



January 21, 2015

Arkansas Department of Environmental Quality
Water Enforcement Branch
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: NPDES Permit AR0000752 Discharge Monitoring Report for period ending December 31, 2014.

Enclosed you will find the Discharge Monitoring Reports ending December 31, 2014. The DMR's for Outfall 010-A were entered on the blank DMR forms provided by Amy Schluterman, ADEQ Water Enforcement.

If you have any questions regarding this report, please contact David Sartain at (870) 863-1400.

Sincerely,

A handwritten signature in black ink that reads "Edward L. Pearson". The signature is fluid and cursive.

Edward L Pearson

Environmental Technician

Enclosures

NON-COMPLIANCE REPORT

Facility Name: **El Dorado Chemical Company**

Permit Number: **AR0000752**

AFIN:

70-00040

Month / Year: **Dec-14**

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
Outfall 006/Zinc Monthly Average (1100 ug/L)	115.62 ug/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 /Zinc Daily Max (1100 ug/L)	231.99 ug/L Daily Max	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / Lead Monthly Average (180 ug/L)	3.8 ug/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / Lead Daily Max. (180ug/L)	7.62 ug/L Daily Max.	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / TDS Monthly Average (750 mg/L)	291 mg/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / TDS Daily Max (750 mg/L)	436.5 mg/L Daily Max	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (4.19 su)	6 su/ Minimum	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (4.71 su)	6 su/ Minimum	12/12/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (5.50su)	6 su/ Minimum	12/19/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (4.60su)	6 su/ Minimum	12/26/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (4.52 su)	6 su/ Minimum	12/27/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / pH Minimum (4.59 su)	6 su/ Minimum	12/28/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Zinc Monthly Average (1200 ug/L)	115.62 ug/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Zinc Daily Averag(1200 ug/L)	231.99 ug/L Daily Max	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Lead Monthly Average (9.8 ug/L)	3.8 ug/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Lead Daily Maximum(9.8 ug/L)	7.62 ug/L Daily Max.	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / TDS Monthly Average (2200 mg/L)	291 mg/L Monthly Average	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007/TDS Daily Average(2200 mg/L)	436.5 mg/L Daily Max	12/5/2014	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
<p>I CERTIFY THAT UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C 1001 AND 33 U.S.C. 1319. (Penalties under these statutes may include fines up to \$10,000 and or maximum imprisonment of between 6 months and 5 years.)</p>				<p style="text-align: center;"><i>Greg Withrow</i> 11/21/15 Signature / Date</p>



November 17, 2014
Control No. 184210-1
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November 17, 2014

Test Results of
Fourth Quarter
Chronic 7-Day Renewal
Biomonitoring Testing
for
Outfall 010
El Dorado, AR

Control No. 184210-1

Prepared for:

Mr. Eddie Pearson
El Dorado Chemical Company
4500 North West Avenue
El Dorado, AR 71730

Prepared by:

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



November 17, 2014
Control No. 184210-1
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El Dorado Chemical Company
ATTN: Mr. Eddie Pearson
4500 North West Avenue
El Dorado, AR 71730

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
Outfall 010 - El Dorado, AR
NPDES Permit No. AR0000752

Dear Mr. Eddie Pearson:

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 2.1 % effluent, which is above the critical dilution of 1.6 %. The NOEC for growth occurred at 2.1 % effluent, which is above the critical dilution of 1.6 %. **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 2.1 % effluent, which is above the critical dilution of 1.6 %. The NOEC for reproduction occurred at 2.1 % effluent, which is above the critical dilution of 1.6 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director

A handwritten signature in black ink is written over a horizontal line. The signature is cursive and appears to read 'John Overbey'. Below the signature, the name 'John Overbey' and title 'Laboratory Director' are printed in a standard font.



PDF cc: El Dorado Chemical Company
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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	0.320	PASS
Control Growth CV < or = 40%	11.4	PASS
Growth Minimum Significant Difference 12 to 30%	14.4	PASS
Critical Dilution CV < or = 40%	13.6	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	22.8	PASS
Control CV < or = 40% per Surviving Female	22.3	PASS
Reproduction Minimum Significant Difference 13 to 47%	28.2	PASS
Critical Dilution CV < or = 40%	35.4	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0000752
2. Test Requirements: Test Methods 1000.0 and 1002.0
3. Receiving Stream:

B. Source of Effluent/Dilution Water

1. Effluent Samples:
 - a. Sampling Point: Outfall 010
 - b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.7	8.0	7.8
pH (standard units)	7.4	8.2	7.0
Alkalinity (mg/l as CaCO ₃)	19	29	18
Hardness (mg/l as CaCO ₃)	37	36	39
Conductivity (umhos/cm)	440	430	400
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	0.35	<0.1	0.23

2. Dilution Water Samples: Synthetic Soft Water #4153

- a. Dates Prepared: October 31 through November 14, 2014
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	5.4	7.8	7.6
pH (standard units)	7.9	8.4	7.2
Alkalinity (mg/l as CaCO ₃)	30	30	30
Hardness (mg/l as CaCO ₃)	48	48	48
Conductivity (umhos/cm)	180	160	150
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: November 4, 2014 at 1205
Date & Time Test Terminated: November 11, 2014 at 1405
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: November 4, 2014 at 1700
Date & Time Test Terminated: November 10, 2014 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 analyzed with Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC) for Reproduction. Dunnett's Test was used to calculate the PMSD.

IV. Standard Reference Toxicants

American Interplex Corporation has an ongoing test organism culturing program. The sensitivity of the offspring is determined by performing a standard reference toxicant test with each effluent test. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Pimephales promelas (Fathead minnow)

Chronic reference tests are performed monthly.

A chronic reference test was performed on October 22, 2014 at 1030 to October 29, 2014 at 1230

The results were as follows: (Control No. 183793-1.)

Survival LC-50: 4815 mg/l

Growth IC-25: 3427 mg/l

Growth PMSD: 19.3

Ceriodaphnia dubia

Chronic reference tests are performed monthly.

A chronic reference test was performed on October 22, 2014 at 1315 to October 28, 2014 at 1500

The results were as follows: (Control No. 183793-2.)

Survival LC-50: 2236 mg/l

Growth IC-25: 993.1 mg/l

Growth PMSD: 13.3

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	101	1.21
pH	SM 4500-H+ B	100	0.405
Conductivity	EPA 120.1	106	3.92

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: November 4, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

Ceriodaphnia dubia

Date: November 4, 2014

Age: <24 hours

Source: In-house culture

Water Chemistry Record:

Alkalinity: 57-64 mg/l

Hardness: 80-100 mg/l

Temperature: 25 deg.C

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

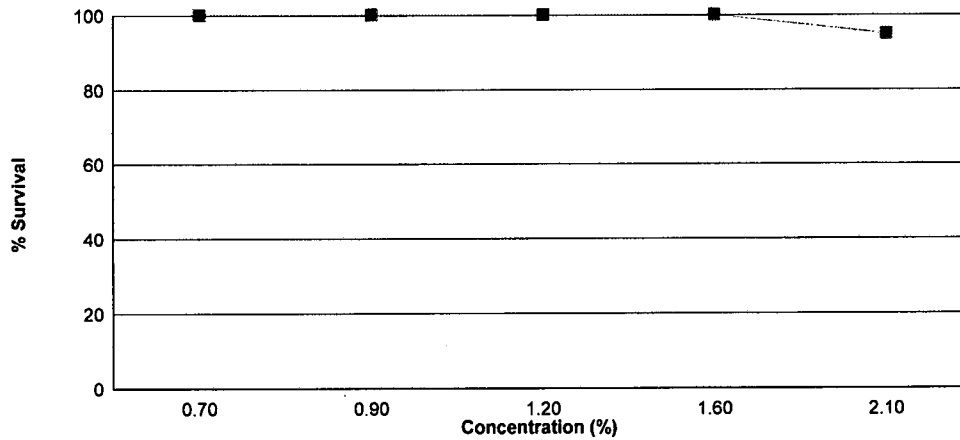
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 0.7 %, 0.9 %, 1.2 %, 1.6 %, 2.1 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 1.6 % effluent.

The test was initiated on November 4, 2014 at 1205 and continued through November 11, 2014 at 1405. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 2.1 % effluent
- b.) NOEC growth = 2.1 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.320
0.7 %	100	0.315
0.9 %	100	0.332
1.2 %	100	0.286
1.6 %	100	0.359
2.1 %	95.0	0.343

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

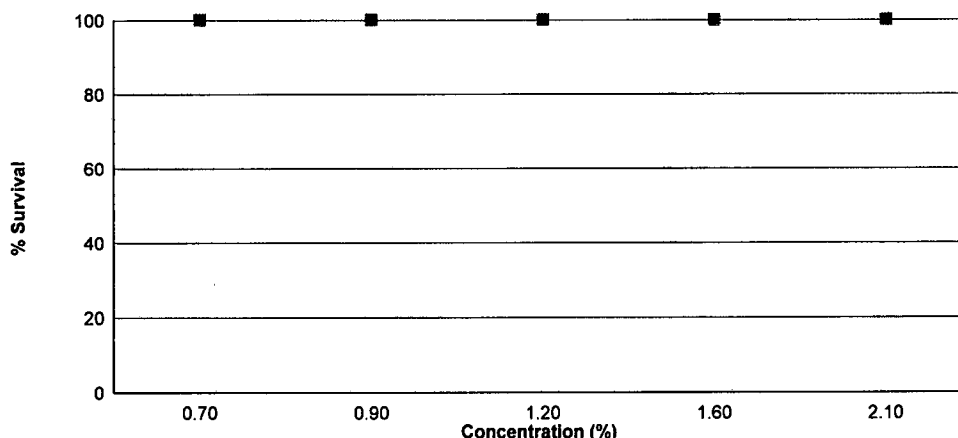
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 0.7 %, 0.9 %, 1.2 %, 1.6 %, 2.1 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 1.6 % effluent.

The test was initiated on November 4, 2014 at 1700 and continued through November 10, 2014 at 1500. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

- a.) NOEC survival = 2.1 % effluent
- b.) NOEC reproduction = 2.1 % effluent



Concentration	Percent Survival	Mean Reproduction
Control	100	22.8
0.7 %	100	21.0
0.9 %	100	21.4
1.2 %	100	18.1
1.6 %	100	21.0
2.1 %	100	22.6

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

 Date and Time Test Initiated: November 4, 2014 at 1205
 Date and Time Test Terminated: November 11, 2014 at 1405

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
0.7 %	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
0.9 %	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
1.2 %	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
1.6 %	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
2.1 %	A	8	8	8	8	8	8	7
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	7	7	7	7	7	7
	E	8	8	8	8	8	8	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: November 4, 2014 at 1205
Test Terminated: November 11, 2014 at 1405

Drying Started: November 10, 2014 at 1740
Drying Ended: November 12, 2014 at 1420

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.91450	.91698	0.00248	8	0.310
	B	.91587	.91893	0.00306	8	0.382
	C	.91684	.91941	0.00257	8	0.321
	D	.91217	.91451	0.00234	8	0.292
	E	.91464	.91700	0.00236	8	0.295
0.7 %	A	.91718	.91944	0.00226	8	0.282
	B	.91548	.91801	0.00253	8	0.316
	C	.92005	.92269	0.00264	8	0.330
	D	.92172	.92446	0.00274	8	0.342
	E	.91926	.92171	0.00245	8	0.306
0.9 %	A	.92081	.92316	0.00235	8	0.294
	B	.92523	.92783	0.00260	8	0.325
	C	.92648	.92909	0.00261	8	0.326
	D	.92859	.93151	0.00292	8	0.365
	E	.92751	.93033	0.00282	8	0.352
1.2 %	A	.92642	.92865	0.00223	8	0.279
	B	.95685	.95906	0.00221	8	0.276
	C	.95345	.95575	0.00230	8	0.288
	D	.95018	.95257	0.00239	8	0.299
	E	.95120	.95350	0.00230	8	0.288
1.6 %	A	.94948	.95168	0.00220	8	0.275
	B	.95034	.95320	0.00286	8	0.358
	C	.95362	.95667	0.00305	8	0.381
	D	.92320	.92638	0.00318	8	0.398
	E	.92256	.92562	0.00306	8	0.382
2.1 %	A	.92282	.92539	0.00257	8	0.321
	B	.91752	.92012	0.00260	8	0.325
	C	.91669	.91970	0.00301	8	0.376
	D	.91638	.91903	0.00265	8	0.331
	E	.91393	.91682	0.00289	8	0.361

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: November 4, 2014 at 1700

Date and Time Test Terminated: November 10, 2014 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	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	3	0	3	4	5	0	3	0	18	10	1.80	
4	2	2	0	4	0	0	0	3	0	2	13	10	1.30	
5	7	10	8	8	9	8	10	8	8	9	85	10	8.50	
6	10	12	11	12	13	12	15	11	16	0	112	10	11.2	
7														
8														
TOTAL	19	24	22	24	25	24	30	22	27	11	228	10	22.8	

Concentration: 0.7 %													
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	2	0	3	3	5	0	5	0	18	10	1.80
4	3	2	0	2	0	0	0	3	0	0	10	10	1.00
5	9	9	10	8	8	9	9	10	9	11	92	10	9.20
6	0	5	12	11	12	13	12	0	12	13	90	10	9.00
7													
8													
TOTAL	12	16	24	21	23	25	26	13	26	24	210	10	21.0

Concentration: 0.9 %													
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	3	0	4	4	5	0	4	0	20	10	2.00
4	2	2	0	3	0	0	0	3	0	2	12	10	1.20
5	0	9	10	8	8	9	8	11	10	10	83	10	8.30
6	13	0	12	12	11	12	14	0	12	13	99	10	9.90
7													
8													
TOTAL	15	11	25	23	23	25	27	14	26	25	214	10	21.4

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: November 4, 2014 at 1700
Date and Time Test Terminated: November 10, 2014 at 1500

Concentration: 1.2 %														
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	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	4	4	4	0	4	0	0	16	10	1.60
4	3	3	4	3	0	0	0	2	0	3	18	10	1.80	
5	11	0	8	10	8	9	9	8	10	11	84	10	8.40	
6	0	12	0	0	13	11	12	0	15	0	63	10	6.30	
7														
8														
TOTAL	14	15	12	13	25	24	25	10	29	14	181	10	18.1	

Concentration: 1.6 %														
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	3	2	4	0	5	4	5	0	23	10	2.30	
4	2	2	0	0	0	3	0	0	0	2	9	10	0.900	
5	9	9	7	9	10	9	10	10	11	8	92	10	9.20	
6	0	0	12	12	13	12	14	12	11	0	86	10	8.60	
7														
8														
TOTAL	11	11	22	23	27	24	29	26	27	10	210	10	21.0	

Concentration: 2.1 %														
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	1	1	0	4	4	5	4	0	19	10	1.90	
4	3	2	0	0	2	0	0	0	0	2	9	10	0.900	
5	10	8	8	9	8	11	8	9	8	9	88	10	8.80	
6	0	13	14	11	12	17	13	15	15	0	110	10	11.0	
7														
8														
TOTAL	13	23	23	21	22	32	25	29	27	11	226	10	22.6	

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	0.7 %	1	1.00000	1.39310
2	0.7 %	2	1.00000	1.39310
2	0.7 %	3	1.00000	1.39310
2	0.7 %	4	1.00000	1.39310
2	0.7 %	5	1.00000	1.39310
3	0.9 %	1	1.00000	1.39310
3	0.9 %	2	1.00000	1.39310
3	0.9 %	3	1.00000	1.39310
3	0.9 %	4	1.00000	1.39310
3	0.9 %	5	1.00000	1.39310
4	1.2 %	1	1.00000	1.39310
4	1.2 %	2	1.00000	1.39310
4	1.2 %	3	1.00000	1.39310
4	1.2 %	4	1.00000	1.39310
4	1.2 %	5	1.00000	1.39310
5	1.6 %	1	1.00000	1.39310
5	1.6 %	2	1.00000	1.39310
5	1.6 %	3	1.00000	1.39310
5	1.6 %	4	1.00000	1.39310
5	1.6 %	5	1.00000	1.39310
6	2.1 %	1	0.87500	1.20940
6	2.1 %	2	1.00000	1.39310
6	2.1 %	3	1.00000	1.39310
6	2.1 %	4	0.87500	1.20940
6	2.1 %	5	1.00000	1.39310

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
<p>D = 0.04049 W = 0.5593 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)</p> <p>Data FAIL normality test (alpha = 0.01).</p>		

Steel's Many-One Rank Test				Transform: Arc Sin(Square Root(Y))	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	0.7 %	27.50	16.00	5.00	
3	0.9 %	27.50	16.00	5.00	
4	1.2 %	27.50	16.00	5.00	
5	1.6 %	27.50	16.00	5.00	
6	2.1 %	22.50	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 = 0.02278 W = 0.9687 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 = 8.996 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	0.01576	0.003152	3.321	
Within (Error)	24	0.02278	0.0009492		
Total	29	0.03854			
Critical F = 3.9 (alpha = 0.01, df = 5,24)					
2.62 (alpha = 0.05, df = 5,24)					
Since F > Critical F 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	0.32	0.32			
2	0.7 %	0.3152	0.3152	0.2463		
3	0.9 %	0.3324	0.3324	-0.6364		
4	1.2 %	0.286	0.286	1.745		
5	1.6 %	0.3588	0.3588	-1.991		
6	2.1 %	0.3428	0.3428	-1.17		
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	0.7 %	5	0.04599	14.4	0.0048	
3	0.9 %	5	0.04599	14.4	-0.0124	
4	1.2 %	5	0.04599	14.4	0.034	
5	1.6 %	5	0.04599	14.4	-0.0388	
6	2.1 %	5	0.04599	14.4	-0.0228	

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
0.7 %	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
0.9 %	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
1.2 %	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
1.6 %	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.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
2.1 %	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	0.7 %	10	0	
2	0.9 %	10	0	
3	1.2 %	10	0	
4	1.6 %	10	0	
5	2.1 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality	No Transformation
D = 0.1342 D* = 1.053 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data FAIL normality test (alpha = 0.01).	

Steel's Many-One Rank Test				No Transformation	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	0.7 %	98.50	75.00	10.00	
3	0.9 %	104.50	75.00	10.00	
4	1.2 %	89.50	75.00	10.00	
5	1.6 %	102.50	75.00	10.00	
6	2.1 %	104.50	75.00	10.00	

Critical values are 1 tailed (k=5)

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Dunnett's Test for PMSD Calculation (excluding deaths if applicable)

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	142.3	28.46	0.7339	
Within (Error)	54	2094	38.78		
Total	59	2236			
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	22.8	22.8			
2	0.7 %	21	21	0.6463		
3	0.9 %	21.4	21.4	0.5027		
4	1.2 %	18.1	18.1	1.688		
5	1.6 %	21	21	0.6463		
6	2.1 %	22.6	22.6	0.07181		
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	0.7 %	10	6.433	28.2	1.8	
3	0.9 %	10	6.433	28.2	1.4	
4	1.2 %	10	6.433	28.2	4.7	
5	1.6 %	10	6.433	28.2	1.8	
6	2.1 %	10	6.433	28.2	0.2	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

 Date and Time Test Initiated: November 4, 2014 at 0856
 Date and Time Test Terminated: November 11, 2014 at 1405

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	5.4	7.4	7.8	7.7	7.6	7.9	7.3
	Final *1	8.0	7.6	7.7	7.2	7.5	7.4	7.0
	Final *2	7.6	7.4	8.1	8.2	7.9	7.4	
pH, units	Initial	7.9	7.4	8.4	7.2	7.2	7.1	7.4
	Final *1	7.5	8.3	7.3	7.4	7.5	7.4	7.4
	Final *2	8.2	7.8	7.3	7.1	7.0	7.3	
Alkalinity, mg CaCO ₃ /l		30	NA	30	NA	30	NA	NA
Hardness, mg CaCO ₃ /l		48	NA	48	NA	48	NA	NA
Conductivity, umhos/cm		180	160	160	150	150	160	150
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 0.7 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	7.6	7.8	7.6	7.7	7.9	7.7
	Final *1	7.8	7.6	7.5	7.2	7.7	7.5	7.0
	Final *2	7.4	7.9	8.1	7.9	7.6	7.2	
pH, units	Initial	7.8	7.3	8.4	7.2	7.2	7.0	7.4
	Final *1	7.5	8.4	7.3	7.3	7.5	7.4	7.5
	Final *2	8.2	7.7	7.3	7.2	7.0	7.3	

Effluent Conc.: 0.9 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	6.0	7.4	7.9	7.6	7.8	8.0	7.6
	Final *1	7.4	7.4	7.7	7.0	7.5	7.4	7.0
	Final *2	7.6	7.8	8.2	8.2	7.5	7.2	
pH, units	Initial	7.9	7.3	8.4	7.2	7.2	7.1	7.4
	Final *1	7.5	8.4	7.3	7.3	7.5	7.5	7.4
	Final *2	8.2	7.7	7.3	7.1	7.0	7.3	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: November 4, 2014 at 0856

Date and Time Test Terminated: November 11, 2014 at 1405

Effluent Conc.: 1.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.9	7.4	7.8	7.7	7.6	7.9	7.5
	Final *1	7.4	7.4	7.8	7.0	7.5	7.2	7.1
	Final *2	7.6	7.5	8.1	8.2	7.9	7.6	
pH, units	Initial	7.7	7.3	8.4	7.2	7.2	7.1	7.4
	Final *1	7.5	8.4	7.4	7.3	7.5	7.4	7.4
	Final *2	8.2	7.8	7.3	7.1	7.0	7.3	

Effluent Conc.: 1.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.8	7.4	7.8	7.6	7.6	7.8	7.5
	Final *1	7.1	7.6	7.6	7.1	7.3	7.3	6.7
	Final *2	7.6	7.2	8.0	8.0	7.9	7.4	
pH, units	Initial	7.8	7.3	8.4	7.2	7.2	7.1	7.4
	Final *1	7.5	8.4	7.3	7.3	7.4	7.4	7.4
	Final *2	8.2	7.8	7.3	7.2	7.0	7.3	
Alkalinity, mg CaCO ₃ /l	41	NA	42	NA	33	NA	NA	NA
Hardness, mg CaCO ₃ /l	50	NA	46	NA	50	NA	NA	NA
Conductivity, umhos/cm	180	160	160	160	160	160	160	160
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

Effluent Conc.: 2.1 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.5	7.4	7.9	7.6	7.8	7.9	7.6
	Final *1	7.5	7.5	7.6	6.8	7.2	7.2	7.0
	Final *2	7.6	7.8	8.2	7.9	7.8	7.4	
pH, units	Initial	7.7	7.4	8.4	7.2	7.2	7.0	7.4
	Final *1	7.5	8.4	7.3	7.2	7.4	7.4	7.5
	Final *2	8.2	7.7	7.3	7.2	7.0	7.4	

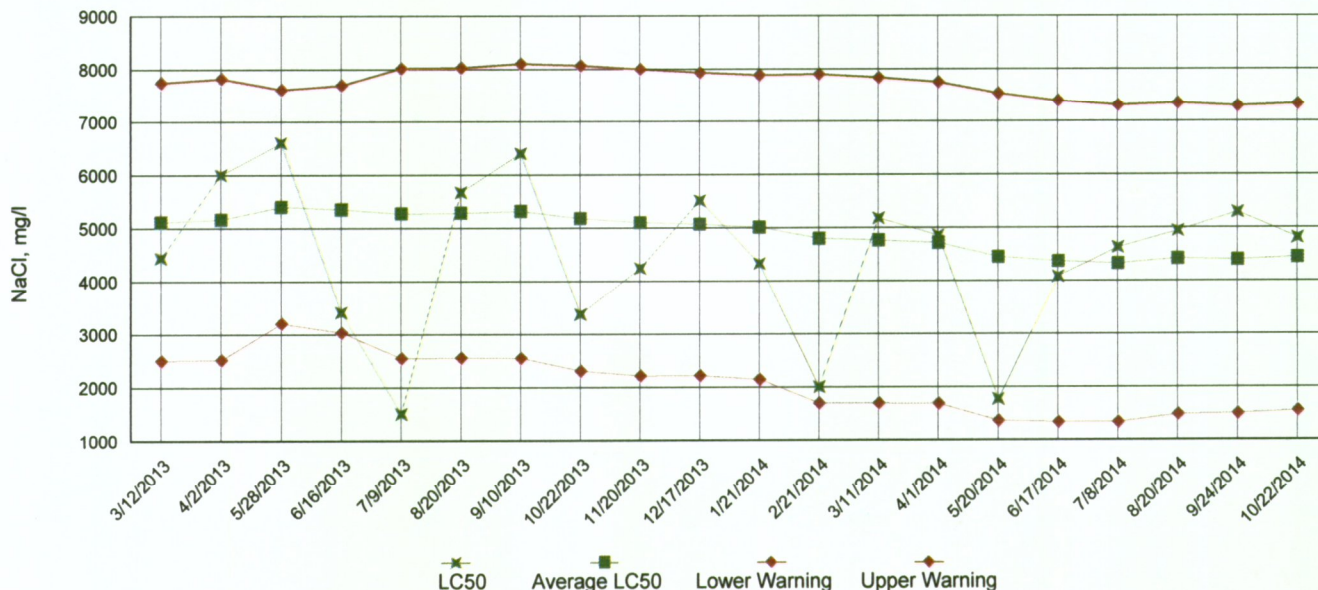
*1 = data from the *Pimephales promelas* (Fathead Minnow) test

*2 = data from the *Ceriodaphnia dubia* test

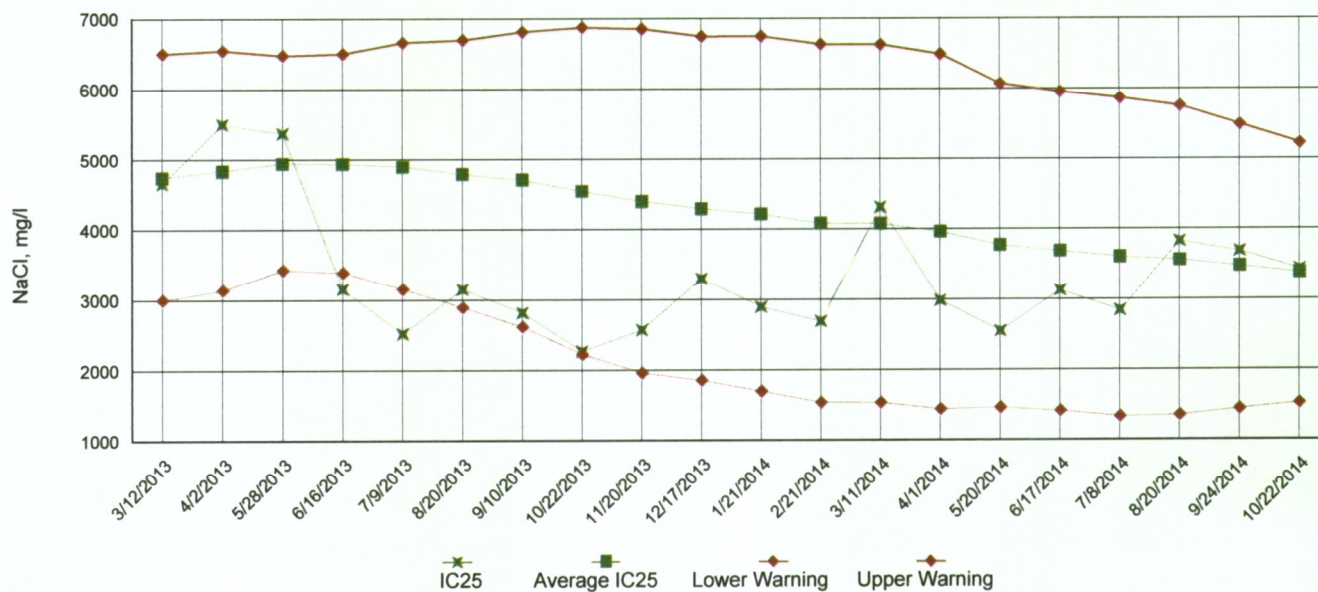
Appendix A4: Test 1000.0

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

LC50 Survival Data

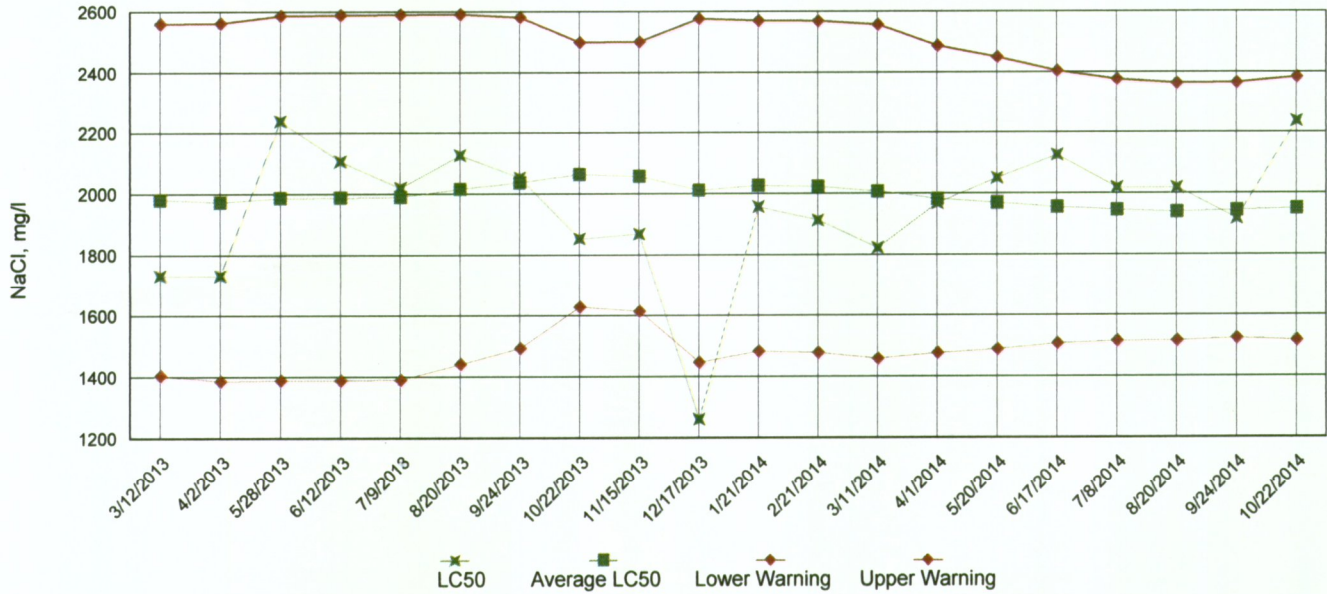


IC25 Growth Data

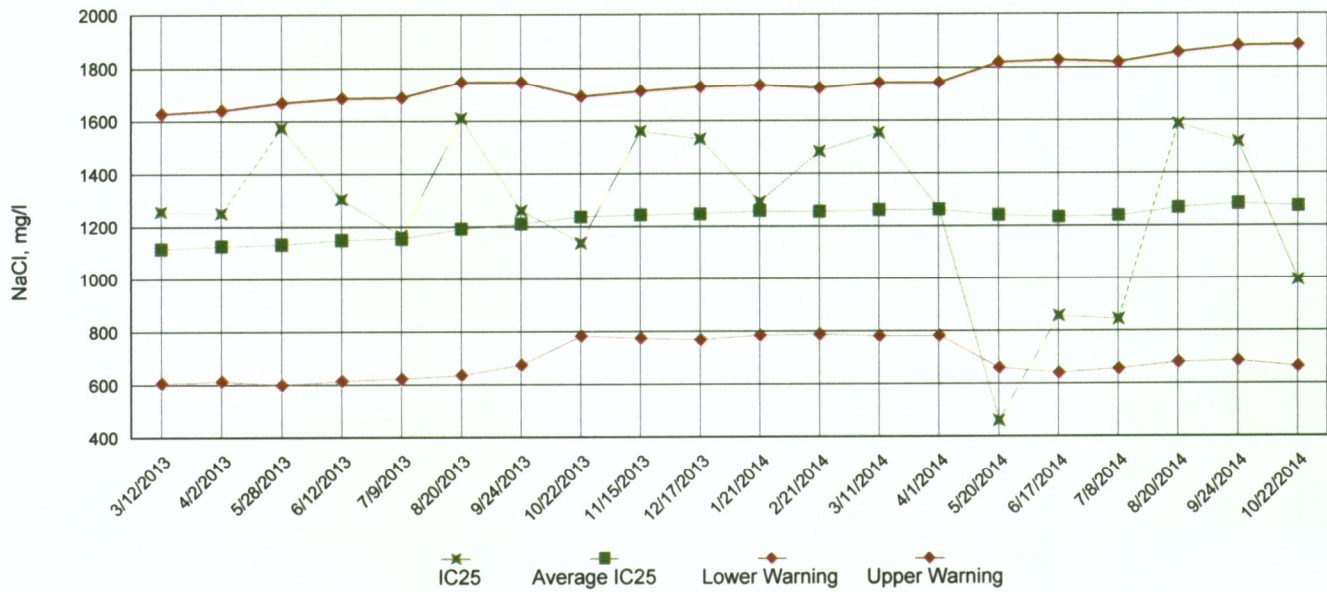


Appendix A4: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



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

Permittee: El Dorado Chemical Company

NPDES No.: AR0000752

Date and Time Test Initiated: November 4, 2014 at 1205

Date and Time Test Terminated: November 11, 2014 at 1405

Dilution water used: Synthetic Soft Water #4153

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
0.7 %	100	100	100	100	100	100	100	100	0.00
0.9 %	100	100	100	100	100	100	100	100	0.00
1.2 %	100	100	100	100	100	100	100	100	0.00
1.6 %	100	100	100	100	100	100	100	100	0.00
2.1 %	87.5	100	100	87.5	100	100	97.5	95.0	7.21

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.310	0.382	0.321	0.292	0.295	0.32	11.4
0.7 %	0.282	0.316	0.330	0.342	0.306	0.315	7.31
0.9 %	0.294	0.325	0.326	0.365	0.352	0.332	8.26
1.2 %	0.279	0.276	0.288	0.299	0.288	0.286	3.16
1.6 %	0.275	0.358	0.381	0.398	0.382	0.359	13.6
2.1 %	0.321	0.325	0.376	0.331	0.361	0.343	7.09

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	(1.6 %)	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<input type="checkbox"/> YES	<input type="checkbox"/> 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	(1.6 %)	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<input type="checkbox"/> YES	<input type="checkbox"/> 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: 2.1 % (TOP6C)
6. LOEC Pimephales Lethality: 2.1 % (TXP6C)
7. NOEC Pimephales Sublethality: 2.1 % (TPP6C)
8. LOEC Pimephales Sublethality: 2.1 % (TYP6C)
9. Coefficient of variation for Pimephales growth: 13.6 (TQP6C)

Appendix B: Test 1000.0

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

PERMITTEE: El Dorado Chemical Company
NPDES NO.: AR0000752
CONTACT: Mr. Eddie Pearson
ANALYST: 280, 304, 310

Test Initiated: DATE: November 4, 2014 TIME: 1205
Test Terminated: DATE: November 11, 2014 TIME: 1405

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	5.4	7.4	7.8	7.7	7.6	7.9	7.3
Final	8.0	7.6	7.7	7.2	7.5	7.4	7.0
pH Initial	7.9	7.4	8.4	7.2	7.2	7.1	7.4
Final	7.5	8.3	7.3	7.4	7.5	7.4	7.4
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	48	NA	48	NA	48	NA	NA
Conductivity	180	160	160	150	150	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
0.7 %							
D.O. Initial	8.3	7.6	7.8	7.6	7.7	7.9	7.7
Final	7.8	7.6	7.5	7.2	7.7	7.5	7.0
pH Initial	7.8	7.3	8.4	7.2	7.2	7.0	7.4
Final	7.5	8.4	7.3	7.3	7.5	7.4	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	160	160	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
0.9 %							
D.O. Initial	6.0	7.4	7.9	7.6	7.8	8.0	7.6
Final	7.4	7.4	7.7	7.0	7.5	7.4	7.0
pH Initial	7.9	7.3	8.4	7.2	7.2	7.1	7.4
Final	7.5	8.4	7.3	7.3	7.5	7.5	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	160	150	150	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.2 %							
D.O. Initial	8.9	7.4	7.8	7.7	7.6	7.9	7.5
Final	7.4	7.4	7.8	7.0	7.5	7.2	7.1
pH Initial	7.7	7.3	8.4	7.2	7.2	7.1	7.4
Final	7.5	8.4	7.4	7.3	7.5	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	160	160	150	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.6 %							
D.O. Initial	8.8	7.4	7.8	7.6	7.6	7.8	7.5
Final	7.1	7.6	7.6	7.1	7.3	7.3	6.7
pH Initial	7.8	7.3	8.4	7.2	7.2	7.1	7.4
Final	7.5	8.4	7.3	7.3	7.4	7.4	7.4
Alkalinity	41	NA	42	NA	33	NA	NA
Hardness	50	NA	46	NA	50	NA	NA
Conductivity	180	160	160	160	160	160	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
2.1 %							
D.O. Initial	8.5	7.4	7.9	7.6	7.8	7.9	7.6
Final	7.5	7.5	7.6	6.8	7.2	7.2	7.0
pH Initial	7.7	7.4	8.4	7.2	7.2	7.0	7.4
Final	7.5	8.4	7.3	7.2	7.4	7.4	7.5
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	200	160	170	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

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

Permittee: El Dorado Chemical Company

NPDES No.: AR0000752

Date and Time Test Initiated: November 4, 2014 at 1700

Date and Time Test Terminated: November 10, 2014 at 1500

Dilution water used: Synthetic Soft Water #4153

PERCENT SURVIVAL

Time of Reading	Control	Percent Effluent				
		0.7 %	0.9 %	1.2 %	1.6 %	2.1 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
6 day	100	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 6 DAYS

Replicates	Control	Percent Effluent				
		0.7 %	0.9 %	1.2 %	1.6 %	2.1 %
A	19	12	15	14	11	13
B	24	16	11	15	11	23
C	22	24	25	12	22	23
D	24	21	23	13	23	21
E	25	23	23	25	27	22
F	24	25	25	24	24	32
G	30	26	27	25	29	25
H	22	13	14	10	26	29
I	27	26	26	29	27	27
J	11	24	25	14	10	11
Mean per Adult	22.8	21.0	21.4	18.1	21.0	22.6
Mean per Surviving Adult	22.8	21.0	21.4	18.1	21.0	22.6
CV %	22.3	25.5	27.0	37.8	35.4	28.9

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	(1.6 %)	_____ YES	_____ X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	_____ YES	_____ NO

2. Steel's Many-One Rank Test:

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

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	_____ 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: 2.1 % (TOP3B)
6. LOEC *Ceriodaphnia* Lethality: 2.1 % (TXP3B)
7. NOEC *Ceriodaphnia* Sublethality: 2.1 % (TPP3B)
8. LOEC *Ceriodaphnia* Sublethality: 2.1 % (TYP3B)
9. Coefficient of variation for *Ceriodaphnia* Reproduction: 35.4 (TQP3B)

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

PERMITTEE: EI Dorado Chemical Company
NPDES NO.: AR0000752
CONTACT: Mr. Eddie Pearson
ANALYST: 280, 304, 310

Test Initiated: DATE: November 4, 2014 TIME: 1700
Test Terminated: DATE: November 10, 2014 TIME: 1500

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	5.4	7.4	7.8	7.7	7.6	7.9	7.3
Final	7.6	7.4	8.1	8.2	7.9	7.4	--
pH Initial	7.9	7.4	8.4	7.2	7.2	7.1	7.4
Final	8.2	7.8	7.3	7.1	7.0	7.3	--
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	48	NA	48	NA	48	NA	NA
Conductivity	180	160	160	150	150	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
0.7 %							
D.O. Initial	8.3	7.6	7.8	7.6	7.7	7.9	7.7
Final	7.4	7.9	8.1	7.9	7.6	7.2	--
pH Initial	7.8	7.3	8.4	7.2	7.2	7.0	7.4
Final	8.2	7.7	7.3	7.2	7.0	7.3	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	160	160	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
0.9 %							
D.O. Initial	6.0	7.4	7.9	7.6	7.8	8.0	7.6
Final	7.6	7.8	8.2	8.2	7.5	7.2	--
pH Initial	7.9	7.3	8.4	7.2	7.2	7.1	7.4
Final	8.2	7.7	7.3	7.1	7.0	7.3	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	160	150	150	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.2 %							
D.O. Initial	8.9	7.4	7.8	7.7	7.6	7.9	7.5
Final	7.6	7.5	8.1	8.2	7.9	7.6	--
pH Initial	7.7	7.3	8.4	7.2	7.2	7.1	7.4
Final	8.2	7.8	7.3	7.1	7.0	7.3	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	180	160	160	150	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.6 %							
D.O. Initial	8.8	7.4	7.8	7.6	7.6	7.8	7.5
Final	7.6	7.2	8.0	8.0	7.9	7.4	--
pH Initial	7.8	7.3	8.4	7.2	7.2	7.1	7.4
Final	8.2	7.8	7.3	7.2	7.0	7.3	--
Alkalinity	41	NA	42	NA	33	NA	NA
Hardness	50	NA	46	NA	50	NA	NA
Conductivity	180	160	160	160	160	160	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
2.1 %							
D.O. Initial	8.5	7.4	7.9	7.6	7.8	7.9	7.6
Final	7.6	7.8	8.2	7.9	7.8	7.4	--
pH Initial	7.7	7.4	8.4	7.2	7.2	7.0	7.4
Final	8.2	7.7	7.3	7.2	7.0	7.4	--
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	200	160	170	160	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company			PO No.		NO OF BOTTLES	ANALYSES REQUESTED											AIC CONTROL NO: 184210	
Project Reference: Quarterly - Permit AR0000752			MATRIX			Chronic - CD, FH												
Project Manager: Mr. Eddie Pearson			G R A B	C O M P	W A T E R	S O I L	1	X										Carrier: Gold Star
Sampled By: <i>Scott Brice</i>									X	X								
AIC No.	Sample Identification	Date/Time Collected																Remarks
	010	11-3-14 1000																
																		Field pH calibration
			Container Type															on _____ @ _____
			Preservative															Buffer:
			G = Glass	P = Plastic	V = VOA vials	H = HCl to pH2	Y = Sodium Thiosulfate											
			NO = none	S = Sulfuric acid pH2	N = Nitric acid pH2	B = NaOH to pH12	Z = Zinc acetate	A=(NH ₄) ₂ SO ₄ , NH ₄ OH										
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ___ DAYS					Relinquished By: <i>[Signature]</i>		Date/Time 11-3-14 1000		Received By:			Date/Time						
Expedited results requested by: _____					Relinquished By:		Date/Time		Received in Lab By: <i>[Signature]</i>			Date/Time 11/3/14 1615						
Who should AIC contact with questions: Phone 870-312-1397 Fax: Report Attention to: Mr. Eddie Pearson Report Address to: 4500 North West Avenue El Dorado, AR 71730 epearson@edc-ark.com					Comments:													



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: 184210						
Project: Quarterly - Permit AR0000752						Chronic - CD, FH											AIC PROPOSAL NO:					
Project Manager: Mr. Eddie Pearson			MATRIX														Carrier: Gold Star					
Sampled By: DAVID SARTAIN			G R A B	C O M P	W A T E R	S O I L	NO OF BOTTLES	Chronic - CD, FH											Received Temperature C 11			
AIC No.	Sample Identification	Date/Time Collected																	Remarks			
3	010	11-7-14 1000AM		X	X		1	X														
Container Type							P												Field pH calibration on _____ @ _____			
Preservative							NO												Buffer:			
G = Glass NO = none			P = Plastic S = Sulfuric acid pH2		V = VOA vials N = Nitric acid pH2		H = HCl to pH2 B = NaOH to pH12		T = Sodium Thiosulfate Z = Zinc acetate												A=(NH ₄) ₂ SO ₄ , NH ₄ OH	
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <i>[Signature]</i>			Date/Time: 11-7-14 1000AM			Received By:			Date/Time:								
Expedited results requested by: _____					Relinquished By: _____			Date/Time:			Received in Lab By: <i>[Signature]</i>			Date/Time: 11-7-14 1615								
Who should AIC contact with questions: Phone 870-312-1397 Fax:					Comments:																	
Report Attention to: Mr. Eddie Pearson Report Address to: 4500 North West Avenue El Dorado, AR 71730 epearson@edc-ark.com																						

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5620

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

Project #: X5620

Outfall: Outfall 007 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. Eddie Pearson

Test Dates: December 6 - 8, 2014

Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 1 -**Fail**
2. Report the NOEC for survival, Parameter TOM6C - 0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 1-**Fail**
2. Report the NOEC for survival, Parameter TOM3D -0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 0.00%.

-Note: Increasing the pH from 4.3 to a range of 6.0-9.0, increased the survival in both tests; however, the *Daphnia pulex* test only had a survival rate of 47.5%. The fathead minnow had a survival rate of 100%.

This report contains a total of 35 pages, including this page. The results pertain only to the samples listed in the chain of custody documents in Appendix A. The information contained within meets the requirements set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.



Bio-Analytical Laboratories

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**THE RESULTS OF TWO 48-HOUR ACUTE
TOXICITY TESTS
FOR OUTFALL 007
AT**

**EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas**

**NPDES #AR0000752
AFIN #70-00040**

EPA Methods 2000.0 and 2021.0

Project X5620

**Test Dates: December 6 - 8, 2014
Report Date: January 15, 2015**

Prepared for:
Mr. Eddie Pearson
El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

Prepared by:
Ginger Briggs
Bio-Analytical Laboratories
P.O. Box 527
Doyline, LA 71023
ADEQ #88-0630

BAL
ADEQ #88-0630
Project X5620

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BAL
ADEQ #88-0630
Project X5620

1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two 48-hour acute toxicity tests for Outfall 007 at El Dorado Chemical Company, El Dorado, Arkansas. The test organisms used were the fathead minnow, *Pimephales promelas* and the cladoceran, *Daphnia pulex*. The purpose of this study is to determine if an appropriately dilute effluent sample adversely affects the survival of the test organism. Toxicity is defined as a statistically significant difference at the 95 percent confidence level between the survival of the test organisms in the critical dilution (the effluent concentration representative of the proportion of effluent in the receiving water during critical low flow or critical mixing conditions) compared to the survival of the test organisms in the control. The test endpoints are the No-Observed-Effect-Concentration (NOEC), which is defined as the highest effluent concentration that is not statistically different from the control, and the 48-hour LC₅₀, the concentration in which 50 percent of the test organisms died.

2.0 Methods and Materials

2.1 Test Methods

All methods followed were according to the latest edition of "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012), "Standard Methods for The Examination of Water and Wastewater. 20th Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

2.2 Test Organisms

The fathead minnows were raised in-house at test temperature and were approximately two days old at test initiation. The minnows were acclimated to dilution water hardness prior to test initiation. The *Daphnia pulex* test organisms were also raised in-house at test temperature and were less than 24 hours old at test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were conducted monthly in order to document organism sensitivity and demonstration of capability.

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ADEQ #88-0630
Project X5620

2.3 Dilution Water

Soft reconstituted water made per EPA guidelines was used as the dilution water and the control for the acute tests.

2.4 Test Concentrations

The test concentrations used in the tests were 100.0, 75.0, 56.0, 50.0, 45.0, and 32.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100.0 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 007 was collected by El Dorado Chemical personnel on December 5, 2014. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. The temperature upon arrival was 1.5^o Celsius.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1^o Celsius. The total residual chlorine level (SM4500-Cl D 1997) was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. An aliquot of the sample was adjusted from an initial pH of 4.3 to a pH range of 6.0-9.0. An extra 100.0 percent dilution was added to each test in order to document any lethality due to low pH. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity (SM2320-B 1997) and hardness (SM2340-C 1997) levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

The tests were run in a Precision^R dual controlled illuminated incubator at a temperature of 25±1^o Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

The NOEC and LC₅₀ values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

BAL
ADEQ #88-0630
Project X5620

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in the critical dilution in both tests after 48 hours of exposure ($p=.05$). The NOEC for survival for the *Daphnia pulex* and the fathead minnow test was zero percent ($p=.05$). The 48 hour LC_{50} value for the *Daphnia pulex* and the fathead minnow test was 8.0 percent ($p=.05$). Increasing the pH increased the survival rate in both tests; however, while the fathead minnow survival rate was 100.0 percent, the *Daphnia pulex* survival rate was only 47.5 percent.

Table 1: Results of the 48-hour Acute Definitive Toxicity Tests

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism		
Control	100.0	100.0
32.0	0.0	0.0
45.0	0.0	0.0
50.0	0.0	0.0
56.0	0.0	0.0
75.0	0.0	0.0
100.0	0.0	0.0
100.0 pH adjusted	100.0	47.5

The 48-hour reference toxicant test results indicated that the *Daphnia pulex* test organisms were within the respective sensitivity range. The fathead minnow test organisms were less sensitive. The graphs of the acute reference toxicant tests can be found in Appendix D.

BAL
ADEQ #88-0630
Project X5620

4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on December 5, 2014, was found to be lethally toxic to the fathead minnow test organisms and the *Daphnia pulex* in the 100.0 percent critical dilution after 48 hours of exposure ($p=0.05$). Increasing the pH significantly reduced the lethal effect in the minnow test, but not in the *Daphnia pulex* test.

BAL
ADEQ #88-0630
Project X5620

5.0 References

- EPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012, Office of Water.
- EPA, 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. EPA-833-R-00-003, Office of Wastewater Management.
- EPA, 2000. Method Guidance and Recommendations for Whole Effluent (WET) Testing. EPA-821-B-00-04, Office of Water
- APHA, 1998. Standard Methods for The Examination of Water and Wastewater. 20th Edition.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Bio-Analytical Laboratories

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NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278

Laboratory Use Only:

Company: El Dorado Chemical Company				Phone: (870) 863-1484		Analysis:				Project Number: X5620			
Address: 4500 Norwest Ave., El Dorado, AR 71731				Fax: (870) 863-7499		Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Acute Ceriodaphnia Acute Mysid Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Acute Ceriodaphnia Acute Mysid Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Acute Ceriodaphnia Acute Mysid Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Acute Ceriodaphnia Acute Mysid Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Acute Ceriodaphnia Acute Mysid Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Temp. upon arrival: 1.5°C	
Permit #: AR0000752/AFIN 70-00040				Purchase Order:								Lab Control Number:	Preservative: (below)
Sampler's Signature/Printed Name/Affiliation: [Signature] / Scott Bruce / EDCC													
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification								
12-5-14 12-5-14	1210 410	X		6 half gallon	007								
Relinquished by/Affiliation: [Signature] / EDCC						Date: 12-6-14	Time: 1200	Received by/Affiliation: [Signature]		Date: 12/6/14	Time: 1200		
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:		Date:	Time:		
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:		Date:	Time:		
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS <u> </u> Client ___ Other Tracking # _____													
Comments:													
COC Rev. 3.0													

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5620

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 Outfall 007

Technicians: EGB/RC

Test initiated: Date 12/6/14 Time 1515

Test terminated: Date 12/8/14 Time 1535

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AU
pH Meter: Model #Orion 230A+ Serial #105253
Conductivity Meter: Model # Control Co. Serial #80277924
Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/Final D.O.(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
C10129	10.5 122.4%	1518.4 100.2%	40.01	NO	0.5	N/A	440.0	0.0	EGB
↓	10.5 122.8%	1518.5 97.0%	↓	↓	↓	↓			↓

Dilution Water Information

Dilution Water	ID#	Initial D.O. (mg/L & %)	Aerate? Minutes/D.O. (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft H2O	3676	N/A				7.2	32.0	32.0	EGB

Test Species Information

Test Species Info.	Species ID#:	Species ID#:	Species ID#:	Species ID#:
	<u>D. pulex</u> La	<u>P. promelas</u> 12414		
Age	24 hours	2 days		
Test Container Size	30 ml	200 ml		
Test volume	25 ml	200 ml		
Feeding: Type	YCT/A/A/A/E	Artemia		
Amount	2.0 hours before initiation			
Aeration?	N/A	N/A		
Amount				
Condition of survivors	Good 12/8/14 RC		Good RC 12/8/14	

Comments: Initial pH = 3.74 EGB 12/6/14

Adjusted extra 100% dilution to pH 6.0-9.0 using 1.0M NaOH (LabChem B018-17). Adding the NaOH caused the solids to immediately separate from the effluent. EGB 12/6

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1500
 Test Species D. pulex ID# L2

Sample Description 007
 Technician: 0hour EBB 24hour EBB 48hour RC 72hour _____ 96hour _____
 Time: 0hour 1415 24hour 1015 48hour 1500 72hour _____ 96hour _____
 Temperature (°C): 0hour 24.7 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
			%	Na																				
0	A		8	8	8			84	7.9	8.1			72	7.5	7.5			148.8	174.0	171.3	130.9			
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
32.0	A		8	0				85.8	8.3				4.0	4.0				158.9	162.1					
	B		8	0																				
	C		8	0																				
	D		8	0																				
	E		8	0																				
			Chemistry Tech					EBB EBB RC					EBB EBB RC					EBB EBB RC						
			prerenewal/postrenewal																					

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1500
 Test Species D.pulex ID# L2

Sample Description 007
 Technician: Ohour 210 24hour 218 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1413 24hour 1515 48hour 1508 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution %	Replicate	Test Salinity Na	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
45.0	A		8	0					8.5	8.2					3.9	4.0				7.3	7.9		
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
50.0	A		8	0					8.5	8.2					3.9	3.9				8.2	8.9		
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	6																			
Chemistry Tech prerenewal/postrenewal							EDC RC					EDC RC					EDC RC						

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1500
 Test Species D. pulex ID# 42

Sample Description 007
 Technician: Ohour 8:48 24hour 208 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1413 24hour 1613 48hour 1500 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
56.0	A	Na	8	0				8.4	8.2					3.9	3.9			8.1	9.0				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
75.0	A		8	0				8.4	5.2					3.9	3.8			10.4	11.0				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	6																			
								<u>RC</u>					<u>RC</u>					<u>RC</u>					

Chemistry Tech
 prer renewal / post renewal

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 6/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1500
 Test Species D. pulex ID# L2

Sample Description 007
 Technician: Ohour 803 24hour 803 48hour RC 72hour _____ 96hour _____
 Ohour 1415 24hour 1415 48hour 500 72hour _____ 96hour _____
 Time: Ohour 244 24hour 245 48hour 249 72hour _____ 96hour _____
 Temperature (°C): Ohour _____ 24hour _____ 48hour _____ 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity									
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96					
100	A	Na	8	0				8.0								3.8	3.8		1375			1309	RC				
	B		8	0																							
	C		8	0																							
	D		8	0																							
	E		8	0																							
100 pH adj	A		8	8	0			8.4	8.0	7.7					8.1	8.2		1560			1580						
	B		8	8	5																						
	C		8	8	8																						
	D		8	8	6																						
	E		8	8	0																						
			Chemistry Tech					EDC RC					EDC RC					EDC RC									
			prerenewal/postrenewal																								

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1515
 Test ended: Date 12/8/14 Time 1535
 Test Species Promelas ID# 12414

Sample Description 007
 Technician: Ohour 1515 24hour 1430 48hour 1535 72hour _____ 96hour _____
 Time: Ohour 1515 24hour 1430 48hour 1535 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test dilution %	Replicate	Test Salinity Na	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A		8	8	8			8.4	8.1	8.1			7.2	7.3	7.3			1088	1111	1150		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32.0	D		8	0				8.5	8.0				4.0	3.9				689	603			
	B		8	6																		
	C		8	0																		
	D		8	0																		
	E		8	6																		
							RC					RC					RC					

Chemistry Tech
 prereneal/postreneal

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X51620
 Client EDCC

Test started: Date 12/6/14 Time 1515
 Test ended: Date 12/8/14 Time 1535
 Test Species P. promelas ID# 12414

Sample Description 007
 Technician: 0hour ELB 24hour ELB 48hour RC 72hour _____ 96hour _____
 0hour 1815 24hour 1430 48hour 1535 72hour _____ 96hour _____
 Time: 0hour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____
 Temperature (°C):

Test Dilution %	Replicate	Test Salinity Na	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
45.0	A		8	0				85	80				39.1	39				763	781			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0															824	842		
	F		8	0																		
50.0	A		8	0				85	80				39.8	39								
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
	F		8	0																		
Chemistry Tech prerenewal/postrenewal								ELB	ELB	RC			ELB	ELB	RC			ELB	ELB	RC		

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1515
 Test ended: Date 12/8/14 Time 1535
 Test Species P. promelas ID# 12414

Sample Description 007
 Technician: Ohour 930 24hour 930 48hour PC 72hour _____ 96hour _____
 Ohour 1515 24hour 1430 48hour 1535 72hour _____ 96hour _____
 Time: Ohour 249 24hour 245 48hour 24.246 72hour _____ 96hour _____
 Temperature (°C): _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity									
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96					
56.0	A	Na	8	0				8.4	7.9					3.9	3.9							89	91				
	B		8	0																							
	C		8	0																							
	D		8	0																							
	E		8	0																							
75.0	A		8	0				8.4	7.9					3.9	3.9							104	112	123			
	B		8	0																							
	C		8	0																							
	D		8	0																							
	E		8	6																							
Chemistry Tech			EJB EJB PC					EJB EJB PC					EJB EJB PC														
prerenewal/postrenewal																											

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5620
 Client EDCC

Test started: Date 12/6/14 Time 1515
 Test ended: Date 12/8/14 Time 1535
 Test Species P. promelas ID# 10414

Sample Description 007
 Technician: Ohour 247 24hour 288 48hour RC 72hour _____ 96hour _____
 Ohour 1515 24hour 1450 48hour 1535 72hour _____ 96hour _____
 Time: Ohour 247 24hour 245 48hour 248 72hour _____ 96hour _____
 Temperature (°C): _____

Test Dilution	Replicate	Test Salinity	† Live Organisms					Dissolved Oxygen					pH					Conductivity																	
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96													
100	A	Na	8	0				8.5	8.0					3.8	3.8																				
	B		8	0																															
	C		8	0																															
	D		8	0																															
100	A		8	8	8			8.4	8.3	7.9				8.1	7.6	7.4					1566	1608	1681	1808											
8% 8dy	B		8	8	8																														
	C		8	8	8																														
	D		8	8	8																														
			8	6	8																														
		Chemistry Tech		prerenewal/postrenewal		EB/EB/ARPC					EB/EB/ARPC					EB/EB/ARPC																			

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

X5620

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Start Date: 12/6/2014	Test ID: X5620DP	Sample ID: AR0000752
End Date: 12/8/2014	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date: 12/5/2014	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
45	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH	0.0000	0.6250	1.0000	0.7500	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
*32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*45	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
100.0 PH	0.4750	0.4750	0.7415	0.1777	1.3931	73.334	5	17.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.48846	0.94	-0.2465	9.4994
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				

Daphnid Acute Test-48 Hr Survival

Start Date: 12/6/2014 Test ID: X5620DP Sample ID: AR000752
 End Date: 12/8/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 12/5/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
45	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH	0.0000	0.6250	1.0000	0.7500	0.0000

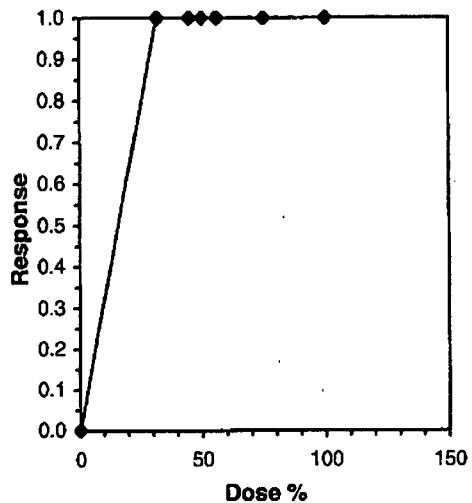
Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	1.0000	1.0000
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
45	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100.0 PH	0.4750	0.4750	0.7415	0.1777	1.3931	73.334	5	0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.87985	0.842	-0.1406	0.61358
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew	
IC05*	1.600	0.000	1.600	1.600	#DIV/0!
IC10*	3.200	0.000	3.200	3.200	-1.0076
IC15*	4.800	0.000	4.800	4.800	1.0076
IC20*	6.400	0.000	6.400	6.400	-1.0076
IC25*	8.000	0.000	8.000	8.000	#DIV/0!
IC40*	12.800	0.000	12.800	12.800	-1.0076
IC50*	16.000	0.000	16.000	16.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



Acute Fish Test-48 Hr Survival

X5020
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Start Date: 12/6/2014 Test ID: X5620PP Sample ID: AR0000752
 End Date: 12/8/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 12/5/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
45	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
*32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*45	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
100.0 PH	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.94		
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				

Acute Fish Test-48 Hr Survival

X5620

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Start Date: 12/6/2014	Test ID: X5620PP	Sample ID: AR0000752
End Date: 12/8/2014	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date: 12/5/2014	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
45	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH	1.0000	1.0000	1.0000	1.0000	1.0000

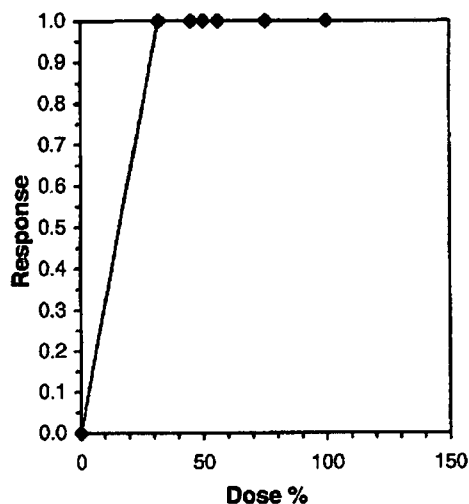
Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	1.0000	1.0000
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
45	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100.0 PH	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.842		
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

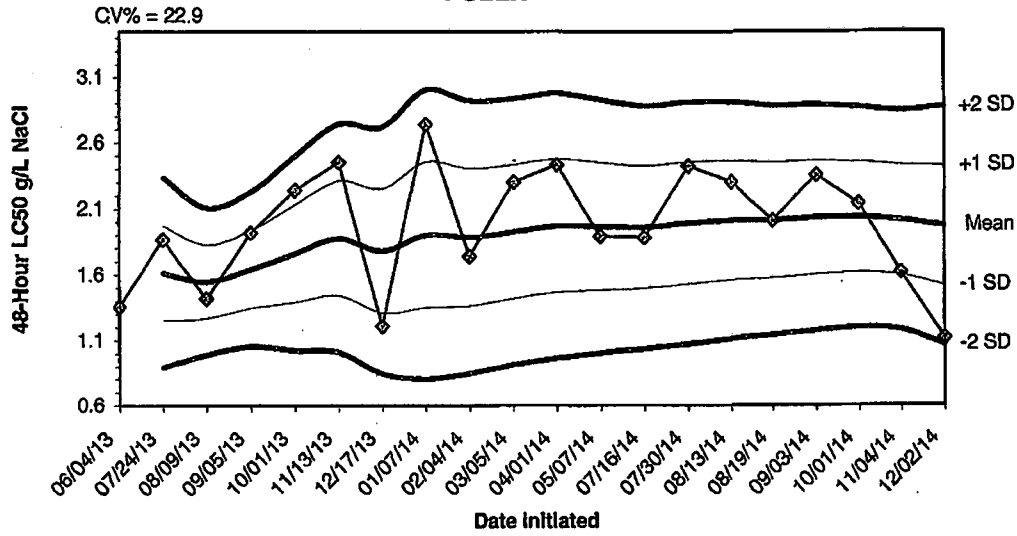
Point	%	SD	95% CL(Exp)	Skew	
IC05*	1.600	0.000	1.600	1.600	#DIV/0!
IC10*	3.200	0.000	3.200	3.200	-1.0076
IC15*	4.800	0.000	4.800	4.800	1.0076
IC20*	6.400	0.000	6.400	6.400	-1.0076
IC25*	8.000	0.000	8.000	8.000	#DIV/0!
IC40*	12.800	0.000	12.800	12.800	-1.0076
IC50*	16.000	0.000	16.000	16.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



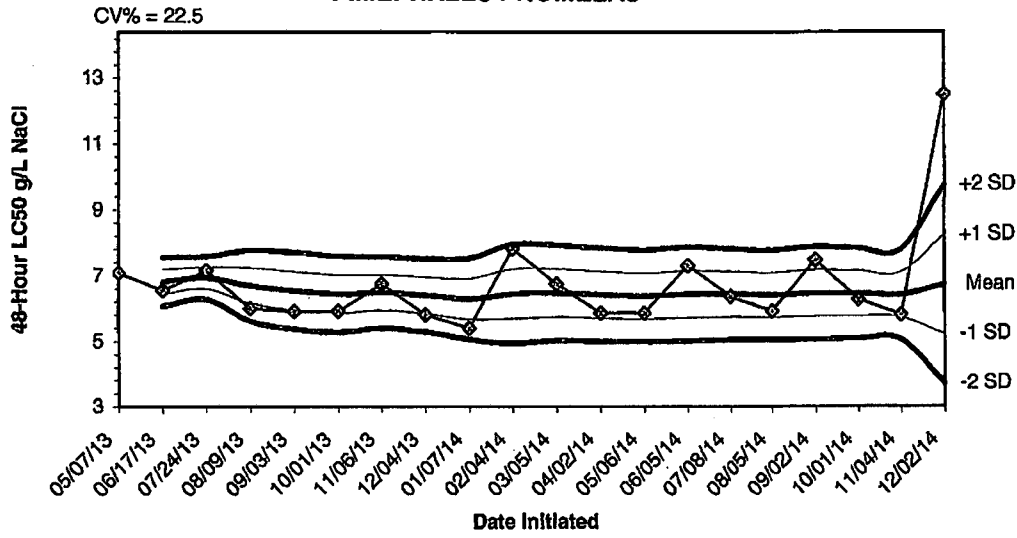
APPENDIX D
QUALITY ASSURANCE CHARTS

2014 ACUTE REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/04/13	1.3600					
07/24/13	1.8700	1.6150	1.2544	0.8938	1.9756	2.3362
08/09/13	1.4200	1.5500	1.2713	0.9925	1.8287	2.1075
09/05/13	1.9200	1.6425	1.3492	1.0559	1.9358	2.2291
10/01/13	2.2400	1.7620	1.3933	1.0247	2.1307	2.4993
11/13/13	2.4500	1.8767	1.4435	1.0103	2.3098	2.7430
12/17/13	1.2100	1.7814	1.3125	0.8437	2.2503	2.7192
01/07/14	2.7400	1.9013	1.3505	0.7998	2.4520	3.0027
02/04/14	1.7400	1.8833	1.3654	0.8474	2.4013	2.9192
03/05/14	2.3000	1.9250	1.4192	0.9134	2.4308	2.9366
04/01/14	2.4300	1.9709	1.4675	0.9641	2.4743	2.9777
05/07/14	1.8900	1.9642	1.4836	1.0031	2.4447	2.9253
07/16/14	1.8800	1.9577	1.4970	1.0363	2.4184	2.8791
07/30/14	2.4200	1.9907	1.5312	1.0716	2.4503	2.9098
08/13/14	2.3000	2.0113	1.5614	1.1114	2.4613	2.9113
08/19/14	2.0100	2.0113	1.5765	1.1418	2.4460	2.8807
09/03/14	2.3500	2.0312	1.6023	1.1735	2.4600	2.8889
10/01/14	2.1400	2.0372	1.6204	1.2036	2.4541	2.8709
11/04/14	1.6200	2.0153	1.5990	1.1828	2.4315	2.8478
12/02/14	1.1200	1.9705	1.5186	1.0667	2.4224	2.8743

**2014 ACUTE REFERENCE TOXICANT TEST RESULTS FOR
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/07/13	7.0900					
06/17/13	6.5600	6.8250	6.4502	6.0755	7.1998	7.5745
07/24/13	7.1600	6.9367	6.6086	6.2805	7.2647	7.5928
08/09/13	6.0000	6.7025	6.1630	5.6234	7.2420	7.7816
09/03/13	5.9200	6.5460	5.9822	5.3785	7.1298	7.7135
10/01/13	5.9200	6.4417	5.8603	5.2790	7.0230	7.6043
11/06/13	6.7500	6.4857	5.9424	5.3991	7.0290	7.5724
12/04/13	5.8100	6.4013	5.8444	5.2875	6.9581	7.5150
01/07/14	5.4000	6.2900	5.6714	5.0527	6.9086	7.5273
02/04/14	7.8200	6.4430	5.6852	4.9274	7.2008	7.9586
03/05/14	6.7500	6.4709	5.7460	5.0212	7.1958	7.9206
04/02/14	5.8600	6.4200	5.7067	4.9934	7.1333	7.8466
05/06/14	5.8600	6.3769	5.6766	4.9782	7.0773	7.7776
06/05/14	7.3100	6.4436	5.7280	5.0084	7.1612	7.8788
07/08/14	6.3700	6.4387	5.7469	5.0552	7.1304	7.8222
08/05/14	5.9200	6.4063	5.7255	5.0447	7.0870	7.7678
09/02/14	7.4800	6.4694	5.7607	5.0520	7.1781	7.8869
10/01/14	6.2800	6.4589	5.7699	5.0809	7.1479	7.8369
11/04/14	5.8100	6.4247	5.7388	5.0528	7.1107	7.7966
12/02/14	12.5000	6.7285	5.2148	3.7012	8.2422	9.7558

APPENDIX E
AGENCY FORMS

**Acute Forms
Daphnia pulex Survival**

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 12/5/14 To: 12/5/14
From: To:

Test Initiated: 12/6/14

Dilution Water Used: Receiving Water Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32.0	45.0	50.0	56.0	75.0	100.0	100.0 pH
24-hour	A	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	B	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	C	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	D	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	E	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
48-hour	A	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	B	100.0	0.0	0.0	0.0	0.0	0.0	0.0	62.5
	C	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	D	100.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
	E	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	100.0	0.0	0.0	0.0	0.0	0.0	0.0	47.5

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different ($p=.05$) than the control survival for the % effluent corresponding to:

- a.) LOW FLOW OR CRITICAL DILUTION (100.0%) YES NO
 b.) 1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A %) YES NO

2. Enter percent effluent corresponding to the LC_{50} below:

LC_{50} = 8.0% effluent

95 % confidence limits: N/A

Method of LC_{50} calculation: Graphical

3. If you answered NO to 1.a) enter (P) otherwise enter (F): F
 4. Enter response to item 3 on DMR Form, parameter TEM3D
 5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
 6. Enter response to item 5 on DMR Form, parameter TFM3D

**Biomonitoring
Daphnia pulex 48 hour Acute Static Renewal
Chemical Parameters Chart***

Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040

Contact: David Sartain
Analyst: Briggs, Callahan

Sample Collected	From:	Date 12/5/14	Time 1210
	To:	Date 12/5/14	Time 0410
Test Begin		Date 12/6/14	Time 1415
Test End		Date 12/8/14	Time 1500

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs
0	8.4	8.3	8.1	24.9	24.5		32.0			32.0			7.2	7.2	7.5
32.0	8.5	8.3		24.9	24.5								4.0	4.0	
45.0	8.5	8.2		24.9	24.5								3.9	4.0	
50.0	8.5	8.2		24.9	24.5								3.9	3.9	
56.0	8.4	8.2		24.9	24.5								3.9	3.9	
75.0	8.4	8.2		24.9	24.5								3.9	3.8	
100.0	8.5	8.2		24.9	24.5		0.0			440.0			3.8	3.8	
100.0 pH	8.4	8.4	7.7	24.9	24.5	24.9							8.1	8.0	7.1

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l CaCO₃

**Acute Forms
Pimephales promelas Survival**

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 12/5/14 To: 12/5/14
From: To:

Test Initiated: 12/6/14

Dilution Water Used: Receiving Water X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32.0	45.0	50.0	56.0	75.0	100.0	100.0 pH
24-hour	A	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	B	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	C	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	D	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	E	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
48-hour	A	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	B	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	C	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	D	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	E	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Mean	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:

- a.) **LOW FLOW OR CRITICAL DILUTION (100.0%)** **YES** **NO**
b.) **1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A%)** **YES** **NO**

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = **8.0% effluent**

95 % confidence limits: N/A

Method of LC₅₀ calculation: Graphical

- 3. If you answered NO to 1.a) enter (P) otherwise enter (F): F**
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

**Biomonitoring
Fathead Minnow 48 hour Acute Static Renewal
Chemical Parameters Chart***

**Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040**

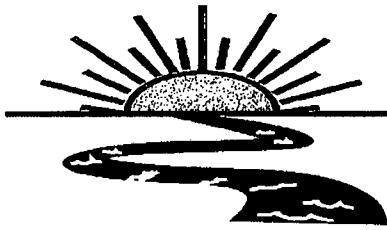
**Contact: David Sartain
Analyst: Briggs, Callahan**

**Sample Collected From: Date 12/5/14 Time 1210
To: Date 12/5/14 Time 0410
Test Begin Date 12/6/14 Time 1515
Test End Date 12/8/14 Time 1535**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.4	8.3	8.1	24.9	24.5		32.0			32.0			7.2	7.2	7.3	
32.0	8.5	8.3		24.9	24.5								4.0	4.0		
45.0	8.5	8.2		24.9	24.5								3.9	4.0		
50.0	8.5	8.2		24.9	24.5								3.9	3.9		
56.0	8.4	8.2		24.9	24.5								3.9	3.9		
75.0	8.4	8.2		24.9	24.5								3.9	3.8		
100.0	8.5	8.2		24.9	24.5		0.0			440.0			3.8	3.8		
100.0 pH	8.4	8.4	7.9	24.9	24.5	24.9							8.1	8.0	7.4	

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l CaCO₃

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-259-1246
Fax: (318) 745-2773

REPORT QUALITY ASSURANCE FORM

Client: El Dorado Chemical

Project#: X5620

Chain of Custody Documents Checked by: EGG 1/15/15
Technician/Date

Raw Data Documents Checked by: EGG 1/15/15
Technician/Date

Statistical Analysis Package Checked by: EGG 1/15/15
Quality Manager/Date

Quality Control Data Checked by: EGG 1/15/15
Quality Manager/Date

Report Checked by: EGG 1/15/15
Quality Manager/Date

I certify that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained in this document, to the best of my knowledge, is true, accurate and complete.

Erin L. Baupp, BS
Quality Manager

1/15/15
Date

No part of this work may be altered in any form or by any means without written permission from Bio-Analytical Laboratories.

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5619

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

Project #: X5619

Outfall: Outfall 006 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. Eddie Pearson

Test Dates: December 6 - 8, 2014

Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

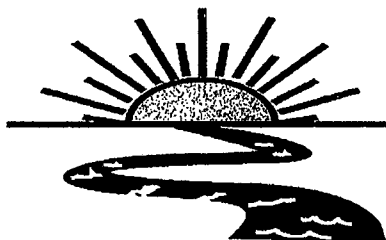
For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0 - **Pass**
2. Report the NOEC for survival, Parameter TOM6C - 100.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 22.43%.

For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0-**Pass**.
2. Report the NOEC for survival, Parameter TOM3D -100.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 11.68%.

This report contains a total of 33 pages, including this page. The results pertain only to the samples listed in the chain of custody documents in Appendix A. The information contained within meets the requirements set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.



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**THE RESULTS OF TWO 48-HOUR ACUTE
TOXICITY TESTS
FOR OUTFALL 006
AT**

**EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas**

**NPDES #AR0000752
AFIN #70-00040**

EPA Methods 2000.0 and 2021.0

Project X5619

**Test Dates: December 6 - 8, 2014
Report Date: January 15, 2014**

Prepared for:
Mr. Eddie Pearson
El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

Prepared by:
Ginger Briggs
Bio-Analytical Laboratories
P.O. Box 527
Doyline, LA 71023
ADEQ #88-0630

BAL
ADEQ #88-0630
Project X5619

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BAL
ADEQ #88-0630
Project X5619

1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two 48-hour acute toxicity tests for Outfall 006 at El Dorado Chemical Company, El Dorado, Arkansas. The test organisms used were the fathead minnow, *Pimephales promelas* and the cladoceran, *Daphnia pulex*. The purpose of this study is to determine if an appropriately dilute effluent sample adversely affects the survival of the test organism. Toxicity is defined as a statistically significant difference at the 95 percent confidence level between the survival of the test organisms in the critical dilution (the effluent concentration representative of the proportion of effluent in the receiving water during critical low flow or critical mixing conditions) compared to the survival of the test organisms in the control. The test endpoints are the No-Observed-Effect-Concentration (NOEC), which is defined as the highest effluent concentration that is not statistically different from the control, and the 48-hour LC_{50} , the concentration in which 50 percent of the test organisms died.

2.0 Methods and Materials

2.1 Test Methods

All methods followed were according to the latest edition of "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012), "Standard Methods for The Examination of Water and Wastewater. 20th Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately two days old at test initiation. The minnows were acclimated to dilution water hardness prior to testing. The *Daphnia pulex* test organisms were also raised in-house at test temperature and were less than 24 hours old at test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were conducted monthly in order to document organism sensitivity and demonstration of capability.

BAL
ADEQ #88-0630
Project X5619

2.3 Dilution Water

Soft reconstituted water made per EPA guidelines was used as the dilution water and the control for the acute tests.

2.4 Test Concentrations

The test concentrations used in the acute tests were 100.0, 75.0, 56.0, 45.0, 32.0 and 22.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100.0 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 006 was collected by El Dorado Chemical personnel on December 5, 2014. Upon completion of collection, the sample was packed in ice and personally delivered to the laboratory. The temperature upon arrival was 1.5° Celsius.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1° Celsius. The total residual chlorine level (SM4500-Cl D 1997) was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity (SM2320-B 1997) and hardness (SM2340-C 1997) levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

The tests were run in a Precision^R dual controlled illuminated incubator at a temperature of 25±1° Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

The NOEC and LC₅₀ values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

BAL
ADEQ #88-0630
Project X5619

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the critical dilution in either test after 48 hours of exposure ($p=.05$). The NOEC values for both tests was 100.0 percent effluent ($p=.05$). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in each effluent concentration. See Appendix C- Statistical Analyses, for more information.

Table 1: Results of the 48-hour Acute Definitive Toxicity Tests

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Control	100.0	100.0
22.0	100.0	97.5
32.0	100.0	100.0
45.0	100.0	92.5
56.0	100.0	95.0
75.0	100.0	100.0
100.0	77.5	95.0

The 48-hour reference toxicant test results indicated that the *Daphnia pulex* test organisms were within the respective sensitivity range, but the fathead minnow test organisms were less sensitive. The graphs of the acute reference toxicant tests can be found in Appendix D.

BAL
ADEQ #88-0630
Project X5619

4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on December 5, 2014, was not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 100.0 percent critical dilution after 48 hours of exposure ($p=.05$). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in the effluent dilutions ($p=.05$).

BAL
ADEQ #88-0630
Project X5619

5.0 References

- EPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012, Office of Water.
- EPA, 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. EPA-833-R-00-003, Office of Wastewater Management.
- EPA, 2000. Method Guidance and Recommendations for Whole Effluent (WET) Testing. EPA-821-B-00-04, Office of Water
- APHA, 1998. Standard Methods for The Examination of Water and Wastewater. 20th Edition.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Bio-Analytical Laboratories

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1-800-286-1246
Fax: (318) 745-2773

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:				Project Number: X5619 Temp. upon arrival: 1.5°C Therm 29 ECB 12/6/14 Preservative: (below)			
Address: 4500 Norwest Ave., El Dorado, AR 71731		Fax: (870) 863-7499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species		Acute Mysid	Acute Ceriodaphnia	Fecal Coliform
Permit #: AR0000752/AFIN 70-00040		Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: <i>Scott Brece / Scott Brece / EDCC</i>											
Date Start Date End	Time Start Time End	C	G					# and type of container			
12-5-14 12-5-14	1200 400	X		6 half gallon	006	X	X			C10128 ICE	
Relinquished by/Affiliation: <i>Scott Brece / EDCC</i>				Date: 12-6-14	Time: 1200	Received by/Affiliation: <i>Chris J. Baird</i>		Date: 12/6/14	Time: 1200		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS ___ Client ___ Other Tracking # _____											
Comments:											
COC Rev. 3.0											

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X5619
Page 12 of 33

Project# X5619

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/RC

Test initiated: Date 12/6/14 Time 1445

Test terminated: Date 12/8/14 Time 1525

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AU
pH Meter: Model #Orion 230A+ Serial #105253
Conductivity Meter: Model # Control Co. Serial #80277924
Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/Final D.O.(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
C10128	9.8 119.1%	715 99.1%	<0.01	NO	3.0	N/A	236.0	24.0	EGB
↓	9.1 112.4%	715 95.9%	↓	↓	↓	↓	↓	↓	EGB

Dilution Water Information

Dilution Water	ID#	Initial D.O (mg/L & %)	Aerate? Minutes/D.O (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft H2O	3676	N/A	---	---	---	7.2	32.0	32.0	EGB

Test Species Information

Test Species Info.	Species: <u>D. pulex</u> ID#: <u>12413</u>	Species: <u>P. promelas</u> ID#: <u>12414</u>	Species: ID#:	Species: ID#:
Age	<24 hours	2 days		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT/Algae	Artemia		
Amount	2.0 hours	before initiation		
Aeration?	N/A	N/A		
Amount				
Condition of survivors	Good RC 12/8/14	Good RC 12/8/14		

Comments:

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1455
 Test Species D. pulex ID# L2

Sample Description 0018
 Technician: Ohour 855 24hour 855 48hour RC 72hour _____ 96hour _____
 Ohour 1415 24hour 1500 48hour 1455 72hour _____ 96hour _____
 Time: Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____
 Temperature (°C):

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	Na	8	8	8			85	7.9	8.2			7.0	7.1	7.6			761	175	287		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
23.0	A		8	8	8			85	7.8	8.2			7.0	7.0	7.5			338	408	430		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8																	

Chemistry Tech
 prerenewal/postrenewal

EDCC RC EDCC RC EDCC RC EDCC RC

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/10/14 Time 1415
 Test ended: Date 12/18/14 Time 1455
 Test Species D. pulex ID# L2

Sample Description 006
 Technician: EB 24hour EB 48hour RC 72hour _____ 96hour _____
EB 24hour EB 48hour EB 72hour _____ 96hour _____
 Time: 1415 24hour 1502 48hour 1455 72hour _____ 96hour _____
 Temperature (°C): 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
32.0	A	NA	8	8	8			8.5	8.0	8.0			7.0	7.1	7.3			406	477	476		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
45.0	A		8	8	6			8.5	8.0	8.0			7.0	7.0	7.3			502	511	511		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8																	

Chemistry Tech
 prerenewal/postrenewal

EB EB RC

EB EB RC

EB EB RC

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1415
 Test ended: Date 12/8/14 Time 1456
 Test Species D. pulex ID# L2

Sample Description 00L6
 Technician: Ohour ESB 24hour EBB 48hour RC 72hour _____ 96hour _____
 Ohour 145 24hour 1500 48hour 1455 72hour _____ 96hour _____
 Time: Ohour 145 24hour 045 48hour 045 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 04.5 48hour 04.5 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	↓ Live Organisms					Dissolved Oxygen					pH				Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56.0	A	NA	8	8	8			8.4	8.6	8.0			7.0	7.1	7.2			580	757	649		
	B		8	8	8													580				
	C		8	8	6																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A		8	8	8			8.4	8.8	8.0			7.0	7.2	7.1			724	330	600	798	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	

Chemistry Techn
 prerenewal/postrenewal

ESB/EBB/RC ESB/EBB/RC ESB/EBB/RC

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/10/14 Time 1415
 Test ended: Date 12/11/14 Time 1455
 Test Species D. pulex ID# L2

Sample Description 006
 Technician: 0hour EB 24hour EB 48hour RC 72hour _____ 96hour _____
 Time: 0hour 1415 24hour 1600 48hour 1455 72hour _____ 96hour _____
 Temperature (°C): 0hour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100.0	A	Na	8	8	8			8.4	8.4	8.0			7.0	7.1	7.1			893	900	946		
	B		8	8	8																	
	C		8	8	6																	
	D		8	8	8																	
	E		8	8	8																	
	F																					
	G																					
	H																					
	I																					
	J																					
	K																					
	L																					
	M																					
	N																					
	O																					
	P																					
	Q																					
	R																					
	S																					
	T																					
	U																					
	V																					
	W																					
	X																					
	Y																					
	Z																					

Chemistry Tech
 prerenewal/postrenewal

EB EB EB
ADRC ADRC ADRC

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1445

Test ended: Date 12/8/14 Time 1525

Test Species P. promelas ID# 12414

Sample Description 000
 Technician: Ohour 245 24hour 400 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1445 24hour 1400 48hour 1525 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	Na	8	8	8			8.5	7.9	8.0			7.0	7.1	7.0			111.1	115	112	119	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
20.0	A		8	8	8			8.5	7.8	8.0			7.0	7.0	7.1			338	400	333	313	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			EBB/AB/RC					EBB/AB/RC					EBB/AB/RC									

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1445
 Test ended: Date 12/8/14 Time 1525
 Test Species P. promelas ID# 12414

Sample Description 006
 Technician: Ohour 1405 24hour 1400 48hour 1525 72hour _____ 96hour _____
 Time: Ohour 1405 24hour 1400 48hour 1525 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test dilution %	Replicate	Test salinity Na	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0h	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
32.0	A		8	8	8			8.5	8.4	7.9			7.0	7.1	7.1			406	459	400	441	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
45.0	A		8	8	7			8.5	8.4	7.9			7.0	7.2	7.1			502	529	506	543	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			EBB/ABRC					EBB/ABRC					EBB/ABRC									

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1445
 Test ended: Date 12/8/14 Time 1525
 Test Species P. promelas ID# 12414

Sample Description 00LD
 Technician: Ohour EB 24hour EB 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1405 24hour 1400 48hour 1525 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56.0	A	NA	8	8	8			8.4	8.4	7.8			7.0	7.1	7.1			580	585	677		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A		8	8	8			8.4	7.6	7.8			7.0	7.0	7.0			724	729	785		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			EB EB RC					EB EB RC					EB EB RC									

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA

Project# X5619
 Client EDCC

Test started: Date 12/6/14 Time 1445
 Test ended: Date 12/8/14 Time 1525
 Test Species P. promelas ID# 12414

Sample Description 006
 Technician: Ohour 810 24hour 803 48hour R 72hour _____ 96hour _____
 Time: Ohour 1445 24hour 1400 48hour 1525 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.5 48hour 24.9 72hour _____ 96hour _____

Test Dilution %	Replicate	Test Salinity	# Live Organisms				Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100.0	A	Na	8	8	8			8.4	7.5	7.7			7.0	7.1	7.0			893	907	918		
	B		8	8	4																	
	C		8	8	5																	
	D		8	8	7																	
	E		8	8	7																	
	D																					
	B																					
	C																					
	D																					
	E																					
Chemistry Tech			AB/RC				AB/RC					AB/RC										
prerenewal/postrenewal			AB/RC				AB/RC					AB/RC										

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

X5619

Page 22 of 33

Start Date: 12/6/2014	Test ID: X5619DP	Sample ID: AR0000752
End Date: 12/8/2014	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date: 12/5/2014	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	1.0000	1.0000	1.0000	0.8750	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	0.7500	1.0000	1.0000	0.8750	1.0000
56	1.0000	1.0000	0.7500	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	0.7500	1.0000	1.0000

Conc-%	Transform: Arcsin Square Root						N	Rank Sum	1-Tailed Critical
	Mean	N-Mean	Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
45	0.9250	0.9250	1.2872	1.0472	1.3931	12.116	5	22.50	16.00
56	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	25.00	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	25.00	16.00

Auxillary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.73847	0.934	-1.8628	3.27478
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

EGB
1/15/15

Acute Fish Test-48 Hr Survival

X5619

Start Date: 12/6/2014 Test ID: X5619PP Sample ID: AR0000752 Page 23 of 33
 End Date: 12/8/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 12/5/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

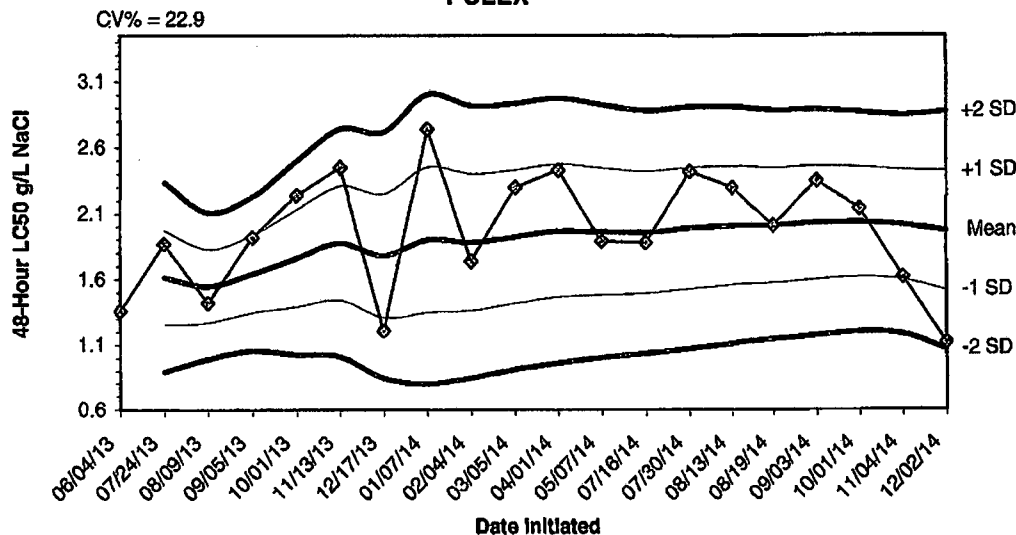
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	0.8750	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	0.7500	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	0.5000	0.6250	0.8750	0.8750

Conc-%	Transform: Arcsin Square Root							Rank Sum	1-Tailed Critical
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
45	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
56	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	25.00	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	0.7750	0.7750	1.1018	0.7854	1.3931	22.427	5	17.50	16.00

Auxillary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.75674	0.934	-0.951	4.31532
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

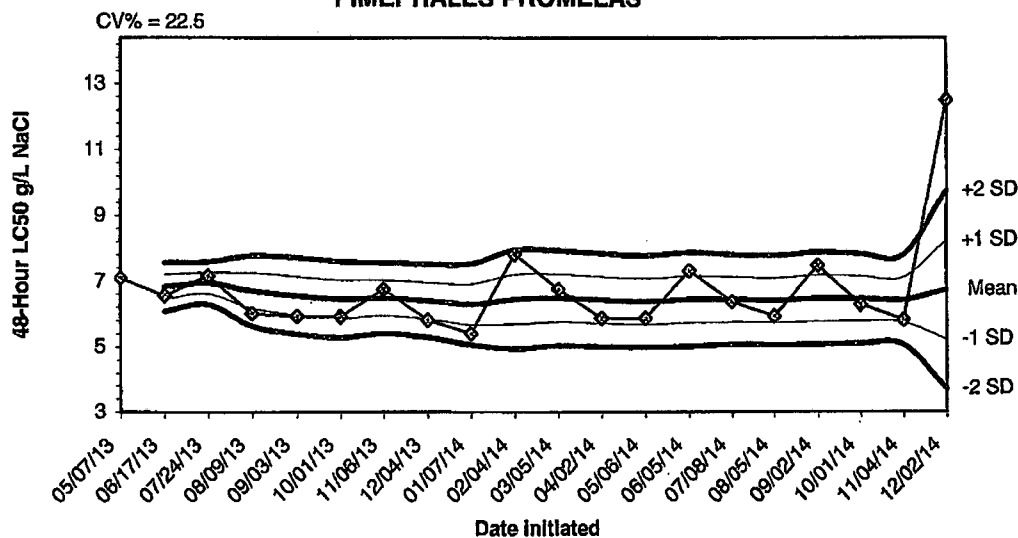
APPENDIX D
QUALITY ASSURANCE CHARTS

2014 ACUTE REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA
PULEX



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/04/13	1.3600					
07/24/13	1.8700	1.6150	1.2544	0.8938	1.9756	2.3362
08/09/13	1.4200	1.5500	1.2713	0.9925	1.8287	2.1075
09/05/13	1.9200	1.6425	1.3492	1.0559	1.9358	2.2291
10/01/13	2.2400	1.7620	1.3933	1.0247	2.1307	2.4993
11/13/13	2.4500	1.8767	1.4435	1.0103	2.3098	2.7430
12/17/13	1.2100	1.7814	1.3125	0.8437	2.2503	2.7192
01/07/14	2.7400	1.9013	1.3505	0.7998	2.4520	3.0027
02/04/14	1.7400	1.8833	1.3654	0.8474	2.4013	2.9192
03/05/14	2.3000	1.9250	1.4192	0.9134	2.4308	2.9366
04/01/14	2.4300	1.9709	1.4675	0.9641	2.4743	2.9777
05/07/14	1.8900	1.9642	1.4836	1.0031	2.4447	2.9253
07/16/14	1.8800	1.9577	1.4970	1.0363	2.4184	2.8791
07/30/14	2.4200	1.9907	1.5312	1.0716	2.4503	2.9098
08/13/14	2.3000	2.0113	1.5614	1.1114	2.4613	2.9113
08/19/14	2.0100	2.0113	1.5765	1.1418	2.4480	2.8807
09/03/14	2.3500	2.0312	1.6023	1.1735	2.4600	2.8889
10/01/14	2.1400	2.0372	1.6204	1.2036	2.4541	2.8709
11/04/14	1.6200	2.0153	1.5990	1.1828	2.4315	2.8478
12/02/14	1.1200	1.9705	1.5186	1.0667	2.4224	2.8743

**2014 ACUTE REFERENCE TOXICANT TEST RESULTS FOR
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/07/13	7.0900					
06/17/13	6.5600	6.8250	6.4502	6.0755	7.1998	7.5745
07/24/13	7.1600	6.9367	6.6086	6.2805	7.2647	7.5928
08/09/13	6.0000	6.7025	6.1630	5.6234	7.2420	7.7816
09/03/13	5.9200	6.5460	5.9622	5.3785	7.1298	7.7135
10/01/13	5.9200	6.4417	5.8603	5.2790	7.0230	7.8043
11/06/13	6.7500	6.4857	5.9424	5.3991	7.0290	7.5724
12/04/13	5.8100	6.4013	5.8444	5.2875	6.9581	7.5150
01/07/14	5.4000	6.2900	5.6714	5.0527	6.9086	7.5273
02/04/14	7.8200	6.4430	5.6852	4.9274	7.2008	7.9586
03/05/14	6.7500	6.4709	5.7460	5.0212	7.1958	7.9208
04/02/14	5.8600	6.4200	5.7067	4.9934	7.1333	7.8466
05/06/14	5.8600	6.3769	5.6766	4.9762	7.0773	7.7776
06/05/14	7.3100	6.4436	5.7260	5.0084	7.1612	7.8788
07/08/14	6.3700	6.4387	5.7469	5.0552	7.1304	7.8222
08/05/14	5.9200	6.4063	5.7255	5.0447	7.0870	7.7678
09/02/14	7.4800	6.4694	5.7607	5.0520	7.1781	7.8869
10/01/14	6.2800	6.4589	5.7699	5.0809	7.1479	7.8369
11/04/14	5.8100	6.4247	5.7388	5.0528	7.1107	7.7966
12/02/14	12.5000	6.7285	5.2148	3.7012	8.2422	9.7558

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected

From: 12/5/14

To: 12/5/14

From:

To:

Test Initiated: 12/6/14

Dilution Water Used:

Receiving Water

X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22.0	32.0	45.0	56.0	75.0	100.0
24-hour	A	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
48-hour	A	100.0	100.0	100.0	75.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	75.0	100.0	75.0
	D	100.0	87.5	100.0	87.5	100.0	100.0	100.0
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Mean	100.0	97.5	100.0	92.5	95.0	100.0	95.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:

- a.) **LOW FLOW OR CRITICAL DILUTION (100.0%)** YES X NO
b.) **1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A %)** YES NO

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = N/A % effluent

95 % confidence limits:

Method of LC₅₀ calculation:

3. If you answered NO to 1.a) enter (P) otherwise enter (F) P

4. Enter response to item 3 on DMR Form, parameter TEM3D

5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A

6. Enter response to item 5 on DMR Form, parameter TFM3D

**Biomonitoring
Daphnia pulex 48 hour Acute Static Renewal
Chemical Parameters Chart***

Permittee: El Dorado Chemical - Outfall 006
 NPDES Number: AR0000752/ AFIN 70-00040
 Contact: David Sartain
 Analyst: Briggs, Callahan
 Sample Collected

From: Date 12/5/14 Time 1200
 To: Date 12/5/14 Time 0400
 Date 12/6/14 Time 1445
 Date 12/8/14 Time 1455

Test Begin
 Test End

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.5	8.5	8.2	24.9	24.5	24.9	32.0				32.0			7.0	7.1	7.6
22.0	8.5	8.5	8.2	24.9	24.5	24.9								7.0	7.0	7.5
32.0	8.5	8.5	8.0	24.9	24.5	24.9								7.0	7.1	7.3
45.0	8.5	8.5	8.0	24.9	24.5	24.9								7.0	7.0	7.3
56.0	8.4	8.4	8.0	24.9	24.5	24.9								7.0	7.1	7.2
75.0	8.4	8.4	8.0	24.9	24.5	24.9								7.0	7.0	7.1
100.0	8.4	8.4	8.0	24.9	24.5	24.9	24.0				236.0			7.0	7.1	7.1

*This Form is to be submitted with each DMR.
 Alkalinity and hardness to be reported as mg/l CaCO₃

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected

From: 12/5/14

To: 12/5/14

From:

To:

Test Initiated: 12/6/14

Dilution Water Used:

Receiving Water

X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22.0	32.0	45.0	56.0	75.0	100.0
24-hour	A	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
48-hour	A	100.0	100.0	100.0	87.5	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	50.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	62.5
	D	100.0	100.0	100.0	100.0	100.0	100.0	87.5
	E	100.0	100.0	100.0	100.0	100.0	100.0	87.5
	Mean	100.0	100.0	100.0	100.0	100.0	100.0	77.5

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:

- a.) **LOW FLOW OR CRITICAL DILUTION (100.0%)** YES X NO
b.) **1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A %)** YES NO

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = N/A % effluent

95 % confidence limits:

Method of LC₅₀ calculation:

3. If you answered NO to 1.a) enter (P) otherwise enter (F) P

4. Enter response to item 3 on DMR Form, parameter TEM3D

5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A

6. Enter response to item 5 on DMR Form, parameter TFM3D

**Biomonitoring
Fathead Minnow 48 hour Acute Static Renewal
Chemical Parameters Chart***

Permittee: El Dorado Chemical - Outfall 006
 NPDES Number: AR0000752/ AFIN 70-00040
 Contact: David Sartain
 Analyst: Briggs, Callahan
 Sample Collected From: Date 12/5/14 Time 1200
 To: Date 12/5/14 Time 0400
 Test Begin Date 12/6/14 Time 1445
 Test End Date 12/8/14 Time 1525

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.5	8.5	8.0	24.9	24.5	24.9	32.0				32.0			7.0	7.1	7.0
22.0	8.5	8.5	8.0	24.9	24.5	24.9								7.0	7.0	7.1
32.0	8.5	8.5	7.9	24.9	24.5	24.9								7.0	7.1	7.1
45.0	8.5	8.4	7.9	24.9	24.5	24.9								7.0	7.2	7.1
56.0	8.4	8.4	7.8	24.9	24.5	24.9								7.0	7.1	7.1
75.0	8.4	8.4	7.8	24.9	24.5	24.9								7.0	7.0	7.0
100.0	8.4	8.4	7.7	24.9	24.5	24.9	24.0				236.0			7.0	7.1	7.0

*This Form is to be submitted with each DMR.
 Alkalinity and hardness to be reported as mg/l CaCO₃

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-259-1246
Fax: (318) 745-2773

REPORT QUALITY ASSURANCE FORM

Client: Eldorado Chemical

Project#: X5619

Chain of Custody Documents Checked by: EGB 1/15/15
Technician/Date

Raw Data Documents Checked by: EGB 1/15/15
Technician/Date

Statistical Analysis Package Checked by: EGB 1/15/15
Quality Manager/Date

Quality Control Data Checked by: EGB 1/15/15
Quality Manager/Date

Report Checked by: EGB 1/15/15
Quality Manager/Date

I certify that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The information contained in this document, to the best of my knowledge, is true, accurate and complete.

Erin D. Bepp, BS
Quality Manager

1/15/15
Date

No part of this work may be altered in any form or by any means without written permission from Bio-Analytical Laboratories.

From: (870) 863-1400
Eddie Pearson
ELDORADO CHEMICAL COMPANY
4500 NORTH WEST AVE
ELDORADO, AR 71730

Origin ID: ELDA



J151015011403uv

Ship Date: 21 JAN 15
ActWgt: 3.0 LB
CAD: 5887030/NET3610

Delivery Address Bar Code



SHIP TO: (501) 682-0744

BILL SENDER

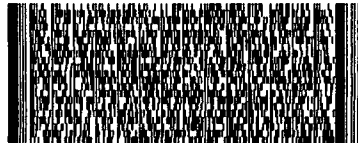
ADEQ - Water Enforcement Branch
5301 Northshore Drive

NORTH LITTLE ROCK, AR 72118

Ref #
Invoice #
PO #
Dept #

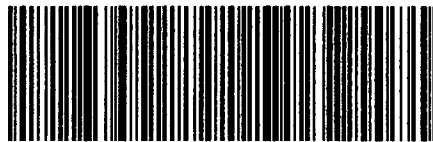
THU - 22 JAN 10:30A
PRIORITY OVERNIGHT

TRK# 7726 6148 2085
0201



X2 LITA

72118
AR-US
LIT



537118F15EE4B