

**BIOASSAY REPORT
ACUTE AND CHRONIC
BIOASSAYS CONDUCTED
March 3 through 10, 2015**

Prepared for

KAISER ALUMINUM
SPOKANE, WASHINGTON

Prepared by



CH2MHILL
Applied Sciences Laboratory (ASL)

1100 NE Circle Boulevard, Suite 300
Corvallis, Oregon 97330
541-768-3160

State of Washington Department of Ecology (WDOE), Lab ID C1233
NELAC #OR100022

Report Date: March 13, 2015
Lab I.D. No. B3285

CONTENTS

Section	Page
INTRODUCTION	1
SUMMARY OF TEST RESULTS	1
ACRONYM DEFINITIONS	2
SAMPLE INFORMATION.....	2
METHODS AND MATERIALS	3
TEST METHODS	3
DEVIATIONS FROM PROTOCOL	3
TEST ORGANISMS	3
DILUTION WATER	3
TEST CONCENTRATIONS	3
SAMPLE COLLECTION	4
SAMPLE PREPARATION	4
MONITORING OF BIOASSAYS	4
DATA ANALYSIS	5
DATA INTERPRETATION	5
RESULTS AND DISCUSSION	6
ACUTE RESULTS	6
CHRONIC RESULTS	7
REFERENCE TOXICANT TESTS	8
APPENDIX A. RAW DATA SHEETS	
APPENDIX B. REFERENCE TOXICANT DATA SHEETS	
APPENDIX C. CHAIN OF CUSTODY	

INTRODUCTION

CH2M HILL conducted acute and chronic bioassays from March 3 through 10, 2015, on samples provided by the Kaiser Aluminum, Spokane, Washington, (NPDES No. WA-000892). The tests were conducted using the fathead minnow (*Pimephales promelas*).

SUMMARY OF TEST RESULTS

Exhibits 1 and 2 provides a summary of the final test results.

EXHIBIT 1

Summary of Acute Test Results

Species	NOEC (%)	LOEC (%)	LC ₅₀ (%)
<i>P. promelas</i>	100	> 100	> 100

Note: acronyms are as defined below.

Acute Toxicity: Toxicity is shown if the NOEC value is less than 71.8 percent.
More detailed information is provided in the Acute Results and Data Interpretation sections

EXHIBIT 2

Summary of Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC ₂₅ (%)
<i>P. promelas</i>	100	> 100	> 100

Note: acronyms are as defined below. See discussion under Table 2 for further details.

Chronic Toxicity: Toxicity is shown if the NOEC value is less than 17.1 percent.
More detailed information is provided in the Chronic Results and Data Interpretation sections.

ACRONYM DEFINITIONS (from EPA guidance):

NOEC = No Observed Effect Concentration: The highest test concentration that causes no observable adverse effects on the test organisms (i.e. no statistically significant reduction from the control).

LOEC = Low Observed Effect Concentration: The lowest test concentration that does cause an observable adverse effect on the test organisms (i.e. is statistically significant reduction from the control).

LC₅₀ = Lethal Concentration (50%): A point estimate of the test concentration that would cause death in 50 percent of the test population.

IC₂₅ = Inhibition Concentration (25%): A point estimate of the test concentration that would cause a 25 percent reduction of a non-quantal biological measurement (i.e. growth, reproduction, etc.) for the test population.

SAMPLE INFORMATION

Exhibit 2 provides a summary of the sample conditions as received.

EXHIBIT 2

Sample Conditions on Receipt

Sample ID	Final Effluent		
		B3285	
CH2M HILL SDG + suffix	-01	-02	-03
Collection - Date and Time	03/2/2015 13:00	03/4/2015 12:30	03/6/2015 12:30
Receipt - Date and Time	03/3/2015 11:15	03/5/2015 09:50	03/7/2015 10:00
Temperature (°C)	0.8	0.1	0.1
Dissolved Oxygen (mg/L)	8.6	8.9	8.7
pH	7.8	7.8	7.4
Conductivity (µS/cm)	287	298	288
Total Residual Chlorine (mg/L)	< 0.02	0.02	< 0.02
Ammonia (mg/L as NH ₃ -N)	< 0.10	< 0.10	< 0.10
Total Hardness (mg/L as CaCO ₃)	143	145	140
Total Alkalinity (mg/L as CaCO ₃)	123	127	127

Water quality measurements during testing remained within test design limits as prescribed by EPA and WDOE, except as noted with the individual test results. (see the Results and Discussion section)

METHODS AND MATERIALS

TEST METHODS

The acute test methods were performed according to: *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water (2002); EPA-821-R-02-012.

The chronic test methods were performed according to: *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002), EPA-821-R-02-013.

Additional guidance was provided by:

- *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, Washington State Department of Ecology (revised 2008) Pub# WQ-R-95-80.

DEVIATIONS FROM PROTOCOLS

Deviations from required procedures in the test methods:

- None noted.

Deviations from recommended procedures in the test methods:

- None noted.

TEST ORGANISMS

The *P. promelas* used in both the acute and the chronic tests were obtained from Aquatox Inc., Hot Springs, Arkansas, and were less than 48 hours old and within a 24-hour age range at test initiation. All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA. The test organisms appeared vigorous and in good condition prior to testing.

DILUTION WATER

The dilution water used was reconstituted, moderately hard water with a total hardness of 80 to 100 mg/L as CaCO₃ and an alkalinity of 60 to 70 mg/L as CaCO₃.

TEST CONCENTRATIONS

The concentrations tested in the acute test were 6.25, 17.1, 25.0, 71.8, and 100 percent effluent with dilution water for the control. For the *P. promelas* acute test, concentrations were run in quadruplicate with 10 organisms per replicate.

The concentrations for the chronic test were 6.25, 17.1, 25.0, 71.8, and 100 percent effluent with dilution water for the control. For the *P. promelas* chronic test, 10 organisms per chamber, with four chambers per concentration for a total of 40 organisms per concentration were used.

SAMPLE COLLECTION

The samples were collected by Kaiser Aluminum personnel on March 2, 4, and 6, 2015. The samples were accepted as scheduled by CH2M HILL's Corvallis Aquatic Toxicology Laboratory. All samples were received within the EPA recommended 0 to 6 °C range.

All samples were used for test initiation or test solution renewal within the EPA recommended 36 hours of sample collection.

Following receipt, the samples were stored in the dark at 0 to 6°C until test solutions were prepared and tested. Chain of Custody for sample collection is provided in Appendix C.

SAMPLE PREPARATION

Samples used during these tests were temperature adjusted prior to test initiation and each daily renewal.

MONITORING OF BIOASSAYS

Samples were monitored on arrival for hardness, alkalinity, total residual chlorine, ammonia, dissolved oxygen, pH, conductivity, and temperature.

The *P. promelas* acute test was monitored at test initiation for pH, conductivity, and dissolved oxygen, and every 24 hours thereafter for mortality, dissolved oxygen, and pH. The 48 hour pre- and post-renewal solutions were monitored for dissolved oxygen and pH. Conductivity was again measured at test termination. Temperature was monitored daily and in the incubator or waterbath continuously throughout the testing period.

For the *P. promelas* chronic test, pre- and post-renewal solutions were monitored for dissolved oxygen and pH daily in all the concentrations. Conductivity was measured in each new sample (100 percent effluent) and in the control. *P. promelas* mortality was measured daily and fish growth was measured by dry weight analysis at the conclusion of the *P. promelas* chronic test. Temperature was monitored in prer renewal solutions daily and in the incubator or waterbath continuously throughout the testing period.

DATA ANALYSIS

The effect measured during the *P. promelas* acute test was survival during the 96-hour exposure period. The statistical analyses performed were those outlined in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water (2002), EPA-821-R-02-012; using CETIS. The acute NOEC and LOEC values were established by hypothesis testing as follows: Dunnett's Procedure or Bonferroni's T-Test was used to compare the survival data between the control and each sample concentration. When the assumptions of normality or homogeneity of variance necessary for Dunnett's Procedure or T-test with Bonferroni Adjustment could not be met, Steel's Many-One Rank Test or Wilcoxon Rank Sum with Bonferroni Adjustment was used to analyze the data. The acute point estimate values (LC₅₀ values) were calculated by use of the Probit, Trimmed Spearman-Kärber, or Linear Interpolation statistical methods.

The effects measured during the *P. promelas* chronic test included survival and growth over the exposure period. The statistical analyses performed were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002), EPA-821-R-02-013, CETIS. The chronic NOEC and LOEC values were established by hypothesis testing as follows: Dunnett's Procedure or Bonferroni's T-Test was used to compare the survival, fecundity, or growth data between the control and each sample concentration. When the assumptions of normality or homogeneity of variance necessary for Dunnett's Procedure or T-test with Bonferroni Adjustment could not be met, Steel's Many-One Rank Test or Wilcoxon Rank Sum with Bonferroni Adjustment was used to analyze the data. The chronic point estimate values (IC₂₅ values) were calculated for growth, reproduction, and/or fecundity effects by use of the Linear Interpolation method.

DATA INTERPRETATION

According to the NPDES permit information provided by Kaiser Aluminum (NPDES file #WA-000089-2, expires June 30, 2016), "Compliance with the effluent limit for acute toxicity means no statistically significant difference in survival between the control and the test concentration representing the ACEC". (i.e. NOEC below the ACEC concentration of 71.8%)

According to the NPDES permit information provided by Kaiser Aluminum (NPDES file #WA-000089-2, expires June 30, 2016), "Compliance with the effluent limit for chronic toxicity means no statistically significant difference in survival between the control and the test concentration representing the CCEC". (i.e. NOEC below the CCEC concentration of 17.1%).

RESULTS AND DISCUSSION

The raw data sheets for all tests are presented in Appendix A.

ACUTE BIOASSAYS

Table 1 summarizes the survival data for the *P. promelas* acute test.

Table 1 <i>P. promelas</i> Acute Results					
Concentration (%)	0 hr	24 hr	48 hr	72 hr	96 hr
Control	100	100	97.5	97.5	95.0
6.25	100	100	95.0	95.0	92.5
17.1	100	100	100	100	100
25.0	100	100	100	100	100
71.8	100	100	95.0	95.0	92.5
100	100	100	95.0	95.0	95.0

The *P. promelas* acute test results indicated no statistically significant reduction in survival at any of the effluent concentrations tested when compared to the control. The NOEC and the LOEC were 100 and greater than 100 percent effluent, respectively. The LC₅₀ value was greater than 100 percent effluent.

From the NPDES permit: Toxicity is shown if the NOEC value is less than 71.8 percent.

Dissolved oxygen concentrations remained at 4.0 mg/L or greater throughout the test period. Test temperatures remained in the range of 20±1°C.

The test meets Test Acceptability Criteria (TAC) of a minimum 90 percent control survival. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered "valid".

CHRONIC BIOASSAYS

Table 2 summarizes the survival and growth data for the *P. promelas* chronic test.

Table 2 Summary of Chronic Results <i>P. promelas</i>		
Sample Concentration (%)	Percent Survival	Mean Dry Weight Per Fish (mg)
Control	85.0	0.678
6.25	87.5	0.807
17.1	95.0	0.697
25.0	80.0	0.691
71.8	87.5	0.755
100	80.0	0.840

The *P. promelas* chronic test results showed no statistically significant reduction in survival or growth at any of the sample concentrations tested when compared to the control. By EPA definition, the NOEC and the LOEC were 100 and greater than 100 percent sample, respectively.

The IC₂₅ value on *P. promelas* growth was calculated as greater than 100 percent sample.

From the NPDES permit: Toxicity is shown if the NOEC value is less than 17.1 percent.

Dissolved oxygen concentrations remained at 4.0 mg/L or greater throughout the test period. Test temperatures remained in the range of 25±1°C.

The *P. promelas* chronic test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum weight of 0.250 mg per surviving control organism. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered "valid".

REFERENCE TOXICANT TESTS

Reference toxicant (reftox) testing is performed to document both initial and ongoing laboratory performance of the test method(s). While the health of the test organisms is primarily evaluated by the performance of the laboratory control, reftox test results also may be used to assess the health and sensitivity of the test organisms. Reftox test results within their respective cumulative summary (Cusum) chart limits are indicative of consistent laboratory performance and normal test organism sensitivity.

The results of the reftox tests indicate that the test organisms were within their respective cusum chart limits based on EPA guidelines. This demonstrates ongoing laboratory proficiency of the test methods and suggests normal test organism sensitivity in the associated client testing.

The *P. promelas* reftox tests were conducted using sodium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Tables 3 and 4 summarize the reference toxicant test results and Cusum chart limits.

Table 3		
Acute Reference Toxicant Test (g/L)		
Species	LC₅₀	Control Chart
<i>P. promelas</i>	7.2	6.2 to 8.5

Table 4		
Chronic Reference Toxicant Test (g/L)		
Species	IC₂₅	Control Chart Limits
<i>P. promelas</i> (survival)	2.2	1.6 to 4.0
<i>P. promelas</i> (growth)	2.1	1.9 to 3.0

APPENDIX A
RAW DATA SHEETS



FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client Kaiser Aluminum - Trentwood

Sample Designation (SDG): B 3285

Test Species Information	FHM # 1809 <i>Pimephales promelas</i> Chronic	FHM # 1809 <i>Pimephales promelas</i> Acute			
Organism Age at Initiation	<48 hrs, all within a 24 hour window	1 Days			
Test Container Size	800 ml	400 ml			
Test Volume	500 ml	250 ml			
Feeding: Type and Amount	0.15 ml <i>Artemia</i> , 2 x Daily	0.15 ml <i>Artemia</i> , @ 48 hrs			
Aeration:	<input type="checkbox"/> None <input type="checkbox"/> Prior to use	<input type="checkbox"/> None <input type="checkbox"/> Prior to use			
In Test Chambers via Slow Bubble :	<input type="checkbox"/> @ _____ hrs	<input type="checkbox"/> @ _____ hrs			
Acclimation Period	<24 hrs	<24 hrs			
Organism Source	<i>Aquatox</i>	<i>Aquatox</i>			
Size	-	-			
Loading Rate	-	-			

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): ☐ All ☐ _____
Date:

Comments:

Test Solution Preparation and Dilution Record

Client: Kaiser Aluminum - Trentwood

Note: ☐ Indicates task not done, ☒ Indicates task was done. Temp adj. = Temperature adjusted to ambient or test temp

Ditto marks (' ') indicate that the same SDG, batch of dilution water, or food as the previous day's entry was used.

Fathead minnow - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00 →	2000
6.25	125 →	2000
17.1	342 →	2000
25	500 →	2000
71.8	1,436 →	2000
100	2,000 →	2000

Total Sample volume needed per day = 4403 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 3285-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/3/2015	12:15	ju
1	B 3285-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/4/15	08:40	MC
2	B 3285-02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/5/15	10:30	MC
3	B 1-02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/6/15	07:10	DW
4	B 1-08	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/7/15	10:30	ju
5	B 1-03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/8/15	10:50	ju
6	B 1-03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 11	3/9/15	10:50	ju

Fathead minnow - Acute

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00 →	1000
6.25	62.5 →	1000
17.1	171 →	1000
25	250 →	1000
71.8	718 →	1000
100	1,000 →	1000

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 3285-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/3/2015	12:15	ju
2	B 3285-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4187	3/5/2015	08:40	MC

Total Sample volume needed per day = 2202 mls

[illegible][illegible]

6#

Waterbath/Incubator Used: # 10

Test Initiation

CA

2015

Time:

500

80

Sample Description

Sample Description

Initial Sample ID # B 3285-01

Termination

7

Uc

Time

13:00

00

Kaiser Aluminum - Trentwood

Trentwood

Time	0 hr	2 hr
$\frac{S}{S_0}$	1.0	0.5

4817

2

1

8

96	13
96	13

$$\begin{array}{r} 13 \cdot 10 \\ \hline 130 \end{array}$$

Test Species

ID# FHM i809

Therm. ID# 0 hr # 215

48 hr

2

#

9

961r #

136

[illegible]

CETIS Summary Report

Report Date: 13 Mar-15 13:19 (p 1 of 1)
Test Code: B328501ppa | 02-0894-1202

Fathead Minnow 96-h Acute Survival Test

CH2M HILL - ASL

Batch ID:	00-2231-4990	Test Type:	Survival (96h)	Analyst:	
Start Date:	03 Mar-15 15:00	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	07 Mar-15 13:00	Species:	Pimephales promelas	Brine:	
Duration:	94h	Source:	Aquatox, AR	Age:	1d
Sample ID:	15-0419-0321	Code:	B3285-01	Client:	
Sample Date:	02 Mar-15 09:00	Material:	Unknown	Project:	
Receive Date:	03 Mar-15 11:15	Source:	Kaiser Aluminum Trentwood (WA0000892)		
Sample Age:	30h (0.8 °C)	Station:			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-9913-1695	96h Survival Rate	100	>100	N/A	9.89%	1	Steel Many-One Rank Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
12-4353-9205	96h Survival Rate	EC50	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
12-4353-9205	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria
13-9913-1695	96h Survival Rate	Control Resp	0.95	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	0.0%
6.25		4	0.925	0.8892	0.9608	0.8	1	0.04787	0.09574	10.35%	2.63%
17.1		4	1	1	1	1	1	0	0	0.0%	-5.26%
25		4	1	1	1	1	1	0	0	0.0%	-5.26%
71.8		4	0.925	0.9063	0.9437	0.9	1	0.025	0.05	5.41%	2.63%
100		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	0.0%

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	0.9	1
6.25		1	1	0.9	0.8
17.1		1	1	1	1
25		1	1	1	1
71.8		1	0.9	0.9	0.9
100		0.9	1	0.9	1

CETIS Analytical Report

Report Date: 13 Mar-15 13:19 (p 1 of 2)
 Test Code: B328501ppa | 02-0894-1202

Fathead Minnow 96-h Acute Survival Test							CH2M HILL - ASL				
Analysis ID: 13-9913-1695		Endpoint: 96h Survival Rate		CETIS Version: CETISv1.8.1							
Analyzed: 13 Mar-15 13:18		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes							
Batch ID: 00-2231-4990		Test Type: Survival (96h)		Analyst:							
Start Date: 03 Mar-15 15:00		Protocol: EPA/821/R-02-012 (2002)		Diluent: Mod-Hard Synthetic Water							
Ending Date: 07 Mar-15 13:00		Species: Pimephales promelas		Brine:							
Duration: 94h		Source: Aquatox, AR		Age: 1d							
Sample ID: 15-0419-0321		Code: B3285-01		Client:							
Sample Date: 02 Mar-15 09:00		Material: Unknown		Project:							
Receive Date: 03 Mar-15 11:15		Source: Kaiser Aluminum Trentwood (WA0000892)									
Sample Age: 30h (0.8 °C)		Station:									
Data Transform		Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD		
Angular (Corrected)		0	C > T	Not Run	100	>100	N/A	1	9.89%		
Steel Many-One Rank Test											
Control	vs	Conc-%	Test Stat	Critical	DF	Ties	P-Value	Decision(α:5%)			
Dilution Water		6.25	17	10	6	3	0.7334	Non-Significant Effect			
		17.1	22	10	6	2	0.9908	Non-Significant Effect			
		25	22	10	6	2	0.9908	Non-Significant Effect			
		71.8	16	10	6	3	0.6105	Non-Significant Effect			
		100	18	10	6	3	0.8333	Non-Significant Effect			
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	0.05977475		0.01195495		5	1.561	0.2212	Non-Significant Effect			
Error	0.1378236		0.007656866		18						
Total	0.1975983		0.01961181		23						
Distributional Tests											
Attribute	Test		Test Stat	Critical	P-Value	Decision(α:1%)					
Variances	Mod Levene Equality of Variance		4.721	4.248	0.0063	Unequal Variances					
Distribution	Shapiro-Wilk W Normality		0.9275	0.884	0.0856	Normal Distribution					
96h Survival Rate Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.95	0.928	0.972	0.9	1	0.02887	0.05773	6.08%	0.0%
6.25		4	0.925	0.8886	0.9614	0.8	1	0.04787	0.09574	10.35%	2.63%
17.1		4	1	1	1	1	1	0	0	0.0%	-5.26%
25		4	1	1	1	1	1	0	0	0.0%	-5.26%
71.8		4	0.925	0.906	0.944	0.9	1	0.025	0.05	5.41%	2.63%
100		4	0.95	0.928	0.972	0.9	1	0.02887	0.05773	6.08%	0.0%
Angular (Corrected) Transformed Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.331	1.295	1.366	1.249	1.412	0.04705	0.09409	7.07%	0.0%
6.25		4	1.295	1.239	1.351	1.107	1.412	0.07348	0.147	11.35%	2.67%
17.1		4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	-6.12%
25		4	1.412	1.412	1.412	1.412	1.412	0	0	0.0%	-6.12%
71.8		4	1.29	1.259	1.321	1.249	1.412	0.04074	0.08149	6.32%	3.06%
100		4	1.331	1.295	1.366	1.249	1.412	0.04705	0.09409	7.07%	0.0%

CETIS Analytical Report

Report Date: 13 Mar-15 13:19 (p 2 of 2)
 Test Code: B328501ppa | 02-0894-1202

Fathead Minnow 96-h Acute Survival Test

CH2M HILL - ASL

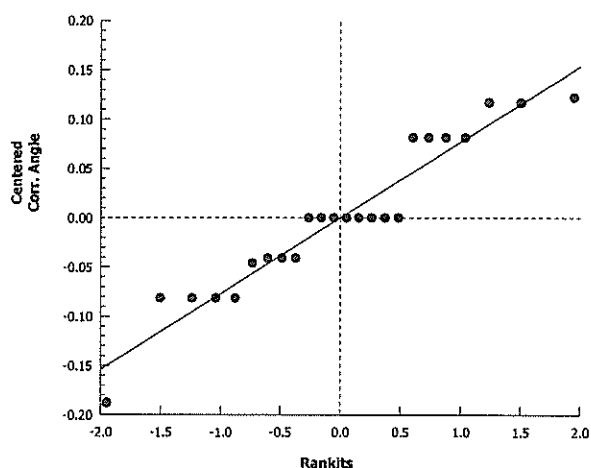
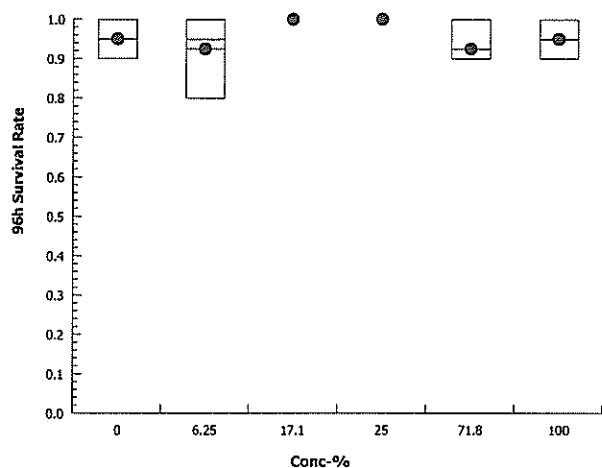
Analysis ID: 13-9913-1695 Endpoint: 96h Survival Rate
 Analyzed: 13 Mar-15 13:18 Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.1
 Official Results: Yes

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	0.9	1
6.25		1	1	0.9	0.8
17.1		1	1	1	1
25		1	1	1	1
71.8		1	0.9	0.9	0.9
100		0.9	1	0.9	1

Graphics



CETIS Analytical Report

Report Date: 13 Mar-15 13:19 (p 1 of 1)

Test Code: B328501ppa | 02-0894-1202

Fathead Minnow 96-h Acute Survival Test

CH2M HILL - ASL

Analysis ID: 12-4353-9205	Endpoint: 96h Survival Rate	CETIS Version: CETISv1.8.1
Analyzed: 13 Mar-15 13:18	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes

Batch ID: 00-2231-4990	Test Type: Survival (96h)	Analyst:
Start Date: 03 Mar-15 15:00	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 07 Mar-15 13:00	Species: Pimephales promelas	Brine:
Duration: 94h	Source: Aquatox, AR	Age: 1d

Sample ID: 15-0419-0321	Code: B3285-01	Client:
Sample Date: 02 Mar-15 09:00	Material: Unknown	Project:
Receive Date: 03 Mar-15 11:15	Source: Kaiser Aluminum Trentwood (WA0000892)	
Sample Age: 30h (0.8 °C)	Station:	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1.983E+09	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	N/A	N/A	<1	N/A	N/A

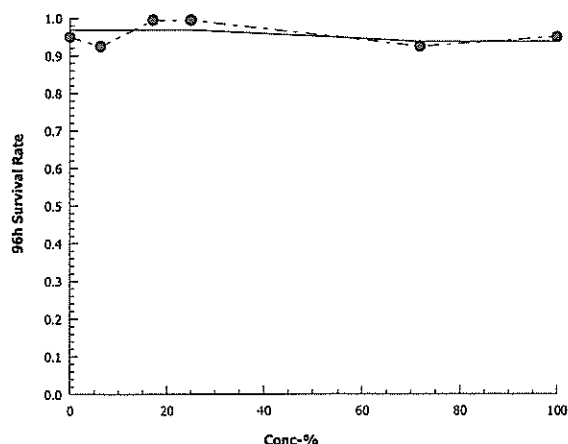
96h Survival Rate Summary

		Calculated Variate(A/B)									
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.95	0.9	1	0.02887	0.05773	6.08%	0.0%	38	40
6.25		4	0.925	0.8	1	0.04787	0.09574	10.35%	2.63%	37	40
17.1		4	1	1	1	0	0	0.0%	-5.26%	40	40
25		4	1	1	1	0	0	0.0%	-5.26%	40	40
71.8		4	0.925	0.9	1	0.025	0.05	5.41%	2.63%	37	40
100		4	0.95	0.9	1	0.02887	0.05773	6.08%	0.0%	38	40

96h Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	0.9	1
6.25		1	1	0.9	0.8
17.1		1	1	1	1
25		1	1	1	1
71.8		1	0.9	0.9	0.9
100		0.9	1	0.9	1

Graphics



FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 3 Waterbath/incubator Used: _____ Date Initiated 3 / 3 / 20 15 Time 15 : 45
 Initial sample ID B 3225 - 01 # 7 Date Terminated 3 / 10 / 20 15 Time 10 : 10

Client Kaiser Aluminum - Trentwood Sample Description _____

Tech: Day 0 SW Day 1 MC Day 2 MC Day 3 DW Day 4 SW Day 5 SW Day 6 SW Day 7 MC
 Time Day 0 1545 Day 1 1115 Day 2 1305 Day 3 0930 Day 4 2130 Day 5 1310 Day 6 1405 Day 7 1010

Conc. or Percent	Day	Number of Live Organisms				Dissolved O ₂ (mg/l)		pH		Temp. (°C)	Therm. ID #	Conductivity (µS)
		A	B	C	D	Pre	Post	Pre	Post	Pre		Post (1 st use)
Control	0	10	10	10	10		7.7		7.9	Post: 24.6	212	296
	1	10	10	10	10	7.6	8.0	8.0	8.1	24.0	217	
	2	10	10	9	9	7.8	7.7	7.8	8.0	24.0	214	313
	3	9	10	7	8	7.6	7.9	7.7	7.9	24.1	217	
	4	9	10	7	8	7.3	7.4	7.7	8.0	24.4	186	308
	5	9	10	7	8	7.1	7.2	7.6	8.0	24.3	186	
	6	9	10	7	8	7.3	7.8	7.2	7.7	24.2	215	
	7	9	10	7	8	7.5		7.6		24.1	214	
6.25 %	0	10	10	10	10		7.6		7.9	Post: 24.8		315
	1	10	10	10	10	7.6	8.0	7.9	8.1	24.0		
	2	10	10	10	9	7.6	7.8	7.8	8.0	24.1		316
	3	10	10	9	9	7.6	7.9	7.7	7.9	24.1		
	4	10	10	8	9	7.1	7.6	7.7	8.0	24.4		320
	5	10	10	7	9	7.0	7.5	7.5	7.9	24.4		
	6	10	9	7	9	7.4	7.9	7.4	7.7	24.2		
	7	10	9	7	9	7.4		7.6		24.5		
17.1 %	0	10	10	10	10		7.6		7.7	Post: 24.8		314
	1	10	10	10	10	7.5	8.0	7.9	8.0	24.0		
	2	10	10	10	10	7.2	7.8	7.7	7.9	24.1		315
	3	10	10	10	9	7.6	7.9	7.7	7.8	24.1		
	4	10	10	10	9	7.1	7.7	7.7	8.0	24.5		318
	5	10	10	10	9	6.9	7.6	7.5	7.9	24.3		
	6	10	10	9	9	7.3	7.9	7.4	7.7	24.3		
	7	10	10	9	9	7.4		7.6		24.5		
25 %	0	10	10	10	10		7.7		7.7	Post: 24.4		313
	1	10	10	10	10	7.2	8.0	7.9	8.0	24.0		
	2	10	10	10	9	7.1	7.9	7.8	7.9	24.1		312
	3	10	9	9	9	7.5	7.9	7.7	7.8	24.2		
	4	9	8	9	9	7.2	7.7	7.8	8.0	24.4		317
	5	8	8	8	9	7.1	7.7	7.6	7.8	24.3		
	6	8	8	8	9	7.3	7.9	7.4	7.6	24.2		
	7	7	8	8	9	7.2		7.6		24.6		
71.8 %	0	10	10	10	10		7.9		7.6	Post: 24.4		303
	1	10	10	10	10	7.3	8.1	8.1	7.8	24.0		
	2	10	10	10	10	7.1	8.0	7.9	7.8	24.0		302
	3	9	10	9	9	7.6	8.1	7.8	7.8	24.1		
	4	9	10	9	9	7.1	7.8	7.8	7.9	24.3		311
	5	9	10	9	8	7.0	8.0	7.7	7.7	24.3		
	6	9	10	9	8	7.2	8.2	7.6	7.5	24.3		
	7	9	10	9	7	7.2		7.6		24.5		
100 %	0	10	10	10	10		8.0		7.5	Post: 24.6		299
	1	10	10	10	10	7.2	8.3	8.1	7.8	24.0		
	2	10	10	9	10	7.0	8.3	8.0	7.8	24.0		271
	3	10	9	8	9	7.4	8.2	7.9	7.8	24.2		
	4	9F	9	8	8F	7.0	7.8	7.9	7.9	24.3		307
	5	9	9	8	8	7.1	8.0	7.8	7.6	24.4		
	6	8F	9	8	8	7.2	8.3	7.7	7.4	24.3		
	7	8	9	7	8	7.2		7.7		24.3		

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.

"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.

"F" = fungus noted on dead organisms.

□ Aeration in test chambers begun @ _____ (Note observations on Test Organism Info sheet)

Pre = Pre-renewal solutions. Post = Post-renewal solutions.

Day 0 Temperatures = Post-renewals

Therm ID# = Thermometer ID used for all measurements that day.

(23.8) = Temp. out of recommended range

FATHEAD MINNOW 7-DAY GROWTH DATA

Client Kaiser Aluminum - Trentwood Tins Labeled As: K. TRENT
 Lab ID: B3285 Start Date: 3/3/2015
 Sample Description: _____

Technician: KJ KJ
 Date: 3/11/2015 2/27/2015
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A	1160.43	1153.52	9
	B	1165.07	1156.51	10
	C	1149.14	1143.53	7
	D	1163.08	1157.06	8
6.25 %	A	1150.52	1142.18	10
	B	1154.97	1145.64	9
	C	1171.56	1164.22	7
	D	1162.97	1155.69	9
17.1 %	A	1165.04	1158.69	10
	B	1157.14	1149.80	10
	C	1168.49	1161.40	9
	D	1167.24	1160.15	9
25 %	A	1164.64	1158.02	7
	B	1152.45	1145.60	8
	C	1162.58	1156.02	8
	D	1161.17	1153.58	9
71.8 %	A	1155.10	1147.35	9
	B	1158.34	1150.08	10
	C	1172.96	1165.24	9
	D	1163.74	1157.29	7
100 %	A	1162.47	1155.79	8
	B	1161.27	1151.65	9
	C	1148.34	1139.06	7
	D	1168.21	1160.19	8

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client Kaiser Aluminum - Trentwood Tins Labeled As: K. TRENT
 Lab ID: B3285 Start Date: 3/3/2015
 Sample Description: _____

Technician: KJ
 Date: 2/27/2015
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A		1153.52	9
	B		1156.51	10
	C		1143.53	7
	D		1157.06	8
6.25 %	A		1142.18	10
	B		1145.64	9
	C		1164.22	7
	D		1155.69	9
17.1 %	A		1158.69	10
	B		1149.80	10
	C		1161.40	9
	D		1160.15	9
25 %	A		1158.02	7
	B		1145.60	8
	C		1156.02	8
	D		1153.58	9
71.8 %	A		1147.35	9
	B		1150.08	10
	C		1165.24	9
	D		1157.29	7
100 %	A		1155.79	8
	B		1151.65	9
	C		1139.06	7
	D		1160.19	8

weigh to 0.01 mg

CETIS Summary Report

Report Date: 13 Mar-15 13:25 (p 1 of 2)
Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

Batch ID:	07-1145-3728	Test Type:	Growth-Survival (7d)	Analyst:	
Start Date:	03 Mar-15 15:45	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	10 Mar-15 10:10	Species:	Pimephales promelas	Brine:	
Duration:	6d 18h	Source:	Aquatox, AR	Age:	<48h
Sample ID:	15-0419-0321	Code:	B3285-01	Client:	
Sample Date:	02 Mar-15 09:00	Material:	Unknown	Project:	
Receive Date:	03 Mar-15 11:15	Source:	Kaiser Aluminum Trentwood (WA0000892)		
Sample Age:	31h (0.8 °C)	Station:			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-5626-1273	7d Survival Rate	100	>100	N/A	22.8%	1	Dunnett Multiple Comparison Test
16-2794-4481	Mean Dry Biomass-mg	100	>100	N/A	23.9%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
19-1256-8692	Mean Dry Biomass-mg	IC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
14-5626-1273	7d Survival Rate	Control Resp	0.85	0.8 - NL	Yes	Passes Acceptability Criteria
16-2794-4481	Mean Dry Biomass-mg	Control Resp	0.6775	0.25 - NL	Yes	Passes Acceptability Criteria
19-1256-8692	Mean Dry Biomass-mg	Control Resp	0.6775	0.25 - NL	Yes	Passes Acceptability Criteria
16-2794-4481	Mean Dry Biomass-mg	PMSD	0.2392	0.12 - 0.3	Yes	Passes Acceptability Criteria

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.85	0.8018	0.8982	0.7	1	0.06455	0.1291	15.19%	0.0%
6.25		4	0.875	0.828	0.922	0.7	1	0.06292	0.1258	14.38%	-2.94%
17.1		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	-11.76%
25		4	0.8	0.7695	0.8305	0.7	0.9	0.04082	0.08165	10.21%	5.88%
71.8		4	0.875	0.828	0.922	0.7	1	0.06292	0.1258	14.38%	-2.94%
100		4	0.8	0.7695	0.8305	0.7	0.9	0.04082	0.08165	10.21%	5.88%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6775	0.6287	0.7263	0.561	0.856	0.06539	0.1308	19.3%	0.0%
6.25		4	0.8073	0.7711	0.8434	0.728	0.933	0.04845	0.0969	12.0%	-19.15%
17.1		4	0.6967	0.6808	0.7127	0.635	0.734	0.02141	0.04281	6.15%	-2.84%
25		4	0.6905	0.6728	0.7082	0.656	0.759	0.02368	0.04735	6.86%	-1.92%
71.8		4	0.7545	0.7257	0.7833	0.645	0.826	0.03855	0.07709	10.22%	-11.37%
100		4	0.84	0.7901	0.8899	0.668	0.962	0.06687	0.1337	15.92%	-23.99%

CETIS Summary Report

Report Date: 13 Mar-15 13:25 (p 2 of 2)

Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	0.7	0.8
6.25		1	0.9	0.7	0.9
17.1		1	1	0.9	0.9
25		0.7	0.8	0.8	0.9
71.8		0.9	1	0.9	0.7
100		0.8	0.9	0.7	0.8

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.691	0.856	0.561	0.602
6.25		0.834	0.933	0.734	0.728
17.1		0.635	0.734	0.709	0.709
25		0.662	0.685	0.656	0.759
71.8		0.775	0.826	0.772	0.645
100		0.668	0.962	0.928	0.802

CETIS Analytical Report

Report Date: 13 Mar-15 13:25 (p 1 of 4)
 Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test								CH2M HILL - ASL			
Analysis ID: 16-2794-4481		Endpoint: Mean Dry Biomass-mg				CETIS Version: CETISv1.8.1					
Analyzed: 13 Mar-15 13:25		Analysis: Parametric-Control vs Treatments				Official Results: Yes					
Batch ID: 07-1145-3728		Test Type: Growth-Survival (7d)				Analyst:					
Start Date: 03 Mar-15 15:45		Protocol: EPA/821/R-02-013 (2002)				Diluent: Mod-Hard Synthetic Water					
Ending Date: 10 Mar-15 10:10		Species: Pimephales promelas				Brine:					
Duration: 6d 18h		Source: Aquatox, AR				Age: <48h					
Sample ID: 15-0419-0321		Code: B3285-01				Client:					
Sample Date: 02 Mar-15 09:00		Material: Unknown				Project:					
Receive Date: 03 Mar-15 11:15		Source: Kaiser Aluminum Trentwood (WA0000892)									
Sample Age: 31h (0.8 °C)		Station:									
Data Transform		Zeta	Alt Hyp	MC Trials		NOEL	LOEL	TOEL	TU	PMSD	
Untransformed		0	C > T	Not Run		100	>100	N/A	1	23.9%	
Dunnett Multiple Comparison Test											
Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)			
Dilution Water		6.25	-1.927	2.407	6	0.1621	0.9989	Non-Significant Effect			
		17.1	-0.286	2.407	6	0.1621	0.9037	Non-Significant Effect			
		25	-0.1931	2.407	6	0.1621	0.8839	Non-Significant Effect			
		71.8	-1.144	2.407	6	0.1621	0.9884	Non-Significant Effect			
		100	-2.413	2.407	6	0.1621	0.9997	Non-Significant Effect			
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	0.09137096		0.01827419		5	2.016	0.1250	Non-Significant Effect			
Error	0.1632008		0.009066711		18						
Total	0.2545717		0.0273409		23						
Distributional Tests											
Attribute	Test			Test Stat	Critical	P-Value	Decision(α:1%)				
Variances	Bartlett Equality of Variance			5.494	15.09	0.3586	Equal Variances				
Distribution	Shapiro-Wilk W Normality			0.9883	0.884	0.9905	Normal Distribution				
Mean Dry Biomass-mg Summary											
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6775	0.6277	0.7272	0.561	0.856	0.06539	0.1308	19.3%	0.0%
6.25		4	0.8073	0.7704	0.8441	0.728	0.933	0.04845	0.0969	12.0%	-19.15%
17.1		4	0.6967	0.6805	0.713	0.635	0.734	0.02141	0.04281	6.15%	-2.84%
25		4	0.6905	0.6725	0.7085	0.656	0.759	0.02368	0.04735	6.86%	-1.92%
71.8		4	0.7545	0.7252	0.7838	0.645	0.826	0.03855	0.07709	10.22%	-11.37%
100		4	0.84	0.7891	0.8909	0.668	0.962	0.06687	0.1337	15.92%	-23.99%

CETIS Analytical Report

Report Date: 13 Mar-15 13:25 (p 2 of 4)

Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

Analysis ID: 16-2794-4481

Endpoint: Mean Dry Biomass-mg

CETIS Version: CETISv1.8.1

Analyzed: 13 Mar-15 13:25

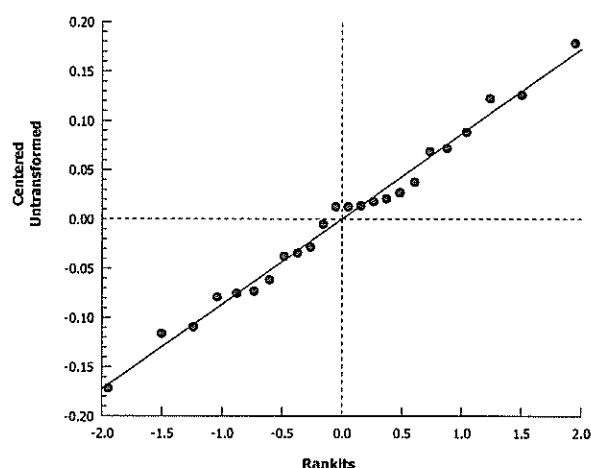
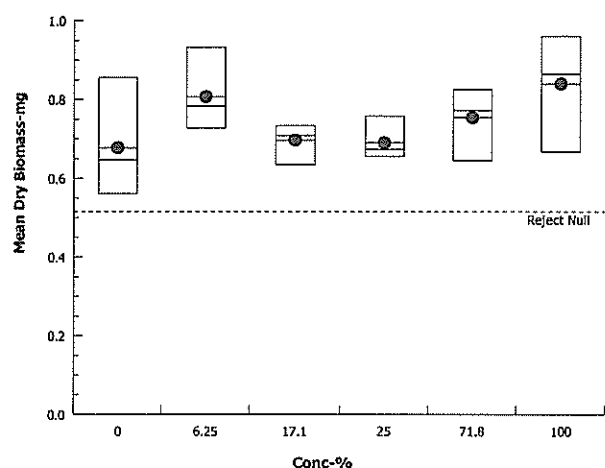
Analysis: Parametric-Control vs Treatments

Official Results: Yes

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.691	0.856	0.561	0.602
6.25		0.834	0.933	0.734	0.728
17.1		0.635	0.734	0.709	0.709
25		0.662	0.685	0.656	0.759
71.8		0.775	0.826	0.772	0.645
100		0.668	0.962	0.928	0.802

Graphics



CETIS Analytical Report

Report Date: 13 Mar-15 13:25 (p 3 of 4)

Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test CH2M HILL - ASL

Analysis ID: 14-5626-1273 Endpoint: 7d Survival Rate CETIS Version: CETISv1.8.1
 Analyzed: 13 Mar-15 13:25 Analysis: Parametric-Control vs Treatments Official Results: Yes

Batch ID: 07-1145-3728 Test Type: Growth-Survival (7d) Analyst:
 Start Date: 03 Mar-15 15:45 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 10 Mar-15 10:10 Species: Pimephales promelas Brine:
 Duration: 6d 18h Source: Aquatox, AR Age: <48h

Sample ID: 15-0419-0321 Code: B3285-01 Client:
 Sample Date: 02 Mar-15 09:00 Material: Unknown Project:
 Receive Date: 03 Mar-15 11:15 Source: Kaiser Aluminum Trentwood (WA0000892)
 Sample Age: 31h (0.8 °C) Station:

Data Transform	Zeta	Alt Hyp	MC Trials	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	100	>100	N/A	1	22.8%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	DF	MSD	P-Value	Decision(α:5%)
Dilution Water		6.25	-0.3479	2.407	6	0.2454	0.9155	Non-Significant Effect
		17.1	-1.38	2.407	6	0.2454	0.9941	Non-Significant Effect
		25	0.7476	2.407	6	0.2454	0.5362	Non-Significant Effect
		71.8	-0.3479	2.407	6	0.2454	0.9155	Non-Significant Effect
		100	0.7476	2.407	6	0.2454	0.5362	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1333764	0.02667529	5	1.283	0.3142	Non-Significant Effect
Error	0.3742097	0.02078943	18			
Total	0.5075862	0.04746472	23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.353	15.09	0.7984	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9634	0.884	0.5111	Normal Distribution

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.85	0.8009	0.8991	0.7	1	0.06455	0.1291	15.19%	0.0%
6.25		4	0.875	0.8271	0.9229	0.7	1	0.06292	0.1258	14.38%	-2.94%
17.1		4	0.95	0.928	0.972	0.9	1	0.02887	0.05773	6.08%	-11.76%
25		4	0.8	0.7689	0.8311	0.7	0.9	0.04082	0.08165	10.21%	5.88%
71.8		4	0.875	0.8271	0.9229	0.7	1	0.06292	0.1258	14.38%	-2.94%
100		4	0.8	0.7689	0.8311	0.7	0.9	0.04082	0.08165	10.21%	5.88%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.19	1.121	1.259	0.9912	1.412	0.09091	0.1818	15.28%	0.0%
6.25		4	1.225	1.159	1.291	0.9912	1.412	0.08699	0.174	14.2%	-2.98%
17.1		4	1.331	1.295	1.366	1.249	1.412	0.04705	0.09409	7.07%	-11.82%
25		4	1.114	1.073	1.154	0.9912	1.249	0.05277	0.1055	9.48%	6.41%
71.8		4	1.225	1.159	1.291	0.9912	1.412	0.08699	0.174	14.2%	-2.98%
100		4	1.114	1.073	1.154	0.9912	1.249	0.05277	0.1055	9.48%	6.41%

CETIS Analytical Report

Report Date: 13 Mar-15 13:25 (p 4 of 4)
 Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test

CH2M HILL - ASL

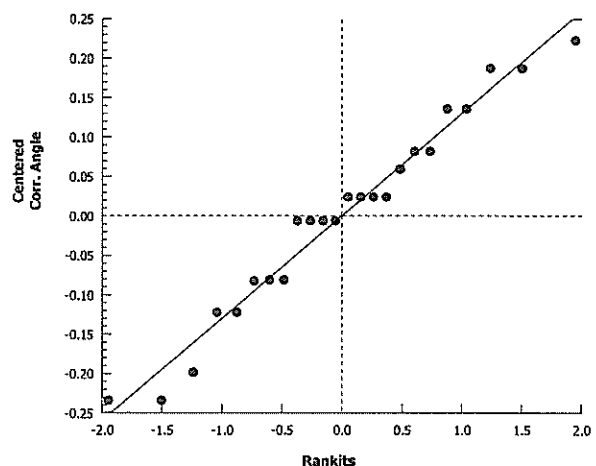
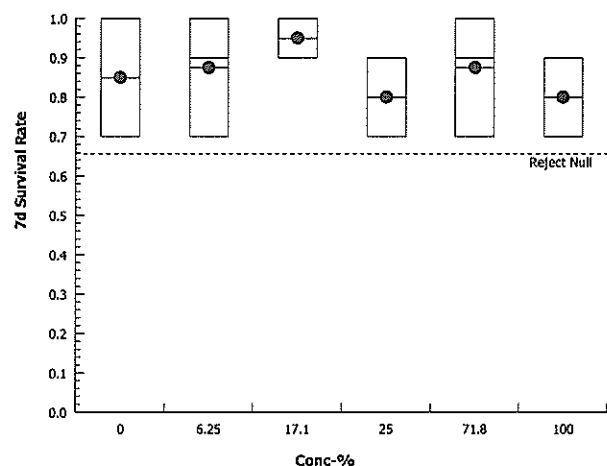
Analysis ID: 14-5626-1273 Endpoint: 7d Survival Rate
 Analyzed: 13 Mar-15 13:25 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.1
 Official Results: Yes

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	0.7	0.8
6.25		1	0.9	0.7	0.9
17.1		1	1	0.9	0.9
25		0.7	0.8	0.8	0.9
71.8		0.9	1	0.9	0.7
100		0.8	0.9	0.7	0.8

Graphics



CETIS Analytical Report

Report Date: 13 Mar-15 13:25 (p 1 of 1)
Test Code: B328501ppc | 05-4029-0640

Fathead Minnow 7-d Larval Survival and Growth Test CH2M HILL - ASL

Analysis ID: 19-1256-8692	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.1
Analyzed: 13 Mar-15 13:25	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes

Batch ID: 07-1145-3728	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 03 Mar-15 15:45	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 10 Mar-15 10:10	Species: Pimephales promelas	Brine:
Duration: 6d 18h	Source: Aquatox, AR	Age: <48h

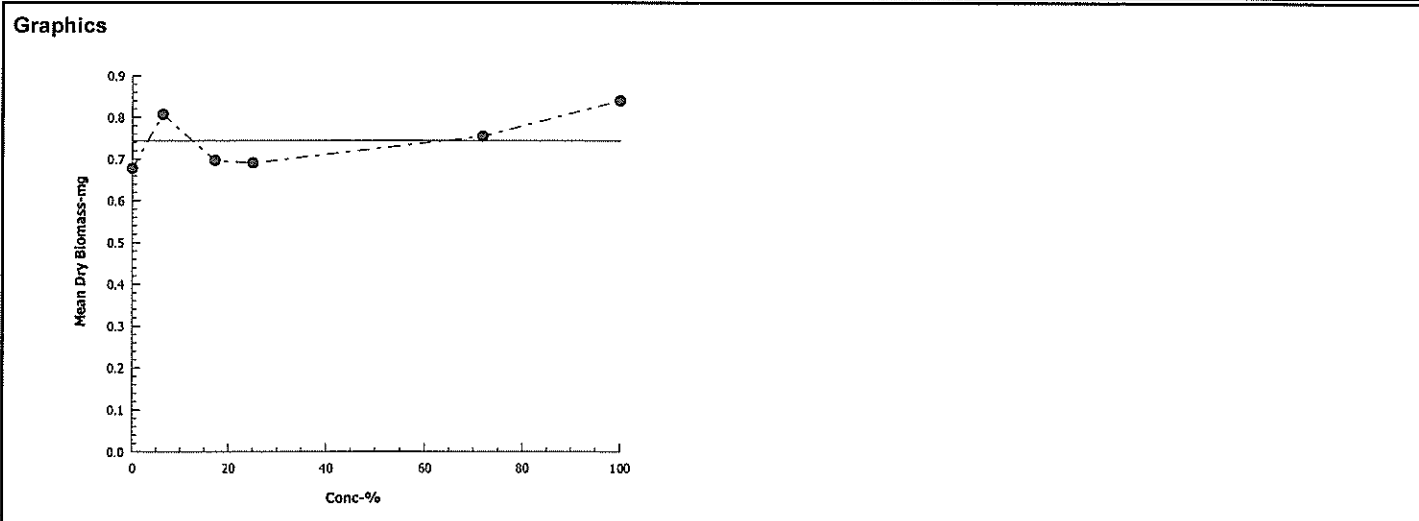
Sample ID: 15-0419-0321	Code: B3285-01	Client:
Sample Date: 02 Mar-15 09:00	Material: Unknown	Project:
Receive Date: 03 Mar-15 11:15	Source: Kaiser Aluminum Trentwood (WA0000892)	
Sample Age: 31h (0.8 °C)	Station:	

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	363697329	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	N/A	N/A	<1	N/A	N/A

Mean Dry Biomass-mg Summary			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6775	0.561	0.856	0.06539	0.1308	19.3%	0.0%
6.25		4	0.8073	0.728	0.933	0.04845	0.0969	12.0%	-19.15%
17.1		4	0.6967	0.635	0.734	0.02141	0.04281	6.15%	-2.84%
25		4	0.6905	0.656	0.759	0.02368	0.04735	6.86%	-1.92%
71.8		4	0.7545	0.645	0.826	0.03855	0.07709	10.22%	-11.37%
100		4	0.84	0.668	0.962	0.06687	0.1337	15.92%	-23.99%

Mean Dry Biomass-mg Detail					
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.691	0.856	0.561	0.602
6.25		0.834	0.933	0.734	0.728
17.1		0.635	0.734	0.709	0.709
25		0.662	0.685	0.656	0.759
71.8		0.775	0.826	0.772	0.645
100		0.668	0.962	0.928	0.802



APPENDIX B
REFERENCE TOXICANT DATA SHEETS

REFERENCE TOXICANT DATA SHEET

Client	QA / QC		Reference Toxicant	NaCl	Test Begin: Date	Time
Test Organism	<i>Pimephales promelas</i>		Stock Solution	20 g/L	Test End: Date	Time
Source	Aquatox		Solvent	Milli-Q water	Reagent Log ID #	
ID#	FHM 1809		*Dilution Water Type		Dilution Water ID#	
Age	1 day		Total Hardness as CaCO ₃	90	Total Alkalinity as CaCO ₃	
Feeding:	none		Conductivity ($\mu\text{mhos/cm}$)	300	Temperature (°C)	20 ± 1 °C
Test Chamber Size	800 ml		Technician	0 hr KF	48 hr KF	
Volume per Replicate	750 ml		Time	1210	1347	1410
			Therm. ID #	TH217	TH177	TH186

Toxicant Concentration (g/L)	Test Chamber Number	Number of Live Organisms			Dissolved Oxygen (mg/l)			pH			Temperature (°C)			Conductivity (µS)		
		0	24	48	0	24	48	0	24	48	20.0	24	48	0	24	48
Control	A	10	10	10	8.1	8.5	7.9	7.69	7.9	7.8	20.0	19.7	20.0	313		327
4.0	A	10	10	10	8.0	8.6	8.2	7.94	7.8	7.7	19.9	19.9	19.9	6900		7050
6.0	A	10	10	8	8.0	8.6	8.1	7.93	7.7	7.6	19.9	19.9	19.9	16390		10430
8.0	A	10	7	4	8.1	8.4	8.1	7.87	7.6	7.6	20.0	19.9	20.1	13390		13790
10.0	A	10	0	—	8.1	8.4	—	7.8	7.6	—	19.9	19.9	—	16456	16770	—
12.0	A	10	0	—	8.2	8.6	—	7.7	7.5	—	19.9	19.8	—	19440	19870	—

We verify this data is true and correct.

48 Hour LC₅₀

Cusum Chart Limits

Statistical Method

Task Manager

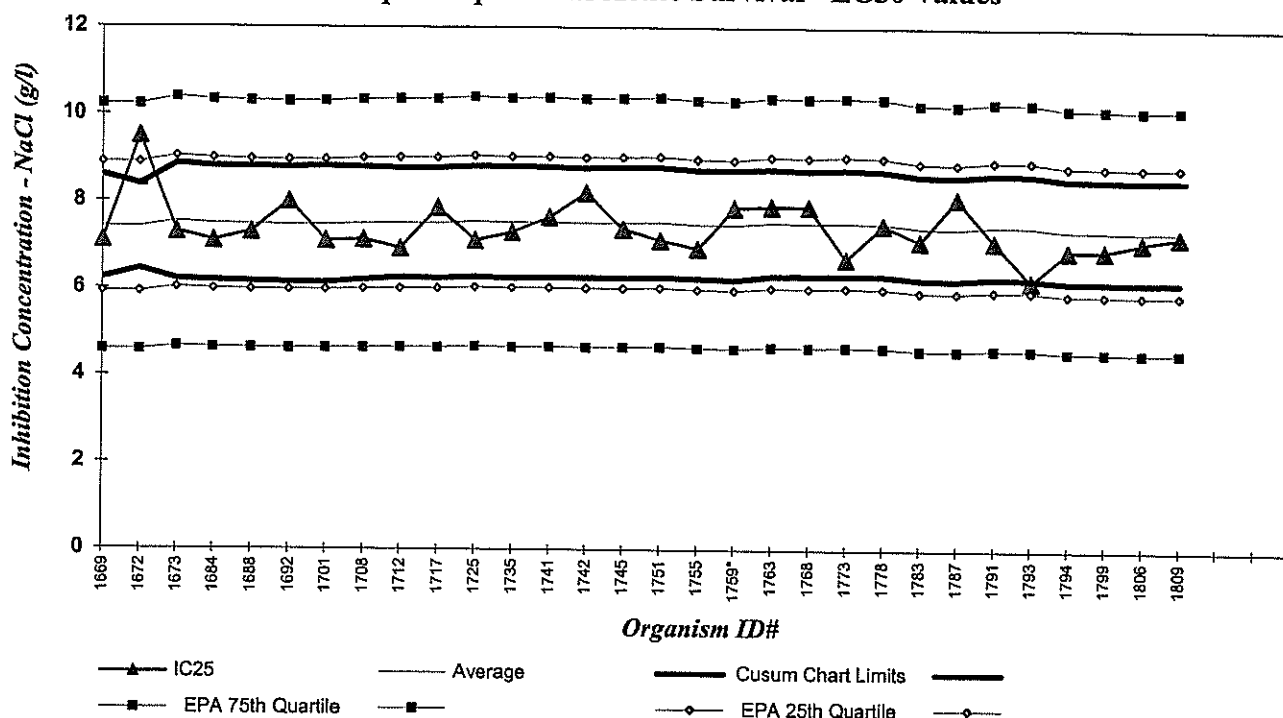
Project Manager

QA Officer

REFTOX - FHM acute.XLS
Doc Control ID: ASL674-0510

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART

Pimephales promelas Acute Survival - LC50 Values



Pimephales promelas - ACUTE (EPA Test Method 2000.0)

SODIUM CHLORIDE (g/L)

Organism age: 1 to 14 days

Endpoint: 48 hour Survival

Stats Method: Probit, Spearman-Kärber, Linear Interpolation

Test Conditions: Recon MH, 20 oC

From EPA 833-R-00-003:

10th Quartile CV (control limit) = 0.08

25th Quartile CV (warning limit) = 0.10

75th Quartile CV (warning limit) = 0.19

90th Quartile CV (control limit) = 0.33

Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's).

If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.

Event #	FHM ID #	Test Start Date	LC50	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
865	1763	5/6/2014	7.9	7.5	0.61	6.3	8.7	0.08
866	1768	6/10/2014	7.9	7.5	0.60	6.3	8.7	0.08
867	1773	7/16/2014	6.7	7.5	0.61	6.3	8.8	0.08
868	1778	8/21/2014	7.5	7.5	0.63	6.3	8.7	0.06
869	1783	9/24/2014	7.1	7.4	0.42	6.2	8.6	0.06
870	1787	10/15/2014	8.1	7.4	0.43	6.2	8.6	0.06
871	1791	11/4/2014	7.1	7.5	0.45	6.3	8.6	0.06
872	1793	12/2/2014	6.2	7.4	0.45	6.3	8.6	0.07
873	1794	12/10/2014	6.9	7.4	0.51	6.2	8.5	0.07
874	1799	1/6/2015	6.9	7.3	0.52	6.2	8.5	0.07
875	1806	2/3/2015	7.1	7.3	0.53	6.2	8.5	0.07
876	1809	3/3/2015	7.2	7.3	0.52	6.2	8.5	0.07
877								
878								

Random Template Used: 6 conc. x 4 reps. # 10
 Stock Sol. ID 2 B 050-06
 Organism ID: FHM 1807

Waterbath/incubator Used:

7Date Initiated 2/16/2015 Time 1500Date Terminated 2/17/2015 Time 10:30Test Container Size: 800 mlSolution Volume / rep: 500 mlClient QA/QC - RefToxSample Description NaCl (50 g/L stock)

Tech: Day 0 EMT Day 1 EMT Day 2 EMT Day 3 EMT Day 4 MC Day 5 MC Day 6 EMT Day 7 EMT
 Time 5:00 Day 0 EMT Day 1 1145 Day 2 1145 Day 3 1145 Day 4 1020 Day 5 1105 Day 6 0930 Day 7 1030

Charge out
 @ 10:30 End
 2-11-15

Conc. or Percent	Day	Number of Live Organisms				Dissolved O ₂ (mg/l)		pH		Temp. (°C)	Therm. ID #	Conductivity (µS)
		A	B	C	D	Pre	Post	Pre	Post	Pre	Post	Post (daily)
Control	0	10	10	10	10		7.1		7.9	25.4	218	298
	1	10	10	10	10	7.9	7.3	7.79	8.2	25.3	218	296
	2	10	10	10	10	7.1	7.3	7.60	8.2	24.6	218	301
	3	10	10	10	10	8.0	8.0	7.8	8.2	24.5	177	299
	4	10	10	10	10	7.8	7.7	7.9	8.2	24.3	184	302
	5	10	10	10	10	7.8	7.8	7.7	8.3	24.2	184	327
	6	10	10	10	10	7.0	7.4	7.5	8.2	24.2	177	321
	7	10	10	10	10	7.0		7.7		24.3	177	
0.3 g/L	0	10	10	10	10		7.0		8.0	25.5		815
	1	10	10	10	10	7.5	7.0	7.9	8.2	25.4		820
	2	10	10	10	10	7.7	7.3	7.8	8.2	24.7		846
	3	10	10	10	10	7.7	7.9	7.9	8.2	25.1		900
	4	10	10	10	10	7.7	7.6	7.9	8.2	24.6		845
	5	10	10	10	10	7.8	7.8	7.8	8.3	24.5		867
	6	10	10	10	10	7.3	7.5	7.7	8.2	24.7		903
	7	10	10	10	10	7.1		7.7		25.1		
1.0 g/L	0	10	10	10	10		7.3		8.0	25.5		2113
	1	10	10	10	10	7.7	7.5	8.0	8.1	25.3		2320
	2	10	10	10	10	7.3	7.4	7.9	8.2	24.6		2260
	3	10	10	10	10	7.6	8.0	7.9	8.2	24.7		2110
	4	10	10	10	10	7.7	7.7	7.9	8.2	24.5		2120
	5	10	10	10	10	7.9	7.9	7.8	8.2	24.5		2150
	6	10	10	10	10	7.5	7.5	7.8	8.1	24.3		2160
	7	10	10	10	10	7.1		7.7		24.2		
2.0 g/L	0	10	10	10	10		7.1		8.0	25.6		3940
	1	10	10	10	10	7.5	7.5	8.0	8.1	25.1		4070
	2	10	10	10	10	7.3	7.5	7.9	8.1	24.8		4140
	3	10	10	10	10	7.6	7.8	7.9	8.1	25.2		4090
	4	10	10	10	10	7.5	7.6	7.9	8.1	24.8		4030
	5	8	10	9	9	7.0	7.6	7.8	8.2	24.5		3940
	6	8	10	9	9	7.4	7.6	7.8	8.1	24.7		3950
	7	6	10	9	7	6.7		7.7		24.5		
4.0 g/L	0	10	10	10	10		7.0		8.0	25.6		6910
	1	10	10	10	10	7.4	7.5	7.9	8.0	25.1		7730
	2	10	10	10	10	7.3	7.5	7.9	8.1	24.9		7700
	3	10	10	10	10	7.4	7.5	7.9	8.1	24.6		7310
	4	10	9	10	10	7.3	7.6	7.8	8.1	24.7		7230
	5	9	8	10	8	7.4	7.7	7.7	8.1	24.6		7300
	6	9	8	10	5	7.5	7.6	7.7	8.0	24.7		7270
	7	4	5	6	3	7.0		7.6		24.7		
8.0 g/L	0	10	10	10	10		7.2		7.9	25.6		12170
	1	10	10	10	10	7.4	7.3	7.9	8.0	25.5		13521
	2	8	8	8	9	7.1	7.3	7.8	8.0	25.2		14090
	3	6	8	5	2	7.4	7.6	7.9	8.0	24.8		13060
	4	5	5	4	1	7.3	7.6	7.8	8.0	24.7		13310
	5	1	4	1	0	7.4	7.6	7.7	8.0	24.7		13460
	6	1	1	1	1	7.7	7.6	7.7	8.0	24.6		13750
	7	1	1	0	1	7.0		7.5		24.9		

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.

"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.

"F" = fungus noted on dead organisms.

Pre = Pre-renewal solutions. Post = Post-renewal solutions.

Day 0 Temperatures = Post-renewal

Therm ID# = Thermometer ID used for all measurements that day.

23.8 = Temp. out of recommended range

Endpoint

IC25

Cusum Chart Limits

Survival

2.2

1.6 to 4.0

Growth

2.1

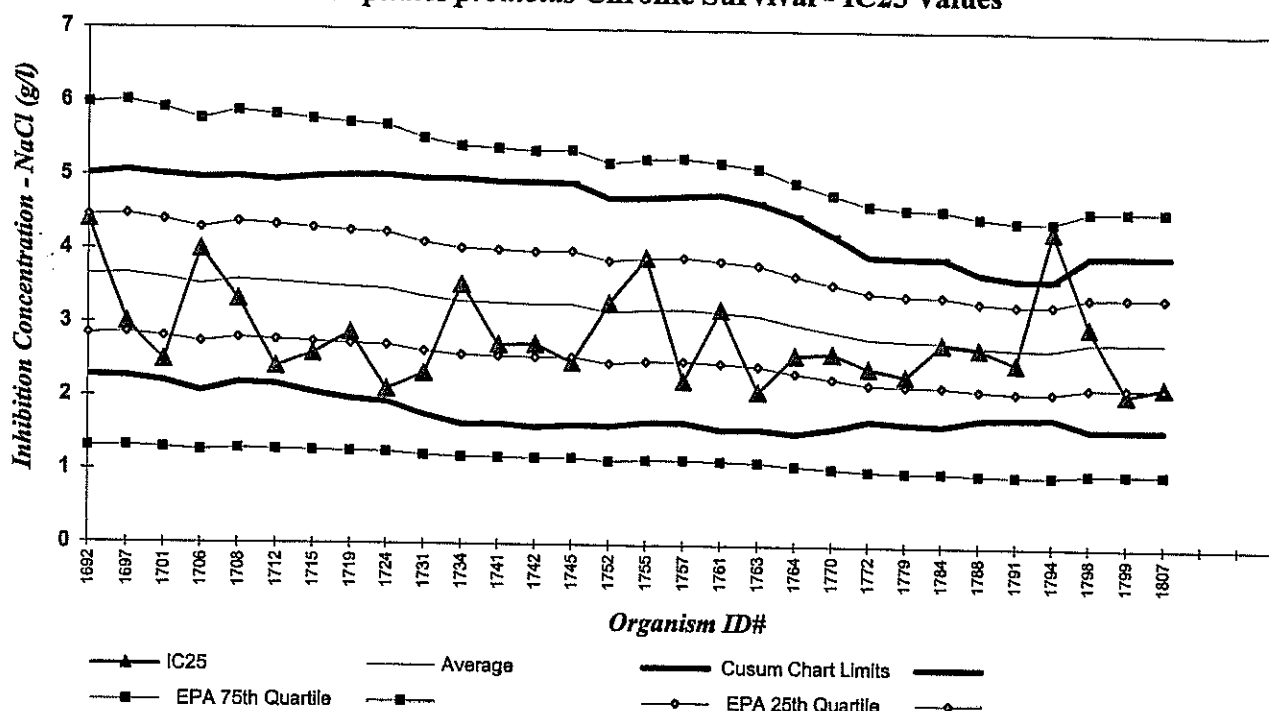
1.9 to 3.0

Task Manager

Project Manager

QA Officer

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
***Pimphales promelas* Chronic Survival - IC25 Values**



***Pimephales promelas* - Chronic (EPA Test Method 1000.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Survival

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (control limit) = 0.03

25th Quartile CV (warning limit) = 0.11

75th Quartile CV (warning limit) = 0.32

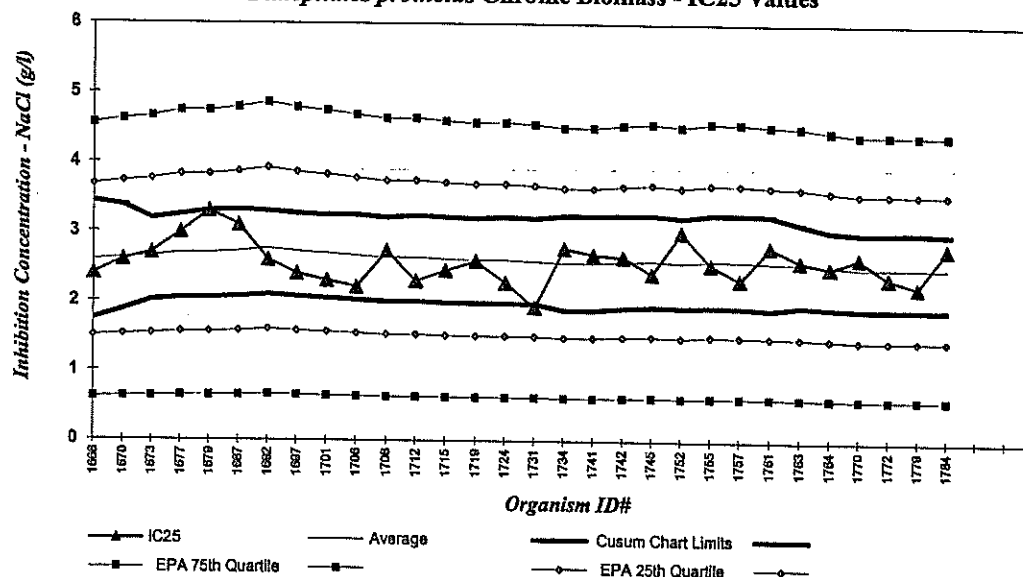
90th Quartile CV (control limit) = 0.52

Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's).

If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
305	1764	05/13/14	2.6	3.0	0.74	1.5	4.5	0.23
306	1770	06/24/14	2.6	2.9	0.66	1.6	4.2	0.20
307	1772	07/12/14	2.4	2.8	0.56	1.7	3.9	0.20
308	1779	08/26/14	2.3	2.8	0.56	1.7	3.9	0.20
309	1784	09/25/14	2.8	2.8	0.57	1.7	3.9	0.18
310	1788	10/21/14	2.7	2.7	0.49	1.7	3.7	0.18
311	1791	11/04/14	2.5	2.7	0.47	1.8	3.6	0.17
312	1794	12/02/14	4.3	2.7	0.47	1.8	3.6	0.21
313	1798	12/16/14	3.0	2.8	0.59	1.6	4.0	0.21
314	1799	01/06/15	2.1	2.8	0.59	1.6	4.0	0.21
315	1807	02/10/15	2.2	2.8	0.59	1.6	4.0	0.21
316								
317								
318								

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART *Pimephales promelas* Chronic Biomass - IC25 Values



Pimephales promelas - Chronic (EPA Test Method 1000.0)

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Growth (Biomass)

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 °C

From EPA 833-R-00-003:

10th Quartile CV (control limit) = 0.12

25th Quartile CV (warning limit) = 0.21

75th Quartile CV (warning limit) = 0.38

90th Quartile CV (control limit) = 0.45

Intralab CV is compared to EPA Warning limits (25th and 75th CV's) and Control limits (10th and 90th CV's).

If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.

limits based off of the 20

	Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV	25 quartile limits		75 quartile limits
							AVG-2SD	AVG+2SD				
22	301	1755	3/4/2014	2.5	2.6	0.33	1.9	3.3	0.13	1.5	3.7	0.6
23	302	1757	3/18/2014	2.3	2.6	0.33	1.9	3.3	0.13	1.5	3.7	0.6
24	303	1761	4/15/2014	2.8	2.6	0.34	1.9	3.3	0.13	1.5	3.7	0.6
25	304	1763	5/6/2014	2.6	2.6	0.33	2.0	3.1	0.11	1.5	3.7	0.6
26	305	1764	5/13/2014	2.5	2.5	0.28	1.9	3.0	0.10	1.5	3.6	0.6
27	306	1770	6/24/2014	2.6	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
28	307	1772	7/12/2014	2.4	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
29	308	1779	8/26/2014	2.2	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
30	309	1784	9/25/2014	2.8	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
31	310	1788	10/21/2014	2.5	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
32	311	1791	11/4/2014	2.5	2.5	0.25	1.9	3.0	0.09	1.5	3.6	0.6
33	312	1794	12/2/2014	2.3	2.5	0.24	1.9	3.0	0.10	1.5	3.6	0.6
34	313	1798	12/16/2014	2.4	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
35	314	1799	1/6/2015	2.4	2.5	0.25	1.9	3.0	0.10	1.5	3.6	0.6
36	315	1807	2/10/2015	2.1	2.5	0.24	1.9	3.0	0.09	1.5	3.6	0.6
37	316											
38	317											
39	318											
40	319											
41	320											

APPENDIX C
CHAIN OF CUSTODY

CH2M HILL

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client KATSER ALUMINUM
 Address PO Box 15108
1500 E Euclid Ave
SPOKANE VALLEY WA 99215
 Contact Person: BUD LEBER
 Phone: (509) 927-6554
 E-mail: BUD.LEBER@KATSERALUM.COM

NPDES# WA0000892

Ship Samples to:
 CH2M HILL - Applied Sciences Laboratory
 Attention: Bioassay Lab
 1100 NE Circle Blvd. Suite 300
 Corvallis, OR 97330
 Lab Phone: (541) 768-3160
 Customer Service: (541) 768-3120

Composite Sample Information:

Initiated: Date 3/11/15 Time 0900
 Ended: Date 3/21/15 Time 0900
 Chilled During Collection? Yes ☒ No ☐
 Dechlorinated prior to shipping? Yes ☐ No ☒

CH2M HILL Project # / Purchase Order # _____

Analysis Required / Comments

Sample ID	Date	Time	Sample Type		# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Green Algae	Trout Acute	Sheepshead Acute	Sheepshead Chronic	Menidia Acute	Menidia Chronic	Mysid Acute	Mysid Chronic	Haz Waste				Concentration and/or Comments
			Comp.	Grab																			
Outfall #001	3/2/15	1300	✓		2	35285-01	✓	✓	✓	✓													

Sampled By & Title <u>RON LEHERMAN</u> <u>Facility Supervisor</u>	(Please sign and print name)	Date/Time <u>3/2/15 1300</u>	Relinquished By <u>Ron Leherman</u>	(Please sign and print name)	Date/Time <u>3/2/15 1300</u>
Received By <u>[Signature]</u>	(Please sign and print name)	Date/Time <u>3/3/15 1115</u>	Relinquished By <u>[Signature]</u>	(Please sign and print name)	Date/Time
Received By <u>[Signature]</u>	(Please sign and print name)	Date/Time	Relinquished By <u>[Signature]</u>	(Please sign and print name)	Date/Time
Received By <u>[Signature]</u>	(Please sign and print name)	Date/Time	Relinquished By <u>[Signature]</u>	(Please sign and print name)	Date/Time
Work Authorized By <u>[Signature]</u>	(Please sign and print name)	Remarks	Shipped Via UPS <input checked="" type="checkbox"/> Bus <input type="checkbox"/> Fed-Ex <input type="checkbox"/> Hand <input type="checkbox"/> Other <input type="checkbox"/>	Shipping #	



Sample Receipt Record

Batch Number: B 3285
Client/Project: KASR

Date Received: 3/3/15
Received By: BW

Were custody seals intact and on the outside of the cooler?

☒ Yes ☐ No ☐ N/A

Packing Material:

☐ Hand Delivered ☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6C) Therm ID: TH173 Exp.

0.3 °C ☒ Yes ☐ No ☐ N/A

Was a Chain of Custody (CoC) Provided?

☒ Yes ☐ No ☐ N/A

Was the CoC correctly filled out (If No, document below)

☒ Yes ☐ No ☐ N/A

Were the sample containers in good condition (broken or leaking)?

☒ Yes ☐ No ☐ N/A

Was enough sample volume provided for analysis? (If No, document below)

☒ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection?

☒ Yes ☐ No ☐ N/A

Sample Exception Report (The following exceptions were noted)

--	--

Client was notified on:

Client contact:

Resolution to Exception:

--	--

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Analysis Required / Comments

Sample ID	Date	Time	Sample Type		# of Containers	Lab ID#											Concentration and/or Comments			
			Comp.	Grab			Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Green Algae	Trout Acute	Sheepshead Acute	Sheepshead Chronic	Menidia Acute	Menidia Chronic		Mysid Acute	Mysid Chronic	Haz Waste
OUTFALL #001	3/4/15	1230	✓				✓	✓	✓											
Sampled By & Title <i>Ron Leeman</i>			(Please sign and print name) <i>FRAGILITY SUPERVISOR</i>			Date/Time <i>3/4/15 1230</i>		Relinquished By <i>Ron Leeman</i> (Please sign and print name)							Date/Time <i>3/4/15 1230</i>					
Received By			(Please sign and print name)			Date/Time		Relinquished By (Please sign and print name)							Date/Time					
Received By			(Please sign and print name)			Date/Time		Relinquished By (Please sign and print name)							Date/Time					
Received By <i>Kelsey Fulcott</i>			(Please sign and print name) <i>Kelsey Triest</i>			Date/Time <i>3/5/15 0950</i>		Shipped Via UPS ___ Bus ___ Fed-Ex ___ Hand ___ Other ___							Shipping #					
Work Authorized By						Remarks <i>B3285 "B"</i>						<i>0.1°C</i>								



Sample Receipt Record

Batch Number: B3285 - "B"
Client/Project: Kaiser

Date Received: 3/5/15
Received By: KF

Were custody seals intact and on the outside of the cooler?

☒ Yes ☐ No ☐ N/A

Packing Material:

☐ Hand Delivered ☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6C) Therm ID: TH173 Exp. 5/15

0.1 °C ☒ Yes ☐ No ☐ N/A

Was a Chain of Custody (CoC) Provided?

☒ Yes ☐ No ☐ N/A

Was the CoC correctly filled out (If No, document below)

☒ Yes ☐ No ☐ N/A

Were the sample containers in good condition (broken or leaking)?

☒ Yes ☐ No ☐ N/A

Was enough sample volume provided for analysis? (If No, document below)

☒ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection?

☒ Yes ☐ No ☐ N/A

Sample Exception Report (The following exceptions were noted)

--

Client was notified on: _____ Client contact: _____

Resolution to Exception:

--

CH2M HILL

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client KAISER Aluminum
 Address P.O. Box 15108
15000 E Euclid Ave
SPokane Valley, WA 99215
 Contact Person: BUD LEBER
 Phone: (509) 927-6554
 E-mail: BUD.LEBER@KAISERALUM.COM

NPDES# WA0000892

Ship Samples to:
 CH2M HILL - Applied Sciences Laboratory
 Attention: Bioassay Lab
 1100 NE Circle Blvd. Suite 300
 Corvallis, OR 97330
 Lab Phone: (541) 768-3160
 Customer Service: (541) 768-3120

Composite Sample Information:

Initiated: Date 3/5/15 Time 0900
 Ended: Date 3/6/15 Time 0900
 Chilled During Collection? Yes ☒ No ☐
 Dechlorinated prior to shipping? Yes ☐ No ☒

CH2M HILL Project # / Purchase Order # _____

Analysis Required / Comments

Sample ID	Date	Time	Sample Type		# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Green Algae	Trout Acute	Sheepshead Acute	Sheepshead Chronic	Menidia Acute	Menidia Chronic	Mysid Acute	Mysid Chronic	Haz Waste	Concentration and/or Comments
			Comp.	Grab																
OUTFALL #001	3/6/15	1230	✓			B3285-03	✓	✓	✓											

Sampled By & Title <u>RON LEHRMAN</u>	(Please sign and print name) FACILITY SUPERVISOR	Date/Time 3/6/15 1230	Relinquished By <u>RON LEHRMAN</u>	(Please sign and print name) RON LEHRMAN	Date/Time 3/6/15 1230
Received By <u>JAY WELLS</u>	(Please sign and print name) JAY WELLS	Date/Time 3/7/2015 10:00	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Shipped Via UPS ___ Bus ___ Fed-Ex ___ Hand ___	Shipping #	
Work Authorized By	(Please sign and print name)	Remarks			



Sample Receipt Record

Batch Number: B 3285
Client/Project: Kaiser

Date Received: 3/7/2015
Received By: SW

Were custody seals intact and on the outside of the cooler?

☒ Yes ☐ No ☐ N/A

Packing Material:

☐ Hand Delivered ☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6C) Therm ID: TH173 Exp.

0.1 °C ☒ Yes ☐ No ☐ N/A

Was a Chain of Custody (CoC) Provided?

☒ Yes ☐ No ☐ N/A

Was the CoC correctly filled out (If No, document below)

☒ Yes ☐ No ☐ N/A

Were the sample containers in good condition (broken or leaking)?

☒ Yes ☐ No ☐ N/A

Was enough sample volume provided for analysis? (If No, document below)

☒ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection?

☒ Yes ☐ No ☐ N/A

Sample Exception Report (The following exceptions were noted)

--

Client was notified on:

Client contact:

Resolution to Exception:

--