

October 31, 2016

Test Results of
Fourth Quarter
Chronic
Biomonitoring Testing
for
Dumas

Control No. 206533-1

Prepared for:

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Prepared by:

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McClelland Consulting Engineers, Inc.
ATTN: Mr. Matt Bienvenu
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Re: Chronic utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
- Dumas
NPDES Permit No. AR0033987 AFIN 21-00045

Dear Mr. Matt Bienvenu:

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 52 % effluent, which is above the critical dilution of 39 %. The NOEC for growth occurred at 52 % effluent, which is above the critical dilution of 39 %. **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 52 % effluent, which is above the critical dilution of 39 %. 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 *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	0.257	PASS
Control Growth CV < or = 40%	9.95	PASS
Growth Minimum Significant Difference 12 to 30%	18.4	PASS
Critical Dilution CV < or = 40%	16.9	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	27.5	PASS
Control CV < or = 40% per Surviving Female	8.27	PASS
Reproduction Minimum Significant Difference 13 to 47%	11.4	BELOW
Critical Dilution CV < or = 40%	9.46	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0033987 AFIN 21-00045
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)	7.6	8.0	7.9
pH (standard units)	7.7	7.8	7.8
Alkalinity (mg/l as CaCO ₃)	89	93	90
Hardness (mg/l as CaCO ₃)	27	32	27
Conductivity (umhos/cm)	300	320	320
Residual Chlorine (mg/l)	0.070	0.090	0.060
Ammonia as N (mg/l)	0.33	0.48	0.42

2. Dilution Water Samples: Synthetic Laboratory Moderate Hard Water #4370

- a. Dates Prepared: October 7, through 21, 2016
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.9	7.8	7.7
pH (standard units)	8.1	7.9	8.1
Alkalinity (mg/l as CaCO ₃)	60	60	60
Hardness (mg/l as CaCO ₃)	76	110	94
Conductivity (umhos/cm)	280	300	290
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 19, 2016 at 1430
Date & Time Test Terminated: October 26, 2016 at 0840
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 19, 2016 at
Date & Time Test Terminated: October 26, 2016 at 1620
Type & Volume of Test Chamber: 30 ml disposable beaker
Volume of Sample: 15 ml
Number of Organisms per replicate: 1
Number of Replicates per dilution: 10

4. Acclimation of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

a. Test 1000.0 *Pimephales promelas*

b. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat.

Pimephales promelas (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Dunnett's Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. 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 19, 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 19, 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

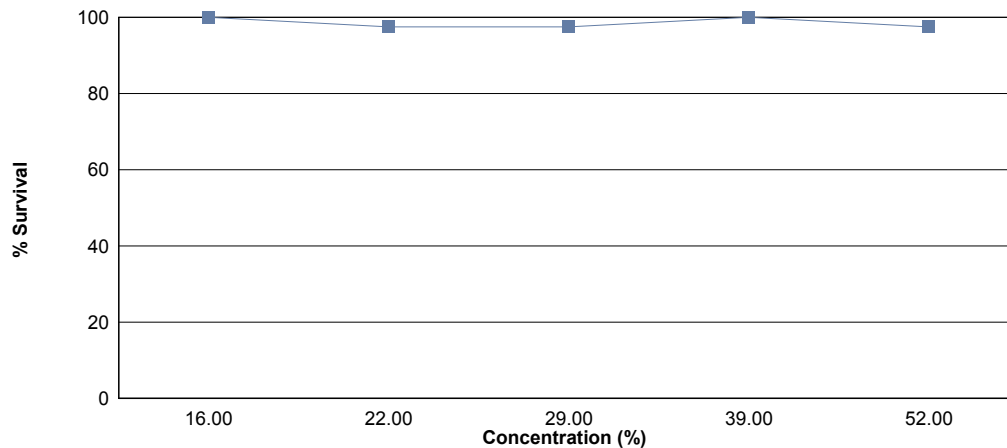
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 16 %, 22 %, 29 %, 39 %, 52 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 39 % effluent.

The test was initiated on October 19, 2016 at 1430 and continued through October 26, 2016 at 0840. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 52 % effluent
- b.) NOEC growth = 52 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.257
16 %	100	0.253
22 %	97.5	0.228
29 %	97.5	0.225
39 %	100	0.253
52 %	97.5	0.279

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

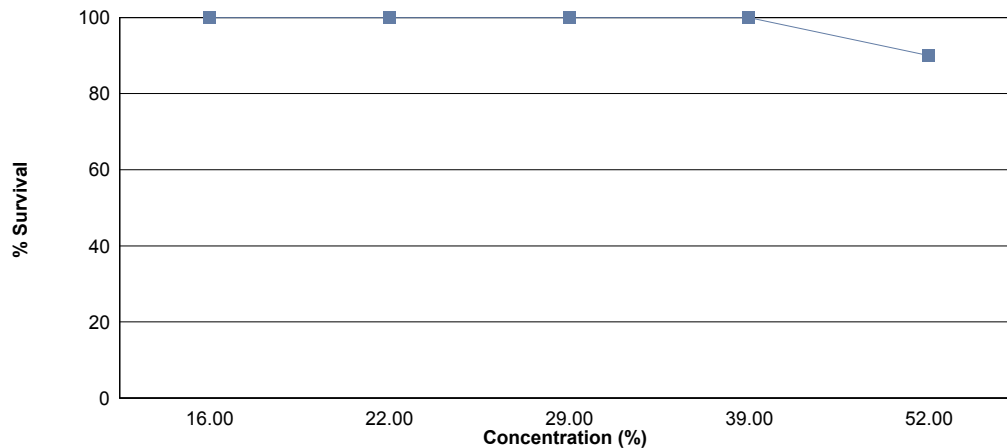
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 16 %, 22 %, 29 %, 39 %, 52 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 39 % effluent.

The test was initiated on October 19, 2016 at and continued through October 26, 2016 at 1620. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 52 % effluent
- b.) NOEC reproduction = 52 % effluent



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	27.5
16 %	100	28.9
22 %	100	28.4
29 %	100	27.2
39 %	100	27.2
52 %	90.0	25.6

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: October 19, 2016 at 1430

Date and Time Test Terminated: October 26, 2016 at 0840

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
16 %	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
22 %	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	8	8	8	8	8
29 %	A	8	8	8	7	7	7	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
39 %	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
52 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	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: October 19, 2016 at 1430

Test Terminated: October 26, 2016 at 0840

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.92427	.92632	0.00205	8	0.256
	B	.92290	.92465	0.00175	8	0.219
	C	.92017	.92220	0.00203	8	0.254
	D	.92399	.92614	0.00215	8	0.269
	E	.92468	.92699	0.00231	8	0.289
16 %	A	.92750	.92912	0.00162	8	0.202
	B	.92770	.92993	0.00223	8	0.279
	C	.92707	.92911	0.00204	8	0.255
	D	.92432	.92649	0.00217	8	0.271
	E	.92005	.92213	0.00208	8	0.260
22 %	A	.92293	.92462	0.00169	8	0.211
	B	.92327	.92523	0.00196	8	0.245
	C	.92184	.92341	0.00157	8	0.196
	D	.92056	.92253	0.00197	8	0.246
	E	.92112	.92306	0.00194	8	0.242
29 %	A	.92733	.92876	0.00143	8	0.179
	B	.92752	.92917	0.00165	8	0.206
	C	.92835	.93024	0.00189	8	0.236
	D	.92961	.93167	0.00206	8	0.258
	E	.92307	.92503	0.00196	8	0.245
39 %	A	.92397	.92603	0.00206	8	0.258
	B	.92549	.92737	0.00188	8	0.235
	C	.92677	.92831	0.00154	8	0.192
	D	.93007	.93252	0.00245	8	0.306
	E	.92263	.92483	0.00220	8	0.275
52 %	A	.92960	.93196	0.00236	8	0.295
	B	.92910	.93114	0.00204	8	0.255
	C	.92791	.92978	0.00187	8	0.234
	D	.92646	.92884	0.00238	8	0.298
	E	.92324	.92574	0.00250	8	0.312

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated:

Date and Time Test Terminated: October 26, 2016 at 1620

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	4	0	2	0	5	0	0	0	0	0	11	10	1.10
4	6	0	4	0	6	11	5	5	6	5	48	10	4.80	
5	10	8	11	9	9	0	9	8	9	11	84	10	8.40	
6	0	12	0	16	1	13	11	12	0	0	65	10	6.50	
7	14	0	12	14E	12	16E	13E	0	15	14	67	10	6.70	
8														
TOTAL	30	24	27	27	28	29	25	25	30	30	275	10	27.5	

E = Excluded fourth brood neonates

Concentration: 16 %														
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	3	0	0	0	5	0	0	0	0	8	10	0.800	
4	5	5	4	7	6	11	5	6	7	7	63	10	6.30	
5	11	0	9	0	9	0	9	11	13	11	73	10	7.30	
6	0	11	0	12	0	14	0	0	0	0	37	10	3.70	
7	15	12E	13	14	11	18E	12	13	14	16	108	10	10.8	
8														
TOTAL	31	19	26	33	26	30	26	30	34	34	289	10	28.9	

E = Excluded fourth brood neonates

Concentration: 22 %														
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	3	0	3	0	6	0	0	0	0	12	10	1.20	
4	5	6	7	8	6	11	4	6	6	6	65	10	6.50	
5	1	1	10	0	11	0	9	11	10	11	64	10	6.40	
6	10	14	0	13	0	11	0	0	0	0	48	10	4.80	
7	12	18E	13	22E	12	13E	14	17	12	15	95	10	9.50	
8														
TOTAL	28	24	30	24	29	28	27	34	28	32	284	10	28.4	

E = Excluded fourth brood neonates

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated:

Date and Time Test Terminated: October 26, 2016 at 1620

Concentration: 29 %														
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	3	0	5	0	0	0	0	8	10	0.800	
4	7	7	4	0	5	11	4	4	6	5	53	10	5.30	
5	0	0	8	10	9	0	9	10	9	9	64	10	6.40	
6	10	12	0	13	0	13	6	0	0	0	54	10	5.40	
7	12	11	12	0	14	17E	6	10	13	15	93	10	9.30	
8														
TOTAL	29	30	24	26	28	29	25	24	28	29	272	10	27.2	

E = Excluded fourth brood neonates

Concentration: 39 %													
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	5	0	4	0	4	0	0	0	0	13	10	1.30
4	6	7	5	0	6	9	3	6	5	5	52	10	5.20
5	0	1	8	11	11	0	9	12	11	11	74	10	7.40
6	8	16	0	15	0	13	12	0	0	0	64	10	6.40
7	11	16E	10	14E	12	14E	0	11	11	14	69	10	6.90
8													
TOTAL	25	29	23	30	29	26	24	29	27	30	272	10	27.2

E = Excluded fourth brood neonates

Concentration: 52 %													
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	3	0	3	0	5	0	0	0	0	11	10	1.10
4	7	0	1	0	5	10	4	6	6	3	42	10	4.20
5	9	10	11	11	10	0	9X	9	10	10	89	9	9.89
6	2	11	14	13	11	13	X	0	0	0	64	9	7.11
7	11	1	1	0	0	17E	X	13	13	11	50	9	5.56
8													
TOTAL	29	25	27	27	26	28	13	28	29	24	256	10	25.6

E = Excluded fourth brood neonates

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	16 %	1	1.00000	1.39310
2	16 %	2	1.00000	1.39310
2	16 %	3	1.00000	1.39310
2	16 %	4	1.00000	1.39310
2	16 %	5	1.00000	1.39310
3	22 %	1	1.00000	1.39310
3	22 %	2	1.00000	1.39310
3	22 %	3	0.87500	1.20940
3	22 %	4	1.00000	1.39310
3	22 %	5	1.00000	1.39310
4	29 %	1	0.87500	1.20940
4	29 %	2	1.00000	1.39310
4	29 %	3	1.00000	1.39310
4	29 %	4	1.00000	1.39310
4	29 %	5	1.00000	1.39310
5	39 %	1	1.00000	1.39310
5	39 %	2	1.00000	1.39310
5	39 %	3	1.00000	1.39310
5	39 %	4	1.00000	1.39310
5	39 %	5	1.00000	1.39310
6	52 %	1	1.00000	1.39310
6	52 %	2	0.87500	1.20940
6	52 %	3	1.00000	1.39310
6	52 %	4	1.00000	1.39310
6	52 %	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 = 0.08099 W = 0.5968 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	16 %	27.50	16.00	5.00	
3	22 %	25.00	16.00	5.00	
4	29 %	25.00	16.00	5.00	
5	39 %	27.50	16.00	5.00	
6	52 %	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 = 0.02415 W = 0.9417 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 = 1.749 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	0.01011	0.002022	2.01	
Within (Error)	24	0.02415	0.001006		
Total	29	0.03426			
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	0.2574	0.2574			
2	16 %	0.2534	0.2534	0.1994		
3	22 %	0.228	0.228	1.466		
4	29 %	0.2248	0.2248	1.625		
5	39 %	0.2532	0.2532	0.2094		
6	52 %	0.2788	0.2788	-1.067		
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	16 %	5	0.04734	18.4	0.004	
3	22 %	5	0.04734	18.4	0.0294	
4	29 %	5	0.04734	18.4	0.0326	
5	39 %	5	0.04734	18.4	0.0042	
6	52 %	5	0.04734	18.4	-0.0214	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
16 %	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
22 %	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
29 %	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
39 %	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
52 %	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.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	16 %	10	0	
2	22 %	10	0	
3	29 %	10	0	
4	39 %	10	0	
5	52 %	10	1	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	65.53	13.11	1.107	
Within (Error)	54	639.4	11.84		
Total	59	704.9			
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	27.5	27.5			
2	16 %	28.9	28.9	-0.9098		
3	22 %	28.4	28.4	-0.5849		
4	29 %	27.2	27.2	0.195		
5	39 %	27.2	27.2	0.195		
6	52 %	25.6	25.6	1.235		
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	16 %	10	3.555	12.9	-1.4		
3	22 %	10	3.555	12.9	-0.9		
4	29 %	10	3.555	12.9	0.3		
5	39 %	10	3.555	12.9	0.3		
6	52 %	10	3.555	12.9	1.9		

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	29.1	5.82	0.6662	
Within (Error)	53	463	8.736		
Total	58	492.1			
Critical F = 3.39 (alpha = 0.01, df = 5,53)					
2.39 (alpha = 0.05, df = 5,53)					
Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)					

Dunnett's Test - Table 1 of 2					No Transformation	
Ho:Control<Treatment						
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05	
1	Control	27.5	27.5			
2	16 %	28.9	28.9	-1.059		
3	22 %	28.4	28.4	-0.6809		
4	29 %	27.2	27.2	0.227		
5	39 %	27.2	27.2	0.227		
6	52 %	27	27	0.3682		
Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,53)						
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	16 %	10	3.053	11.1	-1.4	
3	22 %	10	3.053	11.1	-0.9	
4	29 %	10	3.053	11.1	0.3	
5	39 %	10	3.053	11.1	0.3	
6	52 %	9	3.137	11.4	0.5	

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	7.9	7.8	7.8	8.2	7.7	7.6	7.6
	Final *1	7.1	7.0	7.6	7.7	7.3	7.7	7.3
	Final *2	6.9	7.7	7.9	7.6	7.8	8.1	7.8
pH, units	Initial	8.1	8.0	7.9	8.1	8.1	8.2	7.8
	Final *1	7.9	7.8	7.9	8.2	7.8	8.0	7.6
	Final *2	8.0	8.2	8.3	7.7	8.4	8.0	8.4
Alkalinity, mg CaCO ₃ /l		60	NA	60	NA	60	NA	NA
Hardness, mg CaCO ₃ /l		76	NA	110	NA	94	NA	NA
Conductivity, umhos/cm		280	280	300	280	290	280	260
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 16 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.5	7.5	8.0	7.9	7.8	7.7	7.7
	Final *1	7.1	6.8	7.6	7.8	7.5	7.3	7.3
	Final *2	7.1	8.1	7.6	7.6	7.9	8.2	8.1
pH, units	Initial	8.0	7.9	7.9	8.0	8.1	8.1	7.8
	Final *1	7.9	7.8	7.9	8.2	7.8	7.9	7.7
	Final *2	8.1	8.3	8.4	7.7	8.4	8.1	8.4

Effluent Conc.: 22 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.5	8.0	8.2	7.9	7.8	7.6
	Final *1	6.9	7.0	7.6	7.4	6.9	7.3	7.0
	Final *2	7.1	7.7	7.8	7.6	7.8	8.0	8.2
pH, units	Initial	7.9	7.8	7.9	8.0	8.1	8.1	7.8
	Final *1	7.9	7.8	7.9	8.2	7.8	7.9	7.7
	Final *2	8.1	8.3	8.4	7.7	8.4	8.1	8.5

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Effluent Conc.: 29 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.2	7.9	8.2	7.9	7.6	7.8
	Final *1	7.0	8.1	7.6	7.6	7.7	7.1	7.3
	Final *2	7.3	7.8	7.9	7.3	8.0	8.3	7.8
pH, units	Initial	7.9	7.8	7.9	8.1	8.1	8.1	7.9
	Final *1	7.9	7.8	7.9	8.2	7.9	8.0	7.7
	Final *2	8.1	8.2	8.5	7.7	8.4	8.1	8.5

Effluent Conc.: 39 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.5	7.7	7.9	8.4	7.7	7.6	7.6
	Final *1	6.9	8.0	7.1	7.8	7.5	6.8	7.1
	Final *2	7.1	7.8	7.4	7.5	7.7	8.2	7.8
pH, units	Initial	7.8	7.8	7.9	8.0	8.1	8.1	7.9
	Final *1	7.9	7.8	7.9	8.2	7.8	8.0	7.7
	Final *2	8.1	8.3	8.5	7.8	8.4	8.1	8.5
Alkalinity, mg CaCO ₃ /l	71	NA	78	NA	71	NA	NA	NA
Hardness, mg CaCO ₃ /l	71	NA	73	NA	63	NA	NA	NA
Conductivity, umhos/cm	290	290	300	300	300	270	270	270
Res. Chlorine, mg/l	0.050	NA	0.050	NA	<0.05	NA	NA	NA

Effluent Conc.: 52 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.5	7.5	7.9	8.0	7.9	7.6	7.4
	Final *1	6.8	8.0	7.3	7.8	7.7	7.2	7.2
	Final *2	7.0	7.6	7.7	7.5	7.7	8.1	8.0
pH, units	Initial	7.8	7.8	7.8	8.0	8.2	8.2	8.0
	Final *1	7.9	7.9	8.0	8.2	8.0	8.0	7.7
	Final *2	8.2	8.3	8.6	7.8	8.4	8.1	8.5

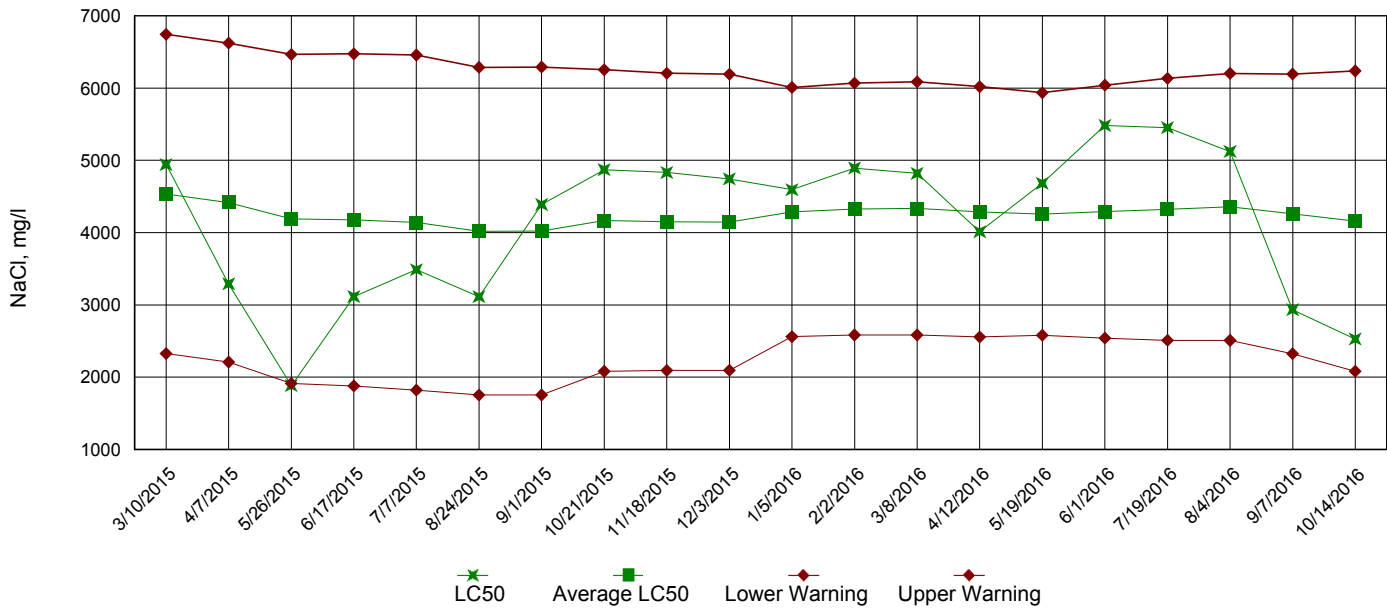
*1 = data from the *Pimephales promelas* (Fathead Minnow) test

*2 = data from the *Ceriodaphnia dubia* test

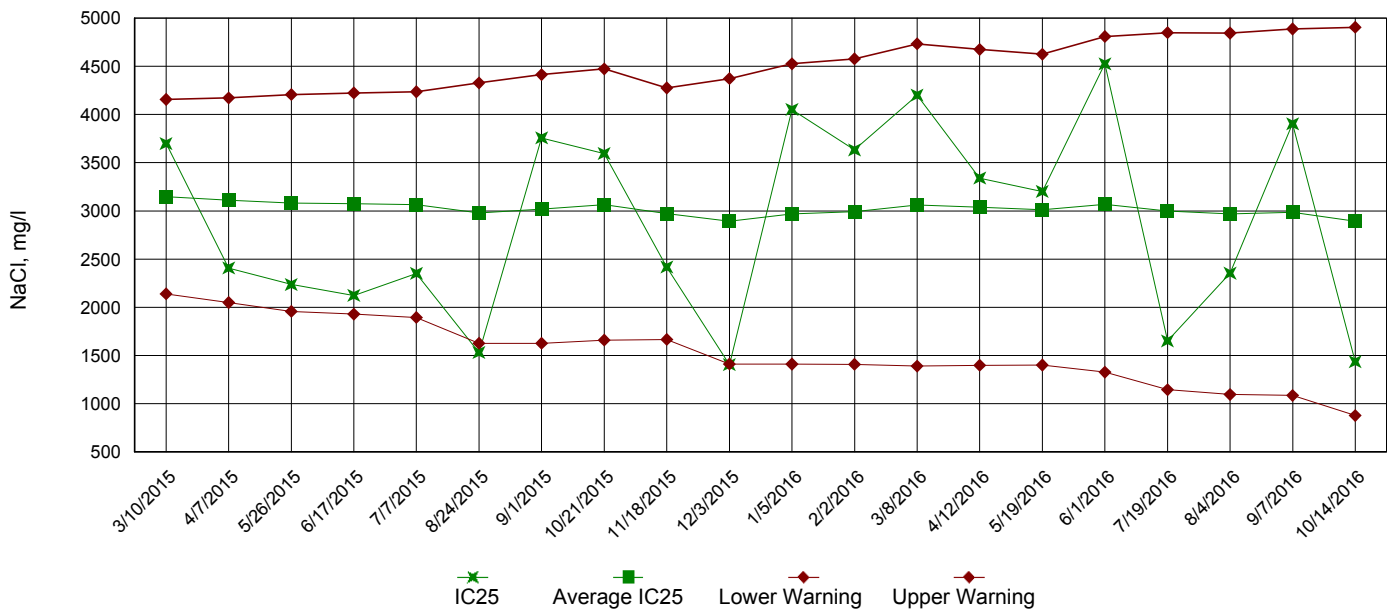
Appendix A4: Test 1000.0

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

LC50 Survival Data

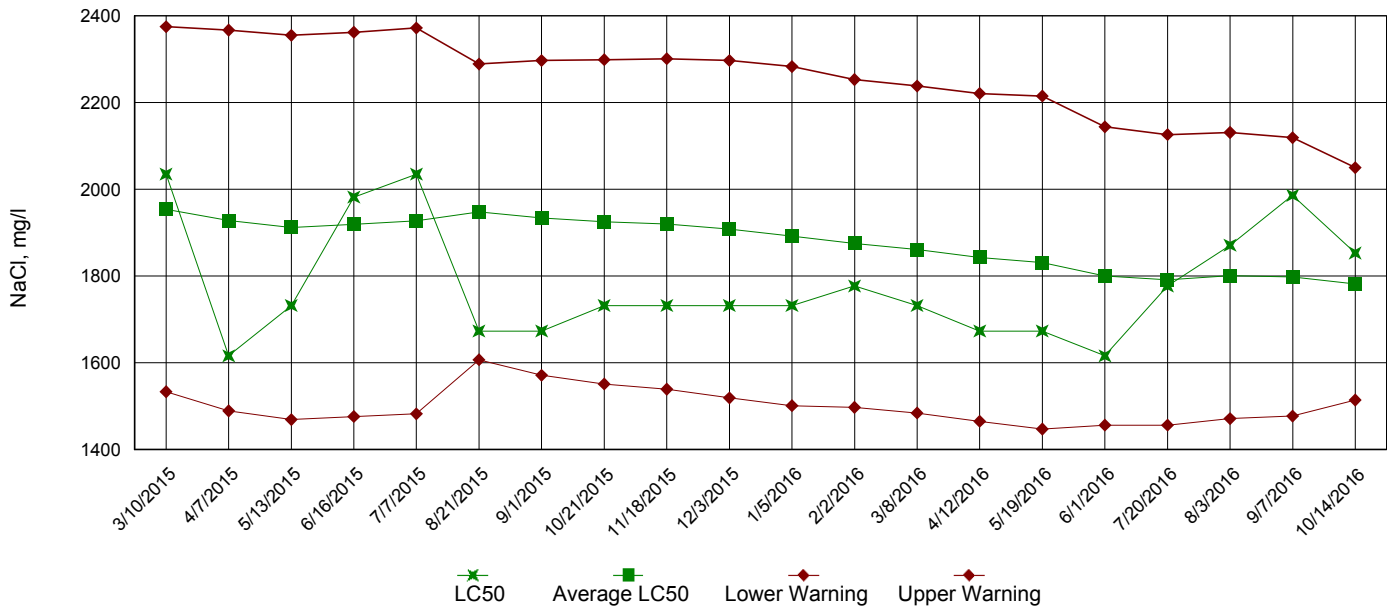


IC25 Growth Data

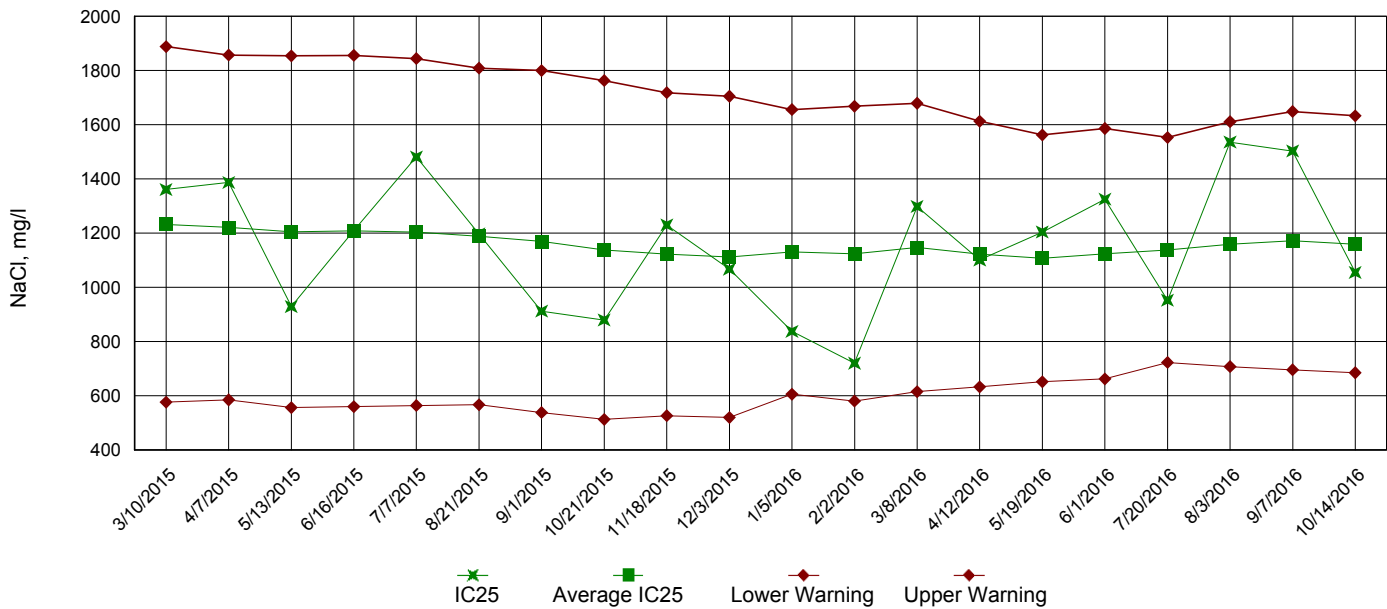


Appendix A4: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



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

Permittee: McClelland Consulting Engineers, Inc.

NPDES No.: AR0033987 AFIN 21-00045

Date and Time Test Initiated: October 19, 2016 at 1430

Date and Time Test Terminated: October 26, 2016 at 0840

Dilution water used: Synthetic Laboratory Moderate Hard Water #4370

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
16 %	100	100	100	100	100	100	100	100	0.00
22 %	100	100	87.5	100	100	100	100	97.5	5.73
29 %	87.5	100	100	100	100	100	100	97.5	5.73
39 %	100	100	100	100	100	100	100	100	0.00
52 %	100	87.5	100	100	100	100	100	97.5	5.73

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.256	0.219	0.254	0.269	0.289	0.257	9.95
16 %	0.202	0.279	0.255	0.271	0.260	0.253	11.9
22 %	0.211	0.245	0.196	0.246	0.242	0.228	10.1
29 %	0.179	0.206	0.236	0.258	0.245	0.225	14.2
39 %	0.258	0.235	0.192	0.306	0.275	0.253	16.9
52 %	0.295	0.255	0.234	0.298	0.312	0.279	11.8

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	(39 %)	<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	(39 %)	<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: 52 % (TOP6C)
6. LOEC *Pimephales* Lethality: 52 % (TXP6C)
7. NOEC *Pimephales* Sublethality: 52 % (TPP6C)
8. LOEC *Pimephales* Sublethality: 52 % (TYP6C)
9. Coefficient of variation for *Pimephales* growth: 16.9 (TQP6C)

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

PERMITTEE: McClelland Consulting Engineers
NPDES NO.: AR0033987 AFIN 21-00045
CONTACT: Mr. Matt Bienvenu
ANALYST: 280, 310, 314

Test Initiated: DATE: October 19, 2016 TIME: 1430
Test Terminated: DATE: October 26, 2016 TIME: 0840

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.9	7.8	7.8	8.2	7.7	7.6	7.6
Final	7.1	7.0	7.6	7.7	7.3	7.7	7.3
pH Initial	8.1	8.0	7.9	8.1	8.1	8.2	7.8
Final	7.9	7.8	7.9	8.2	7.8	8.0	7.6
Alkalinity	60	NA	60	NA	60	NA	NA
Hardness	76	NA	110	NA	94	NA	NA
Conductivity	280	280	300	280	290	280	260
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 16 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.5	7.5	8.0	7.9	7.8	7.7	7.7
Final	7.1	6.8	7.6	7.8	7.5	7.3	7.3
pH Initial	8.0	7.9	7.9	8.0	8.1	8.1	7.8
Final	7.9	7.8	7.9	8.2	7.8	7.9	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	280	280	290	290	290	270	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 22 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.5	8.0	8.2	7.9	7.8	7.6
Final	6.9	7.0	7.6	7.4	6.9	7.3	7.0
pH Initial	7.9	7.8	7.9	8.0	8.1	8.1	7.8
Final	7.9	7.8	7.9	8.2	7.8	7.9	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	280	300	290	300	270	260
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 29 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.6	7.2	7.9	8.2	7.9	7.6	7.8
Final	7.0	8.1	7.6	7.6	7.7	7.1	7.3
pH Initial	7.9	7.8	7.9	8.1	8.1	8.1	7.9
Final	7.9	7.8	7.9	8.2	7.9	8.0	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	280	300	290	300	270	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 39 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.5	7.7	7.9	8.4	7.7	7.6	7.6
Final	6.9	8.0	7.1	7.8	7.5	6.8	7.1
pH Initial	7.8	7.8	7.9	8.0	8.1	8.1	7.9
Final	7.9	7.8	7.9	8.2	7.8	8.0	7.7
Alkalinity	71	NA	78	NA	71	NA	NA
Hardness	71	NA	73	NA	63	NA	NA
Conductivity	290	290	300	300	300	270	270
Chlorine	0.050	NA	0.050	NA	<0.05	NA	NA

DILUTION 52 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.5	7.5	7.9	8.0	7.9	7.6	7.4
Final	6.8	8.0	7.3	7.8	7.7	7.2	7.2
pH Initial	7.8	7.8	7.8	8.0	8.2	8.2	8.0
Final	7.9	7.9	8.0	8.2	8.0	8.0	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	290	310	300	310	290	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

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

Permittee: McClelland Consulting Engineers, Inc.

NPDES No.: AR0033987 AFIN 21-00045

Date and Time Test Initiated:

Date and Time Test Terminated: October 26, 2016 at 1620

Dilution water used: Synthetic Laboratory Moderate Hard Water #4370

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		16 %	22 %	29 %	39 %	52 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	100	100	100	100	100	90.0

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		16 %	22 %	29 %	39 %	52 %
A	30	31	28	29	25	29
B	24	19	24	30	29	25
C	27	26	30	24	23	27
D	27	33	24	26	30	27
E	28	26	29	28	29	26
F	29	30	28	29	26	28
G	25	26	27	25	24	13
H	25	30	34	24	29	28
I	30	34	28	28	27	29
J	30	34	32	29	30	24
Mean per Adult	27.5	28.9	28.4	27.2	27.2	25.6
Mean per Surviving Adult	27.5	28.9	28.4	27.2	27.2	27.0
CV %	8.27	16.3	11.0	8.28	9.46	6.42

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	(39 %)	<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 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	(39 %)	<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: 52 % (TOP3B)
6. LOEC *Ceriodaphnia* Lethality: 52 % (TXP3B)
7. NOEC *Ceriodaphnia* Sublethality: 52 % (TPP3B)
8. LOEC *Ceriodaphnia* Sublethality: 52 % (TYP3B)
9. Coefficient of variation for *Ceriodaphnia* Reproduction: 9.46 (TQP3B)

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

PERMITTEE: McClelland Consulting Engineers,
NPDES NO.: AR0033987 AFIN 21-00045
CONTACT: Mr. Matt Bienvenu
ANALYST: 280, 310, 314

Test Initiated: DATE: October 19, 2016 TIME: _____
Test Terminated: DATE: October 26, 2016 TIME: 1620

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.9	7.8	7.8	8.2	7.7	7.6	7.6
Final	6.9	7.7	7.9	7.6	7.8	8.1	7.8
pH Initial	8.1	8.0	7.9	8.1	8.1	8.2	7.8
Final	8.0	8.2	8.3	7.7	8.4	8.0	8.4
Alkalinity	60	NA	60	NA	60	NA	NA
Hardness	76	NA	110	NA	94	NA	NA
Conductivity	280	280	300	280	290	280	260
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
16 %							
D.O. Initial	7.5	7.5	8.0	7.9	7.8	7.7	7.7
Final	7.1	8.1	7.6	7.6	7.9	8.2	8.1
pH Initial	8.0	7.9	7.9	8.0	8.1	8.1	7.8
Final	8.1	8.3	8.4	7.7	8.4	8.1	8.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	280	280	290	290	290	270	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
22 %							
D.O. Initial	7.6	7.5	8.0	8.2	7.9	7.8	7.6
Final	7.1	7.7	7.8	7.6	7.8	8.0	8.2
pH Initial	7.9	7.8	7.9	8.0	8.1	8.1	7.8
Final	8.1	8.3	8.4	7.7	8.4	8.1	8.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	280	300	290	300	270	260
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
29 %							
D.O. Initial	7.6	7.2	7.9	8.2	7.9	7.6	7.8
Final	7.3	7.8	7.9	7.3	8.0	8.3	7.8
pH Initial	7.9	7.8	7.9	8.1	8.1	8.1	7.9
Final	8.1	8.2	8.5	7.7	8.4	8.1	8.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	280	300	290	300	270	270
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
39 %							
D.O. Initial	7.5	7.7	7.9	8.4	7.7	7.6	7.6
Final	7.1	7.8	7.4	7.5	7.7	8.2	7.8
pH Initial	7.8	7.8	7.9	8.0	8.1	8.1	7.9
Final	8.1	8.3	8.5	7.8	8.4	8.1	8.5
Alkalinity	71	NA	78	NA	71	NA	NA
Hardness	71	NA	73	NA	63	NA	NA
Conductivity	290	290	300	300	300	270	270
Chlorine	0.050	NA	0.050	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
52 %							
D.O. Initial	7.5	7.5	7.9	8.0	7.9	7.6	7.4
Final	7.0	7.6	7.7	7.5	7.7	8.1	8.0
pH Initial	7.8	7.8	7.8	8.0	8.2	8.2	8.0
Final	8.2	8.3	8.6	7.8	8.4	8.1	8.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	290	290	310	300	310	290	270
Chlorine	NA	NA	NA	NA	NA	NA	NA



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: MCE		PO No.:		ANALYSES REQUESTED										AIC CONTROL NO: 206533	
Project Reference:		MATRIX		NO OF BOTTLES										AIC PROPOSAL NO:	
Project Manager: MATT BIENVENUE		WATER												Carrier:	
Sampled By: Jesse James		SOIL												Received Temperature C 0.1	
AIC No. 1		GRA B												Remarks	
Sample Identification Dunes		COM P												Field pH calibration	
Date/Time Collected 10/17-10/18		S												on _____ @ _____	
Collector JA-7A		V												Buffer:	
		N												T = Sodium Thiosulfate	
		O												H = HCl to pH2	
		A												Z = Zinc acetate	
		C												A = (NH ₄) ₂ SO ₄ , NH ₄ OH	
		O												Date/Time	
		M												Relinquished	
		P												By: <i>[Signature]</i>	
		L												Date/Time 10/18/16 1455	
		I												Relinquished	
		N												By: <i>[Signature]</i>	
		G												Date/Time	
		R												Received in Lab	
		A												By: <i>[Signature]</i>	
		S												Date/Time 10-18-16	
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