

**Kent**

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**From:** "American Interplex" <interplex@americaninterplex.com>  
**To:** <kent.hswd@sbcglobal.net>  
**Sent:** Friday, May 31, 2013 2:45 PM  
**Attach:** 978351.pdf  
**Subject:** Control Number 167584 (NPDES Permit No. AR0022381 2nd Quarter Biomonitoring)  
Dear Mr. Kent Latch,

Your report for control number 167584 (NPDES Permit No. AR0022381 2nd Quarter Biomonitoring) is enclosed as an attachment to this e-mail.

If you would prefer to receive your reports via our website (<http://www.americaninterplex.com>), please call our Client Services Department or myself at 501-224-5060 for a username and password. Once your login has been activated you will receive an email notification each time a new report is available.

Sincerely,  
John Overbey  
Laboratory Director

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May 31, 2013  
Control No. 167584-1  
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May 31, 2013

Test Results of  
Second Quarter  
Chronic  
Biomonitoring Testing  
for  
Outfall 002 and Outfall 003  
Heber Springs, AR

Control No. 167584-1

Prepared for:

Mr. Kent Latch  
Heber Springs Water & Sewer  
1108 West Front Street  
Heber Springs, AR 72543

Prepared by:

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



May 31, 2013  
Control No. 167584-1  
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Heber Springs Water & Sewer  
ATTN: Mr. Kent Latch  
1108 West Front Street  
Heber Springs, AR 72543

Re: Chronic utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*  
Outfall 002 and Outfall 003 - Heber Springs, AR  
NPDES Permit No. NPDES Permit AR0022381 AFIN 12-00029

Dear Mr. Kent Latch:

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 11 % effluent, which is above the critical dilution of 8 %. Any statistical difference with sublethal effects cannot be considered toxic due to the minimum significant difference (PMSD) calculated result being below the lower PMSD bounds. **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 11 % effluent, which is above the critical dilution of 8 %. The NOEC for reproduction occurred at 11 % effluent, which is above the critical dilution of 8 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey  
Laboratory Director

PDF cc: Heber Springs Water & Sewer  
ATTN: Mr. Kent Latch  
kent.hswd@sbcglobal.net

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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

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Appendix B: Chains of Custody

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	0.353	PASS
Control Growth CV < or = 40%	6.48	PASS
Growth Minimum Significant Difference 12 to 30%	10.7	BELOW
Critical Dilution CV < or = 40%	10.6	PASS

*Ceriodaphnia dubia* Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	27.7	PASS
Control CV < or = 40% per Surviving Female	20.8	PASS
Reproduction Minimum Significant Difference 13 to 47%	29.8	PASS
Critical Dilution CV < or = 40%	32.8	PASS

II. Outlined Report

A. Introduction

1. Permit Number: NPDES Permit AR0022381 AFIN 12-00029
2. Test Requirements: Chronic Biomonitoring, Quarterly  
Test Methods 1000.0 and 1002.0
3. Receiving Stream: White River Basin

B. Source of Effluent/Dilution Water

1. Effluent Samples:
  - a. Sampling Point: Outfall 002 and Outfall 003
  - b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.4	6.8	6.7
pH (standard units)	7.5	7.3	6.6
Alkalinity (mg/l as CaCO <sub>3</sub> )	58	25	41
Hardness (mg/l as CaCO <sub>3</sub> )	35	32	33
Conductivity (umhos/cm)	270	250	260
Residual Chlorine (mg/l)	0.050	0.070	<0.05
Ammonia as N (mg/l)	8.2	8.1	5.1

2. Dilution Water Samples: Synthetic Soft Water #3993

- a. Dates Prepared: May 21 through June 4, 2013
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.8	8.0	7.9
pH (standard units)	7.7	8.0	7.7
Alkalinity (mg/l as CaCO <sub>3</sub> )	30	30	30
Hardness (mg/l as CaCO <sub>3</sub> )	44	44	44
Conductivity (umhos/cm)	170	160	170
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: May 21, 2013 at 1600  
Date & Time Test Terminated: May 28, 2013 at 1340  
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: May 21, 2013 at 1310  
Date & Time Test Terminated: May 28, 2013 at 1500  
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 April 2, 2013 at 1330 to April 9, 2013 at 1130

The results were as follows: (Control No. 166187-1.)

Survival LC-50: 5995 mg/l

Growth IC-25: 5499 mg/l

Growth PMSD: 17.2

*Ceriodaphnia dubia*

Chronic reference tests are performed monthly.

A chronic reference test was performed on April 2, 2013 at 1510 to April 9, 2013 at 1500

The results were as follows: (Control No. 166187-2.)

Survival LC-50: 1732 mg/l

Growth IC-25: 1250 mg/l

Growth PMSD: 8.05

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	99.0	0.150
pH	SM 4500-H+ B	101	0.134
Conductivity	EPA 120.1	106	0.660

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: May 21, 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: May 21, 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

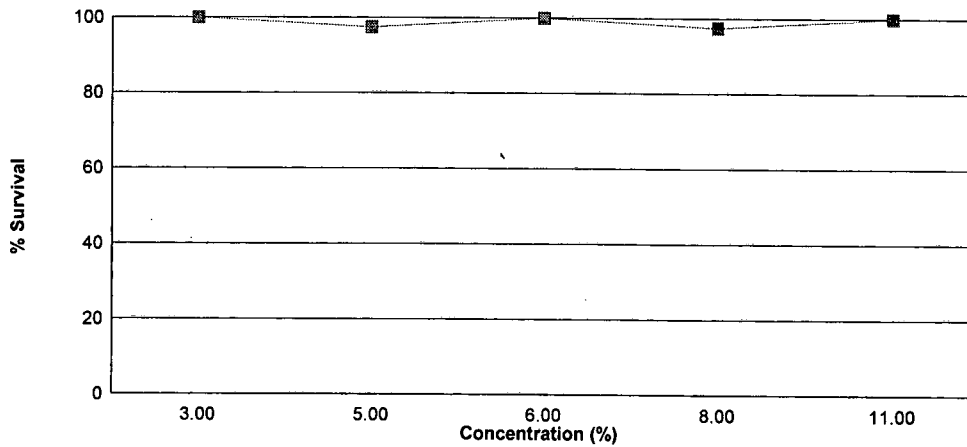
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 3 %, 5 %, 6 %, 8 %, 11 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 8 % effluent.

The test was initiated on May 21, 2013 at 1600 and continued through May 28, 2013 at 1340. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 11 % effluent
- b.) NOEC growth = 11 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.353
3 %	100	0.357
5 %	97.5	0.341
6 %	100	0.358
8 %	97.5	0.343
11 %	100	0.358



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

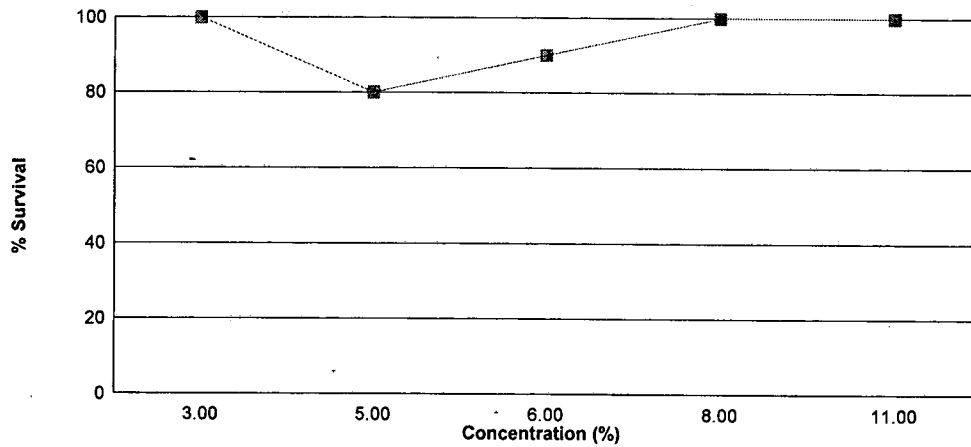
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 3 %, 5 %, 6 %, 8 %, 11 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 8 % effluent.

The test was initiated on May 21, 2013 at 1310 and continued through May 28, 2013 at 1500. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 11 % effluent
- b.) NOEC reproduction = 11 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	27.7
3 %	100	28.3
5 %	80.0	26.0
6 %	90.0	29.3
8 %	100	29.4
11 %	100	34.0

## Appendix A1: Test 1000.0

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

Date and Time Test Initiated: May 21, 2013 at 1600

Date and Time Test Terminated: May 28, 2013 at 1340

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
3 %	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
5 %	A	7	7	7	7	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	8
	E	8	8	8	8	8	8	8
6 %	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	7	7	7	7	7	7	7
	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

Appendix A1: Test 1000.0

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

Test Initiated: May 21, 2013 at 1600  
Test Terminated: May 28, 2013 at 1340

Drying Started: May 24, 2013 at 1445  
Drying Ended: May 30, 2013 at 1130

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.93231	.93522	0.00291	8	0.364
	B	.93725	.93980	0.00255	8	0.319
	C	.94236	.94525	0.00289	8	0.361
	D	.94262	.94537	0.00275	8	0.344
	E	.94382	.94685	0.00303	8	0.379
3 %	A	.94426	.94734	0.00308	8	0.385
	B	.94251	.94536	0.00285	8	0.356
	C	.94387	.94666	0.00279	8	0.349
	D	.94451	.94718	0.00267	8	0.334
	E	.94616	.94904	0.00288	8	0.360
5 %	A	.94844	.95076	0.00232	8	0.290
	B	.95098	.95380	0.00282	8	0.352
	C	.95153	.95423	0.00270	8	0.338
	D	.95174	.95463	0.00289	8	0.361
	E	.95273	.95566	0.00293	8	0.366
6 %	A	.95357	.95618	0.00261	8	0.326
	B	.95453	.95728	0.00275	8	0.344
	C	.95487	.95792	0.00305	8	0.381
	D	.95598	.95909	0.00311	8	0.389
	E	.95587	.95865	0.00278	8	0.348
8 %	A	.94087	.94333	0.00246	8	0.308
	B	.93671	.93975	0.00304	8	0.380
	C	.93295	.93579	0.00284	8	0.355
	D	.93175	.93416	0.00241	8	0.301
	E	.93029	.93326	0.00297	8	0.371
11 %	A	.92948	.93236	0.00288	8	0.360
	B	.92997	.93280	0.00283	8	0.354
	C	.93076	.93356	0.00280	8	0.350
	D	.93041	.93327	0.00286	8	0.358
	E	.92983	.93276	0.00293	8	0.366

## Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: May 21, 2013 at 1310

Date and Time Test Terminated: May 28, 2013 at 1500

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	0	0	0	0	0	0	0	0	10	0.00
4	4	0	4	3	0	0	0	0	4	3	18	10	1.80	
5	0	7	8	10	7	5	5	3	9	0	54	10	5.40	
6	7	6	0	0	9	11	10	11	0	8	62	10	6.20	
7	15	0	14	20	16	15	17	15	14	17	143	10	14.3	
8														
TOTAL	26	13	26	33	32	31	32	29	27	28	277	10	27.7	

Concentration: 3 %														
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	0	3	5	4	4	0	0	5	5	28	10	2.80	
5	1	6	8	9	12	9	8	4	0	0	57	10	5.70	
6	8	8	0	0	0	0	12	7	9	8	52	10	5.20	
7	14	0	19	22	19	17	19	0	18	18	146	10	14.6	
8														
TOTAL	25	14	30	36	35	30	39	11	32	31	283	10	28.3	

Concentration: 5 %														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	X	X	0	0	0	0	0	0	0	0	8	0.00	
2	0	X	X	0	0	0	0	0	0	0	0	8	0.00	
3	0	X	X	0	0	0	0	0	0	0	0	8	0.00	
4	2	X	X	4	4	0	0	0	4	0	14	8	1.75	
5	8	X	X	10	12	6	7	7	8	5	63	8	7.88	
6	0	X	X	0	0	14	9	11	0	9	43	8	5.38	
7	19	X	X	18	20	23	21	19	20	0	140	8	17.5	
8														
TOTAL	29	0	0	32	36	43	37	37	32	14	260	10	26.0	

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: May 21, 2013 at 1310

Date and Time Test Terminated: May 28, 2013 at 1500

Concentration: 6 %														
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	X	0	0	0	0	0	9	0.00
3	0	0	0	0	0	0	X	0	0	0	0	0	9	0.00
4	4	0	4	4	3	4	X	4	5	4	32	9	3.56	
5	8	6	10	10	11	10	X	9	7	8	79	9	8.78	
6	0	12	0	0	0	0	X	0	3	0	15	9	1.67	
7	19	18	18	19	18	19	X	19	18	19	167	9	18.6	
8														
TOTAL	31	36	32	33	32	33	0	32	33	31	293	10	29.3	

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	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	0	0	1	0	0	0	0	4	3	12	10	1.20	
5	6	3	7	10	8	9	0	8	0	9	60	10	6.00	
6	0	0	0	0	13	10	10	10	12	0	55	10	5.50	
7	11	10	10	17	23	16	22	18	19	21	167	10	16.7	
8														
TOTAL	21	13	17	28	44	35	32	36	35	33	294	10	29.4	

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	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	3	0	0	5	0	0	0	0	4	4	16	10	1.60	
5	8	7	8	8	7	6	3	8	11	12	78	10	7.80	
6	0	10	12	0	14	10	13	10	0	0	69	10	6.90	
7	20	18	19	21	22	0	18	20	19	20	177	10	17.7	
8														
TOTAL	31	35	39	34	43	16	34	38	34	36	340	10	34.0	

## 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	3 %	1	1.00000	1.39310
2	3 %	2	1.00000	1.39310
2	3 %	3	1.00000	1.39310
2	3 %	4	1.00000	1.39310
2	3 %	5	1.00000	1.39310
3	5 %	1	0.87500	1.20940
3	5 %	2	1.00000	1.39310
3	5 %	3	1.00000	1.39310
3	5 %	4	1.00000	1.39310
3	5 %	5	1.00000	1.39310
4	6 %	1	1.00000	1.39310
4	6 %	2	1.00000	1.39310
4	6 %	3	1.00000	1.39310
4	6 %	4	1.00000	1.39310
4	6 %	5	1.00000	1.39310
5	8 %	1	1.00000	1.39310
5	8 %	2	1.00000	1.39310
5	8 %	3	1.00000	1.39310
5	8 %	4	0.87500	1.20940
5	8 %	5	1.00000	1.39310
6	11 %	1	1.00000	1.39310
6	11 %	2	1.00000	1.39310
6	11 %	3	1.00000	1.39310
6	11 %	4	1.00000	1.39310
6	11 %	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	3 %	27.50	16.00	5.00	
3	5 %	25.00	16.00	5.00	
4	6 %	27.50	16.00	5.00	
5	8 %	25.00	16.00	5.00	
6	11 %	27.50	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 = 0.01548 W = 0.9582 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 = 9.167 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	0.001401	0.0002802	0.4344	
Within (Error)	24	0.01548	0.000645		
Total	29	0.01688			
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	0.3534	0.3534			
2	3 %	0.3568	0.3568	-0.2117		
3	5 %	0.3414	0.3414	0.7471		
4	6 %	0.3576	0.3576	-0.2615		
5	8 %	0.343	0.343	0.6475		
6	11 %	0.3576	0.3576	-0.2615		
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	3 %	5	0.03791	10.7	-0.0034	
3	5 %	5	0.03791	10.7	0.012	
4	6 %	5	0.03791	10.7	-0.0042	
5	8 %	5	0.03791	10.7	0.0104	
6	11 %	5	0.03791	10.7	-0.0042	

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
3 %	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
5 %	8	2	10
Total	18	2	20

Critical Fisher's value (10,10,10) ( $\alpha=0.05$ ) is 6. b value is 8. 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
6 %	9	1	10
Total	19	1	20

Critical Fisher's value (10,10,10) ( $\alpha=0.05$ ) is 6. b value is 9. 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
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.

Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

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.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	3 %	10	0	
2	5 %	10	2	
3	6 %	10	1	
4	8 %	10	0	
5	11 %	10	0	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Kolmogorov Test for Normality	No Transformation
D = 0.2167 D* = 1.7 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data FAIL normality test (alpha = 0.01).	

Steel's Many-One Rank Test					No Transformation
Ho: Control < Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	3 %	113.50	75.00	10.00	
3	5 %	117.50	75.00	10.00	
4	6 %	130.50	75.00	10.00	
5	8 %	119.50	75.00	10.00	
6	11 %	142.50	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	330.2	66.04	1.165	
Within (Error)	51	2891	56.69		
Total	56	3221			
Critical F = 3.4 (alpha = 0.01, df = 5,51)					
2.4 (alpha = 0.05, df = 5,51)					
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	27.7	27.7			
2	3 %	28.3	28.3	-0.1782		
3	5 %	32.5	32.5	-1.344		
4	6 %	32.556	32.556	-1.404		
5	8 %	29.4	29.4	-0.5049		
6	11 %	34	34	-1.871		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,51)						
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	3 %	10	7.778	28.1	-0.6		
3	5 %	8	8.25	29.8	-4.8		
4	6 %	9	7.991	28.8	-4.856		
5	8 %	10	7.778	28.1	-1.7		
6	11 %	10	7.778	28.1	-6.3		

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: May 21, 2013 at 1058

Date and Time Test Terminated: May 28, 2013 at 1500

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.8	8.0	7.4	7.9	7.6	7.4
	Final *1	7.6	7.4	7.5	7.0	7.1	7.2	6.4
	Final *2	7.9	7.6	8.2	8.3	8.0	8.0	7.7
pH, units	Initial	7.7	8.1	8.0	7.7	7.7	7.6	7.7
	Final *1	7.6	7.6	7.5	7.3	7.4	7.5	7.3
	Final *2	7.7	7.7	8.0	8.0	8.1	8.1	7.7
Alkalinity, mg CaCO <sub>3</sub> /l		30	NA	30	NA	30	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		44	NA	44	NA	44	NA	NA
Conductivity, umhos/cm		170	160	160	160	170	180	190
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 3 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.7	7.5	7.8	7.9	7.7	7.7
	Final *1	7.7	6.9	7.1	6.6	7.1	7.2	7.0
	Final *2	7.1	7.7	7.8	8.4	7.9	7.6	7.9
pH, units	Initial	7.6	7.9	7.8	7.6	7.5	7.6	7.7
	Final *1	7.5	7.4	7.4	7.2	7.4	7.5	7.3
	Final *2	7.6	7.6	8.0	8.0	8.1	8.1	7.8

Effluent Conc.: 5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.8	7.7	7.8	7.6	7.4	7.5
	Final *1	7.7	6.8	7.1	6.8	6.9	7.3	7.2
	Final *2	8.0	7.8	7.8	8.3	7.8	7.9	7.8
pH, units	Initial	7.6	7.8	7.8	7.5	7.4	7.6	7.8
	Final *1	7.5	7.4	7.4	7.3	7.4	7.6	7.5
	Final *2	7.6	7.6	8.0	7.9	8.1	8.3	7.9

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: May 21, 2013 at 1058

Date and Time Test Terminated: May 28, 2013 at 1500

Effluent Conc.: 6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.8	7.8	7.7	7.6	7.5	7.8
	Final *1	7.6	7.1	7.2	6.9	7.2	7.2	7.0
	Final *2	8.0	7.4	8.0	8.2	8.0	8.0	7.7
pH, units	Initial	7.6	7.7	7.7	7.4	7.4	7.6	7.7
	Final *1	7.5	7.4	7.5	7.4	7.4	7.5	7.3
	Final *2	7.6	7.6	8.0	7.9	8.1	8.2	7.7

Effluent Conc.: 8 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.3	7.7	7.8	7.4	7.5	7.5	7.4
	Final *1	7.6	6.7	7.1	7.4	7.2	7.3	6.9
	Final *2	7.9	7.6	7.8	8.0	7.8	8.0	7.6
pH, units	Initial	7.6	7.7	7.7	7.4	7.3	7.6	7.7
	Final *1	7.5	7.4	7.4	7.4	7.4	7.5	7.3
	Final *2	7.5	7.5	7.9	7.9	8.1	8.2	7.8
Alkalinity, mg CaCO <sub>3</sub> /l	41	NA	33	NA	33	NA	NA	NA
Hardness, mg CaCO <sub>3</sub> /l	44	NA	42	NA	43	NA	NA	NA
Conductivity, umhos/cm	170	170	170	170	180	180	200	200
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

Effluent Conc.: 11 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.6	7.7	7.6	7.6	7.5	7.5
	Final *1	7.6	6.6	6.9	7.0	7.0	7.2	7.1
	Final *2	7.6	7.6	7.9	8.1	8.0	7.9	7.5
pH, units	Initial	7.6	7.7	7.6	7.4	7.2	7.6	7.6
	Final *1	7.5	7.4	7.4	7.3	7.4	7.5	7.3
	Final *2	7.5	7.5	8.0	7.9	8.2	8.2	7.8

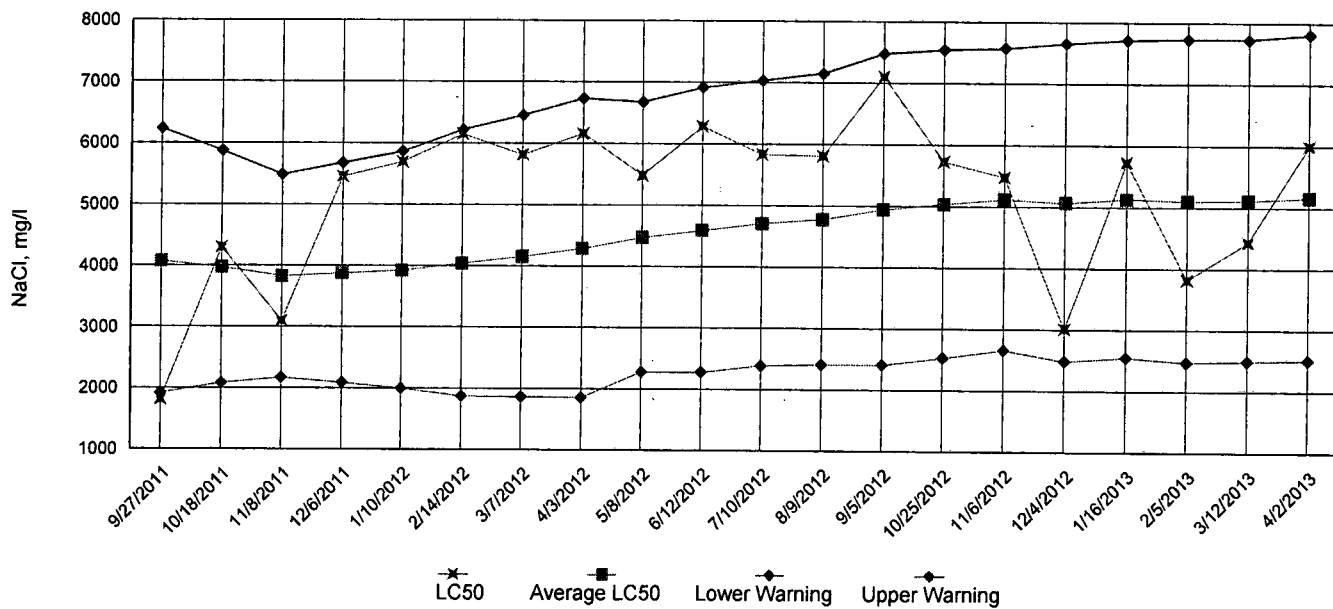
\*1 = data from the *Pimephales promelas* (Fathead Minnow) test

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

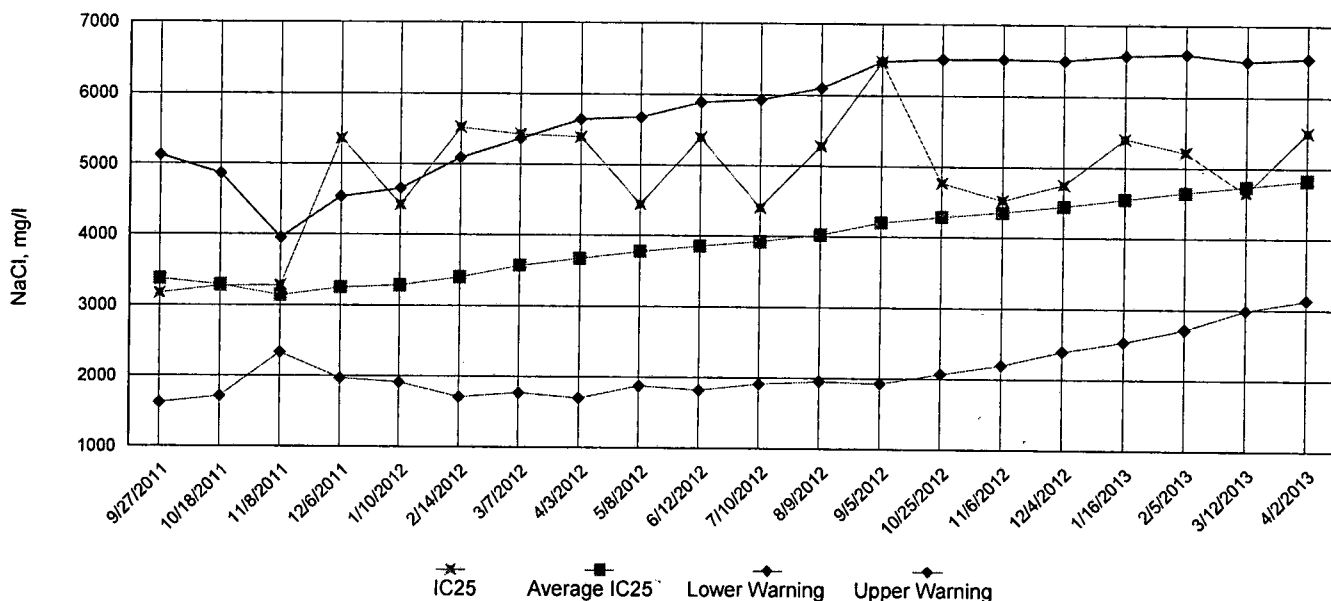


Appendix A4: Test 1000.0  
Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data

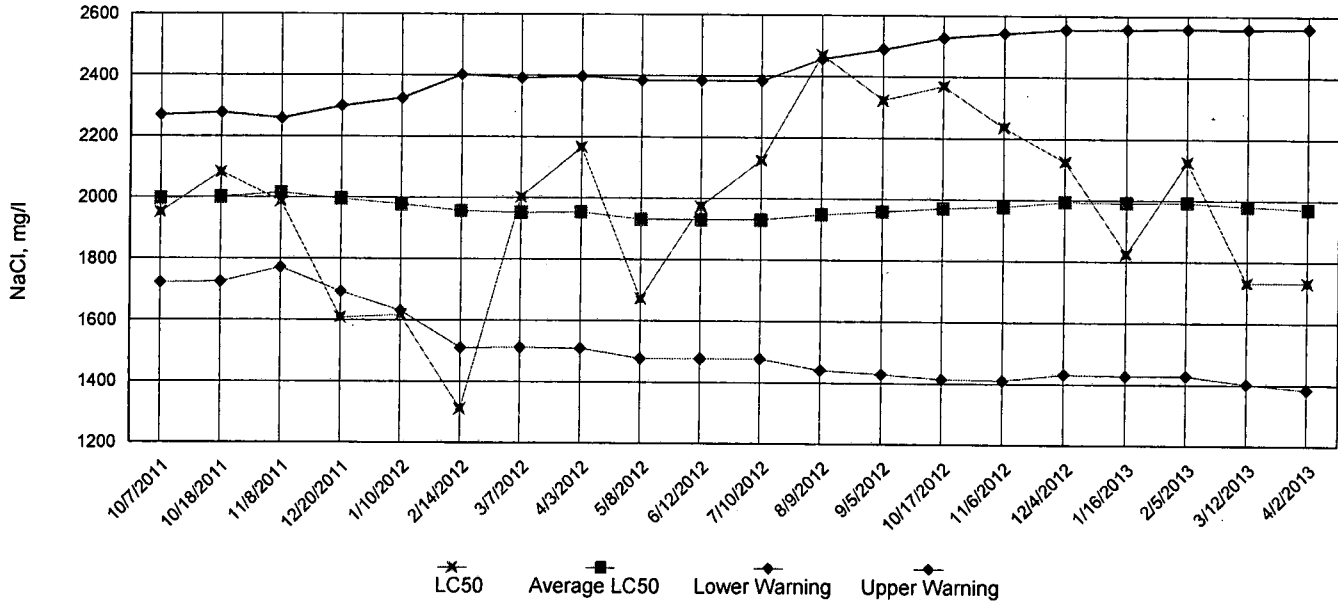


IC25 Growth Data

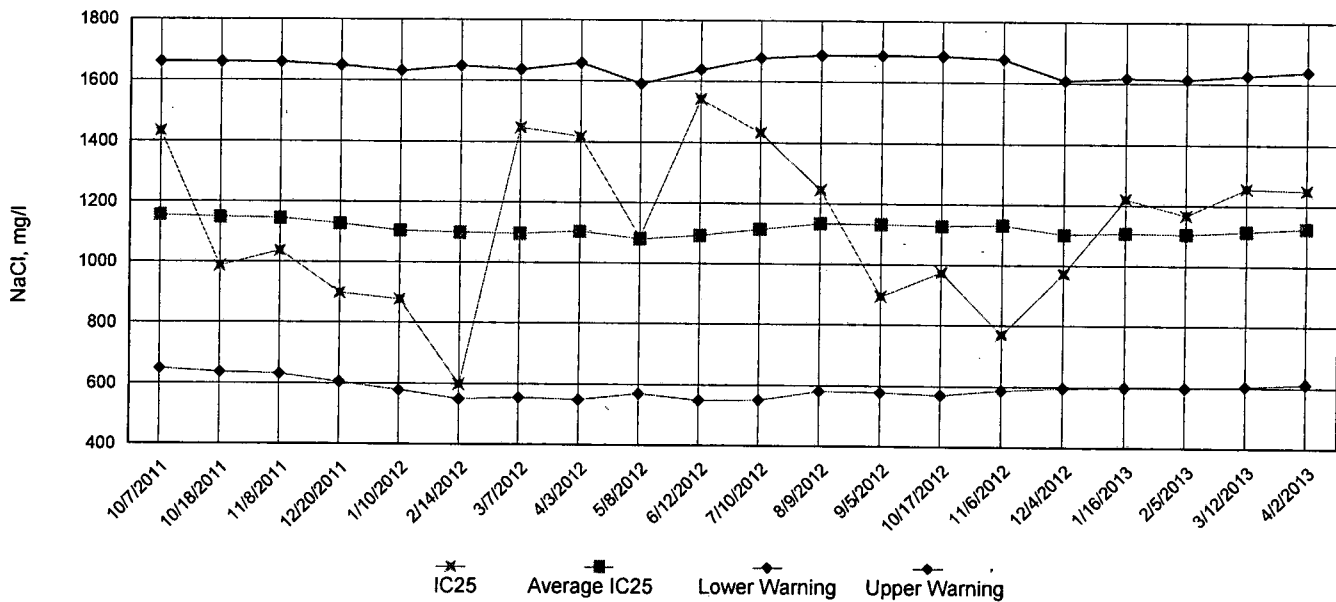


Appendix A4: Test 1002.0  
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1000.0

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

Permittee: Heber Springs Water & Sewer

NPDES No.: NPDES Permit AR0022381 AFIN 12-00029

Date and Time Test Initiated: May 21, 2013 at 1600

Date and Time Test Terminated: May 28, 2013 at 1340

Dilution water used: Synthetic Soft Water #3993

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
3 %	100	100	100	100	100	100	100	100	0.00
5 %	87.5	100	100	100	100	97.5	97.5	97.5	5.73
6 %	100	100	100	100	100	100	100	100	0.00
8 %	100	100	100	87.5	100	97.5	97.5	97.5	5.73
11 %	100	100	100	100	100	100	100	100	0.00

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.364	0.319	0.361	0.344	0.379	0.353	6.48
3 %	0.385	0.356	0.349	0.334	0.360	0.357	5.22
5 %	0.290	0.352	0.338	0.361	0.366	0.341	8.97
6 %	0.326	0.344	0.381	0.389	0.348	0.358	7.41
8 %	0.308	0.380	0.355	0.301	0.371	0.343	10.6
11 %	0.360	0.354	0.350	0.358	0.366	0.358	1.70

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	(8 %)	<u>          </u> YES	<u>  X  </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u>          </u> YES	<u>          </u> 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	(8 %)	<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   (TLP6C)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]:   0   (TGP6C)
5. NOEC Pimephales Lethality:   11 %   (TOP6C)
6. LOEC Pimephales Lethality:   11 %   (TXP6C)
7. NOEC Pimephales Sublethality:   11 %   (TPP6C)
8. LOEC Pimephales Sublethality:   11 %   (TYP6C)
9. Coefficient of variation for Pimephales growth:   10.6   (TQP6C)

Appendix B: Test 1000.0

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

PERMITTEE: Heber Springs Water & Sewer SAMPLE No. 1 COLLECTED ending: DATE: May 21, 2013 TIME: 0800  
 NPDES NO.: NPDES Permit AR0022381 AFIN SAMPLE No. 2 COLLECTED ending: DATE: May 22, 2013 TIME: 0800  
 CONTACT: Mr. Kent Latch SAMPLE No. 3 COLLECTED ending: DATE: May 24, 2013 TIME: 0800  
 ANALYST: 280, 298, 304, 307 Test Initiated: DATE: May 21, 2013 TIME: 1600  
 Test Terminated: DATE: May 28, 2013 TIME: 1340

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	8.0	7.4	7.9	7.6	7.4
Final	7.6	7.4	7.5	7.0	7.1	7.2	6.4
pH Initial	7.7	8.1	8.0	7.7	7.7	7.6	7.7
Final	7.6	7.6	7.5	7.3	7.4	7.5	7.3
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	44	NA	44	NA	44	NA	NA
Conductivity	170	160	160	160	170	180	190
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 3 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.7	7.5	7.8	7.9	7.7	7.7
Final	7.7	6.9	7.1	6.6	7.1	7.2	7.0
pH Initial	7.6	7.9	7.8	7.6	7.5	7.6	7.7
Final	7.5	7.4	7.4	7.2	7.4	7.5	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	160	170	180	180	200
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 5 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.7	7.8	7.6	7.4	7.5
Final	7.7	6.8	7.1	6.8	6.9	7.3	7.2
pH Initial	7.6	7.8	7.8	7.5	7.4	7.6	7.8
Final	7.5	7.4	7.4	7.3	7.4	7.6	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	160	170	170	180	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.8	7.7	7.6	7.5	7.8
Final	7.6	7.1	7.2	6.9	7.2	7.2	7.0
pH Initial	7.6	7.7	7.7	7.4	7.4	7.6	7.7
Final	7.5	7.4	7.5	7.4	7.4	7.5	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	170	180	200
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 8 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.3	7.7	7.8	7.4	7.5	7.5	7.4
Final	7.6	6.7	7.1	7.4	7.2	7.3	6.9
pH Initial	7.6	7.7	7.7	7.4	7.3	7.6	7.7
Final	7.5	7.4	7.4	7.4	7.4	7.5	7.3
Alkalinity	41	NA	33	NA	33	NA	NA
Hardness	44	NA	42	NA	43	NA	NA
Conductivity	170	170	170	170	180	180	200
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.6	7.7	7.6	7.6	7.5	7.5
Final	7.6	6.6	6.9	7.0	7.0	7.2	7.1
pH Initial	7.6	7.7	7.6	7.4	7.2	7.6	7.6
Final	7.5	7.4	7.4	7.3	7.4	7.5	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	170	170	170	170	180	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: Heber Springs Water & Sewer

NPDES No.: NPDES Permit AR0022381 AFIN 12-00029

Date and Time Test Initiated: May 21, 2013 at 1310

Date and Time Test Terminated: May 28, 2013 at 1500

Dilution water used: Synthetic Soft Water #3993

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		3 %	5 %	6 %	8 %	11 %
24 hour	100	100	80.0	100	100	100
48 hour	100	100	80.0	90.0	100	100
7 day	100	100	80.0	90.0	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		3 %	5 %	6 %	8 %	11 %
A	26	25	29	31	21	31
B	13	14	0	36	13	35
C	26	30	0	32	17	39
D	33	36	32	33	28	34
E	32	35	36	32	44	43
F	31	30	43	33	35	16
G	32	39	37	0	32	34
H	29	11	37	32	36	38
I	27	32	32	33	35	34
J	28	31	14	31	33	36
Mean per Adult	27.7	28.3	26.0	29.3	29.4	34.0
Mean per Surviving Adult	27.7	28.3	32.5	32.6	29.4	34.0
CV %	20.8	32.5	26.5	4.64	32.8	21.0

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	(8 %)	_____ YES	<u>  X  </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ 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	(8 %)	_____ 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   (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]:   0   (TGP3B)
5. NOEC Ceriodaphnia Lethality:   11 %   (TOP3B)
6. LOEC Ceriodaphnia Lethality:   11 %   (TXP3B)
7. NOEC Ceriodaphnia Sublethality:   11 %   (TPP3B)
8. LOEC Ceriodaphnia Sublethality:   11 %   (TYP3B)
9. Coefficient of variation for Ceriodaphnia Reproduction:   32.8   (TQP3B)

Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM

*Ceriodaphnia dubia*

CHEMICAL PARAMETERS CHART

PERMITTEE: Heber Springs Water & Sewer SAMPLE No. 1 COLLECTED ending: DATE: May 21, 2013 TIME: 0800  
 NPDES NO.: NPDES Permit AR0022381 AFIN SAMPLE No. 2 COLLECTED ending: DATE: May 22, 2013 TIME: 0800  
 CONTACT: Mr. Kent Latch SAMPLE No. 3 COLLECTED ending: DATE: May 24, 2013 TIME: 0800  
 ANALYST: 280, 298, 304, 307 Test Initiated: DATE: May 21, 2013 TIME: 1310  
 Test Terminated: DATE: May 28, 2013 TIME: 1500

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	8.0	7.4	7.9	7.6	7.4
Final	7.9	7.6	8.2	8.3	8.0	8.0	7.7
pH Initial	7.7	8.1	8.0	7.7	7.7	7.6	7.7
Final	7.7	7.7	8.0	8.0	8.1	8.1	7.7
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	44	NA	44	NA	44	NA	NA
Conductivity	170	160	160	160	170	180	190
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 3 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.7	7.5	7.8	7.9	7.7	7.7
Final	7.1	7.7	7.8	8.4	7.9	7.6	7.9
pH Initial	7.6	7.9	7.8	7.6	7.5	7.6	7.7
Final	7.6	7.6	8.0	8.0	8.1	8.1	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	160	170	180	180	200
Chlorine	NA	NA	NA	NA	NA	NA	NA

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

DILUTION 6 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.8	7.7	7.6	7.5	7.8
Final	8.0	7.4	8.0	8.2	8.0	8.0	7.7
pH Initial	7.6	7.7	7.7	7.4	7.4	7.6	7.7
Final	7.6	7.6	8.0	7.9	8.1	8.2	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	170	180	200
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 8 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.3	7.7	7.8	7.4	7.5	7.5	7.4
Final	7.9	7.6	7.8	8.0	7.8	8.0	7.6
pH Initial	7.6	7.7	7.7	7.4	7.3	7.6	7.7
Final	7.5	7.5	7.9	7.9	8.1	8.2	7.8
Alkalinity	41	NA	33	NA	33	NA	NA
Hardness	44	NA	42	NA	43	NA	NA
Conductivity	170	170	170	170	180	180	200
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 11 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.6	7.7	7.6	7.6	7.5	7.5
Final	7.6	7.6	7.9	8.1	8.0	7.9	7.5
pH Initial	7.6	7.7	7.6	7.4	7.2	7.6	7.6
Final	7.5	7.5	8.0	7.9	8.2	8.2	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	170	170	170	170	180	190
Chlorine	NA	NA	NA	NA	NA	NA	NA



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: <u>Heber Springs Water</u>			PO No. <u>14449</u>		NO OF BOTTLES	ANALYSES REQUESTED <sup>1</sup>										AIC CONTROL NO: <u>167584</u>								
Project: <u>2ND QUARTER</u>			SAMPLE MATRIX			<u>2ND QUARTER BIOMONITORING CHRONIC</u>										AIC PROPOSAL NO:								
Reference: <u>BIOMONITORING</u>																		Carrier/Tracking No. <u>Heber Springs Water</u>						
Project Manager: <u>Kent Latch</u>			WATER	SOIL	BOTTLES											Received Temperature C <u>2</u>								
Sampled By: <u>S. Q. &amp; STEVE UPTON</u>			G R A B	C O M P												Remarks								
AIC No.	Sample Identification	Date/Time Collected																						
<u>1</u>	<u>OUTFALL 002N EFFL H.S.W.T.P</u>	<u>5-20-13 8AM TO 5-21-13 8AM</u>		<input checked="" type="checkbox"/>	<u>3</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 <u>7</u> DAYS						Relinquished By: <u>[Signature]</u>				Date/Time <u>5-21-13 10:45 AM</u>				Received By:				Date/Time						
Expedited results requested by: <u>Kent Latch</u>						Relinquished By:				Date/Time				Received in Lab By: <u>[Signature]</u>				Date/Time <u>5-21-13 1045</u>						
Who should AIC contact with questions: <u>SAM QUARRY</u>						Comments:																		
Phone: <u>501-362-3422</u> Fax: <u>501-362-3338</u>																								
Report Attention to: <u>Kent Latch</u>																								
Report Address to: <u>Heber Springs Water Dept 1108 WEST FRONT ST Heber Springs, AR. 72543</u>																								



### CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

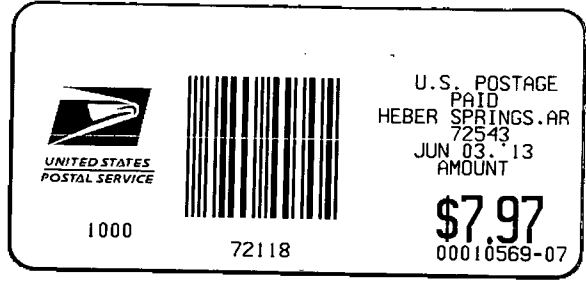
PAGE OF

Client: <u>Heber Springs Water</u>				PO No. <u>14449</u>	NO OF BOTTLES <b>3</b>	ANALYSES REQUESTED <sup>1</sup> <u>2ND QUARTER BIOMONITORING Change</u>								AIC CONTROL NO: <u>167584</u>
Project: <u>2ND QUARTER</u>				SAMPLE MATRIX										AIC PROPOSAL NO:
Reference: <u>BIOMONITORING</u>				WATER										Carrier/Tracking No. <u>Heber Springs Water</u>
Project Manager: <u>Kent Latch</u>				SOIL										Received Temperature C <u>22</u>
Sampled By: <u>S.O. Steve Upton</u>		G R A B	C O M P	A T E R	S O I L							Remarks		
AIC No.	Sample Identification	Date/Time Collected												
<u>2</u>	<u>OUTFALL #02A 24 HR COMP TO H.S. W.W.T.P (EFF)</u>	<u>5-21-13 8AM</u> <u>5-22-13 8AM</u>	<input checked="" type="checkbox"/>	<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 <u>7</u> DAYS						Relinquished By: <u>[Signature]</u>		Date/Time: <u>10:43 5/22/13</u>		Received By:		Date/Time		
Expedited results requested by: <u>Kent Latch</u>						Relinquished By:		Date/Time		Received in Lab By: <u>[Signature]</u>		Date/Time: <u>5-22-13 1043</u>		
Who should AIC contact with questions: <u>SAAM QUARRY</u>						Comments:								
Phone: <u>501-362-3422</u> Fax: <u>501-362-3338</u>														
Report Attention to: <u>Kent Latch</u>														
Report Address to: <u>Heber Springs Water 1108 W. FRONT ST Heber Springs, AR. 72543</u>														

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: <u>Heber Springs Water</u>			PO No. <u>14449</u>		NO OF BOTTLES	ANALYSES REQUESTED'										AIC CONTROL NO: <u>167584</u>	
Project: <u>2ND QUARTER</u>			SAMPLE MATRIX			<u>2ND QUARTER</u> <u>BIOBODORITING</u> <u>CHRONIC</u>										AIC PROPOSAL NO:	
Reference: <u>BIOBODORITING</u>			WATER		SOIL											GRA B	
Project Manager: <u>Kent Latch</u>			SAMPLED BY: <u>S.O. &amp; Steve Upton</u>										Remarks				
AIC No.	Sample Identification	Date/Time Collected	GRA B	COMP	WATER	SOIL											
<u>3</u>	<u>SUTRAL 001A EFFL. Heber W.W.T.P.</u>	<u>5-23-13 SAM</u> <u>5-24-13 SAM</u>		<u>✓</u>	<u>✓</u>		<u>3</u>										
Container Type			Preservative										Field pH calibration on _____ @ _____ 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 <u>7</u> DAYS					Relinquished By: <u>SAM QUERRY</u>		Date/Time <u>5-24-13</u> <u>8:15 AM.</u>		Received By: <u>Randy White</u>		Date/Time <u>5-24-13</u> <u>8:15 AM</u>						
Expedited results requested by: <u>Kent Latch</u>					Relinquished By: <u>Randy White</u>		Date/Time <u>5-24-13</u> <u>9:45 AM</u>		Received in Lab By: <u>Anna Paulsen</u>		Date/Time <u>5-24-13</u> <u>9:45 AM</u>						
Who should AIC contact with questions: <u>SAM QUERRY</u>					Comments												
Phone: <u>501-362-3422</u> Fax: <u>501-362-3738</u>																	
Report Attention to: <u>Kent Latch</u>																	
Report Address to: <u>Heber Springs Water</u> <u>1108 W. FRONT ST.</u> <u>Heber Springs, AR 72543</u>																	



**RETURN RECEIPT  
REQUESTED**

**Heber Springs Water & Sewer Dept.**  
1108 W. Front St.  
Heber Springs, AR 72543  
PH: 501-362-5501 FAX: 501-362-3338

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**TO:** Arkansas Dept. of Environmental Quality  
5301 Northshore Drive  
North Little Rock, AR 72118-5317

