



Environment Testing
TestAmerica

AQUATIC TOXICOLOGY REPORT

Project Name:

CITY OF CHENEY

Location:

CHENEY, WASHINGTON

Prepared by:

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INTRODUCTION

Eurofins TestAmerica – Corvallis (ET-C) Aquatic Toxicology Laboratory conducted toxicity testing on sample(s) from the City of Cheney, Cheney, Washington.

Testing was initiated on: March 19, 2019

The test(s) were conducted using:

- the water flea (*Ceriodaphnia dubia*)
- 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 the City of Cheney, Cheney, Washington facility (permit #WA0020842, effective September 1, 2016, expires August 31, 2021).

Acute toxicity:

- *Testing When There Is No Permit Limit for Acute Toxicity:*
 - "Conduct acute toxicity testing on final effluent in March of 2018 prior to submission of application renewal."
 - "Conduct acute toxicity testing on a series of at least five concentrations of effluent, including 100% effluent and a control."
- The Permittee may choose to conduct a full dilution series test during compliance testing in order to determine dose response.
 - "The series of concentrations must include the acute critical effluent concentration (ACEC). The ACEC equals 100% effluent."

Chronic toxicity:

- *Testing When There Is No Permit Limit for Chronic Toxicity:*
 - "Conduct acute toxicity testing on final effluent in March of 2018 prior to submission of application 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 acute critical effluent concentration (ACEC) and chronic critical effluent concentration (CCEC)."
 - Note: The CCEC level is not defined.
 - "Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance ..."
- *Sampling and Reporting Requirements:*

- “The Permittee must collect grab samples for toxicity testing ... The Permittee must cool the samples to 0 - 6 degrees Celsius during collection and send them to the lab immediately upon completion. The lab must begin the toxicity testing as soon as possible but no later than 36 hours after sampling was completed.”
- “All toxicity tests must meet quality assurance criteria and test conditions specified in the most recent versions of the EPA methods listed in Subsection C and the Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*. If Ecology determines any test results to be invalid or anomalous, the Permittee must repeat the testing with freshly collected effluent.”
- “The Permittee must conduct whole effluent toxicity tests on an unmodified sample of final effluent.”

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

- “To reduce WET limit violations (and anomalous concentration-response relationships) due to statistical significance that is a Type I error [false positive], we lower alpha when differences in test organism 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

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

EXHIBIT 1

Summary of Acute Test Results

Species	NOEC (%)	LOEC (%)	LC ₅₀ (%)	Was a statistically significant difference between control and ACEC shown?
<i>C. dubia</i>	100	> 100	> 100	No
<i>P. promelas</i>	100	> 100	> 100	No

Note: acronyms are as defined below.

From the NPDES permit - "The ACEC = 100%."

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

EXHIBIT 2

Summary of Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC ₂₅ (%)	Was a statistically significant difference between control and ACEC shown?
<i>C. dubia</i>	100	> 100	> 100	No
<i>P. promelas</i>	100	> 100	> 100	No

Note: acronyms are as defined below.

From the NPDES permit - "Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance ... [ACEC = 100%]."

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.

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 3 provides a summary of the sample conditions as received.

EXHIBIT 3

Sample Conditions on Receipt

Sample ID	See Clarifier EFF		
ET-C SDG	B4282		
+ suffix	-01	-02	-03
Collection - Date and Time	03/18/2019 11:43	03/20/2019 11:44	3/22/2019 11:46
Receipt - Date and Time	03/19/2019 10:05	03/21/2019 10:30	3/23/2019 09:50
Temperature (°C)	0.1	3.0	1.9
Dissolved Oxygen (mg/L)	10.5	9.9	9.6
pH	7.1	7.3	7.3
Conductivity (µS/cm)	735	683	658
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)	170	170	180
Total Alkalinity (mg/L as CaCO ₃)	145	147	145

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, (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 Jun 2016) Pub# WQ-R-95-80.

DEVIATIONS FROM PROTOCOLS

Deviations from required procedures in the test methods:

- On Day 2 of the *C. dubia* chronic test, conductivity measurements were taken only at the 100% sample concentration, rather than in all sample concentrations (as required by WDOE guidance). EPA required guidance was met. See further discussion in the Chronic Results section.

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: 6.25, 12.5, 25, 50, and 100 percent sample + dilution water for the control.
- Chronic tests: 6.25, 12.5, 25, 50, 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.

C. dubia acute test: (WDOE)

- Source: ET-C's in-house cultures
- Age: Less than 24 hours old
- Design: Four test vessels per concentration, five organisms per vessel
- Test Solution Renewal: None (i.e. static test)
- Monitoring:

- Daily: Survival, DO, pH, and temperature; all concentrations.
 - Test Initiation and Termination: Conductivity, all concentrations
- Termination: 48 hours.
- Endpoints: Survival (at termination)

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)

C. dubia chronic test:

- Source: ET-C's in-house cultures
- Age: Less than 24 hours old and within an 8-hour age range, with blocking by known parentage
- Design: Ten test vessels per concentration, one organism per vessel
- Test Solution Renewal: Daily
- Monitoring:
 - Daily: Survival and neonate production (with brood determination)
 - 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: When 60%+ of surviving control organisms produce a 3rd brood.
 - Survival: @ after 7 days.
 - Reproduction: When 60%+ of surviving control organisms produce a 3rd brood.
- Endpoints: Survival (at termination) and Reproduction (through first 3 broods)

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)

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 80 to 100 mg/L as CaCO₃ and an alkalinity of 60 to 70 mg/L as CaCO₃.

SAMPLE COLLECTION AND STORAGE

Samples were collected by City of Cheney 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 received within the 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 72 hours past the time of sample collection.
- 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 statistical analyses performed for the chronic tests 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, 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 *C. dubia* acute test.

Table 1 Summary of Acute Results <i>C. dubia</i>	
Sample Concentration (%)	Percent Survival (at Test Termination)
Control	100
6.25	100
12.5	100
25.0	100
50.0	100
100	100

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

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

From the NPDES permit - "The ACEC = 100%."

- No statistically significant difference between control and ACEC 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.

The *C. dubia* 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".

Table 2 summarizes the survival data for the *P. promelas* acute test.

Table 2 Summary of Acute Results <i>P. promelas</i>	
Sample Concentration (%)	Percent Survival (at Test Termination)
Control	97.5
6.25	100
12.5	100
25.0	97.5
50.0	100
100	95.0

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

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

From the NPDES permit - "The ACEC = 100%."

- No statistically significant difference between control and ACEC 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.

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".

CHRONIC BIOASSAYS

Table 3 summarizes the survival and reproduction data for the *C. dubia* chronic test.

Table 3 Summary of Chronic Results <i>C. dubia</i>		
Sample Concentration (%)	Percent Survival	Mean Number of Young Per Adult
Control	100	22.6
6.25	90	21.5
12.5	100	23.6
25.0	80	23.6
50.0	90	20.7
100	80	18.6

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

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

From the NPDES permit - "Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance ... [ACEC = 100%]."

- No statistically significant difference between control and ACEC was shown.

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

Note: EPA guidance states that conductivity is to be measured in each new sample (100% effluent) and the control. WDOE guidance states that conductivity is to be measured in all test concentrations. With the first use of the sample collected on March 20, conductivity measurements were only taken in the 100% sample concentration. This meets EPA guidance but not WDOE guidance. However, it is ET-C's professional opinion that missing the required conductivity measurements had no significant impact on test results.

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".

Table 4 summarizes the survival and growth data for the *P. promelas* chronic test.

Table 4 Summary of Chronic Results <i>P. promelas</i>		
Sample Concentration (%)	Percent Survival	Mean Dry Weight Per Organism Added (mg)
Control	100	0.650
1.5	97.5	0.653
5.6	97.5	0.718
10	97.5	0.735
30	100	0.848
100	95.0	0.878

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

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

From the NPDES permit - "Compare the ACEC to the control using hypothesis testing at the 0.05 level of significance ... [ACEC = 100%]."

- No statistically significant difference between control and ACEC was shown.

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

The *P. promelas* 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* acute reftox test was conducted using sodium chloride. The *P. promelas* chronic reftox test was conducted using potassium chloride. The *C. dubia* reftox tests were conducted using sodium chloride.

The data sheets for the reference toxicant tests are provided in Appendix B.

Tables 5 and 6 summarize the reference toxicant test results and Cusum chart limits.

Table 5		
Acute Reference Toxicant Tests (g/L)		
Species	LC₅₀	Cusum Chart Limits
<i>C. dubia</i>	2.21	1.76 to 2.62
<i>P. promelas</i>	8.5	5.9 to 8.7

Table 6		
Chronic Reference Toxicant Tests (g/L)		
Species	IC₂₅	Cusum Chart Limits
<i>C. dubia</i> (survival)	1.36	1.21 to 1.99
<i>C. dubia</i> (reproduction)	0.63	0.31 to 1.21
<i>P. promelas</i> (survival)	0.59	0.57 to 0.66
<i>P. promelas</i> (growth)	0.59	0.45 to 0.74

APPENDIX A
RAW DATA SHEETS

Client

City of Cheney

SDG # B 4232

Test Initiation: Date

5-5-5

Contact

Mike Lambert 509-498-9305

Test Termination: Date _____

3-26-19

Sample ID Number	Field ID	Collected		Received		Temp (°C) as Rcv'd	Total Residual Chlorine (mg/l) <input type="checkbox"/> Dechlorination allowed 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)
		Date (mm/dd/yy)	Time (Pacific Zone)	Date (mm/dd/yy)	Time (Pacific Zone)									
361282-01	Sae Clarifig- EFF	03/18/19	11:43	03/19/19	10:35	0.1	0.02	20.10	170	145	12.5	7.1	735	<input type="checkbox"/>
-02	Sae Clarifig- EFF	3/20/19	11:44	3/21/19	10:38	3.0	0.02	20.10	170	147	9.9	7.3	683	<input type="checkbox"/>
-03	Sae Clarifig- EFF	3/22/19	11:46	3/23/19	09:50	1.9	0.02	20.10	180	145	9.6	7.3	658	<input type="checkbox"/>
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
		Reporting Limits:				na	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.

Comments: ☒ Indicates the action was taken, (☐= action not taken): " - " = sample not dechlorinated, or analyte not collected/needed.

Comments: ☒ Indicates the action was taken, (☐= action not taken):

			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.
Dilution Water	ID#					
Recon MH (FHM)	4820		82	64		
	4872		85	62		
	4873		92	68		

Water Quality Meters Used/ID#: Dissolved Oxygen # 4 pH # 6 Conductivity # 2

FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client City of Cheney Sample Designation (SDG): B 4282

Test Species Information	Cd # <u>3541</u> <i>Ceriodaphnia dubia</i> Chronic	FHM # <u>2038</u> <i>Pimephales promelas</i> Chronic	Cd # <u>3542</u> <i>Ceriodaphnia dubia</i> Acute	FHM # <u>2038</u> <i>Pimephales promelas</i> Acute	
Organism Age at Initiation	<24 hrs, all within an 8 hr window	<48 hrs, all within a 24 hour window	< 24 hrs	/ Days, within a 24 hour window	
Test Container Size	30 ml	800 ml	30 ml	400 ml	
Test Volume	15 ml	500 ml	25 ml	250 ml	
Feeding: Type and Amount	0.10 ml Algae and 0.10 ml YCT daily	0.15 ml <i>Artemia</i> , 2 x Daily	Algae and YCT during acclimation	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 checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use <input type="checkbox"/> @ _____ hrs	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use	<input checked="" type="checkbox"/> None <input type="checkbox"/> Prior to use <input type="checkbox"/> @ _____ hrs	
Acclimation Period	<24 hrs	<24 hrs	<24 hrs	<24 hrs	
Organism Source	In-House	<u>Aquatox</u>	In-House	<u>Aquatox</u>	
Size	-	-	-	-	
Loading Rate	-	-	-	-	

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): ☐ All ☐ _____
Date: _____

Comments:

Test Solution Preparation and Dilution Record

Client: City of Cheney

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.

Ceriodaphnia dubia - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 200
6.25	12.5	→ 200
12.5	25.0	→ 200
25	50.0	→ 200
50	100	→ 200
100	200	→ 200

Total Sample volume needed per day = 388 mls

Fathead minnow - Chronic

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 2000
6.25	125	→ 2000
12.5	250	→ 2000
25	500	→ 2000
50	1,000	→ 2000
100	2,000	→ 2000

Total Sample volume needed per day = 3875 mls

Ceriodaphnia dubia - Acute

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 200
6.25	12.5	→ 200
12.5	25.0	→ 200
25	50.0	→ 200
50	100	→ 200
100	200	→ 200

Fathead minnow - Acute

Test Concentration (%)	Sample Volume (mls)	Final Volume (mls)
Control	0.00	→ 1000
6.25	62.5	→ 1000
12.5	125	→ 1000
25	250	→ 1000
50	500	→ 1000
100	1,000	→ 1000

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	YCT ID Used	Algae ID Used	Date	Time	Initials
0 (Initiation)	B 4282-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	# 1192	# 1202	3/19/2019	10:40	BW
1	B - 01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	# 1202	# 1202	3/20/19	09:00	BW
2	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	# 1202	# 1202	3/21/19	10:50	BW
3	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	# 1202	# 1202	3/22/19	08:35	BW
4	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4822	# 1193	# 1202	3/23/19	10:40	BW
5	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4822	# 1193	# 1202	3/24/19	10:45	BW
6	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4822	# 1202	# 1202	3/25/19	08:40	BW
7	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID #	#	#	1/19		

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 4282-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/19/2019	10:40	BW
1	B - 01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/20/19	09:01	BW
2	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/21/19	10:50	BW
3	B - 02	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/22/19	08:35	BW
4	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4822	3/23/19	10:40	BW
5	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4822	3/24/19	10:45	BW
6	B - 03	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4823	3/25/19	09:00	BW

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 4282-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/19/2019	10:40	BW

Total Sample volume needed per day = 388 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B 4282-01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/19/2019	10:40	BW
2	B - 01	<input type="checkbox"/> Temp adj, <input type="checkbox"/> Aerated	ID # 4820	3/19/19	15:15	BW
			ID # 4820	3/21/2019	08:25	BW

Total Sample volume needed per day = 1938 mls

48 HOUR FRESHWATER TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Client City of Cheney Sample ID # B 4282-01 Beginning Date 3-19-19 Time 1530
 Sample Description _____ Ending Date 3-21-19 Time 1900
 Random Template Used: Whiskey Cup random # 59 Waterbath/Incubator Used: # 1 Technician 0 hr MB 24 hr 0 48 hr 0
 Test Species Ceriodaphnia dubia ID# Cd 3542 Time 0 hr 1530 24 hr 1235 48 hr 1400
 Therm. ID# 0 hr #251 24 hr #252 48 hr #254

Percent	Test Container Number	Number of Live Organisms			Dissolved Oxygen (mg/l)			pH			Temperature (°C)			Conductivity (µmhos/cm)		
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	Surrogate					7.5			7.7			20.0				
	A	5	5	5	6.5		6.6	8.2		7.8	20.8		19.5	366		409
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												
6.25	Surrogate					7.6			7.7			20.0				
	A	5	5	5	6.8		6.7	8.1		7.8	20.8		19.7	387		420
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												
12.5	Surrogate					7.7			7.8			19.8				
	A	5	5	5	6.9		6.8	8.1		7.8	20.8		19.8	408		428
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												
25	Surrogate					7.8			7.8			20.1				
	A	5	5	5	7.1		6.9	7.9		7.8	20.8		19.8	444		473
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												
50	Surrogate					7.9			7.9			20.3				
	A	5	5	5	7.2		7.0	7.7		7.9	20.7		19.5	502		589
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												
100	Surrogate					8.0			8.1			20.2				
	A	5	5	5	8.1		7.0	7.4		8.0	20.6		20.0	681		700
	B	5	5	5												
	C	5	5	5												
	D	5	5	5												

Note: Use surrogate test chamber to determine temperature, DO, pH, and Conductivity measurements @ 24 hrs (to avoid injuring the organisms).

CETIS Summary Report

Report Date: 04 Apr-19 14:50 (p 1 of 1)
Test Code: B428201cda | 20-1511-5792

Ceriodaphnia 48-h Acute Survival Test							Eurofins TestAmerica - Corvallis				
Batch ID:	14-0480-3199	Test Type:	Survival (48h)	Analyst:	Michelle Bennett						
Start Date:	19 Mar-19 15:30	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Mod-Hard Synthetic Water						
Ending Date:	21 Mar-19 14:00	Species:	Ceriodaphnia dubia	Brine:							
Duration:	46h	Source:	In-House Culture	Age:	<24H						
Sample ID:	21-3288-9496	Code:	B4282-01	Client:							
Sample Date:	18 Mar-19 11:43	Material:	Unknown	Project:							
Receive Date:	19 Mar-19 10:05	Source:	Cheney WWTP (WA0020842)								
Sample Age:	28h (0.1 °C)	Station:									
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
08-8683-4293	48h Survival Rate	100	>100	NA	NA	1	Steel Many-One Rank Sum Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method				
05-4484-6894	48h Survival Rate	EC50	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)				
Test Acceptability											
Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision					
05-4484-6894	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria ✓					
08-8683-4293	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria ✓					
48h Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	1	1	1	1	1	0	0	0.0%	0.0%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	1	1	1	1	1	0	0	0.0%	0.0%
48h Survival Rate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	1	1	1	1						
6.25		1	1	1	1						
12.5		1	1	1	1						
25		1	1	1	1						
50		1	1	1	1						
100		1	1	1	1						
48h Survival Rate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4						
0	Dilution Water	5/5	5/5	5/5	5/5						
6.25		5/5	5/5	5/5	5/5						
12.5		5/5	5/5	5/5	5/5						
25		5/5	5/5	5/5	5/5						
50		5/5	5/5	5/5	5/5						
100		5/5	5/5	5/5	5/5						

CETIS Analytical Report

Report Date: 04 Apr-19 14:50 (p 1 of 2)

Test Code: B428201cda | 20-1511-5792

Ceriodaphnia 48-h Acute Survival Test Eurofins TestAmerica - Corvallis

Analysis ID: 08-8683-4293	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.8.8
Analyzed: 04 Apr-19 14:50	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes

Batch ID: 14-0480-3199	Test Type: Survival (48h)	Analyst: Michelle Bennett
Start Date: 19 Mar-19 15:30	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 21 Mar-19 14:00	Species: Ceriodaphnia dubia	Brine:
Duration: 46h	Source: In-House Culture	Age: <24H

Sample ID: 21-3288-9496	Code: B4282-01	Client:
Sample Date: 18 Mar-19 11:43	Material: Unknown	Project:
Receive Date: 19 Mar-19 10:05	Source: Cheney WWTP (WA0020842)	
Sample Age: 28h (0.1 °C)	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	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	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		12.5	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		25	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		50	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		100	18	10	1	6	0.8333	Asymp	Non-Significant Effect

Test Acceptability Criteria				
Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	5	66540	<0.0001	Significant Effect
Error	0	0	18			
Total	0		23			

48h Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	1	0	0.0%	0.0%
6.25		4	1	1	1	1	1	1	0	0.0%	0.0%
12.5		4	1	1	1	1	1	1	0	0.0%	0.0%
25		4	1	1	1	1	1	1	0	0.0%	0.0%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
6.25		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
12.5		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
25		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
50		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
100		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%

CETIS Analytical Report

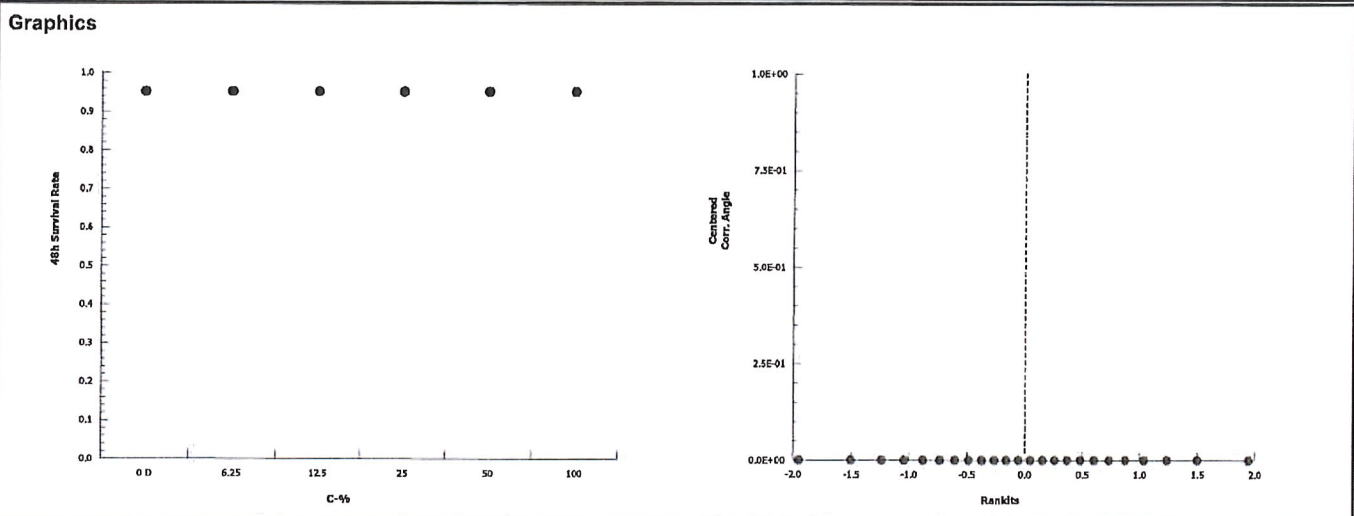
Report Date: 04 Apr-19 14:50 (p 2 of 2)
Test Code: B428201cda | 20-1511-5792

Ceriodaphnia 48-h Acute Survival Test			Eurofins TestAmerica - Corvallis		
Analysis ID:	08-8683-4293	Endpoint:	48h Survival Rate	CETIS Version:	CETISv1.8.8
Analyzed:	04 Apr-19 14:50	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes

48h Survival Rate Detail					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	1
50		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	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.345
12.5		1.345	1.345	1.345	1.345
25		1.345	1.345	1.345	1.345
50		1.345	1.345	1.345	1.345
100		1.345	1.345	1.345	1.345

48h Survival Rate Binomials					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5



CETIS Analytical Report

Report Date: 04 Apr-19 14:50 (p 1 of 2)

Test Code: B428201cda | 20-1511-5792

Ceriodaphnia 48-h Acute Survival Test

Eurofins TestAmerica - Corvallis

Analysis ID: 05-4484-6894 Endpoint: 48h Survival Rate CETIS Version: CETISv1.8.8
 Analyzed: 04 Apr-19 14:50 Analysis: Linear Interpolation (ICPIN) Official Results: Yes

Batch ID: 14-0480-3199 Test Type: Survival (48h) Analyst: Michelle Bennett
 Start Date: 19 Mar-19 15:30 Protocol: EPA/821/R-02-012 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 21 Mar-19 14:00 Species: Ceriodaphnia dubia Brine:
 Duration: 46h Source: In-House Culture Age: <24H

Sample ID: 21-3288-9496 Code: B4282-01 Client:
 Sample Date: 18 Mar-19 11:43 Material: Unknown Project:
 Receive Date: 19 Mar-19 10:05 Source: Cheney WWTP (WA0020842)
 Sample Age: 28h (0.1 °C) Station:

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	838098	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

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

48h Survival Rate Summary

Calculated Variate(A/B)

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	1	1	1	0	0	0.0%	0.0%	20	20
6.25		4	1	1	1	0	0	0.0%	0.0%	20	20
12.5		4	1	1	1	0	0	0.0%	0.0%	20	20
25		4	1	1	1	0	0	0.0%	0.0%	20	20
50		4	1	1	1	0	0	0.0%	0.0%	20	20
100		4	1	1	1	0	0	0.0%	0.0%	20	20

48h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	1
50		1	1	1	1
100		1	1	1	1

48h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

CETIS Analytical Report

Report Date: 04 Apr-19 14:50 (p 2 of 2)
Test Code: B428201cda | 20-1511-5792

Ceriodaphnia 48-h Acute Survival Test

Eurofins TestAmerica - Corvallis

Analysis ID: 05-4484-6894

Endpoint: 48h Survival Rate

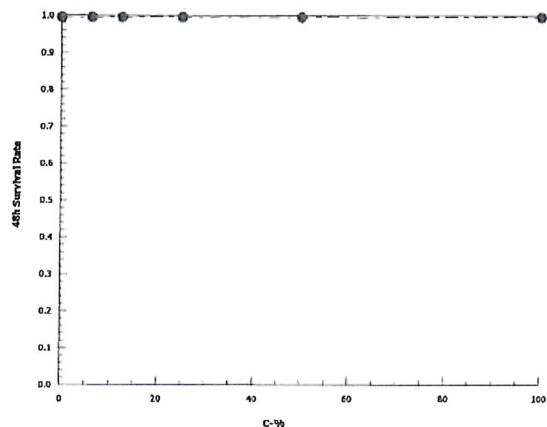
CETIS Version: CETISv1.8.8

Analyzed: 04 Apr-19 14:50

Analysis: Linear Interpolation (ICPIN)

Official Results: Yes

Graphics



96 HOUR FRESHWATER TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Random Template Used:	6 conc. x 4 reps. #	5	Waterbath/Incubator Used: #	1	Test Initiation	Date:	3 / 17 / 20	19	Time:	16 : 10	
Sample Description			Initial Sample ID #	B	4282-01	Termination	Date:	3 / 23 / 20	19	Time:	14 : 15
			Technician	0 hr	24 hr			48 hr	72 hr	96 hr	
			Time	0 hr	16 : 10			48 hr	72 hr	96 hr	
			Therm. ID#	0 hr	# 252			48 hr	72 hr	96 hr	
Client	City of Cheney										
Test Species	<i>Pimpla promelas</i>	ID# FHM	2038								

[illegible]

* 126. 3-23-19

96 HOUR FRESHWATER TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 5 Waterbath/Incubator Used: # 1 Date: 3/19/20 Time: 16:10

Sample Description: City of Cheney Initial Sample ID # B 4282-01 Date: 3/23/20 Time: 14:15

Technician: [Signature] 24 hr: 12:30 48 hr: 09:58 96 hr: 14:15

Therm. ID# 0 # 252 24 hr: 252 48 hr: 252 96 hr: 252

Test Species: Pimephales promelas ID# FHM 2038

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	0	24	48	72	96
25	A	10	10	10	10	10	6.9	8.1	7.9	7.5	7.8	8.0	7.8	7.9	7.6	7.5	19.3	20.5	20.4	20.3	419					4776
	B	10	10	10	10	10																				
	C	10	10	10	10	10																				
	D	10	10	9	9	9																				
50	A	10	10	10	10	10	7.3	8.0	7.7	7.5	7.9	7.8	7.8	7.9	7.6	7.5	19.3	20.3	20.3	20.5	519					548
	B	10	10	10	10	10																				
	C	10	10	10	10	10																				
	D	10	10	10	10	10																				
100	A	10	10	10	10	10	8.0	8.0	7.7	7.6	8.1	7.6	7.8	7.9	7.6	7.5	19.1	20.2	20.4	20.5	681					718
	B	10	10	9	9	9																				
	C	10	10	9	9	9																				
	D	10	10	10	10	10																				

* 206-43-23-19

CETIS Summary Report

Report Date: 04 Apr-19 14:54 (p 1 of 1)

Test Code: B428201ppa | 12-3097-0649

Fathead Minnow 96-h Acute Survival Test

Eurofins TestAmerica - Corvallis

Batch ID: 00-3690-4118	Test Type: Survival (96h)	Analyst: Michelle Bennett
Start Date: 19 Mar-19 16:10	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 23 Mar-19 14:15	Species: Pimephales promelas	Brine:
Duration: 94h	Source: Aquatox, AR	Age: 1 D

Sample ID: 21-3288-9496	Code: B4282-01	Client:
Sample Date: 18 Mar-19 11:43	Material: Unknown	Project:
Receive Date: 19 Mar-19 10:05	Source: Cheney WWTP (WA0020842)	
Sample Age: 28h (0.1 °C)	Station:	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
21-4290-0901	96h Survival Rate	100	>100	NA	6.56%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
13-0355-8748	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
13-0355-8748	96h Survival Rate	Control Resp	0.975	0.9 - NL	Yes	Passes Acceptability Criteria ✓
21-4290-0901	96h Survival Rate	Control Resp	0.975	0.9 - NL	Yes	Passes Acceptability Criteria ✓

96h 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%
12.5		4	1	1	1	1	1	0	0	0.0%	-2.56%
25		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	-2.56%
100		4	0.95	0.8581	1	0.9	1	0.02887	0.05774	6.08%	2.56%

96h 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
12.5		1	1	1	1
25		1	1	1	0.9
50		1	1	1	1
100		1	0.9	0.9	1

96h 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
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10
100		10/10	9/10	9/10	10/10

CETIS Analytical Report

Report Date: 04 Apr-19 14:54 (p 1 of 2)
Test Code: B428201ppa | 12-3097-0649

Fathead Minnow 96-h Acute Survival Test						Eurofins TestAmerica - Corvallis					
Analysis ID: 21-4290-0901		Endpoint: 96h Survival Rate				CETIS Version: CETISv1.8.8					
Analyzed: 04 Apr-19 14:54		Analysis: Nonparametric-Control vs Treatments				Official Results: Yes					
Batch ID: 00-3690-4118		Test Type: Survival (96h)				Analyst: Michelle Bennett					
Start Date: 19 Mar-19 16:10		Protocol: EPA/821/R-02-012 (2002)				Diluent: Mod-Hard Synthetic Water					
Ending Date: 23 Mar-19 14:15		Species: Pimephales promelas				Brine:					
Duration: 94h		Source: Aquatox, AR				Age: 1 D					
Sample ID: 21-3288-9496		Code: B4282-01				Client:					
Sample Date: 18 Mar-19 11:43		Material: Unknown				Project:					
Receive Date: 19 Mar-19 10:05		Source: Cheney WWTP (WA0020842)									
Sample Age: 28h (0.1 °C)		Station:									
Data Transform		Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU	
Angular (Corrected)		NA	C > T	NA	NA	6.56%	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		
		12.5	20	10	1	6	0.9516	Asymp	Non-Significant Effect		
		25	18	10	2	6	0.8333	Asymp	Non-Significant Effect		
		50	20	10	1	6	0.9516	Asymp	Non-Significant Effect		
		100	16	10	2	6	0.6105	Asymp	Non-Significant Effect		
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits		Overlap	Decision						
Control Resp	0.975	0.9 - NL		Yes	Passes Acceptability Criteria						
ANOVA Table											
Source	Sum Squares		Mean Square		DF	F Stat	P-Value	Decision(α:5%)			
Between	0.02213278		0.004426555		5	1.2	0.3485	Non-Significant Effect			
Error	0.06639833		0.003688796		18						
Total	0.08853111				23						
Distributional Tests											
Attribute	Test			Test Stat	Critical	P-Value	Decision(α:1%)				
Variances	Mod Levene Equality of Variance			2	4.248	0.1274	Equal Variances				
Variances	Levene Equality of Variance			10.4	4.248	<0.0001	Unequal Variances				
Distribution	Shapiro-Wilk W Normality			0.8314	0.884	0.0010	Non-normal Distribution				
96h 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	#Error	0.9	1	0.025	5.13%	0.0%
6.25		4	1	1	1	#Error	1	1	0	0.0%	-2.56%
12.5		4	1	1	1	#Error	1	1	0	0.0%	-2.56%
25		4	0.975	0.8954	1	#Error	0.9	1	0.025	5.13%	0.0%
50		4	1	1	1	#Error	1	1	0	0.0%	-2.56%
100		4	0.95	0.8581	1	#Error	0.9	1	0.02887	6.08%	2.56%
Angular (Corrected) Transformed Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.371	1.242	1.501	#Error	1.249	1.412	0.04074	5.94%	0.0%
6.25		4	1.412	1.412	1.412	#Error	1.412	1.412	0	0.0%	-2.97%
12.5		4	1.412	1.412	1.412	#Error	1.412	1.412	0	0.0%	-2.97%
25		4	1.371	1.242	1.501	#Error	1.249	1.412	0.04074	5.94%	0.0%
50		4	1.412	1.412	1.412	#Error	1.412	1.412	0	0.0%	-2.97%
100		4	1.331	1.181	1.48	#Error	1.249	1.412	0.04705	7.07%	2.97%

CETIS Analytical Report

Report Date: 04 Apr-19 14:54 (p 2 of 2)

Test Code: B428201ppa | 12-3097-0649

Fathead Minnow 96-h Acute Survival Test					Eurofins TestAmerica - Corvallis
Analysis ID:	21-4290-0901	Endpoint:	96h Survival Rate	CETIS Version:	CETISv1.8.8
Analyzed:	04 Apr-19 14:54	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes
96h Survival Rate Detail					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1	1	0.9	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	0.9
50		1	1	1	1
100		1	0.9	0.9	1
Angular (Corrected) Transformed Detail					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.249	1.412
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		1.412	1.412	1.412	1.249
50		1.412	1.412	1.412	1.412
100		1.412	1.249	1.249	1.412
96h Survival Rate Binomials					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	9/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10
100		10/10	9/10	9/10	10/10

CETIS Analytical Report

Report Date: 04 Apr-19 14:54 (p 1 of 2)

Test Code: B428201ppa | 12-3097-0649

Fathead Minnow 96-h Acute Survival Test			Eurofins TestAmerica - Corvallis	
Analysis ID:	13-0355-8748	Endpoint:	96h Survival Rate	CETIS Version: CETISv1.8.8
Analyzed:	04 Apr-19 14:54	Analysis:	Linear Interpolation (ICPIN)	Official Results: Yes

Batch ID:	00-3690-4118	Test Type:	Survival (96h)	Analyst:	Michelle Bennett
Start Date:	19 Mar-19 16:10	Protocol:	EPA/821/R-02-012 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	23 Mar-19 14:15	Species:	Pimephales promelas	Brine:	
Duration:	94h	Source:	Aquatox, AR	Age:	1 D

Sample ID:	21-3288-9496	Code:	B4282-01	Client:	
Sample Date:	18 Mar-19 11:43	Material:	Unknown	Project:	
Receive Date:	19 Mar-19 10:05	Source:	Cheney WWTP (WA0020842)		
Sample Age:	28h (0.1 °C)	Station:			

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2134172	200	Yes	Two-Point Interpolation

Test Acceptability Criteria				
Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.975	0.9 - NL	Yes	Passes Acceptability Criteria

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

96h Survival Rate Summary			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.975	0.9	1	0.025	0.05	5.13%	0.0%	39	40
6.25		4	1	1	1	0	0	0.0%	-2.56%	40	40
12.5		4	1	1	1	0	0	0.0%	-2.56%	40	40
25		4	0.975	0.9	1	0.025	0.05	5.13%	0.0%	39	40
50		4	1	1	1	0	0	0.0%	-2.56%	40	40
100		4	0.95	0.9	1	0.02887	0.05773	6.08%	2.56%	38	40

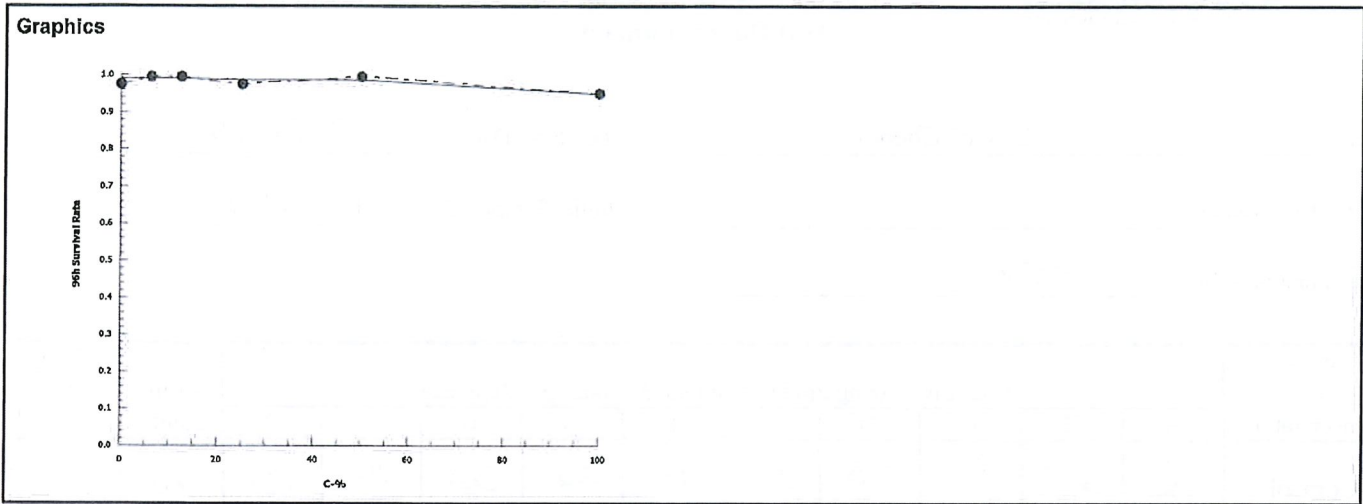
96h Survival Rate Detail					
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.9	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	0.9
50		1	1	1	1
100		1	0.9	0.9	1

96h 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
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10
100		10/10	9/10	9/10	10/10

CETIS Analytical Report

Report Date: 04 Apr-19 14:54 (p 2 of 2)
Test Code: B428201ppa | 12-3097-0649

Fathead Minnow 96-h Acute Survival Test		Eurofins TestAmerica - Corvallis	
Analysis ID: 13-0355-8748	Endpoint: 96h Survival Rate	CETIS Version: CETISv1.8.8	
Analyzed: 04 Apr-19 14:54	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes	



Ceriodaphnia dubia
Survival and Reproduction
Test Data Summary

Client City of Cheney Test Start Date 3-19-19
Sample Description _____ Initial Sample ID# B 4282
Data summarized by MSS

Percent or Concentration	Total Live Young Produced in First 3 Broods per Replicate										# Alive Adults	Total Live Young
	A	B	C	D	E	F	G	H	I	J		
Control	26	25	0	23	23	28	26	32	19	24	10	226
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
6.25 %	3	9	24	26	23	40	27	24	19	20	9	215
	AD?	X	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
12.5 %	25	22	24	28	24	27	23	15	23	25	10	236
	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
25 %	24	23	22	26	29	24	28	22	23	15	8	236
	AD?	AD?	X	AD?	AD?	AD?	AD?	AD?	AD?	AD?		
50 %	18	12	22	24	22	25	22	25	20	17	9	207
	AD?	AD?	AD?	X	AD?	AD?	AD?	AD?	AD?	AD?		
100 %	21	14	20	13	18	21	26	33	0	20	8	186
	AD?	AD?	AD?	AD?	X	AD?	AD?	AD?	AD?	X	AD?	

Survival data summarized through Day 7. 60%+ of surviving controls with 3+ broods first observed on Day 7.

Test Organism Mortality (Adult dead) = ☐ AD? ☒

of Alive Adults = Number of test organism alive at termination
(for WDOE only, = Number of test organisms alive at Day 7)

Test Organism identified as Male = ☐ AD? ☐ M

Total Live Young = Total neonates produced in first 3 broods

Test Organism Injured during test = ☐ AD? ☐ I

Footnote: As per EPA-600-4-91-002 and EPA-821-R-02-013, *Ceriodaphnia dubia* test should be terminated when 60% of the surviving control organisms have produced their third brood, or at the end of eight days, whichever occurs first.

Also as per EPA-821-R-02-013 (13.10.9.1), "In this three-brood test, offspring from fourth or higher broods should not be counted and should not be included in the total number of neonates produced during the test."

CERIODAPHNIA CHRONIC SURVIVAL AND REPRODUCTION DATA

Neo's obtained from
Culture Board ID:
Slot #:

A	B	C	D	E	F	G	H	I	J
T	T	T	T	Food 1192	S. Sub	OCG	S. Sub	DYNO	Food 1205
17	34	42	54	C	G	J	E	B	F

Incubator Used: # 6
Random Template
Used: 6 conc # 11

Client City of Cheney

Test Initiation: Date: 3/19/2019 Time: 13:50

Sample Description Initial Sample ID # B4282 - 01

Termination: Date: 3/26/2019 Time: 02:10

Technician Day 0 MB Day 1 MS Day 2 MS Day 3 MB Day 4 MB Day 5 MB Day 6 MB Day 7 MB Day 8
Time Day 0 1350 Day 1 1100 Day 2 1133 Day 3 8940 Day 4 1176 Day 5 1055 Day 6 0940 Day 7 0920 Day 8

Percent	Day	Daily Number of Live Young for each Replicate										No. Live Adults	Daily Total Live Young
		A	B	C	D	E	F	G	H	I	J		
Control	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	0AY	0	0	0	4	5	0	0	10	9
	4	3	5	0	5	4	4	0	0	3	4	10	28
	5	9	0	0AY	8	7	10	8	12	7	8	10	69.75
	6	0	6	0	10	12	0	14	15	9	12	10	90.75
	7	14	14	0AY	0	0	14	0	(10)	0	0	10	42+0
	8												
6.25 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	4	3	0	0	4	3	4	0	10	18
	4	3AD	5	0	0	4	0	0	6	0	3	9	21
	5	1	4AY	11	10	7	9	11	0	6	7	9	65
	6	1	0	9	13	12	14	12	15	9	10	9	94
	7	1	0	(11)	(12)	0	17	0	(16)	0	0	9	17+0
	8	1											
12.5 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	3	0	0	0	4	0	0	0	10	7
	4	5	0	0	4	4	3	0	3	2	3	10	24
	5	6	2	9	9	8	9	7	10	8	1/0	10	75
	6	0	14	12	15	0	15	12	0	13	6	10	87
	7	14	0	0	0	12	(10)	(12)	2+AY	0	15	10	43+0
	8												
25 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	4	10	4
	3	0	0	0	0	0	0	4	4	3	0	10	14
	4	5	4	4	5	4	3	0	0	0	3	10	28
	5	5	7	7	9	10	8	11	8	9	8	10	82
	6	0	12	11	12	0	13	13	10	11	13	10	95
	7	14	0AY	0AY	(10)	15	0	(13)	(12)	0	0	8	29+0
	8		1	5									
50 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	3	0	3	0	0	0	3	0	0	10	9
	4	3	3	2	0	3	4	3	6	2	3	10	23
	5	5	0	8	10	8	9	8	7	6	4	10	65
	6	10	6	12	0	11	12	0	15	12	10	10	80
	7	0	0	0AY	11	0	0	11	0	0	0	9	22
	8			1									
100 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	3	0	0	3	0	0	0AD	3	10	9
	4	3	3	0	0	3	0	0	0	0	0	9	9
	5	7	5	8	9	6	9	8	10	10	8	9	70
	6	0	0	9	4	9	9	10	12	9	9	9	62
	7	11	6	0	0AY	(12)	(10)	8	11	0	0	8	36+0
	8				1								

"AD" = Adult Dead, "AY" = Aborted young, "M" = male organism, "F" = Female, "R" = Adult releasing young, " / " = split brood (carry-over brood / current day brood),

"Inj" = Adult Injured during test solution renewal, replicate removed from analysis. "AM" = Adult missing, remove from analysis. A circled neonate count = 4th brood

Footnote: As per WDOE, C. dubia test reproduction should be when 60% of the surviving control organisms have produced their third brood (Days 6, 7, or 8). Survival is at seven days.

CERIODAPHNIA WATER QUALITY DATA

Client: _____ City of Cheney _____ Initiated: _____ Date: 3/19/2019 Time: 13:50 Adults Isolated Date: 3/18/2019 Time: 14:20

Sample Description: _____ Initial Sample ID #: B 4282 - 01 Neo's Collected Date: 3/18/2019 Time: 18:40

Tech: Day 0 WB Day 1 MS Day 2 MS Day 3 WB Day 4 WB Day 5 WB Day 6 WB Day 7 WB Day 8 _____

Time Day 0 15:55 Day 1 11:00 Day 2 11:33 Day 3 10:05 Day 4 11:45 Day 5 11:40 Day 6 10:00 Day 7 07:15 Day 8 _____

Therm. Day 0 # 251 Day 1 # 254 Day 2 # 254 Day 3 # 254 Day 4 # 254 Day 5 # 265 Day 6 # 255 Day 7 # 255 Day 8 # _____

%	Dissolved Oxygen (mg/l)								pH								Temperature (°C) / Conductivity (µS) (1 st use of each sample only)										
	Day								Day								Day										
	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8	0	1	2	3	4	5	6	7	8
Control	7.7	7.7	7.6	7.2	7.4	6.1	8.0	7.7		8.3	8.1	8.1	7.9	8.0	7.9	7.4	7.2		15.3	25.4	25.4	25.5	25.3	24.7	25.7	25.3	
6.25 %	7.7	7.3	6.1	7.4	7.2	7.6	8.1	7.8		8.3	8.0	8.1	7.7	8.0	7.9	7.6	7.7		15.3	25.3	25.3	25.8	24.0	25.6	25.1	24.5	
12.5 %	7.8	7.4	7.0	7.4	7.3	7.4	8.3	7.8		8.2	8.1	8.1	7.7	8.0	7.9	7.6	7.7		15.3	25.2	25.1	26.0	26.0	25.9	25.1	25.2	
25 %	7.9	7.7	7.7	7.4	7.7	7.2	8.2	7.9		8.1	8.1	8.1	7.9	8.0	7.9	7.7	7.9		15.3	25.3	25.4	25.5	25.5	25.2	25.2	25.6	
50 %	8.0	7.8	7.6	7.5	7.8	7.3	8.2	7.9		7.9	7.7	7.7	7.6	7.6	7.2	7.4	7.9		15.3	25.3	25.4	24.7	24.7	25.3	24.9	24.9	
100 %	8.0	7.6	7.5	7.4	7.9	7.2	8.2	7.9		8.0	7.5	7.7	7.4	7.5	7.2	7.2	7.9		15.3	25.3	25.4	25.1	25.3	25.0	24.6	24.3	

COMMENTS: Temperatures taken just prior to test solution renewals. DO, pH, and Conductivity taken following organism transfer.

3-15-19

23.8

= Temp out of recom. range

Note: All Day 0 data represents conditions at initiation. All other days: numerator represents pre-renewal conditions, denominator represents post-renewal conditions.

CETIS Summary Report

Report Date: 04 Apr-19 15:00 (p 1 of 2)

Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test Eurofins TestAmerica - Corvallis

Batch ID: 02-7652-4880	Test Type: Reproduction-Survival (7d)	Analyst: Michelle Bennett
Start Date: 19 Mar-19 13:50	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 26 Mar-19 08:10	Species: Ceriodaphnia dubia	Brine:
Duration: 6d 18h	Source: In-House Culture	Age: <24H

Sample ID: 21-3288-9496	Code: B4282-01	Client:
Sample Date: 18 Mar-19 11:43	Material: Unknown	Project:
Receive Date: 19 Mar-19 10:05	Source: Cheney WWTP (WA0020842)	
Sample Age: 26h (0.1 °C)	Station:	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-0402-4936	7d Survival Rate	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test
07-1475-2041	Reproduction	100	>100	NA	31.8%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
16-8816-5075	Reproduction	IC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
16-0402-4936	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria ✓
07-1475-2041	Reproduction	Control Resp	22.6	15 - NL	Yes	Passes Acceptability Criteria ✓
16-8816-5075	Reproduction	Control Resp	22.6	15 - NL	Yes	Passes Acceptability Criteria ✓
07-1475-2041	Reproduction	PMSD	0.3179	0.13 - 0.47	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	10	1	1	1	1	1	0	0	0.0%	0.0%
6.25		10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	0.8	0.4984	1	0	1	0.1333	0.4216	52.7%	20.0%
50		10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	10.0%
100		10	0.8	0.4984	1	0	1	0.1333	0.4216	52.7%	20.0%

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	22.6	16.42	28.78	0	32	2.733	8.644	38.25%	0.0%
6.25		10	21.5	14.29	28.71	3	40	3.188	10.08	46.88%	4.87%
12.5		10	23.6	21.07	26.13	15	28	1.118	3.534	14.97%	-4.43%
25		10	23.6	20.84	26.36	15	29	1.222	3.864	16.37%	-4.43%
50		10	20.7	17.78	23.62	12	25	1.291	4.084	19.73%	8.41%
100		10	18.6	12.4	24.8	0	33	2.741	8.669	46.61%	17.7%

CETIS Summary Report

Report Date: 04 Apr-19 15:00 (p 2 of 2)

Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test											Eurofins TestAmerica - Corvallis
7d Survival Rate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
6.25		0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	0	0	1	1	1	1	1	1	1
50		1	1	0	1	1	1	1	1	1	1
100		1	1	1	0	1	1	1	1	0	1
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	26	25	0	23	23	28	26	32	19	24
6.25		3	9	24	26	23	40	27	24	19	20
12.5		25	22	24	28	24	27	23	15	23	25
25		24	23	22	26	29	24	28	22	23	15
50		18	12	22	24	22	25	22	25	20	17
100		21	14	20	13	18	21	26	33	0	20
7d Survival Rate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	1/1

CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 1 of 2)

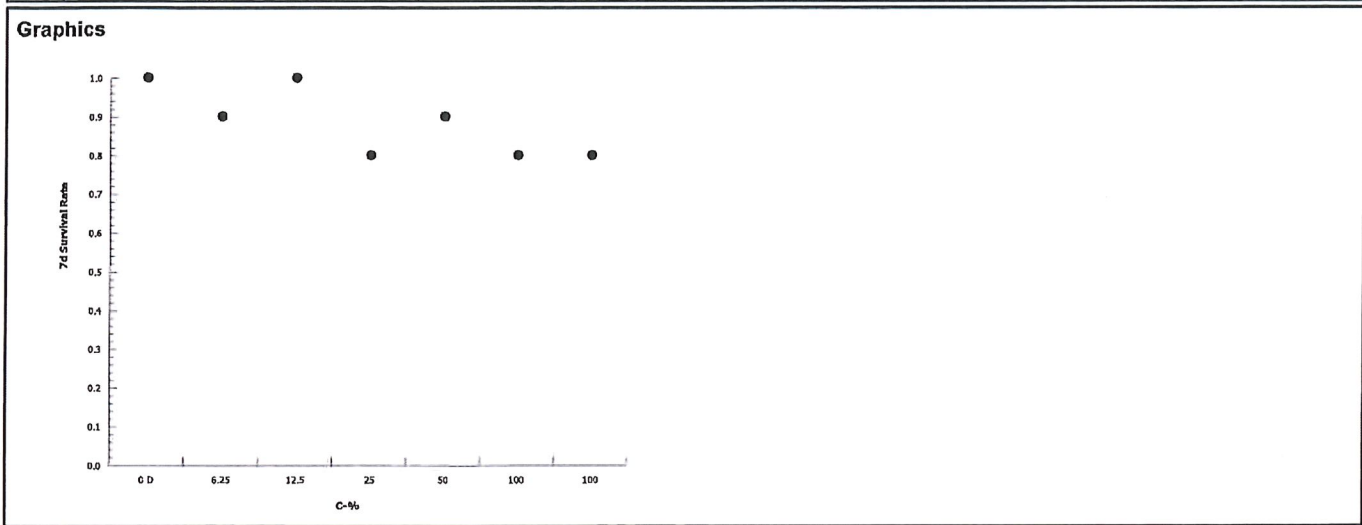
Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test						Eurofins TestAmerica - Corvallis					
Analysis ID:	16-0402-4936	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.8.8						
Analyzed:	04 Apr-19 14:59	Analysis:	STP 2x2 Contingency Tables	Official Results:	Yes						
Batch ID:	02-7652-4880	Test Type:	Reproduction-Survival (7d)	Analyst:	Michelle Bennett						
Start Date:	19 Mar-19 13:50	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water						
Ending Date:	26 Mar-19 08:10	Species:	Ceriodaphnia dubia	Brine:							
Duration:	6d 18h	Source:	In-House Culture	Age:	<24H						
Sample ID:	21-3288-9496	Code:	B4282-01	Client:							
Sample Date:	18 Mar-19 11:43	Material:	Unknown	Project:							
Receive Date:	19 Mar-19 10:05	Source:	Cheney WWTP (WA0020842)								
Sample Age:	26h (0.1 °C)	Station:									
Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL				
Untransformed		C > T	NA	NA	100	>100	NA				
							TU				
							1				
Fisher Exact/Bonferroni-Holm Test											
Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)					
Dilution Water		6.25	0.5	1.0000	Exact	Non-Significant Effect					
		12.5	1	1.0000	Exact	Non-Significant Effect					
		25	0.2368	1.0000	Exact	Non-Significant Effect					
		50	0.5	1.0000	Exact	Non-Significant Effect					
		100	0.2368	1.0000	Exact	Non-Significant Effect					
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria							
Data Summary											
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	Dilution Water	10	0	10	1	0	0.0%				
6.25		9	1	10	0.9	0.1	10.0%				
12.5		10	0	10	1	0	0.0%				
25		8	2	10	0.8	0.2	20.0%				
50		9	1	10	0.9	0.1	10.0%				
100		8	2	10	0.8	0.2	20.0%				
7d Survival Rate Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
6.25		0	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	0	0	1	1	1	1	1	1	1
50		1	1	0	1	1	1	1	1	1	1
100		1	1	1	0	1	1	1	1	0	1
7d Survival Rate Binomials											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	1/1

CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 2 of 2)
 Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test		Eurofins TestAmerica - Corvallis	
Analysis ID: 16-0402-4936	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.8.8	
Analyzed: 04 Apr-19 14:59	Analysis: STP 2x2 Contingency Tables	Official Results: Yes	



CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 1 of 2)
 Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test						Eurofins TestAmerica - Corvallis					
Analysis ID: 07-1475-2041		Endpoint: Reproduction		CETIS Version: CETISv1.8.8							
Analyzed: 04 Apr-19 14:59		Analysis: Nonparametric-Control vs Treatments		Official Results: Yes							
Batch ID: 02-7652-4880		Test Type: Reproduction-Survival (7d)		Analyst: Michelle Bennett							
Start Date: 19 Mar-19 13:50		Protocol: EPA/821/R-02-013 (2002)		Diluent: Mod-Hard Synthetic Water							
Ending Date: 26 Mar-19 08:10		Species: Ceriodaphnia dubia		Brine:							
Duration: 6d 18h		Source: In-House Culture		Age: <24H							
Sample ID: 21-3288-9496		Code: B4282-01		Client:							
Sample Date: 18 Mar-19 11:43		Material: Unknown		Project:							
Receive Date: 19 Mar-19 10:05		Source: Cheney WWTP (WA0020842)									
Sample Age: 26h (0.1 °C)		Station:									
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU		
Untransformed	NA	C > T	NA	NA	31.8%	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	97.5	75	4	18	0.6152	Asymp	Non-Significant Effect		
		12.5	100.5	75	4	18	0.7129	Asymp	Non-Significant Effect		
		25	99.5	75	4	18	0.6816	Asymp	Non-Significant Effect		
		50	81.5	75	2	18	0.1312	Asymp	Non-Significant Effect		
		100	83.5	75	2	18	0.1720	Asymp	Non-Significant Effect		
Test Acceptability Criteria											
Attribute	Test Stat	TAC Limits	Overlap	Decision							
Control Resp	22.6	15 - NL	Yes	Passes Acceptability Criteria							
PMSD	0.3179	0.13 - 0.47	Yes	Passes Acceptability Criteria							
ANOVA Table											
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)					
Between	186.5333	37.30667	5	0.7573	0.5845	Non-Significant Effect					
Error	2660.2	49.26296	54								
Total	2846.733		59								
Distributional Tests											
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)						
Variances	Bartlett Equality of Variance	18	15.09	0.0029	Unequal Variances						
Distribution	Shapiro-Wilk W Normality	0.8745	0.9459	<0.0001	Non-normal Distribution						
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.6	16.42	28.78	24.5	0	32	2.733	38.25%	0.0%
6.25		10	21.5	14.29	28.71	23.5	3	40	3.188	46.88%	4.87%
12.5		10	23.6	21.07	26.13	24	15	28	1.118	14.97%	-4.43%
25		10	23.6	20.84	26.36	23.5	15	29	1.222	16.37%	-4.43%
50		10	20.7	17.78	23.62	22	12	25	1.291	19.73%	8.41%
100		10	18.6	12.4	24.8	20	0	33	2.741	46.61%	17.7%
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	26	25	0	23	23	28	26	32	19	24
6.25		3	9	24	26	23	40	27	24	19	20
12.5		25	22	24	28	24	27	23	15	23	25
25		24	23	22	26	29	24	28	22	23	15
50		18	12	22	24	22	25	22	25	20	17
100		21	14	20	13	18	21	26	33	0	20

CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 2 of 2)
 Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test

Eurofins TestAmerica - Corvallis

Analysis ID: 07-1475-2041

Endpoint: Reproduction

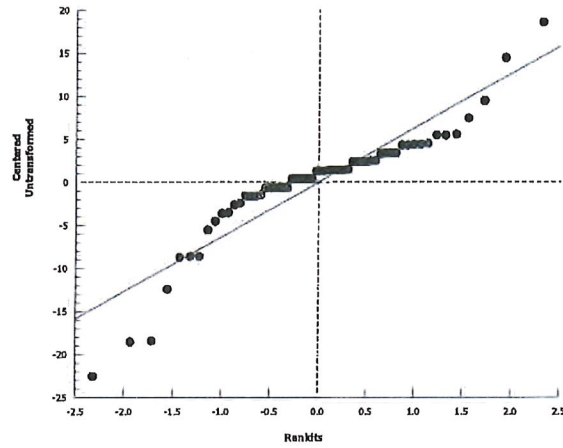
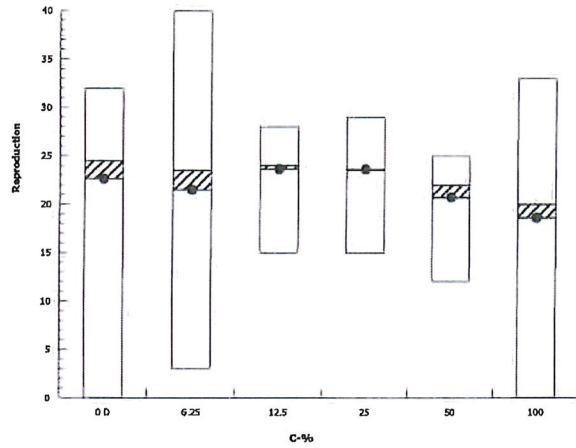
CETIS Version: CETISv1.8.8

Analyzed: 04 Apr-19 14:59

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 1 of 2)

Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test			Eurofins TestAmerica - Corvallis	
Analysis ID:	16-8816-5075	Endpoint:	Reproduction	CETIS Version: CETISv1.8.8
Analyzed:	04 Apr-19 15:00	Analysis:	Linear Interpolation (ICPIN)	Official Results: Yes

Batch ID:	02-7652-4880	Test Type:	Reproduction-Survival (7d)	Analyst:	Michelle Bennett
Start Date:	19 Mar-19 13:50	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	26 Mar-19 08:10	Species:	Ceriodaphnia dubia	Brine:	
Duration:	6d 18h	Source:	In-House Culture	Age:	<24H

Sample ID:	21-3288-9496	Code:	B4282-01	Client:	
Sample Date:	18 Mar-19 11:43	Material:	Unknown	Project:	
Receive Date:	19 Mar-19 10:05	Source:	Cheney WWTP (WA0020842)		
Sample Age:	26h (0.1 °C)	Station:			

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	968504	200	Yes	Two-Point Interpolation

Test Acceptability Criteria				
Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	22.6	15 - NL	Yes	Passes Acceptability Criteria

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

Reproduction Summary			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	22.6	0	32	2.733	8.644	38.25%	0.0%
6.25		10	21.5	3	40	3.188	10.08	46.88%	4.87%
12.5		10	23.6	15	28	1.118	3.534	14.97%	-4.43%
25		10	23.6	15	29	1.222	3.864	16.37%	-4.43%
50		10	20.7	12	25	1.291	4.084	19.73%	8.41%
100		10	18.6	0	33	2.741	8.669	46.61%	17.7%

Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	26	25	0	23	23	28	26	32	19	24
6.25		3	9	24	26	23	40	27	24	19	20
12.5		25	22	24	28	24	27	23	15	23	25
25		24	23	22	26	29	24	28	22	23	15
50		18	12	22	24	22	25	22	25	20	17
100		21	14	20	13	18	21	26	33	0	20

CETIS Analytical Report

Report Date: 04 Apr-19 15:00 (p 2 of 2)

Test Code: B428201cdc | 01-4019-7266

Ceriodaphnia 7-d Survival and Reproduction Test

Eurofins TestAmerica - Corvallis

Analysis ID: 16-8816-5075

Endpoint: Reproduction

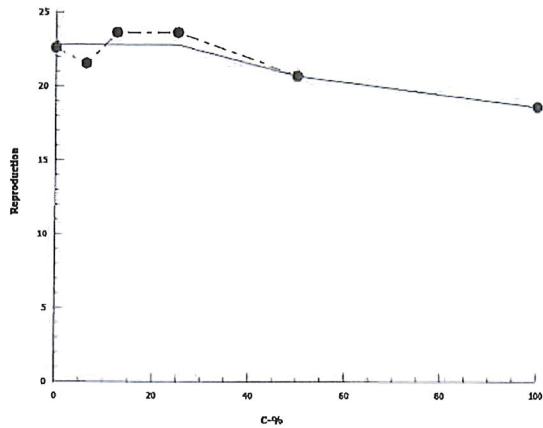
CETIS Version: CETISv1.8.8

Analyzed: 04 Apr-19 15:00

Analysis: Linear Interpolation (ICPIN)

Official Results: Yes

Graphics



FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 6 Waterbath/incubator Used: _____ Date Initiated 3/18/20 19 Time 15:10
Initial sample ID B 4282 - 01 # 10 Date Terminated 3/18/20 19 Time 08:35

Client _____ City of Cheney _____ Sample Description _____

Tech: Day 0 2 Day 1 En Day 2 9 Day 3 0 Day 4 10/10 Day 5 11/10 Day 6 3/11/10 Day 7 0
Time Day 0 15:10 Day 1 11:00 Day 2 12:25 Day 3 10:05 Day 4 13:45 Day 5 11:20 Day 6 11:00 Day 7 08:35

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		6.5		8.2	Post: 25.4	251	366
	1	10	10	10	10	7.0	7.7	7.5	7.8	24.6	251	
	2	10	10	10	10	6.0	7.0	7.6	8.1	24.8	251	342
	3	10	10	10	10	5.8	7.1	7.1	7.8	24.6	251	
	4	10	10	10	10	6.3	7.4	7.6	8.0	24.9	251	326
	5	10	10	10	10	6.0	7.1	7.4	7.9	24.9	251	
	6	10	10	10	10	6.9	8.0	7.6	8.0	24.8	251	
	7	10	10	10	10	6.9		7.5		24.7	252	
6.25 %	0	10	10	10	10		6.8		8.1	Post: 25.6		387
	1	10	10	10	10	7.0	7.7	7.5	7.8	24.7		
	2	10	10	10	9	6.1	7.1	7.6	8.0	24.9		358
	3	10	10	10	9	5.8	7.2	7.2	7.8	24.6		
	4	10	10	10	9	6.5	7.6	7.6	7.9	24.7		354
	5	9	10	10	9	6.2	7.2	7.5	7.8	24.8		
	6	9	10	10	9	7.1	8.1	7.6	7.8	24.4		
	7	5	10	10	9	7.0		7.4		24.6		
12.5 %	0	10	10	10	10		6.9		8.1	Post: 25.5		405
	1	10	10	10	10	7.0	7.8	7.5	7.7	24.6		
	2	10	10	10	10	6.1	7.3	7.6	7.9	24.8		376
	3	10	10	10	10	5.8	7.3	7.2	7.7	24.6		
	4	10	9	10	10	6.5	7.7	7.6	7.8	24.8		375
	5	10	9	10	10	6.2	7.3	7.5	7.7	24.9		
	6	10	9	10	10	7.2	8.1	7.6	7.7	24.3		
	7	10	9	10	10	7.0		7.4		24.7		
25 %	0	10	10	10	10		7.1		7.9	Post: 25.5		444
	1	10	10	10	10	7.0	7.9	7.5	7.5	24.7		
	2	10	10	10	10	6.1	7.4	7.6	7.6	24.8		410
	3	10	10	10	9	5.9	7.4	7.2	7.5	24.6		
	4	10	10	10	9	6.5	7.6	7.6	7.7	24.9		409
	5	10	10	10	9	6.3	7.4	7.5	7.6	24.6		
	6	10	10	10	9	7.2	8.2	7.5	7.5	24.5		
	7	10	10	10	9	7.0		7.4		24.5		
50 %	0	10	10	10	10		7.2		7.7	Post: 25.3		522
	1	10	10	10	10	7.0	8.2	7.5	7.3	24.6		
	2	10	10	10	10	6.1	7.1	7.6	7.4	25.0		487
	3	10	10	10	10	5.9	7.5	7.3	7.3	24.8		
	4	10	10	10	10	6.5	7.9	7.6	7.4	25.0		461
	5	10	10	10	10	6.3	7.6	7.5	7.5	24.7		
	6	10	10	10	10	7.2	8.3	7.6	7.3	24.4		
	7	10	10	10	10	7.0		—		24.5		
100 %	0	10	10	10	10		8.1		7.4	Post: 25.2		681
	1	10	10	10	10	7.0	8.3	7.6	7.1	24.5		
	2	10	10	10	10	6.2	8.0	7.6	7.1	24.9		641
	3	10	10	10	10	6.8	8.1	7.4	7.0	24.8		
	4	10	10	10	10	6.5	8.3	7.6	7.1	24.9		630
	5	10	9	10	9	6.3	7.9	7.6	7.3	24.9		
	6	10	9	10	9	7.1	8.3	7.7	7.1	24.4		
	7	10	9	10	9	7.0		7.5		24.5		

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

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

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

Day 0 Temperatures = Post-renewals

"F" = fungus noted on dead organisms.

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

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

23.8

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Cheney Tins Labeled As: Cheney
 Lab ID: B4282 Start Date: 3/19/2019
 Sample Description: _____

Technician: _____ MB
 Date: 3/25/2019
 Balance Serial #: B328543647 B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A		1042.32	10
	B		1036.87	10
	C		1051.83	10
	D		1033.63	10
6.25 %	A		1039.25	9
	B		1037.23	10
	C		1021.34	10
	D		1018.53	9
12.5 %	A		1037.19	10
	B		1056.75	9
	C		1020.27	10
	D		1041.90	10
25 %	A		1017.55	10
	B		1029.63	10
	C		1035.68	10
	D		1038.86	9
50 %	A		1040.05	10
	B		1017.14	10
	C		1022.47	10
	D		1040.97	10
100 %	A		1046.15	10
	B		986.55	9
	C		1014.68	10
	D		1032.95	9
	A			
	B			
	C			
	D			

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client City of Cheney Tins Labeled As: Cheney

Lab ID: B4282 Start Date: 3/19/2019

Sample Description: _____

Technician:	<u>DG</u>	<u>MB</u>
Date:	<u>4/6/2019</u>	<u>3/25/2019</u>
Balance Serial #:	<u>B328543647</u>	<u>B328543647</u>

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A	1048.25	1042.32	10
	B	1043.02	1036.87	10
	C	1058.70	1051.83	10
	D	1040.68	1033.63	10
6.25 %	A	1046.10	1039.25	9
	B	1044.28	1037.23	10
	C	1028.37	1021.34	10
	D	1023.20	1018.53	9 of 9
12.5 %	A	1044.68	1037.19	10
	B	1064.36	1056.75	9
	C	1026.84	1020.27	10
	D	1048.96	1041.90	10
25 %	A	1025.52	1017.55	10
	B	1037.24	1029.63	10
	C	1043.59	1035.68	10
	D	1044.77	1038.86	9
50 %	A	1048.15	1040.05	10
	B	1026.28	1017.14	10
	C	1031.26	1022.47	10
	D	1048.84	1040.97	10
100 %	A	1055.33	1046.15	10
	B	995.06	986.55	9
	C	1023.05	1014.68	10
	D	1041.99	1032.95	9
	A			
	B			
	C			
	D			

weigh to 0.01 mg

CETIS Summary Report

Report Date: 09 Apr-19 14:27 (p 1 of 2)

Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Batch ID: 21-0577-1546 Test Type: Growth-Survival (7d) Analyst: Brett Muckey
 Start Date: 19 Mar-19 15:10 Protocol: EPA/821/R-02-013 (2002) Diluent: Mod-Hard Synthetic Water
 Ending Date: 26 Mar-19 08:35 Species: Pimephales promelas Brine:
 Duration: 6d 17h Source: Aquatox, AR Age:

Sample ID: 21-3288-9496 Code: B4282-01 Client:
 Sample Date: 18 Mar-19 11:43 Material: Unknown Project:
 Receive Date: 19 Mar-19 10:05 Source: Cheney WWTP (WA0020842)
 Sample Age: 27h (0.1 °C) Station:

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
12-1846-3958	7d Survival Rate	100	>100	NA	7.44%	1	Steel Many-One Rank Sum Test
11-8841-1981	Mean Dry Biomass-mg	100	>100	NA	17.8%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
03-1937-9334	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
12-1846-3958	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
03-1937-9334	Mean Dry Biomass-mg	Control Resp	0.65	0.25 - NL	Yes	Passes Acceptability Criteria
11-8841-1981	Mean Dry Biomass-mg	Control Resp	0.65	0.25 - NL	Yes	Passes Acceptability Criteria
11-8841-1981	Mean Dry Biomass-mg	PMSD	0.1782	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	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	2.5%
12.5		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	2.5%
25		4	0.975	0.8954	1	0.9	1	0.025	0.05	5.13%	2.5%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	0.95	0.8581	1	0.9	1	0.02887	0.05774	6.08%	5.0%

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	0.65	0.5635	0.7365	0.593	0.705	0.02718	0.05437	8.36%	0.0%
6.25		4	0.653	0.51	0.7959	0.5189	0.705	0.04492	0.08984	13.76%	-0.46%
12.5		4	0.7182	0.6432	0.7933	0.657	0.761	0.02359	0.04717	6.57%	-10.5%
25		4	0.735	0.5802	0.8898	0.591	0.797	0.04864	0.09728	13.24%	-13.08%
50		4	0.8475	0.7534	0.9416	0.787	0.914	0.02955	0.05911	6.98%	-30.38%
100		4	0.8775	0.8146	0.9404	0.837	0.918	0.01976	0.03952	4.5%	-35.0%

CETIS Summary Report

Report Date: 09 Apr-19 14:27 (p 2 of 2)

Test Code: B428201ppc | 16-6868-0758

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	1	1
6.25		0.9	1	1	1
12.5		1	0.9	1	1
25		1	1	1	0.9
50		1	1	1	1
100		1	0.9	1	0.9

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.593	0.615	0.687	0.705
6.25		0.685	0.705	0.703	0.5189
12.5		0.749	0.761	0.657	0.706
25		0.797	0.761	0.791	0.591
50		0.81	0.914	0.879	0.787
100		0.918	0.851	0.837	0.904

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
6.25		9/10	10/10	10/10	9/9
12.5		10/10	9/10	10/10	10/10
25		10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10
100		10/10	9/10	10/10	9/10

CETIS Analytical Report

Report Date: 09 Apr-19 14:27 (p 1 of 4)

Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID:	12-1846-3958	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.8.8
Analyzed:	09 Apr-19 14:26	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes
Batch ID:	21-0577-1546	Test Type:	Growth-Survival (7d)	Analyst:	Brett Muckey
Start Date:	19 Mar-19 15:10	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Mod-Hard Synthetic Water
Ending Date:	26 Mar-19 08:35	Species:	Pimephales promelas	Brine:	
Duration:	6d 17h	Source:	Aquatox, AR	Age:	
Sample ID:	21-3288-9496	Code:	B4282-01	Client:	
Sample Date:	18 Mar-19 11:43	Material:	Unknown	Project:	
Receive Date:	19 Mar-19 10:05	Source:	Cheney WWTP (WA0020842)		
Sample Age:	27h (0.1 °C)	Station:			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	7.44%	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	16	10	1	6	0.6105	Asymp	Non-Significant Effect
		12.5	16	10	1	6	0.6105	Asymp	Non-Significant Effect
		25	16	10	1	6	0.6105	Asymp	Non-Significant Effect
		50	18	10	1	6	0.8333	Asymp	Non-Significant Effect
		100	14	10	1	6	0.3451	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01894623	0.003789246	5	0.7962	0.5665	Non-Significant Effect
Error	0.08566787	0.004759327	18			
Total	0.1046141		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.182	4.248	0.3564	Equal Variances
Variances	Levene Equality of Variance	5.949	4.248	0.0020	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8317	0.884	0.0010	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	1	1	1	1	1	1	0	0.0%	0.0%
6.25		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	2.5%
12.5		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	2.5%
25		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	2.5%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	0.95	0.8581	1	0.95	0.9	1	0.02887	6.08%	5.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
6.25		4	1.369	1.242	1.497	1.408	1.249	1.412	0.04007	5.85%	3.04%
12.5		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
25		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
50		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
100		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	5.77%

CETIS Analytical Report

Report Date: 09 Apr-19 14:27 (p 2 of 4)

Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 12-1846-3958

Endpoint: 7d Survival Rate

CETIS Version: CETISv1.8.8

Analyzed: 09 Apr-19 14:26

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
6.25		0.9	1	1	1
12.5		1	0.9	1	1
25		1	1	1	0.9
50		1	1	1	1
100		1	0.9	1	0.9

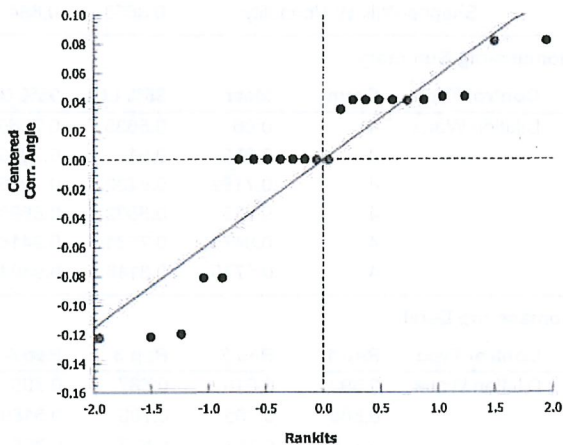
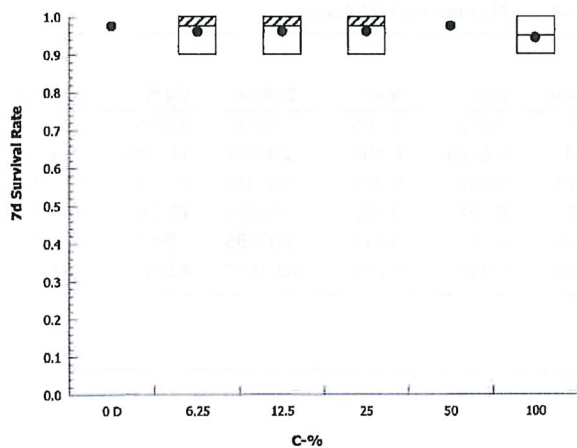
Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.412	1.412	1.412	1.412
6.25		1.249	1.412	1.412	1.403
12.5		1.412	1.249	1.412	1.412
25		1.412	1.412	1.412	1.249
50		1.412	1.412	1.412	1.412
100		1.412	1.249	1.412	1.249

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
6.25		9/10	10/10	10/10	9/9
12.5		10/10	9/10	10/10	10/10
25		10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10
100		10/10	9/10	10/10	9/10

Graphics



CETIS Analytical Report

Report Date: 09 Apr-19 14:27 (p 3 of 4)
Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 11-8841-1981	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.8
Analyzed: 09 Apr-19 14:26	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 21-0577-1546	Test Type: Growth-Survival (7d)	Analyst: Brett Muckey
Start Date: 19 Mar-19 15:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 26 Mar-19 08:35	Species: Pimephales promelas	Brine:
Duration: 6d 17h	Source: Aquatox, AR	Age:
Sample ID: 21-3288-9496	Code: B4282-01	Client:
Sample Date: 18 Mar-19 11:43	Material: Unknown	Project:
Receive Date: 19 Mar-19 10:05	Source: Cheney WWTP (WA0020842)	
Sample Age: 27h (0.1 °C)	Station:	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	17.8%	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	18.5	10	1	6	0.8729	Asymp	Non-Significant Effect
		12.5	24	10	0	6	0.9989	Asymp	Non-Significant Effect
		25	22	10	0	6	0.9908	Asymp	Non-Significant Effect
		50	26	10	0	6	0.9999	Asymp	Non-Significant Effect
		100	26	10	0	6	0.9999	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1854029	0.03708059	5	8.011	0.0004	Significant Effect
Error	0.08331484	0.004628602	18			
Total	0.2687178		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.392	15.09	0.6397	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8658	0.884	0.0044	Non-normal Distribution

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.65	0.5635	0.7365	0.651	0.593	0.705	0.02718	8.36%	0.0%
6.25		4	0.653	0.51	0.7959	0.694	0.5189	0.705	0.04492	13.76%	-0.46%
12.5		4	0.7182	0.6432	0.7933	0.7275	0.657	0.761	0.02359	6.57%	-10.5%
25		4	0.735	0.5802	0.8898	0.776	0.591	0.797	0.04864	13.24%	-13.08%
50		4	0.8475	0.7534	0.9416	0.8445	0.787	0.914	0.02955	6.98%	-30.38%
100		4	0.8775	0.8146	0.9404	0.8775	0.837	0.918	0.01976	4.5%	-35.0%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.593	0.615	0.687	0.705
6.25		0.685	0.705	0.703	0.5189
12.5		0.749	0.761	0.657	0.706
25		0.797	0.761	0.791	0.591
50		0.81	0.914	0.879	0.787
100		0.918	0.851	0.837	0.904

CETIS Analytical Report

Report Date: 09 Apr-19 14:27 (p 4 of 4)

Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 11-8841-1981

Endpoint: Mean Dry Biomass-mg

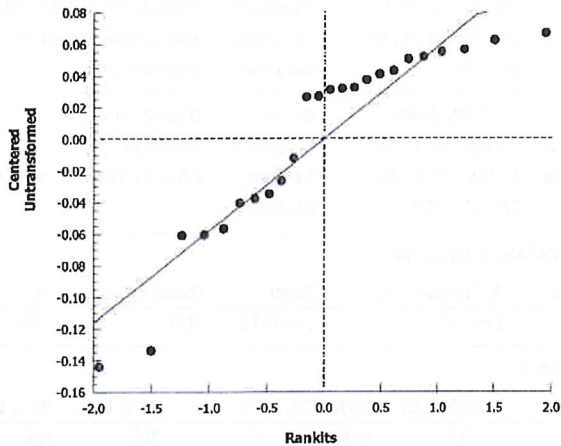
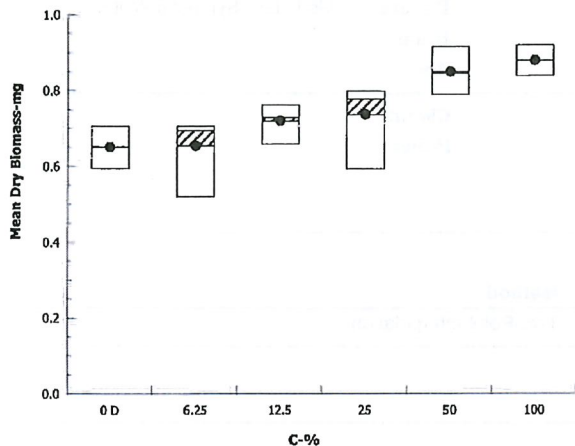
CETIS Version: CETISv1.8.8

Analyzed: 09 Apr-19 14:26

Analysis: Nonparametric-Control vs Treatments

Official Results: Yes

Graphics



CETIS Analytical Report

Report Date: 09 Apr-19 14:27 (p 1 of 1)
Test Code: B428201ppc | 16-6868-0758

Fathead Minnow 7-d Larval Survival and Growth Test

Eurofins TestAmerica - Corvallis

Analysis ID: 03-1937-9334	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.8.8
Analyzed: 09 Apr-19 14:26	Analysis: Linear Interpolation (ICPIN)	Official Results: Yes
Batch ID: 21-0577-1546	Test Type: Growth-Survival (7d)	Analyst: Brett Muckey
Start Date: 19 Mar-19 15:10	Protocol: EPA/821/R-02-013 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 26 Mar-19 08:35	Species: Pimephales promelas	Brine:
Duration: 6d 17h	Source: Aquatox, AR	Age:
Sample ID: 21-3286-9496	Code: B4282-01	Client:
Sample Date: 18 Mar-19 11:43	Material: Unknown	Project:
Receive Date: 19 Mar-19 10:05	Source: Cheney WWTP (WA0020842)	
Sample Age: 27h (0.1 °C)	Station:	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1488612	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

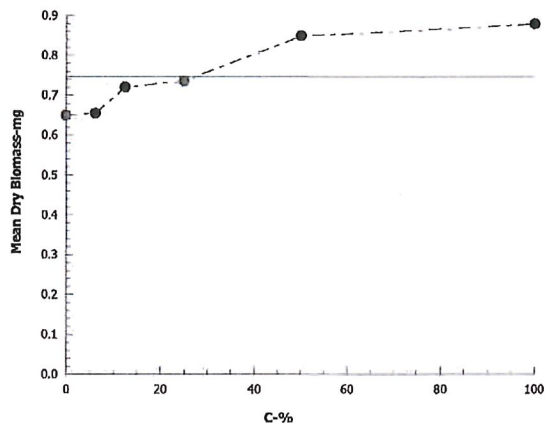
Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.65	0.593	0.705	0.02718	0.05437	8.36%	0.0%
6.25		4	0.653	0.5189	0.705	0.04492	0.08984	13.76%	-0.46%
12.5		4	0.7182	0.657	0.761	0.02359	0.04717	6.57%	-10.5%
25		4	0.735	0.591	0.797	0.04864	0.09728	13.24%	-13.08%
50		4	0.8475	0.787	0.914	0.02955	0.05911	6.98%	-30.38%
100		4	0.8775	0.837	0.918	0.01976	0.03952	4.5%	-35.0%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.593	0.615	0.687	0.705
6.25		0.685	0.705	0.703	0.5189
12.5		0.749	0.761	0.657	0.706
25		0.797	0.761	0.791	0.591
50		0.81	0.914	0.879	0.787
100		0.918	0.851	0.837	0.904

Graphics



APPENDIX B
REFERENCE TOXICANT DATA SHEETS

REFERENCE TOXICANT DATA SHEET

Client	QA/QC	Reference Toxicant	NaCl	Test Begin: Date	3-6-19	Time	1345
Test Organism	<i>Ceriodaphnia dubia</i>	Stock Solution	20 g/L	Test End: Date	3-8-19	Time	1130
Source	In-House culture	Solvent	Milli-Q water	Reagent Log ID #	2-B 072-01		
ID#	CD 3536	*Dilution Water Type	Recon MH (FHM)	Dilution Water ID#	4872		
Age	< 24 hours	Total Hardness as CaCO ₃	81	Total Alkalinity as CaCO ₃	76		
Feeding:	none	Conductivity (µmhos/cm)	327	Temperature (°C)	20 ± 1 °C		
Test Chamber Size	30 ml	Technician	MB	48 hr	MB		
Volume per Replicate	25 ml	Time	1345	48 hr	MB		
		Therm. ID #	252	48 hr	MB		

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	0	24	48
Control	A	5	5	5	7.9	—	8.5	7.9	—	8.2	19.9	19.8	19.6	330	—	374
	B	5	5	5	—	—	—	—	—	—	—	—	—	—	—	—
1.0	A	5	5	5	8.0	—	8.5	7.8	—	8.2	19.8	19.8	19.4	2310	—	2350
	B	5	5	5	—	—	—	—	—	—	—	—	—	—	—	—
1.5	A	5	5	5	8.1	—	8.6	7.9	—	8.2	19.8	19.8	19.6	3290	—	3330
	B	5	5	5	—	—	—	—	—	—	—	—	—	—	—	—
2.0	A	5	5	4	8.2	—	8.5	7.9	—	8.1	19.8	19.6	19.7	4250	—	5390
	B	5	5	3	—	—	—	—	—	—	—	—	—	—	—	—
3.0	A	5	2	0	8.3	—	8.6	7.9	—	8.6	20.0	19.5	19.7	6050	—	6210
	B	5	1	0	—	—	—	—	—	—	—	—	—	—	—	—
4.0	A	5	0	—	8.3	7.9	—	7.9	7.5	—	20.0	19.5	—	7710	—	—
	B	5	0	—	—	—	—	—	—	—	—	—	—	—	—	—
Test Acceptability Criteria:		Survival in Controls: > or = 90%			(@ 20°C): >4.0 and <9.1			pH: > 6.0 and <9.0			Temperature + 1 °C					

*Dilution Water Code
 Recon. - reconstituted water
 S - soft
 MH - moderately hard
 H - hard
 Art. Sea - Artificial Sea Water

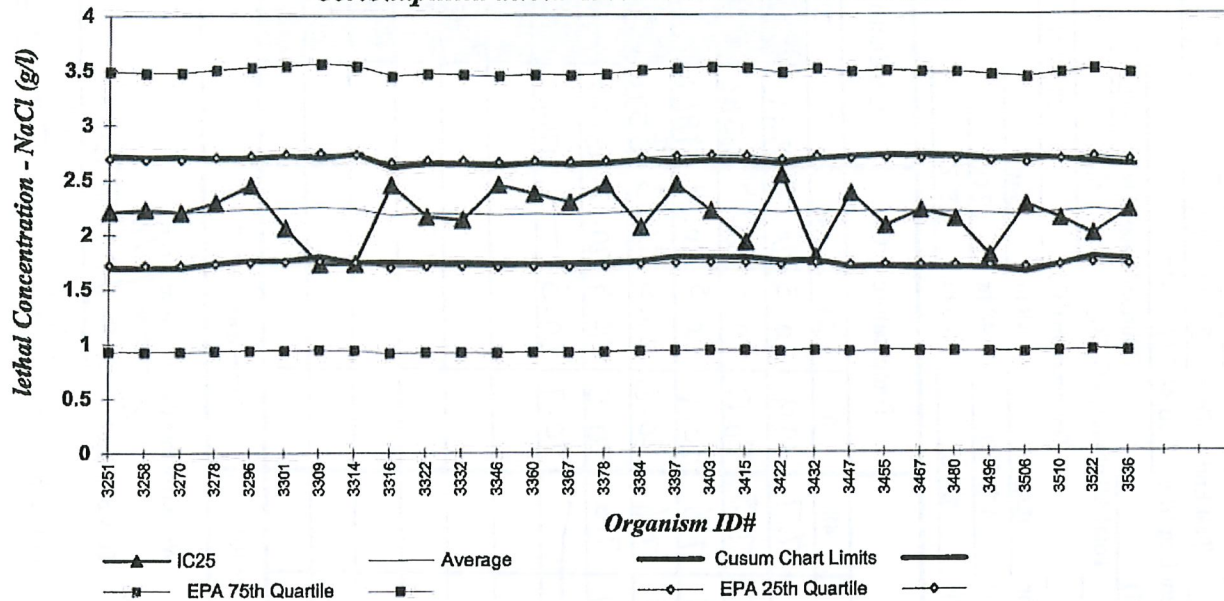
We verify this data is true and correct.

Task Manager Lead
 Project Manager MB
 QA Officer Anti-Stamping for Ryan McMuris
 3-14-19

48 Hour LC₅₀ 2.21
 Cusum Chart Limits 1.76 to 2.62
 Statistical Method Spearmen-Kärber

REFTOX - Cerio acute.XLS
 Doc Control ID: ASL670-0510

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
Ceriodaphnia dubia Acute Survival - LC50 Values



***Ceriodaphnia dubia* - ACUTE (EPA Test Method 2002.0)**

SODIUM CHLORIDE (g/L)

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) = 0.06

25th Quartile CV (warning limit) = 0.11

75th Quartile CV (warning limit) = 0.29




90th Quartile CV (control limit) = 0.34

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.

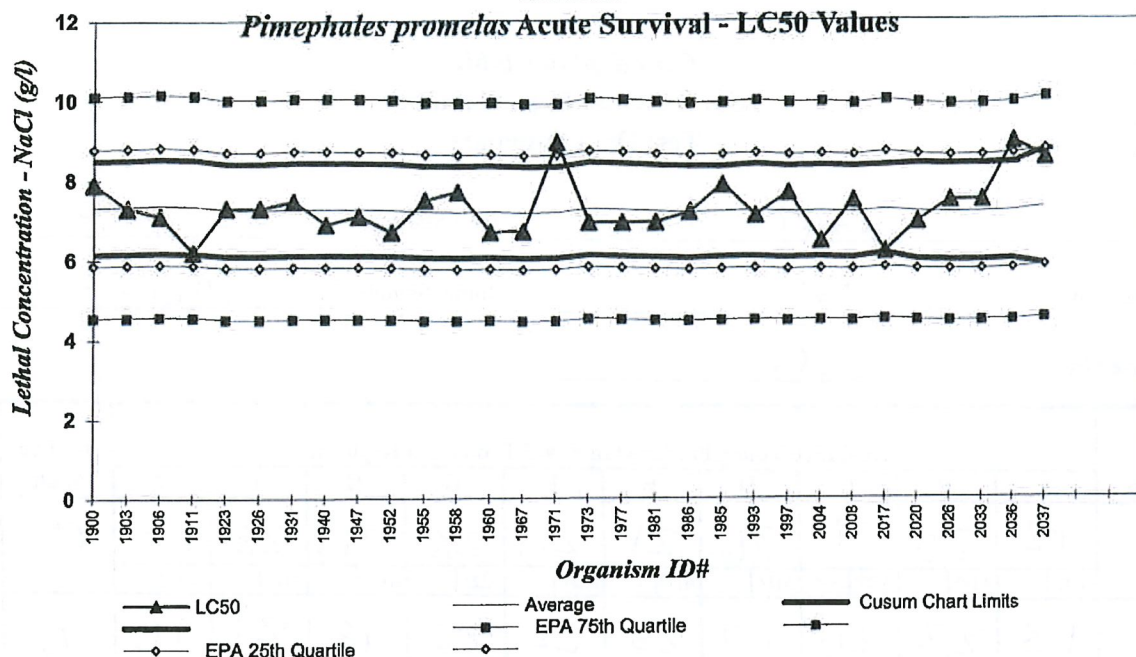
Event #	Cerio ID #	Test Start Date	LC50	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
156	3415	04/09/18	1.92	2.2	0.22	1.78	2.66	0.10
157	3422	05/01/18	2.54	2.2	0.22	1.75	2.64	0.10
158	3432	06/01/18	1.78	2.2	0.23	1.75	2.68	0.11
159	3447	07/24/18	2.37	2.2	0.25	1.69	2.70	0.12
160	3455	08/07/18	2.07	2.2	0.25	1.69	2.71	0.12
161	3467	09/05/18	2.21	2.2	0.26	1.68	2.71	0.12
162	3480	10/05/18	2.13	2.2	0.26	1.68	2.71	0.11
163	3496	11/06/18	1.79	2.2	0.25	1.68	2.68	0.12
164	3506	12/19/18	2.26	2.2	0.26	1.64	2.69	0.11
165	3510	01/09/19	2.13	2.2	0.24	1.71	2.67	0.10
166	3522	02/01/19	1.99	2.2	0.22	1.78	2.65	0.10
167	3536	03/06/19	2.21	2.2	0.21	1.76	2.62	0.10

Client	Q/A/QC	Reference Toxicant	NaCl	Test Begin: Date	Time
Test Organism	<i>Pimephales promelas</i>	Stock Solution	20 g/L	Test End: Date	Time
Source	<i>A44.572x</i>	Solvent	Milli-Q water	Reagent Log ID #	
ID#	FHM 02537	*Dilution Water Type	Recon MH (FHM)	Dilution Water ID#	
Age	2 days	Total Hardness as CaCO ₃	90	Total Alkalinity as CaCO ₃	
Feeding:	none	Conductivity (µmhos/cm)	351	Temperature (°C)	20 ± 1 °C
Test Chamber Size	800 ml	Technician	Jw/mab	48 hr	
Volume per Replicate	750 ml	Time	1200	48 hr	
		Therm. ID #	252	48 hr	

*Dilution Water Code					
Recon. - reconstituted water					
S - soft					
MH - moderately hard					
H - hard					
Art. Sea - Artificial Sea Water					
48 Hour LC ₅₀	8.5				
Cusum Chart Limits	S. 1 to 2.7				
Statistical Method	Paired				
We verify this data is true and correct.					
		Task Manager			
		Project Manager			
		QA Officer			
REFTOX - FHM acute.XLS					
Doc Control ID: ASL674-0510					

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 °C

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	
911	1971	3/6/2018	8.9	7.2	0.42	6.0	8.3	0.08
912	1973	3/16/2018	6.9	7.3	0.57	6.1	8.4	0.08
913	1977	4/4/2018	6.9	7.3	0.58	6.1	8.4	0.08
914	1981	5/2/2018	6.9	7.2	0.57	6.1	8.4	0.08
915	1986	6/6/2018	7.2	7.2	0.57	6.0	8.3	0.08
916	1985	6/1/2018	7.9	7.2	0.57	6.1	8.3	0.08
917	1993	7/10/2018	7.1	7.2	0.58	6.1	8.4	0.08
918	1997	8/1/2018	7.7	7.2	0.56	6.0	8.3	0.08
919	2004	9/5/2018	6.5	7.2	0.57	6.1	8.4	0.08
920	2008	10/5/2018	7.5	7.2	0.60	6.0	8.3	0.08
921	2017	11/9/2018	6.2	7.2	0.55	6.1	8.4	0.08
922	2020	12/5/2018	6.9	7.2	0.60	6.0	8.4	0.08
923	2026	1/15/2019	7.5	7.2	0.60	6.0	8.4	0.08
924	2033	2/14/2019	7.5	7.2	0.60	6.0	8.4	0.08
925	2036	3/6/2019	8.9	7.2	0.60	6.0	8.4	0.10
926	2037	3/15/2019	8.5	7.3	0.72	5.9	8.7	0.10
927								
928								
929								

Ceriodaphnia dubia
Survival and Reproduction
Test Data Summary

Client QA / QC Test Start Date 3-5-19
 Sample Description NaCl Initial Sample ID# 2B068-06
 Data summarized by MB

Percent or Concentration	Total Live Young Produced in First 3 Broods per Replicate										# Alive Adults	Total Live Young
	A	B	C	D	E	F	G	H	I	J		
Control	12	20	7	36	21	24	28	26	28	10	9	212
	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>		
0.25 g/L	13	22	26	17	25	22	22	19	21	16	10	197
	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>		
0.50 g/L	20	17	15	22	21	19	20	20	21	11	10	186
	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>		
1.0 g/L	7	7	7	10	11	12	14	3	7	11	8	89
	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>		
1.5 g/L	3	6	1	7	3	0	0	7	6	0	7	33
	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>	AD? <input type="checkbox"/>		
2.0 g/L	0	0	0	0	0	0	0	0	0	0	0	0
	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>		
4.0 g/L	0	0	0	0	0	0	0	0	0	0	0	0
	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>	AD? <input checked="" type="checkbox"/>		

Test Organism Mortality (Adult dead) = ☐ AD? ☒

of Alive Adults = Number of test organism alive at termination

Test Organism identified as Male = ☐ AD? ☐ M

Total Live Young = Total neonates produced in first 3 broods

Test Organism Injured during test = ☐ AD? ☐ I

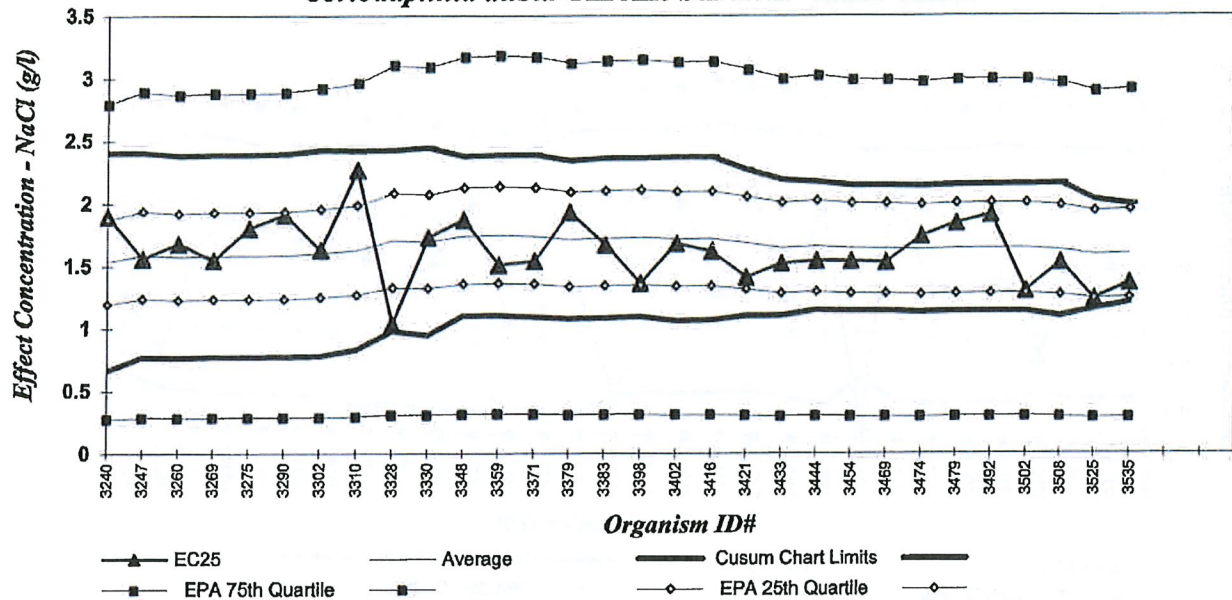
Footnote: As per EPA-600-4-91-002 and EPA-821-R-02-013, *Ceriodaphnia dubia* test should be terminated when 60% of the surviving control organisms have produced their third brood, or at the end of eight days, whichever occurs first.

Also as per EPA-821-R-02-013 (13.10.9.1), "In this three-brood test, offspring from fourth or higher broods should not be counted and should not be included in the total number of neonates produced during the test."

Endpoint	Value	Cusum Chart Limits
Survival - EC ₂₅	<u>1.36</u>	<u>1.21 to 1.99</u>
Reproduction - IC ₂₅	<u>0.63</u>	<u>0.31 to 1.21</u>

Task Manager [Signature]
 Project Manager [Signature]
 QA Officer [Signature] 3-19-19

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART
***Ceriodaphnia dubia* Chronic Survival - EC25 Values**



***Ceriodaphnia dubia* - Chronic (EPA Test Method 1002.0)**

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) = 0.07

25th Quartile CV (warning limit) = 0.11

75th Quartile CV (warning limit) = 0.41

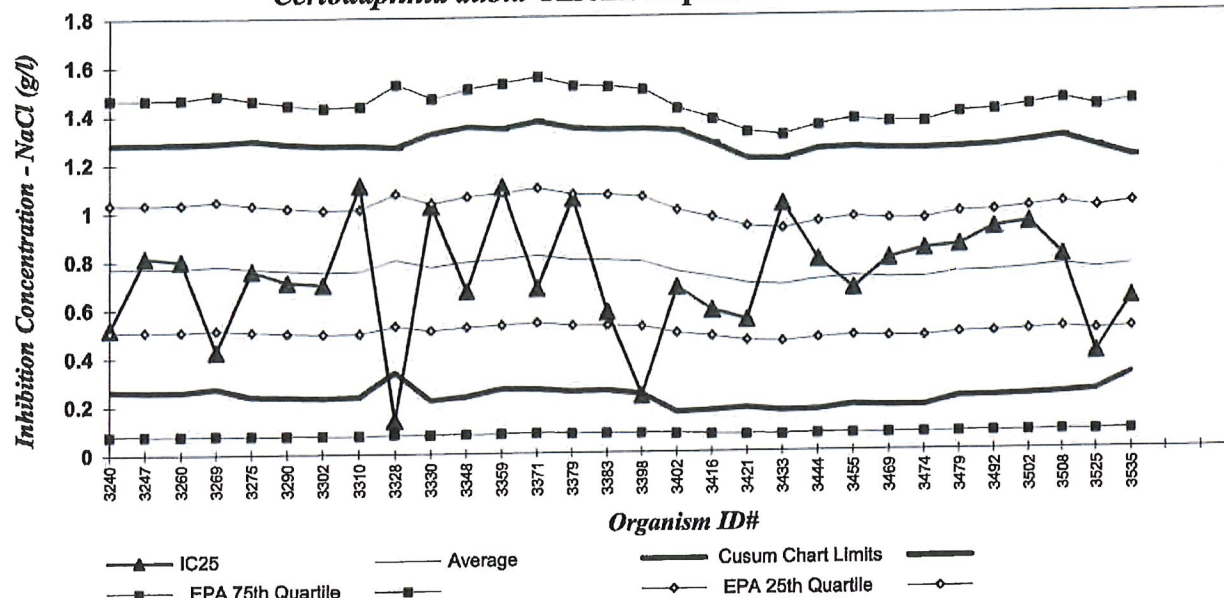
90th Quartile CV (control limit) = 0.81

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 #	Cerio ID #	Test Start Date	EC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
327	3433	06/05/18	1.52	1.64	0.27	1.10	2.19	0.15
328	3444	07/10/18	1.54	1.66	0.26	1.15	2.17	0.15
329	3454	08/07/18	1.54	1.64	0.25	1.14	2.14	0.15
330	3469	09/07/18	1.53	1.64	0.25	1.14	2.14	0.15
331	3474	09/20/18	1.74	1.63	0.25	1.13	2.14	0.15
332	3479	10/04/18	1.84	1.64	0.25	1.14	2.15	0.15
333	3492	10/30/18	1.91	1.64	0.25	1.13	2.15	0.15
334	3502	12/11/18	1.30	1.64	0.25	1.13	2.15	0.16
335	3508	01/08/19	1.53	1.63	0.27	1.10	2.16	0.14
336	3525	02/08/19	1.24	1.59	0.22	1.15	2.03	0.12
337	3535	03/05/19	1.36	1.60	0.20	1.21	1.99	0.13
338								
339								

REFERENCE TOXICANT CUMULATIVE SUMMARY (CUSUM) CHART *Ceriodaphnia dubia* Chronic Reproduction - IC25 Values



***Ceriodaphnia dubia* - Chronic (EPA Test Method 1002.0)**

SODIUM CHLORIDE (g/L)

Endpoint: Chronic Reproduction

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (control limit) = 0.08

25th Quartile CV (warning limit) = 0.17

75th Quartile CV (warning limit) = 0.45

90th Quartile CV (control limit) = 0.62

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 #	Cerio ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
330	3469	9/7/2018	0.79	0.71	0.27	0.18	1.24	0.37
331	3474	9/20/2018	0.83	0.71	0.27	0.18	1.24	0.35
332	3479	10/4/2018	0.84	0.73	0.26	0.22	1.25	0.35
333	3492	10/30/2018	0.92	0.74	0.26	0.22	1.25	0.35
334	3502	12/11/2018	0.94	0.75	0.26	0.22	1.27	0.35
335	3508	01/08/19	0.80	0.76	0.26	0.23	1.29	0.34
336	3525	2/8/2019	0.40	0.74	0.25	0.24	1.25	0.30
337	3535	3/5/2019	0.63	0.76	0.22	0.31	1.21	0.29
338								
339								

Random Template Used: 6 conc. x 4 reps. # 7

Waterbath/incubator Used:

Date Initiated 3/5/2019 Time 13:50

Stock Sol. ID 2B074-04

4

Date Terminated 3/12/2019 Time 09:25

Organism ID: FHM 20360

Test Container Size: 800 ml

Solution Volume / rep: 500 ml

Client QA/QC - RefTox

Sample Description

KCl (50 g/L stock)

Tech: Day 0 MB Day 1 MB Day 2 MB Day 3 MB Day 4 MB Day 5 MB Day 6 MB Day 7 MB
 Time Day 0 1350 Day 1 1255 Day 2 1230 Day 3 0950 Day 4 1425 Day 5 1450 Day 6 1130 Day 7 0925

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		7.9		7.6	25.1	251	324
	1	10	10	9	10	6.8	7.7	7.5	7.9	25.3	254	329
	2	10	10	9	10	7.4	7.6	7.4	7.9	24.7	254	341
	3	10	10	9	10	7.6	7.9	7.6	7.9	25.2	255	330
	4	10	10	9	10	6.3	6.7	7.2	7.9	24.9	252	357
	5	10	10	9	10	6.5	7.6	7.3	8.0	25.1	252	333
	6	10	10	9	10	7.5	8.0	7.3	7.9	25.5	252	343
0.25 g/L	0	10	10	10	10		7.9		7.7	25.1		800
	1	10	10	9	10	7.0	7.9	7.5	7.9	25.3		780
	2	9	9	9	10	7.2	7.8	7.5	8.8.1	24.7		769
	3	9	9	9	10	7.5	8.0	7.6	8.0	25.1		806
	4	9	9	9	10	6.4	7.5	7.1	7.9	24.9		816
	5	9	9	9	10	6.6	7.8	7.4	8.1	25.3		81
	6	9	9	9	10	7.4	8.1	7.3	8.0	25.6		834
0.50 g/L	0	10	10	10	10		8.1		7.8	25.0		1770
	1	10	10	10	10	6.9	8.1	7.5	7.9	25.2		1273
	2	10	10	10	10	7.0	7.9	7.6	8.1	24.8		1276
	3	10	10	10	10	7.5	8.0	7.7	8.0	25.1		1266
	4	10	10	9	9	6.4	7.3	7.2	7.9	25.0		1296
	5	10	10	9	9	6.6	7.9	7.4	8.1	25.2		1223
	6	10	10	9	9	7.0	8.2	7.4	8.0	25.6		1300
1.0 g/L	0	10	10	10	10		8.2		7.9	25.1		2110
	1	8	3	5	5	6.9	8.1	7.6	7.9	25.3		2180
	2	5	0	2	5	6.9	7.9	7.6	8.2	24.8		2190
	3	5		2	5	7.5	8.0	7.7	8.1	25.2		2190
	4	5		2	3	6.4	7.1	7.3	8.0	25.1		2150
	5	3		2	3	6.5	7.9	7.5	8.2	25.3		2140
	6	2		2	2	6.9	8.2	7.5	8.0	25.6		2195
2.0 g/L	0	10	10	10	10		8.1		7.9	25.1		3990
	1	0	0	0	0	7.0	8.1	7.6		25.3		
	2											
	3											
	4											
	5											
	6											
4.0 g/L	0	10	10	10	10		8.0		7.9	25.0		7120
	1	0	0	0	0	7.1	8.0	7.6		25.1		
	2											
	3											
	4											
	5											
	6											

✓ 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.

Endpoint

Survival - EC₂₅

0.59

Growth - IC₂₅

0.59

Cusum Chart Limits

0.57 to 0.66

0.45 to 0.74

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

Day 0 Temperatures = Post-renewals

23.8 = Temp. out of recommended range

Task Manager

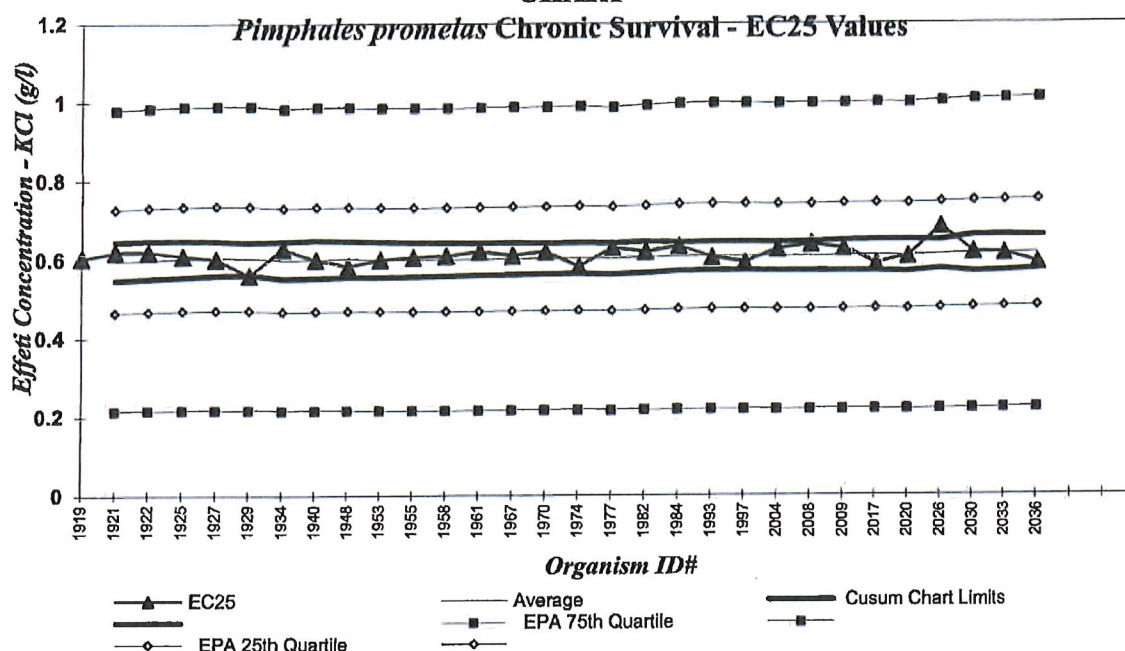
Project Manager

QA Officer

3-21-19

* Waterbath malfunction. Repair pump failure fixed 3-12-19 3pm

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 oC

75th Quartile CV (warning limit) = 0.32

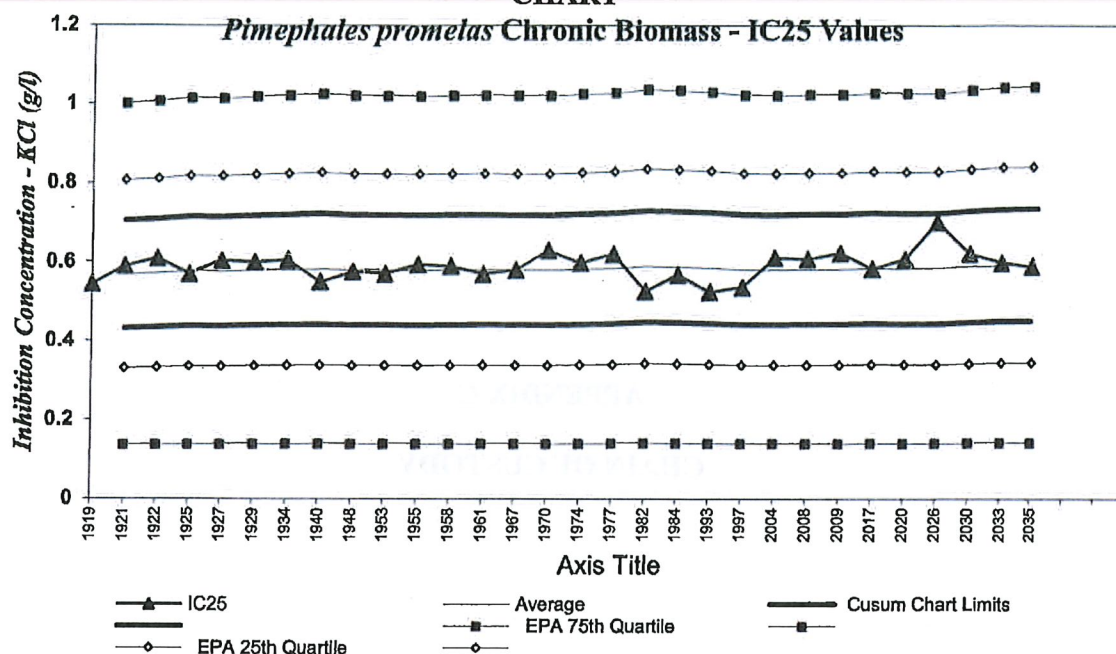
90th Quartile CV (control limit) = 0.52

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	
20	1970	02/27/18	0.62	0.6	0.02	0.56	0.64	0.03
21	1974	03/20/18	0.58	0.6	0.02	0.56	0.64	0.03
22	1977	04/03/18	0.63	0.6	0.02	0.56	0.64	0.03
23	1982	05/02/18	0.62	0.6	0.02	0.57	0.64	0.03
24	1984	06/19/18	0.63	0.6	0.02	0.57	0.64	0.03
25	1993	07/10/18	0.61	0.6	0.02	0.57	0.64	0.03
26	1997	08/01/18	0.59	0.6	0.02	0.57	0.64	0.03
27	2004	9/6/2018	0.63	0.6	0.02	0.57	0.64	0.03
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

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	
22	1977	04/03/18	0.62	0.58	0.03	0.44	0.72	0.04
23	1982	05/02/18	0.53	0.59	0.02	0.45	0.73	0.05
24	1984	06/19/18	0.57	0.59	0.03	0.45	0.73	0.05
25	1993	07/10/18	0.53	0.59	0.03	0.44	0.73	0.05
26	1997	08/01/18	0.54	0.58	0.03	0.44	0.72	0.05
27	2004	9/6/2018	0.61	0.58	0.03	0.44	0.72	0.05
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

APPENDIX C
CHAIN OF CUSTODY

Sample Receipt Record

Batch Number: B4282-01
Client/Project: Cheney

Date Received: 3-19-19
Received By: [Signature]

Were custody seals intact?

☒ Yes ☐ No ☐ N/A

Packing Material:

☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6°C) Therm ID: 173 Expires: 4/16/2019 Observed: 0.1°C, Actual Temp: 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 (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 on: _____ Client contact: _____

Resolution to Exception:

--

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

THE LEADER IN ENVIRONMENTAL TESTING

Client City of Cheney
Address 116 Anderson Rd
Cheney WA 99004

NPDES# WA0020843 Ship Samples to: _____
Composite Sample Information _____ PO# 0403233

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

Samples/Hour _____ Volume/Sample _____
 Total Hours _____ Total Volume _____
 Initiated: Date _____ Time _____
 Ended: Date _____ Time _____
 Chilled During Collection _____

Contact Person: Mike Lambert
Phone: 509-498-9305

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

Project #

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

[illegible]

Sampled By & Title <i>Mike Lambert WFTPII</i>	(Please sign and print name) <i>Mike Lambert</i>	Date/Time <i>3-18-19 11:23</i>	Relinquished By <i>Mike Lambert</i>	(Please sign and print name) <i>Mike Lambert</i>	Date/Time <i>3-18-19 14:09</i>
Received By <i>[Signature]</i>	(Please sign and print name) <i>Chad Thomas</i>	Date/Time <i>3-19-19 10:53</i>	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 Bis Fed-Ex Hand Other	Shipping #	
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls Doc Control ID: ASL612-0717		

CHENEY, - WA 99024
UNITED STATES US

BILL SENDER

CORVALIS OR 97330

(541) 243-61 37
INV: PKG ID: 1 B129J
PO:

REF: CINDY NIEMEIER

DEPT



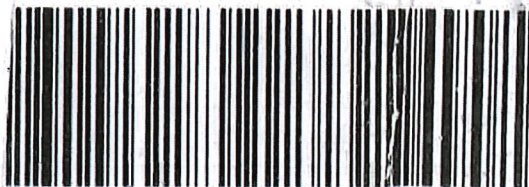
TRV:

0048 9286

TUE - 19 MAR 12:00P
PRIORITY OVERNIGHT

CVOA

97330
OR-US PDX



DISCLAIMER: UPS is not responsible for any loss or damage to goods in transit. UPS is not responsible for any loss or damage to goods in transit. UPS is not responsible for any loss or damage to goods in transit.

Sample Receipt Record

Batch Number: B4282-02
Client/Project: Cheney

Date Received: 3-24-19
Received By: [Signature]

Were custody seals intact?

☒ Yes ☐ No ☐ N/A

Packing Material:

☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6°C) Therm ID: 173 Expires: 4/16/2019 Observed: 1.6 °C, Actual Temp: 3.6 °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 on:

Client contact:

Resolution to Exception:

CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client City of Cheney
Address 119 Anderson Rd
Cheney WA 99004

NPDES# WA0020842 Ship Samples to: PO# 040223
Composite Sample Information _____

TestAmerica ASL

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

Samples/Hour _____ Volume/Sample _____
 Total Hours _____ Total Volume _____
 Initiated: Date _____ Time _____
 Ended: Date _____ Time _____
 Chilled During Collection _____
 Check Ctl _____
 Temp. Upr _____

Contact Person: Mike Lambert
Phone: 509-498-9305

Check Chlorine (Y/N)

Temp. Upon Arrival (°C)

Check Ammonia (Y/N)

Project # _____

Analysis Required / Comments

[illegible]

Sampled By & Title <i>Mike Lambert WPT II</i>	(Please sign and print name)	Date/Time 3-20-19 1144	Relinquished By <i>Mike Lambert</i>	(Please sign and print name)	Date/Time 3-20-19 1416
Received By <i>G. O'Hara</i>	(Please sign and print name)	Date/Time 3-21-19 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 Bis Fed-Ex Hand Other	Shipping #
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls Doc Control ID: ASL6112-0717		

ORIGIN ID: GEGA (509) 235-5551
SHIPPED THROUGH
COPY JUNCTION
1921 FIRST STREET
CHENEY, WA 99004
UNITED STATES US

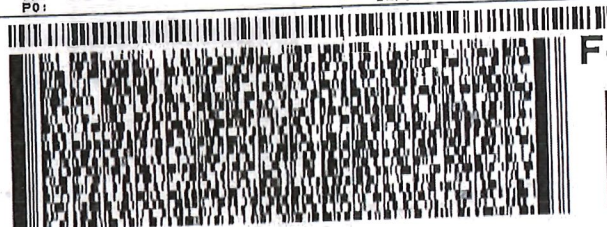
SHIP DATE: 20MAR19
ACTWGT: 64.97 LB
CAD: 112048993/WSXI3300
DIMS: 26x14x14 IN
BILL SENDER

TO AQUATIC TOXICOLOGY LABORATORY
TEST AMERICA ASL
1100 NE CIRCLE BLVD STE 310

CORVALLIS OR 97330

(541) 243-6137
INV: PKG ID: 191485
PO:

REF: CINDY NIEMEIER
DEPT:



FedEx
Express



J151019010701uv

TRKH# 7861 5101 0786
0201

THU - 21 MAR 12:00P
PRIORITY OVERNIGHT

XH CVOA

97330
OR-US PDX



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Sample Receipt Record

Batch Number: B4282-03
Client/Project: Cheney

Date Received: 3-23-19
Received By: [Signature]

Were custody seals intact?

☒ Yes ☐ No ☐ N/A

Packing Material:

☒ Ice ☐ Blue Ice ☐ Box

Temp OK? (<6°C) Therm ID: 173 Expires: 4/16/2019 Observed: 0.8°C, Actual Temp: 1.9°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)

<p>Client v Resolu</p>	<p>ORIGIN ID: GEGA (509) 235-5551 SHIPPED THROUGH COPY JUNCTION 1921 FIRST STREET CHENEY, WA 99004 UNITED STATES US</p>	<p>SHIP DATE: 22MAR19 ACTWGT: 64.28 LB CAD: 112046933/MSX13300 DIMS: 25x14x14 IN BILL SENDER</p>	<p>TO AQUATIC TOXICOLOGY LABORATORY TEST AMERICA ASL 1100 NE CIRCLE BLVD STE 310 CORVALLIS OR 97330</p>	<p>REF: CINDY NIEMEIER DEPT: INV: PKG ID: 151593 PO:</p>	<p>565J1/46D3/23RD</p>	<p>1191019010701</p>	<p>FedEx Express</p>	<p>E</p>	<p>TRK# 7861 9805 4393 0201</p>	<p>SATURDAY 1:30P PRIORITY OVERNIGHT</p>	<p>97330 OR-US PDX</p>	<p>X0 CVOA</p>	<p>[Barcode]</p>	<p>SEE NOTICE ON REVERSE regarding UPS Terms and conditions of liability. Where allowed by law, shipper authorizes UPS to act as forwarding agent for export control and customs purposes. Shipper agrees to indemnify and hold UPS harmless from all claims, damages, losses, and expenses, including reasonable attorney's fees, arising out of or from the use of the services provided by UPS.</p>
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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

NPDES# WA0020842
Composite Sample Information _____

TestAmerica ASL

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

Corvallis, OR 97331
Phone: 541.243._____
Check Chlorine (Y/N) _____
Temp. Upon Arrival (°C) _____

Check Chlorine (Y/N) _____

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

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

Check Ammonia (Y/N)

Project #

Analysis Required / Comments

[illegible]

Sampled By & Title <i>Mike Lambert WFO TP III</i>	(Please sign and print name)	Date/Time 3-23-19 1146	Relinquished By <i>Mike Lambert</i>	(Please sign and print name)	Date/Time 3-22-19			
Received By <i>[Signature]</i>	(Please sign and print name) <i>Mike Lambert</i>	Date/Time 3-23-19 0952	Relinquished By <i>[Signature]</i>	(Please sign and print name)	Date/Time 1410			
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	Bis	Fed-Ex	Hand	Other	Shipping #
Work Authorized By	(Please sign and print name)	Remarks	COC_Bioassay.xls Doc Control ID: ASL612-0717					