	X	X	X	X	X	X	X			
Salt. (ppt)	28	26	25	25	26	25	25			
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salt. (ppt)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salt. (ppt)										
Conc.: 100%	SALTED									UNSALTED
pH	7.9		7.9	7.9		8.0				7.4 7.5 7.7
D.O. (mg/L)										
Temp. (°C)	25	25	25	25	25	25	25			8.0
Salt. (ppt)	28		26			26				8 9 9
Hard. (mg/L)	3600		4160			2640				132 148 118
Alk. (mg/L)	194		115			198				131 121 169
TRC (mg/L)										0.05 0.11 0.08
NH <sub>3</sub> (mg/L)										2.0 2.0 2.0
Date:	2/23/23	2/24/23	2/25/23	2/26/23	2/27/23	2/28/23	3/1/23			
Time:	1435	1230	1340	1400	1630	1555	1145			
Initials:	LM	TA	LM	TA	WT	TA	LM			

Note: Hardness, alkalinity, TRC, and NH<sub>3</sub> data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

\*Dilution/control water and effluent were brought to 20°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 20°C.

Den 3/10/23 jwp

GA. MS 3/13/14

CHRONIC CHEMICAL DATA (FINAL)

Project Number:	14001-056-239
Test Species:	<i>Americamysis bahia</i>

%	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Meter #	Remarks
Conc.: Control									All Conc.	
pH	8.0	7.9	7.9	7.8	7.7	7.8	7.6		19	
D.O. (mg/L)	6.2	5.9	5.9	6.3	6.0	5.3	5.4		17	
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>		144	
Salt.(ppt)	28	27	28	29	29	27	27		#2	
Conc.: 0.8%										
pH	8.0	7.8	7.9	7.8	7.7	7.8	7.7			
D.O. (mg/L)	6.1	5.6	5.7	6.1	5.4	5.2	5.4			
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>A</sup>			
Salt.(ppt)	28	27	28	29	28	25	29			
Conc.: 2.4%										
pH	8.0	7.9	7.9	7.9	7.7	7.9	7.7			
D.O. (mg/L)	6.0	5.7	5.4	6.2	5.4	5.5	5.4			
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>A</sup>			
Salt.(ppt)	28	27	27	29	28	26	29			
Conc.: 3.6%										
pH	8.0	7.9	7.9	7.8	7.8	7.9	7.7			
D.O. (mg/L)	6.0	5.8	5.6	6.0	5.5	5.5	5.3			
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>			
Salt.(ppt)	28	27	29	29	28	27	29			
Conc.: 7.2%										
pH	8.0	7.9	8.0	8.0	7.8	8.0	7.8			
D.O. (mg/L)	5.6	5.9	5.8	6.1	5.6	5.5	5.3			
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>	23 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>			
Salt.(ppt)	28	29	28	29	29	26	29			
Conc.: 10.8%										
pH	8.0	7.9	8.0	7.9	7.8	8.0	7.8			
D.O. (mg/L)	5.7	6.0	5.8	6.0	5.6	5.4	5.5			
Temp (°C)	22 <sup>A</sup>	22 <sup>A</sup>	23 <sup>D</sup>	23 <sup>D</sup>	23 <sup>A</sup>	23 <sup>A</sup>	23 <sup>D</sup>			
Salt.(ppt)	28	27	27	29	27	26	29			
Date:	2/24/23	2/25/23	2/26/23	2/27/23	2/28/23	3/1/23	3/2/23			
Time:	1230	1345	1400	1655	1555	1150	1400			
Initials:	TA	LM	TA	WT	TA	LM	WT			

checked all reps

QA: AS 3/13/23

### DAILY TOXICITY TEST LOG

Project Number:	14001-056-239
Test Species:	<i>Americamysis bahia</i>

General Comments	Random Chart: <u>NR</u> Thermometer# <u>M-32</u>	Feeding * 0.1 ml Am #1000 0.05 ml B.S. 0.2 ml - PM 3 X Daily	Initials/Date
Test Day 0	Test Solution Mixed at: <u>1435</u> Test Organisms Added at: <u>1445</u>	Fed @ * 1615 TA	LM 02/23/23
Test Day 1	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>23-26</u> °C	Fed @ * 0840 en * 1330 TA * 1600 WT	TA 2/24/23
Test Day 2	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>23-26</u> °C	Fed @ * 0850 LM * 1230 RA * 1520 JJ	LM 02/25/23
Test Day 3	Real Time Temp= <u>25</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ * 0855 JJ TA * 1145 TA * 1550 TA	TA 2/26/23
Test Day 4	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ * 0830 HP * 1230 HP * 1720 PJ TA	WT 2/27/23
Test Day 5	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ * 0835 JJ * 1130 RA * 1645 TA	TA 2/28/23
Test Day 6	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-25</u> °C	Fed @ 0840 TA 1200 WT 1700 PJ TA	WT 3/1/23
Test Day 7	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-25</u> °C	NONE * 0840 JJ * 1130 WT	WT TA 3/2/23
Test Day 8	Real Time Temp= °C Range (Min-Max) = °C		

2/23/23

QA LM 3/7/23

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: <u>14001-056-239</u>		Test Substance: <u>Effluent</u>		Comments: Analytical Balance ID: <u>SORT#1</u> Dried in Oven # <u>1</u> from Date: <u>3/2/23</u> Time: <u>1630</u> to Date: <u>3/4/23</u> Time: <u>0845</u>							
Species: <u>Americamysis bahia</u>		Analyst Tare: <u>LM</u>		Analyst Gross: <u>DI</u>							
Date/Time of Tare Wt.: <u>03/02/23 0850</u>		Date/Time of Gross Wt.: <u>03/07/2023</u>									
Boat No.	Treatment	Rep.	Length Units:	Weight Type (Circle):			Dry ( <u>60-99.95°C</u> )	AFDW (>500°C)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
				Tare Weight (g)	Gross Weight (g)	Net Weight (g)					
0		A		1.18186							
				1.16604							
				1.17363							
				1.19289							
				1.17369							
				1.17277							
				1.16442							
0.81	A	B		1.18489							
				1.19198							
				1.18437							
				1.14782							
		C		1.16320							
				1.16456							
Blank											
Range											
Mean											
Test Solution Volume:								Loading Rate:			

Add in weight loss of blank boat, if appropriate.

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

QA m 3/2/23

Project Number: 14001-056-239		Test Substance: Effluent		Comments: Analytical Balance ID: <u>Sart #1</u> Dried in Oven # <u>    </u> from Date: <u>    </u> to Date: <u>    </u> Time: <u>    </u>					
Species: <u>Amenocryptis bahia</u>		Analyst Tare: <u>LM</u>		Analyst Gross: <u>    </u>					
Date/Time of Tare Wt.: <u>03/02/23 @ 0850</u>		Date/Time of Gross Wt.: <u>    </u>		Lot or Batch Number: <u>23-005</u>					
Boat No.	Treatment	Rep.	Length Units:	Weight Type (Circle):			Mean Wt. per Treatment (mg) (Original)	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
				Tare Weight (g)	Gross Weight (g)	Net Weight (g)			
		E		1.15663					
		F		1.17726					
		G		1.18712					
		H		1.17638					
	2.41.	A		1.19540					
		B		1.16224					
		C		1.19603					
		D		1.16363					
		E		1.19084					
		F		1.16594					
		G		1.16550					
		H		1.17638					
Blank									
Range									
Mean									
Test Solution Volume:				Loading Rate:					

Add in weight loss of blank boat, if appropriate.



TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: <u>14001-056 239</u>		Test Substance: <u>Effluent</u>		Comments: Analytical Balance ID: _____ Dried in Oven # _____ from Date: _____ Time: _____ to Date: _____ Time: _____													
Species: <u>Americamysis bahia</u>		Analyst Tare: <u>LM</u>		Analyst Gross: _____													
Date/Time of Tare Wt.: <u>03/02/23 @ 0850</u>		Date/Time of Gross Wt.: _____		_____													
Boat No.	Treatment	Rep.	Length Units:	Weight Type (Circle):			Wet	Blot Dry	Dry (60-90°C)	Dry (>100°C)	AFDW (>500°C)	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
				Tare Weight (g)	Gross Weight (g)	Net Weight (g)											
	3.61	A		1.18581													
		B		1.19321													
		C		1.19828													
		D		1.17012													
		E		1.17278													
		F		1.17176													
		G		1.17438													
	7.21	A		1.17331													
		B		1.16016													
		C		1.16431													
		D		1.16694													
				1.19102													
Blank																	
Range																	
Mean																	
Test Solution Volume: _____												Loading Rate: _____					

Add in weight loss of blank boat, if appropriate.

dam 3/7/23

Add in weight loss of blank boat, if appropriate.

*24* *11* *3/15/23*

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-056-239

Species: *Americamysis bahia*

Date/Time of Tare Wt: 3/2/23 @ 0850

Date/Time of Gross Wt: 3/7/23 @ 0850

(options: Wet, Bloy Dry, Dry (60-90C), Dry (>100C), AFDW (>500C))

Weight Type: Dry (60-90C)

Test Substance Effluent Balance ID: Sart 1

Oven #: 1

Time: 1630

Time: 0845

from Date: 3/2/2023

to Date: 3/4/2023

Analyst Tare: LM

Analyst Gross: DI/TA

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
Control	A		1.18186	1.18368	0.00182	0.00182	5	0.3640	0.3100	5	0.3640	0.3159
	B		1.16604	1.16731	0.00127	0.00127	5	0.254		5	0.254	
	C		1.17363	1.17515	0.00152	0.00152	5	0.304		5	0.304	
	D		1.19289	1.19494	0.00205	0.00205	5	0.410		5	0.410	
	E		1.17369	1.17513	0.00144	0.00144	5	0.288		5	0.288	
	F		1.17277	1.17371	0.00094	0.00094	5	0.188		4	0.235	
	G		1.16442	1.16641	0.00199	0.00199	5	0.398		5	0.398	
	H		1.18489	1.18626	0.00137	0.00137	5	0.274		5	0.274	
0.80%	A		1.19198	1.19329	0.00131	0.00131	5	0.2620	0.2770	5	0.2620	0.2770
	B		1.18437	1.18559	0.00122	0.00122	5	0.244		5	0.244	
	C		1.14782	1.14932	0.00150	0.00150	5	0.300		5	0.300	
	D		1.16320	1.16461	0.00141	0.00141	5	0.282		5	0.282	
	E		1.15663	1.15774	0.00111	0.00111	5	0.222		5	0.222	
	F		1.17726	1.17860	0.00134	0.00134	5	0.268		5	0.268	
	G		1.18712	1.18878	0.00166	0.00166	5	0.332		5	0.332	
	H		1.17638	1.17791	0.00153	0.00153	5	0.306		5	0.306	
2.4%	A		1.19540	1.19714	0.00174	0.00174	5	0.3480	0.3196	5	0.3480	0.3377
	B		1.16224	1.16358	0.00134	0.00134	5	0.268		4	0.335	
	C		1.19603	1.19749	0.00146	0.00146	5	0.292		5	0.292	
	D		1.16363	1.16529	0.00166	0.00166	4	0.415		4	0.415	
	E		1.19084	1.19245	0.00161	0.00161	5	0.322		5	0.322	
	F		1.16594	1.16748	0.00154	0.00154	5	0.308		5	0.308	
	G		1.16550	1.16697	0.00147	0.00147	5	0.294		5	0.294	
	H		1.17638	1.17793	0.00155	0.00155	5	0.310		4	0.387	

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-056-239      Test Substance: Effluent      Balance ID: Sart 1      Oven #: 1

Species: Americamysis bahia      Analyst Tare: LM      from Date: 3/2/2023      Time: 1630

Date/Time of Tare Wt: 3/2/23 @ 0850      Analyst Gross: DI / TA      to Date: 3/4/2023      Time: 0845

Date/Time of Gross Wt: 3/7/23 @ 0850      (options: Wet, Bloy Dry, Dry (60-90C), Dry (>100C), AFDW (>500C))

QA mvv 3/15/23

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
3.6%	A		1.18581	1.18706	0.00125	0.00125	5	0.250	0.2377	5	0.250	0.2448
	B		1.19321	1.19440	0.00119	0.00119	5	0.238		5	0.238	
	C		1.19828	1.19949	0.00121	0.00121	5	0.242		5	0.242	
	D		1.17012	1.17148	0.00136	0.00136	5	0.272		5	0.272	
	E		1.17278	1.17391	0.00113	0.00113	5	0.226		4	0.283	
	F		1.17176	1.17309	0.00133	0.00133	5	0.266		5	0.266	
	G		1.17438	1.17558	0.00120	0.00120	5	0.240		5	0.240	
	H		1.17331	1.17415	0.00084	0.00084	5	0.168		5	0.168	
7.2%	A		1.16016	1.16166	0.00150	0.00150	5	0.300	0.2875	5	0.300	0.3225
	B		1.16431	1.16570	0.00139	0.00139	5	0.278		4	0.348	
	C		1.16694	1.16844	0.00150	0.00150	5	0.300		5	0.300	
	D		1.19102	1.19277	0.00175	0.00175	5	0.350		4	0.438	
	E		1.16657	1.16798	0.00141	0.00141	5	0.282		5	0.282	
	F		1.15631	1.15780	0.00149	0.00149	5	0.298		5	0.298	
	G		1.16036	1.16146	0.00110	0.00110	5	0.220		4	0.275	
	H		1.17605	1.17741	0.00136	0.00136	5	0.272		4	0.340	
10.8%	A		1.17573	1.17716	0.00143	0.00143	5	0.286	0.2877	5	0.286	0.2944
	B		1.16412	1.16547	0.00135	0.00135	5	0.270		5	0.270	
	C		1.15537	1.15670	0.00133	0.00133	5	0.266		5	0.266	
	D		1.18630	1.18806	0.00176	0.00176	5	0.352		5	0.352	
	E		1.17147	1.17292	0.00145	0.00145	5	0.290		5	0.290	
	F		1.18429	1.18567	0.00138	0.00138	5	0.276		5	0.276	
	G		1.17358	1.17533	0.00175	0.00175	5	0.350		5	0.350	
	H		1.18492	1.18598	0.00106	0.00106	5	0.212		4	0.265	
Blank			1.16456	1.16458	0.00002							

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-056-239      Test Substance:                           Effluent:                           Balance ID: Sart 1      Oven #: 1

Species: Americamysis bahia      Analyst Tare: LM      from Date: 3/2/2023      Time: 1630

Date/Time of Tare Wt: 3/2/23 @ 0850      Analyst Gross: DI / TA      to Date: 3/4/2023      Time: 0845

Date/Time of Gross Wt: 3/7/23 @ 0850      (options: Wet, Bloy Dry, Dry (60-90C), Dry (>100C), AFDW (>500C))

Weight Type: Dry (60-90C)

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
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## Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.8	1.0	0.9750	0.0707	7.25%
0.80%	8	1.0	1.0	1.0000	0.0000	0.00%
2.4%	8	0.8	1.0	0.9500	0.0926	9.75%
3.6%	8	0.8	1.0	0.9750	0.0707	7.25%
7.2%	8	0.8	1.0	0.9000	0.1069	11.88%
10.8%	8	1.0	1.0	0.9750	0.0707	7.25%

## Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.	% of Control
Control	8	0.188	0.4100.3100	0.0761	0.0761	24.54%	--
0.80%	8	0.222	0.3320.2770	0.0355	0.0355	12.83%	89%
2.4%	8	0.268	0.4150.3196	0.0451	0.0451	14.10%	103%
3.6%	8	0.168	0.2720.2377	0.0320	0.0320	13.44%	77%
7.2%	8	0.220	0.3500.2875	0.0363	0.0363	12.64%	93%
10.8%	7	0.266	0.3520.2877	0.0368	0.0368	12.78%	93%

## Summary Statistics for Growth Data (dry wt per surviving organism)

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.235	0.4100.3159	0.0665	0.0665	21.05%
0.80%	8	0.222	0.3320.2770	0.0355	0.0355	12.83%
2.4%	8	0.292	0.4150.3377	0.0442	0.0442	13.10%
3.6%	8	0.168	0.2830.2448	0.0351	0.0351	14.33%
7.2%	8	0.275	0.4380.3225	0.0530	0.0530	16.44%
10.8%	8	0.266	0.3520.2944	0.0368	0.0368	12.50%

Comments: lost one organism in 2.4% D during weighing process

# CETIS Analytical Report

Report Date: 10 Mar-23 14:20 (p 1 of 2)  
Test Code: 056-239 | 10-2711-9843

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 12-2038-8085	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 10 Mar-23 14:20	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 08-3791-5696	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 23 Feb-23 14:45	Protocol: EPA/821/R-02-012 (2002)	Diluent: Laboratory Seawater
Ending Date: 02 Mar-23 14:05	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 00-8679-3916	Code: 52C5EBC	Client: BP Cherry Point
Sample Date: 22 Feb-23 08:14	Material: Ambient Sample	Project: WET Quarterly Compliance Test (1Q)
Receive Date: 04 Mar-23	Source: Discharge Monitoring Report	
Sample Age: 31h	Station: Effluent	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	12.3%	10.8	>10.8	NA	9.259

## Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:1%)
Dilution Water		0.8	72	40	1	14	0.9294	Asymp	Non-Significant Effect
		2.4	64	40	2	14	0.6797	Asymp	Non-Significant Effect
		3.6	68	40	2	14	0.8333	Asymp	Non-Significant Effect
		7.2	56	40	2	14	0.3008	Asymp	Non-Significant Effect
		10.8	68	40	2	14	0.8333	Asymp	Non-Significant Effect

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:1%)
Between	0.06822618	0.01364524	5	1.662	0.1649	Non-Significant Effect
Error	0.344747	0.008208262	42			
Total	0.4129732		47			

## Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.477	3.49	0.0470	Equal Variances
Variances	Levene Equality of Variance	5.153	3.49	0.0009	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7853	0.934	<0.0001	Non-normal Distribution

## Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	0.975	0.9159	1	1	0.8	1	0.025	7.25%	0.0%
0.8		8	1	1	1	1	1	1	0	0.0%	-2.56%
2.4		8	0.95	0.8726	1	1	0.8	1	0.03273	9.75%	2.56%
3.6		8	0.975	0.9159	1	1	0.8	1	0.025	7.25%	0.0%
7.2		8	0.9	0.8106	0.9894	0.9	0.8	1	0.0378	11.9%	7.69%
10.8		8	0.975	0.9159	1	1	0.8	1	0.025	7.25%	0.0%

## Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	1.316	1.245	1.386	1.345	1.107	1.345	0.02977	6.4%	0.0%
0.8		8	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	-2.26%
2.4		8	1.282	1.192	1.373	1.345	1.107	1.345	0.03838	8.46%	2.52%
3.6		8	1.316	1.245	1.386	1.345	1.107	1.345	0.02977	6.4%	0.0%
7.2		8	1.226	1.12	1.333	1.226	1.107	1.345	0.045	10.4%	6.79%
10.8		8	1.316	1.245	1.386	1.345	1.107	1.345	0.02977	6.4%	0.0%

# CETIS Analytical Report

Report Date: 10 Mar-23 14:20 (p 2 of 2)

Test Code: 056-239 | 10-2711-9843

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 12-2038-8085

Endpoint: Survival Rate

CETIS Version: CETISv1.8.7

Analyzed: 10 Mar-23 14:20

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

### Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	1	1	1	0.8	1	1
0.8		1	1	1	1	1	1	1	1
2.4		1	0.8	1	1	1	1	1	0.8
3.6		1	1	1	1	0.8	1	1	1
7.2		1	0.8	1	0.8	1	1	0.8	0.8
10.8		1	1	1	1	1	1	1	0.8

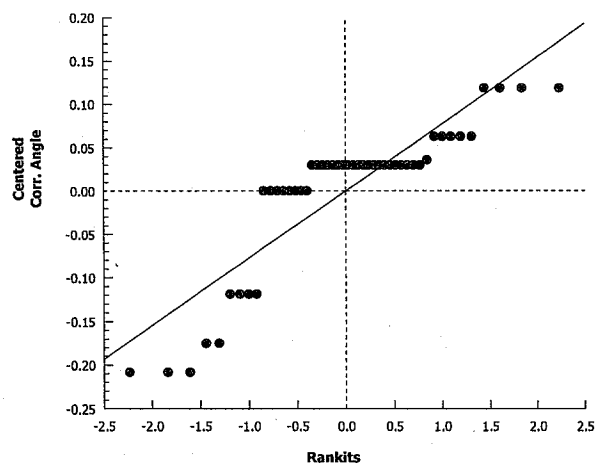
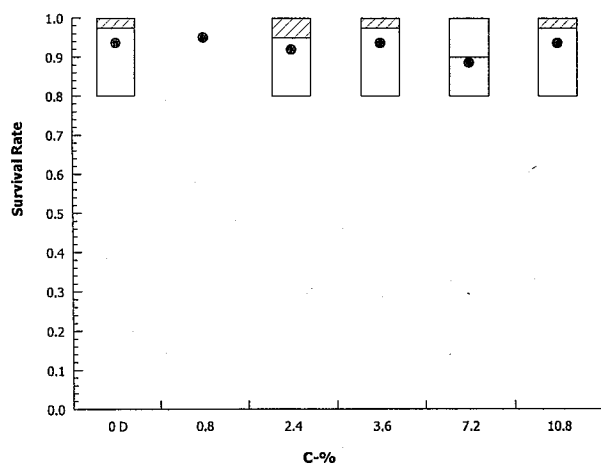
### Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.345	1.345	1.345	1.345	1.345	1.107	1.345	1.345
0.8		1.345	1.345	1.345	1.345	1.345	1.345	1.345	1.345
2.4		1.345	1.107	1.345	1.318	1.345	1.345	1.345	1.107
3.6		1.345	1.345	1.345	1.345	1.107	1.345	1.345	1.345
7.2		1.345	1.107	1.345	1.107	1.345	1.345	1.107	1.107
10.8		1.345	1.345	1.345	1.345	1.345	1.345	1.345	1.107

### Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	5/5	5/5	5/5	5/5	5/5	4/5	5/5	5/5
0.8		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
2.4		5/5	4/5	5/5	4/4	5/5	5/5	5/5	4/5
3.6		5/5	5/5	5/5	5/5	4/5	5/5	5/5	5/5
7.2		5/5	4/5	5/5	4/5	5/5	5/5	4/5	4/5
10.8		5/5	5/5	5/5	5/5	5/5	5/5	5/5	4/5

### Graphics



## CETIS Analytical Report

Report Date: 08 Mar-23 17:00 (p 1 of 2)

Test Code: 056-239 | 10-2711-9843

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 08-2953-0173	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 08 Mar-23 16:59	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 08-3791-5696	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 23 Feb-23 14:45	Protocol: EPA/821/R-02-012 (2002)	Diluent: Laboratory Seawater
Ending Date: 02 Mar-23 14:05	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 00-8679-3916	Code: 52C5EBC	Client: BP Cherry Point
Sample Date: 22 Feb-23 08:14	Material: Ambient Sample	Project: WET Quarterly Compliance Test (1Q)
Receive Date: 04 Mar-23	Source: Discharge Monitoring Report	
Sample Age: 31h	Station: Effluent	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	17.6%	10.8	>10.8	NA	9.259

## Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision( $\alpha$ :5%)
Dilution Water		0.8	1.39	2.31	0.055	14	0.2566	CDF	Non-Significant Effect
		2.4	-0.4056	2.31	0.055	14	0.9263	CDF	Non-Significant Effect
		3.6*	3.044	2.31	0.055	14	0.0086	CDF	Significant Effect
		7.2	0.9481	2.31	0.055	14	0.4409	CDF	Non-Significant Effect
		10.8	0.9375	2.31	0.055	14	0.4457	CDF	Non-Significant Effect

*known Type I error*

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	0.0329506	0.00659012	5	2.925	0.0236	Significant Effect
Error	0.09462488	0.002252973	42			
Total	0.1275755		47			

## Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variances	Bartlett Equality of Variance	7.538	15.1	0.1836	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9728	0.934	0.3245	Normal Distribution

## Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	0.31	0.2464	0.3736	0.296	0.188	0.41	0.02689	24.5%	0.0%
0.8		8	0.277	0.2473	0.3067	0.275	0.222	0.332	0.01256	12.8%	10.6%
2.4		8	0.3196	0.2819	0.3573	0.309	0.268	0.415	0.01594	14.1%	-3.1%
3.6		8	0.2378	0.211	0.2645	0.241	0.168	0.272	0.0113	13.4%	23.3%
7.2		8	0.2875	0.2571	0.3179	0.29	0.22	0.35	0.01285	12.6%	7.26%
10.8		8	0.2877	0.2495	0.326	0.281	0.212	0.352	0.01619	15.9%	7.18%

## Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.364	0.254	0.304	0.41	0.288	0.188	0.398	0.274
0.8		0.262	0.244	0.3	0.282	0.222	0.268	0.332	0.306
2.4		0.348	0.268	0.292	0.415	0.322	0.308	0.294	0.31
3.6		0.25	0.238	0.242	0.272	0.226	0.266	0.24	0.168
7.2		0.3	0.278	0.3	0.35	0.282	0.298	0.22	0.272
10.8		0.286	0.27	0.266	0.352	0.29	0.276	0.35	0.212



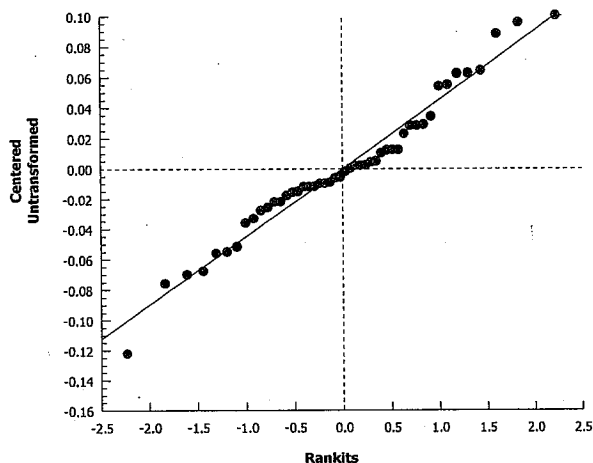
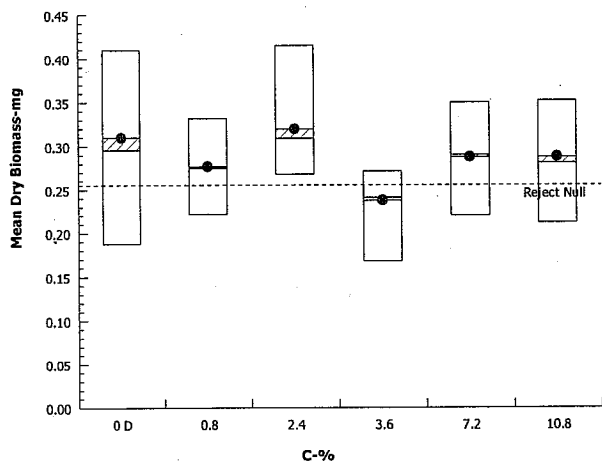
Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 08-2953-0173      Endpoint: Mean Dry Biomass-mg  
 Analyzed: 08 Mar-23 16:59      Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.7  
 Official Results: Yes

Graphics



## CETIS Analytical Report

Report Date: 15 Mar-23 13:06 (p 1 of 2)

Test Code: 056-239 | 10-2711-9843

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 13-2939-4396	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 15 Mar-23 13:06	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 08-3791-5696	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 23 Feb-23 14:45	Protocol: EPA/821/R-02-012 (2002)	Diluent: Laboratory Seawater
Ending Date: 02 Mar-23 14:05	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 6d 23h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 00-8679-3916	Code: 52C5EBC	Client: BP Cherry Point
Sample Date: 22 Feb-23 08:14	Material: Ambient Sample	Project: WET Quarterly Compliance Test (1Q)
Receive Date: 04 Mar-23	Source: Discharge Monitoring Report	
Sample Age: 31h	Station: Effluent	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	17.0%	10.8	>10.8	NA	9.259

## Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		0.8	1.671	2.31	0.054	14	0.1669	CDF	Non-Significant Effect
		2.4	-0.9378	2.31	0.054	14	0.9810	CDF	Non-Significant Effect
		3.6*	3.055	2.31	0.054	14	0.0084	CDF	Significant Effect
		7.2	-0.2848	2.31	0.054	14	0.9042	CDF	Non-Significant Effect
		10.8	0.9244	2.31	0.054	14	0.4517	CDF	Non-Significant Effect

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04619922	0.009239845	5	4.27	0.0031	Significant Effect
Error	0.09087868	0.002163778	42			
Total	0.1370779		47			

## Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.885	15.1	0.4300	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9683	0.934	0.2181	Normal Distribution

## Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	0.3159	0.2603	0.3715	0.296	0.235	0.41	0.02351	21.1%	0.0%
0.8		8	0.277	0.2473	0.3067	0.275	0.222	0.332	0.01256	12.8%	12.3%
2.4		8	0.3377	0.3007	0.3747	0.3285	0.292	0.415	0.01564	13.1%	-6.91%
3.6		8	0.2448	0.2155	0.2741	0.246	0.168	0.2825	0.0124	14.3%	22.5%
7.2		8	0.3225	0.2782	0.3668	0.3	0.275	0.4375	0.01874	16.4%	-2.1%
10.8		8	0.2944	0.2642	0.3245	0.281	0.265	0.352	0.01275	12.3%	6.81%

## Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.364	0.254	0.304	0.41	0.288	0.235	0.398	0.274
0.8		0.262	0.244	0.3	0.282	0.222	0.268	0.332	0.306
2.4		0.348	0.335	0.292	0.415	0.322	0.308	0.294	0.3875
3.6		0.25	0.238	0.242	0.272	0.2825	0.266	0.24	0.168
7.2		0.3	0.3475	0.3	0.4375	0.282	0.298	0.275	0.34
10.8		0.286	0.27	0.266	0.352	0.29	0.276	0.35	0.265

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 13-2939-4396

Endpoint: Mean Dry Weight-mg

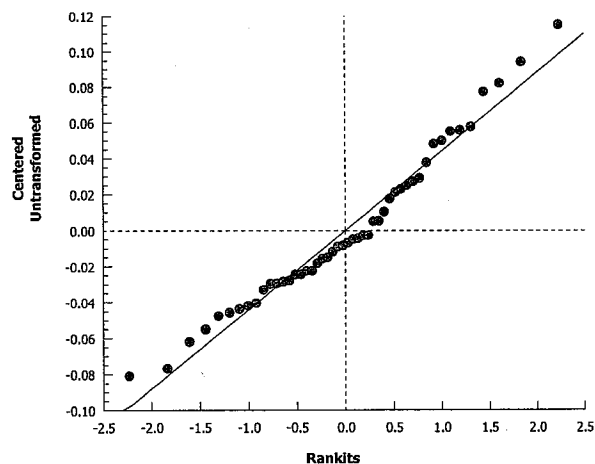
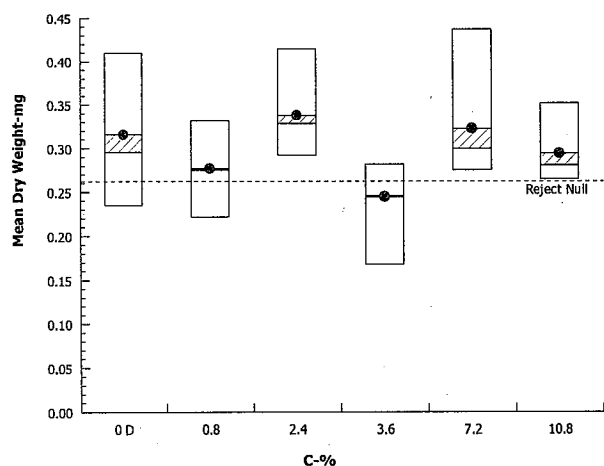
CETIS Version: CETISv1.8.7

Analyzed: 15 Mar-23 13:06

Analysis: Parametric-Control vs Treatments

Official Results: Yes

Graphics



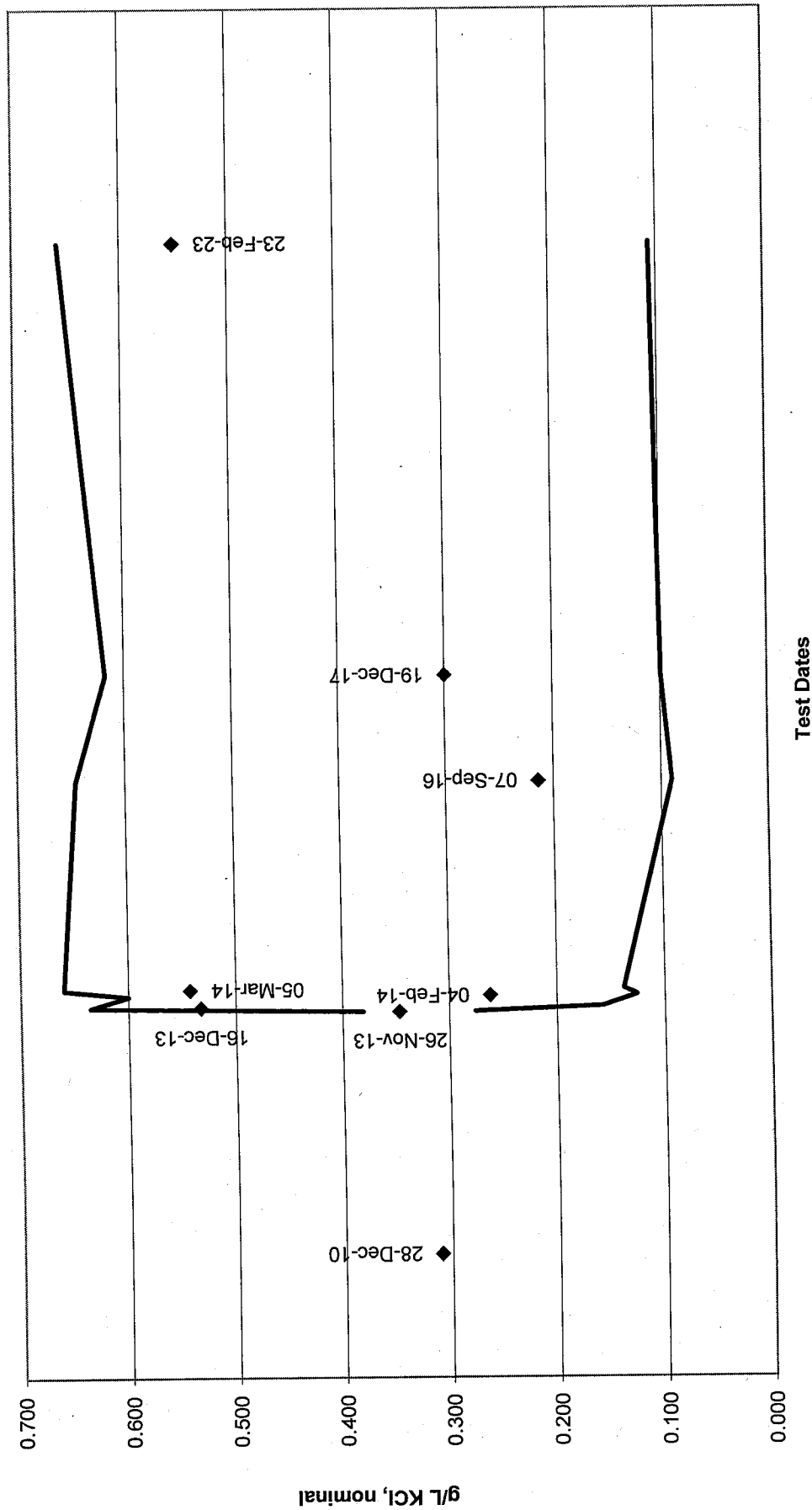
## **APPENDIX C**

### **Reference Toxicant Control Chart, Spreadsheet, and Raw Test Data**

TRE Environmental Strategies, LLC  
*Americamysis bahia* Chronic Ref Tox at 26C  
 IC25 based on dry weight per original organism  
 Commercially Supplied Organisms

run 3/9/23

December 2010 through February 2023



FILE IS MYSID CHRONIC 14001-904-848  
REFERENCE TOXICANT DATA FOR AMERICAMYSIS BAHIA CHRONICS  
COMMERCIALY SUPPLIED  
EXPRESSED AS G/L KCL, NOMINAL  
TRE ENVIRONMENTAL STRATEGIES, LLC  
IC25 BASED ON MEAN DRY WEIGHT PER ORIGINAL MYSID

*nu 3/9/13*

ITONI	DATE	LOT	Linear X		ACCEPTABLE RANGE				%CV
			Transform	IC25	MEAN	SD	LOW	HIGH	
1	28-Dec-10	10-045		0.310	0.310	#DIV/0!	#DIV/0!	#DIV/0!	
2	26-Nov-13	13-045		0.347	0.329	0.026	0.276	0.381	7.96
3	16-Dec-13	13-049		0.533	0.397	0.120	0.158	0.636	30.13
4	04-Feb-14	14-005		0.262	0.363	0.119	0.126	0.600	32.66
5	05-Mar-14	14-008		0.543	0.399	0.130	0.138	0.660	32.70
6	07-Sep-16	16-026		0.214	0.368	0.139	0.090	0.646	37.75
7	19-Dec-17	17-038		0.300	0.358	0.129	0.099	0.617	36.12
8	23-Feb-23	23-005		0.551	0.383	0.138	0.107	0.658	36.04
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

# TOXICITY DATA PACKAGE COVER SHEET

OK 2/2/23

Test Type: Chronic  
Test Substance: 100 g/L KCl stock solution  
Dilution Water Type: Salt Water @ 25‰ ± 2 ppt  
Concurrent Control Water Type: N/A  
Date and Time Test Began: 2/23/23 @ 1545  
Protocol Number: USEPA 2002, method 1007.0

Project Number: 14001-904-1357  
Species: Americamysis bahia  
Organism Lot or Batch Number: 23-005  
Age: 7 days (7 days) Supplier: ABS  
Date and Time Test Ended: 3/2/23 @ 1450  
Investigator(s): TA/HR/SJ/en/WT/LMYD

## Background Information

Type of Test: Static Renewal

Test Temperature: 26±1°C

Photoperiod: 16 h light : 8 h dark

Test Solution Vol.: 150 ml

Length of Test: 7 days

pH Control?: Yes No If Yes, give % CO<sub>2</sub>: N/A

Env. Chmbr/Bath #: 21 Test Chambers: 540 ml plastic containers

Light Intensity: 50 – 100 ft.-c

Number of Replicates per Treatment: 8

Number of Organisms per Replicate: 5

Type of Food and Quantity per Chamber: 0.1 ml B.S / 0.2 ml B.S. (PM). \*\* Feeding Frequency: 3 x Daily

Test Substance Characterization Parameters and Frequency:

NH<sub>3</sub>: Sx. Receipt pH: Daily SALINITY: daily in 1 rep of each treatment \*

Hardness: Sx. Receipt

Alkalinity: Sx. Receipt

D.O.: Daily Temp.: Daily

TRC: Sx. Receipt

Test Concentrations (Volume): Control, 0.125, 0.25, 0.5 and 1.0 g/L of KCl

Agency Summary Sheet(s)?       

Reference Toxicant Data: Test Dates:        to        LC<sub>50</sub> or IC<sub>25</sub> (Circle):         
Hist. 95% Control Limits:        to        Method for Determining Ref. Tox. Value:       

## Special Procedures and Considerations:

DO measured using salinity compensating meter set @ NA mg/L chloride at 26°C

D.O. maintained ≥ 4.0 mg/L; if DO ≤ 4.0 then aerate study

\* Salinity measured in 1 rep of each treatment day 0; and 1 rep of each treatment days 1 to 7 in old solutions

\*\* Feed 0.1 ml B.S AM and Noon and 0.2 ml B.S. in PM

Study Director Initials:       

Date:       

OK 2/23/23 TA

# TEST SUBSTANCE USAGE LOG

Project Number 14001-904-1357

GA M 3/15/23

	Sample 1	Sample 2	Sample 3	Sample 4
Test Substance Number				
Stock Solution Preparation Date and Time	N/A			
Sample Type (Grab or Comp)	N/A			
Date Test Substance Received	Prepared stock			
Dilution Water Number RW# or TRE#, circle one	14901			
Concurrent Control Water RW#	N/A			
Date(s) Used	2/23/23	2/27/23		
	2/24/23	02/28/23		
	2/25/23	3/1/23		
	2/26/23			

## PREPARATION OF TEST SOLUTIONS

Test Substance Conc., g/L KCl	Test Substance Stock Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0	0	1200	1200						
0.125	1.5	1198.5	1200						
0.25	3	1197	1200						
0.5	6	1194	1200						
1.0	12	1188	1200						
Total	22.5	5977.5	6000						
Initials/Date	TA 2/23/23 Mixed My C								
Initials/Date	J 2/24/23 "								
Initials/Date	EM 2/25/23 "								
Initials/Date	WT 2/26/23 "								
Initials/Date	TA 2/27/23 "								
Initials/Date	LM 02/28/23 "								
Initials/Date	TA 3/1/23								
Initials/Date									



Mysid Shrimp (*Americamysis bahia*)  
CHRONIC BIOLOGICAL DATA

BA m 3/9/23

Project Number: 14001-904-1357

Conc. g/L	Test Replicate	Number of Surviving Organisms								Remarks
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Control	A	5	5	5	5	5	5	5	5	90
	B	5	4	4	4	4	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	5	
	F	5	4	5	4	4	4	4	4	
	G	5	4	3	3	3	3	3	3	
	H	5	5	4	4	4	4	4	4	
0.125	A	5	5	5	5	5	5	5	5	90
	B	5	4~	4	4	4	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	5	
	F	5	5	5	5	5	5	5	5	
	G	5	4	4	4	4	4	4	4	
	H	5	5	5	5	5	5	5	5	
0.25	A	5	5	5	5	5	5	5	5	90
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	5	4	
	D	5	4*	4	3	3	3	3	3	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	5	5	5	5	
	G	5	5	4x	4	4	4	4	4	
	H	5	5	5	5	5	5	5	5	
0.5	A	5	5	5	5	5	5	5	5	90
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	4	4	
	D	5	4	3	3	3	3	3	3	
	E	5	5	5	5	5	5	5	5	
	F	5	5	5	5	4	4	4	4	
	G	5	5	5	5	4	4	4	4	
	H	5	5	5	5	4x	3	3	3	
	Date:	2/13/23	2/14/23	2/25/23	2/26/23	2/27/23	2/28/23	3/1/23	3/2/23	
	Time:	1455	1155	1430	1425	1145	1145	1200	1450	
	Initials:	TA/HP	J)	en	WT	TA	LM	TD	HP	

3 Den 2/27/23 e 2 m 3/9/23 f

Mysid Shrimp (*Americamysis bahia*)  
CHRONIC BIOLOGICAL DATA

Sam 3/9/23

Project Number: 14001-904-1357

Conc. g/L	Test Replicate	Number of Surviving Organisms								Remarks
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
1.0	A	5	0	—	—	—	—	—	—	D
	B	5	0	—	—	—	—	—	—	
	C	5	0	—	—	—	—	—	—	
	D	5	0	—	—	—	—	—	—	
	E	5	0	—	—	—	—	—	—	
	F	5	0	—	—	—	—	—	—	
	G	5	0	—	—	—	—	—	—	
	H	5	0	—	—	—	—	—	—	
	A									
	B									
	C									
	D									
	E									
	F									
	G									
	H									
	A									
	B									
	C									
	D									
	E									
	F									
	G									
	H									
	A									
	B									
	C									
	D									
	E									
	F									
	G									
	H									
	Date:	2/23/23	2/24/23	2/25/23	2/26/23	2/27/23	2/28/23	3/1/23	3/2/23	
	Time:	1455	1155	1430	1425	1145	1145	1700	1450	
	Initials:	TA/HP	J)	en	WT	TD	LM	TA	HP	

CHRONIC CHEMICAL DATA (INITIAL)

BA MW 3/15/23

Project Number: 14001-904-1357

Test Species (Circle): *C. dubia* *D. magna* *D. pulex* *P. promelas* Other (Specify): *Americamysis bahia*

g/L		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.:	Cont									All Conc.	
pH		8.2	8.0	8.0	8.0	8.1	8.0	8.0		19	
D.O. (mg/L)		6.6	6.7	6.4	6.3	6.8	6.7	6.8		17	
Temp. (°C)		25	25	25	25	25	25	25		144	
Salinity (ppt)		28*	24	25	25	26	26	25		#2	
Hard. (mg/L)		450								Tit.	
Alk. (mg/L)		116								Tit.	
TRC (mg/L)		0.02								21	
NH <sub>3</sub> (mg/L)		410								HAI	
Conc.:	0.125										
pH		8.2	8.1	8.0	8.0	8.1	8.1	8.0			
D.O. (mg/L)		6.6	6.4	6.5	6.3	6.7	6.7	6.7			
Temp. (°C)		*	*	*	*	*	*	*			
Salinity (ppt)		28*	24	26	25	27	26	25			
Hard. (mg/L)											
Alk. (mg/L)											
TRC (mg/L)											
NH <sub>3</sub> (mg/L)											
Conc.:	0.25										
pH		8.2	8.1	8.0	8.0	8.1	8.1	8.0			
D.O. (mg/L)		6.5	6.4	6.6	6.3	6.6	6.6	6.7			
Temp. (°C)		*	*	*	*	*	*	*			
Salinity (ppt)		28*	25	24	25	27	26	26			
Hard. (mg/L)											
Alk. (mg/L)											
TRC (mg/L)											
NH <sub>3</sub> (mg/L)											
Date:		2/17/23	2/18/23	2/19/23	2/20/23	2/21/23	2/22/23	2/23/23	3/1/23		▲ Salinity, 1 rep each treatment D O
Time:		1445	1110	1415	1420	1145	1135	1130			
Initials:		TP	J)	en	WT	TPA	LM	LM			

NOTE: Hardness, alkalinity, TRC, and NH<sub>3</sub> data appearing on this page have been transcribed from the wet chemistry log, QA Form No. 084.  
 \* Dilution/control water and stock solution were brought to 26°C prior to mixing the dilution series. The temperature of resulting stock dilution is assumed to also be 26°C.

OLM, 02/28/23, E

CHRONIC CHEMICAL DATA (INITIAL)

QA m3/15/23

Project Number: 14001-904-1357

Test Species (Circle): *C. dubia* *D. magna* *D. pulex* *P. promelas* Other (Specify): *Americamysis bahia*

g/L	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 0.5										
pH	8.1	8.1	8.0	8.1	8.1	8.1	8.1			
D.O. (mg/L)	6.6	6.4	6.4	6.3	6.7	6.7	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salinity (ppt)	28*	25	26	25	27	25	26			
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH <sub>3</sub> (mg/L)										
Conc.: 1.0										
pH	8.1	8.1								
D.O. (mg/L)	6.6	6.5								
Temp. (°C)	*	*	*①							
Salinity (ppt)	28*	26								
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH <sub>3</sub> (mg/L)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salinity (ppt)										
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH <sub>3</sub> (mg/L)										
Date:	7/23/23	7/24/23	7/25/23	7/26/23	7/27/23	7/28/23	7/29/23			▲ Salinity, 1 rep each treatment D 0
Time:	1445	1110	1415	1420	1145	1135	1130			
Initials:	TA	JJ	en	WT	TA/LM	LM				

NOTE: Hardness, alkalinity, TRC, and NH<sub>3</sub> data appearing on this page have been transcribed from the wet chemistry log, QA Form No. 084.  
 \* Dilution/control water and stock solution were brought to 26°C prior to mixing the dilution series. The temperature of resulting stock dilution is assumed to also be 26°C.

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DA M 3/15/23

CHRONIC CHEMICAL DATA (FINAL)

Project Number: 14001-904-1357									
Test Species (Circle): C. dubia D. magna D. pulex P. promelas Other (Specify): Americamysis bahia									
g/L	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 0.125								All Conc.	
pH	8.0	7.7	7.8	8.0	7.9	7.8	7.7	19	
D.O. (mg/L)	5.0	4.9	5.5	6.1	5.6	5.4	5.3	17	
Temp. (°C)	23	23	24	27	23	23	24	L-44	
Salinity (ppt) ▲	23	27	26	20	27	25	31	#2	
Conc.: 0.25									
pH	8.0	7.7	7.8	7.9	7.9	7.8	7.7		
D.O. (mg/L)	5.7	5.0	5.0	5.5	5.6	4.8	5.0		
Temp. (°C)	23	23	24	20	23	23	23		
Salinity (ppt) ▲	29	26	25	24	25	26	28		
Conc.: 0.5									
pH	7.9	7.7	7.8	8.0	8.0	7.8	7.7		
D.O. (mg/L)	5.3	5.0	4.9	5.7	5.9	5.3	5.0		
Temp. (°C)	23	23	24	20	23	23	23		
Salinity (ppt) ▲	29	26	25	27	26	27	31		
Conc.: 1.0									
pH	8.1								
D.O. (mg/L)	5.0								
Temp. (°C)	23								
Salinity (ppt) ▲	27								
Conc.:									
pH									
D.O. (mg/L)									
Temp. (°C)									
Salinity (ppt) ▲									
Date:	2/21/23	2/27/23	2/26/23	2/27/23	2/28/23	3/1/23	3/2/23		▲ Salinity, 1 rep each treatment DAILY
Time:	11:15	1420	1420	1155	1140	1135	1445		
Initials:	J)	en	WT	TP/en	LM	LM	HP		

①)) 2/21/23: e "24" ③ en  
 ②)) 2/24/23: e "115"

DAILY TOXICITY TEST LOG

*OK WZ 3/15/23*

Project Number: 14001-904-1357

Test Species (Circle): *C. dubia* *D. magna* *D. pulex* *P. promelas* *O. mykiss* Other (Specify): *Americamysis bahia*

General Comments	Measured salinity of stock = _____ ppt Measured salinity of dilution water = _____ ppt Measured Cl <sup>-</sup> of stock = _____ mg/L Measured Cl <sup>-</sup> of dilution water = _____ mg/L Random Chart ID: <u>Kappa</u>	Feeding Δ 0.1ml B.S. 2 x Daily  * 0.2 ml B.S. 1 x Daily (PM)	Initials/Date
Test Day 0	Test Solution Mixed at: <u>1435</u> Test Organisms Added at: <u>1455</u>	Fed @ <u>1615 TA</u>	<u>TA</u> <u>2/23/23</u>
Test Day 1	Real Time Temp= <u>24</u> °C Range= <u>23-25</u> °C	Fed @ <u>Δ 0840 an</u> <u>Δ 1225 HP</u> <u>* 1600 WT</u>	<u>JJ</u> <u>2/24/23</u>
Test Day 2	Real Time Temp= <u>24</u> °C Range= <u>23-26</u> °C	Fed @ <u>Δ 0850 LM</u> <u>Δ 1230 12*</u>	<u>en</u> <u>2/25/23</u>
Test Day 3	Real Time Temp= <u>25</u> °C Range= <u>24-26</u> °C	Fed @ <u>Δ 0855 N/TA</u> <u>Δ 1145 TA</u> <u>* 1550 TA</u>	<u>WT</u> <u>2/26/23</u>
Test Day 4	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ <u>Δ 0830 HP</u> <u>Δ 1230 HP</u> <u>* 1730 N/TA</u>	<u>TA</u> <u>2/27/23</u>
Test Day 5	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ <u>Δ 0835 JJ</u> <u>Δ 1215 LM</u> <u>* 1730 Δ 1645 TA</u>	<u>LM</u> <u>02/28/23</u>
Test Day 6	Real Time Temp= <u>24</u> °C Range= <u>24-25</u> °C	Fed @ <u>0840 TA</u> <u>1200 TA</u> <u>1700 *TA</u>	<u>TA</u> <u>3/1/23</u>
Test Day 7	Real Time Temp= <u>24</u> °C Range= <u>24-25</u> °C	<u>NONE</u> <u>Δ 0835 JJ</u> <u>Δ 1130 WT</u>	<u>HP</u> <u>3/2/23</u>
Test Day 8			

6111 3/15/23

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-904-1357		Test Substance: 100g/L KCl		Comments:									
Species: <i>Americamysis bahia</i>		Analyst Tare: LM		Analytical Balance ID:									
Date/Time of Tare Wt.: 03/02/23 @ 0940		Date/Time of Gross Wt.: 3/7/23 @ 1100		Dried in Oven # 1 from Date: to Date: Time: Time:									
Boat No.	Treatment	Rep.	Length Units:	Weight Type (Circle): Wet Blot Dry Dry (60-90°C) Dry (>100°C) AFDW (>500°C)			Lot or Batch Number: 23-005						
				Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g) <sup>1</sup>	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
0	A			1.17005									
	B			1.17533									
	C			1.16590									
	D			1.17244									
	E			1.19501									
	F			1.20106									
	G			1.16736									
	H			1.17677									
0.125	A			1.16739									
	B			1.17002									
	C			1.16720									
	D			1.17956									
Blank				1.19472									
Range													
Mean													
Test Solution Volume:				Loading Rate:									

<sup>1</sup> Add in weight loss of blank boat, if appropriate.







# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-904-1357

Species: *Americamysis bahia*

*by m 3/9/23*

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
Control	A		1.17005	1.17119	0.00114	0.00119	5	0.238	0.2513	5	0.238	0.2799
	B		1.17533	1.17629	0.00096	0.00101	5	0.202		4	0.253	
	C		1.16590	1.16738	0.00148	0.00153	5	0.306		5	0.306	
	D		1.17244	1.17395	0.00151	0.00156	5	0.312		5	0.312	
	E		1.19501	1.19642	0.00141	0.00146	5	0.292		5	0.292	
	F		1.20106	1.20239	0.00133	0.00138	5	0.276		4	0.345	
	G		1.16736	1.16813	0.00077	0.00082	5	0.164		3	0.273	
	H		1.17677	1.17738	0.00061	0.00066	3	0.220		3	0.220	
0.125	A		1.16739	1.16877	0.00138	0.00143	5	0.286	0.3122	5	0.286	0.3209
	B		1.17002	1.17120	0.00118	0.00123	4	0.308		4	0.308	
	C		1.16720	1.16878	0.00158	0.00163	5	0.326		5	0.326	
	D		1.17956	1.18119	0.00163	0.00168	5	0.336		5	0.336	
	E		1.17245	1.17376	0.00131	0.00136	5	0.272		5	0.272	
	F		1.16179	1.16367	0.00188	0.00193	5	0.386		5	0.386	
	G		1.18366	1.18500	0.00134	0.00139	5	0.278		4	0.348	
	H		1.17749	1.17897	0.00148	0.00153	5	0.306		5	0.306	
0.25	A		1.16984	1.17154	0.00170	0.00175	5	0.350	0.2968	5	0.350	0.3235
	B		1.15255	1.15383	0.00128	0.00133	5	0.266		5	0.266	
	C		1.17394	1.17542	0.00148	0.00153	5	0.306		4	0.383	
	D		1.17859	1.17957	0.00098	0.00103	5	0.206		3	0.343	
	E		1.15994	1.16159	0.00165	0.00170	5	0.340		5	0.340	
	F		1.19326	1.19442	0.00116	0.00121	5	0.242		5	0.242	
	G		1.17544	1.17675	0.00131	0.00136	4	0.340		4	0.340	
	H		1.16619	1.16776	0.00157	0.00162	5	0.324		5	0.324	

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-904-1357

Species: *Americamysis bahia*

SAW 3/2/23

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
0.5	A		1.14970	1.15082	0.00112	0.00117	5	0.2340	0.2392	5	0.2340	0.2881
	B		1.17824	1.17941	0.00117	0.00122	5	0.244		5	0.244	
	C		1.15338	1.15445	0.00107	0.00112	5	0.224		4	0.280	
	D		1.17019	1.17122	0.00103	0.00108	5	0.216		3	0.360	
	E		1.16331	1.16477	0.00146	0.00151	5	0.302		5	0.302	
	F		1.17892	1.18011	0.00119	0.00124	5	0.248		4	0.310	
	G		1.18098	1.18207	0.00109	0.00114	5	0.228		4	0.285	
	H		1.16682	1.16764	0.00082	0.00087	4	0.218		3	0.290	
	A				0.00000	0.00000		#DIV/0!	#DIV/0!			#DIV/0!
	B				0.00000	0.00000		#DIV/0!				
	C				0.00000	0.00000		#DIV/0!				
	D				0.00000	0.00000		#DIV/0!				
	E				0.00000	0.00000		#DIV/0!				
	F				0.00000	0.00000		#DIV/0!				
	G				0.00000	0.00000		#DIV/0!				
	H				0.00000	0.00000		#DIV/0!				
	A				0.00000	0.00000		#DIV/0!	#DIV/0!			#DIV/0!
	B				0.00000	0.00000		#DIV/0!				
	C				0.00000	0.00000		#DIV/0!				
	D				0.00000	0.00000		#DIV/0!				
	E				0.00000	0.00000		#DIV/0!				
	F				0.00000	0.00000		#DIV/0!				
	G				0.00000	0.00000		#DIV/0!				
	H				0.00000	0.00000		#DIV/0!				
Blank			1.19472	1.19467	-0.00005							

# TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-904-1357

Species: *Americamysis bahia*

Rb w 3/9/23

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)

## Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.6	1.0	0.9000	0.1512	16.798%
0.125	8	0.8	1.0	0.9750	0.0707	7.252%
0.25	8	0.6	1.0	0.9250	0.1488	16.087%
0.5	8	0.6	1.0	0.8438	0.1450	17.186%
0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

## Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.164	0.3120.2513		0.0537	21.355%
0.125	8	0.272	0.3860.3122		0.0373	11.946%
0.25	8	0.206	0.3500.2968		0.0529	17.824%
0.5	8	0.216	0.3020.2392		0.0279	11.652%
0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

## Summary Statistics for Growth Data (dry wt per surviving organism)

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.220	0.3450.2799		0.0418	14.938%
0.125	8	0.272	0.3860.3209		0.0363	11.305%
0.25	8	0.242	0.3830.3235		0.0464	14.344%
0.5	8	0.234	0.3600.2881		0.0393	13.628%
0	0	0.000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
0	0	0.000	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

# CETIS Analytical Report

Report Date: 09 Mar-23 11:05 (p 1 of 2)  
Test Code: 904-1357 | 10-2557-8674

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 00-0267-1475	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 09 Mar-23 11:05	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 02-9536-3305	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 23 Feb-23 14:55	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 02 Mar-23 14:50	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d	Source: Aquatic Biosystems, CO	Age:
Sample ID: 04-4133-8716	Code: 1A4E4B5C	Client: Internal Lab
Sample Date: 07 Mar-23 14:43	Material: Potassium chloride	Project: Special Studies
Receive Date: 07 Mar-23 14:43	Source: Reference Toxicant	
Sample Age: NA	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	19.0%	0.5	1	0.7071	

## Dunnett Multiple Comparison Test

Control	vs	C-gm/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision( $\alpha$ :5%)
Dilution Water		0.125	-2.752	2.15	0.048	14	0.9998	CDF	Non-Significant Effect
		0.25	-2.055	2.15	0.048	14	0.9981	CDF	Non-Significant Effect
		0.5	0.5448	2.15	0.048	14	0.5234	CDF	Non-Significant Effect

## ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	0.02961978	0.009873261	3	5.035	0.0065	Significant Effect
Error	0.05490793	0.001960997	28			
Total	0.08452771		31			

## Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variances	Bartlett Equality of Variance	3.504	11.3	0.3202	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9753	0.908	0.6575	Normal Distribution

## Mean Dry Biomass-mg Summary

C-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	0.2512	0.2064	0.2961	0.257	0.164	0.312	0.01897	21.4%	0.0%
0.125		8	0.3122	0.281	0.3434	0.3067	0.272	0.386	0.01319	11.9%	-24.3%
0.25		8	0.2968	0.2525	0.341	0.315	0.206	0.35	0.0187	17.8%	-18.1%
0.5		8	0.2392	0.2159	0.2625	0.231	0.216	0.302	0.009853	11.7%	4.8%
1		8	0	0	0	0	0	0	0		100.0%

## Mean Dry Biomass-mg Detail

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.238	0.202	0.306	0.312	0.292	0.276	0.164	0.22
0.125		0.286	0.3075	0.326	0.336	0.272	0.386	0.278	0.306
0.25		0.35	0.266	0.306	0.206	0.34	0.242	0.34	0.324
0.5		0.234	0.244	0.224	0.216	0.302	0.248	0.228	0.2175
1		0	0	0	0	0	0	0	0

3/9/23

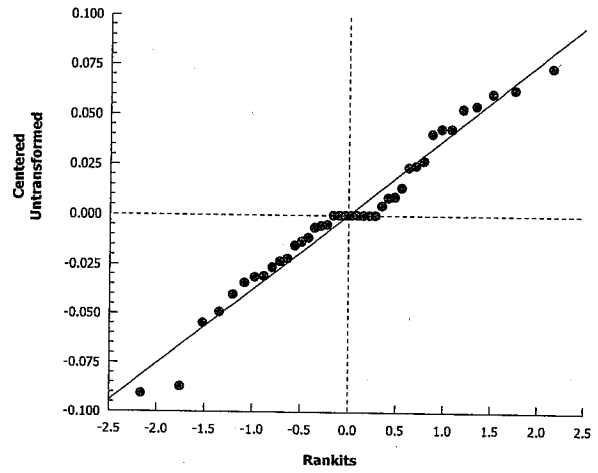
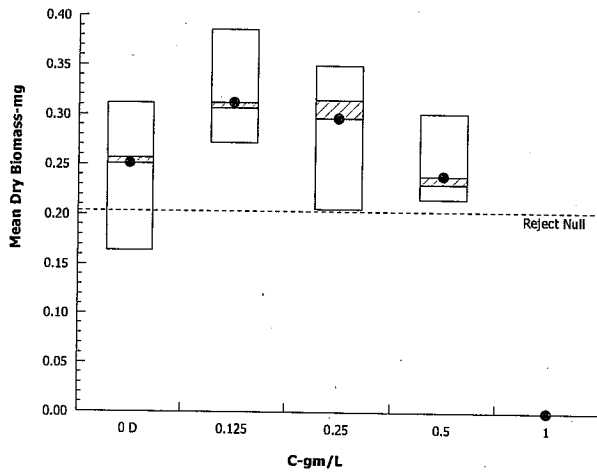
Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 00-0267-1475  
 Analyzed: 09 Mar-23 11:05  
 Endpoint: Mean Dry Biomass-mg  
 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.7  
 Official Results: Yes

Graphics



# CETIS Analytical Report

Report Date: 09 Mar-23 12:17 (p 1 of 2)

Test Code: 904-1357 | 10-2557-8674

## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 18-6781-0117	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 09 Mar-23 12:17	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 02-9536-3305	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 23 Feb-23 14:55	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 02 Mar-23 14:50	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d	Source: Aquatic Biosystems, CO	Age:
Sample ID: 04-4133-8716	Code: 1A4E4B5C	Client: Internal Lab
Sample Date: 07 Mar-23 14:43	Material: Potassium chloride	Project: Special Studies
Receive Date: 07 Mar-23 14:43	Source: Reference Toxicant	
Sample Age: NA	Station:	

### Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	623027	200	Yes	Two-Point Interpolation

### Point Estimates

Level	gm/L	95% LCL	95% UCL
IC5	0.3254	0.2163	0.3895
IC10	0.4008	0.3316	0.5085
IC15	0.4762	0.4011	0.5358
IC20	0.5205	0.4539	0.5631
IC25	0.5505	0.5069	0.5904
IC40	0.6404	0.6055	0.6723
IC50	0.7003	0.6713	0.7269

### Mean Dry Biomass-mg Summary

C-gm/L	Control Type	Count	Calculated Variate						
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.2512	0.164	0.312	0.01897	0.05365	21.4%	0.0%
0.125		8	0.3122	0.272	0.386	0.01319	0.03729	11.9%	-24.3%
0.25		8	0.2968	0.206	0.35	0.0187	0.05289	17.8%	-18.1%
0.5		8	0.2392	0.216	0.302	0.009853	0.02787	11.7%	4.8%
1		8	0	0	0	0	0		100.0%

### Mean Dry Biomass-mg Detail

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.238	0.202	0.306	0.312	0.292	0.276	0.164	0.22
0.125		0.286	0.3075	0.326	0.336	0.272	0.386	0.278	0.306
0.25		0.35	0.266	0.306	0.206	0.34	0.242	0.34	0.324
0.5		0.234	0.244	0.224	0.216	0.302	0.248	0.228	0.2175
1		0	0	0	0	0	0	0	0

3/9/23

# CETIS Analytical Report

Report Date: 09 Mar-23 12:17 (p 2 of 2)  
Test Code: 904-1357 | 10-2557-8674

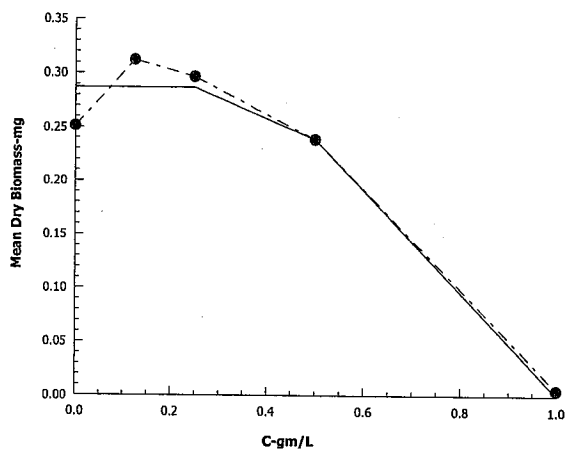
## Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 18-6781-0117      Endpoint: Mean Dry Biomass-mg  
Analyzed: 09 Mar-23 12:17      Analysis: Linear Interpolation (ICPIN)

CETIS Version: CETISv1.8.7  
Official Results: Yes

### Graphics





**APPENDIX D**  
**Power Standards**

## POWER STANDARDS CALCULATION FOR CHRONIC TESTS

Project Number: 14001-056-239 Test Species: Americamysis bahia

Test Period: February 23, 2023 to March 2, 2023

	Mysid average weight / organism (mg/)								
CCEC	Rep A	Rep B	Rep C	Rep D	Rep E	Rep F	Rep G	Rep H	Mean
0.8% effluent	0.262	0.244	0.300	0.282	0.222	0.268	0.332	0.306	0.277 (A)
Control	Rep A	Rep B	Rep C	Rep D	Rep E	Rep F	Rep G	Rep H	Mean
Lab water	0.364	0.254	0.304	0.410	0.288	0.188	0.398	0.274	0.310 (B)

1. 0.310 (B) - 0.277 (A) = 0.033 (C)
2. [0.033 (C) ÷ 0.310 (B) = 0.1065 x 100 = 10.65 (D)
3. If (D) is ≤ 39 percent, then this test has met the power standard.
4. This test **DOES** / DOES NOT meet the power standard.

Note: WET tests that fail WET limits do not have to meet power standards.