Bio-Analytical Laboratories' Executive Summary

Permittee: Magnolia Wastewater System
Columbia Road
Magnolia, AR
Project #: X8409
Outfall: 001 (treated domestic wastewater)
Permit #: AR0043613/ AFIN 14-00059
Contact: Tracie Love
Test Dates: July 25 – August 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 - 100.0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B – 16.30%.
6. PMSD Reproduction = 47.0% (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 - 0 **(Pass)**.
2. If the NOEC for growth is less than the critical dilution (80.0%), enter a "1"; otherwise, enter a "0" for Parameter TGP6C- 0 **(Pass)**.
3. Report the NOEC value for survival, Parameter TOP6C - 100.0%
4. Report the NOEC value for growth, Parameter TPP6C - 100.0%
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C – 22.29%.
6. PMSD Biomass = 26.20% (12.0 – 30.0%)- moderate precision, acceptable for passing test

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-259-1246
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 X8409

Test Dates: July 25 – August 6, 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

TABLE OF CONTENTS

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" 22nd 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 July 25, 27 and 29, 2022, at 0800 hours. 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 1.8, 1.8 and 1.7^0 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 ± 1^0 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 $CaCO_3$ on the control and the undiluted effluent samples.

2.7 Monitoring of the Tests

The cladoceran test was run in a Precision^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 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 Steel's Many-One Test, a non-parametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Steel's Many-One Rank Test, and growth (biomass) data was analyzed using Dunnett's Test, a parametric test comparing concentration data to control data. 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. Eighty percent survival occurred in the control and 100.0 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 16.0 and 22.0, respectively. The NOEC for survival and reproduction in this test was 100.0 percent effluent (p=.05).

The fathead minnow test results can be found in Table 2. After seven days of exposure, 95.0 percent survival occurred in the control and 88.0 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 0.950 and 0.810 milligram (mg), respectively. The NOEC for survival and growth in this test was 100.0 percent effluent (p=.05).

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	80.0		20.0	16.0	
32.0	60.0		18.0	11.0	
42.0	100.0		21.0	21.0	
56.0	90.0		21.0	19.0	
80.0	100.0		22.0	22.0	
100.0	100.0		20.0	20.0	

*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	95.0		0.950	
32.0	90.0		0.940	
42.0	95.0		0.990	
56.0	88.0		0.720	
80.0	95.0		0.810	
100.0	88.0		0.800	
100.0 UV	82.0		0.600	

*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 July 25, 27 and 29, 2022, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms nor the fathead minnow test organisms in the 100.0 percent critical dilution after seven days of exposure (p=.05). Sub-lethal effects (i.e., reproduction or growth) were not noted in either test (p=.05).

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. 22nd Edition.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023
(318) 745-2772
1-800-259-1246
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: City of Magnolia	Phone: (870) 234-2955	Analysis:								
Address: P.O. Box 666, Magnolia, AR 71753	Fax: (870) 234-2203									
Permit #: AR0043613/AFIN 14-00059	Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: Trace Love / Trace Love / MWWS										

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Project Number: X8409 / Temp. upon arrival: 1.8°C / Therm #: 24 / Color: clear / Odor: none / Tech: SRV / Preservative: (below)
7/24/22 - 7/25/22	800 - 800	X		8 half gallons	001	X	X						C23414	ICE

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: Trace Love / MWWS	7/25/22	0850	Received by/Affiliation:	7/25/22	0850
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 7/25/22	Time: 1200	Received by/Affiliation:	Date: 7/25/22	Time: 1200

Method of Shipment: X Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS ___ Client ___ Other Tracking #_____
Comments:

COC Rev.3.1

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023
(318) 745-2772
1-800-259-1246
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: City of Magnolia	Phone: (870) 234-2955	Analysis:							Lab Control Number:	Project Number: X8409
Address: P.O. Box 666, Magnolia, AR 71753	Fax: (870) 234-2203	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform		Temp. upon arrival: 2.0 Therm # 29
Permit #: AR0043613/AFIN 14-00059	Purchase Order:									Color: clear
Sampler's Signature/Printed Name/Affiliation: Jane Love / Trace Love / MWWS										Odor: none
										Tech: SDM

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification								Preservative: (below)
7/24/22 - 7/27/22	800 - 800	X		8 half gallons	001	X	X						ICE

Relinquished by/Affiliation: Jane Love / MWWS	Date: 7/27/22	Time: 0950	Received by/Affiliation:	Date: 7/27/22	Time: 0950
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 7/27/22	Time: 1155	Received by/Affiliation:	Date: 7/27/22	Time: 1155

Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS ___ Client ___ Other Tracking #_____

Comments:

COC Rev.3.1

Bio-Analytical Laboratories
3340 Spurgin Road
Post Office Box 527
Doyline, LA 71023
(318) 745-2772
1-800-288-1248
Fax: (318) 745-2773

NELAP/LELAP 01975, ADEQ 88-0634, TCEQ T104704278

Laboratory Use Only:

Company: City of Magnolia	Phone: (870) 234-2955
Address: P.O. Box 666, Magnolia, AR 71753	Fax: (870) 234-2203
Permit #: AR0043613/AFIN 14-00059	Purchase Order:
Sampler's Signature/Printed Name/Affiliation: Chris Love / Tracie Love / MWWS	

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Preservative: (below)
7/28/22- 7/29/22	800- 800	X		8 half gallons	001	X	X						C23140	ICE

Project Number: X8409
Temp. upon arrival: 1.7 °C
Therm #: 24
Color: clear
Odor: none
Tech: SDW

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Chris Love / MWWS	7-29-22	0935	[signature]	7-29-22	0935
[signature]	7/29/22	1200	[signature]	7/29/22	1200

Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS ___ Client X ___ Other Tracking #______
Comments:

COC Rev.3.1

APPENDIX B
RAW DATA SHEETS

*7/26/22 MV

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X8409 Date start: 7/26/22 Date end: 8/2/22

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/MV

Adults isolated: Date 7-25-22 Time: 2000

Neonates collected: Date 7-27-22 Time: 2300 Board: S5 MH/S
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. 7.2/85.5/EGM	0. NO/EGM	0.	0.
1. 9.3/111.4/EGM	1. Y/12/8.0/91.2/EGM	1.	1.
2. 7.5/92.8%/EGM	2. NO/EGM	2.	2.
3. 8.3/99.8%/EGM	3. NO/EGM	3.	3.
4. 8.1/90.7%/EGB	4. NO/EGB	4.	4.
5. 8.2/90.3%/EGB	5. NO/EGB	5.	5.
6. 8.9/105.7%/EGM	6. Y/12/8.3/99.0%/EGM	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. <0.5/EGM	1. NO/EGM	1. 0.5/EGM	1. C23414 7/26/22
2. <0.5/EGM	2. NO/EGM	2. 0.5/EGM	2. C23427 7/28/22
3. <0.5/EGB	3. NO/EGB	3. 3.0/EGB	3. C23440 7/29/22

Comments: 8/1/22 - 2330hrs - No neonates in controls EGB
8/2/22 - 0645hrs - Counted + collected neonates EGB

BIO-ANALYTICAL LABORATORIES

CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST-LIVE NEONATE PRODUCTION-EPA 1002 OECD 202

Project# X8409 Client City of Magnolia Sample ID 001

Test started: Date 7/21/22 Time 1347 Test ended: Date 8/2/22 Time 1400

Date/Tech: Day0 7/21/22 MJ 1 7/22/22 MJ 2 7/25/22 MJ 3 7/29/22 MJ 4 7/30/22 MJ 5 7/31/22 MJ 6 8/1/22 MJ 7 8/2/22 MJ 8

Time: Day0 1347 1 1102 2 1115 3 1034 4 1025 5 1024 6 1010 7 1400 8

Temp. (°C): Day0 24.5 1 21.8 2 23.9 3 24.1 4 23.2 5 24.0 6 24.2 7 24.6 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	13	13	12	X	0	13	13	13	0	12	7
	5	0	—	—	|	—	—	—	X	—	—	8
	6	2/7	2/7	2/6	|	13	0	2/6	|	1/8	2/11	8
	7	3/8	3/10	3/12	|	2/12	2,3/16	3/11	|	2,3/17	3/8	8
	8											
32.0	1	0	—	—	—	—	—	—	—	—	—	10
	2	0	—	—	—	—	—	—	—	—	—	10
	3	0	—	—	—	—	—	—	—	—	—	10
	4	13	13	X	13	13	X	12	X	0	0	7
	5	0	—	|	X	—	|	—	|	13	12	6
	6	2/10	0	|	|	2/5	|	0	|	8/9	11	6
	7	3/11	2/10	|	|	3/12	|	2/9	|	3/12	2/11	6
	8											
42.0	1	0	—	—	—	—	—	—	—	—	—	10
	2	0	—	—	—	—	—	—	—	—	—	10
	3	0	—	—	—	—	—	—	—	—	—	10
	4	12	13	12	13	11	12	13	12	11	13	10
	5	0	—	—	—	—	2/9	—	—	—	—	10
	6	2/9	2/10	0	2/8	0	0	2/12	2/9	2/10	2/9	10
	7	3/12	3/14	2/3	3/12	2/10	3/13	3/13	3/15	3/15	3/13	
	8											
56.0	1	0	—	—	—	—	—	—	—	—	—	10
	2	0	—	—	—	—	—	—	—	—	—	10
	3	0	—	—	—	—	—	—	—	—	—	10
	4	13	12	14	13	13	12	13	X	12	11	10 9
	5	0	—	—	—	—	—	—	|	—	—	9 8
	6	2/5	2/6	2/9	2/7	2/5	2/6	2/7	|	0/7	0	8 9
	7	3/13	3/13	3/13	3/13	3/13	3/14	3/14	|	3/13	2/10	9
	8											
80.0	1	0	—	—	—	—	—	—	|	—	—	10
	2	0	—	—	—	—	—	—	|	—	—	10
	3	0	—	—	—	—	—	—	|	—	—	10
	4	13	12	12	11	14	12	13	13	14	12	10
	5	0	—	—	—	—	—	—	—	—	—	10
	6	2/9	2/9	0	0	2/8	2/6	2/8	2/4	2/7	2/8	10
	7	3/13	3/14	2/9	2/7	3/13	3/15	3/17	3/14	3/15	3/13	10
	8											
100.0	1	0	—	—	—	—	—	—	—	—	—	10
	2	0	—	—	—	—	—	—	—	—	—	10
	3	0	—	—	—	—	—	—	—	—	—	10
	4	13	12	12	11	12	14	13	12	12	13	10
	5	0	—	—	—	—	—	—	—	—	—	10
	6	2/6	2/2	2/6	2/7	2/5	2/7	2/9	2/6	2/7	2/8	10
	7	3/13	3/13	3/12	3/9	3/10	3/13	3/12	3/9	3/10	3/14	10
	8											

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

CERIO2 Rev 4.0

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

Project# X840 **Client** City of Magnolia **Organism** C. dubia

Date	Day 0 SAS 7/26/22	Day 1 7/27/22	Day 2 7/28/22	Day 3 7/29/22	Day 4 7/30/22	Day 5 7/31/22	Day 6 8/1/22	Day 7 8/2/22	Day 8
Concentration:	○ soft								
Temperature (°C)	25.0	24.0 / 25.2	23.7 / 25.2	24.3 / 24.2	23.1 / 23.9	23.2 / 23.9	23.9 / 23.8	24.1 / -	
pH	6.9	8.3 / 7.0	7.6 / 7.5	8.7 / 7.4	9.5 / 8.1	9.4 / 8.0	7.9 / 8.3	7.5	
DO (mg/l)	7.6	8.1 / 7.6	7.9 / 7.7	8.5 / 7.9	8.5 / 8.1	8.3 / 8.1	8.6 / 8.2	7.7	○ 8/2/22
Cond (umhos/cm)	169	168	166	173	153	159	160	~~173~~ ○	
Concentration:	32.0%								
Temperature (°C)	25.3	24.0 / 25.2	23.6 / 25.1	24.4 / 24.2	23.1 / 24.2	23.7 / 24.2	24.1 / 24.4	23.9	
pH	7.0	8.1 / 7.1	7.6 / 7.3	8.0 / 7.3	8.0 / 7.6	7.9 / 7.7	7.7 / 7.6	7.6	
DO (mg/l)	7.5	8.7 / 7.6	7.5 / 7.4	8.6 / 7.7	8.5 / 8.1	8.3 / 8.1	8.6 / 8.1	7.4	
Cond (umhos/cm)	256	245	260	258	261	252	242		
Concentration:	42.0%								
Temperature (°C)	25.1	24.1 / 25.1	23.5 / 25.0	24.6 / 24.2	23.4 / 23.9	23.2 / 23.6	24.2 / 24.5	24.0	
pH	7.0	8.0 / 7.1	7.6 / 7.3	7.9 / 7.4	7.7 / 7.3	7.6 / 7.2	7.8 / 7.3	7.5	
DO (mg/l)	7.4	8.9 / 7.7	7.4 / 7.4	8.8 / 7.6	8.5 / 8.0	8.3 / 8.0	8.2 / 8.1	7.4	
Cond (umhos/cm)	276	278	284	291	271	291	278		
Prerenewal Tech Initials/Time		LCM 1110	SDW 1115	1034 MV	MV 1025	1024 MV	LCM 1012	SDW 1400	
Postrenewal Tech Initials/Time	LCM 0845	LCM 0845	SDW 0935	SDW 0910	EVB 0820	EVB 0740	MV		

Control Alkalinity (mg/L as $CaCO_3$) Control Hardness (mg/L as $CaCO_3$)

ID# 5195 Result 28 Date Tested 7/28/22 ID# 5195 Result 60 Date Tested 7/28/22
ID# ____ Result ____ Date Tested ____ ID# ____ Result ____ Date Tested ____
ID# ____ Result ____ Date Tested ____ ID# ____ Result ____ Date Tested ____

Sample Alkalinity (mg/L as $CaCO_3$) Sample Hardness (mg/L as $CaCO_3$)

ID# C23414 Result 128 Date Tested 7/28/22 ID# C23414 Result 12 Date Tested 7/28/22
ID# C23427 Result 116 Date Tested 7/28/22 ID# C23427 Result 28 Date Tested 7/28/22
ID# C23440 Result 128 Date Tested 8/4/22 ID# C23440 Result 32 Date Tested 8/4/22

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

Project# X8409 **Client** City of Magnolia **Organism** C. dubia

Date	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Concentration: 56.0%									
Temperature (°C)	25.0	23.9 25.1	23.5 24.9	24.6 24.2	23.4 23.7	24.0 23.1	24.2 24.3	24.3	
pH	7.0	8.0 7.2	7.6 7.3	7.9 7.4	7.7 7.1	7.8 7.1	7.9 7.1	7.5	
DO (mg/l)	7.3	8.9 7.4	7.7 7.7	9.0 7.8	8.5 7.9	8.5 7.9	8.8 8.0	7.7	
Cond (umhos/cm)	331	335	338	336	313	319	326		
Concentration: 80.0%									
Temperature (°C)	25.0	23.9 25.0	23.4 24.5	24.7 24.2	23.4 23.7	23.9 23.1	24.4 24.4	23.9	
pH	7.1	8.0 7.2	7.6 7.3	7.9 7.4	7.7 7.0	7.7 7.0	7.9 7.1	7.6	
DO (mg/l)	7.3	9.1 7.5	7.8 7.4	7.0 7.5	8.5 8.0	8.5 8.0	8.9 8.1	7.7	
Cond (umhos/cm)	391	376	404	404	393	381	388		
Concentration: 100.0%									
Temperature (°C)	24.8	23.7 25.0	23.4 24.3	24.5 24.2	23.5 23.3	24.0 22.5	24.4 24.4	23.7	
pH	7.1	8.1 7.2	7.7 7.3	7.9 7.4	7.7 7.0	7.7 7.0	7.9 7.1	7.4	
DO (mg/l)	7.3	9.2 7.5	7.6 7.4	4.3 7.5	8.5 7.9	8.5 8.0	9.0 8.1	7.8	
Cond (umhos/cm)	447	449	472	471	450	434	456		
Prerenewal Tech Initials/Time		LCM 1110	EDW 1115	1034 MV	MV 1025	1024 MV	LCM 1017	EDW 1400	
Postrenewal Tech Initials/Time	LCM 0845	LCM 0845	EDW 0935	EDW 0910	EWB 0820	EWB 0740	0917 MV		

Control Alkalinity (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Control Hardness (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Sample Alkalinity (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Sample Hardness (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

CETIS Test Data Worksheet

Report Date: 22 Jul-22 15:46 (p 1 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

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

Start Date:	26 Jul-22 13:30	**Species:**	Ceriodaphnia dubia
End Date:	02 Aug-22 18:30	**Protocol:**	EPA/821/R-02-013 (2002)
Sample Date:	25 Jul-22 08:00	**Material:**	POTW Effluent
Sample Code:	53ACDE45		
Sample Source:	AR0043613		
Sample Station:	001		

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

Analyst: _____ QA: EB 8/9/22

CETIS Test Data Worksheet

Report Date: 22 Jul-22 15:46 (p 2 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

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

Analyst:_____ QA: EVB 8/9/22

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

7/26/22
MV

Set #1

2, 4, 1, 6, 3, 5 Parent# 5E

Set #2

3, 5, 1, 2, 4, 6 Parent# 4E

Set #3

3, 6, 2, 1, 5, 4 Parent# 4B

Set #4

2, 4, 6, 1, 5, 3 Parent# 7G

Set #5

6, 2, 5, 3, 1, 4 Parent# 4H

Set #6

1, 3, 6, 5, 2, 4 Parent# 3J

Set #7

1, 2, 5, 6, 3, 4 Parent# 7C

Set #8

1, 6, 5, 3, 2, 4 Parent# 6A

Set #9

1, 6, 2, 4, 5, 3 Parent# 5I

Set #10

2, 1, 5, 3, 6, 4 Parent# 5G

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X8409 Date started: 7/25/22 Date ended 8/1/22

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/MV
Test organism age 24H hours Vendor/ID# BAL 072522

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			EDW/1435/0.2mL
1	EDW/0830/0.10mL	EDW/1300/0.10mL	EDW/1630/0.10mL
2	EDW/0755/0.1mL	EDW/1340/0.1mL	EDW/1425/0.1mL
3	EDW/0805/0.1mL	EDW/1155/0.1mL	EDW/1430/0.1mL
4	EDW/0755/0.1mL	EDW/1145/0.1mL	EDW/1430/0.10mL
5	EGB/0715/0.10mL	EGB/1045/0.10mL	EGB/1530/0.10mL
6	EGB/0915/0.20mL		EGB/1610/0.10mL

Dissolved Oxygen Meter: Model YSI550 Serial #02F0741 AH
pH Meter: Model Orion 230A+ Serial #015253
Conductivity Meter: Model YSI EC300A 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.	7.2/86.8/1/EGB	NO/EGB		
1.	7.2/85.5/1/EGB	NO/EGB		
2.	9.3/111.4/1/EGB	Y/12/8.0/91.2/1/EGB		
3.	7.5/92.8%/EGB	NO/EGB		
4.	8.3/99.8%/EGB	NO/EGB		
5.	8.1/90.7%/EGB	NO/EGB		
6.	8.2/90.3%/EGB	NO/EGB		

	Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1.	<0.5/EGB	NO/EGB	0.5/EGB	C23414 7/25/22
2.	<0.5/EGB	NO/EGB	0.5/EGB	C23427 7/28/22
3.	<0.5/EGB	NO/EGB	3.0/EGB	C23440 7/29/22

Comments: Under supervision of EGB/EDW/MV

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

Project# X8409 **Test started: Date** 7/27/22 **Time** 1415

Client City of Magnolia **Sample ID** 001 **Test ended: Date** 8/1/22 **Time** 1322

Date/Tech: Day0 7/27/22 1 7/26/22 2 7/27/22 3 7/28/22 4 7/29/22 5 7/30/22 6 7/31/22 7 8/1/22

Time: Day0 1752 1 1255 2 1340 3 1049 4 1108 5 1015 6 0906 7 1322

Temp (°C) Day0 24.6 1 25.2 2 23.2 3 25.1 4 24.8 5 24.8 6 24.5 7 24.8

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

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

Project# X8409 **Test started: Date** 7/25/22 **Time** 1415

Client City of Magnolia **Sample ID** 09 **Test ended: Date** 8/1/22 **Time** 1327

Date/Tech: Day0 7/25/22 [illegible] 1 7/26/22 [illegible] 2 7/27/22 3 7/28/22 4 7/29/22 [illegible] 5 7/30/22 [illegible] 6 7/31/22 [illegible] 7 8/1/22

Time: Day0 1415 1 1255 2 1340 3 1049 4 1108 5 1015 6 0906 7 1327

Temp (°C) Day0 24.8 1 25.2 2 25.0 3 25.1 4 24.8 5 24.8 6 24.5 7 24.5

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
100.0% CV	1	8	8	8	8	8	8	8	8
	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	3
	5	8	8	8	8	8	8	8	6
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								
	1								
	2								
	3								
	4								
	5								

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET (Minnow3 Rev 2.1)

Project#/Client Magnolia X8409 Temp Start (°C) 11.6 Tech LW Date: 8/1/22 Time: 1320
Temp End (°C) 13.3 Tech LW Date: 8/2/22 Time: 0815

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 7/28/22 Tech: LW	Wt. of pan + larvae(g)/ Date weighed: 8/2/22 Tech: LW	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 SOFT	1 36	1.0522	1.0606				
	2 37	1.0363	1.0431				
	3 38	1.0307	1.0382				
	4 39	1.0475	1.0560				
	5 40	1.0254	1.0322				
32.0	1 41	1.0358	1.0444				
	2 42	1.0428	1.0514				
	3 43	1.0329	1.0390				
	4 44	1.0336	1.0395				
	5 45	1.0329	1.0413				
42.0	1 46	1.0226	1.0303				
	2 47	1.0302	1.0369				
	3 48	1.0359	1.0447				
	4 49	1.0324	1.0398				
	5 50	1.0212	1.0300				
56.0	1 51	1.0390	1.0432				
	2 52	1.0370	1.0419				
	3 53	1.0392	1.0472				
	4 54	1.0422	1.0496				
	5 55	1.0314	1.0359				
80.0	1 56	1.0428	1.0498				
	2 57	1.0408	1.0473				
	3 58	1.0334	1.0390				
	4 59	1.0346	1.0362				
	5 60	1.0276	1.0352				
100.0	1 61	1.0361	1.0429				
	2 62	1.0476	1.0543				
	3 63	1.0445	1.0519				
	4 64	1.0343	1.0382				
	5 65	1.0374	1.0446				

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

Calculated by: CET 5 Calculations checked by: EWB 8/9/22

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET (Minnow3 Rev 2.1)

Project#/Client X8409 Magnolia Temp Start(°C) 11.5.6 Tech lw Date: 8/1/22 Time: 1300
Temp End(°C) 11.3.3 Tech lw Date: 8/2/22 Time: 0815

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 7/28/22 Tech: lw	Wt. of pan + larvae(g)/ Date weighed: 8/2/22 Tech: lw	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*
100UV	1 66	1.0500	1.0570				
	2 67	1.0378	1.0433				
	3 68	1.0450	1.0499				
	4 69	1.0368	1.0395				
	5 70	1.0275	1.0315				
	1						
	2						
	3						
	4						
	5						
	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: CETIS Calculations checked by: ECB 8/9/22

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

Project# X8409 Client City of Magnolia Organism P. promelas

Date	Day 0 7/25/22 5189	Day 1 7/26/22	Day 2 7/27/22	Day 3 7/28/22	Day 4 7/29/22	Day 5 7/30/22 5199	Day 6 7/31/22	Day 7 8/1/22	Day 8
Concentration: 0 50ft									
Temperature (°C)	25.8	24.8 / 27.5	25.4 / 27.3	24.9 / 26.6	24.9 / 24.3	23.7 / 25.1	23.8 / 26.8	25.5	
pH	7.7	7.2 / 6.9	7.2 / 7.3	7.6.9 / 8.1	7.1 / 7.5	8.0 / 7.9	7.8 / 7.9	7.6.9	
DO (mg/l)	7.3	7.4 / 6.9	6.1 / 7.3	6.2 / 7.4	6.1 / 7.9	6.3 / 7.4	6.5 / 7.5	5.0	
Cond (umhos/cm)	171	1168	1167	168	169	158	164	178.1	
Concentration: 32.0%									
Temperature (°C)	26.3	25.1 / 26.9	25.6 / 26.8	25.0 / 26.1	25.0 / 24.4	23.7 / 26.7	24.1 / 25.7	25.5	
pH	7.3	7.2 / 7.0	7.1 / 7.3	7.0 / 7.9	6.9 / 7.3	7.5 / 7.3	7.3 / 7.4	6.7	
DO (mg/l)	7.3	7.4 / 7.1	5.4 / 7.4	6.2 / 7.5	5.5 / 7.9	4.9 / 7.5	5.9 / 7.6	4.6	
Cond (umhos/cm)	270	2666	2663	265	262	261	257	256.4	
Concentration: 42.0%									
Temperature (°C)	25.9	25.3 / 26.5	25.5 / 26.5	25.0 / 26.0	25.0 / 24.6	23.8 / 26.2	24.2 / 25.2	25.3	
pH	7.2	7.2 / 7.0	7.1 / 7.3	7.0 / 7.6	6.9 / 7.4	7.1 / 7.1	7.1 / 7.1	6.7 / 6.	
DO (mg/l)	7.3	2.0 / 7.1	5.1 / 7.5	6.4 / 7.1	5.6 / 7.3	5.1 / 7.5	5.4 / 7.7	4.3	
Cond (umhos/cm)	287	300	293	288	293	298	285	309.2	
Prerenewal Tech Initials/Time		EBW 1255	LW1345 1445	LW 1055	LW1110 1110	EBB 1515	EBB 0909	LW 1328	
Postrenewal Tech Initials/Time	LBM 1350	LBM 0931	LBM 0939	SBW 0930	SBW 0900	EBB 0800	EBB 0735		

Control Alkalinity (mg/L as $CaCO_3$) Control Hardness (mg/L as $CaCO_3$)

ID# 5189 Result 32 Date Tested 7/21/22 ID# 5189 Result 56 Date Tested 7/21/22
ID# 5199 Result 36 Date Tested 8/4/22 ID# 5199 Result 52 Date Tested 8/4/22
ID# _____ Result _____ Date Tested _____ ID# _____ Result _____ Date Tested _____

Sample Alkalinity (mg/L as $CaCO_3$) Sample Hardness (mg/L as $CaCO_3$)

ID# C23414 Result 128 Date Tested 7/28/22 ID# C23414 Result 12 Date Tested 7/28/22
ID# C23423 Result 116 Date Tested 7/28/22 ID# C23423 Result 28 Date Tested 7/28/22
ID# C23440 Result 128 Date Tested 8/4/22 ID# C23440 Result 32 Date Tested 8/4/22

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

Project# X8409 Client City of 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)	25.1	25.4 / 24.2	25.5 / 24.2	25.1 / 24.8	25.0 / 24.5	23.7 / 25.5	24.2 / 24.5	25.1	
pH	7.1	7.2 / 7.0	7.1 / 7.3	7.0 / 7.6	6.9 / 7.4	7.0 / 7.0	7.0 / 7.0	6.7	
DO (mg/l)	7.2	6.0 / 7.1	5.3 / 7.7	5.1 / 7.8	5.2 / 7.3	4.9 / 7.6	4.2 / 7.7	4.7	
Cond (umhos/cm)	323	336	333	325	338	322	322	329.0	
Concentration: 80.0%									
Temperature (°C)	25.0	25.4 / 24.2	25.4 / 24.2	25.1 / 25.1	24.9 / 24.4	23.9 / 25.5	24.3 / 24.4	25.1	
pH	7.1	7.2 / 7.0	7.2 / 7.3	7.2 / 7.3	7.0 / 7.4	7.0 / 6.9	7.0 / 6.9	6.7	
DO (mg/l)	7.5	6.3 / 7.2	5.5 / 7.1	6.0 / 7.6	5.1 / 7.6	4.6 / 7.7	4.1 / 7.8	4.0	
Cond (umhos/cm)	395	405	391	409	406	402	387	393.5	
Concentration: 100.0%									
Temperature (°C)	25.0	25.1 / 25.4	25.4 / 25.1	25.0 / 24.7	24.9 / 24.5	23.9 / 24.6	24.3 / 24.6	24.5	
pH	7.1	7.4 / 7.1	7.4 / 7.3	7.3 / 7.1	7.1 / 7.3	7.0 / 6.9	7.0 / 6.9	6.7	
DO (mg/l)	7.4	7.0 / 7.3	5.1 / 7.1	5.1 / 7.8	5.1 / 7.8	4.6 / 7.9	4.1 / 7.9	3.2	
Cond (umhos/cm)	454	450	455	475	471	445	435	450.6	
Prerenewal Tech Initials/Time		EW 1255	EW 1345	EW 1055	EW 1110	EB 1015	EB 0909	EW 1328	
Postrenewal Tech Initials/Time	LGM 1350	LGM 0931	LGM 0939	EW 0930	EW 0900	EB 0880	EB 0735		

Control Alkalinity (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Control Hardness (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Sample Alkalinity (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

Sample Hardness (mg/L as $CaCO_3$)

ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____
ID#_____ Result_____ Date Tested_____

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

Project# X8409 **Client** City of 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% OV								
Temperature (°C)	24.6	23.1 25.1	25.3 25.2	25.0 24.5	24.8 24.8	24.0 23.7	24.2 24.0	24.8	
pH	7.1	7.0 7.0	7.5 7.2	7.4 7.1	7.2 7.3	7.1 6.9	7.0 6.9	6.8	
DO (mg/l)	7.3	6.9 7.0	6.3 7.6	5.9 7.5	5.2 7.5	4.8 7.9	4.2 7.9	3.5	
Cond (umhos/cm)	438	451	449	447	471	442	437	457.2	
Concentration:									
Temperature (°C)									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
Temperature (°C)									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Prerenewal Tech Initials/Time		EW 1255	EW 1345	EW 1055	EW 1110	EW 1015	EW 0909	EW 1328	
Postrenewal Tech Initials/Time	LCM 1350	LCM 0931	LCM 0931	EW 0930	EW 0900	EW 0500	EW 0735		

Control Alkalinity (mg/L as $CaCO_3$)

ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____

Control Hardness (mg/L as $CaCO_3$)

ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____

Sample Alkalinity (mg/L as $CaCO_3$)

ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____

Sample Hardness (mg/L as $CaCO_3$)

ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____
ID#____ Result____ Date Tested____

CETIS Test Data Worksheet

Report Date: 22 Jul-22 15:48 (p 1 of 1)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test — **Bio-Analytical Laboratories**

Start Date:	26 Jul-22 14:52	**Species:**	Pimephales promelas	**Sample Code:**	CDF0BB2
End Date:	02 Aug-22 09:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Sample Source:**	AR0043613
Sample Date:	25 Jul-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	To Weig
101		5	1									
80		2	2									
80		4	3									
56		2	4									
100		4	5									
56		1	6									
0	D	2	7									
101		1	8									
100		5	9									
32		5	10									
100		1	11									
101		2	12									
32		4	13									
0	D	5	14									
42		3	15									
42		5	16									
42		4	17									
101		4	18									
32		2	19									
0	D	4	20									
100		3	21									
0	D	1	22									
42		2	23									
0	D	3	24									
42		1	25									
101		3	26									
56		4	27									
80		3	28									
56		3	29									
80		1	30									
100		2	31									
80		5	32									
56		5	33									
32		3	34									
32		1	35									

Analyst:_____ QA: EVB 8/9/22

APPENDIX C
STATISTICAL ANALYSIS

CETIS Analytical Report

Report Date: 05 Aug-22 16:29 (p 1 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID:	01-5032-3146	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	05 Aug-22 16:29	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Edit Date:	05 Aug-22 16:17	MD5 Hash:	D4D4FFE7217E893865ACCC7C40D29231	Editor ID:	008-522-314-5
Batch ID:	15-4660-6270	Test Type:	Reproduction-Survival (2-8d)	Analyst:	
Start Date:	26 Jul-22 13:47	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Reconstituted Water
Ending Date:	02 Aug-22 14:00	Species:	Ceriodaphnia dubia	Brine:	
Test Length:	7d 0h	Taxon:	Branchiopoda	Source:	In-House Culture Age: <24
Sample ID:	14-0383-8021	Code:	X8409	Project:	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	Material:	POTW Effluent	Source:	AR0043613
Receipt Date:	25 Jul-22 12:00	CAS (PC):		Station:	001
Sample Age:	30h (1.8 °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	0.31	Exact	1.0000	Non-Significant Effect
		42	1.00	Exact	1.0000	Non-Significant Effect
		56	0.89	Exact	1.0000	Non-Significant Effect
		80	1.00	Exact	1.0000	Non-Significant Effect
		100	1.00	Exact	1.0000	Non-Significant Effect

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	8	2	10	0.80	0.20	0.00%
32		6	4	10	0.60	0.40	25.00%
42		10	0	10	1.00	0.00	-25.00%
56		9	1	10	0.90	0.10	-12.50%
80		10	0	10	1.00	0.00	-25.00%
100		10	0	10	1.00	0.00	-25.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	0.80	0.50	1.00	1.00	0.00	1.00	0.13	52.70%	0.00%
32		10	0.60	0.23	0.97	1.00	0.00	1.00	0.16	86.07%	25.00%
42		10	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	-25.00%
56		10	0.90	0.67	1.00	1.00	0.00	1.00	0.10	35.14%	-12.50%
80		10	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	-25.00%
100		10	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	-25.00%

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	0.00	1.00	1.00	1.00	0.00	1.00	1.00
32		1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
42		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
56		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00
80		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Analyst: [signature] QA: EVB 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:29 (p 2 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

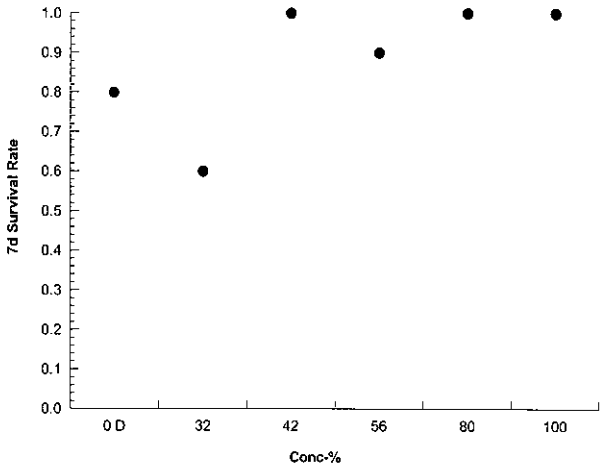
Ceriodaphnia 7-d Survival and Reproduction Test — **Bio-Analytical Laboratories**

Analysis ID:	01-5032-3146	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	05 Aug-22 16:17	**MD5 Hash:**	D4D4FFE7217E893865ACCC7C40D29231	**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	0/1	1/1	1/1	1/1	0/1	1/1	1/1
32		1/1	1/1	0/1	0/1	1/1	0/1	1/1	0/1	1/1	1/1
42		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
80		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: 8/5/22 QA: EWB 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:29 (p 1 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

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

Analysis ID:	05-3915-4492	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:29	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Edit Date:	05 Aug-22 16:17	**MD5 Hash:**	66AFA6A2D1537583DC3028097DF8FAA2	**Editor ID:**	008-522-314-5
Batch ID:	15-4660-6270	**Test Type:**	Reproduction-Survival (2-8d)	**Analyst:**	
Start Date:	26 Jul-22 13:47	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Reconstituted Water
Ending Date:	02 Aug-22 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	14-0383-8021	**Code:**	X8409	**Project:**	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	**Material:**	POTW Effluent	**Source:**	AR0043613
Receipt Date:	25 Jul-22 12:00	**CAS (PC):**		**Station:**	001
Sample Age:	30h (1.8 °C)	**Client:**	Magnolia Wastewater System		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	6.2	31.19%

Wilcoxon/Bonferroni Adj Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	40	---	1	12	Exact	1.0000	Non-Significant Effect
		42	110	---	1	16	Exact	1.0000	Non-Significant Effect
		56	96	---	2	15	Exact	1.0000	Non-Significant Effect
		80	120	---	1	16	Exact	1.0000	Non-Significant Effect
		100	94	---	3	16	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	86.2987	17.2597	5	0.59	0.7049	Non-Significant Effect
Error	1366.83	29.0816	47			
Total	1453.13		52			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	11	15	0.0549	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.88	0.94	8.1E-05	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	8	20	17	22	20	15	25	1	14.26%	0.00%
32		6	18	12	24	17	11	24	2.3	32.55%	10.55%
42		10	21	16	27	24	5	28	2.3	34.49%	-8.35%
56		9	21	18	24	22	11	26	1.4	20.20%	-6.33%
80		10	22	17	27	25	8	28	2.1	30.83%	-11.39%
100		10	20	18	23	20	17	25	1	16.30%	-2.28%

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	18	20	20	15	19	20	25	21		
32		24	13	20	11	24	14				
42		23	23	5	23	11	24	28	26	26	25
56		21	21	26	23	19	22	24	22	11	
80		25	25	11	8	25	23	28	26	26	23
100		22	17	20	17	17	24	24	17	19	25

Analyst: SPM 8/5/22 QA: EVB 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:30 (p 1 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID:	20-4612-5153	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.7
Analyzed:	05 Aug-22 16:30	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	05 Aug-22 16:17	MD5 Hash:	A639EC831C301D2DAABF69B246BF86C9	Editor ID:	008-522-314-5
Batch ID:	15-4660-6270	Test Type:	Reproduction-Survival (2-8d)	Analyst:	
Start Date:	26 Jul-22 13:47	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Reconstituted Water
Ending Date:	02 Aug-22 14:00	Species:	Ceriodaphnia dubia	Brine:	
Test Length:	7d 0h	Taxon:	Branchiopoda	Source:	In-House Culture Age: <24
Sample ID:	14-0383-8021	Code:	X8409	Project:	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	Material:	POTW Effluent	Source:	AR0043613
Receipt Date:	25 Jul-22 12:00	CAS (PC):		Station:	001
Sample Age:	30h (1.8 °C)	Client:	Magnolia Wastewater System		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	7.6	47.35%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	88	75	3	18	CDF	0.3061	Non-Significant Effect
		42	130	75	1	18	CDF	0.9999	Non-Significant Effect
		56	120	75	3	18	CDF	0.9974	Non-Significant Effect
		80	140	75	1	18	CDF	0.9999	Non-Significant Effect
		100	110	75	3	18	CDF	0.9664	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	868.55	173.71	5	3.1	0.0149	Significant Effect
Error	2994.7	55.4574	54			
Total	3863.25		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9	15	0.1098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.95	4.5E-05	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	16	10	22	20	0	25	2.6	50.41%	0.00%
32		10	11	3.9	18	12	0	24	3.1	89.62%	32.30%
42		10	21	16	27	24	5	28	2.3	34.49%	-32.92%
56		10	19	13	24	22	0	26	2.5	41.02%	-17.39%
80		10	22	17	27	25	8	28	2.1	30.83%	-36.65%
100		10	20	18	23	20	17	25	1	16.30%	-25.47%

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	18	20	20	0	15	19	20	3	25	21
32		24	13	0	3	20	0	11	0	24	14
42		23	23	5	23	11	24	28	26	26	25
56		21	21	26	23	19	22	24	0	22	11
80		25	25	11	8	25	23	28	26	26	23
100		22	17	20	17	17	24	24	17	19	25

Analyst: EAL 8/5/22 QA: ELB 8/9/22

CETIS Analytical Report

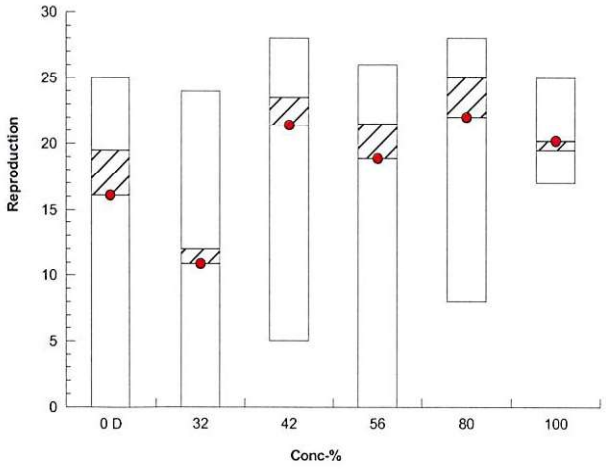
Report Date: 05 Aug-22 16:30 (p 2 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

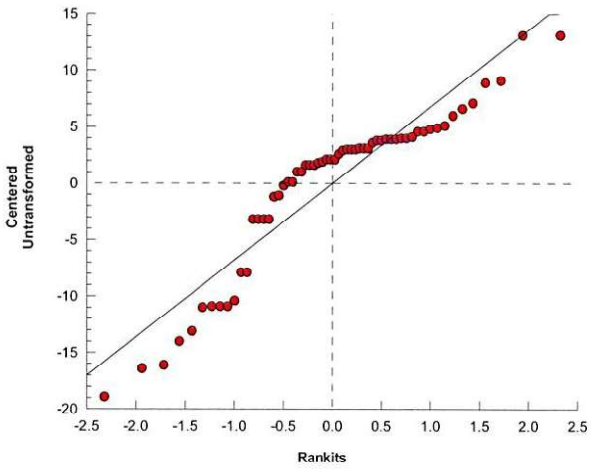
Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID:	20-4612-5153	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:30	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Aug-22 16:17	**MD5 Hash:**	A639EC831C301D2DAABF69B246BF86C9	**Editor ID:**	008-522-314-5

Graphics





Analyst: 8/5/22 QA: 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:30 (p 1 of 2)
Test Code/ID: 46AEA78E / 11-8585-1278

Ceriodaphnia 7-d Survival and Reproduction Test

Bio-Analytical Laboratories

Analysis ID:	00-9703-0579	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.7
Analyzed:	05 Aug-22 16:30	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	05 Aug-22 16:17	MD5 Hash:	A639EC831C301D2DAABF69B246BF86C9	Editor ID:	008-522-314-5
Batch ID:	15-4660-6270	Test Type:	Reproduction-Survival (2-8d)	Analyst:	
Start Date:	26 Jul-22 13:47	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Reconstituted Water
Ending Date:	02 Aug-22 14:00	Species:	Ceriodaphnia dubia	Brine:	
Test Length:	7d 0h	Taxon:	Branchiopoda	Source:	In-House Culture Age: <24
Sample ID:	14-0383-8021	Code:	X8409	Project:	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	Material:	POTW Effluent	Source:	AR0043613
Receipt Date:	25 Jul-22 12:00	CAS (PC):		Station:	001
Sample Age:	30h (1.8 °C)	Client:	Magnolia Wastewater System		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	682256	1000	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	10	16	20	0	25	50.41%	0.00%	18	0.00%
32		10	11	12	0	24	89.62%	32.30%	18	0.00%
42		10	21	24	5	28	34.49%	-32.92%	18	0.00%
56		10	19	22	0	26	41.02%	-17.39%	18	0.00%
80		10	22	25	8	28	30.83%	-36.65%	18	0.00%
100		10	20	20	17	25	16.30%	-25.47%	18	0.00%

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	18	20	20	0	15	19	20	3	25	21
32		24	13	0	3	20	0	11	0	24	14
42		23	23	5	23	11	24	28	26	26	25
56		21	21	26	23	19	22	24	0	22	11
80		25	25	11	8	25	23	28	26	26	23
100		22	17	20	17	17	24	24	17	19	25

Analyst: SDW 8/5/22 QA: EJB 8/9/22

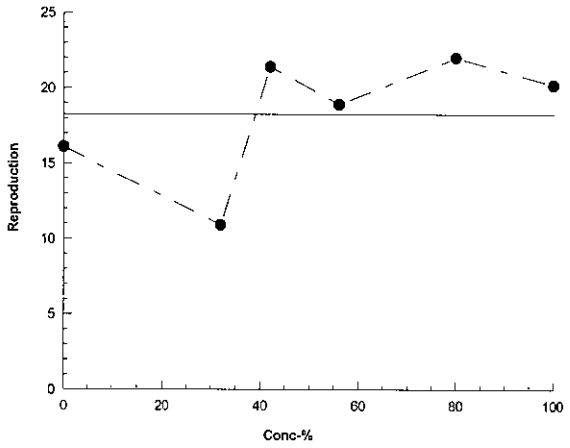
CETIS Analytical Report

Report Date:	05 Aug-22 16:30 (p 2 of 2)
Test Code/ID:	46AEA78E / 11-8585-1278

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

Analysis ID:	00-9703-0579	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	05 Aug-22 16:17	**MD5 Hash:**	A639EC831C301D2DAABF69B246BF86C9	**Editor ID:**	008-522-314-5

Graphics



Analyst: SM 8/5/22 QA: EVP 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:45 (p 1 of 2)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test — **Bio-Analytical Laboratories**

Analysis ID:	13-1517-7716	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Aug-22 16:36	**MD5 Hash:**	F3F1A326C2DCD57166E57C0FB5E2F841	**Editor ID:**	008-522-314-5
Batch ID:	05-5152-1990	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	25 Jul-22 14:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Reconstituted Water
Ending Date:	01 Aug-22 13:22	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	6d 23h	**Taxon:**	Actinopterygii	**Source:**	In-House Culture **Age:** <24
Sample ID:	02-1594-4114	**Code:**	X8409	**Project:**	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	**Material:**	POTW Effluent	**Source:**	AR0043613
Receipt Date:	25 Jul-22 12:00	**CAS (PC):**		**Station:**	001
Sample Age:	6h (1.8 °C)	**Client:**	Magnolia Wastewater System		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	101	>101	---	0.9901	0.24	24.79%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	24	16	2	8	CDF	0.5746	Non-Significant Effect
		42	28	16	2	8	CDF	0.8571	Non-Significant Effect
		56	26	16	1	8	CDF	0.7135	Non-Significant Effect
		80	29	16	1	8	CDF	0.9262	Non-Significant Effect
		100	26	16	2	8	CDF	0.7925	Non-Significant Effect
		~~101~~ 100UV	26	16	1	8	CDF	0.7135	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	0.95	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0984087	0.0164014	6	0.39	0.8795	Non-Significant Effect
Error	1.17946	0.0421236	28			
Total	1.27787		34			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	8.9	17	0.1805	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.88	0.91	0.0012	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	0.00%
32		5	0.90	0.77	1.00	0.88	0.75	1.00	0.05	11.62%	5.26%
42		5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	0.00%
56		5	0.88	0.66	1.00	1.00	0.62	1.00	0.08	20.20%	7.89%
80		5	0.95	0.81	1.00	1.00	0.75	1.00	0.05	11.77%	0.00%
100		5	0.88	0.61	1.00	1.00	0.50	1.00	0.10	24.74%	7.89%
~~101~~ 100UV		5	0.82	0.48	1.00	1.00	0.38	1.00	0.12	33.20%	13.16%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	0.00%
32		5	1.30	1.10	1.40	1.20	1.00	1.40	0.07	11.68%	5.24%
42		5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	0.00%
56		5	1.20	0.94	1.50	1.40	0.91	1.40	0.10	18.86%	6.97%
80		5	1.30	1.10	1.50	1.40	1.00	1.40	0.07	11.68%	-0.32%
100		5	1.20	0.91	1.60	1.40	0.79	1.40	0.12	21.34%	6.43%
~~101~~ 100UV		5	1.20	0.77	1.60	1.40	0.66	1.40	0.15	27.70%	10.80%

Analyst: 8/5/22 QA: 8/9/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:45 (p 2 of 2)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID:	13-1517-7716	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1
Edit Date:	05 Aug-22 16:36	MD5 Hash:	F3F1A326C2DCD57166E57C0FB5E2F841	Editor ID:	008-522-314-5

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.88	1.00	1.00	0.88	1.00
32		1.00	0.88	0.75	0.88	1.00
42		0.88	0.88	1.00	1.00	1.00
56		0.62	1.00	1.00	1.00	0.75
80		1.00	1.00	0.75	1.00	1.00
100		1.00	0.88	1.00	0.50	1.00
~~101~~ 100UV		1.00	1.00	1.00	0.38	0.75

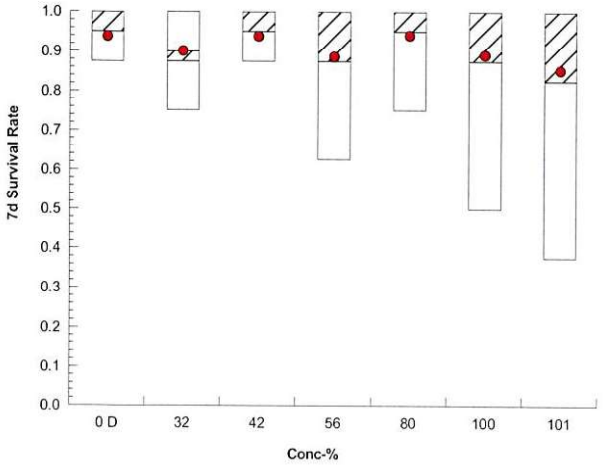
Angular (Corrected) Transformed Detail

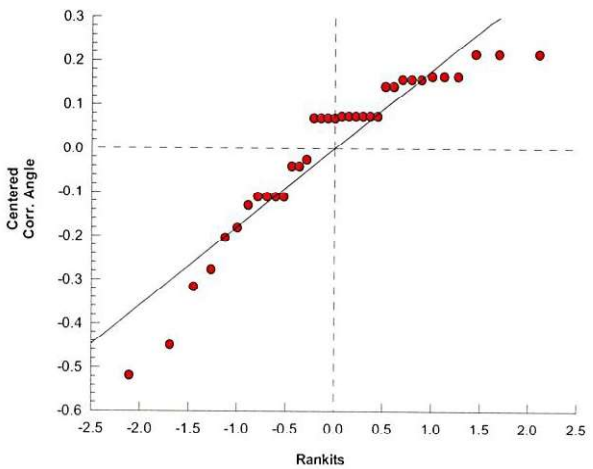
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.20	1.40	1.40	1.20	1.40
32		1.40	1.20	1.00	1.20	1.40
42		1.20	1.20	1.40	1.40	1.40
56		0.91	1.40	1.40	1.40	1.00
80		1.40	1.40	1.00	1.40	1.40
100		1.40	1.20	1.40	0.79	1.40
~~101~~ 100UV		1.40	1.40	1.40	0.66	1.00

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	7/8	8/8	8/8	7/8	8/8
32		8/8	7/8	6/8	7/8	8/8
42		7/8	7/8	8/8	8/8	8/8
56		5/8	8/8	8/8	8/8	6/8
80		8/8	8/8	6/8	8/8	8/8
100		8/8	7/8	8/8	4/8	8/8
~~101~~ 100UV		8/8	8/8	8/8	3/8	6/8

Graphics





Analyst: EW 8522 QA: EWB 8/19/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:45 (p 1 of 2)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test — **Bio-Analytical Laboratories**

Analysis ID:	05-0870-9094	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Aug-22 16:36	**MD5 Hash:**	E4607ACCBEF6B43E5A1389BF942CE953	**Editor ID:**	008-522-314-5
Batch ID:	05-5152-1990	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	25 Jul-22 14:15	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Reconstituted Water
Ending Date:	01 Aug-22 13:22	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	6d 23h	**Taxon:**	Actinopterygii	**Source:**	In-House Culture **Age:** <24
Sample ID:	02-1594-4114	**Code:**	X8409	**Project:**	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	**Material:**	POTW Effluent	**Source:**	AR0043613
Receipt Date:	25 Jul-22 12:00	**CAS (PC):**		**Station:**	001
Sample Age:	6h (1.8 °C)	**Client:**	Magnolia Wastewater System		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	101	100.5	1	0.25	26.20%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	0.097	2.4	0.25	8	CDF	0.8293	Non-Significant Effect
		42	-0.34	2.4	0.25	8	CDF	0.9296	Non-Significant Effect
		56	2.2	2.4	0.25	8	CDF	0.0791	Non-Significant Effect
		80	1.4	2.4	0.25	8	CDF	0.2904	Non-Significant Effect
		100	1.5	2.4	0.25	8	CDF	0.2632	Non-Significant Effect
		~~101~~*	3.4	2.4	0.25	8	CDF	0.0057	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	0.95	0.25	>>	Yes	Passes Criteria
PMSD	0.26	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.573563	0.0955939	6	3.6	0.0093	Significant Effect
Error	0.748387	0.0267281	28			
Total	1.32195		34			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.1	17	0.6665	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.91	0.3509	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	0.95	0.82	1.1	0.94	0.85	1.1	0.046	10.89%	0.00%
32		5	0.94	0.72	1.2	1.1	0.74	1.1	0.078	18.51%	1.05%
42		5	0.99	0.84	1.1	0.96	0.84	1.1	0.051	11.61%	-3.68%
56		5	0.72	0.45	1	0.61	0.52	1	0.099	30.43%	23.68%
80		5	0.81	0.67	0.94	0.81	0.7	0.95	0.049	13.57%	15.00%
100		5	0.8	0.58	1	0.85	0.49	0.93	0.08	22.29%	15.79%
~~101~~		5	0.6	0.35	0.85	0.61	0.34	0.88	0.09	33.43%	36.58%

Analyst: 8/5/22 QA: 8/19/22

CETIS Analytical Report

Report Date: 05 Aug-22 16:45 (p 2 of 2)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test

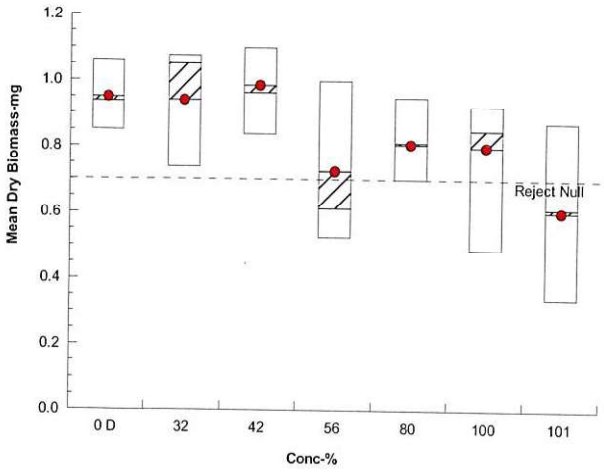
Bio-Analytical Laboratories

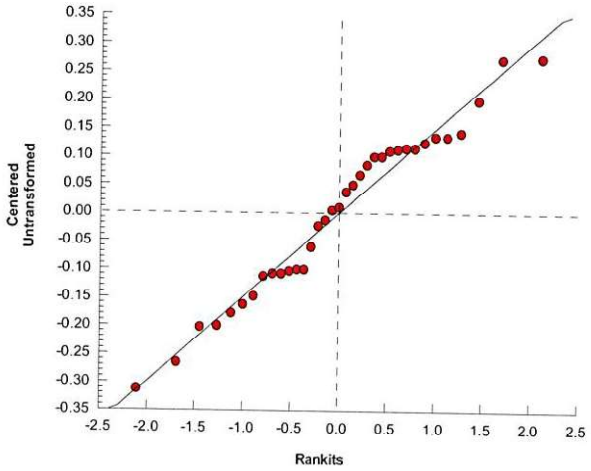
Analysis ID:	05-0870-9094	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	05 Aug-22 16:36	**MD5 Hash:**	E4607ACCBEF6B43E5A1389BF942CE953	**Editor ID:**	008-522-314-5

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.1	0.85	0.94	1.1	0.85
32		1.1	1.1	0.76	0.74	1.1
42		0.96	0.84	1.1	0.93	1.1
56		0.52	0.61	1	0.93	0.56
80		0.88	0.81	0.7	0.7	0.95
100		0.85	0.84	0.93	0.49	0.9
~~101~~ 100 LIV		0.88	0.69	0.61	0.34	0.5

Graphics





8/9/22
EDM ⊙EVB
8/5/22 100 LIV

CETIS Analytical Report

Report Date: 05 Aug-22 16:45 (p 1 of 2)
Test Code/ID: 56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test

Bio-Analytical Laboratories

Analysis ID:	07-7935-9301	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	05 Aug-22 16:36	MD5 Hash:	E4607ACCBEF6B43E5A1389BF942CE953	Editor ID:	008-522-314-5
Batch ID:	05-5152-1990	Test Type:	Growth-Survival (7d)	Analyst:	
Start Date:	25 Jul-22 14:15	Protocol:	EPA/821/R-02-013 (2002)	Diluent:	Reconstituted Water
Ending Date:	01 Aug-22 13:22	Species:	Pimephales promelas	Brine:	
Test Length:	6d 23h	Taxon:	Actinopterygii	Source:	In-House Culture Age: <24
Sample ID:	02-1594-4114	Code:	X8409	Project:	WET Monthly Compliance Test (JUL)
Sample Date:	25 Jul-22 08:00	Material:	POTW Effluent	Source:	AR0043613
Receipt Date:	25 Jul-22 12:00	CAS (PC):		Station:	001
Sample Age:	6h (1.8 °C)	Client:	Magnolia Wastewater System		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	827280	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.95	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	49	23	100	2.023	0.9796	4.361
IC15	53	43	120	1.882	0.808	2.312
IC20	100	26	100	0.9994	0.99	3.853
IC25	100	31	---	0.9967	---	3.233
IC40	>100	---	---	<0.9901	---	---
IC50	>100	---	---	<0.9901	---	---

Mean Dry Biomass-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	5	0.95	0.94	0.85	1.1	10.89%	0.00%	0.96	0.00%
32		5	0.94	1.1	0.74	1.1	18.51%	1.05%	0.96	0.00%
42		5	0.99	0.96	0.84	1.1	11.61%	-3.68%	0.96	0.00%
56		5	0.72	0.61	0.52	1	30.43%	23.68%	0.78	18.87%
80		5	0.81	0.81	0.7	0.95	13.57%	15.00%	0.78	18.87%
100		5	0.8	0.85	0.49	0.93	22.29%	15.79%	0.78	18.87%
~~101~~ 100 UV		5	0.6	0.61	0.34	0.88	33.43%	36.58%	0.6	37.13%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.1	0.85	0.94	1.1	0.85
32		1.1	1.1	0.76	0.74	1.1
42		0.96	0.84	1.1	0.93	1.1
56		0.52	0.61	1	0.93	0.56
80		0.88	0.81	0.7	0.7	0.95
100		0.85	0.84	0.93	0.49	0.9
~~101~~ 100 UV		0.88	0.69	0.61	0.34	0.5

Analyst: EDW 8/5/22 QA: EVB 8/9/22

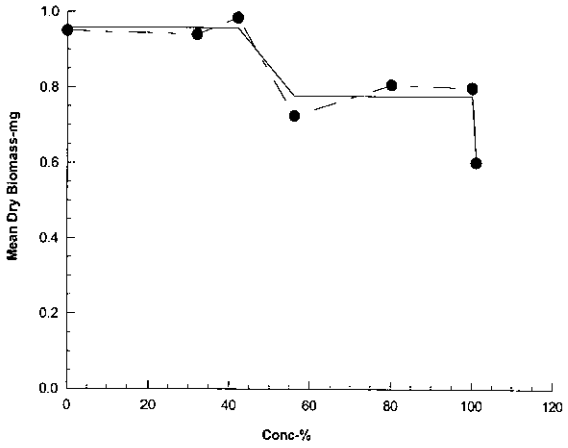
CETIS Analytical Report

Report Date:	05 Aug-22 16:45 (p 2 of 2)
Test Code/ID:	56277FEE / 14-4542-9230

Fathead Minnow 7-d Larval Survival and Growth Test — **Bio-Analytical Laboratories**

Analysis ID:	07-7935-9301	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	05 Aug-22 16:45	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	05 Aug-22 16:36	**MD5 Hash:**	E4607ACCBEF6B43E5A1389BF942CE953	**Editor ID:**	008-522-314-5

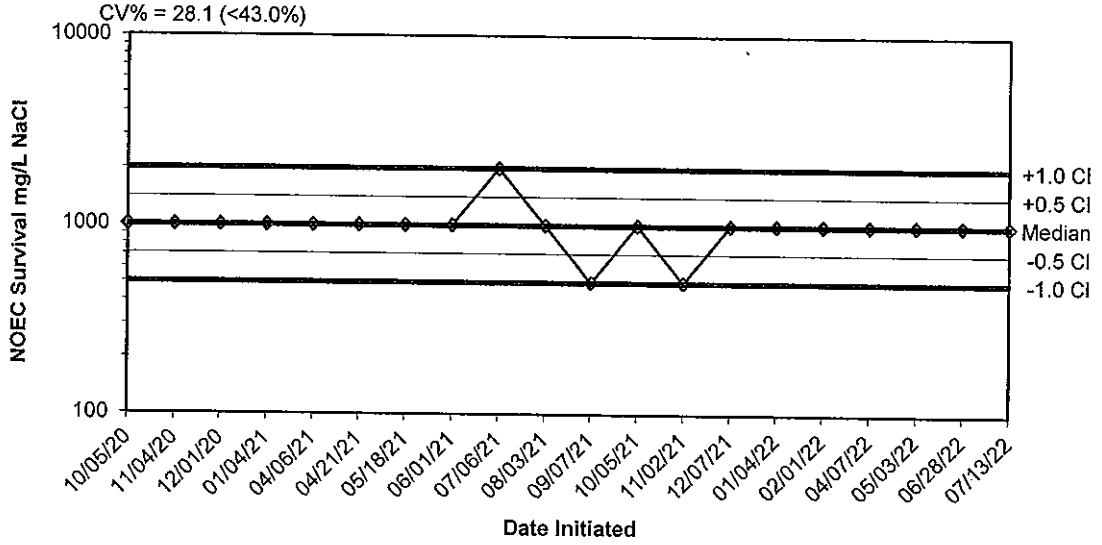
Graphics



Analyst: QA: 8/9/22

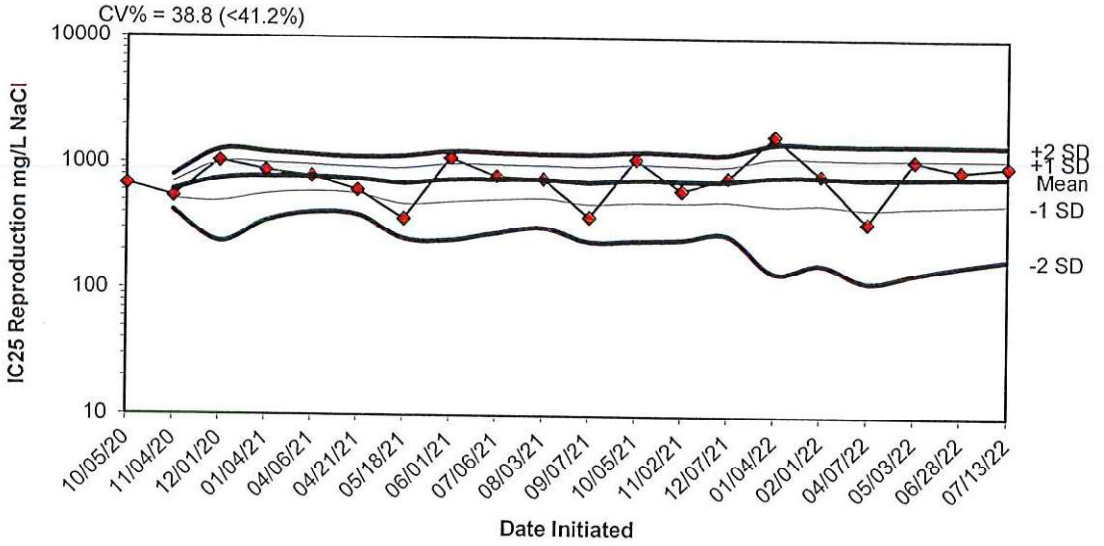
APPENDIX D
QUALITY ASSURANCE CHARTS

2022 CHRONIC REFERENCE TOXICANT TEST RESULTS FOR CERIODAPHNIA DUBIA IN SOFT WATER



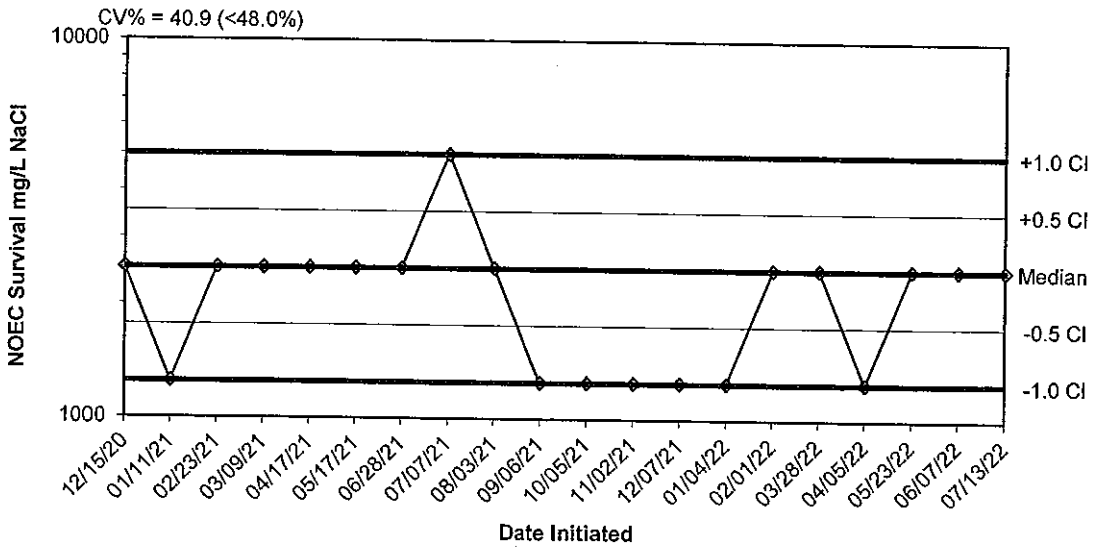
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
10/05/20	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
11/04/20	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
12/01/20	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
01/04/21	1000.0000	1000.0000	707.1068	500.0000	1414.2136	2000.0000
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

2022 CHRONIC REFERENCE TOXICANT TEST RESULTS FOR CERIODAPHNIA DUBIA IN SOFT WATER



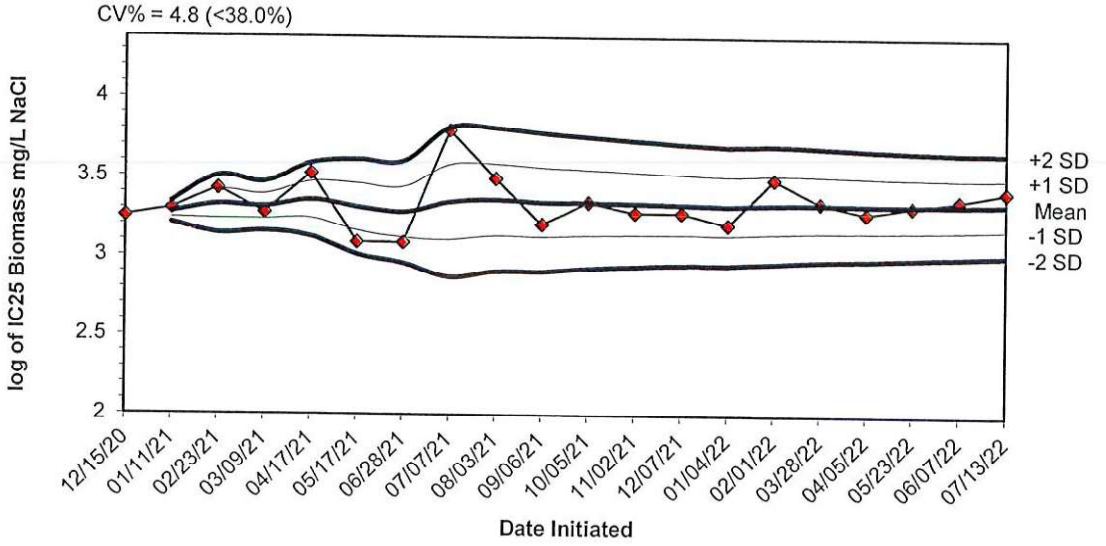
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/05/20	675.5000					
11/04/20	540.5000	608.0000	512.5406	417.0812	703.4594	798.9188
12/01/20	1037.7000	751.2333	494.1271	237.0209	1008.3396	1265.4458
01/04/21	877.4000	782.7750	563.5751	344.3753	1001.9749	1221.1747
04/06/21	788.0000	783.8200	593.9730	404.1259	973.6670	1163.5141
04/21/21	612.8000	755.3167	571.7189	388.1210	938.9145	1122.5123
05/18/21	364.6000	699.5000	476.1200	252.7400	922.8800	1146.2600
06/01/21	1106.3000	750.3500	498.4452	246.5404	1002.2548	1254.1596
07/06/21	800.0000	755.8667	519.6508	283.4349	992.0825	1228.2984
08/03/21	760.0000	756.2800	533.5697	310.8594	978.9903	1201.7006
09/07/21	380.0000	722.0727	482.2574	242.4420	961.8881	1201.7034
10/05/21	1100.0000	753.5667	500.2181	246.8695	1006.9153	1260.2638
11/02/21	620.0000	743.2923	497.9170	252.5418	988.6676	1234.0429
12/07/21	790.0000	746.6286	510.5494	274.4702	982.7078	1218.7870
01/04/22	1700.0000	810.1867	475.0048	139.8229	1145.3686	1480.5505
02/01/22	830.0000	811.4250	487.5706	163.7163	1135.2794	1459.1337
04/07/22	350.0000	784.2824	451.3397	118.3969	1117.2251	1450.1678
05/03/22	1100.0000	801.8222	470.3590	138.8958	1133.2854	1464.7486
06/28/22	920.0000	808.0421	484.7788	161.5156	1131.3054	1454.5686
07/13/22	1000.0000	817.6400	500.0844	182.5288	1135.1956	1452.7512

2022 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
12/15/20	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
01/11/21	1250.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
02/23/21	2500.0000	2500.0000	1767.7670	1250.0000	3535.5339	5000.0000
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

2022 CHRONIC REFERENCE TOXICANT TEST RESULTS FOR PIMEPHALES PROMELAS IN MH WATER



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/15/20	3.2489					
01/11/21	3.2962	3.2726	3.2391	3.2057	3.3060	3.3395
02/23/21	3.4237	3.3230	3.2326	3.1422	3.4134	3.5038
03/09/21	3.2733	3.3105	3.2327	3.1548	3.3884	3.4663
04/17/21	3.5199	3.3524	3.2370	3.1216	3.4678	3.5832
05/17/21	3.0878	3.3083	3.1589	3.0095	3.4577	3.6072
06/28/21	3.0854	3.2765	3.1162	2.9558	3.4368	3.5971
07/07/21	3.7924	3.3410	3.1058	2.8706	3.5761	3.8113
08/03/21	3.4914	3.3577	3.1321	2.9064	3.5833	3.8089
09/06/21	3.2041	3.3423	3.1241	2.9060	3.5605	3.7787
10/05/21	3.3424	3.3423	3.1353	2.9284	3.5493	3.7563
11/02/21	3.2788	3.3370	3.1388	2.9406	3.5352	3.7334
12/07/21	3.2788	3.3325	3.1421	2.9516	3.5230	3.7135
01/04/22	3.2041	3.3234	3.1372	2.9510	3.5095	3.6957
02/01/22	3.4914	3.3346	3.1500	2.9654	3.5191	3.7037
03/28/22	3.3424	3.3351	3.1567	2.9784	3.5134	3.6917
04/05/22	3.2788	3.3318	3.1586	2.9854	3.5050	3.6782
05/23/22	3.3222	3.3312	3.1632	2.9951	3.4993	3.6673
06/07/22	3.3617	3.3328	3.1694	3.0059	3.4963	3.6597
07/13/22	3.4150	3.3369	3.1768	3.0166	3.4971	3.6572

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia Survival and Reproduction

Permittee: Magnolia Wastewater System **NPDES No.: AR0043613**
AFIN: 14-00059

	Time	Date		Time	Date
Composite 1 Collected From:	0800	07/24/22	To	0800	07/25/22
Composite 2 Collected From:	0800	07/26/22	To	0800	07/27/22
Composite 3 Collected From:	0800	07/28/22	To	0800	07/29/22

Test initiated: 1347 am/pm 07/26/22 Date
Test terminated: 1400 am/pm 08/02/22 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	80.0	60.0	100.0	90.0	100.0	100.0

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32.0	42.0	56.0	80.0	100.0
1	18	24	23	21	25	22
2	20	13	23	21	25	17
3	20	D	5	26	11	20
4	D	D3	23	23	8	17
5	15	20	11	19	25	17
6	19	D	24	22	23	24
7	20	11	28	24	28	24
8	D3	D	26	D	26	17
9	25	24	26	22	26	19
10	21	14	25	11	23	25
Surv. Mean	20.0	18.0	21.0	21.0	22.0	20.0
Total Mean	16.0	11.0	21.0	19.0	22.0	20.0
CV%*	14.26	32.55	34.49	20.20	30.83	16.30

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

PMSD = 47.35

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%):		**YES**	**X**	**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): 0
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:	**100.0 % 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: Valle, Ware, Mitchell, Briggs

Sample #1 Collected: **Date:** 7/25/2022 **Time:** 800
Sample #2 Collected: **Date:** 7/27/2022 **Time:** 800
Sample #3 Collected: **Date:** 7/29/2022 **Time:** 800
Test Begin: **Date:** 7/26/2022 **Time:** 1347
Test End: **Date:** 8/2/2022 **Time:** 1400

Dilution:	0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	8.1	7.9	8.5	8.5	8.3	8.6	7.7
DO Final	7.6	7.7	7.9	8.1	8.1	8.2	
pH Initial	8.3	7.6	8.7	9.5	9.4	7.9	7.5
pH Final	7.0	7.5	7.4	8.1	8.0	8.3	
Conductivity	168.0	166.0	173.0	153.0	159.0	160.0	
Alkalinity	28.0						
Hardness	60.0						
Chlorine	<0.5						

Dilution:	32.0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	8.7	7.5	8.6	8.5	8.3	8.6	7.4
DO Final	7.6	7.4	7.7	8.1	8.1	8.1	
pH Initial	8.1	7.6	8.0	8.0	7.9	7.7	7.6
pH Final	7.1	7.3	7.3	7.6	7.7	7.6	
Conductivity	245.0	260.0	258.0	261.0	252.0	242.0	
Alkalinity							
Hardness							
Chlorine							

Dilution:	42.0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	8.9	7.4	8.8	8.5	8.3	8.2	7.4
DO Final	7.7	7.4	7.6	8.0	8.0	8.1	
pH Initial	8.0	7.6	7.9	7.7	7.6	7.8	7.5
pH Final	7.1	7.3	7.4	7.3	7.2	7.3	
Alkalinity							
Hardness							
Conductivity	278.0	284.0	291.0	271.0	291.0	278.0	
Chlorine							

Dilution:	56.0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	8.9	7.7	9.0	8.5	8.5	8.8	7.7
DO Final	7.4	7.7	7.8	7.9	7.9	8.0	
pH Initial	8.0	7.6	7.9	7.7	7.8	7.9	7.5
pH Final	7.2	7.3	7.4	7.1	7.1	7.1	
Conductivity	335.0	338.0	336.0	313.0	319.0	326.0	
Alkalinity							
Hardness							
Chlorine							

Dilution:	80.0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	9.1	7.8	7.0	8.5	8.5	8.9	7.7
DO Final	7.5	7.4	7.5	8.0	8.0	8.1	
pH Initial	8.0	7.6	7.9	7.7	7.7	7.9	7.6
pH Final	7.2	7.3	7.4	7.0	7.0	7.1	
Conductivity	376.0	404.0	404.0	393.0	381.0	388.0	
Alkalinity							
Hardness							
Chlorine							

Dilution:	100.0%						
Day:	1	2	3	4	5	6	7
T (°C)	24.8	23.9	24.1	22.8	24.0	24.2	24.6
DO Initial	9.2	7.6	7.3	8.5	8.5	9.0	7.8
DO Final	7.5	7.4	7.4	7.9	8.0	8.1	
pH Initial	8.1	7.7	7.9	7.7	7.7	7.9	7.4
pH Final	7.2	7.3	7.4	7.0	7.0	7.1	
Alkalinity	128.0	116.0	128.0				
Hardness	12.0	28.0	32.0				
Conductivity	449.0	172.0	471.0	450.0	434.0	456.0	
Chlorine	<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

	Time	Date		Time	Date
Composite 1 Collected from:	**0800**	**07/24/22**	**To**	**0800**	**07/25/22**
Composite 2 Collected from:	**0800**	**07/26/22**	**To**	**0800**	**07/27/22**
Composite 3 Collected from:	**0800**	**07/28/22**	**To**	**0800**	**07/29/22**

Test initiated: **1415** **am/pm** **07/25/22** **Date**
Test terminated: **1322** **am/pm** **08/01/22** **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	
0	88.0	100.0	100.0	88.0	100.0	100.0	100.0	95.0	7.62
32.0	100.0	88.0	75.0	88.0	100.0	100.0	100.0	90.0	11.68
42.0	88.0	88.0	100.0	100.0	100.0	100.0	100.0	95.0	7.62
56.0	62.0	100.0	100.0	100.0	75.0	97.5	97.5	88.0	18.86
80.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0	95.0	11.68
100.0	100.0	88.0	100.0	50.0	100.0	100.0	100.0	88.0	21.34

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
0	1.100	0.850	0.940	1.100	0.850	0.950	10.89
32.0	1.100	1.100	0.760	0.740	1.100	0.940	18.51
42.0	0.960	0.840	1.100	0.930	1.100	0.990	11.61
56.0	0.520	0.610	1.000	0.930	0.560	0.720	30.43
80.0	0.880	0.810	0.700	0.700	0.950	0.810	13.57
100.0	0.850	0.840	0.930	0.490	0.900	0.800	22.29

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

PMSD =26.20 %

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%)	YES	X	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%)	YES	X	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): 0
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	100.0% effluent
b.) NOEC growth	100.0% effluent

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

Permittee:	Magnolia Wastewater System	**Sample #1 Collected:**	**Date:**	7/25/2022	**Time:**	800
NPDES#:	AR0043613/AFIN 14-00059	**Sample #2 Collected:**	**Date:**	7/27/2022	**Time:**	800
Contact:	Tracie Love	**Sample #3 Collected:**	**Date:**	7/29/2022	**Time:**	800
Analysts:	Ware, Ware, Morado, Briggs	**Test Begin:**	**Date:**	7/25/2022	**Time:**	1415
		Test End:	**Date:**	8/1/2022	**Time:**	1322

Dilution:	0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	7.4	6.1	6.2	6.1	6.3	6.5	5.0
DO Final	6.9	7.3	7.4	7.9	7.4	7.5	
pH Initial	7.2	7.2	6.9	7.1	8.0	7.8	6.7
pH Final	6.9	7.3	8.1	7.5	7.9	7.9	
Conductivity	168.0	167.0	168.0	169.0	158.0	164.0	178.1
Alkalinity	32.0				36.0		
Hardness	56.0				52.0		
Chlorine	<0.5				<0.5		
Dilution:	32.0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	7.4	5.4	6.2	5.5	4.9	5.9	4.6
DO Final	7.1	7.4	7.5	7.9	7.5	7.6	
pH Initial	7.2	7.1	7.0	6.9	7.5	7.3	6.7
pH Final	7.0	7.3	7.9	7.3	7.3	7.4	
Conductivity	266.0	263.0	265.0	262.0	261.0	257.0	256.4
Alkalinity							
Hardness							
Chlorine							
Dilution:	42.0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	7.0	5.1	6.4	5.6	5.1	5.4	4.3
DO Final	7.1	7.5	7.1	7.3	7.5	7.7	
pH Initial	7.2	7.1	7.0	6.9	7.1	7.1	6.7
pH Final	7.0	7.3	7.6	7.4	7.1	7.1	
Alkalinity							
Hardness							
Conductivity	300.0	293.0	288.0	293.0	298.0	285.0	309.2
Chlorine							

Dilution:	56.0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	6.0	5.3	5.1	5.2	4.9	4.2	4.7
DO Final	7.1	7.7	7.8	7.3	7.6	7.7	
pH Initial	7.2	7.1	7.0	6.9	7.0	7.0	6.7
pH Final	7.0	7.3	7.6	7.4	7.0	7.0	
Conductivity	336.0	333.0	325.0	338.0	322.0	322.0	324.0
Alkalinity							
Hardness							
Chlorine							
Dilution:	80.0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	6.3	5.5	6	5.1	4.6	4.1	4.0
DO Final	7.2	7.1	7.6	7.6	7.7	7.8	
pH Initial	7.2	7.2	7.2	7.0	7.0	7.0	6.7
pH Final	7.0	7.3	7.3	7.4	6.9	6.9	
Conductivity	405.0	397.0	409.0	406.0	402.0	387.0	393.5
Alkalinity							
Hardness							
Chlorine							
Dilution:	100.0%						
Day:	1	2	3	4	5	6	7
T (°C)	25.2	25.2	25.1	24.8	24.8	24.5	24.8
DO Initial	7.0	5.1	5.1	5.1	4.8	4.7	3.2
DO Final	7.3	7.1	7.8	7.8	7.9	7.9	
pH Initial	7.4	7.4	7.3	7.1	7.0	7.0	6.7
pH Final	7.1	7.3	7.1	7.3	6.9	6.9	
Alkalinity	128.0		116.0		128.0		
Hardness	12.0		28.0		32.0		
Conductivity	450.0	455.0	475.0	471.0	445.0	435.0	430.6
Chlorine	<0.5		<0.5		<0.5		

Comments:

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#: X8409

Chain of Custody Documents Checked by: Em Moore 8/6/22
Technician/Date

Raw Data Documents Checked by: Em Moore 8/6/22
Technician/Date

Statistical Analysis Package Checked by: EGB 8/9/22
Quality Manager/Date

Quality Control Data Checked by: EGB 8/9/22
Quality Manager/Date

Report Checked by: EGB 8/15/22
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.

Cindy P. Bruggs, BS
Quality Manager

8/15/22
Date

Report Rev. 3.0