

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5788

Bio-Analytical Laboratories' Executive Summary

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

Project #: X5788

Outfall: Outfall 006 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. David Sartain

Test Dates: July 5 - 7, 2015

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- 1 - **Fail**.
2. Report the NOEC for survival, Parameter TOM3D -0.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 27.54%.

Note: Due to the lack of available neonates less than 24 hours old, only the control and the 100% effluent dilution was set up in this test.

This report contains a total of 31 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 006
AT**

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

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

EPA Methods 2000.0 and 2021.0

Project X5788

**Test Dates: July 5 - 7, 2015
Report Date: July 16, 2015**

Prepared for:
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ADEQ #88-0630

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ADEQ #88-0630
Project X5788

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ADEQ #88-0630
Project X5788

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

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

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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, 45.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to lack of available neonates, the test concentrations used in the *Daphnia pulex* test were 100.0 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 July 4, 2015, at 1200 hours. Upon completion of collection, the sample was packed in ice and personally delivered to the laboratory. The temperature upon arrival was 3.9⁰ 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±1⁰ 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±1⁰ Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

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

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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 the minnow test, but were noted in the *Daphnia pulex* test after 48 hours of exposure (p=.05). The NOEC value for the fathead and *Daphnia pulex* test was 100.0 and zero percent effluent, respectively (p=.05). The 48-hour LC₅₀ values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration. See Appendix C- Statistical Analyses, for more information.

The original control for the daphnid test was actually invalid (i.e. less than 90 percent survival). The control for Project X5788 (EDCC Outfall 007) was used with this. The daphnids were of the same age and came from the same lot of cultures.

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Control	97.5	100.0
22.0	100.0	-----
32.0	97.5	-----
45.0	97.5	-----
56.0	92.5	-----
75.0	97.5	-----
100.0	100.0	62.5

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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4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on July 4, 2015, was not found to be lethally toxic to the fathead minnow test organisms in the 100.0 percent critical dilution after 48 hours of exposure; however, significant lethal effects were noted in the *Daphnia pulex* test ($p=.05$). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in the effluent dilutions ($p=.05$).

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5.0 References

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

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Bio-Analytical Laboratories

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

Laboratory Use Only:

Company: El Dorado Chemical Company				Phone: (870) 863-1484		Analysis:				Project Number: X5788 Temp. upon arrival: 39°C Therm 29 ECB 7/4/15 Preservative: (below)			
Address: 4500 Norwest Ave., El Dorado, AR 71731				Fax: (870) 863-7499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species		Acute Mysid	Acute Ceriodaphnia	Fecal Coliform
Permit #: AR0000752/AFIN 70-00040				Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: <i>Edward Pearson / EDCC / Edward L Pearson</i>													
Date Start	Date End	C	G	# and type of container	Sample Identification							Lab Control Number:	
07-04-15	0800	✓		6 half gallons	006			X	X			C1178	
07-04-15	1200												
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:				Date:	Time:
<i>Edward Pearson / EDCC</i>						07-04-15	1400	<i>Carl Buapp</i>				7/4/15	1400
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:				Date:	Time:
Relinquished by/Affiliation:						Date:	Time:	Received by/Affiliation:				Date:	Time:
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS <input checked="" type="checkbox"/> Client ___ Other Tracking # _____													
Comments:													
COC Rev. 3.0													

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5788

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/RC/CR

Test initiated: Date 7/5/15 Time 1130

Test terminated: Date 7/7/15 Time 1120

Dissolved Oxygen Meter: Model # YSI550A Serial #06E2089 AV

pH Meter: Model #Orion 230A+ Serial #015253

Conductivity Meter: Model # Control Co. Serial #122175539

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
C11178	8.1 97.6%	No/EGB	<0.01	NO	0.5	N/A	880	20.0	EGB
	7.8 93.9%	No/CR							CR

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	3745					7.0	48.0	28.0	EGB
↓	3749					7.0	56.0	24.0	EGB

Test Species Information

Test Species Info.	Species: <u>Artemia</u> ID#: <u>062815</u>	Species: <u>D. pulex</u> ID#: <u>02, 06, 52</u>	Species: ID#:	Species: ID#:
Age	<u>7 days</u>	<u><24 hours</u>		
Test Container Size	<u>250ml</u>	<u>30.0ml</u>		
Test volume	<u>200ml</u>	<u>25.0ml</u>		
Feeding: Type	<u>Artemia</u>	<u>Algae/YCT</u>		
Amount	<u>2.0 hours before initiation</u>			
Aeration?	<u>N/A</u>			
Amount				
Condition of survivors	<u>good CR 7/7/15</u>			

Comments: Due to lack of available neonates, only control and 100% dilutions ~~to~~ to 7/5 were set up in the D. pulex test EGB 7/5/15

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

Project# X5788

Test started: Date 7/5/15 Time 1130

Client EDCC

Test ended: Date 7/7/15 Time 1043

Sample Description 006

Test Species D. pulex ID# 02R0150

Technician: 0hour EGB 24hour CR 48hour CR 72hour _____ 96hour _____

Time: 0hour 1130 24hour 1352 48hour 1043 72hour _____ 96hour _____

Temperature (°C): 0hour 25.5 24hour 25.5 48hour 25.5 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity																																					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96																																	
0%		N/A				24	48																																																
0.30 FT	A		8	5	5	8	8	8	8.1	8.1				7.2	7.4	7.3									168.5	231	190.6																												
	B		8	3	2	8	8																																																
	C		8	6	3	8	8																																																
	D		8	7	6	8	8																																																
	E		8	5	4	8	8																																																
			A-EGB 7/7/15																																																				
22.0	A		8					7.9					7.1													203																													
	B		8																																																				
	C		8																																																				
	D		8																																																				
	E		8																																																				
			VO ID EGB 7/5/15																																																				
		Chemistry Tech prerenewal/postrenewal																																																					

Ⓢ Using control from X5789. Same lot of organisms.
EGB 7/7/15

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

Project# X5788

Test started: Date 7/5/15 Time 1130

Client EDCC

Test ended: Date 7/7/15 Time 1043

Sample Description 006

Test Species D. pulex ID# 0050

Technician: Ohour EB 24hour CR 48hour CR 72hour _____ 96hour _____

Time: Ohour 1130 24hour 1352 48hour 1243 72hour _____ 96hour _____

Temperature (°C): Ohour 25.5 24hour 26.5 48hour 25.5 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0.0		N/A																				
100.0	A	}	8	5	5			7.6	8.0 7.8	7.9			6.5	7.1 6.6	6.9			307	360 333	352		
	B		8	7	7																	
	C		8	6	6																	
	D		8	5	5																	
	E		8	2	2																	
100.0 pH Adj	A	}	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# X5788

Test started: Date 7/5/15 Time 1000

Client EDCC

Test ended: Date 7/7/15 Time 1120

Sample Description 006

Test Species D. promelas ID# 060815

Technician: 0hour EBB 24hour CR 48hour CR 72hour _____ 96hour _____

Time: 0hour 1000 24hour 1545 48hour 1120 72hour _____ 96hour _____

Temperature (°C): 0hour 24.9 24hour 24.9 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
0.50FT	A	N/A	8	8	8			8.0	7.9 8.3	7.7			7.2	7.3 7.2			168.5	170.8 170.8	180.				
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	7																		
22.0	A		8	8	8			7.9	7.8 7.2	7.7			7.1	7.1 7.1			223	227 227	205	212			
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	8																		
Chemistry Tech prerenewal/postrenewal			EBB CR CR					EBB CR CR					EBB CR CR										

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

Project# X5788

Test started: Date 7/5/15 Time 1000

Client EOCC

Test ended: Date 7/7/15 Time 1120

Sample Description 006

Test Species P. promelas ID# 062815

Technician: Ohour ELB 24hour CR 48hour CR 72hour _____ 96hour _____

Time: Ohour 1000 24hour 1545 48hour 1120 72hour _____ 96hour _____

Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
<u>40</u>		<u>N/A</u>																				
<u>32.0</u>	<u>A</u>		<u>8</u>	<u>8</u>	<u>8</u>			<u>7.8</u>	<u>7.7</u>	<u>7.6</u>			<u>7.0</u>	<u>7.1</u>	<u>7.2</u>			<u>217</u>	<u>234</u>	<u>219</u>	<u>229</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>C</u>		<u>8</u>	<u>8</u>	<u>7</u>																	
	<u>D</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>E</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
<u>45.0</u>	<u>A</u>		<u>8</u>	<u>8</u>	<u>8</u>			<u>7.9</u>	<u>7.7</u>	<u>8.0</u>	<u>7.5</u>		<u>6.8</u>	<u>7.1</u>	<u>7.1</u>			<u>238</u>	<u>256</u>	<u>241</u>	<u>248</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>7</u>																	
	<u>C</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>D</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>E</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
Chemistry Tech prerenewal/postrenewal			<u>ELB</u>	<u>CR</u>	<u>CR</u>			<u>ELB</u>	<u>CR</u>	<u>CR</u>			<u>ELB</u>	<u>CR</u>	<u>CR</u>			<u>ELB</u>	<u>CR</u>	<u>CR</u>		

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

Project# X5788

Test started: Date 7/5/15 Time 1000

Client EDCC

Test ended: Date 7/7/15 Time 1120

Sample Description 006
 Technician: Ohour EDB 24hour CR 48hour CR
 Time: Ohour 1000 24hour 1545 48hour 1120
 Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.9

Test Species P. promelas ID# 062815
 72hour _____ 96hour _____
 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
9%		N/A																				
56.0	A		8	8	6			7.8	7.1 7.9	7.5			6.8	7.1 6.9	7.1			252	215 257	262		
	B		8	8	8																	
	C		8	7	7																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A		8	8	8			7.9	7.1 7.9	7.5			6.8	7.0 6.8	7.0			289	303 290	296		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								EDB	CR CR	CR			EDB	CR CR	CR			EDB	CR CR	CR		

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

Project# X5788

Test started: Date 7/5/15 Time 1000

Client EDCC

Test ended: Date 7/7/15 Time 1120

Sample Description 006

Test Species P. promelas ID# 062815

Technician: Ohour EGB 24hour CR 48hour CR 72hour _____ 96hour _____

Time: Ohour 1000 24hour 1545 48hour 1120 72hour _____ 96hour _____

Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0.10		N/A																				
100.0	A	}	8	8	8			7.6	7.7	7.5			6.5	6.9	6.9			327	350	343		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
100.0 PR Adj	A	}	8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
			VOID EGB 7/5/15																			
Chemistry Tech prerenewal/postrenewal			EGB CR CR CR CR					EGB CR CR CR CR					EGB CR CR CR CR									

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

Start Date: 7/5/2015	Test ID: X5788DP	Sample ID: AR0000752-006
End Date: 7/7/2015	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date: 7/4/2015	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.6250	0.8750	0.7500	0.6250	0.2500

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		
*100	0.6250	0.6250	0.9207	0.5236	1.2094	27.541	5	15.00	19.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test Indicates non-normal distribution ($p \leq 0.05$)	0.75303	0.842	-1.0509	4.23212
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Wilcoxon Two-Sample Test indicates significant differences				
Treatments vs D-Control				

Acute Fish Test-48 Hr Survival

Start Date: 7/5/2015 Test ID: X5788PP Sample ID: AR0000752-006
 End Date: 7/7/2015 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/4/2015 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

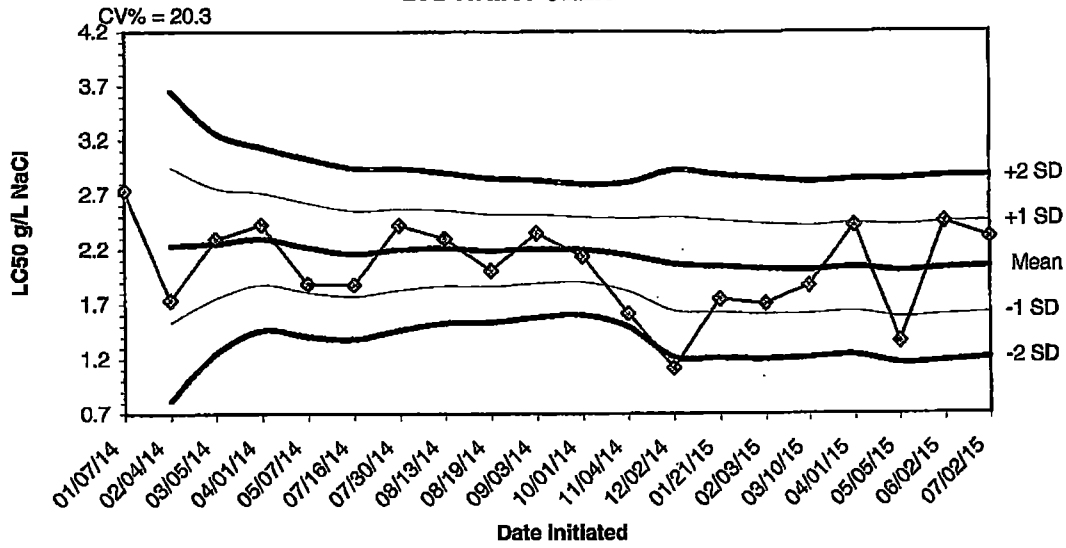
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.8750
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	0.8750	1.0000	1.0000
45	1.0000	0.8750	1.0000	1.0000	1.0000
56	0.7500	1.0000	0.8750	1.0000	1.0000
75	1.0000	1.0000	1.0000	0.8750	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
22	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
32	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00
45	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00
56	0.9250	0.9487	1.2872	1.0472	1.3931	12.116	5	24.50	16.00
75	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00
100	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.77154	0.934	-1.5047	2.13305
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

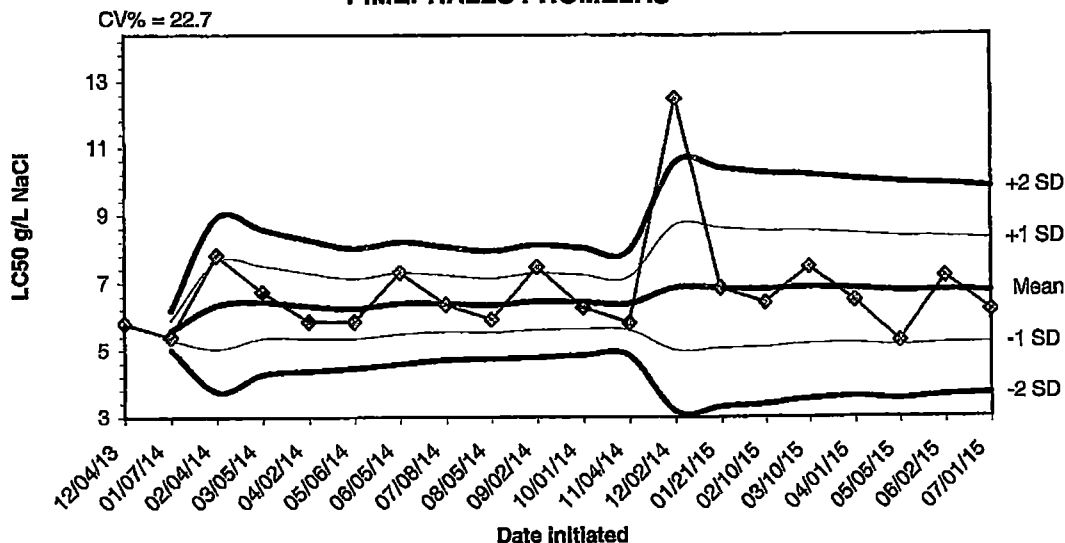
APPENDIX D
QUALITY ASSURANCE CHARTS

**2015 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS USING
DAPHNIA PULEX**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
01/07/14	2.7400					
02/04/14	1.7400	2.2400	1.5329	0.8258	2.9471	3.6542
03/05/14	2.3000	2.2600	1.7588	1.2576	2.7612	3.2624
04/01/14	2.4300	2.3025	1.8845	1.4666	2.7205	3.1384
05/07/14	1.8900	2.2200	1.8137	1.4075	2.6263	3.0325
07/16/14	1.8800	2.1633	1.7744	1.3854	2.5523	2.9413
07/30/14	2.4200	2.2000	1.8319	1.4638	2.5681	2.9362
08/13/14	2.3000	2.2125	1.8699	1.5272	2.5551	2.8978
08/19/14	2.0100	2.1900	1.8625	1.5349	2.5175	2.8451
09/03/14	2.3500	2.2060	1.8931	1.5802	2.5189	2.8318
10/01/14	2.1400	2.2000	1.9025	1.6050	2.4975	2.7950
11/04/14	1.6200	2.1517	1.8223	1.4929	2.4811	2.8105
12/02/14	1.1200	2.0723	1.6465	1.2206	2.4981	2.9240
01/21/15	1.7500	2.0493	1.6312	1.2131	2.4674	2.8855
02/03/15	1.7100	2.0267	1.6144	1.2021	2.4390	2.8513
03/10/15	1.8700	2.0169	1.6166	1.2164	2.4171	2.8174
04/01/15	2.4200	2.0406	1.6409	1.2412	2.4403	2.8399
05/05/15	1.3600	2.0028	1.5832	1.1635	2.4224	2.8420
06/02/15	2.4500	2.0263	1.6058	1.1853	2.4468	2.8673
07/02/15	2.3100	2.0405	1.6263	1.2121	2.4547	2.8689

**2015 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS USING
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/04/13	5.8100					
01/07/14	5.4000	5.6050	5.3151	5.0252	5.8949	6.1848
02/04/14	7.8200	6.3433	5.0482	3.7530	7.6385	8.9336
03/05/14	6.7500	6.4450	5.3681	4.2913	7.5219	8.5987
04/02/14	5.8600	6.3280	5.3594	4.3908	7.2966	8.2652
05/06/14	5.8600	6.2500	5.3628	4.4757	7.1372	8.0243
06/05/14	7.3100	6.4014	5.4979	4.5944	7.3050	8.2085
07/08/14	6.3700	6.3975	5.5609	4.7243	7.2341	8.0707
08/05/14	5.9200	6.3444	5.5459	4.7473	7.1430	7.9416
09/02/14	7.4800	6.4580	5.6238	4.7897	7.2922	8.1263
10/01/14	6.2800	6.4418	5.6486	4.8555	7.2350	8.0282
11/04/14	5.8100	6.3892	5.6112	4.8333	7.1671	7.9450
12/02/14	12.5000	6.8592	5.0079	3.1567	8.7105	10.5618
01/21/15	6.8500	6.8586	5.0799	3.3013	8.6372	10.4159
02/10/15	6.4200	6.8293	5.1116	3.3940	8.5470	10.2647
03/10/15	7.4800	6.8700	5.2026	3.5352	8.5374	10.2048
04/01/15	6.4800	6.8471	5.2298	3.6126	8.4643	10.0815
05/05/15	5.2900	6.7606	5.1493	3.5380	8.3718	9.9831
06/02/15	7.2000	6.7837	5.2146	3.6454	8.3528	9.9220
07/01/15	6.1800	6.7535	5.2203	3.6870	8.2867	9.8200

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: 7/4/15 To: 7/4/15
From: To:

Test Initiated: 6/18/15

Dilution Water Used: Receiving Water X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	100.0					
24-hour	A	100.0	62.5					
	B	100.0	87.5					
	C	100.0	75.0					
	D	100.0	62.5					
	E	100.0	25.0					
48-hour	A	100.0	62.5					
	B	100.0	87.5					
	C	100.0	75.0					
	D	100.0	62.5					
	E	100.0	25.0					
	Mean		100.0	62.5				

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) F

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

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

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

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

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

Sample Collected **From:** **Date 7/04/15** **Time 0800**
To: **Date 7/04/15** **Time 1200**
Test Begin **Date 7/05/15** **Time 1130**
Test End **Date 7/07/15** **Time 1043**

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		8.0	8.3	8.1	25.5	25.5	25.5	28.0	24.0		48.0	56.0		7.2	7.3	7.3
100.0		7.6	7.8	7.9	25.5	25.5	25.5	20.0			88.0			6.5	6.6	6.9

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

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 7/4/15 To: 7/4/15
From: To:

Test Initiated: 6/18/15

Dilution Water Used: Receiving Water 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	87.5	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	75.0	100.0	100.0
	B	100.0	100.0	100.0	87.5	100.0	100.0	100.0
	C	100.0	100.0	87.5	100.0	87.5	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	87.5	100.0
	E	87.5	100.0	100.0	100.0	100.0	100.0	100.0
	Mean	97.5	100.0	97.5	97.5	92.5	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 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) F**
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

**Biomonitoring
Pimephales promelas 48 hour Acute Static Renewal
Chemical Parameters Chart***

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

**Sample Collected From: Date 7/04/15 Time 0800
To: Date 7/04/15 Time 1200
Test Begin Date 7/05/15 Time 1000
Test End Date 7/07/15 Time 1120**

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		8.0	8.3	7.7	24.9	24.9	24.9	28.0	24.0		48.0	56.0		7.2	7.3	7.2
22.0		7.9	8.2	7.7	24.9	24.9	24.9							7.1	7.1	7.1
32.0		7.8	8.1	7.6	24.9	24.9	24.9							7.0	7.0	7.2
45.0		7.9	8.0	7.5	24.9	24.9	24.9							6.8	6.9	7.1
56.0		7.8	7.9	7.5	24.9	24.9	24.9							6.8	6.9	7.1
75.0		7.9	7.9	7.5	24.9	24.9	24.9							6.8	6.8	7.0
100.0		7.6	7.8	7.5	24.9	24.9	24.9	20.0			88.0			6.5	6.6	6.9

*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: E1 Dorado Chemical 006

Project#: X X ^{pc 7/16/15} 5788

Chain of Custody Documents Checked by: RC 7/16/15
Technician/Date

Raw Data Documents Checked by: RC 7/16/15
Technician/Date

Statistical Analysis Package Checked by: EOB 7/16/15
Quality Manager/Date

Quality Control Data Checked by: EOB 7/16/15
Quality Manager/Date

Report Checked by: EOB 7/16/15
Quality Manager/Date

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

Cliff G. Baupp, BS 7/16/15
Quality Manager Date

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