

Bio-Analytical Laboratories (BAL)  
ADEQ#88-0630  
Project X5928

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X5928

**Outfall:** Outfall 006 (contaminated storm water)

**Permit #:** AR0000752/ AFIN #70-00040

**Contact:** Mr. Eddie Pearson

**Test Dates:** January 8 - 10, 2016

**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:

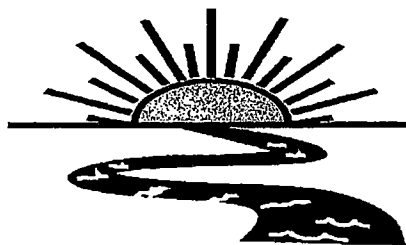
##### For *Pimephales promelas*:

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 - 47.45% (**exceeded permit limit**).

##### 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 - 6.06%.

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



## 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 X5928**

**Test Dates: January 8 - 10, 2016  
Report Date: January 20, 2016**

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

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ADEQ #88-0630

BAL  
ADEQ #88-0630  
Project X5928

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## 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<sub>50</sub>, 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. 20<sup>th</sup> Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

### 2.2 Test Organisms

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

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

### **2.5 Sample Collection**

One sample of Outfall 006 were collected by El Dorado Chemical personnel on January 7, 2016 at 0900 hours. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. The temperature upon arrival was 1.1<sup>0</sup> Celsius, respectively.

### **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<sup>0</sup> Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/L) with a Capital Controls<sup>R</sup> amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a HACH<sup>R</sup> test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements (in mg/L, standard units and umhos/cm, respectively) 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 in mg/L as CaCO<sub>3</sub> on the control and the highest effluent concentration.

### **2.7 Monitoring of the Tests**

The tests were run in a Precision<sup>R</sup> dual controlled illuminated incubator at a temperature of 25±1<sup>0</sup> Celsius. An AEMC<sup>R</sup> 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 LC<sub>50</sub> values 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 either test after 48 hours of exposure ( $p=.05$ ). The NOEC value for the fathead and *Daphnia pulex* tests was 100.0 percent effluent ( $p=.05$ ). The 48-hour  $LC_{50}$  values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration. The percent coefficient of variation (%CV) was 47.4 percent in the 100.0 percent critical dilution in the fathead minnow test. This value measures the variability amongst replicates in a concentration. It exceeded the permit limit of 40.0 percent.

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Control	100.0	97.5
22.0	87.5	100.0
32.0	95.0	100.0
45.0	80.0	100.0
56.0	80.0	97.5
75.0	80.0	100.0
100.0	75.0	100.0

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 January 7, 2016, were 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 ( $p=.05$ ). The percent coefficient of variation (%CV) in the fathead minnow test was 47.4 percent in the 100.0 percent critical dilution. This exceeded the permit limit of 40.0 percent for a passing test.

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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. 20<sup>th</sup> 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:

<b>Company:</b> El Dorado Chemical Company				<b>Phone:</b> (870) 863-1484		<b>Analysis:</b>				Project Number:  X 5928  Temp. upon arrival: 0.5°C Therm 29 EOB 1/8/16 Preservative: (below)
<b>Address:</b> 4500 Norwest Ave., El Dorado, AR 71731				<b>Fax:</b> (870) 863-7499		Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Lab Control Number:			
<b>Permit #:</b> AR0000752/AFIN 70-00040				<b>Purchase Order:</b>						
<b>Sampler's Signature/Printed Name/Affiliation:</b> Edward L Pearson / Edward L Pearson / EDCC										
<b>Date Start</b> Date End	<b>Time Start</b> Time End	C	G	# and type of container	Sample Identification					
01-07-2016 01-07-2016	0700 0900	X		6 half gallons	Outfall 006		C11915			
<b>Relinquished by/Affiliation:</b> Edward L Pearson / EDCC				<b>Date:</b> 01-08-2016	<b>Time:</b> 0930	<b>Received by/Affiliation:</b> [Signature]		<b>Date:</b> 1-8-16	<b>Time:</b> 0945	
<b>Relinquished by/Affiliation:</b>				<b>Date:</b>	<b>Time:</b>	<b>Received by/Affiliation:</b>		<b>Date:</b>	<b>Time:</b>	
<b>Relinquished by/Affiliation:</b> [Signature]				<b>Date:</b> 1-8-16	<b>Time:</b> 1145	<b>Received by/Affiliation:</b> [Signature]		<b>Date:</b> 1/8/16	<b>Time:</b> 1145	
<b>Method of Shipment:</b> <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other <b>Tracking #</b> _____										
<b>Comments:</b>										
COC Rev. 3.0										

**APPENDIX B**  
**RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES  
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5928

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 1/8/16 Time 1500

Test terminated: Date 1/10/16 Time 1530

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)	Dechlor inated? Amount?	Ammonia (NH3) mg/L	Salinity	Hard-ness	Alkal-inity	Tech
C11915	7.5/15.1%	7/15/7.9 95.3%	<0.01	NO	6.0	N/A	100% 200.0	100% 40.0	CR
	5.2/10.3%	7/20/7.4 91.1%							

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	Hard-ness	Alkal-inity	Tech
Soft H2O	3813	N/A	N/A	N/A	N/A	7.0	100% 40.0	100% 28.0	CR

Test Species Information

Test Species Info.	Diplolex Species: ID#: BAL ES-F6	P. promelas Species: ID#: BAL 0106	Species: ID#:	Species: ID#:
Age	<24 hrs	2d		
Test Container Size	30 ml	300 ml		
Test volume	25 ml	250 ml		
Feeding: Type	2 hrs prior to test initiation			
Amount				
Aeration?	N/A	N/A		
Amount				
Condition of survivors	good	good		

Comments:

✓  
EGB 1/10/16

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

Project# X5928

Test started: Date 1/8/16

Time 1500

Client EDCC

Test ended: Date 1/10/16

Time 1510

Sample Description 006

Test Species D. pulex

ID# ES-F6

Technician: 0hour ESB 24hour CR 48hour ESB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Time: 0hour 1500 24hour 1513 48hour 1519 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Temperature (°C): 0hour 24.8 24hour 24.8 48hour 24.4 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	N/A	8	8	8			7.9	<del>7.9</del> 5.0	8.1			7.2	<del>7.3</del> 7.2	7.5			173.3	<del>216</del> 181.3	209		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	7	7																	
22.0	A		8	8	8			7.9	<del>7.8</del> 7.9	8.1			7.2	<del>7.3</del> 7.2	7.4			275	<del>317</del> 293	300		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			CR					CR					CR					CR				

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

Project# X5928

Test started: Date 1/8/16

Time 1500

Client ED CC

Test ended: Date 1/10/16

Time 1510

Sample Description 006

Test Species D. pulex

ID# E5-F6

Technician: Ohour EGB 24hour CR 48hour EGB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1500 24hour 1513 48hour 1510 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 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
90		N/A																				
32.0	A		8	8	8			7.8	<del>7.7</del> 7.9	7.9			7.2	<del>7.3</del> 7.2	7.3			328	<del>362</del> 340	349		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
45.0	A		8	8	8			7.8	<del>7.7</del> 7.8	8.4			7.2	<del>7.3</del> 7.2	7.3			391	<del>421</del> 403	405		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR	CR

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

Project# X5928

Test started: Date 1/8/16

Time 1500

Client EDCC

Test ended: Date 1/10/16

Time 1510

Sample Description 006

Test Species D. pulley ID# E5-F6

Technician: 0hour EGB 24hour CR 48hour EGB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1500 24hour 1513 48hour 1510 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 24.8 24hour 24.8 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
9%		N/A																				
56.0	A		8	8	8			7.7	<del>7.6</del> 7.8	8.0			7.2	<del>7.3</del> 7.2	7.2			442	<del>484</del> 455	460		
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	8	8																	
75.0	A		8	8	8			7.7	<del>7.6</del> 7.6	8.0			7.2	<del>7.3</del> 7.2	7.2			527	<del>573</del> 551	560		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			CR CR EGB					CR CR EGB					CR CR EGB									

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

Project# X5928

Test started: Date 1/8/16 Time 1500

Client EDCC

Test ended: Date 1/10/16 Time 1510

Sample Description 006

Test Species D. pulex ID# ES-F6

Technician: 0hour EBB 24hour CE 48hour EBB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1500 24hour 1513 48hour 1510 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 14.8 24hour 14.8 48hour 14.6 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
0.10		N/A																				
100.0	A	}	8	8	8			7.6	7.5 7.5	8.1			7.2	7.3 7.3	7.2			653	696 679	657		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
CR 1/9/16	E		8	8	8																	
<del>100.0 PK Adj</del>	A	}	8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal			CR <u>CE</u> / <u>EBB</u>					CR <u>CE</u> / <u>EBB</u>					CR <u>CE</u> / <u>EBB</u>									



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

Project# X5928

Test started: Date 1/8/16 Time 1516

Client EDCC

Test ended: Date 1/10/16 Time 1530 *ca 1716*

Sample Description 006

Test Species P. promelas ID# 8A191616

Technician: Ohour CR 24hour CR 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1516 24hour 1623 48hour 1530 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 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
9/10		N/A																				
0.50FT	A		8	8	8			7.9	7.8	8.0	8.1		7.2	7.1	7.2	7.4		173.3	230	181.3	196	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22.0	A		8	8	8			7.9	7.9	7.9	8.1		7.2	7.0	7.2	7.2		215	311	213	295	
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	4	4																	
Chemistry Tech prerenewal/postrenewal			CR CR CR EB					CR CR CR EB					CR CR CR EB									

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

Project# X5928

Test started: Date 1/8/16 Time 1516

Client EDGC

Test ended: Date 1/10/16 Time 1530

Sample Description 006 <sup>K<sub>1</sub>CR</sup> 1/8/16

Test Species P. promelas ID# BAL 010616

Technician: 0hour CR 24hour CR 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1516 24hour 1643 48hour 1530 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 15.248 24hour 24.8 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
<u>9.0</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>7.5</u>	<u>7.9</u>			<u>7.2</u>	<u>7.1</u>	<u>7.2</u>			<u>328</u>	<u>312</u>	<u>340</u>	<u>343</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>C</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>D</u>		<u>8</u>	<u>7</u>	<u>7</u>																	
	<u>E</u>		<u>8</u>	<u>7</u>	<u>7</u>																	
<u>45.0</u>	<u>A</u>		<u>8</u>	<u>8</u>	<u>8</u>			<u>7.8</u>	<u>7.5</u>	<u>7.9</u>			<u>7.2</u>	<u>7.1</u>	<u>7.2</u>			<u>391</u>	<u>429</u>	<u>463</u>	<u>405</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</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>0</u>	<u>0</u>																	
Chemistry Tech prerenewal/postrenewal			<u>CR</u> <u>CR</u> <u>CR</u> <u>EB</u>					<u>CR</u> <u>CR</u> <u>CR</u> <u>EB</u>					<u>CR</u> <u>CR</u> <u>CR</u> <u>EB</u>									

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

Project# X5928

Test started: Date 11/8/16 Time 1516

Client EDCC

Test ended: Date 11/10/16 Time 1530

Sample Description 006 Test Species P. promelas ID# BAL010615  
 Technician: Ohour CR 24hour CR 48hour EBB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Time: Ohour 1516 24hour 1623 48hour 1530 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Temperature (°C): Ohour 24.8 24hour 24.8 48hour 24.10 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																				
56.0	A	}	8	8	8			7.7	7.4	7.8			7.2	7.1	7.2			442	452	455	451	
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	1	1																	
75.0	A	}	8	8	8			7.7	7.3	7.7			7.2	7.1	7.1			527	515	551	540	
	B		8	8	8																	
	C		8	7	7																	
	D		8	8	8																	
	E		8	1	1																	
Chemistry Tech prerenewal/postrenewal			CR CR CR EBB					CR CR CR EBB					CR CR CR EBB									

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

Project# X5928

Test started: Date 01/06/10 Time 1516

Client EDCC

Test ended: Date 1/10/10 Time 1530

Sample Description 006

Test Species P. promelas ID# BAL010016

Technician: Ohour CR 24hour CR 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1516 24hour 1623 48hour 1530 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 48hour 24.8 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	<del>7.2</del> 7.5	7.7			7.2	<del>7.1</del> 7.3	7.0			663	<del>705</del> 676	676		
	B		8	8	8																	
	C		8	7	7																	
	D		8	7	7																	
	E		8	0	6																	
<del>100.0 PK Adj</del>	A	}	8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal			CR/CR/CR/CR/CR					CR/CR/CR/CR/CR					CR/CR/CR/CR/CR									

**APPENDIX C**  
**STATISTICAL ANALYSES**

**Daphnid Acute Test-48 Hr Survival**

Start Date: 1/8/2016 Test ID: X5928CD Sample ID: AR0000752-006  
 End Date: 1/10/2016 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial  
 Sample Date: 1/7/2016 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	0.8750
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	0.8750	1.0000
75	1.0000	1.0000	1.0000	1.0000	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	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
45	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
56	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00
75	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	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 <= 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				

**Acute Fish Test-48 Hr Survival**

Start Date: 1/8/2016      Test ID: X5928PP      Sample ID: AR0000752-006  
 End Date: 1/10/2016      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 1/7/2016      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	0.8750	0.5000
32	1.0000	1.0000	1.0000	0.8750	0.8750
45	1.0000	1.0000	1.0000	1.0000	0.0000
56	1.0000	1.0000	1.0000	0.8750	0.1250
75	1.0000	1.0000	0.8750	1.0000	0.1250
100	1.0000	1.0000	0.8750	0.8750	0.0000

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	0.8750	0.8750	1.2348	0.7854	1.3931	21.341	5	22.50	16.00
32	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	22.50	16.00
45	0.8000	0.8000	1.1500	0.1777	1.3931	47.263	5	25.00	16.00
56	0.8000	0.8000	1.1500	0.3614	1.3931	38.954	5	22.50	16.00
75	0.8000	0.8000	1.1500	0.3614	1.3931	38.954	5	22.50	16.00
100	0.7500	0.7500	1.0765	0.1777	1.3931	47.447	5	20.00	16.00

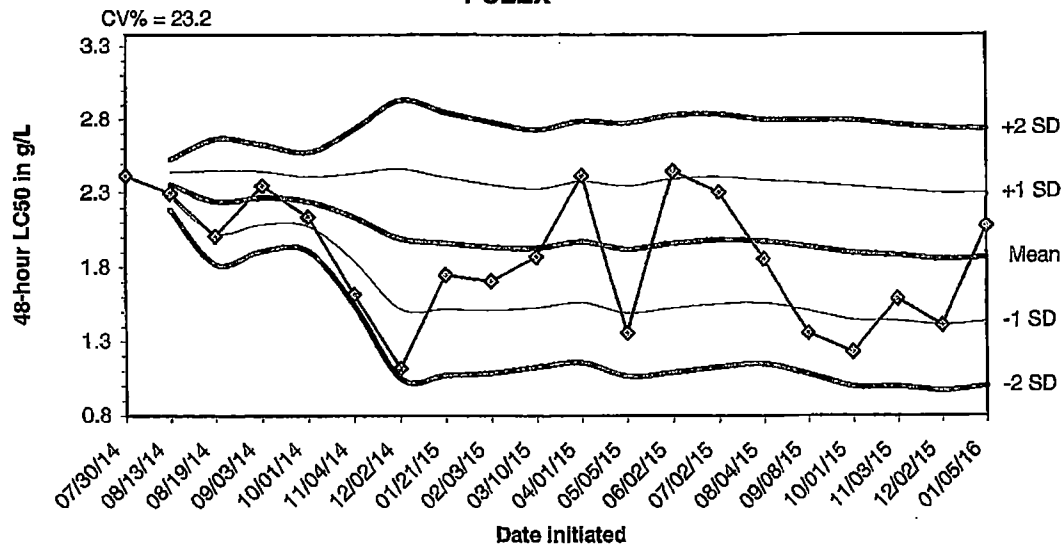
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.72277	0.934	-1.8254	2.41605
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

*EGB*  
1/18/16

**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

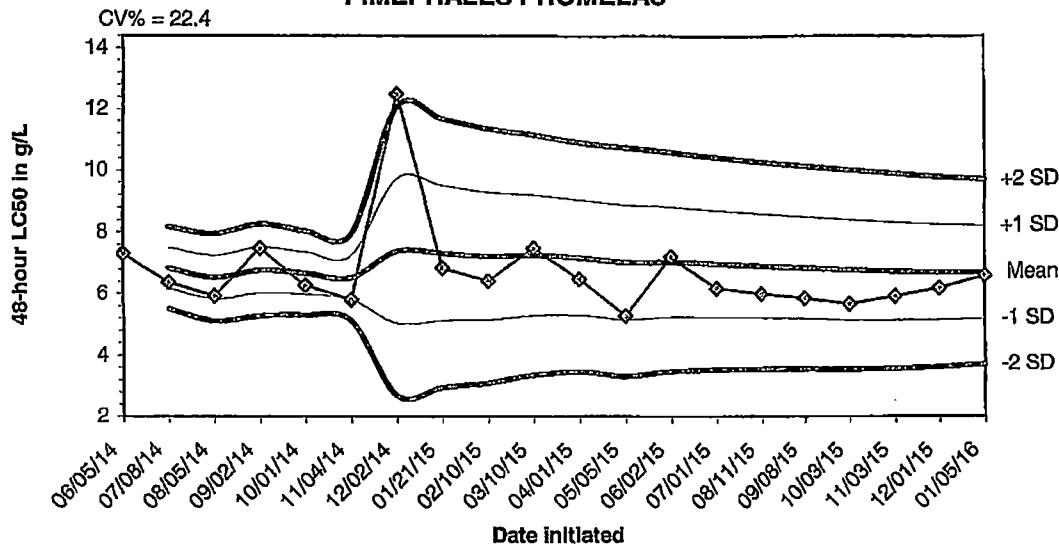


**2016 48-HOUR REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/30/14	2.4200					
08/13/14	2.3000	2.3600	2.2751	2.1903	2.4449	2.5297
08/19/14	2.0100	2.2433	2.0325	1.8217	2.4541	2.6649
09/03/14	2.3500	2.2700	2.0898	1.9096	2.4502	2.6304
10/01/14	2.1400	2.2440	2.0775	1.9110	2.4105	2.5770
11/04/14	1.6200	2.1400	1.8449	1.5498	2.4351	2.7302
12/02/14	1.1200	1.9943	1.5240	1.0537	2.4646	2.9349
01/21/15	1.7500	1.9638	1.5198	1.0759	2.4077	2.8516
02/03/15	1.7100	1.9356	1.5118	1.0880	2.3593	2.7831
03/10/15	1.8700	1.9290	1.5289	1.1289	2.3291	2.7291
04/01/15	2.4200	1.9736	1.5662	1.1589	2.3810	2.7884
05/05/15	1.3600	1.9225	1.4956	1.0687	2.3494	2.7763
06/02/15	2.4500	1.9631	1.5289	1.0948	2.3972	2.8313
07/02/15	2.3100	1.9879	1.5606	1.1333	2.4151	2.8424
08/04/15	1.8600	1.9793	1.5663	1.1532	2.3924	2.8055
09/08/15	1.3600	1.9406	1.5126	1.0845	2.3687	2.7967
10/01/15	1.2300	1.8988	1.4500	1.0011	2.3477	2.7965
11/03/15	1.5900	1.8817	1.4402	0.9987	2.3232	2.7647
12/02/15	1.4100	1.8568	1.4143	0.9719	2.2993	2.7418
01/05/16	2.0800	1.8680	1.4344	1.0009	2.3016	2.7351

**2016 48-HOUR REFERENCE TOXICANT TEST RESULTS FOR  
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/05/14	7.3100					
07/08/14	6.3700	6.8400	6.1753	5.5106	7.5047	8.1694
08/05/14	5.9200	6.5333	5.8241	5.1148	7.2426	7.9518
09/02/14	7.4800	6.7700	6.0221	5.2741	7.5179	8.2659
10/01/14	6.2800	6.6720	5.9882	5.3044	7.3658	8.0396
11/04/14	5.8100	6.5283	5.8227	5.1171	7.2340	7.9396
12/02/14	12.5000	7.3814	5.0342	2.6870	9.7286	12.0758
01/21/15	6.8500	7.3150	5.1338	2.9526	9.4962	11.6774
02/10/15	6.4200	7.2156	5.1535	3.0915	9.2776	11.3396
03/10/15	7.4800	7.2420	5.2961	3.3502	9.1879	11.1338
04/01/15	6.4800	7.1727	5.3125	3.4522	9.0330	10.8933
05/05/15	5.2900	7.0158	5.1607	3.3056	8.8709	10.7260
06/02/15	7.2000	7.0300	5.2531	3.4763	8.8069	10.5837
07/01/15	6.1800	6.9693	5.2471	3.5249	8.6915	10.4137
08/11/15	6.0000	6.9047	5.2264	3.5480	8.5830	10.2613
09/08/15	5.8600	6.8394	5.1971	3.5548	8.4817	10.1240
10/03/15	5.6700	6.7706	5.1553	3.5401	8.3858	10.0011
11/03/15	5.9200	6.7233	5.1435	3.5638	8.3031	9.8829
12/01/15	6.1800	6.6947	5.1544	3.6141	8.2351	9.7754
01/05/16	6.5900	6.6895	5.1901	3.6906	8.1889	9.6884

**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: 1/07/16      To: 1/07/16  
From:      To:

Test Initiated: 1/08/16

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	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	87.5	100.0	100.0
	E	87.5	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	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	87.5	100.0	100.0
	E	87.5	100.0	100.0	100.0	100.0	100.0	100.0
	Mean	97.5	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       NO  
b.) 1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A %)      YES      NO

2. Enter percent effluent corresponding to the LC<sub>50</sub> below:

LC<sub>50</sub> =      N/A % effluent

95 % confidence limits:

Method of LC<sub>50</sub> 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: Eddie Pearson  
 Analyst: Briggs, Callahan  
 Sample Collected      From:      Date 1/07/16      Time 0700  
    To:      Date 1/07/16      Time 0900  
 Test Begin                              Date 1/08/16      Time 1500  
 Test End                                 Date 1/10/16      Time 1510

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		7.9	8.0	8.1	24.8	24.8	24.6	28.0			40.0			7.2	7.2	7.5
22.0		7.9	7.9	8.1	24.8	24.8	24.6							7.2	7.2	7.4
32.0		7.8	7.9	7.9	24.8	24.8	24.6							7.2	7.2	7.3
45.0		7.8	7.8	8.4	24.8	24.8	24.6							7.2	7.2	7.3
56.0		7.7	7.8	8.0	24.8	24.8	24.6							7.2	7.2	7.2
75.0		7.7	7.6	8.0	24.8	24.8	24.6							7.2	7.2	7.2
100.0		7.6	7.5	8.1	24.8	24.8	24.6	40.0			200.0			7.2	7.3	7.2

\*This Form is to be submitted with each DMR.  
 Alkalinity and hardness to be reported as mg/l CaCO<sub>3</sub>

**Acute Forms**  
**Pimephales promelas (Fathead minnow) Survival**

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected      From: 1/07/16      To: 1/07/16  
From:      To:

Test Initiated: 1/08/16

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	87.5	87.5
	D	100.0	87.5	87.5	100.0	87.5	100.0	87.5
	E	100.0	50.0	87.5	0.0	12.5	12.5	0.0
48-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	87.5	87.5
	D	100.0	87.5	87.5	100.0	87.5	100.0	87.5
	E	100.0	50.0	87.5	0.0	12.5	12.5	0.0
	Mean	100.0	87.5	95.0	80.0	80.0	80.0	75.0

**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 LC<sub>50</sub> below:**

LC<sub>50</sub> =      N/A % effluent

95 % confidence limits:

Method of LC<sub>50</sub> 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: Eddie Pearson  
 Analyst: Briggs, Callahan

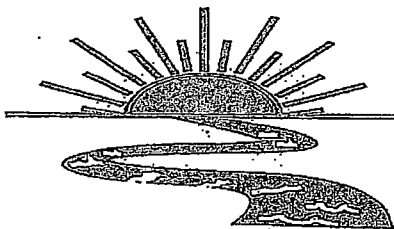
Sample Collected      From:      Date 1/07/16      Time 0700  
    To:      Date 1/07/16      Time 0900  
 Test Begin                              Date 1/08/16      Time 1516  
 Test End                                 Date 1/10/16      Time 1530

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		7.9	8.0	8.1	24.8	24.8	24.6	28.0			40.0			7.2	7.2	7.4
22.0		7.9	7.9	8.1	24.8	24.8	24.6							7.2	7.2	7.2
32.0		7.8	7.9	8.0	24.8	24.8	24.6							7.2	7.2	7.2
45.0		7.8	7.8	7.9	24.8	24.8	24.6							7.2	7.2	7.2
56.0		7.7	7.8	7.8	24.8	24.8	24.6							7.2	7.2	7.2
75.0		7.7	7.6	7.7	24.8	24.8	24.6							7.2	7.2	7.1
100.0		7.6	7.5	7.7	24.8	24.8	24.6	40.0			200.0			7.2	7.3	7.0

\*This Form is to be submitted with each DMR.  
 Alkalinity and hardness to be reported as mg/l CaCO<sub>3</sub>

**APPENDIX F**  
**REPORT QUALITY ASSURANCE FORM**





# Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

(318) 745-2772  
1-800-259-1248  
Fax: (318) 745-2773

## REPORT QUALITY ASSURANCE FORM

Client: El Dorado Chemical Company 1006

Project#: X5928

Chain of Custody Documents Checked by: RC 4/5/16  
Technician/Date

Raw Data Documents Checked by: RC 4/5/16  
Technician/Date

Statistical Analysis Package Checked by: EGG 1/18/16  
Quality Manager/Date

Quality Control Data Checked by: EGG 1/8/16  
Quality Manager/Date

Report Checked by: EGG 1/20/16  
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.

Paul S. Buapp, BS 1/20/16  
Quality Manager 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 X5941

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X5941

**Outfall:** Outfall 006 (contaminated storm water)

**Permit #:** AR0000752/ AFIN #70-00040

**Contact:** Mr. Eddie Pearson

**Test Dates:** January 22 - 24, 2016

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

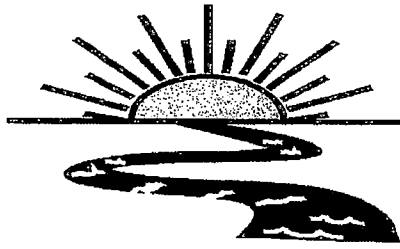
**Results:**

**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 - 16.60%.

**This is a retest for a fathead minnow test conducted earlier this month. The previous test passed, but the % coefficient of variation in the 100% critical dilution was >40.0%. This exceeded the test acceptance limits listed in the whole effluent toxicity test section of the permit.**

**This report contains a total of 26 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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3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

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

**THE RESULTS OF A 48-HOUR ACUTE  
TOXICITY TEST  
FOR OUTFALL 006  
AT**

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

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

**EPA Method 2000.0**

**Project X5941**

**Test Dates: January 22 - 24, 2016  
Report Date: February 2, 2016**

**Prepared for:**  
Mr. Eddie Pearson  
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**Prepared by:**  
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ADEQ #88-0630

BAL  
ADEQ #88-0630  
Project X5941

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ADEQ #88-0630  
Project X5941

## 1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted a 48-hour acute toxicity test for Outfall 006 at El Dorado Chemical Company, El Dorado, Arkansas. The test organism used was the fathead minnow, *Pimephales promelas*. 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 organism 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 organism 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<sub>50</sub>, 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, 20<sup>th</sup> Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

### 2.2 Test Organisms

The fathead minnows were raised in-house and were approximately two days old at test initiation. The minnows were acclimated to dilution water hardness prior to testing. 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 test.

### **2.4 Test Concentrations**

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

### **2.5 Sample Collection**

Two composite samples of Outfall 006 were collected by El Dorado Chemical personnel on January 22 and 23, 2016, at 1200 and 0800 hours, respectively. Upon completion of collection, the samples were packed in ice and delivered to the laboratory by BAL personnel. The temperature upon arrival for each sample was -0.11 and 2.7° Celsius, respectively.

### **2.6 Sample Preparation**

Upon arrival, each sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to  $25 \pm 1^{\circ}$  Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/L) with a Capital Controls<sup>R</sup> amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a HACH<sup>R</sup> test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements (in mg/L, standard units and umhos/cm, respectively) 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 in mg/L as CaCO<sub>3</sub> on the control and the highest effluent concentration.

### **2.7 Monitoring of the Test**

The test was run in a Precision<sup>R</sup> dual controlled illuminated incubator at a temperature of  $25 \pm 1^{\circ}$  Celsius. An AEMC<sup>R</sup> 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 LC<sub>50</sub> 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 test can be found in Table 1. Significant differences in survival were not noted in the critical dilution after 48 hours of exposure ( $p=.05$ ). The NOEC value for the test was 100.0 percent effluent ( $p=.05$ ). The 48-hour  $LC_{50}$  value could not be calculated because greater than 50.0 percent survival occurred in each effluent concentration.

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

Percent Effluent	Percent Survival
Test Organism	<i>Pimephales promelas</i>
Control	95.0
22.0	92.5
32.0	90.0
45.0	95.0
56.0	95.0
75.0	95.0
100.0	92.5

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 two composite samples of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on January 22 and 23, 2016, were not found to be lethally toxic to the fathead minnow test organisms in the 100.0 percent critical dilution after 48 hours of exposure ( $p=.05$ ). The 48-hour  $LC_{50}$  value 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. 20<sup>th</sup> Edition.

**APPENDIX A**  
**CHAIN-OF-CUSTODY DOCUMENTS**



**Bio-Analytical Laboratories**

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71029

(318) 745-2772  
1-800-259-1245  
Fax: (318) 745-2773

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

Laboratory Use Only:

<b>Company:</b> El Dorado Chemical Company		<b>Phone:</b> (870) 863-1484		<b>Analysis:</b> Chronic Ceriodaphnia Chronic minnow Acute minnow(fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform						<b>Project Number:</b> X5941			
<b>Address:</b> 4500 Norwest Ave., El Dorado, AR 71731		<b>Fax:</b> (870) 863-7499								<b>Temperature upon arrival:</b> -0.11°		<b>Thermometer #:</b> 29	
<b>Permit #:</b> AR0000752/AFIN 70-00040		<b>Purchase Order:</b>								<b>Tech:</b> CR		<b>Date:</b> 1/22/16	
<b>Sampler's Signature/Printed Name/Affiliation:</b> <i>Edward L Pearson / Edward L Pearson / EDC</i>										<b>Preservative:</b> (below)			
<b>Date Start</b> Date End	<b>Time Start</b> Time End	C	G	# and type of container	Sample Identification					<b>Lab Control Number:</b> CR 1/22/16			
01-21-16 01-27-16	1400 1200	X		3 half gallons	DD6		X			EC C1969 ice			
<b>Relinquished by/Affiliation:</b> <i>Edward L Pearson</i>				<b>Date:</b> 01/22/16	<b>Time:</b> 2:30	<b>Received by/Affiliation:</b> BAC <i>Chris J. Bragg</i>		<b>Date:</b> 1/22/16	<b>Time:</b> 1500				
<b>Relinquished by/Affiliation:</b> <i>Chris J. Bragg</i>				<b>Date:</b> 1/22/16	<b>Time:</b> 1500	<b>Received by/Affiliation:</b> <i>Cherry Rex</i>		<b>Date:</b> 1/22/16	<b>Time:</b> 1520				
<b>Relinquished by/Affiliation:</b>				<b>Date:</b>	<b>Time:</b>	<b>Received by/Affiliation:</b>		<b>Date:</b>	<b>Time:</b>				
<b>Method of Shipment:</b> ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS <input checked="" type="checkbox"/> Client ___ Other ___ <b>Tracking #</b> _____													
<b>Comments:</b>													
COC Rev. 3.0													



**Bio-Analytical Laboratories**

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

(318) 745-2772  
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Fax: (318) 745-2773

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278, OKDEQ 1420

Laboratory Use Only:

Company: <i>EL DORADO CHEMICAL</i>		Phone: <i>870-863-1400</i>		Analysis:				Project Number: <i>X5941</i>																
Address: <i>4500 NORTH WEST AVE</i>		Fax: <i>870-863-1499</i>		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species		Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Temp. upon arrival: <i>2.70C</i>												
Permit #:		Purchase Order:											Lab Control Number:	Preservative: <i>(below)</i>										
Sampler's Signature/Printed Name/Affiliation: <i>David Sartain / EDC</i>		Date Start Date End	Time Start Time End												C	G	# and type of container	Sample Identification						
								<i>1-22-16 - 1-23-16</i>											<i>1400 - 0800</i>	<i>✓</i>		<i>3 half Gallons</i>	<i>006</i>	<i>X X</i>
Relinquished by/Affiliation: <i>David Sartain / EDC</i>				Date:	Time:	Received by/Affiliation: <i>David Baigg</i>			Date:	Time:														
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:																								

**APPENDIX B  
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES  
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5941

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 1/22/16 Time 1640

Test terminated: Date 1/24/16 Time 1615

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
C19169	10.5/124.6%	1/20/8.0 98.7%	<0.01	NO	6.0	N/A	100% 88.0	100% 24.0	CR
C19170	9.4/109%	1/20/8.0 97.6%	<0.01		6.0		44.0	24.0	EGB

Dilution Water Information

Dilution Water	ID#	Initial D.O. (mg/L & %)	Aerate? Minutes/D.O. (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft H2O	3817	N/A	N/A	N/A	N/A	7.2	100% 44.0	100% 360	CR

Test Species Information

Test Species Info.	Species: ID#	Species: ID#	Species: ID#	Species: ID#
Age	<u>P. promelas</u> ID#: <u>012010</u>			
Test Container Size	<u>~2 days</u>			
Test volume	<u>300 ml</u>			
Feeding: Type Amount	<u>250 ml</u>			
Aeration?	<u>2 hrs prior to test initiation</u>			
Amount	<u>N/A</u>			
Condition of survivors	<u>8000</u>			

Comments:

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

Project# X5941

Test started: Date 1/22/16 Time 1640

Client EDCC

Test ended: Date 1/24/16 Time 1105

Sample Description 006

Test Species P. promelas ID# BAL/012016

Technician: 0hour RC 24hour EUB 48hour EUB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1640 24hour 1330 48hour 1105 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 24.7 24hour 24.7 48hour 24.0 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	
0.3FT	A	N/A	8	8	8			8.1	7.8	7.7			7.2	7.3			168.0	166.0	166.0				
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	6	6																		
22.0	A		8	8	8			8.0	7.8	7.8			7.1	7.2			210.0	209.0	209.0				
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	5	5																		
Chemistry Tech prerenewal/postrenewal			CR <u>EUB</u> <u>EUB</u>					CR <u>EUB</u> <u>EUB</u>					CR <u>EUB</u> <u>EUB</u>										

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

Project# X5941

Test started: Date 1/21/16

Time 1646

Client EDCC

Test ended: Date 1/24/16

Time 1615

Sample Description 006

Test Species P. promelas ID# BAL/012016

Technician: Ohour PC 24hour EJB 48hour EJB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1640 24hour 1330 48hour 1615 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.7 24hour 24.7 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
40		N/A																				
32.0	A		8	8	8			8.0	<del>7.8</del>	7.8			7.1	<del>7.1</del>	7.1			226	<del>250</del>	250	258	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	4	4																	
45.0	A		8	8	8			8.0	<del>7.8</del>	7.8			7.1	<del>7.1</del>	7.1			250	<del>275</del>	275	289	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	6																	
Chemistry Tech prerenewal/postrenewal			CR <del>EJB</del>					CR <del>EJB</del>					CR <del>EJB</del>									



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

Project# X5941

Test started: Date 1/22/16 Time 1640

Client EDCC

Test ended: Date 1/24/16 Time 1615

Sample Description 006

Test Species P. promelas ID# BAL/012016

Technician: Ohour RC 24hour ELB 48hour ELB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1640 24hour 1330 48hour 1615 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.7 24hour 24.7 48hour 24.8 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																				
56.0	A		8	8	8			8.0	7.9	7.9			7.2	7.1	7.0			270	268	267		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	6	6																	
75.0	A		8	8	8			7.9	7.8	7.8			7.1	7.1	7.1			309	313	314		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	7	6																	
Chemistry Tech prerenewal/postrenewal			CR <u>ELB</u>					CR <u>ELB</u>					CR <u>ELB</u>									

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

Project# X5941

Test started: Date 1/22/16 Time 1640

Client EDCC

Test ended: Date 1/24/16 Time 1615

Sample Description 006 Test Species P. promelas ID# BAL/012016

Technician: Ohour PC 24hour EB 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1640 24hour 1330 48hour 1615 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.7 24hour 24.7 48hour 24.8 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			7.5	7.6	7.8			7.1	7.2	7.0			355	360	344	335	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	5																	
100.0 <del>PK Adj</del>	A	}	8					/					/					/				
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal			CR <del>EB</del>					CR <del>EB</del>					CR <del>EB</del>									

**APPENDIX C**  
**STATISTICAL ANALYSES**

## Acute Fish Test-48 Hr Survival

Start Date: 1/22/2016 Test ID: X5941PP Sample ID: AR0000752/006  
 End Date: 1/24/2016 Lab ID: AEQ880630 Sample Type: EFF2-Industrial  
 Sample Date: 1/22/2016 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	0.7500
22	1.0000	1.0000	1.0000	1.0000	0.6250
32	1.0000	1.0000	1.0000	1.0000	0.5000
45	1.0000	1.0000	1.0000	1.0000	0.7500
56	1.0000	1.0000	1.0000	1.0000	0.7500
75	1.0000	1.0000	1.0000	1.0000	0.7500
100	1.0000	1.0000	1.0000	1.0000	0.6250

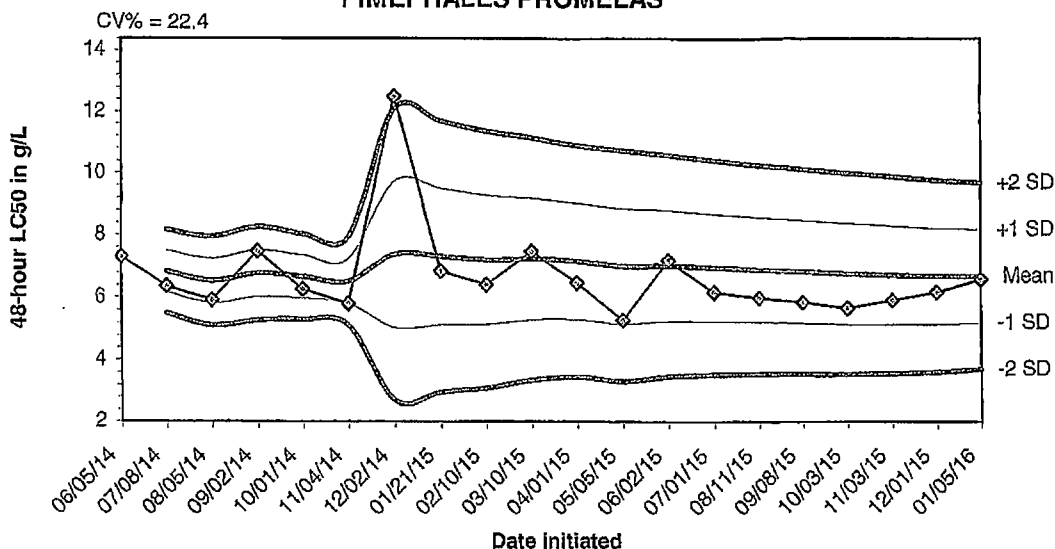
Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5		
22	0.9250	0.9737	1.2968	0.9117	1.3931	16.600	5	27.00 16.00	
32	0.9000	0.9474	1.2715	0.7854	1.3931	21.373	5	27.00 16.00	
45	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5	27.50 16.00	
56	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5	27.50 16.00	
75	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5	27.50 16.00	
100	0.9250	0.9737	1.2968	0.9117	1.3931	16.600	5	27.00 16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p <= 0.05$ )	0.61326	0.934	-1.6937	1.3322
Bartlett's Test indicates equal variances ( $p = 0.87$ )	2.51765	16.8119		
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

EGB  
2/2/16

**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

**2016 48-HOUR REFERENCE TOXICANT TEST RESULTS FOR  
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/05/14	7.3100					
07/08/14	6.3700	6.8400	6.1753	5.5106	7.5047	8.1694
08/05/14	5.9200	6.5333	5.8241	5.1148	7.2426	7.9518
09/02/14	7.4800	6.7700	6.0221	5.2741	7.5179	8.2659
10/01/14	6.2800	6.6720	5.9882	5.3044	7.3558	8.0396
11/04/14	5.8100	6.5283	5.8227	5.1171	7.2340	7.9396
12/02/14	12.5000	7.3814	5.0342	2.6870	9.7286	12.0758
01/21/15	6.8500	7.3150	5.1338	2.9526	9.4962	11.6774
02/10/15	6.4200	7.2156	5.1535	3.0915	9.2776	11.3396
03/10/15	7.4800	7.2420	5.2961	3.3502	9.1879	11.1338
04/01/15	6.4800	7.1727	5.3125	3.4522	9.0330	10.8933
05/05/15	5.2900	7.0158	5.1607	3.3056	8.8709	10.7260
06/02/15	7.2000	7.0300	5.2531	3.4763	8.8069	10.5837
07/01/15	6.1800	6.9693	5.2471	3.5249	8.6915	10.4137
08/11/15	6.0000	6.9047	5.2264	3.5480	8.5830	10.2613
09/08/15	5.8600	6.8394	5.1971	3.5548	8.4817	10.1240
10/03/15	5.6700	6.7706	5.1553	3.5401	8.3858	10.0011
11/03/15	5.9200	6.7233	5.1435	3.5638	8.3031	9.8829
12/01/15	6.1800	6.6947	5.1544	3.6141	8.2351	9.7754
01/05/16	6.5900	6.6895	5.1901	3.6906	8.1889	9.6884

**APPENDIX E**  
**AGENCY FORMS**

**Acute Forms**  
**Pimephales promelas (Fathead minnow) Survival**

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected      From: 1/21/16      To: 1/22/16  
From:      To:

Test Initiated: 1/22/16

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	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	E	75.0	62.5	50.0	100.0	75.0	87.5	100.0
48-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	75.0	62.5	50.0	75.0	75.0	75.0	62.5
	Mean	95.0	92.5	90.0	95.0	95.0	95.0	92.5

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

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

2. Enter percent effluent corresponding to the LC<sub>50</sub> below:

LC<sub>50</sub> =      N/A% effluent

95 % confidence limits:

Method of LC<sub>50</sub> 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



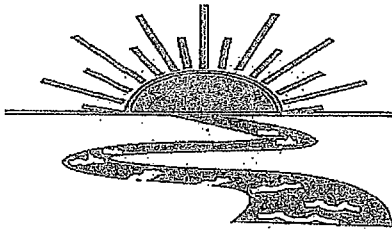
**Biomonitoring  
Fathead minnow 48 hour Acute Static Renewal  
Chemical Parameters Chart\***

Permittee: El Dorado Chemical - Outfall 006  
 NPDES Number: AR0000752/ AFIN 70-00040  
 Contact: Eddie Pearson  
 Analyst: Briggs, Callahan  
 Sample Collected      From:      Date 1/21/16      Time 1400  
    To:      Date 1/22/16      Time 1200  
 Test Begin                              Date 1/22/16      Time 1640  
 Test End                                 Date 1/24/16      Time 1615

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	8.1	7.9	7.7	24.7	24.7	24.0	36.0				44.0			7.2	7.2	7.3
22.0	8.0	7.8	7.8	24.7	24.7	24.0								7.1	7.1	7.2
32.0	8.0	7.8	7.8	24.7	24.7	24.0								7.1	7.1	7.1
45.0	8.0	7.8	7.8	24.7	24.7	24.0								7.1	7.1	7.1
56.0	8.0	8.0	7.9	24.7	24.7	24.0								7.2	7.1	7.0
75.0	7.9	7.9	7.8	24.7	24.7	24.0								7.1	7.1	7.1
100.0	7.8	8.0	7.8	24.7	24.7	24.0	24.0	24.0			88.0	44.0		7.1	7.0	7.0

\*This Form is to be submitted with each DMR.  
 Alkalinity and hardness to be reported as mg/l CaCO<sub>3</sub>

**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/006

Project#: X5941

Chain of Custody Documents Checked by: RC 1/29/16  
Technician/Date

Raw Data Documents Checked by: RC 1/29/16  
Technician/Date

Statistical Analysis Package Checked by: EGB 2/2/16  
Quality Manager/Date

Quality Control Data Checked by: EGB 1/8/16  
Quality Manager/Date

Report Checked by: EGB 2/2/16  
Quality Manager/Date

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

Erin D. Brugg, BS  
Quality Manager

2/2/16  
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 X5929

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X5929

**Outfall:** Outfall 007 (contaminated storm water)

**Permit #:** AR0000752/ AFIN #70-00040

**Contact:** Mr. Eddie Pearson

**Test Dates:** January 8 - 10, 2016

**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 - 7.62%.

**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 - 0.00%.

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



## Bio-Analytical Laboratories

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Fax: (318) 745-2773

**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 X5929**

**Test Dates: January 8 - 10, 2016  
Report Date: January 20, 2016**

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

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

BAL  
ADEQ #88-0630  
Project X5929

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BAL  
ADEQ #88-0630  
Project X5929

## 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. 20<sup>th</sup> Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

### 2.2 Test Organisms

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

BAL  
ADEQ #88-0630  
Project X5929

### 2.3 Dilution Water

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

### 2.4 Test Concentrations

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

### 2.5 Sample Collection

One sample of Outfall 007 were collected by El Dorado Chemical personnel on January 7, 2016 at 0930 hours. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. The temperature upon arrival was 0.1° Celsius, respectively.

### 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  $25 \pm 1^{\circ}$  Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/L) with a Capital Controls<sup>R</sup> amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a HACH<sup>R</sup> test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements (in mg/L, standard units and umhos/cm, respectively) 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 in mg/L as CaCO<sub>3</sub> on the control and the highest effluent concentration.

### 2.7 Monitoring of the Tests

The tests were run in a Precision<sup>R</sup> dual controlled illuminated incubator at a temperature of  $25 \pm 1^{\circ}$  Celsius. An AEMC<sup>R</sup> 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 LC<sub>50</sub> values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.



BAL  
ADEQ #88-0630  
Project X5929

### 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 value for the fathead and *Daphnia pulex* tests was 100.0 percent effluent ( $p=.05$ ). The 48-hour  $LC_{50}$  values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration.

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism		
Control	100.0	100.0
32.0	100.0	100.0
45.0	100.0	90.0
50.0	100.0	100.0
56.0	100.0	100.0
75.0	97.5	97.5
100.0	95.0	100.0

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 X5929

#### 4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on January 7, 2016, were 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 X5929

## 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. 20<sup>th</sup> Edition.

**APPENDIX A**  
**CHAIN-OF-CUSTODY DOCUMENTS**



**Bio-Analytical Laboratories**

3240 Spurgin Road (318) 745-2772  
 Post Office Box 527 1-800-250-1248  
 Doyline, LA 71023 Fax: (318) 745-2773

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

Laboratory Use Only:

<b>Company:</b> El Dorado Chemical Company		<b>Phone:</b> (870) 863-1484		<b>Analysis:</b>				<b>Project Number:</b> X5929  <b>Temp. upon arrival:</b> 0.10C Thermo 29 EDO 1/8/16 <b>Preservative:</b> (below) ICE				
<b>Address:</b> 4500 Norwest Ave., El Dorado, AR 71731		<b>Fax:</b> (870) 863-7499 17499		Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Lab Control Number:							
<b>Permit #:</b> AR0000752/AFIN 70-00040		<b>Purchase Order:</b>				Date Start Date End	Time Start Time End		C	G	# and type of container	Sample Identification
<b>Sampler's Signature/Printed Name/Affiliation:</b> Edward L Pearson / Edward L Pearson / EDCC												
01-07-2016 01-07-2016	0730 0930	X	6 half gallons					Outfall 007				
<b>Relinquished by/Affiliation:</b> Edward L Pearson				<b>Date:</b> 01-08-2016	<b>Time:</b> 0930	<b>Received by/Affiliation:</b> J Bign		<b>Date:</b> 1-8-16	<b>Time:</b> 0945			
<b>Relinquished by/Affiliation:</b>				<b>Date:</b>	<b>Time:</b>	<b>Received by/Affiliation:</b>		<b>Date:</b>	<b>Time:</b>			
<b>Relinquished by/Affiliation:</b> J Bign				<b>Date:</b> 1-8-16	<b>Time:</b> 1145	<b>Received by/Affiliation:</b> Our J Bign		<b>Date:</b> 1/8/16	<b>Time:</b> 1145			
<b>Method of Shipment:</b> <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other <b>Tracking #</b> _____												
<b>Comments:</b>												
COC Rev. 3.0												

**APPENDIX B**  
**RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES  
ACUTE TOXICITY TEST WATER QUALITY DATA

X5929  
Page 12 of 33

Project# X5929

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 007

Technicians: EGB/RC/CR

Test initiated: Date 1/8/16 Time 1530

Test terminated: Date 1/10/16 Time 1535

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

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

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
C11916	100/122.6%	4/30/17.8/93.9%	<0.01	NO	6.0	N/A	100% 524.0	100% 124.0	CR
↓	11.5/100.2%	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	3813	N/A	N/A	N/A	N/A	7.0	100% 40.0	100% 28.0	CR

Test Species Information

Test Species Info.	Species ID#:	Species ID#:	Species ID#:	Species ID#:
	D. guley BAL E5- E16	P. promelas BAL01016		
Age	<24 hrs	2d		
Test Container Size	30 ml	300 ml		
Test volume	25 ml	250 ml		
Feeding: Type	2 hrs	prior to		
Amount	test	initiation		
Aeration?	N/A	N/A		
Amount	1	1		
Condition of survivors	good	good		

Comments:

✓  
EGB

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

Project# X5929

Test started: Date 1/8/16

Time 1530

Client EDCC

Test ended: Date 1/10/16

Time 1515

Sample Description 007

Test Species D. pulex

ID# E5-F6

Technician: Ohour EGG 24hour CK 48hour EGG 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Time: Ohour 1530 24hour 1540 48hour 1515 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Temperature (°C): Ohour 24.8 24hour 24.8 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
0%		N/A																				
0.50%	A	}	8	8	8			7.9	<del>7.6</del> 8.0	8.1			7.2	<del>7.3</del> 7.2	7.6			152	<del>157</del> 149	203		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32.0	A	}	8	8	8			7.8	<del>7.6</del> 7.9	8.2			7.5	<del>7.7</del> 7.5	7.6			810	<del>850</del> 853	847		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			CR <del>CR</del> / <del>CR</del> EGG					CR <del>CR</del> / <del>CR</del> EGG					CR <del>CR</del> / <del>CR</del> EGG									



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

Project# X5929

Test started: Date 1/8/16

Time 1530

Client EDCC

Test ended: Date 1/10/16

Time 1515

Sample Description 007

Test Species D. pulex

ID# E5FL6

Technician: 0hour EBB 24hour CR 48hour EBB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Time: 0hour 1530 24hour 1546 48hour 1515 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Temperature (°C): 0hour 24.8 24hour 24.8 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
<u>20</u>		<u>N/A</u>																				
<u>45.0</u>	<u>A</u>	}	<u>8</u>	<u>8</u>	<u>8</u>			<u>7.7</u>	<u>7.5</u>	<u>7.8</u>	<u>7.9</u>		<u>7.6</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>		<u>1060</u>	<u>1105</u>	<u>1075</u>	<u>1064</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>C</u>		<u>8</u>	<u>8</u>	<u>8</u>																	
	<u>D</u>		<u>8</u>	<u>5</u>	<u>8</u>	<u>EBB</u>																
	<u>E</u>		<u>8</u>	<u>7</u>	<u>7</u>	<u>10</u>																
<u>50.0</u>	<u>A</u>	}	<u>8</u>	<u>8</u>	<u>8</u>			<u>7.7</u>	<u>7.5</u>	<u>7.8</u>	<u>8.0</u>		<u>7.6</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>		<u>1157</u>	<u>1171</u>	<u>1171</u>	<u>1186</u>	
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</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>CR</u>	<u>CR</u>	<u>EBB</u>			<u>CR</u>	<u>CR</u>	<u>EBB</u>			<u>CR</u>	<u>CR</u>	<u>EBB</u>			<u>CR</u>	<u>CR</u>	<u>EBB</u>		

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

Project# X5929

Test started: Date 1/8/16

Time 1530

Client EDCC

Test ended: Date 1/10/16

Time 1515

Sample Description 007

Test Species D. pulex

ID# ESF6

Technician: Ohour ESB 24hour CF 48hour ESB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1530 24hour 1546 48hour 1515 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 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
40		N/A																				
56.0	A	}	8	8	8			7.6	7.4	7.9			7.7	7.8	7.8			1254	1313	1255		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A	}	8	7	7			7.7	7.5	8.0			7.7	7.9	7.9			1593	1650	1633		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			CR <u>CF</u> / <u>ESB</u>					CR <u>CF</u> / <u>ESB</u>					CR <u>CF</u> / <u>ESB</u>									

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

Project# X5929

Test started: Date 1/8/16

Time 1530

Client EDCC

Test ended: Date 1/10/16

Time 1515

Sample Description 007

Test Species D. pulex

ID# E5-F6

Technician: 0hour ELB 24hour OL 48hour ELB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1530 24hour 14.8 48hour 15.5 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 24.8 24hour 15.6 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
		N/A																				
100.0	A	}	8	8	8			7.6	7.5	8.0			7.8	7.9	7.9			2020	2020	1970		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
pH 003 100.0	A	}	8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								OL	ELB				OL	ELB				OL	ELB			

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

Project# X5929

Test started: Date 1/8/14 Time 1553

Client EDCC

Test ended: Date 1/10/14 Time 1539

Sample Description 007

Test Species P. promelas ID# BAL010616

Technician: Ohour CR 24hour CR 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1553 24hour 1653 48hour 1835 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 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			
0%		N/A																							
0 <sub>soft</sub>	A	}	8	8	8			7.9	<del>7.9</del> 8.0	8.1			7.2	<del>7.9</del> 7.2	7.6			75.2	<del>80.4</del> 79.2	79.7					
	B		8	8	8																				
	C		8	8	8																				
	D		8	8	8																				
ec 0/1/15 7	E		8	8	8																				
32.0	A	}	8	8	8			7.8	<del>7.9</del> 7.9	8.1			7.5	<del>7.5</del> 7.5	7.5			81.0	<del>80.7</del> 85.3	84.3					
	B		8	8	8																				
	C		8	8	8																				
	D		8	8	8																				
	E		8	8	8																				
Chemistry Tech prerenewal/postrenewal			CR	CR	EB			CR	CR	CR	EB			CR	CR	CR	EB			CR	CR	CR	EB		

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

Project# X5929

Test started: Date 1/8/16

Time 1553

Client EDCC

Test ended: Date 1/10/16

Time 1535

Sample Description 007

Test Species P.promelas

ID# DAL010416

Technician: 0hour CR 24hour CR 48hour EB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: 0hour 1553 24hour 1653 48hour 1535 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): 0hour 24.8 24hour 24.8 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
<u>90</u>		<u>NIA</u>																				
<u>45.0</u>	<u>A</u>	}	<u>8</u>	<u>8</u>	<u>8</u>			<u>7.7</u>	<u>7.6</u>	<u>7.9</u>			<u>7.6</u>	<u>7.6</u>	<u>7.6</u>			<u>1056</u>	<u>1121</u>	<u>1073</u>		
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</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>																	
<u>50.0</u>	<u>A</u>	}	<u>8</u>	<u>8</u>	<u>8</u>			<u>7.7</u>	<u>7.5</u>	<u>7.9</u>			<u>7.6</u>	<u>7.7</u>	<u>7.7</u>			<u>1157</u>	<u>1122</u>	<u>1174</u>		
	<u>B</u>		<u>8</u>	<u>8</u>	<u>8</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>7</u>																	
Chemistry Tech prerenewal/postrenewal								<u>CR CR EB</u>					<u>CR CR EB</u>					<u>CR CR EB</u>				

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

Project# X5929

Test started: Date 1/8/16

Time 153

Client EDCC

Test ended: Date 1/10/16

Time 1535

Sample Description 007

Test Species P.promelas

ID# BAL01016

Technician: Ohour CR 24hour CR 48hour CR 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Time: Ohour 1553 24hour 1633 48hour 1633 72hour \_\_\_\_\_ 96hour \_\_\_\_\_

Temperature (°C): Ohour 24.8 24hour 24.8 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
90		N/A																				
56.0	A	}	8	8	8			7.6	7.5	7.7	7.8		7.7	7.7	7.7			1254	1319	1304	1282	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A	}	8	8	8			7.7	7.4	7.8			7.7	7.8	7.7			1593	1674	1686	1628	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	7	7																	
Chemistry tech prerenewal/postrenewal			CR CR CR CR CR					CR CR CR CR CR					CR CR CR CR CR									

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

Project# X5929

Test started: Date <sup>CR 1/8/16</sup> 1/8/16

Time 1553

Client EDCC

Test ended: Date 1/10/16

Time 1535

Sample Description 007

Test Species P. promelas

ID# 13A1010614

Technician: Ohour CR 24hour CR 48hour EUB 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Time: Ohour 1553 24hour 1553 48hour 1535 72hour \_\_\_\_\_ 96hour \_\_\_\_\_  
 Temperature (°C): Ohour 24.8 24hour 24.8 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
100.0	A	N/A	8	8	8			7.10	<del>7.3</del> 8.9	7.5			7.8	<del>7.8</del> 7.1	7.7			<del>2020</del> 2148	<del>2148</del> 2190	<del>2190</del> 2070		
	B		8	8	8																	
	C		8	7	7																	
	D		8	7	7																	
	E		8	8	8																	
PH 0.05 100.0	A	N/A	8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal			CR CR EUB					CR CR AB					CR CR AB									

**APPENDIX C**  
**STATISTICAL ANALYSES**



**Daphnid Acute Test-48 Hr Survival**

Start Date: 1/8/2016      Test ID: X5929DP      Sample ID: AR0000752-007  
 End Date: 1/10/2016      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 1/7/2016      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
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	1.0000	1.0000	1.0000	0.6250	0.8750
50	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	0.8750	1.0000	1.0000	1.0000	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	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	16.00
45	0.9000	0.9000	1.2601	0.9117	1.3931	16.693	5	22.50	16.00
50	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
75	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
100	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00

Auxillary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.59171	0.934	-2.5724	12.4585
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				

**Acute Fish Test-48 Hr Survival**

Start Date: 1/8/2016      Test ID: X5929PP      Sample ID: AR0000752-007  
 End Date: 1/10/2016      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 1/7/2016      Protocol: EPAAW02-EPA/821/R-02-01      Test Species: PP-Pimephales promelas  
 Comments:

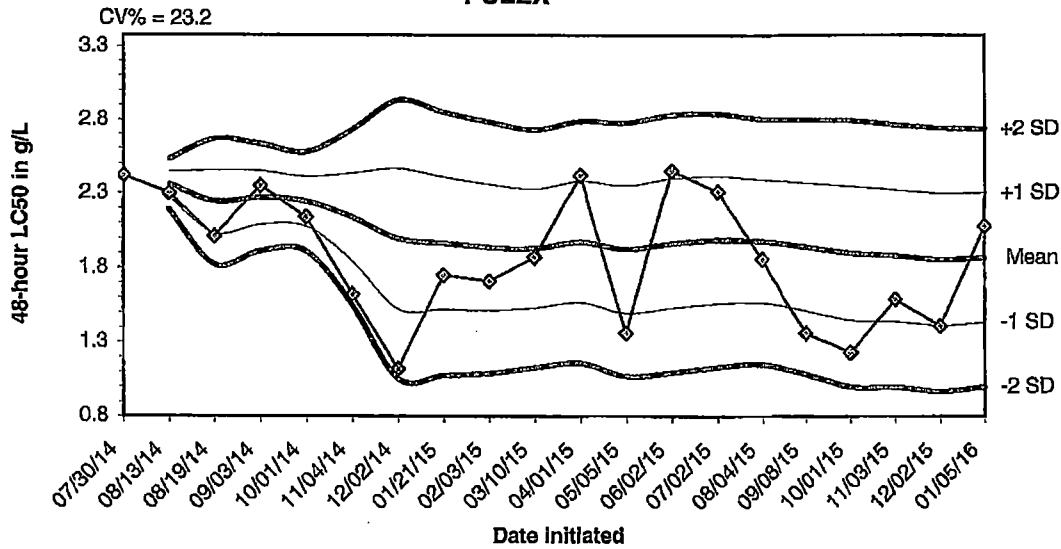
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	0.8750
100	1.0000	1.0000	0.8750	0.8750	1.0000

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		
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
45	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
50	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
75	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
100	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	22.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.67398	0.934	-1.5743	4.34273
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				

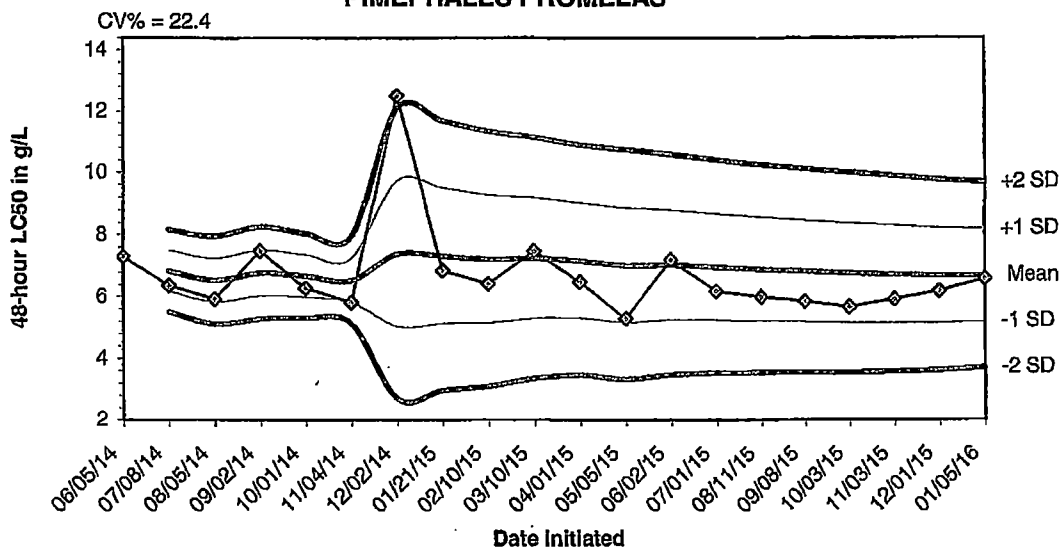
**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

**2016 48-HOUR REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/30/14	2.4200					
08/13/14	2.3000	2.3600	2.2751	2.1903	2.4449	2.5297
08/19/14	2.0100	2.2433	2.0325	1.8217	2.4541	2.6649
09/03/14	2.3500	2.2700	2.0898	1.9096	2.4502	2.6304
10/01/14	2.1400	2.2440	2.0775	1.9110	2.4105	2.5770
11/04/14	1.6200	2.1400	1.8449	1.5498	2.4351	2.7302
12/02/14	1.1200	1.9943	1.5240	1.0537	2.4646	2.9349
01/21/15	1.7500	1.9638	1.5198	1.0759	2.4077	2.8516
02/03/15	1.7100	1.9356	1.5118	1.0880	2.3593	2.7831
03/10/15	1.8700	1.9290	1.5289	1.1289	2.3291	2.7291
04/01/15	2.4200	1.9736	1.5662	1.1589	2.3810	2.7884
05/05/15	1.3600	1.9225	1.4956	1.0687	2.3494	2.7763
06/02/15	2.4500	1.9631	1.5289	1.0948	2.3972	2.8313
07/02/15	2.3100	1.9879	1.5606	1.1333	2.4151	2.8424
08/04/15	1.8600	1.9793	1.5663	1.1532	2.3924	2.8055
09/08/15	1.3600	1.9406	1.5126	1.0845	2.3687	2.7967
10/01/15	1.2300	1.8988	1.4500	1.0011	2.3477	2.7965
11/03/15	1.5900	1.8817	1.4402	0.9987	2.3232	2.7647
12/02/15	1.4100	1.8568	1.4143	0.9719	2.2993	2.7418
01/05/16	2.0800	1.8680	1.4344	1.0009	2.3016	2.7351

**2016 48-HOUR REFERENCE TOXICANT TEST RESULTS FOR  
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/05/14	7.3100					
07/08/14	6.3700	6.8400	6.1753	5.5106	7.5047	8.1694
08/05/14	5.9200	6.5333	5.8241	5.1148	7.2426	7.9518
09/02/14	7.4800	6.7700	6.0221	5.2741	7.5179	8.2659
10/01/14	6.2800	6.6720	5.9882	5.3044	7.3558	8.0396
11/04/14	5.8100	6.5283	5.8227	5.1171	7.2340	7.9396
12/02/14	12.5000	7.3814	5.0342	2.6870	9.7286	12.0758
01/21/15	6.8500	7.3150	5.1338	2.9526	9.4962	11.6774
02/10/15	6.4200	7.2156	5.1535	3.0915	9.2776	11.3396
03/10/15	7.4800	7.2420	5.2961	3.3502	9.1879	11.1338
04/01/15	6.4800	7.1727	5.3125	3.4522	9.0330	10.8933
05/05/15	5.2900	7.0158	5.1607	3.3056	8.8709	10.7260
06/02/15	7.2000	7.0300	5.2531	3.4763	8.8069	10.5897
07/01/15	6.1800	6.9693	5.2471	3.5249	8.6915	10.4137
08/11/15	6.0000	6.9047	5.2264	3.5480	8.5830	10.2613
09/08/15	5.8600	6.8394	5.1971	3.5548	8.4817	10.1240
10/03/15	5.6700	6.7706	5.1553	3.5401	8.3858	10.0011
11/03/15	5.9200	6.7233	5.1435	3.5638	8.3031	9.8829
12/01/15	6.1800	6.6947	5.1544	3.6141	8.2351	9.7754
01/05/16	6.5900	6.6895	5.1901	3.6906	8.1889	9.6884

**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: 1/07/16 To: 1/07/16**  
**From: To:**

**Test Initiated: 1/08/16**

**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
24-hour	A	100.0	100.0	100.0	100.0	100.0	87.5	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	62.5	100.0	100.0	100.0	100.0
	E	100.0	100.0	87.5	100.0	100.0	100.0	100.0
48-hour	A	100.0	100.0	100.0	100.0	100.0	87.5	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	62.5	100.0	100.0	100.0	100.0
	E	100.0	100.0	87.5	100.0	100.0	100.0	100.0
	Mean	100.0	100.0	90.0	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 LC<sub>50</sub> below:**

LC<sub>50</sub> = N/A% effluent

**95 % confidence limits:**

**Method of LC<sub>50</sub> 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 007  
NPDES Number: AR0000752/ AFIN 70-00040**

**Contact: Eddie Pearson  
Analyst: Briggs, Callahan**

**Sample Collected From: Date 1/07/16 Time 0730  
To: Date 1/07/16 Time 0930**

**Test Begin Date 1/08/16 Time 1530  
Test End Date 1/10/16 Time 1515**

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	7.9	8.0	8.1	24.8	24.8	24.6	28.0				40.0			7.2	7.2	7.6
32.0	7.8	7.9	8.2	24.8	24.8	24.6								7.5	7.5	7.6
45.0	7.7	7.8	7.9	24.8	24.8	24.6								7.6	7.6	7.8
50.0	7.7	7.8	8.0	24.8	24.8	24.6								7.6	7.6	7.8
56.0	7.6	7.7	7.9	24.8	24.8	24.6								7.7	7.7	7.8
75.0	7.7	8.5	8.0	24.8	24.8	24.6								7.7	7.1	7.9
100.0	7.6	8.9	8.0	24.8	24.8	24.6	124.0				524.0			7.8	7.1	7.9

\*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO<sub>3</sub>



**Acute Forms**  
**Pimephales promelas (Fathead minnow) Survival**

Permittee: El Dorado Chemical - Outfall 007

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected      From: 1/07/16      To: 1/07/16  
From:      To:

Test Initiated: 1/08/16

Dilution Water Used:      Receiving Water       Reconstituted Water

**Dilution Series Results - Percent Survival**

TIME OF READING	REP	0	32.0	45.0	50.0	56.0	75.0	100.0
24-hour	A	100.0	100.0	100.0	100.0	100.0	87.5	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	87.5
	D	100.0	100.0	100.0	100.0	100.0	100.0	87.5
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
48-hour	A	100.0	100.0	100.0	100.0	100.0	87.5	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	87.5
	D	100.0	100.0	100.0	100.0	100.0	100.0	87.5
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Mean	100.0	100.0	100.0	100.0	100.0	100.0	97.5

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

a.) LOW FLOW OR CRITICAL DILUTION (100.0%)      YES       NO

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

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

$LC_{50}$  =      N/A % effluent

95 % confidence limits:

Method of  $LC_{50}$  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\***

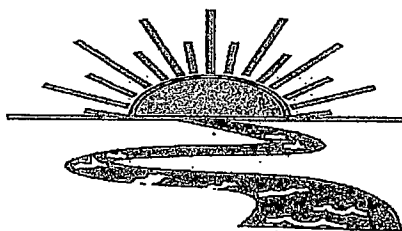
**Permittee: El Dorado Chemical - Outfall 007  
NPDES Number: AR0000752/ AFIN 70-00040  
Contact: Eddie Pearson  
Analyst: Briggs, Callahan**

**Sample Collected      From:      Date 1/07/16      Time 0730  
   To:      Date 1/07/16      Time 0930  
Test Begin                              Date 1/08/16      Time 1553  
Test End                                 Date 1/10/16      Time 1535**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		7.9	8.0	8.1	24.8	24.8	24.6	28.0			40.0			7.2	7.2	7.6
32.0		7.8	7.9	8.1	24.8	24.8	24.6							7.5	7.5	7.5
45.0		7.7	7.8	7.9	24.8	24.8	24.6							7.6	7.6	7.6
50.0		7.7	7.8	7.9	24.8	24.8	24.6							7.6	7.6	7.7
56.0		7.6	7.7	7.8	24.8	24.8	24.6							7.7	7.7	7.7
75.0		7.7	8.5	7.8	24.8	24.8	24.6							7.7	7.1	7.7
100.0		7.6	8.9	7.5	24.8	24.8	24.6	124.0			524.0			7.8	7.1	7.7

\*This Form is to be submitted with each DMR.  
Alkalinity and hardness to be reported as mg/l CaCO<sub>3</sub>

**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 / 007

Project#: X 5929

Chain of Custody Documents Checked by: RC 1/5/16  
Technician/Date

Raw Data Documents Checked by: RC 1/5/16  
Technician/Date

Statistical Analysis Package Checked by: EOB 1/18/16  
Quality Manager/Date

Quality Control Data Checked by: EOB 1/8/16  
Quality Manager/Date

Report Checked by: EOB 1/20/16  
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 S. Bragg  
Quality Manager

1/20/16  
Date

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

ORIGIN ID:ELDA (870) 863-1400  
EDDIE PEARSON  
ELDORADO CHEMICAL COMPANY  
4500 NORTH WEST AVE

SHIP DATE: 23FEB16  
ACTWGT: 5.00 LB  
CAD: 5887030/INET3730

ELDORADO, AR 71730  
UNITED STATES US

BILL SENDER

TO WATER ENFORCEMENT BRANCH  
ADEQ  
5301 NORTHSHORE DR

NORTH LITTLE ROCK AR 72118

(870) 863-1484

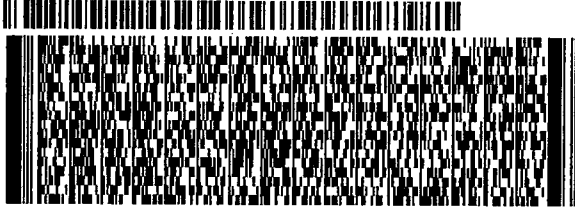
REF:

INV:

PO:

DEPT:

540.1197071727F



JIS1016204501707

WED - 24 FEB 10:30A

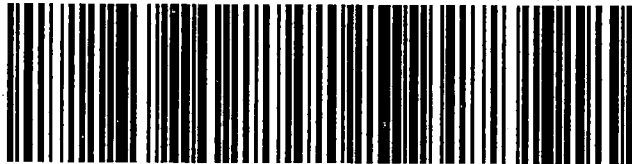
PRIORITY OVERNIGHT

TRK#  
0201

7757 1505 6790

X2 LITA

72118  
AR-US LIT



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number. Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on [fedex.com](http://fedex.com). FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.