

August 13, 2014

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

Control No. 181262-1

Prepared for:

Mr. Barry Rowe
El Dorado Chemical Company
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Prepared by:

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

Dear Mr. Barry Rowe:

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 %. Any statistical difference with sublethal effects cannot be considered toxic due to the minimum significant difference (PMSD) calculated result being below the lower PMSD bounds. **The sample, therefore PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

John Overbey
Laboratory Director



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I. Control Acceptance Criteria

Pimephales promelas (Fathead minnow) Method 1000.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.296	PASS
Control Growth CV < or = 40%	12.2	PASS
Growth Minimum Significant Difference 12 to 30%	13.5	PASS
Critical Dilution CV < or = 40%	6.44	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	33.7	PASS
Control CV < or = 40% per Surviving Female	8.28	PASS
Reproduction Minimum Significant Difference 13 to 47%	6.44	BELOW
Critical Dilution CV < or = 40%	6.76	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)	8.8	8.5	7.8
pH (standard units)	8.7	7.8	7.5
Alkalinity (mg/l as CaCO ₃)	52	47	40
Hardness (mg/l as CaCO ₃)	37	37	38
Conductivity (umhos/cm)	320	310	320
Residual Chlorine (mg/l)	0.050	<0.05	<0.05
Ammonia as N (mg/l)	1.1	0.84	0.20

2. Dilution Water Samples: Synthetic Soft Water #4120

- a. Dates Prepared: July 30 through August 13, 2014
- b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.1	7.7	7.9
pH (standard units)	7.5	7.4	7.5
Alkalinity (mg/l as CaCO ₃)	30	30	30
Hardness (mg/l as CaCO ₃)	46	44	44
Conductivity (umhos/cm)	150	150	140
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05

C. Test Methods

1. Test methods used:

Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Methods 1000.0 and 1002.0, Fathead Minnow Survival and Growth and *Ceriodaphnia dubia* Survival and Reproduction.

2. Endpoint: No Observable Effects Concentration (NOEC)

3. Test Conditions:

Pimephales promelas (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated: August 5, 2014 at 1100
Date & Time Test Terminated: August 12, 2014 at 1000
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: August 5, 2014 at 1100
Date & Time Test Terminated: August 12, 2014 at 1240
Type & Volume of Test Chamber: 30 ml disposable beaker
Volume of Sample: 15 ml
Number of Organisms per replicate: 1
Number of Replicates per dilution: 10

4. Acclimation of test organisms: Obtained from in-house cultures

5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms

1. Scientific Name

- a. Test 1000.0 *Pimephales promelas*
- b. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat.

Pimephales promelas (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Dunnett's Test to determine the No Observable Effects Concentration (NOEC) for Reproduction.

IV. Standard Reference Toxicants

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

Pimephales promelas (Fathead minnow)

Chronic reference tests are performed monthly.

A chronic reference test was performed on July 8, 2014 at 1615 to July 15, 2014 at 1500

The results were as follows: (Control No. 180430-1.)

Survival LC-50: 4632 mg/l

Growth IC-25: 2837 mg/l

Growth PMSD: 9.25

Ceriodaphnia dubia

Chronic reference tests are performed monthly.

A chronic reference test was performed on July 8, 2014 at 1620 to July 14, 2014 at 1420

The results were as follows: (Control No. 180430-2.)

Survival LC-50: 2019 mg/l

Growth IC-25: 842.6 mg/l

Growth PMSD: 15.9

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.00
Hardness	EPA 200.7	102	2.19
pH	SM 4500-H+ B	102	2.42
Conductivity	EPA 120.1	98.0	2.06

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: August 5, 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: August 5, 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

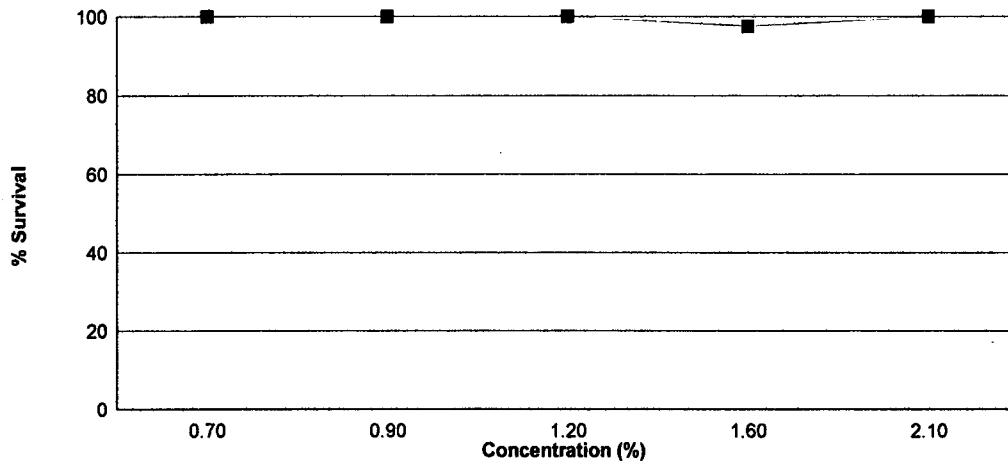
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

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 August 5, 2014 at 1100 and continued through August 12, 2014 at 1000. 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	0.296
0.7 %	100	0.310
0.9 %	100	0.351
1.2 %	100	0.330
1.6 %	97.5	0.304
2.1 %	100	0.280

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

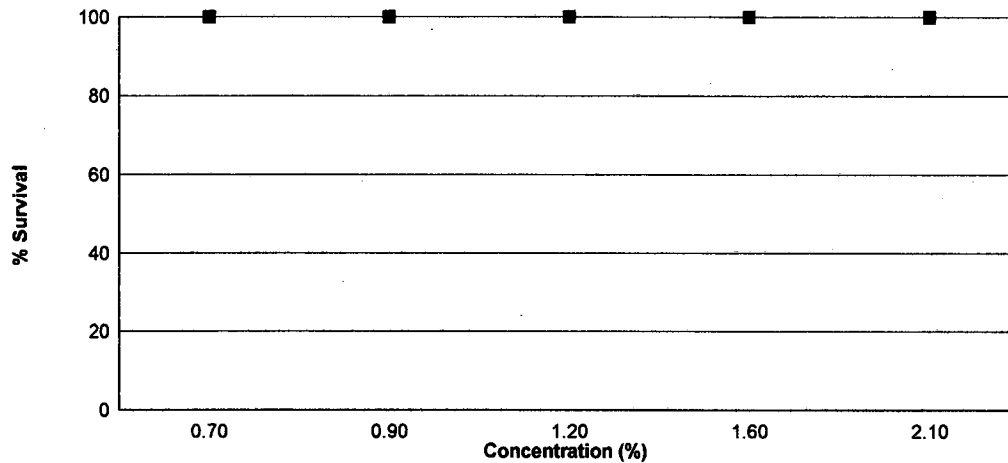
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

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 August 5, 2014 at 1100 and continued through August 12, 2014 at 1240. 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



Summary of the 7-day <i>Ceriodaphnia dubia</i> Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	33.7
0.7 %	100	33.6
0.9 %	100	33.5
1.2 %	100	33.3
1.6 %	100	33.6
2.1 %	100	33.9

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: August 5, 2014 at 1100

Date and Time Test Terminated: August 12, 2014 at 1000

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	7	7	7
2.1 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

 Test Initiated: August 5, 2014 at 1100
 Test Terminated: August 12, 2014 at 1000

 Drying Started: August 12, 2014 at 0730
 Drying Ended: August 13, 2014 at 1030

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.94177	.94442	0.00265	8	0.331
	B	.94102	.94335	0.00233	8	0.291
	C	.94367	.94614	0.00247	8	0.309
	D	.94133	.94322	0.00189	8	0.236
	E	.94041	.94290	0.00249	8	0.311
0.7 %	A	.94373	.94595	0.00222	8	0.278
	B	.94241	.94470	0.00229	8	0.286
	C	.93916	.94148	0.00232	8	0.290
	D	.94092	.94362	0.00270	8	0.338
	E	.94195	.94480	0.00285	8	0.356
0.9 %	A	.94625	.94894	0.00269	8	0.336
	B	.94255	.94520	0.00265	8	0.331
	C	.94053	.94356	0.00303	8	0.379
	D	.94152	.94428	0.00276	8	0.345
	E	.93930	.94220	0.00290	8	0.362
1.2 %	A	.94431	.94692	0.00261	8	0.326
	B	.94205	.94446	0.00241	8	0.301
	C	.94191	.94452	0.00261	8	0.326
	D	.94508	.94800	0.00292	8	0.365
	E	.94149	.94414	0.00265	8	0.331
1.6 %	A	.94297	.94546	0.00249	8	0.311
	B	.94574	.94819	0.00245	8	0.306
	C	.94267	.94518	0.00251	8	0.314
	D	.94265	.94520	0.00255	8	0.319
	E	.94124	.94340	0.00216	8	0.270
2.1 %	A	.93737	.93932	0.00195	8	0.244
	B	.93980	.94215	0.00235	8	0.294
	C	.94127	.94364	0.00237	8	0.296
	D	.94069	.94299	0.00230	8	0.288
	E	.94282	.94505	0.00223	8	0.279

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: August 5, 2014 at 1100
Date and Time Test Terminated: August 12, 2014 at 1240

Concentration: Control														
Day	Replicate										No. of Young	No. of Adults	Young per Adult	
	1	2	3	4	5	6	7	8	9	10				
1	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	7	7	3	7	5	6	4	5	5	4	53	10	5.30	
5	11	12	10	11	10	11	12	10	10	8	105	10	10.5	
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
7	19	18	18	20	17	17	16	19	17	18	179	10	17.9	
8														
TOTAL	37	37	31	38	32	34	32	34	32	30	337	10	33.7	

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	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	5	6	5	4	5	5	4	5	6	7	52	10	5.20	
5	11	10	12	10	11	12	11	10	8	10	105	10	10.5	
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
7	18	20	18	18	16	19	17	17	19	17	179	10	17.9	
8														
TOTAL	34	36	35	32	32	36	32	32	33	34	336	10	33.6	

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	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	0	0	0	0	0	0	0	0	10	0.00
4	6	5	5	4	3	5	6	4	5	5	48	10	4.80	
5	10	12	11	10	10	9	10	12	11	10	105	10	10.5	
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
7	19	19	17	20	18	19	19	18	13	20	182	10	18.2	
8														
TOTAL	35	36	33	34	31	33	35	34	29	35	335	10	33.5	

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: August 5, 2014 at 1100
Date and Time Test Terminated: August 12, 2014 at 1240

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	0	0	0	0	0	0	0	0	10	0.00
4	4	5	5	4	4	4	6	6	6	5	49	10	4.90	
5	10	11	9	10	10	12	11	10	9	10	102	10	10.2	
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00	
7	19	20	16	19	18	17	18	19	19	17	182	10	18.2	
8														
TOTAL	33	36	30	33	32	33	35	35	34	32	333	10	33.3	

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	0	0	0	0	0	0	0	0	0	10	0.00
4	6	5	4	5	4	5	4	6	4	5	48	10	4.80
5	12	11	11	10	11	12	10	12	10	9	108	10	10.8
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00
7	18	20	19	17	18	17	16	19	19	17	180	10	18.0
8													
TOTAL	36	36	34	32	33	34	30	37	33	31	336	10	33.6

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	0	0	0	0	0	0	0	0	0	10	0.00
4	6	6	4	5	5	4	5	6	5	4	50	10	5.00
5	10	11	11	10	9	12	10	10	11	10	104	10	10.4
6	0	0	0	0	0	0	0	0	0	0	0	10	0.00
7	19	20	16	19	19	18	17	18	20	19	185	10	18.5
8													
TOTAL	35	37	31	34	33	34	32	34	36	33	339	10	33.9

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	0.87500	1.20940
6	2.1 %	1	1.00000	1.39310
6	2.1 %	2	1.00000	1.39310
6	2.1 %	3	1.00000	1.39310
6	2.1 %	4	1.00000	1.39310
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))
D = 0.027 W = 0.4161 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)		
Data FAIL normality test (alpha = 0.01).		

Steel's Many-One Rank Test				Transform: Arc Sin(Square Root(Y))	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	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 %	25.00	16.00	5.00	
6	2.1 %	27.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality	No Transformation
D = 0.01715 W = 0.9796 Critical W = 0.9 (alpha = 0.01, N = 30) Critical W = 0.927 (alpha = 0.05, N = 30)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 3.078 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.	

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	0.01578	0.003156	4.416	
Within (Error)	24	0.01715	0.0007146		
Total	29	0.03293			
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	0.2956	0.2956			
2	0.7 %	0.3096	0.3096	-0.8281		
3	0.9 %	0.3506	0.3506	-3.253		
4	1.2 %	0.3298	0.3298	-2.023		
5	1.6 %	0.304	0.304	-0.4968		
6	2.1 %	0.2802	0.2802	0.9109		
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	0.0399	13.5	-0.014	
3	0.9 %	5	0.0399	13.5	-0.055	
4	1.2 %	5	0.0399	13.5	-0.0342	
5	1.6 %	5	0.0399	13.5	-0.0084	
6	2.1 %	5	0.0399	13.5	0.0154	

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 = 0.0714 D* = 0.5602 Critical D* = 1.035 (alpha = 0.01, N = 60)	
Data PASS normality test (alpha = 0.01).	

Bartlett's Test for Homogeneity of Variance	No Transformation
Calculated B1 statistic = 3.541 Critical B = 15.086 (alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

ANOVA Table				No Transformation	
SOURCE	DF	SS	MS	F	
Between	5	2	0.4	0.0906	
Within (Error)	54	238.4	4.415		
Total	59	240.4			
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	33.7	33.7			
2	0.7 %	33.6	33.6	0.1064		
3	0.9 %	33.5	33.5	0.2128		
4	1.2 %	33.3	33.3	0.4257		
5	1.6 %	33.6	33.6	0.1064		
6	2.1 %	33.9	33.9	-0.2128		
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	2.171	6.44	0.1	
3	0.9 %	10	2.171	6.44	0.2	
4	1.2 %	10	2.171	6.44	0.4	
5	1.6 %	10	2.171	6.44	0.1	
6	2.1 %	10	2.171	6.44	-0.2	

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: August 5, 2014 at 0815

Date and Time Test Terminated: August 12, 2014 at 1240

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.4	7.7	8.1	7.9	7.4	7.6
	Final *1	7.5	6.4	6.8	6.4	6.5	6.8	6.5
	Final *2	8.1	7.9	7.5	7.9	7.8	6.6	8.2
pH, units	Initial	7.5	7.2	7.4	7.2	7.5	7.3	7.3
	Final *1	7.4	6.9	7.2	7.0	7.4	7.3	7.2
	Final *2	7.6	7.6	7.6	7.6	7.5	7.5	7.6
Alkalinity, mg CaCO3/l		30	NA	30	NA	30	NA	NA
Hardness, mg CaCO3/l		46	NA	44	NA	44	NA	NA
Conductivity, umhos/cm		150	160	150	140	140	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	8.2	8.6	7.7	8.2	7.9	7.4	7.5
	Final *1	7.1	6.9	6.9	6.6	7.7	7.2	6.6
	Final *2	8.0	8.0	7.6	7.8	7.8	7.0	8.0
pH, units	Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
	Final *1	7.4	7.0	7.3	7.0	7.4	7.3	7.2
	Final *2	7.6	7.6	7.7	7.5	7.6	7.5	7.6

Effluent Conc.: 0.9 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	9.0	7.7	7.9	8.0	7.6	7.4
	Final *1	7.2	6.8	7.1	6.6	7.7	7.0	6.6
	Final *2	8.0	8.0	7.7	7.8	7.8	7.2	8.1
pH, units	Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
	Final *1	7.4	7.0	7.4	7.1	7.4	7.4	7.3
	Final *2	7.6	7.6	7.7	7.6	7.6	7.5	7.6

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: August 5, 2014 at 0815
Date and Time Test Terminated: August 12, 2014 at 1240

Effluent Conc.: 1.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.9	7.7	7.9	8.1	7.5	7.4
	Final *1	7.2	7.0	7.2	6.8	7.6	7.1	6.9
	Final *2	8.1	7.9	7.5	7.9	7.6	8.4	8.1
pH, units	Initial	7.5	7.4	7.4	7.4	7.5	7.4	7.3
	Final *1	7.4	7.1	7.4	7.2	7.4	7.4	7.4
	Final *2	7.6	7.6	7.7	7.6	7.6	7.6	7.6

Effluent Conc.: 1.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.8	7.6	7.8	8.0	7.3	7.5
	Final *1	7.2	6.4	7.1	6.8	7.4	7.0	7.0
	Final *2	8.3	8.0	7.5	7.9	7.8	8.4	8.1
pH, units	Initial	7.5	7.4	7.4	7.3	7.5	7.4	7.4
	Final *1	7.4	7.1	7.4	7.2	7.4	7.4	7.4
	Final *2	7.6	7.6	7.7	7.6	7.6	7.5	7.5
Alkalinity, mg CaCO ₃ /l	39	NA	40	NA	38	NA	NA	NA
Hardness, mg CaCO ₃ /l	49	NA	47	NA	43	NA	NA	NA
Conductivity, umhos/cm	160	160	150	150	150	160	150	150
Res. Chlorine, mg/l	<0.05	NA	<0.05	NA	<0.05	NA	NA	NA

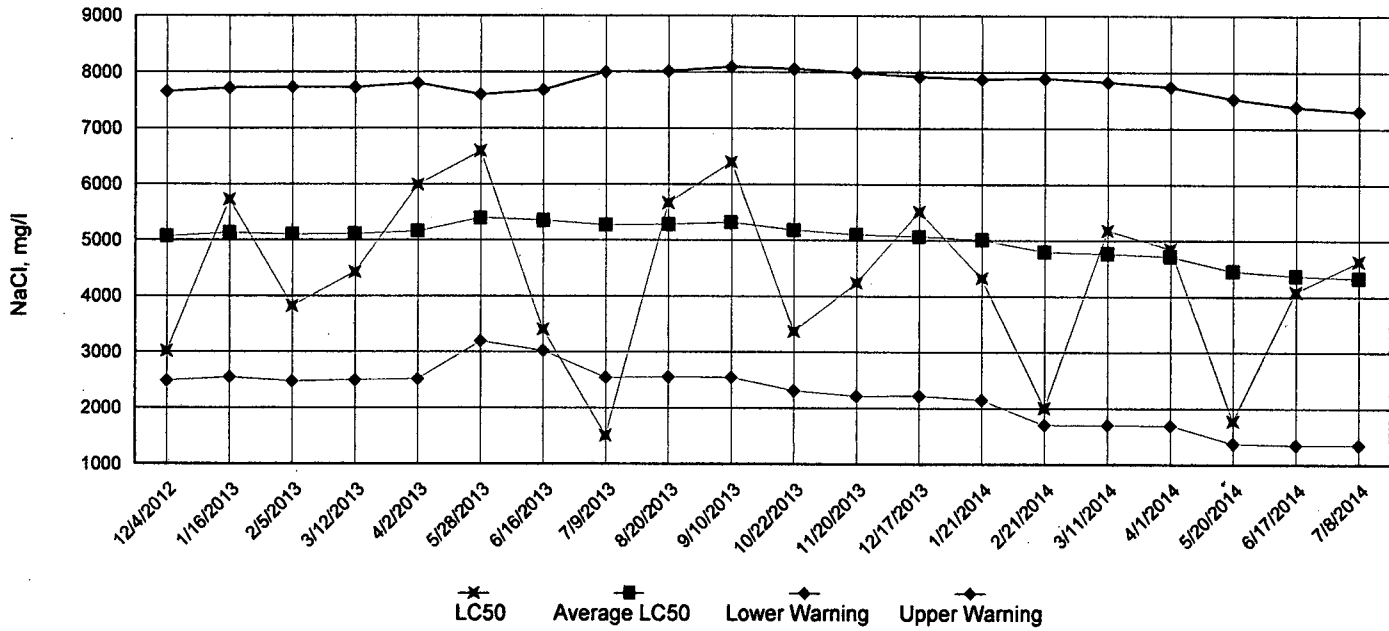
Effluent Conc.: 2.1 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.8	8.0	7.9	7.7	7.5	7.5
	Final *1	7.2	7.1	7.0	6.7	7.7	7.3	6.8
	Final *2	8.2	7.9	7.6	7.9	7.7	8.4	7.9
pH, units	Initial	7.5	7.5	7.4	7.4	7.5	7.4	7.4
	Final *1	7.4	7.2	7.4	7.2	7.4	7.4	7.4
	Final *2	7.6	7.6	7.7	7.6	7.6	7.5	7.6

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

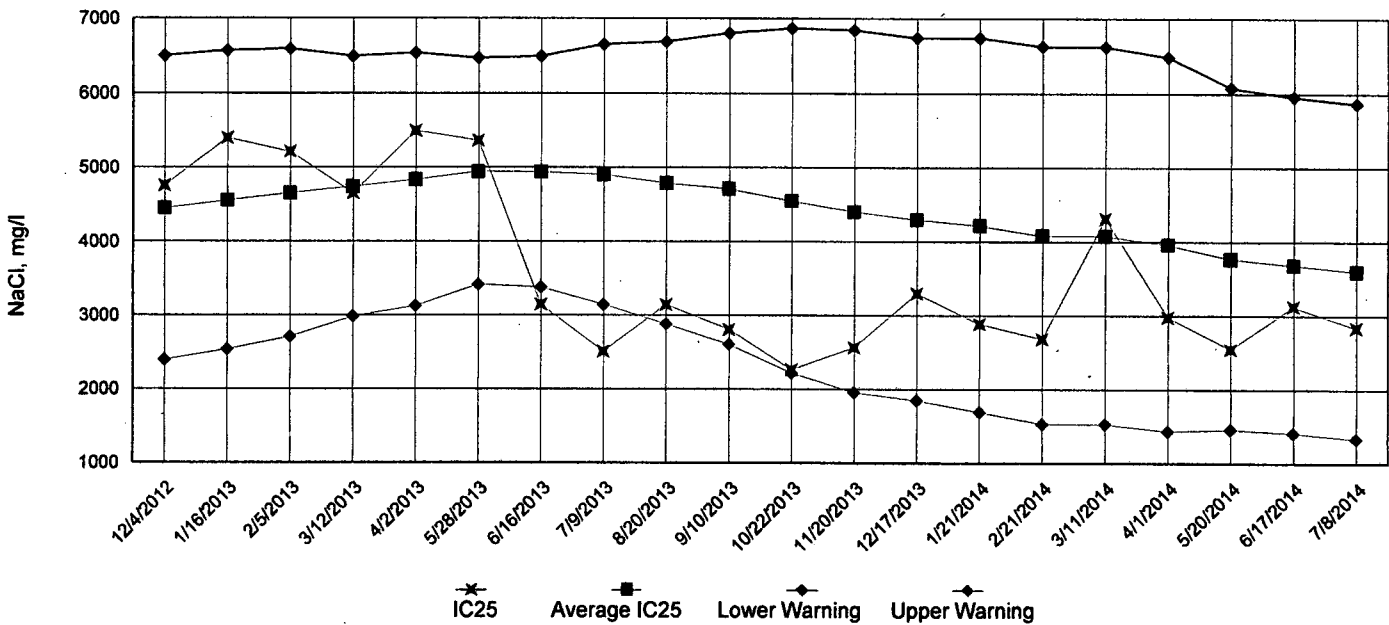
Appendix A4: Test 1000.0

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

LC50 Survival Data

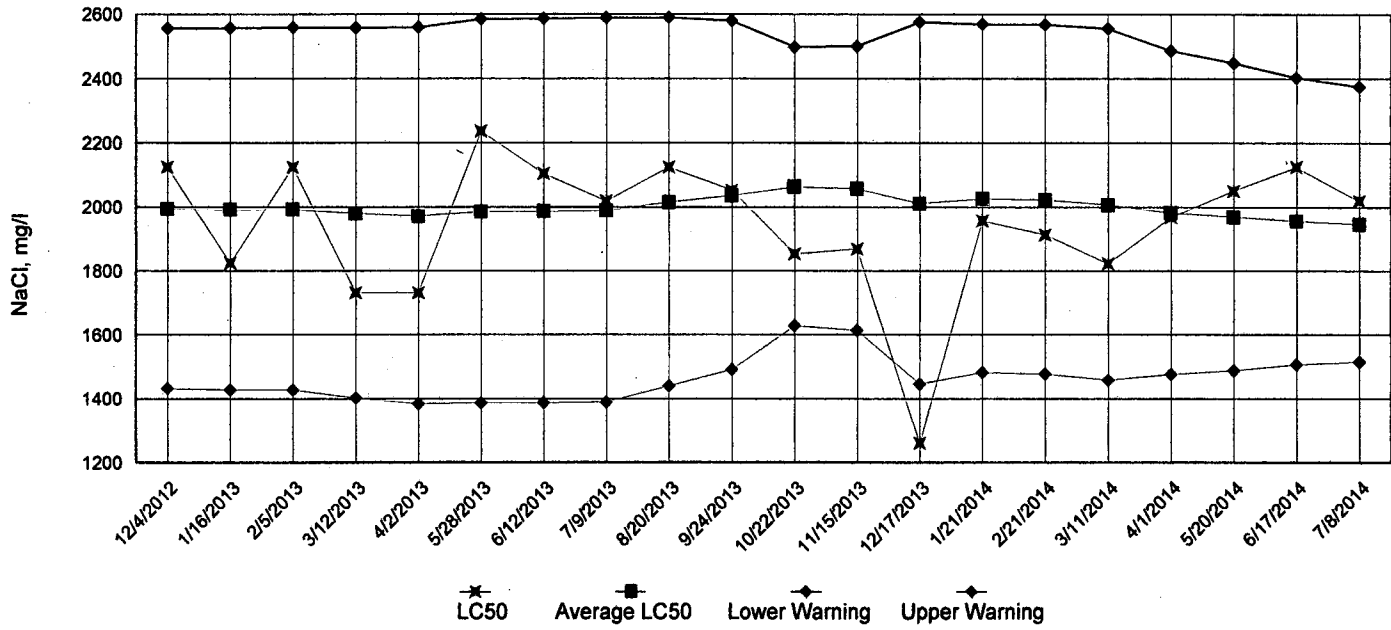


IC25 Growth Data

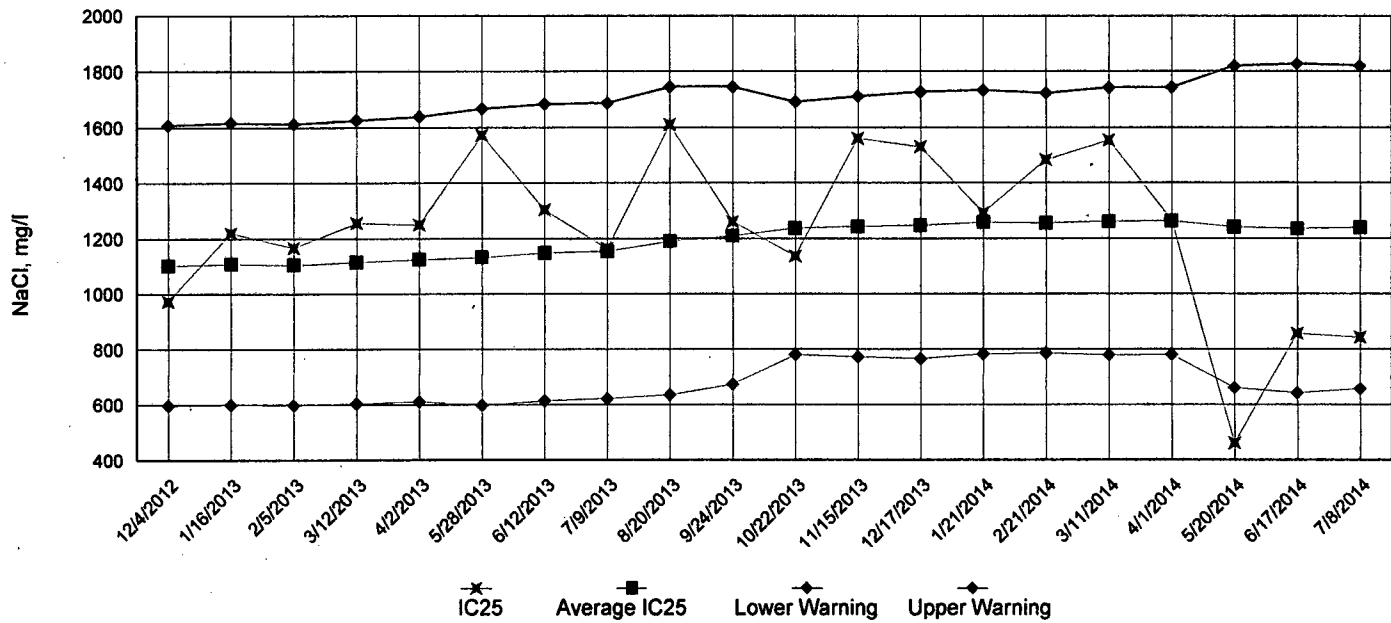


Appendix A4: Test 1002.0
Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



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

Permittee: El Dorado Chemical Company

NPDES No.: AR0000752

Date and Time Test Initiated: August 5, 2014 at 1100

Date and Time Test Terminated: August 12, 2014 at 1000

Dilution water used: Synthetic Soft Water #4120

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	87.5	100	100	97.5	5.73
2.1 %	100	100	100	100	100	100	100	100	0.00

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers					Mean dry weight, mg	CV%
	A	B	C	D	E		
Control	0.331	0.291	0.309	0.236	0.311	0.296	12.2
0.7 %	0.278	0.286	0.290	0.338	0.356	0.31	11.3
0.9 %	0.336	0.331	0.379	0.345	0.362	0.351	5.64
1.2 %	0.326	0.301	0.326	0.365	0.331	0.33	6.95
1.6 %	0.311	0.306	0.314	0.319	0.270	0.304	6.44
2.1 %	0.244	0.294	0.296	0.288	0.279	0.28	7.60

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 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

2. Dunnett's Test:

Is the mean dry weight (growth) significantly different ($p=0.05$) than the control's dry weight (growth) for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	<u> </u> YES	<u> X </u> NO
b.) 1/2 LOW FLOW DILUTION	(NA)	<u> </u> YES	<u> </u> NO

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

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

5. NOEC Pimephales Lethality: 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: 12.2 (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. Barry Rowe
ANALYST: 280, 304, 307, 310

Test Initiated: DATE: August 5, 2014 TIME: 1100
Test Terminated: DATE: August 12, 2014 TIME: 1000

DILUTION	DAY						
	1	2	3	4	5	6	7
Control							
D.O. Initial	8.1	8.4	7.7	8.1	7.9	7.4	7.6
Final	7.5	6.4	6.8	6.4	6.5	6.8	6.5
pH Initial	7.5	7.2	7.4	7.2	7.5	7.3	7.3
Final	7.4	6.9	7.2	7.0	7.4	7.3	7.2
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	46	NA	44	NA	44	NA	NA
Conductivity	150	160	150	140	140	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	8.2	8.6	7.7	8.2	7.9	7.4	7.5
Final	7.1	6.9	6.9	6.6	7.7	7.2	6.6
pH Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
Final	7.4	7.0	7.3	7.0	7.4	7.3	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	150	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	8.2	9.0	7.7	7.9	8.0	7.6	7.4
Final	7.2	6.8	7.1	6.6	7.7	7.0	6.6
pH Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
Final	7.4	7.0	7.4	7.1	7.4	7.4	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	150	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.2 %							
D.O. Initial	8.1	8.9	7.7	7.9	8.1	7.5	7.4
Final	7.2	7.0	7.2	6.8	7.6	7.1	6.9
pH Initial	7.5	7.4	7.4	7.4	7.5	7.4	7.3
Final	7.4	7.1	7.4	7.2	7.4	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	150	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION	DAY						
	1	2	3	4	5	6	7
1.6 %							
D.O. Initial	8.1	8.8	7.6	7.8	8.0	7.3	7.5
Final	7.2	6.4	7.1	6.8	7.4	7.0	7.0
pH Initial	7.5	7.4	7.4	7.3	7.5	7.4	7.4
Final	7.4	7.1	7.4	7.2	7.4	7.4	7.4
Alkalinity	39	NA	40	NA	38	NA	NA
Hardness	49	NA	47	NA	43	NA	NA
Conductivity	160	160	150	150	150	160	150
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	8.1	8.8	8.0	7.9	7.7	7.5	7.5
Final	7.2	7.1	7.0	6.7	7.7	7.3	6.8
pH Initial	7.5	7.5	7.4	7.4	7.5	7.4	7.4
Final	7.4	7.2	7.4	7.2	7.4	7.4	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	150	150	150	160	150
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: August 5, 2014 at 1100

Date and Time Test Terminated: August 12, 2014 at 1240

Dilution water used: Synthetic Soft Water #4120

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
7 day	100	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

Replicates	Control	Percent Effluent				
		0.7 %	0.9 %	1.2 %	1.6 %	2.1 %
A	37	34	35	33	36	35
B	37	36	36	36	36	37
C	31	35	33	30	34	31
D	38	32	34	33	32	34
E	32	32	31	32	33	33
F	34	36	33	33	34	34
G	32	32	35	35	30	32
H	34	32	34	35	37	34
I	32	33	29	34	33	36
J	30	34	35	32	31	33
Mean per Adult	33.7	33.6	33.5	33.3	33.6	33.9
Mean per Surviving Adult	33.7	33.6	33.5	33.3	33.6	33.9
CV %	8.28	4.90	6.33	5.31	6.76	5.29

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 %)	<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 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 %)	<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 (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: 8.28 (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. Barry Rowe
ANALYST: 280, 304, 307, 310

Test Initiated: DATE: August 5, 2014 TIME: 1100
Test Terminated: DATE: August 12, 2014 TIME: 1240

DILUTION Control	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.1	8.4	7.7	8.1	7.9	7.4	7.6
Final	8.1	7.9	7.5	7.9	7.8	6.6	8.2
pH Initial	7.5	7.2	7.4	7.2	7.5	7.3	7.3
Final	7.6	7.6	7.6	7.6	7.5	7.5	7.6
Alkalinity	30	NA	30	NA	30	NA	NA
Hardness	46	NA	44	NA	44	NA	NA
Conductivity	150	160	150	140	140	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 0.7 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.2	8.6	7.7	8.2	7.9	7.4	7.5
Final	8.0	8.0	7.6	7.8	7.8	7.0	8.0
pH Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
Final	7.6	7.6	7.7	7.5	7.6	7.5	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	150	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 0.9 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.2	9.0	7.7	7.9	8.0	7.6	7.4
Final	8.0	8.0	7.7	7.8	7.8	7.2	8.1
pH Initial	7.5	7.5	7.4	7.3	7.5	7.4	7.3
Final	7.6	7.6	7.7	7.6	7.6	7.5	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	160	160	150	150	150	160	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

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

DILUTION 1.6 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.1	8.8	7.6	7.8	8.0	7.3	7.5
Final	8.3	8.0	7.5	7.9	7.8	8.4	8.1
pH Initial	7.5	7.4	7.4	7.3	7.5	7.4	7.4
Final	7.6	7.6	7.7	7.6	7.6	7.5	7.5
Alkalinity	39	NA	40	NA	38	NA	NA
Hardness	49	NA	47	NA	43	NA	NA
Conductivity	160	160	150	150	150	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 2.1 %	DAY						
	1	2	3	4	5	6	7
D.O. Initial	8.1	8.8	8.0	7.9	7.7	7.5	7.5
Final	8.2	7.9	7.6	7.9	7.7	8.4	7.9
pH Initial	7.5	7.5	7.4	7.4	7.5	7.4	7.4
Final	7.6	7.6	7.7	7.6	7.6	7.5	7.6
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	170	160	150	150	150	160	150
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: 181262								
Project Reference: Quarterly - Permit AR0000752			MATRIX			Chronic - CD, FH													AIC PROPOSAL NO:					
Project Manager: Mr. Barry Rowe			WATER	SOIL																Carrier: Gold Star				
Sampled By: Bayle			GRA	CAMP														Received Temperature C 11.1						
AIC No.	Sample Identification	Date/Time Collected	B	P	R	L													Remarks					
①	010	8-4-14 KU	X	X																				
																		Field pH calibration						
			Container Type															on _____ @ _____						
			Preservative															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) NORMAL or EXPEDITED IN ___ DAYS					Relinquished By: Bayle					Date/Time 8-4-14 10:30					Received By:					Date/Time				
Expedited results requested by: _____					Relinquished By:					Date/Time					Received in Lab By: Jimmy Ray					Date/Time 8/4/14 1600				
Who should AIC contact with questions:					Comments:																			
Phone 870-312-1397 Fax:																								
Report Attention to: Mr. Barry Rowe																								
Report Address to: 4500 North West Avenue El Dorado, AR 71730 browe@educ.ark.com																								

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company			PO No.		NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: 181262					
Project Reference: Quarterly - Permit AR0000752			MATRIX			Chronic - CD, FH															AIC PROPOSAL NO:
Project Manager: Mr. Barry Rowe			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>Barry Rowe</i>						Date/Time Collected				X	X										
AIC No.	Sample Identification																				
2	010	8-6-14 10:00																			
																					Field pH calibration
																					on _____ @ _____
																					Buffer:
G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate			NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A = (NH ₄) ₂ SO ₄ , NH ₄ OH																		
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN ___ DAYS						Relinquished By: <i>Barry Rowe</i>		Date/Time: 8-6-14 11:00		Received By:		Date/Time:									
Expedited results requested by: _____						Relinquished By:		Date/Time:		Received in Lab By: <i>Lynce Hopton</i>		Date/Time: 8-6-14 1545									
Who should AIC contact with questions: Phone 870-312-1397 Fax: Report Attention to: Mr. Barry Rowe Report Address to: 4500 North West Avenue El Dorado, AR 71730 browe@educ.ark.com						Comments:															



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company Project Reference: Quarterly - Permit AR0000752 Project Manager: Mr. Barry Rowe						PO No.	NO OF BOTTLES	ANALYSES REQUESTED										AIC CONTROL NO: 181262								
Sampled By: <i>Barry Rowe</i>				G R A B	C O M P	M A T R I X W A T E R		S O I L		B O T T L E S	C h r o m i c - C D, F H											AIC PROPOSAL NO:				
AIC No.	Sample Identification		Date/Time Collected		B	P	X	X	X	1	X											Carrier: Gold Star				
3	010		8-08-14 10:30																			Received Temperature C 0.9				
														Remarks												
														Field pH calibration on _____ @ _____ Buffer:												
														Container Type Preservative	P NO											
														G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A = (NH ₄) ₂ SO ₄ , NH ₄ OH												
Turnaround Time Requested: (Please circle) NORMAL or EXPEDITED IN ____ DAYS Expedited results requested by: _____ Who should AIC contact with questions: Phone 870-312-1397 Fax:							Relinquished By: <i>Barry Rowe</i> Date/Time: 8-08-14 10:30			Received By: _____ Date/Time:		Relinquished By: _____ Date/Time:			Received in Lab By: <i>Luca Kaplan</i> Date/Time: 8-8-14 1515											
Report Attention to: Mr. Barry Rowe Report Address to: 4500 North West Avenue El Dorado, AR 71730 browe@educ.ark.com							Comments:																			

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5500

Bio-Analytical Laboratories' Executive Summary

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

Project #: X5500

Outfall: Outfall 007 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. David Sartain

Test Dates: August 2 - 4 , 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 - 45.0%.
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 -45.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 6.06%.

Both tests passed at the 100.0 percent critical dilution when the pH was adjusted to a range of 6.0-9.0.

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 X5500

Test Dates: August 2 - 4, 2014

Report Date: August 26, 2014

Prepared for:
Mr. David Sartain
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 X5500

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BAL
ADEQ #88-0630
Project X5500

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 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 at test temperature and dilution water hardness and were approximately 12 days old at 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 X5500

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 fathead minnow test were 100.0, 75.0, 56.0, 50.0, 45.0, and 32.0 percent effluent and a reconstituted water control. Due to the lack of available test organisms, the concentrations used in the *Daphnia pulex* test were 100.0, 75.0, 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 August 1, 2014. Upon completion of collection, the sample was packed in ice and personally delivered to the laboratory. The temperature upon arrival was 0.4^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 4.1 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.

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ADEQ #88-0630
Project X5500

2.8 Data Analysis

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

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 24 hours of exposure (p=.05). The NOEC value for the minnow and daphnid tests after 48 hours of exposure was 45.0 percent effluent (p=.05). The 48-hour LC₅₀ values for the minnow and *Daphnia pulex* tests were 49.54 and 46.78 percent effluent, respectively. See Appendix C- Statistical Analyses, for more information.

Raising the pH of the sample significantly reduced the lethality in both tests.

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	97.5
32.0	100.0	75.0
45.0	95.0	62.5
50.0	50.0	45.0
56.0	0.0	-----
75.0	0.0	5.0
100.0	0.0	0.0
100.0 pH adj	87.5	82.5

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

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ADEQ #88-0630
Project X5500

4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on August 1, 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 24 hours of exposure ($p=.05$). The 48-hour LC_{50} values in the fathead minnow and *Daphnia pulex* tests were 49.54 and 46.78 percent effluent, respectively ($p=.05$). Raising the pH from 4.1 to a range of 6.0-9.0 significantly reduced the lethal effect to both test organisms ($p=.05$).

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ADEQ #88-0630
Project X5500

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



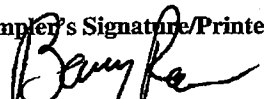
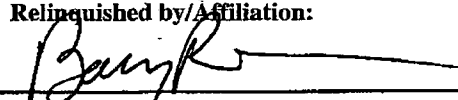

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NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278

Laboratory Use Only:

Company: El Dorado Chemical Company				Phone: (870) 863-1484		Analysis:				Project Number: X5500	
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	Temperature upon arrival: 0.4°C Thermometer #: 29 Tech: DA Date: 8/2/14	Temp. upon arrival: Preservative: (below)	Lab Control Number:	CG469	ice
Permit #: AR0000752/AFIN 70-00040				Purchase Order:							
Sampler's Signature/Printed Name/Affiliation:  Barry Rowe											
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification						
	0801-14 1200			6 half gallon	007			X	X		
Relinquished by/Affiliation: 				Date: 8/2/14	Time: 1310	Received by/Affiliation: 		Date: 8/2/14	Time: 1310		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____											
Comments:											
COC Rev. 3.0											

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X5500
Page 12 of 35

Project# X5500

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 007

Technicians: EGB/AH/RC/AC

Test initiated: Date 8/2/14 Time 1645

Test terminated: Date 8/4/14 Time 1650

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
C9469	9.9 / 118.0%	4/25 8.2 / 97.1%	20.01	NO	0.5	N/A	404.0	21.0	EGB
↓	10.1 / 125.5%	4/25 7.8 / 94.4%	↓	↓	↓	↓		(0.0)	

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	3639	NA	NA	NA	NA	7.2	52.0	32.0	EGB

Test Species Information

Test Species Info.	Species ID#:	Species ID#:	Species ID#:	Species ID#:
Age	424h	~12d		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT Algae	Artemia		
Amount	Fed 7hrs prior to test initiation			
Aeration?	NA	NA		
Amount				
Condition of survivors	Good RC 8/4/14		Good RC 8/4/14	

Comments: pH before aeration → 4.0
after → 4.1

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

Project# X5500

Test started: Date 8/2/14

Time 1705

Client El Dorado Chemical

Test ended: Date 8/4/14

Time 1645

Sample Description 007

Test Species D. pulex

ID# BAJ10-K8
24 8/2/14

Technician: Ohour AH 24hour AH 48hour RC 72hour RC 96hour RC

Time: Ohour 1705 24hour 1700 48hour 1645 72hour RC 96hour RC

Temperature (°C): Ohour 24.6 24hour 24.6 48hour 24.7 72hour RC 96hour RC

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	8.4	7.8			7.0	7.2	6.8			48.7	47.5	47.5		
	B		8	7	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32	A		8	8	8			8.3	8.2	7.8			6.5	6.5	6.6			35.0	34.0	42.5		
	B		8	8	8																	
	C		8	8	8																	
	D		8	4	2																	
	E		8	7	4																	
Chemistry Tech prerenewal/postrenewal							AH	AH	RC				AH	AH	RC			AH	AH	RC		

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

Project# X5500

Test started: Date 8/2/14 Time 705

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1645

Sample Description 007

Test Species D. pulex ID# BA150-K1

Technician: Ohour AH 24hour AH 48hour RC 72hour 96hour

Time: Ohour 1705 24hour 1700 48hour 1645 72hour 96hour

Temperature (°C): Ohour 24.6 24hour 24.6 48hour 24.7 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	A		8	8	8			83	80	7.9			6.0	6.0	6.7			420	460	550			
	B		8	6	6																		
	C		8	8	2																		
	D		8	8	5																		
	E		8	7	4																		
	F																						
50	A		8	8	7			82	80	7.9			5.4	6.9	6.3			417	460	589			
	B		8	8	0																		
	C		8	7	6																		
	D		8	7	5																		
	E		8	4	0																		
	F																						
Chemistry Tech prerenewal/postrenewal																							

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

Project# X5500

Client El Dorado Chemical

Sample Description 007

Technician: Ohour AH 24hour OH 48hour RC 72hour 96hour

Time: Ohour 1705 24hour 1700 48hour 1645 72hour 96hour

Temperature (°C): Ohour 24.6 24hour 24.6 48hour 24.7 72hour 96hour

Test started: Date 8/2/14 Time 1705

Test ended: Date 8/4/14 Time 1645

Test Species D. pulex ID# BAUTO 11

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	
			Ua																				
75	A		8	8	0			8.1	8.0 7.9	7.9				4.4	5.5 4.3	5.2				68.9	66.0 71.4	78.5	
	B		8	8	0																		
	C		8	8	1																		
	D		8	8	0																		
	E		8	8	1																		
100	A		8	2	0			8.0	8.0 7.8	7.9				4.2	4.9 4.0	4.3				87.1	87.8 88.9	89.9	
	B		8	3	0																		
	C		8	6	0																		
	D		8	1	0																		
	E		8	2	0																		
Chemistry Tech prerenewal/postrenewal			AH	AH OH	RC			AH	AH OH	RC				AH	AH OH	RC							

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

Project# X5500

Test started: Date 8/2/14

Time 1705

Client El Dorado Chemical

Test ended: Date 8/4/14

Time 1645

Sample Description 007

Test Species D. pulex

ID# BALTO-K1

Technician: 0hour AM 24hour AM 48hour RC 72hour 96hour

Time: 0hour 1705 24hour 1700 48hour 1645 72hour 96hour

Temperature (°C): 0hour 24.6 24hour 24.6 48hour 24.7 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	
100 DHAJ	A		8	7	7			8.0	7.8	7.9			7.5	7.6	5.5			8.9	8.3	8.0	10.0		
	B		8	8	8																		
	C		8	6	6																		
	D		8	8	7																		
	E		8	5	5																		
	A		8	8																			
	B		8																				
	C		8																				
	D		8																				
	E		8																				
Chemistry Tech prerenewal/postrenewal																							

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

Project# X5500

Test started: Date 8/2/14 Time 1645

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1650

Sample Description 007

Test Species P. promelas ID# BAU7/2/14

Technician: Ohour AC 24hour AC 48hour RC 72hour 96hour

Time: Ohour 1645 24hour 1655 48hour 1650 72hour 96hour

Temperature (°C): Ohour 24.6 24hour 24.4 48hour 24.7 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	7.6	8.4	7.1			7.0	6.9	7.0	7.3			148	164.5	163.0				
	B		8	8	8																					
	C		8	8	8																					
	D		8	8	8																					
	E		8	8	8																					
32	A		8	8	8			8.3	7.6	8.2	7.6			6.5	6.6	6.5	7.0			350	352	343				
	B		8	8	8																					
	C		8	8	8																					
	D		8	8	8																					
	E		8	8	8																					
Chemistry Tech prerenewal/postrenewal																										

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

Project# X5500

Test started: Date 8/2/14 Time 1645

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1650

Sample Description 007

Test Species P. promelas ID# BAU7/2/14

Technician: 0hour AC 24hour AC 48hour RC 72hour _____ 96hour _____
 Time: 0hour 1645 24hour 1655 48hour 1650 72hour _____ 96hour _____
 Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.7 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	A		8	8	7			8.3	7.7	7.7			6.0	6.4	6.7			450	495	501		
	B		8	7	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
50	A		8	8	7			8.2	7.7	7.7			5.4	6.2	6.3			417	458	543		
	B		8	8	5																	
	C		8	8	4																	
	D		8	8	1																	
	E		8	7	3																	
Chemistry tech prerenewal/postrenewal							AH AC RC					AH AC RC					AH AC RC					

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

Project# X5500

Test started: Date 8/2/14 Time 1645

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1650

Sample Description 007

Test Species P. promelas ID# BAU712114

Technician: 0hour AC 24hour AC 48hour RC 72hour RC 96hour RC

Time: 0hour 1645 24hour 1655 48hour 1650 72hour RC 96hour RC

Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.7 72hour RC 96hour RC

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	A	Na	8	8	0			8.2	8.0 8.0	7.9			5.1	5.1 5.6	5.7			479	491 574	589		
	B		8	8	0																	
	C		8	8	0																	
	D		8	8	0																	
	E		8	8	0																	
75	A		8	0	1			8.1	7.7 7.9	—			4.4	4.3 4.3	—			686	695 714	—		
	B		8	0	1																	
	C		8	0	1																	
	D		8	0	1																	
	E		8	0	1																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X5500

Test started: Date 8/2/14 Time 1645

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1656

Sample Description 007

Test Species P. promelas ID# BAU712114

Technician: 0hour AC 24hour AC 48hour RC 72hour 96hour

Time: 0hour 1645 24hour 1655 48hour 1650 72hour 96hour

Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.7 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	A	Na	8	0	-			8.0	7.7 7.8	-			4.2	4.3 4.2	-			871	868 888	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
100 PHADJ	A		8	7	7			8.0	7.4 7.5	7.5			7.5	6.3 6.6	6.4			809	814 830	916		
	B		8	8	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	7	5																	
Chemistry Tech prerenewal/postrenewal								PH	AC	RC			PH	AC	RC			PH	AC	RC		

ACUTE2 Rev 1.0

* AC 8/3/14

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

X5500

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Start Date: 8/2/2014 Test ID: X5500DP Sample ID: 7
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	0.8750	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	0.2500	0.5000
45	1.0000	0.7500	0.2500	0.6250	0.5000
50	0.8750	0.0000	0.7500	0.6250	0.0000
75	0.0000	0.0000	0.1250	0.0000	0.1250
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH ADJ	0.8750	1.0000	0.7500	0.8750	0.6250

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
32	0.7500	0.7692	1.0977	0.5236	1.3931	37.808	5	24.00	16.00
45	0.6250	0.6410	0.9322	0.5236	1.3931	34.535	5	18.00	16.00
*50	0.4500	0.4615	0.7048	0.1777	1.2094	69.887	5	15.50	16.00
*75	0.0500	0.0513	0.2512	0.1777	0.3614	40.049	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 ADJ	0.8250	0.8462	1.1542	0.9117	1.3931	15.823	5	19.00	16.00

Auxiliary Tests

Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$) Statistic: 0.94988 Critical: 0.934 Skew: -0.4191 Kurt: 0.29972

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

X5500

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Start Date: 8/2/2014 Test ID: X5500DP Sample ID: 7
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

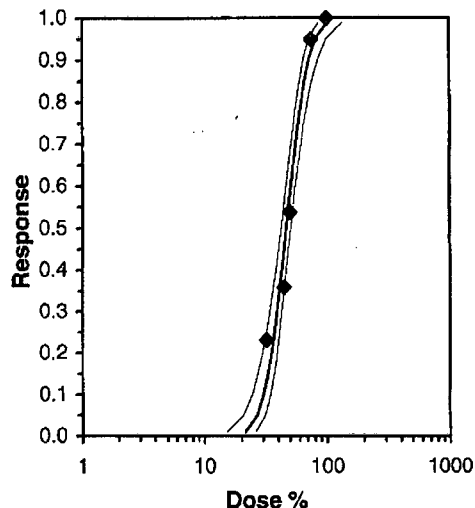
Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	0.8750	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	0.2500	0.5000
45	1.0000	0.7500	0.2500	0.6250	0.5000
50	0.8750	0.0000	0.7500	0.6250	0.0000
75	0.0000	0.0000	0.1250	0.0000	0.1250
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH ADJ	0.8750	1.0000	0.7500	0.8750	0.6250

Conc-%	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	1	40
32	0.7500	0.7692	1.0977	0.5236	1.3931	37.808	5	10	40
45	0.6250	0.6410	0.9322	0.5236	1.3931	34.535	5	15	40
50	0.4500	0.4615	0.7048	0.1777	1.2094	69.887	5	22	40
75	0.0500	0.0513	0.2512	0.1777	0.3614	40.049	5	38	40
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
100.0 PH ADJ	0.8250	0.8462	1.1542	0.9117	1.3931	15.823	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.9404	0.927	-0.4253	0.16573
Equality of variance cannot be confirmed				

Parameter	Value	SE	95% Fiducial Limits		Maximum Likelihood-Probit						
			Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter		
Slope	6.83683	0.96024	4.95475	8.71891	0.025	5.11507	7.81473	0.16356	1.67005	0.14627	6
Intercept	-6.4179	1.63038	-9.6134	-3.2223							
TSCR	0.03618	0.02907	-0.0208	0.09315							
Point	Probits	%	95% Fiducial Limits								
EC01	2.674	21.3691	15.1784	26.1106							
EC05	3.355	26.8823	20.7375	31.4045							
EC10	3.718	30.3812	24.456	34.7021							
EC15	3.964	32.9957	27.3075	37.1573							
EC20	4.158	35.2332	29.7836	39.2655							
EC25	4.326	37.2733	32.059	41.2039							
EC40	4.747	42.9533	38.382	46.78							
EC50	5.000	46.7792	42.5137	50.7983							
EC60	5.253	50.9459	46.7783	55.5294							
EC75	5.674	58.7095	53.9685	65.4224							
EC80	5.842	62.1089	56.8617	70.1371							
EC85	6.036	66.3206	60.2954	76.2333							
EC90	6.282	72.028	64.7544	84.8681							
EC95	6.645	81.4029	71.7494	99.8132							
EC99	7.326	102.405	86.5133	136.029							



Acute Fish Test-48 Hr Survival

X5500
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Start Date: 8/2/2014 Test ID: X5500PP Sample ID: 7
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 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	1.0000	1.0000	1.0000	1.0000	1.0000
45	0.8750	0.8750	1.0000	1.0000	1.0000
50	0.8750	0.6250	0.5000	0.1250	0.3750
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 ADJ	0.8750	0.8750	1.0000	1.0000	0.6250

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		
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	17.00
45	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	22.50	17.00
*50	0.5000	0.5000	0.7854	0.3614	1.2094	39.835	5	15.00	17.00
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
100.0 PH ADJ	0.8750	0.8750	1.2234	0.9117	1.3931	16.097	5	20.00	17.00

Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.857	0.918	-0.2601	3.43952

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

X5500

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Start Date: 8/2/2014 Test ID: X5500PP Sample ID: 7
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

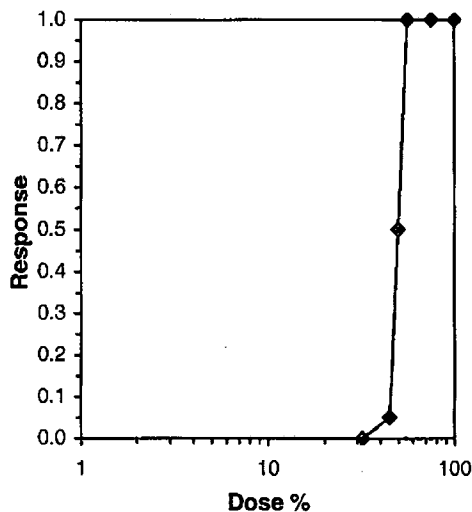
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	0.8750	0.8750	1.0000	1.0000	1.0000
50	0.8750	0.6250	0.5000	0.1250	0.3750
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100.0 PH ADJ	0.8750	0.8750	1.0000	1.0000	0.6250

Conc-%	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	0	40
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	0	40
45	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	2	40
50	0.5000	0.5000	0.7854	0.3614	1.2094	39.835	5	20	40
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
100.0 PH ADJ	0.8750	0.8750	1.2234	0.9117	1.3931	16.097	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.857	0.918	-0.2601	3.43952
Equality of variance cannot be confirmed				

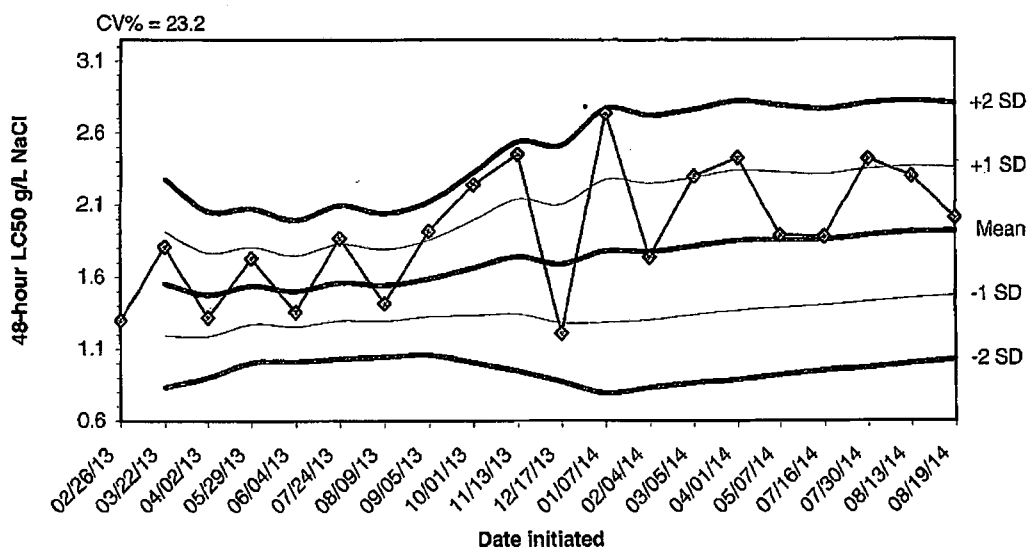
Trimmed Spearman-Kärber

Trim Level	EC50	95% CL
0.0%	49.544	48.411 50.704
5.0%	49.958	48.992 50.943
10.0%	49.963	48.895 51.053
20.0%	49.972	48.587 51.396
Auto-0.0%	49.544	48.411 50.704



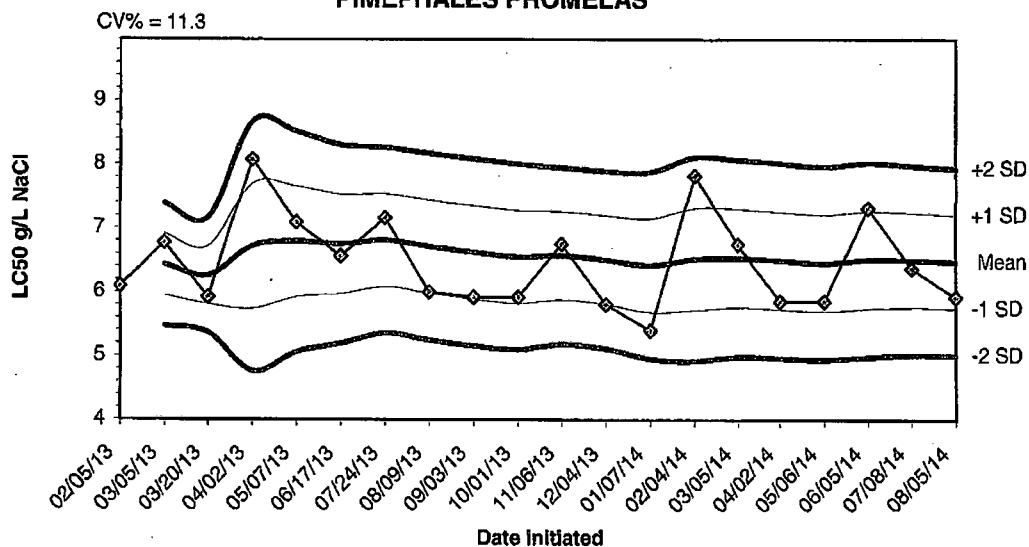
APPENDIX D
QUALITY ASSURANCE CHARTS

2014 48-Hour Reference Toxicant Test Results for *Daphnia pulex*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/26/13	1.3000					
03/22/13	1.8100	1.5550	1.1944	0.8338	1.9156	2.2762
04/02/13	1.3200	1.4767	1.1878	0.8990	1.7655	2.0544
05/29/13	1.7300	1.5400	1.2723	1.0046	1.8077	2.0754
06/04/13	1.3600	1.5040	1.2586	1.0132	1.7494	1.9948
07/24/13	1.8700	1.5650	1.2995	1.0339	1.8305	2.0961
08/09/13	1.4200	1.5443	1.2958	1.0472	1.7928	2.0413
09/05/13	1.9200	1.5913	1.3256	1.0599	1.8569	2.1226
10/01/13	2.2400	1.6633	1.3339	1.0045	1.9928	2.3222
11/13/13	2.4500	1.7420	1.3441	0.9461	2.1399	2.5379
12/17/13	1.2100	1.6936	1.2835	0.8733	2.1038	2.5140
01/07/14	2.7400	1.7808	1.2867	0.7925	2.2750	2.7691
02/04/14	1.7400	1.7777	1.3044	0.8312	2.2509	2.7242
03/05/14	2.3000	1.8150	1.3394	0.8637	2.2906	2.7663
04/01/14	2.4300	1.8560	1.3709	0.8859	2.3411	2.8261
05/07/14	1.8900	1.8581	1.3894	0.9207	2.3268	2.7955
07/16/14	1.8800	1.8594	1.4056	0.9517	2.3132	2.7671
07/30/14	2.4200	1.8906	1.4309	0.9712	2.3502	2.8099
08/13/14	2.3000	1.9121	1.4556	0.9991	2.3686	2.8251
08/19/14	2.0100	1.9170	1.4721	1.0273	2.3619	2.8067

**2014 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/05/13	6.0900					
03/05/13	6.7700	6.4300	5.9492	5.4683	6.9108	7.3917
03/20/13	5.9200	6.2600	5.8102	5.3604	6.7098	7.1596
04/02/13	8.0700	6.7125	5.7358	4.7592	7.6892	8.6658
05/07/13	7.0900	6.7880	5.9255	5.0630	7.6505	8.5130
06/17/13	6.5600	6.7500	5.9730	5.1959	7.5270	8.3041
07/24/13	7.1600	6.8086	6.0825	5.3564	7.5346	8.2607
08/09/13	6.0000	6.7075	5.9770	5.2466	7.4380	8.1684
09/03/13	5.9200	6.6200	5.8880	5.1560	7.3520	8.0840
10/01/13	5.9200	6.5500	5.8252	5.1005	7.2748	7.9995
11/06/13	6.7500	6.5682	5.8780	5.1878	7.2584	7.9486
12/04/13	5.8100	6.5050	5.8115	5.1180	7.1985	7.8920
01/07/14	5.4000	6.4200	5.6887	4.9574	7.1513	7.8826
02/04/14	7.8200	6.5200	5.7240	4.9279	7.3160	8.1121
03/05/14	6.7500	6.5353	5.7660	4.9966	7.3047	8.0741
04/02/14	5.8600	6.4931	5.7309	4.9687	7.2553	8.0176
05/06/14	5.8600	6.4559	5.7021	4.9482	7.2097	7.9635
06/05/14	7.3100	6.5033	5.7448	4.9863	7.2619	8.0204
07/08/14	6.3700	6.4963	5.7585	5.0207	7.2341	7.9719
08/05/14	5.9200	6.4675	5.7379	5.0083	7.1971	7.9267

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: To: 8/01/14
From: To:

Test Initiated: 8/02/14

Dilution Water Used: Receiving Water Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32.0	45.0	50.0	75.0	100.0	100.0 pH adj
24-hour	A	100.0	100.0	100.0	100.0	100.0	25.0	87.5
	B	87.5	100.0	75.0	100.0	100.0	67.5	100.0
	C	100.0	100.0	100.0	87.5	100.0	75.0	75.0
	D	100.0	50.0	100.0	87.5	100.0	12.5	100.0
	E	100.0	87.5	87.5	50.0	100.0	25.0	62.5
48-hour	A	100.0	100.0	100.0	87.5	0.0	0.0	87.5
	B	87.5	100.0	75.0	0.0	0.0	0.0	100.0
	C	100.0	100.0	25.0	75.0	12.5	0.0	75.0
	D	100.0	25.0	62.5	62.5	0.0	0.0	87.5
	E	100.0	50.0	50.0	0.0	0.0	0.0	62.5
	Mean	97.5	75.0	62.5	45.0	5.0	0.0	82.5

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 LC₅₀ below:

LC₅₀ = 46.78% effluent
95 % confidence limits: 50.80 - 42.51
Method of LC₅₀ calculation: Probit

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

NOTE: TOXICITY NOT NOTED IN PH ADJUSTED CONCENTRATION

**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: Haughton, Callahan

Sample Collected

From:

Date

Time

Date 8/01/14

Time 1200

Date 8/02/14

Time 1705

Date 8/04/14

Time 1645

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	8.4	7.8	24.6	24.6	24.7	32.0				52.0			7.0	7.0	6.8
32.0	8.3	8.2	7.8	24.6	24.6	24.7								6.5	6.5	6.6
45.0	8.3	8.1	7.9	24.6	24.6	24.7								6.0	5.8	6.7
50.0	8.2	8.1	7.9	24.6	24.6	24.7								5.4	5.1	6.3
75.0	8.1	7.9	7.9	24.6	24.6	24.7								4.4	4.3	5.2
100.0	8.0	7.8	7.9	24.6	24.6	24.7	0.0				404.0			4.2	4.2	4.3
100.0 pH	8.0	7.8	7.9	24.6	24.6	24.7								7.5	6.6	5.5

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

Acute Forms
Pimephales promelas (Fathead Minnow) Survival

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

Composite Collected From: To: 8/01/14
From: To:

Test Initiated: 8/02/14

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 adj
24-hour	A	100.0	100.0	100.0	100.0	100.0	0.0	0.0	87.5
	B	100.0	100.0	87.5	100.0	100.0	0.0	0.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	0.0	0.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	0.0	0.0	100.0
	E	100.0	100.0	100.0	87.5	100.0	0.0	0.0	87.5
48-hour	A	100.0	100.0	87.5	87.5	0.0	0.0	0.0	87.5
	B	100.0	100.0	87.5	62.5	0.0	0.0	0.0	87.5
	C	100.0	100.0	100.0	50.0	0.0	0.0	0.0	100.0
	D	100.0	100.0	100.0	12.5	0.0	0.0	0.0	100.0
	E	100.0	100.0	100.0	37.5	0.0	0.0	0.0	62.5
	Mean	100.0	100.0	95.0	50.0	0.0	0.0	0.0	87.5

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%) X 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 = 49.54% effluent
95 % confidence limits: 50.70 - 48.41

Method of LC₅₀ calculation: Spearman Karber

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

NOTE: TOXICITY NOT NOTED IN PH ADJUSTED CONCENTRATION

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

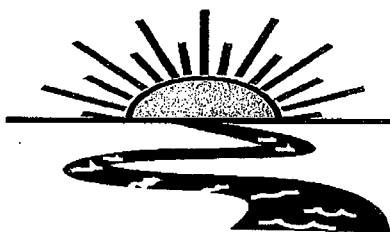
Permittee: El Dorado Chemical - Outfall 007
 NPDES Number: AR0000752/ AFIN 70-00040
 Contact: David Sartain
 Analyst: Callahan, Callahan

Sample Collected	From:	Date	Time
	To:	Date 8/01/14	Time 1200
Test Begin		Date 8/02/14	Time 1645
Test End		Date 8/04/14	Time 1650

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	8.4	7.7	24.6	24.4	24.7	32.0				52.0			7.0	7.0	7.3
32.0	8.3	8.2	7.6	24.6	24.4	24.7								6.5	6.5	7.0
45.0	8.3	8.1	7.7	24.6	24.4	24.7								6.0	5.8	6.7
50.0	8.2	8.1	7.7	24.6	24.4	24.7								5.4	5.1	6.3
56.0	8.2	8.0	7.9	24.6	24.4	24.7								5.1	4.6	5.7
75.0	8.1	7.9		24.6	24.4									4.4	4.3	
100.0	8.0	7.8		24.6	24.4		0.0				404.0			4.2	4.2	
100.0 pH	8.0	7.8	7.5	24.6	24.4	24.7								7.5	6.6	6.0

*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#: X5500

Chain of Custody Documents Checked by: EGB 8/26/14
Technician/Date

Raw Data Documents Checked by: EGB 8/26/14
Technician/Date

Statistical Analysis Package Checked by: EGB 8/12/14
Quality Manager/Date

Quality Control Data Checked by: EGB 8/26/14
Quality Manager/Date

Report Checked by: EGB 8/27/14
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.

Quinn H. Bragg, BS
Quality Manager

8/27/14
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 X5499

Bio-Analytical Laboratories' Executive Summary

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

Project #: X5499

Outfall: Outfall 006 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. David Sartain

Test Dates: August 2 - 4, 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:

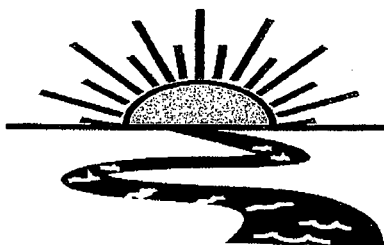
For *Pimephales promelas*:

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 - 6.06%.

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 - 15.82%.

This report contains a total of 32 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 X5499

**Test Dates: August 2 - 4, 2014
Report Date: August 26, 2014**

Prepared for:
Mr. David Sartain
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 X5499

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BAL
ADEQ #88-0630
Project X5499

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 at test temperature and dilution water hardness and were approximately 12 days old at 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.

BAL
ADEQ #88-0630
Project X5499

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 minnow test were 100.0, 75.0, 56.0, 45.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to lack of available organisms, the test concentrations used in the *Daphnia pulex* test were 100.0, 75.0, 56.0, 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 August 1, 2014. Upon completion of collection, the sample was packed in ice and personally delivered to the laboratory. The temperature upon arrival was 0.4^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. 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.

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ADEQ #88-0630
Project X5499

2.8 Data Analysis

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

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 the minnow and daphnid tests was 100.0 percent effluent (p=.05). The 48-hour LC₅₀ value 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		
Control	100.0	95.0
22.0	100.0	87.5
32.0	100.0	85.0
45.0	100.0	-----
56.0	97.5	70.0
75.0	100.0	77.5
100.0	97.5	82.5

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

BAL
ADEQ #88-0630
Project X5499

4.0 Conclusions

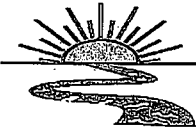
The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on August 1, 2014, was not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 100.0 percent critical dilution after 48 hours of exposure ($p=.05$). The 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 X5499

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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1-800-258-1245
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: X5499			
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	Temperature upon arrival: 0.4°C Thermometer #: 29 Tech: DH Date: 8/2/14	Temp. upon arrival: Preservative: (below) ice	Lab Control Number: C9468				
Permit #: AR0000752/AFIN 70-00040				Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: Barry R. [unclear]													
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification								
	8:01-14 12:00			6 half gallon	006			X	X				
Relinquished by/Affiliation: 						Date: 8/2/14	Time: 1310	Received by/Affiliation: 				Date: 8/2/14	Time: 1310
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:				Date:	Time:
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:				Date:	Time:
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____													
Comments: COC Rev. 3.0													

**APPENDIX B
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X5499
Page 12 of 32

Project# X5499

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/AH/RC/AC

Test initiated: Date 8/2/14 Time 1645

Test terminated: Date 8/4/14 Time 1640

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
09468	8.8/103.6%	4/25 8.1/96.5%	0.01	NO	6.0	N/A	192.0	16.0	EGB
	9.6/119.4%	4/25 7.8/94.5%	↓	↓	↓	↓			

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	3639	N/A	N/A	N/A	N/A	7.2	52.0	32.0	EGB

Test Species Information

Test Species Info.	Species: <u>Daphnia</u> ID#: <u>BA110-16</u>	Species: <u>Promelas</u> ID#: <u>BA114-72114</u>	Species: ID#:	Species: ID#:
Age	<u>24h</u>	<u>~12d</u>		
Test Container Size	<u>30ml</u>	<u>250ml</u>		
Test volume	<u>25ml</u>	<u>200ml</u>		
Feeding: Type Amount	<u>VCT, Algae Artemia</u> <u>Feed 2 hrs prior to test initiation</u>			
Aeration? Amount	<u>N/A</u>	<u>N/A</u>		
Condition of survivors	<u>good EGB 8/4/14</u>			

Comments: pH before aeration → 6.3
after → 6.9

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

Project# X5499

Test started: Date 8/2/14

Time 1645

Client Eldorado Chemical

Test ended: Date 8/4/14

Time 1625

Sample Description 006

Test Species D. pulex

ID# BAL/IO-168 8/2/14

Technician: 0hour PH 24hour PH 48hour RC 72hour PH 96hour PH

Time: 0hour 1645 24hour 1640 48hour 1625 72hour PH 96hour PH

Temperature (°C): 0hour 24.6 24hour 24.6 48hour 24.7 72hour PH 96hour PH

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	8.4	7.8			7.1	7.2	6.4			146.4	146.8	146.8	140.3			
	B		8	8	8																			
	C		8	7	7																			
	D		8	8	7																			
	E		8	8	8																			
22	A		8	6	6			8.4	8.2	7.8			6.8	6.7	6.5			300	300	299	317			
	B		8	8	8																			
	C		8	8	8																			
	D		8	7	7																			
	F		8	6	6																			
Chemistry Tech prerenewal/postrenewal							PH	PH	PH	RC			PH	PH	PH	RC			PH	PH	PH	RC		

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

Project# X5499

Test started: Date 8/2/14

Time 1645

Client Eldorado Chemical

Test ended: Date 8/4/14

Time 1625

Sample Description 006

Test Species D. pulex

ID# BAL/IO-K1

Technician: Ohour AH 24hour AH 48hour RC 72hour --- 96hour ---

Time: Ohour 1645 24hour 1640 48hour 1625 72hour --- 96hour ---

Temperature (°C): Ohour 24.6 24hour 24.6 48hour 24.7 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																					
32	A		8	8	5			8.3	8.0	7.8			6.9	6.7	6.5			30.5	30.4	30.9	32.7			
	B		8	7	6																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	7																			
56	A		8	7	5			8.2	8.0	7.8			6.8	6.8	6.8			52.5	52.0	53.0	55.9			
	B		8	8	7																			
	C		8	8	8																			
	D		8	6	6																			
	F		8	8	2																			
Chemistry Tech prerenewal/postrenewal			AH	AH	AH	RC							AH	AH	AH	RC								

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

Project# X5499

Test started: Date 8/2/14

Time 1645

Client Eldorado Chemical

Test ended: Date 8/4/14

Time 1625

Sample Description 006

Test Species D. pullex

ID# BAL/IO-K1

Technician: Ohour AH 24hour AH 48hour RC 72hour _____ 96hour _____

Time: Ohour 1045 24hour 1100 48hour 1634 72hour _____ 96hour _____

Temperature (°C): Ohour NV 24hour NV 48hour 24.6 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																			
75	A		8	8	7			8.1	8.0	7.7			6.8	7.1	6.8			6.5	6.8	6.8		
	B		8	7	7																	
	C		8	7	6																	
	D		8	6	6																	
	E		8	7	5																	
100	A		8	8	8			8.0	8.2	7.8			6.8	7.0	6.8			8.1	7.6	8.6		
	B		8	7	5																	
	C		8	7	7																	
	D		8	6	6																	
	E		8	7	7																	
Chemistry Tech prerenewal/postrenewal							AH/AH/RC					AH/AH/RC					AH/AH/RC					

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

Project# XS499

Test started: Date 8/2/14 Time 1700

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1640

Sample Description 006

Test Species P. promelas ID# BA472114

Technician: 0hour AC 24hour AC 48hour AC 72hour 96hour

Time: 0hour 1700 24hour 1625 48hour 1640 72hour 96hour

Temperature (°C): 0hour 24.7 24hour 24.5 48hour 24.7 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	7.5	7.6			7.1	6.8	7.1			146.4	170.4	146.8	162.6	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	8			8.4	7.5	7.5			6.8	6.7	7.1			300	317	317	318	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal							ALL	AC/AC	AC			ALL	AC/AC	AC			ALL	AC/AC	AC			

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

Project# X5499

Test started: Date 8/2/14 Time 1720

Client El Dorado Chemical

Test ended: Date 8/2/14 Time 1640

Sample Description 006

Test Species P. promelas ID# BA4712114

Technician: 0hour AC 24hour AC 48hour AC 72hour AC 96hour AC

Time: 0hour 1720 24hour 1625 48hour 1640 72hour AC 96hour AC

Temperature (°C): 0hour 24.7 24hour 24.5 48hour 24.7 72hour AC 96hour AC

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		
32	A	Na	8	8	8			8.3	7.5	7.5			6.9	6.7	7.3			305	375	369	357			
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
45	A		8	8	8			8.2	7.5	7.5			6.8	6.7	7.1			450	454	453	474			
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
Chemistry Tech prerenewal/postrenewal							AC	AC	AC			AC	AC	AC			AC	AC	AC					

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

Project# X5409

Test started: Date 8/2/14 Time 1720

Client El Dorado Chemical

Test ended: Date 8/4/14 Time 1640

Sample Description 006

Test Species P. promelas ID# BA47/2/14

Technician: 0hour AC 24hour AC 48hour AC 72hour AC 96hour AC

Time: 0hour 1720 24hour 1625 48hour 1640 72hour AC 96hour AC

Temperature (°C): 0hour 24.7 24hour 24.5 48hour 24.7 72hour AC 96hour AC

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	A	Na	8	8	8			8.2	8.0	7.5			6.8	6.7	7.1			525	525	550		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	7																	
75	A		8	8	8			8.1	7.4	7.4			6.8	6.7	7.0			652	652	688		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal							OH	AC	AC			AH	AC	AC			AH	AC	AC			

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

Project# X5499

Test started: Date 8/2/14 Time 1720

client El Dorado Chemical

Test ended: Date 8/4/14 Time 1640

Sample Description 0010

Test Species P. promelas ID# BAU 7/21/14

Technician: 0hour AC 24hour AC 48hour AC 72hour 96hour

Time: 0hour 1720 24hour 1625 48hour 1640 72hour 96hour

Temperature (°C): 0hour 24.7 24hour 24.5 48hour 24.7 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	A	Na	8	8	7			80	7.4	7.3			6.8	6.6	6.8			814	809	826	866			
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
	F		8	8																				
	D		8	8																				
	B		8	8																				
	C		8	8																				
	D		8	8																				
	E		8	8																				
Chemistry Tech prerenewal/postrenewal							ADH	AC	AC	AC			ADH	AC	AC	AC			ADH	AC	AC	AC		

**APPENDIX C
STATISTICAL ANALYSES**

Daphnid Acute Test-48 Hr Survival

X5499
Page 21 of 32

Start Date: 8/2/2014 Test ID: X5499DP Sample ID: 6
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 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	0.8750	0.8750	1.0000
22	0.7500	1.0000	1.0000	0.8750	0.7500
32	0.6250	0.7500	1.0000	1.0000	0.8750
56	0.6250	0.8750	1.0000	0.7500	0.2500
75	0.8750	0.8750	0.7500	0.7500	0.6250
100	1.0000	0.6250	0.8750	0.7500	0.8750

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	1-Tailed		
			Mean	Min	Max	CV%		t-Stat	Critical	MSD
D-Control	0.9500	1.0000	1.3196	1.2094	1.3931	7.623	5			
22	0.8750	0.9211	1.2180	1.0472	1.3931	14.204	5	0.798	2.360	0.3004
32	0.8500	0.8947	1.1909	0.9117	1.3931	17.846	5	1.011	2.360	0.3004
*56	0.7000	0.7368	1.0170	0.5236	1.3931	32.385	5	2.378	2.360	0.3004
75	0.7750	0.8158	1.0850	0.9117	1.2094	11.644	5	1.843	2.360	0.3004
100	0.8250	0.8684	1.1542	0.9117	1.3931	15.823	5	1.300	2.360	0.3004

Auxiliary Tests		Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)		0.97799	0.927	-0.4384	0.54483						
Bartlett's Test indicates equal variances (p = 0.28)		6.27225	15.0863								
Hypothesis Test (1-tail, 0.05)		NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test		100	>100		1	0.21282	0.22683	0.0558	0.0405	0.26763	5, 24
Treatments vs D-Control											

56.0% - anomaly. ^{EGB} 8/12/14

Acute Fish Test-48 Hr Survival

X5499

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Start Date: 8/2/2014 Test ID: X5499PP Sample ID: 6
 End Date: 8/4/2014 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 8/2/2014 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
42	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	0.8750
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.8750	1.0000	1.0000	1.0000	1.0000

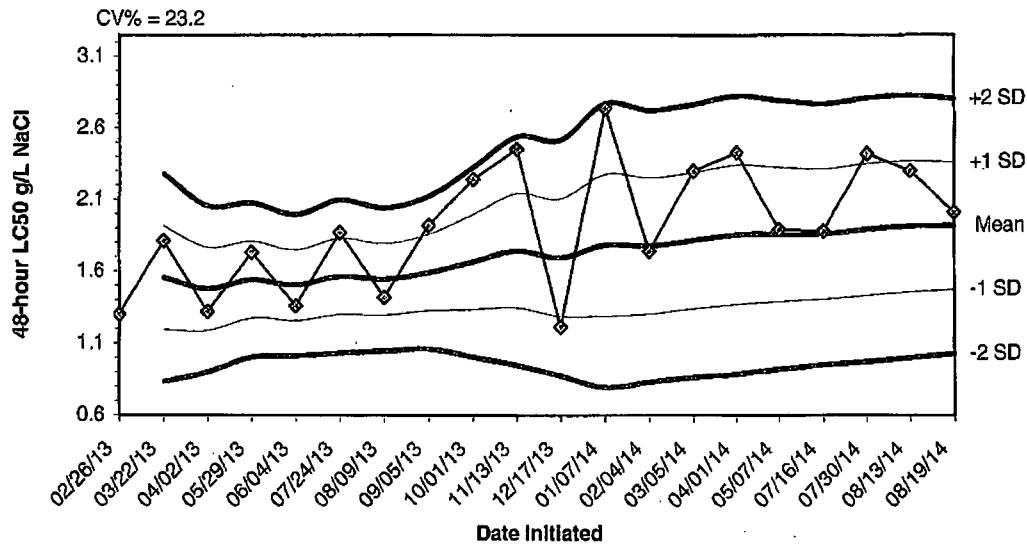
Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
42	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
56	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.51902	0.934	-2.9335	9.90057
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				

EBB
8/12/14

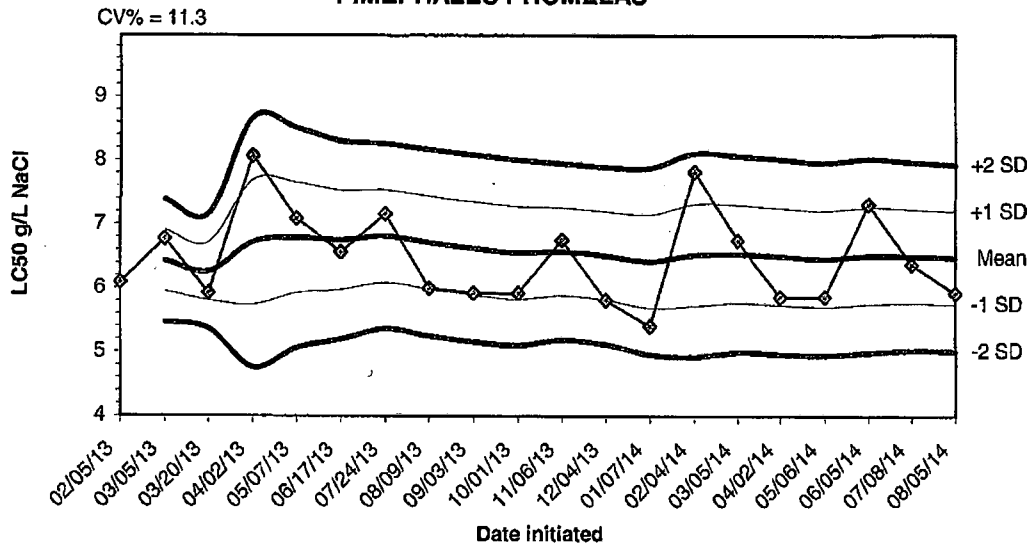
APPENDIX D
QUALITY ASSURANCE CHARTS

2014 48-Hour Reference Toxicant Test Results for *Daphnia pulex*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/26/13	1.3000	1.5550	1.1944	0.8338	1.9156	2.2762
03/22/13	1.8100	1.4767	1.1878	0.8990	1.7655	2.0544
04/02/13	1.3200	1.5400	1.2723	1.0046	1.8077	2.0754
05/29/13	1.7300	1.5040	1.2586	1.0132	1.7494	1.9948
06/04/13	1.3600	1.5650	1.2995	1.0339	1.8305	2.0961
07/24/13	1.8700	1.5443	1.2958	1.0472	1.7928	2.0413
08/09/13	1.4200	1.5913	1.3256	1.0599	1.8569	2.1226
09/05/13	1.9200	1.6633	1.3339	1.0045	1.9928	2.3222
10/01/13	2.2400	1.7420	1.3441	0.9461	2.1399	2.5379
11/13/13	2.4500	1.6936	1.2835	0.8733	2.1038	2.5140
12/17/13	1.2100	1.7808	1.2867	0.7925	2.2750	2.7691
01/07/14	2.7400	1.7777	1.3044	0.8312	2.2509	2.7242
02/04/14	1.7400	1.8150	1.3394	0.8637	2.2906	2.7663
03/05/14	2.3000	1.8560	1.3709	0.8859	2.3411	2.8261
04/01/14	2.4300	1.8581	1.3894	0.9207	2.3268	2.7955
05/07/14	1.8900	1.8594	1.4056	0.9517	2.3132	2.7671
07/16/14	1.8800	1.8906	1.4309	0.9712	2.3502	2.8099
07/30/14	2.4200	1.9121	1.4556	0.9991	2.3686	2.8251
08/13/14	2.3000	1.9170	1.4721	1.0273	2.3619	2.8067
08/19/14	2.0100					

2014 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR
PIMEPHALES PROMELAS



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/05/13	6.0900					
03/05/13	6.7700	6.4300	5.9492	5.4683	6.9108	7.3917
03/20/13	5.9200	6.2600	5.8102	5.3604	6.7098	7.1596
04/02/13	8.0700	6.7125	5.7358	4.7592	7.6892	8.6658
05/07/13	7.0900	6.7880	5.9255	5.0630	7.6505	8.5130
06/17/13	6.5600	6.7500	5.9730	5.1959	7.5270	8.3041
07/24/13	7.1600	6.8086	6.0825	5.3564	7.5346	8.2607
08/09/13	6.0000	6.7075	5.9770	5.2466	7.4380	8.1684
09/03/13	5.9200	6.6200	5.8880	5.1560	7.3520	8.0840
10/01/13	5.9200	6.5500	5.8252	5.1005	7.2748	7.9995
11/06/13	6.7500	6.5682	5.8780	5.1878	7.2584	7.9486
12/04/13	5.8100	6.5050	5.8115	5.1180	7.1985	7.8920
01/07/14	5.4000	6.4200	5.6887	4.9574	7.1513	7.8826
02/04/14	7.8200	6.5200	5.7240	4.9279	7.3160	8.1121
03/05/14	6.7500	6.5353	5.7660	4.9966	7.3047	8.0741
04/02/14	5.8600	6.4931	5.7309	4.9687	7.2553	8.0176
05/06/14	5.8600	6.4559	5.7021	4.9482	7.2097	7.9635
06/05/14	7.3100	6.5033	5.7448	4.9863	7.2619	8.0204
07/08/14	6.3700	6.4963	5.7585	5.0207	7.2341	7.9719
08/05/14	5.9200	6.4675	5.7379	5.0083	7.1971	7.9267

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: To: 8/01/14
From: To:

Test Initiated: 8/2/14

Dilution Water Used: Receiving Water Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22.0	32.0	56.0	75.0	100.0	
24-hour	A	100.0	75.0	100.0	87.5	100.0	100.0	
	B	100.0	100.0	87.5	100.0	87.5	87.5	
	C	87.5	100.0	100.0	100.0	87.5	87.5	
	D	100.0	87.5	100.0	75.0	75.0	75.0	
	E	100.0	75.0	100.0	100.0	87.5	87.5	
48-hour	A	100.0	75.0	62.5	62.5	87.5	100.0	
	B	100.0	100.0	75.0	87.5	87.5	62.5	
	C	87.5	100.0	100.0	100.0	75.0	87.5	
	D	87.5	87.5	100.0	75.0	75.0	75.0	
	E	100.0	75.0	87.5	25.0	62.5	87.5	
	Mean	95.0	87.5	85.0	70.0	77.5	82.5	

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 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: Haughton, Callahan
 Sample Collected

From: Date 8/1/14 Time 1200
 To: Date 8/2/14 Time 1645
 Test Begin Date 8/4/14 Time 1625
 Test End Date 8/4/14 Time 1625

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	8.4	7.8	24.6	24.6	24.7	32.0				52.0			7.1	6.8	6.4
22.0	8.4	8.2	7.8	24.6	24.6	24.7								6.8	6.7	6.5
32.0	8.3	8.2	7.8	24.6	24.6	24.7								6.9	6.7	6.5
56.0	8.2	8.0	7.8	24.6	24.6	24.7								6.8	6.8	6.8
75.0	8.1	7.9	7.7	24.6	24.6	24.7								6.8	6.8	6.8
100.0	8.0	7.8	7.8	24.6	24.6	24.7	16.0				192.0			6.8	6.8	6.8

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

Acute Forms
Pimephales promelas (Fathead minnow) Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 7 To: 8/01/14
From: To:

Test Initiated: 8/2/14

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	100.0	100.0	100.0	87.5
	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	87.5	100.0
	Mean	100.0	100.0	100.0	100.0	100.0	97.5	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 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***

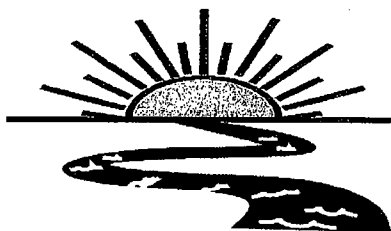
Permittee: El Dorado Chemical - Outfall 006
 NPDES Number: AR0000752/ AFIN 70-00040
 Contact: David Sartain
 Analyst: Callahan
 Sample Collected

From: Date 7 Time
 To: Date 8/1/14 Time 1200
 Test Begin Date 8/2/14 Time 1720
 Test End Date 8/4/14 Time 1640

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	8.4	7.6	24.7	24.5	24.7	32.0				52.0			7.1	6.8	7.1
22.0	8.4	8.2	7.5	24.7	24.5	24.7								6.8	6.7	7.1
32.0	8.3	8.2	7.5	24.7	24.5	24.7								6.9	6.7	7.2
45.0	8.2	8.1	7.5	24.7	24.5	24.7								6.8	6.7	7.1
56.0	8.2	8.0	7.5	24.7	24.5	24.7								6.8	6.8	7.1
75.0	8.1	7.9	7.4	24.7	24.5	24.7								6.8	6.8	7.0
100.0	8.0	7.8	7.3	24.7	24.5	24.7	16.0				192.0			6.8	6.8	6.8

*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 Company

Project#: X5499

Chain of Custody Documents Checked by: EGG 8/26/14
Technician/Date

Raw Data Documents Checked by: EGG 8/26/14
Technician/Date

Statistical Analysis Package Checked by: EGG 8/12/14
Quality Manager/Date

Quality Control Data Checked by: EGG 8/26/14
Quality Manager/Date

Report Checked by: EGG 8/27/14
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.

Cynthia L. Bragg, BS
Quality Manager

8/27/14
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) 863-1403
David Sartain
El Dorado Chemical Company
4500 NW Ave

Origin ID: ELDA



J14221409230328

El Dorado, AR 71730

Ship Date: 24SEP14
ActWgt: 2.0 LB
CAD: 5887030/INET3550

Delivery Address Bar Code



SHIP TO: (870) 863-1484

BILL SENDER

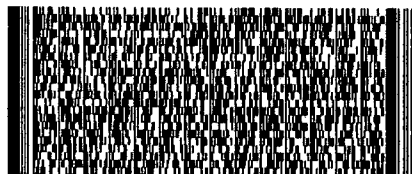
Water Enforcement Branch
ADEQ
5301 NORTSHORE DR

NORTH LITTLE ROCK, AR 72118

Ref #
Invoice #
PO #
Dept #

THU - 25 SEP 10:30A
PRIORITY OVERNIGHT

TRK# 7712 6129 9776
0201



X2 LITA

72118
AR-US
LIT

