



Environment Testing
TestAmerica

AQUATIC TOXICOLOGY REPORT

Project Name: SPOKANE COUNTY REGIONAL WRF

Location: SPOKANE, WASHINGTON

c/o Jacobs

Prepared by: Eurofins TestAmerica - Corvallis

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Eurofins TestAmerica – Corvallis Lab I.D. No. B4392

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INTRODUCTION

Eurofins TestAmerica – Corvallis (ET-C) Aquatic Toxicology Laboratory conducted toxicity testing on samples from the Jacobs - Spokane County Regional Water Reclamation Facility, Spokane, Washington.

Testing was conducted on behalf of: Jacobs

The Project Name was: Spokane County Regional Water Reclamation facility

Testing was initiated on: July 9, 2019

The test was 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 ET-C's reading of the NPDES permit for Spokane County Regional Water Reclamation Facility (permit #WA0093317, effective Dec 1, 2011, expired Nov 31, 2016). At the time of testing, no additional permit information was available.

Chronic toxicity:

- *Effluent Limit for Chronic Toxicity:*
 - “No toxicity detected in a test concentration representing the chronic critical effluent concentration (CCEC).”
 - “The CCEC equals 8.4% effluent.”
- *Compliance with the Effluent Limit for Chronic Toxicity:*
 - “Compliance with the effluent limit for chronic toxicity means the results ... show no statistically significant difference in response between the control and the CCEC.”
 - “The Permittee must determine the statistical significance by conducting a hypothesis test at the 0.05 level of significance ...” (i.e. $\alpha = 0.05$)
 - “If the difference in survival between the control and the CCEC is less than 20 percent, ... must conduct the hypothesis test at the 0.01 level of significance.”
- *Compliance Testing for Chronic Toxicity:*
 - “Conduct quarterly chronic toxicity testing on the final effluent ...”
 - “... using the following species on a rotating basis ...”

- *Response to Noncompliance with the Effluent Limit for Chronic Toxicity:*
 - “If a toxicity test ... determines a statistically significant difference in response between the CCEC and the control ... the Permittee must begin additional compliance monitoring within one week of receiving the test results”.

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 Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC ₂₅ (%)	Was a statistically significant difference in response shown between control and the CCEC?
<i>P. promelas</i>	100	> 100	> 100	No

Note: acronyms are as defined below.

From the NPDES permit: “Compliance with the effluent limit for chronic toxicity means the results ... show no statistically significant difference in response between the control and the CCEC (8.4% 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).

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		
ET-C SDG			B4392		
+ suffix			-01	-02	-03
Collection	-	Date and Time	07/08/2019 10:00	07/10/2019 09:34	07/12/2019 09:30
Receipt	-	Date and Time	07/09/2019 11:10	07/11/2019 10:30	07/13/2019 10:05
Temperature		(°C)	0.2	1.2	0.8
Dissolved Oxygen		(mg/L)	9.9	10.0	9.9
pH			7.4	7.3	7.0
Conductivity		(µS/cm)	820	863	885
Total Residual Chlorine		(mg/L)	0.02	< 0.02	0.03
Ammonia		(mg/L as NH ₃ -N)	0.18	0.22	0.13
Total Hardness		(mg/L as CaCO ₃)	105	148	145
Total Alkalinity		(mg/L as CaCO ₃)	70	78	65

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 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:

- *Whole Effluent Toxicity Testing Guidance and Test Review Criteria*, Washington State Department of Ecology (revised June 2016) Pub# WQ-R-95-80.
- *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR Part 136), (EPA August 2000), EPA 821-B-00-004.

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:

Chronic tests: 6.25, 8.40, 25.0, 56.5, 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 chronic test:

- Source: Aquatox Inc., Hot Springs, Arkansas
- Age: Less than 48 hours old and within an 24 hour age range
- Design: Four test vessels per concentration, ten organisms per vessel
- Test Solution Renewal: Daily

- Monitoring:
 - Daily: Survival
 - Daily: DO and pH in pre and post-renewal solutions, all concentrations
 - Daily: Temperature in pre-renewal solutions, all concentrations
 - With each new sample: Conductivity in post-renewal solutions, control and highest sample concentration
- Termination: 7 days after test initiation.
- Endpoints: Survival and Growth (average dry weight per organism added @ initiation)
- Acute Dual-Endpoint: 48 hour Survival (from the 2 day chronic exposure data)

DILUTION WATER

The dilution water used was the standard culture water used by ET-C:

- 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 Jacobs - Spokane personnel. The samples were accepted as scheduled by ET-C. Chain of Custody and Sample Receipt Records are provided in Appendix C.

- All samples were received within the EPA recommended 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.
- 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 chronic test were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, USEPA Office of Water, Fourth Edition (EPA 2002), EPA-821-R-02-013, 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.

RESULTS AND DISCUSSION

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

CHRONIC BIOASSAY

Table 1 summarizes the survival and reproduction data for the *P. promelas* chronic test.

Table 1 Summary of Chronic Results <i>P. promelas</i>		
Sample Concentration (%)	Percent Survival	Mean Dry Weight per Organism Added (mg)
Control	97.5	0.665
6.25	100	0.746
8.40	97.5	0.657
25.0	100	0.696
56.5	100	0.764
100	100	0.805

Statistical analysis in accordance with the EPA protocol results in:

- NOEC = 100 %
- LOEC > 100 %
- IC₂₅ > 100 %

From the NPDES permit: “Compliance with the effluent limit for chronic toxicity means the results ... show no statistically significant difference in response between the control and the CCEC (8.4% effluent).”

- A statistically significant difference between control and CCEC was not shown.

The dissolved oxygen levels in the chronic tests remained above 4.0 mg/L. Test temperatures remained at 25±1 °C.

The *C. dubia* test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum 15 young produced per surviving control adult. 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 test was conducted using potassium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 2 summarizes the reference toxicant test results and Cusum chart limits.

Table 2		
Chronic Reference Toxicant Tests (g/L)		
Species	IC₂₅	Cusum Chart Limits
<i>P. promelas</i> (survival)	0.61	0.56 to 0.67
<i>P. promelas</i> (growth)	0.58	0.45 to 0.73

APPENDIX A
RAW DATA SHEETS

SDG # B 4397

Test Initiation: Date

7-9-19

Neil DeJonge (509) 536-3710 x20710

Test Termination: Date _____

7-16-18

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):	
				" - " = sample not dechlorinated, or analyte not collected/needed.	
Recon MH (FHM)	4892	88	67		
	4894	85	66		

Water Quality Meters Used/ID#: Dissolved Oxygen # 4 pH # 11 Conductivity # 2

Test Solution Preparation and Dilution Record

Client: Jacobs - Spokane County RWRP

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
8.4	168 →	2000
25.0	500 →	2000
56.5	1,130 →	2000
100	2,000 →	2000

Total Sample volume needed per day = 3923 mls

Total = 2540 mls
on Day 6

6.25 81.25 → 1300
8.4 109.2 → 1300
25 325 → 1300
56.5 734.5 → 1300
100 1300 → 1300

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 4392-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4892	7/9/2019	11:55	JK
1	B 4392-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4892	7/10/19	08:35	SS
2	B 4392-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4894	7/11/19	12:10	JK
3	B 4392-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4895	7/12/19	08:20	JK
4	B 4392-03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4895	7/13/19	11:00	TA
5	B 4392-03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4895	7/14/19	08:05	TA
6	B 4392-03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4897	7/15/19	09:55	JK

FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client Jacobs - Spokane County RWRF

Sample Designation (SDG): B 4392

Test Species Information	FHM # <u>2053</u> <i>Pimephales promelas</i> Chronic				
Organism Age at Initiation	<48 hrs, all within a 24 hour window				
Test Container Size	400 ml				
Test Volume	500 ml				
Feeding: Type and Amount	0.15 ml <i>Artemia</i> , 2 x Daily				
Aeration:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use				
In Test Chambers via Slow Bubble :	<input type="checkbox"/> @ _____ hrs				
Acclimation Period	<24 hrs				
Organism Source	<u>Aquatox</u>				
Size	-				
Loading Rate	-				

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): ☐ All ☐ _____
Date:

Comments:

FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 5 Waterbath/incubator Used: _____ Date Initiated 7/9/2019 Time 15:30
Initial sample ID B 4392 - 01 # 4 Date Terminated 7/16/2019 Time 11:45
Client Jacobs - Spokane County RWRP Sample Description _____

Tech: Day 0 BAM/TA Day 1 JK/0 Day 2 TA Day 3 TA Day 4 BAM/TA Day 5 BAM/TA Day 6 JK/BAM Day 7 TA
Time Day 0 15:30 Day 1 13:00 Day 2 14:00 Day 3 11:15 Day 4 13:45 Day 5 12:20 Day 6 15:00 Day 7 11:45

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		8.1		7.9	Post: 24.8	253	319
	1	10	10	10	10	6.6	8.0	7.3	7.6	25.5	252	
	2	10	10	9	10	7.5	8.0	7.7	7.8	25.5	252	333
	3	10	10	9	10	7.6	8.0	7.8	7.9	25.5	252	
	4	10	10	9	10	7.2	8.1	7.4	7.9	25.3	252	316
	5	10	10	9	10	7.2	7.9	7.6	7.9	25.4	250	
	6	10	10	9	10	7.1	8.0	7.3	7.7	25.4	251	
6.25 %	0	10	10	10	10		8.1		8.0	Post: 24.8		352
	1	10	10	10	10	6.7	8.0	7.3	7.7	25.5		
	2	10	10	10	10	7.5	8.2	7.7	7.9	25.5		373
	3	10	10	10	10	7.6	8.1	7.8	7.9	25.3		
	4	10	10	10	10	7.2	8.0	7.5	7.9	25.3		358
	5	10	10	10	10	7.2	7.9	7.6	7.8	25.2		
	6	10	10	10	10	7.1	8.0	7.3	7.7	25.2		
8.4 %	0	10	10	10	10		8.2		8.0	Post: 24.7		363
	1	10	10	10	10	6.8	8.0	7.3	7.7	25.5		
	2	10	10	10	10	7.5	8.2	7.7	7.9	25.4		387
	3	10	9	10	10	7.6	8.1	7.8	8.0	25.2		
	4	10	9	10	10	7.0	8.1	7.6	7.9	25.4		370
	5	10	9	10	10	7.1	8.0	7.5	7.8	25.4		
	6	10	9	10	10	7.1	8.1	7.4	7.8	25.4		
25.0 %	0	10	10	10	10		8.2		8.0	Post: 24.8		440
	1	10	10	10	10	7.0	8.1	7.3	7.7	25.4		
	2	10	10	10	10	7.5	8.3	7.7	7.9	25.3		476
	3	10	10	10	10	7.6	8.1	7.8	8.0	25.3		
	4	10	10	10	10	7.1	8.2	7.6	7.9	25.4		461
	5	10	10	10	10	7.1	8.0	7.5	7.8	25.4		
	6	10	10	10	10	7.2	8.1	7.4	7.8	25.3		
56.5 %	0	10	10	10	10		8.3		7.9	Post: 24.7		586
	1	10	10	10	10	6.9	8.2	7.3	7.7	25.5		
	2	10	10	10	10	7.5	8.1	7.8	7.9	25.3		648
	3	10	9	10	10	7.5	8.2	7.8	7.9	25.1		
	4	10	9	10	10	7.2	8.2	7.6	7.9	25.4		658
	5	10	9	10	10	7.1	8.1	7.5	7.8	25.6		
	6	10	9	10	10	7.2	8.2	7.4	7.7	25.4		
100 %	0	10	10	10	10		8.3		7.8	Post: 24.6		786
	1	10	10	10	10	7.2	8.2	7.3	7.7	25.3		
	2	10	10	10	10	7.6	8.2	7.9	7.8	25.1		887
	3	10	10	10	10	7.1	8.3	7.8	7.8	24.9		
	4	10	10	10	10	7.2	8.4	7.6	7.8	25.3		865
	5	10	10	10	10	7.1	8.3	7.5	7.6	25.5		
	6	10	10	10	10	7.1	8.3	7.4	7.6	25.4		

✓ 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 Jacobs - Spokane County RWRF Tins Labeled As: Spokane
 Lab ID: B4392 Start Date: 7/9/2019
 Sample Description: _____

Technician: TA JSJ
 Date: 7/18/2019 7/9/2019
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A	1033.47	1027.29	10
	B	1027.72	1020.85	10
	C	1051.77	1044.52	9
	D	1053.62	1047.34	10
6.25 %	A	1029.23	1022.81	10
	B	1039.72	1031.51	10
	C	1037.74	1029.56	10
	D	1014.96	1007.95	10
8.4 %	A	1042.09	1035.33	10
	B	1026.57	1020.49	9
	C	1058.27	1051.66	10
	D	1013.90	1007.08	10
25 %	A	1034.34	1027.52	10
	B	1030.22	1023.02	10
	C	1037.40	1030.15	10
	D	1027.04	1020.49	10
56.5 %	A	1016.57	1009.59	10
	B	1014.61	1007.20	10
	C	1052.17	1044.28	10
	D	1045.84	1037.57	10
100 %	A	1032.48	1025.43	10
	B	1047.23	1039.24	10
	C	1052.22	1043.77	10
	D	1043.30	1034.58	10
	A			
	B			
	C			
	D			

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client Jacobs - Spokane County RWRF Tins Labeled As: Spokane
 Lab ID: B4392 Start Date: 7/9/2019
 Sample Description: _____

Technician: _____ JSJ
 Date: 7/9/2019
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A		1027.29	10
	B		1020.85	10
	C		1044.52	9
	D		1047.34	10
6.25 %	A		1022.81	10
	B		1031.51	10
	C		1029.56	10
	D		1007.95	10
8.4 %	A		1035.33	10
	B		1020.49	9
	C		1051.66	10
	D		1007.08	10
25 %	A		1027.52	10
	B		1023.02	10
	C		1030.15	10
	D		1020.49	10
56.5 %	A		1009.59	10
	B		1007.20	10
	C		1044.28	10
	D		1037.57	10
100 %	A		1025.43	10
	B		1039.24	10
	C		1043.77	10
	D		1034.58	10
	A			
	B			
	C			
	D			

weigh to 0.01 mg

CETIS Summary Report

Report Date: 29 Jul-19 09:06 (p 1 of 2)
Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Batch ID: 11-3978-1022 Test Type: Growth-Survival (7d) Analyst: Brett Muckey
Start Date: 09 Jul-19 15:30 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
Ending Date: 16 Jul-19 11:45 Species: Pimephales promelas Brine:
Duration: 6d 20h Source: Aquatox, AR Age:

Sample ID: 13-0437-2513 Code: B4392-01 Client:
Sample Date: 08 Jul-19 10:00 Material: POTW Effluent Project:
Receive Date: 09 Jul-19 11:10 Source: Jacobs - Spokane County Regional Water (
Sample Age: 30h Station:

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-8644-2191	7d Survival Rate	100	>100	NA	5.25%	1	Steel Many-One Rank Sum Test
10-2560-9618	Mean Dry Biomass-mg	100	>100	NA	15.2%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
18-4317-0035	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
05-8644-2191	7d Survival Rate	Control Resp	0.975	0.8 - NL	Yes	Passes Acceptability Criteria
10-2560-9618	Mean Dry Biomass-mg	Control Resp	0.6645	0.25 - NL	Yes	Passes Acceptability Criteria
18-4317-0035	Mean Dry Biomass-mg	Control Resp	0.6645	0.25 - NL	Yes	Passes Acceptability Criteria
10-2560-9618	Mean Dry Biomass-mg	PMSD	0.1523	0.12 - 0.3	Yes	Passes Acceptability Criteria

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	-2.56%
8.4		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	0.0%
25		4	1	1	1	1	1	0	0	0.0%	-2.56%
56.5		4	1	1	1	1	1	0	0	0.0%	-2.56%
100		4	1	1	1	1	1	0	0	0.0%	-2.56%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6645	0.5841	0.7449	0.618	0.725	0.02527	0.05054	7.61%	0.0%
6.25		4	0.7455	0.6042	0.8868	0.642	0.821	0.04439	0.08878	11.91%	-12.19%
8.4		4	0.6567	0.6032	0.7103	0.608	0.682	0.01684	0.03368	5.13%	1.17%
25		4	0.6955	0.6428	0.7482	0.655	0.725	0.01656	0.03313	4.76%	-4.67%
56.5		4	0.7637	0.6743	0.8532	0.698	0.827	0.02811	0.05621	7.36%	-14.94%
100		4	0.8052	0.6886	0.9219	0.705	0.872	0.03666	0.07332	9.11%	-21.18%

CETIS Summary Report

Report Date: 29 Jul-19 09:06 (p 2 of 2)
Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.9	1
6.25		1	1	1	1
8.4		1	0.9	1	1
25		1	1	1	1
56.5		1	1	1	1
100		1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.618	0.687	0.725	0.628
6.25		0.642	0.821	0.818	0.701
8.4		0.676	0.608	0.661	0.682
25		0.682	0.72	0.725	0.655
56.5		0.698	0.741	0.789	0.827
100		0.705	0.799	0.845	0.872

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	9/10	10/10
6.25		10/10	10/10	10/10	10/10
8.4		10/10	9/10	10/10	10/10
25		10/10	10/10	10/10	10/10
56.5		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

CETIS Analytical Report

Report Date: 29 Jul-19 09:06 (p 1 of 4)

Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 05-8644-2191	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.8
Analyzed: 29 Jul-19 9:05	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 11-3978-1022	Test Type: Growth-Survival (7d)	Analyst: Brett Muckey
Start Date: 09 Jul-19 15:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 16 Jul-19 11:45	Species: Pimephales promelas	Brine:
Duration: 6d 20h	Source: Aquatox, AR	Age:
Sample ID: 13-0437-2513	Code: B4392-01	Client:
Sample Date: 08 Jul-19 10:00	Material: POTW Effluent	Project:
Receive Date: 09 Jul-19 11:10	Source: Jacobs - Spokane County Regional Water (
Sample Age: 30h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	5.25%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		8.4	18	10	2	6	0.8333	Asymp	Non-Significant Effect
		25	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		56.5	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		100	20	10	1	6	0.9516	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00885311	0.001770622	5	0.8	0.5640	Non-Significant Effect
Error	0.039839	0.002213278	18			
Total	0.04869211		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.8	4.248	0.5640	Equal Variances
Variances	Levene Equality of Variance	7.2	4.248	0.0007	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.6154	0.884	<0.0001	Non-normal Distribution

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	0.0%
6.25		4	1	1	1	1	1	1	0	0.0%	-2.56%
8.4		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	0.0%
25		4	1	1	1	1	1	1	0	0.0%	-2.56%
56.5		4	1	1	1	1	1	1	0	0.0%	-2.56%
100		4	1	1	1	1	1	1	0	0.0%	-2.56%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.0%
6.25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%
8.4		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.0%
25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%
56.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%
100		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%

CETIS Analytical Report

Report Date: 29 Jul-19 09:06 (p 2 of 4)
Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 05-8644-2191
Analyzed: 29 Jul-19 9:05

Endpoint: 7d Survival Rate
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.8.8
Official Results: Yes

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.9	1
6.25		1	1	1	1
8.4		1	0.9	1	1
25		1	1	1	1
56.5		1	1	1	1
100		1	1	1	1

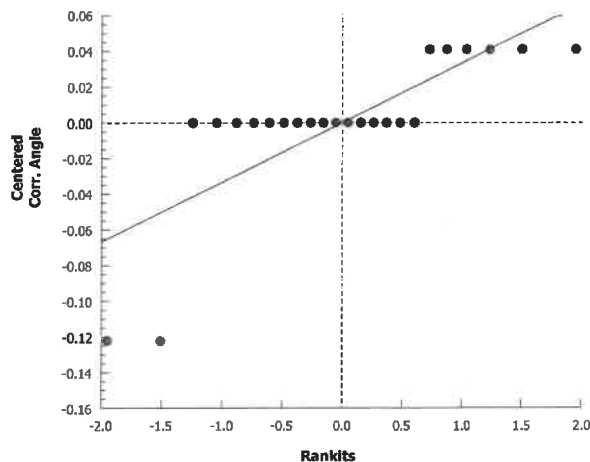
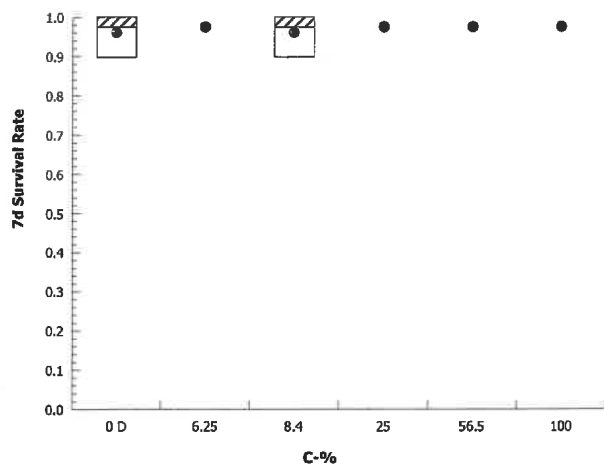
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.412	1.412	1.249	1.412
6.25		1.412	1.412	1.412	1.412
8.4		1.412	1.249	1.412	1.412
25		1.412	1.412	1.412	1.412
56.5		1.412	1.412	1.412	1.412
100		1.412	1.412	1.412	1.412

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	9/10	10/10
6.25		10/10	10/10	10/10	10/10
8.4		10/10	9/10	10/10	10/10
25		10/10	10/10	10/10	10/10
56.5		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Graphics



CETIS Analytical Report

Report Date: 29 Jul-19 09:06 (p 3 of 4)
Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 10-2560-9618	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.8
Analyzed: 29 Jul-19 9:05	Analysis: Parametric-Control vs Treatments	Official Results: Yes
Batch ID: 11-3978-1022	Test Type: Growth-Survival (7d)	Analyst: Brett Muckey
Start Date: 09 Jul-19 15:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 16 Jul-19 11:45	Species: Pimephales promelas	Brine:
Duration: 6d 20h	Source: Aquatox, AR	Age:
Sample ID: 13-0437-2513	Code: B4392-01	Client:
Sample Date: 08 Jul-19 10:00	Material: POTW Effluent	Project:
Receive Date: 09 Jul-19 11:10	Source: Jacobs - Spokane County Regional Water (
Sample Age: 30h	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	15.2%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	-1.927	2.407	0.101	6	0.9989	CDF	Non-Significant Effect
		8.4	0.1844	2.407	0.101	6	0.7733	CDF	Non-Significant Effect
		25	-0.7375	2.407	0.101	6	0.9658	CDF	Non-Significant Effect
		56.5	-2.361	2.407	0.101	6	0.9997	CDF	Non-Significant Effect
		100	-3.348	2.407	0.101	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0699674	0.01399348	5	3.96	0.0134	Significant Effect
Error	0.06361137	0.003533965	18			
Total	0.1335788		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.039	15.09	0.5439	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.949	0.884	0.2583	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	4	0.6645	0.5841	0.7449	0.6575	0.618	0.725	0.02527	7.61%	0.0%
6.25		4	0.7455	0.6042	0.8868	0.7595	0.642	0.821	0.04439	11.91%	-12.19%
8.4		4	0.6567	0.6032	0.7103	0.6685	0.608	0.682	0.01684	5.13%	1.17%
25		4	0.6955	0.6428	0.7482	0.701	0.655	0.725	0.01656	4.76%	-4.67%
56.5		4	0.7637	0.6743	0.8532	0.765	0.698	0.827	0.02811	7.36%	-14.94%
100		4	0.8052	0.6886	0.9219	0.822	0.705	0.872	0.03666	9.11%	-21.18%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.618	0.687	0.725	0.628
6.25		0.642	0.821	0.818	0.701
8.4		0.676	0.608	0.661	0.682
25		0.682	0.72	0.725	0.655
56.5		0.698	0.741	0.789	0.827
100		0.705	0.799	0.845	0.872

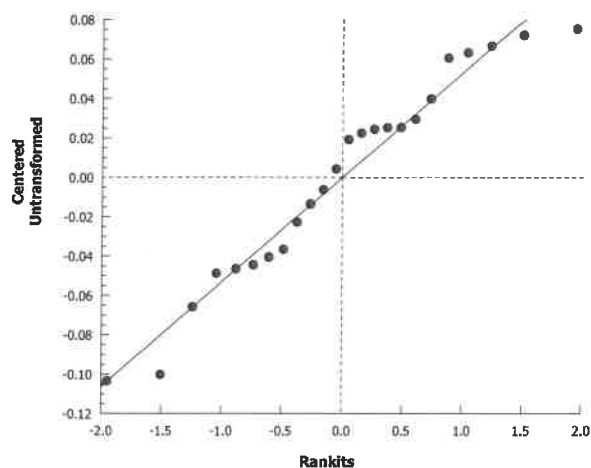
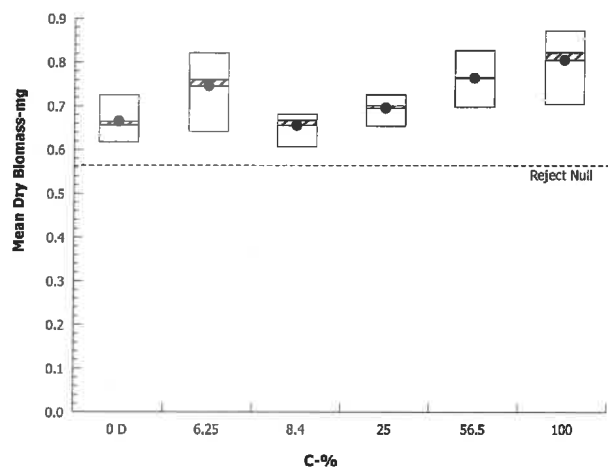
Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 10-2560-9618 Endpoint: Mean Dry Biomass-mg
 Analyzed: 29 Jul-19 9:05 Analysis: Parametric-Control vs Treatments

CETIS Version: CETISv1.8.8
 Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 29 Jul-19 09:06 (p 1 of 1)
Test Code: B439201ppc | 19-3969-5590

Fathead Minnow 7-d Larval Survival and Growth Test				Eurofins TestAmerica - Corvallis	
Analysis ID:	18-4317-0035	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.8.8
Analyzed:	29 Jul-19 9:06	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes
Batch ID:	11-3978-1022	Test Type:	Growth-Survival (7d)	Analyst:	Brett Muckey
Start Date:	09 Jul-19 15:30	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	16 Jul-19 11:45	Species:	Pimephales promelas	Brine:	
Duration:	6d 20h	Source:	Aquatox, AR	Age:	
Sample ID:	13-0437-2513	Code:	B4392-01	Client:	
Sample Date:	08 Jul-19 10:00	Material:	POTW Effluent	Project:	
Receive Date:	09 Jul-19 11:10	Source:	Jacobs - Spokane County Regional Water (
Sample Age:	30h	Station:			

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	351928	200	Yes	Two-Point Interpolation

Point Estimates

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

Mean Dry Biomass-mg Summary

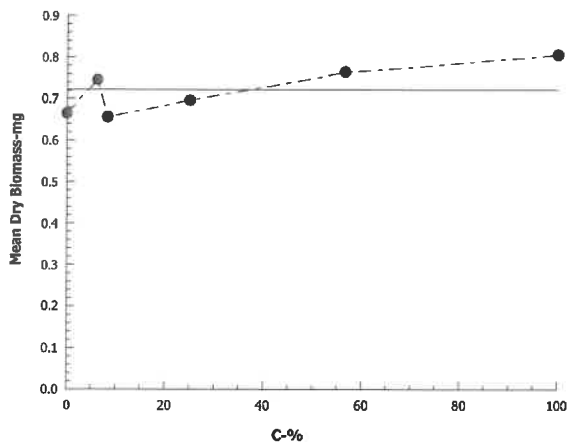
Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6645	0.618	0.725	0.02527	0.05054	7.61%	0.0%
6.25		4	0.7455	0.642	0.821	0.04439	0.08878	11.91%	-12.19%
8.4		4	0.6567	0.608	0.682	0.01684	0.03368	5.13%	1.17%
25		4	0.6955	0.655	0.725	0.01656	0.03313	4.76%	-4.67%
56.5		4	0.7637	0.698	0.827	0.02811	0.05621	7.36%	-14.94%
100		4	0.8052	0.705	0.872	0.03666	0.07332	9.11%	-21.18%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.618	0.687	0.725	0.628
6.25		0.642	0.821	0.818	0.701
8.4		0.676	0.608	0.661	0.682
25		0.682	0.72	0.725	0.655
56.5		0.698	0.741	0.789	0.827
100		0.705	0.799	0.845	0.872

Graphics



APPENDIX B

REFERENCE TOXICANT DATA SHEETS

Random Template Used: 6 conc. x 4 reps. # 8

Waterbath/incubator Used:

Date Initiated 7 / 9 / 20 19 Time 15 : 00

Stock Sol. ID 2 B 076-01

3

Date Terminated 7 / 16 / 20 19 Time 10 : 00

Organism ID: FHM 2053

Test Container Size: 800 ml

Solution Volume / rep: 500 ml

Client QA / QC - RefTox

Sample Description

KCl (50 g/L stock)

Tech: Day 0 JK Day 1 JK Day 2 JK Day 3 JK Day 4 TA/BAW Day 5 BAW Day 6 JK Day 7 JK

Time Day 0 1500 Day 1 1330 Day 2 0920 Day 3 0950 Day 4 1150 Day 5 1300 Day 6 1045 Day 7 1000

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 (daily)
Control	0	10	10	10	10		7.8		7.6	Post: 25.0	253	315
	1	10	10	10	10	7.1	7.8	7.4	7.9	25.1	251	327
	2	10	10	10	10	7.1	7.8	7.3	7.6	25.1	251	330
	3	10	10	10	9	7.2	7.9	7.4	7.7	25.1	251	320
	4	10	10	10	9	7.7	8.3	7.8	7.7	25.1	251	311
	5	10	10	10	9	7.1	7.8	7.5	7.8	25.2	250	334
	6	10	10	10	9	6.2	7.2	7.2	7.5	25.2	251	343
	7	10	10	10	9	7.1		7.6		25.1	251	
0.25 g/L	0	10	10	7-10-19 10 7-10-19 10 11	10		7.8		7.7	Post: 24.7		767
	1	10	10	11	10	7.1	7.9	7.3	7.9	25.1		810
	2	9	10	11	10	7.3	7.9	7.3	7.7	25.0		809
	3	9	10	11	10	7.3	8.0	7.4	7.8	25.1		806
	4	9	10	11	10	7.6	8.2	7.8	7.9	25.1		796
	5	9	10	11	10	7.1	7.9	7.5	7.9	25.2		808
	6	9	10	11	10	6.2	7.3	7.2	7.6	25.1		838
	7	9	10	11	10	7.0		7.6		25.1		
0.50 g/L	0	10	10	10	10		8.1		7.8	Post: 24.4		1242
	1	10	10	10	10	7.1	8.0	7.4	8.0	25.1		1267
	2	10	10	10	10	7.3	8.0	7.4	7.8	25.1		1268
	3	10	10	9	10	7.2	8.1	7.4	7.9	25.1		1240
	4	9	10	9	10	7.5	8.3	7.8	8.0	25.1		1247
	5	9	10	9	10	7.0	7.7	7.5	8.0	25.2		1291
	6	9	10	9	10	6.2	7.1	7.3	7.7	25.1		1273
	7	4	10	9	10	7.1		7.7		25.1		
1.0 g/L	0	7-10-19 10 7-10-19 10 10	10	10	10		8.0		7.8	Post: 24.4		2190
	1	JK RO6 886	1	2	4	7.2	8.0	7.4	8.0	25.1		2200
	2	6	1	2	4	7.3	8.1	7.4	7.9	25.1		2190
	3	6	1	2	4	7.3	8.1	7.5	8.0	25.1		2160
	4	3	0	2	1	7.4	8.3	7.8	8.1	25.1		2130
	5	1	1	2	1	7.1	7.9	7.5	8.1	25.3		2220
	6	1	1	2	1	6.2	7.1	7.4	7.8	25.1		2220
	7	1	1	1	1	7.2		7.7		25.0		
2.0 g/L	0	10	10	10	10		8.1		7.9	Post: 24.4		3970
	1	0	0	0	0	7.3	8.0	7.5	8.0	25.0		3950
	2											
	3											
	4											
	5											
	6											
	7											
4.0 g/L	0	10	10	10	10		8.1		7.9	Post: 24.4		7510
	1	0	0	0	0	7.3	8.0	7.5	8.1	25.1		7320
	2											
	3											
	4											
	5											
	6											
	7											

✓ 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-renewals

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

23.8 = Temp. out of recommended range

Endpoint

Cusum Chart Limits

Survival - EC₂₅

0.661

0.56 to 0.67

Growth - IC₂₅

0.58

0.45 to 0.73

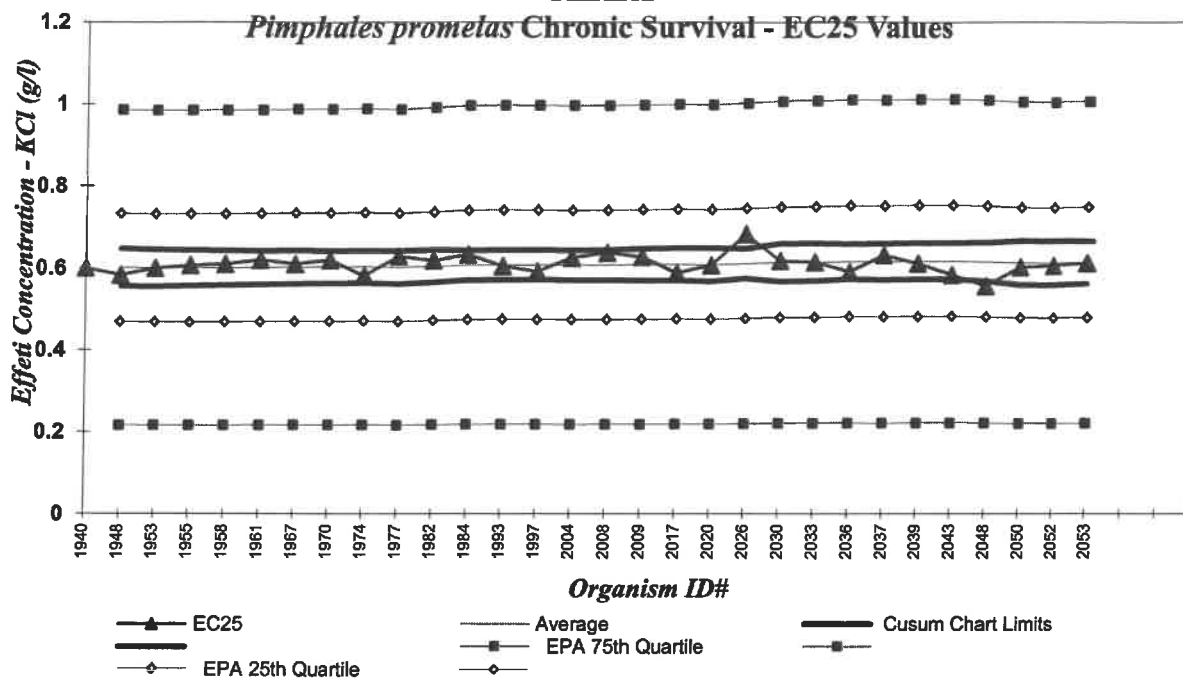
Task Manager

Project Manager

QA Officer

REFTOX - FHM chronic (KCl) - SL1282-1118 Doc Control ID: SL1282-1118

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART



Pimephales promelas - Chronic (EPA Test Method 1000.0)

POTASSIUM CHLORIDE (g/L)

From EPA 833-R-00-003:

Endpoint: Chronic Survival

10th Quartile CV (control limit) = 0.03

Stats Method: Linear Interpolation

25th Quartile CV (warning limit) = 0.11

Test Conditions: Recon MH, 25 °C

75th Quartile CV (warning limit) = 0.32

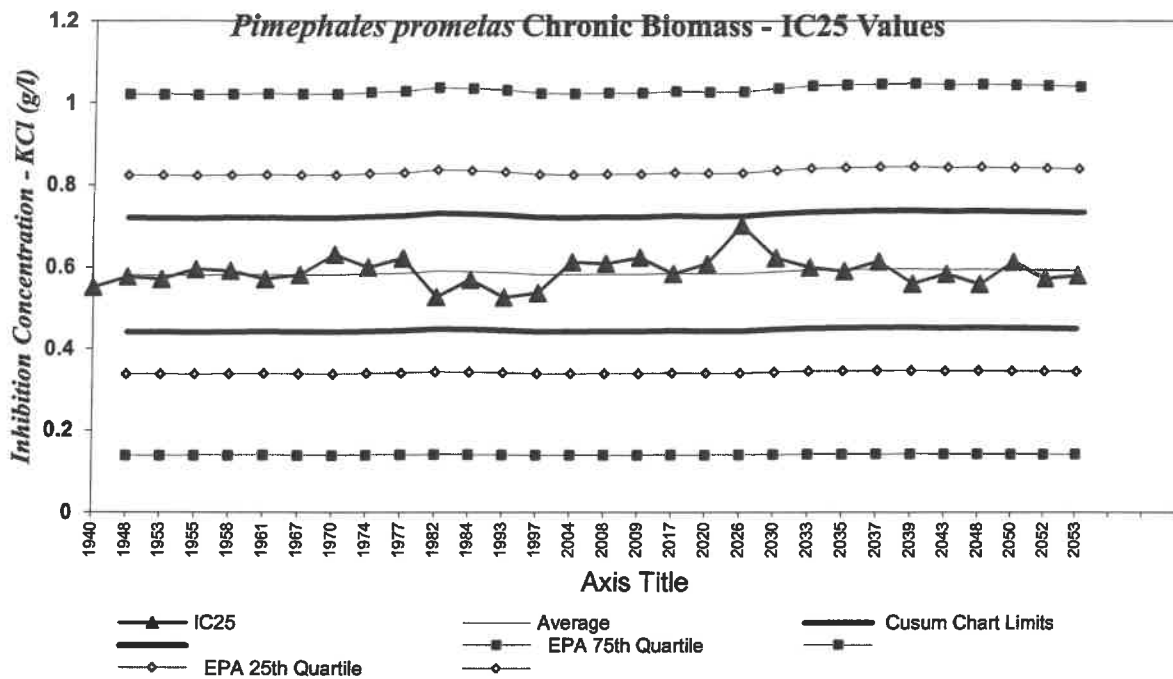
90th Quartile CV (control limit) = 0.52

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	EC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
28	2008	10/2/2018	0.638	0.6	0.02	0.571	0.644	0.03
29	2009	10/4/2018	0.63	0.6	0.02	0.57	0.65	0.03
30	2017	11/6/2018	0.59	0.6	0.02	0.57	0.65	0.03
31	2020	12/4/2018	0.61	0.6	0.02	0.57	0.65	0.03
32	2026	1/15/2019	0.68	0.6	0.02	0.57	0.65	0.04
33	2030	1/29/2019	0.62	0.6	0.02	0.57	0.66	0.04
34	2033	2/12/2019	0.62	0.6	0.02	0.57	0.66	0.04
35	2036	3/5/2019	0.59	0.6	0.02	0.57	0.66	0.04
36	2037	3/14/2019	0.63	0.6	0.02	0.57	0.66	0.04
37	2039	3/26/2019	0.61	0.6	0.02	0.57	0.66	0.04
38	2043	4/16/2019	0.58	0.6	0.02	0.57	0.66	0.04
39	2048	5/30/2019	0.56	0.6	0.02	0.57	0.66	0.04
40	2050	6/11/2019	0.60	0.6	0.03	0.56	0.67	0.04
41	2052	6/25/2019	0.61	0.6	0.03	0.56	0.67	0.04
42	2053	7/9/2019	0.61	0.6	0.03	0.56	0.67	0.04
43								

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART



Pimephales promelas - Chronic (EPA Test Method 1000.0)

POTASSIUM CHLORIDE (g/L)

From EPA 833-R-00-003:

Endpoint: Chronic Growth (Biomass)

10th Quartile CV (control limit) = 0.12

Stats Method: Linear Interpolation

25th Quartile CV (warning limit) = 0.21

Test Conditions: Recon MH, 25 oC

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.

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
28	2008	10/2/2018	0.61	0.58	0.03	0.44	0.72	0.05
29	2009	10/4/2018	0.62	0.58	0.03	0.44	0.72	0.05
30	2017	11/6/2018	0.58	0.58	0.03	0.44	0.72	0.05
31	2020	12/4/2018	0.61	0.58	0.03	0.44	0.72	0.05
32	2026	1/15/2019	0.70	0.58	0.03	0.44	0.72	0.07
33	2030	1/29/2019	0.62	0.59	0.04	0.45	0.73	0.07
34	2033	2/12/2019	0.60	0.59	0.04	0.45	0.73	0.07
35	2035	3/5/2019	0.59	0.59	0.04	0.45	0.74	0.07
36	2037	3/14/2019	0.61	0.59	0.04	0.45	0.74	0.07
37	2039	3/26/2019	0.56	0.60	0.04	0.45	0.74	0.07
38	2043	4/16/2019	0.58	0.59	0.04	0.45	0.74	0.07
39	2048	5/30/2019	0.56	0.59	0.04	0.45	0.74	0.07
40	2050	6/11/2019	0.61	0.59	0.04	0.45	0.74	0.07
41	2052	6/25/2019	0.57	0.59	0.04	0.45	0.73	0.07
42	2053	7/9/2019	0.58	0.59	0.04	0.45	0.73	0.07
43								

APPENDIX C
CHAIN OF CUSTODY



Environment Testing
TestAmerica

Sample Receipt Record

Batch Number: B4392

Date Received: 7-9-19

Client/Project: Jacobs-Spokane

Received By: RAM

Were custody seals intact?

☒ Yes ☐ No ☐ N/A

Packing Material:

☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6°C) Therm ID: TH173 Expires: 7/12/2019 Observed: 1.0 °C, Actual Temp: 0.2 °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 (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, ☐ Greyhound, ☐ Other: _____ ☐ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified	62 LBS SHIP WT: 62 LBS DATE: 08 JUL 2019 RH	SHIP BRETT MUCKEY TO: (541) 243-6137 TESTAMERICA ASL STE 310 CORVALLIS OR 97330-4741 1100 NE CIRCLE BLVD	OR 9733 1-01	UPS NEXT DAY AIR TRACKING #: 1Z 940 X50 01 3383 7668	1SH 13.00N Z2P 450 12.5U 04/2019
Resolution to Exc	NEIL DEJONGE (509) 536-3710 JACOBS 1004 N FREYA ST SPOKANE WA 99202-6004				

BILLING: P/P

REGULATIONS ON ADVISE regarding UPS terms, and notice of limitation of liability, when allowed by law, shipper authorizes UPS to act as forwarding agent for export control and customs purposes. If reported from the US, shipper certifies that the commodity technology or software were reported from the US in accordance with the Export Administration Regulations. Diversion contrary to law is prohibited.

TestAmerica ASL
Attention: Aquatic
1100 NE Circle Blvd
Corvallis, OR 97331
Phone: 541.243.6100

Check Chlorine (Y/N) _____
Temp. Upon Arrival (°C) _____
Check Ammonia (Y/N) _____

Check Ammonia (Y/N)	Dechlorinated (Y/N)	Analysis Required / Comments

Sampled By & Title <i>Corvelis Dotong</i>	(Please sign and print name)	Date/Time <i>7/8/19 1000</i>	Relinquished By <i>Corvelis Dotong</i>	(Please sign and print name)	Date/Time <i>7/8/19 1000</i>
Received By	(Please sign and print name)	Date/Time	Relinquished By	(Please sign and print name)	Date/Time
Received By <i>B. Marthaler</i>	(Please sign and print name) <i>TA-CVO</i>	Date/Time <i>7-9-19 1100</i>	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Shipped Via	UPS Bis Fed-Ex Hand Other	Shipping #
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls Doc Control ID: ASLE12-0717		



Environment Testing
TestAmerica

Sample Receipt Record

Batch Number: B4392-02
Client/Project: Jacobs-Spokane

Date Received: 7-11-19
Received By: BAM

Were custody seals intact?

Packing Material:

Temp OK? (<6°C) Therm ID: TH173 Expires: 7/12/2019 Observed: 0.9°C, Actual Temp: 1.2°C

Was a Chain of Custody (CoC) Provided?

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

Were the sample containers in good condition (not broken or leaking)?

Are all samples within 36 hours of collection?

Method of Shipment: ☐ Hand Delivered, ☒ FedEx, ☐ UPS, ☐ Greyhound, ☐ Other: _____

☒ Yes ☐ No ☐ N/A

☒ Ice ☐ Blue Ice ☐ Box

☒ Yes ☐ No ☐ N/A

☒ Yes ☐ No ☐ N/A

☒ Yes ☐ No ☐ N/A

☒ Yes ☐ No ☐ N/A

☒ Yes ☐ No ☐ N/A

☐ N/A

Sample Exception Report (The following exceptions were noted)

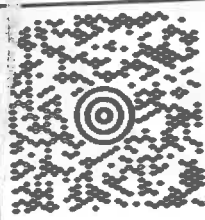
Client was notified

Resolution to E

NEIL DEJONGE
(509) 536-3710
JACOBS
1004 N FREYA ST
SPOKANE WA 99202-6004

SHIP BRETT MUCKEY
TO: (541) 243-6137
TESTAMERICA ASL
STE 310
1100 NE CIRCLE BLVD
CORVALLIS OR 97330-4741

OR 973 1-01



UPS NEXT DAY AIR

1

TRACKING #: 1Z 940 X50 01 3385 1026



BILLING: P/P

18H 13.00H 22P 450 13.5U 04/2019

SEE NOTICE ON REVERSE regarding UPS Terms and conditions of limitation of liability. Where allowed by law, shipper authorizes UPS to act as forwarding agent for export control and customs purposes. It represents and warrants that the shipper certifies that the commodity, technology or software were exported from the U.S. in accordance with the Export Administration Regulations. Governmental laws are published.



Copy of Bioassay Receipt verification (ASL933-0918)
Doc Control ID: ASL993-0918

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client SPOKANE COUNTY / JACOBS
Address 1004 N FRP A ST
SPOKANE, WA, 99202

NPDES# WA 0093317
Composite Sample Information

Ship Samples to:
PO#

TestAmerica ASL

Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd, Suite 310
Corvallis, OR 97330
Phone: 541.243.6137

Samples/Hour 4 Volume/Sample 200ml

Total Hours 29 Total Volume 1935

Contact Person: Neil DeJonge
Phone: 509-536-3710

Phone: 509-538-3710

Check Chlorine (Y/N)

Temp. Upon Arrival (°C)

Check Ammonia (Y/N)

Project #

Dechlorinated (Y/N)

Analysis Required / Comments

[illegible]

Sampled By & Title <i>Cornelia's Debus</i>	(Please sign and print name)	Date/Time <i>7/10/19</i>	Relinquished By <i>Cornelia's Debus</i>	(Please sign and print name)	Date/Time <i>7/10/19</i>
Received By <i>HA</i>	(Please sign and print name)	Date/Time <i>7-11-19</i>	Relinquished By	(Please sign and print name)	Date/Time
Received By <i>B. Marchalles</i>	(Please sign and print name)	Date/Time <i>7-11-19 1030</i>	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Shipped Via	UPS Bis Fed-Ex Hand Other	Shipping #
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls Doc Control ID: ASL612-0717		



Environment Testing
TestAmerica

Sample Receipt Record

Batch Number: B4392-03
Client/Project: J. Spokane

Date Received: 7-13-19
Received By: BAM

Were custody seals intact?

Packing Material:

Temp OK? (<6°C) Therm ID: TH1B Expires: 10/12/2019 Observed: 1.4°C, Actual Temp: 0.8°C

Was a Chain of Custody (CoC) Provided?

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

Were the sample containers in good condition (not broken or leaking)?

Are all samples within 36 hours of collection?

Method of Shipment: ☐ Hand Delivered, ☐ FedEx, ☒ UPS, ☐ Greyhound, ☐ Other: ☐ N/A

☒ Yes ☐ No ☐ N/A
☒ Ice ☐ Blue Ice ☐ Box
☒ Yes ☐ No ☐ N/A
☒ Yes ☐ No ☐ N/A
☒ Yes ☐ No ☐ N/A
☒ Yes ☐ No ☐ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified
Resolution to Exception

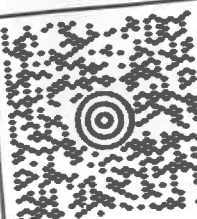
63 LBS
SHIP WT: 63 LBS
DATE: 12 JUL 2019
RH

NEIL DEJONGE
(509) 536-3710
JACOBS
1004 N FREYA ST
SPOKANE WA 99202-6004

SHIP BRETT MUCKEY
TO: (541) 243-6137
TESTAMERICA ASL

STE 310
1100 NE CIRCLE BLVD
CORVALLIS OR 97330-4741

OR 973 1-01



UPS NEXT DAY AIR EARLY 1+S

TRACKING #: 1Z 940 X50 41 3386 2716



BILLING: P/P



Saturday
Delivery

Place directly below address label
011189 2/07 MW

Doc Control ID: ASL993-0918

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client SPOKANE COUNTY/JACOBS NPDES# WA 0093317
Address 1004 N FEARA ST Composite Sample Information

Ship Samples to:
PO#

TestAmerica ASL
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd, Suite 310
Corvallis, OR 97330
Phone: 541.243.6137

Spokane, WA. 99202
 Contact Person: Neil Peterson
 Phone: 509-536-3710
 Samples/Hour 4
 Total Hours 24
 Initiated: Date 7/11/19
 Ended: Date 7/13/19
 Chilled During Collection YES
 Volume/Sample 200mL
 Total Volume 19.2L
 Time 0908
 Time 0920
 Check Ch Temp. Up

Check Chlorine (Y/N) _____
Temp. Upon Arrival (°C) _____

Project #

Check Ammonia (Y/N)	Dechlorinated (Y/N)

Analysis Required / Comments

[illegible]

Sampled By & Title <i>Cerevel's Desktop</i>	(Please sign and print name) <i>[Signature]</i>	Date/Time <i>7/13/19</i>	Relinquished By <i>[Signature]</i>	(Please sign and print name)	Date/Time <i>7/13/19</i>
Received By	(Please sign and print name)	Date/Time	Relinquished By	(Please sign and print name)	Date/Time
Received By <i>[Signature]</i>	(Please sign and print name) <i>B. Mandel</i>	Date/Time <i>7-13-19 1005</i>	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Shipped Via <i>UPS</i>	Bis Fed-Ex Hand Other	Shipping #
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls		

Doc Control ID: ASL612-0717