

## Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X8582

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

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

**Contact:** Tracie Love

**Test Dates:** December 13 - 20, 2022

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

### Results:

#### 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 -18.33%.
6. PMSD Biomass = 23.35% (12.0 – 30.0%)- moderate precision, acceptable for passing test

This report contains a total of 37 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.



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**THE RESULTS OF A CHRONIC  
DEFINITIVE TOXICITY TEST  
FOR OUTFALL 001**

**AT**

**MAGNOLIA WASTEWATER SYSTEM  
Magnolia, Arkansas**

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

**EPA Method 1000.0**

**Project X8582**

**Test Dates: December 13 - 20, 2022**

**Report Date: January 4, 2023**

**Prepared for:**

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Magnolia Wastewater System  
P.O. Box 666  
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**Prepared by:**

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ADEQ #88-0630

## TABLE OF CONTENTS

1.0 Introduction	4
2.0 Methods and Materials	4
2.1 Test Methods	4
2.2 Test Organisms	4
2.3 Dilution Water	4
2.4 Test Concentrations	5
2.5 Sample Collection	5
2.6 Sample Preparation	5
2.7 Monitoring of the Test	5
2.8 Data Analysis	5
3.0 Results and Discussion	6
4.0 Conclusions	6
5.0 References	7
Appendices	
A- Chain-of-Custody Documents	8
B- Raw Data Sheets	12
C- Statistical Analysis	22
D- Quality Assurance Charts	29
E- Agency Forms	32
F- Report Quality Assurance Form	36

## **1.0 Introduction**

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted a chronic definitive toxicity test for Outfall 001 at the wastewater plant serving the city of Magnolia, Arkansas. The test organism used was the fathead minnow, *Pimephales promelas*. The purpose of this study is to determine if appropriately dilute effluent samples adversely affect the survival and growth of the test organism. Toxicity is defined as a statistically significant difference at the 95 percent confidence level between the survival and 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 and 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 fathead minnows were raised in-house at test temperature 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 test. 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 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 December 12, 14 and 16, 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. The temperature upon arrival each of the effluent samples was 6.8, 1.8 and 1.0<sup>o</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>o</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 Test

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>o</sup> Celsius. A data-logger was used to monitor diurnal test temperature. Test temperature was recorded at the beginning of the day, after test renewal and at the end of the day. Light cycle and intensity were recorded twice a month.

## 2.8 Data Analysis

Survival data was analyzed using Steel's Many-One Rank Test, a nonparametric test comparing concentration data to control data. 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 fathead minnow test results can be found in Table 1. After seven days of exposure, 100.0 percent survival occurred in the control and 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 0.780 and 0.740 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 Fathead Minnow Test**

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	100.0		0.780	
32.0	90.0		0.820	
42.0	98.0		0.980	
56.0	100.0		0.930	
80.0	98.0		0.740	
100.0	100.0		0.830	
100.0 UV	95.0		0.860	

\*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 December 12, 14 and 16, 2022, were not found to be lethally toxic to the *Pimephales promelas* test organisms in the 100.0 percent critical dilution after seven days exposure (p=.05). Sublethal effects (i.e., low growth) were not noted in the 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. 22<sup>nd</sup> Edition.

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





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

Laboratory Use Only:

Company: City of Magnolia		Phone: (870) 234-2955		Analysis:						Project Number: <b>X8582</b>	
Address: P.O. Box 666, Magnolia, AR 71753		Fax: (870) 234-2203		Chronic Ceriodaphnia						Temp. upon arrival: <b>6.8°C</b>	
Permit #: AR0043613/AFIN 14-00059		Purchase Order:		Chronic minnow						Therm #: <b>29</b>	
Sampler's Signature/Printed Name/Affiliation: <i>Ann WML Trace Love / MWS</i>				Acute Daphnia species						Color: <i>clear</i>	
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification	Acute Mysid		Lab Control Number:	Odor: <i>none</i>		
12/11/22 12/12/22	8:00- 8:00	X		8 half gallons	001	Acute Ceriodaphnia			Tech: <i>AW</i>		
Reinquished by/Affiliation: <i>Ann Love / MWS</i>		Date: 12/12/22		Time: 8:48A		Fecal Coliform		Preservative: (below)			
Reinquished by/Affiliation: <i>Ann Love</i>		Date: 12/12/22		Time: 11:34		Received by/Affiliation: <i>Ann Love</i>		Date: 12/12/22		Time: 8:48A	
Reinquished by/Affiliation: <i>Ann Love</i>		Date: 12/12/22		Time: 11:34		Received by/Affiliation: <i>Ann Love</i>		Date: 12/12/22		Time: 11:3	
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other <input type="checkbox"/> Tracking # _____											
Comments: COC Rev.3.1											



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NEI/LAP/LEI/LAP 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		Chronic Ceriodaphnia		Chronic minnow		Acute minnow (fresh/marine)		Acute Daphnia species		Acute Mysid		Acute Ceriodaphnia		Fecal Coliform			
Permit #: AR0043613/AFIN 14-00059		Purchase Order:		X															
Sampler's Signature/Printed Name/Affiliation: <i>Sam Love / TCEQ Love / mwws</i>																			
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification	Lab Control Number:		Project Number: X 8552		Temp. upon arrival: 1-8 Therm #: 29		Color: clear		Odor: none		Tech: <i>AW</i>		Preservative: (below)	
12/13/22 - 12/14/22	8:00 - 8:00	X		8 half gallons	001	024103		ICE											
Relinquished by/Affiliation: <i>Sam Love / mwws</i>																			
Relinquished by/Affiliation: <i>Gene Fee</i>																			
Date:		Time:		Received by/Affiliation:		Date:		Time:		Received by/Affiliation:		Date:		Time:		Received by/Affiliation:		Date:	
12/14/22		12:16p		<i>Gene Fee</i>		12/14/22		8:47A		<i>Gene Fee</i>		12/14/22		8:47A		<i>Gene Fee</i>		12/14/22	
Method of Shipment: Lab _____ Bus _____ Fed Ex _____ DHL _____ UPS _____ Client _____ Other _____ Tracking # _____																			
Comments: _____																			
COC Rev.3.1																			



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Laboratory Use Only:

Company: City of Magnolia		Phone: (870) 234-2955		Analysis:						Project Number: <b>X8582</b>					
Address: P.O. Box 666, Magnolia, AR 71753		Fax: (870) 234-2203		Chronic Ceriodaphnia						Temp. upon arrival: 11.0					
Permit #: AR0043613/AFIN 14-00059		Purchase Order:		Chronic minnow						Therm #: 29					
Sampler's Signature/Printed Name/Affiliation: <i>Mu Lone / Trace Love / MWWS</i>				Acute minnow(fresh/marine)						Color: <i>green</i>					
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification	Acute Daphnia species						Odor: <i>none</i>			
12/15/22 - 12/16/22	800 - 800	X		8 half gallons	001	Acute Mysid						Tech: <i>EMV</i>			
Relinquished by/Affiliation: <i>Mu Lone / MWWS</i>		Date: 12/16/22		Time: 8:38A		Acute Ceriodaphnia						Preservative: (below) ICE			
Relinquished by/Affiliation: <i>Steve Lee</i>		Date: 12/16/22		Time: 12:07P		Fecal Coliform						Lab Control Number: <i>GM13D</i>			
Relinquished by/Affiliation: <i>Steve Lee</i>		Date: 12/16/22		Time: 12:07P		Received by/Affiliation: <i>Steve Lee</i>						Date: 12/16/22		Time: 8:38A	
Relinquished by/Affiliation: <i>Steve Lee</i>		Date: 12/16/22		Time: 12:07P		Received by/Affiliation: <i>Em Moore</i>						Date: 12/16/22		Time: 12:07	
Method of Shipment: Comments:		Lab	Bus	Fed Ex	DHL	UPS	Client	Other	Tracking #						
COC Rev.3.1															

**APPENDIX B  
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES  
 PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X8582 Date started: 11/13/22 Date ended 12/20/22

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 24 hrs Vendor/ID# BAL 121222

Day	Feeding Times		
	AM	NOON	PM
0			
1	<u>PM 1085/0.1ml</u>	<u>PM 1500/0.1ml</u>	<u>PM 1840/0.1ml</u>
2	<u>PM 1085/0.1ml</u>	<u>PM 1400/0.1ml</u>	<u>PM 1800/0.1ml</u>
3	<u>EDW 10830/0.10ml</u>	<u>PM 1223/0.1ml</u>	<u>PM 1725/0.1ml</u>
4	<u>EDW 10900/0.20ml</u>	<u>PM 1220/0.1ml</u>	<u>EDW 1720/0.10ml</u>
5	<u>PM 10910/0.2ml</u>		<u>EDW 1520/0.20ml</u>
6	<u>PM 10825/0.1ml</u>		<u>EDW 1450/0.20ml</u> <u>PM 1730/0.2ml</u>

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. <u>9.2/110.5i.1dk</u>	0. <u>y/18/8.3/100.9i.1dk</u>	0. _____	0. _____
1. <u>8.6/102.7i.1dk</u>	1. <u>y/6/9/95.0i.1dk</u>	1. _____	1. _____
2. <u>7.9/93.1i.1dk</u>	2. <u>No/AM</u>	2. _____	2. _____
3. <u>8.1/94.3i.1dk</u>	3. <u>No/AM</u>	3. _____	3. _____
4. <u>8.0/97.4% EDW</u>	4. <u>No/EDW</u>	4. _____	4. _____
5. <u>8.0/98.1% EDW</u>	5. <u>No/EDW</u>	5. _____	5. _____
6. <u>9.1/108.5i.1dk</u>	6. <u>y/12/8.2/98.9i.1dk</u>	6. _____	6. _____

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <u>20.5/AM</u>	1. <u>No/AM</u>	1. <u>20.5/AM</u>	1. <u>C24083 12/13/22</u>
2. <u>20.5/AM</u>	2. <u>No/AM</u>	2. <u>1.0/AM</u>	2. <u>C24103 12/15/22</u>
3. <u>20.5/EDW</u>	3. <u>No/EDW</u>	3. <u>1.0/EDW</u>	3. <u>C24130 12/17/22</u>

Comments:

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

Project# X8582

Test started: Date 12/12/22 Time 1530

Client City of Magnolia

Sample ID 001

Test ended: Date 12/16/22 Time 1515

Date/Tech: Day 0 12/13/22 M1 12/14/22 M2 12/15/22 M3 12/16/22 M4 12/17/22 M5 12/18/22 M6 12/19/22 M7 12/20/22 M8 12/21/22 M9 12/22/22 M10 12/23/22 M11 12/24/22 M12 12/25/22 M13 12/26/22 M14 12/27/22 M15 12/28/22 M16 12/29/22 M17 12/30/22 M18 12/31/22 M19 1/1/23 M20 1/2/23 M21 1/3/23 M22 1/4/23 M23 1/5/23 M24 1/6/23 M25 1/7/23 M26 1/8/23 M27 1/9/23 M28 1/10/23 M29 1/11/23 M30 1/12/23 M31 1/13/23 M32 1/14/23 M33 1/15/23 M34 1/16/23 M35 1/17/23 M36 1/18/23 M37 1/19/23 M38 1/20/23 M39 1/21/23 M40 1/22/23 M41 1/23/23 M42 1/24/23 M43 1/25/23 M44 1/26/23 M45 1/27/23 M46 1/28/23 M47 1/29/23 M48 1/30/23 M49 1/31/23 M50 2/1/23 M51 2/2/23 M52 2/3/23 M53 2/4/23 M54 2/5/23 M55 2/6/23 M56 2/7/23 M57 2/8/23 M58 2/9/23 M59 2/10/23 M60 2/11/23 M61 2/12/23 M62 2/13/23 M63 2/14/23 M64 2/15/23 M65 2/16/23 M66 2/17/23 M67 2/18/23 M68 2/19/23 M69 2/20/23 M70 2/21/23 M71 2/22/23 M72 2/23/23 M73 2/24/23 M74 2/25/23 M75 2/26/23 M76 2/27/23 M77 2/28/23 M78 2/29/23 M79 2/30/23 M80 3/1/23 M81 3/2/23 M82 3/3/23 M83 3/4/23 M84 3/5/23 M85 3/6/23 M86 3/7/23 M87 3/8/23 M88 3/9/23 M89 3/10/23 M90 3/11/23 M91 3/12/23 M92 3/13/23 M93 3/14/23 M94 3/15/23 M95 3/16/23 M96 3/17/23 M97 3/18/23 M98 3/19/23 M99 3/20/23 M100 3/21/23 M101 3/22/23 M102 3/23/23 M103 3/24/23 M104 3/25/23 M105 3/26/23 M106 3/27/23 M107 3/28/23 M108 3/29/23 M109 3/30/23 M110 3/31/23 M111 4/1/23 M112 4/2/23 M113 4/3/23 M114 4/4/23 M115 4/5/23 M116 4/6/23 M117 4/7/23 M118 4/8/23 M119 4/9/23 M120 4/10/23 M121 4/11/23 M122 4/12/23 M123 4/13/23 M124 4/14/23 M125 4/15/23 M126 4/16/23 M127 4/17/23 M128 4/18/23 M129 4/19/23 M130 4/20/23 M131 4/21/23 M132 4/22/23 M133 4/23/23 M134 4/24/23 M135 4/25/23 M136 4/26/23 M137 4/27/23 M138 4/28/23 M139 4/29/23 M140 4/30/23 M141 5/1/23 M142 5/2/23 M143 5/3/23 M144 5/4/23 M145 5/5/23 M146 5/6/23 M147 5/7/23 M148 5/8/23 M149 5/9/23 M150 5/10/23 M151 5/11/23 M152 5/12/23 M153 5/13/23 M154 5/14/23 M155 5/15/23 M156 5/16/23 M157 5/17/23 M158 5/18/23 M159 5/19/23 M160 5/20/23 M161 5/21/23 M162 5/22/23 M163 5/23/23 M164 5/24/23 M165 5/25/23 M166 5/26/23 M167 5/27/23 M168 5/28/23 M169 5/29/23 M170 5/30/23 M171 5/31/23 M172 6/1/23 M173 6/2/23 M174 6/3/23 M175 6/4/23 M176 6/5/23 M177 6/6/23 M178 6/7/23 M179 6/8/23 M180 6/9/23 M181 6/10/23 M182 6/11/23 M183 6/12/23 M184 6/13/23 M185 6/14/23 M186 6/15/23 M187 6/16/23 M188 6/17/23 M189 6/18/23 M190 6/19/23 M191 6/20/23 M192 6/21/23 M193 6/22/23 M194 6/23/23 M195 6/24/23 M196 6/25/23 M197 6/26/23 M198 6/27/23 M199 6/28/23 M200 6/29/23 M201 6/30/23 M202 7/1/23 M203 7/2/23 M204 7/3/23 M205 7/4/23 M206 7/5/23 M207 7/6/23 M208 7/7/23 M209 7/8/23 M210 7/9/23 M211 7/10/23 M212 7/11/23 M213 7/12/23 M214 7/13/23 M215 7/14/23 M216 7/15/23 M217 7/16/23 M218 7/17/23 M219 7/18/23 M220 7/19/23 M221 7/20/23 M222 7/21/23 M223 7/22/23 M224 7/23/23 M225 7/24/23 M226 7/25/23 M227 7/26/23 M228 7/27/23 M229 7/28/23 M230 7/29/23 M231 7/30/23 M232 7/31/23 M233 8/1/23 M234 8/2/23 M235 8/3/23 M236 8/4/23 M237 8/5/23 M238 8/6/23 M239 8/7/23 M240 8/8/23 M241 8/9/23 M242 8/10/23 M243 8/11/23 M244 8/12/23 M245 8/13/23 M246 8/14/23 M247 8/15/23 M248 8/16/23 M249 8/17/23 M250 8/18/23 M251 8/19/23 M252 8/20/23 M253 8/21/23 M254 8/22/23 M255 8/23/23 M256 8/24/23 M257 8/25/23 M258 8/26/23 M259 8/27/23 M260 8/28/23 M261 8/29/23 M262 8/30/23 M263 8/31/23 M264 9/1/23 M265 9/2/23 M266 9/3/23 M267 9/4/23 M268 9/5/23 M269 9/6/23 M270 9/7/23 M271 9/8/23 M272 9/9/23 M273 9/10/23 M274 9/11/23 M275 9/12/23 M276 9/13/23 M277 9/14/23 M278 9/15/23 M279 9/16/23 M280 9/17/23 M281 9/18/23 M282 9/19/23 M283 9/20/23 M284 9/21/23 M285 9/22/23 M286 9/23/23 M287 9/24/23 M288 9/25/23 M289 9/26/23 M290 9/27/23 M291 9/28/23 M292 9/29/23 M293 9/30/23 M294 10/1/23 M295 10/2/23 M296 10/3/23 M297 10/4/23 M298 10/5/23 M299 10/6/23 M300 10/7/23 M301 10/8/23 M302 10/9/23 M303 10/10/23 M304 10/11/23 M305 10/12/23 M306 10/13/23 M307 10/14/23 M308 10/15/23 M309 10/16/23 M310 10/17/23 M311 10/18/23 M312 10/19/23 M313 10/20/23 M314 10/21/23 M315 10/22/23 M316 10/23/23 M317 10/24/23 M318 10/25/23 M319 10/26/23 M320 10/27/23 M321 10/28/23 M322 10/29/23 M323 10/30/23 M324 10/31/23 M325 11/1/23 M326 11/2/23 M327 11/3/23 M328 11/4/23 M329 11/5/23 M330 11/6/23 M331 11/7/23 M332 11/8/23 M333 11/9/23 M334 11/10/23 M335 11/11/23 M336 11/12/23 M337 11/13/23 M338 11/14/23 M339 11/15/23 M340 11/16/23 M341 11/17/23 M342 11/18/23 M343 11/19/23 M344 11/20/23 M345 11/21/23 M346 11/22/23 M347 11/23/23 M348 11/24/23 M349 11/25/23 M350 11/26/23 M351 11/27/23 M352 11/28/23 M353 11/29/23 M354 11/30/23 M355 12/1/23 M356 12/2/23 M357 12/3/23 M358 12/4/23 M359 12/5/23 M360 12/6/23 M361 12/7/23 M362 12/8/23 M363 12/9/23 M364 12/10/23 M365 12/11/23 M366 12/12/23 M367 12/13/23 M368 12/14/23 M369 12/15/23 M370 12/16/23 M371 12/17/23 M372 12/18/23 M373 12/19/23 M374 12/20/23 M375 12/21/23 M376 12/22/23 M377 12/23/23 M378 12/24/23 M379 12/25/23 M380 12/26/23 M381 12/27/23 M382 12/28/23 M383 12/29/23 M384 12/30/23 M385 12/31/23 M386 1/1/24 M387 1/2/24 M388 1/3/24 M389 1/4/24 M390 1/5/24 M391 1/6/24 M392 1/7/24 M393 1/8/24 M394 1/9/24 M395 1/10/24 M396 1/11/24 M397 1/12/24 M398 1/13/24 M399 1/14/24 M400 1/15/24 M401 1/16/24 M402 1/17/24 M403 1/18/24 M404 1/19/24 M405 1/20/24 M406 1/21/24 M407 1/22/24 M408 1/23/24 M409 1/24/24 M410 1/25/24 M411 1/26/24 M412 1/27/24 M413 1/28/24 M414 1/29/24 M415 1/30/24 M416 1/31/24 M417 2/1/24 M418 2/2/24 M419 2/3/24 M420 2/4/24 M421 2/5/24 M422 2/6/24 M423 2/7/24 M424 2/8/24 M425 2/9/24 M426 2/10/24 M427 2/11/24 M428 2/12/24 M429 2/13/24 M430 2/14/24 M431 2/15/24 M432 2/16/24 M433 2/17/24 M434 2/18/24 M435 2/19/24 M436 2/20/24 M437 2/21/24 M438 2/22/24 M439 2/23/24 M440 2/24/24 M441 2/25/24 M442 2/26/24 M443 2/27/24 M444 2/28/24 M445 2/29/24 M446 2/30/24 M447 3/1/24 M448 3/2/24 M449 3/3/24 M450 3/4/24 M451 3/5/24 M452 3/6/24 M453 3/7/24 M454 3/8/24 M455 3/9/24 M456 3/10/24 M457 3/11/24 M458 3/12/24 M459 3/13/24 M460 3/14/24 M461 3/15/24 M462 3/16/24 M463 3/17/24 M464 3/18/24 M465 3/19/24 M466 3/20/24 M467 3/21/24 M468 3/22/24 M469 3/23/24 M470 3/24/24 M471 3/25/24 M472 3/26/24 M473 3/27/24 M474 3/28/24 M475 3/29/24 M476 3/30/24 M477 3/31/24 M478 4/1/24 M479 4/2/24 M480 4/3/24 M481 4/4/24 M482 4/5/24 M483 4/6/24 M484 4/7/24 M485 4/8/24 M486 4/9/24 M487 4/10/24 M488 4/11/24 M489 4/12/24 M490 4/13/24 M491 4/14/24 M492 4/15/24 M493 4/16/24 M494 4/17/24 M495 4/18/24 M496 4/19/24 M497 4/20/24 M498 4/21/24 M499 4/22/24 M500 4/23/24 M501 4/24/24 M502 4/25/24 M503 4/26/24 M504 4/27/24 M505 4/28/24 M506 4/29/24 M507 4/30/24 M508 5/1/24 M509 5/2/24 M510 5/3/24 M511 5/4/24 M512 5/5/24 M513 5/6/24 M514 5/7/24 M515 5/8/24 M516 5/9/24 M517 5/10/24 M518 5/11/24 M519 5/12/24 M520 5/13/24 M521 5/14/24 M522 5/15/24 M523 5/16/24 M524 5/17/24 M525 5/18/24 M526 5/19/24 M527 5/20/24 M528 5/21/24 M529 5/22/24 M530 5/23/24 M531 5/24/24 M532 5/25/24 M533 5/26/24 M534 5/27/24 M535 5/28/24 M536 5/29/24 M537 5/30/24 M538 5/31/24 M539 6/1/24 M540 6/2/24 M541 6/3/24 M542 6/4/24 M543 6/5/24 M544 6/6/24 M545 6/7/24 M546 6/8/24 M547 6/9/24 M548 6/10/24 M549 6/11/24 M550 6/12/24 M551 6/13/24 M552 6/14/24 M553 6/15/24 M554 6/16/24 M555 6/17/24 M556 6/18/24 M557 6/19/24 M558 6/20/24 M559 6/21/24 M560 6/22/24 M561 6/23/24 M562 6/24/24 M563 6/25/24 M564 6/26/24 M565 6/27/24 M566 6/28/24 M567 6/29/24 M568 6/30/24 M569 7/1/24 M570 7/2/24 M571 7/3/24 M572 7/4/24 M573 7/5/24 M574 7/6/24 M575 7/7/24 M576 7/8/24 M577 7/9/24 M578 7/10/24 M579 7/11/24 M580 7/12/24 M581 7/13/24 M582 7/14/24 M583 7/15/24 M584 7/16/24 M585 7/17/24 M586 7/18/24 M587 7/19/24 M588 7/20/24 M589 7/21/24 M590 7/22/24 M591 7/23/24 M592 7/24/24 M593 7/25/24 M594 7/26/24 M595 7/27/24 M596 7/28/24 M597 7/29/24 M598 7/30/24 M599 7/31/24 M600 8/1/24 M601 8/2/24 M602 8/3/24 M603 8/4/24 M604 8/5/24 M605 8/6/24 M606 8/7/24 M607 8/8/24 M608 8/9/24 M609 8/10/24 M610 8/11/24 M611 8/12/24 M612 8/13/24 M613 8/14/24 M614 8/15/24 M615 8/16/24 M616 8/17/24 M617 8/18/24 M618 8/19/24 M619 8/20/24 M620 8/21/24 M621 8/22/24 M622 8/23/24 M623 8/24/24 M624 8/25/24 M625 8/26/24 M626 8/27/24 M627 8/28/24 M628 8/29/24 M629 8/30/24 M630 8/31/24 M631 9/1/24 M632 9/2/24 M633 9/3/24 M634 9/4/24 M635 9/5/24 M636 9/6/24 M637 9/7/24 M638 9/8/24 M639 9/9/24 M640 9/10/24 M641 9/11/24 M642 9/12/24 M643 9/13/24 M644 9/14/24 M645 9/15/24 M646 9/16/24 M647 9/17/24 M648 9/18/24 M649 9/19/24 M650 9/20/24 M651 9/21/24 M652 9/22/24 M653 9/23/24 M654 9/24/24 M655 9/25/24 M656 9/26/24 M657 9/27/24 M658 9/28/24 M659 9/29/24 M660 9/30/24 M661 10/1/24 M662 10/2/24 M663 10/3/24 M664 10/4/24 M665 10/5/24 M666 10/6/24 M667 10/7/24 M668 10/8/24 M669 10/9/24 M670 10/10/24 M671 10/11/24 M672 10/12/24 M673 10/13/24 M674 10/14/24 M675 10/15/24 M676 10/16/24 M677 10/17/24 M678 10/18/24 M679 10/19/24 M680 10/20/24 M681 10/21/24 M682 10/22/24 M683 10/23/24 M684 10/24/24 M685 10/25/24 M686 10/26/24 M687 10/27/24 M688 10/28/24 M689 10/29/24 M690 10/30/24 M691 10/31/24 M692 11/1/24 M693 11/2/24 M694 11/3/24 M695 11/4/24 M696 11/5/24 M697 11/6/24 M698 11/7/24 M699 11/8/24 M700 11/9/24 M701 11/10/24 M702 11/11/24 M703 11/12/24 M704 11/13/24 M705 11/14/24 M706 11/15/24 M707 11/16/24 M708 11/17/24 M709 11/18/24 M710 11/19/24 M711 11/20/24

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

Project# X8582

Test started: Date 12/12/12 Time 1530

Client City of Magnolia Sample ID 001

Test ended: Date 12/16/12 Time 1515

Date/Tech: Day 0 12/12/12 PM 1:30 1 12/13/12 PM 1:40 2 12/14/12 PM 1:44 3 12/15/12 PM 10:30 4 12/16/12 PM 09:55 5 12/18/12 PM 11:08 6 12/19/12 PM 12:30 7 12/20/12 PM 1:15

Temp (°C) Day 0 26.4 1 26.4 2 25.9 3 25.4 4 26.1 5 26.3 6 26.8 7 26.7

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
100.0 OV	1	8	8	8	7	7	7	7	7
	2	8	8	8	8	8	8	8	8
	3	8	8	8	7	7	7	7	7
	4	8	8	8	8	8	8	8	8
	5	8	8	8	8	8	8	8	8
	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 Page 1 of 37)

Project#/Client <sup>X8582</sup> Magnoka Temp Start (°C) 80.5 Tech PM Date: 12/20/22 Time: 1515  
Temp End (°C) 97.2 Tech PM Date: 12/21/22 Time: 0935

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 12/15/22 weighed: Tech: PM	Wt. of pan + larvae(g)/ Date 12/22/22 weighed: Tech: PM	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	0.9723	0.9789				
	2	0.9797	0.9854				
	3	0.9666	0.9739				
	4	0.9798	0.9846				
	5	0.9818	0.9884				
32	1	0.9825	0.9895				
	2	0.9743	0.9816				
	3	0.9627	0.9700				
	4	0.9812	0.9865				
	5	0.9819	0.9877				
42	1	0.9848	0.9932				
	2	0.9842	0.9929				
	3	0.9698	0.9759				
	4	0.9766	0.9857				
	5	0.9736	0.9805				
56	1	0.9723	0.9794				
	2	0.9643	0.9716				
	3	0.9733	0.9808				
	4	0.9736	0.9847				
	5	0.9710	0.9771				
80	1	0.9721	0.9773				
	2	1.0393	1.0457				
	3	1.0489	1.0563				
	4	1.0398	1.0444				
	5	1.0386	1.0445				
100	1	1.0354	1.0419				
	2	1.0463	1.0528				
	3	1.0367	1.0436				
	4	1.0329	1.0396				
	5	1.0340	1.0407				

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

Calculated by: CETIS Calculations checked by: EGB 12/28/22



BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET (Minnow3 Rev Page 17 of 37)

X8582

Project#/Client Magnolia Temp Start (°C) 80.5 Tech PM Date: 12/20/22 Time: 1515

Temp End (°C) 97.2 Tech PM Date: 12/21/22 Time: 0935

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*
100 UV	1 31	1.0284 Date 12/15/22 Tech: PM	1.0343 Date 12/22/22 Tech: AN				
	2 32	1.0422	1.0488				
	3 33	1.0324	1.0392				
	4 34	1.0415	1.0485				
	5 35	1.0509	1.0588				
	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: ELB 12/28/22

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

Project# X8582 client City of Magnolia Organism P. promelas

Date	Day 0 12/13/22 5293	Day 1 12/14/22	Day 2 12/15/22	Day 3 12/16/22	Day 4 12/17/22	Day 5 12/18/22	Day 6 12/19/22	Day 7 12/20/22	Day 8
Concentration:	0.50%								
Temperature (°C)	26.1	25.8 26.7	25.3 25.9	24.6 25.8	24.1 24.9	23.1 26.7	26.2 27.5	26.2	
pH	7.6	6.6 6.9	6.5 6.8	7.3 7.6	7.4 7.5	7.3 7.8	6.5 7.8	6.4	
DO (mg/L)	8.1	7.2 7.3	5.9 7.4	6.2 7.2	7.3 7.6	7.2 7.3	6.2 7.1	6.3	
Cond (umhos/cm)	170	163	176	172	180	167	186	197	
Concentration:	32.0%								
Temperature (°C)	25.9	26.3 26.1	25.5 25.2	24.9 25.4	23.9 24.9	23.4 26.6	24.2 27.3	24.5	
pH	7.4	6.6 7.1	6.5 6.8	7.2 7.2	7.3 7.5	7.2 7.5	6.5 7.5	6.4	
DO (mg/L)	8.1	6.3 7.4	5.1 7.5	6.1 7.4	6.9 7.6	7.0 7.3	5.9 7.3	5.9	
Cond (umhos/cm)	274	208	209	203	208	188	191	247	
Concentration:	42.0%								
Temperature (°C)	25.8	26.2 26.0	25.5 25.0	25.1 25.4	24.1 25.1	24.1 26.5	24.6 27.3	26.5	
pH	7.3	6.5 7.2	6.6 6.8	7.1 7.1	7.4 7.4	7.2 7.4	6.5 7.4	6.4	
DO (mg/L)	8.1	6.3 7.5	5.3 7.6	6.3 7.5	6.9 7.4	7.0 7.4	5.9 7.3	6.1	
Cond (umhos/cm)	225	218	221	216	219	194	199	235	
Prerenewal Tech Initials/Time		1545 PM	JW 1157	JW 1023	EPW 0955	EPW 1108	1235 PM	1320 PM	
Postrenewal Tech Initials/Time	1126 AM	0950 AM	0907 AM	0922 AM	EPW 0935	EPW 0940	1035 AM		

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

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

ID# 5293 Result 36 Date Tested 12/13/22 ID# 5293 Result 44 Date Tested 12/17/22  
 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# C24083 Result 48 Date Tested 12/16/22 ID# C24083 Result 32.0 Date Tested 12/20/22  
 ID# C24103 Result 64 Date Tested 12/16/22 ID# C24103 Result 44.0 Date Tested 12/20/22  
 ID# C24130 Result 52 Date Tested 12/16/22 ID# C24130 Result 52.0 Date Tested 12/20/22

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

Project# X8582 Client City of Magnolia Organism P. promelas

Date	Day 0 12/13/22	Day 1 12/14/22	Day 2 12/15/22	Day 3 12/16/22	Day 4 12/17/22	Day 5 12/18/22	Day 6 12/19/22	Day 7 12/20/22	Day 8
Concentration:	56.0%								
Temperature (°C)	25.6	26.5 25.6	25.3 24.6	25.3 24.9	24.1 25.1	23.5 26.3	24.7 26.8	26.5	
pH	7.3	6.7 7.2	6.7 6.7	7.2 7.0	7.4 7.4	7.3 7.1	6.6 7.4	6.5	
DO (mg/l)	8.2	6.0 7.5	5.4 7.7	6.4 7.7	7.3 2.6	7.1 2.5	5.7 7.6	6.0	
Cond (umhos/cm)	244	236	240	234	230	203	207	273	
Concentration:	80.0%								
Temperature (°C)	25.3	26.3 25.2	25.2 24.0	25.5 24.9	23.9 25.3	24.8 26.2	26.7 26.4	26.5	
pH	7.3	6.8 7.2	6.8 6.8	7.2 7.0	7.3 7.6	7.3 7.0	6.6 7.3	6.6	
DO (mg/l)	8.3	6.1 7.7	5.4 8.0	6.3 7.8	6.5 2.9	6.8 7.6	5.1 7.6	5.9	
Cond (umhos/cm)	274	265	274	268	274	218	221	269	
Concentration:	100.0%								
Temperature (°C)	25.3	26.5 25.0	25.5 23.9	25.6 24.5	24.9 25.3	24.9 26.5	26.8 26.3	26.5	
pH	7.3	6.9 7.1	6.9 6.7	7.3 7.0	7.4 7.7	7.3 7.7	6.7 7.2	6.7	
DO (mg/l)	8.4	5.9 8.1	5.4 8.6	6.3 8.6	7.3 7.8	7.0 7.3	5.2 7.8	6.0	
Cond (umhos/cm)	300	291	307	298	290	234	236	290	
Prerenewal Tech Initials/Time		1545 PM	1157 AM	1023 AM	0955 AM	1108 AM	1235 PM	1520 PM	
Postrenewal Tech Initials/Time	1126 AM	0950 AM	0907 AM	0922 AM	0935 AM	0940 AM	1035 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 \_\_\_\_\_

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

Project# X8582 Client City of Magnolia Organism P. Promelas

Date	Day 0 12/13/22	Day 1 12/14/22	Day 2 12/15/22	Day 3 12/16/22	Day 4 12/17/22	Day 5 12/18/22	Day 6 12/19/22	Day 7	Day 8
Concentration:	100.0% UV								
Temperature (°C)	25.0	26.4	25.5	25.4	23.9	25.0	26.9	26.6	
pH	7.2	7.0	6.9	7.3	7.4	7.3	6.9	6.8	
DO (mg/l)	8.4	6.0	5.2	6.2	7.0	7.0	5.4	5.1	
Cond (umhos/cm)	299	287	298	302	307	273	230	322	
Concentration:									
Temperature (°C)									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
Temperature (°C)									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Prerenewal Tech Initials/Time		1545 PM	JW 1157	JW 1023	EDW 0955	EDW 1108	1235 PM	1520 PM	
Postrenewal Tech Initials/Time	1126 AM	0950 AM	0907 AM	0922 AM	0935 AM	0940 AM	1035 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 \_\_\_\_\_

**CETIS Test Data Worksheet**

Report Date: 12 Dec-22 09:23 (p 1 of 1)  
 Test Code/ID: 27857188 / 06-6305-6776

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

Start Date: 13 Dec-22 17:35 Species: *Pimephales promelas* Sample Code: 6446FF3B  
 End Date: 20 Dec-22 16:30 Protocol: EPA/821/R-02-013 (2002) Sample Source: AR0043613  
 Sample Date: 12 Dec-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	Tot Weigh
32		5	1									
80		5	2									
42		1	3									
101		4	4									
80		3	5									
0	D	4	6									
100		4	7									
56		1	8									
100		1	9									
42		2	10									
42		4	11									
56		2	12									
56		5	13									
80		2	14									
101		1	15									
80		1	16									
32		1	17									
100		3	18									
0	D	2	19									
0	D	5	20									
101		2	21									
32		4	22									
32		3	23									
42		3	24									
32		2	25									
56		3	26									
56		4	27									
101		3	28									
100		2	29									
42		5	30									
100		5	31									
101		5	32									
80		4	33									
0	D	1	34									
0	D	3	35									

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

# CETIS Analytical Report

Report Date: 26 Dec-22 14:53 (p 1 of 2)  
Test Code/ID: 27857188 / 06-6305-6776

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

Bio-Analytical Laboratories

Analysis ID: 12-6395-2226	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 26 Dec-22 14:53	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 26 Dec-22 14:44	MD5 Hash: 9FF9432A4AE35CF86F0408B0595A84FC	Editor ID: 008-522-314-5
Batch ID: 10-8977-6054	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 13 Dec-22 15:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 20 Dec-22 15:15	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 16-8237-4459	Code: X8582	Project: WET Monthly Compliance Test (DEC)
Sample Date: 12 Dec-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 12 Dec-22 11:13	CAS (PC):	Station: 001
Sample Age: 32h (6.8 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	101	101	---	0.9901	0.087	8.72%

### Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	20	16	1	8	CDF	0.2114	Non-Significant Effect
		42	25	16	1	8	CDF	0.6693	Non-Significant Effect
		56	28	16	1	8	CDF	0.8571	Non-Significant Effect
		80	25	16	1	8	CDF	0.6693	Non-Significant Effect
		100	28	16	1	8	CDF	0.8571	Non-Significant Effect
		100 UV	22	16	1	8	CDF	0.4265	Non-Significant Effect

### Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

### ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0823153	0.0137192	6	2.1	0.0805	Non-Significant Effect
Error	0.17981	0.0064218	28			
Total	0.262125		34			

### ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.87	0.91	0.0008	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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	0.00%
32		5	0.90	0.77	1.00	0.88	0.75	1.00	0.05	11.62%	10.00%
42		5	0.98	0.91	1.00	1.00	0.88	1.00	0.03	5.73%	2.50%
56		5	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	0.00%
80		5	0.98	0.91	1.00	1.00	0.88	1.00	0.03	5.73%	2.50%
100		5	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00%	0.00%
100 UV		5	0.95	0.86	1.00	1.00	0.88	1.00	0.03	7.21%	5.00%

### Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	5	1.40	1.40	1.40	1.40	1.40	1.40	0.00	0.00%	0.00%
32		5	1.30	1.10	1.40	1.20	1.00	1.40	0.07	11.68%	10.24%
42		5	1.40	1.30	1.50	1.40	1.20	1.40	0.04	6.06%	2.64%
56		5	1.40	1.40	1.40	1.40	1.40	1.40	0.00	0.00%	0.00%
80		5	1.40	1.30	1.50	1.40	1.20	1.40	0.04	6.06%	2.64%
100		5	1.40	1.40	1.40	1.40	1.40	1.40	0.00	0.00%	0.00%
100 UV		5	1.30	1.20	1.40	1.40	1.20	1.40	0.05	7.62%	5.27%

# CETIS Analytical Report

Report Date: 26 Dec-22 14:53 (p 2 of 2)  
 Test Code/ID: 27857188 / 06-6305-6776

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

Bio-Analytical Laboratories

Analysis ID: 12-6395-2226      Endpoint: 7d Survival Rate      CETIS Version: CETISv1.9.7  
 Analyzed: 26 Dec-22 14:53      Analysis: Nonparametric-Control vs Treatments      Status Level: 1  
 Edit Date: 26 Dec-22 14:44      MD5 Hash: 9FF9432A4AE35CF86F0408B0595A84FC      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	1.00	1.00	1.00
32		0.88	1.00	1.00	0.75	0.88
42		0.88	1.00	1.00	1.00	1.00
56		1.00	1.00	1.00	1.00	1.00
80		1.00	0.88	1.00	1.00	1.00
100		1.00	1.00	1.00	1.00	1.00
101		0.88	1.00	0.88	1.00	1.00

*Handwritten: 100uv*

### Angular (Corrected) Transformed Detail

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

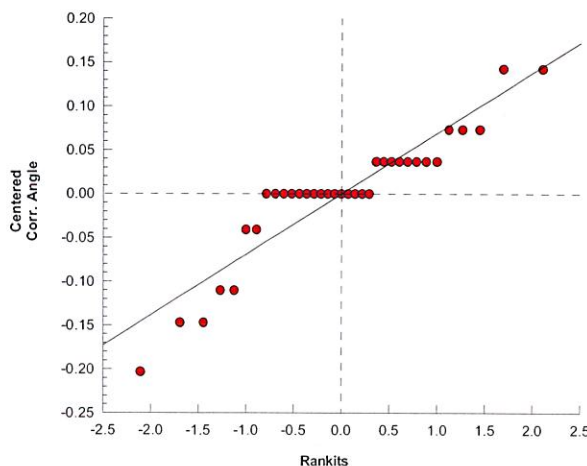
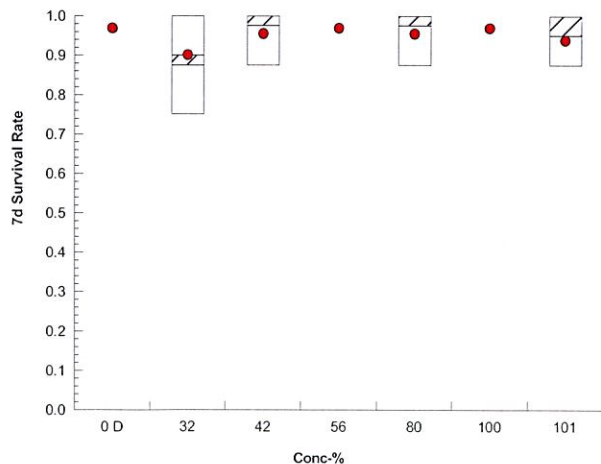
*Handwritten: 100uv*

### 7d Survival Rate Binomials

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

*Handwritten: 100uv*

### Graphics





# CETIS Analytical Report

Report Date: 26 Dec-22 14:54 (p 1 of 2)  
Test Code/ID: 27857188 / 06-6305-6776

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

Bio-Analytical Laboratories

Analysis ID: 10-8295-2841	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 26 Dec-22 14:53	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 26 Dec-22 14:44	MD5 Hash: 4A8E0E313ED3401F2DBFBEE77C63ED47	Editor ID: 008-522-314-5
Batch ID: 10-8977-6054	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 13 Dec-22 15:30	Protocol: EPA/821/R-02-013 (2002)	Diluent: Reconstituted Water
Ending Date: 20 Dec-22 15:15	Species: Pimephales promelas	Brine:
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 16-8237-4459	Code: X8582	Project: WET Monthly Compliance Test (DEC)
Sample Date: 12 Dec-22 08:00	Material: POTW Effluent	Source: AR0043613
Receipt Date: 12 Dec-22 11:13	CAS (PC):	Station: 001
Sample Age: 32h (6.8 °C)	Client: Magnolia Wastewater System	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	10 <sup>+</sup>	>10 <sup>+</sup>	---	0.9901	0.18	23.35%

### Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		32	-0.57	2.4	0.18	8	CDF	0.9592	Non-Significant Effect
		42	-2.7	2.4	0.18	8	CDF	1.0000	Non-Significant Effect
		56	-2	2.4	0.18	8	CDF	0.9996	Non-Significant Effect
		80	0.5	2.4	0.18	8	CDF	0.6808	Non-Significant Effect
		100	-0.76	2.4	0.18	8	CDF	0.9759	Non-Significant Effect
		100W	-1.1	2.4	0.18	8	CDF	0.9898	Non-Significant Effect

### Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.78	0.25	>>	Yes	Passes Criteria
PMSD	0.23	0.12	0.3	Yes	Passes Criteria

### ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.212434	0.0354057	6	2.5	0.0456	Significant Effect
Error	0.395568	0.0141274	28			
Total	0.608002		34			

### ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	11	17	0.0989	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.98	0.91	0.8094	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	0.78	0.62	0.93	0.83	0.6	0.91	0.054	15.60%	0.00%
32		5	0.82	0.67	0.96	0.88	0.66	0.91	0.052	14.20%	-5.48%
42		5	0.98	0.78	1.2	1.1	0.76	1.1	0.072	16.32%	-26.45%
56		5	0.93	0.76	1.1	0.91	0.76	1.1	0.061	14.59%	-19.68%
80		5	0.74	0.57	0.91	0.74	0.57	0.93	0.06	18.33%	4.84%
100		5	0.83	0.81	0.86	0.84	0.81	0.86	0.0094	2.51%	-7.42%
100W		5	0.86	0.74	0.97	0.85	0.74	0.99	0.04	10.57%	-10.32%

Analyst: *SPW* *ELB*  
QA: *12/28/22*

# CETIS Analytical Report

Report Date: 26 Dec-22 14:54 (p 2 of 2)  
 Test Code/ID: 27857188 / 06-6305-6776

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

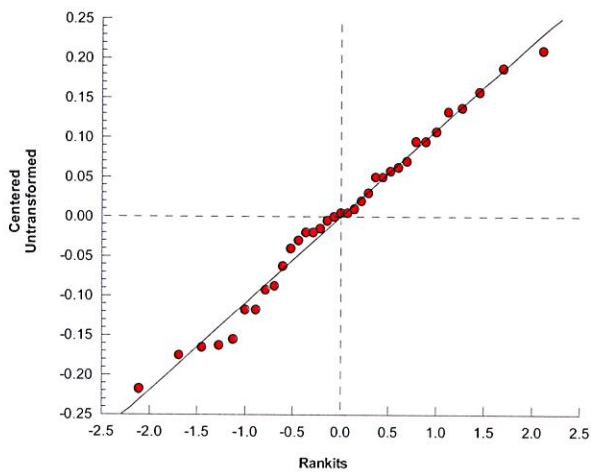
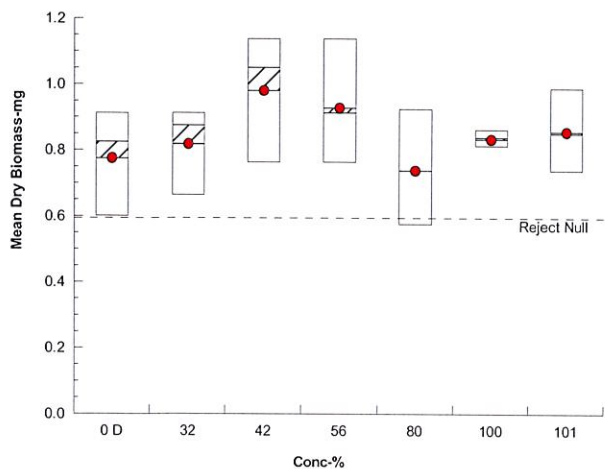
Bio-Analytical Laboratories

Analysis ID: 10-8295-2841      Endpoint: Mean Dry Biomass-mg      CETIS Version: CETISv1.9.7  
 Analyzed: 26 Dec-22 14:53      Analysis: Parametric-Control vs Treatments      Status Level: 1  
 Edit Date: 26 Dec-22 14:44      MD5 Hash: 4A8E0E313ED3401F2DBFBEE77C63ED47      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	0.83	0.71	0.91	0.6	0.83
32		0.88	0.91	0.91	0.66	0.72
42		1.1	1.1	0.76	1.1	0.86
56		0.89	0.91	0.94	1.1	0.76
80		0.65	0.8	0.93	0.57	0.74
100		0.81	0.81	0.86	0.84	0.84
101		0.74	0.83	0.85	0.88	0.99

### Graphics



**CETIS Analytical Report**

Report Date: 26 Dec-22 14:54 (p 1 of 2)  
Test Code/ID: 27857188 / 06-6305-6776

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

Bio-Analytical Laboratories

Analysis ID: 19-1244-0862      Endpoint: Mean Dry Biomass-mg      CETIS Version: CETISv1.9.7  
Analyzed: 26 Dec-22 14:54      Analysis: Linear Interpolation (ICPIN)      Status Level: 1  
Edit Date: 26 Dec-22 14:44      MD5 Hash: 4A8E0E313ED3401F2DBFBEE77C63ED47      Editor ID: 008-522-314-5

Batch ID: 10-8977-6054      Test Type: Growth-Survival (7d)      Analyst:  
Start Date: 13 Dec-22 15:30      Protocol: EPA/821/R-02-013 (2002)      Diluent: Reconstituted Water  
Ending Date: 20 Dec-22 15:15      Species: Pimephales promelas      Brine:  
Test Length: 7d      Taxon: Actinopterygii      Source: In-House Culture      Age: <24

Sample ID: 16-8237-4459      Code: X8582      Project: WET Monthly Compliance Test (DEC)  
Sample Date: 12 Dec-22 08:00      Material: POTW Effluent      Source: AR0043613  
Receipt Date: 12 Dec-22 11:13      CAS (PC):      Station: 001  
Sample Age: 32h (6.8 °C)      Client: Magnolia Wastewater System

**Linear Interpolation Options**

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	750956	1000	Yes	Two-Point Interpolation

**Test Acceptability Criteria**

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.78	0.25	>>	Yes	Passes Criteria

**Point Estimates**

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<0.9901	---	---
IC15	>100	---	---	<0.9901	---	---
IC20	>100	---	---	<0.9901	---	---
IC25	>100	---	---	<0.9901	---	---
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	0.78	0.83	0.6	0.91	15.60%	0.00%	0.88	0.00%
32		5	0.82	0.88	0.66	0.91	14.20%	-5.48%	0.88	0.00%
42		5	0.98	1.1	0.76	1.1	16.32%	-26.45%	0.88	0.00%
56		5	0.93	0.91	0.76	1.1	14.59%	-19.68%	0.88	0.00%
80		5	0.74	0.74	0.57	0.93	18.33%	4.84%	0.81	7.62%
100		5	0.83	0.84	0.81	0.86	2.51%	-7.42%	0.81	7.62%
100		5	0.86	0.85	0.74	0.99	10.57%	-10.32%	0.81	7.62%

**Mean Dry Biomass-mg Detail**

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.83	0.71	0.91	0.6	0.83
32		0.88	0.91	0.91	0.66	0.72
42		1.1	1.1	0.76	1.1	0.86
56		0.89	0.91	0.94	1.1	0.76
80		0.65	0.8	0.93	0.57	0.74
100		0.81	0.81	0.86	0.84	0.84
100		0.74	0.83	0.85	0.88	0.99

100  
100WV

100  
100WV

# CETIS Analytical Report

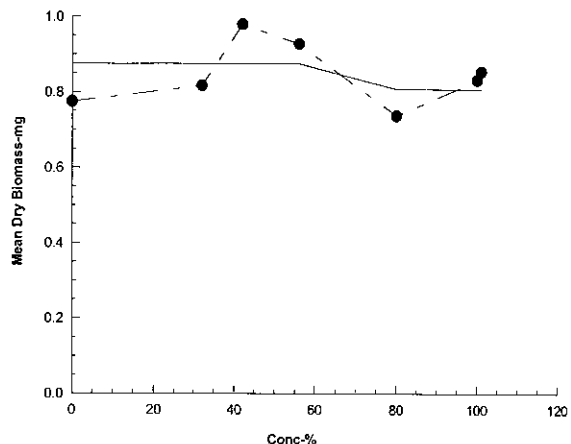
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Test Code/ID: 27857188 / 06-6305-6776

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

Bio-Analytical Laboratories

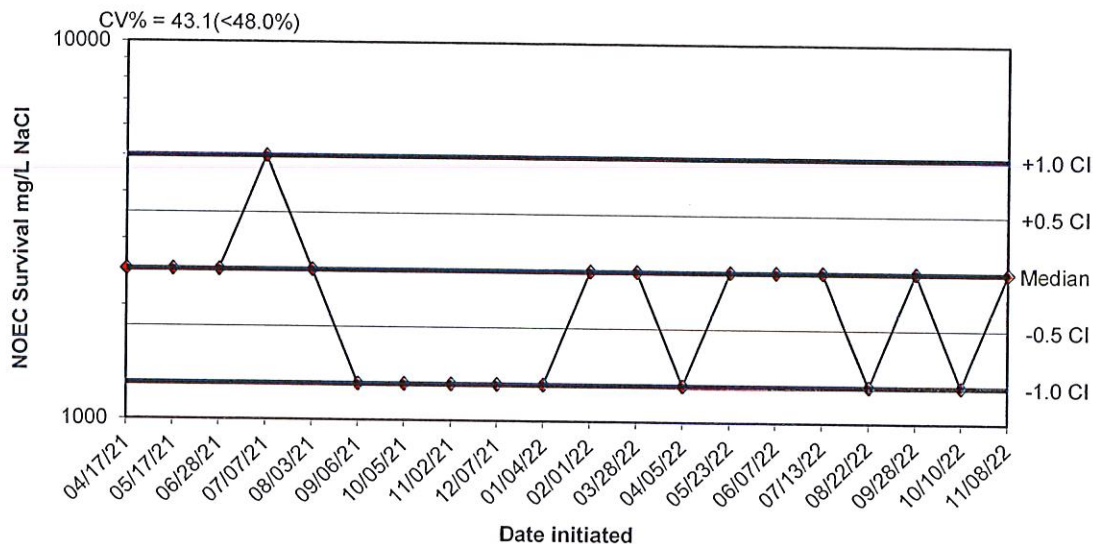
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Analyzed: 26 Dec-22 14:54	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 26 Dec-22 14:44	MD5 Hash: 4A8E0E313ED3401F2DBFBEE77C63ED47	Editor ID: 008-522-314-5

### Graphics



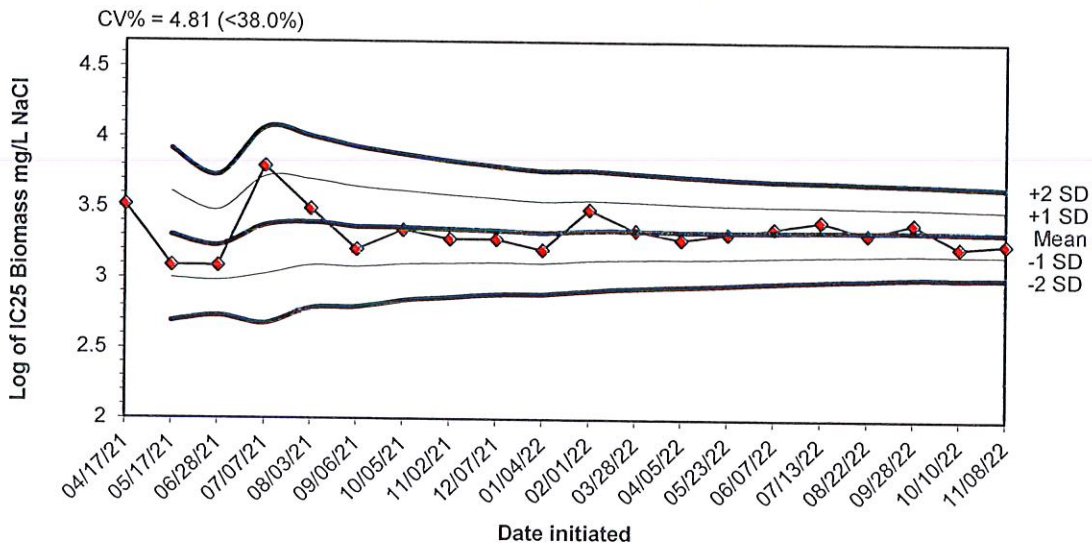
**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

### 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
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
11/08/22	2500.0000	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
04/17/21	3.5199					
05/17/21	3.0878	3.3039	2.9983	2.6927	3.6094	3.9150
06/28/21	3.0854	3.2310	2.9809	2.7307	3.4812	3.7314
07/07/21	3.7924	3.3714	3.0242	2.6771	3.7185	4.0657
08/03/21	3.4914	3.3954	3.0900	2.7846	3.7008	4.0061
09/06/21	3.2041	3.3635	3.0794	2.7953	3.6476	3.9317
10/05/21	3.3424	3.3605	3.1010	2.8416	3.6199	3.8794
11/02/21	3.2788	3.3503	3.1083	2.8664	3.5922	3.8342
12/07/21	3.2788	3.3423	3.1148	2.8872	3.5699	3.7975
01/04/22	3.2041	3.3285	3.1096	2.8906	3.5475	3.7664
02/01/22	3.4914	3.3433	3.1299	2.9164	3.5568	3.7702
03/28/22	3.3424	3.3432	3.1397	2.9362	3.5467	3.7503
04/05/22	3.2788	3.3383	3.1426	2.9469	3.5339	3.7296
05/23/22	3.3222	3.3371	3.1491	2.9611	3.5252	3.7132
06/07/22	3.3617	3.3388	3.1575	2.9761	3.5201	3.7014
07/13/22	3.4150	3.3435	3.1673	2.9911	3.5197	3.6959
08/22/22	3.3222	3.3423	3.1716	3.0009	3.5130	3.6836
09/28/22	3.3979	3.3454	3.1793	3.0132	3.5115	3.6776
10/10/22	3.2304	3.3393	3.1758	3.0122	3.5029	3.6664
11/08/22	3.2553	3.3351	3.1748	3.0145	3.4954	3.6557

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



**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	12/11/22	To	0800	12/12/22
Composite 2 Collected from:	0800	12/13/22	To	0800	12/14/22
Composite 3 Collected from:	0800	12/15/22	To	0800	12/16/22

Test initiated:	1530	am/pm		12/13/22	Date
Test terminated:	1515	am/pm		12/20/22	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	100.0	100.0	100.0	100.0	100.0	100.0	0.00
<b>32.0</b>	88.0	100.0	100.0	75.0	88.0	100.0	100.0	90.0	11.68
<b>42.0</b>	88.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0	6.06
<b>56.0</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00
<b>80.0</b>	100.0	88.0	100.0	100.0	100.0	100.0	100.0	98.0	6.06
<b>100.0</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00

**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>	0.830	0.710	0.910	0.600	0.830	0.780	15.60
<b>32.0</b>	0.880	0.910	0.910	0.660	0.720	0.820	14.20
<b>42.0</b>	1.100	1.100	0.760	1.100	0.860	0.980	16.32
<b>56.0</b>	0.890	0.910	0.940	1.100	0.760	0.930	14.59
<b>80.0</b>	0.650	0.800	0.930	0.570	0.740	0.740	18.33
<b>100.0</b>	0.810	0.810	0.860	0.840	0.840	0.830	2.51

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

PMSD =23.35 %

**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  
NPDES#: AR0043613/AFIN 14-00059  
Contact: Tracie Love  
Analysts: Ware, Mitchell, Miller

Sample #1 Collected: 12/12/2022 Time: 800  
Sample #2 Collected: 12/14/2022 Time: 800  
Sample #3 Collected: 12/16/2022 Time: 800  
Test Begin: 12/13/2022 Time: 1530  
Test End: 12/20/2022 Time: 1515

Dilution:	0%						
Day:	1	2	3	4	5	6	7
T (°C)	26.4	25.9	25.4	26.1	26.3	26.8	26.7
DO Initial	7.2	5.9	6.2	7.3	7.2	6.2	6.3
DO Final	7.3	7.4	7.2	7.6	7.3	7.1	
pH Initial	6.6	6.5	7.3	7.4	7.3	6.5	6.4
pH Final	6.9	6.8	7.6	7.5	7.8	7.8	
Conductivity	163.0	170.0	172.0	180.0	167.0	186.0	197.0
Alkalinity	36.0						
Hardness	44.0						
Chlorine	<0.5						

Dilution:	32.0%						
Day:	1	2	3	4	5	6	7
T (°C)	26.4	25.9	25.4	26.1	26.3	26.8	26.7
DO Initial	6.3	5.1	6.1	6.9	7.0	5.9	5.9
DO Final	7.4	7.5	7.4	7.6	7.3	7.3	
pH Initial	6.6	6.5	7.2	7.3	7.2	6.5	6.4
pH Final	7.1	6.8	7.2	7.5	7.5	7.5	
Conductivity	208.0	204.0	203.0	208.0	188.0	191.0	247.0
Alkalinity							
Hardness							
Chlorine							

Dilution:	42.0%						
Day:	1	2	3	4	5	6	7
T (°C)	26.4	25.9	25.4	26.1	26.3	26.8	26.7
DO Initial	6.3	5.3	6.3	6.9	7.0	5.9	6.1
DO Final	7.5	7.6	7.5	7.4	7.4	7.3	
pH Initial	6.5	6.6	7.1	7.4	7.2	6.5	6.4
pH Final	7.2	6.8	7.1	7.4	7.4	7.4	
Alkalinity							
Hardness							
Conductivity	218.0	221.0	216.0	219.0	194.0	199.0	235.0
Chlorine							

Dilution:	56.0%						
Day:	1	2	3	4	5	6	7
T (°C)	26.4	25.9	25.4	26.1	26.3	26.8	26.7
DO Initial	6.0	5.4	6.4	7.3	7.4	5.7	6.0
DO Final	7.5	7.7	7.7	7.5	7.5	7.6	
pH Initial	6.7	6.7	7.2	7.4	7.2	6.6	6.5
pH Final	7.2	6.7	7.0	7.4	7.1	7.4	
Conductivity	236.0	240.0	234.0	230.0	203.0	207.0	273.0
Alkalinity							
Hardness							
Chlorine							

Dilution:	100.0%						
Day:	1	2	3	4	5	6	7
T (°C)	26.4	25.9	25.4	26.1	26.3	26.8	26.7
DO Initial	5.9	5.4	6.3	7.3	7.0	5.2	6.0
DO Final	8.1	8.6	8.0	7.8	7.3	7.8	
pH Initial	6.9	6.9	7.3	7.4	7.3	6.7	6.7
pH Final	7.1	6.7	7.0	7.7	7.7	7.2	
Alkalinity	48.0		64.0		52.0		
Hardness	32.0		44.0		52.0		
Conductivity	291.0	307.0	298.0	290.0	234.0	236.0	290.0
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#: X8582

Chain of Custody Documents Checked by: Emmore 12/27/22  
Technician/Date

Raw Data Documents Checked by: Emmore 12/27/22  
Technician/Date

Statistical Analysis Package Checked by: ECB 12/28/22  
Quality Manager/Date

Quality Control Data Checked by: ECB 1/6/23  
Quality Manager/Date

Report Checked by: ECB 1/6/23  
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.

Ernest P. Bragg, BS  
Quality Manager

1/6/23  
Date

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