



Environment Testing
America

AQUATIC TOXICOLOGY REPORT

Project Name:

KAISER ALUMINUM

Location:

SPOKANE VALLEY, WASHINGTON

Outfall 001

Prepared by:

Eurofins Environment Testing Northwest, LLC

(aka TestAmerica – ASL)

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Accredited in accordance
with NELAP

Oregon Environmental Laboratory Accreditation Program #OR100022 (NELAP)

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Report Date: September 15, 2022

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Lab I.D. No. B5428

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Results relate only to the items tested and the sample(s) as received by the laboratory. The results included in this report have been reviewed for compliance and meet all requirements for accredited parameters. All data have been found to be compliant with laboratory protocol, with the exception of any items noted in this report. For questions, please contact the Project Manager (contact info on next page).

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INTRODUCTION

Eurofins Environment Testing Northwest, LLC Applied Sciences Laboratory (EETNW - ASL) conducted toxicity testing on sample(s) from Kaiser Aluminum, Spokane Valley, Washington.

The Sample ID was: Outfall 001

Testing was initiated on: August 16, 2022

The test(s) were conducted using:

- the fathead minnow (*Pimephales promelas*)

OVERVIEW OF REGULATORY GUIDANCE

The following provides an overview and excerpts of applicable permit specifics, regulatory guidance, and other relevant information. This is intended only as a helpful guide, from a laboratory perspective, for understanding test outcomes. The final responsibility for interpretation of results remains with the client and/or regulatory agency.

The following guidance is taken from EETNW's reading of the NPDES permit for Kaiser Aluminum Fabricated products, LLC (permit #WA0000892, effective June 1, 2022, and expired on May 31, 2027).

Acute toxicity:

- **S15.A:** *Effluent Limit for Acute Toxicity:*
 - "... no acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC)."
 - "The ACEC equals 40% effluent."
- **S15.B:** *Compliance with an Effluent Limit for Acute Toxicity:*
 - "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."
 - "The Permittee shall immediately implement subsection D if any acute toxicity test conducted for compliance monitoring determines a statistically significant difference in survival between the control and the ACEC using hypothesis testing at the 0.05 level of significance" (i.e. $\alpha = 0.05$)
 - "If the difference in survival between the control and the ACEC is less than 10 percent, ... the hypothesis test shall be conducted at the 0.01 level of significance."
- **S15.C:** *Compliance Testing for Acute Toxicity:*
 - "Perform the Acute Toxicity Tests with 100%, the ACEC, and a control, or with a full dilution series."
 - "Conduct quarterly acute toxicity testing on the final effluent. Testing must begin by July 1, 2022."
 - "... using each of the species and protocols listed ... on a rotating basis."

- **S15.D:** *Response to Noncompliance With an Effluent Limit for Acute Toxicity:*
 - “If a toxicity test...determines a statistically significant difference in response between the ACEC and the control...the permittee must begin additional testing within one week from the time of receiving test results.”
 - “Conduct one additional test each week for four consecutive weeks...”

Chronic toxicity:

- **S16.A:** *Testing when there is no permit limit for chronic toxicity:*
 - “Conduct Chronic Toxicity testing on final effluent once in the last winter and once in the last summer prior to submission of the application permit renewal.”
 - “Conduct Chronic Toxicity testing on a series of at least five concentrations of effluent and a control. This series of dilutions must include the ACEC and CCEC of 4.9% effluent.”

The following is taken from the WDOE guidance (WQ-R-95-80, June 2016 revision):

- “To reduce WET limit violations due to statistical significance that is a Type I error (false positive), we lower the alpha for hypothesis testing when differences in test organisms response are small.”
- “Alpha will be lowered from 0.05 to 0.01 if a 10% difference in an acute test is significant or a 20% difference in a chronic test is significant.”

SUMMARY OF TEST RESULTS

Exhibit 1 provides a summary of the final test results.

EXHIBIT 1

Summary of Acute Test Results

Species	NOEC (%)	LOEC (%)	LC₅₀ (%)	Was there a statistically significant difference in survival between the control and the test concentration representing the ACEC (40%)?
<i>P. promelas</i>	100	> 100	> 100	No

Note: acronyms are as defined below.

From the NPDES permit: “No acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC). The ACEC equals 40% effluent.”

More detailed information is provided in the Results and Discussion section.

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.

SAMPLE INFORMATION

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

EXHIBIT 2

Sample Conditions on Receipt

Sample ID	Outfall 001
EETNW - ASL SDG	B5428-01
Collection - Date and Time	08/15/2022 10:00
Receipt - Date and Time	08/16/2022 10:30
Temperature (°C)	1.1
Dissolved Oxygen (mg/L)	8.4
pH	7.6
Conductivity (µS/cm)	375
Total Residual Chlorine (mg/L)	0.03
Ammonia (mg/L as NH ₃ -N)	< 0.10
Total Hardness (mg/L as CaCO ₃)	178
Total Alkalinity (mg/L as CaCO ₃)	161

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.

Additional guidance was provided by:

- *Whole Effluent Toxicity Testing Guidance and Test Review Criteria*, Washington State Department of Ecology (revised Jun 2016) 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 DESIGN

The following summarizes the conditions used for both overall testing and the specifics for each test (observations and notations can be found on the datasheets in Appendix A):

Overall Test Design:

- Acute tests: 2.5, 4.9, 25, 40, and 100 percent sample + dilution water for the control.

Test Organism Conditions:

- All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA (2002).
- The test organisms appeared vigorous and in good condition prior to testing.

P. promelas acute test (renewal):

- Source: Aquatox Inc., Hot Springs, Arkansas
- Age: 1 to 14 days old, within a 24 hour age range
- Design: Four test vessels per concentration, Ten organisms per vessel
- Test Solution Renewal: Once @ 48 hours (i.e. static-renewal test)
- Monitoring:
 - Daily: Survival, DO, pH, and temperature; all concentrations.
 - Pre and Post Renewal solutions: DO and pH, all concentrations.
 - Test Initiation, with each new sample use, and Termination:
 - Conductivity, all concentrations (WDOE)
- Termination: 96 hours.
- Endpoints: Survival (at termination)

DILUTION WATER

The dilution water used was the standard culture water used by EETNW - ASL:

- Reconstituted, moderately hard water (as per EPA protocol) with a total hardness of 75 to 105 mg/L as CaCO₃ and an alkalinity of 50 to 75 mg/L as CaCO₃.

SAMPLE COLLECTION AND STORAGE

Samples were collected by Kaiser Aluminum personnel. The samples were accepted as scheduled by EETNW - ASL. Chain of Custody and Sample Receipt Records are provided in Appendix C.

- All samples were received within the EPA recommended and WDOE required 0 to 6 °C range.
- All samples were initially used for test initiation or test solution renewal within the EPA recommended maximum holding time of 36 hours of sample collection.
- All subsequent uses of a sample occurred within the EPA recommended maximum holding time of 72 hours past the time of initial use of that sample.
- All subsequent uses of a sample occurred within the WDOE recommended maximum holding time of 84 hours past the time of sample collection. (Extended for renewals of a 96 hour duration acute test).
- Following receipt, the samples were stored in the dark at 0 to 6 °C until test solutions were prepared and tested.

SAMPLE PREPARATION

Samples used during these tests were:

- Temperature adjusted prior to test initiation and each daily renewal.

DATA ANALYSIS

The statistical analyses performed for the acute tests were those outlined in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water, Fifth Edition (2002), EPA-821-R-02-012, using CETIS.

- The specific statistical analysis and CETIS version used for each endpoint evaluation is listed with the statistical outputs included with each test in Appendix A.
- If any additional analysis methods were also used, an explanation of the rationale and reference to the source method is included with the presentation of those results below.

Additional guidance was provided by:

- *Whole Effluent Toxicity Testing Guidance and Test Review Criteria*, Washington State Department of Ecology (revised Jun 2016) Pub# WQ-R-95-80.

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 Summary of Acute Results <i>P. promelas</i>	
Sample Concentration (%)	Percent Survival (at Test Termination)
Control	97.5
2.5	100
4.9	100
25	100
40	95.0
100	97.5

Statistical analysis in accordance with the EPA protocol and WDOE guidance results in:

- NOEC = 100 %
- LOEC > 100 %
- LC₅₀ > 100 %

From the NPDES permit: “No acute toxicity detected in a test concentration representing the acute critical effluent concentration (ACEC). The ACEC equals 40% effluent.”

- No statistically significant difference in survival between control and ACEC (40%) was shown.

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. Test pH remained within the recommended 6.0 to 9.0 range.

The *P. promelas* acute 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”.

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* acute reftox test was conducted using sodium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 3 summarizes the reference toxicant test results and Cusum chart limits.

Table 3		
Acute Reference Toxicant Tests (g/L)		
Species	LC₅₀	Cusum Chart Limits
<i>P. promelas</i>	7.1	6.5 to 8.9

APPENDIX A
RAW DATA SHEETS

FRESHWATER TOXICITY TEST: SAMPLE AND DILUTION WATER DATA

Client: Kaiser Aluminum - Trentwood Test Initiation: Date 5/10/22
 Contact: Brett Pitcher - or - Brent Downey (509) 927-6584 Test Termination: Date 5/20/22

Sample ID Number	Field ID	Collected Date (mm/dd/yy)	Time (Pacific Zone)	Received Date (mm/dd/yy)	Time (Pacific Zone)	Temp (°C) as Rcv'd	Total Residual Chlorine (mg/l) as Rcv'd / after Dechlor.	Ammonia NH ₃ -N mg/l as Rcv'd	Hardness mg/l as CaCO ₃ as Rcv'd	Alkalinity mg/l as CaCO ₃ as Rcv'd	DO (mg/L) as Rcv'd	pH as Rcv'd	Cond. (uS) as Rcv'd	60 um filtered? (organisms noted)
B5478 -01	Outfall 001	5/15/22	10:00	5/16/22	10:30	1.1	0.03 / -	< 0.10	178	161	8.4	7.6	315	<input type="checkbox"/> <u>24</u>
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
Reporting Limits:							0.02 mg/L	0.10 mg/L	5 mg/L	5 mg/L	na	na	na	na

Note: "-" Indicates data collection or dechlorination not needed. Any other adjustments to samples prior to use are documented in Comments below or on Dilutions page.

Dilution Water	ID#	Hardness mg/l as CaCO ₃	Alkalinity mg/l as CaCO ₃	Comments: <input checked="" type="checkbox"/> Indicates the action was taken, (<input type="checkbox"/> = action not taken):
Recon MH (FHM)	5604	90	50	"-" = sample not dechlorinated, or analyte not collected/needed.
	5606	92	50	

Water Quality Meters Used/ID#: _____ Dissolved Oxygen # 7 pH # 11 Conductivity # 2

FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client Kaiser Aluminum - Trentwood

Sample Designation (SDG): B 6428

Test Species Information	FHM # <u>2239</u> <i>Pimephales promelas</i> Acute				
Organism Age at Initiation	<u>8</u> Days, within a 24 hour window				
Test Container Size	400 ml				
Test Volume	250 ml				
Feeding: Type and Amount	0.15 ml <i>Artemia</i> , @ 48 hrs				
Aeration: In Test Chambers via Slow Bubble :	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use <input type="checkbox"/> @ _____ hrs				
Acclimation Period	<u>7</u> Days				
Organism Source	<u>Aquatic</u> ✓				
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 - Acute

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Test concentration	0.00 →	1000
2.5	25.0 →	1000
4.9	49.0 →	1000
25	250 →	1000
40	400 →	1000
100	1,000 →	1000

Test Day 0 (Initiation)	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
2	B5421-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 5604	8/16/2022	11:55	07
	B5423-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 5000	8/19/2022	07:25	TC

Total Sample volume needed per day = 1724 mls

96 HOUR FRESHWATER TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Random Template Used:		6 conc. x 4 reps. # <u>10</u>		Waterbath/Incubator Used: # <u>7</u>		Date: <u>8 / 16 / 20</u>		Time: <u>14 : 52</u>	
Sample Description		Outfall 001		Initial Sample ID # <u>B 3428</u>		Date: <u>09 / 13 / 20</u>		Time: <u>13 : 57</u>	
Client		Kaiser Aluminum - Trentwood		Technician		Date: <u>09 / 13 / 20</u>		Time: <u>14 : 18</u>	
Test Species		Pimephales promelas		Therm. ID#		Date: <u>11 / 11 / 20</u>		Time: <u>13 : 57</u>	
		ID# <u>FHM 2234</u>		Therm. ID#		Date: <u>11 / 11 / 20</u>		Time: <u>13 : 57</u>	

Percent	Test Container Number	Number of Live Organisms				Dissolved Oxygen (mg/l)				pH				Temperature (°C)				Conductivity (µmhos/cm)			
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
concentra	A	10	10	10	10	9	7.8	7.8	7.9	8.0	7.9	7.8	7.5	7.7	7.5	7.8	20.3	19.5	20.1	20.0	310
	B	10	10	10	10	10															
	C	10	10	10	10	10															
	D	10	10	10	10	10															
Pa _{2.5}	A	10	10	10	10	10	7.9	7.8	8.0	8.2	8.0	7.8	7.6	7.7	7.5	7.8	20.2	19.3	20.1	20.0	324
	B	10	10	10	10	10															
	C	10	10	10	10	10															
	D	10	10	10	10	10															
4.9	A	10	10	10	10	10	7.8	7.8	8.0	8.2	8.0	7.8	7.6	7.7	7.5	7.8	20.2	19.4	20.1	20.0	328
	B	10	10	10	10	10															
	C	10	10	10	10	10															
	D	10	10	10	10	10															

72

5

1

#

Cooper Aluminium 011 FHM no Doc Control ID: ASL899-0122

CETIS Summary Report

Report Date: 07 Sep-22 13:07 (p 1 of 1)
Test Code/ID: B542801ppa / 00-5873-6430

Fathead Minnow 96-h Acute Survival Test

Eurofins TestAmerica - Corvallis

Batch ID: 02-9287-5991	Test Type: Survival (96h)	Analyst: Michelle Bennett
Start Date: 16 Aug-22 14:52	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 20 Aug-22 13:57	Species: Pimephales promelas	Brine:
Test Length: 95h	Taxon: Actinopterygii	Source: Aquatox, AR Age: 8D
Sample ID: 16-8919-7267	Code: B5428-01	Project:
Sample Date: 15 Aug-22 10:00	Material: Industrial Effluent	Source: Kaiser Aluminum Trentwood (WA0000)
Receipt Date: 16 Aug-22 10:30	CAS (PC):	Station:
Sample Age: 29h (1.1 °C)	Client:	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
03-8184-3752	96h Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	8.35%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
15-6238-6019	96h Survival Rate	Linear Interpolation (ICPIN)	EC50	>100	---	---	<1	1

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Decision
				Lower	Upper	Overlap	
03-8184-3752	96h Survival Rate	Control Resp	0.975	0.9	>>	Yes	Passes Criteria
15-6238-6019	96h Survival Rate	Control Resp	0.975	0.9	>>	Yes	Passes Criteria

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
2.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
4.9		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
40		4	0.9500	0.7909	1.1090	0.8000	1.0000	0.0500	0.1000	10.53%	2.56%
100		4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%

96h Survival Rate Detail

MD5: 480FF1136FC5D58F3C4ED77589E8C8AD

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.9000	1.0000	1.0000	1.0000
2.5		1.0000	1.0000	1.0000	1.0000
4.9		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
40		0.8000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9000

96h Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	9/10	10/10	10/10	10/10
2.5		10/10	10/10	10/10	10/10
4.9		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
40		8/10	10/10	10/10	10/10
100		10/10	10/10	10/10	9/10

CETIS Analytical Report

Report Date: 07 Sep-22 13:07 (p 1 of 2)
Test Code/ID: B542801ppa / 00-5873-6430

Fathead Minnow 96-h Acute Survival Test						Eurofins TestAmerica - Corvallis	
Analysis ID:	03-8184-3752	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7		
Analyzed:	07 Sep-22 13:06	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1		
Edit Date:	07 Sep-22 13:06	MD5 Hash:	480FF1136FC5D58F3C4ED77589E8C8AD	Editor ID:	000-042-882-4		
Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08142	8.35%

Steel Many-One Rank Sum Test									
Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		2.5	20	10	1	6	CDF	0.9516	Non-Significant Effect
		4.9	20	10	1	6	CDF	0.9516	Non-Significant Effect
		25	20	10	1	6	CDF	0.9516	Non-Significant Effect
		40	17.5	10	1	6	CDF	0.7867	Non-Significant Effect
		100	18	10	2	6	CDF	0.8333	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0199357	0.0039872	5	0.6551	0.6616	Non-Significant Effect
Error	0.109547	0.006086	18			
Total	0.129483		23			

ANOVA Assumptions Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variance	Bartlett Equality of Variance Test				Indeterminate	
Distribution	Shapiro-Wilk W Normality Test	0.7345	0.884	3.0E-05	Non-Normal Distribution	

96h Survival Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
2.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
4.9		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
40		4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	2.56%
100		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%

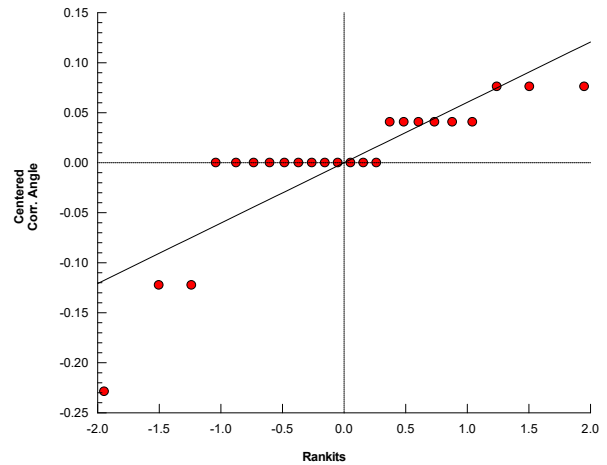
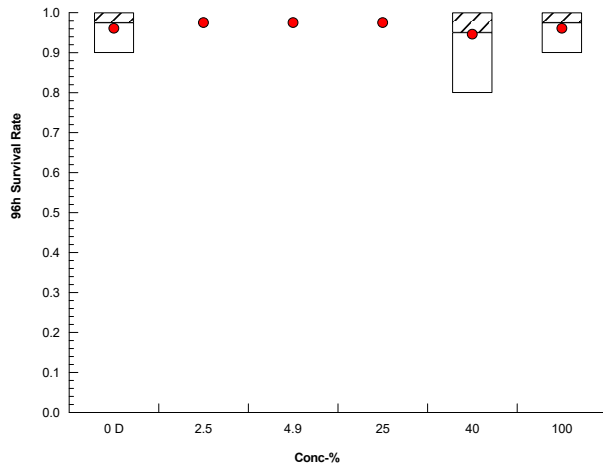
Angular (Corrected) Transformed Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	0.00%
2.5		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
4.9		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
25		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
40		4	1.3360	1.0930	1.5780	1.4120	1.1070	1.4120	0.0762	11.41%	2.59%
100		4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	0.00%

Fathead Minnow 96-h Acute Survival Test

Eurofins TestAmerica - Corvallis

Analysis ID:	03-8184-3752	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	07 Sep-22 13:06	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	07 Sep-22 13:06	MD5 Hash:	480FF1136FC5D58F3C4ED77589E8C8AD	Editor ID:	000-042-882-4

Graphics



CETIS Analytical Report

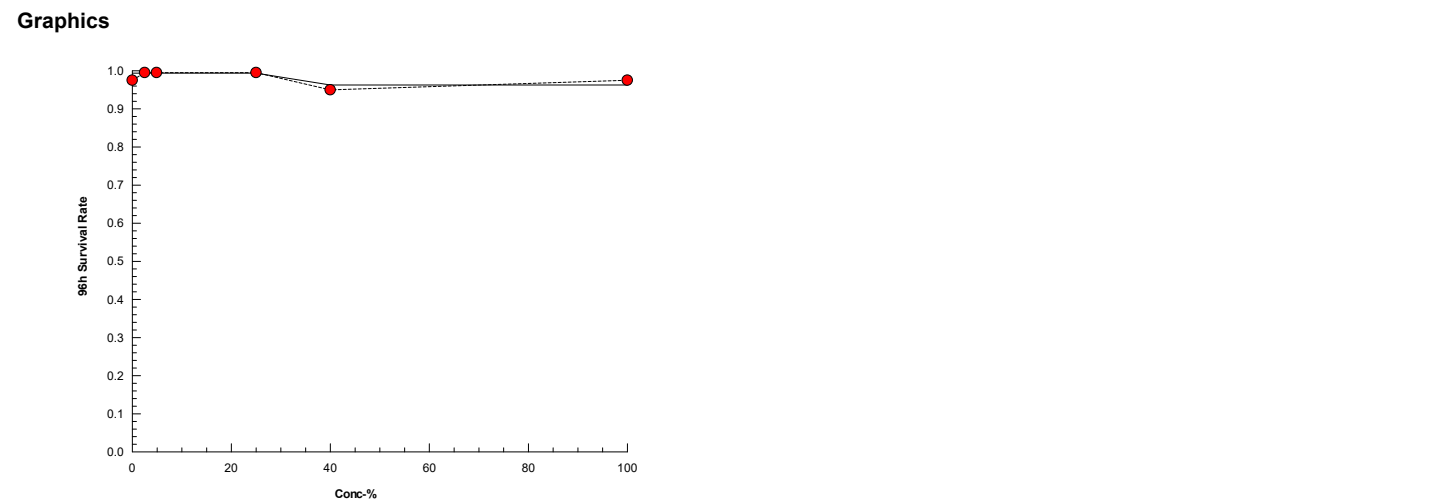
Report Date: 07 Sep-22 13:07 (p 1 of 1)
Test Code/ID: B542801ppa / 00-5873-6430

Fathead Minnow 96-h Acute Survival Test				Eurofins TestAmerica - Corvallis	
Analysis ID:	15-6238-6019	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	07 Sep-22 13:06	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	07 Sep-22 13:06	MD5 Hash:	480FF1136FC5D58F3C4ED77589E8C8AD	Editor ID:	000-042-882-4

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	744727	200	Yes	Two-Point Interpolation

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	---	---	<1	---	---

96h Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	D	4	0.9750	1.0000	0.9000	1.0000	5.13%	0.00%	39/40	0.9937	0.00%
2.5		4	1.0000	1.0000	1.0000	1.0000	0.00%	-2.56%	40/40	0.9937	0.00%
4.9		4	1.0000	1.0000	1.0000	1.0000	0.00%	-2.56%	40/40	0.9937	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	0.00%	-2.56%	40/40	0.9937	0.00%
40		4	0.9500	1.0000	0.8000	1.0000	10.53%	2.56%	38/40	0.9625	3.14%
100		4	0.9750	1.0000	0.9000	1.0000	5.13%	0.00%	39/40	0.9625	3.14%



APPENDIX B

REFERENCE TOXICANT DATA SHEETS

REFERENCE TOXICANT DATA SHEET

Client	QA/QC	Reference Toxican	NaCl	Test Begin: Date	8/23/2022	Time	11:00
Test Organism	<i>Pimephales promelas</i>	Stock Solution	20 g/L in DI (ASTM Type D) water	Test End: Date	8/25/2022	Time	11:02
Source	FHM 2236	Reagent Log ID #	5B 004-04	*Dilution Water (Recon MH) ID#			
ID#	2236	Designed Test Temperature	20 ± 1 °C	Dilution Water Hardness (as CaCO ₃)			
Age	8 Days	Technician	KG	Dilution Water Alkalinity (as CaCO ₃)			
Feeding:	none	Time	11:00	48 hr			
Test Chamber Size	800 ml	Therm. ID #	252	48 hr			
Volume per Replicate	750 ml			48 hr			

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	0	24	48			
Control	A	10	8	10	8.1	7.7	7.3	7.3	7.6	7.7	20.1	20.9	21.0	380	335	
4.0	A	10	10	10	8.0	7.8	7.1	7.1	7.5	7.6	20.3	20.8	20.8	6550	7280	
6.0	A	10	10	10	8.0	7.8	7.3	7.7	7.5	7.6	20.5	20.8	20.8	10550	10530	
8.0	A	10	7	1	8.0	7.8	7.3	7.7	7.5	7.6	20.4	20.4	20.6	13780	13940	
10.0	A	10	0	—	8.0	7.8	—	7.7	7.5	—	20.5	20.6	—	17120	16696	
12.0	A	10	0	—	8.0	7.9	—	7.6	7.5	—	20.4	20.8	—	20200	20600	
Test Acceptability Criteria (TAC) or test condition:		Survival in Controls: ≥ 90% (required TAC)			(@ 20°C): > 4.0 and < 9.1 (recommended)			pH: > 6.0 and < 9.0 (recommended)			Temperature + 1 °C (recommended)			(QA) none		

We verify this data is true and correct.

*Dilution Water Code

Recon. - reconstituted water

S - soft

MH - moderately hard

H - hard

Art. Sea - Artificial Sea Water

48 Hour LC₅₀

7.1

Cusum Chart Limits

6.5 to 8.9

Statistical Method

Spearman-Kärber

Task Manager

Kendall Gill

Project Manager

[Signature]

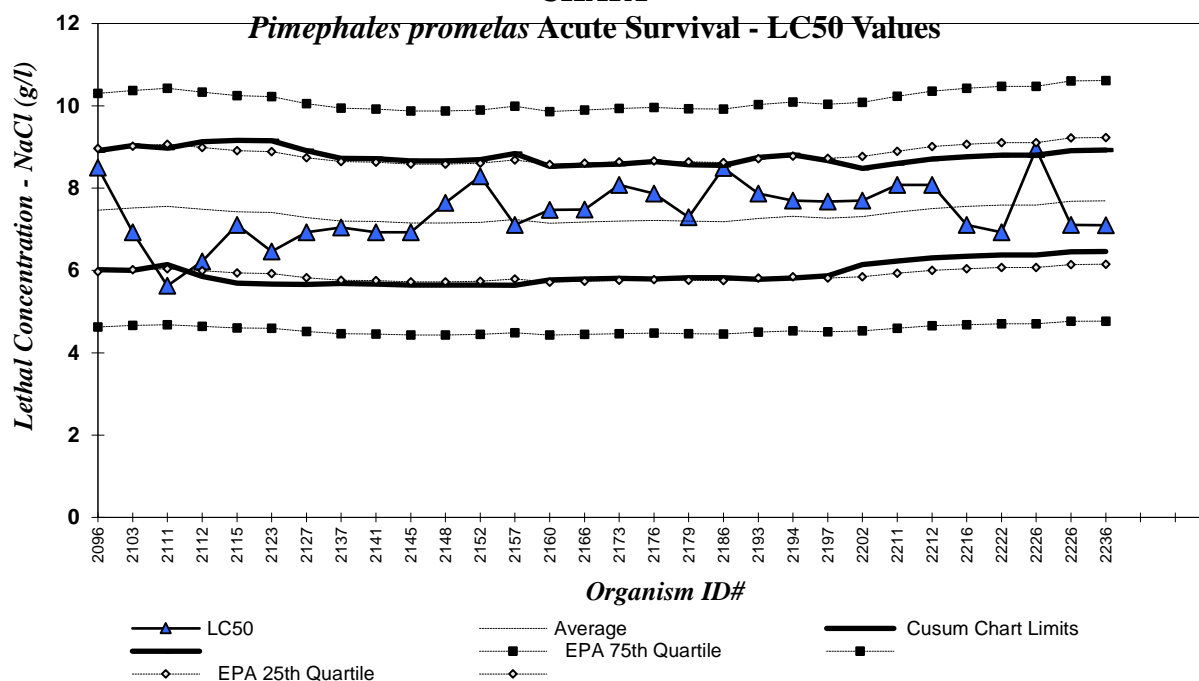
QA Officer

[Signature]

REFTOX - FHM acute (ASL 674-0220)

Doc Control ID: ASL674-0220

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART



***Pimephales promelas* - ACUTE (EPA Test Method 2000.0)**

SODIUM CHLORIDE (g/L)

From EPA 833-R-00-003:

Organism age: 1 to 14 days

10th Quartile CV (*control limit*) = 0.08

Endpoint: 48 hour Survival

25th Quartile CV (*warning limit*) = 0.10

Stats Method: Probit, Spearman-Kärber, Linear Interpolation

75th Quartile CV (*warning limit*) = 0.19

Test Conditions: Recon MH, 20 oC

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	
958	2186	10/21/2021	8.5	7.2	0.68	5.8	8.6	0.10
959	2193	11/23/2021	7.9	7.3	0.74	5.8	8.7	0.10
960	2194	12/7/2021	7.7	7.3	0.75	5.8	8.8	0.10
961	2197	1/4/2022	7.7	7.3	0.70	5.9	8.7	0.10
962	2202	2/8/2022	7.7	7.3	0.70	6.1	8.5	0.08
963	2211	3/22/2022	8.1	7.4	0.58	6.2	8.6	0.07
964	2212	4/5/2022	8.1	7.5	0.53	6.3	8.7	0.07
965	2216	5/4/2022	7.1	7.6	0.53	6.3	8.8	0.06
966	2222	6/14/2022	6.9	7.6	0.48	6.4	8.8	0.06
967	2226	7/6/2022	9.0	7.6	0.48	6.4	8.8	0.07
968	2226	7/12/2022	7.1	7.7	0.55	6.5	8.9	0.07
969	2236	8/23/2022	7.1	7.7	0.54	6.5	8.9	0.07
970								
971								
972								

APPENDIX C
CHAIN OF CUSTODY



Environment Testing
America

Sample Receipt Record

Batch Number: B5428-01
Client/Project: Kaiser A OF001

Date Received: 8/16/22
Received By: YBL

Were custody seals intact?

☒ Yes ☐ No ☐ N/A

Packing Material:

☒ Ice ☐ Blue Ice ☐ Box

Temperature: Digital Therm ID: 264 Expires: 9/9/2022 Observed: 1.1 °C

Is ☒ Yes

- OR - IR Therm ID: _____ Expires: / / 20 Observed: _____ °C

Temp OK? ☐ No

(for solid samples) IR Gun Daily Offset: _____ °C

(≤ 6.0 °C) ☐ N/A

Corrected Sample Temperature (IR Observed + IR Offset): _____ °C

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen?

☐ 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 (not broken or leaking)?

☒ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection?

☒ Yes ☐ No ☐ N/A

Method of Shipment:

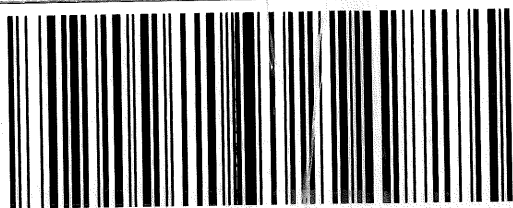
☐ Hand Delivered, ☐ FedEx, ☒ UPS, ☐ Other: _____ ☐ N/A

Sample Exception Report (The following exceptions were noted)

UPS NEXT DAY AIR

1

TRACKING #: 1Z 20A 238 01 4442 2705



RTLLING: P/P

Client was notified on:

Client contact:

Resolution to Exception:

Client: Kaiser Aluminum

NPDES# WA 0000892

Address: 15000 E Euclid Ave
Spokane Valley, WA 99215

Ship Samples to:

Eurofins Environment Testing NW
Attention: Aquatic Toxicology Lab
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Contact Person: Elena Wolf

Phone: (504) 638-3303

PO# P22 - 113581.

Composite Sample Information

Samples/Hour	<u>4</u>	Volume/Sample	_____
Total Hours	<u>24</u>	Total Volume	_____
Initiated:	Date <u>8/14/22</u>	Time <u>10:00</u>	
Ended:	Date <u>8/15/22</u>	Time <u>10:00</u>	
Chilled During Collection _____			

Analysis Required / Comments

[illegible]

Sampled By & Title <i>Chad Moriz</i>	(Please sign and print name) Chad Moriz, Env. Engineer	Date/Time 8/15/22 11:30	Relinquished By <i>Chad Moriz</i>	(Please sign and print name) Chad Moriz	Date/Time 8/15/22 11:30
Received By <i>Chad Moriz</i>	(Please sign and print name)	Date/Time 8/15/22 1030	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 _____ Other _____	Shipping #	
Work Authorized By	(Please sign and print name)	Remarks	COC Bioassay as of 020522 Doc Control ID: ASL612-0519		