

Bio-Analytical Laboratories (BAL)  
ADEQ Certificate #88-0630  
Project X5370

### Bio-Analytical Laboratories' Executive Summary

**Permittee:** Magnolia Wastewater System  
P.O. Box 666  
Magnolia, AR 71753

**Project #:** X5370

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

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

**Contact:** Russell Thomas

**Dates:** March 10 - 18, 2014

**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, 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 - 11.57%.

##### 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, 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 reproduction, Parameter TPP6C - 100.0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 26.35%.

This report contains a total of 44 pages, including this page. The results contained within pertains only to the samples listed on the chain of custody documents in Appendix A. The information meets the standards set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

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

**Ceriodaphnia dubia**  
**Survival and Reproduction (cont)**

**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 (100.0%): | YES | X | NO |
| b) 1/2 LOW FLOW DILUTION (N/A %):          | 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 (100.0%): | YES | X | NO |
| b) 1/2 LOW FLOW DILUTION (N/A %):          | 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): N/A

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 |
| c) LOEC survival:     | N/A % effluent  |
| d) LOEC reproduction: | N/A % effluent  |

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

Permittee: City of Magnolia  
NPDES No.: ARB043613/AFIN 14-00059  
Contact: Russell Thomas  
Analyst: Houghton, Callahan, Briggs

Sample No. 1 Collected Date: 3/10/14 Time: 0700  
Sample No. 2 Collected Date: 3/12/14 Time: 0700  
Sample No. 3 Collected Date: 3/14/14 Time: 0700  
Test Begin: Date: 3/11/14 Time: 1530  
Test End: Date: 3/13/14 Time: 1100

Dilution: 0 Day:									Dilution: 56.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0		Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
DO Initial	8.4	8.2	8.0	8.4	8.1	8.3	8.2		DO Initial	8.3	7.9	7.9	8.3	8.0	8.2	8.0	
DO Final	8.5	8.5	8.2	8.3	8.3	8.3			DO Final	8.1	8.2	8.1	8.2	8.2	8.0		
pH Initial	7.5	7.5	7.2	7.3	7.3	7.2	7.3		pH Initial	7.6	7.3	7.1	7.1	7.1	7.1	7.2	
pH Final	7.3	7.3	7.2	7.4	7.4	7.3			pH Final	7.3	7.3	7.3	7.3	7.3	7.2		
Alkalinity	28.0	28.0							Alkalinity								
Hardness	48.0	44.0							Hardness								
Conductivity	169.7	165.7	167.8	166.5	168.2	171.5			Conductivity	221.0	212.0	221.0	204.0	206.0	210.8		
Chlorine	<.01	<.01							Chlorine								
Dilution: 32.0 Day:									Dilution: 80.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0		Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
DO Initial	8.4	8.1	8.0	8.3	8.0	8.2	8.2		DO Initial	8.2	7.8	7.9	8.3	8.0	8.1	7.9	
DO Final	8.3	8.3	8.2	8.3	8.2	8.2			DO Final	7.9	8.1	8.1	8.2	8.2	7.9		
pH Initial	7.5	7.4	7.1	7.2	7.2	7.2	7.2		pH Initial	7.6	7.2	7.0	7.1	7.1	7.1	7.2	
pH Final	7.3	7.3	7.1	7.3	7.3	7.3			pH Final	7.3	7.3	7.4	7.4	7.4	7.2		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	201.0	193.9	199.9	189.2	190.7	196.1			Conductivity	243.0	237.0	245.0	224.0	225.0	224.0		
Chlorine									Chlorine								
Dilution: 42.0 Day:									Dilution: 100.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0		Temp (C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
DO Initial	8.4	8.0	8.0	8.3	8.0	8.2	8.2		DO Initial	8.2	7.7	7.9	8.3	7.9	8.1	7.9	
DO Final	8.2	8.3	8.2	8.2	8.2	8.1			DO Final	7.8	8.1	8.1	8.2	8.1	7.9		
pH Initial	7.6	7.3	7.1	7.2	7.2	7.2	7.2		pH Initial	7.6	7.2	7.0	7.1	7.1	7.1	7.2	
pH Final	7.3	7.3	7.2	7.2	7.3	7.2			pH Final	7.3	7.4	7.4	7.4	7.4	7.2		
Alkalinity									Alkalinity	32.0	32.0		28.0				
Hardness									Hardness	40.0	32.0		36.0				
Conductivity	209.0	201.0	209.0	195.1	196.6	200.0			Conductivity	262.0	269.0	224.0	254.0	249.0	239.0		
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee: City of Magnolia

NPDES No.: AR0043613/AFIN 14-00059

	<b>Time</b>	<b>Date</b>	<b>Time</b>	<b>Date</b>
<b>Composite 1 Collected from:</b>	<b>0700</b>	<b>3/09/14</b>	<b>To 0700</b>	<b>3/10/14</b>
<b>Composite 2 Collected from:</b>	<b>0700</b>	<b>3/11/14</b>	<b>To 0700</b>	<b>3/12/14</b>
<b>Composite 3 Collected from:</b>	<b>0700</b>	<b>3/13/14</b>	<b>To 0700</b>	<b>3/14/14</b>

**Test initiated:** 1710 am/pm 3/10/14 date  
**Test terminated:** 1050 am/pm 3/17/14 date  
**Dilution water used:** Receiving 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	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00
32.0	100.0	100.0	87.5	100.0	100.0	100.0	97.5	97.5	6.06
42.0	100.0	100.0	87.5	100.0	87.5	97.5	97.5	95.0	7.62
56.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00
80.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.00
100.0	100.0	87.5	87.5	100.0	100.0	100.0	100.0	95.0	7.62

**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	0.500	0.413	0.613	0.575	0.675	0.555	18.34
32.0	0.500	0.500	0.275	0.500	0.488	0.453	21.96
42.0	0.438	0.513	0.425	0.638	0.513	0.505	16.75
56.0	0.475	0.550	0.413	0.488	0.438	0.473	11.13
80.0	0.500	0.438	0.563	0.513	0.588	0.520	11.22
100.0	0.688	0.438	0.375	0.400	0.550	0.490	26.35

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

**PMSD = 24.6%**

**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) 1/2 LOW FLOW DILUTION (N/A %)	YES		NO

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

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

a) LOW FLOW OR CRITICAL DILUTION (100.0%)	X	YES	NO
b) 1/2 LOW FLOW DILUTION (N/A %)		YES	NO

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 1

4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A

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.
c.) LOEC survival	N/A % effluent
d.) LOEC growth	N/A % effluent

Biomonitoring Form  
Chronic Toxicity Summary Form  
Pimephales grandis  
Chemical Parameters Chart

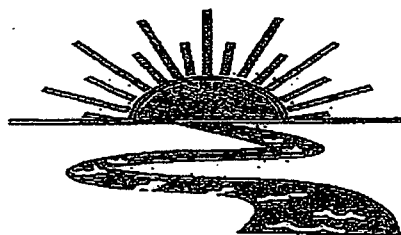
Permittee: City of Magnolia  
NPDES No.: ARD043613/AFIN 14-00059  
Contact: Russell Thomas  
Analyst: Houghton, Callahan

Sample No. 1 Collected: Date: 3/10/14 Time: 0700  
Sample No. 2 Collected: Date: 3/12/14 Time: 0700  
Sample No. 3 Collected: Date: 3/14/14 Time: 0700  
Test Begin: Date: 3/10/14 Time: 1710  
Test End: Date: 3/14/14 Time: 1650

Dilution: 0 Day:									Dilution: 56.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0		Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0	
DO Initial	7.2	6.5	6.4	6.8	7.3	6.9	6.7		DO Initial	6.5	6.5	6.5	6.9	7.2	6.7	6.5	
DO Final	8.4	8.5	8.5	8.2	8.3	8.3			DO Final	8.1	8.1	8.2	8.1	8.2	8.2		
pH Initial	7.0	7.0	6.8	6.8	7.1	7.1	7.0		pH Initial	7.1	6.9	6.7	7.0	6.9	6.7	6.8	
pH Final	7.2	7.3	7.3	7.2	7.4	7.4			pH Final	7.1	7.3	7.3	7.3	7.3	7.3		
Alkalinity	28.0		28.0						Alkalinity								
Hardness	48.0		44.0						Hardness								
Conductivity	174.6	169.7	165.7	167.8	166.5	168.2			Conductivity	229.0	231.0	212.0	231.0	204.0	206.0		
Chlorine	<.01		<.01						Chlorine								
Dilution: 32.0 Day:									Dilution: 80.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0		Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0	
DO Initial	6.8	6.4	6.4	6.8	7.2	6.9	6.6		DO Initial	6.6	6.5	6.5	7.0	7.2	6.7	6.3	
DO Final	8.3	8.3	8.3	8.2	8.3	8.2			DO Final	8.6	7.9	8.1	8.1	8.2	8.2		
pH Initial	6.9	6.8	6.7	6.9	6.9	6.8	6.9		pH Initial	7.2	7.0	6.8	7.0	6.9	6.7	6.8	
pH Final	7.1	7.3	7.3	7.1	7.3	7.3			pH Final	7.1	7.3	7.3	7.4	7.4	7.4		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	208.0	201.0	193.9	199.9	189.2	190.7			Conductivity	251.0	283.0	237.0	245.0	224.0	223.0		
Chlorine									Chlorine								
Dilution: 62.0 Day:									Dilution: 100.0 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0		Temp (C)	25.6	25.3	25.1	25.5	26.0	26.0	26.0	
DO Initial	7.0	6.4	6.4	6.8	7.2	6.7	6.6		DO Initial	7.1	6.4	7.0	6.6	7.2	6.6	6.4	
DO Final	8.2	8.2	8.3	8.2	8.2	8.2			DO Final	7.8	7.8	8.1	8.1	8.2	8.1		
pH Initial	7.1	6.8	6.7	7.0	6.9	6.8	6.8		pH Initial	7.4	7.1	6.9	6.9	7.0	6.7	6.8	
pH Final	7.1	7.3	7.3	7.2	7.2	7.3			pH Final	7.1	7.3	7.4	7.4	7.4	7.4		
Alkalinity									Alkalinity	32.0		32.0		28.0			
Hardness									Hardness	40.0		32.0		36.0			
Conductivity	216.0	209.0	201.0	209.0	195.1	196.6			Conductivity	269.0	262.0	269.0	224.0	254.0	249.0		
Chlorine									Chlorine	<.01		<.01		<.01			

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





# Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71028

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

## REPORT QUALITY ASSURANCE FORM

Client: Magnolia Waste Water

Project#: X5370

Chain of Custody Documents Checked by: AH 3/25/14  
Technician/Date

Raw Data Documents Checked by: AH 3/25/14  
Technician/Date

Statistical Analysis Package Checked by: EBB 3/24/14  
Quality Manager/Date

Quality Control Data Checked by: EBB 3/24/14  
Quality Manager/Date

Report Checked by: EBB 4/16/14  
Quality Manager/Date

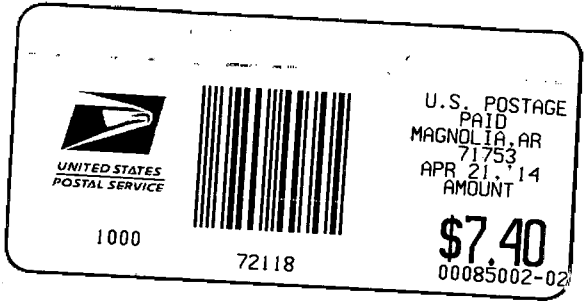
I certify that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained in this document, to the best of my knowledge, is true, accurate and complete.

Erin S. Brupp, BS  
Quality Manager

4/16/14  
Date

No part of this work may be altered in any form or by any means without written permission from Bio-Analytical Laboratories.

City of Magnolia Big Creek WWTP  
P.O. Box 666  
Magnolia, AR 71754-0666  
Permit # AR0043613  
AFIN # 14-00059



NPDES Enforcement Section  
Water Division  
ADEQ  
5301 N. Shore Dr.  
North Little Rock, Arkansas 72118-5317

