Sanitary Sewer Overflow Monthly Report

Facility Name: Malvern Water Works **Permit Number:** AR0034126 **Reporting Period (Month/Year):** June, 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
Malvern Manor / Hwy 9	Private	6/26/13	6/26/13	900	G	NEAH	JET VAC	GR
629 Fraview	Cleanout	6/5/13	6/5/13	750	G	NEAH	JET VAC	GR
Laurel St.		6/4/13	6/12/13	500	CO	NEAH	WO	GR/CR
Called Alan Anderson on 6/4/13 to confirm plans to Repair manhole.								
Called back on 6/14/13 with final notes.								
REROUTE CREEK & Replace manhole.								

Signature of Cognizant or Ranking Official — Date: 7/3/2013

"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."

June 19, 2013

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

Control No. 167925-1

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:

A statistically significant difference was noted for *Ceriodaphnia dubia* reproduction at the 6.5 % effluent concentration. As no effect was observed at the 8.5% effluent concentration, the statistically significant difference is considered an anomaly.

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%	100	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.293	PASS
Control Growth CV < or = 40%	7.17	PASS
Growth Minimum Significant Difference 12 to 30%	33.7	FAIL
Critical Dilution CV < or = 40%	48.6	FAIL

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	20.7	PASS
Control CV < or = 40% per Surviving Female	22.9	PASS
Reproduction Minimum Significant Difference 13 to 47%	22.3	PASS
Critical Dilution CV < or = 40%	31.0	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: Outfall 001
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.4	7.6	8.5
pH (standard units)	7.1	7.1	7.3
Alkalinity (mg/l as CaCO3)	33	16	17
Hardness (mg/l as CaCO3)	32	33	31
Conductivity (umhos/cm)	200	200	200
Residual Chlorine (mg/l)	0.16	0.10	<0.05
Ammonia as N (mg/l)	0.38	0.42	0.33

2. Dilution Water Samples: Synthentic Soft Water #3995
   a. Dates Prepared: May 29 through June 12, 2013
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.0	7.6	8.8
pH (standard units)	7.6	7.6	7.7
Alkalinity (mg/l as CaCO3)	30	30	30
Hardness (mg/l as CaCO3)	47	47	44
Conductivity (umhos/cm)	160	160	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:	June 4, 2013 at 1630
Date & Time Test Terminated:	June 11, 2013 at 1527
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:	June 4, 2013 at 1630
Date & Time Test Terminated:	June 11, 2013 at 1440
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. Steel's Many-One Rank test was used to determine the No Observable Effects Concentration (NOEC) for growth. Dunnett's Test was used to calculate the PMSD.

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 28, 2013 at 1645 to June 4, 2013 at 1520
The results were as follows: (Control No. 167778-1.)
Survival LC-50: 6598 mg/l
Growth IC-25: 5369 mg/l
Growth PMSD: 22.6

Ceriodaphnia dubia

Chronic reference tests are performed monthly.
A chronic reference test was performed on May 28, 2013 at 1700 to June 4, 2013 at 1500
The results were as follows: (Control No. 167778-2.)
Survival LC-50: 2236 mg/l
Growth IC-25: 1573 mg/l
Growth PMSD: 13.9

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	101	0.750
pH	SM 4500-H+ B	101	0.00
Conductivity	EPA 120.1	110	1.04

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: June 4, 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: June 4, 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

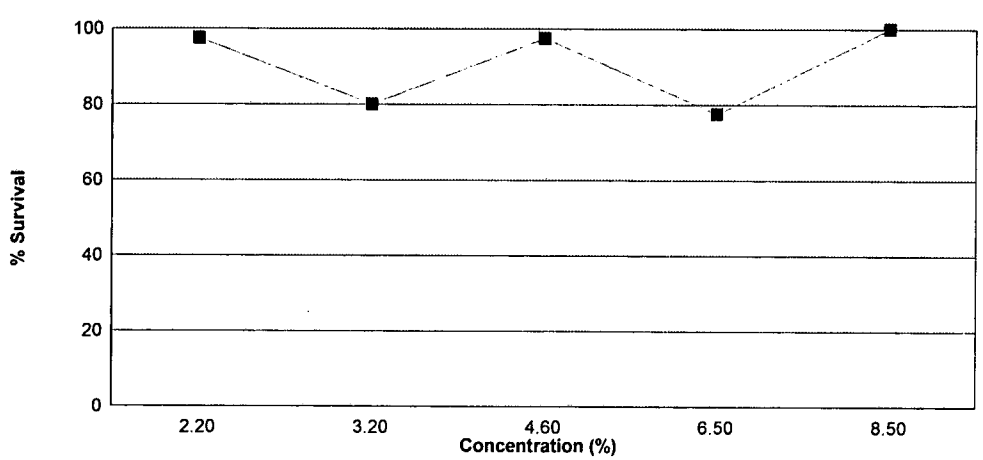
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

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 June 4, 2013 at 1630 and continued through June 11, 2013 at 1527. 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	0.293
2.2 %	97.5	0.301
3.2 %	80.0	0.258
4.6 %	97.5	0.290
6.5 %	77.5	0.250
8.5 %	100	0.315

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

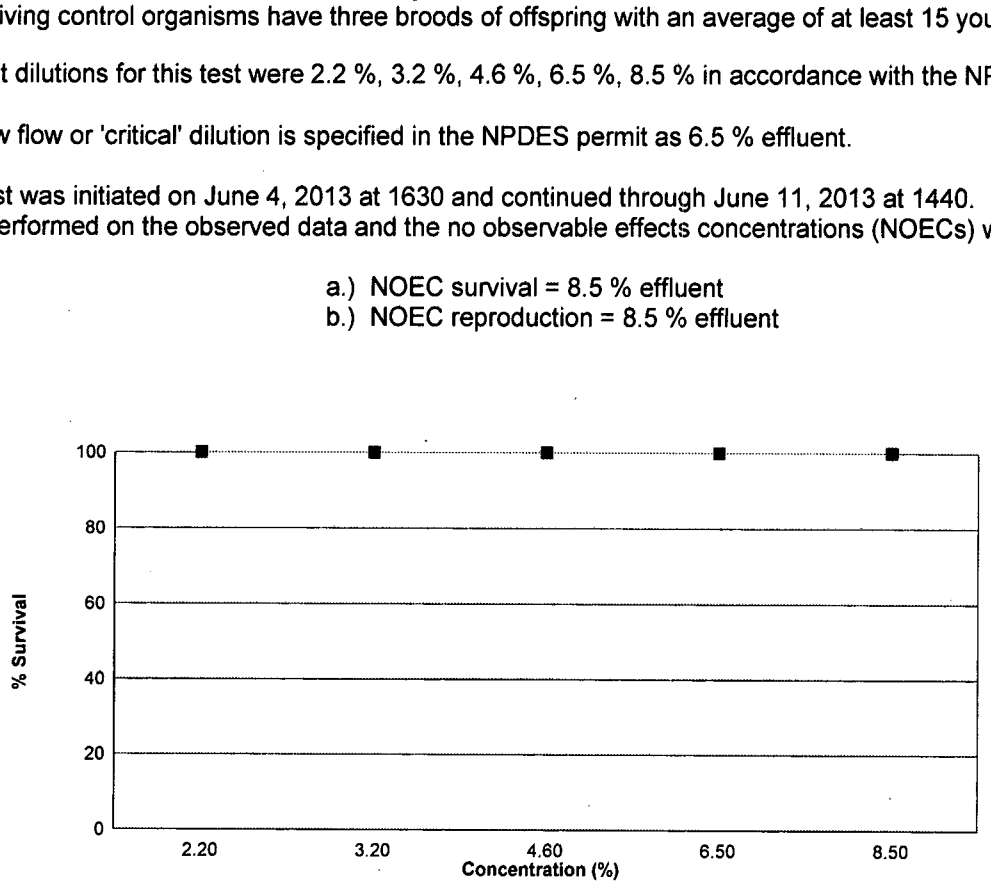
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 June 4, 2013 at 1630 and continued through June 11, 2013 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 reproduction = 8.5 % effluent



Summary of the 7-day *Ceriodaphnia dubia* Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	20.7
2.2 %	100	16.7
3.2 %	100	16.5
4.6 %	100	16.4
6.5 %	100	14.6 *
8.5 %	100	16.8

*Significant difference when compared to the control (p=0.05)

The significant toxicity is not due to true dose response effects, and should be considered an anomaly.

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: June 4, 2013 at 1630
Date and Time Test Terminated: June 11, 2013 at 1527

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	7	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
3.2 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	7	6	6	6	6
	D	8	8	8	8	8	8	8
	E	8	8	7	3	3	3	2
4.6 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	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
6.5 %	A	8	8	8	8	8	8	8
	B	8	8	7	6	6	6	6
	C	8	8	8	8	8	8	8
	D	8	8	8	6	6	4	1
	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: June 4, 2013 at 1630
Test Terminated: June 11, 2013 at 1527

Drying Started: June 10, 2013 at 0950
Drying Ended: June 12, 2013 at 1550

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.90717	.90930	0.00213	8	0.266
	B	.90800	.91033	0.00233	8	0.291
	C	.90944	.91197	0.00253	8	0.316
	D	.91016	.91241	0.00225	8	0.281
	E	.91073	.91323	0.00250	8	0.312
2.2 %	A	.90862	.91069	0.00207	8	0.259
	B	.90613	.90861	0.00248	8	0.310
	C	.90436	.90680	0.00244	8	0.305
	D	.90491	.90740	0.00249	8	0.311
	E	.90699	.90956	0.00257	8	0.321
3.2 %	A	.90654	.90920	0.00266	8	0.332
	B	.90848	.91048	0.00200	8	0.250
	C	.91003	.91225	0.00222	8	0.278
	D	.91165	.91420	0.00255	8	0.319
	E	.91296	.91384	0.00088	8	0.110
4.6 %	A	.90790	.91001	0.00211	8	0.264
	B	.90881	.91072	0.00191	8	0.239
	C	.90684	.90914	0.00230	8	0.288
	D	.90653	.90900	0.00247	8	0.309
	E	.90791	.91073	0.00282	8	0.352
6.5 %	A	.90858	.91078	0.00220	8	0.275
	B	.91349	.91559	0.00210	8	0.262
	C	.91282	.91541	0.00259	8	0.324
	D	.90799	.90833	0.00034	8	0.042
	E	.90770	.91049	0.00279	8	0.349
8.5 %	A	.90387	.90635	0.00248	8	0.310
	B	.90230	.90492	0.00262	8	0.328
	C	.90375	.90630	0.00255	8	0.319
	D	.90583	.90858	0.00275	8	0.344
	E	.90705	.90925	0.00220	8	0.275

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: June 4, 2013 at 1630
Date and Time Test Terminated: June 11, 2013 at 1440

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	4	0	4	0	4	4	0	2	2	2	22	10	2.20
5	6	3	0	6	0	0	5	6	5	5	36	10	3.60
6	1	8	9	0	7	12	8	1	0	2	48	10	4.80
7	11	0	10	11	12	13	10	11	11	12	101	10	10.1
8													
TOTAL	22	11	23	17	23	29	23	20	18	21	207	10	20.7

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	4	0	4	2	2	0	3	0	2	0	17	10	1.70
5	0	4	10	4	2	6	6	4	5	6	47	10	4.70
6	8	5	0	1	4	8	1	10	2	9	48	10	4.80
7	10	0	10	8	8	0	10	0	9	0	55	10	5.50
8													
TOTAL	22	9	24	15	16	14	20	14	18	15	167	10	16.7

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	4	4	2	0	4	0	0	0	18	10	1.80
5	0	5	0	6	0	5	6	6	4	4	36	10	3.60
6	5	0	7	0	6	7	2	5	11	5	48	10	4.80
7	11	8	9	9	10	0	8	0	0	8	63	10	6.30
8													
TOTAL	18	15	20	19	18	12	20	11	15	17	165	10	16.5

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: June 4, 2013 at 1630
Date and Time Test Terminated: June 11, 2013 at 1440

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	0	0	4	4	2	0	0	2	0	0	12	10	1.20
5	8	4	0	6	0	5	5	0	4	5	37	10	3.70
6	8	9	9	0	8	9	6	1	6	6	62	10	6.20
7	0	8	9	11	0	8	0	9	8	0	53	10	5.30
8													
TOTAL	16	21	22	21	10	22	11	12	18	11	164	10	16.4

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	0	4	2	0	0	0	0	0	0	10	10	1.00
5	0	4	6	6	0	6	8	5	6	5	46	10	4.60
6	9	6	0	0	7	7	0	10	7	6	52	10	5.20
7	8	0	7	8	0	8	7	0	0	0	38	10	3.80
8													
TOTAL	21	10	17	16	7	21	15	15	13	11	146	10	14.6

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	4	0	4	2	4	0	0	0	0	2	16	10	1.60
5	0	4	0	7	0	5	4	8	6	6	40	10	4.00
6	9	6	8	6	10	5	8	6	7	2	67	10	6.70
7	10	0	8	0	10	9	0	0	0	8	45	10	4.50
8													
TOTAL	23	10	20	15	24	19	12	14	13	18	168	10	16.8

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	0.87500	1.20940
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	0.75000	1.04720
3	3.2 %	4	1.00000	1.39310
3	3.2 %	5	0.25000	0.52360
4	4.6 %	1	1.00000	1.39310
4	4.6 %	2	0.87500	1.20940
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	0.75000	1.04720
5	6.5 %	3	1.00000	1.39310
5	6.5 %	4	0.12500	0.36137
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 = 1.439		
W = 0.7409		
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 %	25.00	16.00	5.00	
3	3.2 %	22.50	16.00	5.00	
4	4.6 %	25.00	16.00	5.00	
5	6.5 %	22.50	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 = 0.1051		
W = 0.8395		
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					No Transformation
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	2.2 %	29.00	16.00	5.00	
3	3.2 %	26.00	16.00	5.00	
4	4.6 %	25.00	16.00	5.00	
5	6.5 %	26.00	16.00	5.00	
6	8.5 %	34.00	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation
SOURCE	DF	SS	MS	F
Between	5	0.01604	0.003208	0.7319
Within (Error)	24	0.1052	0.004383	
Total	29	0.1212		

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	0.2932	0.2932		
2	2.2 %	0.3012	0.3012	-0.1911	
3	3.2 %	0.2578	0.2578	0.8454	
4	4.6 %	0.2904	0.2904	0.06687	
5	6.5 %	0.2504	0.2504	1.022	
6	8.5 %	0.3152	0.3152	-0.5254	

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	0.09882	33.7	-0.008
3	3.2 %	5	0.09882	33.7	0.0354
4	4.6 %	5	0.09882	33.7	0.0028
5	6.5 %	5	0.09882	33.7	0.0428
6	8.5 %	5	0.09882	33.7	-0.022

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 = 0.077 D* = 0.6041 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 = 2.013 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	201.8	40.36	2.02
Within (Error)	54	1079	19.98	
Total	59	1281		

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	20.7	20.7		
2	2.2 %	16.7	16.7	2.001	
3	3.2 %	16.5	16.5	2.101	
4	4.6 %	16.4	16.4	2.151	
5	6.5 %	14.6	14.6	3.052	*
6	8.5 %	16.8	16.8	1.951	

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	4.618	22.3	4
3	3.2 %	10	4.618	22.3	4.2
4	4.6 %	10	4.618	22.3	4.3
5	6.5 %	10	4.618	22.3	6.1
6	8.5 %	10	4.618	22.3	3.9

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: June 4, 2013 at 1341
Date and Time Test Terminated: June 11, 2013 at 1527

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	7.9	7.6	7.6	8.8	8.1	7.9
	Final *1	7.6	7.2	7.3	7.8	7.1	7.6	7.2
	Final *2	8.1	8.0	7.9	7.9	7.9	8.0	8.0
pH, units	Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
	Final *1	7.5	7.5	7.4	7.4	7.4	7.4	7.2
	Final *2	7.9	8.1	7.9	7.9	7.9	7.8	7.5
Alkalinity, mg CaCO3/l		30	NA	30	NA	30	NA	NA
Hardness, mg CaCO3/l		47	NA	47	NA	44	NA	NA
Conductivity, umhos/cm		160	170	160	160	160	180	170
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	8.4	8.0	7.6	7.5	8.5	7.7	7.7
	Final *1	7.4	6.9	6.5	7.0	7.1	7.4	7.2
	Final *2	8.3	7.9	7.8	8.1	8.1	8.3	8.0
pH, units	Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
	Final *1	7.5	7.4	7.2	7.2	7.3	7.3	7.2
	Final *2	8.0	8.1	8.0	7.9	8.0	7.9	7.6

Effluent Conc.: 3.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.8	7.6	7.9	8.6	7.9	7.7
	Final *1	7.2	7.0	6.4	7.0	7.0	7.5	7.0
	Final *2	7.8	7.9	7.8	8.0	8.0	8.3	8.0
pH, units	Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.5
	Final *1	7.4	7.4	7.1	7.2	7.3	7.3	7.2
	Final *2	8.0	8.2	8.0	7.9	8.0	7.9	7.6

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: June 4, 2013 at 1341
Date and Time Test Terminated: June 11, 2013 at 1527

Effluent Conc.: 4.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.8	7.8	7.6	7.7	8.7	7.9	7.9
	Final *1	7.4	6.9	6.3	7.0	7.1	7.4	7.0
	Final *2	8.0	7.6	7.8	8.1	8.1	8.3	7.7
pH, units	Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
	Final *1	7.5	7.4	7.1	7.2	7.4	7.3	7.2
	Final *2	8.1	8.2	8.0	8.0	8.1	7.9	7.5

Effluent Conc.: 6.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.7	7.9	7.6	7.7	8.9	8.1	7.9
	Final *1	7.7	7.0	6.4	7.3	7.0	7.6	7.1
	Final *2	8.1	7.8	7.9	8.0	8.2	8.3	7.8
pH, units	Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
	Final *1	7.5	7.4	7.1	7.3	7.4	7.4	7.2
	Final *2	8.0	8.3	8.1	8.0	8.1	8.0	7.5
Alkalinity, mg CaCO3/l		33	NA	28	NA	29	NA	NA
Hardness, mg CaCO3/l		44	NA	46	NA	43	NA	NA
Conductivity, umhos/cm		170	170	160	170	170	170	180
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

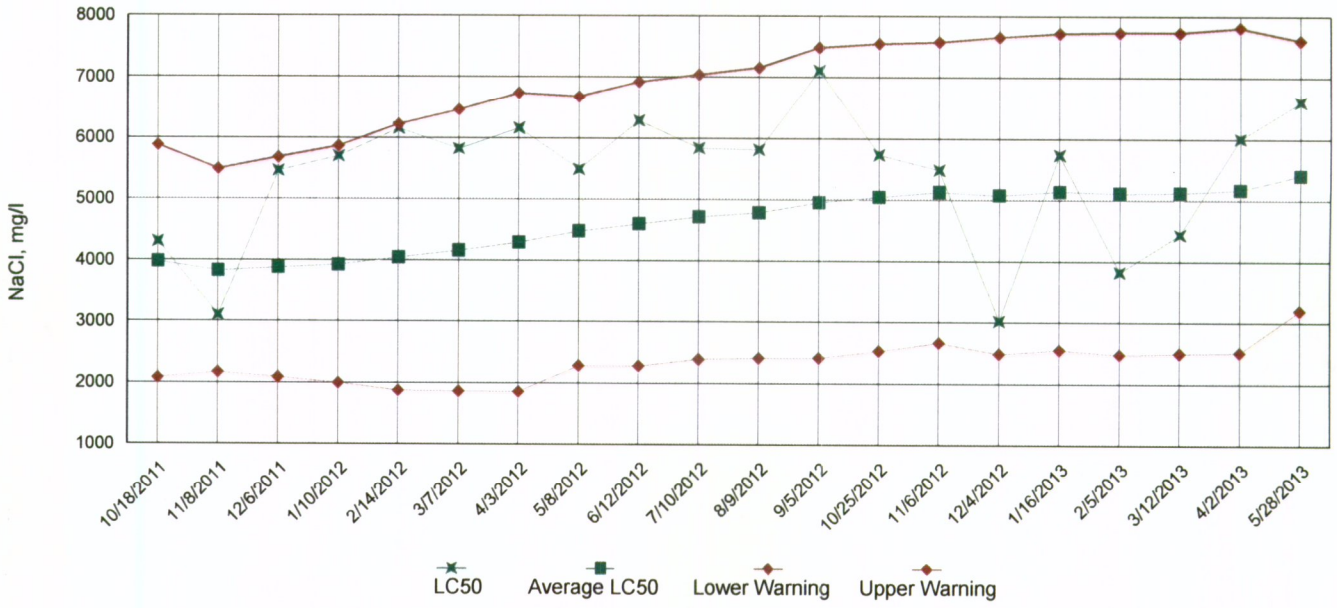
Effluent Conc.: 8.5 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	7.7	7.8	7.5	7.6	8.5	7.8	8.0
	Final *1	7.1	7.0	6.0	7.0	6.9	7.3	7.3
	Final *2	7.7	7.8	7.9	8.1	8.0	8.5	7.9
pH, units	Initial	7.6	7.5	7.6	7.6	7.7	7.6	7.5
	Final *1	7.4	7.4	7.1	7.2	7.3	7.4	7.3
	Final *2	8.1	8.3	8.1	8.0	8.0	7.9	7.6

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

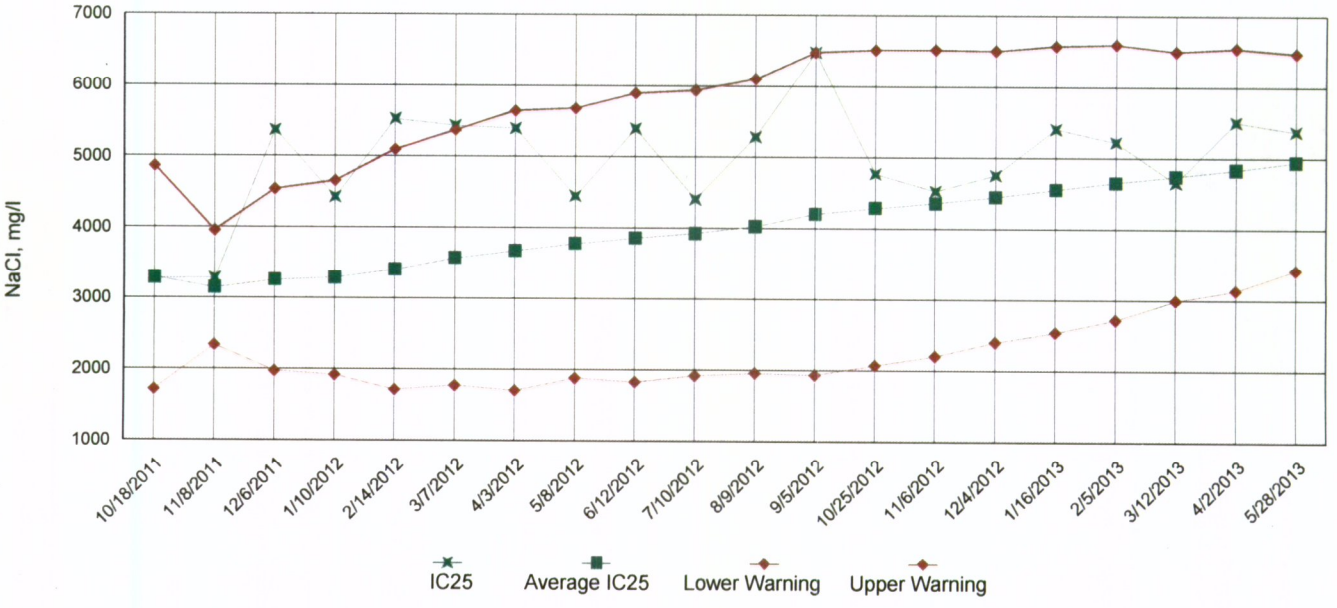
Appendix A4: Test 1000.0

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

LC50 Survival Data



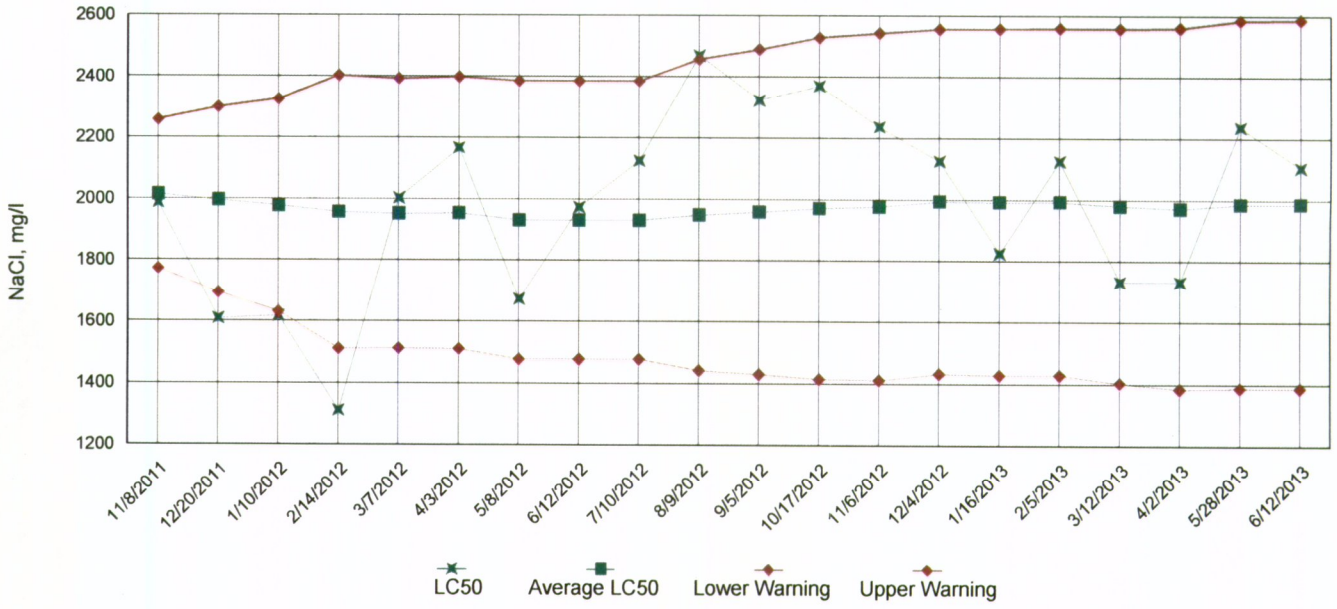
IC25 Growth Data



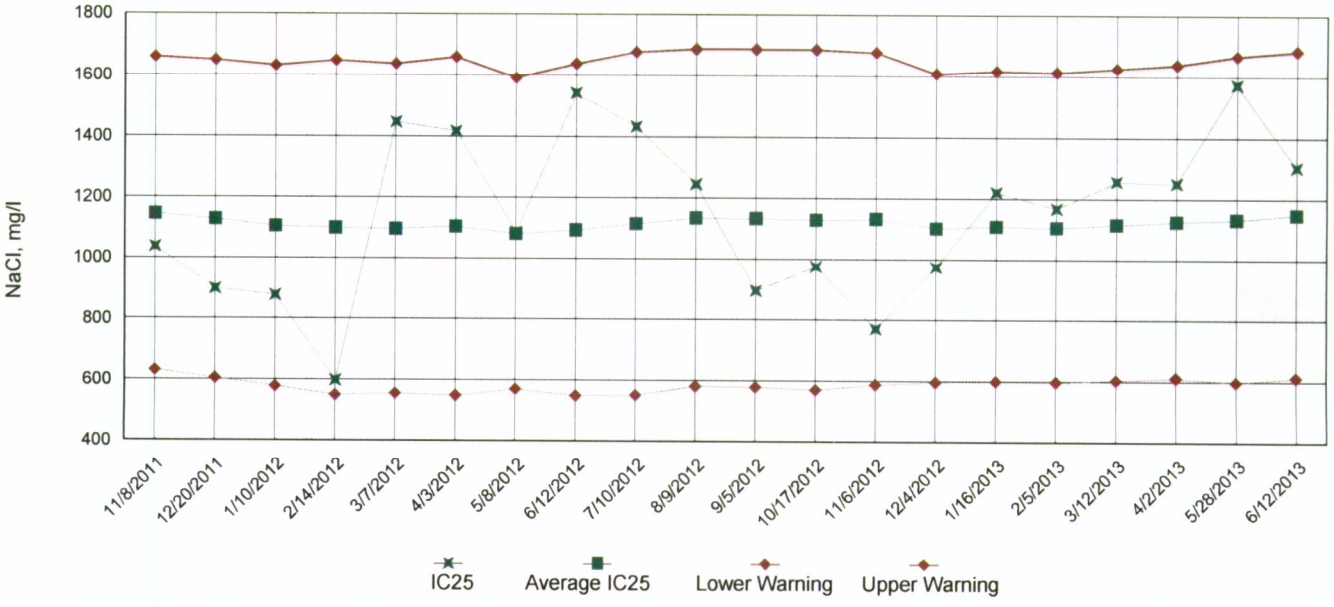
Appendix A4: Test 1002.0

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: June 4, 2013 at 1630
Date and Time Test Terminated: June 11, 2013 at 1527
Dilution water used: Synthentic Soft Water #3995

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 %	87.5	100	100	100	100	100	100	97.5	5.73
3.2 %	100	100	75.0	100	25.0	100	100	80.0	40.7
4.6 %	100	87.5	100	100	100	100	100	97.5	5.73
6.5 %	100	75.0	100	12.5	100	100	100	77.5	48.9
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	0.266	0.291	0.316	0.281	0.312	0.293	7.17
2.2 %	0.259	0.310	0.305	0.311	0.321	0.301	8.07
3.2 %	0.332	0.250	0.278	0.319	0.110	0.258	34.5
4.6 %	0.264	0.239	0.288	0.309	0.352	0.29	14.9
6.5 %	0.275	0.262	0.324	0.042	0.349	0.25	48.6
8.5 %	0.310	0.328	0.319	0.344	0.275	0.315	8.17

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. Steel's Many-One Rank 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: 48.6 (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. 1 COLLECTED ending: DATE: June 4, 2013 TIME: 0900

Test Initiated: DATE: June 4, 2013 TIME: 1630
Test Terminated: DATE: June 11, 2013 TIME: 1527

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.0	7.9	7.6	7.6	8.8	8.1	7.9
Final	7.6	7.2	7.3	7.8	7.1	7.6	7.2
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	7.5	7.5	7.4	7.4	7.4	7.4	7.2
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	47	NA	47	NA	44	NA	NA
Conductivity	160	170	160	160	160	180	170
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	8.4	8.0	7.6	7.5	8.5	7.7	7.7
Final	7.4	6.9	6.5	7.0	7.1	7.4	7.2
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	7.5	7.4	7.2	7.2	7.3	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	160	180	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.6	7.9	8.6	7.9	7.7
Final	7.2	7.0	6.4	7.0	7.0	7.5	7.0
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.5
Final	7.4	7.4	7.1	7.2	7.3	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	160	160	170	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.6	7.7	8.7	7.9	7.9
Final	7.4	6.9	6.3	7.0	7.1	7.4	7.0
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	7.5	7.4	7.1	7.2	7.4	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	160	170	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.7	7.9	7.6	7.7	8.9	8.1	7.9
Final	7.7	7.0	6.4	7.3	7.0	7.6	7.1
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	7.5	7.4	7.1	7.3	7.4	7.4	7.2
Alkalinity	33	NA	28	NA	29	NA	NA
Hardness	44	NA	46	NA	43	NA	NA
Conductivity	170	170	160	170	170	170	180
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	7.7	7.8	7.5	7.6	8.5	7.8	8.0
Final	7.1	7.0	6.0	7.0	6.9	7.3	7.3
pH Initial	7.6	7.5	7.6	7.6	7.7	7.6	7.5
Final	7.4	7.4	7.1	7.2	7.3	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	170	170	170	170	180
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: June 4, 2013 at 1630
Date and Time Test Terminated: June 11, 2013 at 1440
Dilution water used: Synthentic Soft Water #3995

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	22	22	18	16	21	23
B	11	9	15	21	10	10
C	23	24	20	22	17	20
D	17	15	19	21	16	15
E	23	16	18	10	7	24
F	29	14	12	22	21	19
G	23	20	20	11	15	12
H	20	14	11	12	15	14
I	18	18	15	18	13	13
J	21	15	17	11	11	18
Mean per Adult	20.7	16.7	16.5	16.4	14.6	16.8
Mean per Surviving Adult	20.7	16.7	16.5	16.4	14.6	16.8
CV %	22.9	26.3	19.2	30.6	31.0	28.2

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 %)	____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: 31 (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. 1 COLLECTED ending: DATE: June 4, 2013 TIME: 0900

Test Initiated: DATE: June 4, 2013 TIME: 1630
Test Terminated: DATE: June 11, 2013 TIME: 1440

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.0	7.9	7.6	7.6	8.8	8.1	7.9
Final	8.1	8.0	7.9	7.9	7.9	8.0	8.0
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	7.9	8.1	7.9	7.9	7.9	7.8	7.5
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	47	NA	47	NA	44	NA	NA
Conductivity	160	170	160	160	160	180	170
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	8.4	8.0	7.6	7.5	8.5	7.7	7.7
Final	8.3	7.9	7.8	8.1	8.1	8.3	8.0
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	8.0	8.1	8.0	7.9	8.0	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	160	180	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 3.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.6	7.9	8.6	7.9	7.7
Final	7.8	7.9	7.8	8.0	8.0	8.3	8.0
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.5
Final	8.0	8.2	8.0	7.9	8.0	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	160	160	170	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 4.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.8	7.8	7.6	7.7	8.7	7.9	7.9
Final	8.0	7.6	7.8	8.1	8.1	8.3	7.7
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	8.1	8.2	8.0	8.0	8.1	7.9	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	160	170	160	170	170
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 6.5 %	DAY 1	2	3	4	5	6	7
D.O. Initial	7.7	7.9	7.6	7.7	8.9	8.1	7.9
Final	8.1	7.8	7.9	8.0	8.2	8.3	7.8
pH Initial	7.6	7.6	7.6	7.6	7.7	7.6	7.4
Final	8.0	8.3	8.1	8.0	8.1	8.0	7.5
Alkalinity	33	NA	28	NA	29	NA	NA
Hardness	44	NA	46	NA	43	NA	NA
Conductivity	170	170	160	170	170	170	180
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	7.7	7.8	7.5	7.6	8.5	7.8	8.0
Final	7.7	7.8	7.9	8.1	8.0	8.5	7.9
pH Initial	7.6	7.5	7.6	7.6	7.7	7.6	7.5
Final	8.1	8.3	8.1	8.0	8.0	7.9	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	170	170	170	170	170	180
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: Tom DAVIS

PO No.

SAMPLE MATRIX

NO OF BOTTLES

ANALYSES REQUESTED

AIC CONTROL NO: 167925
AIC PROPOSAL NO:
Carrier:
Received on Ice (4°C)? YES 4.6 NO
Remarks

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL		NO OF BOTTLES	Bio-Monitoring
1	MALVERN WASTEWATER	6-3-13 10:30 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
	6/4/13 11:21 AM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			6/4/13 11:26

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

PAGE OF

Client: MALVERN WASTEWATER (3.4)
Project Reference:
Project Manager:
Sampled By: JOHN DAVIS

PO No.

SAMPLE MATRIX: WATER, SOIL

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	Bromide	NO3+NO2-N	TP	Aluminum
(2)	MALVERN WASTEWATER	6/5/13 9:25 AM		X			1	X			
	MALVERN WASTEWATER #2	6/5/13 9:40 AM	X				1		X		
	MALVERN WASTEWATER #3	6/5/13 9:45 AM	X				1			X	
	MALVERN WATER PLANT	6/5/13 10:15 AM	X				1				X
		Container Type									
		Preservative									

ANALYSES REQUESTED

AIC CONTROL NO: 167925
AIC PROPOSAL NO:
Carrier:
Received on Ice (4°C)? (YES) NO
Remarks

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
	6/5/13 12:18 PM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			6-5-13 1218

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

PAGE OF

Client: MALVERN WASTEWATER
Project Reference:
Project Manager:
Sampled By: John Davis

PO No.

SAMPLE MATRIX

AIC CONTROL NO: 167925
AIC PROPOSAL NO:
Carrier: Sola
Received on Ice (4°C)? YES 2c NO

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	Bacteriological	Remarks
3	MALVERN WASTEWATER	6/7/13 8:30		X			1	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
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
	6/7/13 12:03 PM		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			6-7-13 12:03

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
N. Little Rock, AR 72118-5317