

## Bio-Analytical Laboratories' Executive Summary

**Permittee:** Magnolia Wastewater System  
Columbia Road  
Magnolia, AR

**Project #:** X8521

**Outfall:** 001 (treated domestic wastewater)

**Permit #:** AR0043613/ AFIN 14-00059

**Contact:** Tracie Love

**Test Dates:** October 25 – November 2, 2022

**Test Type:** Chronic Static Renewal Survival and Reproduction Test using *Ceriodaphnia dubia* (EPA Method 1002.0).  
Chronic Static Renewal Survival and Growth Test using *Pimephales promelas* (EPA Method 1000.0).

### Results:

#### For *Ceriodaphnia dubia*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0 (**Pass**).
2. If the NOEC for reproduction is less than the critical dilution (80.0%), enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 0 (**Pass**).
3. Report the NOEC value for survival, Parameter TOP3B - 100.0%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 80.0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 35.95%.
6. PMSD Reproduction = 39.98% (13.0 – 47.0%)- moderate precision, acceptable for passing test

#### For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter TLP6C - 1 (**Fail**).
2. If the NOEC for growth is less than the critical dilution (80.0%), enter a "1"; otherwise, enter a "0" for Parameter TGP6C- 1 (**Fail**).
3. Report the NOEC value for survival, Parameter TOP6C - 80.0%
4. Report the NOEC value for growth, Parameter TPP6C - 42.0%
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 24.04%.
6. PMSD Biomass = 15.59% (12.0 – 30.0%)- moderate precision, acceptable for passing test

This report contains a total of 60 pages, including this page. The results in the report pertain only to the samples documented in the enclosed chain of custody documents and complies with the TNI (2009) and ADEQ standards. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.



## **Bio-Analytical Laboratories**

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

(318) 745-2772  
1-800-259-1248  
Fax: (318) 745-2773

**THE RESULTS OF TWO CHRONIC  
DEFINITIVE TOXICITY TESTS  
FOR OUTFALL 001**

**AT**

**MAGNOLIA WASTEWATER SYSTEM  
Magnolia, Arkansas**

**NPDES #AR0043613  
AFIN: 14-00059**

**EPA Methods 1000.0 and 1002.0**

**Project X8521**

**Test Dates: October 25 – November 2, 2022**

**Report Date: August 15, 2022**

**Prepared for:**

Tracie Love  
Magnolia Wastewater System  
P.O. Box 666  
Magnolia, AR 71753

**Prepared by:**

Ginger Briggs  
Bio-Analytical Laboratories  
P.O. Box 527  
Doyline, LA 71023  
ADEQ #88-0630

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## 1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two chronic definitive toxicity tests for Outfall 001 at the wastewater plant serving the city of Magnolia, Arkansas. The test organisms used were the cladoceran, *Ceriodaphnia dubia*, and the fathead minnow, *Pimephales promelas*. The purpose of this study is to determine if appropriately dilute effluent samples adversely affect the survival, reproduction and/or growth of the test organisms. Toxicity is defined as a statistically significant difference at the 95 percent confidence level between the survival, reproduction and/or growth of the test organism in the critical dilution (the effluent concentration representative of the proportion of effluent in the receiving water during critical low flow or critical mixing conditions) compared to the survival, reproduction and/or growth of the test organism in the control. The test endpoint is the No-Observed-Effect-Concentration (NOEC), the highest effluent concentration that is not significantly different from the control.

## 2.0 Methods and Materials

### 2.1 Test Methods

All methods followed were according to the latest edition of “Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms” (EPA-821-R-02-013), “Standard Methods for The Examination of Water and Wastewater” 22<sup>nd</sup> Edition (APHA 2012) and BAL’s standard operating procedure.

### 2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and dilution water hardness and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnows were also raised in-house and were less than 24 hours old at test initiation. Monthly chronic reference toxicant tests were conducted in order to document organism sensitivity and demonstration of capability.

### 2.3 Dilution Water

Soft reconstituted water, made per method guidelines, was used as the dilution water and the control for the tests. Conductivity (SM 2510 B) and pH (SM 4500-H+ B) measurements, in umhos/cm and standard units, respectively, were checked on each lot of water prior to use to confirm water hardness.

## 2.4 Test Concentrations

The test concentrations used in the chronic toxicity tests were 100.0, 80.0, 56.0, 42.0 and 32.0 percent effluent and a control. The lethal and sub-lethal critical dilution was 100.0 and 80.0 percent effluent, respectively. The *Ceriodaphnia* test was conducted using 10 replicates of one animal each for a total of 10 animals per concentration. The fathead minnow test was conducted using five replicates of eight animals each for a total of 40 animals per concentration.

## 2.5 Sample Collection

Three composite samples of Outfall 001 were collected by city personnel on October 24, 26 and 28, 2022, at 0800 hours, for the minnow test, and on October 26, 28 and 31, 2022, at 0800 hours for the *Ceriodaphnia dubia* test. Upon collection and completion of each composite, the samples were packed in ice and delivered the same day to the laboratory by hotshot service. The temperature upon arrival each of the effluent samples was 1.3, 1.9, 2.5 and 1.2<sup>0</sup> Celsius, respectively.

## 2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number, and refrigerated unless needed. Prior to use, the samples were warmed to 25±1<sup>0</sup> Celsius. Total residual chlorine levels were measured in milligrams/Liter (mg/L) with a test strip and recorded if present. Total ammonia levels were measured in mg/L using a test strip. In the minnow test, each sample was treated with an 18-watt ultraviolet light (UV) at a rate of 113 ml/minute, with an extra 100 percent dilution set up with the treated portion. This was to document any toxicity that may be due to pathogen interference. Dissolved oxygen (4500-O G) and pH (4500-H+ B) measurements were measured in mg/L and standard units, respectively, on the control and each concentration at test initiation, at test renewal and at test termination. Conductivity (2510 B) measurements in umhos/cm were also taken at test initiation and at each renewal. Alkalinity (2320 B) and hardness (2340 C) levels were measured in mg/L as CaCO<sub>3</sub> on the control and the undiluted effluent samples.

## 2.7 Monitoring of the Tests

The cladoceran test was run in a Precision<sup>R</sup> dual-programmable, illuminated incubator at a temperature of 25±1<sup>0</sup> Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor<sup>R</sup> heated liquid circulator to keep a constant temperature of 25±1<sup>0</sup> Celsius. Data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

## 2.8 Data Analysis

*Ceriodaphnia dubia* survival data was analyzed using Fisher's Exact Test, an equality test comparing concentration data to control data. Reproduction data was analyzed using Dunnett's Test, a parametric test comparing concentration data to control data. Fathead minnow survival and growth (biomass) data was also analyzed using Dunnett's Test. Other test endpoints were obtained by approved EPA methods of analysis.

## 3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. Ninety percent survival occurred in the control and 60.0 percent survival occurred in the 100.0 percent critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the 80.0 percent critical dilution was 22.0 and 14.0, respectively. The NOEC for survival and reproduction in this test was 100.0 and 80.0 percent effluent, respectively (p=.05).

The fathead minnow test results can be found in Table 2. After seven days of exposure, 98.0 percent survival occurred in the control and 72.0 percent survival occurred in the 100.0 percent critical dilution. The average weight gained per minnow in the control and in the 80.0 percent critical dilution was 0.790 and 0.620 milligram (mg), respectively. The NOEC for survival and growth in this test was 80.0 and 42.0 percent effluent, respectively (p=.05). Eighty percent survival occurred in the UV-treated 100.0 percent test concentration.

**Table 1: Results of the Chronic Definitive *Ceriodaphnia dubia* Test**

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	90.0		23.0	22.0	
32.0	80.0		15.0	13.0	
42.0	80.0		19.0	16.0	
56.0	70.0		18.0	14.0	
80.0	90.0		16.0	14.0	
100.0	60.0		15.0	9.6	*

\*significant when compared to the control (p=.05). Test validity based on mean number of neonates per surviving female. NOEC value based on total mean number of neonates. +accidental death.

**Table 2: Results of the Chronic Definitive Fathead Minnow Test**

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	98.0		0.790	
32.0	95.0		0.690	
42.0	95.0		0.680	
56.0	90.0		0.600	*
80.0	95.0		0.620	*
100.0	72.0	*	0.370	*
100.0 UV	80.0	*	0.370	*

\*significant when compared to the control (p=.05). +Test validity based on mean dry weight per surviving larvae in the control. NOEC value based on mean dry weight per the number of larvae at the start of the test.

The monthly chronic reference toxicant tests demonstrated that the test organisms were within the acceptable sensitivity levels. The graphs of the results of the chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

#### 4.0 Conclusions

The three composite samples of Outfall 001 collected from the wastewater plant serving the city of Magnolia, Arkansas, on October 26, 28 and 31, 2022, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100.0 percent critical dilution after seven days of exposure (p=.05). Sub-lethal effects (i.e., reproduction) were not noted in the 80.0 percent dilution (p=.05). The three composite samples collected on October 24, 26 and 28, 2022, were found to be lethally toxic to the *Pimephales promelas* test organisms in the 100.0 percent critical dilution after seven days exposure. Treating the sample with UV-light did not significantly increase survival in the minnow test.

## 5.0 References

- EPA, 2002. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. EPA-821-R-02-013, Office of Water.
- EPA, 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. EPA-833-R-00-003, Office of Wastewater Management.
- EPA, 2000. Method Guidance and Recommendations for Whole Effluent (WET) Testing. EPA-821-B-00-04, Office of Water
- APHA, 2012. Standard Methods for The Examination of Water and Wastewater. 22<sup>nd</sup> Edition.



**APPENDIX A**  
**CHAIN-OF-CUSTODY DOCUMENTS**

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278



**Bio-Analytical Laboratories**  
 3240 Spurgin Road  
 Post Office Box 527  
 Doyline, LA 71023  
 (318) 746-2772  
 1-800-258-1246  
 Fax: (318) 746-2773

Company:		Phone:		Project Number:		Laboratory Use Only:	
City of Magnolia		(870) 234-2955		X8521		Temp. upon arrival: 11.3	
Address:		Fax:		Therm #: 29		Color: clear	
P.O. Box 666, Magnolia, AR 71753		(870) 234-2203		Odor: none		Tech: JMN	
Permit #:		Purchase Order:		Lab Control Number:		Preservative: (below)	
AR0043613/AFIN 14-00059				L23873		ICE	
Sampler's Signature/Printed Name/Affiliation:				Analysis:			
Joni Love   Travel Love   mwws				Fecal Coliform			
Date Start / Date End				Acute Ceriodaphnia			
Time Start / Time End				Acute Mysis			
C G # and type of container				Acute Daphnia species			
X 8 half gallons				Acute minnow (fresh/marine)			
Sample Identification				Chronic minnow			
001				Chronic Ceriodaphnia			
Date Start / Date End		C		G		Received by/Affiliation:	
10/23/22 - 10/24/22		X		800-800		Joni Love   mwws	
Time		Date		Time		Date	
8:00 - 8:00		10/24/22		4:48		10/24/22	
Relinquished by/Affiliation:				Received by/Affiliation:			
Joni Love   mwws				Joni Love   mwws			
Date		Time		Date		Time	
10/24/22		4:48		10/24/22		13:05	
Relinquished by/Affiliation:				Received by/Affiliation:			
Joni Love   mwws				Joni Love   mwws			
Date		Time		Date		Time	
10/24/22		13:05		10/24/22		13:05	
Method of Shipment:				Tracking #			
Lab <input checked="" type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Other <input checked="" type="checkbox"/>							
Comments:							
COC Rev.3.1							

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278



**Bio-Analytical Laboratories**  
3240 Spaurin Road  
Post Office Box 527  
Doyline, LA 71023  
(318) 745-2772  
1-800-258-1248  
Fax: (318) 745-2775

Laboratory Use Only:

<b>Company:</b> City of Magnolia		<b>Phone:</b> (870) 234-2955		<b>Project Number:</b> X8521	
<b>Address:</b> P.O. Box 666, Magnolia, AR 71753		<b>Fax:</b> (870) 234-2203		<b>Temp. upon arrival:</b> Therm #: 29	
<b>Permit #:</b> AR0043613/AFIN 14-00059		<b>Purchase Order:</b>		<b>Color:</b> Clear	
<b>Sampler's Signature/Printed Name/Affiliation:</b> [Signature] Mike Love / Tracee Love / MWWS		<b>Lab Control Number:</b> C23881		<b>Odor:</b> None	
<b>Date Start / Date End:</b> 10/25/22 - 10/26/22		<b>Time Start / Time End:</b> 800 - 800		<b>Tech:</b> GDD	
<b>Date:</b> 10/26/22		<b># and type of container:</b> 8 half gallons		<b>Preservative: (below)</b> ICE	
<b>Relinquished by/Affiliation:</b> [Signature] Mike Love / MWWS		<b>C</b>		<b>Received by/Affiliation:</b> [Signature] GDD	
<b>Relinquished by/Affiliation:</b>		<b>G</b>		<b>Received by/Affiliation:</b>	
<b>Relinquished by/Affiliation:</b>		<b>X</b>		<b>Received by/Affiliation:</b>	
<b>Relinquished by/Affiliation:</b>		<b>Sample Identification:</b> 001		<b>Date:</b> 10/26/22	
<b>Relinquished by/Affiliation:</b>		<b>Time:</b>		<b>Date:</b>	
<b>Relinquished by/Affiliation:</b>		<b>Time:</b>		<b>Date:</b>	
<b>Relinquished by/Affiliation:</b>		<b>Time:</b>		<b>Date:</b>	
<b>Method of Shipment:</b>		<b>Lab</b> <input checked="" type="checkbox"/> <b>Bus</b> <input type="checkbox"/> <b>Fed Ex</b> <input type="checkbox"/> <b>DHL</b> <input type="checkbox"/> <b>UPS</b> <input type="checkbox"/> <b>Client</b> <input type="checkbox"/> <b>Other</b> <input type="checkbox"/> <b>Tracking #</b>		<b>Time:</b>	
<b>Comments:</b>				<b>Time:</b>	
				<b>Time:</b>	

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ TI04704278



**Bio-Analytical Laboratories**

3240 Spaurgin Road  
 Suite Office, Box 227  
 Doyline, LA 71025  
 (318) 745-2772  
 1-800-258-1246  
 Fax: (318) 745-2773

<b>Company:</b> City of Magnolia		<b>Phone:</b> (870) 234-2955		<b>Project Number:</b> X8521	
<b>Address:</b> P.O. Box 666, Magnolia, AR 71753		<b>Fax:</b> (870) 234-2203		<b>Temp. upon arrival:</b> 2.5 <b>Therm #: 24</b>	
<b>Permit #:</b> AR0043613/AFIN 14-00059		<b>Purchase Order:</b>		<b>Color:</b> clear <b>Odor:</b> none <b>Tech:</b> SGN	
<b>Sampler's Signature/Printed Name/Affiliation:</b> <i>Mike Lowe / Trace Love / MWNWS</i>		<b>Lab Control Number:</b> C23897		<b>Preservative:</b> (below) ICE	
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification
10/27/22 - 10/28/22	800 - 800	X		8 half gallons	001
<b>Relinquished by/Affiliation:</b> <i>Mike Lowe / MWNWS</i>		<b>Received by/Affiliation:</b> <i>[Signature]</i>		<b>Date:</b> 10/28/22 <b>Time:</b> 947	<b>Date:</b> 10/28/22 <b>Time:</b> 0950
<b>Relinquished by/Affiliation:</b>		<b>Received by/Affiliation:</b>		<b>Date:</b> <b>Time:</b>	<b>Date:</b> <b>Time:</b>
<b>Relinquished by/Affiliation:</b>		<b>Received by/Affiliation:</b>		<b>Date:</b> 10/29/22 <b>Time:</b> 1220	<b>Date:</b> 10/28/22 <b>Time:</b> 1220
<b>Method of Shipment:</b>		Lab ___ Bus ___ Fed Ex ___	DHL ___ UPS ___	Client <input checked="" type="checkbox"/> Other <input type="checkbox"/> Tracking # _____	
<b>Comments:</b>					
COC Rev.3.1					



**APPENDIX B  
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X8521 Date start: 10/26/22 Date end: 11/2/22  
 11/2/22  
 11/1/22<sup>EDW</sup> 11/2/22

Client/Contact: MAGN/Magnolia Waste Water  
 Address: P.O. Box 666 Magnolia AR 71753  
 NPDES#: AR0043613  
 Sample Description: 001 Dilution Water: Soft Reconstituted  
 Test Temperature(°C) 25±1° Technicians: EGB/EDW/AM/PM

Adults isolated: Date 10/25/22 Time: 2330

Neonates collected: Date 10/26/22 Time: 0650 Board: U05  
 Dissolved Oxygen Meter: Model YSI550 Serial #02F0741 AH  
 pH Meter: Model Orion 230A+ Serial #015253  
 Conductivity Meter: Model YSI EC300A Serial# JC02714

Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0. <u>8.2/96.8% / EDW</u>	0. <u>NO / EDW</u>	0. _____	0. _____
1. <u>7.6/93.9% / EDW</u>	1. <u>NO / EDW</u>	1. _____	1. _____
2. <u>7.5/91.6% / EDW</u>	2. <u>NO / EDW</u>	2. _____	2. _____
3. <u>6.4/74.9% / EGB</u>	3. <u>Y / 7.7/88.5% / EGB</u>	3. _____	3. _____
4. <u>5.4/64.0% / EGB</u>	4. <u>Y / 7.2/83.5% / EGB</u>	4. _____	4. _____
5. <u>6.6/78.3% / AM</u>	5. <u>Y / 7.0/82.4% / AM</u>	5. _____	5. _____
6. <u>6.4/77.6% / AM</u>	6. <u>Y / 7.0/84.6% / AM</u>	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in Use
1. <u>&lt;0.5 / EDW</u>	1. <u>NO / EDW</u>	1. <u>&lt;0.5 / EDW</u>	1. <u>C23881 10/26/22</u>
2. <u>&lt;0.5 / EGB</u>	2. <u>NO / EGB</u>	2. <u>&lt;0.5 / EGB</u>	2. <u>C23897 10/29/22</u>
3. <u>&lt;0.5 / AM</u>	3. <u>NO / AM</u>	3. <u>1.01 / AM</u>	3. <u>C23902 11-1-22</u>

Comments:

CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST-LIVE NEONATE PRODUCTION- EPR 99-16-00

Project# X8521 Client Magnolia

Test started: Date 10/26/02 Time 1520

Sample ID 001

Date/Tech: Day 0 10/26/02 Time 1520 Test ended: Date 11/2/02 Time 1350

Time: Day 0 1520 1 1425 2 1340 3 1510 4 1515 5 1452 6 1315 7 1350 8

Temp. (°C): Day 0 24.9 1 24.7 2 24.5 3 24.9 4 24.9 5 24.3 6 24.1 7 24.1 8

Conc %	Day	1	2	3	4	5	6	7	8	9	10	Number of Live	
0 soft	1	0										10	
	2	0										10	
	3	0										10	
	4	0	1/2	0	0	0	1/3	1/3	1/2	0	0	1/3	10
	5	4/8	2/9	1/5	0	0	0	2/7	2/7	1/9	1/1	2/8	10
	6	0	0	2/7	1/2/10	2/9	0	X	0	0	1/7	0	9
	7	2/11/6	3/12	3/14	3/13	3/12	3/13			2/9	3/13	3/14	9
	8												
32.0	1	0										10	
	2	0										10	
	3	0										10	
	4	1/3	1/4	0	0	X	0					9	
	5	2/9	2/9	0	0		1/1	1/6	1/6	1/4	0	1/3	9
	6	0	X	0	0		0	0	0	2/3	0	1/3	9
	7	3/12		1/2	1/3		2/9	3/13	3/12	2/8	2/9		8
	8												
42.0	1	0										10	
	2	0										10	
	3	0										10	
	4	1/5	1/4	X	0	1/3	0	0	1/5	1/2	1/6	1/6	9
	5	2/8	2/4		0	0	0	1/5	2/7	0	2/3	0	9
	6	0	X		1/3	2/4	1/7	0	2/1	2/3	0	0	8
	7	3/12			2/9	3/14	2/9	2/10	3/14	2/9	3/14		8
	8												
56.0	1	0										10	
	2	0										10	
	3	0										10	
	4	1/6	1/5	0	0	0	1/2	1/6	1/5	X	1/5	1/5	9
	5	2/1	2/6	X	0	0	0	0	2/7		1/1	1/1	7
	6		0		0	1/2	0	2/4	0		2/4	0	7
	7		3/12		1/3	2/9	2/10	3/13	3/12		3/13		7
	8												
80.0	1	0										10	
	2	0										10	
	3	0										10	
	4	1/2	1/3	0	0	0	0	1/4	1/3	0	1/3	1/3	10
	5	2/6	1/1	0	0	1/1	0	2/5	2/7	1/1	2/5	2/5	10
	6	0	0	1/1	X	1/3	1/5	0	0	0	0	0	9
	7	3/12	2/9	2/7		2/10	2/11	3/12	3/13	2/6	3/10		9
	8												
100.0	1	0										10	
	2	0										10	
	3	0										10	
	4	1/6	1/5	0	X	X	0	X	4	1/3	0	1/5	7
	5	0	2/3	0			X			2/5	0	2/3	6
	6	0	0	0						0	1/2	2/2	6
	7	2/9	3/13	1/3						3/12	2/9	9/12	6
	8												

Key: X=dead adult, X<sup>n</sup>=adult had n neonates before death, M=male.  
B/N = Brood count/#neonates



BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA (CHR CHEM Rev.4.0)

Project# X8521 Client magnolia Organism C. dubia

Date	Day 0 10/26/22 5255	Day 1 10/27/22 5261	Day 2 10/28/22	Day 3 10/29/22	Day 4 10/30/22 5265	Day 5 10/31/22	Day 6 11/1/22	Day 7 11/2/22	Day 8
Concentration:	0 soft								
Temperature (°C)	24.6	24.1 25.1	23.9 23.5	23.6 23.4	24.4 23.2	24.4 26.0	23.6 22.8	24.1	
pH	7.1	7.3 7.9	7.7 7.5	7.1 7.0	7.2 7.0	7.6 7.4	7.8 7.6	7.4	
DO (mg/l)	7.5	7.2 7.6	7.3 8.0	8.0 7.3	7.5 7.6	7.5 7.6	8.0 8.4	7.6	
Cond (umhos/cm)	180	185	169	163	164	162	171		
Concentration:	32.0%								
Temperature (°C)	24.4	23.9 25.1	22.9 23.9	24.8 24.3	24.6 23.7	24.2 25.5	23.8 23.2	23.9	
pH	7.2	7.4 7.3	7.5 7.4	7.1 7.1	7.7 7.1	7.7 7.4	7.6 7.4	7.5	
DO (mg/l)	7.4	7.3 7.5	7.4 7.7	8.0 7.5	7.6 7.5	7.2 7.1	8.0 8.0	7.4	
Cond (umhos/cm)	307	306	286	288	306	288	234		
Concentration:	42.0%								
Temperature (°C)	24.3	23.9 25.2	23.4 24.1	24.2 23.9	24.6 23.6	24.3 25.3	23.6 23.5	24.3	
pH	7.2	7.3 7.3	7.4 7.5	7.5 7.3	7.7 7.5	7.8 7.6	7.4 7.4	7.4	
DO (mg/l)	7.4	7.2 7.4	7.3 7.7	7.9 7.4	7.6 7.4	7.3 7.1	8.0 7.8	7.6	
Cond (umhos/cm)	359	354	342	352	351	352	263		
Prerenewal Tech Initials/Time		EDM 1435	EDM 1340	EDB 1515	EDB 1515	1455 AM	1317 AM	EDM 1350	
Postrenewal Tech Initials/Time	EDM 1430	EDM 0930	EDM 0930	EDB 0905	EDB 0815	1042 AM	1013 AM		

Control Alkalinity (mg/L as CaCO<sub>3</sub>) \_\_\_\_\_ Control Hardness (mg/L as CaCO<sub>3</sub>) \_\_\_\_\_

ID# 5255 Result 28 Date Tested 10/27/22 ID# 5255 Result 88 Date Tested 10/29/22  
 ID# 5261 Result 44 Date Tested 10/27/22 ID# 5261 Result 89 Date Tested 10/27/22  
 ID# 5265 Result 28 Date Tested 11/3/22 ID# 5265 Result 52 Date Tested 11/3/22

Sample Alkalinity (mg/L as CaCO<sub>3</sub>) \_\_\_\_\_ Sample Hardness (mg/L as CaCO<sub>3</sub>) \_\_\_\_\_

ID# C23881 Result 200 Date Tested 10/27/22 ID# C23881 Result 52 Date Tested 11/27/22  
 ID# C23897 Result 200 Date Tested 11/3/22 ID# C23897 Result 52 Date Tested 11/3/22  
 ID# C23902 Result 128 Date Tested 11/3/22 ID# C23902 Result 20 Date Tested 11/3/22

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA (CHR CHEM Rev.4.0)

Project# X8521 Client Magnolia

Organism C. dubia

Date	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Concentration: <u>56.0%</u>									
Temperature (°C)	<u>24.1</u>	<u>23.9</u>	<u>24.1</u>	<u>24.4</u>	<u>24.6</u>	<u>24.1</u>	<u>23.5</u>	<u>24.1</u>	
pH	<u>7.5</u>	<u>7.3</u>	<u>7.4</u>	<u>7.7</u>	<u>7.9</u>	<u>8.0</u>	<u>7.7</u>	<u>7.4</u>	
DO (mg/l)	<u>7.7</u>	<u>7.2</u>	<u>7.3</u>	<u>7.1</u>	<u>7.8</u>	<u>7.5</u>	<u>7.9</u>	<u>7.6</u>	
Cond (umhos/cm)	<u>411</u>	<u>434</u>	<u>411</u>	<u>414</u>	<u>418</u>	<u>418</u>	<u>304</u>		
Concentration: <u>80.0%</u>									
Temperature (°C)	<u>23.9</u>	<u>24.1</u>	<u>23.9</u>	<u>24.6</u>	<u>24.6</u>	<u>24.2</u>	<u>23.4</u>	<u>23.9</u>	
pH	<u>7.5</u>	<u>7.2</u>	<u>7.3</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>7.4</u>	
DO (mg/l)	<u>7.3</u>	<u>7.1</u>	<u>7.4</u>	<u>8.0</u>	<u>7.8</u>	<u>7.6</u>	<u>7.9</u>	<u>7.6</u>	
Cond (umhos/cm)	<u>500</u>	<u>550</u>	<u>522</u>	<u>503</u>	<u>525</u>	<u>528</u>	<u>361</u>		
Concentration: <u>100.0%</u>									
Temperature (°C)	<u>23.6</u>	<u>24.1</u>	<u>24.2</u>	<u>24.6</u>	<u>24.6</u>	<u>24.4</u>	<u>23.5</u>	<u>24.1</u>	
pH	<u>7.5</u>	<u>7.3</u>	<u>7.4</u>	<u>7.9</u>	<u>8.0</u>	<u>7.9</u>	<u>7.8</u>	<u>7.5</u>	
DO (mg/l)	<u>7.6</u>	<u>7.0</u>	<u>7.3</u>	<u>7.9</u>	<u>7.9</u>	<u>7.7</u>	<u>7.8</u>	<u>7.6</u>	
Cond (umhos/cm)	<u>600</u>	<u>632</u>	<u>600</u>	<u>583</u>	<u>616</u>	<u>612</u>	<u>420</u>		
Prerenewal Tech Initials/Time		<u>EDW 1425</u>	<u>EDW 1340</u>	<u>EBB 1515</u>	<u>EBB 1515</u>	<u>AK 1455</u>	<u>AK 1317</u>	<u>EDW 1350</u>	
Postrenewal Tech Initials/Time	<u>EDW 1430</u>	<u>EDW 0930</u>	<u>EDW 0930</u>	<u>EBB 0905</u>	<u>EBB 0815</u>	<u>AK 1042</u>	<u>AK 1015</u>		

Control Alkalinity (mg/L as CaCO<sub>3</sub>)

Control Hardness (mg/L as CaCO<sub>3</sub>)

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

Sample Alkalinity (mg/L as CaCO<sub>3</sub>)

Sample Hardness (mg/L as CaCO<sub>3</sub>)

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

**CETIS Test Data Worksheet**

Report Date: 24 Oct-22 09:14 (p 1 of 2)  
 Test Code/ID: 5C430EB7 / 15-4789-8551

**Ceriodaphnia 7-d Survival and Reproduction Test** Bio-Analytical Laboratories

Start Date: 25 Oct-22 09:59 Species: Ceriodaphnia dubia Sample Code: 5C80EA58  
 End Date: 01 Nov-22 12:45 Protocol: EPA/821/R-02-013 (2002) Sample Source: AR0043613  
 Sample Date: 24 Oct-22 08:00 Material: POTW Effluent Sample Station: 001

Conc-%	Code	Rep	Pos	# Exposed	1d Surv	2d Surv	3d Surv	4d Surv	5d Surv	6d Surv	7d Surv	8d Surv	2d Neo
32		4	1	1									0
100		6	2	1									0
80		9	3	1									0
42		8	4	1									0
32		10	5	1									0
80		4	6	1									0
80		1	7	1									0
56		10	8	1									0
0	D	4	9	1									0
32		7	10	1									0
0	D	10	11	1									0
42		3	12	1									0
42		9	13	1									0
42		7	14	1									0
32		1	15	1									0
100		7	16	1									0
56		6	17	1									0
0	D	8	18	1									0
0	D	2	19	1									0
32		2	20	1									0
100		5	21	1									0
32		3	22	1									0
80		2	23	1									0
42		10	24	1									0
80		3	25	1									0
100		2	26	1									0
56		1	27	1									0
56		8	28	1									0
42		4	29	1									0
100		3	30	1									0
100		4	31	1									0
80		8	32	1									0
80		5	33	1									0
42		6	34	1									0
0	D	6	35	1									0
0	D	5	36	1									0
0	D	7	37	1									0
42		2	38	1									0
0	D	1	39	1									0
56		2	40	1									0
0	D	3	41	1									0
56		7	42	1									0

**CETIS Test Data Worksheet**

Report Date: 24 Oct-22 09:14 (p 2 of 2)  
 Test Code/ID: 5C430EB7 / 15-4789-8551

Conc-%	Code	Rep	Pos	# Exposed	1d Surv	2d Surv	3d Surv	4d Surv	5d Surv	6d Surv	7d Surv	8d Surv	2d Neo
100		9	43	1								0	
56		5	44	1								0	
56		4	45	1								0	
80		10	46	1								0	
42		1	47	1								0	
56		3	48	1								0	
32		5	49	1								0	
80		6	50	1								0	
100		10	51	1								0	
42		5	52	1								0	
32		9	53	1								0	
100		1	54	1								0	
80		7	55	1								0	
56		9	56	1								0	
0	D	9	57	1								0	
32		8	58	1								0	
100		8	59	1								0	
32		6	60	1								0	

BIO-ANALYTICAL LABORATORIES  
CERIODAPHNIA DUBIA CHRONIC TEST  
PARENTAL BLOCK ASSIGNMENT RANDOM NUMBER TEMPLATE #3  
FOR 6 CONCENTRATION TEST

- Set #1  
2, 4, 1, 6, 3, 5 Parent# 6A
- Set #2  
3, 5, 1, 2, 4, 6 Parent# 6H
- Set #3  
3, 6, 2, 1, 5, 4 Parent# 76
- Set #4  
2, 4, 6, 1, 5, 3 Parent# 1F
- Set #5  
6, 2, 5, 3, 1, 4 Parent# 1H
- Set #6  
1, 3, 6, 5, 2, 4 Parent# 3H
- Set #7  
1, 2, 5, 6, 3, 4 Parent# 3F
- Set #8  
1, 6, 5, 3, 2, 4 Parent# 4C
- Set #9  
1, 6, 2, 4, 5, 3 Parent# 4F
- Set #10  
2, 1, 5, 3, 6, 4 Parent# 6F

EDW  
10/26/22

BIO-ANALYTICAL LABORATORIES  
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X8521 Date started: 10/25/22 Date ended 11-1-22

Client/Contact MAGN/Magnolia Waste Water  
Address P.O. Box 666 Magnolia AR 71753  
NPDES# AR0043613 AFIN14-00059  
Sample Description 001 Dilution Water Soft Reconstituted  
Test Temperature (°C) 25+1° Celsius Technicians EGB/EDW/AM/PM  
Test organism age <24hr Vendor/ID# BAL102422

Day	Feeding Times		
	AM	NOON	PM
0			
1	PM/0915/0.1ml	AM/1320/0.1ml	AM/1718/0.2ml
2	PM/0840/0.1ml	EDW/1300/0.10ml	AM/1815/0.1ml
3	EDW/0840/0.10ml	EDW/1310/0.0ml	PM/1705/0.1ml
4	PM/1000/0.1ml	PM/1400/0.1ml	PM/1700/0.1ml
5	PM/0810/0.2ml		PM/1625/0.1ml
6	PM/0825/0.1ml	EDW/1320/0.10ml	PM/1815/0.2ml
			AM/1845/0.1ml

Dissolved Oxygen Meter: Model YSI550  
pH Meter: Model Orion 230A+ Serial #02F0741 AH  
Conductivity Meter: Model YSI EC300A Serial #015253  
Serial #JC02714

Effluent Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0. 8.2/99.7% /EDW	0. No/EDW	0. _____	0. _____
1. 6.7/83.2% /AM	1. y/6/7.2/86.6% /AM	1. _____	1. _____
2. 7.1/69.3% /EDW	2. No/EDW	2. _____	2. _____
3. 7.5/91.6% /EDW	3. No/EDW	3. _____	3. _____
4. 6.4/74.9% /EDW	4. y/9/7.7/88.5% /EDW	4. _____	4. _____
5. 5.4/64.0% /EDW	5. y/21/7.2/83.5% /EDW	5. _____	5. _____
6. 6.6/78.3% /AM	6. y/18/7.0/82.4% /AM	6. _____	6. _____

Total Residual Chlorine (mg/L)/Tech

Dechlorinated? Amount?/Tech

Ammonia (NH3) (mg/L)/Tech

BAL Sample # Date in use

1. <0.5/EDW  
2. <0.5/EDW  
3. <0.5/EDW

1. No/EDW  
2. No/EDW  
3. No/EDW

1. 6.0/EDW  
2. 6.0/EDW  
3. <0.5/EDW

1. C23873 10/25/22  
2. C23881 10/27/22  
3. C23897 10/29/22

Comments: PM under supervision of staff EDW 11/9/22

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA- EPA 1000, OECD 210

Project# X8521

Client Magnolia

Test started: Date 10/25 Time 1540

Date/Tech: Day0 10/25/22 1 10/26 PM 2 10/27 PM 3 10/28 PM 4 10/29 PM 5 10/30 PM 6 10/31 PM 7 11-1-22

Time: Day0 1540 1 1435 2 1210 3 1545 4 1245 5 1200 6 1145 7 1534

Temp (°C) Day0 25.5 1 26.3 2 25.4 3 25.0 4 25.0 5 24.9 6 24.9 7 25.2

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	1	8	8	8	8	8	8	8	8
	2	8	8	8	8	8	8	8	8
	3	8	8	7	7	7	7	7	7
	4	8	8	8	8	8	8	8	8
	5	8	8	8	8	8	8	8	8
32.0	1	8	7	7	7	7	7	7	7
	2	8	8	8	8	8	8	8	8
	3	8	8	8	8	8	8	8	8
	4	8	8	8	8	8	8	8	8
	5	8	8	8	8	8	8	8	8
42.0	1	8	8	8	8	8	8	7	7
	2	8	8	8	8	8	8	8	8
	3	8	8	8	8	8	8	8	8
	4	8	8	8	8	8	8	8	8
	5	8	8	8	8	8	8	8	8
56.0	1	8	8	8	8	8	8	7	7
	2	8	8	8	8	8	8	8	8
	3	8	8	8	7	7	7	8	8
	4	8	8	8	8	8	5	5	5
	5	8	8	8	8	8	8	8	8
80.0	1	8	8	8	8	8	8	8	7
	2	8	8	8	8	8	7	7	7
	3	8	8	8	8	8	8	8	8
	4	8	8	8	8	7	7	7	7
	5	8	8	8	8	8	8	8	8
100.0	1	8	7	7	7	7	8	8	8
	2	8	8	8	8	8	5	5	5
	3	8	8	7	7	8	8	8	8
	4	8	8	7	5	4	4	4	4
	5	8	7	7	7	6	6	5	5

\*PM 10/28/22

\*PM 10/29/22

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA- EPA 1000, OECD 210

Project# X8521 Test started: Date 10/25/22 Time 1540  
 Client magnolol Sample ID 001 Test ended: Date 11-1-22 Time 1536  
 Date/Tech: Day0 10/25/22 PM 1 10/26 AM 2 10/27 PM 3 10/28 PM 4 10/29 PM 5 10/30 PM 6 10/31 PM 7 11-1-22 AM  
 Time: Day0 1540 1 1435 2 1210 3 1545 4 1245 5 1200 6 1145 7 1536  
 Temp (°C) Day0 25.5 1 26.3 2 23.9 3 25.0 4 25.0 5 24.9 6 24.9 7 25.2

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
100% UV	1	8	8	7	7	7	7	7	7
	2	8	7	6	5	5	5	5	5
	3	8	8	7	6	6	6	6.5 AM	6
	4	8	7	7	7	7	7	7	7
	5	8	8	8	7	7	7	7	7
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								



Project#/Client X8521  
Magnolia

Temp Start (°C) 95.5  
Temp End (°C) 105.6

Tech AM  
Tech AM

Date: 11-1-22 Time: 1538  
Date: 11/2/22 Time: 0845

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: Tech:	Wt. of pan + larvae(g)/ Date weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	1 36	1.0337 10/27/22 EPR	1.0404 11/3/22 PM				
	2 37	1.0321	1.0379				
	3 38	1.0417	1.0479				
	4 39	1.0390	1.0450				
	5 40	1.0409	1.0478				
32	1 41	1.0545	1.0598				
	2 42	1.0523	1.0576				
	3 43	1.0448	1.0511				
	4 44	1.0413	1.0469				
	5 45	1.0530	1.0581				
42	1 46	1.0376	1.0429				
	2 47	1.0381	1.0439				
	3 48	1.0348	1.0398				
	4 49	1.0449	1.0507				
	5 50	1.0539	1.0590				
56	1 51	1.0363	1.0415				
	2 52	1.0419	1.0475				
	3 53	1.0439	1.0484				
	4 54	1.0420	1.0466				
	5 55	1.0328	1.0369				
80	1 56	1.0418	1.0467				
	2 57	1.0423	1.0480				
	3 58	1.0372	1.0420				
	4 59	1.0447	1.0497				
	5 60	1.0399	1.0445				
100	1 61	1.0455	1.0476				
	2 62	1.0505	1.0553				
	3 63	1.0357	1.0394				
	4 64	1.0385	1.0406				
	5 65	1.0412	1.0434				

\* Test acceptance of control weight based on surviving larvae at end of test.

Calculated by: CEIS

Calculations checked by: EBB 11/10/22

Project#/Client X8521

Temp Start (°C) 95.5

Tech AM

Date: 11-1-22 Time: 1536

Magnolia

Temp End (°C) 105.6

Tech AM

Date: 11/2/22 Time: 0845

Conc. %	Replicate/Pan number	Wt. of pan(g)/ Date weighed: <u>10/27/22</u> Tech: <u>EDM</u>	Wt. of pan + larvae(g)/ Date weighed: <u>11/3/22</u> Tech: <u>DM</u>	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
100 UV	1	<u>66</u>	<u>1.0373</u>	<u>1.0408</u>			
	2	<u>67</u>	<u>1.0522</u>	<u>1.0544</u>			
	3	<u>68</u>	<u>1.0435</u>	<u>1.0467</u>			
	4	<u>69</u>	<u>1.0409</u>	<u>1.0442</u>			
	5	<u>70</u>	<u>1.0383</u>	<u>1.0410</u>			
	1						
	2						
	3						
	4						
	5						
	1						
	2						
	3						
	4						
	5						
	1						
	2						
	3						
	4						
	5						
	1						
	2						
	3						
	4						
	5						

\* Test acceptance of control weight based on surviving larvae at end of test.

Calculated by: CETTS

Calculations checked by: EUB 11/10/22

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA (CHR CHEM Rev.4.0)

Project# X8521 client Magnolia

Organism P. promelas

Date	Day 0 10/25/22 5258	Day 1 10/26/22	Day 2 10/27/22	Day 3 10/28/22 10/28/22	Day 4 10/29/22 5267	Day 5 10/30/22	Day 6 10/31/22	Day 7 11/1/22	Day 8
Concentration:	0 Soft								
Temperature (°C)	28.0	28.7	25.3* 29.3	23.4* 23.5	24.8 25.9	24.5	24.7 26.4	25.0	
pH	7.4	7.5	6.4* 7.5	6.6 7.4	6.7 7.2	6.9	6.5 7.0	6.6	
DO (mg/l)	7.5	6.9	5.8* 7.4	8.36* 7.5	6.4 7.3	6.0	5.1	5.9	
Cond (umhos/cm)	174	188	185	169	169	170	171		
Concentration:	32.0%								
Temperature (°C)	27.4	28.1	25.5* 28.4	23.4* 27.0	25.1 25.9	24.7	25.0	24.7	
pH	7.5	7.6	6.8* 7.4	6.9 7.3	7.1 7.3	7.0	6.7	6.6	
DO (mg/l)	7.2	7.0	5.6* 7.4	8.35.8 7.4	5.9 7.3	5.0	4.3	5.9	
Cond (umhos/cm)	306	335	338	310	306	320	317		
Concentration:	42.0%								
Temperature (°C)	26.4	27.9	25.5* 27.9	23.4* 26.9	25.1 25.1	24.9	25.1	24.8	
pH	7.5	7.6	7.0* 7.1	7.0 7.4	7.3 7.3	7.1	6.8	6.5	
DO (mg/l)	7.7	7.0	5.4* 7.4	8.35.7 7.4	5.5 7.3	4.6	3.2	5.7	
Cond (umhos/cm)	353	372	383	361	348	359	372		
Prerenewal Tech Initials/Time			1220 PM	1555 PM	1855 PM	1205 PM	1150 PM	1544 AM	
Postrenewal Tech Initials/Time	80W 1000	1017 AM	80W 0930	80W 0930	80B 0900	80B 0810	AM 1037	AM 1544	

Control Alkalinity (mg/L as CaCO<sub>3</sub>)      Control Hardness (mg/L as CaCO<sub>3</sub>) \*PM 10/25/22

ID# 5258 Result 360 Date Tested 10/27/22 ID# 5258 Result 64.0 Date Tested 10/27/22  
 ID# 5264 Result 440 Date Tested 11/3/22 ID# 5262 Result 68.0 Date Tested 11/3/22  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_ ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

Sample Alkalinity (mg/L as CaCO<sub>3</sub>)      Sample Hardness (mg/L as CaCO<sub>3</sub>)

ID# C23881 Result 200 Date Tested 10/27/22 ID# C23881 Result 52.0 Date Tested 10/27/22  
 ID# C23897 Result 220 Date Tested 11/3/22 ID# C23897 Result 52.0 Date Tested 11/3/22  
 ID# C23902 Result 228 Date Tested 11/3/22 ID# C23902 Result 22.0 Date Tested 11/3/22

\*PM 10/27/22 Technician forgot to take readings.

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA (CHR CHEM Rev.4.0)

Project# X8521 Client Magnolia

Organism P. Promelas

Date	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Concentration:	56.0%								
Temperature (°C)	26.5	* 27.4	25.5	23.4*	25.2	24.8	25.0	24.7	
pH	7.3	* 7.6	7.2	7.2	7.2	7.3	6.9	6.4	
DO (mg/l)	7.7	* 6.9	5.5	8.355	5.2	4.1	3.6	5.5	
Cond (umhos/cm)	399	445	450	424	413	424	429		
Concentration:	80.0%								
Temperature (°C)	25.8	* 27.3	25.4	23.4*	25.1	24.9	25.0	24.6	
pH	7.5	* 7.7	7.3	7.3	7.5	7.5	7.1	6.5	
DO (mg/l)	7.5	* 7.1	5.3	8.353	5.0	3.2	3.5	5.4	
Cond (umhos/cm)	515	544	564	531	523	511	533		
Concentration:	100.0%								
Temperature (°C)	24.8	* 26.2	25.0	23.4*	25.0	24.9	25.0	24.6	
pH	7.6	* 7.7	7.3	7.5	7.8	7.7	7.3	6.7	
DO (mg/l)	7.7	* 7.1	6.4	8.352	4.9	3.8	3.5	5.1	
Cond (umhos/cm)	595	633	643	622	601	600	634		
Prerenewal Tech Initials/Time		*	1220 PM	1555 PM	1255 PM	1205 PM	1150 PM	1544 AM	
Postrenewal Tech Initials/Time	EDW 1000	1017 AM	EDW 0930	EDW 0930	ZUB 0900	ELB 0810	1037 AM		

Control Alkalinity (mg/L as CaCO<sub>3</sub>)

Control Hardness (mg/L as CaCO<sub>3</sub>) \* PM 10/28/22

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

Sample Alkalinity (mg/L as CaCO<sub>3</sub>)

Sample Hardness (mg/L as CaCO<sub>3</sub>)

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_  
 ID# \_\_\_\_\_ Result \_\_\_\_\_ Date Tested \_\_\_\_\_

\*Technician forgot to take readings PM 10/27/22

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA (CHR CHEM Rev.4.0)

Project# X8521 Client Magnolia Organism P. promelas

Date	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Concentration:	100.0% UV								
Temperature (°C)	24.5	* 26.5	25.4	25.2 25.4	29.9	24.4	25.1	24.7	
pH	7.7	* 7.8	7.6	7.6	7.9	7.9	7.4	6.8	
DO (mg/L)	7.7	* 7.4	7.3	7.9	7.4	7.6	7.5	5.1	
Cond (umhos/cm)	599	611	632	622	69	7.2	6.2		
Concentration:	* 9M 10/28/12								
Temperature (°C)									
pH									
DO (mg/L)									
Cond (umhos/cm)									
Concentration:									
Temperature (°C)									
pH									
DO (mg/L)									
Cond (umhos/cm)									
Prerenewal Tech Initials/Time		* 12:20 PM	1:55 PM	12:58 PM	12:05 PM	11:50 PM	15:44 PM		
Postrenewal Tech Initials/Time	SDW 10:00	10:17 AM	SDW 09:30	SDW 09:30	EB 09:50	EB 08:10	10:37 AM		

Control Alkalinity (mg/L as CaCO<sub>3</sub>) Control Hardness (mg/L as CaCO<sub>3</sub>)

ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____
ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____
ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____

Sample Alkalinity (mg/L as CaCO<sub>3</sub>) Sample Hardness (mg/L as CaCO<sub>3</sub>)

ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____
ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____
ID# _____	Result _____	Date Tested _____	ID# _____	Result _____	Date Tested _____

\* Technician forgot to take readings.

**CETIS Test Data Worksheet**

Report Date: 24 Oct-22 09:14 (p 1 of 1)  
 Test Code/ID: 1A754197 / 04-4389-2119

**Fathead Minnow 7-d Larval Survival and Growth Test**

Bio-Analytical Laboratories

Start Date: 25 Oct-22 10:05 Species: Pimephales promelas Sample Code: 3BFF35D1  
 End Date: 01 Nov-22 09:32 Protocol: EPA/821/R-02-013 (2002) Sample Source: AR0043613  
 Sample Date: 24 Oct-22 08:00 Material: POTW Effluent Sample Station: 001

Conc-%	Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Td Weigh
101		5	1									
42		4	2									
101		2	3									
0	D	4	4									
42		1	5									
100		2	6									
56		1	7									
42		5	8									
0	D	5	9									
32		3	10									
101	/	3	11									
42		3	12									
56		4	13									
101	✓	4	14									
56		2	15									
80		3	16									
56		3	17									
100	/	3	18									
100		1	19									
80		1	20									
100		5	21									
80	-	5	22									
100	/	4	23									
80		4	24									
80		2	25									
56		5	26									
32		5	27									
0	D	3	28									
0	D	2	29									
42	/	2	30									
32		2	31									
0	D	1	32									
32		4	33									
32		1	34									
101		1	35									

**APPENDIX C**  
**STATISTICAL ANALYSIS**

**CETIS Analytical Report**

Report Date: 08 Nov-22 16:36 (p 1 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

**Ceriodaphnia 7-d Survival and Reproduction Test**

Bio-Analytical Laboratories

Analysis ID: 03-4136-7091	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:36	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 08 Nov-22 16:27	MD5 Hash: 037EF0389D731A83014E5CDA2D3D8029	Editor ID: 008-522-314-5
Batch ID: 14-2146-4387	Test Type: Reproduction-Survival (2-8d)	Analyst:
Start Date: 26 Oct-22 15:20	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 02 Nov-22 13:50	Species: Ceriodaphnia dubia	Brine:
Test Length: 6d 22h	Taxon: Branchiopoda	Source: In-House Culture      Age: <24
Sample ID: 15-5195-2472	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 26 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 26 Oct-22 12:20	CAS (PC):	Station: 001
Sample Age: 7h (1.9 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

**Fisher Exact/Bonferroni-Holm Test**

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	0.50	Exact	1.0000	Non-Significant Effect
		42	0.50	Exact	1.0000	Non-Significant Effect
		56	0.29	Exact	1.0000	Non-Significant Effect
		80	0.76	Exact	0.7632	Non-Significant Effect
		100	0.15	Exact	0.7585	Non-Significant Effect

**7d Survival Rate Frequencies**

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	9	1	10	0.90	0.10	0.00%
32		8	2	10	0.80	0.20	11.11%
42		8	2	10	0.80	0.20	11.11%
56		7	3	10	0.70	0.30	22.22%
80		9	1	10	0.90	0.10	0.00%
100		6	4	10	0.60	0.40	33.33%

**7d Survival Rate Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	0.90	0.67	1.00	1.00	0.00	1.00	0.10	35.14%	0.00%
32		10	0.80	0.50	1.00	1.00	0.00	1.00	0.13	52.70%	11.11%
42		10	0.80	0.50	1.00	1.00	0.00	1.00	0.13	52.70%	11.11%
56		10	0.70	0.35	1.00	1.00	0.00	1.00	0.15	69.01%	22.22%
80		10	0.90	0.67	1.00	1.00	0.00	1.00	0.10	35.14%	0.00%
100		10	0.60	0.23	0.97	1.00	0.00	1.00	0.16	86.07%	33.33%

**7d Survival Rate Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
32		1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
42		1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
56		0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
80		1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
100		1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00



# CETIS Analytical Report

Report Date: 08 Nov-22 16:36 (p 2 of 2)  
 Test Code/ID: 5C430EB7 / 15-4789-8551

## Ceriodaphnia 7-d Survival and Reproduction Test

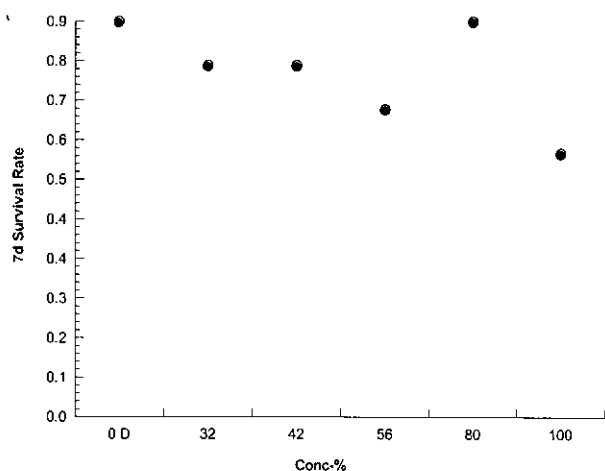
Bio-Analytical Laboratories

Analysis ID: 03-4136-7091	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:36	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 08 Nov-22 16:27	MD5 Hash: 037EF0389D731A83014E5CDA2D3D8029	Editor ID: 008-522-314-5

### 7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
32		1/1	0/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
42		1/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
56		0/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
80		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	0/1	0/1	0/1	0/1	1/1	1/1	1/1

### Graphics



**CETIS Analytical Report**

Report Date: 08 Nov-22 16:40 (p 1 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

Ceriodaphnia 7-d Survival and Reproduction Test **SURVIVING** Bio-Analytical Laboratories

Analysis ID: 06-9027-2374	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:39	Analysis: Parametric-Multiple Comparison	Status Level: 1
Edit Date: 08 Nov-22 16:39	MD5 Hash: 0A760E2BB6DDDF01C62A9428490EDC1	Editor ID: 008-522-314-5
Batch ID: 14-2146-4387	Test Type: Reproduction-Survival (2-8d)	Analyst:
Start Date: 26 Oct-22 15:20	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 02 Nov-22 13:50	Species: Ceriodaphnia dubia	Brine:
Test Length: 6d 22h	Taxon: Branchiopoda	Source: In-House Culture <span style="float: right;">Age: &lt;24</span>
Sample ID: 15-5195-2472	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 26 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 26 Oct-22 12:20	CAS (PC):	Station: 001
Sample Age: 7h (1.9 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	8.4	36.46%

**Bonferroni Adj t Test**

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32*	2.5	2.4	7.7	15	CDF	0.0370	Significant Effect
		42	1.2	2.4	7.7	15	CDF	0.5798	Non-Significant Effect
		56	1.4	2.4	8	14	CDF	0.4375	Non-Significant Effect
		80	2.4	2.4	7.5	16	CDF	0.0522	Non-Significant Effect
		100	2.2	2.4	8.4	13	CDF	0.0813	Non-Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	410.214	82.0428	5	1.9	0.1154	Non-Significant Effect
Error	1771.02	43.1956	41			
Total	2181.23		46			

**ANOVA Assumptions Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	12	15	0.0307	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.93	0.2082	Normal Distribution

**Reproduction Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	9	23	21	25	23	18	26	0.78	10.20%	0.00%
32		8	15	7.1	23	14	2	26	3.3	62.70%	35.33%
42		8	19	14	24	18	12	27	2	29.24%	16.85%
56		7	18	11	26	23	3	24	3	43.17%	19.88%
80		9	16	11	20	16	7	23	1.9	35.95%	32.37%
100		6	15	7.6	23	18	3	22	3	47.87%	33.33%

**Reproduction Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	24	23	26	23	24	23	18	21	25	
32		24	2	3	13	26	24	15	12		
42		25	12	21	16	15	27	14	23		
56		23	3	21	12	23	24	23			
80		20	13	8	14	16	21	23	7	18	
100		15	21	3	20	11	22				

**CETIS Analytical Report**

Report Date: 08 Nov-22 16:41 (p 1 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

**Ceriodaphnia 7-d Survival and Reproduction Test**

Bio-Analytical Laboratories

Analysis ID: 17-0104-1898	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:41	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:40	MD5 Hash: 983FE6A6CFD3EF7C2BD6CADE86953147	Editor ID: 008-522-314-5
Batch ID: 14-2146-4387	Test Type: Reproduction-Survival (2-8d)	Analyst:
Start Date: 26 Oct-22 15:20	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 02 Nov-22 13:50	Species: Ceriodaphnia dubia	Brine:
Test Length: 6d 22h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 15-5195-2472	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 26 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 26 Oct-22 12:20	CAS (PC):	Station: 001
Sample Age: 7h (1.9 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	80	100	89.44	1.25	8.6	39.98%

**Dunnnett Multiple Comparison Test**

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	2.2	2.3	8.6	18	CDF	0.0572	Non-Significant Effect
		42	1.5	2.3	8.6	18	CDF	0.2313	Non-Significant Effect
		56	2.1	2.3	8.6	18	CDF	0.0714	Non-Significant Effect
		80	2	2.3	8.6	18	CDF	0.0884	Non-Significant Effect
		100*	3.2	2.3	8.6	18	CDF	0.0054	Significant Effect

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	795.283	159.057	5	2.2	0.0638	Non-Significant Effect
Error	3841.7	71.1426	54			
Total	4636.98		59			

**ANOVA Assumptions Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	5.1	15	0.3988	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.95	0.0248	Normal Distribution

**Reproduction Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	22	18	25	23	9	26	1.6	22.91%	0.00%
32		10	13	6.4	20	13	0	26	3	71.67%	38.89%
42		10	16	10	22	16	0	27	2.6	51.42%	25.46%
56		10	14	6.2	21	16	0	24	3.3	75.80%	37.04%
80		10	14	8.8	19	15	0	23	2.3	51.51%	35.19%
100		10	9.6	3	16	7.5	0	22	2.9	96.63%	55.56%

**Reproduction Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	24	23	26	23	24	23	9	18	21	25
32		24	13	2	3	0	13	26	24	15	12
42		25	8	0	12	21	16	15	27	14	23
56		7	23	0	3	21	12	23	24	0	23
80		20	13	8	0	14	16	21	23	7	18
100		15	21	3	0	0	0	4	20	11	22

# CETIS Analytical Report

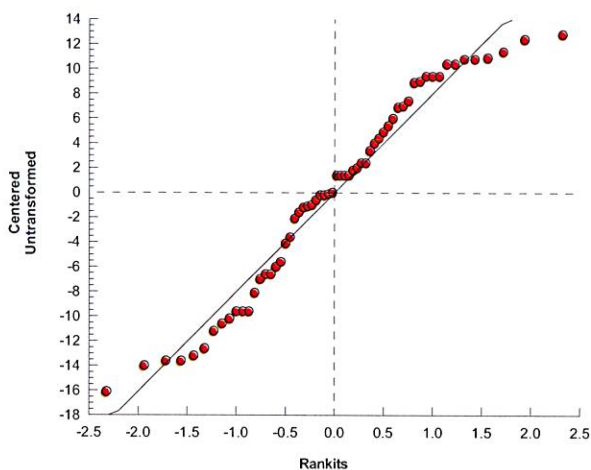
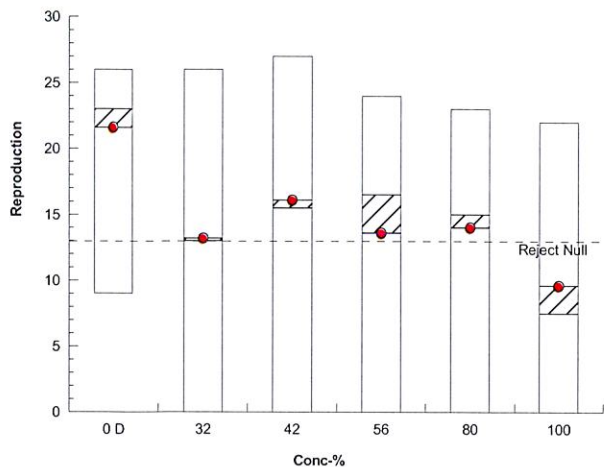
Report Date: 08 Nov-22 16:41 (p 2 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

## Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID: 17-0104-1898	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:41	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:40	MD5 Hash: 983FE6A6CFD3EF7C2BD6CADE86953147	Editor ID: 008-522-314-5

### Graphics



**CETIS Analytical Report**

Report Date: 08 Nov-22 16:41 (p 1 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

**Ceriodaphnia 7-d Survival and Reproduction Test**

Bio-Analytical Laboratories

Analysis ID: 07-5700-4291	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:41	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 08 Nov-22 16:40	MD5 Hash: 983FE6A6CFD3EF7C2BD6CADE86953147	Editor ID: 008-522-314-5
Batch ID: 14-2146-4387	Test Type: Reproduction-Survival (2-8d)	Analyst:
Start Date: 26 Oct-22 15:20	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 02 Nov-22 13:50	Species: Ceriodaphnia dubia	Brine:
Test Length: 6d 22h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 15-5195-2472	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 26 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 26 Oct-22 12:20	CAS (PC):	Station: 001
Sample Age: 7h (1.9 °C)	Client: Magnolia Wastewater System	

**Linear Interpolation Options**

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	703619	1000	Yes	Two-Point Interpolation

**Point Estimates**

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	9.9	7.2	39	10.05	2.59	13.88
IC15	15	11	47	6.703	2.13	9.254
IC20	20	14	63	5.027	1.584	6.94
IC25	25	18	83	4.022	1.205	5.552
IC40	84	29	---	1.19	---	3.47
IC50	94	54	---	1.061	---	1.846

**Reproduction Summary**

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	10	22	23	9	26	22.91%	0.00%	22	0.00%
32		10	13	13	0	26	71.67%	38.89%	15	32.18%
42		10	16	16	0	27	51.42%	25.46%	15	32.18%
56		10	14	16	0	24	75.80%	37.04%	14	36.11%
80		10	14	15	0	23	51.51%	35.19%	14	36.11%
100		10	9.6	7.5	0	22	96.63%	55.56%	9.6	55.56%

**Reproduction Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	24	23	26	23	24	23	9	18	21	25
32		24	13	2	3	0	13	26	24	15	12
42		25	8	0	12	21	16	15	27	14	23
56		7	23	0	3	21	12	23	24	0	23
80		20	13	8	0	14	16	21	23	7	18
100		15	21	3	0	0	0	4	20	11	22

# CETIS Analytical Report

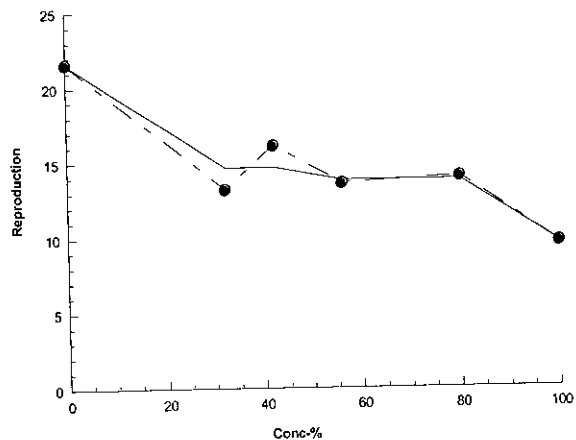
Report Date: 08 Nov-22 16:41 (p 2 of 2)  
Test Code/ID: 5C430EB7 / 15-4789-8551

## Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID: 07-5700-4291	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:41	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 08 Nov-22 16:40	MD5 Hash: 983FE6A6CFD3EF7C2BD6CADE86953147	Editor ID: 008-522-314-5

### Graphics



**CETIS Analytical Report**

Report Date: 08 Nov-22 16:51 (p 1 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

**Fathead Minnow 7-d Larval Survival and Growth Test**

Bio-Analytical Laboratories

Analysis ID: 16-3029-0450	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:51	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:44	MD5 Hash: 63B484A5C5025EF82242A2FC9A8CB73C	Editor ID: 008-522-314-5
Batch ID: 04-0708-0579	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 25 Oct-22 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 01 Nov-22 15:36	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 10-0658-1201	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 24 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 24 Oct-22 13:05	CAS (PC):	Station: 001
Sample Age: 32h (1.3 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	80	100	89.44	1.25	0.16	16.52%

**Dunnett Multiple Comparison Test**

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	0.37	2.4	0.23	8	CDF	0.7000	Non-Significant Effect
		42	0.37	2.4	0.23	8	CDF	0.7000	Non-Significant Effect
		56	0.98	2.4	0.23	8	CDF	0.4279	Non-Significant Effect
		80	0.37	2.4	0.23	8	CDF	0.7000	Non-Significant Effect
		100*	3.2	2.4	0.23	8	CDF	0.0080	Significant Effect

**Test Acceptability Criteria**

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.98	0.8	>>	Yes	Passes Criteria

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.333996	0.0667991	5	2.8	0.0405	Significant Effect
Error	0.576464	0.0240193	24			
Total	0.910459		29			

**ANOVA Assumptions Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	8.4	15	0.1377	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.9	0.0450	Normal Distribution

**7d Survival Rate Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	0.98	0.91	1.00	1.00	0.88	1.00	0.03	5.73%	0.00%
32		5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	2.56%
42		5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	2.56%
56		5	0.90	0.70	1.00	1.00	0.62	1.00	0.07	18.11%	7.69%
80		5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	2.56%
100		5	0.72	0.47	0.98	0.62	0.50	1.00	0.09	28.33%	25.64%

**Angular (Corrected) Transformed Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	1.40	1.30	1.50	1.40	1.20	1.40	0.04	6.06%	0.00%
32		5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	2.71%
42		5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	2.71%
56		5	1.30	1.00	1.50	1.40	0.91	1.40	0.09	16.69%	7.10%
80		5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	2.71%
100		5	1.00	0.73	1.40	0.91	0.79	1.40	0.11	24.04%	23.16%

# CETIS Analytical Report

Report Date: 08 Nov-22 16:51 (p 2 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

## Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID: 16-3029-0450	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:51	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:44	MD5 Hash: 63B484A5C5025EF82242A2FC9A8CB73C	Editor ID: 008-522-314-5

### 7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.00	1.00	0.88	1.00	1.00
32		0.88	1.00	1.00	1.00	0.88
42		0.88	1.00	1.00	1.00	0.88
56		1.00	1.00	0.62	1.00	0.88
80		0.88	1.00	0.88	1.00	1.00
100		0.62	1.00	0.88	0.50	0.62

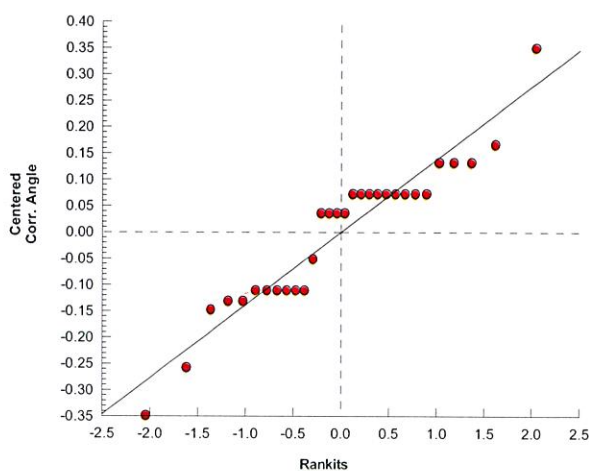
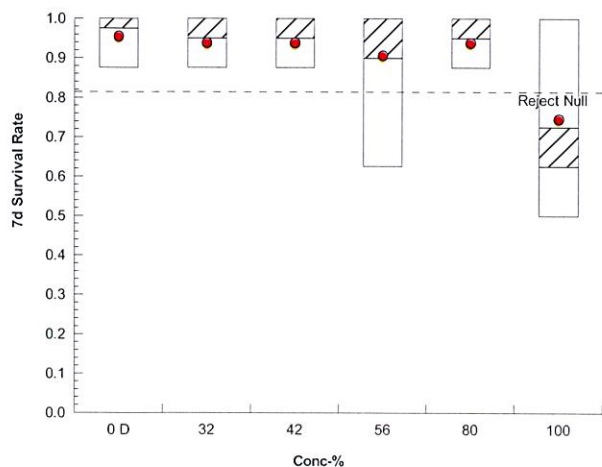
### Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.40	1.40	1.20	1.40	1.40
32		1.20	1.40	1.40	1.40	1.20
42		1.20	1.40	1.40	1.40	1.20
56		1.40	1.40	0.91	1.40	1.20
80		1.20	1.40	1.20	1.40	1.40
100		0.91	1.40	1.20	0.79	0.91

### 7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	8/8	8/8	7/8	8/8	8/8
32		7/8	8/8	8/8	8/8	7/8
42		7/8	8/8	8/8	8/8	7/8
56		8/8	8/8	5/8	8/8	7/8
80		7/8	8/8	7/8	8/8	8/8
100		5/8	8/8	7/8	4/8	5/8

### Graphics





**CETIS Analytical Report**

Report Date: 08 Nov-22 16:54 (p 1 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

**Fathead Minnow 7-d Larval Survival and Growth Test**

Bio-Analytical Laboratories

Analysis ID: 17-6808-4416	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:53	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:53	MD5 Hash: E873612F5F59785A1CA03BE9D8A27DA2	Editor ID: 008-522-314-5
Batch ID: 04-0708-0579	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 25 Oct-22 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 01 Nov-22 15:36	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 10-0658-1201	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 24 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 24 Oct-22 13:05	CAS (PC):	Station: 001
Sample Age: 32h (1.3 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	42	56	48.5	2.381	0.12	15.59%

**Dunnett Multiple Comparison Test**

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	1.9	2.4	0.12	8	CDF	0.1149	Non-Significant Effect
		42	2.2	2.4	0.12	8	CDF	0.0679	Non-Significant Effect
		56*	3.6	2.4	0.12	8	CDF	0.0028	Significant Effect
		80*	3.2	2.4	0.12	8	CDF	0.0088	Significant Effect
		100*	8	2.4	0.12	8	CDF	<1.0E-05	Significant Effect

**Test Acceptability Criteria**

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.79	0.25	>>	Yes	Passes Criteria
PMSD	0.16	0.12	0.3	Yes	Passes Criteria

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.491649	0.0983298	5	14	<1.0E-05	Significant Effect
Error	0.163189	0.0067995	24			
Total	0.654838		29			

**ANOVA Assumptions Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	8.6	15	0.1281	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.9	0.0473	Normal Distribution

**Mean Dry Biomass-mg Summary**

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	0.79	0.72	0.86	0.78	0.73	0.86	0.026	7.37%	0.00%
32		5	0.69	0.62	0.76	0.66	0.64	0.79	0.026	8.54%	12.66%
42		5	0.68	0.62	0.73	0.66	0.62	0.73	0.021	7.05%	14.56%
56		5	0.6	0.51	0.69	0.57	0.51	0.7	0.033	12.41%	24.05%
80		5	0.62	0.56	0.69	0.61	0.57	0.71	0.023	8.37%	20.89%
100		5	0.37	0.18	0.56	0.28	0.26	0.6	0.068	41.06%	52.85%

**Mean Dry Biomass-mg Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.84	0.73	0.78	0.75	0.86
32		0.66	0.66	0.79	0.7	0.64
42		0.66	0.73	0.62	0.72	0.64
56		0.65	0.7	0.56	0.57	0.51
80		0.61	0.71	0.6	0.62	0.57
100		0.26	0.6	0.46	0.26	0.28

# CETIS Analytical Report

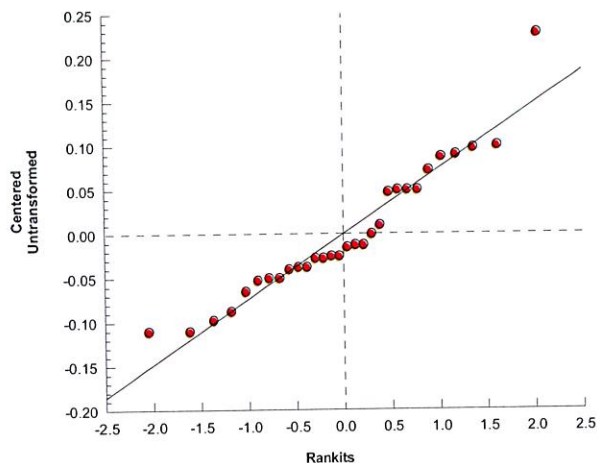
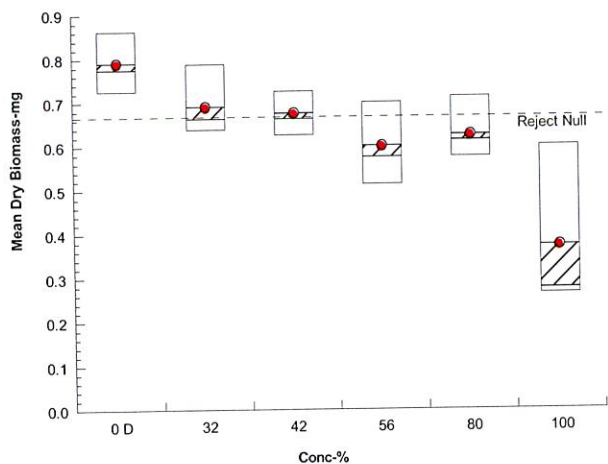
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Test Code/ID: 1A754197 / 04-4389-2119

## Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID: 17-6808-4416	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:53	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 08 Nov-22 16:53	MD5 Hash: E873612F5F59785A1CA03BE9D8A27DA2	Editor ID: 008-522-314-5

### Graphics



# CETIS Analytical Report

Report Date: 08 Nov-22 16:54 (p 1 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

## Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID: 13-5378-6773	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:54	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 08 Nov-22 16:53	MD5 Hash: E873612F5F59785A1CA03BE9D8A27DA2	Editor ID: 008-522-314-5
Batch ID: 04-0708-0579	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 25 Oct-22 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 01 Nov-22 15:36	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture      Age: <24
Sample ID: 10-0658-1201	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 24 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 24 Oct-22 13:05	CAS (PC):	Station: 001
Sample Age: 32h (1.3 °C)	Client: Magnolia Wastewater System	

### Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1199351	1000	Yes	Two-Point Interpolation

### Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.79	0.25	>>	Yes	Passes Criteria

### Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	25	13	54	3.956	1.862	7.655
IC15	43	17	64	2.337	1.558	5.827
IC20	52	34	98	1.937	1.025	2.963
IC25	82	35	88	1.224	1.138	2.837
IC40	92	85	---	1.092	---	1.177
IC50	98	89	---	1.019	---	1.119

### Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	5	0.79	0.78	0.73	0.86	7.37%	0.00%	0.79	0.00%
32		5	0.69	0.66	0.64	0.79	8.54%	12.66%	0.69	12.66%
42		5	0.68	0.66	0.62	0.73	7.05%	14.56%	0.68	14.56%
56		5	0.6	0.57	0.51	0.7	12.41%	24.05%	0.61	22.47%
80		5	0.62	0.61	0.57	0.71	8.37%	20.89%	0.61	22.47%
100		5	0.37	0.28	0.26	0.6	41.06%	52.85%	0.37	52.85%

### Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.84	0.73	0.78	0.75	0.86
32		0.66	0.66	0.79	0.7	0.64
42		0.66	0.73	0.62	0.72	0.64
56		0.65	0.7	0.56	0.57	0.51
80		0.61	0.71	0.6	0.62	0.57
100		0.26	0.6	0.46	0.26	0.28

# CETIS Analytical Report

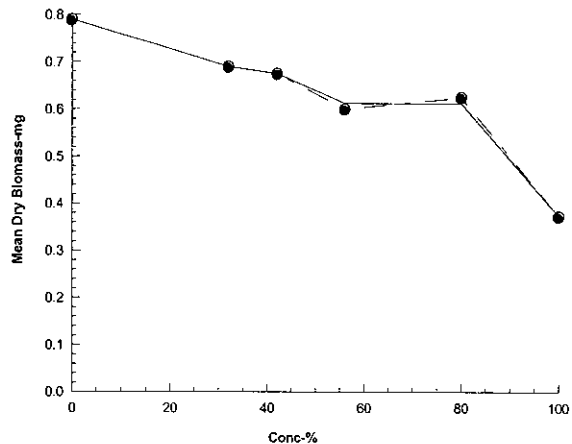
Report Date: 08 Nov-22 16:54 (p 2 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

## Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID: 13-5378-6773	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:54	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 08 Nov-22 16:53	MD5 Hash: E873612F5F59785A1CA03BE9D8A27DA2	Editor ID: 008-522-314-5

### Graphics



# CETIS Analytical Report

Report Date: 08 Nov-22 16:52 (p 1 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

## Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID: 16-6597-5335	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:52	Analysis: Parametric-Two Sample	Status Level: 1
Edit Date: 08 Nov-22 16:44	MD5 Hash: 4B3281D913A909ADFA6AA5756BB4C350	Editor ID: 008-522-314-5
Batch ID: 04-0708-0579	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 25 Oct-22 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 01 Nov-22 15:36	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 10-0658-1201	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 24 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 24 Oct-22 13:05	CAS (PC):	Station: 001
Sample Age: 32h (1.3 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	101% failed 7d survival rate endpoint	9.21%

### Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		101* 100UV	3.4	1.9	0.13	8	CDF	0.0048	Significant Effect

### Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.98	0.8	>>	Yes	Passes Criteria

### ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.142695	0.142695	1	11	0.0096	Significant Effect
Error	0.099617	0.0124521	8			
Total	0.242312		9			

### ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.7	23	0.3607	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.81	0.74	0.0195	Normal Distribution

### 7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	0.98	0.91	1.00	1.00	0.88	1.00	0.03	5.73%	0.00%
101 100UV		5	0.80	0.66	0.94	0.88	0.62	0.88	0.05	13.98%	17.95%

### Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	1.40	1.30	1.50	1.40	1.20	1.40	0.04	6.06%	0.00%
101 100UV		5	1.10	0.95	1.30	1.20	0.91	1.20	0.06	12.06%	17.61%

### 7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.00	1.00	0.88	1.00	1.00
101 100UV		0.88	0.62	0.75	0.88	0.88

### Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.40	1.40	1.20	1.40	1.40
101 100UV		1.20	0.91	1.00	1.20	1.20

### 7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	8/8	8/8	7/8	8/8	8/8
101 100UV		7/8	5/8	6/8	7/8	7/8

**CETIS Analytical Report**

Report Date: 08 Nov-22 16:54 (p 1 of 2)  
Test Code/ID: 1A754197 / 04-4389-2119

**Fathead Minnow 7-d Larval Survival and Growth Test**

Bio-Analytical Laboratories

Analysis ID: 00-6822-4812	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 08 Nov-22 16:54	Analysis: Parametric-Two Sample	Status Level: 1
Edit Date: 08 Nov-22 16:53	MD5 Hash: 43AF471603E4DB243B4EDBF0EE19A8B9	Editor ID: 008-522-314-5
Batch ID: 04-0708-0579	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 25 Oct-22 15:40	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 01 Nov-22 15:36	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture      Age: <24
Sample ID: 10-0658-1201	Code: X8521	Project: WET Quarterly Compliance Test (4Q)
Sample Date: 24 Oct-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 24 Oct-22 13:05	CAS (PC):	Station: 001
Sample Age: 32h (1.3 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	101% failed mean dry biomass-mg endpoint	9.25%

**Equal Variance t Two-Sample Test**

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		10+ <sup>+</sup> 100UV	11	1.9	0.073	8	CDF	<1.0E-05	Significant Effect

**Test Acceptability Criteria**

**TAC Limits**

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.79	0.25	>>	Yes	Passes Criteria
PMSD	0.092	0.12	0.3	Yes	Below Criteria

**ANOVA Table**

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.435782	0.435782	1	110	<1.0E-05	Significant Effect
Error	0.0308728	0.0038591	8			
Total	0.466655		9			

**ANOVA Assumptions Tests**

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.3	23	0.8188	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.74	0.5058	Normal Distribution

**Mean Dry Biomass-mg Summary**

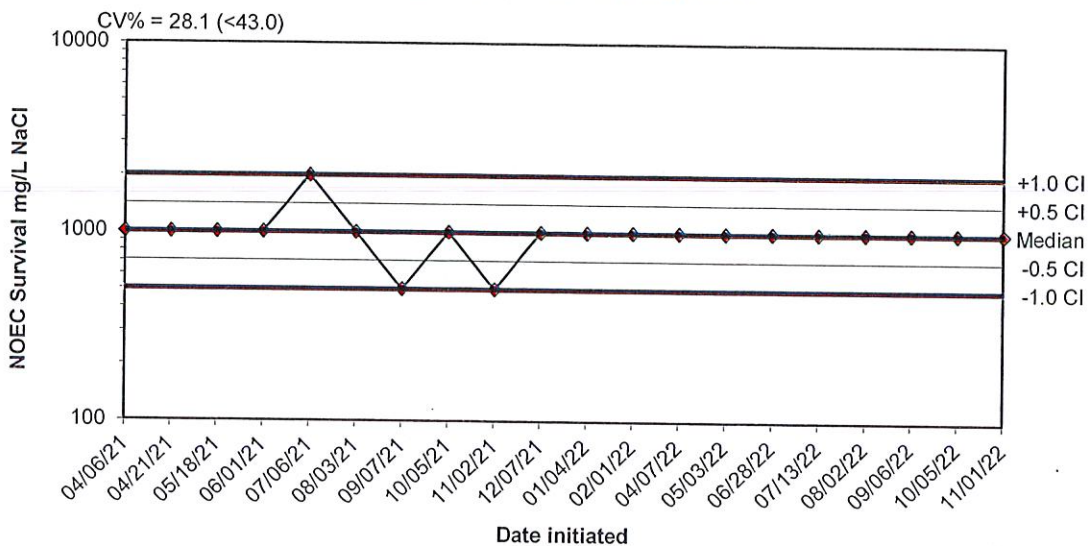
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	0.79	0.72	0.86	0.78	0.73	0.86	0.026	7.37%	0.00%
10+ 100UV		5	0.37	0.29	0.45	0.4	0.28	0.44	0.029	17.66%	52.85%

**Mean Dry Biomass-mg Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.84	0.73	0.78	0.75	0.86
10+ 100UV		0.44	0.28	0.4	0.41	0.34

**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

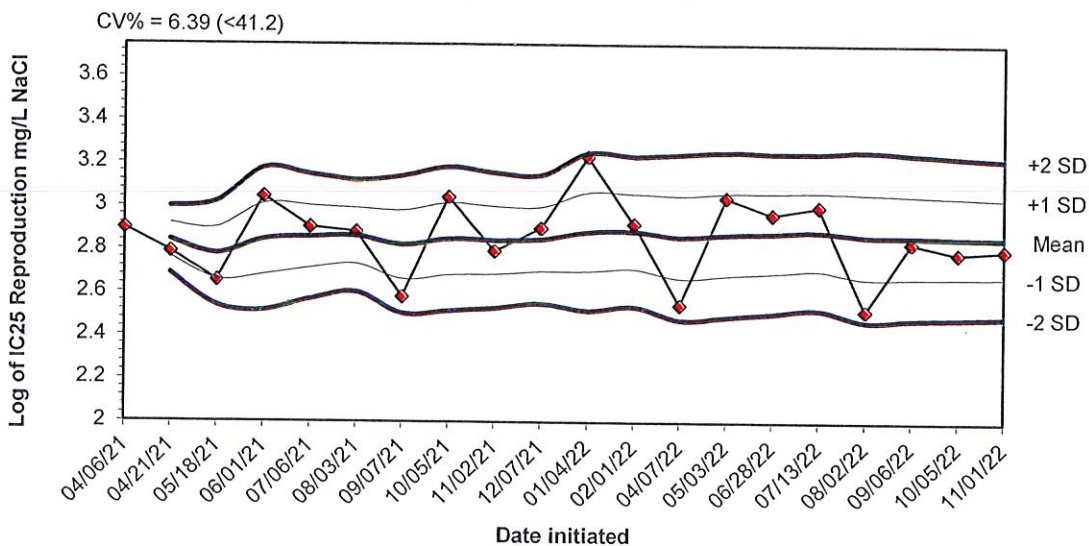
### CHRONIC REFERENCE TOXICANT TEST RESULTS FOR CERIODAPHNIA DUBIA IN SOFT WATER



Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
04/06/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
04/21/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
05/18/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
06/01/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
07/06/21	2000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
08/03/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
09/07/21	500.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
10/05/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
11/02/21	500.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
12/07/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
01/04/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
02/01/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
04/07/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
05/03/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
06/28/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
07/13/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
08/02/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
09/06/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
10/05/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
11/01/22	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000

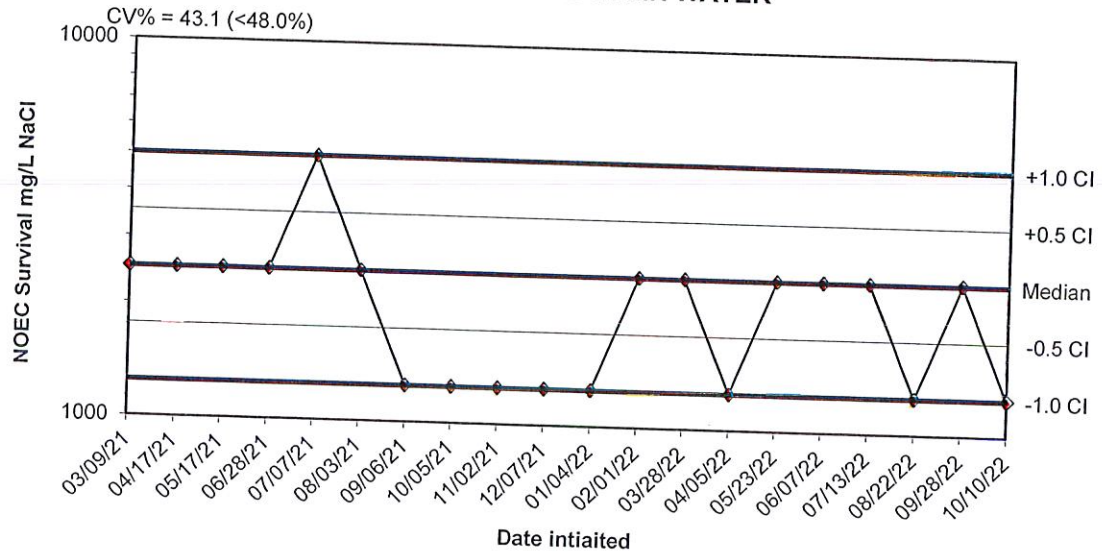


### CHRONIC REFERENCE TOXICANT TEST RESULTS FOR CERIODAPHNIA DUBIA IN SOFT WATER



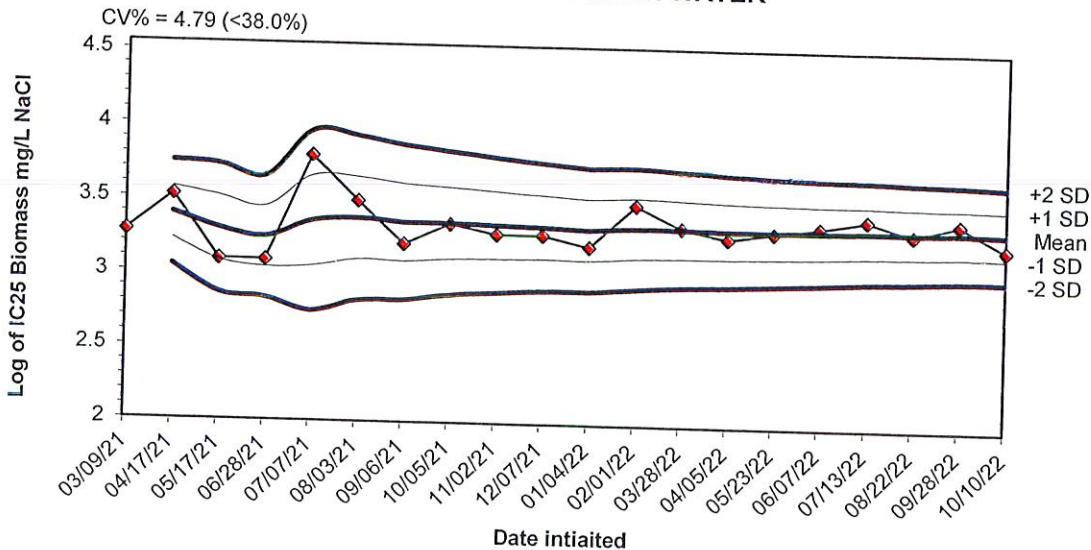
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/06/21	2.8965					
04/21/21	2.7873	2.8419	2.7647	2.6875	2.9191	2.9964
05/18/21	2.6557	2.7798	2.6593	2.5387	2.9004	3.0210
06/01/21	3.0439	2.8459	2.6812	2.5165	3.0105	3.1752
07/06/21	2.9031	2.8573	2.7124	2.5675	3.0022	3.1471
08/03/21	2.8808	2.8612	2.7313	2.6013	2.9912	3.1211
09/07/21	2.5798	2.8210	2.6617	2.5023	2.9804	3.1397
10/05/21	3.0414	2.8486	2.6817	2.5149	3.0154	3.1822
11/02/21	2.7924	2.8423	2.6851	2.5280	2.9995	3.1567
12/07/21	2.8976	2.8479	2.6986	2.5494	2.9971	3.1463
01/04/22	3.2304	2.8826	2.7000	2.5174	3.0652	3.2479
02/01/22	2.9191	2.8857	2.7112	2.5368	3.0601	3.2345
04/07/22	2.5441	2.8594	2.6674	2.4754	3.0514	3.2434
05/03/22	3.0414	2.8724	2.6816	2.4908	3.0632	3.2540
06/28/22	2.9638	2.8785	2.6931	2.5078	3.0638	3.2492
07/13/22	3.0000	2.8861	2.7045	2.5228	3.0677	3.2493
08/02/22	2.5185	2.8645	2.6673	2.4701	3.0616	3.2588
09/06/22	2.8325	2.8627	2.6713	2.4798	3.0541	3.2455
10/05/22	2.7853	2.8586	2.6717	2.4849	3.0455	3.2324
11/01/22	2.7993	2.8556	2.6733	2.4909	3.0380	3.2204

### CHRONIC REFERENCE TOXICANT TEST RESULTS FOR PIMEPHALES PROMELAS IN MH WATER



Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
03/09/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
04/17/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
05/17/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
06/28/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
07/07/21	5000.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
08/03/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
09/06/21	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
10/05/21	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
11/02/21	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
12/07/21	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
01/04/22	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
02/01/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
03/28/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
04/05/22	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
05/23/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
06/07/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
07/13/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
08/22/22	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
09/28/22	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
10/10/22	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000

### CHRONIC REFERENCE TOXICANT TEST RESULTS FOR PIMEPHALES PROMELAS IN MH WATER



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/09/21	3.2733					
04/17/21	3.5199	3.3966	3.2223	3.0479	3.5710	3.7454
05/17/21	3.0878	3.2937	3.0769	2.8601	3.5105	3.7273
06/28/21	3.0854	3.2416	3.0363	2.8309	3.4470	3.6523
07/07/21	3.7924	3.3518	3.0480	2.7442	3.6556	3.9594
08/03/21	3.4914	3.3750	3.0974	2.8197	3.6527	3.9303
09/06/21	3.2041	3.3506	3.0891	2.8275	3.6122	3.8737
10/05/21	3.3424	3.3496	3.1074	2.8652	3.5918	3.8339
11/02/21	3.2788	3.3417	3.1140	2.8862	3.5695	3.7972
12/07/21	3.2788	3.3354	3.1198	2.9041	3.5511	3.7667
01/04/22	3.2041	3.3235	3.1151	2.9067	3.5319	3.7403
02/01/22	3.4914	3.3375	3.1330	2.9285	3.5420	3.7465
03/28/22	3.3424	3.3379	3.1420	2.9462	3.5337	3.7295
04/05/22	3.2788	3.3336	3.1448	2.9561	3.5224	3.7112
05/23/22	3.3222	3.3329	3.1509	2.9690	3.5148	3.6968
06/07/22	3.3617	3.3347	3.1588	2.9828	3.5106	3.6865
07/13/22	3.4150	3.3394	3.1680	2.9965	3.5109	3.6823
08/22/22	3.3222	3.3384	3.1721	3.0057	3.5048	3.6712
09/28/22	3.3979	3.3416	3.1793	3.0170	3.5038	3.6661
10/10/22	3.2304	3.3360	3.1761	3.0163	3.4959	3.6558

**APPENDIX E**  
**AGENCY FORMS**

**SUMMARY REPORTING FORMS  
 CHRONIC BIOMONITORING  
Ceriodaphnia dubia Survival and Reproduction**

Permittee: Magnolia Wastewater System

NPDES No.: AR0043613

AFIN: 14-00059

	<b>Time</b>	<b>Date</b>	<b>To</b>	<b>Time</b>	<b>Date</b>
Composite 1 Collected From:	0800	10/25/22	0800	0800	10/26/22
Composite 2 Collected From:	0800	10/27/22	0800	0800	10/28/22
Composite 3 Collected From:	0800	10/30/22	0800	0800	10/31/22
Test initiated:	1520 am/pm			10/26/22	Date
Test terminated:	1350 am/pm			11/02/22	Date
Dilution water used:	Receiving		X	Reconstituted	

**PERCENT SURVIVAL**

Time of Reading	Percent Effluent					
	0	32.0	42.0	56.0	80.0	100.0
24h	100.0	100.0	100.0	100.0	100.0	100.0
48h	100.0	100.0	100.0	100.0	100.0	100.0
End of test	90.0	80.0	80.0	70.0	90.0	60.0

**NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST**

Rep	0	32.0	42.0	56.0	80.0	100.0
1	24	24	25	D7	20	15
2	23	D13	D8	23	13	21
3	26	2	D	D	8	3
4	23	3	12	3	D	D
5	24	D	21	21	14	D
6	23	13	16	12	16	D
7	D9	26	15	23	21	D4
8	18	24	27	24	23	20
9	21	15	14	D	7	11
10	25	12	23	23	18	22
Surv. Mean	23.0	15.0	19.0	18.0	16.0	15.0
Total Mean	22.0	13.0	16.0	14.0	14.0	9.6
CV%*	10.20	62.70	29.24	43.17	35.95	47.87

\*coefficient of variation = standard deviation x 100/mean. D=dead adult

PMSD = 39.98

Ceriodaphnia dubia  
Survival and Reproduction (continued)

**1. Fisher's Exact Test:**

Is the mean survival at the end of the test significantly different ( $p=.05$ ) than the control survival for the % effluent corresponding to (lethality):

- |  |     |   |    |
|--|-----|---|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%): | YES | X | NO |
| b) ½ LOW FLOW DILUTION (NA%):            | YES |   | NO |

**2. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:**

Is the mean number of young produced per female significantly different ( $p=.05$ ) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

- |  |   |     |    |
|--|---|-----|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%): | X | YES | NO |
| b) ½ LOW FLOW DILUTION (NA%):            |   | YES | NO |

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 1
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1):
5. Enter response to item 3 on DMR Form, parameter #TEP3B.
6. Enter response to item 4 on DMR Form, parameter #TFP3B.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:
  - a) NOEC survival: 100.0 % effluent
  - b) NOEC reproduction: 80.0 % effluent

**Biomonitoring Form**  
 Chronic Toxicity Summary Form for Ceriodaphnia dubia  
 Chemical Parameters Chart

**Permittee:** Magnolia Wastewater System  
**NPDES#:** AR0043613/AFIN 14-00059  
**Contact:** Russell Thomas  
**Analysts:** Ware, Mitchell, Briggs

**Sample #1 Collected:**                      **Date:** 10/26/2022 **Time:** 800  
**Sample #2 Collected:**                      **Date:** 10/28/2022 **Time:** 800  
**Sample #3 Collected:**                      **Date:** 10/31/2022 **Time:** 800  
**Test Begin:**                      **Date:** 10/26/2022 **Time:** 1520  
**Test End:**                      **Date:** 11/2/2022 **Time:** 1350

<b>Dilution:</b>	0%							<b>Dilution:</b>	56.0%						
<b>Day:</b>	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
<b>T (°C)</b>	24.7	24.5	24.9	24.9	24.3	24.1	24.1	24.7	24.5	24.9	24.9	24.3	24.1	24.1	
<b>DO Initial</b>	7.2	7.3	8.0	7.5	7.5	8.0	7.6	7.2	7.3	7.9	7.8	7.5	7.9	7.6	
<b>DO Final</b>	7.6	8.0	7.3	7.6	7.6	8.4	7.4	7.4	7.6	7.4	7.3	7.0	7.6	7.4	
<b>pH Initial</b>	7.3	7.4	7.1	7.2	7.6	7.8	7.4	7.3	7.4	7.7	7.9	8.0	7.7	7.4	
<b>pH Final</b>	7.9	7.5	7.0	7.0	7.4	7.6	7.4	7.3	7.4	7.3	7.5	7.6	7.3	7.4	
<b>Conductivity</b>	185.0	169.0	163.0	164.0	162.0	171.0	171.0	434.0	411.0	414.0	418.0	418.0	304.0	304.0	
<b>Alkalinity</b>	28.0	44.0		28.0											
<b>Hardness</b>	88.0	84.0		52.0											
<b>Chlorine</b>	<0.5	<0.5		<0.5											

<b>Dilution:</b>	32.0%							<b>Dilution:</b>	80.0%						
<b>Day:</b>	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
<b>T (°C)</b>	24.7	24.5	24.9	24.9	24.3	24.1	24.1	24.7	24.5	24.9	24.9	24.3	24.1	24.1	
<b>DO Initial</b>	7.3	7.4	8.0	7.6	7.2	8.0	7.4	7.1	7.4	8.0	7.8	7.6	7.9	7.6	
<b>DO Final</b>	7.5	7.7	7.5	7.5	7.1	8.0	7.4	7.4	7.6	7.3	7.2	7.0	7.4	7.4	
<b>pH Initial</b>	7.4	7.5	7.1	7.7	7.7	7.6	7.5	7.2	7.3	7.9	7.9	7.8	7.7	7.4	
<b>pH Final</b>	7.3	7.4	7.1	7.1	7.6	7.4	7.4	7.3	7.5	7.3	7.6	7.5	7.3	7.3	
<b>Conductivity</b>	306.0	286.0	286.0	306.0	288.0	234.0	234.0	550.0	522.0	503.0	525.0	528.0	361.0	361.0	
<b>Alkalinity</b>															
<b>Hardness</b>															
<b>Chlorine</b>															

<b>Dilution:</b>	42.0%							<b>Dilution:</b>	100.0%						
<b>Day:</b>	1	2	3	4	5	6	7	1	2	3	4	5	6	7	
<b>T (°C)</b>	24.7	24.5	24.9	24.9	24.3	24.1	24.1	24.7	24.5	24.9	24.9	24.3	24.1	24.1	
<b>DO Initial</b>	7.2	7.3	7.9	7.6	7.3	8.0	7.6	7.2	7.3	7.9	7.9	7.7	7.8	7.6	
<b>DO Final</b>	7.4	7.7	7.4	7.4	7.1	7.8	7.4	7.0	7.6	7.2	7.2	7.0	7.0	7.0	
<b>pH Initial</b>	7.3	7.4	7.5	7.7	7.8	7.5	7.4	7.3	7.4	7.9	8.0	7.9	7.8	7.5	
<b>pH Final</b>	7.3	7.5	7.3	7.5	7.6	7.4	7.4	7.3	7.4	7.4	7.6	7.5	7.4	7.4	
<b>Alkalinity</b>											128.0				
<b>Hardness</b>											20.0				
<b>Conductivity</b>	354.0	342.0	352.0	351.0	352.0	263.0	263.0	632.0	600.0	583.0	616.0	612.0	420.0	420.0	
<b>Chlorine</b>								<0.5	<0.5		<0.5				

**Comments:**

**SUMMARY REPORTING FORMS CHRONIC BIOMONITORING  
 FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL  
 (*Pimephales promelas*)**

Permittee: Magnolia Wastewater System

NPDES No.: AR0043613  
 AFIN: 14-00059

	<b>Time</b>	<b>Date</b>		<b>Time</b>	<b>Date</b>
Composite 1 Collected from:	0800	10/23/22	To	0800	10/24/22
Composite 2 Collected from:	0800	10/25/22	To	0800	10/26/22
Composite 3 Collected from:	0800	10/27/22	To	0800	10/28/22

Test initiated:	1540	am/pm		10/25/22	Date
Test terminated:	1536	am/pm		11/01/22	Date
Dilution water used:		Receiving	X	Reconstituted	

**DATA TABLE FOR SURVIVAL**

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
<b>0</b>	100.0	100.0	88.0	100.0	100.0	100.0	98.0	98.0	6.06
<b>32.0</b>	88.0	100.0	100.0	100.0	88.0	98.0	98.0	95.0	7.62
<b>42.0</b>	88.0	100.0	100.0	100.0	88.0	100.0	100.0	95.0	7.62
<b>56.0</b>	100.0	100.0	62.0	100.0	88.0	100.0	100.0	90.0	16.69
<b>80.0</b>	88.0	100.0	88.0	100.0	100.0	100.0	100.0	95.0	7.62
<b>100.0</b>	62.0	100.0	88.0	50.0	62.0	96.0	90.0	72.0	24.04

**DATA TABLE FOR GROWTH**

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
<b>0</b>	0.840	0.730	0.780	0.750	0.860	0.790	7.37
<b>32.0</b>	0.660	0.660	0.790	0.700	0.640	0.690	8.54
<b>42.0</b>	0.660	0.730	0.620	0.720	0.640	0.680	7.05
<b>56.0</b>	0.650	0.700	0.560	0.570	0.510	0.600	12.41
<b>80.0</b>	0.610	0.710	0.600	0.620	0.570	0.620	8.37
<b>100.0</b>	0.260	0.600	0.460	0.260	0.280	0.370	41.06

\*coefficient of variation = standard deviation x 100/mean.

PMSD =15.59 %



**FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL (cont)**  
**(Pimephales promelas)**

**1. Dunnett's Procedure or Steels Many-One Rank Test as appropriate:**

Is the mean survival at 7 days significantly different ( $p=.05$ ) than the control survival for the % effluent corresponding to:

a) LOW FLOW OR CRITICAL DILUTION (100.0%)	X	YES	NO
b) ½ LOW FLOW DILUTION (NA%)		YES	NO

**2. Dunnett's Procedure (or appropriate test):**

Is the mean dry weight (growth) at 7 days significantly different ( $p=.05$ ) than the control's dry weight for the % effluent corresponding to (significant non-lethal effects):

a) LOW FLOW OR CRITICAL DILUTION (100.0%)	X	YES	NO
b) ½ LOW FLOW DILUTION (NA%)		YES	NO

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 1
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1):
5. Enter response to item 3 on DMR Form, parameter #TEP6C.
6. Enter response to item 4 on DMR Form, parameter #TFP6C.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

a.) NOEC survival	80.0% effluent
b.) NOEC growth	42.0% effluent

Biomonitoring Form  
Chronic Toxicity Summary Form for Pimephales promelas  
Chemical Parameters Chart

Permittee: Magnolia Wastewater System  
NPDES#: AR0043613/AFIN 14-00059  
Contact: Tracie Love  
Analysts: Ware, Mitchell, Miller

Sample #1 Collected: 10/24/2022 Time: 800  
Sample #2 Collected: 10/26/2022 Time: 800  
Sample #3 Collected: 10/28/2022 Time: 800  
Test Begin: 10/25/2022 Time: 1540  
Test End: 11/1/2022 Time: 1536

Dilution:	0%							56.0%						
Day:	1	2	3	4	5	6	7	1	2	3	4	5	6	7
T (°C)	26.3	25.4	25.0	25.0	24.9	24.9	25.2	26.3	25.4	25.0	25.0	24.9	24.9	25.2
DO Initial	*	5.8	6.7	6.4	6	5.1	5.9	*	5.5	5.5	5.2	4.1	3.6	5.5
DO Final	6.9	7.4	7.5	7.3	7.0	6.4	6.6	6.9	6.6	7.6	7.1	7.1	6.7	6.4
pH Initial	*	6.4	6.6	6.7	6.9	6.5	6.6	*	7.2	7.2	7.2	7.3	7.3	6.9
pH Final	7.5	7.5	7.4	7.2	7.0	7.0	7.0	7.6	7.2	7.3	7.3	7.5	7.5	6.4
Conductivity	188.0	185.0	169.0	169.0	170.0	171.0	171.0	445.0	450.0	424.0	413.0	424.0	429.0	429.0
Alkalinity	36.0			44.0										
Hardness	64.0			68.0										
Chlorine	<0.5			<0.5										
Dilution:	32.0%							80.0%						
Day:	1	2	3	4	5	6	7	1	2	3	4	5	6	7
T (°C)	26.3	25.4	25.0	25.0	24.9	24.9	25.2	26.3	25.4	25.0	25.0	24.9	24.9	25.2
DO Initial	*	5.6	5.8	5.9	5.0	4.3	5.9	*	5.3	5.2	5.0	3.2	3.5	5.4
DO Final	7.0	7.4	7.4	7.3	7.0	6.8	6.8	7.1	7.7	7.7	7.1	7.2	6.8	7.1
pH Initial	*	6.8	6.9	7.1	7.0	6.7	6.6	*	7.4	7.3	7.5	7.5	7.1	6.5
pH Final	7.6	7.4	7.3	7.3	7.3	7.4	7.4	7.7	7.4	7.3	7.3	7.6	7.6	7.6
Conductivity	335.0	338.0	310.0	306.0	320.0	317.0	317.0	544.0	564.0	531.0	523.0	511.0	533.0	533.0
Alkalinity														
Hardness														
Chlorine														
Dilution:	42.0%							100.0%						
Day:	1	2	3	4	5	6	7	1	2	3	4	5	6	7
T (°C)	26.3	25.4	25.0	25.0	24.9	24.9	25.2	26.3	25.4	25.0	25.0	24.9	24.9	25.2
DO Initial	*	5.4	5.7	5.5	4.6	3.2	5.7	*	6.4	5.2	4.9	3.8	3.5	5.1
DO Final	7.0	7.4	7.4	7.3	7.0	6.9	6.9	7.1	7.1	8.1	7.0	7.3	6.7	7.3
pH Initial	*	7.0	7.0	7.3	7.1	6.8	6.5	*	7.3	7.5	7.8	7.7	7.3	6.7
pH Final	7.6	7.1	7.4	7.3	7.4	7.4	7.4	7.7	7.2	7.3	7.3	7.6	7.8	7.8
Alkalinity								200.0	200.0	128.0				
Hardness								52.0	52.0	20.0				
Conductivity	372.0	383.0	361.0	348.0	359.0	372.0	372.0	633.0	643.0	622.0	601.0	600.0	634.0	634.0
Chlorine								<0.5	<0.5		<0.5			

Comments: \* = Technician did not take readings.

**APPENDIX F**  
**REPORT QUALITY ASSURANCE FORM**



# Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

(318) 745-2772  
1-800-259-1246  
Fax: (318) 745-2773

## REPORT QUALITY ASSURANCE FORM

Client: City of Magnolia

Project#: X 8521

Chain of Custody Documents Checked by: Emilie 11/9/22  
Technician/Date

Raw Data Documents Checked by: Emilie 11/9/22  
Technician/Date

Statistical Analysis Package Checked by: EOB 11/10/22  
Quality Manager/Date

Quality Control Data Checked by: EOB 11/18/22  
Quality Manager/Date

Report Checked by: EOB 11/28/22  
Quality Manager/Date

I certify that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained in this document, to the best of my knowledge, is true, accurate and complete.

Chris A. Bragg, BS  
Quality Manager

11/28/22  
Date

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