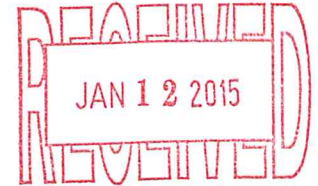
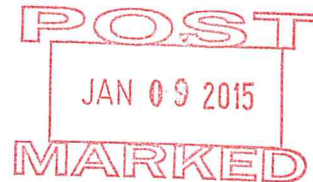




November 21, 2014  
Control No. 184502-1  
Page 1 of 31



November 21, 2014  
Test Results of  
Fourth Quarter  
Chronic 7-Day Renewal  
Biomonitoring Testing  
for  
Plant Effluent  
City of Hot Springs  
Control No. 184502-1



Prepared for:

Mr. James Sorrells  
City of Hot Springs  
320 Davidson Drive  
Hot Springs, AR 71901

Prepared by:

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



City of Hot Springs  
ATTN: Mr. James Sorrells  
320 Davidson Drive  
Hot Springs, AR 71901

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*  
Plant Effluent - City of Hot Springs  
NPDES Permit No. AR0033880 AFIN#26-00145

Dear Mr. James Sorrells:

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 87 % effluent, which is above the critical dilution of 65 %. 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 87 % effluent, which is above the critical dilution of 65 %. The NOEC for reproduction occurred at 87 % effluent, which is above the critical dilution of 65 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey  
Laboratory Director

PDF cc: City of Hot Springs  
ATTN: Ms. Jessica Burks  
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City of Hot Springs  
ATTN: Mr. Dennis Brunson  
dbrunson@cityhs.net

City of Hot Springs  
ATTN: Mr. James Sorrells  
jsorrells@cityhs.net

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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	0.305	PASS
Control Growth CV < or = 40%	4.75	PASS
Growth Minimum Significant Difference 12 to 30%	6.80	BELOW
Critical Dilution CV < or = 40%	5.66	PASS

*Ceriodaphnia dubia* Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	31.5	PASS
Control CV < or = 40% per Surviving Female	20.2	PASS
Reproduction Minimum Significant Difference 13 to 47%	16.5	PASS
Critical Dilution CV < or = 40%	12.6	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0033880 AFIN#26-00145
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Methods 1000.0 and 1002.0
3. Receiving Stream: Lake Catherine

B. Source of Effluent/Dilution Water

1. Effluent Samples:

- a. Sampling Point: Plant Effluent
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.8	9.3	8.8
pH (standard units)	6.6	6.9	6.6
Alkalinity (mg/l as CaCO <sub>3</sub> )	20	27	31
Hardness (mg/l as CaCO <sub>3</sub> )	60	74	88
Conductivity (umhos/cm)	300	350	380
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	<0.1	<0.1	<0.1

2. Dilution Water Samples: Synthetic Soft Water #4153

- a. Dates Prepared: October 31 through November 14, 2014
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.6	7.7	8.0
pH (standard units)	7.3	7.3	7.0
Alkalinity (mg/l as CaCO <sub>3</sub> )	31	31	31
Hardness (mg/l as CaCO <sub>3</sub> )	48	48	48
Conductivity (umhos/cm)	160	160	150
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: November 11, 2014 at 1140  
Date & Time Test Terminated: November 18, 2014 at 0940  
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: November 11, 2014 at 1140  
Date & Time Test Terminated: November 17, 2014 at 1315  
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 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 October 22, 2014 at 1030 to October 29, 2014 at 1230

The results were as follows: (Control No. 183793-1.)

Survival LC-50: 4815 mg/l

Growth IC-25: 3427 mg/l

Growth PMSD: 19.3

*Ceriodaphnia dubia*

Chronic reference tests are performed monthly.

A chronic reference test was performed on October 22, 2014 at 1315 to October 28, 2014 at 1500

The results were as follows: (Control No. 183793-2.)

Survival LC-50: 2236 mg/l

Growth IC-25: 993.1 mg/l

Growth PMSD: 13.3

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	99.9	5.73
pH	SM 4500-H+ B	100	0.271
Conductivity	EPA 120.1	101	8.00

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: November 11, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

*Ceriodaphnia dubia*

Date: November 11, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

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

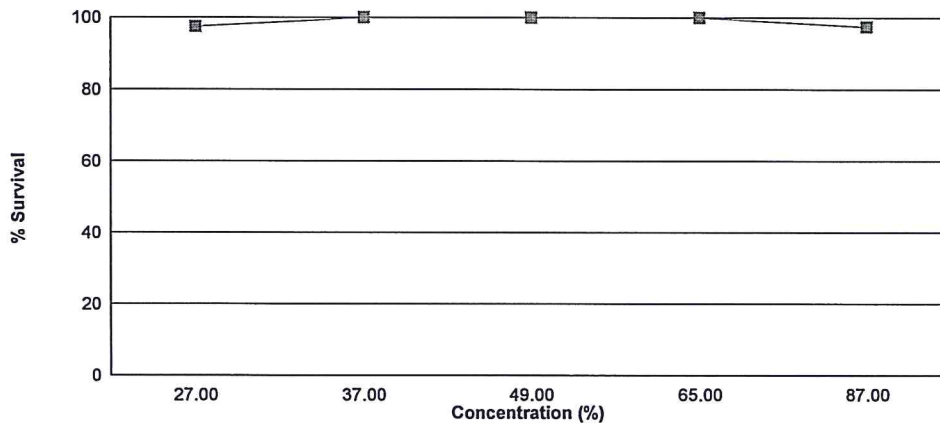
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 27 %, 37 %, 49 %, 65 %, 87 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 65 % effluent.

The test was initiated on November 11, 2014 at 1140 and continued through November 18, 2014 at 0940. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 87 % effluent
- b.) NOEC growth = 87 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.305
27 %	97.5	0.322
37 %	100	0.306
49 %	100	0.320
65 %	100	0.303
87 %	97.5	0.326



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

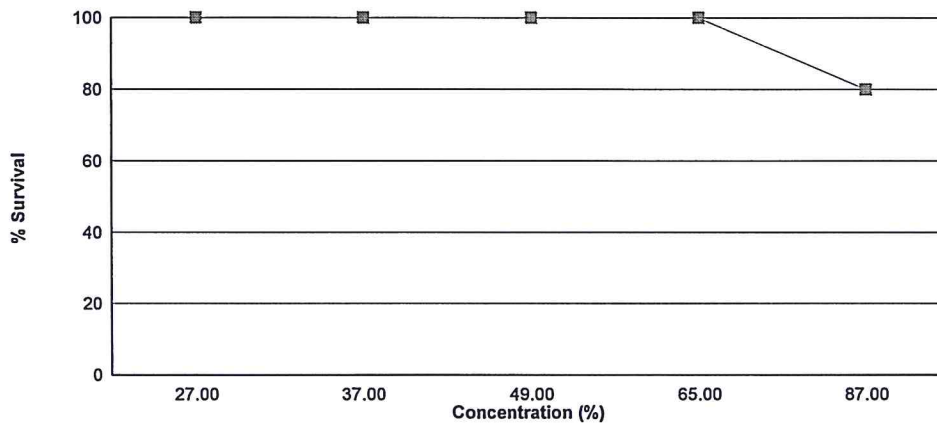
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 27 %, 37 %, 49 %, 65 %, 87 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 65 % effluent.

The test was initiated on November 11, 2014 at 1140 and continued through November 17, 2014 at 1315. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 87 % effluent
- b.) NOEC reproduction = 87 % effluent



Summary of the 6-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	31.5
27 %	100	29.3
37 %	100	30.9
49 %	100	30.9
65 %	100	28.0
87 %	80.0	24.4



Appendix A1: Test 1000.0

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

Date and Time Test Initiated: November 11, 2014 at 1140

Date and Time Test Terminated: November 18, 2014 at 0940

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
27 %	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	7
	E	8	8	8	8	8	8	8
37 %	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
49 %	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
65 %	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
87 %	A	8	8	8	8	8	8	8
	B	7	7	7	7	7	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

Appendix A1: Test 1000.0

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

Test Initiated: November 11, 2014 at 1140  
Test Terminated: November 18, 2014 at 0940

Drying Started: November 17, 2014 at 1950  
Drying Ended: November 19, 2014 at 1200

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.92605	.92868	0.00263	8	0.329
	B	.92565	.92801	0.00236	8	0.295
	C	.92400	.92647	0.00247	8	0.309
	D	.92522	.92760	0.00238	8	0.298
	E	.92880	.93116	0.00236	8	0.295
27 %	A	.92284	.92548	0.00264	8	0.330
	B	.91970	.92231	0.00261	8	0.326
	C	.92329	.92571	0.00242	8	0.302
	D	.92550	.92810	0.00260	8	0.325
	E	.92429	.92692	0.00263	8	0.329
37 %	A	.92685	.92935	0.00250	8	0.312
	B	.92383	.92627	0.00244	8	0.305
	C	.92007	.92254	0.00247	8	0.309
	D	.92170	.92412	0.00242	8	0.302
	E	.92195	.92436	0.00241	8	0.301
49 %	A	.92329	.92599	0.00270	8	0.338
	B	.92807	.93050	0.00243	8	0.304
	C	.92757	.93015	0.00258	8	0.322
	D	.92749	.93001	0.00252	8	0.315
	E	.92919	.93176	0.00257	8	0.321
65 %	A	.91658	.91893	0.00235	8	0.294
	B	.91506	.91735	0.00229	8	0.286
	C	.91813	.92061	0.00248	8	0.310
	D	.91744	.91979	0.00235	8	0.294
	E	.91766	.92029	0.00263	8	0.329
87 %	A	.92032	.92287	0.00255	8	0.319
	B	.91684	.91935	0.00251	8	0.314
	C	.91772	.92049	0.00277	8	0.346
	D	.92043	.92320	0.00277	8	0.346
	E	.91912	.92157	0.00245	8	0.306

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: November 11, 2014 at 1140

Date and Time Test Terminated: November 17, 2014 at 1315

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	4	4	4	0	3	4	0	0	4	4	27	10	2.70	
4	8	9	8	4	7	9	4	5	8	7	69	10	6.90	
5	9	8	9	12	10	7	8	2	11	9	85	10	8.50	
6	14	14	13	13	14	15	13	10	16	12	134	10	13.4	
7														
8														
TOTAL	35	35	34	29	34	35	25	17	39	32	315	10	31.5	

Concentration: 27 %														
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	4	0	4	4	4	0	4	0	0	0	20	10	2.00	
4	7	5	8	9	10	5	9	5	4	4	66	10	6.60	
5	8	6	7	7	0	9	10	9	8	9	73	10	7.30	
6	13	14	14	13	12	14	12	11	15	16	134	10	13.4	
7														
8														
TOTAL	32	25	33	33	26	28	35	25	27	29	293	10	29.3	

Concentration: 37 %														
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	4	0	0	4	4	0	3	4	4	0	23	10	2.30	
4	7	5	4	7	9	6	7	8	8	4	65	10	6.50	
5	8	10	7	9	2	10	10	9	11	9	85	10	8.50	
6	12	14	16	15	13	14	13	10	14	15	136	10	13.6	
7														
8														
TOTAL	31	29	27	35	28	30	33	31	37	28	309	10	30.9	



Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: November 11, 2014 at 1140  
Date and Time Test Terminated: November 17, 2014 at 1315

Concentration: 49 %														
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	4	0	4	4	3	0	0	0	0	4	19	10	1.90	
4	7	5	8	8	6	5	4	4	3	9	59	10	5.90	
5	9	8	10	9	10	9	8	10	9	7	89	10	8.90	
6	13	16	12	13	14	17	15	16	14	12	142	10	14.2	
7														
8														
TOTAL	33	29	34	34	33	31	27	30	26	32	309	10	30.9	

Concentration: 65 %														
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	4	0	3	4	4	0	0	0	0	0	15	10	1.50	
4	10	4	7	8	8	4	5	4	3	4	57	10	5.70	
5	8	9	8	9	0	9	10	8	7	8	76	10	7.60	
6	11	17	10	11	13	15	16	13	12	14	132	10	13.2	
7														
8														
TOTAL	33	30	28	32	25	28	31	25	22	26	280	10	28.0	

Concentration: 87 %														
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	4	0	0	0	0	4	X	0	0	4	12	9	1.33	
4	8	5	4	4	4	7	X	5	4	9	50	9	5.56	
5	9	8	9	9	7X	9	X	10	8	9	78	8	9.75	
6	15	14	16	11	X	17	X	0	16	15	104	8	13.0	
7														
8														
TOTAL	36	27	29	24	11	37	0	15	28	37	244	10	24.4	



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	27 %	1	1.00000	1.39310
2	27 %	2	1.00000	1.39310
2	27 %	3	1.00000	1.39310
2	27 %	4	0.87500	1.20940
2	27 %	5	1.00000	1.39310
3	37 %	1	1.00000	1.39310
3	37 %	2	1.00000	1.39310
3	37 %	3	1.00000	1.39310
3	37 %	4	1.00000	1.39310
3	37 %	5	1.00000	1.39310
4	49 %	1	1.00000	1.39310
4	49 %	2	1.00000	1.39310
4	49 %	3	1.00000	1.39310
4	49 %	4	1.00000	1.39310
4	49 %	5	1.00000	1.39310
5	65 %	1	1.00000	1.39310
5	65 %	2	1.00000	1.39310
5	65 %	3	1.00000	1.39310
5	65 %	4	1.00000	1.39310
5	65 %	5	1.00000	1.39310
6	87 %	1	1.00000	1.39310
6	87 %	2	0.87500	1.20940
6	87 %	3	1.00000	1.39310
6	87 %	4	1.00000	1.39310
6	87 %	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	27 %	25.00	16.00	5.00	
3	37 %	27.50	16.00	5.00	
4	49 %	27.50	16.00	5.00	
5	65 %	27.50	16.00	5.00	
6	87 %	25.00	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 = 0.004643  W = 0.9553  Critical W = 0.9 (alpha = 0.01, N = 30)  Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 6.204  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	0.002647	0.0005294	2.736	
Within (Error)	24	0.004643	0.0001935		
Total	29	0.00729			
Critical F = 3.9 (alpha = 0.01, df = 5,24)					
2.62 (alpha = 0.05, df = 5,24)					
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	0.3052	0.3052			
2	27 %	0.3224	0.3224	-1.955		
3	37 %	0.3058	0.3058	-0.0682		
4	49 %	0.32	0.32	-1.682		
5	65 %	0.3026	0.3026	0.2955		
6	87 %	0.3262	0.3262	-2.387		
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	27 %	5	0.02076	6.8	-0.0172	
3	37 %	5	0.02076	6.8	-0.0006	
4	49 %	5	0.02076	6.8	-0.0148	
5	65 %	5	0.02076	6.8	0.0026	
6	87 %	5	0.02076	6.8	-0.021	



Appendix A2: Statistics

*Ceriodaphnia dubia* Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
27 %	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
37 %	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
49 %	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
65 %	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
87 %	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.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	27 %	10	0	
2	37 %	10	0	
3	49 %	10	0	
4	65 %	10	0	
5	87 %	10	2	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Kolmogorov Test for Normality	No Transformation
<p>D = 0.1191 D* = 0.9344 Critical D* = 1.035                      (alpha = 0.01, N = 60)</p> <p>Data PASS normality test (alpha = 0.01).</p>	

Bartlett's Test for Homogeneity of Variance	No Transformation
<p>Calculated B1 statistic = 32.23 Critical B = 15.086                      (alpha = 0.01, df = 5)</p> <p>Data FAIL B1 homogeneity test at 0.01 level.</p>	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	27 %	85.50	75.00	10.00	
3	37 %	93.00	75.00	10.00	
4	49 %	89.00	75.00	10.00	
5	65 %	78.50	75.00	10.00	
6	87 %	89.50	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	89.71	17.94	0.798	
Within (Error)	52	1169	22.48		
Total	57	1259			
Critical F = 3.39 (alpha = 0.01, df = 5,52)					
2.39 (alpha = 0.05, df = 5,52)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	31.5	31.5			
2	27 %	29.3	29.3	1.038		
3	37 %	30.9	30.9	0.283		
4	49 %	30.9	30.9	0.283		
5	65 %	28	28	1.651		
6	87 %	29.125	29.125	1.056		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,52)						
WARNING - Unequal replicate sizes. Critical values assuming equal replicate sizes have been used.						

Dunnett's Test - Table 2 of 2						No Transformation	
Ho:Control<Treatment							
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control		
1	Control	10					
2	27 %	10	4.898	15.5	2.2		
3	37 %	10	4.898	15.5	0.6		
4	49 %	10	4.898	15.5	0.6		
5	65 %	10	4.898	15.5	3.5		
6	87 %	8	5.195	16.5	2.375		

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: November 11, 2014 at 0814  
Date and Time Test Terminated: November 18, 2014 at 0940

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.8	7.7	7.6	8.0	7.7	8.0
	Final *1	7.9	7.7	7.9	8.2	7.8	8.1	8.0
	Final *2	7.1	7.4	8.0	7.6	7.8	8.0	
pH, units	Initial	7.3	7.4	7.3	7.0	7.0	7.4	7.3
	Final *1	7.2	7.2	7.2	7.0	7.4	7.4	7.3
	Final *2	7.6	7.6	7.2	7.3	7.4	7.5	
Alkalinity, mg CaCO <sub>3</sub> /l		31	NA	31	NA	31	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		48	NA	48	NA	48	NA	NA
Conductivity, umhos/cm		160	160	160	160	150	160	150
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 27 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.6	8.2	7.8	8.4	7.8	7.8
	Final *1	7.4	7.9	8.0	8.3	7.8	8.1	7.8
	Final *2	7.3	7.5	7.9	7.6	7.8	8.0	
pH, units	Initial	7.1	7.2	7.2	7.0	6.9	7.4	7.3
	Final *1	7.1	7.2	7.2	7.0	7.4	7.4	7.3
	Final *2	7.6	7.6	7.2	7.3	7.4	7.5	

Effluent Conc.: 37 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.5	8.4	8.0	8.4	7.7	7.9
	Final *1	7.6	7.8	8.0	8.4	7.8	8.6	7.9
	Final *2	7.2	7.4	8.0	7.6	7.7	8.7	
pH, units	Initial	7.0	7.2	7.1	7.0	6.8	7.4	7.2
	Final *1	7.2	7.1	7.1	7.0	7.4	7.4	7.4
	Final *2	7.6	7.6	7.2	7.4	7.4	7.5	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: November 11, 2014 at 0814  
Date and Time Test Terminated: November 18, 2014 at 0940

Effluent Conc.: 49 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.9	7.8	8.6	8.0	8.4	7.7	7.8
	Final *1	7.8	7.8	8.0	8.4	7.6	8.0	7.8
	Final *2	7.3	7.5	8.0	7.7	7.8	8.2	
pH, units	Initial	7.0	7.1	7.0	7.0	6.8	7.4	7.2
	Final *1	7.2	7.2	7.2	6.9	7.4	7.4	7.3
	Final *2	7.6	7.6	7.2	7.4	7.4	7.5	

Effluent Conc.: 65 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.6	8.6	8.0	8.4	7.6	7.8
	Final *1	7.9	7.7	7.9	8.3	7.8	8.1	8.0
	Final *2	7.2	7.4	7.9	7.7	7.9	7.9	
pH, units	Initial	6.9	7.1	7.0	6.9	6.7	7.4	7.1
	Final *1	7.2	7.2	7.1	6.9	7.4	7.4	7.4
	Final *2	7.6	7.6	7.2	7.4	7.5	7.5	
Alkalinity, mg CaCO <sub>3</sub> /l		25	NA	30	NA	32	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		55	NA	66	NA	77	NA	NA
Conductivity, umhos/cm		250	250	280	280	290	310	280
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

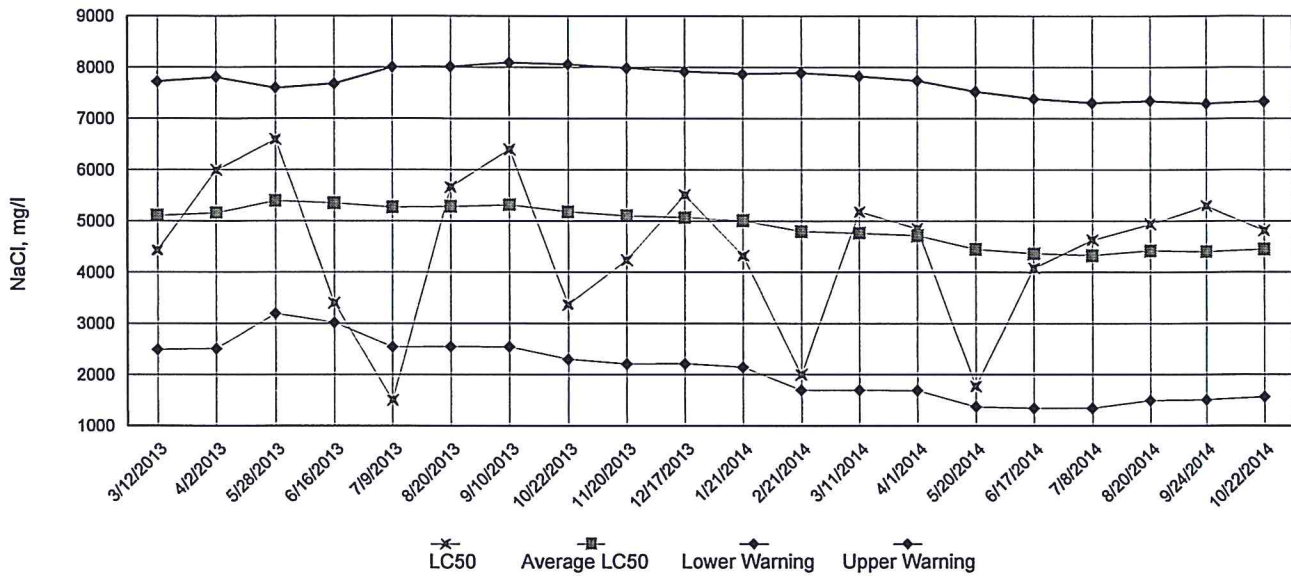
Effluent Conc.: 87 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.7	9.0	8.1	8.6	7.6	7.9
	Final *1	7.4	7.8	8.0	8.3	7.8	7.9	7.8
	Final *2	7.3	7.4	8.0	7.6	7.8	7.8	
pH, units	Initial	6.8	7.0	6.9	6.8	6.6	7.4	7.0
	Final *1	7.1	7.1	7.1	6.9	7.4	7.4	7.4
	Final *2	7.5	7.5	7.2	7.4	7.4	7.6	

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

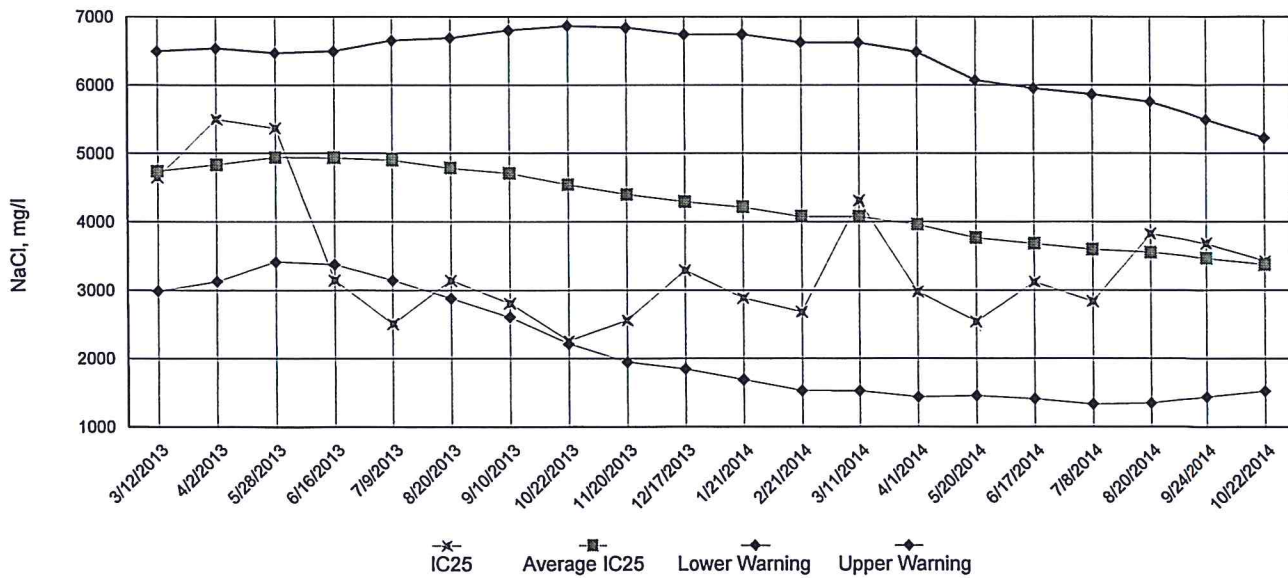


Appendix A4: Test 1000.0  
Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data

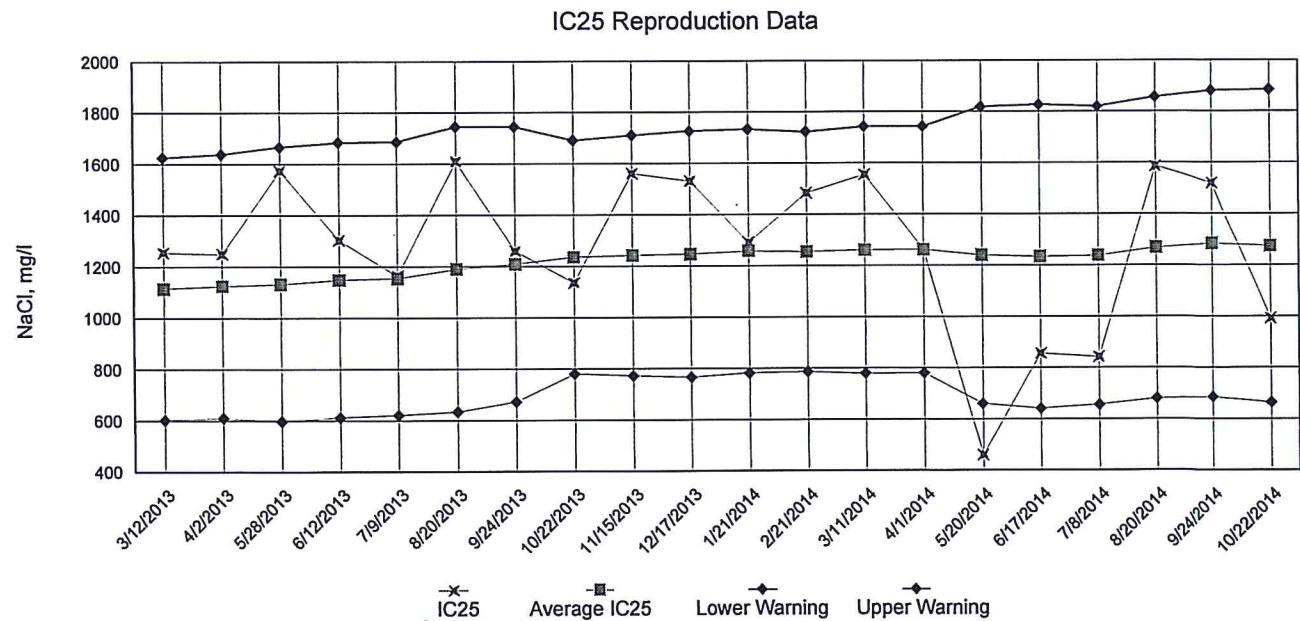
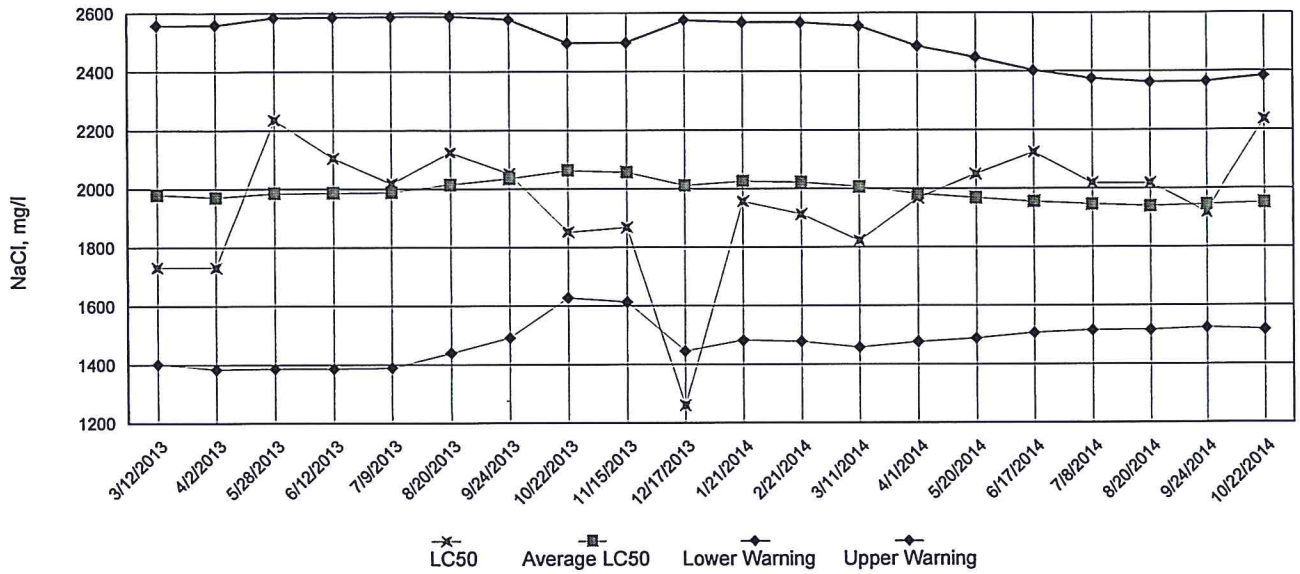


IC25 Growth Data



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

LC50 Survival Data





Appendix B: Test 1000.0

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

Permittee: City of Hot Springs

NPDES No.: AR0033880 AFIN#26-00145

Date and Time Test Initiated: November 11, 2014 at 1140

Date and Time Test Terminated: November 18, 2014 at 0940

Dilution water used: Synthetic Soft Water #4153

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
27 %	100	100	100	87.5	100	100	100	97.5	5.73
37 %	100	100	100	100	100	100	100	100	0.00
49 %	100	100	100	100	100	100	100	100	0.00
65 %	100	100	100	100	100	100	100	100	0.00
87 %	100	87.5	100	100	100	97.5	97.5	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	0.329	0.295	0.309	0.298	0.295	0.305	4.75
27 %	0.330	0.326	0.302	0.325	0.329	0.322	3.59
37 %	0.312	0.305	0.309	0.302	0.301	0.306	1.52
49 %	0.338	0.304	0.322	0.315	0.321	0.32	3.86
65 %	0.294	0.286	0.310	0.294	0.329	0.303	5.66
87 %	0.319	0.314	0.346	0.346	0.306	0.326	5.72

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	(65 %)	<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	(65 %)	<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:   87 %   (TOP6C)

6. LOEC Pimephales Lethality:   87 %   (TXP6C)

7. NOEC Pimephales Sublethality:   87 %   (TPP6C)

8. LOEC Pimephales Sublethality:   87 %   (TYP6C)

9. Coefficient of variation for Pimephales growth:   5.66   (TQP6C)

Appendix B: Test 1000.0

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

PERMITTEE: City of Hot Springs  
NPDES NO.: AR0033880 AFIN#26-00145  
CONTACT: Mr. James Sorrells  
ANALYST: 280, 304, 310

2400  
2400  
2400

Test Initiated: DATE: November 11, 2014 TIME: 1140  
Test Terminated: DATE: November 18, 2014 TIME: 0940

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.7	7.6	8.0	7.7	8.0
Final	7.9	7.7	7.9	8.2	7.8	8.1	8.0
pH Initial	7.3	7.4	7.3	7.0	7.0	7.4	7.3
Final	7.2	7.2	7.2	7.0	7.4	7.4	7.3
Alkalinity	31	NA	31	NA	31	NA	NA
Hardness	48	NA	48	NA	48	NA	NA
Conductivity	160	160	160	160	150	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 27 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.6	8.2	7.8	8.4	7.8	7.8
Final	7.4	7.9	8.0	8.3	7.8	8.1	7.8
pH Initial	7.1	7.2	7.2	7.0	6.9	7.4	7.3
Final	7.1	7.2	7.2	7.0	7.4	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	190	190	200	210	210	220	210
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 37 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.5	8.4	8.0	8.4	7.7	7.9
Final	7.6	7.8	8.0	8.4	7.8	8.6	7.9
pH Initial	7.0	7.2	7.1	7.0	6.8	7.4	7.2
Final	7.2	7.1	7.1	7.0	7.4	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	210	210	220	230	230	250	230
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 49 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	8.6	8.0	8.4	7.7	7.8
Final	7.8	7.8	8.0	8.4	7.6	8.0	7.8
pH Initial	7.0	7.1	7.0	7.0	6.8	7.4	7.2
Final	7.2	7.2	7.2	6.9	7.4	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	230	230	240	250	260	280	250
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 65 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.6	8.6	8.0	8.4	7.6	7.8
Final	7.9	7.7	7.9	8.3	7.8	8.1	8.0
pH Initial	6.9	7.1	7.0	6.9	6.7	7.4	7.1
Final	7.2	7.2	7.1	6.9	7.4	7.4	7.4
Alkalinity	25	NA	30	NA	32	NA	NA
Hardness	55	NA	66	NA	77	NA	NA
Conductivity	250	250	280	280	290	310	280
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 87 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.7	9.0	8.1	8.6	7.6	7.9
Final	7.4	7.8	8.0	8.3	7.8	7.9	7.8
pH Initial	6.8	7.0	6.9	6.8	6.6	7.4	7.0
Final	7.1	7.1	7.1	6.9	7.4	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	280	280	320	320	340	360	330
Chlorine	NA	NA	NA	NA	NA	NA	NA



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

Permittee: City of Hot Springs

NPDES No.: AR0033880 AFIN#26-00145

Date and Time Test Initiated: November 11, 2014 at 1140

Date and Time Test Terminated: November 17, 2014 at 1315

Dilution water used: Synthetic Soft Water #4153

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		27 %	37 %	49 %	65 %	87 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
6 day	100	100	100	100	100	80.0

NUMBER OF YOUNG PRODUCED PER FEMALE @ 6 DAYS

Replicates	Control	Percent Effluent				
		27 %	37 %	49 %	65 %	87 %
A	35	32	31	33	33	36
B	35	25	29	29	30	27
C	34	33	27	34	28	29
D	29	33	35	34	32	24
E	34	26	28	33	25	11
F	35	28	30	31	28	37
G	25	35	33	27	31	0
H	17	25	31	30	25	15
I	39	27	37	26	22	28
J	32	29	28	32	26	37
Mean per Adult	31.5	29.3	30.9	30.9	28.0	24.4
Mean per Surviving Adult	31.5	29.3	30.9	30.9	28.0	29.1
CV %	20.2	12.6	10.5	9.21	12.6	26.0

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	(65 %)	_____ YES	_____ X 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	(65 %)	_____ 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:   87 %   (TOP3B)

6. LOEC *Ceriodaphnia* Lethality:   87 %   (TXP3B)

7. NOEC *Ceriodaphnia* Sublethality:   87 %   (TPP3B)

8. LOEC *Ceriodaphnia* Sublethality:   87 %   (TYP3B)

9. Coefficient of variation for *Ceriodaphnia* Reproduction:   20.2   (TQP3B)



Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM  
*Ceriodaphnia dubia*  
CHEMICAL PARAMETERS CHART

PERMITTEE: City of Hot Springs  
NPDES NO.: AR0033880 AFIN#26-00145  
CONTACT: Mr. James Sorrells  
ANALYST: 280, 304, 310

2400  
2400  
2400

Test Initiated: DATE: November 11, 2014 TIME: 1140  
Test Terminated: DATE: November 17, 2014 TIME: 1315

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.8	7.7	7.6	8.0	7.7	8.0
Final	7.1	7.4	8.0	7.6	7.8	8.0	--
pH Initial	7.3	7.4	7.3	7.0	7.0	7.4	7.3
Final	7.6	7.6	7.2	7.3	7.4	7.5	--
Alkalinity	31	NA	31	NA	31	NA	NA
Hardness	48	NA	48	NA	48	NA	NA
Conductivity	160	160	160	160	150	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 27 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.6	8.2	7.8	8.4	7.8	7.8
Final	7.3	7.5	7.9	7.6	7.8	8.0	--
pH Initial	7.1	7.2	7.2	7.0	6.9	7.4	7.3
Final	7.6	7.6	7.2	7.3	7.4	7.5	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	190	190	200	210	210	220	210
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 37 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.5	8.4	8.0	8.4	7.7	7.9
Final	7.2	7.4	8.0	7.6	7.7	8.7	--
pH Initial	7.0	7.2	7.1	7.0	6.8	7.4	7.2
Final	7.6	7.6	7.2	7.4	7.4	7.5	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	210	210	220	230	230	250	230
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 49 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	8.6	8.0	8.4	7.7	7.8
Final	7.3	7.5	8.0	7.7	7.8	8.2	--
pH Initial	7.0	7.1	7.0	7.0	6.8	7.4	7.2
Final	7.6	7.6	7.2	7.4	7.4	7.5	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	230	230	240	250	260	280	250
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 65 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.6	8.6	8.0	8.4	7.6	7.8
Final	7.2	7.4	7.9	7.7	7.9	7.9	--
pH Initial	6.9	7.1	7.0	6.9	6.7	7.4	7.1
Final	7.6	7.6	7.2	7.4	7.5	7.5	--
Alkalinity	25	NA	30	NA	32	NA	NA
Hardness	55	NA	66	NA	77	NA	NA
Conductivity	250	250	280	280	290	310	280
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 87 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.7	9.0	8.1	8.6	7.6	7.9
Final	7.3	7.4	8.0	7.6	7.8	7.8	--
pH Initial	6.8	7.0	6.9	6.8	6.6	7.4	7.0
Final	7.5	7.5	7.2	7.4	7.4	7.6	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	280	280	320	320	340	360	330
Chlorine	NA	NA	NA	NA	NA	NA	NA



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: City of Hot Springs		AIC Control No: 184502	
Project Reference: Plant Effluent		AIC Proposal No:	
Project Manager: James Sorrells		Carrier: HOT SPRINGS	
Sampled By: <i>A. Morrison</i>		Received Temperature °C: 0.1	
AIC No. 119114		Remarks:	
Sample Identification: Plant Effluent 0000-2400			
Date/Time Collected: 11/19/14			
Sample Matrix: WATER			
G R A B C O M P X			
Container Type: Plastic			
Preservative: P = Plastic			
G = Glass			
NO = none			
S = Sulfuric acid pH2			
N = Nitric acid pH2			
V = VOA vials			
H = HCl to pH2			
B = NaOH to pH12			
Z = Zinc acetate			
T = Sodium Thiosulfate			
A = (NH4)2SO4			
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ___ DAYS		Date/Time Received: 11-18-14	
Expedited results requested by:		By: <i>A. Morrison</i>	
Who should AIC contact with questions:		Date/Time Received in Lab: 11-20-14	
P phone: _____		By: <i>A. Morrison</i>	
F fax: _____		Date/Time: 11/10/14	
Report Attention to: Mr. James Sorrells		By: <i>A. Morrison</i>	
Report Address to: 320 Davidson Road		Date/Time: 11-20-14	
Hot Springs, AR 71901		By: <i>A. Morrison</i>	
Comments:			





CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: City of Hot Springs		AIC Control No:	
Project Reference: Plant Effluent		AIC Proposal No:	
Project Manager: James Sorrells		Carrier: <i>MT SPRING LP DEWNERLY</i>	
Sampled By: <i>MS</i>		Received Temperature °C: <i>21</i>	
Sample Identification: <i>Plant Effluent</i>		Remarks:	
Date/Time Collected: <i>11/12/14</i>			
AIC No: <i>2000-2600</i>			

No of BOTTLES	Sample Matrix	Analyses Requested		Field pH calibration on Buffer:
		WATER	SOIL	
3	WATER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	SOIL	<input type="checkbox"/>	<input type="checkbox"/>	
	COMPOST	<input type="checkbox"/>	<input type="checkbox"/>	
	GRAVEL	<input type="checkbox"/>	<input type="checkbox"/>	
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	

Relinquished By: <i>M. Mann</i>	Date/Time: <i>11-12-14 @ 9:40</i>
Relinquished By: <i>M. Mann</i>	Date/Time: <i>11-12-14 11:35am</i>
Received in Lab By: <i>Paulinda Hankel</i>	Date/Time: <i>11-12-14 11:35am</i>

H = HCl to pH2    B = NaOH to pH12    T = Sodium Thiosulfate  
 V = VOA vials    N = Nitric acid pH2    Z = Zinc acetate  
 G = Glass    NO = none    S = Sulfuric acid pH2    A = (NH4)2SO4  
 P = Plastic

Turnaround Time Requested: (Please circle)  
 NORMAL or EXPEDITED IN \_\_\_ DAYS  
 Expedited results requested by: \_\_\_\_\_  
 Who should AIC contact with questions: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Report Attention to: Mr. James Sorrells  
 Report Address to: 320 Davidson Road  
Hot Springs, AR 71901



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: City of Hot Springs		AIC Control No:																							
Project Reference: Plant Effluent		AIC Proposal No:																							
Project Manager: James Somells		Carrier:																							
Sampled By: <i>A. Mauds</i>		Received Temperature °C																							
AIC Sample Date/Time Collected: 11/13/14		0.7°C																							
No. Identification: Plant Effluent 20000-2400		Remarks:																							
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