

**SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING**

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected From	0900	6/17/12 To	0900	6/18/12
Composite 2 Collected From	0900	6/19/12 To	0900	6/20/12
Composite 3 Collected From	0900	6/21/12 To	0900	6/22/12
Test initiated:	1610 am/pm		6/19/12	date
Test terminated:	1205 am/pm		6/25/12	date
Dilution water used:	Receiving	X	Reconstituted	

PERCENT SURVIVAL

Time of Reading	Percent Effluent					
	0	31	42	56	75	100
24h	100	100	100	100	100	100
48h	100	100	100	100	100	100
End of test	100	100	100	100	90	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	31	42	56	75	100
A	25	27	28	25	32	29
B	29	30	23	25	23	29
C	28	29	33	27	24	19
D	24	27	30	21	26	20
E	20	25	30	32	29	24
F	23	30	29	27	D	24
G	22	32	33	25	32	27
H	24	28	27	28	25	27
I	23	31	27	24	30	24
J	28	35	27	25	20	23
Surv. Mean	24.6	29.4	28.7	25.9	26.8	24.6
Total Mean	24.6	29.4	28.7	25.9	24.1	24.6
CV%*	11.84	9.78	10.52	11.14	15.71	13.98

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

PMSD = 23.1%

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) 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%):	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% effluent
b) NOEC reproduction:	100% effluent
c) LOEC survival:	N/A% effluent
d) LOEC reproduction:	N/A% effluent

Bio-monitoring Form
 Carcass Toxicity Summary Form
Carpodacus dubia
 Chemical Parameters Chart

Permittee: City of Walnut Ridge
 NPDES No.: AR0006566
 Contact: John Kopp
 Analyst: Briggs, Braughton, Zauggler, Callahan

Sample No. 1 Collected: Date: 6/18/12 Time: 0900
 Sample No. 2 Collected: Date: 6/20/12 Time: 0900
 Sample No. 3 Collected: Date: 6/22/12 Time: 0900
 Test Begin: Date: 6/19/12 Time: 1610
 Test End: Date: 6/25/12 Time: 1205

Dilution: 0 Day:									Dilution: 86 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.2	8.2	8.1	8.2	8.3	8.3			DO Initial	7.9	7.7	7.6	8.0	7.8	7.8		
DO Final	8.1	8.0	7.8	8.1	8.2				DO Final	8.2	8.1	7.9	8.1	8.1			
pH Initial	8.1	8.0	8.0	7.9	8.0	8.0			pH Initial	8.1	8.0	8.0	7.9	8.1	8.1		
pH Final	8.0	8.0	8.0	7.8	7.8				pH Final	8.0	8.1	8.1	8.1	8.0			
Alkalinity	60.0		60.0	64.0					Alkalinity								
Hardness	100.0		88.0	88.0					Hardness								
Conductivity	356	343	353	339	342				Conductivity	403	402	387	407	413			
Chlorine	<.01		<.01	<.01					Chlorine								
Dilution: 51 Day:									Dilution: 75 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.1	8.1	7.9	8.1	8.0	8.2			DO Initial	7.8	7.6	7.5	7.8	7.8	7.6		
DO Final	8.1	8.1	7.9	8.1	8.2				DO Final	8.1	8.1	8.0	8.1	8.1			
pH Initial	8.1	8.0	8.1	8.0	8.1	8.1			pH Initial	8.1	8.0	8.1	8.1	8.1	8.1		
pH Final	8.0	8.1	8.2	8.0	7.9				pH Final	8.0	8.2	8.1	8.1	8.0			
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	383	366	381	380	383				Conductivity	421	426	417	421	443			
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)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.0	7.7	7.6	8.0	7.9	8.0			DO Initial	7.7	7.6	7.5	7.8	7.8	7.8		
DO Final	8.1	8.1	7.9	8.2	8.1				DO Final	8.1	8.1	8.0	8.1	8.1			
pH Initial	8.1	8.0	8.0	8.0	8.1	8.1			pH Initial	8.1	8.1	8.1	8.1	8.1	8.1		
pH Final	8.1	8.1	8.2	8.1	8.0				pH Final	8.0	8.3	8.2	8.1	8.0			
Alkalinity									Alkalinity	116.0	132.0		132.0				
Hardness									Hardness	136.0	132.0		148.0				
Conductivity	388	373	386	389	399				Conductivity	446	452	396	399	498			
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected from:	0900	6/17/12 To	0900	6/18/12
Composite 2 Collected from:	0900	6/19/12 To	0900	6/20/12
Composite 3 Collected from:	0900	6/21/12 To	0900	6/22/12

Test initiated: 1615 am/pm 6/19/12 date
 Test terminated: 1135 am/pm 6/26/12 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	75.0	62.5	87.5	75.0	87.5	100	100	77.5	
31	100	100	100	100	100	100	100	100	
42	100	75.0	87.5	100	87.5	100	100	90.0	
56	87.5	100	100	87.5	100	100	100	97.5	
75	100	100	100	100	100	100	100	100	
100	100	100	100	100	100	100	100	100	

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		

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

NOTE: TEST INVALID, CONTROL SURVIVAL <80%

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

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected from:	0900	7/08/12 To	0900	7/09/12
Composite 2 Collected from:	0900	7/10/12 To	0900	7/11/12
Composite 3 Collected from:	0900	7/12/12 To	0900	7/13/12

Test initiated: 1550 am/pm 7/10/12 date
 Test terminated: 0925 am/pm 7/17/12 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	100	100	100	100	100	100	100	100	0.00
31	100	100	100	100	87.5	100	100	97.5	6.06
42	100	100	100	100	100	100	100	100	0.00
56	100	100	100	100	100	100	100	100	0.00
75	100	100	100	100	100	100	100	100	0.00
100	100	100	100	100	100	100	100	100	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		
0	0.738	0.588	0.625	0.675	0.663	0.658	8.57
31	0.588	0.550	0.613	0.538	0.600	0.578	5.60
42	0.588	0.575	0.575	10.663	0.575	0.595	6.41
56	0.588	0.625	0.538	0.663	0.668	0.620	9.63
75	0.663	0.675	0.638	0.563	0.700	0.648	8.12
100	0.613	0.638	0.575	0.675	0.750	0.650	10.27

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

PMSD: 12.27%

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 |

NOTE: THIS IS A RETEST FOR AN INVALID TEST CONDUCTED IN JUNE 2012

**Monitoring Form
 Chronic Toxicity Summary Form
 Pineholes program
 Chemical Parameters Chart**

Permittee: City of Walnut Ridge
 MTD'S No.: AH0146566
 Contact: John Kapp
 Analyst: Haughton, Ziegler, Callahan

Sample No. 1 Collected: Date: 7/9/12 Time: 0900
 Sample No. 2 Collected: Date: 7/11/12 Time: 0900
 Sample No. 3 Collected: Date: 7/13/12 Time: 0900
 Test Begin: Date: 7/10/12 Time: 1550
 Test End: Date: 7/17/12 Time: 0918

Dilution: 0 Day:								Dilution: 56 Day:									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.4	6.6	7.3	7.7	7.4	6.9	6.1		DO Initial	6.8	6.4	7.3	7.6	7.2	6.7	6.3	
DO Final	8.1	8.3	8.7	8.6	8.3	8.3			DO Final	8.2	8.2	8.4	8.5	8.4	8.3		
pH Initial	7.8	7.7	7.8	7.8	7.8	7.9	7.5		pH Initial	8.0	7.9	8.0	8.1	8.1	7.9	7.8	
pH Final	8.1	8.2	8.1	8.1	8.2	8.2			pH Final	8.1	8.3	8.3	8.2	8.3	8.3		
Alkalinity	60.0					56.0			Alkalinity								
Hardness	100.0					100.0			Hardness								
Conductivity	339	335	340	349	349	326			Conductivity	464	468	484	486	472	489		
Chlorine	<.01					<.01			Chlorine								
Dilution: 31 Day:								Dilution: 75 Day:									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.9	6.3	7.4	7.7	7.4	6.8	6.3		DO Initial	6.7	6.5	7.3	7.6	7.1	6.6	6.3	
DO Final	8.2	8.2	8.5	8.5	8.3	8.3			DO Final	8.2	8.1	8.4	8.5	8.4	8.3		
pH Initial	7.7	7.8	7.8	8.0	8.0	7.8	7.5		pH Initial	8.1	8.0	8.1	8.2	8.1	7.9	7.8	
pH Final	8.1	8.3	8.2	8.2	8.3	8.2			pH Final	8.1	8.4	8.3	8.2	8.3	8.3		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	410	409	423	427	418	401			Conductivity	508	519	533	529	513	507		
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)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.9	6.5	7.4	7.6	7.3	6.8	6.2		DO Initial	6.8	6.3	7.3	7.6	7.1	6.6	6.3	
DO Final	8.2	8.2	8.5	8.5	8.3	8.3			DO Final	8.2	8.0	8.2	8.5	8.4	8.3		
pH Initial	7.9	7.9	8.0	8.1	8.1	7.8	7.7		pH Initial	8.3	8.1	8.2	8.3	8.2	8.0	8.0	
pH Final	8.1	8.3	8.2	8.2	8.3	8.3			pH Final	8.1	8.4	8.3	8.3	8.2	8.2		
Alkalinity									Alkalinity	168.0	148.0		156.0				
Hardness									Hardness	200.0	204.0		203.0				
Conductivity	433	432	449	452	441	425			Conductivity	569	589	607	576	568	572		
Chlorine									Chlorine	<.01	<.01		<.01				



Bio-Analytical Laboratories

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FACSIMILE TRANSMITTAL SHEET

TO:	John Kopp	FROM:	Ginger Briggs
COMPANY:	City of Walnut Ridge	DATE:	7-23-12
FAX NUMBER:	(870) 886-7824	TOTAL NO. OF PAGES INCLUDING COVER:	10
PHONE NUMBER:	(870) 886-2312	SENDER'S REFERENCE NUMBER:	X4782
RE:	2012 WETI	YOUR REFERENCE NUMBER:	

URGENT FOR REVIEW PLEASE COMMENT PLEASE REPLY PLEASE RECYCLE

NOTES/COMMENTS:

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Full report to follow.

I only have one set of DMR's left (3012)

Ginger

Bio-Analytical Laboratories (BAL)
ADEQ Certificate #88-0630
Project X4782

Bio-Analytical Laboratories' Executive Summary

Permittee: City of Walnut Ridge
216 Southwest 4th Street
Walnut Ridge, AR 72476

Project #: X4782

Outfall: 001

Permit #: AR0046566

Contact: John Kopp

Test Dates: June 19 - July 17, 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 - 13.98%.

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 - 10.27%.

This report contains a total of 52 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 results in this report is for monitoring purposes only and should not be included on discharge monitoring reports.



Bio-Analytical Laboratories

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

AT

**THE CITY OF WALNUT RIDGE
Walnut Ridge, Arkansas**

NPDES #AR0046566

EPA Methods 1000.0 and 1002.0

Project X4782

Test Dates: June 19 - July 17, 2012

Report Date: July 24, 2012

Prepared for:

John Kopp
City of Walnut Ridge
216 Southwest 4th Street
Walnut Ridge, AR 72476

Prepared by:

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

BAL
ADEQ #88-0630
Project X4782

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ADEQ #88-0630
Project X4782

1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two chronic definitive toxicity tests for Outfall 001 at the wastewater treatment plant serving the city of Walnut Ridge, 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.

The tests were initiated on June 19, 2012; however, the fathead minnow test was invalid because the control did not meet the test acceptance requirements. It was initiated again on July 10, 2012. This report summarizes the valid tests. All valid and invalid test data can be found in the appendices of this report.

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) 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 minnow test organisms 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

Moderately-hard reconstituted water, made per method guidelines, was used as the dilution water and the control for the toxicity tests.

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ADEQ #88-0630
Project X4782

2.4 Test Concentrations

The test concentrations used in the chronic toxicity tests were 100, 75, 56, 42 and 31 percent effluent and a reconstituted water control. The critical dilution was 100 percent effluent. 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 24-hour composite samples of Outfall 001 were collected by city personnel on June 18, 20 and 22, 2012, for the *Ceriodaphnia dubia* test and on July 9, 11 and 13, 2012, for the fathead minnow test. Upon collection and completion of each composite, the samples were chilled to 4⁰ Celsius. The samples were delivered to the laboratory by overnight carrier.

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±1⁰ Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. An extra 100 percent dilution was treated with ultraviolet light to detect any pathogen interference that was noted in previous tests. Dissolved oxygen and pH measurements were measured on the control and each concentration at test initiation, at test renewal and at test termination. Conductivity measurements were also taken at test initiation and at each renewal. Alkalinity and hardness levels were measured 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±1⁰ 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±1⁰ Celsius. AEMC^R 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 Rank Test, a nonparametric test comparing concentration data to control data.

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Project X4782

Fathead minnow survival data was analyzed using Steel's Many-One Rank Test, a nonparametric test, and the growth data was analyzed using Dunnett's Test, a parametric test. The chronic endpoints in the reference toxicant tests 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. One hundred percent survival occurred in the control and in the critical dilution after six days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 24.6. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 percent effluent ($p=.05$).

The fathead minnow results can be found in Table 2. One hundred percent survival occurred in the control and in the critical dilution after seven days of exposure. The average weight gained in the control was 0.658 milligram (mg), while the average gained in the critical dilution was 0.650 mg. The NOEC for survival and growth in this test was 100 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	100.0		24.6	24.6	
31.0	100.0		29.4	29.4	
42.0	100.0		28.7	28.7	
56.0	100.0		25.9	25.9	
75.0	90.0		26.8	24.1	
100.0	100.0		24.6	24.6	
100.0 UV	100.0		25.0	22.5	

*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.

BAL
ADEQ #88-0630
Project X4782

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	100.0		0.658	
31.0	97.5		0.578	
42.0	100.0		0.595	
56.0	100.0		0.620	
75.0	100.0		0.648	
100.0	100.0		0.650	

*significant when compared to the control (p=.05). +Test validity based on mean dry weight per surviving larvae in the control.

The chronic reference toxicant tests conducted this month showed the test organisms to be within the respective sensitivity range. 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 on June 18, 20 and 22, 2012, from the wastewater treatment plant serving the city of Walnut Ridge, Arkansas, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after six days of exposure (p=.05). Non-lethal effects (i.e. lack of reproduction) were not noted in the critical dilution in the test (p=.05). The samples collected on July 9, 11 and 13, 2012, were not found to be lethally toxic to the fathead minnow test organisms in the 100 percent critical dilution after seven days of exposure (p=.05). Non-lethal effects (i.e. lack of growth) were not noted in the critical dilution in the test (p=.05). The fathead minnow test initiated in June, 2012, was invalid.

BAL
ADEQ #88-0630
Project X4782

5.0 Reference

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.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773
 bioanalytical@worldnet.att.net

LELAP #01975, EPA Code LA00917

Laboratory Use Only:

Company: The City of Walnut Ridge				Phone: (870) 886-3348		Analysis:				Lab Control Number:		Project Number: X4782	
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476 (870) 886-7824				Fax: (870) 886-7824		Chronic Ceriodaphnia Chronic minnow Acute minnow Acute Daphnia species Acute Ceriodaphnia						Temperature upon arrival: 11.6°C	Thermometer #: 29
Permit #: AR0046566				Purchase Order:									
Sampler's Signature: <i>Jon Koff</i>				Printed Name: Jon Koff									
Date Start	Time Start	C	G	# containers	Sample Identification								
6-17-12	9 AM			6	001	X	X						
6-18-12	9 AM												
Relinquished by: <i>Jon Koff</i>				Date:	Time:	Received by: <i>J. J. J. J.</i>				Date:	Time:		
				6-18-12	9:00 A.M.					6/19/12	1500		
Relinquished by:				Date:	Time:	Received by:				Date:	Time:		
Relinquished by:				Date:	Time:	Received by laboratory:				Date:	Time:		
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ Airborne ___ UPS ___ Client ___ Other ___ Tracking # ___													
Comments:													

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773
 bioanalytical@worldnet.att.net

LELAP #01975, EPA Code LA00917

Laboratory Use Only:

Company: The City of Walnut Ridge				Phone: (870) 886-3348		Analysis:				Lab Control Number:	Project Number: X4782	
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476				Fax: (870) 886-7824		Chronic Ceriodaphnia	Chronic minnow	Acute minnow	Acute Daphnia species			Acute Ceriodaphnia
Permit #: AR0046566				Purchase Order:								
Sampler's Signature: <i>[Signature]</i>				Printed Name: Son Koff								
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification							
6-19	9 AM			6	001	X	X				C5705	
6-20	9 AM											
Relinquished by: <i>[Signature]</i>				Date:	Time:	Received by: <i>[Signature]</i>				Date:	Time:	
				6-20-12	9 A.M.					6/21/12	1330	
Relinquished by:				Date:	Time:	Received by:				Date:	Time:	
Relinquished by:				Date:	Time:	Received by laboratory:				Date:	Time:	
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ Airborne ___ UPS ___ Client ___ Other ___ Tracking # ___												
Comments:												

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 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773
 bioanalytical@worldnet.att.net

LELAP #01975, EPA Code LA00917

Laboratory Use Only:

Company: The City of Walnut Ridge				Phone: (870) 886-3348		Analysis:				Lab Control Number:		Project Number:		
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476				Fax: (870) 886-7824		Chronic Ceriodaphnia	Chronic minnow	Acute minnow	Acute Daphnia species	Acute Ceriodaphnia				X4782 Temp. upon arrival: 2,10C #29 ESB 6/22/12 Preservative: (below) ice
Permit #: AR0046566				Purchase Order:										
Sampler's Signature: <i>[Signature]</i>				Printed Name: SON KOEP										
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification									
6-21-12	9 AM			6	001	X	X						C5712	
6-22-12	9 AM			half gallons										
Relinquished by: <i>[Signature]</i>				Date: 6-22-12	Time: 9 AM	Received by:				Date:	Time:			
Relinquished by:				Date:	Time:	Received by:				Date:	Time:			
Relinquished by:				Date:	Time:	Received by laboratory: <i>[Signature]</i>				Date: 6-23-12	Time: 8920			
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> Airborne <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # ? ESB 6/23/12														
Comments:														

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773
 bioanalytical@worldnet.att.net

LELAP #01975, EPA Code LA00917

Laboratory Use Only:

Company: The City of Walnut Ridge		Phone: (870) 886-3348		Analysis:				Lab Control Number:	Project Number: X4780
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476		Fax: (870) 886-7824		Chronic Ceriodaphnia	Chronic minnow	Acute minnow	Acute Daphnia species		
Permit #: AR0046566		Purchase Order:						Temp. upon arrival: Therm # 29 → 5.4 ² At 7/10/12	Preservative: (below) ice
Sampler's Signature: <i>Jon Kopp</i>		Printed Name: Jon Kopp							
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification				
7-8-12	9 a.m.			1	001	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	CS814	
7-9-12	9 a.m.								
Relinquished by: <i>Jon Kopp</i>		Date:	7-9-12	Time:	9:00 A.M.	Received by: <i>J. Yeagler</i>		Date:	7/10/12
Relinquished by:		Date:		Time:		Received by:		Date:	
Relinquished by:		Date:		Time:		Received by laboratory:		Date:	
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> Airborne <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____									
Comments:									

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773
 bioanalytical@worldnet.att.net

LELAP #01975, EPA Code LA00917


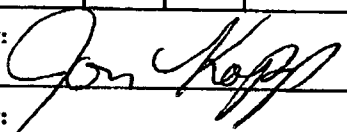
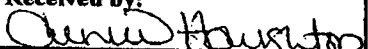
Laboratory Use Only:

Company: The City of Walnut Ridge		Phone: (870) 886-3348		Analysis:				Lab Control Number:	Project Number: X4782
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476		Fax: (870) 886-7824		Chronic Ceriodaphnia Chronic minnow Acute minnow Acute Daphnia species Acute Ceriodaphnia				Temp. upon arrival: B.62 Thermometer #: 29 Tech: Long Date: 7/12/12 Preservative: (below)	
Permit #: AR0046566		Purchase Order:							
Sampler's Signature: <i>Jon Kopp</i>			Printed Name: Jon Kopp						
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification				
7-10-12	9am.			6	001				
7-11-12	9am.								
Relinquished by: <i>Jon Kopp</i>		Date: 7/11/12	Time: 9:00	Received by: <i>J. Yeagler</i>		Date: 7/12/12	Time: 1400		
Relinquished by:		Date:	Time:	Received by:		Date:	Time:		
Relinquished by:		Date:	Time:	Received by laboratory:		Date:	Time:		
Method of Shipment: Lab Bus <input checked="" type="checkbox"/> Fed Ex Airborne UPS Client Other Tracking #									
Comments:									

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772 Fax (318) 745-2773

bioanalytical@worldnet.att.net LELAP #01975, EPA Code LA00917

Laboratory Use Only:

Company: The City of Walnut Ridge		Phone: (870) 886-3348		Analysis:				Lab Control Number:	Project Number: X4782
Address: 216 S. W. 4 th Street, Walnut Ridge, AR 72476		Fax: (870) 886-7824		Chronic Ceriodaphnia Chronic minnow Acute minnow Acute Daphnia species Acute Ceriodaphnia				Temperature upon arrival: Thermometer #: 29 Tech: FH Date: 7/14/12	Temp. upon arrival: 4.5°C Preservative: (below) ice
Permit #: AR0046566		Purchase Order:		Date Start Date End					
Sampler's Signature: 		Printed Name: Jon Kopp		Sample Identification					
		C	G	# containers					
7-12-12	9 A.M.			6	001				C5844
7-13-12	9 A.M.								
Relinquished by: 		Date: 7-13-12		Time: 9 A.M.		Received by: 		Date: 7/14/12	
Relinquished by:		Date:		Time:		Received by:		Date:	
Relinquished by:		Date:		Time:		Received by laboratory:		Date:	
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input checked="" type="checkbox"/> Fed Ex <input type="checkbox"/> Airborne <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # 4858 3966 2638									
Comments:									

**APPENDIX B
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4782 Date start: 6/19/12 Date end: 6/25/12

Client/Contact: WLRD/Walnut Ridge
Address 216 Southwest 4th St Walnut Ridge AR 72476
NPDES# AR0046566

Sample Description 001 Dilution Water MH Reconstituted
Test Temperature(°C) 25±1° Technicians: EGB/AH/LGZ/RC

Adults isolated: Date 6/18/12 Time: 2315

Neonates collected: Date 6/19/12 Time: 0630 Board: X4766

Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU

pH Meter: Model Orion 230A+ Serial #015253

Conductivity Meter: Model Control Company Serial# 80277924

Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

Effluent	Aerate?/Minutes	Receiving Water	Aerate?/Minutes
Initial D.O.	/Final D.O.	Initial D.O.	/Final D.O.
(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech

0. <u>7.6/90.8%/RC</u>	0. <u>No/RC</u>	0. <u>NA</u>	0. <u>NA</u>
1. <u>9.5/113.0%/EGB</u>	1. <u>4/20/8.2/97.2%/EGB</u>		
2. <u>10.5/124.2%/EGB</u>	2. <u>4/20/8.2/96.7%/RC</u>		
3. <u>9.8/116.2%/EGB</u>	3. <u>4/20/8.2/96.8%/RC</u>		
4. <u>9.4/111.5%/EGB</u>	4. <u>4/10/8.1/95.2%/EGB</u>		
5. <u>10.0/120.0%/EGB</u>	5. <u>4/10/8.1/96.1%/EGB</u>		
6. <u>10.0/117.6%/AH</u>	6. <u>4/20/8.4/98.8%/AH</u>		
7. _____	7. _____		

Total Residual Chlorine (mg/L)/Tech

Dechlorinated? Amount?/Tech

Ammonia (NH3) (mg/L)/Tech

BAL Sample # Date in Use

1. <0.01/RC
2. <0.01/EGB
3. <0.01/EGB

1. No/RC
2. No/EGB
3. No/EGB

1. 0.5/RC
2. 0.25/EGB
3. 0.0/EGB

1. C5687 6/19/12
2. C5705 6/21/12
3. C5712 6/23/12

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4782

Test Dates 6/19/12 - 6/25/12

Client Walnut Ridge

Replicate	% Concentration						
	0	31	42	56	75	100	100uv
A	25	27	28	28	32	29	29
B	29	30	23	25	23	29	27
C	28	29	33	27	24	19	23
D	24	27	30	21	26	20	26
E	20	25	30	32	29	24	22
F	23	30	29	27	X	24	26
G	22	32	33	25	32	27	19
H	24	28	27	28	25	27	26
I	23	31	27	24	30	24	X
J	28	35	27	25	20	23	27
Surviving Mean	24.6	29.4	28.7	25.9	26.8	24.6	25.0
Total Mean	24.6	29.4	28.7	25.9	24.1	24.6	22.5
CV%*	11.84	9.78	10.52	11.14	15.71	13.98	12.33

*coefficient of variation = standard deviation x 100/mean (calculation based on young of the surviving adults)

Key: M=male; X=dead adult

Calculated by: LM 6/27/12

Calculations checked by: AH 6/27/12

BIO-ANALYTICAL LABORATORIES
 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4782

Test started: Date 6/19/12 Time 16:10

Client Nutnut Ridge

Test ended: Date 6/29/12 Time 17:05

Technician: Day0 AM 1 AM 2 RC 3 AM 4 EBB 5 EBB 6 AM 7 _____ 8 _____
 Time: Day0 16:10 1 10:35 2 15:40 3 11:40 4 11:35 5 1:00 6 1:05 7 _____ 8 _____
 Temperature: Day0 25.3 1 24.6 2 25.3 3 24.8 4 24.8 5 24.4 6 24.3 7 _____ 8 _____

% Conc.	Day	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	#Live Adults	Total Live Neonates	
		A	B	C	D	E	F	G	H	I	J			
0	1											10		
	2	0										10		
	3	0	3	4	3	4	3	2	4	3	5	10		
	4	0	0	0	0	0	1	0	0	0	0	10		
	5	0	9	9	8	5	5	7	8	9	9	10		
	6	0	13	17	15	13	11	14	13	12	11	14	10	
	7													
	8													
31	1											10		
	2	0										10		
	3	0	5	0	3	2	5	1	4	5	5	10		
	4	0	0	5	0	0	0	0	0	0	10	10		
	5	0	9	8	11	10	10	12	9	10	0	10		
	6	0	15	16	16	13	13	15	19	15	16	20	10	
	7													
	8													
42	1											10		
	2	0										10		
	3	0	0	0	3	3	3	4	3	3	3	10		
	4	0	0	4	0	0	7	0	0	6	0	10		
	5	0	6	13	11	12	2	13	10	0	9	10		
	6	0	18	15	16	16	15	17	16	14	18	15	10	
	7													
	8													
56	1											10		
	2	0										10		
	3	0	0	4	3	4	2	2	3	2	2	10		
	4	0	0	0	0	0	2	0	1	0	0	10		
	5	0	7	10	4	12	0	9	8	5	10	16		
	6	0	15	16	13	14	16	17	14	16	17	13	10	
	7													
	8													
75	1											10		
	2	0										10		
	3	0	3	4	4	3	x	4	3	3	4	9		
	4	0	1	0	0	0	1	0	0	0	6	9		
	5	0	4	6	11	9	1	15	6	12	0	9		
	6	0	18	15	14	11	17	1	13	16	15	10	9	
	7													
	8													
100	1											10		
	2	0										10		
	3	0	4	3	0	3	3	2	4	3	3	10		
	4	0	0	0	0	0	7	1	0	0	0	10		
	5	0	6	8	3	8	0	8	8	0	8	10		
	6	0	17	19	8	15	13	14	16	15	13	12	10	
	7													
	8													

Key: X=dead adult; X*=adult had n neonates before death; M=male

File: Cerio2

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4782 Test started: Date 6/19/12 Time 1610
Client Walnut Ridge Test ended: Date 6/21/12 Time 1205

Technician: Day0 PH 1 PH 2 3 4 5 6 7 8
Time: Day0 1610 1103 2134 3114 4135 5100 6130 7 8
Temperature: Day0 25.3 24.6 25.0 24.8 24.8 24.4 24.5 7 8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV- tr'd	1	0										10	
	2	0								X	0	9	
	3	3	3	2	1	0	2	0	0			3	
	4	0	0	0	0	0	0	0	0			0	
	5	11	5	5	10	9	10	5	11			8	
	6	15	19	16	13	13	14	14	13			16	
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
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	5												
	6												
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												

Key: X=dead adult; X'=adult had n neonates before death; M=male

File: Cerio2

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4782 Test started: Date 6/19/12 Time 6:10
 Client Walnut Ridge Test ended: Date 6/20/12 Time 12:25
 Organism C. dubia

Day/# water used	338	1	2	334	342	5	6	7	8
Concentration: Control MH									
pH	8.1	8.1 8.0	8.0 8.0	8.0 8.0	7.9 7.8	8.0 7.8	8.0 8.0	8.0 8.0	
DO (mg/l)	7.9	8.1 8.1	8.2 8.0	8.1 7.8	8.2 8.1	8.3 8.2	8.3 8.2	8.2 8.2	
Cond (umhos/cm)	335	356	343	333	339	342	337		
Alkalinity (mg/L)	60.0			60.0	64.0				
Hardness (mg/L)	100.0			88.0	88.0				
Concentration: 31									
pH	7.9	8.1 8.0	8.0 8.1	8.1 8.2	8.0 8.0	8.1 7.9	8.1 8.0		
DO (mg/l)	7.9	8.1 8.1	8.1 8.1	7.8 7.9	8.1 8.1	8.0 8.2	8.2 8.2		
Cond (umhos/cm)	373	383	366	351	380	383	391		
Concentration: 42									
pH	7.7	8.1 8.1	8.0 8.1	8.0 8.2	8.0 8.1	8.1 8.0	8.1 8.0		
DO (mg/l)	7.9	8.0 8.1	7.7 8.1	7.6 7.9	8.0 8.2	7.9 8.1	8.0 8.2		
Cond (umhos/cm)	402	388	373	356	389	399	409		
Concentration: 56									
pH	7.7	8.1 8.0	8.0 8.2	8.0 8.1	7.9 8.1	8.1 8.0	8.1 8.0		
DO (mg/l)	7.9	7.9 8.2	7.7 8.1	7.6 7.9	8.0 8.1	7.8 8.1	7.8 8.2		
Cond (umhos/cm)	402	405	402	387	407	413	434		
Concentration: 75									
pH	7.7	8.1 8.0	8.0 8.2	8.1 8.1	8.1 8.1	8.1 8.0	8.1 8.1		
DO (mg/l)	8.7	7.8 8.1	7.6 8.1	7.5 8.0	7.8 8.1	7.8 8.1	7.8 8.2		
Cond (umhos/cm)	411	421	426	417	421	443	462		
Concentration: 100									
pH	7.5	8.1 8.0	8.1 8.3	8.1 8.0	8.1 8.1	8.1 8.0	8.1 8.1		
DO (mg/l)	9.1	7.7 8.1	7.6 8.1	7.5 8.0	7.8 8.1	7.8 8.1	7.5 8.2		
Cond (umhos/cm)	441	446	452	396	399	495	486		
Tech-prerenewal	RC	AH	dm	dm	EBB	EBB	dm		
Tech-postrenewal		EBB	RC	dm	EBB	EBB	dm		
Hardness (mg/L)	136.0		132.0		148.0				
Alkalinity (mg/l)	116.0		132.0		132.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4782
Client Walnut Ridge
Organism C. dubia

Test started: Date 6/19/12 Time 10:10
Test ended: Date 6/25/12 Time 5:25

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: <u>Control 100µV-HHd</u>									
pH	7.6	8.0 8.1	8.0 8.1	8.1 8.0	8.0 8.1	8.2 8.1	8.2 8.0	8.3 8.0	
DO (mg/l)	8.2	7.6 8.1	7.5 7.6	7.4 7.8	7.9 7.8	7.7 8.0	7.6 8.0		
Cond (umhos/cm)	446	436	311	436	394	441	480		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	AH	OH	YH	EB	EB	OH		
Tech-postrenewal		EB	RC	OH	EB	EB	OH		
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4782 Date started: 6/19/12 Date ended 6/26/12

Client/Contact WLRD/ Walnut Ridge
Address 216 Southwest 4th St Walnut Ridge AR 72476
NPDES# AR0046566

Sample Description 001 Dilution Water MH Reconstituted
Test Temperature(°C) 25+1° Celsius Technicians EGB/AH/LGZ/RC
Test organism age <48hr Vendor/ID# ABS/719

Feeding Times

Day	Technician/Time/Amount (per replicate)		
	AM	NOON	PM
0			RC/1615/0.20ml
1	EGB/0730/0.10ml	RC/1135/0.10ml	RC/1630/0.10ml
2	RC/0815/0.10ml	RC/1100/0.10ml	EGB/1615/0.10ml
3	EGB/0700/0.10ml	EGB/1130/0.10ml	RC/1350/0.10ml
4	EGB/1140/0.20ml		EGB/1700/0.20ml
5	EGB/0700/0.10ml	EGB/1150/0.10ml	EGB/1630/0.10ml
6	EGB/0825/0.10ml	EGB/1100/0.10ml	EGB/1505/0.10ml

Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU
pH Meter: Model Orion 230A+ Serial #015253
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

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. 7.6/90.8%/RC	0. No/RC	0. NA	0. NA
1. 9.5/113%/EGB	1. Y/20/8.2/97.8%/EGB		
2. 10.5/124.2%/RC	2. Y/06/8.2/96.7%/RC		
3. 9.8/116.2%/EGB	3. Y/20/8.2/96.8%/EGB		
4. 9.4/111.5%/EGB	4. Y/10/8.1/95.2%/EGB		
5. 10.0/120.0%/EGB	5. Y/10/8.1/96.1%/EGB		
6. 10.0/117.6%/EGB	6. Y/20/8.4/98.8%/EGB		

Total Residual Chlorine(mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <0.01/RC	1. No/RC	1. 0.5/RC	1 C5687 6/19/12
2. <0.01/RC	2. No/RC	2. 0.25/RC	2 C5705 6/21/12
3. <0.01/EGB	3. No/EGB	3. 0.0/EGB	3 C5712 6/23/12

Comments:

Invalid. Control survival <80%
EGB
6/26/12

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4782 Test started: Date 6/12/12 Time 1615
 Client Walnut Ridge Test ended: Date 6/12/12 Time 1135
 Technician: Day0 RC 1 RC 2 RC 3 RC 4 RC 5 RC 6 RC 7 RC
 Time: Day0 1615 1 1130 2 1555 3 1050 4 1115 5 0940 6 1055 7 1135
 Temperature Day0 25.3 1 25.6 2 25.4 3 26.1 4 25.5 5 26.6 6 26.0 7 25.1

Conc.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	∞	∞	∞	∞	∞	6	6	6
	B	∞	∞	∞	∞	∞	8	8	5
	C	∞	∞	∞	∞	7	7	7	7
	D	∞	∞	∞	∞	8	8	8	6
	E	∞	∞	∞	∞	8	8	8	7
31	A	∞	∞	∞	∞	∞	∞	∞	∞
	B	∞	∞	∞	∞	∞	∞	∞	∞
	C	∞	∞	∞	∞	∞	∞	∞	∞
	D	∞	∞	∞	∞	∞	∞	∞	∞
	E	∞	∞	∞	∞	∞	∞	∞	∞
42	A	∞	∞	∞	∞	∞	∞	∞	∞
	B	∞	∞	∞	∞	7	6	6	6
	C	∞	∞	∞	∞	7	7	7	7
	D	∞	∞	∞	∞	∞	∞	∞	∞
	E	∞	∞	∞	∞	∞	7	7	7
56	A	∞	∞	∞	∞	∞	∞	7	7
	B	∞	∞	∞	∞	∞	∞	∞	∞
	C	∞	∞	∞	∞	∞	∞	∞	∞
	D	∞	∞	∞	∞	∞	7	7	7
	E	∞	∞	∞	∞	∞	∞	∞	∞
75	A	∞	∞	∞	∞	∞	∞	∞	∞
	B	∞	∞	∞	∞	∞	∞	∞	∞
	C	∞	∞	∞	∞	∞	∞	∞	∞
	D	∞	∞	∞	∞	∞	∞	∞	∞
	E	∞	∞	∞	∞	∞	∞	∞	∞
100	A	∞	∞	∞	∞	∞	∞	∞	∞
	B	∞	∞	∞	∞	∞	∞	∞	∞
	C	∞	∞	∞	∞	∞	∞	∞	∞
	D	∞	∞	∞	∞	∞	∞	∞	∞
	E	∞	∞	∞	∞	∞	∞	∞	∞

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4782/Walnut R Test Dates 6/19/12 - 6/26/12
Over Temperature (Celsius)

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: Tech:	Wt. of pan + larvae(g)/ Date weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 121	0.9291 6/22/12 RC	0.9353 6/22/12 RC	0.0062	8	0.775	6) 1.033
	B 122	0.9287	0.9334	0.0047	8	0.588	5) 0.940
	C 123	0.9282	0.9331	0.0049	8	0.613	7) 0.700
	D 124	0.9277	0.9328	0.0051	8	0.638	6) 0.850
	E 125	0.9237	0.9268	0.0031	8	0.388	7) 0.443
31	A 126	0.9240	0.9306	0.0066	8	0.825	
	B 127	0.9250	0.9319	0.0069	8	0.863	
	C 128	0.9257	0.9317	0.0060	8	0.750	
	D 129	0.9264	0.9341	0.0077	8	0.963	
	E 130	0.9245	0.9324	0.0079	8	0.988	
42	A 131	0.9251	0.9329	0.0078	8	0.975	
	B 132	0.9284	0.9351	0.0067	8	0.838	
	C 133	0.9287	0.9344	0.0057	8	0.713	
	D 134	0.9270	0.9350	0.0080	8	1.000	
	E 135	0.9284	0.9342	0.0058	8	0.725	
56	A 136	0.9275	0.9343	0.0068	8	0.850 0.50 Avg 0.912	
	B 137	0.9284	0.9355	0.0071	8	0.888	
	C 138	0.9468	0.9547	0.0079	8	0.988	
	D 139	0.9466	0.9532	0.0066	8	0.825	
	E 140	0.9458	0.9539	0.0081	8	1.013	
75	A 141	0.9439	0.9509	0.0070	8	0.875	
	B 142	0.9421	0.9491	0.0070	8	0.875	
	C 143	0.9412	0.9495	0.0083	8	0.1038	
	D 144	0.9392	0.9473	0.0081	8	1.013	
	E 145	0.9372	0.9448	0.0076	8	0.950	
100	A 146	0.9285	0.9312	0.0084	8	1.050	
	B 147	0.9435	0.9504	0.0069	8	0.863	
	C 148	0.9441	0.9514	0.0073	8	0.913	
	D 149	0.9284	0.9362	0.0078	8	0.975	
	E 150	0.9314	0.9394	0.0080	8	1.000	

* Test acceptance of control weight based on surviving larvae at end of test.
Calculated by: AW 6/29/12 Calculations checked by: J. Hong 6/29/12

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4782 Test started: Date 6/12/15 Time 1615
 Client Walnut Ridge Test ended: Date 6/12/15 Time 1135
 Organism P. promelas

Day/# water used	03338	1	2	3341	3342	5	6	7	8
Concentration: Control MH									
pH	8.1	7.4 / 8.0	7.5 / 8.0	7.4 / 8.0	7.3 / 7.8	7.3 / 7.8	7.5 / 8.0	7.5 / 8.0	
DO (mg/l)	7.9	6.6 / 8.1	6.0 / 8.0	6.7 / 8.1	7.3 / 8.1	6.8 / 8.2	6.7 / 8.2	6.9 / 8.1	
Cond (umhos/cm)	335	356	343	333	339	342	337		
Alkalinity (mg/L)	60.0			60.0	64.0				
Hardness (mg/L)	100.0			88.0	88.0				
Concentration: 31									
pH	7.9	7.5 / 8.0	7.5 / 8.1	7.7 / 8.2	7.5 / 8.0	7.4 / 7.9	7.5 / 8.0	7.6 / 8.0	
DO (mg/l)	7.9	6.3 / 8.1	5.5 / 8.1	6.1 / 7.9	6.8 / 8.1	6.1 / 8.2	6.5 / 8.2	6.8 / 8.1	
Cond (umhos/cm)	373	383	366	351	380	383	391		
Concentration: 42									
pH	7.7	7.6 / 8.1	7.5 / 8.1	7.7 / 8.2	7.5 / 8.1	7.4 / 8.0	7.6 / 8.0	7.7 / 8.0	
DO (mg/l)	7.9	6.3 / 8.1	5.4 / 8.1	6.1 / 7.9	6.2 / 8.1	6.0 / 8.1	6.3 / 8.2	6.8 / 8.1	
Cond (umhos/cm)	390	388	373	356	389	399	409		
Concentration: 56									
pH	7.7	7.7 / 8.0	7.6 / 8.2	7.7 / 8.1	7.6 / 8.1	7.5 / 8.0	7.7 / 8.0	7.7 / 8.0	
DO (mg/l)	7.9	6.3 / 8.2	5.5 / 8.1	6.2 / 7.9	6.7 / 8.1	5.8 / 8.1	6.4 / 8.2	6.8 / 8.1	
Cond (umhos/cm)	402	405	402	387	407	413	434		
Concentration: 75									
pH	7.7	7.7 / 8.0	7.6 / 8.2	7.8 / 8.1	7.6 / 8.1	7.5 / 8.0	7.7 / 8.1	7.8 / 8.1	
DO (mg/l)	8.7	6.2 / 8.1	5.6 / 8.1	6.1 / 8.0	6.8 / 8.1	5.8 / 8.1	6.2 / 8.2	6.5 / 8.1	
Cond (umhos/cm)	411	421	426	417	421	443	462		
Concentration: 100									
pH	7.5	7.8 / 8.0	7.6 / 8.3	7.8 / 8.2	7.7 / 8.1	7.5 / 8.0	7.7 / 8.1	7.9 / 8.1	
DO (mg/l)	9.1	6.0 / 8.1	5.5 / 8.1	6.0 / 8.0	6.4 / 8.1	5.8 / 8.1	6.1 / 8.2	6.3 / 8.1	
Cond (umhos/cm)	441	446	452	396	399	495	486		
Tech-prerenewal	RC	6/11/15 RC AH	6/11/15 RC AH	6/11/15 RC EGB	6/11/15 RC EGB	6/11/15 RC EGB	6/11/15 RC EGB		
Tech-postrenewal		EGB	RC	6/11/15 RC EGB	6/11/15 RC EGB	6/11/15 RC EGB	6/11/15 RC EGB		
Hardness (mg/l)	136.0		132.0		148.0				
Alkalinity (mg/l)	116.0		132.0		132.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4782 Date started: 7/10/12 Date ended 7/17/12

Client/Contact WLRD/Walnut Ridge
Address 216 Southwest 4th St Walnut Ridge AR 72476
NPDES# AR0046566
Sample Description 001 Dilution Water MH Reconstituted
Test Temperature (°C) 25+1° Celsius Technicians EGB/AH/LGZ/RC
Test organism age 24h Vendor/ID# BAL/71012

Feeding Times

Day	Technician/Time/Amount (per replicate)		
	AM	NOON	PM
0			<u>Y/1555/0.20ml</u>
1	<u>RC/0815/0.10ml</u>	<u>RC/1200/0.10ml</u>	<u>Y/1651/0.10ml</u>
2	<u>RC/0825/0.10ml</u>	<u>RC/1055/0.10ml</u>	<u>RC/1605/0.10ml</u>
3	<u>RC/0830/0.10ml</u>	<u>AH/1135/0.10ml</u>	<u>Y/1345/0.10ml</u>
4	<u>Y/0955/0.20ml</u>	<u>AH/1205/0.20ml</u>	
5		<u>AH/1205/0.20ml</u>	<u>AH/1520/0.20ml</u>
6	<u>RC/0810/0.10ml</u>	<u>RC/1115/0.10ml</u>	<u>Y/1515/0.10ml</u>

Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU
pH Meter: Model Orion 230A+ Serial #015253
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

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>10.7/126.7% / AH</u>	0. <u>Y/20/8.2/97.6% / AH</u>	NA	0. <u>NA</u>
1. <u>9.6/112.9% / AH</u>	1. <u>Y/20/8.3/97.6% / AH</u>		1. _____
2. <u>9.8/117.1% / RC</u>	2. <u>Y/20/8.1/96.6% / RC</u>		2. _____
3. <u>9.5/117.4% / AH</u>	3. <u>Y/20/8.3/98.5% / AH</u>		3. _____
4. <u>9.9/116.5% / AH</u>	4. <u>Y/20/8.6/99.4%</u>		4. _____
5. <u>9.0/103.4% / AH</u>	5. <u>Y/20/8.6/98.9% / AH</u>		5. _____
6. <u>10.2/120.8% / AH</u>	6. <u>Y/20/8.4/97.3% / AH</u>		6. _____

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <u><0.01 / AH</u>	1. <u>NO / AH</u>	1. <u>0.25 / AH</u>	1. <u>C5814 7/10/12</u>
2. <u><0.01 / RC</u>	2. <u>NO / RC</u>	2. <u>0.5 / RC</u>	2. <u>C5838 7/12/12</u>
3. <u><0.01 / AH</u>	3. <u>NO / AH</u>	3. <u>0.25 / AH</u>	3. <u>C5844 7/14/12</u>

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4782 Test started: Date 7/10/02 Time 1550
 Client Walnut Ridge Test ended: Date 7/17/02 Time 0925
 Technician: Day0 AM/AM 1 RC 2 RC 3 AM 4 AM 5 AM 6 AM 7 RC
 Time: Day0 500 1 1135 2 1135 3 1035 4 1225 5 1510 6 1045 7 0925
 Temperature Day0 25.2 1 25.1 2 24.6 3 25.2 4 25 5 25.3 6 25.0 7 24.9

Conc.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
31	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
42	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
56	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
75	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
100	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project# / Client: X4782 / Walnut Ridge Test Dates: 7/10/12 - 7/17/12
 Oven Temperature (° Celsius): 105°C EBS 7/18/12

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: Tech:	Wt. of pan + larvae(g)/ Date weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 126	0.9345 7/10/12 SBJ	0.9404 7/18/12 SBJ	0.0059	8	0.738	
	B 127	0.9365	0.9412	0.0047	8	0.588	
	C 128	0.9404	0.9454	0.0050	8	0.625	
	D 129	0.9433	0.9487	0.0054	8	0.675	
	E 130	0.9431	0.9484	0.0053	8	0.663	
31	A 131	0.9474	0.9521	0.0047	8	0.588	
	B 132	0.9492	0.9536	0.0044	8	0.550	
	C 133	0.9535	0.9584	0.0049	8	0.613	
	D 134	0.9543	0.9586	0.0043	8	0.538	
	E 135	0.9540	0.9588	0.0048	8	0.600	
42	A 136	0.9516	0.9563	0.0047	8	0.588	
	B 137	0.9492	0.9538	0.0046	8	0.575	
	C 138	0.9471	0.9517	0.0046	8	0.575	
	D 139	0.9454	0.9507	0.0053	8	0.663	
	E 140	0.9474	0.9520	0.0046	8	0.575	
56	A 141	0.9481	0.9528	0.0047	8	0.588	
	B 142	0.9508	0.9558	0.0050	8	0.625	
	C 143	0.9518	0.9561	0.0043	8	0.538	
	D 144	0.9507	0.9560	0.0053	8	0.663	
	E 145	0.9484	0.9539	0.0055	8	0.688	
75	A 146	0.9485	0.9538	0.0053	8	0.663	
	B 147	0.9472	0.9526	0.0054	8	0.675	
	C 148	0.9462	0.9513	0.0051	8	0.638	
	D 149	0.9457	0.9502	0.0045	8	0.563	
	E 150	0.9434	0.9490	0.0056	8	0.700	
100	A 151	0.9402	0.9451	0.0049	8	0.613	
	B 152	0.9384	0.9435	0.0051	8	0.638	
	C 153	0.9373	0.9419	0.0046	8	0.575	
	D 154	0.9378	0.9432	0.0054	8	0.675	
	E 155	0.9399	0.9459	0.0060	8	0.750	

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

Calculated by: PH 7/18/12 Calculations checked by: SBJ 7/18/12

Project# X4782
 Client Walnut Ridge
 Organism P. promelas

Test started: Date 7/11/12 Time 1550
 Test ended: Date 7/11/12 Time 0905

Day/# water used	1	2	3	4	5	6	7	8
Concentration: Control <u>3351</u> <u>3350</u> <u>3351</u> <u>3352</u> <u>3353</u>								
pH	8.1	8.1	8.2	8.1	7.8	8.2	8.2	7.5
DO (mg/l)	8.1	8.1	8.3	8.7	8.6	8.3	8.3	6.1
Cond (umhos/cm)	328	339	335	340	349	349	326	
Alkalinity (mg/L)	60.0						56.0	
Hardness (mg/L)	100.0						100.0	
Concentration: <u>31</u>								
pH	8.3	8.1	8.3	8.2	8.2	8.3	8.2	7.5
DO (mg/l)	8.1	8.2	8.2	8.5	8.5	8.3	8.3	6.3
Cond (umhos/cm)	397	410	409	423	427	418	401	
Concentration: <u>42</u>								
pH	8.3	8.1	8.3	8.2	8.2	8.3	8.3	7.7
DO (mg/l)	8.1	8.2	8.2	8.5	8.5	8.3	8.3	6.2
Cond (umhos/cm)	421	433	432	449	452	441	425	
Concentration: <u>56</u>								
pH	8.3	8.1	8.3	8.3	8.2	8.3	8.3	7.8
DO (mg/l)	8.1	8.2	8.2	8.4	8.5	8.4	8.3	6.3
Cond (umhos/cm)	449	464	465	484	486	472	459	
Concentration: <u>75</u>								
pH	8.3	8.1	8.4	8.3	8.2	8.3	8.3	7.8
DO (mg/l)	8.1	8.2	8.1	8.4	8.5	8.4	8.3	6.2
Cond (umhos/cm)	495	508	519	533	529	513	507	
Concentration: <u>100</u>								
pH	8.3	8.2	8.4	8.3	8.3	8.2	8.2	8.0
DO (mg/l)	8.1	8.2	8.0	8.2	8.5	8.4	8.3	6.3
Cond (umhos/cm)	557	569	589	607	574	568	572	
Tech-prerenewal	AH	RC	RC	AH	AH	AH	RC	
Tech-postrenewal		RC	AH	AH	AH	AH		
Hardness (mg/l)	200.0		204.0		200.0			
Alkalinity (mg/l)	168.0		148.0		156.0			

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 6/19/2012 Test ID: X4782CD Sample ID: AR0046566 NPDES 001
 End Date: 6/25/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 6/18/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
31	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100 UV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	1.0000	1.0000	0	10	10	10		
31	1.0000	1.0000	0	10	10	10	1.0000	0.0500
42	1.0000	1.0000	0	10	10	10	1.0000	0.0500
56	1.0000	1.0000	0	10	10	10	1.0000	0.0500
75	0.9000	0.9000	1	9	10	10	0.5000	0.0500
100	1.0000	1.0000	0	10	10	10	1.0000	0.0500
100 UV	0.9000	0.9000	1	9	10	10	0.5000	0.0500

Hypothesis Test (1-tail, 0.05)

Fisher's Exact Test indicates no significant differences
 Treatments vs D-Control

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 6/19/2012 Test ID: X4782CD Sample ID: AR0046566 NPDES 001
 End Date: 6/25/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 6/18/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	25.000	29.000	28.000	24.000	20.000	23.000	22.000	24.000	23.000	28.000
31	27.000	30.000	29.000	27.000	25.000	30.000	32.000	28.000	31.000	35.000
42	28.000	23.000	33.000	30.000	30.000	29.000	33.000	27.000	27.000	27.000
56	25.000	25.000	27.000	21.000	32.000	27.000	25.000	28.000	24.000	25.000
75	32.000	23.000	24.000	26.000	29.000	32.000	25.000	30.000	20.000	
100	29.000	29.000	19.000	20.000	24.000	24.000	27.000	27.000	24.000	23.000
100 UV	29.000	27.000	23.000	26.000	22.000	26.000	19.000	26.000	27.000	

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%			Critical	MSD
D-Control	24.600	1.0000	24.600	20.000	29.000	11.844	10			
31	29.400	1.1951	29.400	25.000	35.000	9.780	10	-3.335	2.462	3.543
42	28.700	1.1667	28.700	23.000	33.000	10.524	10	-2.849	2.462	3.543
56	25.900	1.0528	25.900	21.000	32.000	11.138	10	-0.903	2.462	3.543
75	26.778	1.0885	26.778	20.000	32.000	15.709	9	-1.473	2.462	3.640
100	24.600	1.0000	24.600	19.000	29.000	13.977	10	0.000	2.462	3.543
100 UV	25.000	1.0163	25.000	19.000	29.000	12.329	9	-0.271	2.462	3.640

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.76858	0.895	-0.0606	-0.5061		
Bartlett's Test indicates equal variances (p = 0.91)	2.05346	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates no significant differences Treatments vs D-Control	3.64013	0.14797	38.1682	10.3566	0.00345	6, 61

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 6/19/2012 Test ID: X4782CD Sample ID: AR0046566 NPDES 001
 End Date: 6/25/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 6/18/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	25.000	29.000	28.000	24.000	20.000	23.000	22.000	24.000	23.000	28.000
31	27.000	30.000	29.000	27.000	25.000	30.000	32.000	28.000	31.000	35.000
42	28.000	23.000	33.000	30.000	30.000	29.000	33.000	27.000	27.000	27.000
56	25.000	25.000	27.000	21.000	32.000	27.000	25.000	28.000	24.000	25.000
75	32.000	23.000	24.000	26.000	29.000	0.000	32.000	25.000	30.000	20.000
100	29.000	29.000	19.000	20.000	24.000	24.000	27.000	27.000	24.000	23.000
100 UV	29.000	27.000	23.000	26.000	22.000	26.000	19.000	26.000	0.000	27.000

Conc-%	Transform: Untransformed							Rank Sum	1-Tailed Critical
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	24.600	1.0000	24.600	20.000	29.000	11.844	10		
31	29.400	1.1951	29.400	25.000	35.000	9.780	10	143.00	74.00
42	28.700	1.1667	28.700	23.000	33.000	10.524	10	136.50	74.00
56	25.900	1.0528	25.900	21.000	32.000	11.138	10	119.00	74.00
75	24.100	0.9797	24.100	0.000	32.000	38.799	10	116.50	74.00
100	24.600	1.0000	24.600	19.000	29.000	13.977	10	106.50	74.00
100 UV	22.500	0.9146	22.500	0.000	29.000	37.435	10	104.00	74.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.44625	0.895	-2.5448	10.552
Bartlett's Test indicates unequal variances (p = 9.94E-06)	33.1202	16.8119		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 6/19/2012 Test ID: X4782CD Sample ID: AR0046566 NPDES 001
 End Date: 6/25/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 6/18/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	25.000	29.000	28.000	24.000	20.000	23.000	22.000	24.000	23.000	28.000
31	27.000	30.000	29.000	27.000	25.000	30.000	32.000	28.000	31.000	35.000
42	28.000	23.000	33.000	30.000	30.000	29.000	33.000	27.000	27.000	27.000
56	25.000	25.000	27.000	21.000	32.000	27.000	25.000	28.000	24.000	25.000
75	32.000	23.000	24.000	26.000	29.000	0.000	32.000	25.000	30.000	20.000
100	29.000	29.000	19.000	20.000	24.000	24.000	27.000	27.000	24.000	23.000
100 UV	29.000	27.000	23.000	26.000	22.000	26.000	19.000	26.000	0.000	27.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%	Critical			MSD	
D-Control	24.600	1.0000	24.600	20.000	29.000	11.844	10				
31	29.400	1.1951	29.400	25.000	35.000	9.780	10	-1.986	2.347	5.672	
42	28.700	1.1667	28.700	23.000	33.000	10.524	10	-1.697	2.347	5.672	
56	25.900	1.0528	25.900	21.000	32.000	11.138	10	-0.538	2.347	5.672	
75	24.100	0.9797	24.100	0.000	32.000	38.799	10	0.207	2.347	5.672	
100	24.600	1.0000	24.600	19.000	29.000	13.977	10	0.000	2.347	5.672	
100 UV	22.500	0.9146	22.500	0.000	29.000	37.435	10	0.869	2.347	5.672	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.44625	0.895	-2.5448	10.552		
Bartlett's Test indicates unequal variances (p = 9.94E-06)	33.1202	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs D-Control	5.67213	0.23057	63.2476	29.2	0.05805	6, 63

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 7/10/2012 Test ID: X4782PP Sample ID: 1
 End Date: 7/17/2012 Lab ID: ADEQ 880630 Sample Type: EFF1-POTW
 Sample Date: 7/10/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
31	1.0000	1.0000	1.0000	0.8750	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Transform: Arcsin Square Root							Rank Sum	1-Tailed Critical
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
31	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
42	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05) Equality of variance cannot be confirmed	0.41613	0.927	-3.8705	19.8512
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 7/10/2012 Test ID: X4782PP Sample ID: 1
 End Date: 7/17/2012 Lab ID: ADEQ 880630 Sample Type: EFF1-POTW
 Sample Date: 7/10/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

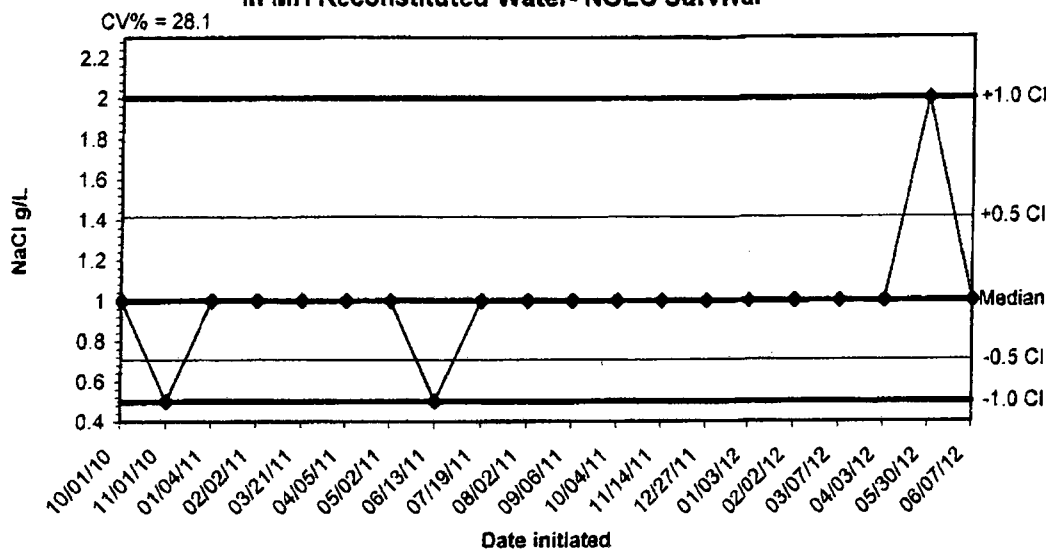
Conc-%	1	2	3	4	5
D-Control	0.7375	0.5875	0.6250	0.6750	0.6625
31	0.5875	0.5500	0.6125	0.5375	0.6000
42	0.5875	0.5750	0.5750	0.6625	0.5750
56	0.5875	0.6250	0.5375	0.6625	0.6875
75	0.6625	0.6750	0.6375	0.5625	0.7000
100	0.6125	0.6375	0.5750	0.6750	0.7500
O-SN	0.7375	0.5875	0.6250	0.6750	0.6625

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%			Critical	MSD
D-Control	0.6575	1.0000	0.6575	0.5875	0.7375	8.566	5			
31	0.5775	0.8783	0.5775	0.5375	0.6125	5.603	5	2.389	2.409	0.0807
42	0.5950	0.9049	0.5950	0.5750	0.6625	6.407	5	1.866	2.409	0.0807
56	0.6200	0.9430	0.6200	0.5375	0.6875	9.627	5	1.120	2.409	0.0807
75	0.6475	0.9848	0.6475	0.5625	0.7000	8.122	5	0.299	2.409	0.0807
100	0.6500	0.9886	0.6500	0.5750	0.7500	10.266	5	0.224	2.409	0.0807
O-SN	0.6575	1.0000	0.6575	0.5875	0.7375	8.566	5	0.000	2.409	0.0807

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97087	0.934	0.11678	-0.4899		
Bartlett's Test indicates equal variances ($p = 0.86$)	2.58118	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs D-Control	0.08066	0.12267	0.00525	0.0028	0.12121	6, 28

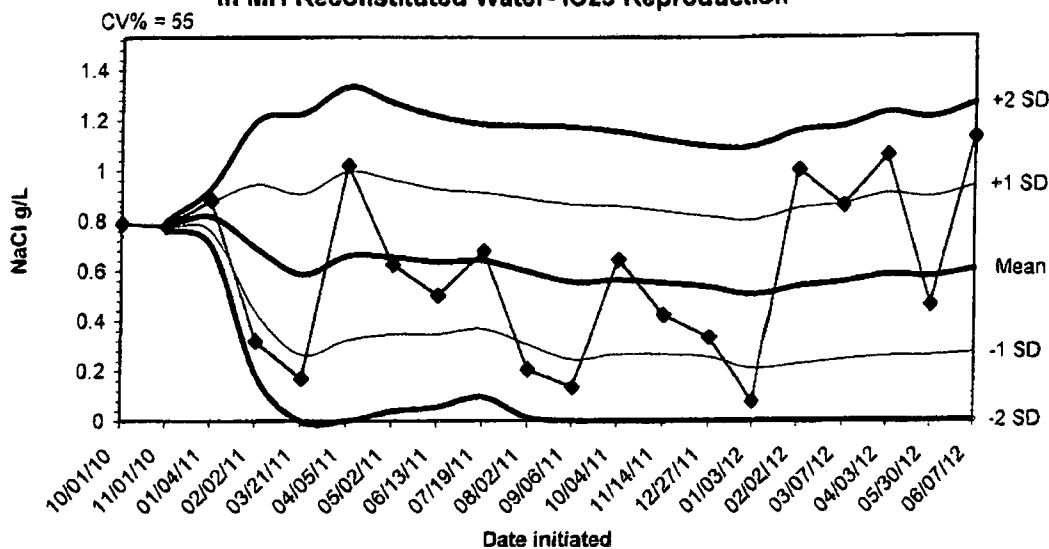
APPENDIX D
QUALITY ASSURANCE CHARTS

**2012 Chronic Reference Toxicant Test Results for Ceriodaphnia dubia
in MH Reconstituted Water- NOEC Survival**



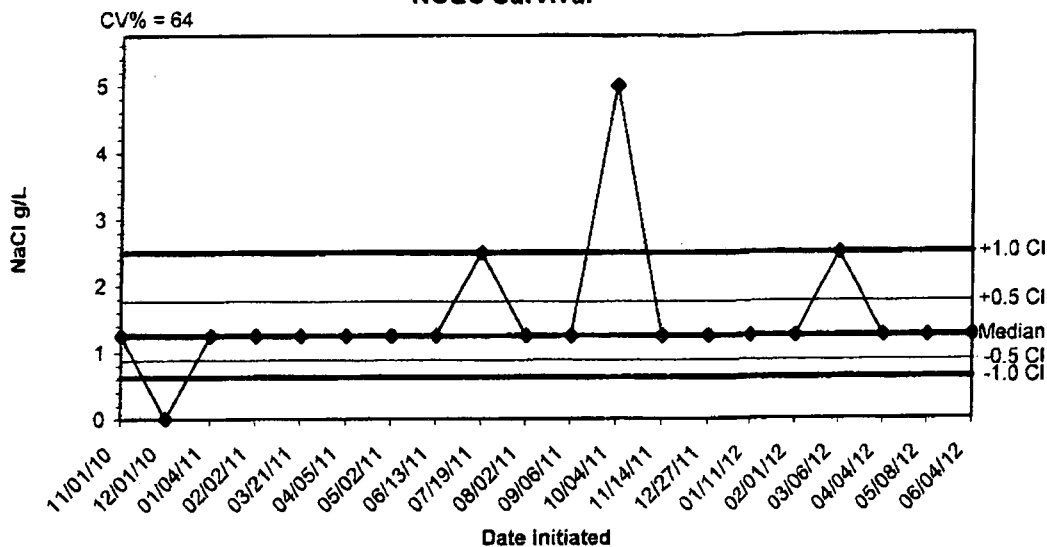
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
10/01/10	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
11/01/10	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
01/04/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
02/02/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
03/21/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/05/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/02/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/13/11	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
07/19/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
08/02/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
09/06/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
10/04/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
11/14/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
12/27/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
01/03/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
02/02/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
03/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/03/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/30/12	2.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000

**2012 Chronic Reference Toxicant Test Results for Ceriodaphnia dubia
in MH Reconstituted Water- IC25 Reproduction**



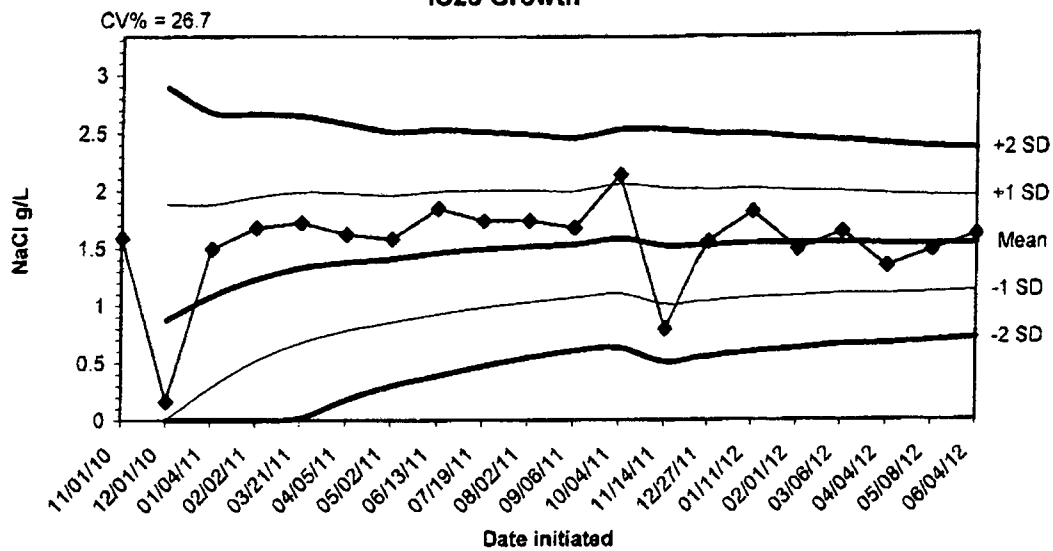
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/01/10	0.7892					
11/01/10	0.7769	0.7831	0.7744	0.7657	0.7917	0.8004
01/04/11	0.8824	0.8162	0.7585	0.7008	0.8739	0.9315
02/02/11	0.3177	0.6916	0.4379	0.1843	0.9452	1.1988
03/21/11	0.1689	0.5870	0.2663	0.0000	0.9078	1.2285
04/05/11	1.0200	0.6592	0.3222	0.0000	0.9962	1.3331
05/02/11	0.6250	0.6543	0.3464	0.0385	0.9622	1.2701
06/13/11	0.5000	0.6350	0.3448	0.0546	0.9252	1.2155
07/19/11	0.6792	0.6399	0.3680	0.0962	0.9118	1.1837
08/02/11	0.2051	0.5964	0.3056	0.0147	0.8873	1.1782
09/06/11	0.1350	0.5545	0.2454	0.0000	0.8635	1.1726
10/04/11	0.6438	0.5619	0.2661	0.0000	0.8577	1.1535
11/14/11	0.4229	0.5512	0.2654	0.0000	0.8370	1.1229
12/27/11	0.3333	0.5357	0.2550	0.0000	0.8164	1.0971
01/03/12	0.0756	0.5050	0.2096	0.0000	0.8004	1.0959
02/02/12	1.0012	0.5360	0.2248	0.0000	0.8472	1.1584
03/07/12	0.8586	0.5550	0.2437	0.0000	0.8663	1.1776
04/03/12	1.0600	0.5830	0.2584	0.0000	0.9077	1.2323
05/30/12	0.4622	0.5767	0.2600	0.0000	0.8934	1.2101
06/07/12	1.1306	0.6044	0.2722	0.0000	0.9366	1.2688

**2012 Chronic Reference Toxicant Test Results for Pimephales promelas
NOEC Survival**



Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
11/01/10	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
12/01/10	0.0000	1.2500	0.8839	0.6250	1.7678	2.5000
01/04/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
02/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
03/21/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
04/05/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
05/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
06/13/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
07/19/11	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
08/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
09/06/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
10/04/11	5.0000	1.2500	0.8839	0.6250	1.7678	2.5000
11/14/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
12/27/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
01/11/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
02/01/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
03/06/12	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
04/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
05/08/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
06/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000

**2012 Chronic Reference Toxicant Test Results for Pimephales promelas-
IC25 Growth**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/01/10	1.5900					
12/01/10	0.1645	0.8773	0.0000	0.0000	1.8852	2.8932
01/04/11	1.4953	1.0833	0.2862	0.0000	1.8803	2.6774
02/02/11	1.6800	1.2325	0.5165	0.0000	1.9484	2.6643
03/21/11	1.7200	1.3300	0.6727	0.0155	1.9872	2.6445
04/05/11	1.6200	1.3783	0.7786	0.1790	1.9780	2.5776
05/02/11	1.5800	1.4071	0.8544	0.3017	1.9598	2.5125
06/13/11	1.8500	1.4625	0.9273	0.3922	1.9976	2.5327
07/19/11	1.7400	1.4933	0.9843	0.4752	2.0024	2.5114
08/02/11	1.7400	1.5180	1.0318	0.5455	2.0042	2.4904
09/06/11	1.6800	1.5327	1.0689	0.6050	1.9966	2.4604
10/04/11	2.1400	1.5833	1.1076	0.6318	2.0591	2.5348
11/14/11	0.7959	1.5227	1.0176	0.5125	2.0279	2.5330
12/27/11	1.5600	1.5254	1.0400	0.5546	2.0108	2.4963
01/11/12	1.8182	1.5449	1.0711	0.5973	2.0188	2.4926
02/01/12	1.4900	1.5415	1.0835	0.6255	1.9995	2.4574
03/06/12	1.6400	1.5473	1.1032	0.6591	1.9914	2.4354
04/04/12	1.3400	1.5358	1.1022	0.6686	1.9694	2.4029
05/08/12	1.4800	1.5328	1.1113	0.6897	1.9544	2.3760
06/04/12	1.6119	1.5368	1.1261	0.7154	1.9475	2.3582

APPENDIX E
AGENCY FORMS

**SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING**

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected From	0900	6/17/12 To	0900	6/18/12
Composite 2 Collected From	0900	6/19/12 To	0900	6/20/12
Composite 3 Collected From	0900	6/21/12 To	0900	6/22/12
Test initiated:	1610 am/pm		6/19/12	date
Test terminated:	1205 am/pm		6/25/12	date
Dilution water used:	Receiving	X	Reconstituted	

PERCENT SURVIVAL

Time of Reading	Percent Effluent					
	0	31	42	56	75	100
24h	100	100	100	100	100	100
48h	100	100	100	100	100	100
End of test	100	100	100	100	90	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	31	42	56	75	100
A	25	27	28	25	32	29
B	29	30	23	25	23	29
C	28	29	33	27	24	19
D	24	27	30	21	26	20
E	20	25	30	32	29	24
F	23	30	29	27	D	24
G	22	32	33	25	32	27
H	24	28	27	28	25	27
I	23	31	27	24	30	24
J	28	35	27	25	20	23
Surv. Mean	24.6	29.4	28.7	25.9	26.8	24.6
Total Mean	24.6	29.4	28.7	25.9	24.1	24.6
CV%*	11.84	9.78	10.52	11.14	15.71	13.98

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

PMSD = 23.1%

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) 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%):	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% effluent
b) NOEC reproduction:	100% 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 Walnut Ridge
NPDES No.: AR0046566
Contact: John Kopp
Analyst: Briggs, Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 6/18/12 Time: 0900
Sample No. 2 Collected: Date: 6/20/12 Time: 0900
Sample No. 3 Collected: Date: 6/22/12 Time: 0900
Test Begin: Date: 6/19/12 Time: 1610
Test End: Date: 6/25/12 Time: 1205

Dilution: 0									Dilution: 56								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.2	8.2	8.1	8.3	8.3	8.2			DO Initial	7.9	7.7	7.6	8.0	7.8	7.8		
DO Final	8.1	8.0	7.8	8.1	8.2				DO Final	8.2	8.1	7.9	8.1	8.1			
pH Initial	8.1	8.0	8.0	7.9	8.0	8.0			pH Initial	8.1	8.0	8.0	7.9	8.1	8.1		
pH Final	8.0	8.0	8.0	7.8	7.8				pH Final	8.0	8.2	8.1	8.1	8.0			
Alkalinity	60.0		60.0	64.0					Alkalinity								
Hardness	100.0		88.0	88.0					Hardness								
Conductivity	356	343	333	339	342				Conductivity	405	402	387	407	413			
Chlorine	<.01		<.01	<.01					Chlorine								
Dilution: 31									Dilution: 75								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.1	8.1	7.8	8.1	8.0	8.2			DO Initial	7.8	7.6	7.5	7.8	7.8	7.6		
DO Final	8.1	8.1	7.9	8.1	8.2				DO Final	8.1	8.1	8.0	8.1	8.1			
pH Initial	8.1	8.0	8.1	8.0	8.1	8.1			pH Initial	8.1	8.0	8.1	8.1	8.1	8.1		
pH Final	8.0	8.1	8.2	8.0	7.9				pH Final	8.0	8.2	8.1	8.1	8.0			
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	383	366	351	380	383				Conductivity	421	426	417	421	443			
Chlorine									Chlorine								
Dilution: 42									Dilution: 100								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5			Temp (C)	24.6	25.3	24.8	24.8	24.4	24.5		
DO Initial	8.0	7.7	7.6	8.0	7.9	8.0			DO Initial	7.7	7.6	7.5	7.8	7.8	7.5		
DO Final	8.1	8.1	7.9	8.2	8.1				DO Final	8.1	8.1	8.0	8.1	8.1			
pH Initial	8.1	8.0	8.0	8.0	8.1	8.1			pH Initial	8.1	8.1	8.1	8.1	8.1	8.1		
pH Final	8.1	8.1	8.2	8.1	8.0				pH Final	8.0	8.3	8.2	8.1	8.0			
Alkalinity									Alkalinity	116.0	132.0		132.0				
Hardness									Hardness	136.0	132.0		148.0				
Conductivity	388	373	356	389	399				Conductivity	446	452	396	399	495			
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected from:	0900	6/17/12 To	0900	6/18/12
Composite 2 Collected from:	0900	6/19/12 To	0900	6/20/12
Composite 3 Collected from:	0900	6/21/12 To	0900	6/22/12

Test initiated: 1615 am/pm 6/19/12 date
 Test terminated: 1135 am/pm 6/26/12 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	75.0	62.5	87.5	75.0	87.5	100	100	77.5	
31	100	100	100	100	100	100	100	100	
42	100	75.0	87.5	100	87.5	100	100	90.0	
56	87.5	100	100	87.5	100	100	100	97.5	
75	100	100	100	100	100	100	100	100	
100	100	100	100	100	100	100	100	100	

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		

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

NOTE: TEST INVALID, CONTROL SURVIVAL <80%

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

Permittee: City of Walnut Ridge

NPDES No.: AR0046566

	Time	Date	Time	Date
Composite 1 Collected from:	0900	7/08/12 To	0900	7/09/12
Composite 2 Collected from:	0900	7/10/12 To	0900	7/11/12
Composite 3 Collected from:	0900	7/12/12 To	0900	7/13/12

Test initiated:	1550	am/pm	7/10/12	date
Test terminated:	0925	am/pm	7/17/12	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	100	100	100	100	100	100	100	100	0.00
31	100	100	100	100	87.5	100	100	97.5	6.06
42	100	100	100	100	100	100	100	100	0.00
56	100	100	100	100	100	100	100	100	0.00
75	100	100	100	100	100	100	100	100	0.00
100	100	100	100	100	100	100	100	100	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		
0	0.738	0.588	0.625	0.675	0.663	0.658	8.57
31	0.588	0.550	0.613	0.538	0.600	0.578	5.60
42	0.588	0.575	0.575	10.663	0.575	0.595	6.41
56	0.588	0.625	0.538	0.663	0.688	0.620	9.63
75	0.663	0.675	0.638	0.563	0.700	0.648	8.12
100	0.613	0.638	0.575	0.675	0.750	0.650	10.27

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

PMSD: 12.27%

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) 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%) | 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 #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 |

NOTE: THIS IS A RETEST FOR AN INVALID TEST CONDUCTED IN JUNE 2012

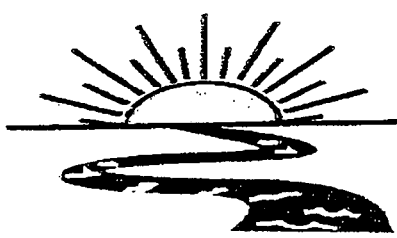
Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: City of Walnut Ridge
NPDES No.: AR0046566
Contact: John Kopp
Analyst: Haughton, Zeigler, Callahan

Sample No. 1 Collected: Date: 7/9/12 Time: 0900
Sample No. 2 Collected: Date: 7/11/12 Time: 0900
Sample No. 3 Collected: Date: 7/13/12 Time: 0900
Test Begin: Date: 7/10/12 Time: 1550
Test End: Date: 7/17/12 Time: 0925

Dilution: 0 Day:									Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.8	6.6	7.5	7.7	7.4	6.9	6.1		DO Initial	6.8	6.4	7.3	7.6	7.2	6.7	6.3	
DO Final	8.1	8.3	8.7	8.6	8.3	8.3			DO Final	8.2	8.2	8.4	8.5	8.4	8.3		
pH Initial	7.5	7.7	7.8	7.8	7.8	7.9	7.5		pH Initial	8.0	7.9	8.0	8.1	8.1	7.9	7.8	
pH Final	8.1	8.2	8.1	8.1	8.2	8.2			pH Final	8.1	8.3	8.3	8.2	8.3	8.3		
Alkalinity	60.0					56.0			Alkalinity								
Hardness	100.0					100.0			Hardness								
Conductivity	339	335	340	349	349	326			Conductivity	464	465	484	486	472	459		
Chlorine	<.01					<.01			Chlorine								
Dilution: 31 Day:									Dilution: 75 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.9	6.3	7.4	7.7	7.4	6.8	6.3		DO Initial	6.7	6.5	7.3	7.6	7.1	6.6	6.2	
DO Final	8.2	8.2	8.5	8.5	8.3	8.3			DO Final	8.2	8.1	8.4	8.5	8.4	8.3		
pH Initial	7.7	7.8	7.8	8.0	8.0	7.8	7.5		pH Initial	8.1	8.0	8.1	8.2	8.1	7.9	7.8	
pH Final	8.1	8.3	8.2	8.2	8.3	8.2			pH Final	8.1	8.4	8.3	8.2	8.3	8.3		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	410	409	423	427	418	401			Conductivity	508	519	533	529	513	507		
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)	25.1	24.6	25.2	25.0	25.3	25.0	24.9		Temp (C)	24.1	24.6	25.2	25.0	25.3	25.0	24.9	
DO Initial	6.9	6.5	7.4	7.6	7.3	6.8	6.2		DO Initial	6.8	6.3	7.3	7.6	7.1	6.6	6.3	
DO Final	8.2	8.2	8.5	8.5	8.3	8.3			DO Final	8.2	8.0	8.2	8.5	8.4	8.3		
pH Initial	7.9	7.9	8.0	8.1	8.1	7.8	7.7		pH Initial	8.3	8.1	8.1	8.3	8.2	8.0	8.0	
pH Final	8.1	8.3	8.2	8.2	8.3	8.3			pH Final	8.2	8.4	8.3	8.3	8.2	8.2		
Alkalinity									Alkalinity	168.0	148.0		156.0				
Hardness									Hardness	200.0	204.0		200.0				
Conductivity	433	432	449	453	441	425			Conductivity	569	589	607	574	568	572		
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
1-800-259-1248
Fax: (318) 745-2773

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: Walnut Ridge

Project#: X4782

Chain of Custody Documents Checked by: AH 7/18/12
Technician/Date

Raw Data Documents Checked by: AH 7/18/12
Technician/Date

Statistical Analysis Package Checked by: EOB 7/23/12
Quality Manager/Date

Quality Control Data Checked by: EOB 7/23/12
Quality Manager/Date

Report Checked by: EOB 7/23/12
Quality Manager/Date

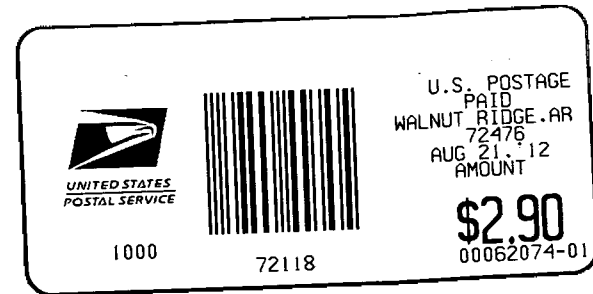
I certify that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained in this document, to the best of my knowledge, is true, accurate and complete.

Erin J. Brugg, BS
Quality Manager

7/24/12
Date

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

Cww
216 S.W. 4th
Walnut Ridge, AR 72476



ADEQ
NPDES Enforcement
5301 Northshore Drive
North Little Rock, AR 72118