

August 28, 2013

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

Control No. 169705-1

Prepared for:

Mr. Paul Abernathy
Searcy Water and Sewer System
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Searcy, AR 72145

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 19 % effluent, which is equal to 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

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I. Control Acceptance Criteria

Pimephales promelas (Fathead minnow) Method 1000.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.269	PASS
Control Growth CV < or = 40%	24.0	PASS
Growth Minimum Significant Difference 12 to 30%	20.4	PASS
Critical Dilution CV < or = 40%	17.1	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	19.1	PASS
Control CV < or = 40% per Surviving Female	14.1	PASS
Reproduction Minimum Significant Difference 13 to 47%	27.8	PASS
Critical Dilution CV < or = 40%	17.6	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)	8.4	8.3	8.3
pH (standard units)	7.0	7.2	7.1
Alkalinity (mg/l as CaCO ₃)	30	34	32
Hardness (mg/l as CaCO ₃)	41	43	42
Conductivity (umhos/cm)	180	220	240
Residual Chlorine (mg/l)	0.070	<0.05	<0.05
Ammonia as N (mg/l)	0.40	0.41	0.37

2. Dilution Water Samples: Synthetic Soft Water #4012

- a. Dates Prepared: August 8 through August 22, 2013
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.4	8.6	7.4
pH (standard units)	7.5	7.8	7.9
Alkalinity (mg/l as CaCO ₃)	32	32	32
Hardness (mg/l as CaCO ₃)	44	47	47
Conductivity (umhos/cm)	140	170	190
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: August 14, 2013 at 1630
Date & Time Test Terminated: August 21, 2013 at 1450
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: August 14, 2013 at 1545
Date & Time Test Terminated: August 21, 2013 at 1400
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 Bartlett's test and analyzed with Dunnett's Test to determine the No Observable Effects Concentration (NOEC) for Reproduction.

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 July 9, 2013 at 0920 to July 16, 2013 at 1045

The results were as follows: (Control No. 168661-1.)

Survival LC-50: 1505 mg/l

Growth IC-25: 2509 mg/l

Growth PMSD: 11.9

Ceriodaphnia dubia

Chronic reference tests are performed monthly.

A chronic reference test was performed on July 9, 2013 at 1340 to July 16, 2013 at 1530

The results were as follows: (Control No. 168661-2.)

Survival LC-50: 2019 mg/l

Growth IC-25: 1164 mg/l

Growth PMSD: 13

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	102	3.17
pH	SM 4500-H+ B	101	0.266
Conductivity	EPA 120.1	105	2.56

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: August 14, 2013

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: August 14, 2013

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

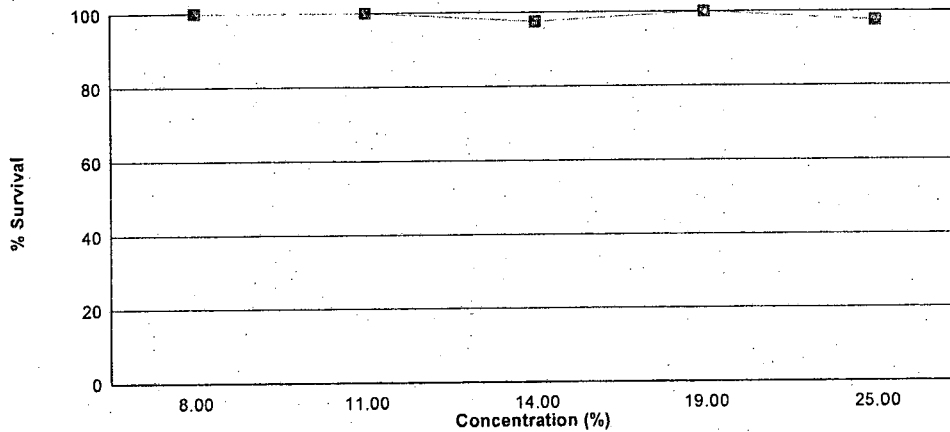
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

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 August 14, 2013 at 1630 and continued through August 21, 2013 at 1450. 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 = 19 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.269
8 %	100	0.216
11 %	100	0.226
14 %	97.5	0.216
19 %	100	0.215
25 %	97.5	0.200 *

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

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

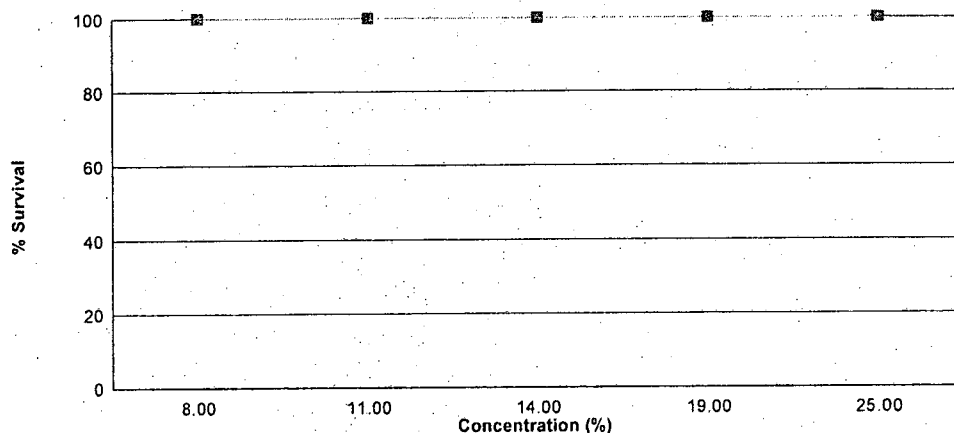
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 August 14, 2013 at 1545 and continued through August 21, 2013 at 1400. 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



Concentration	Percent Survival	Mean Reproduction
Control	100	19.1
8 %	100	23.6
11 %	100	27.3
14 %	100	30.5
19 %	100	27.5
25 %	100	28.9

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: August 14, 2013 at 1630

Date and Time Test Terminated: August 21, 2013 at 1450

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	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	8
	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	7	7
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
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	8	8	8	8
	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	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: August 14, 2013 at 1630
Test Terminated: August 21, 2013 at 1450

Drying Started: August 19, 2013 at 1105
Drying Ended: August 23, 2013 at 1050

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.93851	.94042	0.00191	8	0.239
	B	.93375	.93649	0.00274	8	0.342
	C	.93615	.93877	0.00262	8	0.328
	D	.93518	.93668	0.00150	8	0.188
	E	.93552	.93750	0.00198	8	0.248
8 %	A	.93550	.93711	0.00161	8	0.201
	B	.92770	.92962	0.00192	8	0.240
	C	.93252	.93427	0.00175	8	0.219
	D	.93038	.93223	0.00185	8	0.231
	E	.92618	.92768	0.00150	8	0.188
11 %	A	.92412	.92575	0.00163	8	0.204
	B	.92512	.92715	0.00203	8	0.254
	C	.92283	.92469	0.00186	8	0.232
	D	.92427	.92615	0.00188	8	0.235
	E	.93615	.93778	0.00163	8	0.204
14 %	A	.93730	.93910	0.00180	8	0.225
	B	.94011	.94176	0.00165	8	0.206
	C	.94018	.94192	0.00174	8	0.218
	D	.92067	.92226	0.00159	8	0.199
	E	.92519	.92706	0.00187	8	0.234
19 %	A	.93562	.93723	0.00161	8	0.201
	B	.92711	.92893	0.00182	8	0.228
	C	.92950	.93079	0.00129	8	0.161
	D	.93475	.93683	0.00208	8	0.260
	E	.92049	.92230	0.00181	8	0.226
25 %	A	.92116	.92226	0.00110	8	0.138
	B	.92080	.92237	0.00157	8	0.196
	C	.92080	.92263	0.00183	8	0.229
	D	.91972	.92135	0.00163	8	0.204
	E	.92094	.92280	0.00186	8	0.232

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: August 14, 2013 at 1545

Date and Time Test Terminated: August 21, 2013 at 1400

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	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	2	4	4	0	4	2	4	0	4	4	28	10	2.80
5	0	6	6	4	7	6	6	5	0	5	45	10	4.50
6	7	0	7	9	0	10	0	12	11	9	65	10	6.50
7	8	10	1	2	13	0	11	0	7	1	53	10	5.30
8													
TOTAL	17	20	18	15	24	18	21	17	22	19	191	10	19.1

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	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	4	4	4	2	4	5	0	0	0	27	10	2.70
5	0	7	8	7	9	8	8	5	7	6	65	10	6.50
6	9	0	0	0	10	11	0	9	9	10	58	10	5.80
7	18	14	17	13	4	0	19	0	0	1	86	10	8.60
8													
TOTAL	31	25	29	24	25	23	32	14	16	17	236	10	23.6

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	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	4	5	4	4	4	2	4	5	3	39	10	3.90
5	0	9	10	6	9	9	9	8	0	8	68	10	6.80
6	9	0	8	1	1	0	11	12	11	10	63	10	6.30
7	18	18	1	12	17	17	1	0	19	0	103	10	10.3
8													
TOTAL	31	31	24	23	31	30	23	24	35	21	273	10	27.3

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: August 14, 2013 at 1545

Date and Time Test Terminated: August 21, 2013 at 1400

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	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	0	2	4	4	4	4	4	4	0	30	10	3.00	
5	9	8	8	0	8	9	10	10	0	6	68	10	6.80	
6	0	17	12	12	0	10	0	0	12	9	72	10	7.20	
7	16	0	1	21	20	1	17	19	22	18	135	10	13.5	
8														
TOTAL	29	25	23	37	32	24	31	33	38	33	305	10	30.5	

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	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	4	4	4	0	4	4	4	4	4	4	36	10	3.60	
5	6	9	10	6	9	8	7	6	0	9	70	10	7.00	
6	0	0	14	7	1	10	1	8	11	0	52	10	5.20	
7	15	16	0	17	16	0	15	0	20	18	117	10	11.7	
8														
TOTAL	25	29	28	30	30	22	27	18	35	31	275	10	27.5	

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	0	0	0	0	0	0	0	0	0	0	10	0.00	
4	4	3	2	4	4	4	4	3	4	4	36	10	3.60	
5	10	9	8	1	8	10	9	0	0	0	55	10	5.50	
6	0	10	0	13	1	10	8	8	9	10	69	10	6.90	
7	12	0	15	22	16	0	2	18	21	23	129	10	12.9	
8														
TOTAL	26	22	25	40	29	24	23	29	34	37	289	10	28.9	

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	1.00000	1.39310
2	8 %	1	1.00000	1.39310
2	8 %	2	1.00000	1.39310
2	8 %	3	1.00000	1.39310
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	0.87500	1.20940
4	14 %	3	1.00000	1.39310
4	14 %	4	1.00000	1.39310
4	14 %	5	1.00000	1.39310
5	19 %	1	1.00000	1.39310
5	19 %	2	1.00000	1.39310
5	19 %	3	1.00000	1.39310
5	19 %	4	1.00000	1.39310
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	1.00000	1.39310

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
<p>D = 0.05399 W = 0.5466 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 %	27.50	16.00	5.00	
3	11 %	27.50	16.00	5.00	
4	14 %	25.00	16.00	5.00	
5	19 %	27.50	16.00	5.00	
6	25 %	25.00	16.00	5.00	
<p>Critical values are 1 tailed (k=5)</p>					

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
D = 0.03236 W = 0.9814 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 10.43 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.	

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	0.01408	0.002816	2.089	
Within (Error)	24	0.03236	0.001348		
Total	29	0.04644			
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	0.269	0.269		
2	8 %	0.2158	0.2158	2.291	
3	11 %	0.2258	0.2258	1.86	
4	14 %	0.2164	0.2164	2.265	
5	19 %	0.2152	0.2152	2.317	
6	25 %	0.1998	0.1998	2.98	*
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	0.0548	20.4	0.0532	
3	11 %	5	0.0548	20.4	0.0432	
4	14 %	5	0.0548	20.4	0.0526	
5	19 %	5	0.0548	20.4	0.0538	
6	25 %	5	0.0548	20.4	0.0692	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
8 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. 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 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. 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
14 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. 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
19 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO 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 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) ($\alpha=0.05$) is 6. b value is 10. Since b is greater than 6 there is NO 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	0	
2	11 %	10	0	
3	14 %	10	0	
4	19 %	10	0	
5	25 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
D = 0.0519 D* = 0.4072 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 6.521 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction.

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	858.3	171.7	6.511	
Within (Error)	54	1424	26.37		
Total	59	2282			
Critical F = 3.38 (alpha = 0.01, df = 5,54)					
2.38 (alpha = 0.05, df = 5,54)					
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	19.1	19.1			
2	8 %	23.6	23.6	-1.959		
3	11 %	27.3	27.3	-3.571		
4	14 %	30.5	30.5	-4.964		
5	19 %	27.5	27.5	-3.658		
6	25 %	28.9	28.9	-4.267		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)						

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	5.305	27.8	-4.5		
3	11 %	10	5.305	27.8	-8.2		
4	14 %	10	5.305	27.8	-11.4		
5	19 %	10	5.305	27.8	-8.4		
6	25 %	10	5.305	27.8	-9.8		

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: August 14, 2013 at 1313

Date and Time Test Terminated: August 21, 2013 at 1450

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.4	7.7	8.6	8.0	7.4	7.6	7.7
	Final *1	7.7	8.1	7.1	7.2	7.3	6.8	8.2
	Final *2	7.6	8.2	7.6	7.9	7.6	7.6	7.8
pH, units	Initial	7.5	7.8	7.8	7.7	7.9	7.7	7.5
	Final *1	7.6	7.6	7.4	7.6	7.7	7.3	7.8
	Final *2	8.0	8.1	8.0	8.2	8.0	8.0	7.9
Alkalinity, mg CaCO ₃ /l		32	NA	32	NA	32	NA	NA
Hardness, mg CaCO ₃ /l		44	NA	47	NA	47	NA	NA
Conductivity, umhos/cm		140	170	170	170	190	200	180
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	8.4	7.6	8.6	8.0	7.6	7.6	7.6
	Final *1	7.7	8.1	7.1	7.1	7.4	6.9	8.2
	Final *2	8.5	8.1	7.7	7.7	7.5	7.6	7.7
pH, units	Initial	7.4	7.6	7.7	7.6	7.9	7.7	7.4
	Final *1	7.6	7.6	7.4	7.6	7.6	7.3	7.6
	Final *2	8.0	8.1	8.0	8.2	8.1	8.0	7.9

Effluent Conc.: 11 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.4	7.7	8.5	8.0	7.4	7.6	7.6
	Final *1	7.5	8.1	7.2	6.9	7.3	6.7	8.3
	Final *2	8.8	8.4	7.6	7.9	7.6	7.6	7.9
pH, units	Initial	7.4	7.6	7.7	7.5	7.9	7.7	7.4
	Final *1	7.6	7.6	7.4	7.6	7.6	7.3	7.6
	Final *2	8.0	8.1	8.0	8.2	8.0	8.0	7.8

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: August 14, 2013 at 1313
Date and Time Test Terminated: August 21, 2013 at 1450

Effluent Conc.: 14 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.4	7.6	8.4	7.9	7.3	7.5	7.6
	Final *1	7.6	8.1	7.2	7.1	7.3	7.1	8.2
	Final *2	8.7	8.4	7.8	7.8	7.6	7.5	7.9
pH, units	Initial	7.4	7.6	7.7	7.5	7.8	7.7	7.4
	Final *1	7.6	7.6	7.5	7.6	7.6	7.4	7.5
	Final *2	8.0	8.2	8.1	8.2	8.1	8.0	7.8

Effluent Conc.: 19 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	7.5	8.4	7.9	7.3	7.5	7.6
	Final *1	7.4	8.0	7.1	7.1	7.3	7.2	8.2
	Final *2	8.6	8.9	7.8	7.8	7.6	7.4	7.8
pH, units	Initial	7.3	7.6	7.7	7.5	7.8	7.7	7.3
	Final *1	7.6	7.6	7.4	7.6	7.6	7.4	7.5
	Final *2	8.0	8.2	8.2	8.3	8.2	8.0	7.8
Alkalinity, mg CaCO ₃ /l	30	NA	30	NA	28	NA	NA	NA
Hardness, mg CaCO ₃ /l	44	NA	45	NA	47	NA	NA	NA
Conductivity, umhos/cm	150	180	180	180	200	200	200	200
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

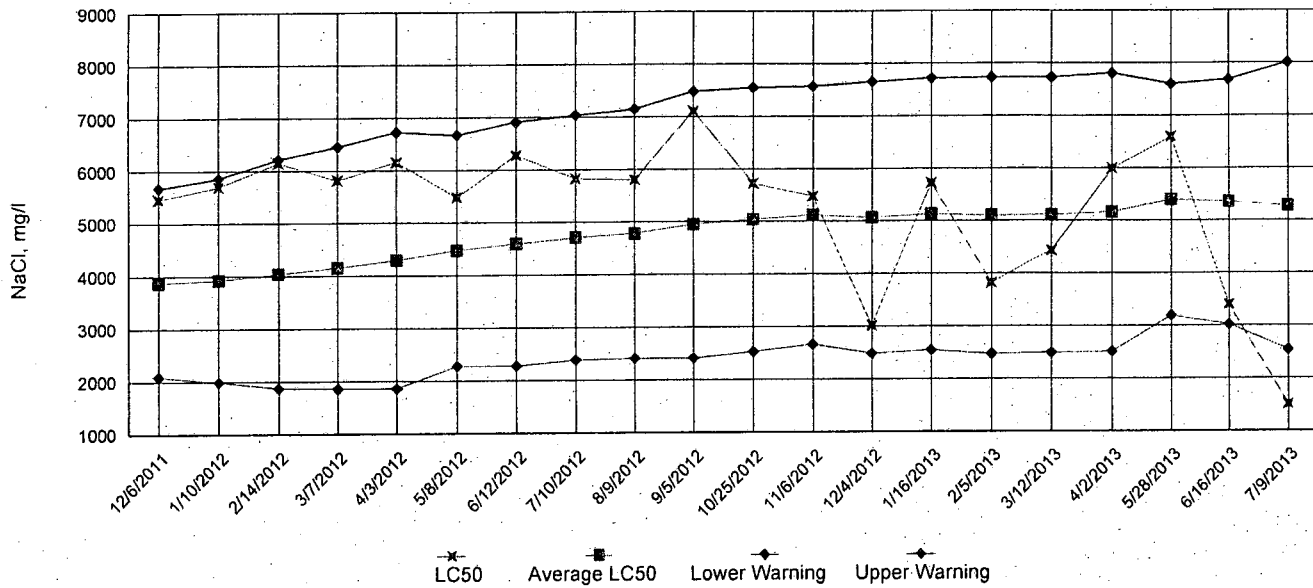
Effluent Conc.: 25 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	7.6	8.4	7.9	7.3	7.4	7.6
	Final *1	8.7	8.0	7.1	7.1	7.4	7.2	8.2
	Final *2	8.8	8.8	7.8	7.7	7.7	7.3	7.6
pH, units	Initial	7.2	7.5	7.6	7.5	7.8	7.6	7.3
	Final *1	7.6	7.7	7.5	7.6	7.7	7.5	7.5
	Final *2	7.9	8.3	8.2	8.2	8.2	7.5	7.9

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

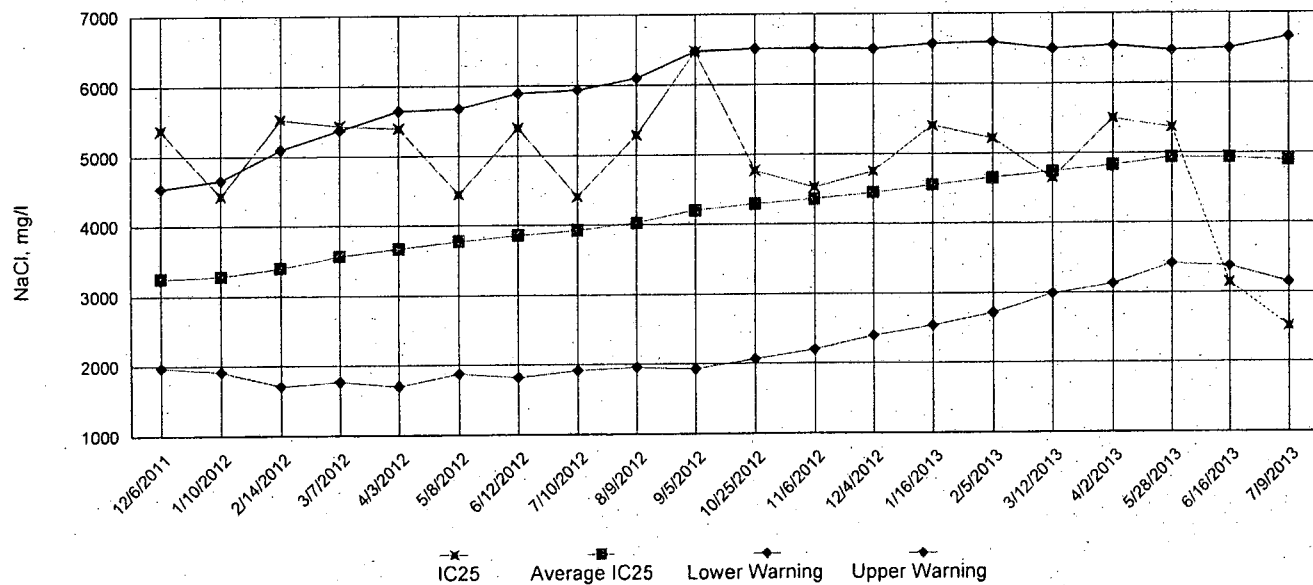
Appendix A4: Test 1000.0

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

LC50 Survival Data

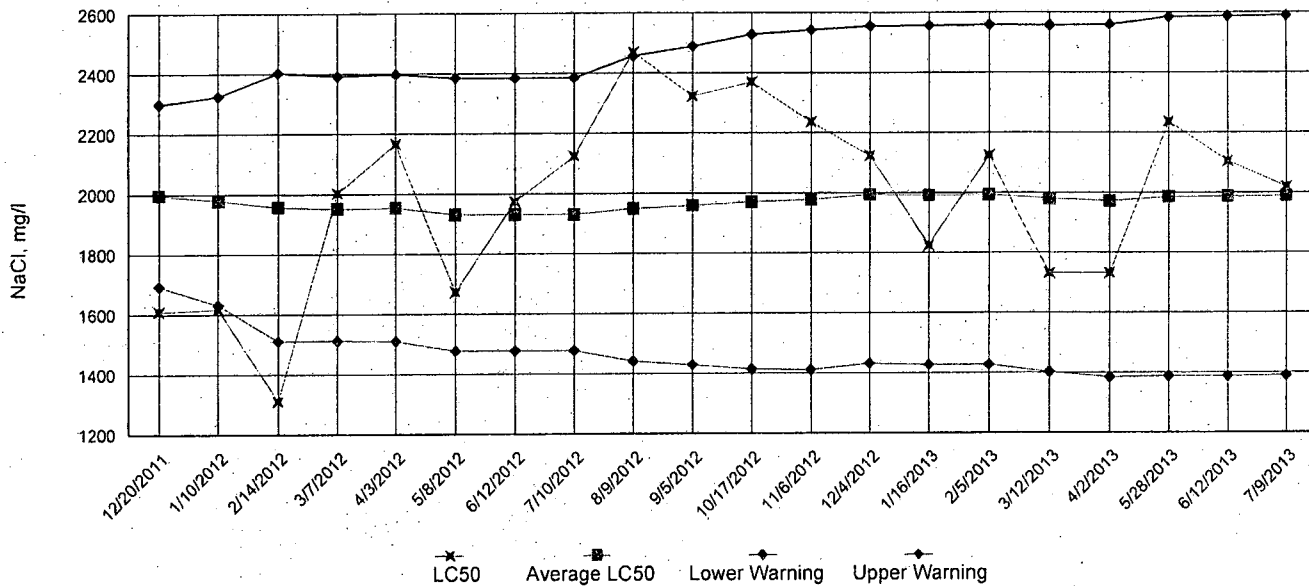


IC25 Growth Data

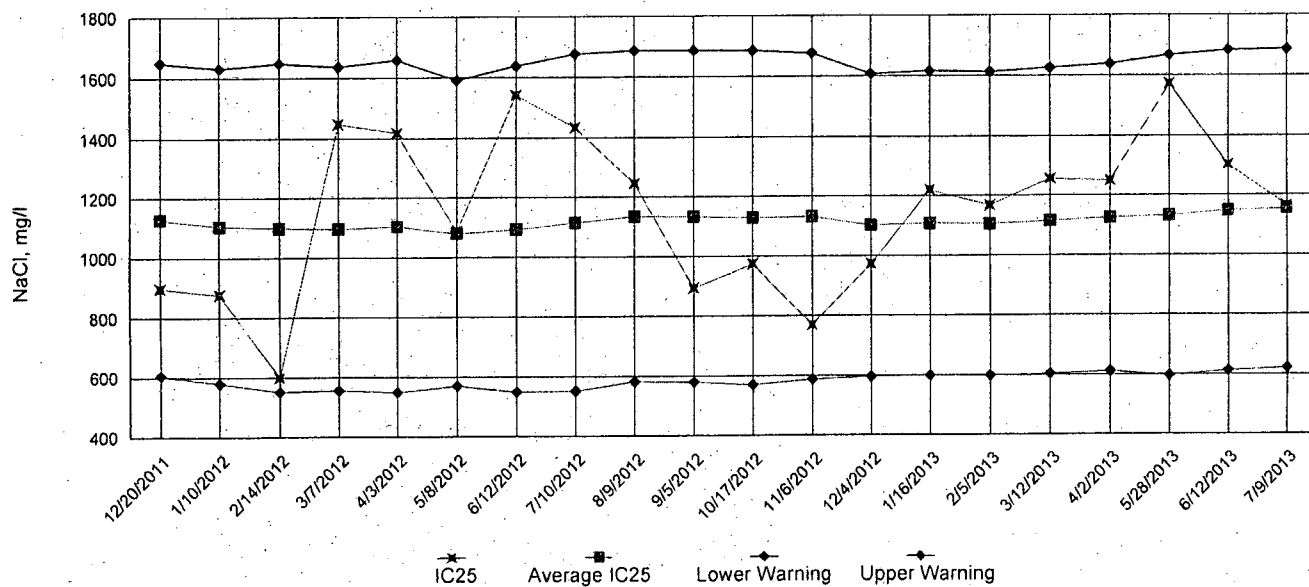


Appendix A4: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

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: August 14, 2013 at 1630

Date and Time Test Terminated: August 21, 2013 at 1450

Dilution water used: Synthetic Soft Water #4012

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	100	100	100	100	0.00
8 %	100	100	100	100	100	100	100	100	0.00
11 %	100	100	100	100	100	100	100	100	0.00
14 %	100	87.5	100	100	100	100	100	97.5	5.73
19 %	100	100	100	100	100	100	100	100	0.00
25 %	87.5	100	100	100	100	100	100	97.5	5.73

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.239	0.342	0.328	0.188	0.248	0.269	24.0
8 %	0.201	0.240	0.219	0.231	0.188	0.216	9.88
11 %	0.204	0.254	0.232	0.235	0.204	0.226	9.57
14 %	0.225	0.206	0.218	0.199	0.234	0.216	6.52
19 %	0.201	0.228	0.161	0.260	0.226	0.215	17.1
25 %	0.138	0.196	0.229	0.204	0.232	0.2	19.0

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 %)	_____ YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ 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 %)	_____ YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ 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: 19 % (TPP6C)
- 8. LOEC Pimephales Sublethality: 25 % (TYP6C)
- 9. Coefficient of variation for Pimephales growth: 24 (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: August 13, 2013 TIME: 2340
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: August 15, 2013 TIME: 2345
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: August 18, 2013 TIME: 2345
 ANALYST: 280, 298, 304, 307 Test Initiated: DATE: August 14, 2013 TIME: 1630
 Test Terminated: DATE: August 21, 2013 TIME: 1450

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.7	8.6	8.0	7.4	7.6	7.7
Final	7.7	8.1	7.1	7.2	7.3	6.8	8.2
pH Initial	7.5	7.8	7.8	7.7	7.9	7.7	7.5
Final	7.6	7.6	7.4	7.6	7.7	7.3	7.8
Alkalinity	32	NA	32	NA	32	NA	NA
Hardness	44	NA	47	NA	47	NA	NA
Conductivity	140	170	170	170	190	200	180
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 8 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.6	8.6	8.0	7.6	7.6	7.6
Final	7.7	8.1	7.1	7.1	7.4	6.9	8.2
pH Initial	7.4	7.6	7.7	7.6	7.9	7.7	7.4
Final	7.6	7.6	7.4	7.6	7.6	7.3	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	170	180	180	190	200	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.7	8.5	8.0	7.4	7.6	7.6
Final	7.5	8.1	7.2	6.9	7.3	6.7	8.3
pH Initial	7.4	7.6	7.7	7.5	7.9	7.7	7.4
Final	7.6	7.6	7.4	7.6	7.6	7.3	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	180	200	200	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 14 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.6	8.4	7.9	7.3	7.5	7.6
Final	7.6	8.1	7.2	7.1	7.3	7.1	8.2
pH Initial	7.4	7.6	7.7	7.5	7.8	7.7	7.4
Final	7.6	7.6	7.5	7.6	7.6	7.4	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	180	190	200	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 19 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.3	7.5	8.4	7.9	7.3	7.5	7.6
Final	7.4	8.0	7.1	7.1	7.3	7.2	8.2
pH Initial	7.3	7.6	7.7	7.5	7.8	7.7	7.3
Final	7.6	7.6	7.4	7.6	7.6	7.4	7.5
Alkalinity	30	NA	30	NA	28	NA	NA
Hardness	44	NA	45	NA	47	NA	NA
Conductivity	150	180	180	180	200	200	200
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 25 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.3	7.6	8.4	7.9	7.3	7.4	7.6
Final	8.7	8.0	7.1	7.1	7.4	7.2	8.2
pH Initial	7.2	7.5	7.6	7.5	7.8	7.6	7.3
Final	7.6	7.7	7.5	7.6	7.7	7.5	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	190	200	210	210
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: August 14, 2013 at 1545

Date and Time Test Terminated: August 21, 2013 at 1400

Dilution water used: Synthetic Soft Water #4012

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	100	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		8 %	11 %	14 %	19 %	25 %
A	17	31	31	29	25	26
B	20	25	31	25	29	22
C	18	29	24	23	28	25
D	15	24	23	37	30	40
E	24	25	31	32	30	29
F	18	23	30	24	22	24
G	21	32	23	31	27	23
H	17	14	24	33	18	29
I	22	16	35	38	35	34
J	19	17	21	33	31	37
Mean per Adult	19.1	23.6	27.3	30.5	27.5	28.9
Mean per Surviving Adult	19.1	23.6	27.3	30.5	27.5	28.9
CV %	14.1	26.5	17.5	17.1	17.6	21.4

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 %)	_____ YES	_____ X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ 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 %)	_____ YES	_____ X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ 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: 17.6 (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: August 13, 2013 TIME: 2340
 NPDES NO.: AR0021601 AFIN# 73-00055 SAMPLE No. 2 COLLECTED ending: DATE: August 15, 2013 TIME: 2345
 CONTACT: Mr. Paul Abernathy SAMPLE No. 3 COLLECTED ending: DATE: August 18, 2013 TIME: 2345
 ANALYST: 280, 298, 304, 307 Test Initiated: DATE: August 14, 2013 TIME: 1545
 Test Terminated: DATE: August 21, 2013 TIME: 1400

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.7	8.6	8.0	7.4	7.6	7.7
Final	7.6	8.2	7.6	7.9	7.6	7.6	7.8
pH Initial	7.5	7.8	7.8	7.7	7.9	7.7	7.5
Final	8.0	8.1	8.0	8.2	8.0	8.0	7.9
Alkalinity	32	NA	32	NA	32	NA	NA
Hardness	44	NA	47	NA	47	NA	NA
Conductivity	140	170	170	190	200	200	180
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 8 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.6	8.6	8.0	7.6	7.6	7.6
Final	8.5	8.1	7.7	7.7	7.5	7.6	7.7
pH Initial	7.4	7.6	7.7	7.6	7.9	7.7	7.4
Final	8.0	8.1	8.0	8.2	8.1	8.0	7.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	170	180	180	190	200	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.7	8.5	8.0	7.4	7.6	7.6
Final	8.8	8.4	7.6	7.9	7.6	7.6	7.9
pH Initial	7.4	7.6	7.7	7.5	7.9	7.7	7.4
Final	8.0	8.1	8.0	8.2	8.0	8.0	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	180	200	200	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 14 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	7.6	8.4	7.9	7.3	7.5	7.6
Final	8.7	8.4	7.8	7.8	7.6	7.5	7.9
pH Initial	7.4	7.6	7.7	7.5	7.8	7.7	7.4
Final	8.0	8.2	8.1	8.2	8.1	8.0	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	180	190	200	190
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 19 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.3	7.5	8.4	7.9	7.3	7.5	7.6
Final	8.6	8.9	7.8	7.8	7.6	7.4	7.8
pH Initial	7.3	7.6	7.7	7.5	7.8	7.7	7.3
Final	8.0	8.2	8.2	8.3	8.2	8.0	7.8
Alkalinity	30	NA	30	NA	28	NA	NA
Hardness	44	NA	45	NA	47	NA	NA
Conductivity	150	180	180	180	200	200	200
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 25 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.3	7.6	8.4	7.9	7.3	7.4	7.6
Final	8.8	8.8	7.8	7.7	7.7	7.3	7.6
pH Initial	7.2	7.5	7.6	7.5	7.8	7.6	7.3
Final	7.9	8.3	8.2	8.2	8.2	7.5	7.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	180	180	190	200	210	210
Chlorine	NA	NA	NA	NA	NA	NA	NA



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: <u>Searcy Water</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED ¹										AIC CONTROL NO: <u>169705</u>	
Project Reference: <u>BIO monitor</u>			SAMPLE MATRIX													AIC PROPOSAL NO:	
Project Manager: <u>Paul Abernathy</u>			WATER SOIL													Carrier/Tracking No.:	
Sampled By: <u>Johnny Trule</u>			GRA B	COMP											Received Temperature C <u>3.6</u>		
AIC No.	Sample Identification	Date/Time Collected													Remarks		
<u>1</u>	<u>FFF</u>	<u>START 8-14-13/11:00h</u> <u>STOP 8-14-13/11:40h</u>		<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							
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS					Relinquished By: <u>[Signature]</u>		Date/Time <u>8-14-13</u> <u>06:00</u>		Received By: <u>Tom Harkfield</u>		Date/Time <u>8-14-13</u> <u>06:00</u>						
Expedited results requested by: _____					Relinquished By: <u>Tom Harkfield</u>		Date/Time <u>8-14-13</u> <u>08:35</u>		Received in Lab By: <u>[Signature]</u>		Date/Time <u>8-14-13</u> <u>0835</u>						
Who should AIC contact with questions: _____					Comments:												
Phone: _____ Fax: _____																	
Report Attention to:																	
Report Address to:																	



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

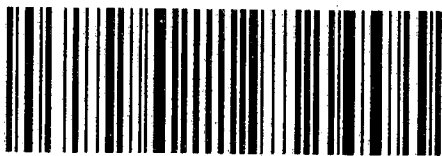
PAGE OF

Client: <u>Seneca</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED ¹										AIC CONTROL NO: <u>169705</u>	
Project Reference:			SAMPLE MATRIX			WATER SOIL											AIC PROPOSAL NO:
Project Manager: <u>Paul Abernathy</u>			GRA	COMP	BOTTLES												Carrier/Tracking No. _____
Sampled <u>X</u> <u>bars Hole</u>																Received Temperature C <u>2</u>	
By:													Remarks				
AIC No.	Sample Identification	Date/Time Collected															
<u>2</u>	<u>EFF STAT STG</u>	<u>8-14-13 11:45AM</u> <u>8-15-13 11:45AM</u>			<u>✓</u>	<u>✓</u>											
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					
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS					Relinquished By: <u>[Signature]</u>		Date/Time <u>8-16-13 06:00</u>		Received By: <u>Tom Hartfield</u>		Date/Time <u>8-16-13 06:00</u>						
Expedited results requested by: _____					Relinquished By: <u>Tom Hartfield</u>		Date/Time <u>8-16-13 08:40</u>		Received in Lab By: <u>[Signature]</u>		Date/Time <u>8-16-13 0840</u>						
Who should AIC contact with questions: _____					Comments: _____												
Phone: _____ Fax: _____																	
Report Attention to: <u>Seneca Water & Sewer</u>																	
Report Address to: <u>P.O. Box 73A</u> <u>Seneca, AR 72145</u>																	

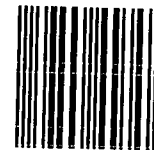
CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Searcy</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED ¹										AIC CONTROL NO: <u>169705</u>								
Project			SAMPLE MATRIX			2	1	2	3	4	5	6	7	8	9	10	AIC PROPOSAL NO:							
Reference:			WATER SOIL																					
Project Manager: <u>Paul Abernethy</u>			G R A B	C O M P	P	NO	P	NO	NO	NO	NO	NO	NO	NO	NO	NO	Received Temperature C <u>2°C</u>							
Sampled By: <u>Johnny Smith</u>																								
AIC No.	Sample Identification	Date/Time Collected											Field pH calibration on _____ @ _____ Buffer:											
3	EFF	Start 8-17-13/11:45am Stop 8-18-13/11:45am																						
Container Type													P											
Preservative													NO											
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												
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <u>[Signature]</u>					Date/Time <u>8-19-13</u> <u>06:00</u>					Received By: <u>Tom Hartsfield</u>					Date/Time <u>8-19-13</u> <u>06:00</u>				
Expedited results requested by: _____					Relinquished By: <u>Tom Hartsfield</u>					Date/Time <u>8-19-13</u> <u>9:14</u>					Received in Lab By: <u>[Signature]</u>					Date/Time <u>8-19-13</u> <u>9:16am</u>				
Who should AIC contact with questions: _____					Comments:																			
Phone: _____ Fax: _____																								
Report Attention to:																								
Report Address to: <u>Searcy Water + Sewer</u> <u>P.O. Box 13A</u> <u>SEARCY, VA 22145</u>																								

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

**RETURN RECEIPT
REQUESTED**

