AMERICAN INTERPLEX CORPORATION
LABORATORIES

April 3, 2014

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

Control No. 176711-1

Prepared for:

Mr. John Davis
Malvern Water Works
506 Overman
Malvern, AR 72104

Prepared by:

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

AMERICAN INTERPLEX CORPORATION
LABORATORIES

Malvern Water Works
ATTN: Mr. John Davis
506 Overman
Malvern, AR 72104

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
Outfall 001 - Malvern, AR
NPDES Permit No. AR0034126 AFIN 30-00040

Dear Mr. John Davis:

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 8.5 % effluent, which is above the critical dilution of 6.5 %. 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 8.5 % effluent, which is above the critical dilution of 6.5 %. The NOEC for reproduction occurred at 8.5 % effluent, which is above the critical dilution of 6.5 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

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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	0.285	PASS
Control Growth CV < or = 40%	6.39	PASS
Growth Minimum Significant Difference 12 to 30%	10.9	BELOW
Critical Dilution CV < or = 40%	6.59	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	23.7	PASS
Control CV < or = 40% per Surviving Female	12.7	PASS
Reproduction Minimum Significant Difference 13 to 47%	24.8	PASS
Critical Dilution CV < or = 40%	21.9	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0034126 AFIN 30-00040
2. Test Requirements: Test Methods 1000.0 and 1002.0
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)	8.2	7.5	7.5
pH (standard units)	7.1	7.2	7.6
Alkalinity (mg/l as CaCO3)	44	44	41
Hardness (mg/l as CaCO3)	33	33	31
Conductivity (umhos/cm)	220	220	210
Residual Chlorine (mg/l)	0.070	<0.05	<0.05
Ammonia as N (mg/l)	4.6	4.3	4.4

2. Dilution Water Samples: Synthentic Soft Water #4082
   a. Dates Prepared: March 25 through April 8, 2014
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.2	7.8	7.8
pH (standard units)	7.2	7.6	7.6
Alkalinity (mg/l as CaCO3)	32	32	34
Hardness (mg/l as CaCO3)	46	46	46
Conductivity (umhos/cm)	150	150	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 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:	March 25, 2014 at 1350
Date & Time Test Terminated:	April 1, 2014 at 1320
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:	March 25, 2014 at 1540
Date & Time Test Terminated:	April 1, 2014 at 1425
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 March 11, 2014 at 1015 to March 18, 2014 at 1030
The results were as follows: (Control No. 176141-1.)
Survival LC-50: 5182 mg/l
Growth IC-25: 4314 mg/l
Growth PMSD: 14.6

Ceriodaphnia dubia

Chronic reference tests are performed monthly.
A chronic reference test was performed on March 11, 2014 at 1430 to March 18, 2014 at 1435
The results were as follows: (Control No. 176141-2.)
Survival LC-50: 1823 mg/l
Growth IC-25: 1555 mg/l
Growth PMSD: 14

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	99.3	0.750
pH	SM 4500-H+ B	100	1.21
Conductivity	EPA 120.1	105	4.62

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: March 25, 2014
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

Ceriodaphnia dubia

Date: March 25, 2014
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

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

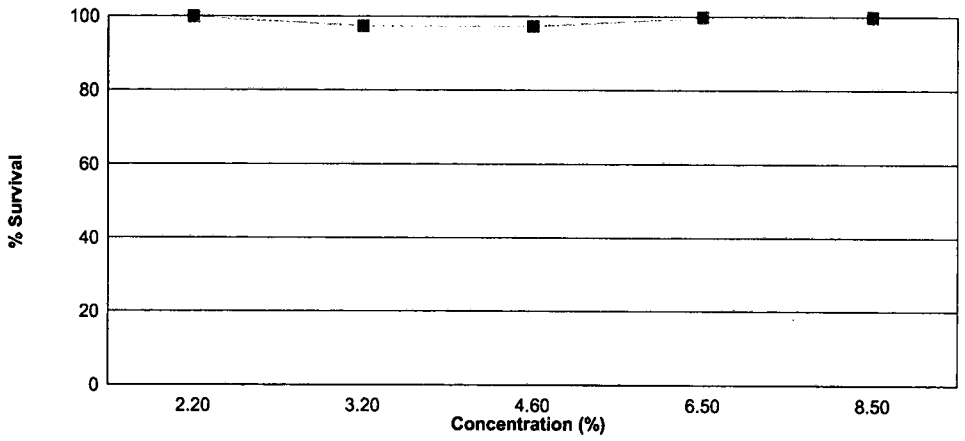
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 2.2 %, 3.2 %, 4.6 %, 6.5 %, 8.5 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 6.5 % effluent.

The test was initiated on March 25, 2014 at 1350 and continued through April 1, 2014 at 1320. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 8.5 % effluent
b.) NOEC growth = 8.5 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.285
2.2 %	100	0.255
3.2 %	97.5	0.254
4.6 %	97.5	0.265
6.5 %	100	0.281
8.5 %	100	0.271

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

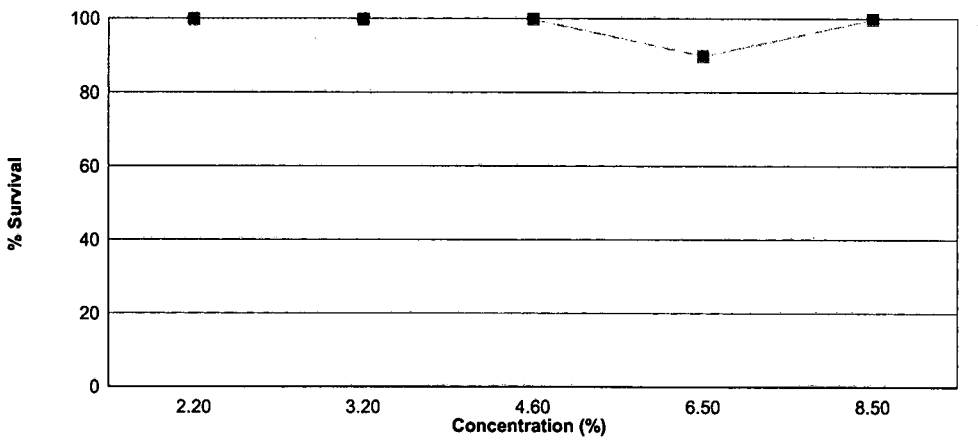
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 2.2 %, 3.2 %, 4.6 %, 6.5 %, 8.5 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 6.5 % effluent.

The test was initiated on March 25, 2014 at 1540 and continued through April 1, 2014 at 1425. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 8.5 % effluent
b.) NOEC reproduction = 8.5 % effluent



Summary of the 7-day *Ceriodaphnia dubia* Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	23.7
2.2 %	100	23.1
3.2 %	100	22.7
4.6 %	100	24.2
6.5 %	90.0	22.5
8.5 %	100	26.1

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: March 25, 2014 at 1350
Date and Time Test Terminated: April 1, 2014 at 1320

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
2.2 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
3.2 %	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
4.6 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	7	7	7	7	7
	E	8	8	8	8	8	8	8
6.5 %	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
8.5 %	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

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: March 25, 2014 at 1350
Test Terminated: April 1, 2014 at 1320

Drying Started: March 31, 2014 at 1010
Drying Ended: April 2, 2014 at 1310

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.94488	.94696	0.00208	8	0.260
	B	.94406	.94639	0.00233	8	0.291
	C	.94415	.94661	0.00246	8	0.308
	D	.94270	.94490	0.00220	8	0.275
	E	.94360	.94593	0.00233	8	0.291
2.2 %	A	.94546	.94749	0.00203	8	0.254
	B	.94557	.94770	0.00213	8	0.266
	C	.94687	.94885	0.00198	8	0.248
	D	.94757	.94964	0.00207	8	0.259
	E	.94688	.94885	0.00197	8	0.246
3.2 %	A	.94855	.95040	0.00185	8	0.231
	B	.94992	.95203	0.00211	8	0.264
	C	.94838	.95045	0.00207	8	0.259
	D	.94940	.95169	0.00229	8	0.286
	E	.94869	.95055	0.00186	8	0.232
4.6 %	A	.94749	.94945	0.00196	8	0.245
	B	.94836	.95049	0.00213	8	0.266
	C	.94493	.94705	0.00212	8	0.265
	D	.94542	.94763	0.00221	8	0.276
	E	.94666	.94886	0.00220	8	0.275
6.5 %	A	.94680	.94890	0.00210	8	0.262
	B	.94887	.95102	0.00215	8	0.269
	C	.95045	.95264	0.00219	8	0.274
	D	.95395	.95640	0.00245	8	0.306
	E	.95346	.95582	0.00236	8	0.295
8.5 %	A	.95340	.95514	0.00174	8	0.218
	B	.95460	.95664	0.00204	8	0.255
	C	.95300	.95532	0.00232	8	0.290
	D	.95153	.95391	0.00238	8	0.298
	E	.94981	.95215	0.00234	8	0.292

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: March 25, 2014 at 1540
Date and Time Test Terminated: April 1, 2014 at 1425

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	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	4	0	4	4	4	4	4	4	34	10	3.40
5	0	0	0	6	8	8	6	8	10	6	52	10	5.20
6	9	8	8	12	0	0	10	11	0	0	58	10	5.80
7	11	12	11	12	12	12	0	0	13	10	93	10	9.30
8													
TOTAL	22	24	23	30	24	24	20	23	27	20	237	10	23.7

Concentration: 2.2 %													
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	2	4	4	0	2	4	4	0	0	22	10	2.20
5	0	0	0	8	6	2	9	6	0	6	37	10	3.70
6	9	8	9	0	12	0	0	11	8	10	67	10	6.70
7	10	9	10	13	15	10	13	0	12	13	105	10	10.5
8													
TOTAL	21	19	23	25	33	14	26	21	20	29	231	10	23.1

Concentration: 3.2 %													
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	0	4	0	0	0	4	4	4	4	0	20	10	2.00
5	0	0	0	6	8	6	8	11	8	6	53	10	5.30
6	8	8	2	13	13	0	0	13	0	11	68	10	6.80
7	12	11	0	12	0	12	12	0	15	12	86	10	8.60
8													
TOTAL	20	23	2	31	21	22	24	28	27	29	227	10	22.7

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: March 25, 2014 at 1540
Date and Time Test Terminated: April 1, 2014 at 1425

Concentration: 4.6 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	2	2	0	2	4	4	4	4	2	28	10	2.80
5	0	0	0	6	6	10	8	10	11	6	57	10	5.70
6	7	10	8	14	0	0	0	13	0	0	52	10	5.20
7	10	12	10	12	12	14	13	0	12	10	105	10	10.5
8													
TOTAL	21	24	20	32	20	28	25	27	27	18	242	10	24.2

Concentration: 6.5 %													
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	X	0	0	0	0	0	0	0	0	9	0.00
3	0	0	X	0	0	0	0	0	0	0	0	9	0.00
4	0	4	X	0	2	4	2	4	4	0	20	9	2.22
5	0	0	X	8	8	8	8	10	8	5	55	9	6.11
6	8	8	X	15	13	14	11	14	0	10	93	9	10.3
7	9	9	X	13	0	0	0	0	13	13	57	9	6.33
8													
TOTAL	17	21	0	36	23	26	21	28	25	28	225	10	22.5

Concentration: 8.5 %													
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	4	4	4	0	0	4	4	2	4	0	26	10	2.60
5	0	0	8	6	6	10	8	6	8	5	57	10	5.70
6	8	8	0	12	14	0	0	15	0	11	68	10	6.80
7	13	12	14	16	15	15	12	0	13	0	110	10	11.0
8													
TOTAL	25	24	26	34	35	29	24	23	25	16	261	10	26.1

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	2.2 %	1	1.00000	1.39310
2	2.2 %	2	1.00000	1.39310
2	2.2 %	3	1.00000	1.39310
2	2.2 %	4	1.00000	1.39310
2	2.2 %	5	1.00000	1.39310
3	3.2 %	1	1.00000	1.39310
3	3.2 %	2	1.00000	1.39310
3	3.2 %	3	1.00000	1.39310
3	3.2 %	4	1.00000	1.39310
3	3.2 %	5	0.87500	1.20940
4	4.6 %	1	1.00000	1.39310
4	4.6 %	2	1.00000	1.39310
4	4.6 %	3	1.00000	1.39310
4	4.6 %	4	0.87500	1.20940
4	4.6 %	5	1.00000	1.39310
5	6.5 %	1	1.00000	1.39310
5	6.5 %	2	1.00000	1.39310
5	6.5 %	3	1.00000	1.39310
5	6.5 %	4	1.00000	1.39310
5	6.5 %	5	1.00000	1.39310
6	8.5 %	1	1.00000	1.39310
6	8.5 %	2	1.00000	1.39310
6	8.5 %	3	1.00000	1.39310
6	8.5 %	4	1.00000	1.39310
6	8.5 %	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))
D = 0.05399		
W = 0.5466		
Critical W = 0.9	(alpha = 0.01, N = 30)	
Critical W = 0.927	(alpha = 0.05, N = 30)	

Data FAIL normality test (alpha = 0.01).

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	2.2 %	27.50	16.00	5.00	
3	3.2 %	25.00	16.00	5.00	
4	4.6 %	25.00	16.00	5.00	
5	6.5 %	27.50	16.00	5.00	
6	8.5 %	27.50	16.00	5.00	

Critical values are 1 tailed (k=5)

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality		No Transformation
D = 0.01035		
W = 0.968		
Critical W = 0.9	(alpha = 0.01, N = 30)	
Critical W = 0.927	(alpha = 0.05, N = 30)	
Data PASS normality test (alpha = 0.01).		

Bartlett's Test for Homogeneity of Variance		No Transformation
Calculated B1 statistic = 7.906		
Critical B = 15.086	(alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.		

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation
SOURCE	DF	SS	MS	F
Between	5	0.004198	0.0008396	1.949
Within (Error)	24	0.01034	0.0004308	
Total	29	0.01454		

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	0.285	0.285		
2	2.2 %	0.2546	0.2546	2.316	
3	3.2 %	0.2544	0.2544	2.331	
4	4.6 %	0.2654	0.2654	1.493	
5	6.5 %	0.2812	0.2812	0.2895	
6	8.5 %	0.2706	0.2706	1.097	

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	2.2 %	5	0.03098	10.9	0.0304
3	3.2 %	5	0.03098	10.9	0.0306
4	4.6 %	5	0.03098	10.9	0.0196
5	6.5 %	5	0.03098	10.9	0.0038
6	8.5 %	5	0.03098	10.9	0.0144

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
2.2 %	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
3.2 %	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
4.6 %	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
6.5 %	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.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
8.5 %	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.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	2.2 %	10	0	
2	3.2 %	10	0	
3	4.6 %	10	0	
4	6.5 %	10	1	
5	8.5 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality		No Transformation
D = 0.1451 D* = 1.138 Critical D* = 1.035	(alpha = 0.01, N = 60)	
Data FAIL normality test (alpha = 0.01).		

Steel's Many-One Rank Test					No Transformation
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	2.2 %	99.00	75.00	10.00	
3	3.2 %	107.50	75.00	10.00	
4	4.6 %	109.50	75.00	10.00	
5	6.5 %	107.00	75.00	10.00	
6	8.5 %	125.00	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	78.57	15.71	0.5111
Within (Error)	53	1629	30.74	
Total	58	1708		

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	23.7	23.7		
2	2.2 %	23.1	23.1	0.242	
3	3.2 %	22.7	22.7	0.4033	
4	4.6 %	24.2	24.2	-0.2017	
5	6.5 %	25	25	-0.5103	
6	8.5 %	26.1	26.1	-0.9679	

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	2.2 %	10	5.728	24.2	0.6
3	3.2 %	10	5.728	24.2	1
4	4.6 %	10	5.728	24.2	-0.5
5	6.5 %	9	5.885	24.8	-1.3
6	8.5 %	10	5.728	24.2	-2.4

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: March 25, 2014 at 1103
Date and Time Test Terminated: April 1, 2014 at 1425

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	8.3	7.8	7.4	7.8	7.8	8.2
	Final *1	8.4	7.2	7.2	7.8	7.8	7.7	7.3
	Final *2	8.2	7.7	7.7	7.8	8.6	7.9	7.2
pH, units	Initial	7.2	7.6	7.6	7.8	7.6	7.7	7.2
	Final *1	7.4	7.4	7.4	7.6	7.9	7.8	7.4
	Final *2	7.6	7.9	8.0	8.1	8.2	7.4	7.8
Alkalinity, mg CaCO3/l		32	NA	32	NA	34	NA	NA
Hardness, mg CaCO3/l		46	NA	46	NA	46	NA	NA
Conductivity, umhos/cm		150	180	150	160	160	160	150
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 2.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.2	7.8	7.5	7.2	8.0	8.2
	Final *1	8.5	6.3	7.2	7.5	8.0	7.7	7.3
	Final *2	8.1	7.7	7.7	7.9	8.4	7.9	7.6
pH, units	Initial	7.2	7.5	7.5	7.7	7.4	7.7	7.2
	Final *1	7.3	7.2	7.3	7.7	8.0	7.8	7.4
	Final *2	7.5	7.9	7.9	8.1	8.2	7.4	7.8

Effluent Conc.: 3.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.7	8.2	7.9	7.4	7.4	8.0	8.0
	Final *1	8.6	6.8	7.2	7.6	7.9	7.6	7.2
	Final *2	8.1	7.6	7.8	7.9	8.6	8.1	7.6
pH, units	Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.2
	Final *1	7.3	7.3	7.4	7.6	8.0	7.8	7.4
	Final *2	7.5	7.8	7.9	8.1	8.2	7.4	7.8

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: March 25, 2014 at 1103
Date and Time Test Terminated: April 1, 2014 at 1425

Effluent Conc.: 4.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	8.1	7.9	7.3	7.0	7.9	8.0
	Final *1	8.4	6.5	7.2	7.8	8.2	7.8	7.2
	Final *2	8.2	7.7	7.6	7.8	8.6	7.9	7.4
pH, units	Initial	7.2	7.5	7.4	7.6	7.4	7.7	7.2
	Final *1	7.4	7.2	7.4	7.7	8.0	7.9	7.4
	Final *2	7.5	7.8	7.9	8.0	8.2	7.5	7.8

Effluent Conc.: 6.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.2	7.8	7.5	7.2	7.8	8.1
	Final *1	8.3	6.5	7.1	7.6	8.2	7.9	7.3
	Final *2	8.0	7.6	7.6	7.8	8.6	7.9	7.3
pH, units	Initial	7.2	7.4	7.4	7.7	7.4	7.7	7.1
	Final *1	7.3	7.2	7.4	7.7	8.0	7.9	7.3
	Final *2	7.5	7.8	7.9	8.0	8.2	7.5	7.8
Alkalinity, mg CaCO3/l		36	NA	34	NA	30	NA	NA
Hardness, mg CaCO3/l		45	NA	45	NA	43	NA	NA
Conductivity, umhos/cm		160	180	160	160	160	160	160
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

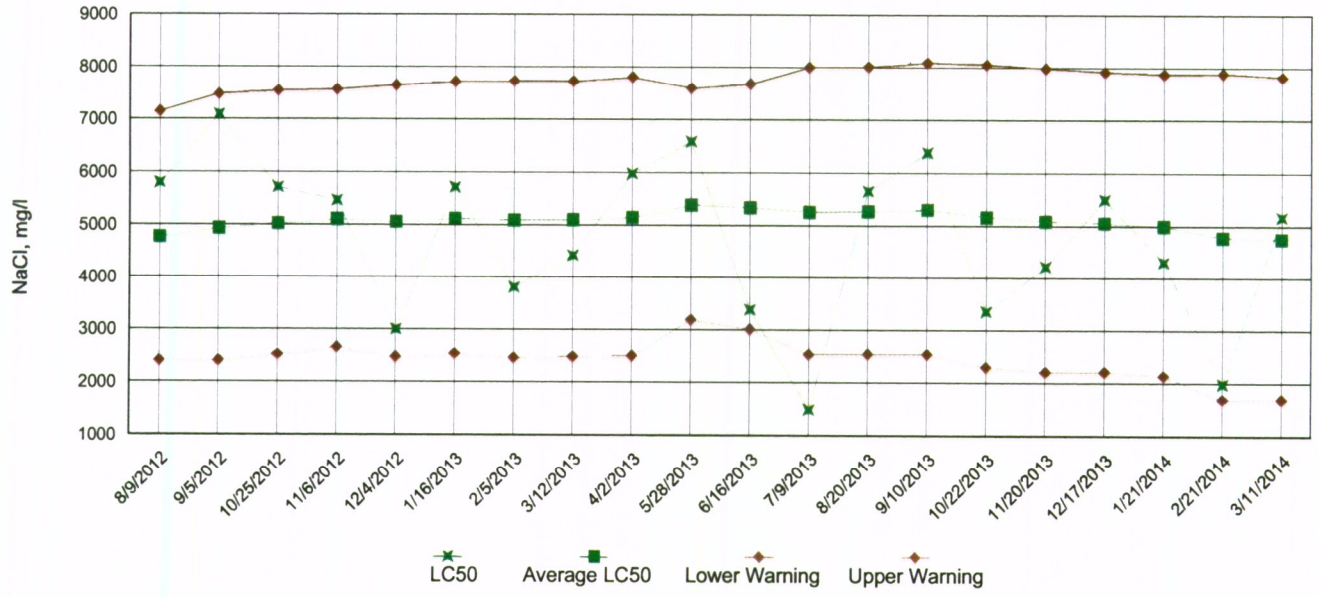
Effluent Conc.: 8.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	8.2	7.9	7.6	7.2	7.6	8.0
	Final *1	8.3	6.3	7.1	7.7	7.9	7.5	7.0
	Final *2	8.1	7.5	7.7	7.9	8.7	8.0	7.5
pH, units	Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.1
	Final *1	7.3	7.2	7.4	7.7	8.0	7.9	7.3
	Final *2	7.5	7.8	8.0	8.1	8.3	7.5	7.8

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

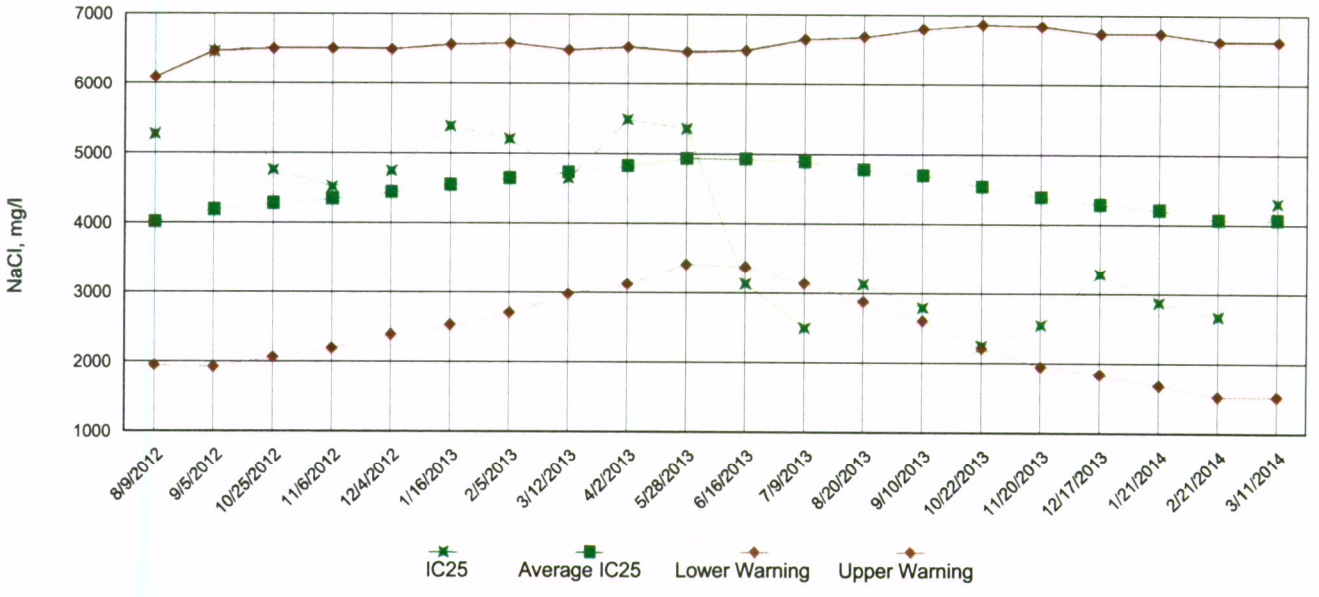
Appendix A4: Test 1000.0

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

LC50 Survival Data



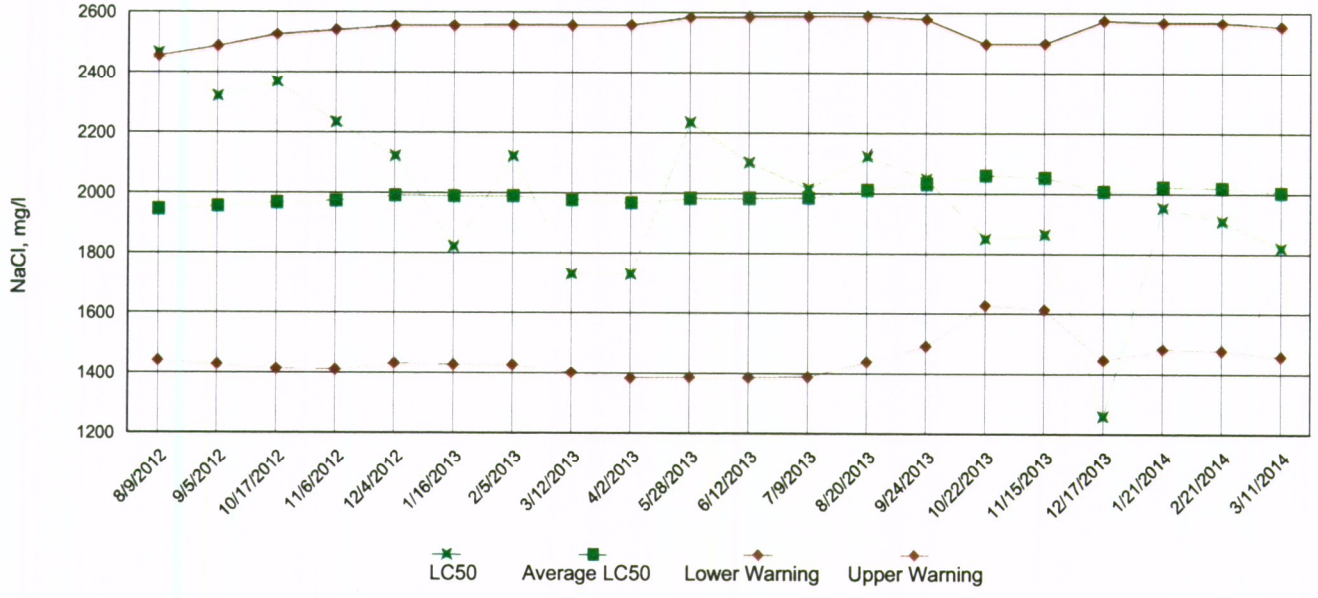
IC25 Growth Data



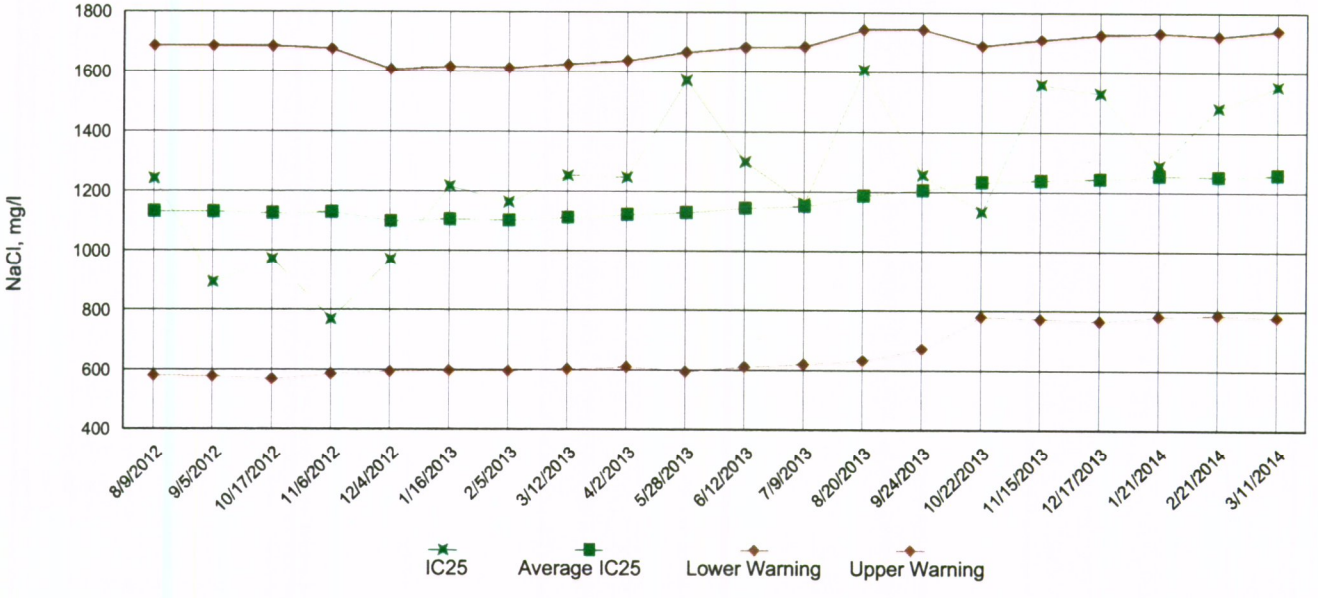
Appendix A4: Test 1002.0

Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1000.0

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

Permittee: Malvern Water Works

NPDES No.: AR0034126 AFIN 30-00040

Date and Time Test Initiated: March 25, 2014 at 1350
Date and Time Test Terminated: April 1, 2014 at 1320
Dilution water used: Synthentic Soft Water #4082

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in replicate chambers A	B	C	D	E	Mean percent survival 24 hr	48 hr	7 days	CV%
Control	100	100	100	100	100	100	100	100	0.00
2.2 %	100	100	100	100	100	100	100	100	0.00
3.2 %	100	100	100	100	87.5	100	100	97.5	5.73
4.6 %	100	100	100	87.5	100	100	100	97.5	5.73
6.5 %	100	100	100	100	100	100	100	100	0.00
8.5 %	100	100	100	100	100	100	100	100	0.00

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers A	B	C	D	E	Mean dry weight, mg	CV%
Control	0.260	0.291	0.308	0.275	0.291	0.285	6.39
2.2 %	0.254	0.266	0.248	0.259	0.246	0.255	3.21
3.2 %	0.231	0.264	0.259	0.286	0.232	0.254	9.14
4.6 %	0.245	0.266	0.265	0.276	0.275	0.265	4.70
6.5 %	0.262	0.269	0.274	0.306	0.295	0.281	6.59
8.5 %	0.218	0.255	0.290	0.298	0.292	0.271	12.5

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	(6.5 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____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	(6.5 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP6C)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP6C)

5. NOEC Pimephales Lethality: 8.5 % (TOP6C)

6. LOEC Pimephales Lethality: 8.5 % (TXP6C)

7. NOEC Pimephales Sublethality: 8.5 % (TPP6C)

8. LOEC Pimephales Sublethality: 8.5 % (TYP6C)

9. Coefficient of variation for Pimephales growth: 6.59 (TQP6C)

Appendix B: Test 1000.0

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

PERMITTEE: Malvern Water Works
NPDES NO.: AR0034126 AFIN 30-00040
CONTACT: Mr. John Davis
ANALYST: 280, 304, 307, 310

SAMPLE No. 2 COLLECTED ending: DATE: March 26, 2014 TIME: 0900
SAMPLE No. 3 COLLECTED ending: DATE: March 28, 2014 TIME: 0700
Test Initiated: DATE: March 25, 2014 TIME: 1350
Test Terminated: DATE: April 1, 2014 TIME: 1320

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	7.8	7.4	7.8	7.8	8.2
Final	8.4	7.2	7.2	7.8	7.8	7.7	7.3
pH Initial	7.2	7.6	7.6	7.8	7.6	7.7	7.2
Final	7.4	7.4	7.4	7.6	7.9	7.8	7.4
Alkalinity	32	NA	32	NA	34	NA	NA
Hardness	46	NA	46	NA	46	NA	NA
Conductivity	150	180	150	160	160	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 2.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	7.8	7.5	7.2	8.0	8.2
Final	8.5	6.3	7.2	7.5	8.0	7.7	7.3
pH Initial	7.2	7.5	7.5	7.7	7.4	7.7	7.2
Final	7.3	7.2	7.3	7.7	8.0	7.8	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	150	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.7	8.2	7.9	7.4	7.4	8.0	8.0
Final	8.6	6.8	7.2	7.6	7.9	7.6	7.2
pH Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.2
Final	7.3	7.3	7.4	7.6	8.0	7.8	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.3	8.1	7.9	7.3	7.0	7.9	8.0
Final	8.4	6.5	7.2	7.8	8.2	7.8	7.2
pH Initial	7.2	7.5	7.4	7.6	7.4	7.7	7.2
Final	7.4	7.2	7.4	7.7	8.0	7.9	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	7.8	7.5	7.2	7.8	8.1
Final	8.3	6.5	7.1	7.6	8.2	7.9	7.3
pH Initial	7.2	7.4	7.4	7.7	7.4	7.7	7.1
Final	7.3	7.2	7.4	7.7	8.0	7.9	7.3
Alkalinity	36	NA	34	NA	30	NA	NA
Hardness	45	NA	45	NA	43	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 8.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.2	7.9	7.6	7.2	7.6	8.0
Final	8.3	6.3	7.1	7.7	7.9	7.5	7.0
pH Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.1
Final	7.3	7.2	7.4	7.7	8.0	7.9	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

Appendix B: Test 1002.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: Malvern Water Works

NPDES No.: AR0034126 AFIN 30-00040

Date and Time Test Initiated: March 25, 2014 at 1540
Date and Time Test Terminated: April 1, 2014 at 1425
Dilution water used: Synthentic Soft Water #4082

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent 2.2 %	3.2 %	4.6 %	6.5 %	8.5 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	90.0	100
7 day	100	100	100	100	90.0	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent 2.2 %	3.2 %	4.6 %	6.5 %	8.5 %
A	22	21	20	21	17	25
B	24	19	23	24	21	24
C	23	23	2	20	0	26
D	30	25	31	32	36	34
E	24	33	21	20	23	35
F	24	14	22	28	26	29
G	20	26	24	25	21	24
H	23	21	28	27	28	23
I	27	20	27	27	25	25
J	20	29	29	18	28	16
Mean per Adult	23.7	23.1	22.7	24.2	22.5	26.1
Mean per Surviving Adult	23.7	23.1	22.7	24.2	25.0	26.1
CV %	12.7	23.4	35.9	18.3	21.9	21.1

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	(6.5 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(6.5 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)

5. NOEC Ceriodaphnia Lethality: 8.5 % (TOP3B)

6. LOEC Ceriodaphnia Lethality: 8.5 % (TXP3B)

7. NOEC Ceriodaphnia Sublethality: 8.5 % (TPP3B)

8. LOEC Ceriodaphnia Sublethality: 8.5 % (TYP3B)

9. Coefficient of variation for Ceriodaphnia Reproduction: 21.9 (TQP3B)

Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: Malvern Water Works
NPDES NO.: AR0034126 AFIN 30-00040
CONTACT: Mr. John Davis
ANALYST: 280, 304, 307, 310

SAMPLE No. 2 COLLECTED ending: DATE: March 26, 2014 TIME: 0900
SAMPLE No. 3 COLLECTED ending: DATE: March 28, 2014 TIME: 0700
Test Initiated: DATE: March 25, 2014 TIME: 1540
Test Terminated: DATE: April 1, 2014 TIME: 1425

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	7.8	7.4	7.8	7.8	8.2
Final	8.2	7.7	7.7	7.8	8.6	7.9	7.2
pH Initial	7.2	7.6	7.6	7.8	7.6	7.7	7.2
Final	7.6	7.9	8.0	8.1	8.2	7.4	7.8
Alkalinity	32	NA	32	NA	34	NA	NA
Hardness	46	NA	46	NA	46	NA	NA
Conductivity	150	180	150	160	160	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 2.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	7.8	7.5	7.2	8.0	8.2
Final	8.1	7.7	7.7	7.9	8.4	7.9	7.6
pH Initial	7.2	7.5	7.5	7.7	7.4	7.7	7.2
Final	7.5	7.9	7.9	8.1	8.2	7.4	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	150	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.7	8.2	7.9	7.4	7.4	8.0	8.0
Final	8.1	7.6	7.8	7.9	8.6	8.1	7.6
pH Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.2
Final	7.5	7.8	7.9	8.1	8.2	7.4	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.3	8.1	7.9	7.3	7.0	7.9	8.0
Final	8.2	7.7	7.6	7.8	8.6	7.9	7.4
pH Initial	7.2	7.5	7.4	7.6	7.4	7.7	7.2
Final	7.5	7.8	7.9	8.0	8.2	7.5	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	7.8	7.5	7.2	7.8	8.1
Final	8.0	7.6	7.6	7.8	8.6	7.9	7.3
pH Initial	7.2	7.4	7.4	7.7	7.4	7.7	7.1
Final	7.5	7.8	7.9	8.0	8.2	7.5	7.8
Alkalinity	36	NA	34	NA	30	NA	NA
Hardness	45	NA	45	NA	43	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 8.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.2	7.9	7.6	7.2	7.6	8.0
Final	8.1	7.5	7.7	7.9	8.7	8.0	7.5
pH Initial	7.2	7.5	7.4	7.7	7.4	7.7	7.1
Final	7.5	7.8	8.0	8.1	8.3	7.5	7.8
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	160	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: MALVERN WASTEWATER
Project Reference:
Project Manager:
Sampled By: JOHN DAVIS
PO No.:

AIC CONTROL NO: 176711
AIC PROPOSAL NO:
Carrier:
Received on Ice (4°C)? YES (circled) 2.3C NO

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	SAMPLE MATRIX: WATER	SAMPLE MATRIX: SOIL	SAMPLE MATRIX	NO OF BOTTLES	ANALYSES REQUESTED: BIO-MONITERING											Remarks
1	MALVERN WASTEWATER	3/25/14 9:20 AM		X				1	X											
		Container Type																		
		Preservative																		

Field pH calibration
on ________ @ ______
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)
NORMAL or EXPEDITED IN ____ DAYS
Expedited results requested by: ____________
Who should AIC contact with questions: ____________
Phone: ____________ Fax: ____________
Report Attention to: ____________
Report Address to:

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	3/25/14 10:45 AM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
		[signature] Jimmy Day	3/25/14 1045

Comments:

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: MALVERN WASTEWATER
Project Reference:
Project Manager:
Sampled By: John DAVIS
PO No.

AIC CONTROL NO: 176711
AIC PROPOSAL NO:
Carrier:
Received on ice (4°C)? YES 1.9 NO

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	SAMPLE MATRIX: WATER	SOIL	NO OF BOTTLES	ANALYSES REQUESTED: BOD-Monitoring
2	MALVERN WASTEWATER	3/26/14 10:05 AM		X			1	X
		Container Type						
		Preservative						

Remarks: Date & Time 3/25&26/14 10am-9am

Field pH calibration on _____ @ _____ 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)
NORMAL or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: _____
Phone: _____ Fax: _____
Report Attention to: _____
Report Address to:

Relinquished By:	Date/Time	Received By:	Date/Time
	3/26/14 12:15 PM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			3-26-14 1215

Comments:

5/01

FORM 0060

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060
FAX (501) 224-5072

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: MALVERN WASTEWATER (2.814)
Project Reference:
Project Manager:
Sampled By: John Davis

PO No.

SAMPLE MATRIX: WATER, SOIL

NO OF BOTTLES

ANALYSES REQUESTED: NO3+NO2-N, TP; Aluminum; Bio Monitoring

AIC CONTROL NO: 176711
AIC PROPOSAL NO:
Carrier:
Received on Ice (4°C)? (YES) 1.6°C NO

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	NO3+NO2-N, TP	Aluminum	Bio Monitoring
	MALVERN WASTEWATER #1	3/28/14 8:11am	X				1	X		
	MALVERN WATER	3/28/14 10:22A	X				1		X	
(3)	MALVERN WASTEWATER #2	3/28/14 8:09A		X			1			X
		Container Type								
		Preservative								

Remarks
AIC # 176893
AIC # 176893

Field pH calibration
on _____ @ _____
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)
NORMAL or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: _____
Phone: _____ Fax: _____
Report Attention to: _____
Report Address to:

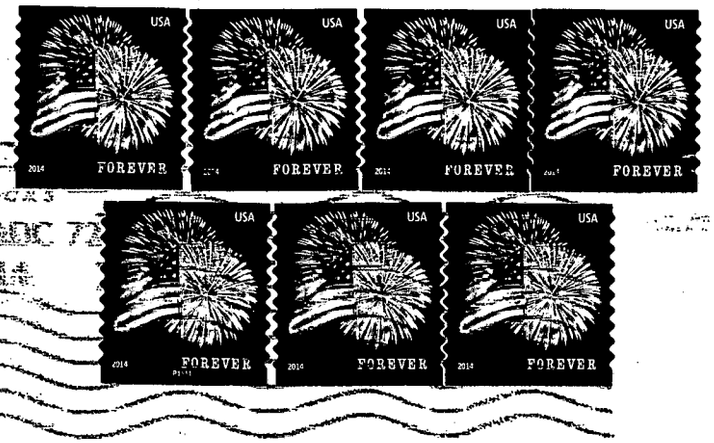
Relinquished By:	Date/Time	Received By:	Date/Time
	3/28/14 11:29 hr		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			3/28/14 1140

Comments:

5/01

FORM 0060

Malvern Water Works
Wastewater Division
P.O.Box 638
Malvern, AR 72104



ADEQ
WATER DIVISION-ENFORCEMENT BRANCH
5301 NORTHSHORE DRIVE
NORTH LITTLE ROCK, AR 72118-5317