

October 31, 2016

Test Results of
Fourth Quarter
Chronic
Biomonitoring Testing
for

Control No. 206502-1

Prepared for:

Mr. Scotty Jones
Trumann Water and Sewer Commission
106 East Main Street
Trumann, AR 72472

Prepared by:

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Trumann Water and Sewer Commission
ATTN: Mr. Scotty Jones
106 East Main Street
Trumann, AR 72472

Re: Chronic utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
NPDES Permit No. AR0035602 AFIN 56-00047

Dear Mr. Scotty Jones:


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 Chief Operating Officer 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 12 % effluent, which is above the critical dilution of 9 %. 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 12 % effluent, which is above the critical dilution of 9 %. The NOEC for reproduction occurred at 12 % effluent, which is above the critical dilution of 9 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION



John Overbey
Chief Operating Officer

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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	0.250	PASS
Control Growth CV < or = 40%	3.70	PASS
Growth Minimum Significant Difference 12 to 30%	9.82	BELOW
Critical Dilution CV < or = 40%	5.67	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	25.5	PASS
Control CV < or = 40% per Surviving Female	11.3	PASS
Reproduction Minimum Significant Difference 13 to 47%	21.7	PASS
Critical Dilution CV < or = 40%	27.3	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0035602 AFIN 56-00047
2. Test Requirements: Test Methods 1000.0 and 1002.0
3. Receiving Stream:

B. Source of Effluent/Dilution Water

1. Effluent Samples:
 - a. Sampling Point:
 - b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.3	7.6	8.1
pH (standard units)	8.2	8.1	8.1
Alkalinity (mg/l as CaCO ₃)	110	130	110
Hardness (mg/l as CaCO ₃)	35	43	40
Conductivity (umhos/cm)	420	360	380
Residual Chlorine (mg/l)	0.060	0.050	0.070
Ammonia as N (mg/l)	0.35	0.29	0.33

2. Dilution Water Samples: Synthetic Laboratory Moderately Hard Water # 4370, 4372
 - a. Dates Prepared: October 7, through 21, 2016; October 15, through 29, 2016
 - b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.4	7.2	8.4
pH (standard units)	8.1	7.9	8.0
Alkalinity (mg/l as CaCO ₃)	60	60	60
Hardness (mg/l as CaCO ₃)	94	110	94
Conductivity (umhos/cm)	330	270	280
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05

C. Test Methods

1. Test methods used:

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

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Pimephales promelas (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: October 18, 2016 at 1635
Date & Time Test Terminated: October 25, 2016 at 1020
Type & Volume of Test Chamber: 500 ml disposable beaker
Volume of Sample: 250 ml
Number of Organisms per replicate: 8
Number of Replicates per dilution: 5

Ceriodaphnia dubia Survival and Growth Method 1002.0

Date & Time Test Initiated: October 18, 2016 at 1610
Date & Time Test Terminated: October 25, 2016 at 1605
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 October 14, 2016 at 1445 to October 18, 2016 at 1040

The results were as follows: (Control No. 206268-1.)

Survival LC-50: 2528 mg/l

Growth IC-25: 1434 mg/l

Growth PMSD: 5.65

Ceriodaphnia dubia

Chronic reference tests are performed monthly.

A chronic reference test was performed on October 14, 2016 at 1330 to October 21, 2016 at 1345

The results were as follows: (Control No. 206268-2.)

Survival LC-50: 1853 mg/l

Growth IC-25: 1055 mg/l

Growth PMSD: 18.8

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	99.3	1.07
pH	SM 4500-H+ B	101	0.145
Conductivity	EPA 120.1	101	3.30

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: October 18, 2016

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

Ceriodaphnia dubia

Date: October 18, 2016

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

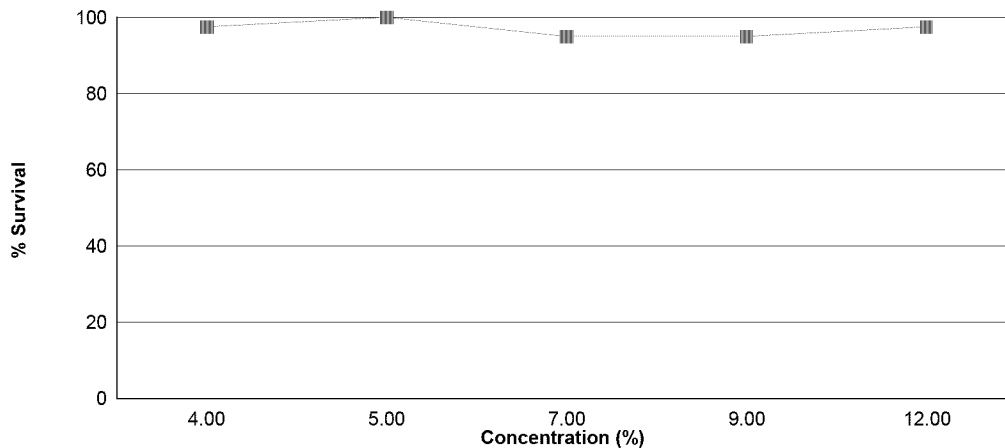
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 4 %, 5 %, 7 %, 9 %, 12 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 9 % effluent.

The test was initiated on October 18, 2016 at 1635 and continued through October 25, 2016 at 1020. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 12 % effluent
- b.) NOEC growth = 12 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.250
4 %	97.5	0.276
5 %	100	0.306
7 %	95.0	0.276
9 %	95.0	0.249
12 %	97.5	0.226

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

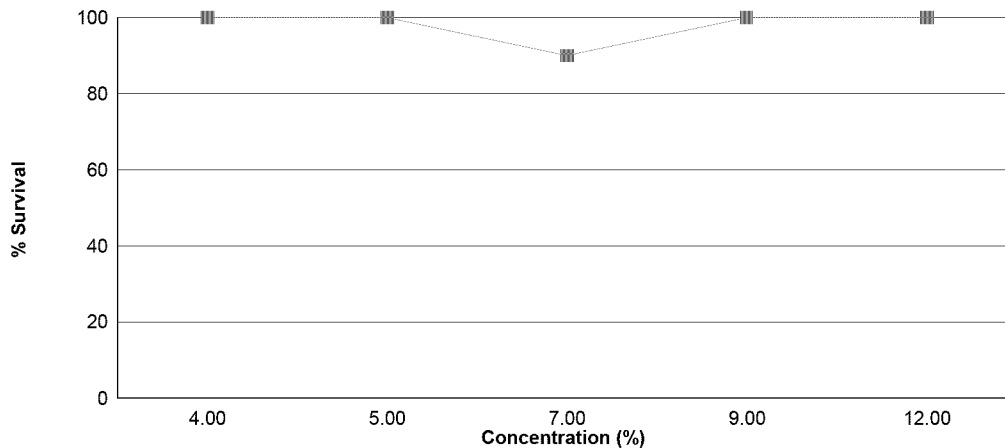
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 4 %, 5 %, 7 %, 9 %, 12 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 9 % effluent.

The test was initiated on October 18, 2016 at 1610 and continued through October 25, 2016 at 1605. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 12 % effluent
- b.) NOEC reproduction = 12 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	25.5
4 %	100	25.1
5 %	100	24.3
7 %	90.0	23.8
9 %	100	24.9
12 %	100	20.4

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: October 18, 2016 at 1635

Date and Time Test Terminated: October 25, 2016 at 1020

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
4 %	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	7	7	7	7	7
5 %	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
7 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	7
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	7	7
	E	8	8	8	8	8	8	8
9 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	7	7
	D	8	8	8	8	8	8	8
	E	8	8	7	7	7	7	7
12 %	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	7	7	7
	E	8	8	8	8	8	8	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: October 18, 2016 at 1635

Test Terminated: October 25, 2016 at 1020

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.93093	.93294	0.00201	8	0.251
	B	.92689	.92893	0.00204	8	0.255
	C	.92281	.92468	0.00187	8	0.234
	D	.92792	.92996	0.00204	8	0.255
	E	.91896	.92101	0.00205	8	0.256
4 %	A	.92227	.92453	0.00226	8	0.282
	B	.92513	.92727	0.00214	8	0.268
	C	.92953	.93160	0.00207	8	0.259
	D	.92570	.92805	0.00235	8	0.294
	E	.92672	.92893	0.00221	8	0.276
5 %	A	.92468	.92705	0.00237	8	0.296
	B	.92807	.93034	0.00227	8	0.284
	C	.93095	.93354	0.00259	8	0.324
	D	.92581	.92839	0.00258	8	0.322
	E	.92227	.92470	0.00243	8	0.304
7 %	A	.92480	.92680	0.00200	8	0.250
	B	.92642	.92860	0.00218	8	0.272
	C	.93008	.93240	0.00232	8	0.290
	D	.92766	.92985	0.00219	8	0.274
	E	.92958	.93193	0.00235	8	0.294
9 %	A	.92852	.93036	0.00184	8	0.230
	B	.92792	.92991	0.00199	8	0.249
	C	.93099	.93305	0.00206	8	0.258
	D	.93152	.93365	0.00213	8	0.266
	E	.93124	.93317	0.00193	8	0.241
12 %	A	.93034	.93229	0.00195	8	0.244
	B	.93257	.93433	0.00176	8	0.220
	C	.93401	.93570	0.00169	8	0.211
	D	.93097	.93255	0.00158	8	0.198
	E	.93002	.93207	0.00205	8	0.256

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: October 18, 2016 at 1610

Date and Time Test Terminated: October 25, 2016 at 1605

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	6	4	5	6	5	6	4	4	4	0	44	10	4.40	
5	10	9	11	9	8	8	10	7	9	6	87	10	8.70	
6	0	0	0	0	0	0	0	0	0	12	12	10	1.20	
7	11	10	13	10	11	10	10	10	15	12	112	10	11.2	
8														
TOTAL	27	23	29	25	24	24	24	21	28	30	255	10	25.5	

Concentration: 4 %													
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	6	6	6	4	4	6	6	5	4	5	52	10	5.20
5	9	10	7	10	9	10	10	8	9	0	82	10	8.20
6	0	0	0	0	0	0	0	0	0	7	7	10	0.700
7	11	9	0	13	13	10	12	11	16	15	110	10	11.0
8													
TOTAL	26	25	13	27	26	26	28	24	29	27	251	10	25.1

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	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	5	5	6	4	6	6	6	6	5	0	49	10	4.90
5	9	8	11	8	9	9	12	9	8	4	87	10	8.70
6	0	0	0	0	0	0	0	0	0	2	2	10	0.200
7	11	9	14	13	11	10	12	11	14	0	105	10	10.5
8													
TOTAL	25	22	31	25	26	25	30	26	27	6	243	10	24.3

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: October 18, 2016 at 1610

Date and Time Test Terminated: October 25, 2016 at 1605

Concentration: 7 %														
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	5	4	4	6	5	5	4	4	3	0	40	10	4.00	
5	7	10	6	10	10	8	10	9	9	7	86	10	8.60	
6	0	0	0	0	0	0	0	0	0	11	11	10	1.10	
7	6	13	9X	12	12	11	13	11	14	0	101	9	11.2	
8														
TOTAL	18	27	19	28	27	24	27	24	26	18	238	10	23.8	

Concentration: 9 %													
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	5	5	6	5	5	6	2	4	4	4	46	10	4.60
5	9	10	10	9	10	10	2	9	0	7	76	10	7.60
6	0	0	0	0	0	0	0	0	7	0	7	10	0.700
7	14	15	12	15	11	13	3	14	11	12	120	10	12.0
8													
TOTAL	28	30	28	29	26	29	7	27	22	23	249	10	24.9

Concentration: 12 %													
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	6	2	6	5	6	3	3	3	40	10	4.00
5	9	8	9	3	8	9	0	9	7	7	69	10	6.90
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00
7	11	11	12	17	11	11	2	8	8	4	95	10	9.50
8													
TOTAL	22	23	27	22	25	25	8	20	18	14	204	10	20.4

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	4 %	1	1.00000	1.39310
2	4 %	2	1.00000	1.39310
2	4 %	3	1.00000	1.39310
2	4 %	4	1.00000	1.39310
2	4 %	5	0.87500	1.20940
3	5 %	1	1.00000	1.39310
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	7 %	1	1.00000	1.39310
4	7 %	2	0.87500	1.20940
4	7 %	3	1.00000	1.39310
4	7 %	4	0.87500	1.20940
4	7 %	5	1.00000	1.39310
5	9 %	1	1.00000	1.39310
5	9 %	2	1.00000	1.39310
5	9 %	3	0.87500	1.20940
5	9 %	4	1.00000	1.39310
5	9 %	5	0.87500	1.20940
6	12 %	1	1.00000	1.39310
6	12 %	2	1.00000	1.39310
6	12 %	3	1.00000	1.39310
6	12 %	4	0.87500	1.20940
6	12 %	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 = 0.135 W = 0.8143 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	4 %	25.00	16.00	5.00	
3	5 %	27.50	16.00	5.00	
4	7 %	22.50	16.00	5.00	
5	9 %	22.50	16.00	5.00	
6	12 %	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 = 0.006503 W = 0.9693 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 = 3.470 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	0.01964	0.003928	14.51	
Within (Error)	24	0.0065	0.0002708		
Total	29	0.02614			
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	0.2502	0.2502			
2	4 %	0.2758	0.2758	-2.46		
3	5 %	0.306	0.306	-5.361		
4	7 %	0.276	0.276	-2.479		
5	9 %	0.2488	0.2488	0.1345		
6	12 %	0.2258	0.2258	2.344		
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	4 %	5	0.02456	9.82	-0.0256	
3	5 %	5	0.02456	9.82	-0.0558	
4	7 %	5	0.02456	9.82	-0.0258	
5	9 %	5	0.02456	9.82	0.0014	
6	12 %	5	0.02456	9.82	0.0244	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
4 %	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 %	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
7 %	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
9 %	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
12 %	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	4 %	10	0	
2	5 %	10	0	
3	7 %	10	1	
4	9 %	10	0	
5	12 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
<p>D = 0.1724 D* = 1.353 Critical D* = 1.035 (alpha = 0.01, N = 60)</p> <p>Data FAIL normality test (alpha = 0.01).</p>	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	4 %	111.00	75.00	10.00	
3	5 %	110.50	75.00	10.00	
4	7 %	95.00	75.00	10.00	
5	9 %	111.50	75.00	10.00	
6	12 %	76.00	75.00	10.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

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

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	173.6	34.72	1.213	
Within (Error)	54	1546	28.63		
Total	59	1720			
Critical F = 3.38 (alpha = 0.01, df = 5,54)					
2.38 (alpha = 0.05, df = 5,54)					
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	25.5	25.5			
2	4 %	25.1	25.1	0.1672		
3	5 %	24.3	24.3	0.5015		
4	7 %	23.8	23.8	0.7104		
5	9 %	24.9	24.9	0.2507		
6	12 %	20.4	20.4	2.131		
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	4 %	10	5.528	21.7	0.4	
3	5 %	10	5.528	21.7	1.2	
4	7 %	10	5.528	21.7	1.7	
5	9 %	10	5.528	21.7	0.6	
6	12 %	10	5.528	21.7	5.1	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.4	8.0	7.2	7.9	8.4	7.7	7.7
	Final *1	7.5	6.8	6.8	6.9	7.8	7.2	7.7
	Final *2	7.9	6.9	7.9	8.0	7.6	7.8	7.6
pH, units	Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
	Final *1	8.0	7.8	7.8	7.7	8.2	7.8	7.7
	Final *2	8.1	8.0	8.3	8.1	7.8	8.3	8.2
Alkalinity, mg CaCO ₃ /l		60	NA	60	NA	60	NA	NA
Hardness, mg CaCO ₃ /l		94	NA	110	NA	94	NA	NA
Conductivity, umhos/cm		330	270	270	290	280	290	260
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 4 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	8.1	7.0	8.0	8.3	7.8	7.6
	Final *1	7.5	6.5	7.0	7.3	7.8	7.4	7.6
	Final *2	7.9	7.1	8.2	7.8	7.6	7.4	7.8
pH, units	Initial	8.0	8.0	7.9	7.9	8.0	8.1	7.9
	Final *1	8.0	7.7	7.8	7.7	8.2	7.7	7.7
	Final *2	8.1	8.0	8.3	8.1	7.8	8.3	8.2

Effluent Conc.: 5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.9	7.2	8.0	8.2	7.8	7.5
	Final *1	7.3	6.5	6.9	7.4	7.6	7.0	7.7
	Final *2	7.9	7.4	8.0	8.0	7.8	7.8	7.5
pH, units	Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
	Final *1	8.0	7.7	7.8	7.7	8.2	7.7	7.7
	Final *2	8.2	8.1	8.3	8.1	7.8	8.3	8.2

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Effluent Conc.: 7 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.7	7.1	8.0	8.4	7.8	7.8
	Final *1	7.6	6.9	6.9	7.3	7.6	7.5	7.7
	Final *2	7.9	7.4	8.0	7.7	7.8	7.4	7.6
pH, units	Initial	8.0	7.9	7.9	7.9	8.0	8.1	7.9
	Final *1	8.0	7.8	7.8	7.7	8.2	7.8	7.8
	Final *2	8.1	8.1	8.3	8.1	7.8	8.3	8.2

Effluent Conc.: 9 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.7	7.2	8.0	8.1	7.6	7.8
	Final *1	7.3	6.8	6.6	7.3	7.7	7.3	7.5
	Final *2	8.0	7.2	7.9	7.8	7.6	7.9	7.8
pH, units	Initial	8.1	8.0	8.0	8.0	8.0	8.2	8.0
	Final *1	8.0	7.8	7.8	7.7	8.2	7.7	7.8
	Final *2	8.2	8.0	8.3	8.0	7.8	8.2	8.2
Alkalinity, mg CaCO ₃ /l	63	NA	62	NA	66	NA	NA	NA
Hardness, mg CaCO ₃ /l	83	NA	92	NA	84	NA	NA	NA
Conductivity, umhos/cm	340	270	280	290	290	290	270	270
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

Effluent Conc.: 12 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.8	7.5	7.6	8.4	7.8	7.7
	Final *1	7.7	6.8	6.6	7.3	8.0	7.4	7.5
	Final *2	7.8	7.5	NA	7.9	7.5	7.6	7.3
pH, units	Initial	8.1	7.9	8.0	8.0	8.0	8.2	7.9
	Final *1	8.0	7.8	7.8	7.8	8.2	7.8	7.8
	Final *2	8.2	8.1	NA	8.1	7.8	8.3	8.3

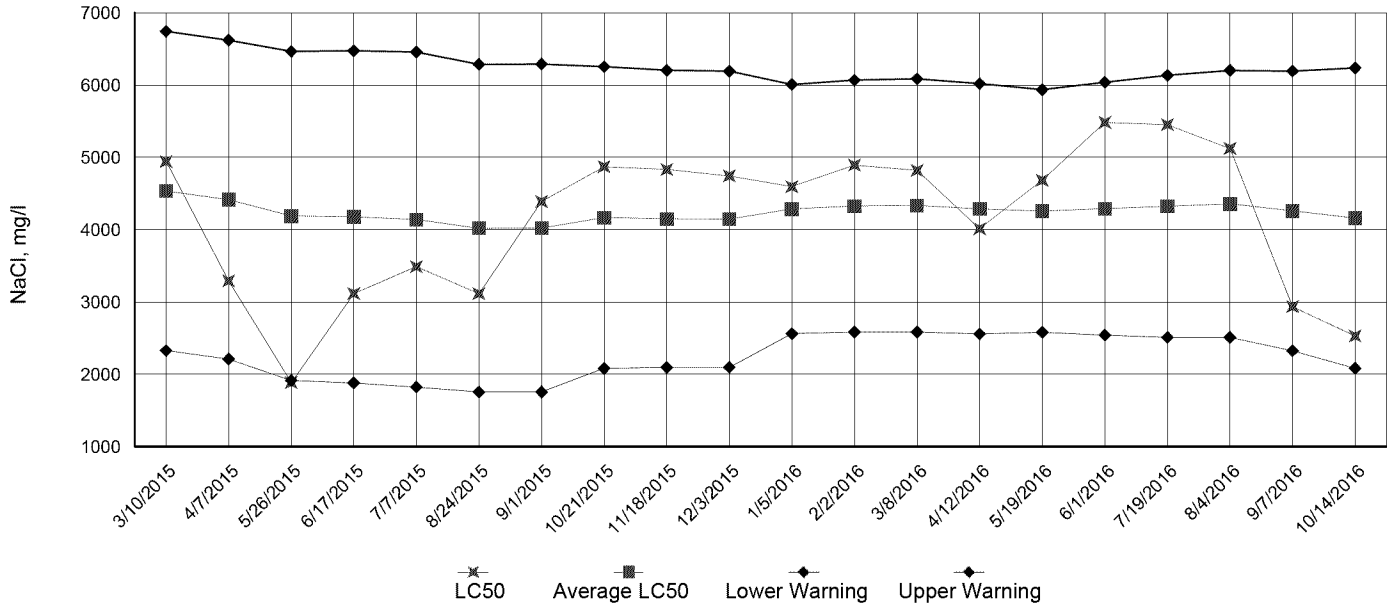
*1 = data from the *Pimephales promelas* (Fathead Minnow) test

*2 = data from the *Ceriodaphnia dubia* test

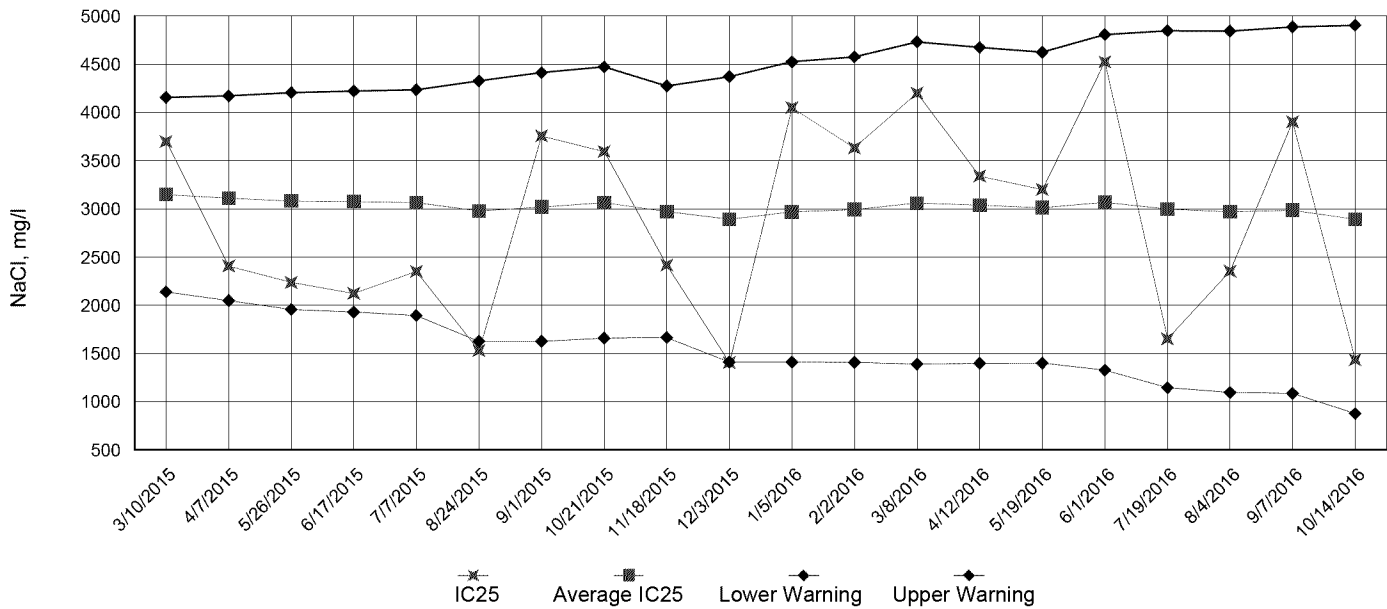
Appendix A4: Test 1000.0

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

LC50 Survival Data

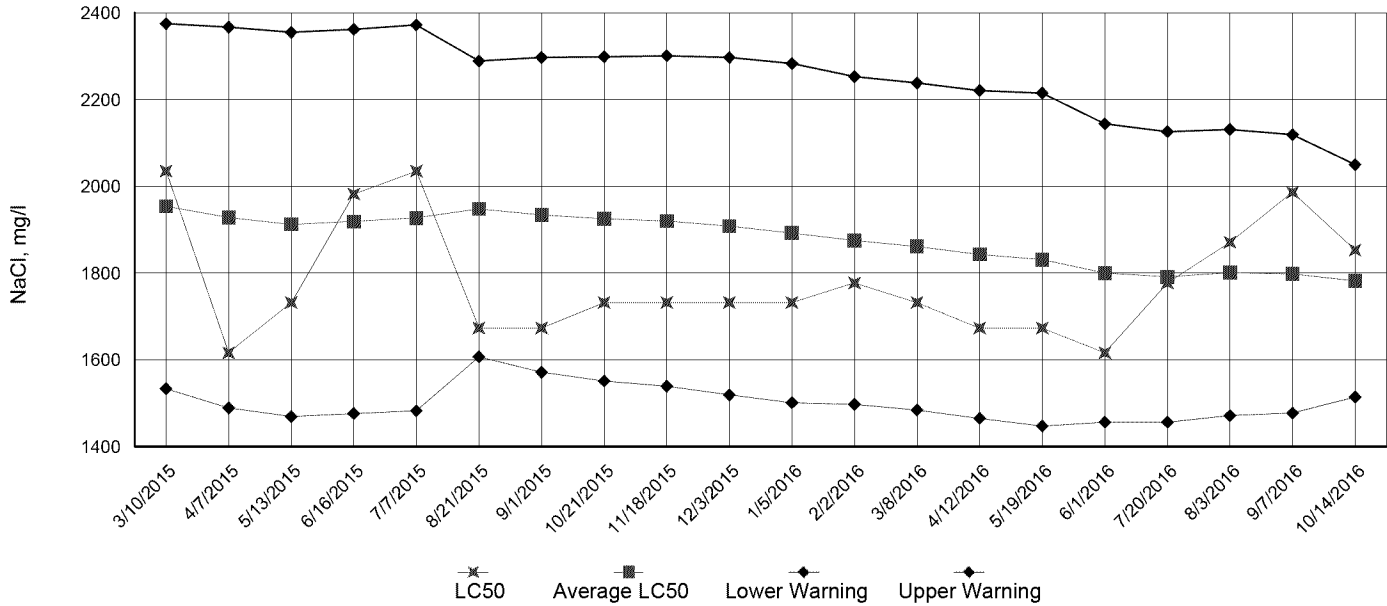


IC25 Growth Data

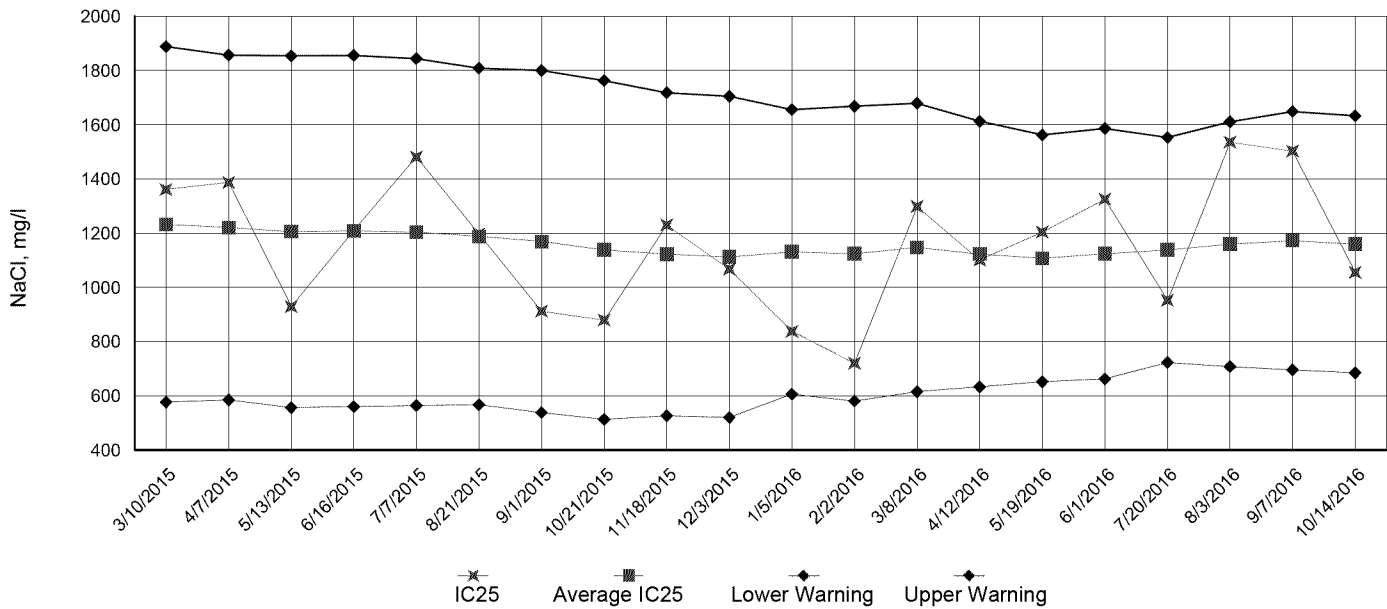


Appendix A4: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



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

Permittee: Trumann Water and Sewer Commission

NPDES No.: AR0035602 AFIN 56-00047

Date and Time Test Initiated: October 18, 2016 at 1635

Date and Time Test Terminated: October 25, 2016 at 1020

Dilution water used: Synthetic Laboratory Moderately Hard Water # 4370, 4372

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
4 %	100	100	100	100	87.5	100	100	97.5	5.73
5 %	100	100	100	100	100	100	100	100	0.00
7 %	100	87.5	100	87.5	100	100	100	95.0	7.21
9 %	100	100	87.5	100	87.5	100	100	95.0	7.21
12 %	100	100	100	87.5	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	0.251	0.255	0.234	0.255	0.256	0.25	3.70
4 %	0.282	0.268	0.259	0.294	0.276	0.276	4.84
5 %	0.296	0.284	0.324	0.322	0.304	0.306	5.58
7 %	0.250	0.272	0.290	0.274	0.294	0.276	6.32
9 %	0.230	0.249	0.258	0.266	0.241	0.249	5.67
12 %	0.244	0.220	0.211	0.198	0.256	0.226	10.5

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	(9 %)	<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	(9 %)	<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: 12 % (TOP6C)
6. LOEC *Pimephales* Lethality: 12 % (TXP6C)
7. NOEC *Pimephales* Sublethality: 12 % (TPP6C)
8. LOEC *Pimephales* Sublethality: 12 % (TYP6C)
9. Coefficient of variation for *Pimephales* growth: 5.67 (TQP6C)

Appendix B: Test 1000.0
CHRONIC TOXICITY SUMMARY FORM
Pimephales promelas (Fathead minnow)
CHEMICAL PARAMETERS CHART

PERMITTEE: Trumann Water and Sewer Commi
NPDES NO.: AR0035602 AFIN 56-00047
CONTACT: Mr. Scotty Jones
ANALYST: 280, 310, 314

Test Initiated: DATE: October 18, 2016 TIME: 1635
Test Terminated: DATE: October 25, 2016 TIME: 1020

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.4	8.0	7.2	7.9	8.4	7.7	7.7
Final	7.5	6.8	6.8	6.9	7.8	7.2	7.7
pH Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.0	7.8	7.8	7.7	8.2	7.8	7.7
Alkalinity	60	NA	60	NA	60	NA	NA
Hardness	94	NA	110	NA	94	NA	NA
Conductivity	330	270	270	290	280	290	260
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 4 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	8.1	7.0	8.0	8.3	7.8	7.6
Final	7.5	6.5	7.0	7.3	7.8	7.4	7.6
pH Initial	8.0	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.0	7.7	7.8	7.7	8.2	7.7	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	330	270	280	300	290	290	260
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 5 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.9	7.2	8.0	8.2	7.8	7.5
Final	7.3	6.5	6.9	7.4	7.6	7.0	7.7
pH Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.0	7.7	7.8	7.7	8.2	7.7	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	330	270	280	290	290	290	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 7 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.7	7.1	8.0	8.4	7.8	7.8
Final	7.6	6.9	6.9	7.3	7.6	7.5	7.7
pH Initial	8.0	7.9	7.9	7.9	8.0	8.1	7.9
Final	8.0	7.8	7.8	7.7	8.2	7.8	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	340	280	280	290	290	290	280
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 9 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.0	7.7	7.2	8.0	8.1	7.6	7.8
Final	7.3	6.8	6.6	7.3	7.7	7.3	7.5
pH Initial	8.1	8.0	8.0	8.0	8.0	8.2	8.0
Final	8.0	7.8	7.8	7.7	8.2	7.7	7.8
Alkalinity	63	NA	62	NA	66	NA	NA
Hardness	83	NA	92	NA	84	NA	NA
Conductivity	340	270	280	290	290	290	270
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 12 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.5	7.6	8.4	7.8	7.7
Final	7.7	6.8	6.6	7.3	8.0	7.4	7.5
pH Initial	8.1	7.9	8.0	8.0	8.0	8.2	7.9
Final	8.0	7.8	7.8	7.8	8.2	7.8	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	340	280	280	300	290	300	280
Chlorine	NA	NA	NA	NA	NA	NA	NA

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

Permittee: Trumann Water and Sewer Commission

NPDES No.: AR0035602 AFIN 56-00047

Date and Time Test Initiated: October 18, 2016 at 1610

Date and Time Test Terminated: October 25, 2016 at 1605

Dilution water used: Synthetic Laboratory Moderately Hard Water # 4370, 4372

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		4 %	5 %	7 %	9 %	12 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	100	100	100	90.0	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		4 %	5 %	7 %	9 %	12 %
A	27	26	25	18	28	22
B	23	25	22	27	30	23
C	29	13	31	19	28	27
D	25	27	25	28	29	22
E	24	26	26	27	26	25
F	24	26	25	24	29	25
G	24	28	30	27	7	8
H	21	24	26	24	27	20
I	28	29	27	26	22	18
J	30	27	6	18	23	14
Mean per Adult	25.5	25.1	24.3	23.8	24.9	20.4
Mean per Surviving Adult	25.5	25.1	24.3	24.3	24.9	20.4
CV %	11.3	17.9	28.5	15.8	27.3	28.2

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

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

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(9 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(9 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)
5. NOEC *Ceriodaphnia* Lethality: 12 % (TOP3B)
6. LOEC *Ceriodaphnia* Lethality: 12 % (TXP3B)
7. NOEC *Ceriodaphnia* Sublethality: 12 % (TPP3B)
8. LOEC *Ceriodaphnia* Sublethality: 12 % (TYP3B)
9. Coefficient of variation for *Ceriodaphnia* Reproduction: 27.3 (TQP3B)

Appendix B: Test 1002.0
CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Trumann Water and Sewer Commi
NPDES NO.: AR0035602 AFIN 56-00047
CONTACT: Mr. Scotty Jones
ANALYST: 280, 310, 314

Test Initiated: DATE: October 18, 2016 TIME: 1610
Test Terminated: DATE: October 25, 2016 TIME: 1605

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.4	8.0	7.2	7.9	8.4	7.7	7.7
Final	7.9	6.9	7.9	8.0	7.6	7.8	7.6
pH Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.1	8.0	8.3	8.1	7.8	8.3	8.2
Alkalinity	60	NA	60	NA	60	NA	NA
Hardness	94	NA	110	NA	94	NA	NA
Conductivity	330	270	270	290	280	290	260
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
4 %							
D.O. Initial	7.6	8.1	7.0	8.0	8.3	7.8	7.6
Final	7.9	7.1	8.2	7.8	7.6	7.4	7.8
pH Initial	8.0	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.1	8.0	8.3	8.1	7.8	8.3	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	330	270	280	300	290	290	260
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
5 %							
D.O. Initial	7.6	7.9	7.2	8.0	8.2	7.8	7.5
Final	7.9	7.4	8.0	8.0	7.8	7.8	7.5
pH Initial	8.1	8.0	7.9	7.9	8.0	8.1	7.9
Final	8.2	8.1	8.3	8.1	7.8	8.3	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	330	270	280	290	290	290	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
7 %							
D.O. Initial	7.6	7.7	7.1	8.0	8.4	7.8	7.8
Final	7.9	7.4	8.0	7.7	7.8	7.4	7.6
pH Initial	8.0	7.9	7.9	7.9	8.0	8.1	7.9
Final	8.1	8.1	8.3	8.1	7.8	8.3	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	340	280	280	290	290	290	280
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
9 %							
D.O. Initial	8.0	7.7	7.2	8.0	8.1	7.6	7.8
Final	8.0	7.2	7.9	7.8	7.6	7.9	7.8
pH Initial	8.1	8.0	8.0	8.0	8.0	8.2	8.0
Final	8.2	8.0	8.3	8.0	7.8	8.2	8.2
Alkalinity	63	NA	62	NA	66	NA	NA
Hardness	83	NA	92	NA	84	NA	NA
Conductivity	340	270	280	290	290	290	270
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
12 %							
D.O. Initial	7.8	7.8	7.5	7.6	8.4	7.8	7.7
Final	7.8	7.5	NA	7.9	7.5	7.6	7.3
pH Initial	8.1	7.9	8.0	8.0	8.0	8.2	7.9
Final	8.2	8.1	NA	8.1	7.8	8.3	8.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	340	280	280	300	290	300	280
Chlorine	NA	NA	NA	NA	NA	NA	NA

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>TRUMANN WATER WORKS</u>		PO No.		No of		Analyses Requested										AIC Control No: <u>206502</u>			
Project Reference: <u>AR0035202</u>		Sample Matrix		BOTTLES		<u>BIDMONITORING-CHRONIC CO+FH</u>										AIC Proposal No:			
Project Manager: <u>SCOTTY JONES</u>		WATER SOIL														Carrier: <u>FSD*</u>			
Sampled By: <u>LORRE HOLT</u>		G	C	A	S											Received Temperature °C: <u>0.1</u>			
AIC No.	Sample Identification	A	P	R	L											Remarks			
<u>1</u>	<u>AR0035202</u>	<u>10/16/16</u>	<u>10/17/16</u>	<u>8:00 AM</u>	<u>8:00 AM</u>	<u>✓</u>	<u>✓</u>												
Container Type <u>P</u>												Field pH calibration on _____ @ _____							
Preservative <u>NO</u>												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) <u>NORMAL</u> or EXPEDITED IN _____ DAYS				Relinquished By: <u>LORRE HOLT</u>		Date/Time: <u>10/17/16 10:40</u>		Received By:		Date/Time									
Expedited results requested by: _____				Relinquished By:		Date/Time:		Received in Lab By: <u>P. BROWN</u>		Date/Time: <u>10-18-16 08/5</u>									
Who should AIC contact with questions: <u>LORRE HOLT</u>																			
Phone: <u>870-483-2882</u> Fax: <u>870-483-16525</u>																			
Report Attention to: <u>LORRE HOLT</u>																			
Report Address to: <u>106 E. MAIN ST. TRUMANN, AR 72472</u>																			
												<u>7843 7034 5228</u>							

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>Trumann Water Works</u>			PO No.		No of BOTTLES	Analyses Requested										AIC Control No: <u>206502</u>			
Project Reference: <u>AR0035202</u>			Sample Matrix			Biomonitoring-Chronic CO+FH										AIC Proposal No:			
Project Manager: <u>Scotty Jones</u>			WATER SOIL													Carrier: <u>FED X</u>			
Sampled By: <u>LORRE HOLT</u>			G R A B	C O M P	A T E R	S O I L												Received Temperature °C <u>0.1</u>	
AIC No.	Sample Identification	Date/Time Collected																Remarks	
<u>2</u>	<u>AR0035202</u>	<u>10/18/16 - 10/19/16</u> <u>8:00 AM - 8:00 AM</u>	<u>✓</u>	<u>✓</u>			<u>3</u>												
			Container Type <u>P</u>												Field pH calibration on _____ @ _____				
			Preservative <u>NO</u>												Buffer:				
			G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate																
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <u>Lorre Holt</u>			Date/Time: <u>10/19/16 11:00</u>			Received By: _____			Date/Time: _____					
Expedited results requested by: _____					Relinquished By: _____			Date/Time: _____			Received in Lab By: <u>D. Brown</u>			Date/Time: <u>10-20-16 0810</u>					
Who should AIC contact with questions: <u>LORRE HOLT</u>					Comments: <u>8066 7410 9465</u>														
Phone: <u>870-483-2882</u> Fax: <u>870-483-6525</u>																			
Report Attention to: <u>LORRE HOLT</u>																			
Report Address to: <u>106 E. Main St., Trumann, AR 72472</u>																			

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: TRUMANN WATER WORKS			PO No.		No of BOTTLES	Analyses Requested												AIC Control No: 206502	
Project Reference: AR0035602			Sample Matrix			BID MONITORING - CHRONIC CD + FH												AIC Proposal No:	
Project Manager: SCOTTY JONES			WATER SOIL															Carrier: Fed Ex	
Sampled By: LORRE HOLT			GRAB COMP			Received Temperature °C 0.1													
AIC No.	Sample Identification	Date/Time Collected														Remarks			
3	AR0035602	10/21/16 - 10/21/16 8:00 AM - 8:00 AM	✓	✓															
Container Type P			Preservative NO														Field pH calibration on _____ @ _____		
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								Buffer:		
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN _____ DAYS						Relinquished By: Lorre Holt			Date/Time: 10/21/16 @ 11:50 AM			Received By: _____			Date/Time: _____				
Expedited results requested by: _____						Relinquished By: _____			Date/Time: _____			Received in Lab By: _____			Date/Time: 22 Oct 16 0805				
Who should AIC contact with questions: LORRE HOLT						Comments: 8066 7410 9454													
Phone: 870-483-2882 Fax: 870-483-6525																			
Report Attention to: LORRE HOLT																			
Report Address to: 106 E MAIN ST. TRUMANN, AR 72472																			