

*Biomonitoring  
1<sup>st</sup> Quarter 2015  
(Jan, Feb, Mar.)*

February 20, 2015

Test Results of  
First Quarter  
Chronic 7-Day Renewal  
Biomonitoring Testing  
for  
Outfall 001  
Benton, AR

Control No. 187505-1

Prepared for:

Mr. Jonathon Buff  
Benton Utilities  
616 West Hazel  
Benton, AR 72015

Prepared by:

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

Benton Utilities  
ATTN: Mr. Jonathon Buff  
616 West Hazel  
Benton, AR 72015

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow)  
Outfall 001 - Benton, AR  
NPDES Permit No. AR0036498 AFIN# 63-00063

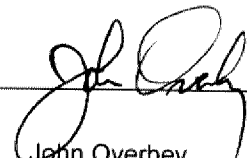
Dear Mr. Jonathon Buff:

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 100 % effluent, which is equal to the critical dilution of 100 %. The NOEC for growth occurred at 100 % effluent, which is equal to the critical dilution of 100 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

**AMERICAN INTERPLEX CORPORATION**

  
\_\_\_\_\_  
John Overbey  
Laboratory Director

PDF cc: Benton Utilities  
ATTN: Mr. Jonathon Buff  
jwbuff@bentonar.org

Table of Contents

- I. Control Acceptance Criteria
- II. Outlined Report
- III. Data Analysis
- IV. Standard Reference Toxicants
- V. Chemical Analysis/Quality Control
- VI. Organism History
- VII. Results Summary
  - Pimephales promelas* (Fathead minnow)
- Appendix A: Raw Data
  - A1: Test 1000.0
    - Pimephales promelas* (Fathead minnow) Survival and Growth
  - A2: Statistics
  - A3: Water Chemistry
  - A4: Reference Toxicant
- 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	0.285	PASS
Control Growth CV < or = 40%	13.2	PASS
Growth Minimum Significant Difference 12 to 30%	14.6	PASS
Critical Dilution CV < or = 40%	7.55	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0036498 AFIN# 63-00063
2. Test Requirements: Chronic Biomonitoring, Quarterly Test Method 1000.0
3. Receiving Stream: Ouachita River Basin

B. Source of Effluent/Dilution Water

1. Effluent Samples:
  - a. Sampling Point: Outfall 001
  - b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.4	6.8	7.5
pH (standard units)	7.0	7.1	7.6
Alkalinity (mg/l as CaCO <sub>3</sub> )	36	41	42
Hardness (mg/l as CaCO <sub>3</sub> )	81	80	80
Conductivity (umhos/cm)	290	350	320
Residual Chlorine (mg/l)	0.050	0.050	0.050
Ammonia as N (mg/l)	<0.1	<0.1	0.34

2. Dilution Water Samples: Synthetic Soft Water #4183

- a. Dates Prepared: February 3 through February 17, 2015
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.3	6.8	7.6
pH (standard units)	7.2	6.9	7.6
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)	140	180	160
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 Method 1000.0, Fathead Minnow Survival and Growth.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

*Pimephales promelas* (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: February 10, 2015 at 1400

Date & Time Test Terminated: February 18, 2015 at 1410

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

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*

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.

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 February 4, 2015 at 1425 to February 11, 2015 at 1310

The results were as follows: (Control No. 187315-1.)

Survival LC-50: 4540 mg/l

Growth IC-25: 3331 mg/l

Growth PMSD: 16.3

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	2.17
Hardness	EPA 200.7	98.9	0.767
pH	SM 4500-H+ B	101	0.134
Conductivity	EPA 120.1	104	5.37

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: February 10, 2015

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

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

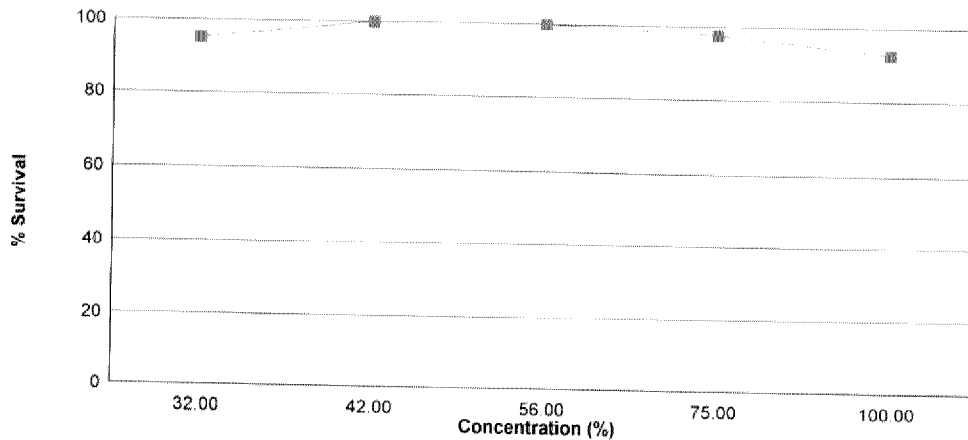
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 32 %, 42 %, 56 %, 75 %, 100 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 100 % effluent.

The test was initiated on February 10, 2015 at 1400 and continued through February 18, 2015 at 1410. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 100 % effluent
- b.) NOEC growth = 100 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.285
32 %	95.0	0.293
42 %	100	0.287
56 %	100	0.314
75 %	97.5	0.293
100 %	92.5	0.280

Appendix A1: Test 1000.0

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

Date and Time Test Initiated: February 10, 2015 at 1400

Date and Time Test Terminated: February 18, 2015 at 1410

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
32 %	A	8	8	8	8	8	8	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
42 %	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
56 %	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
75 %	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
100 %	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	7	5



Appendix A1: Test 1000.0

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

Test Initiated: February 10, 2015 at 1400  
Test Terminated: February 18, 2015 at 1410

Drying Started: February 16, 2015 at 1420  
Drying Ended: February 19, 2015 at 1345

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.92466	.92737	0.00271	8	0.339
	B	.92903	.93095	0.00192	8	0.240
	C	.92858	.93075	0.00217	8	0.271
	D	.92840	.93082	0.00242	8	0.302
	E	.92706	.92923	0.00217	8	0.271
32 %	A	.92568	.92774	0.00206	8	0.258
	B	.92617	.92833	0.00216	8	0.270
	C	.92910	.93156	0.00246	8	0.308
	D	.93052	.93291	0.00239	8	0.299
	E	.93537	.93799	0.00262	8	0.328
42 %	A	.93817	.94055	0.00238	8	0.298
	B	.93526	.93778	0.00252	8	0.315
	C	.93225	.93432	0.00207	8	0.259
	D	.93295	.93486	0.00191	8	0.239
	E	.92965	.93225	0.00260	8	0.325
56 %	A	.93164	.93425	0.00261	8	0.326
	B	.93197	.93447	0.00250	8	0.312
	C	.93445	.93707	0.00262	8	0.328
	D	.93437	.93689	0.00252	8	0.315
	E	.93398	.93629	0.00231	8	0.289
75 %	A	.93112	.93357	0.00245	8	0.306
	B	.93059	.93309	0.00250	8	0.312
	C	.93397	.93639	0.00242	8	0.302
	D	.93424	.93650	0.00226	8	0.282
	E	.93471	.93683	0.00212	8	0.265
100 %	A	.93934	.94165	0.00231	8	0.289
	B	.93857	.94077	0.00220	8	0.275
	C	.93716	.93958	0.00242	8	0.302
	D	.93442	.93671	0.00229	8	0.286
	E	.93091	.93288	0.00197	8	0.246

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	32 %	1	0.87500	1.20940
2	32 %	2	1.00000	1.39310
2	32 %	3	0.87500	1.20940
2	32 %	4	1.00000	1.39310
2	32 %	5	1.00000	1.39310
3	42 %	1	1.00000	1.39310
3	42 %	2	1.00000	1.39310
3	42 %	3	1.00000	1.39310
3	42 %	4	1.00000	1.39310
3	42 %	5	1.00000	1.39310
4	56 %	1	1.00000	1.39310
4	56 %	2	1.00000	1.39310
4	56 %	3	1.00000	1.39310
4	56 %	4	1.00000	1.39310
4	56 %	5	1.00000	1.39310
5	75 %	1	1.00000	1.39310
5	75 %	2	1.00000	1.39310
5	75 %	3	1.00000	1.39310
5	75 %	4	0.87500	1.20940
5	75 %	5	1.00000	1.39310
6	100 %	1	1.00000	1.39310
6	100 %	2	1.00000	1.39310
6	100 %	3	1.00000	1.39310
6	100 %	4	1.00000	1.39310
6	100 %	5	0.62500	0.91174

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
<p>D = 0.2529  W = 0.705  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	32 %	22.50	16.00	5.00	
3	42 %	27.50	16.00	5.00	
4	56 %	27.50	16.00	5.00	
5	75 %	25.00	16.00	5.00	
6	100 %	25.00	16.00	5.00	
<p>Critical values are 1 tailed (k=5)</p>					

Appendix A2: Statistics

*Pimephales promelas* (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
<p>D = 0.01856 W = 0.9737 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 = 4.445 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	0.003589	0.0007178	0.9282	
Within (Error)	24	0.01856	0.0007733		
Total	29	0.02215			
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	0.2846	0.2846			
2	32 %	0.2926	0.2926	-0.4549		
3	42 %	0.2872	0.2872	-0.1478		
4	56 %	0.314	0.314	-1.672		
5	75 %	0.2934	0.2934	-0.5004		
6	100 %	0.2796	0.2796	0.2843		
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	32 %	5	0.04151	14.6	-0.008	
3	42 %	5	0.04151	14.6	-0.0026	
4	56 %	5	0.04151	14.6	-0.0294	
5	75 %	5	0.04151	14.6	-0.0088	
6	100 %	5	0.04151	14.6	0.005	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: February 10, 2015 at 1405

Date and Time Test Terminated: February 18, 2015 at 1410

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	8.2	6.8	7.7	7.6	7.2	8.5
	Final	7.8	8.0	7.9	7.9	6.8	7.1	7.3
pH, units	Initial	7.2	7.5	6.9	7.4	7.6	7.5	7.0
	Final	7.5	7.6	7.4	7.4	7.4	7.4	6.9
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		140	170	180	150	160	180	130
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 32 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	8.3	6.5	7.8	7.6	7.5	8.3
	Final	7.5	8.0	8.1	8.2	7.2	7.3	7.5
pH, units	Initial	7.1	7.4	7.0	7.5	7.5	7.6	7.0
	Final	7.5	7.6	7.5	7.4	7.5	7.4	6.9

Effluent Conc.: 42 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	7.9	6.3	7.8	7.7	7.4	8.3
	Final	7.7	8.7	7.7	7.9	7.2	7.1	7.4
pH, units	Initial	7.1	7.4	6.9	7.5	7.6	7.6	7.0
	Final	7.5	7.6	7.5	7.5	7.5	7.4	6.9

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: February 10, 2015 at 1405

Date and Time Test Terminated: February 18, 2015 at 1410

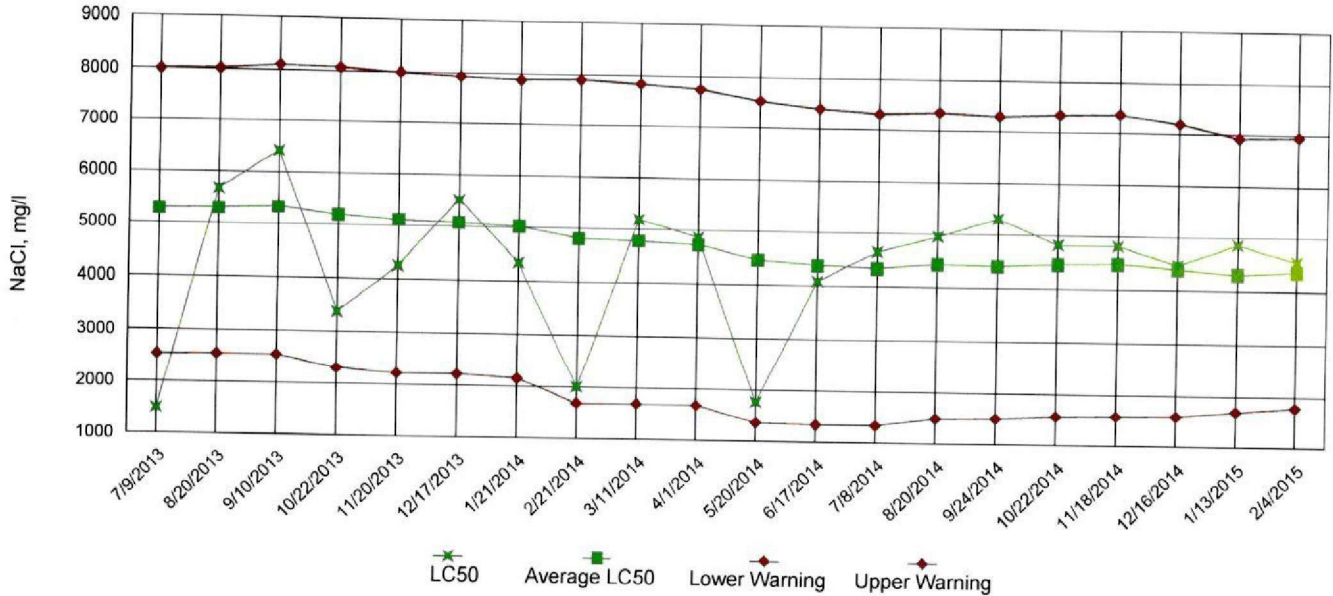
Effluent Conc.: 56 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.7	7.9	6.3	7.8	8.0	7.3	7.8
	Final	7.6	8.5	8.1	8.1	7.2	7.4	7.4
pH, units	Initial	7.1	7.4	7.0	7.5	7.6	7.6	7.0
	Final	7.5	7.6	7.5	7.5	7.5	7.5	6.9

Effluent Conc.: 75 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.1	6.0	7.9	7.7	7.4	8.0
	Final	7.4	8.4	8.0	8.0	7.2	7.0	7.4
pH, units	Initial	7.0	7.4	7.0	7.5	7.6	7.6	6.9
	Final	7.5	7.6	7.5	7.5	7.5	7.5	7.0

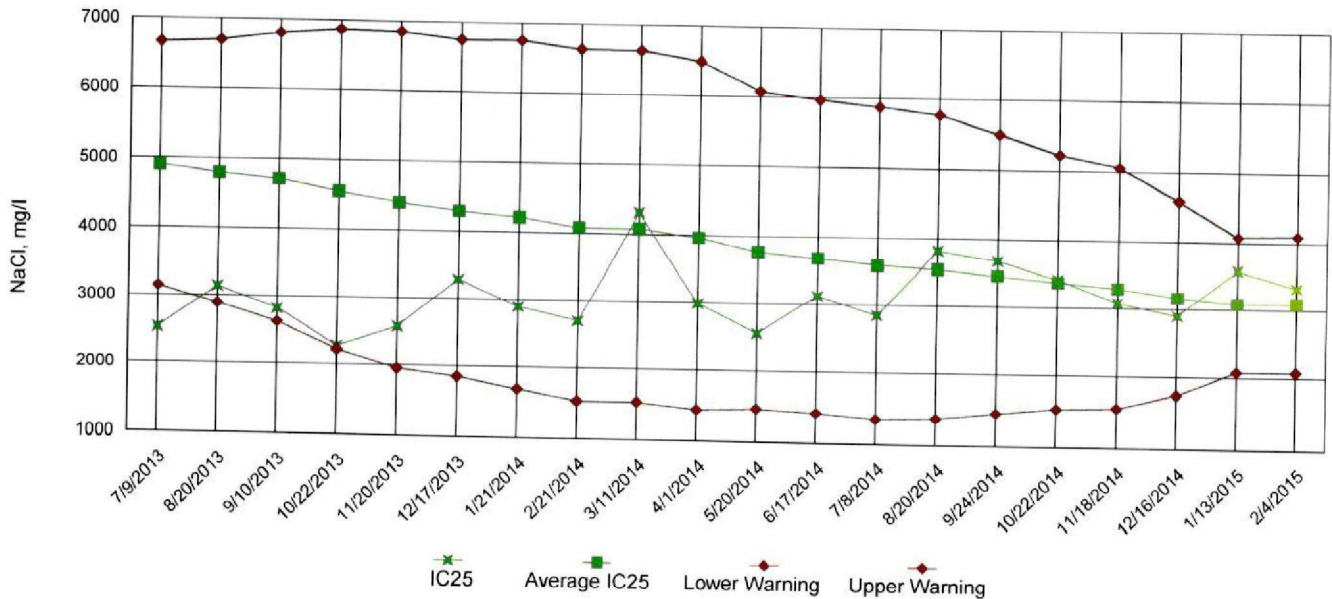
Effluent Conc.: 100 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.4	8.2	6.8	7.9	7.5	7.4	8.1
	Final	8.4	8.4	7.9	8.0	7.3	7.2	7.3
pH, units	Initial	7.0	7.4	7.1	7.5	7.6	7.6	6.9
	Final	7.6	7.6	7.6	7.5	7.6	7.5	7.5
Alkalinity, mg CaCO <sub>3</sub> /l		36	NA	41	NA	42	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		81	NA	80	NA	80	NA	NA
Conductivity, umhos/cm		290	340	350	310	320	350	290
Res. Chlorine, mg/l		0.050	NA	0.050	NA	0.050	NA	NA

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

LC50 Survival Data



IC25 Growth Data





Appendix B: Test 1000.0

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

Permittee: Benton Utilities

NPDES No.: AR0036498 AFIN# 63-00063

Date and Time Test Initiated: February 10, 2015 at 1400

Date and Time Test Terminated: February 18, 2015 at 1410

Dilution water used: Synthetic Soft Water #4183

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
32 %	87.5	100	87.5	100	100	100	100	95.0	7.21
42 %	100	100	100	100	100	100	100	100	0.00
56 %	100	100	100	100	100	100	100	100	0.00
75 %	100	100	100	87.5	100	100	100	97.5	5.73
100 %	100	100	100	100	62.5	100	100	92.5	18.1

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.339	0.240	0.271	0.302	0.271	0.285	13.2
32 %	0.258	0.270	0.308	0.299	0.328	0.293	9.73
42 %	0.298	0.315	0.259	0.239	0.325	0.287	12.8
56 %	0.326	0.312	0.328	0.315	0.289	0.314	4.96
75 %	0.306	0.312	0.302	0.282	0.265	0.293	6.63
100 %	0.289	0.275	0.302	0.286	0.246	0.28	7.55

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	(100 %)	<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	(100 %)	<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:  100 %  (TOP6C)
6. LOEC *Pimephales* Lethality:  100 %  (TXP6C)
7. NOEC *Pimephales* Sublethality:  100 %  (TPP6C)
8. LOEC *Pimephales* Sublethality:  100 %  (TYP6C)
9. Coefficient of variation for *Pimephales* growth:  13.2  (TQP6C)

Appendix B: Test 1000.0

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

PERMITTEE: Benton Utilities  
NPDES NO.: AR0036498 AFIN# 63-00063  
CONTACT: Mr. Jonathon Buff  
ANALYST: 280, 304, 310

SAMPLE No. 1 COLLECTED ending: DATE: February 10, 2015 TIME: 0840  
SAMPLE No. 2 COLLECTED ending: DATE: February 12, 2015 TIME: 0900  
SAMPLE No. 3 COLLECTED ending: DATE: February 13, 2015 TIME: 0910  
Test Initiated: DATE: February 10, 2015 TIME: 1400  
Test Terminated: DATE: February 18, 2015 TIME: 1410

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.3	8.2	6.8	7.7	7.6	7.2	8.5
Final	7.8	8.0	7.9	7.9	6.8	7.1	7.3
pH Initial	7.2	7.5	6.9	7.4	7.6	7.5	7.0
Final	7.5	7.6	7.4	7.4	7.4	7.4	6.9
Alkalinity	31	NA	31	NA	31	NA	NA
Hardness	48	NA	48	NA	48	NA	NA
Conductivity	140	170	180	150	160	180	130
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 32 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	6.5	7.8	7.6	7.5	8.3
Final	7.5	8.0	8.1	8.2	7.2	7.3	7.5
pH Initial	7.1	7.4	7.0	7.5	7.5	7.6	7.0
Final	7.5	7.6	7.5	7.4	7.5	7.4	6.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	220	230	200	210	230	180
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 42 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.1	7.9	6.3	7.8	7.7	7.4	8.3
Final	7.7	8.7	7.7	7.9	7.2	7.1	7.4
pH Initial	7.1	7.4	6.9	7.5	7.6	7.6	7.0
Final	7.5	7.6	7.5	7.5	7.5	7.4	6.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	200	240	250	210	220	250	200
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 56 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.7	7.9	6.3	7.8	8.0	7.3	7.8
Final	7.6	8.5	8.1	8.1	7.2	7.4	7.4
pH Initial	7.1	7.4	7.0	7.5	7.6	7.6	7.0
Final	7.5	7.6	7.5	7.5	7.5	7.5	6.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	220	260	270	240	250	260	220
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 75 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.1	8.1	6.0	7.9	7.7	7.4	8.0
Final	7.4	8.4	8.0	8.0	7.2	7.0	7.4
pH Initial	7.0	7.4	7.0	7.5	7.6	7.6	6.9
Final	7.5	7.6	7.5	7.5	7.5	7.5	7.0
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	250	300	300	270	280	300	250
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 100 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.4	8.2	6.8	7.9	7.5	7.4	8.1
Final	8.4	8.4	7.9	8.0	7.3	7.2	7.3
pH Initial	7.0	7.4	7.1	7.5	7.6	7.6	6.9
Final	7.6	7.6	7.6	7.5	7.6	7.5	7.5
Alkalinity	36	NA	41	NA	42	NA	NA
Hardness	81	NA	80	NA	80	NA	NA
Conductivity	290	340	350	310	320	350	290
Chlorine	0.050	NA	0.050	NA	0.050	NA	NA





