

September 23, 2014

Test Results of  
Third Quarter  
Chronic 7-Day Renewal  
Biomonitoring Testing  
for  
Outfall 001

Control No. 182410-1

Prepared for:

Mr. Paul Abernathy  
Searcy Water and Sewer System  
Post Office Box 1319  
Searcy, AR 72145

Prepared by:

AMERICAN INTERPLEX CORPORATION  
8600 Kanis Road  
Little Rock, AR 72204-2322



September 23, 2014  
Control No. 182410-1  
Page 2 of 31

Searcy Water and Sewer System  
ATTN: Mr. Paul Abernathy  
Post Office Box 1319  
Searcy, AR 72145

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*  
Outfall 001  
NPDES Permit No. AR0021601 AFIN# 73-00055

Dear Mr. Paul Abernathy:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the laboratory director or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1000.0 Chronic *Pimephales promelas* (Fathead minnow) Survival and Growth Test: The No Observable Effects Concentration (NOEC) for survival occurred at 25 % effluent, which is above the critical dilution of 19 %. The NOEC for growth occurred at 25 % effluent, which is above the critical dilution of 19 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 25 % effluent, which is above the critical dilution of 19 %. The NOEC for reproduction occurred at 25 % effluent, which is above the critical dilution of 19 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey  
Laboratory Director

PDF cc: Searcy Water and Sewer System  
ATTN: Mr. Paul Abernathy  
pabernathy1@hotmail.com

Searcy Water and Sewer System  
ATTN: Mr. Dan Dawson  
d.dawson@cablelynx.com

Table of Contents

I. Control Acceptance Criteria

II. Outlined Report

III. Data Analysis

IV. Standard Reference Toxicants

V. Chemical Analysis/Quality Control

VI. Organism History

VII. Results Summary

*Pimephales promelas* (Fathead minnow)

*Ceriodaphnia dubia*

Appendix A: Raw Data

A1: Test 1000.0

*Pimephales promelas* (Fathead minnow) Survival and Growth

Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

A2: Statistics

A3: Water Chemistry

A4: Reference Toxicant

Appendix B: Chains of Custody

I. Control Acceptance Criteria

*Pimephales promelas* (Fathead minnow) Method 1000.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	95.0	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.282	PASS
Control Growth CV < or = 40%	5.90	PASS
Growth Minimum Significant Difference 12 to 30%	16.4	PASS
Critical Dilution CV < or = 40%	10.0	PASS

*Ceriodaphnia dubia* Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	90.0	PASS
Control Reproduction > or = 15 per Surviving Female	29.7	PASS
Control CV < or = 40% per Surviving Female	12.8	PASS
Reproduction Minimum Significant Difference 13 to 47%	13.1	PASS
Critical Dilution CV < or = 40%	12.0	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0021601 AFIN# 73-00055
2. Test Requirements: Chronic Biomonitoring, Quarterly  
Test Methods 1000.0 and 1002.0
3. Receiving Stream: Little Red River

B. Source of Effluent/Dilution Water

1. Effluent Samples:

- a. Sampling Point: Outfall 001
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.1	8.2	8.2
pH (standard units)	7.4	7.3	7.4
Alkalinity (mg/l as CaCO <sub>3</sub> )	68	78	63
Hardness (mg/l as CaCO <sub>3</sub> )	46	46	39
Conductivity (umhos/cm)	370	390	400
Residual Chlorine (mg/l)	<0.05	0.050	<0.05
Ammonia as N (mg/l)	0.85	1.9	0.17

2. Dilution Water Samples: Synthetic Soft Water #4135

- a. Dates Prepared: August 28 through September 11, 2014
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.0	7.9	8.2
pH (standard units)	7.5	7.6	7.7
Alkalinity (mg/l as CaCO <sub>3</sub> )	33	33	33
Hardness (mg/l as CaCO <sub>3</sub> )	45	47	45
Conductivity (umhos/cm)	150	150	160
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Methods 1000.0 and 1002.0, Fathead Minnow Survival and Growth and *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

*Pimephales promelas* (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: September 10, 2014 at 1330  
Date & Time Test Terminated: September 17, 2014 at 1515  
Type & Volume of Test Chamber: 500 ml disposable beaker  
Volume of Sample: 250 ml  
Number of Organisms per replicate: 8  
Number of Replicates per dilution: 5

*Ceriodaphnia dubia* Survival and Growth Method 1002.0

Date & Time Test Initiated: September 10, 2014 at 1140  
Date & Time Test Terminated: September 17, 2014 at 1305  
Type & Volume of Test Chamber: 30 ml disposable beaker  
Volume of Sample: 15 ml  
Number of Organisms per replicate: 1  
Number of Replicates per dilution: 10

4. Acclimation of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

- a. Test 1000.0 *Pimephales promelas*
- b. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat.

*Pimephales promelas* (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

*Ceriodaphnia dubia* survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

American Interplex Corporation has an ongoing test organism culturing program. The sensitivity of the offspring is determined by performing a standard reference toxicant test with each effluent test. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

*Pimephales promelas* (Fathead minnow)

Chronic reference tests are performed monthly.

A chronic reference test was performed on August 20, 2014 at 1600 to August 27, 2014 at 1545

The results were as follows: (Control No. 181923-1.)

Survival LC-50: 4944 mg/l

Growth IC-25: 3826 mg/l

Growth PMSD: 11.6

*Ceriodaphnia dubia*

Chronic reference tests are performed monthly.

A chronic reference test was performed on August 20, 2014 at 1600 to August 27, 2014 at 1520

The results were as follows: (Control No. 181923-2.)

Survival LC-50: 2019 mg/l

Growth IC-25: 1587 mg/l

Growth PMSD: 14.4

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	96.0	2.23
pH	SM 4500-H+ B	100	0.135
Conductivity	EPA 120.1	107	6.90

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: September 10, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

*Ceriodaphnia dubia*

Date: September 10, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

VII. Results Summary *Pimephales promelas*, Fathead minnow Larval Survival and Growth Test -- Method 1000.0

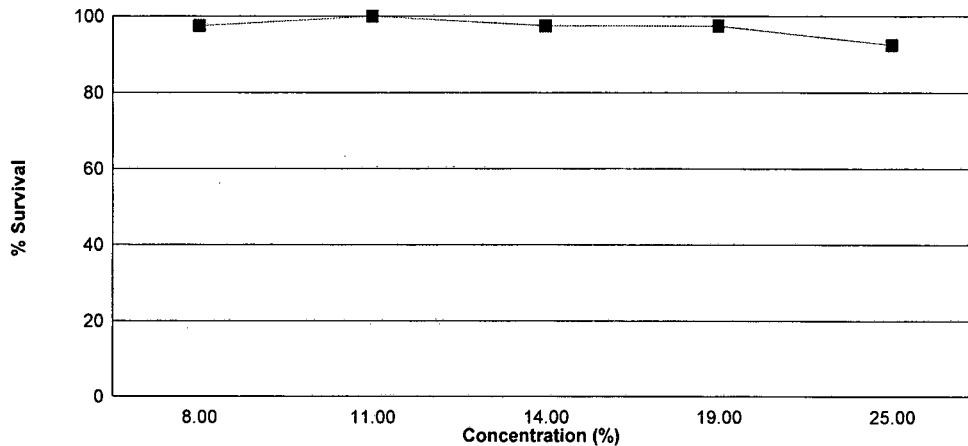
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 8 %, 11 %, 14 %, 19 %, 25 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 19 % effluent.

The test was initiated on September 10, 2014 at 1330 and continued through September 17, 2014 at 1515. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 25 % effluent
- b.) NOEC growth = 25 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	95.0	0.268
8 %	97.5	0.250
11 %	100	0.241
14 %	97.5	0.237
19 %	97.5	0.275
25 %	92.5	0.276

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

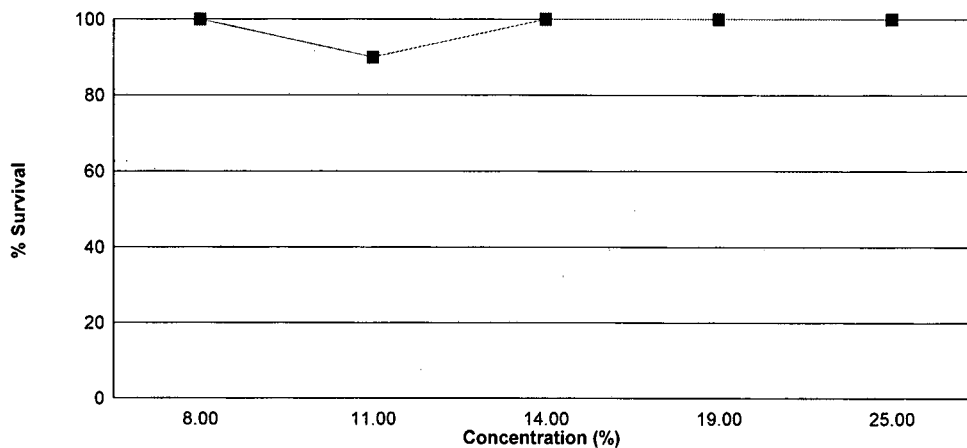
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 8 %, 11 %, 14 %, 19 %, 25 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 19 % effluent.

The test was initiated on September 10, 2014 at 1140 and continued through September 17, 2014 at 1305. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 25 % effluent
- b.) NOEC reproduction = 25 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	90.0	27.0
8 %	100	30.4
11 %	90.0	28.2
14 %	100	31.7
19 %	100	32.8
25 %	100	29.5



Appendix A1: Test 1000.0

*Pimephales promelas* (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: September 10, 2014 at 1330

Date and Time Test Terminated: September 17, 2014 at 1515

Concentration Replicate		Number of Survivors						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	6
	E	8	8	8	8	8	8	8
8 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
11 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
14 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	7	7	7	7	7	7	7
19 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	7	7	7	7
	E	8	8	8	8	8	8	8
25 %	A	8	8	8	8	8	8	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	6

Appendix A1: Test 1000.0

*Pimephales promelas* (Fathead Minnow) 7-Day Growth

Test Initiated: September 10, 2014 at 1330  
Test Terminated: September 17, 2014 at 1515

Drying Started: September 15, 2014 at 1030  
Drying Ended: September 17, 2014 at 1200

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.94998	.95230	0.00232	8	0.290
	B	.94807	.95028	0.00221	8	0.276
	C	.95094	.95307	0.00213	8	0.266
	D	.95269	.95467	0.00198	8	0.248
	E	.95318	.95527	0.00209	8	0.261
8 %	A	.95578	.95792	0.00214	8	0.268
	B	.95498	.95682	0.00184	8	0.230
	C	.95219	.95411	0.00192	8	0.240
	D	.95240	.95461	0.00221	8	0.276
	E	.94949	.95139	0.00190	8	0.238
11 %	A	.94691	.94888	0.00197	8	0.246
	B	.94983	.95179	0.00196	8	0.245
	C	.94924	.95129	0.00205	8	0.256
	D	.95099	.95300	0.00201	8	0.251
	E	.95565	.95729	0.00164	8	0.205
14 %	A	.95416	.95609	0.00193	8	0.241
	B	.95543	.95740	0.00197	8	0.246
	C	.95569	.95736	0.00167	8	0.209
	D	.95231	.95398	0.00167	8	0.209
	E	.95434	.95660	0.00226	8	0.282
19 %	A	.95857	.96058	0.00201	8	0.251
	B	.96435	.96649	0.00214	8	0.268
	C	.96186	.96444	0.00258	8	0.322
	D	.95915	.96123	0.00208	8	0.260
	E	.95842	.96063	0.00221	8	0.276
25 %	A	.95145	.95324	0.00179	8	0.224
	B	.94895	.95164	0.00269	8	0.336
	C	.95067	.95269	0.00202	8	0.252
	D	.94759	.95016	0.00257	8	0.321
	E	.95121	.95318	0.00197	8	0.246

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: September 10, 2014 at 1140  
Date and Time Test Terminated: September 17, 2014 at 1305

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	4	0	0	0	0	0	0	0	3	0	7	10	0.700
4	4	0	4	4	3	4	4	4	X	4	31	9	3.44	
5	11	10	11	9	12	13	12	13	X	12	103	9	11.4	
6	10	11	0	0	0	0	0	0	X	0	21	9	2.33	
7	0	0	14	13	14	17	15	17	X	18	108	9	12.0	
8														
TOTAL	25	25	29	26	29	34	31	34	3	34	270	10	27.0	

Concentration: 8 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	4	0	0	0	0	0	0	0	4	0	8	10	0.800
4	4	0	4	4	4	4	4	3	0	4	31	10	3.10	
5	11	12	11	9	12	13	12	13	12	13	118	10	11.8	
6	0	14	0	0	0	0	0	0	0	0	14	10	1.40	
7	13	0	12	17	13	16	15	16	16	15	133	10	13.3	
8														
TOTAL	28	30	27	30	29	33	31	32	32	32	304	10	30.4	

Concentration: 11 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	3	0	0	0	0	0	0	0	3	0	6	10	0.600
4	4	0	2X	4	4	4	3	4	0	3	28	9	3.11	
5	12	11	X	12	11	16	15	14	13	15	119	9	13.2	
6	11	13	X	0	0	0	0	0	0	0	24	9	2.67	
7	0	0	X	14	15	17	14	15	14	16	105	9	11.7	
8														
TOTAL	27	27	2	30	30	37	32	33	30	34	282	10	28.2	

## Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: September 10, 2014 at 1140

Date and Time Test Terminated: September 17, 2014 at 1305

Concentration: 14 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	4	0	0	0	0	0	0	0	3	0	7	10	0.700
4	4	0	4	4	3	3	3	3	0	4	28	10	2.80	
5	13	12	12	12	13	15	13	14	14	15	133	10	13.3	
6	0	14	0	0	0	0	0	0	0	0	14	10	1.40	
7	14	0	15	15	16	15	16	14	13	17	135	10	13.5	
8														
TOTAL	31	30	31	31	32	33	32	31	30	36	317	10	31.7	

Concentration: 19 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	3	0	0	0	0	0	0	4	0	7	10	0.700	
4	3	0	3	3	4	4	3	3	0	4	27	10	2.70	
5	13	12	16	12	17	16	12	12	13	14	137	10	13.7	
6	12	16	0	0	0	2	0	0	0	0	30	10	3.00	
7	0	0	17	16	17	18	14	16	14	15	127	10	12.7	
8														
TOTAL	28	31	36	31	38	40	29	31	31	33	328	10	32.8	

Concentration: 25 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
3	0	4	0	0	0	0	0	0	0	3	7	10	0.700	
4	3	0	3	3	3	3	4	3	0	4	26	10	2.60	
5	12	13	12	14	14	12	13	13	12	13	128	10	12.8	
6	1	0	0	0	0	0	0	0	0	0	1	10	0.100	
7	0	15	16	10	17	15	10	15	18	17	133	10	13.3	
8														
TOTAL	16	32	31	27	34	30	27	31	33	34	295	10	29.5	

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Survival

Transformation of Data			Transform: Arc Sin(Square Root(Y))	
Group	Identification	Rep	Value	Transformed
1	Control	1	1.00000	1.39310
1	Control	2	1.00000	1.39310
1	Control	3	1.00000	1.39310
1	Control	4	0.75000	1.04720
1	Control	5	1.00000	1.39310
2	8 %	1	1.00000	1.39310
2	8 %	2	1.00000	1.39310
2	8 %	3	0.87500	1.20940
2	8 %	4	1.00000	1.39310
2	8 %	5	1.00000	1.39310
3	11 %	1	1.00000	1.39310
3	11 %	2	1.00000	1.39310
3	11 %	3	1.00000	1.39310
3	11 %	4	1.00000	1.39310
3	11 %	5	1.00000	1.39310
4	14 %	1	1.00000	1.39310
4	14 %	2	1.00000	1.39310
4	14 %	3	1.00000	1.39310
4	14 %	4	1.00000	1.39310
4	14 %	5	0.87500	1.20940
5	19 %	1	1.00000	1.39310
5	19 %	2	1.00000	1.39310
5	19 %	3	1.00000	1.39310
5	19 %	4	0.87500	1.20940
5	19 %	5	1.00000	1.39310
6	25 %	1	0.87500	1.20940
6	25 %	2	1.00000	1.39310
6	25 %	3	1.00000	1.39310
6	25 %	4	1.00000	1.39310
6	25 %	5	0.75000	1.04720

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
<p>D = 0.274 W = 0.7793 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data FAIL normality test (alpha = 0.01).</p>		

Steel's Many-One Rank Test		Transform: Arc Sin(Square Root(Y))			
Ho: Control < Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	8 %	28.00	16.00	5.00	
3	11 %	30.00	16.00	5.00	
4	14 %	28.00	16.00	5.00	
5	19 %	28.00	16.00	5.00	
6	25 %	25.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 0.02086 W = 0.97 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 6.433 Critical B = 15.086 (alpha = 0.01, df = 5)</p> <p>Data PASS B1 homogeneity test at 0.01 level.</p>	

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	0.007543	0.001509	1.736	
Within (Error)	24	0.02086	0.0008692		
Total	29	0.0284			
Critical F = 3.9 (alpha = 0.01, df = 5,24)					
2.62 (alpha = 0.05, df = 5,24)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation
Ho: Control < Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	0.2682	0.2682		
2	8 %	0.2504	0.2504	0.9546	
3	11 %	0.2406	0.2406	1.48	
4	14 %	0.2374	0.2374	1.652	
5	19 %	0.2754	0.2754	-0.3861	
6	25 %	0.2758	0.2758	-0.4076	
Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)					

Dunnett's Test - Table 2 of 2					No Transformation
Ho: Control < Treatment					
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control
1	Control	5			
2	8 %	5	0.044	16.4	0.0178
3	11 %	5	0.044	16.4	0.0276
4	14 %	5	0.044	16.4	0.0308
5	19 %	5	0.044	16.4	-0.0072
6	25 %	5	0.044	16.4	-0.0076



Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test			
Identification	Dead	Alive	Total Animals
Control	1	9	10
8 %	0	10	10
Total	1	19	20

Critical Fisher's value (10,10,1) (alpha=0.05) is negative. b value is 0. NO SIGNIFICANT DIFFERENCE.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	9	1	10
11 %	9	1	10
Total	18	2	20

Critical Fisher's value (10,10,9) (alpha=0.05) is 4. b value is 9. Since b is greater than 4 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Dead	Alive	Total Animals
Control	1	9	10
14 %	0	10	10
Total	1	19	20

Critical Fisher's value (10,10,1) (alpha=0.05) is negative. b value is 0. NO SIGNIFICANT DIFFERENCE.

Fisher's Exact Test			
Identification	Dead	Alive	Total Animals
Control	1	9	10
19 %	0	10	10
Total	1	19	20

Critical Fisher's value (10,10,1) (alpha=0.05) is negative. b value is 0. NO SIGNIFICANT DIFFERENCE.

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test			
Identification	Dead	Alive	Total Animals
Control	1	9	10
25 %	0	10	10
Total	1	19	20

Critical Fisher's value (10,10,1) ( $\alpha=0.05$ ) is negative. b value is 0. NO SIGNIFICANT DIFFERENCE.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	1	
1	8 %	10	0	
2	11 %	10	1	
3	14 %	10	0	
4	19 %	10	0	
5	25 %	10	0	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Kolmogorov Test for Normality	No Transformation
<p>D = 0.2372 D* = 1.861 Critical D* = 1.035                      (alpha = 0.01, N = 60)</p> <p>Data FAIL normality test (alpha = 0.01).</p>	

Steel's Many-One Rank Test					No Transformation
Ho: Control < Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	8 %	114.50	75.00	10.00	
3	11 %	113.50	75.00	10.00	
4	14 %	124.00	75.00	10.00	
5	19 %	127.00	75.00	10.00	
6	25 %	114.00	75.00	10.00	

Critical values are 1 tailed (k=5)

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Dunnett's Test for PMSD Calculation (excluding deaths if applicable)

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	78.67	15.73	1.237	
Within (Error)	52	661.5	12.72		
Total	57	740.2			
Critical F = 3.39 (alpha = 0.01, df = 5,52)					
2.39 (alpha = 0.05, df = 5,52)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation
Ho: Control < Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	29.667	29.667		
2	8 %	30.4	30.4	-0.4473	
3	11 %	31.111	31.111	-0.8589	
4	14 %	31.7	31.7	-1.241	
5	19 %	32.8	32.8	-1.912	
6	25 %	29.5	29.5	0.1019	
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,52)					
WARNING - Unequal replicate sizes. Critical values assuming equal replicate sizes have been used.					

Dunnett's Test - Table 2 of 2					No Transformation	
Ho: Control < Treatment						
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control	
1	Control	9				
2	8 %	10	3.785	12.8	-0.733	
3	11 %	9	3.884	13.1	-1.444	
4	14 %	10	3.785	12.8	-2.033	
5	19 %	10	3.785	12.8	-3.133	
6	25 %	10	3.785	12.8	0.167	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: September 10, 2014 at 0852

Date and Time Test Terminated: September 17, 2014 at 1515

Effluent Conc.: Control	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	8.0	7.7	7.9	8.0	8.2	7.9	8.2
	Final *1	7.4	7.6	8.6	8.4	8.4	8.5	7.3
	Final *2	8.4	8.0	8.5	8.2	8.3	9.0	8.5
pH, units	Initial	7.5	7.4	7.6	7.9	7.7	7.8	7.6
	Final *1	7.3	7.6	7.7	7.4	7.5	7.4	7.2
	Final *2	7.7	7.9	8.3	8.1	7.7	7.9	7.5
Alkalinity, mg CaCO <sub>3</sub> /l	33	NA	33	NA	33	NA	NA	
Hardness, mg CaCO <sub>3</sub> /l	45	NA	47	NA	45	NA	NA	
Conductivity, umhos/cm	150	150	150	160	160	190	150	
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	

Effluent Conc.: 8 %	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.8	7.8	7.9	8.0	8.1	7.9	7.8
	Final *1	7.4	7.7	8.6	8.1	8.4	8.3	7.4
	Final *2	8.5	8.0	8.3	8.1	8.3	9.2	8.2
pH, units	Initial	7.5	7.4	7.6	7.8	7.8	7.9	7.4
	Final *1	7.4	7.6	7.7	7.4	7.4	7.4	7.3
	Final *2	7.7	8.0	8.3	8.1	7.8	7.9	7.6

Effluent Conc.: 11 %	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.6	7.8	7.9	7.8	7.8	7.9	7.7
	Final *1	7.5	7.7	8.6	8.3	8.3	8.5	7.5
	Final *2	8.4	8.0	8.4	8.2	8.1	8.8	8.4
pH, units	Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
	Final *1	7.4	7.6	7.8	7.4	7.5	7.4	7.3
	Final *2	7.7	8.0	8.2	8.1	7.8	7.8	7.6

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: September 10, 2014 at 0852

Date and Time Test Terminated: September 17, 2014 at 1515

Effluent Conc.: 14 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.9	7.8	8.0	8.0	8.0	7.9	7.8
	Final *1	7.5	7.6	8.5	8.3	8.3	8.4	7.5
	Final *2	8.3	8.0	8.4	8.1	8.3	9.2	8.4
pH, units	Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
	Final *1	7.4	7.6	7.7	7.4	7.5	7.4	7.3
	Final *2	7.7	8.0	8.2	8.1	7.8	7.9	7.6

Effluent Conc.: 19 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.8	8.2	8.0	8.2	7.8	7.2
	Final *1	7.6	7.6	8.6	8.3	8.3	8.4	7.5
	Final *2	8.2	8.0	8.4	8.2	8.0	9.0	8.6
pH, units	Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
	Final *1	7.4	7.6	7.8	7.4	7.6	7.5	7.3
	Final *2	7.7	8.0	8.1	8.1	7.8	7.9	7.6
Alkalinity, mg CaCO <sub>3</sub> /l		43	NA	45	NA	50	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		43	NA	46	NA	44	NA	NA
Conductivity, umhos/cm		190	190	200	210	200	250	210
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 25 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.7	8.2	7.9	8.2	8.2	9.0
	Final *1	7.3	7.6	8.6	8.1	8.3	8.4	7.6
	Final *2	8.2	8.0	8.3	8.1	8.2	9.0	8.4
pH, units	Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.5
	Final *1	7.5	7.6	7.7	7.4	7.5	7.4	7.4
	Final *2	7.8	8.0	8.2	8.1	7.8	7.9	7.6

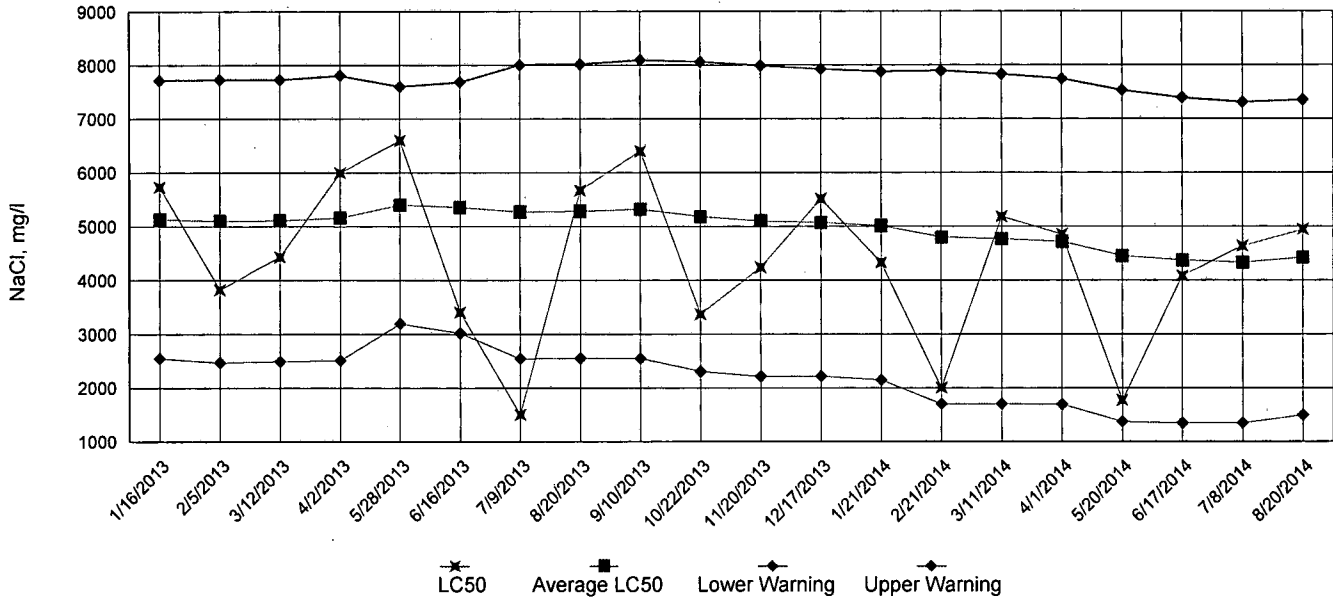
\*1 = data from the *Pimephales promelas* (Fathead Minnow) test

\*2 = data from the *Ceriodaphnia dubia* test

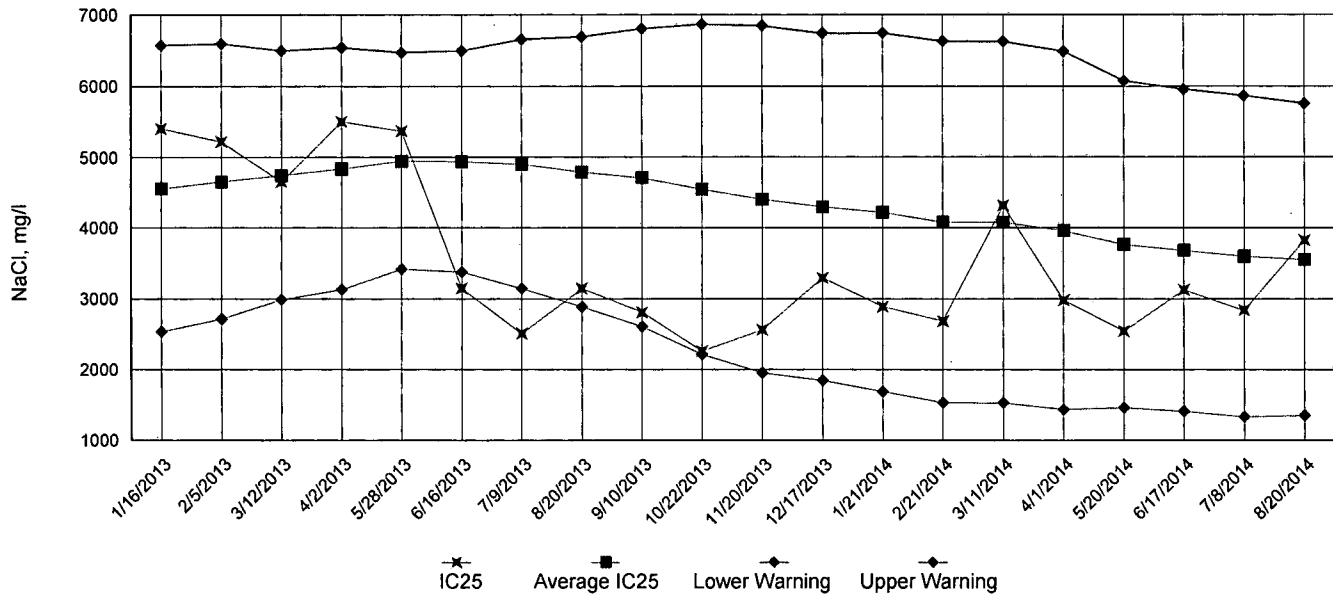
Appendix A4: Test 1000.0

Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



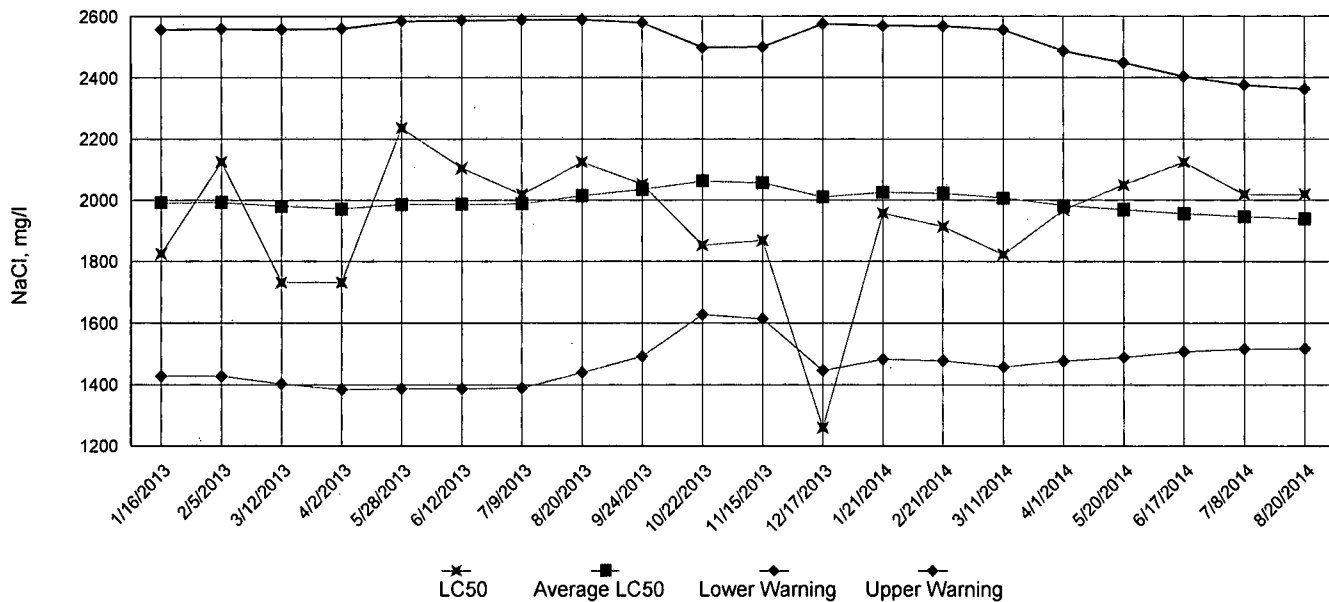
IC25 Growth Data



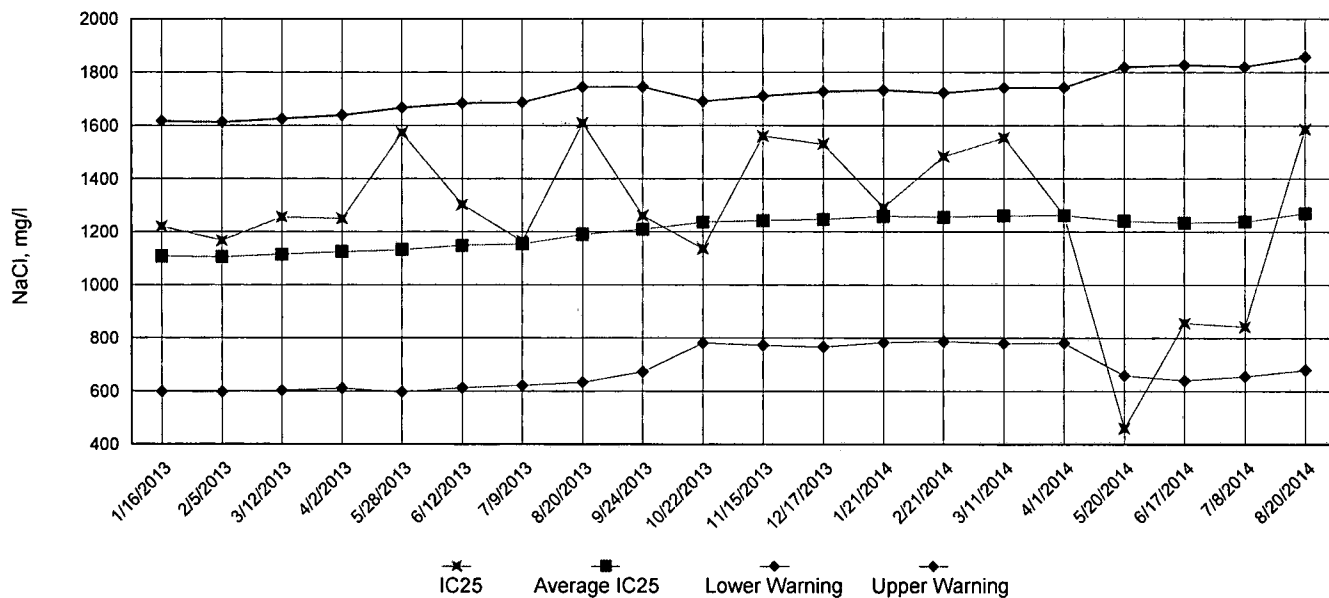


Appendix A4: Test 1002.0  
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1000.0  
SUMMARY REPORTING FORMS  
CHRONIC BIOMONITORING  
*Pimephales promelas* (Fathead Minnow)  
SURVIVAL AND GROWTH

Permittee: Searcy Water and Sewer System

NPDES No.: AR0021601 AFIN# 73-00055

Date and Time Test Initiated: September 10, 2014 at 1330

Date and Time Test Terminated: September 17, 2014 at 1515

Dilution water used: Synthetic Soft Water #4135

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in replicate chambers					Mean percent survival			CV%
	A	B	C	D	E	24 hr	48 hr	7 days	
Control	100	100	100	75.0	100	100	100	95.0	11.8
8 %	100	100	87.5	100	100	100	100	97.5	5.73
11 %	100	100	100	100	100	100	100	100	0.00
14 %	100	100	100	100	87.5	97.5	97.5	97.5	5.73
19 %	100	100	100	87.5	100	100	100	97.5	5.73
25 %	87.5	100	100	100	75.0	100	100	92.5	12.1

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.290	0.276	0.266	0.248	0.261	0.268	5.90
8 %	0.268	0.230	0.240	0.276	0.238	0.25	8.09
11 %	0.246	0.245	0.256	0.251	0.205	0.241	8.47
14 %	0.241	0.246	0.209	0.209	0.282	0.237	12.8
19 %	0.251	0.268	0.322	0.260	0.276	0.275	10.0
25 %	0.224	0.336	0.252	0.321	0.246	0.276	18.0

CV = Coefficient of variation = standard deviation \* 100 / mean

Appendix B: Test 1000.0

SUMMARY REPORTING FORMS  
CHRONIC BIOMONITORING  
Pimephales promelas (Fathead Minnow)  
SURVIVAL AND GROWTH

1. Steel's Many-One Rank Test:

Is the mean survival significantly different ( $p=0.05$ ) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION	(19 %)	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<input type="checkbox"/> YES	<input type="checkbox"/> NO

2. Dunnett's Test:

Is the mean dry weight (growth) significantly different ( $p=0.05$ ) than the control's dry weight (growth) for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION	(19 %)	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<input type="checkbox"/> YES	<input type="checkbox"/> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP6C)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP6C)
5. NOEC Pimephales Lethality: 25 % (TOP6C)
6. LOEC Pimephales Lethality: 25 % (TXP6C)
7. NOEC Pimephales Sublethality: 25 % (TPP6C)
8. LOEC Pimephales Sublethality: 25 % (TYP6C)
9. Coefficient of variation for Pimephales growth: 10 (TQP6C)

Appendix B: Test 1000.0

CHRONIC TOXICITY SUMMARY FORM  
*Pimephales promelas* (Fathead minnow)  
CHEMICAL PARAMETERS CHART

PERMITTEE: Searcy Water and Sewer System SAMPLE No. 1 COLLECTED ending: DATE: September 9, 2014 TIME: 1140  
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: September 11, 2014 TIME: 1145  
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: September 14, 2014 TIME: 1145  
 ANALYST: 280, 304, 307, 310 Test Initiated: DATE: September 10, 2014 TIME: 1330  
 Test Terminated: DATE: September 17, 2014 TIME: 1515

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	8.0	7.7	7.9	8.0	8.2	7.9	8.2
Final	7.4	7.6	8.6	8.4	8.4	8.5	7.3
pH Initial	7.5	7.4	7.6	7.9	7.7	7.8	7.6
Final	7.3	7.6	7.7	7.4	7.5	7.4	7.2
Alkalinity	33	NA	33	NA	33	NA	NA
Hardness	45	NA	47	NA	45	NA	NA
Conductivity	150	150	150	160	160	190	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
8 %							
D.O. Initial	7.8	7.8	7.9	8.0	8.1	7.9	7.8
Final	7.4	7.7	8.6	8.1	8.4	8.3	7.4
pH Initial	7.5	7.4	7.6	7.8	7.8	7.9	7.4
Final	7.4	7.6	7.7	7.4	7.4	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	180	190	180	220	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
11 %							
D.O. Initial	7.6	7.8	7.9	7.8	7.8	7.9	7.7
Final	7.5	7.7	8.6	8.3	8.3	8.5	7.5
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.4	7.6	7.8	7.4	7.5	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	170	180	190	180	220	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
14 %							
D.O. Initial	7.9	7.8	8.0	8.0	8.0	7.9	7.8
Final	7.5	7.6	8.5	8.3	8.3	8.4	7.5
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.4	7.6	7.7	7.4	7.5	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	180	180	190	190	220	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
19 %							
D.O. Initial	8.0	7.8	8.2	8.0	8.2	7.8	7.2
Final	7.6	7.6	8.6	8.3	8.3	8.4	7.5
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.4	7.6	7.8	7.4	7.6	7.5	7.3
Alkalinity	43	NA	45	NA	50	NA	NA
Hardness	43	NA	46	NA	44	NA	NA
Conductivity	190	190	200	210	200	250	210
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
25 %							
D.O. Initial	8.0	7.7	8.2	7.9	8.2	8.2	9.0
Final	7.3	7.6	8.6	8.1	8.3	8.4	7.6
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.5
Final	7.5	7.6	7.7	7.4	7.5	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	200	200	210	220	230	250	220
Chlorine	NA	NA	NA	NA	NA	NA	NA

Appendix B: Test 1002.0  
SUMMARY REPORTING FORMS  
CHRONIC BIOMONITORING  
*Ceriodaphnia dubia*  
SURVIVAL AND REPRODUCTION

Permittee: Searcy Water and Sewer System

NPDES No.: AR0021601 AFIN# 73-00055

Date and Time Test Initiated: September 10, 2014 at 1140

Date and Time Test Terminated: September 17, 2014 at 1305

Dilution water used: Synthetic Soft Water #4135

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		8 %	11 %	14 %	19 %	25 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	90.0	100	90.0	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		8 %	11 %	14 %	19 %	25 %
A	25	28	27	31	28	16
B	25	30	27	30	31	32
C	29	27	2	31	36	31
D	26	30	30	31	31	27
E	29	29	30	32	38	34
F	34	33	37	33	40	30
G	31	31	32	32	29	27
H	34	32	33	31	31	31
I	3	32	30	30	31	33
J	34	32	34	36	33	34
Mean per Adult	27.0	30.4	28.2	31.7	32.8	29.5
Mean per Surviving Adult	29.7	30.4	31.1	31.7	32.8	29.5
CV %	12.8	6.43	10.5	5.57	12.0	18.2

CV = Coefficient of variation = standard deviation \* 100 / mean  
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0  
SUMMARY REPORTING FORMS  
CHRONIC BIOMONITORING  
*Ceriodaphnia dubia*  
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

Is the mean survival significantly different ( $p=0.05$ ) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION	(19 %)	<u>          </u> YES	<u>  X  </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u>          </u> YES	<u>          </u> NO

2. Steel's Many-One Rank Test:

Is the mean number of young produced per female significantly different ( $p=0.05$ ) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION	(19 %)	<u>          </u> YES	<u>  X  </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u>          </u> YES	<u>          </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]:   0   (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]:   0   (TGP3B)
5. NOEC *Ceriodaphnia* Lethality:   25 %   (TOP3B)
6. LOEC *Ceriodaphnia* Lethality:   25 %   (TXP3B)
7. NOEC *Ceriodaphnia* Sublethality:   25 %   (TPP3B)
8. LOEC *Ceriodaphnia* Sublethality:   25 %   (TYP3B)
9. Coefficient of variation for *Ceriodaphnia* Reproduction:   12.8   (TQP3B)

Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM

*Ceriodaphnia dubia*

CHEMICAL PARAMETERS CHART

PERMITTEE: Searcy Water and Sewer System SAMPLE No. 1 COLLECTED ending: DATE: September 9, 2014 TIME: 1140  
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: September 11, 2014 TIME: 1145  
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: September 14, 2014 TIME: 1145  
 ANALYST: 280, 304, 307, 310 Test Initiated: DATE: September 10, 2014 TIME: 1140  
 Test Terminated: DATE: September 17, 2014 TIME: 1305

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.7	7.9	8.0	8.2	7.9	8.2
Final	8.4	8.0	8.5	8.2	8.3	9.0	8.5
pH Initial	7.5	7.4	7.6	7.9	7.7	7.8	7.6
Final	7.7	7.9	8.3	8.1	7.7	7.9	7.5
Alkalinity	33	NA	33	NA	33	NA	NA
Hardness	45	NA	47	NA	45	NA	NA
Conductivity	150	150	150	160	160	190	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 8 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.9	8.0	8.1	7.9	7.8
Final	8.5	8.0	8.3	8.1	8.3	9.2	8.2
pH Initial	7.5	7.4	7.6	7.8	7.8	7.9	7.4
Final	7.7	8.0	8.3	8.1	7.8	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	180	190	180	220	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.9	7.8	7.8	7.9	7.7
Final	8.4	8.0	8.4	8.2	8.1	8.8	8.4
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.7	8.0	8.2	8.1	7.8	7.8	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	170	180	190	180	220	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 14 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	8.0	8.0	8.0	7.9	7.8
Final	8.3	8.0	8.4	8.1	8.3	9.2	8.4
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.7	8.0	8.2	8.1	7.8	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	180	180	190	190	220	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 19 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.8	8.2	8.0	8.2	7.8	7.2
Final	8.2	8.0	8.4	8.2	8.0	9.0	8.6
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.4
Final	7.7	8.0	8.1	8.1	7.8	7.9	7.6
Alkalinity	43	NA	45	NA	50	NA	NA
Hardness	43	NA	46	NA	44	NA	NA
Conductivity	190	190	200	210	200	250	210
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 25 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.7	8.2	7.9	8.2	8.2	9.0
Final	8.2	8.0	8.3	8.1	8.2	9.0	8.4
pH Initial	7.5	7.4	7.5	7.8	7.8	7.9	7.5
Final	7.8	8.0	8.2	8.1	7.8	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	200	200	210	220	230	250	220
Chlorine	NA	NA	NA	NA	NA	NA	NA

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Searcy</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: <u>M0145246 192410</u>		
Project Reference:			MATRIX			WATER SOIL											AIC PROPOSAL NO:	
Project Manager: <u>Paul Abernethy</u>			GRAB	COMP	2		Bio monitoring											Carrier:
Sampled By: <u>Johnny Jacob</u>																Received Temperature C <u>3.6</u>		
AIC No.	Sample Identification	Date/Time Collected																Remarks
	<u>KFF</u>	<u>STOP 9-5-14/11:40am</u>																
		<u>STOP 9-5-14/11:40am</u>																
Container Type																		Field pH calibration
Preservative																		on _____ @ _____ Buffer:
G = Glass		P = Plastic		V = VOA vials		H = HCl to pH2		T = Sodium Thiosulfate										
NO = none		S = Sulfuric acid pH2		N = Nitric acid pH2		B = NaOH to pH12		Z = Zinc acetate										
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS					Relinquished By: <u>JL</u>			Date/Time <u>9-10-14</u> <u>6:00am</u>			Received By: <u>Raj</u>			Date/Time <u>9-10-14</u> <u>6:00am</u>				
Expedited results requested by: _____					Relinquished By: <u>Raj</u>			Date/Time <u>9-10-14</u> <u>8:28am</u>			Received in Lab By: <u>[Signature]</u>			Date/Time <u>9-10-14</u> <u>0828</u>				
Who should AIC contact with questions: Phone: _____ Fax: _____					Comments:													
Report Attention to: Report Address to: <u>Searcy Water Utilities</u> <u>P.O. Box 1319</u> <u>Searcy, AR 72145</u>																		



5 gals  
compare  
of Searey  
with Lab

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Searey</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: <u>182410</u>	
Project Reference:			MATRIX			<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>										AIC PROPOSAL NO:	
Project Manager: <u>Paul White</u>			WATER	SOIL	<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>											Carrier:	
Sampled <u>water</u>															GRA	COMP	<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>
By: <u>JJ</u>			<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>										Remarks				
AIC No.	Sample Identification	Date/Time Collected											<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>				
<u>2</u>	<u>FPP</u>	<u>9-11-14 11:45 AM</u> <u>9-11-14 11:55 AM</u>															
	<u>South Sludge Lab</u>	<u>9-11-14 9:20 AM</u>	<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>										<u>AIC 182522</u>				
	<u>North Sludge Lab</u>	<u>9-11-14 9:05 AM</u>															
Container Type			<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>										Field pH calibration				
Preservative													<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>				
G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate			<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>														
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A = (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> , NH <sub>4</sub> OH													<u>metals + no parameters</u> <u>ICU % solids</u> <u>Biomonitoring</u>				
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS						Relinquished By: <u>Paul White</u>		Date/Time: <u>9-12-14 6:00 AM</u>		Received By: <u>Synn Brewer</u>		Date/Time: <u>9-12-14 6:00 AM</u>					
Expedited results requested by: _____						Relinquished By: <u>Synn Brewer</u>		Date/Time: <u>9-12-14 8:40</u>		Received in Lab By: _____		Date/Time: <u>9-12-14 0840</u>					
Who should AIC contact with questions: _____						Comments:											
Phone: _____ Fax: _____																	
Report Attention to: _____																	
Report Address to: <u>Searey Water Utilities</u> <u>P.O. Box 1319</u> <u>Searey, VA 2245-</u>																	


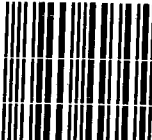
**CHAIN OF CUSTODY / ANALYSIS REQUEST FORM**

Client: <i>Searcy</i>				PO No.	NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: <i>18240</i>								
Project Reference:				MATRIX		Bromination										AIC PROPOSAL NO:								
Project Manager: <i>Paul Abernathy</i>				W												A	S	O	I	L				
Sampled By: <i>Johnny Sander</i>				GRA	COMP											Received Temperature C <i>5.7</i>								
AIC No.	Sample Identification	Date/Time Collected																						Remarks
<i>3</i>	<i>KFF</i>	<i>9-13-14 11:45am</i> <i>9-14-14 4:57pm 11:45pm</i>																						
Container Type																								Field pH calibration
Preservative																								on _____ @ _____ Buffer:
G = Glass     P = Plastic NO = none     S = Sulfuric acid pH2			V = VOA vials N = Nitric acid pH2			H = HCl to pH2 B = NaOH to pH12			T = Sodium Thiosulfate Z = Zinc acetate			A = (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> . NH <sub>4</sub> OH												
Turnaround Time Requested: (Please circle) <i>(NORMAL)</i> or EXPEDITED IN _____ DAYS Expedited results requested by: _____										Relinquished By: <i>[Signature]</i>			Date/Time <i>9-15-14</i> <i>6:00 AM</i>			Received By: <i>[Signature]</i>			Date/Time <i>9-15-14</i> <i>6:00 AM</i>					
Who should AIC contact with questions: Phone: _____ Fax: _____ Report Attention to: Report Address to: <i>Searcy Water Utilities</i> <i>P.O. Box 1319</i> <i>Searcy, AR 72145</i>										Relinquished By: <i>[Signature]</i>			Date/Time <i>9-15-14</i> <i>10:20</i>			Received in Lab By: <i>[Signature]</i>			Date/Time <i>9-15-14</i> <i>1020</i>					
Comments:																								

**CERTIFIED MAIL™**



7010 2780 0002 5135 3343

U.S. POSTAGE  
PAID  
SEARCY, AR  
72143  
OCT 21, 14  
AMOUNT

1000 72118

**\$8.45**  
00011866-08

**SEARCY WATER UTILITIES**

300 NORTH ELM STREET

P.O. BOX 1319

SEARCY, ARKANSAS 72145-1319

NPDES Enforcement Division  
A.D.E.Q.  
5301 Northshore Dr.  
North Little Rock, AR 72118-5317

