

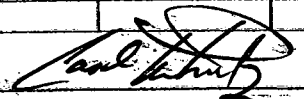
## Sanitary Sewer Overflow Monthly Report

**Facility Name:** Malvern Water Works **Permit Number:** AR0034126 **Reporting Period (Month/Year):** Dec. 2013

No Sanitary Sewer Overflows This Monitoring Period

Summary Report Code Descriptions				
Cause(s) of SSO		SSO Impact	Action(s) Taken	Ultimate Discharge Location
CO-Construction	D-Debris	NEAH-No Evidence of Adverse Health or Environmental Impact	WO-Work Order	CR-Creek/Stream/River (Please Specify)
E-Equipment Failure	G-Grease	OEHC-Observed or Evidence of Human Contact	EC-Environmental Cleanup	DI-Ditch
HC-Hydro Clean	LF-Line Failure Break	EFK-Evidence of Fish Kill	HC-Hydro Cleaned	DR-Drop Inlet
R-Rainfall	RG-Roots & Grease		HR-Hand Rodded	GR-Ground Surface
RO-Roots	V-Vandalism		EN-Referred to Engineering	PA-Paved Area
			PN-Public Notification	CB-Contained in Building

Description								
Location	Manhole #	Start Date of SSO	End Date of SSO	Estimated Volume (in gallons)	Cause of SSO	Environmental Impact	Action(s) Taken to Address SSO	Ultimate Discharge Location
Code - Work Force (Sullenberger St)	878	12/2/13	12/2/13	3000	D	NEAH	SET RODD	CR, GR, DI
City Park Lift Station (Highway 220)	LS	12/2/13	12/2/13	1500	E	NEAH	WO	CR, GR


Date 1/06/2014

Signature of Cognizant or Ranking Official

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violation."

October 10, 2013

Test Results of  
Fourth Quarter  
Chronic 7-Day Renewal  
Biomonitoring Testing  
for  
Outfall 001

Control No. 171098-1

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



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  
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 %. The NOEC for growth 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 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

A handwritten signature in black ink, appearing to read 'John Overbey', is written over a horizontal line.

John Overbey  
Laboratory Director

PDF cc: Malvern Water Works  
ATTN: Mr. John Davis  
jdavis@malvernar.gov

Malvern Water Works  
ATTN: Mr. Carl Wheatley  
cwheatley@malvernar.gov

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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	0.393	PASS
Control Growth CV < or = 40%	7.10	PASS
Growth Minimum Significant Difference 12 to 30%	13.4	PASS
Critical Dilution CV < or = 40%	6.40	PASS

*Ceriodaphnia dubia* Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	20.1	PASS
Control CV < or = 40% per Surviving Female	11.4	PASS
Reproduction Minimum Significant Difference 13 to 47%	15.0	PASS
Critical Dilution CV < or = 40%	9.83	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:
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.5	8.6	9.0
pH (standard units)	7.9	7.2	6.7
Alkalinity (mg/l as CaCO <sub>3</sub> )	35	33	33
Hardness (mg/l as CaCO <sub>3</sub> )	33	32	29
Conductivity (umhos/cm)	210	230	240
Residual Chlorine (mg/l)	0.13	0.080	0.15
Ammonia as N (mg/l)	0.26	0.25	0.17

2. Dilution Water Samples: Synthetic Soft Water #4026

- a. Dates Prepared: September 24 through October 8, 2013
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.5	8.1	8.8
pH (standard units)	8.5	8.0	7.6
Alkalinity (mg/l as CaCO <sub>3</sub> )	32	32	31
Hardness (mg/l as CaCO <sub>3</sub> )	48	46	46
Conductivity (umhos/cm)	170	180	170
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 1, 2013 at 1430  
Date & Time Test Terminated: October 8, 2013 at 1425  
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 1, 2013 at 1430  
Date & Time Test Terminated: October 8, 2013 at 1430  
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.

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 September 10, 2013 at 1435 to September 17, 2013 at 1316

The results were as follows: (Control No. 170403-1.)

Survival LC-50: 6398.6 mg/l

Growth IC-25: 2808 mg/l

Growth PMSD: 12.9

*Ceriodaphnia dubia*

Chronic reference tests are performed monthly.

A chronic reference test was performed on September 24, 2013 at 1615 to September 30, 2013 at 1500

The results were as follows: (Control No. 170403-2.)

Survival LC-50: 2052 mg/l

Growth IC-25: 1260 mg/l

Growth PMSD: 22

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	101	2.08
pH	SM 4500-H+ B	101	0.803
Conductivity	EPA 120.1	101	0.00

VI. Organism History

*Pimephales promelas* (Fathead minnow)

Date: October 1, 2013

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 1, 2013

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

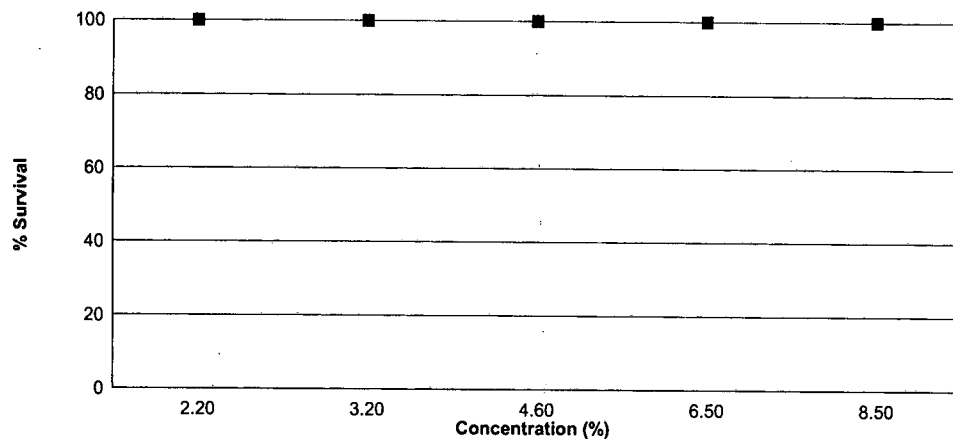
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

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 October 1, 2013 at 1430 and continued through October 8, 2013 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 growth = 8.5 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.393
2.2 %	100	0.366
3.2 %	100	0.398
4.6 %	100	0.356
6.5 %	100	0.371
8.5 %	100	0.364



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

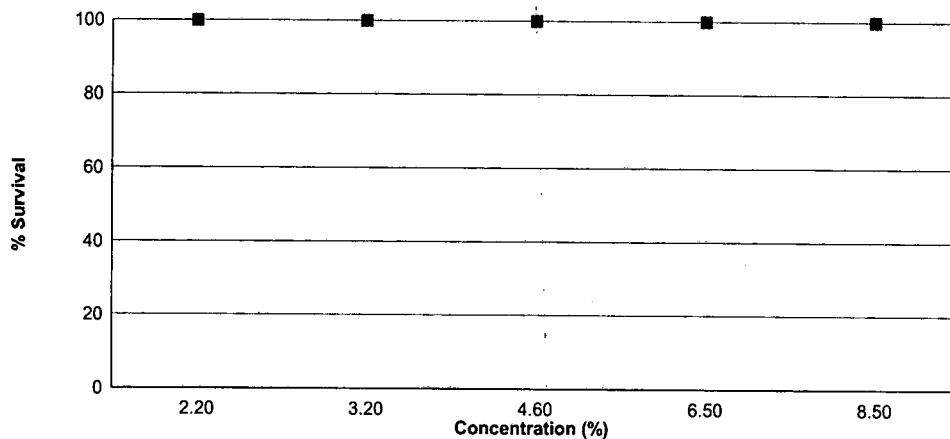
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 October 1, 2013 at 1430 and continued through October 8, 2013 at 1430. 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



Concentration	Percent Survival	Mean Reproduction
Control	100	20.1
2.2 %	100	23.2
3.2 %	100	22.6
4.6 %	100	22.8
6.5 %	100	22.6
8.5 %	100	21.1

Appendix A1: Test 1000.0

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

Date and Time Test Initiated: October 1, 2013 at 1430  
Date and Time Test Terminated: October 8, 2013 at 1425

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	8	8	8	8	8
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	8	8	8	8	8
	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: October 1, 2013 at 1430  
Test Terminated: October 8, 2013 at 1425

Drying Started: October 3, 2013 at 1120  
Drying Ended: October 9, 2013 at 1450

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.93557	.93868	0.00311	8	0.389
	B	.93776	.94124	0.00348	8	0.435
	C	.93482	.93770	0.00288	8	0.360
	D	.93640	.93962	0.00322	8	0.402
	E	.93396	.93700	0.00304	8	0.380
2.2 %	A	.93213	.93489	0.00276	8	0.345
	B	.93370	.93662	0.00292	8	0.365
	C	.93610	.93891	0.00281	8	0.351
	D	.93131	.93434	0.00303	8	0.379
	E	.92875	.93186	0.00311	8	0.389
3.2 %	A	.92950	.93258	0.00308	8	0.385
	B	.93061	.93376	0.00315	8	0.394
	C	.92971	.93303	0.00332	8	0.415
	D	.93363	.93671	0.00308	8	0.385
	E	.93502	.93832	0.00330	8	0.412
4.6 %	A	.93532	.93777	0.00245	8	0.306
	B	.93563	.93780	0.00217	8	0.271
	C	.93465	.93764	0.00299	8	0.374
	D	.93407	.93761	0.00354	8	0.442
	E	.93467	.93776	0.00309	8	0.386
6.5 %	A	.93469	.93743	0.00274	8	0.342
	B	.93476	.93783	0.00307	8	0.384
	C	.93347	.93666	0.00319	8	0.399
	D	.93452	.93755	0.00303	8	0.379
	E	.93552	.93833	0.00281	8	0.351
8.5 %	A	.93419	.93684	0.00265	8	0.331
	B	.93173	.93437	0.00264	8	0.330
	C	.93216	.93517	0.00301	8	0.376
	D	.93180	.93495	0.00315	8	0.394
	E	.93112	.93425	0.00313	8	0.391

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: October 1, 2013 at 1430

Date and Time Test Terminated: October 8, 2013 at 1430

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	4	3	5	3	4	3	4	3	4	3	36	10	3.60	
5	8	7	6	5	6	6	4	5	5	8	60	10	6.00	
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
7	12	10	10	10	10	10	10	10	10	13	105	10	10.5	
8														
TOTAL	24	20	21	18	20	19	18	18	19	24	201	10	20.1	

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	4	4	4	4	4	3	3	3	4	4	37	10	3.70
5	5	0	8	8	8	6	0	8	6	8	57	10	5.70
6	0	6	0	0	0	0	8	0	0	0	14	10	1.40
7	10	12	12	12	12	12	14	14	14	12	124	10	12.4
8													
TOTAL	19	22	24	24	24	21	25	25	24	24	232	10	23.2

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	4	4	4	1	4	5	3	2	3	1	31	10	3.10
5	8	8	5	7	8	8	7	10	8	6	75	10	7.50
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00
7	12	14	14	10	12	12	10	12	14	10	120	10	12.0
8													
TOTAL	24	26	23	18	24	25	20	24	25	17	226	10	22.6

Appendix A1: Test 1002.0

*Ceriodaphnia dubia* Survival and Reproduction

Date and Time Test Initiated: October 1, 2013 at 1430  
Date and Time Test Terminated: October 8, 2013 at 1430

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	3	3	4	3	4	3	4	4	3	3	34	10	3.40
5	6	0	8	7	9	7	7	8	5	9	66	10	6.60
6	0	6	0	0	0	0	0	0	0	0	6	10	0.600
7	12	14	15	12	12	10	10	13	12	12	122	10	12.2
8													
TOTAL	21	23	27	22	25	20	21	25	20	24	228	10	22.8

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	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	3	5	4	4	4	4	4	4	5	41	10	4.10
5	10	1	7	7	9	8	7	6	6	7	68	10	6.80
6	0	9	0	0	0	0	0	0	0	0	9	10	0.900
7	12	12	12	10	11	10	12	9	10	10	108	10	10.8
8													
TOTAL	26	25	24	21	24	22	23	19	20	22	226	10	22.6

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	3	4	4	4	4	5	3	3	2	5	37	10	3.70
5	8	7	7	7	9	7	2	8	5	0	60	10	6.00
6	0	0	0	0	0	0	0	0	0	10	10	10	1.00
7	10	10	11	10	13	10	6	13	9	12	104	10	10.4
8													
TOTAL	21	21	22	21	26	22	11	24	16	27	211	10	21.1

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	1.00000	1.39310
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	1.00000	1.39310
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		
W = 0		
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 %	27.50	16.00	5.00	
4	4.6 %	27.50	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
<p>D = 0.02994 W = 0.971 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 = 11.88 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	0.007253	0.001451	1.163	
Within (Error)	24	0.02995	0.001248		
Total	29	0.0372			
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	0.3932	0.3932			
2	2.2 %	0.3658	0.3658	1.226		
3	3.2 %	0.3982	0.3982	-0.2238		
4	4.6 %	0.3558	0.3558	1.674		
5	6.5 %	0.371	0.371	0.9936		
6	8.5 %	0.3644	0.3644	1.289		
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	0.05273	13.4	0.0274	
3	3.2 %	5	0.05273	13.4	-0.005	
4	4.6 %	5	0.05273	13.4	0.0374	
5	6.5 %	5	0.05273	13.4	0.0222	
6	8.5 %	5	0.05273	13.4	0.0288	

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 %	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
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	0	
5	8.5 %	10	0	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

Kolmogorov Test for Normality	No Transformation
D = 0.1007 D* = 0.7901 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 10.32 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.	

Appendix A2: Statistics

*Ceriodaphnia dubia* Reproduction

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	71.93	14.39	1.683	
Within (Error)	54	461.8	8.552		
Total	59	533.7			
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	20.1	20.1			
2	2.2 %	23.2	23.2	-2.37		
3	3.2 %	22.6	22.6	-1.912		
4	4.6 %	22.8	22.8	-2.065		
5	6.5 %	22.6	22.6	-1.912		
6	8.5 %	21.1	21.1	-0.7646		
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	2.2 %	10	3.021	15	-3.1	
3	3.2 %	10	3.021	15	-2.5	
4	4.6 %	10	3.021	15	-2.7	
5	6.5 %	10	3.021	15	-2.5	
6	8.5 %	10	3.021	15	-1	

Appendix A3: Water Chemistry  
Routine Chemical and Physical Data

Date and Time Test Initiated: October 1, 2013 at 1057  
Date and Time Test Terminated: October 8, 2013 at 1430

Effluent Conc.: Control	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.5	8.0	8.1	8.0	8.8	8.0	7.9
	Final *1	7.2	7.6	7.7	8.5	8.2	8.5	7.1
	Final *2	8.3	8.1	8.2	8.4	8.3	8.3	8.3
pH, units	Initial	8.5	7.6	8.0	7.8	7.6	7.8	8.1
	Final *1	7.3	7.3	7.2	7.9	7.9	7.5	7.6
	Final *2	8.1	7.8	7.8	8.2	8.2	8.1	8.2
Alkalinity, mg CaCO <sub>3</sub> /l	32	NA	32	NA	31	NA	NA	
Hardness, mg CaCO <sub>3</sub> /l	48	NA	46	NA	46	NA	NA	
Conductivity, umhos/cm	170	180	180	170	170	170	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	7.4	8.0	8.1	7.9	8.2	8.0	7.6
	Final *1	7.2	7.2	7.2	8.2	8.1	8.4	7.1
	Final *2	8.2	8.1	8.0	8.1	8.0	8.0	7.8
pH, units	Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
	Final *1	7.3	7.2	7.0	7.9	7.8	7.4	7.6
	Final *2	8.0	7.8	7.8	8.1	8.1	8.0	8.1

Effluent Conc.: 3.2 %	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
DO, mg/l	Initial	7.4	8.1	8.1	7.8	8.4	8.0	7.8
	Final *1	7.3	6.8	7.1	8.4	8.1	8.3	7.2
	Final *2	8.1	8.1	8.0	8.1	8.0	7.9	8.0
pH, units	Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
	Final *1	7.4	7.1	7.0	8.0	7.8	7.4	7.6
	Final *2	8.0	7.8	7.8	8.2	8.2	8.1	8.2

Appendix A3: Water Chemistry  
Routine Chemical and Physical Data

Date and Time Test Initiated: October 1, 2013 at 1057  
Date and Time Test Terminated: October 8, 2013 at 1430

Effluent Conc.: 4.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.3	8.1	8.0	7.7	8.0	8.2	7.7
	Final *1	7.3	7.6	6.9	8.2	8.3	7.5	7.3
	Final *2	8.2	8.1	8.0	8.0	7.9	7.8	7.9
pH, units	Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
	Final *1	7.4	7.3	7.1	7.9	7.8	7.5	7.7
	Final *2	8.0	7.8	7.9	8.0	8.0	8.0	8.2

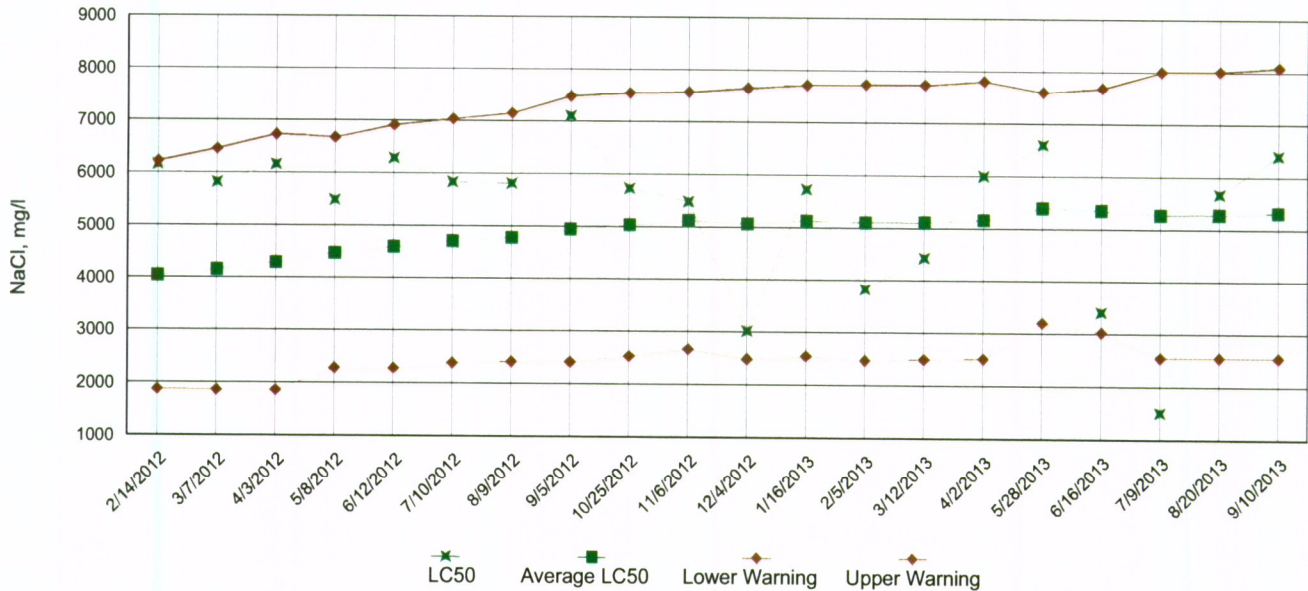
Effluent Conc.: 6.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.3	8.0	7.9	8.0	8.5	8.1	7.7
	Final *1	7.4	7.0	6.7	8.4	8.3	7.5	7.5
	Final *2	8.1	8.0	8.0	8.0	8.2	8.0	8.1
pH, units	Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
	Final *1	7.4	7.2	7.0	7.9	7.8	7.5	7.7
	Final *2	8.0	7.8	7.9	8.0	8.1	8.1	8.2
Alkalinity, mg CaCO <sub>3</sub> /l		32	NA	36	NA	33	NA	NA
Hardness, mg CaCO <sub>3</sub> /l		48	NA	47	NA	45	NA	NA
Conductivity, umhos/cm		160	190	180	180	180	190	170
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	0.060	NA	NA

Effluent Conc.: 8.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.5	8.0	8.0	8.0	8.4	8.0	7.7
	Final *1	7.3	7.0	6.9	7.9	8.2	7.6	7.2
	Final *2	8.0	8.0	8.1	7.7	8.0	8.0	7.9
pH, units	Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
	Final *1	7.4	7.2	7.1	7.8	7.9	7.5	7.7
	Final *2	8.0	7.8	8.0	8.0	8.0	8.0	8.2

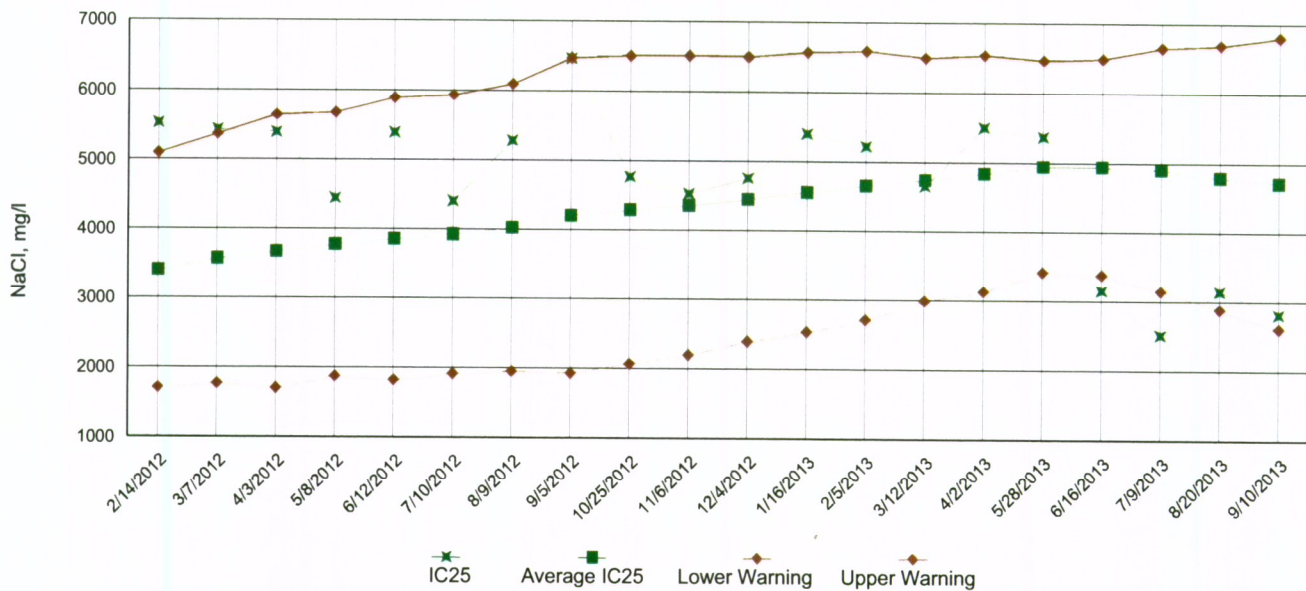
\*1 = data from the *Pimephales promelas* (Fathead Minnow) test      \*2 = data from the *Ceriodaphnia dubia* test

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

LC50 Survival Data



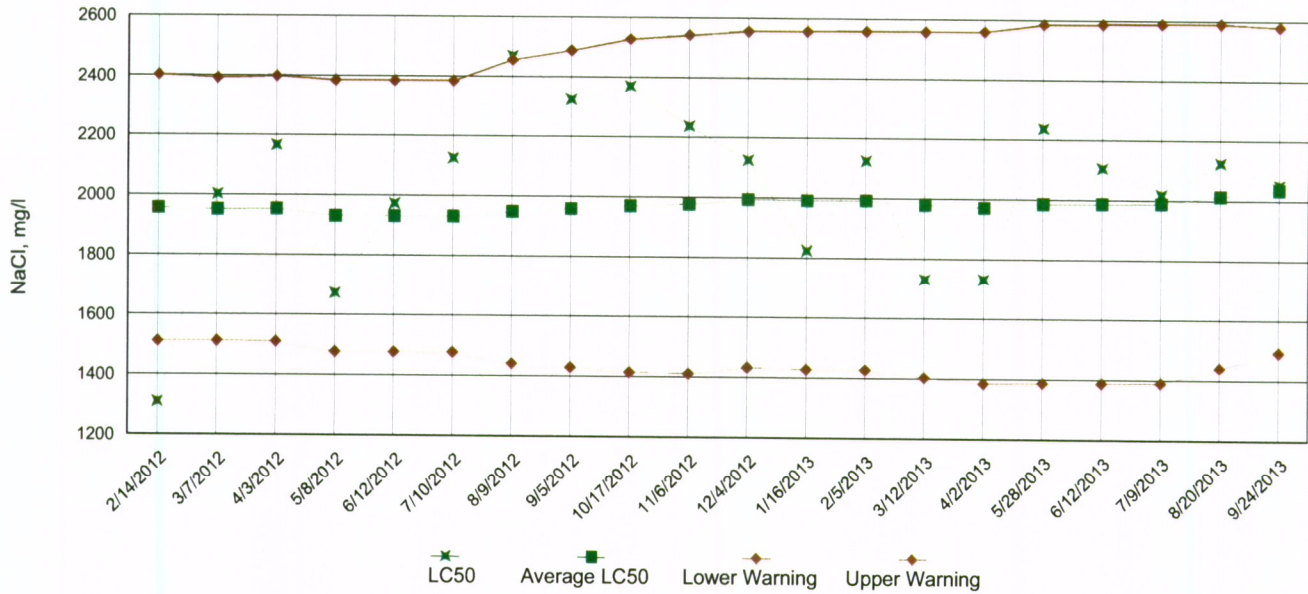
IC25 Growth Data



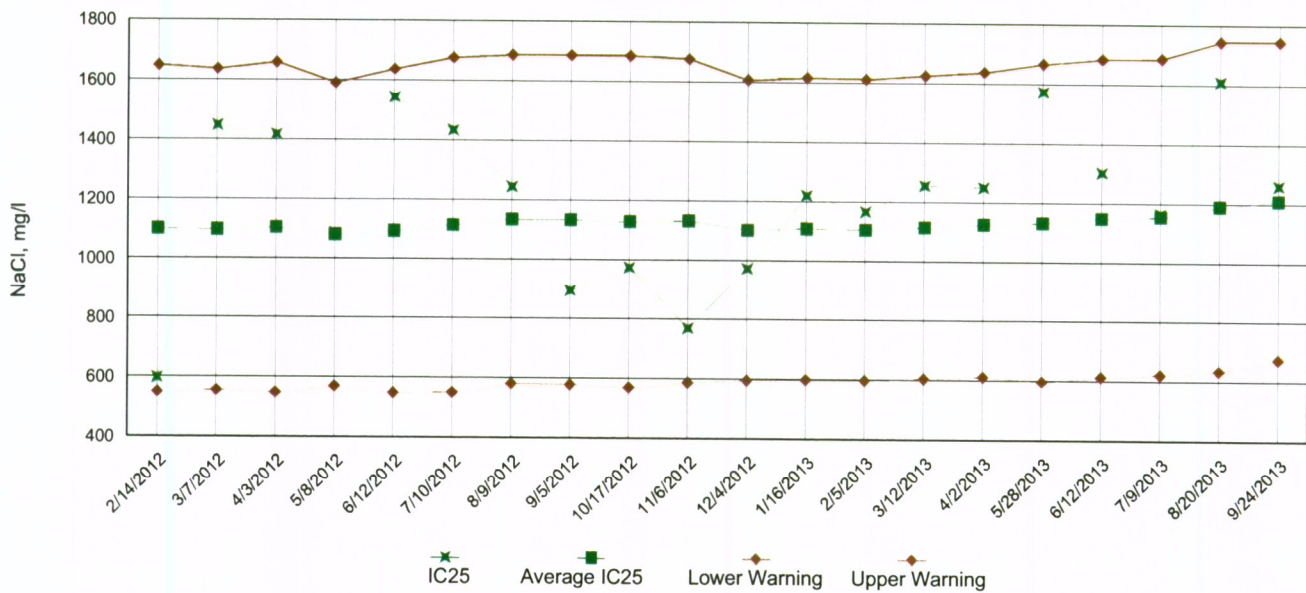


Appendix A4: Test 1002.0  
Chronic Reference Toxicant, *Ceriodaphnia dubia*

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: October 1, 2013 at 1430

Date and Time Test Terminated: October 8, 2013 at 1425

Dilution water used: Synthetic Soft Water #4026

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
2.2 %	100	100	100	100	100	100	100	100	0.00
3.2 %	100	100	100	100	100	100	100	100	0.00
4.6 %	100	100	100	100	100	100	100	100	0.00
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					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.389	0.435	0.360	0.402	0.380	0.393	7.10
2.2 %	0.345	0.365	0.351	0.379	0.389	0.366	5.05
3.2 %	0.385	0.394	0.415	0.385	0.412	0.398	3.64
4.6 %	0.306	0.271	0.374	0.442	0.386	0.356	19.0
6.5 %	0.342	0.384	0.399	0.379	0.351	0.371	6.40
8.5 %	0.331	0.330	0.376	0.394	0.391	0.364	8.70

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 %)	<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	(6.5 %)	<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:   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:   7.1   (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, 298, 304, 307

SAMPLE No. 3 COLLECTED ending: DATE: October 4, 2013 TIME: \_\_\_\_\_  
Test Initiated: DATE: October 1, 2013 TIME: 1430  
Test Terminated: DATE: October 8, 2013 TIME: 1425

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.5	8.0	8.1	8.0	8.8	8.0	7.9
Final	7.2	7.6	7.7	8.5	8.2	8.5	7.1
pH Initial	8.5	7.6	8.0	7.8	7.6	7.8	8.1
Final	7.3	7.3	7.2	7.9	7.9	7.5	7.6
Alkalinity	32	NA	32	NA	31	NA	NA
Hardness	48	NA	46	NA	46	NA	NA
Conductivity	170	180	180	170	170	170	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	7.4	8.0	8.1	7.9	8.2	8.0	7.6
Final	7.2	7.2	7.2	8.2	8.1	8.4	7.1
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	7.3	7.2	7.0	7.9	7.8	7.4	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	170	170	180	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.4	8.1	8.1	7.8	8.4	8.0	7.8
Final	7.3	6.8	7.1	8.4	8.1	8.3	7.2
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	7.4	7.1	7.0	8.0	7.8	7.4	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	180	170	180	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.3	8.1	8.0	7.7	8.0	8.2	7.7
Final	7.3	7.6	6.9	8.2	8.3	7.5	7.3
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	7.4	7.3	7.1	7.9	7.8	7.5	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	180	170	190	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.3	8.0	7.9	8.0	8.5	8.1	7.7
Final	7.4	7.0	6.7	8.4	8.3	7.5	7.5
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	7.4	7.2	7.0	7.9	7.8	7.5	7.7
Alkalinity	32	NA	36	NA	33	NA	NA
Hardness	48	NA	47	NA	45	NA	NA
Conductivity	160	190	180	180	180	190	170
Chlorine	<0.05	NA	<0.05	NA	0.060	NA	NA

DILUTION 8.5 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	7.5	8.0	8.0	8.0	8.4	8.0	7.7
Final	7.3	7.0	6.9	7.9	8.2	7.6	7.2
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	7.4	7.2	7.1	7.8	7.9	7.5	7.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	190	180	180	190	190	170
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: . October 1, 2013 at 1430

Date and Time Test Terminated: October 8, 2013 at 1430

Dilution water used: Synthetic Soft Water #4026

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	100	100
7 day	100	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		2.2 %	3.2 %	4.6 %	6.5 %	8.5 %
A	24	19	24	21	26	21
B	20	22	26	23	25	21
C	21	24	23	27	24	22
D	18	24	18	22	21	21
E	20	24	24	25	24	26
F	19	21	25	20	22	22
G	18	25	20	21	23	11
H	18	25	24	25	19	24
I	19	24	25	20	20	16
J	24	24	17	24	22	27
Mean per Adult	20.1	23.2	22.6	22.8	22.6	21.1
Mean per Surviving Adult	20.1	23.2	22.6	22.8	22.6	21.1
CV %	11.4	8.33	13.9	10.5	9.83	22.2

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

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

1. Fisher's Exact Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(6.5 %)	<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	(6.5 %)	<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:   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:   11.4   (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, 298, 304, 307

SAMPLE No. 3 COLLECTED ending: DATE: October 4, 2013 TIME: \_\_\_\_\_  
Test Initiated: DATE: October 1, 2013 TIME: 1430  
Test Terminated: DATE: October 8, 2013 TIME: 1430

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	7.5	8.0	8.1	8.0	8.8	8.0	7.9
Final	8.3	8.1	8.2	8.4	8.3	8.3	8.3
pH Initial	8.5	7.6	8.0	7.8	7.6	7.8	8.1
Final	8.1	7.8	7.8	8.2	8.2	8.1	8.2
Alkalinity	32	NA	32	NA	31	NA	NA
Hardness	48	NA	46	NA	46	NA	NA
Conductivity	170	180	180	170	170	170	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
2.2 %							
D.O. Initial	7.4	8.0	8.1	7.9	8.2	8.0	7.6
Final	8.2	8.1	8.0	8.1	8.0	8.0	7.8
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	8.0	7.8	7.8	8.1	8.1	8.0	8.1
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	170	170	180	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
3.2 %							
D.O. Initial	7.4	8.1	8.1	7.8	8.4	8.0	7.8
Final	8.1	8.1	8.0	8.1	8.0	7.9	8.0
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	8.0	7.8	7.8	8.2	8.2	8.1	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	180	170	180	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
4.6 %							
D.O. Initial	7.3	8.1	8.0	7.7	8.0	8.2	7.7
Final	8.2	8.1	8.0	8.0	7.9	7.8	7.9
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	8.0	7.8	7.9	8.0	8.0	8.0	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	180	180	170	190	180	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
6.5 %							
D.O. Initial	7.3	8.0	7.9	8.0	8.5	8.1	7.7
Final	8.1	8.0	8.0	8.0	8.2	8.0	8.1
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	8.0	7.8	7.9	8.0	8.1	8.1	8.2
Alkalinity	32	NA	36	NA	33	NA	NA
Hardness	48	NA	47	NA	45	NA	NA
Conductivity	160	190	180	180	180	190	170
Chlorine	<0.05	NA	<0.05	NA	0.060	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
8.5 %							
D.O. Initial	7.5	8.0	8.0	8.0	8.4	8.0	7.7
Final	8.0	8.0	8.1	7.7	8.0	8.0	7.9
pH Initial	8.2	7.6	7.5	7.4	7.6	7.4	7.7
Final	8.0	7.8	8.0	8.0	8.0	8.0	8.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	190	180	180	190	190	170
Chlorine	NA	NA	NA	NA	NA	NA	NA



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

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: MAUER'S WASTEWATER			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: 171098			
Project Reference:			SAMPLE MATRIX			BROMINE											AIC PROPOSAL NO:		
Project Manager:			WATER														Carrier:		
Sampled By: JOAN DAVES			G	C	A	S											Received on Ice (4°C)? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		
AIC No.	Sample Identification	Date/Time Collected	A	O	T	E											Remarks		
1	MAUER'S WASTEWATER	10/1/13 9:10 AM	X																
Container Type			Field pH calibration on _____ @ _____																
Preservative			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					Relinquished By: [Signature]		Date/Time: 10/1/13 11:00 AM		Received By: [Signature]		Date/Time:								
Expedited results requested by: _____					Relinquished By:		Date/Time:		Received in lab By: [Signature]		Date/Time: 10-1-13 11:08 AM								
Who should AIC contact with questions: _____					Comments:														
Phone: _____ Fax: _____																			
Report Attention to: _____																			
Report Address to: _____																			

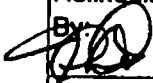
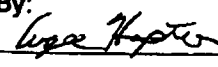


## CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

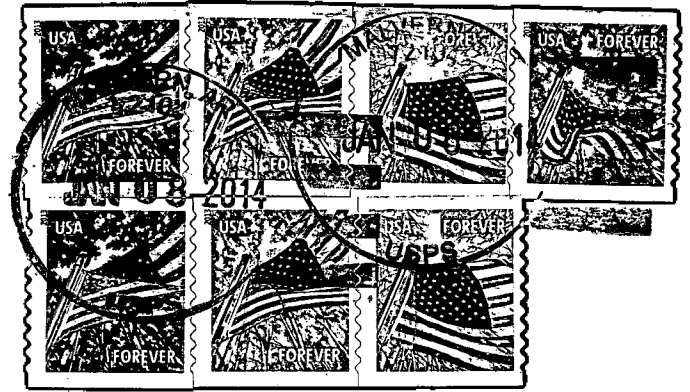
Client: <b>MALVERN WASTEWATER</b>				PO No.	NO OF	ANALYSES REQUESTED												PAGE	OF				
Project Reference:				SAMPLE MATRIX	BOTTLES													AIC CONTROL NO: <b>171098</b>	AIC PROPOSAL NO:				
Project Manager:				SAMPLE MATRIX		BIOHAZARD													Carrier:				
Sampled By: <b>JOHN DAVIS</b>				G	C		W	S													Received on Ice (4°C)? <b>YES</b> 2.7°C <b>NO</b>		
AIC No.	Sample Identification	Date/Time Collected	B	P	A		O	L													Remarks		
<b>2</b>	<b>MALVERN WASTEWATER</b>	<b>10/2/13 9:25 AM</b>		<input checked="" type="checkbox"/>					<b>1</b>	<input checked="" type="checkbox"/>													
				Container Type																Field pH calibration			
				Preservative																on _____ @ _____			
				G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate																Buffer:			
				NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate																			
Turnaround Time Requested: (Please circle) <b>NORMAL</b> or EXPEDITED IN ___ DAYS						Relinquished By: <b>[Signature]</b>			Date/Time: <b>10/2/13 10:10 AM</b>			Received By: _____			Date/Time: _____								
Expedited results requested by: _____						Relinquished By: _____			Date/Time: _____			Received in Lab By: <b>[Signature]</b>			Date/Time: <b>10-2-13 1010</b>								
Who should AIC contact with questions: _____						Comments:																	
Phone: _____ Fax: _____																							
Report Attention to: _____																							
Report Address to: _____																							

**CHAIN OF CUSTODY / ANALYSIS REQUEST FORM**

PAGE 3 OF 3

Client: <b>MAKERN WASTEWATER</b>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: <b>171098</b>					
Project Reference:			SAMPLE MATRIX			WATER	SOIL	BIO-MONITORING	TP	NO3 + NO2N											AIC PROPOSAL NO:
Project Manager:			GRA	COMP											Carrier:						
Sampled By: <b>JOHN DANES</b>															Received on Ice (4°C)? <b>YES 1.5°C NO</b>						
AIC No.	Sample Identification	Date/Time Collected																	Remarks		
③	MAKERN WASTEWATER B2	10/4/13 7:22AM		X				X											Time AS; 8AM-7AM		
	MAKERN WASTEWATER N	10/4/13 7:24A		X					X												
	MAKERN WASTEWATER P	10/4/13 7:25A		X				X													
Container Type													Field pH calibration								
Preservative													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					Relinquished By: 		Date/Time 10/4/13 9:28A		Received By:		Date/Time										
Expedited results requested by: _____					Relinquished By:		Date/Time		Received in Lab By: 		Date/Time 10-4-13 0926										
Who should AIC contact with questions: _____					Comments:																
Phone: _____ Fax: _____																					
Report Attention to: _____																					
Report Address to: _____																					

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



ADEQ

Water Division - Enforcement Branch

5301 Northshore Drive

N. Little Rock, AR

72118-5317

