

October 22, 2015

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

Control No. 194912-1

Prepared for:

Mr. Paul Abernathy  
Searcy Water and Sewer System  
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Prepared by:

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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 8 % effluent, which is below the critical dilution of 19 %. The NOEC for reproduction occurred at 0 % effluent, which is below the critical dilution of 19 %. **The sample, therefore, FAILED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey  
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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	0.476	PASS
Control Growth CV < or = 40%	8.74	PASS
Growth Minimum Significant Difference 12 to 30%	13.9	PASS
Critical Dilution CV < or = 40%	8.79	PASS

*Ceriodaphnia dubia* Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	19.3	PASS
Control CV < or = 40% per Surviving Female	30.1	PASS
Reproduction Minimum Significant Difference 13 to 47%	25.4	PASS
Critical Dilution CV < or = 40%	0.00	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)	7.6	7.4	8.0
pH (standard units)	7.2	7.0	7.6
Alkalinity (mg/l as CaCO <sub>3</sub> )	30	57	34
Hardness (mg/l as CaCO <sub>3</sub> )	46	42	41
Conductivity (umhos/cm)	370	360	480
Residual Chlorine (mg/l)	0.090	<0.05	<0.05
Ammonia as N (mg/l)	1.4	0.74	0.29

2. Dilution Water Samples: Synthetic Soft Water #4258

- a. Dates Prepared: September 27 through October 11, 2015
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.9	7.9	8.0
pH (standard units)	7.8	7.4	7.5
Alkalinity (mg/l as CaCO <sub>3</sub> )	30	30	30
Hardness (mg/l as CaCO <sub>3</sub> )	41	41	42
Conductivity (umhos/cm)	140	130	130
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: October 7, 2015 at 1410  
Date & Time Test Terminated: October 13, 2015 at 1250  
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: October 7, 2015 at 1200  
Date & Time Test Terminated: October 13, 2015 at 1100  
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 and Bartlett's test. The survival data was then analyzed using Dunnett's 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 Shapiro-Wilk's and Bartlett's test and analyzed with Dunnett's 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 September 1, 2015 at 1630 to September 8, 2015 at 1520

The results were as follows: (Control No. 193794-1.)

Survival LC-50: 4389 mg/l

Growth IC-25: 3757 mg/l

Growth PMSD: 6.75

*Ceriodaphnia dubia*

Chronic reference tests are performed monthly.

A chronic reference test was performed on September 1, 2015 at 1500 to September 8, 2015 at 1500

The results were as follows: (Control No. 193794-2.)

Survival LC-50: 1673 mg/l

Growth IC-25: 912 mg/l

Growth PMSD: 17.7

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	6.15
Hardness	EPA 200.7	98.0	0.769
pH	SM 4500-H+ B	101	0.134
Conductivity	EPA 120.1	96.6	2.09

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: October 7, 2015

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: October 7, 2015

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

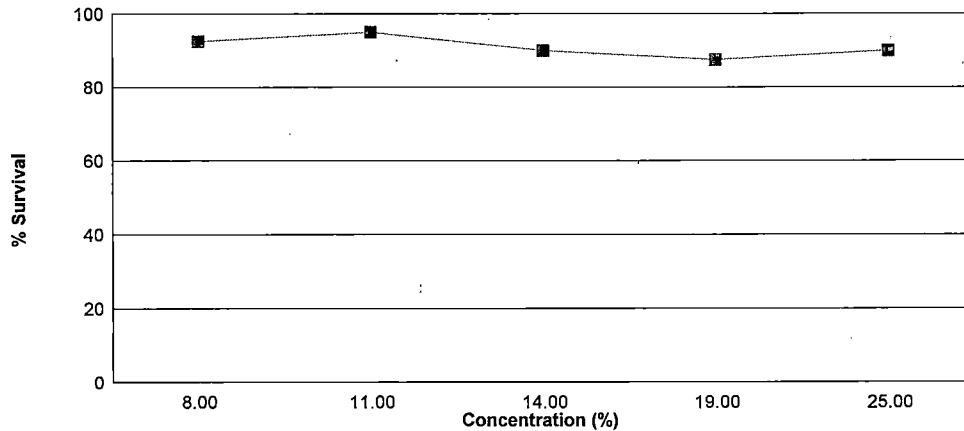
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

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 October 7, 2015 at 1410 and continued through October 13, 2015 at 1250. 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	0.452
8 %	92.5	0.435
11 %	95.0	0.429
14 %	90.0	0.420
19 %	87.5	0.418
25 %	90.0	0.416

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

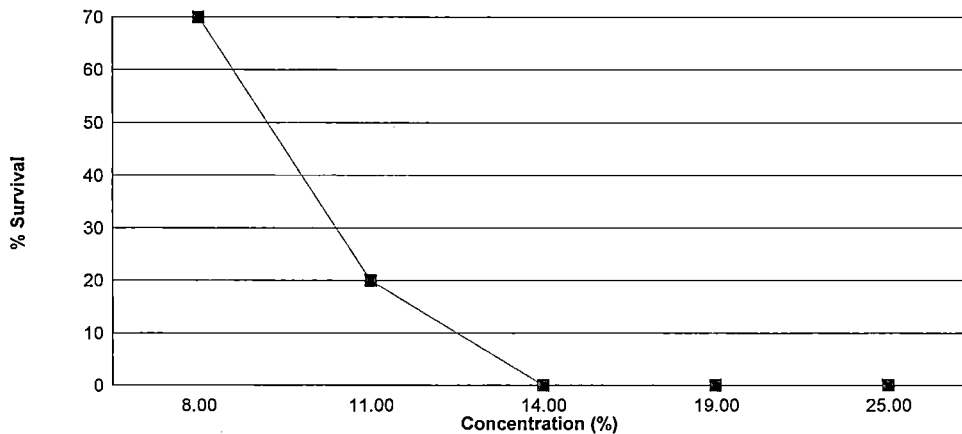
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 October 7, 2015 at 1200 and continued through October 13, 2015 at 1100. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 8 % effluent
- b.) NOEC reproduction = 0 % effluent



Summary of the 6-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	19.3
8 %	70.0 *	9.70 *
11 %	20.0 *	--
14 %	0.00 *	--
19 %	0.00 *	--
25 %	0.00 *	--

\*Significant difference when compared to the control (p=0.05)



## Appendix A1: Test 1000.0

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

Date and Time Test Initiated: October 7, 2015 at 1410

Date and Time Test Terminated: October 13, 2015 at 1250

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	8
	E	8	8	8	8	7	7	6
8 %	A	8	8	8	8	7	7	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	7
	E	8	8	8	8	8	7	7
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	7	7
	E	8	8	8	8	8	7	7
14 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	7	7
	C	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	6
19 %	A	8	8	8	8	8	8	8
	B	8	8	8	7	7	7	7
	C	8	8	8	8	8	8	8
	D	8	8	8	7	7	6	6
	E	8	8	8	8	8	6	6
25 %	A	8	8	8	8	8	7	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	7
	E	8	8	8	8	7	7	6

Appendix A1: Test 1000.0

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

Test Initiated: October 7, 2015 at 1410  
Test Terminated: October 13, 2015 at 1250

Drying Started: October 9, 2015 at 1500  
Drying Ended: October 14, 2015 at 0900

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.94113	.94431	0.00318	8	0.398
	B	.93869	.94275	0.00406	8	0.508
	C	.93949	.94301	0.00352	8	0.440
	D	.94510	.94876	0.00366	8	0.458
	E	.94038	.94401	0.00363	8	0.454
8 %	A	.93816	.94135	0.00319	8	0.399
	B	.93923	.94257	0.00334	8	0.418
	C	.94602	.94968	0.00366	8	0.458
	D	.93873	.94241	0.00368	8	0.460
	E	.93874	.94225	0.00351	8	0.439
11 %	A	.94183	.94517	0.00334	8	0.418
	B	.93471	.93872	0.00401	8	0.501
	C	.94229	.94595	0.00366	8	0.458
	D	.93946	.94224	0.00278	8	0.348
	E	.94357	.94691	0.00334	8	0.418
14 %	A	.94585	.94935	0.00350	8	0.438
	B	.94719	.95060	0.00341	8	0.426
	C	.94075	.94419	0.00344	8	0.430
	D	.94518	.94884	0.00366	8	0.458
	E	.94379	.94656	0.00277	8	0.346
19 %	A	.93971	.94295	0.00324	8	0.405
	B	.94185	.94488	0.00303	8	0.379
	C	.94218	.94554	0.00336	8	0.420
	D	.94392	.94718	0.00326	8	0.408
	E	.94134	.94516	0.00382	8	0.478
25 %	A	.93886	.94175	0.00289	8	0.361
	B	.94211	.94582	0.00371	8	0.464
	C	.94580	.94940	0.00360	8	0.450
	D	.93955	.94294	0.00339	8	0.424
	E	.94474	.94779	0.00305	8	0.381

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: October 7, 2015 at 1200

Date and Time Test Terminated: October 13, 2015 at 1100

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	0	0	0	6	0	0	0	0	0	0	6	10	0.600
4	6	6	0	6	0	4	4	4	3	3	36	10	3.60	
5	6	11	9	10	8	7	9	9	8	10	87	10	8.70	
6	0	8	9	11	12	9	0	8	0	7	64	10	6.40	
7														
8														
TOTAL	12	25	18	27	26	20	13	21	11	20	193	10	19.3	

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	X	X	X	0	7	0.00	
2	0	0	0	0	0	0	0	X	X	X	0	7	0.00	
3	0	0	0	0	0	0	0	X	X	X	0	7	0.00	
4	5	5	4	5	1	5	5	X	X	X	30	7	4.29	
5	0	9	7	8	9	6	8	X	X	X	47	7	6.71	
6	0	0	8	0	12	0	0	X	X	X	20	7	2.86	
7														
8														
TOTAL	5	14	19	13	22	11	13	0	0	0	97	10	9.70	

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	X	0	0	X	X	X	X	X	X	0	3	0.00	
2	0	X	0	X	X	X	X	X	X	X	0	2	0.00	
3	0	X	0	X	X	X	X	X	X	X	0	2	0.00	
4	4	X	4	X	X	X	X	X	X	X	8	2	4.00	
5	7	X	6	X	X	X	X	X	X	X	13	2	6.50	
6	8	X	0	X	X	X	X	X	X	X	8	2	4.00	
7														
8														
TOTAL	19	0	10	0	0	0	0	0	0	0	29	10	2.90	

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: October 7, 2015 at 1200  
Date and Time Test Terminated: October 13, 2015 at 1100

Concentration: 14 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	X	X	X	X	X	X	X	X	X	X	0	0	0.00
2	X	X	X	X	X	X	X	X	X	X	0	0	0.00
3	X	X	X	X	X	X	X	X	X	X	0	0	0.00
4	X	X	X	X	X	X	X	X	X	X	0	0	0.00
5	X	X	X	X	X	X	X	X	X	X	0	0	0.00
6	X	X	X	X	X	X	X	X	X	X	0	0	0.00
7													
8													
TOTAL	0	0	0	0	0	0	0	0	0	0	0	10	0.00

Concentration: 19 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	X	X	X	X	X	X	X	X	X	X	0	0	0.00
2	X	X	X	X	X	X	X	X	X	X	0	0	0.00
3	X	X	X	X	X	X	X	X	X	X	0	0	0.00
4	X	X	X	X	X	X	X	X	X	X	0	0	0.00
5	X	X	X	X	X	X	X	X	X	X	0	0	0.00
6	X	X	X	X	X	X	X	X	X	X	0	0	0.00
7													
8													
TOTAL	0	0	0	0	0	0	0	0	0	0	0	10	0.00

Concentration: 25 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	X	X	X	X	X	X	X	X	X	X	0	0	0.00
2	X	X	X	X	X	X	X	X	X	X	0	0	0.00
3	X	X	X	X	X	X	X	X	X	X	0	0	0.00
4	X	X	X	X	X	X	X	X	X	X	0	0	0.00
5	X	X	X	X	X	X	X	X	X	X	0	0	0.00
6	X	X	X	X	X	X	X	X	X	X	0	0	0.00
7													
8													
TOTAL	0	0	0	0	0	0	0	0	0	0	0	10	0.00

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	1.00000	1.39310
1	Control	5	0.75000	1.04720
2	8 %	1	0.87500	1.20940
2	8 %	2	1.00000	1.39310
2	8 %	3	1.00000	1.39310
2	8 %	4	0.87500	1.20940
2	8 %	5	0.87500	1.20940
3	11 %	1	1.00000	1.39310
3	11 %	2	1.00000	1.39310
3	11 %	3	1.00000	1.39310
3	11 %	4	0.87500	1.20940
3	11 %	5	0.87500	1.20940
4	14 %	1	1.00000	1.39310
4	14 %	2	0.87500	1.20940
4	14 %	3	0.87500	1.20940
4	14 %	4	1.00000	1.39310
4	14 %	5	0.75000	1.04720
5	19 %	1	1.00000	1.39310
5	19 %	2	0.87500	1.20940
5	19 %	3	1.00000	1.39310
5	19 %	4	0.75000	1.04720
5	19 %	5	0.75000	1.04720
6	25 %	1	0.87500	1.20940
6	25 %	2	1.00000	1.39310
6	25 %	3	1.00000	1.39310
6	25 %	4	0.87500	1.20940
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 = 0.4672 W = 0.9308 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	Transform: Arc Sin(Square Root(Y))
<p>Calculated B1 statistic = 1.775 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) Survival

ANOVA Table			Transform: Arc Sin(Square Root(Y))	
SOURCE	DF	SS	MS	F
Between	5	0.04449	0.008898	0.457
Within (Error)	24	0.4672	0.01947	
Total	29	0.5117		
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				Transform: Arc Sin(Square Root(Y))	
Ho:Control<Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	1.3239	0.95		
2	8 %	1.2829	0.925	0.4646	
3	11 %	1.3196	0.95	0.04873	
4	14 %	1.2504	0.9	0.8329	
5	19 %	1.218	0.875	1.2	
6	25 %	1.2504	0.9	0.8329	
Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)					

Dunnett's Test - Table 2 of 2				Transform: Arc Sin(Square Root(Y))	
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	0.1336	14.2	0.025
3	11 %	5	0.1336	14.2	0
4	14 %	5	0.1336	14.2	0.05
5	19 %	5	0.1336	14.2	0.075
6	25 %	5	0.1336	14.2	0.05

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 0.04236 W = 0.9782 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 = 2.178 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	0.00459	0.000918	0.5201	
Within (Error)	24	0.04236	0.001765		
Total	29	0.04695			
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	0.4516	0.4516			
2	8 %	0.4348	0.4348	0.6323		
3	11 %	0.4286	0.4286	0.8656		
4	14 %	0.4196	0.4196	1.204		
5	19 %	0.418	0.418	1.265		
6	25 %	0.416	0.416	1.34		
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	0.06271	13.9	0.0168		
3	11 %	5	0.06271	13.9	0.023		
4	14 %	5	0.06271	13.9	0.032		
5	19 %	5	0.06271	13.9	0.0336		
6	25 %	5	0.06271	13.9	0.0356		

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
8 %	7	3	10
Total	17	3	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 7. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
11 %	2	8	10
Total	12	8	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 2. Since b is less than or equal to 6 there is A SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

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

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 0. Since b is less than or equal to 6 there is A SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

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

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 0. Since b is less than or equal to 6 there is A SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

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

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 0. Since b is less than or equal to 6 there is A SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

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

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 888.2 W = 0.9404 Critical W = 0.868                      (alpha = 0.01, N = 20) Critical W = 0.905                      (alpha = 0.05, N = 20)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 0.8924 Critical B = 6.635                      (alpha = 0.01, df = 1)</p> <p>Data PASS B1 homogeneity test at 0.01 level.</p>	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	1	460.8	460.8	9.339	
Within (Error)	18	888.2	49.34		
Total	19	1349			
Critical F = 8.28 (alpha = 0.01, df = 1,18)					
4.41 (alpha = 0.05, df = 1,18)					
Since F > Critical F 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	19.3	19.3			
2	8 %	9.7	9.7	3.056	*	
Dunnett's critical value = 1.73 (1 Tailed, alpha = 0.05, df = 1,18)						

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	10				
2	8 %	10	5.435	28.2	9.6	

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	1	122	122	3.774	
Within (Error)	15	484.9	32.33		
Total	16	606.9			
Critical F = 8.68 (alpha = 0.01, df = 1,15)					
4.54 (alpha = 0.05, df = 1,15)					
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	19.3	19.3			
2	8 %	13.857	13.857	1.942	*	
Dunnett's critical value = 1.75 (1 Tailed, alpha = 0.05, df = 1,15)						
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	10				
2	8 %	7	4.904	25.4	5.443	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: October 7, 2015 at 0932

Date and Time Test Terminated: October 13, 2015 at 1250

Effluent Conc.: Control	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.9	7.8	7.9	7.9	8.0	7.7	8.0
	Final *1	7.6	7.7	7.7	7.7	7.8	7.6	8.0
	Final *2	7.8	8.0	7.9	8.1	7.8	7.1	8.0
pH, units	Initial	7.8	7.7	7.4	7.5	7.5	7.3	7.4
	Final *1	7.5	7.4	7.5	7.4	7.2	7.3	7.3
	Final *2	8.0	7.8	7.8	7.8	7.7	7.1	7.7
Alkalinity, mg CaCO <sub>3</sub> /l	30	NA	30	NA	30	NA	NA	
Hardness, mg CaCO <sub>3</sub> /l	41	NA	41	NA	42	NA	NA	
Conductivity, umhos/cm	140	140	130	140	130	140	140	
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	7.6	7.9	7.8	7.8	7.5
	Final *1	7.4	7.4	7.5	7.8	7.4	7.2	7.6
	Final *2	8.0	7.5	8.0	8.1	7.6	7.2	8.2
pH, units	Initial	7.7	7.6	7.4	7.5	7.4	7.3	7.3
	Final *1	7.5	7.4	7.5	7.4	7.2	7.3	7.2
	Final *2	8.1	7.8	7.9	7.9	7.8	7.2	7.8

Effluent Conc.: 11 %	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.9	7.8	7.8	7.9	7.9	7.8	7.8
	Final *1	7.5	7.7	7.8	7.8	7.4	7.4	7.8
	Final *2	8.0						
pH, units	Initial	7.6	7.6	7.4	7.5	7.4	7.3	7.3
	Final *1	7.5	7.4	7.5	7.5	7.2	7.3	7.2
	Final *2	8.1						

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: October 7, 2015 at 0932  
Date and Time Test Terminated: October 13, 2015 at 1250

Effluent Conc.: 14 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.7	7.7	7.7	8.0	7.5	7.7
	Final *1	7.6	7.4	7.8	7.9	7.5	7.4	7.8
	Final *2	7.9						
pH, units	Initial	7.5	7.6	7.4	7.5	7.4	7.3	7.2
	Final *1	7.5	7.4	7.5	7.5	7.3	7.3	7.2
	Final *2	8.0						

Effluent Conc.: 19 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.7	7.8	7.7	8.0	7.8	7.6
	Final *1	7.6	7.7	7.8	7.9	7.7	7.6	7.7
	Final *2	7.8						
pH, units	Initial	7.5	7.6	7.4	7.4	7.4	7.3	7.2
	Final *1	7.5	7.4	7.6	7.5	7.3	7.3	7.2
	Final *2	8.0						
Alkalinity, mg CaCO <sub>3</sub> /l	32	NA	36	NA	36	NA	NA	NA
Hardness, mg CaCO <sub>3</sub> /l	42	NA	38	NA	41	NA	NA	NA
Conductivity, umhos/cm	180	180	180	180	180	180	180	180
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

Effluent Conc.: 25 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.6	7.7	8.0	8.0	7.9	7.3
	Final *1	7.3	7.3	7.6	7.8	7.4	7.4	7.6
	Final *2	7.7						
pH, units	Initial	7.4	7.6	7.3	7.5	7.4	7.3	7.1
	Final *1	7.5	7.4	7.5	7.5	7.3	7.4	7.3
	Final *2	8.0						

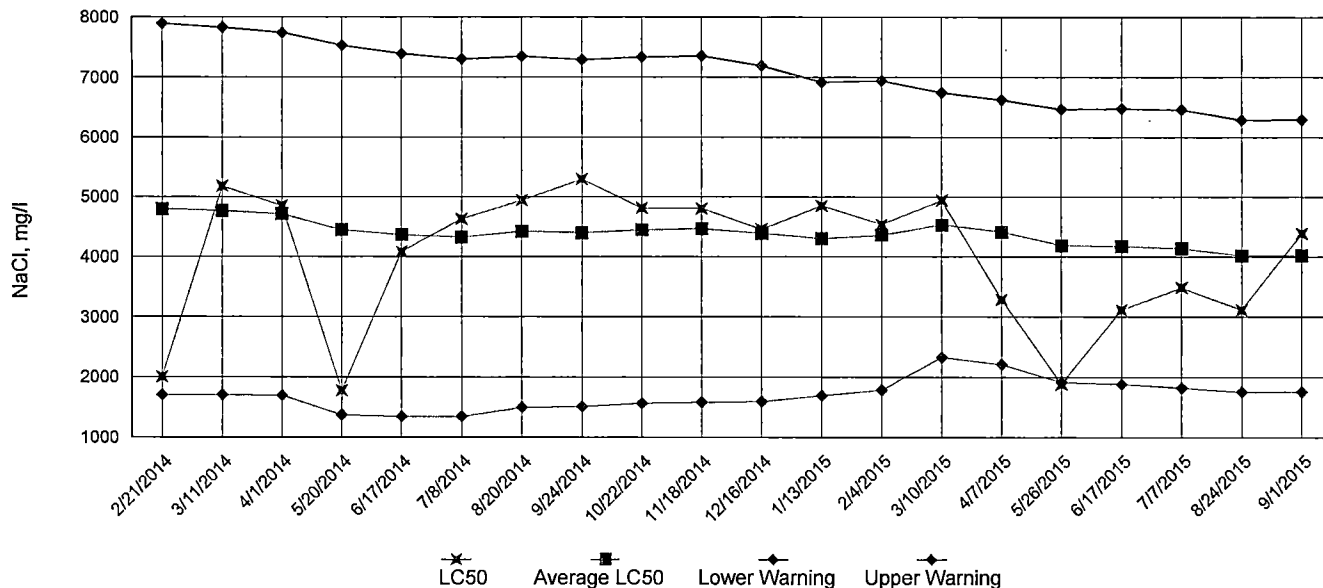
\*1 = data from the *Pimephales promelas* (Fathead Minnow) test      \*2 = data from the *Ceriodaphnia dubia* test



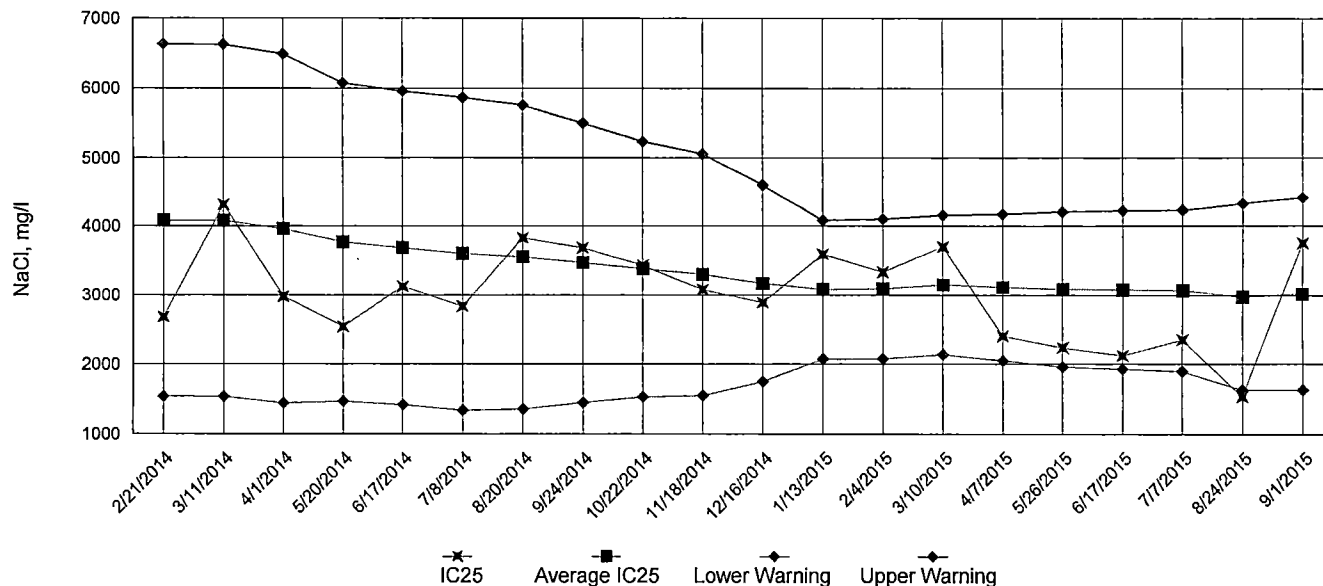
Appendix A4: Test 1000.0

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

LC50 Survival Data

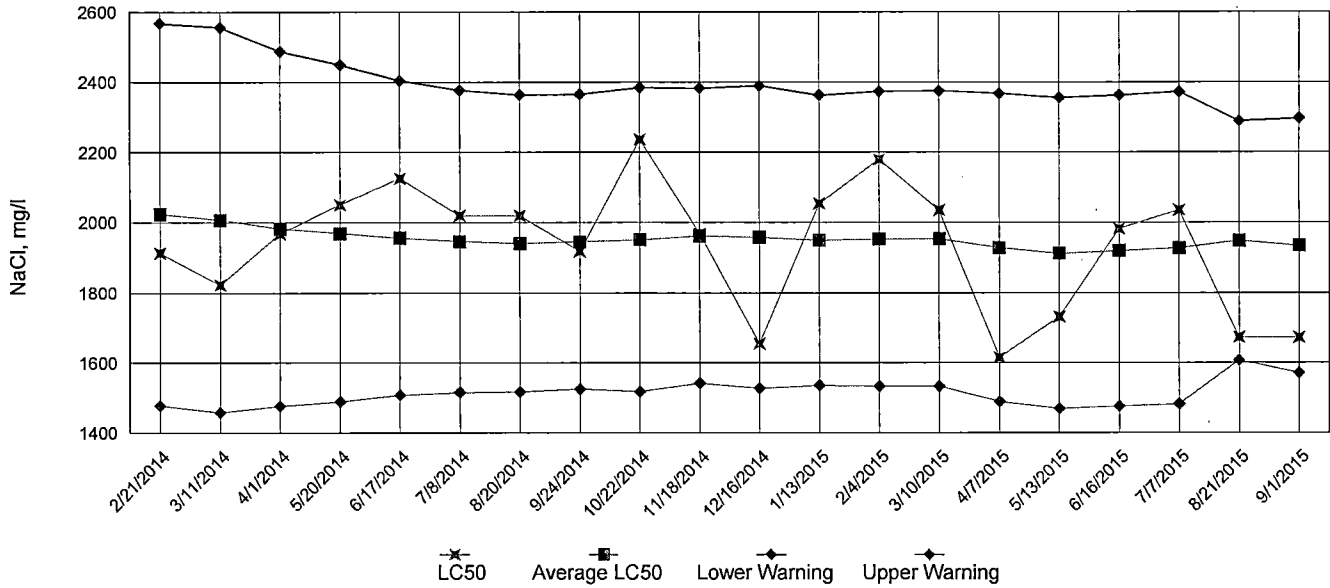


IC25 Growth Data

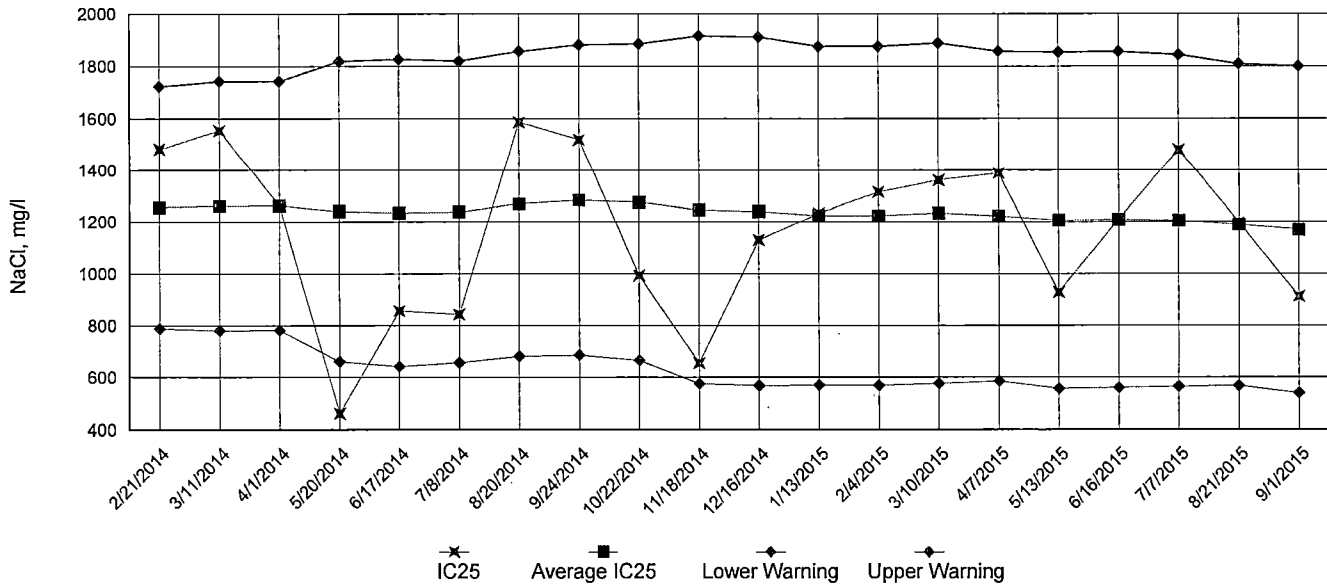


Appendix A4: Test 1002.0  
Chronic Reference Toxicant, *Ceriodaphnia dubia*

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: October 7, 2015 at 1410

Date and Time Test Terminated: October 13, 2015 at 1250

Dilution water used: Synthetic Soft Water #4258

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	100	75.0	100	100	95.0	11.8
8 %	87.5	100	100	87.5	87.5	100	100	92.5	7.40
11 %	100	100	100	87.5	87.5	100	100	95.0	7.21
14 %	100	87.5	87.5	100	75.0	100	100	90.0	11.6
19 %	100	87.5	100	75.0	75.0	100	100	87.5	14.3
25 %	87.5	100	100	87.5	75.0	100	100	90.0	11.6

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.398	0.508	0.440	0.458	0.454	0.452	8.74
8 %	0.399	0.418	0.458	0.460	0.439	0.435	6.04
11 %	0.418	0.501	0.458	0.348	0.418	0.429	13.2
14 %	0.438	0.426	0.430	0.458	0.346	0.42	10.2
19 %	0.405	0.379	0.420	0.408	0.478	0.418	8.79
25 %	0.361	0.464	0.450	0.424	0.381	0.416	10.6

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. Dunnett's 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: 8.79 (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: October 6, 2015 TIME: 1145  
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: October 8, 2015 TIME: 1145  
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: October 11, 2015 TIME: 1145  
 ANALYST: 280, 304, 310, 314 Test Initiated: DATE: October 7, 2015 TIME: 1410  
 Test Terminated: DATE: October 13, 2015 TIME: 1250

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	7.9	7.9	8.0	7.7	8.0
Final	7.6	7.7	7.7	7.7	7.8	7.6	8.0
pH Initial	7.8	7.7	7.4	7.5	7.5	7.3	7.4
Final	7.5	7.4	7.5	7.4	7.2	7.3	7.3
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	41	NA	41	NA	42	NA	NA
Conductivity	140	140	130	140	130	140	140
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	7.6	7.9	7.8	7.8	7.5
Final	7.4	7.4	7.5	7.8	7.4	7.2	7.6
pH Initial	7.7	7.6	7.4	7.5	7.4	7.3	7.3
Final	7.5	7.4	7.5	7.4	7.2	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	150	160	150	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	7.8	7.9	7.9	7.8	7.8
Final	7.5	7.7	7.8	7.8	7.4	7.4	7.8
pH Initial	7.6	7.6	7.4	7.5	7.4	7.3	7.3
Final	7.5	7.4	7.5	7.5	7.2	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	160	170	160	170	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 14 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.7	7.7	7.7	8.0	7.5	7.7
Final	7.6	7.4	7.8	7.9	7.5	7.4	7.8
pH Initial	7.5	7.6	7.4	7.5	7.4	7.3	7.2
Final	7.5	7.4	7.5	7.5	7.3	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	170	160	170	170	180	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 19 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.7	7.8	7.7	8.0	7.8	7.6
Final	7.6	7.7	7.8	7.9	7.7	7.6	7.7
pH Initial	7.5	7.6	7.4	7.4	7.4	7.3	7.2
Final	7.5	7.4	7.6	7.5	7.3	7.3	7.2
Alkalinity	32	NA	36	NA	36	NA	NA
Hardness	42	NA	38	NA	41	NA	NA
Conductivity	180	180	180	180	180	180	180
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 25 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.6	7.7	8.0	8.0	7.9	7.3
Final	7.3	7.3	7.6	7.8	7.4	7.4	7.6
pH Initial	7.4	7.6	7.3	7.5	7.4	7.3	7.1
Final	7.5	7.4	7.5	7.5	7.3	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	190	190	190	200	200	200	190
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: October 7, 2015 at 1200

Date and Time Test Terminated: October 13, 2015 at 1100

Dilution water used: Synthetic Soft Water #4258

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		8 %	11 %	14 %	19 %	25 %
24 hour	100	70.0	30.0	0.00	0.00	0.00
48 hour	100	70.0	20.0	0.00	0.00	0.00
6 day	100	70.0	20.0	0.00	0.00	0.00

NUMBER OF YOUNG PRODUCED PER FEMALE @ 6 DAYS

Replicates	Control	Percent Effluent				
		8 %	11 %	14 %	19 %	25 %
A	12	5	19	0	0	0
B	25	14	0	0	0	0
C	18	19	10	0	0	0
D	27	13	0	0	0	0
E	26	22	0	0	0	0
F	20	11	0	0	0	0
G	13	13	0	0	0	0
H	21	0	0	0	0	0
I	11	0	0	0	0	0
J	20	0	0	0	0	0
Mean per Adult	19.3	9.70	2.90	0.00	0.00	0.00
Mean per Surviving Adult	19.3	13.9	14.5	0.00	0.00	0.00
CV %	30.1	39.6	43.9	0.00	0.00	0.00

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>  X  </u> YES	<u>      </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u>      </u> YES	<u>      </u> NO

2. Dunnett's 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>  X  </u> YES	<u>      </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]: | <u>  1  </u>  | (TLP3B) |
| 4. If you answered NO to 2.a) enter [0] otherwise enter [1]: | <u>  1  </u>  | (TGP3B) |
| 5. NOEC Ceriodaphnia Lethality:                              | <u>  8  %</u> | (TOP3B) |
| 6. LOEC Ceriodaphnia Lethality:                              | <u> 11 %</u>  | (TXP3B) |
| 7. NOEC Ceriodaphnia Sublethality:                           | <u>  0  %</u> | (TPP3B) |
| 8. LOEC Ceriodaphnia Sublethality:                           | <u>  0  %</u> | (TYP3B) |
| 9. Coefficient of variation for Ceriodaphnia Reproduction:   | <u> 30.1 </u> | (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: October 6, 2015 TIME: 1145  
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: October 8, 2015 TIME: 1145  
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: October 11, 2015 TIME: 1145  
 ANALYST: 280, 304, 310, 314 Test Initiated: DATE: October 7, 2015 TIME: 1200  
 Test Terminated: DATE: October 13, 2015 TIME: 1100

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	7.9	7.9	8.0	7.7	8.0
Final	7.8	8.0	7.9	8.1	7.8	7.1	8.0
pH Initial	7.8	7.7	7.4	7.5	7.5	7.3	7.4
Final	8.0	7.8	7.8	7.8	7.7	7.1	7.7
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	41	NA	41	NA	42	NA	NA
Conductivity	140	140	130	140	130	140	140
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	7.6	7.9	7.8	7.8	7.5
Final	8.0	7.5	8.0	8.1	7.6	7.2	8.2
pH Initial	7.7	7.6	7.4	7.5	7.4	7.3	7.3
Final	8.1	7.8	7.9	7.9	7.8	7.2	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	150	160	150	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	7.8	7.9	7.9	7.8	7.8
Final	8.0	--	--	--	--	--	--
pH Initial	7.6	7.6	7.4	7.5	7.4	7.3	7.3
Final	8.1	--	--	--	--	--	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	160	170	160	170	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 14 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.7	7.7	7.7	8.0	7.5	7.7
Final	7.9	--	--	--	--	--	--
pH Initial	7.5	7.6	7.4	7.5	7.4	7.3	7.2
Final	8.0	--	--	--	--	--	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	170	160	170	170	180	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 19 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.7	7.8	7.7	8.0	7.8	7.6
Final	7.8	--	--	--	--	--	--
pH Initial	7.5	7.6	7.4	7.4	7.4	7.3	7.2
Final	8.0	--	--	--	--	--	--
Alkalinity	32	NA	36	NA	36	NA	NA
Hardness	42	NA	38	NA	41	NA	NA
Conductivity	180	180	180	180	180	180	180
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 25 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.6	7.7	8.0	8.0	7.9	7.3
Final	7.7	--	--	--	--	--	--
pH Initial	7.4	7.6	7.3	7.5	7.4	7.3	7.1
Final	8.0	--	--	--	--	--	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	190	190	190	200	200	200	190
Chlorine	NA	NA	NA	NA	NA	NA	NA



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <i>Seaugy</i>		PO No.		ANALYSES REQUESTED												AIC CONTROL NO: <i>194912</i>													
Project		MATRIX		<i>Bio monitoring</i>												AIC PROPOSAL NO:													
Reference:																Carrier:													
Project Manager: <i>Danny Smith</i>		WATER														Received Temperature C <i>0.1</i>													
Sampled By: <i>Johnny Fowler</i>		SOIL														BOTTLES <i>2</i> ✓		Remarks											
AIC No.	Sample Identification	Date/Time Collected	GRAMPS																										
<i>1</i>	<i>EFF</i>	<i>Start 10-5-15/11:45am Stop 10-6-15/11:45am</i>	<input checked="" type="checkbox"/>																										
			Container Type													Field pH calibration on _____ @ _____													
			Preservative													Buffer:													
			G = Glass NO = none	P = Plastic 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) (NORMAL or EXPEDITED IN _____ DAYS)				Relinquished By: <i>Johnny Fowler</i>				Date/Time <i>10-7-15 7:00am</i>				Received By: <i>Ray</i>				Date/Time <i>10-7-15 2:00pm</i>													
Expedited results requested by: _____				Relinquished By: <i>[Signature]</i>				Date/Time <i>10-7-15 8:50 AM</i>				Received in Lab By: <i>Danny Brown</i>				Date/Time <i>10-7-15 0856</i>													
Who should AIC contact with questions: Phone: _____ Fax: _____				Comments:																									
Report Attention to: Report Address to: <i>Seaugy Water Utilities P.O. Box 1319 Seaugy, AZ 72145</i>																													
Email Address: _____																													



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Searcy</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: <u>194912</u>				
Project Reference:						BIOLOGICAL											AIC PROPOSAL NO:			
Project Manager: <u>Jimmy Smith</u>			MATRIX														Carrier:			
Sampled By: <u>Greg Hale</u>			W	S													Received Temperature C <u>1.3</u>			
AIC No.	Sample Identification	Date/Time Collected	G	C	A	S	NO OF BOTTLES											Remarks		
			A	O	T	R														
<u>2</u>	<u>FFP STW STU</u>	<u>10-7-15 11:45A</u> <u>10-8-15 11:45A</u>			<u>✓</u>	<u>✓</u>	<u>2</u>													
Container Type							<u>P</u>											Field pH calibration on _____ @ _____		
Preservative							<u>NO</u>											Buffer:		
G = Glass			P = Plastic		V = VOA vials		H = HCl to pH2		T = Sodium Thiosulfate			Z = Zinc acetate					A=(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> , NH <sub>4</sub> OH			
NO = none			S = Sulfuric acid pH2		N = Nitric acid pH2		B = NaOH to pH12													
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <u>[Signature]</u>			Date/Time <u>10-9-15</u> <u>7:00am</u>			Received By: <u>[Signature]</u>			Date/Time <u>10-9-15</u> <u>7:00am</u>						
Expedited results requested by: _____					Relinquished By: <u>[Signature]</u>			Date/Time <u>10/9/15</u> <u>8:47am</u>			Received in Lab By: <u>D. BROWN</u>			Date/Time <u>10-9-15</u> <u>0847</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>																				
Email Address: _____																				



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300 NORTH ELM STREET

P.O. BOX 1319

SEARCY, ARKANSAS 72145-1319

**RETURN RECEIPT  
REQUESTED**

NPDES Enforcement Division  
A.D.E.Q.

5301 Northshore Dr.  
North Little Rock, AR 72118-5317

