

March 28, 2023

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

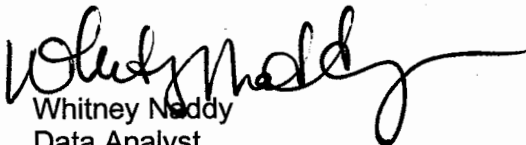
Subject: Results of chronic *Americamysis bahia* 2023 WET test – Round 2

Ms. Larson:

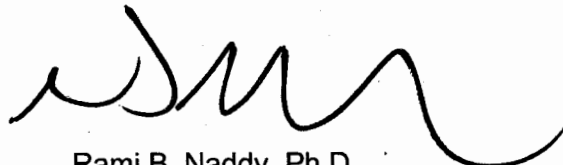
Enclosed is a copy of the report for the chronic *Americamysis bahia* toxicity test conducted in March 2023.

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



Rami B. Naddy, Ph.D.
Manager / Environmental Toxicologist
naddyrb.tre@gmail.com

Attachment:

14001-056-243

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

**Project ID: 14001-056-243
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: naddyrb.tre@gmail.com
Report Author	Erin Nace (970) 416-0916 email: naceec.tre@gmail.com

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	March 9, 2023 @ 1420 to March 16, 2023 @ 1530
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	03/08/23 @ 0850 – 0853	37534	03/09/23	4.0	
2	NA	03/10/23 @ 0910 – 0913	37541	03/11/23	2.6	
3	NA	03/13/23 @ 0820 – 0824	37565	03/15/23	2.4	HT

Note: See Appendix A for chain of custody records

Sample Characterization (as Received)

Sample No.	pH	Hard. (mg/L) ^{HA}	Alk. (mg/L) ^{HA}	Salinity (‰)	TRC (mg/L) ^G	NH ₃ -N (mg/L)
1	7.9	116	129	6	0.07	<1.0
2	8.0	140	122	6	0.03	<1.0
3	7.8	112	141	5	0.07	<1.0

Sample Characterization (after Salt Addition)

Sample No.	pH	Hard. (mg/L) ^{HA}	Alk. (mg/L) ^{HA}	Salinity (‰)	TRC (mg/L) ^G	NH ₃ -N (mg/L)
1	8.0	1,880	165	25	NM	NM
2	8.1	2,433	264	26	NM	NM
3	8.4	2,840	228	26	NM	NM

NM = not measured

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L) ^{HA}	Alk. (mg/L) ^{HA}	Salinity (‰)	TRC (mg/L) ^G	NH ₃ -N (mg/L)
14917	8.3	4,300	116	27	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 # 23-009)
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 March 9, 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	100	100	100	100
0.8	100	100	97.5	97.5	97.5	97.5	97.5
2.4	100	100	100	100	100	100	100
3.6	100	100	100	100	100	97.5	97.5
7.2	100	100	100	97.5	95	95	95
10.8	100	100	100	97.5	97.5	95	95

Note: See Appendix B for copies of laboratory data sheets

Biological Data – Growth (Dry Weight)

Treatment (% Effluent)	Mean Dry Weight/Original Organism (mg) ^{W1}	Significant Reduction Relative to the Dilution Water Control?	Mean Dry Weight/ Surviving Organism (mg) ^{W2}	Signification Reduction Relative to the Dilution Water Control?
0 (Dilution Water Cont.)	0.281	NA	0.281	NA
0.8	0.284	No	0.294	No
2.4	0.347	No	0.347	No
3.6	0.318	No	0.327	No
7.2	0.307	No	0.324	No
10.8	0.334	No	0.351	No
Percent Minimum Significant Difference (PMSD)	25.5	NA	25.3	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 ₂₅	>10.8	No
Growth (per original organism)	NOEC	10.8	No
	LOEC	>10.8	---
	ChV	>10.8	---
	IC ₂₅	>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

IC₂₅ = 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)	7.7	8.3	4.5	6.9	24	28	24	26	T1
10.8	7.9	8.2	4.2	6.8	25	27	24	26	T1
All Treatments	7.7	8.3	≥3.6		NA		24	26	O3, T1,T3
							24	26	T4

Reference Toxicant Test Results for *A. bahia*

7-day IC ₂₅ (g KCl/L)	TRE Historical 95% Control Limits (g KCl/L)	
	Low	High
0.54	0.122	0.677

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.

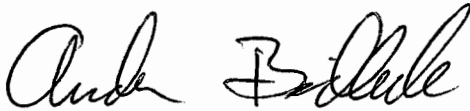
Explanation of Qualifiers

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 CaCO₃.
- 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 4th 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 *C. dubia* 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.

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

3/23/23
Date

Data Analyst

3/24/23
Date

APPENDIX A
Chain of Custody Records

[illegible]

Effective Date: 02/13/19

①LM, 02/20/23, E

Serial No. 08028

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. 08050

Page 7 of 7

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

[illegible]

Effective Date: 07/13/19

Serial No. 08047

APPENDIX B**Test Data**

QA: AB 3/27/20

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Chronic Project Number: 14001-056-243
Test Substance: Effluent Species: Americamysis bahia
Dilution Water Type: Salt water @ 25 ‰ ± 2 ppt Organism Lot or Batch Number: 23-009
Concurrent Control Water Type: NA Age: 7d (7 days) Supplier: ABS
Date and Time Test Began: 3/9/23 @ 1420 Date and Time Test Ended: 3/16/23 @ 1530
Protocol Number: USEPA 2002, method 1007.0 Investigator(s): TA/HP/WT/PA/D/ILM/JJ

Background Information

Type of Test: Static-Renewal pH control?: Yes No
If yes, give % CO₂: 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 NH₃: 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)?: _____

Reference Toxicant Data:	Test Dates: <u>3/9/23</u> to <u>3/16/23</u>	IC ₂₅ : <u>0.54</u>
Hist. 95% Control Limits: <u>0.122</u> to <u>0.677</u> Method for Determining Ref. Tox. Value: <u>Linear Interpolation</u>		

Special Procedures and Considerations:
D.O. maintained ≥ 4.0 mg/L
Study Director Initials: <u>AB for PBN</u> Date: <u>3/9/23</u>

QALVS 3/23/23

TEST SUBSTANCE USAGE LOG

Project Number: 14001-056-243

	Sample 1	Sample 2	Sample 3	
Test Substance Number	37534	37541	37565	
Test Substance Collection Date and Time	From: 3/8/23 @ 0850 To: 3/8/23 @ 0853	From: 03/10/23 @ 0900 To: 03/10/23 @ 0913	From: 3/11/23 @ 0820 To: 3/11/23 @ 0824	
Sample Type (Grab or Comp)	Grab	Grab	Grab	
Date Test Substance Received	3/9/23	03/11/23	3/15/23	
Dilution Water Number RW# or TRE#, circle one	14917	14917	14917	
Concurrent Control Water RW#	NA	NA	NA	
Date(s) Used	3/9/23 3/10/23	3/11/23 3/12/23 3/13/23 3/14/23	3/15/23 3	

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	TA 3/9/23 Mixed MyC								
Initials / Date	WT 3/10/23 "								
Initials / Date	PA 3/11/23 "								
Initials / Date	TH 3/12/23 "								
Initials / Date	HP 3/13/23 "								
Initials / Date	J 3/14/23 "								
Initials / Date	TH 3/15/23 "								
Initials / Date									

① J 3/15/23: C "42"

CA-13/23/10

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

Project Number: 14001-056-243

90 Surv

%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	
	B	5	5	5	5	5	5	5	5	100
	C	5	5	5	5	5	5	5	5	
	D	5	5	5	5	4*	4	4	4	* 1 org NF
	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	4*	* 1 org NF
	H	5	5	5	5	5	5	5	5	
0.8%	A	5	5	5	5	5	5	5	5	
	B	5	5	5	5	5	5	5	4*	* 1 org consumed
	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	5 4	4	* 1 org NF
2.4%	A	5	5	5	5	5	5	5	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	100
	F	5	5	5	5	5	5	5	5	
	G	5	5	5	5	5	5	5	5	
	H	5	5	5	5	6 0	5	5	5	
Date:		3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23	3/16/23	
Time:		1420	1420	1310	1620	1615	1630	1135	1530	
Initials:		TA/HP	WT	PA	TA	TA	JJ	TA	TA	

① JJ for TA 3/14/23:6
 ② WP 3/15/23 TA

QAS 3/23/23

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

Project Number: 14001-056-243

%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	4	*1 org consumed
	B	5	5	5	5	5	5	5	5	
	C	5	5	5	5	5	5	4*	4	*1 org NF
	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	
7.2%	A	5	5	5	5	4*	4	4	4	*1 org NF
	B	5	5	5	5	5	4~	4	4	~ TC
	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	4*	4	4	Δ org consumed
	H	5	5	5	5	5	5	5	5	
10.8%	A	5	5	5	5	5	5	4*	4	*1 org NF
	B	5	5	5	5	5	0/4 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	4*	4	4	4	*1 org NF
	H	5	5	5	5	5	5	5	5	
Date:		3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23	3/16/23	
Time:		1420	1420	1310	1620	1615	1630	1135	1530	
Initials:		TA/HP	WT	PS	TA	TA	JJ	TA	TA	

OE 3/15/23 TA for JJ

QA #3 3/23/23

CHRONIC CHEMICAL DATA (INITIAL)

Project Number:	14001-056-243
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	8.3	8.1	8.0	8.1	8.1	7.9	8.1		19	
D.O. (mg/L)	6.8	6.4	6.5	6.6	6.4	6.4	6.9		17	
Temp. (°C)	26	26	26	26	26	26	26		144	
Salt. (ppt)	27		27						#2	
Hard. (mg/L)	4300		3500				2980		Tit.	
Alk. (mg/L)	116		128				122		Tit.	
TRC (mg/L)	0.02	3.1	0.02						21	
NH ₃ (mg/L)	<1.0	1	<1.0						HAI	
Conc.: 0.8%										
pH	8.2	8.1	8.1	8.1	8.1	8.0	8.1			
D.O. (mg/L)	6.6	6.3	6.4	6.4	6.4	6.4	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	28		26							
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Conc.: 2.4%										
pH	8.2	8.1	8.1	8.1	8.1	8.0	8.1			
D.O. (mg/L)	6.5	6.3	6.3	6.5	6.3	6.4	6.8			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	28		25							
Conc.: 3.6%										
pH	8.3	8.1	8.0	8.1	8.1	8.0	8.1			
D.O. (mg/L)	6.6	6.3	6.4	6.5	6.4	6.4	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	26		26							
Date:	3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23			
Time:	1415	1410	1250	1550	1610	1540	1120			
Initials:	TA	WT	TA	TA	WT	JJ	TA			

Note: Hardness, alkalinity, TRC, and NH₃ 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.

Don 3/23/23

CHRONIC CHEMICAL DATA (INITIAL)

Project Number: 14001-056-243										
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.: 7.2%									All Conc.	
pH	8.2	8.1	8.1	8.1	8.1	8.1	8.1			
D.O. (mg/L)	6.7	6.3	6.3	6.7	6.4	6.4	6.8			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	26		25							
Conc.: 10.8%										
pH	8.2	8.1	8.1	8.1	8.1	8.1	8.1			
D.O. (mg/L)	6.6	6.3	6.3	6.6	6.4	6.4	6.7			
Temp. (°C)	*	*	*	*	*	*	*			
Salt. (ppt)	26		27							
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salt. (ppt)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salt. (ppt)										
Conc.: 100%	salted						8.4			Ambient
pH	8.0		8.1				↓			7.9 8.0 7.8
D.O. (mg/L)										
Temp. (°C)	26	26	26	26	26	26	26			
Salt. (ppt)	27000	25	2433	26			26			6 6 5
Hard. (mg/L)	1880		264				2840			116 140 112
Alk. (mg/L)	165		2433				228			129 122 141
TRC (mg/L)			0.03							0.07 0.03 0.07
NH ₃ (mg/L)			4.0							4.0 4.0 4.0
Date:	3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23			
Time:	1415	1410	1250	1550	1610	1540	1120			
Initials:	TA	WT	PA	TA	WT	JJ	TA			

Note: Hardness, alkalinity, TRC, and NH₃ 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.

② en 3/12/23 je

① PA 3/11/23 WP ③ en for TA 3/22/23 jwp

CHRONIC CHEMICAL DATA (FINAL)

QA: MS 3/23/23

Project Number:	14001-056-243
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	7.9	7.9	7.8	7.7	7.8	7.9	7.7		19	
D.O. (mg/L)	6.9	6.2	4.5	4.9	5.0	5.4	5.5		17	
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25		244	
Salt. (ppt)	26	25	28	27	24	26	27		Ref #2	
Conc.: 0.8%										
pH	7.9	7.9	7.8	7.7	7.8	7.8	7.9			
D.O. (mg/L)	6.7	5.9	4.1	4.3	4.5	4.5	5.4			
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25			
Salt. (ppt)	27	24.5	27	26	25	26	26			
Conc.: 2.4%										
pH	7.9	7.9	7.8	7.8	7.9	7.8	7.8			
D.O. (mg/L)	6.7	5.9	4.0	4.9	7.8	4.6	4.7			
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25			
Salt. (ppt)	27	25	27	26	27	27	25			
Conc.: 3.6%										
pH	7.9	7.9	7.8	7.8	8.0	7.8	7.8			
D.O. (mg/L)	6.5	6.0	3.6	4.9	5.3	4.6	5.6			
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25			
Salt. (ppt)	27	25	27	27	28.0	25	26			
Conc.: 7.2%										
pH	8.0	7.9	7.8	7.8	7.9	7.9	7.9			
D.O. (mg/L)	6.7	6.2	3.7	4.8	5.1	5.0	4.9			
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25			
Salt. (ppt)	27	25	27	27	27	26	27			
Conc.: 10.8%										
pH	8.0	8.0	7.9	7.9	8.0	8.0	7.9			
D.O. (mg/L)	6.8	6.3	4.2	4.7	5.2	5.2	5.4			
Temp (°C)	24 [°]	25	25	24 [°]	24 [°]	24 [°]	25			
Salt. (ppt)	27	25	27	27	26	26	27			
Date:	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23	3/16/23			
Time:	1445	1255	1555	1610	1545	1125	1510			
Initials:	WT	PA	WT	WT	J)	TA	TA			

Δ Checked all reps

0 J) 3/14/23: 6

QA-3 63123

DAILY TOXICITY TEST LOG

Project Number:	14001-056-243
Test Species:	<i>Americamysis bahia</i>

General Comments		Feeding ★ 0.2 ml B.S. 3 X Daily	Initials/Date
	Random Chart: <u>Void</u> Thermometer# <u>M-32</u>		
Test Day 0	Test Solution Mixed at: <u>1350</u> Test Organisms Added at: <u>1420</u>	Fed @ 1650 TA	TA 3/9/23
Test Day 1	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ ★ 0925 DI/LM ★ 1225 DI/LM ★ 1650 DI/LM	WT 3/10/23
Test Day 2	Real Time Temp= <u>25</u> °C Range (Min-Max) = <u>25-25</u> °C	Fed @ ★ 0850 LM ★ 1140 LM ★ 1650 LM	TA 3/11/23
Test Day 3	Real Time Temp= <u>25</u> °C Range (Min-Max) = <u>25-26</u> °C	Fed @ ★ 0855 WT ★ 1200 WT ★ 1650 DI/LM	TA 3/12/23
Test Day 4	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ ★ 0840 DI/TA ★ 1220 TA ★ 1700 DI/LM	TA 3/13/23
Test Day 5	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ ★ 0905 DI/LM ★ 1220 DI/TA ★ 1700 TA	JJ 3/14/23
Test Day 6	Real Time Temp= <u>24</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ ★ 0810 JJ ★ 1210 JJ ★ 1645 TA	TA 3/15/23
Test Day 7	Real Time Temp= <u>25</u> °C Range (Min-Max) = <u>24-26</u> °C	Fed @ ★ 0855 HP ★ 1200 WT	TA 3/16/23
Test Day 8	Real Time Temp= °C Range (Min-Max) = °C		

★ Fed 0.2 ml BS

At 0715 on 03-12-2023, the lab clocks were set ahead one hour to 0815 to adjust time to Daylight Savings Time. All times recorded for data on this day are Daylight Savings times. Initials: TA

① HP 3/16/23, E

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

QA: 03/23/23

Project Number: 14001-056-243

Balance ID: Sartorius #1

Date/Time of Tare Wt: 3/16/23 @ 1040

Date/Time of Gross Wt: 3/19/23 at 0850

Test Substance Effluent Species

A. bahia

from Date: 3/16/2023

to Date: 3/19/2023

Oven #: 3

Time: 1725

Time: 850

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

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)
Control	A		1.21723	1.21882	0.00159	0.00159	5	0.318	0.2808	5	0.318	0.2808
	B		1.17229	1.17359	0.00130	0.00130	5	0.260		5	0.260	
	C		1.18132	1.18262	0.00130	0.00130	5	0.260		5	0.260	
	D		1.18458	1.18567	0.00109	0.00109	4	0.273		4	0.273	
	E		1.18462	1.18599	0.00137	0.00137	5	0.274		5	0.274	
	F		1.16913	1.16981	0.00068	0.00068	3	0.227		3	0.227	
	G		1.16492	1.16621	0.00129	0.00129	4	0.323		4	0.323	
	H		1.18352	1.18477	0.00125	0.00125	4	0.313		4	0.313	
0.80%	A		1.20451	1.20598	0.00147	0.00147	5	0.294	0.2854	5	0.294	0.2939
	B		1.18595	1.18705	0.00110	0.00110	4	0.275		4	0.275	
	C		1.19029	1.19178	0.00149	0.00149	5	0.298		5	0.298	
	D		1.17801	1.17924	0.00123	0.00123	5	0.246		5	0.246	
	E		1.17797	1.17925	0.00128	0.00128	5	0.256		5	0.256	
	F		1.18207	1.18367	0.00160	0.00160	5	0.320		5	0.320	
	G		1.13874	1.14035	0.00161	0.00161	5	0.322		5	0.322	
	H		1.17566	1.17702	0.00136	0.00136	5	0.272		4	0.340	
2.4%	A		1.16935	1.17108	0.00173	0.00173	5	0.346	0.3469	5	0.346	0.3469
	B		1.16979	1.17202	0.00223	0.00223	4	0.557		4	0.557	
	C		1.17339	1.17513	0.00174	0.00174	5	0.348		5	0.348	
	D		1.18067	1.18206	0.00139	0.00139	5	0.278		5	0.278	
	E		1.20003	1.20143	0.00140	0.00140	5	0.280		5	0.280	
	F		1.19131	1.19274	0.00143	0.00143	5	0.286		5	0.286	
	G		1.19124	1.19306	0.00182	0.00182	5	0.364		5	0.364	
	H		1.19689	1.19847	0.00158	0.00158	5	0.316		5	0.316	

QA-103
 3/23/23
 A. bahia

Project Number:		14001-056-243		Test Substance		Effluent		Species		A. bahia	
3.6%	A	1.17821	1.17954	0.00133	0.00133	4	0.333	0.3178	4	0.333	0.3273
	B	1.18973	1.19116	0.00143	0.00143	5	0.286		5	0.286	
	C	1.17875	1.18026	0.00151	0.00151	5	0.302		4	0.378	
	D	1.15921	1.16099	0.00178	0.00178	5	0.356		5	0.356	
	E	1.17309	1.17445	0.00136	0.00136	5	0.272		5	0.272	
	F	1.16500	1.16679	0.00179	0.00179	5	0.358		5	0.358	
	G	1.18505	1.18672	0.00167	0.00167	5	0.334		5	0.334	
	H	1.21569	1.21720	0.00151	0.00151	5	0.302		5	0.302	
7.2%	A	1.16900	1.17042	0.00142	0.00142	5	0.284	0.3071	4	0.355	0.3236
	B	1.19706	1.19876	0.00170	0.00170	4	0.425		4	0.425	
	C	1.17529	1.17718	0.00189	0.00189	5	0.378		5	0.378	
	D	1.19514	1.19650	0.00136	0.00136	5	0.272		5	0.272	
	E	1.19817	1.19947	0.00130	0.00130	5	0.260		5	0.260	
	F	1.15040	1.15173	0.00133	0.00133	5	0.266		5	0.266	
	G	1.18834	1.18956	0.00122	0.00122	5	0.244		4	0.305	
	H	1.17652	1.17816	0.00164	0.00164	5	0.328		5	0.328	
10.8%	A	1.17748	1.17919	0.00171	0.00171	5	0.342	0.3340	4	0.427	0.3514
	B	1.17793	1.17954	0.00161	0.00161	5	0.322		5	0.322	
	C	1.16890	1.17084	0.00194	0.00194	5	0.388		5	0.388	
	D	1.17373	1.17580	0.00207	0.00207	5	0.414		5	0.414	
	E	1.17655	1.17890	0.00235	0.00235	5	0.470		5	0.470	
	F	1.17826	1.17945	0.00119	0.00119	5	0.238		5	0.238	
	G	1.17511	1.17618	0.00107	0.00107	5	0.214		4	0.267	
	H	1.19030	1.19172	0.00142	0.00142	5	0.284		5	0.284	
Blank		1.19328	1.19328	0.00000							

Project Number: 14001-056-243

Species: A. bahia

Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	1.0	1.0	1.0000	0.0000	0.000%
0.80%	8	0.8	1.0	0.9750	0.0707	7.252%
2.4%	8	1.0	1.0	1.0000	0.0000	0.000%
3.6%	8	0.8	1.0	0.9750	0.0707	7.252%
7.2%	8	0.8	1.0	0.9500	0.0926	9.745%
10.8%	8	0.8	1.0	0.9429	0.0976	10.350%

Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.	% of Control
Control	8	0.227	0.323	0.2808	0.0339	12.069%	--
0.80%	8	0.246	0.322	0.2854	0.0280	9.799%	102%
2.4%	8	0.278	0.557	0.3469	0.0914	26.357%	124%
3.6%	8	0.272	0.358	0.3178	0.0320	10.065%	113%
7.2%	8	0.244	0.425	0.3071	0.0644	20.964%	109%
10.8%	7	0.214	0.470	0.3340	0.0924	27.679%	119%

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

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.227	0.323	0.2808	0.0339	12.069%
0.80%	8	0.246	0.340	0.2939	0.0332	11.286%
2.4%	8	0.278	0.557	0.3469	0.0914	26.357%
3.6%	8	0.272	0.378	0.3273	0.0373	11.411%
7.2%	8	0.260	0.425	0.3236	0.0593	18.325%
10.8%	8	0.238	0.470	0.3514	0.0868	24.711%

Comments: 2 organisms lost during drying process in control F, 1 in control H, 1 in 2.4 B

CETIS Analytical Report

Report Date: 23 Mar-23 10:59 (p 1 of 2)

Test Code: 056-243 | 09-7593-6507

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 04-5390-4068	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 23 Mar-23 10:59	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 08-6442-2023	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:20	Protocol: EPA/821/R-02-012 (2002)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 15:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 1h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 18-6090-7269	Code: 6EEB3105	Client: BP Cherry Point
Sample Date: 08 Mar-23 08:53	Material: Ambient Sample	Project: Special Studies
Receive Date: 09 Mar-23	Source: Discharge Monitoring Report	
Sample Age: 29h	Station: Effluent	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	25.5%	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:5%)
Dilution Water		0.8	70	46	0	14	0.8886	Asymp	Non-Significant Effect
		2.4	89	46	0	14	0.9999	Asymp	Non-Significant Effect
		3.6	86	46	0	14	0.9994	Asymp	Non-Significant Effect
		7.2	74	46	1	14	0.9577	Asymp	Non-Significant Effect
		10.8	81	46	0	14	0.9955	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02757065	0.00551413	5	1.426	0.2347	Non-Significant Effect
Error	0.1623624	0.003865771	42			
Total	0.189933		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.28	15.1	0.0040	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9338	0.934	0.0095	Non-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	0.2808	0.2524	0.3091	0.2732	0.2267	0.3225	0.01198	12.1%	0.0%
0.8		8	0.2854	0.262	0.3088	0.2845	0.246	0.322	0.009887	9.8%	-1.64%
2.4		8	0.3469	0.2705	0.4234	0.331	0.278	0.5575	0.03233	26.4%	-23.6%
3.6		8	0.3178	0.2911	0.3446	0.3173	0.272	0.358	0.01131	10.1%	-13.2%
7.2		8	0.3071	0.2533	0.361	0.278	0.244	0.425	0.02276	21.0%	-9.39%
10.8		8	0.334	0.2605	0.4075	0.332	0.214	0.47	0.03109	26.3%	-19.0%

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	0.318	0.26	0.26	0.2725	0.274	0.2267	0.3225	0.3125
0.8		0.294	0.275	0.298	0.246	0.256	0.32	0.322	0.272
2.4		0.346	0.5575	0.348	0.278	0.28	0.286	0.364	0.316
3.6		0.3325	0.286	0.302	0.356	0.272	0.358	0.334	0.302
7.2		0.284	0.425	0.378	0.272	0.26	0.266	0.244	0.328
10.8		0.342	0.322	0.388	0.414	0.47	0.238	0.214	0.284

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 04-5390-4068

Endpoint: Mean Dry Biomass-mg

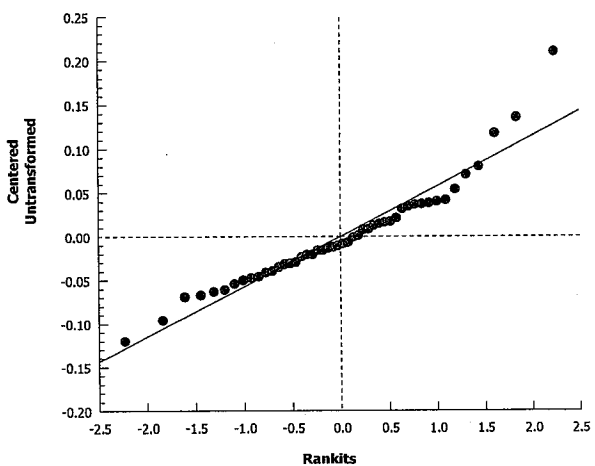
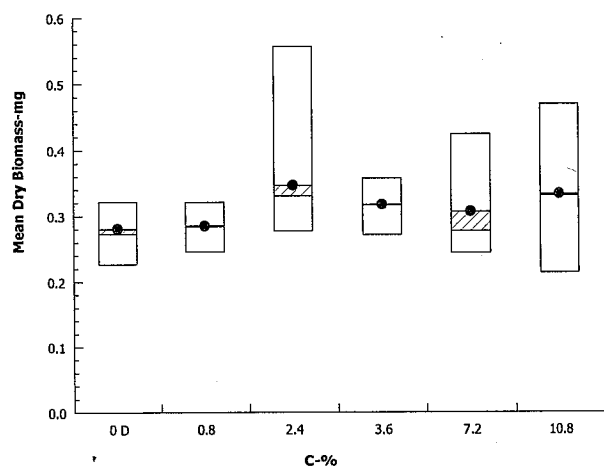
CETIS Version: CETISv1.8.7

Analyzed: 23 Mar-23 10:59

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 23 Mar-23 11:13 (p 1 of 2)

Test Code: 056-243 | 09-7593-6507

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 04-7520-7663	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 23 Mar-23 11:12	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 08-6442-2023	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:20	Protocol: EPA/821/R-02-012 (2002)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 15:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 1h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 18-6090-7269	Code: 6EEB3105	Client: BP Cherry Point
Sample Date: 08 Mar-23 08:53	Material: Ambient Sample	Project: Special Studies
Receive Date: 09 Mar-23	Source: Discharge Monitoring Report	
Sample Age: 29h	Station: Effluent	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	25.3%	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	-0.4259	2.31	0.071	14	0.9296	CDF	Non-Significant Effect
		2.4	-2.15	2.31	0.071	14	0.9997	CDF	Non-Significant Effect
		3.6	-1.51	2.31	0.071	14	0.9968	CDF	Non-Significant Effect
		7.2	-1.393	2.31	0.071	14	0.9953	CDF	Non-Significant Effect
		10.8	-2.294	2.31	0.071	14	0.9998	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α :5%)
Between	0.03195773	0.006391547	5	1.688	0.1587	Non-Significant Effect
Error	0.1590738	0.003787471	42			
Total	0.1910315		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α :1%)
Variances	Bartlett Equality of Variance	13.71	15.1	0.0175	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9445	0.934	0.0242	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	0.2808	0.2524	0.3091	0.2732	0.2267	0.3225	0.01198	12.1%	0.0%
0.8		8	0.2939	0.2661	0.3216	0.296	0.246	0.34	0.01173	11.3%	-4.67%
2.4		8	0.3469	0.2705	0.4234	0.331	0.278	0.5575	0.03233	26.4%	-23.6%
3.6		8	0.3272	0.296	0.3585	0.3332	0.272	0.3775	0.0132	11.4%	-16.6%
7.2		8	0.3236	0.274	0.3732	0.3165	0.26	0.425	0.02097	18.3%	-15.3%
10.8		8	0.3514	0.2804	0.4223	0.355	0.238	0.47	0.03001	24.2%	-25.1%

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	0.318	0.26	0.26	0.2725	0.274	0.2267	0.3225	0.3125
0.8		0.294	0.275	0.298	0.246	0.256	0.32	0.322	0.34
2.4		0.346	0.5575	0.348	0.278	0.28	0.286	0.364	0.316
3.6		0.3325	0.286	0.3775	0.356	0.272	0.358	0.334	0.302
7.2		0.355	0.425	0.378	0.272	0.26	0.266	0.305	0.328
10.8		0.4275	0.322	0.388	0.414	0.47	0.238	0.2675	0.284

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 04-7520-7663

Endpoint: Mean Dry Weight-mg

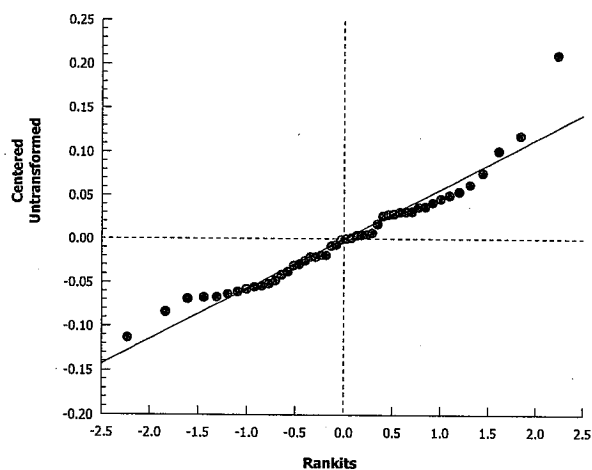
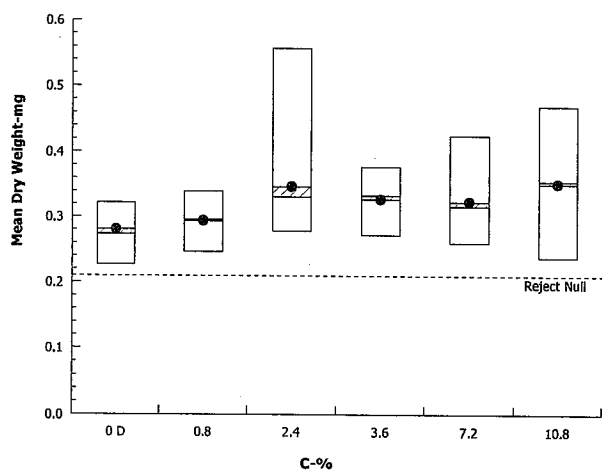
CETIS Version: CETISv1.8.7

Analyzed: 23 Mar-23 11:12

Analysis: Parametric-Control vs Treatments

Official Results: Yes

Graphics

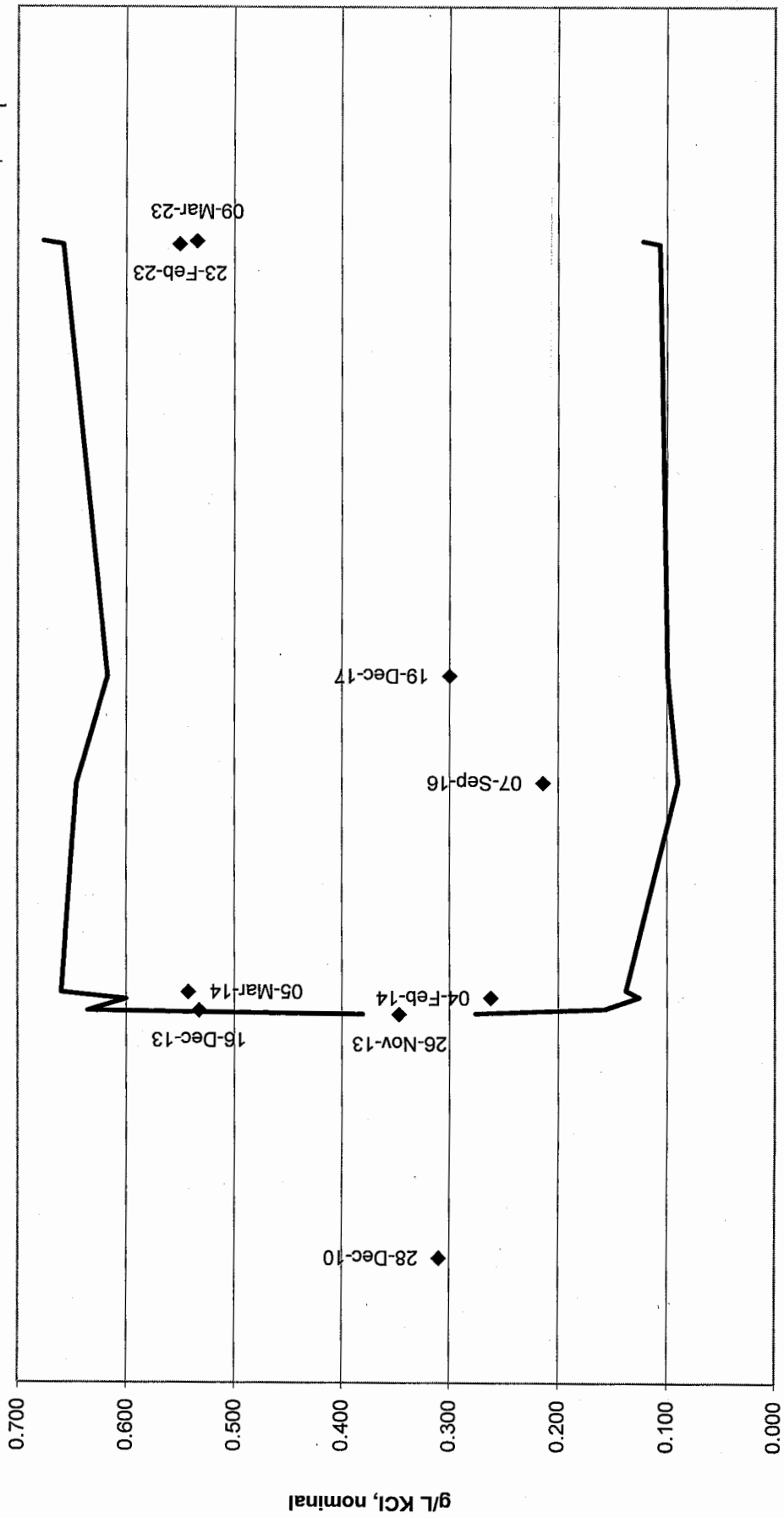


APPENDIX C**Reference Toxicant Control Chart, Spreadsheet, and Raw Test Data**

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

December 2010 through March 2023

on new 3/23/23



FILE IS MYSID CHRONIC 14001-904-XXX
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

QA MR 3/23/28

ITONI	DATE	LOT	Linear X	MEAN	ACCEPTABLE RANGE			%CV
			Transform		SD	LOW	HIGH	
1	28-Dec-10	10-045	IC25	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	09-Mar-23	23-009	0.535	0.399	0.139	0.122	0.677	34.70
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

TOXICITY DATA PACKAGE COVER SHEET

QA 3/23/23

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: 03/09/23 @ 1435
Protocol Number: USEPA 2002, method 1007.0

Project Number: 14001-904-1365
Species: Americamysis bahia
Organism ☒ Lot or Batch Number: 23-009
Age: 7 days (7 days) Supplier: ABS
Date and Time Test Ended: 03/16/23 @ 1630
Investigator(s): (M/J) / TA / HP / WT / RA

Background Information

Type of Test: Static Renewal

pH Control?: Yes No If Yes, give % CO₂: N/A

Test Temperature: 26 ± 1°C

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

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: 0.1 ml B.S / 0.2 ml B.S. (PM). ** Feeding Frequency: 3 x Daily

Test Substance Characterization Parameters and Frequency:

Hardness: Sx. Receipt

Alkalinity: Sx. Receipt

NH₃: Sx. Receipt pH: Daily SALINITY: daily in 1 rep of each treatment *

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 _____ LC₅₀ or IC₂₅ (Circle): _____

Hist. 95% Control Limits: _____ to _____ Method for Determining Ref. Tox. Value: _____

Special Procedures and Considerations:

DO measured using salinity compensating meter set @ 25 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: MS

Date: 3/9/23

TEST SUBSTANCE USAGE LOG

Project Number 14001-904-1365

as m 3/23/23

	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	14917			
Concurrent Control Water RW#	N/A			
Date(s) Used	3/9/23 03/13/23 3/10/23 3/14/23 3/11/23 3/15/23 3/12/23			

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	LM 03/09/23 mixed MyC								
Initials/Date	HP 3/10/23 "								
Initials/Date	PA 3/11/23 "								
Initials/Date	WT 3/12/23 "								
Initials/Date	LM 03/13/23 "								
Initials/Date	PA 3/14/23 "								
Initials/Date	JJ 3/15/23 "								
Initials/Date									

Mysid Shrimp (*Americamysis bahia*)
 CHRONIC BIOLOGICAL DATA

QA W 3/15/13

Project Number: 14001-904-1365

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	100% NF (Te) PO		
	B	5	5	5	5	5	5	4 ⁰	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 ⁰ (Te)			
	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			
0.125	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	4 ⁰	4	4	4	4		100% NF	
	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			
0.25	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	4 ⁰	4	4		100% NF	
	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			
0.5	A	5	5	5	5	5	5	5	4 ⁰	100% NF 99.4		
	B	5	5	5	5	5	5	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	4 ⁰	4	4			
	F	5	5	5	4 ⁰	3	3	3	3		100% eaten	
	G	5	5	5	5	5	5	5	5			
	H	5	5	5	5	5	5	5	5			
	Date:	3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23	3/16/23			
	Time:	1435	1530	1440	1530	1615	1605	1105	1630			
	Initials:	LM/J)	HP	Qx	WT	LM	Qx	J)	WT			

① WT 3/16/13 E

① WT 3/16/13 E "1630"

Mysid Shrimp (*Americamysis bahia*)
 CHRONIC BIOLOGICAL DATA

DA m 3/23/23

Project Number: 14001-904-1365

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	—	—	—	—	—	—	0
	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:	3/9/23	3/10/23	3/11/23	3/12/23	3/13/23	3/14/23	3/15/23	3/16/23	
	Time:	1435	1530	1440	1530	1615	1605	1105	1630	
	Initials:	LM/	HP	PA	WT	LM	PA	J)	WT	

CHRONIC CHEMICAL DATA (INITIAL)

LA 3/23/23

Project Number: 14001-904-1365

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	8.3	8.2	8.0	/	8.0	/	8.1	/	19	
D.O. (mg/L)	6.5	6.3	6.5	/	6.5	/	6.7	/	17	
Temp. (°C)	25	25	25	/	25	/	25	/	29	
Salinity (ppt)	27	NM	NM	/		/		/	#2	
Hard. (mg/L)									Tit.	
Alk. (mg/L)									Tit.	
TRC (mg/L)									21	
NH ₃ (mg/L)									HA1	
Conc.: 0.125										
pH	8.3	8.1	8.1	/	8.1	/	8.1	/		
D.O. (mg/L)	6.5	6.3	6.5	/	6.4	/	6.8	/		
Temp. (°C)	*	*	*	/	*	/	*	/		
Salinity (ppt)	26	NM	NM	/		/		/		
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Conc.: 0.25										
pH	8.3	8.1	8.1	/	8.1	/	8.1	/		
D.O. (mg/L)	6.6	6.3	6.5	/	6.5	/	6.8	/		
Temp. (°C)	*	*	*	/	*	/	*	/		
Salinity (ppt)	27	NM	NM	/		/		/		
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Date:	3/9/23	3/10/23	3/11/23	/	3/13/23	/	3/15/23	/		▲ Salinity, 1 rep each treatment D 0
Time:	1425	1525	1430	/	1605	/	1035	/		
Initials:	LM	HP	PA	/	LM	/	J)	/		

NOTE: Hardness, alkalinity, TRC, and NH₃ 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, 03/13/23, E

CHRONIC CHEMICAL DATA (INITIAL)

QA on 3/23/23

Project Number: 14001-904-1365

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	8.3	8.2	8.1	/	8.1	/	8.1	/		
D.O. (mg/L)	6.6	6.3	6.6	/	6.6	/	6.8	/		
Temp. (°C)	*	*	*	/	*	/	*	/		
Salinity (ppt)	27	NM	NM	/	/	/	/	/		
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Conc.: 1.0										
pH	8.3	8.2	/	/	/	/	/	/		
D.O. (mg/L)	6.6	6.3	/	/	/	/	/	/		
Temp. (°C)	*	*	*	/	/	/	/	/		
Salinity (ppt)	26	NM	NM	/	/	/	/	/		
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salinity (ppt)										
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH ₃ (mg/L)										
Date:	3/9/23	3/10/23	3/11/23	/	3/13/23	/	3/15/23	/		▲ Salinity, 1 rep each treatment D O
Time:	1425	1525	1430	/	1605	/	1035	/		
Initials:	LM	HP	QA	/	LM	/	JJ	/		

NOTE: Hardness, alkalinity, TRC, and NH₃ 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.

at wt 3/23/23

CHRONIC CHEMICAL DATA (FINAL)

Project Number: 14001-904-1365										
Test Species (Circle): <i>C. dubia</i> <i>D. magna</i> <i>D. pulex</i> <i>P. promelas</i> Other (Specify): <i>Americamysis bahia</i>										
g/L	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		Meter #	Remarks
Conc.: Cont.									All Conc.	
pH	8.0	/	7.8	/	7.8	/	7.7		19	
D.O. (mg/L)	5.8	/	4.8	/	5.0	/	5.5		17	
Temp. (°C)	25	/	25	/	25	/	24		L-45	
Salinity (ppt) ▲	20	/	25	/	27	/	27		#2	
Conc.: 0.125										
pH	8.0	/	7.8	/	7.7	/	7.8			
D.O. (mg/L)	5.0	/	4.8	/	4.4	/	5.8			
Temp. (°C)	24	/	28	/	25	/	24			
Salinity (ppt) ▲	27	/	28	/	27	/	28			
Conc.: 0.25										
pH	8.0	/	8.0	/	7.9	/	7.8			
D.O. (mg/L)	5.7	/	5.6	/	4.9	/	6.0			
Temp. (°C)	24	/	25	/	25	/	24			
Salinity (ppt) ▲	27	/	28	/	28	/	28			
Conc.: 0.5										
pH	8.0	/	7.9	/	7.9	/	7.9			
D.O. (mg/L)	5.7	/	5.3	/	5.0	/	5.8			
Temp. (°C)	25	/	25	/	25	/	24			
Salinity (ppt) ▲	28	/	28	/	29	/	28			
Conc.: 1.0										
pH	8.0	/	/	/	/	/	/			
D.O. (mg/L)	5.8	/	/	/	/	/	/			
Temp. (°C)	25	/	/	/	/	/	/			
Salinity (ppt) ▲	27	/	20	/	/	/	/			
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Salinity (ppt) ▲										
Date:	3/10/23	3/11/23	3/14/23	3/16/23						▲ Salinity, 1 rep each treatment DAILY
Time:	1525	1545	1600	1520						
Initials:	HP	WT	PA	WT						

OUT 3/12/23: WP

DAILY TOXICITY TEST LOG

QA *nm* 3/23/23

Project Number: 14001-904-1365

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 = <u>23</u> ppt Measured Cl ⁻ of stock = _____mg/L Measured Cl ⁻ 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>1425</u> Test Organisms Added at: <u>1435</u>	Fed @ *1650 TA	LM 03/09/23
Test Day 1	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ *0925 DI/LM *1225 DI/LM *1650 DI/LM	HP 3/10/23
Test Day 2	Real Time Temp= <u>25</u> °C Range= <u>25-25</u> °C	Fed @ *0850 LM *1140 LM *1650 LM	PS 3/11/23
Test Day 3	Real Time Temp= <u>25</u> °C Range= <u>25-26</u> °C	Fed @ *0855 DI/WT *1200 WT *1650 DI/WT	WT 3/12/23
Test Day 4	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ *0840 DI/TA *1220 TA *1700 DI/WT	LM 03/13/23
Test Day 5	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ *0905 DI/LM *1220 DI/PA *1700 PA	PA 3/14/23
Test Day 6	Real Time Temp= <u>24</u> °C Range= <u>24-26</u> °C	Fed @ *0810 J) *1645 TA	J) 3/15/23
Test Day 7	Real Time Temp= <u>25</u> °C Range= <u>24-26</u> °C	*0855 HP *1200 WT	WT 3/16/23
Test Day 8			

At 0715 on 03-12-2023, the lab clocks were set ahead one hour to 0815 to adjust time to Daylight Savings Time. All times recorded for data on this day are Daylight Savings times. Initials: TA

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-904-1365

Balance ID: Sartorius #1

Date/Time of Tare Wt: 3/16/23 @ 1120

Date/Time of Gross Wt: 3/19/23 at 1530

Test Substance

KCl

Species

A. bahis

Oven #:

3

Time:

1720

Time:

1530

from Date: 3/16/2023

to Date: 3/19/2023

Analyst Tare: HR

Analyst Gross: DI / rbn

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

Weight Type: Dry (60-90°C)

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		1.16595	1.16743	0.00148	0.00148	5	0.2960	0.3464	5	0.2960	0.3464
	B		1.17367	1.17504	0.00137	0.00137	4	0.343		4	0.343	
	C		1.15937	1.16099	0.00162	0.00162	5	0.324		5	0.324	
	D		1.18063	1.18216	0.00153	0.00153	5	0.306		5	0.306	
	E		1.17384	1.17534	0.00150	0.00150	4	0.375		4	0.375	
	F		1.18984	1.19146	0.00162	0.00162	5	0.324		5	0.324	
	G		1.18326	1.18488	0.00162	0.00162	5	0.324		5	0.324	
	H		1.18461	1.18701	0.00240	0.00240	5	0.480		5	0.480	
0.125 g/L KCl	A		1.16517	1.16695	0.00178	0.00178	5	0.3560	0.3292	5	0.3560	0.3390
	B		1.19843	1.20031	0.00188	0.00188	5	0.376		5	0.376	
	C		1.20134	1.20317	0.00183	0.00183	5	0.366		5	0.366	
	D		1.18405	1.18561	0.00156	0.00156	5	0.312		4	0.390	
	E		1.19309	1.19466	0.00157	0.00157	5	0.314		5	0.314	
	F		1.17009	1.17158	0.00149	0.00149	5	0.298		5	0.298	
	G		1.17902	1.18065	0.00163	0.00163	5	0.326		5	0.326	
	H		1.17567	1.17710	0.00143	0.00143	5	0.286		5	0.286	
0.25 g/L KCl	A		1.16180	1.16360	0.00180	0.00180	5	0.3600	0.3167	5	0.3600	0.3237
	B		1.19234	1.19372	0.00138	0.00138	5	0.276		5	0.276	
	C		1.21358	1.21509	0.00151	0.00151	5	0.302		5	0.302	
	D		1.16532	1.16643	0.00111	0.00111	5	0.222		4	0.278	
	E		1.19462	1.19616	0.00154	0.00154	5	0.308		5	0.308	
	F		1.17578	1.17763	0.00185	0.00185	5	0.370		5	0.370	
	G		1.18660	1.18842	0.00182	0.00182	5	0.364		5	0.364	
	H		1.18559	1.18725	0.00166	0.00166	5	0.332		5	0.332	

Project Number: 14001-904-1365		Test Substance		KCl		Species		A. bahis	
0.5 g/L KCl	A	1.18776	1.18888	0.00112	0.00112	5	0.2240	4	0.2800
	B	1.17269	1.17420	0.00151	0.00151	5	0.302	4	0.377
	C	1.16635	1.16779	0.00144	0.00144	5	0.288	5	0.288
	D	1.16985	1.17110	0.00125	0.00125	5	0.250	5	0.250
	E	1.19634	1.19766	0.00132	0.00132	5	0.264	4	0.330
	F	1.18562	1.18673	0.00111	0.00111	4	0.278	3	0.370
	G	1.17331	1.17488	0.00157	0.00157	5	0.314	5	0.314
	H	1.17904	1.18062	0.00158	0.00158	5	0.316	5	0.316
1.0 g/L KCl	A			0.00000	0.00000	5	0.0000		#DIV/0!
	B			0.00000	0.00000	5	0.000		-
	C			0.00000	0.00000	5	0.000		-
	D			0.00000	0.00000	5	0.000		-
	E			0.00000	0.00000	5	0.000		-
	F			0.00000	0.00000	5	0.000		-
	G			0.00000	0.00000	5	0.000		-
	H			0.00000	0.00000	5	0.000		-
Blank		1.18693	1.18693	0.00000	0.00000				

on 3/23/23

Project Number: 14001-904-1365

Test Substance KCl Species A. bahis

Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	1.0	1.0	1.0000	0.0000	0.0000%
0.125 g/L KCl	8	0.8	1.0	0.9750	0.0707	7.252%
0.25 g/L KCl	8	0.8	1.0	0.9750	0.0707	7.252%
0.5 g/L KCl	8	0.8	1.0	0.8938	0.1148	12.840%
1.0 g/L KCl	0	0.0	0.0	0.0000	0.0000	#DIV/0!
#REF!	0	#REF!	#REF!	#REF!	#REF!	#REF!

Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.	% of Control
Control	8	0.296	0.4800.3464	0.0590	0.0590	17.028%	--
0.125 g/L KCl	8	0.286	0.3760.3292	0.0330	0.0330	10.034%	95%
0.25 g/L KCl	8	0.222	0.3700.3167	0.0509	0.0509	16.055%	91%
0.5 g/L KCl	8	0.224	0.3160.2794	0.0323	0.0323	11.553%	81%
1.0 g/L KCl	0	0.000	0.0000.0000	0.0000	0.0000	#DIV/0!	0%
#REF!	0	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

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

Treatment	N	Min	Max	Mean	SD	C.V.
Control	8	0.296	0.4800.3464	0.0590	0.0590	17.028%
0.125 g/L KCl	8	0.286	0.3900.3390	0.0383	0.0383	11.300%
0.25 g/L KCl	8	0.276	0.3700.3237	0.0383	0.0383	11.840%
0.5 g/L KCl	8	0.250	0.3770.3157	0.0436	0.0436	13.825%
1.0 g/L KCl	0	0.000	0.000	#DIV/0!	#DIV/0!	#DIV/0!
#REF!	0	#REF!	#REF!	#REF!	#REF!	#REF!

Comments:

CETIS Analytical Report

Report Date: 22 Mar-23 10:40 (p 1 of 2)
 Test Code: 904-1365 | 06-4049-1431

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 08-5585-8784	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 22 Mar-23 10:40	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 21-1639-7332	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:35	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 16:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 2h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-5836-8624	Code: 9708370	Client: Internal Lab
Sample Date: 22 Mar-23 10:31	Material: Potassium chloride	Project: Special Studies
Receive Date: 22 Mar-23 10:31	Source: Reference Toxicant	
Sample Age: NA	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	10.5%	0.5	1	0.7071	

Steel Many-One Rank Sum Test

Control	vs	C-gm/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α :5%)
Dilution Water		0.125	64	48	1	14	0.5773	Asymp	Non-Significant Effect
		0.25	64	48	1	14	0.5773	Asymp	Non-Significant Effect
		0.5	52	48	1	14	0.1108	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α :5%)
Between	0.06827726	0.02275909	3	2.756	0.0610	Non-Significant Effect
Error	0.231183	0.008256535	28			
Total	0.2994602		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α :1%)
Variances	Bartlett Equality of Variance	22.75	11.3	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8207	0.908	0.0001	Non-normal Distribution

Survival Rate Summary

C-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	1	1	1	1	1	1	0	0.0%	0.0%
0.125		8	0.975	0.9159	1	1	0.8	1	0.025	7.25%	2.5%
0.25		8	0.975	0.9159	1	1	0.8	1	0.025	7.25%	2.5%
0.5		8	0.8938	0.7978	0.9897	0.9	0.75	1	0.04057	12.8%	10.6%
1		8	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-gm/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	1.338	1.328	1.349	1.345	1.318	1.345	0.004446	0.94%	0.0%
0.125		8	1.316	1.245	1.386	1.345	1.107	1.345	0.02977	6.4%	1.72%
0.25		8	1.316	1.245	1.386	1.345	1.107	1.345	0.02977	6.4%	1.72%
0.5		8	1.219	1.104	1.333	1.226	1.047	1.345	0.04834	11.2%	8.95%
1		8	0.2255	0.2255	0.2255	0.2255	0.2255	0.2255	0	0.0%	83.2%

Survival Rate 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	1	1	1	1	1	1	1	1
0.125		1	1	1	0.8	1	1	1	1
0.25		1	1	1	0.8	1	1	1	1
0.5		0.8	0.8	1	1	0.8	0.75	1	1
1		0	0	0	0	0	0	0	0

CETIS Analytical Report

Report Date: 22 Mar-23 10:40 (p 2 of 2)
Test Code: 904-1365 | 06-4049-1431

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 08-5585-8784 Endpoint: Survival Rate
Analyzed: 22 Mar-23 10:40 Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.7
Official Results: Yes

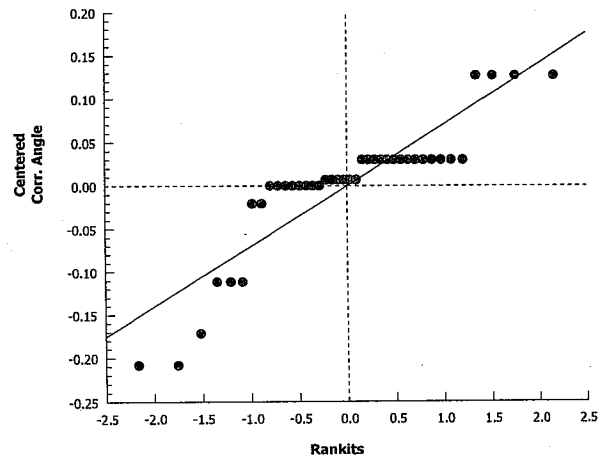
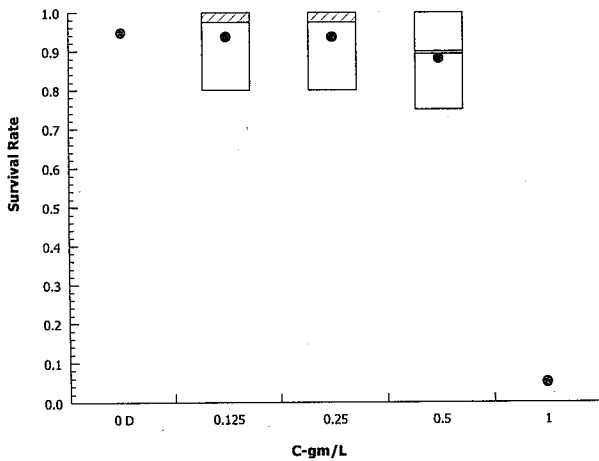
Angular (Corrected) Transformed Detail

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.345	1.318	1.345	1.345	1.318	1.345	1.345	1.345
0.125		1.345	1.345	1.345	1.107	1.345	1.345	1.345	1.345
0.25		1.345	1.345	1.345	1.107	1.345	1.345	1.345	1.345
0.5		1.107	1.107	1.345	1.345	1.107	1.047	1.345	1.345
1		0.2255	0.2255	0.2255	0.2255	0.2255	0.2255	0.2255	0.2255

Survival Rate Binomials

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	5/5	4/4	5/5	5/5	4/4	5/5	5/5	5/5
0.125		5/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5
0.25		5/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5
0.5		4/5	4/5	5/5	5/5	4/5	3/4	5/5	5/5
1		0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5

Graphics



CETIS Analytical Report

Report Date: 22 Mar-23 10:41 (p 1 of 1)
Test Code: 904-1365 | 06-4049-1431

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 08-5794-7202	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 22 Mar-23 10:41	Analysis: Trimmed Spearman-Kärber	Official Results: Yes
Batch ID: 21-1639-7332	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:35	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 16:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 2h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-5836-8624	Code: 9708370	Client: Internal Lab
Sample Date: 22 Mar-23 10:31	Material: Potassium chloride	Project: Special Studies
Receive Date: 22 Mar-23 10:31	Source: Reference Toxicant	
Sample Age: NA	Station:	

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	2.50%	-0.1789	0.01588	0.6623	0.6156	0.7125

Survival Rate Summary

Calculated Variate(A/B)

C-gm/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	8	1	1	1	0	0	0.0%	0.0%	38	38
0.125		8	0.975	0.8	1	0.025	0.07071	7.25%	2.5%	39	40
0.25		8	0.975	0.8	1	0.025	0.07071	7.25%	2.5%	39	40
0.5		8	0.8938	0.75	1	0.04057	0.1148	12.8%	10.6%	35	39
1		8	0	0	0	0	0		100.0%	0	40

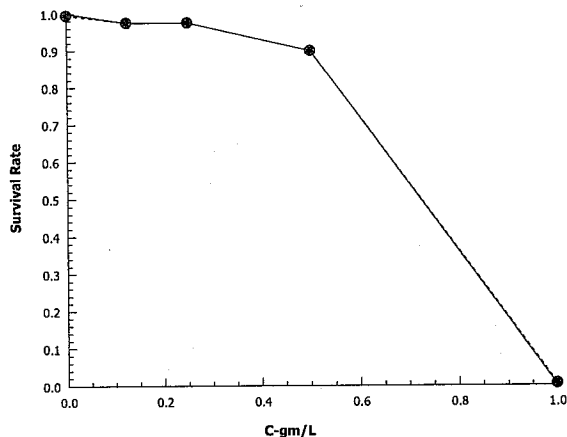
Survival Rate Detail

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	1	1	1	1	1	1
0.125		1	1	1	0.8	1	1	1	1
0.25		1	1	1	0.8	1	1	1	1
0.5		0.8	0.8	1	1	0.8	0.75	1	1
1		0	0	0	0	0	0	0	0

Survival Rate Binomials

C-gm/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	5/5	4/4	5/5	5/5	4/4	5/5	5/5	5/5
0.125		5/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5
0.25		5/5	5/5	5/5	4/5	5/5	5/5	5/5	5/5
0.5		4/5	4/5	5/5	5/5	4/5	3/4	5/5	5/5
1		0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5

Graphics



CETIS Analytical Report

Report Date: 22 Mar-23 15:37 (p 1 of 2)
Test Code: 904-1365 | 06-4049-1431

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 20-9248-3717	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 22 Mar-23 15:37	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 21-1639-7332	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:35	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 16:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 2h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-5836-8624	Code: 9708370	Client: Internal Lab
Sample Date: 22 Mar-23 10:31	Material: Potassium chloride	Project: Special Studies
Receive Date: 22 Mar-23 10:31	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	14.1%	0.25	0.5	0.3536	

Dunnett Multiple Comparison Test

Control	vs	C-gm/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		0.125	0.7592	2.15	0.049	14	0.4282	CDF	Non-Significant Effect
		0.25	1.311	2.15	0.049	14	0.2169	CDF	Non-Significant Effect
		0.5*	2.96	2.15	0.049	14	0.0084	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01939103	0.006463676	3	3.153	0.0404	Significant Effect
Error	0.05739845	0.002049944	28			
Total	0.07678948		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.602	11.3	0.3077	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9527	0.908	0.1724	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	0.3464	0.2971	0.3958	0.324	0.296	0.48	0.02086	17.0%	0.0%
0.125		8	0.3292	0.3016	0.3569	0.32	0.286	0.376	0.01168	10.0%	4.96%
0.25		8	0.3167	0.2742	0.3593	0.32	0.222	0.37	0.01798	16.1%	8.57%
0.5		8	0.2794	0.2524	0.3064	0.2828	0.224	0.316	0.01141	11.6%	19.3%
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	0.296	0.3425	0.324	0.306	0.375	0.324	0.324	0.48
0.125		0.356	0.376	0.366	0.312	0.314	0.298	0.326	0.286
0.25		0.36	0.276	0.302	0.222	0.308	0.37	0.364	0.332
0.5		0.224	0.302	0.288	0.25	0.264	0.2775	0.314	0.316
1		0	0	0	0	0	0	0	0

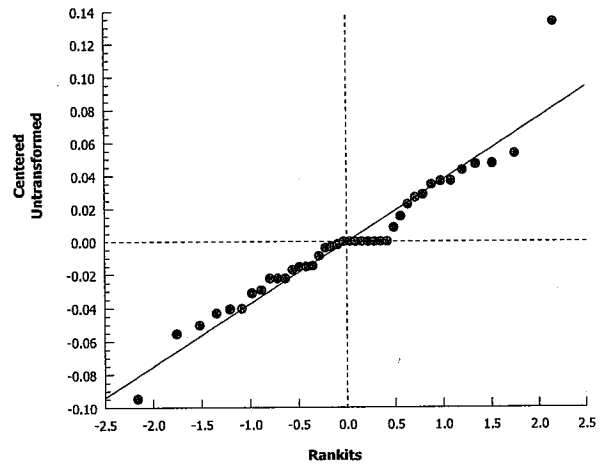
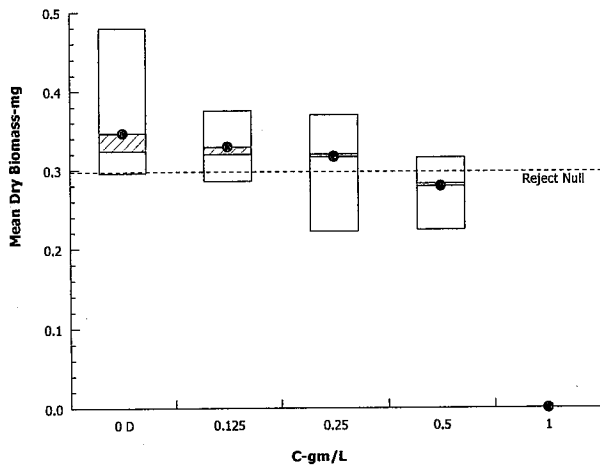
Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 20-9248-3717 Endpoint: Mean Dry Biomass-mg
 Analyzed: 22 Mar-23 15:37 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.7
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 22 Mar-23 15:37 (p 1 of 2)

Test Code: 904-1365 | 06-4049-1431

Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 18-5201-8840	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.7
Analyzed: 22 Mar-23 15:37	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 21-1639-7332	Test Type: Survival-Growth	Analyst: Lab Tech
Start Date: 09 Mar-23 14:35	Protocol: Washington DOE (2003)	Diluent: Laboratory Seawater
Ending Date: 16 Mar-23 16:30	Species: Mysidopsis bahia	Brine: Crystal Sea
Duration: 7d 2h	Source: Aquatic Biosystems, CO	Age:
Sample ID: 01-5836-8624	Code: 9708370	Client: Internal Lab
Sample Date: 22 Mar-23 10:31	Material: Potassium chloride	Project: Special Studies
Receive Date: 22 Mar-23 10:31	Source: Reference Toxicant	
Sample Age: NA	Station:	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1665390	200	Yes	Two-Point Interpolation

Point Estimates

Level	gm/L	95% LCL	95% UCL
IC5	0.1263	0.03957	0.3478
IC10	0.2832	0.07913	0.4986
IC15	0.3993	0.1187	0.5276
IC20	0.5041	0.2405	0.5554
IC25	0.5351	0.4219	0.5832
IC40	0.6281	0.5857	0.6665
IC50	0.6901	0.6547	0.7221

Mean Dry Biomass-mg Summary

Calculated Variate

C-gm/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.3464	0.296	0.48	0.02086	0.05899	17.0%	0.0%
0.125		8	0.3292	0.286	0.376	0.01168	0.03304	10.0%	4.96%
0.25		8	0.3167	0.222	0.37	0.01798	0.05085	16.1%	8.57%
0.5		8	0.2794	0.224	0.316	0.01141	0.03228	11.6%	19.3%
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	0.296	0.3425	0.324	0.306	0.375	0.324	0.324	0.48
0.125		0.356	0.376	0.366	0.312	0.314	0.298	0.326	0.286
0.25		0.36	0.276	0.302	0.222	0.308	0.37	0.364	0.332
0.5		0.224	0.302	0.288	0.25	0.264	0.2775	0.314	0.316
1		0	0	0	0	0	0	0	0

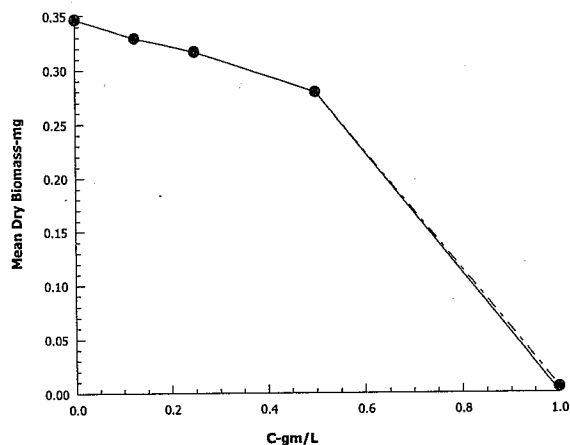
Mysidopsis 7-d Survival, Growth and Fecundity Test

TRE Environmental Strategies, LLC

Analysis ID: 18-5201-8840 Endpoint: Mean Dry Biomass-mg
 Analyzed: 22 Mar-23 15:37 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: 14001-056-243 Test Species: Americamysis bahia

Test Period: March 9, 2023 to March 16, 2023

CCEC	Mysid average weight / organism (mg)							
	Rep A	Rep B	Rep C	Rep D	Rep E	Rep F	Rep G	Rep H
0.8% effluent	0.294	0.275	0.298	0.246	0.256	0.320	0.322	0.272
Control	Rep A	Rep B	Rep C	Rep D	Rep E	Rep F	Rep G	Rep H
Lab water	0.318	0.260	0.260	0.273	0.274	0.227	0.323	0.313
								Mean
								0.285 (A)
								Mean
								0.281 (B)

1. $\frac{0.281}{0.281} (B) - 0.285 (A) = -0.004 (C)$
2. $\frac{-0.004}{0.281} (C) \div 0.281 (B) = -0.0142 \times 100 = -1.42 (D)$
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.