

Bio-Analytical Laboratories (BAL)
ADEQ Certificate #88-0630
Project X4805

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4805

Outfall: 001

Permit #: AR0043613/ AFIN #14-00059

Contact: Russell Thomas

Dates: July 16 - 24, 2012

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%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0
2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 0
3. Report the NOEC value for survival, Parameter TOP3B - 100%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 100%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 17.60%.

For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP6C - 0
2. If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP6C - 0
3. Report the NOEC value for survival, Parameter TOP6C - 100%.
4. Report the NOEC value for reproduction, Parameter TPP6C - 100%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 16.69%.

This report contains a total of 43 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

**SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING**

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Magnolia
Outfall 001

NPDES No.: AR0043613
AFIN: 14-00059

	Time	Date	Time	Date
Composite 1 Collected From	0700	7/15/12 To	0700	7/16/12
Composite 2 Collected From	0700	7/17/12 To	0700	7/18/12
Composite 3 Collected From	0700	7/19/12 To	0700	7/20/12
Test initiated:	1130 am/pm		7/17/12	date
Test terminated:	1310 am/pm		7/24/12	date
Dilution water used:	Receiving	X	Reconstituted	

PERCENT SURVIVAL

Time of Reading	Percent Effluent					
	0	32	42	56	80	100
24h	90	100	100	100	100	100
48h	90	100	100	100	100	100
End of test	90	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	80	100
A	18	19	20	22	14	15
B	19	19	20	18	17	13
C	15	17	16	17	16	15
D	24	17	18	19	15	16
E	19	13	18	18	17	20
F	D	15	14	13	16	16
G	23	21	24	20	21	16
H	16	19	16	13	19	21
I	19	20	19	10	19	22
J	21	21	22	20	18	20
Surv. Mean	19.3	18.1	18.7	17.0	17.2	17.4
Total Mean	17.4	18.1	18.7	17.0	17.2	17.4
CV%*	15.30	14.37	15.95	22.36	12.20	17.60

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

PMSD = 22.6%

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%): | YES | X | NO |
| b) ½ 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%): | YES | X | NO |
| b) ½ 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% effluent
 - b) NOEC reproduction: 100% effluent
 - c) LOEC survival: N/A % effluent
 - d) LOEC reproduction: N/A % effluent

Biomonitoring Form
Chronic Toxicity Summary Form
Cryptosporidium dubia
Chemical Parameters Chart

Permittee: City of Magnolia
NPDES No.: AR0043613/ APIN 14-00059
Contact: Russell Thomas
Analyst: Briggs, Haughton, Zeigler

Sample No. 1 Collected: Date: 7/16/12 Time: 0700
Sample No. 2 Collected: Date: 7/18/12 Time: 0700
Sample No. 3 Collected: Date: 7/20/12 Time: 0700
Test Begin: Date: 7/17/12 Time: 1130
Test Ends: Date: 7/24/12 Time: 1310

Dilution: 0 Day:									Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8		Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8	
DO Initial	8.3	8.3	8.2	7.8	7.9	8.0	8.0		DO Initial	8.1	8.2	8.0	7.4	7.5	7.8	7.9	
DO Final	8.0	8.0	7.8	7.7	7.6	8.0			DO Final	8.2	8.2	8.1	8.0	7.8	8.1		
pH Initial	7.9	8.0	8.1	7.6	7.8	7.7	7.6		pH Initial	7.7	7.7	7.8	7.5	7.5	7.5	7.5	
pH Final	8.0	7.8	7.7	7.6	7.7	7.9			pH Final	7.3	7.6	7.6	7.6	7.6	7.6		
Alkalinity	48.0		52.0						Alkalinity								
Hardness	48.0		52.0						Hardness								
Conductivity	178.4	179.0	180.8	178.6	179.0	171.9			Conductivity	298	287	302	295	284	282		
Chlorine	<.01		<.01						Chlorine								
Dilution: 32 Day:									Dilution: 80 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8		Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8	
DO Initial	8.3	8.3	8.2	7.4	7.6	7.9	8.0		DO Initial	8.1	8.1	8.0	7.4	7.5	7.7	7.9	
DO Final	8.2	8.1	8.0	7.9	7.8	8.1			DO Final	8.4	8.3	8.2	8.1	7.9	8.2		
pH Initial	7.9	7.9	8.0	7.5	8.0	7.7	7.6		pH Initial	7.6	7.6	7.5	7.5	7.6	7.4	7.4	
pH Final	7.8	7.8	7.8	7.8	7.7	7.7			pH Final	7.0	7.5	7.5	7.6	7.5	7.5		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	248	244	254	253	241	236			Conductivity	348	331	355	345	333	326		
Chlorine									Chlorine								
Dilution: 42 Day:									Dilution: 100 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8		Temp (C)	24.5	24.7	24.6	24.9	24.6	25.0	24.8	
DO Initial	8.2	8.2	8.2	7.4	7.6	7.9	8.0		DO Initial	8.0	8.0	8.0	7.4	7.5	7.6	7.9	
DO Final	8.2	8.2	8.0	7.9	7.8	8.1			DO Final	8.5	8.5	8.4	8.4	8.0	8.2		
pH Initial	7.8	7.8	7.9	7.5	7.9	7.6	7.5		pH Initial	7.1	7.2	7.3	7.4	7.5	7.3	7.3	
pH Final	7.5	7.7	7.7	7.7	7.7	7.6			pH Final	6.4	7.2	7.4	7.5	7.4	7.4		
Alkalinity									Alkalinity	4.0	16.0		12.0				
Hardness									Hardness	48.0	64.0		56.0				
Conductivity	268	262	273	269	261	256			Conductivity	393	357	398	378	387	363		
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee: City of Magnolia
Outfall 001

NPDES No.: AR0043613
AFIN: 14-00059

	Time	Date	Time	Date
Composite 1 Collected from:	0700	7/15/12 To	0700	7/16/12
Composite 2 Collected from:	0700	7/17/12 To	0700	7/18/12
Composite 3 Collected from:	0700	7/19/12 To	0700	7/20/12

Test initiated: 1430 am/pm 7/16/12 date
 Test terminated: 0950 am/pm 7/23/12 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	100	100	100	100	100	100	100	0.00
32	100	100	100	87.5	100	100	100	97.5	6.06
42	87.5	100	87.5	100	100	100	100	95.0	7.62
56	75.0	100	100	100	100	100	100	95.0	11.68
80	75.0	100	75.0	75.0	100	100	100	85.0	15.98
100	62.5	100	87.5	100	100	100	100	90.0	16.69

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	0.788	0.650	0.588	0.650	0.650	0.665	11.07
32	0.513	0.650	0.638	0.600	0.650	0.610	9.55
42	0.638	0.563	0.575	0.563	0.600	0.588	5.42
56	0.475	0.688	0.613	0.663	0.538	0.595	14.83
80	0.650	0.638	0.488	0.413	0.588	0.555	18.41
100	0.575	0.713	0.675	0.613	0.713	0.658	9.37

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

PMSD = 16.4%

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%) | YES | X | NO |
| b) ½ 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%) | YES | X | NO |
| b) ½ 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 #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% effluent. |
| b.) NOEC growth | 100% effluent. |
| c.) LOEC survival | N/A% effluent |
| d.) LOEC growth | N/A% effluent |

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: City of Magnolia
NPDES No.: AR0043613/ AFIN 14-00059
Contact: Russell Thomas
Analyst: Briggs, Haughton, Zeigler

Sample No. 1 Collected: Date: 7/16/12 Time: 0700
Sample No. 2 Collected: Date: 7/18/12 Time: 0700
Sample No. 3 Collected: Date: 7/20/12 Time: 0700
Test Begin: Date: 7/16/12 Time: 1430
Test End: Date: 7/23/12 Time: 0950

Dilution: 0 Day:									Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6		Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6	
DO Initial	7.6	6.7	6.8	6.1	5.4	5.0	5.2		DO Initial	7.7	6.7	6.6	6.4	5.6	5.0	4.9	
DO Final	8.1	8.0	8.0	7.8	7.7	7.6			DO Final	8.3	8.2	8.2	8.1	8.0	7.8		
pH Initial	7.9	7.7	7.7	7.6	7.6	7.7	7.4		pH Initial	7.4	7.3	7.3	7.7	7.2	7.2	7.1	
pH Final	7.8	8.0	7.8	7.7	7.6	7.7			pH Final	7.3	7.3	7.6	7.6	7.6	7.6		
Alkalinity	48.0			52.0					Alkalinity								
Hardness	48.0			52.0					Hardness								
Conductivity	177.0	178.4	179.0	180.8	178.6	179.0			Conductivity	297	298	287	302	295	284		
Chlorine	<.01			<.01					Chlorine								
Dilution: 32 Day:									Dilution: 80 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6		Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6	
DO Initial	7.7	6.6	6.7	6.3	5.4	5.0	5.3		DO Initial	7.7	6.8	7.0	6.3	5.7	5.4	5.0	
DO Final	8.2	8.2	8.1	8.0	7.9	7.8			DO Final	8.3	8.4	8.3	8.2	8.1	7.9		
pH Initial	7.7	7.4	7.4	7.4	7.4	7.4	7.4		pH Initial	7.1	7.2	7.2	7.2	7.1	7.1	7.1	
pH Final	7.7	7.8	7.8	7.8	7.8	7.7			pH Final	7.1	7.0	7.5	7.5	7.6	7.5		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	247	248	244	254	253	241			Conductivity	345	348	331	355	345	333		
Chlorine									Chlorine								
Dilution: 42 Day:									Dilution: 100 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6		Temp (C)	24.9	24.4	24.6	24.5	24.5	24.9	24.6	
DO Initial	7.8	6.6	6.7	6.3	5.4	5.1	4.8		DO Initial	7.8	7.2	7.1	6.5	5.7	5.2	5.2	
DO Final	8.3	8.2	8.2	8.0	7.9	7.8			DO Final	8.5	8.5	8.5	8.4	8.4	8.0		
pH Initial	7.6	7.3	7.3	7.3	7.1	7.3	7.3		pH Initial	6.6	7.0	7.0	7.0	7.1	7.1	7.0	
pH Final	7.5	7.5	7.7	7.7	7.7	7.7			pH Final	6.4	6.4	7.2	7.4	7.5	7.4		
Alkalinity									Alkalinity	4.0	16.0		12.0				
Hardness									Hardness	48.0	64.0		56.0				
Conductivity	267	268	262	273	269	261			Conductivity	393	393	357	398	378	387		
Chlorine									Chlorine	<.01	<.01		<.01				

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 (v. 31612)

Client: Magnolia

Project#: X4805

Chain of Custody Documents Checked by: EGG 7/30/12
Technician/Date

Raw Data Documents Checked by: AM 7/25/12
Technician/Date

Statistical Analysis Package Checked by: EGG 7/30/12
Quality Manager/Date

Quality Control Data Checked by: EGG 8/1/12
Quality Manager/Date

Report Checked by: EGG 8/15/12
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 H. Brupp BS
Quality Manager

8/15/12
Date

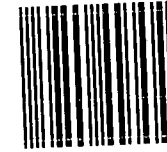
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City of Magnolia Big Creek WWTP
P.O. Box 666
Magnolia, AR 71754-0666
Permit # AR0043613
AFIN # 14-00059

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ADEQ
5301 N. Shore Dr.
North Little Rock, Arkansas 72118-5317