Sanitary Sewer Overflow Monthly Report

Facility Name: Malvern Water Works **Permit Number:** AR0034126 **Reporting Period (Month/Year):** June, 2015

☐ 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
Hwy 270 city Park	LS	6/2/15	6/2/15	5000	E	NEAH	WO	GR, CR

Carl White 6/30/15

Signature of Cognizant or Ranking Official — Date

"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."

AMERICAN INTERPLEX CORPORATION
LABORATORIES

June 3, 2015

Test Results of
Second Quarter
Chronic 7-Day Renewal
Biomonitoring Testing
for
Malvern Wastewater
Malvern, AR

Control No. 190819-1

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*
Malvern Wastewater - 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 %. 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

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%	97.5	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.288	PASS
Control Growth CV < or = 40%	16.3	PASS
Growth Minimum Significant Difference 12 to 30%	16.2	PASS
Critical Dilution CV < or = 40%	8.59	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	20.1	PASS
Reproduction Minimum Significant Difference 13 to 47%	21.8	PASS
Critical Dilution CV < or = 40%	17.0	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: Malvern Wastewater
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.4	8.0	7.1
pH (standard units)	7.1	6.9	6.7
Alkalinity (mg/l as CaCO3)	19	16	17
Hardness (mg/l as CaCO3)	28	29	29
Conductivity (umhos/cm)	140	140	130
Residual Chlorine (mg/l)	0.14	0.050	0.080
Ammonia as N (mg/l)	0.74	0.77	0.47

2. Dilution Water Samples: Synthentic Soft Water #4215
   a. Dates Prepared: May 12 through May 26, 2015
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.2	7.1	7.1
pH (standard units)	7.5	7.4	7.4
Alkalinity (mg/l as CaCO3)	31	31	31
Hardness (mg/l as CaCO3)	44	44	44
Conductivity (umhos/cm)	140	140	140
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:	May 26, 2015 at 1600
Date & Time Test Terminated:	June 2, 2015 at 1440
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:	May 26, 2015 at 1420
Date & Time Test Terminated:	June 2, 2015 at 1500
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 May 26, 2015 at 1450 to June 2, 2015 at 1315
The results were as follows: (Control No. 190396-1.)
Survival LC-50: 1884 mg/l
Growth IC-25: 2236 mg/l
Growth PMSD: 17.9

Ceriodaphnia dubia

Chronic reference tests are performed monthly.
A chronic reference test was performed on May 13, 2015 at 1730 to May 19, 2015 at 1630
The results were as follows: (Control No. 190396-2.)
Survival LC-50: 1732 mg/l
Growth IC-25: 928.9 mg/l
Growth PMSD: 12

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	97.2	0.929
pH	SM 4500-H+ B	101	0.133
Conductivity	EPA 120.1	108	0.00

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: May 26, 2015
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

Ceriodaphnia dubia

Date: May 26, 2015
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

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

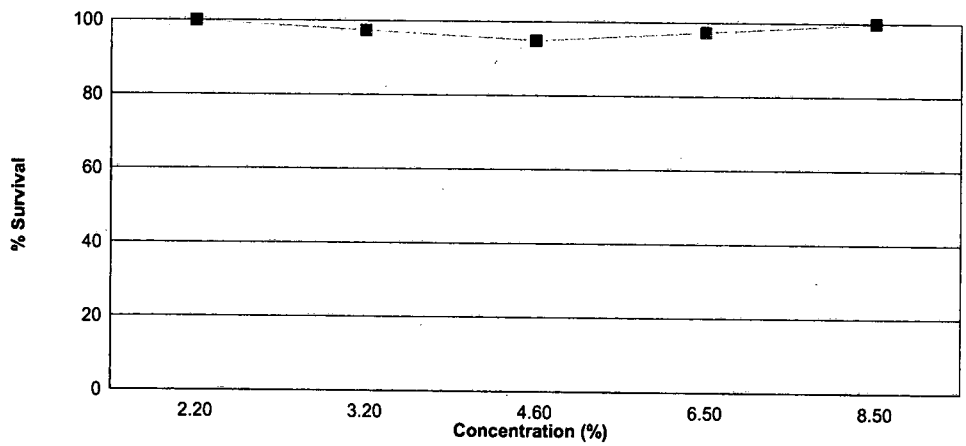
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 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 May 26, 2015 at 1600 and continued through June 2, 2015 at 1440. 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	97.5	0.281
2.2 %	100	0.237
3.2 %	97.5	0.239
4.6 %	95.0	0.240
6.5 %	97.5	0.254
8.5 %	100	0.276

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

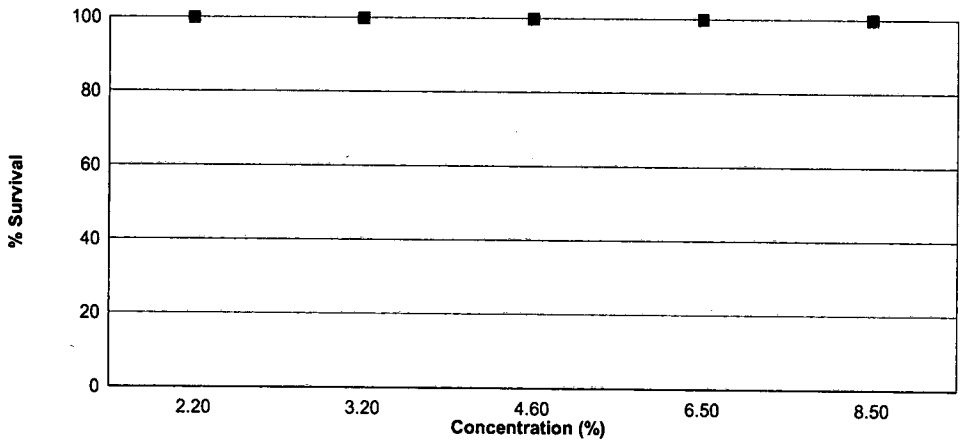
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 May 26, 2015 at 1420 and continued through June 2, 2015 at 1500. 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	20.1
2.2 %	100	20.3
3.2 %	100	20.3
4.6 %	100	18.7
6.5 %	100	19.0
8.5 %	100	19.5

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: May 26, 2015 at 1600
Date and Time Test Terminated: June 2, 2015 at 1440

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	7	7
	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	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
4.6 %	A	8	8	8	8	8	7	7
	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	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
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: May 26, 2015 at 1600
Test Terminated: June 2, 2015 at 1440

Drying Started: May 29, 2015 at 1010
Drying Ended: June 3, 2015 at 1030

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.93448	.93697	0.00249	8	0.311
	B	.93346	.93527	0.00181	8	0.226
	C	.93789	.94026	0.00237	8	0.296
	D	.93181	.93447	0.00266	8	0.332
	E	.93110	.93302	0.00192	8	0.240
2.2 %	A	.93169	.93364	0.00195	8	0.244
	B	.93767	.93954	0.00187	8	0.234
	C	.93532	.93723	0.00191	8	0.239
	D	.93478	.93665	0.00187	8	0.234
	E	.93460	.93648	0.00188	8	0.235
3.2 %	A	.93602	.93784	0.00182	8	0.228
	B	.93336	.93504	0.00168	8	0.210
	C	.93027	.93224	0.00197	8	0.246
	D	.92878	.93075	0.00197	8	0.246
	E	.93161	.93374	0.00213	8	0.266
4.6 %	A	.93280	.93434	0.00154	8	0.192
	B	.93684	.93880	0.00196	8	0.245
	C	.94093	.94271	0.00178	8	0.222
	D	.93885	.94104	0.00219	8	0.274
	E	.93388	.93603	0.00215	8	0.269
6.5 %	A	.93764	.93950	0.00186	8	0.232
	B	.93136	.93327	0.00191	8	0.239
	C	.93555	.93779	0.00224	8	0.280
	D	.93770	.93990	0.00220	8	0.275
	E	.93621	.93817	0.00196	8	0.245
8.5 %	A	.93480	.93657	0.00177	8	0.221
	B	.93818	.94025	0.00207	8	0.259
	C	.93491	.93722	0.00231	8	0.289
	D	.93831	.94085	0.00254	8	0.318
	E	.93431	.93666	0.00235	8	0.294

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: May 26, 2015 at 1420
Date and Time Test Terminated: June 2, 2015 at 1500

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	5	3	4	2	2	2	3	3	5	31	10	3.10
5	1	6	7	7	0	1	9	6	2	6	45	10	4.50
6	0	9	8	0	8	10	12	1	9	8	65	10	6.50
7	12	0	0	13	8	13	0	14	12E	0	60	10	6.00
8													
TOTAL	15	20	18	24	18	26	23	24	14	19	201	10	20.1

E = Excluded fourth brood neonates

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	3	2	4	4	3	5	3	4	2	4	34	10	3.40
5	4	7	4	8	0	0	6	4	0	9	42	10	4.20
6	0	0	0	0	7	8	0	0	9	6	30	10	3.00
7	10	11	6	13	8	18	8	13	10	0	97	10	9.70
8													
TOTAL	17	20	14	25	18	31	17	21	21	19	203	10	20.3

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	2	2	5	2	1	5	4	2	5	4	32	10	3.20
5	1	6	9	9	0	1	0	5	0	5	36	10	3.60
6	5	0	0	0	10	7	7	1	11	2	43	10	4.30
7	8	9	13	12	12	11	8	11	8	0	92	10	9.20
8													
TOTAL	16	17	27	23	23	24	19	19	24	11	203	10	20.3

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: May 26, 2015 at 1420
Date and Time Test Terminated: June 2, 2015 at 1500

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	1	1	4	3	5	3	3	4	3	3	30	10	3.00
5	0	8	8	5	0	0	8	0	1	4	34	10	3.40
6	10	1	0	0	8	8	10	9	6	0	52	10	5.20
7	9	0	16	8	8	6	0	9	7	8	71	10	7.10
8													
TOTAL	20	10	28	16	21	17	21	22	17	15	187	10	18.7

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	4	2	4	5	3	5	2	4	5	38	10	3.80
5	0	3	8	5	0	0	7	0	1	8	32	10	3.20
6	8	0	0	0	6	8	7	8	10	0	47	10	4.70
7	9	7	11	7	7	7	0	8	11	6	73	10	7.30
8													
TOTAL	21	14	21	16	18	18	19	18	26	19	190	10	19.0

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	3	6	4	3	3	4	5	3	38	10	3.80
5	0	4	5	6	0	0	4	0	1	4	24	10	2.40
6	7	0	0	0	10	6	1	11	7	2	44	10	4.40
7	12	9	8	10	9	7	7	10	6	11	89	10	8.90
8													
TOTAL	22	17	16	22	23	16	15	25	19	20	195	10	19.5

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	0.87500	1.20940
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	0.87500	1.20940
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	0.87500	1.20940
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	0.87500	1.20940
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 = 0.1215		
W = 0.7519		
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 %	30.00	16.00	5.00	
3	3.2 %	27.50	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 %	30.00	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
D = 0.02242		
W = 0.9684		
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 = 14.18		
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	0.009526	0.001905	2.039
Within (Error)	24	0.02242	0.0009342	
Total	29	0.03195		

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	0.281	0.281		
2	2.2 %	0.2372	0.2372	2.266	
3	3.2 %	0.2392	0.2392	2.162	
4	4.6 %	0.2404	0.2404	2.1	
5	6.5 %	0.2542	0.2542	1.386	
6	8.5 %	0.2762	0.2762	0.2483	

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	0.04562	16.2	0.0438
3	3.2 %	5	0.04562	16.2	0.0418
4	4.6 %	5	0.04562	16.2	0.0406
5	6.5 %	5	0.04562	16.2	0.0268
6	8.5 %	5	0.04562	16.2	0.0048

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 = 0.082 D* = 0.6433 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 = 2.664 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	23.95	4.79	0.2661
Within (Error)	54	971.8	18	
Total	59	995.7		

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 %	20.3	20.3	-0.1054	
3	3.2 %	20.3	20.3	-0.1054	
4	4.6 %	18.7	18.7	0.7379	
5	6.5 %	19	19	0.5798	
6	8.5 %	19.5	19.5	0.3162	

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	4.383	21.8	-0.2
3	3.2 %	10	4.383	21.8	-0.2
4	4.6 %	10	4.383	21.8	1.4
5	6.5 %	10	4.383	21.8	1.1
6	8.5 %	10	4.383	21.8	0.6

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: May 26, 2015 at 1315
Date and Time Test Terminated: June 2, 2015 at 1500

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.2	7.4	7.1	7.4	7.1	7.3	7.3
	Final *1	6.8	7.2	5.6	6.7	7.1	7.6	7.3
	Final *2	7.7	7.6	7.7	7.4	7.6	6.4	7.2
pH, units	Initial	7.5	7.2	7.4	7.2	7.4	7.2	7.2
	Final *1	7.3	7.0	6.8	7.2	7.3	7.2	7.2
	Final *2	7.8	7.5	7.6	7.8	7.7	6.5	7.5
Alkalinity, mg CaCO3/l		31	NA	31	NA	31	NA	NA
Hardness, mg CaCO3/l		44	NA	44	NA	44	NA	NA
Conductivity, umhos/cm		140	120	140	130	140	140	140
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	7.3	7.8	7.5	7.4	7.0	7.3
	Final *1	6.8	7.0	6.0	6.7	6.9	6.7	7.6
	Final *2	7.6	7.1	7.8	7.5	8.0	5.7	7.3
pH, units	Initial	7.5	7.3	7.4	7.2	7.3	7.3	7.3
	Final *1	7.2	7.0	6.9	7.2	7.2	7.1	7.3
	Final *2	7.8	7.4	7.6	7.7	7.7	6.5	7.5

Effluent Conc.: 3.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.5	7.5	7.8	7.5	7.2	7.5	7.4
	Final *1	7.2	7.0	6.3	6.9	7.1	6.9	7.6
	Final *2	7.7	7.6	7.7	7.7	7.8	6.1	7.4
pH, units	Initial	7.6	7.4	7.4	7.2	7.3	7.3	7.3
	Final *1	7.2	7.0	6.9	7.1	7.2	7.1	7.4
	Final *2	7.8	7.4	7.5	7.8	7.6	6.6	7.5

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: May 26, 2015 at 1315
Date and Time Test Terminated: June 2, 2015 at 1500

Effluent Conc.: 4.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.3	7.3	7.2	7.4	7.1	7.6	7.5
	Final *1	7.0	7.2	6.6	6.9	7.4	7.5	7.5
	Final *2	7.6	7.5	7.7	7.6	7.3	6.0	7.3
pH, units	Initial	7.6	7.4	7.3	7.2	7.3	7.4	7.3
	Final *1	7.2	7.1	6.9	7.1	7.3	7.1	7.4
	Final *2	7.8	7.4	7.5	7.8	7.6	6.6	7.5

Effluent Conc.: 6.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.6	7.2	7.4	7.2	6.8	7.6	7.3
	Final *1	6.9	7.0	6.0	6.4	7.1	7.4	7.6
	Final *2	8.0	7.5	7.7	7.8	7.6	5.2	7.3
pH, units	Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
	Final *1	7.2	7.1	6.8	7.0	7.2	7.1	7.4
	Final *2	8.0	7.4	7.5	7.8	7.7	6.5	7.5
Alkalinity, mg CaCO3/l		31	NA	34	NA	30	NA	NA
Hardness, mg CaCO3/l		42	NA	43	NA	44	NA	NA
Conductivity, umhos/cm		140	120	130	130	130	140	140
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

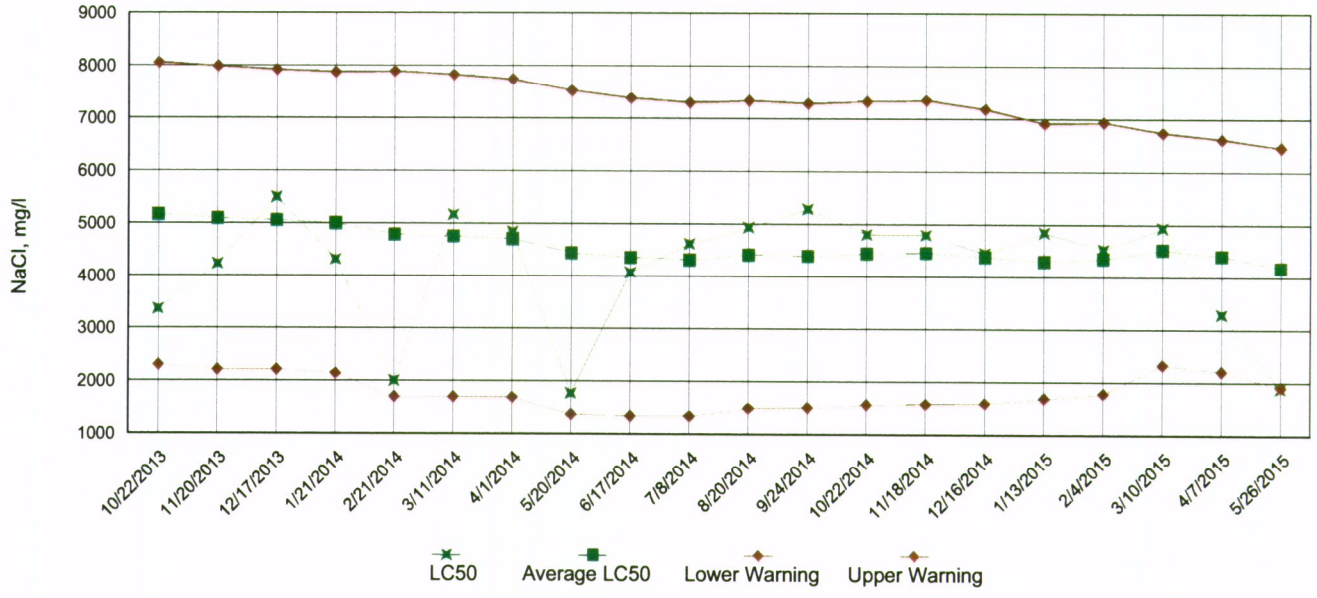
Effluent Conc.: 8.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.3	7.2	7.7	7.4	7.4	7.2	7.1
	Final *1	6.9	7.0	6.5	6.8	6.8	7.1	7.3
	Final *2	7.9	7.2	7.4	7.2	7.6	5.3	7.4
pH, units	Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
	Final *1	7.2	7.0	7.0	7.1	7.2	7.1	7.4
	Final *2	7.9	7.5	7.5	7.7	7.6	6.5	7.5

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

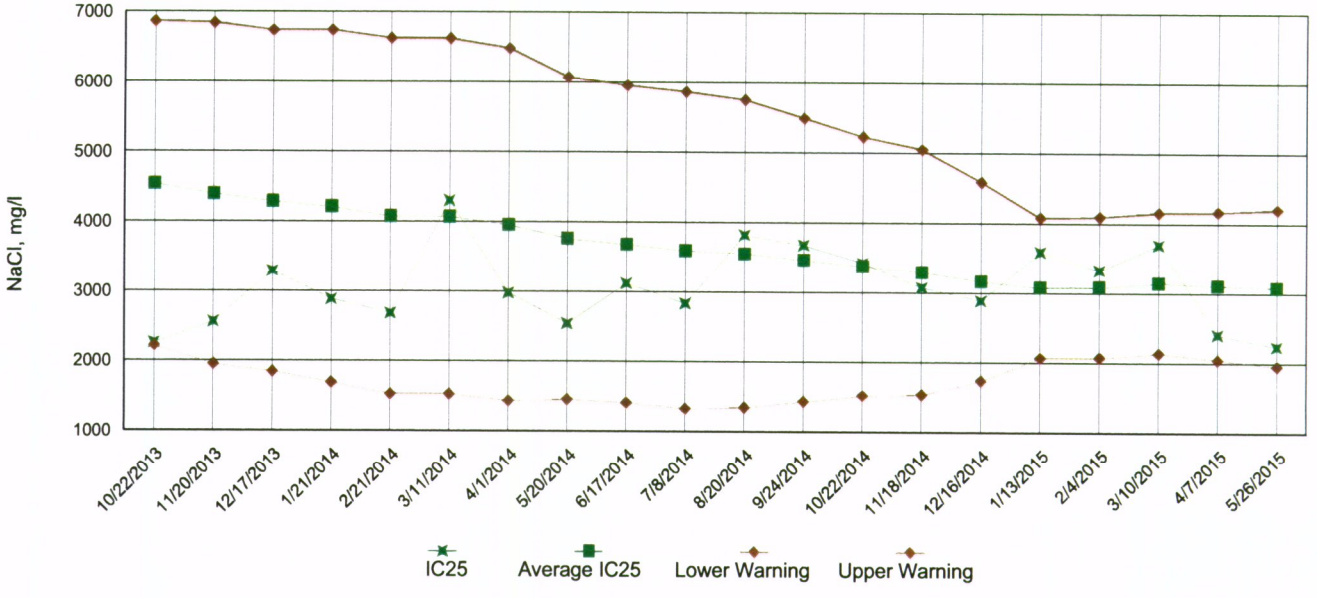
Appendix A4: Test 1000.0

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

LC50 Survival Data



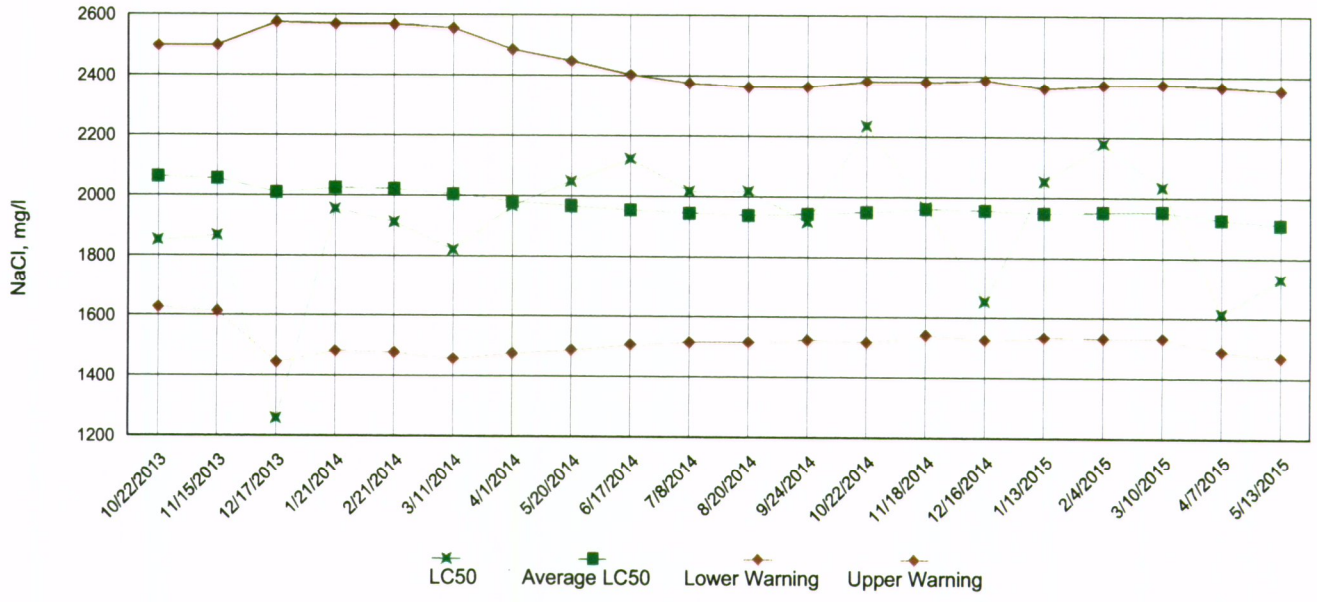
IC25 Growth Data



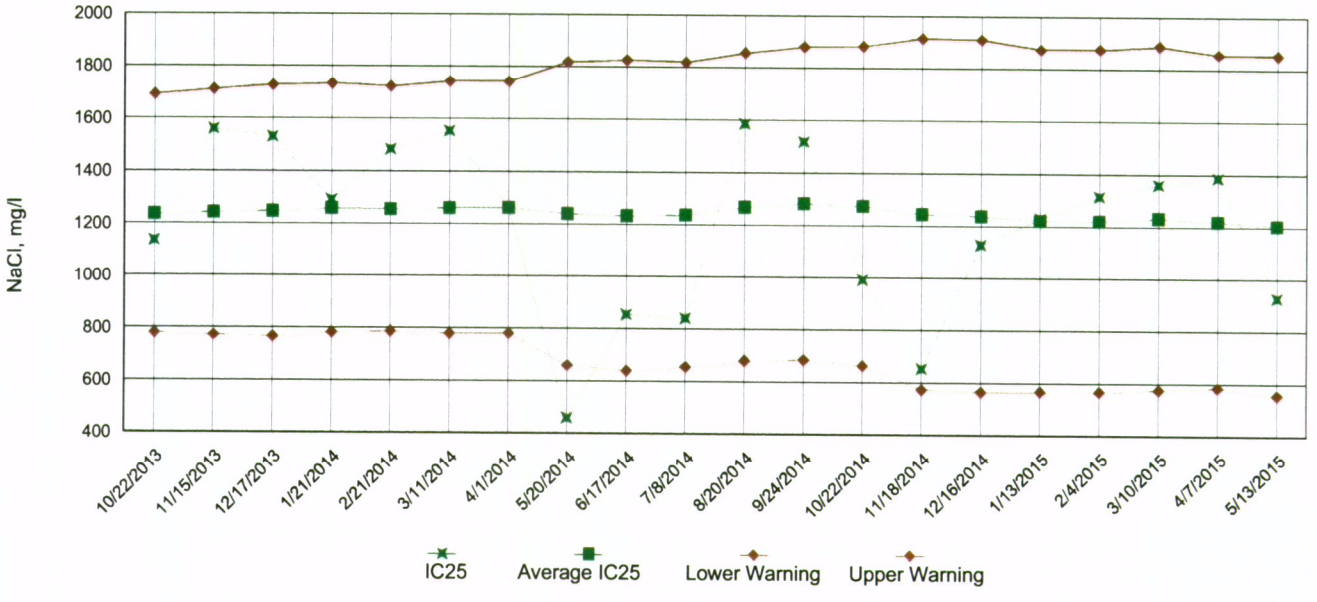
Appendix A4: Test 1002.0

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: Malvern Water Works

NPDES No.: AR0034126 AFIN 30-00040

Date and Time Test Initiated: May 26, 2015 at 1600
Date and Time Test Terminated: June 2, 2015 at 1440
Dilution water used: Synthentic Soft Water #4215

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	87.5	100	100	100	97.5	5.73
2.2 %	100	100	100	100	100	100	100	100	0.00
3.2 %	100	87.5	100	100	100	100	100	97.5	5.73
4.6 %	87.5	100	100	87.5	100	100	100	95.0	7.21
6.5 %	100	87.5	100	100	100	100	100	97.5	5.73
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	0.311	0.226	0.296	0.332	0.240	0.281	16.3
2.2 %	0.244	0.234	0.239	0.234	0.235	0.237	1.82
3.2 %	0.228	0.210	0.246	0.246	0.266	0.239	8.84
4.6 %	0.192	0.245	0.222	0.274	0.269	0.24	14.2
6.5 %	0.232	0.239	0.280	0.275	0.245	0.254	8.59
8.5 %	0.221	0.259	0.289	0.318	0.294	0.276	13.5

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: 16.3 (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, 310, 314

Test Initiated: DATE: May 26, 2015 TIME: 1600
Test Terminated: DATE: June 2, 2015 TIME: 1440

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	7.2	7.4	7.1	7.4	7.1	7.3	7.3
Final	6.8	7.2	5.6	6.7	7.1	7.6	7.3
pH Initial	7.5	7.2	7.4	7.2	7.4	7.2	7.2
Final	7.3	7.0	6.8	7.2	7.3	7.2	7.2
Alkalinity	31	NA	31	NA	31	NA	NA
Hardness	44	NA	44	NA	44	NA	NA
Conductivity	140	120	140	130	140	140	140
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	7.3	7.8	7.5	7.4	7.0	7.3
Final	6.8	7.0	6.0	6.7	6.9	6.7	7.6
pH Initial	7.5	7.3	7.4	7.2	7.3	7.3	7.3
Final	7.2	7.0	6.9	7.2	7.2	7.1	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.5	7.5	7.8	7.5	7.2	7.5	7.4
Final	7.2	7.0	6.3	6.9	7.1	6.9	7.6
pH Initial	7.6	7.4	7.4	7.2	7.3	7.3	7.3
Final	7.2	7.0	6.9	7.1	7.2	7.1	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	140	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.3	7.3	7.2	7.4	7.1	7.6	7.5
Final	7.0	7.2	6.6	6.9	7.4	7.5	7.5
pH Initial	7.6	7.4	7.3	7.2	7.3	7.4	7.3
Final	7.2	7.1	6.9	7.1	7.3	7.1	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.6	7.2	7.4	7.2	6.8	7.6	7.3
Final	6.9	7.0	6.0	6.4	7.1	7.4	7.6
pH Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
Final	7.2	7.1	6.8	7.0	7.2	7.1	7.4
Alkalinity	31	NA	34	NA	30	NA	NA
Hardness	42	NA	43	NA	44	NA	NA
Conductivity	140	120	130	130	130	140	140
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	7.3	7.2	7.7	7.4	7.4	7.2	7.1
Final	6.9	7.0	6.5	6.8	6.8	7.1	7.3
pH Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
Final	7.2	7.0	7.0	7.1	7.2	7.1	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
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: May 26, 2015 at 1420
Date and Time Test Terminated: June 2, 2015 at 1500
Dilution water used: Synthentic Soft Water #4215

PERCENT SURVIVAL

		Percent Effluent				
Time of Reading	Control	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

		Percent Effluent				
Replicates	Control	2.2 %	3.2 %	4.6 %	6.5 %	8.5 %
A	15	17	16	20	21	22
B	20	20	17	10	14	17
C	18	14	27	28	21	16
D	24	25	23	16	16	22
E	18	18	23	21	18	23
F	26	31	24	17	18	16
G	23	17	19	21	19	15
H	24	21	19	22	18	25
I	14	21	24	17	26	19
J	19	19	11	15	19	20
Mean per Adult	20.1	20.3	20.3	18.7	19.0	19.5
Mean per Surviving Adult	20.1	20.3	20.3	18.7	19.0	19.5
CV %	20.1	23.6	23.6	26.0	17.0	17.6

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. 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 %)	____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: 20.1 (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, 310, 314

Test Initiated: DATE: May 26, 2015 TIME: 1420
Test Terminated: DATE: June 2, 2015 TIME: 1500

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	7.2	7.4	7.1	7.4	7.1	7.3	7.3
Final	7.7	7.6	7.7	7.4	7.6	6.4	7.2
pH Initial	7.5	7.2	7.4	7.2	7.4	7.2	7.2
Final	7.8	7.5	7.6	7.8	7.7	6.5	7.5
Alkalinity	31	NA	31	NA	31	NA	NA
Hardness	44	NA	44	NA	44	NA	NA
Conductivity	140	120	140	130	140	140	140
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	7.3	7.8	7.5	7.4	7.0	7.3
Final	7.6	7.1	7.8	7.5	8.0	5.7	7.3
pH Initial	7.5	7.3	7.4	7.2	7.3	7.3	7.3
Final	7.8	7.4	7.6	7.7	7.7	6.5	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.5	7.5	7.8	7.5	7.2	7.5	7.4
Final	7.7	7.6	7.7	7.7	7.8	6.1	7.4
pH Initial	7.6	7.4	7.4	7.2	7.3	7.3	7.3
Final	7.8	7.4	7.5	7.8	7.6	6.6	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	140	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.3	7.3	7.2	7.4	7.1	7.6	7.5
Final	7.6	7.5	7.7	7.6	7.3	6.0	7.3
pH Initial	7.6	7.4	7.3	7.2	7.3	7.4	7.3
Final	7.8	7.4	7.5	7.8	7.6	6.6	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.6	7.2	7.4	7.2	6.8	7.6	7.3
Final	8.0	7.5	7.7	7.8	7.6	5.2	7.3
pH Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
Final	8.0	7.4	7.5	7.8	7.7	6.5	7.5
Alkalinity	31	NA	34	NA	30	NA	NA
Hardness	42	NA	43	NA	44	NA	NA
Conductivity	140	120	130	130	130	140	140
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	7.3	7.2	7.7	7.4	7.4	7.2	7.1
Final	7.9	7.2	7.4	7.2	7.6	5.3	7.4
pH Initial	7.5	7.4	7.3	7.2	7.3	7.3	7.2
Final	7.9	7.5	7.5	7.7	7.6	6.5	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	120	140	130	130	140	140
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

Client: MALVERN WASTEWATER
Project Reference:
Project Manager:
Sampled By: JOHN DAVIS

PO No.

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	SAMPLE MATRIX: WATER	SOIL	NO OF BOTTLES	ANALYSES REQUESTED: Bio-Chronic Check
1	MALVERN WASTEWATER	5/26/15 9:38 AM		X			1	X
		Container Type						
		Preservative						

AIC CONTROL NO: 190819
AIC PROPOSAL NO:
Carrier: S.
Received on ice (4°C)? YES NO
Remarks 5.6°C

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
	5/26/15 12:55 PM		
Relinquished By:	Date/Time	Received in Lab By: D. Brown	Date/Time 5-26-15 12:55

Comments:

5/01

FORM 0080

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
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CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

Client: MALVERN WASTEWATER
Project Reference:
Project Manager:
Sampled By: JOHN DAVIS

PO No.

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	SAMPLE MATRIX: WATER	SOIL	NO OF BOTTLES	Bio Cyprex conf
2	MALVERN WASTEWATER #2	5/27/15 9:44		Y			1	X
		Container Type						
		Preservative						

ANALYSES REQUESTED

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

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
	5/27/15 12:04 PM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			5-27-15 12:04

Comments:

5/01

FORM 0080

AMERICAN INTERPLEX CORPORATION
LABORATORIES

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

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE OF

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

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	SAMPLE MATRIX: WATER	SOIL	NO OF BOTTLES	ANALYSES REQUESTED: BTS-Chlorine Cl2	ANALYSES REQUESTED: P, NO3+NO2-N
3	MAULDIN WASTEWATER #3	5/29/15 8:23AM		X			1	X	
	MAULDIN WASTEWATER	5/29/15 8:40AM	X				1		X
		Container Type							
		Preservative							

AIC CONTROL NO: 190819
AIC PROPOSAL NO:
Carrier:
Received on Ice (4°C)? YES 1.9 NO
Remarks
190934
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:

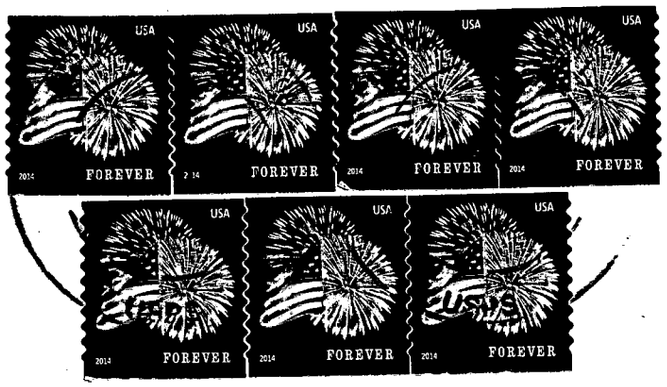
Relinquished By:	Date/Time	Received By:	Date/Time
	5/29/15 11:12 AM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			5-29-15 1112

Comments:

5/01

FORM 0080

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