

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X6228

Bio-Analytical Laboratories' Executive Summary

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

Project #: X6228

Outfall: Outfall 006 (contaminated storm water)

Permit #: AR0000752/ AFIN #70-00040

Contact: Mr. Eddie Pearson

Test Dates: December 5 - 7, 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:

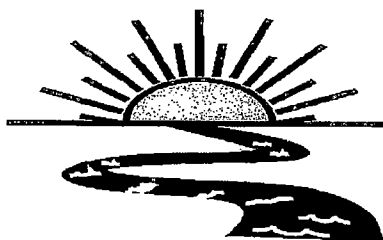
For *Daphnia pulex*:

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 - 31.89%.

For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0- **Pass**.
2. Report the NOEC for survival, Parameter TOM6C - 100.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 6.82%.

This report contains a total of 37 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 X6228

**Test Dates: December 5 - 7, 2016
Report Date: January 5, 2017**

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

Prepared by:
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Bio-Analytical Laboratories
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Doyline, LA 71023
ADEQ #88-0630

BAL
ADEQ #88-0630
Project X6228

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Project X6228

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately nine 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 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 tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One composite sample of Outfall 006 was collected by El Dorado Chemical personnel on December 4, 2016 at 2415 hours. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. The temperature upon arrival was 0.8° Celsius.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to $25 \pm 1^{\circ}$ Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/L) with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a 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 CaCO₃ on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

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

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2.8 Data Analysis

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

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the critical dilution in either test after 48 hours of exposure (p=.05). The NOEC value for the fathead and *Daphnia pulex* tests was 100.0 percent effluent (p=.05). The 48-hour LC₅₀ values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration.

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

Percent Effluent	Percent Survival	
Test Organism	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Control	97.5	92.5
22.0	95.0	85.0
32.0	95.0	100.0
45.0	95.0	87.5
56.0	95.0	97.5
75.0	82.5	97.5
100.0	96.9	85.0

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

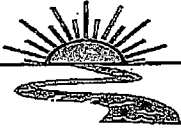
The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on December 4, 2016, was not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 100.0 percent critical dilution after 48 hours of exposure ($p=.05$). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in the 100.0 percent dilution ($p=.05$).

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Project X6228

5.0 References

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

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Bio-Analytical Laboratories

3240 Spangin Road
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(318) 745-2772
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NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:					Project Number: X6228 Temp. upon arrival: 0.80C Therm 29 ECB 12/5/16 Preservative: (below)	
Address: 4500 Norwest Ave., El Dorado, AR 71731		Fax: (870) 863-7499		Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform	Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform		
Permit #: AR0000752/AFIN 70-00040		Purchase Order:								Lab Control Number:
Sampler's Signature/Printed Name/Affiliation: <i>David H. Sartin / DAVID SARTAN / EDC</i>										
Date Start Date End	Time Start Time End	C	G						# and type of container	
12-3-16 - 12-4-16	1015 - 2415	X		6 half gallon	006	1CE				
Relinquished by/Affiliation: <i>D. H. Sartin / EDC</i>				Date: 12-5-16	Time: 0935	Received by/Affiliation: <i>J. B.</i>		Date: 12-5-16	Time: 0935	
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:	
Relinquished by/Affiliation: <i>J. B.</i>				Date: 12-5-16	Time: 1130	Received by/Affiliation: <i>Ch. D. Briggs</i>		Date: 12/5/16	Time: 1130	
Method of Shipment: <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 Tracking #										
Comments: Tan, no odor. ECB 12/5/16										
COC Rev. 3.0										

**APPENDIX B
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X6228
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Project# X6228

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 Outfall 006

Technicians: EGB/PC/MM 12/5/16 1710

Test initiated: Date 12/5/16 Time 1540

Test terminated: Date 12/7/16 Time 1445

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

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

Conductivity Meter: Model # FISHER Serial #130168768

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 EGB 12/20 31e.0	Tech
C13352	10.1 / 29.2%	180 / 7.8% 97.2%	<0.01	NO	0.0	N/A	80.0	800	EGB/PC
↓	9.8 / 17.9%	120 / 8.3% 97.7%					↓	↓	PC

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	395	N/A	N/A	N/A	N/A	6.9	44.0	28.0	EGB

Test Species Information

Test Species Info.	Species: D. pulex ID#: BALD-3	Species: P. promelas ID#: BAL 12/16	Species: ID#:	Species: ID#:
Age	<24 hours	9dys		
Test Container Size	30 ml	250 ml		
Test volume	20 ml	200 ml		
Feeding: Type	Algae/YCT	Artemia		
Amount	>2.0 hrs. prior to initiation	>2.0 hrs prior to initiation		
Aeration?	N/A	N/A		
Amount				
Condition of survivors	Good	Good		

Comments:

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

Project# X6228

Test started: Date 12/5/16

Time 1540

Client EDCC

Test ended: Date 12/11/16

Time 1445

Sample Description 006 PC AD PERMITS

Test Species D. pulex

ID# BALG1-51

Technician: Ohour PC 24hour PC 48hour PC 72hour PC 96hour PC

Time: Ohour 1440 24hour 1811 48hour 1445 72hour PC 96hour PC

Temperature (°C): Ohour 14.8 24hour 14.4 48hour 14.9 72hour PC 96hour PC

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
010																						
05	1	N/A	8	8	8	8		8.3	7.9	7.7	7.5	7.4	7.5	7.3	7.1	7.1		209	200	196	191	187
	2	PCN/A	8	4	4	8																
	3		8	4	4	8																
	4		8	6	7	7																
	5		8	6	6	6																
22.0	1		8	8	6		8.2	8.1	7.6			7.4	7.4	7.3			174	170	168	168	168	
	2		8	8	8																	
	3		8	8	5																	
	4		8	8	8																	
	5		8	7	7																	
Chemistry Tech prerenewal/postrenewal			PC/PC/PC					PC/PC/PC					PC/PC/PC									

ACUTE2 Rev 1.0 $\text{\textcircled{P}}$ Combined controls from X6228 & X6229. Static causing organisms to stick to sides of cup EB12/1/16

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

Project# X6228

Test started: Date 12/5/16

Time 1540

Client EDCC

Test ended: Date 12/7/16

Time 1445

Sample Description 006

Test Species D. pulex

ID# BALQ-51

Technician: Ohour TC 24hour TC 48hour TC 72hour TC 96hour TC

Time: Ohour 1440 24hour 1841 48hour 1445 72hour TC 96hour TC

Temperature (°C): Ohour 12.8 24hour 11.4 48hour 12.6 72hour TC 96hour TC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 Hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0/0																						
32.0	1	N/A	8	8	8			8.2	7.8	7.6			7.3	7.3	7.3			300	320	32		
	2	}	8	8	8																	
	3		8	8	8																	
	4		8	8	8																	
	5		8	8	8																	
45.0	1		8	8	6			8.1	7.9	7.6			7.3	7.2	7.1			337	331	356		
	2		8	8	7																	
	3		8	8	8																	
	4		8	8	8																	
	5		8	8	6																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X6228
 Client EDCC

Test started: Date 12/5/16 Time 1540
 Test ended: Date 12/7/16 Time 1445
 Test Species D. pulex ID# BRAI-SI

Sample Description 004 PC 15th PC 16th
 Technician: 0hour PC 24hour PC 48hour PC 72hour _____ 96hour _____
 Time: 0hour 14:40 24hour 18:21 48hour 14:5 72hour _____ 96hour _____
 Temperature (°C): 0hour 14.6 24hour 14.4 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																						
56.0	1	N/A	8	8	8			8.1	7.8	8.1	7.7		7.3	7.7	7.3	7.2		318	318	318	318	
	2	[Handwritten mark]	8	8	8																	
	3		8	8	8																	
	4		8	8	8																	
	5		8	7	7																	
75.0	1			8	8	8			8.0	7.9	8.1	7.7		7.3	7.2	7.3	7.2		418	418	418	418
	2		8	8	8													426				
	3		8	8	8																	
	4		8	8	7																	
	5		8	8	8																	
Chemistry Tech prerenewal/postrenewal			PC PC PC PC PC					PC PC PC PC PC					PC PC PC PC PC									

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

Project# X6228
 Client EDCC

Test started: Date PC 12/15/10 Time 1540
 Test ended: Date PC 12/17/10 Time 1445

Sample Description 006 PC 12/15/10
 Technician: Ohour PC 24hour PC 48hour PC 72hour _____ 96hour _____
 Time: Ohour 1540 24hour 1521 48hour 1445 72hour _____ 96hour _____
 Temperature (°C): Ohour 14.8 24hour 14.4 48hour 14.6 72hour _____ 96hour _____

Test Species D. pulex ID# Q1-S1BA

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0/0																						
100.0	1	N/A	8	8	8			7.8	7.7	7.1			7.3	7.2	7.1			194	195	190	190	
	2	}	8	8	8																	
	3		8	8	8																	
	4		8	8	8																	
	5		8	2	2																	
Chemistry Tech prerenewal/postrenewal																						

Test: DA-Daphnid Acute Test Test ID: X6228DP
 Species: DP-Daphnia pulex Protocol: EPAAW02-EPA/821/R-02-012
 Sample ID: AR0000752006 Sample Type: EFF2-Industrial
 Start Date: 12/5/2016 End Date: 12/7/2016 Lab ID: 880630

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
36	16	1		22					
37	17	2		22					
38	32	2		100					
39	4	4	D-Control						
40	8	3		22					
41	14	4		32					
42	27	2		75					
43	17	2		45					
44	1	1	D-Control						
45	19	4		45					
46	34	4		100					
47	18	3		45					
48	24	4		56					
49	31	1		100					
50	35	5		100					
51	21	1		56					
52	20	5		45					
53	12	2		32					
54	25	1		75					
55	3	3	D-Control						
56	15	1		45					
57	10	5		22					
58	23	3		56					
59	22	2		56					
60	5	5	D-Control						
61	2	2	D-Control						
62	9	4		22					
63	28	3		75					
64	13	3		32					
65	11	1		32					
66	33	3		100					
67	15	5		32					
68	25	5		56					
69	29	4		75					
70	30	5		75					

Comments:

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

Project# X16228

Test started: Date 12/5/16 Time 1710

Client EDCC

Test ended: Date 12/7/16 Time 1610

Sample Description 006

Test Species P. promelas ID# BAL112816

Technician: Ohour PC 24hour PC 48hour PC 72hour _____ 96hour _____

Time: Ohour 1710 24hour 1930 48hour 1610 72hour _____ 96hour _____

Temperature (°C): Ohour 24.8 24hour 24.4 48hour 24.7 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
010																						
05	1	N/A	8	8	8			8.3	7.9	7.6			7.5	7.5	7.1			209	208	208		
	2	}	8	8	7																	
	3		8	8	8																	
	4		8	8	8																	
	5		8	8	8																	
22.0	1			8	8	7			8.2	8.1	7.4			7.2	7.1	7.1			210	209	208	
	2	}	8	8	8																	
	3		8	8	8																	
	4		8	8	7																	
	5		8	8	8																	
Chemistry Tech prerenewal/postrenewal			PC/PC					PC/PC					PC/PC									

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

Project# X6228
 Client EDCC
 Sample Description 006
 Technician: 0hour PC 24hour PC 48hour PC 72hour _____ 96hour _____
 Time: 0hour 1710 24hour 1930 48hour 1610 72hour _____ 96hour _____
 Temperature (°C): 0hour 24.8 24hour 24.4 48hour 24.7 72hour _____ 96hour _____

Test started: Date 12/5/16 Time 1710
 Test ended: Date 12/11/16 Time 1610
 Test Species P. promelas ID# BAL1125116

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
32.0	1	N/A	8	8	6			8.2	N/A			7.3	7.1	7.1			300	300	300					
	2	}	8	8	8																			
	3		8	8	8																			
	4		8	8	8																			
	5		8	8	8																			
45.0	1			8	8	8			8.1	N/A			7.3	7.1	7.1			33	300	333				
	2		8	8	8																			
	3		8	8	8																			
	4		8	8	8																			
	5		8	7	6																			
Chemistry Tech prerenewal/postrenewal								PC	PC	PC		PC	PC	PC			PC	PC	PC					

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

Project# X6228

Test started: Date 12/5/16 Time 1710

Client EDCC

Test ended: Date 12/7/16 Time 1610

Sample Description 00L0

Test Species P. promelas ID# BAL 1217516
PC 1215116

Technician: 0hour PC 24hour PC 48hour PC 72hour _____ 96hour _____

Time: 0hour 1710 24hour 1930 48hour 1610 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	
010																							
56.0	1	N/A	8	8	8			8.17	8.17			7.3	7.1			36	36						
	2	[Handwritten squiggle]	8	8	8																		
	3		8	7	7																		
	4		8	8	8																		
	5		8	8	7																		
75.0	1			8	6	5			8.0	8.14			7.3	7.1			41	41					
	2		8	8	8																		
	3		8	8	7																		
	4		8	7	6																		
	5		8	7	7																		
Chemistry Tech prerenewal/postrenewal																							

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

Project# X16228

Test started: Date 12/5/16 Time 1710

Client EDCL

Test ended: Date 12/11/16 Time 1610

Sample Description 006

Test Species P. promelas ID# BAL112816

Technician: 0hour PC 24hour PC 48hour PC 72hour _____ 96hour _____
 Time: 0hour 1710 24hour 1930 48hour 1610 72hour _____ 96hour _____
 Temperature (°C): 0hour 24.8 24hour 14.4 48hour 14.1 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	1	N/A	8	8	8	dropped cup	7.8	7.2	7.3			7.3	7.2	7.1			4.7	4.9	4.9			
	2	S	8	8	8																	
	3		8	8	8																	
	4		8	8	7																	
	5		8	8	8																	

Chemistry Tech
 prerenewal/postrenewal

PC PC PC

PC PC PC

PC PC PC

Test: AC-Acute Fish Test Test ID: X6228PP
 Species: PP-Pimephales promelas Protocol: EPAAW02-EPA/821/R-02-012
 Sample ID: AR0000752006 Sample Type: EFF2-Industrial
 Start Date: 12/5/2016 End Date: 12/7/2016 Lab ID: 880630

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
1	2	2	D-Control						
2	24	4	56						
3	29	4	75						
4	21	1	56						
5	30	5	75						
6	26	1	75						
7	20	5	45						
8	19	4	45						
9	25	5	56						
10	32	2	100						
11	33	3	100						
12	28	3	75						
13	11	1	32						
14	3	3	D-Control						
15	9	4	22						
16	6	1	22						
17	1	1	D-Control						
18	22	2	56						
19	35	5	100						
20	14	4	32						
21	4	4	D-Control						
22	17	2	45						
23	27	2	75						
24	18	3	45						
25	34	4	100						
26	5	5	D-Control						
27	10	5	22						
28	12	2	32						
29	16	1	45						
30	31	1	100						
31	15	5	32						
32	13	3	32						
33	8	3	22						
34	23	3	56						
35	7	2	22						

Comments:

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

Start Date: 12/5/2016 Test ID: X6228DP Sample ID: AR0000752
 End Date: 12/7/2016 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 12/4/2016 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

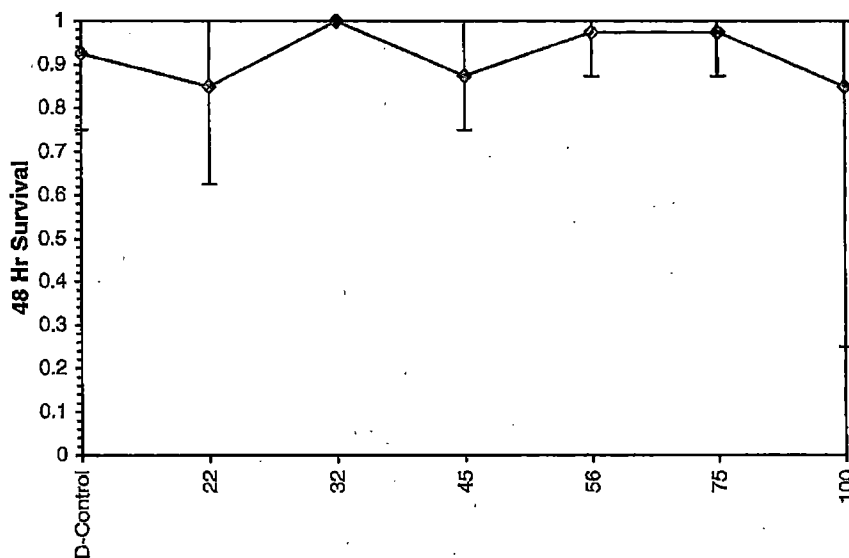
Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	0.8750	0.7500
22	0.7500	1.0000	0.6250	1.0000	0.8750
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	0.7500	0.8750	1.0000	1.0000	0.7500
56	1.0000	1.0000	1.0000	1.0000	0.8750
75	1.0000	1.0000	1.0000	0.8750	1.0000
100	1.0000	1.0000	1.0000	1.0000	0.2500

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5		
22	0.8500	0.9189	1.1909	0.9117	1.3931	17.846	5	24.00	16.00
32	1.0000	1.0811	1.3931	1.3931	1.3931	0.000	5	32.50	16.00
45	0.8750	0.9459	1.2180	1.0472	1.3931	14.204	5	24.50	16.00
56	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	30.50	16.00
75	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	30.50	16.00
100	0.8500	0.9189	1.2192	0.5236	1.3931	31.894	5	29.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.8314	0.934	-1.9342	6.01585
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				

Dose-Response Plot



Test: DA-Daphnid Acute Test Test ID: X6228DP
 Species: DP-Daphnia pulex Protocol: EPAAW02-EPA/821/R-02-012
 Sample ID: AR0000752 Sample Type: EFF2-Industrial
 Start Date: 12/5/2016 End Date: 12/7/2016 Lab ID: ADEQ880630

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	8	8	8			
	2	2	D-Control	8	8	8			
	3	3	D-Control	8	8	8			
	4	4	D-Control	8	8	7			
	5	5	D-Control	8	8	6			
	6	1	22	8	8	6			
	7	2	22	8	8	8			
	8	3	22	8	8	5			
	9	4	22	8	8	8			
	10	5	22	8	7	7			
	11	1	32	8	8	8			
	12	2	32	8	8	8			
	13	3	32	8	8	8			
	14	4	32	8	8	8			
	15	5	32	8	8	8			
	16	1	45	8	8	6			
	17	2	45	8	8	7			
	18	3	45	8	8	8			
	19	4	45	8	8	8			
	20	5	45	8	8	6			
	21	1	56	8	8	8			
	22	2	56	8	8	8			
	23	3	56	8	8	8			
	24	4	56	8	8	8			
	25	5	56	8	7	7			
	26	1	75	8	8	8			
	27	2	75	8	8	8			
	28	3	75	8	8	8			
	29	4	75	8	8	7			
	30	5	75	8	8	8			
	31	1	100	8	8	8			
	32	2	100	8	8	8			
	33	3	100	8	8	8			
	34	4	100	8	8	8			
	35	5	100	8	8	2			

Comments:

Acute Fish Test-48 Hr Survival

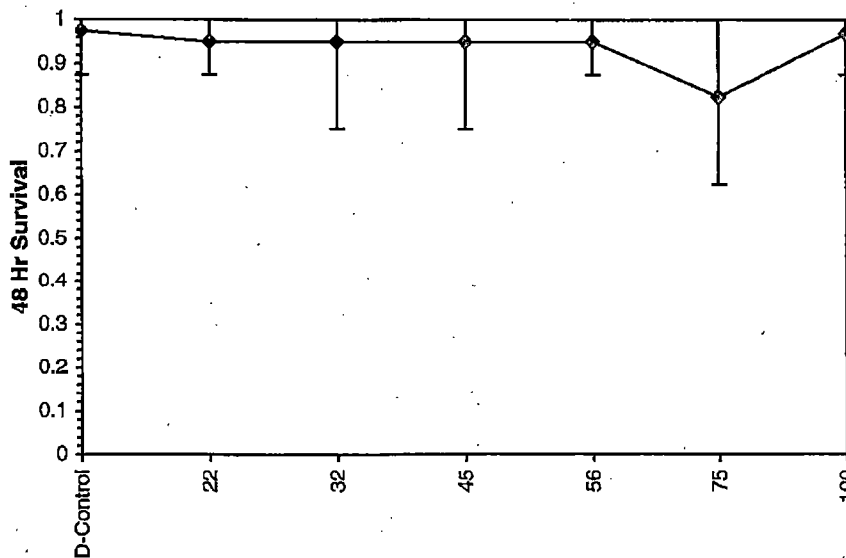
Start Date: 12/5/2016 Test ID: X6228PP Sample ID: AR0000752
 End Date: 12/7/2016 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 12/4/2016 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

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

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
22	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00	16.00
32	0.9500	0.9744	1.3239	1.0472	1.3931	11.684	5	27.00	16.00
45	0.9500	0.9744	1.3239	1.0472	1.3931	11.684	5	27.00	16.00
56	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00	16.00
75	0.8250	0.8462	1.1542	0.9117	1.3931	15.823	5	19.00	16.00
100	0.9688	0.9936	1.3472	1.2094	1.3931	6.816	4	19.50	10.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.79827	0.933	-0.9745	0.55217
Bartlett's Test indicates equal variances (p = 0.67)	4.0602	16.8119		
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Wilcoxon Rank Sum Test	100	>100		1
Treatments vs D-Control				

Dose-Response Plot



Test: AC-Acute Fish Test

Test ID: X6228PP

Species: PP-Pimephales promelas

Protocol: EPAAW02-EPA/821/R-02-012

Sample ID: AR0000752

Sample Type: EFF2-Industrial

Start Date: 12/5/2016

End Date: 12/7/2016

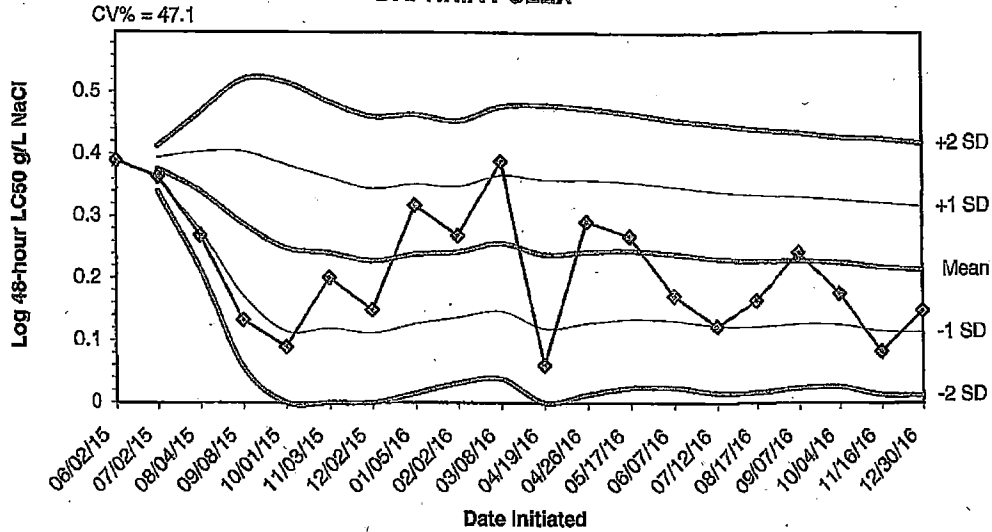
Lab ID: ADEQ880630

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	8	8	8			
	2	2	D-Control	8	8	7			
	3	3	D-Control	8	8	8			
	4	4	D-Control	8	8	8			
	5	5	D-Control	8	8	8			
	6	1	22	8	8	7			
	7	2	22	8	8	8			
	8	3	22	8	8	8			
	9	4	22	8	8	7			
	10	5	22	8	8	8			
	11	1	32	8	8	6			
	12	2	32	8	8	8			
	13	3	32	8	8	8			
	14	4	32	8	8	8			
	15	5	32	8	8	8			
	16	1	45	8	8	8			
	17	2	45	8	8	8			
	18	3	45	8	8	8			
	19	4	45	8	8	8			
	20	5	45	8	7	6			
	21	1	56	8	8	8			
	22	2	56	8	8	8			
	23	3	56	8	7	7			
	24	4	56	8	8	8			
	25	5	56	8	8	7			
	26	1	75	8	6	5			
	27	2	75	8	8	8			
	28	3	75	8	8	7			
	29	4	75	8	7	6			
	30	5	75	8	7	7			
	31	1	100	8	8	8			
	32	2	100	8	8	8			
	33	3	100	8	8	7			
	34	4	100	8	8	8			

Comments:

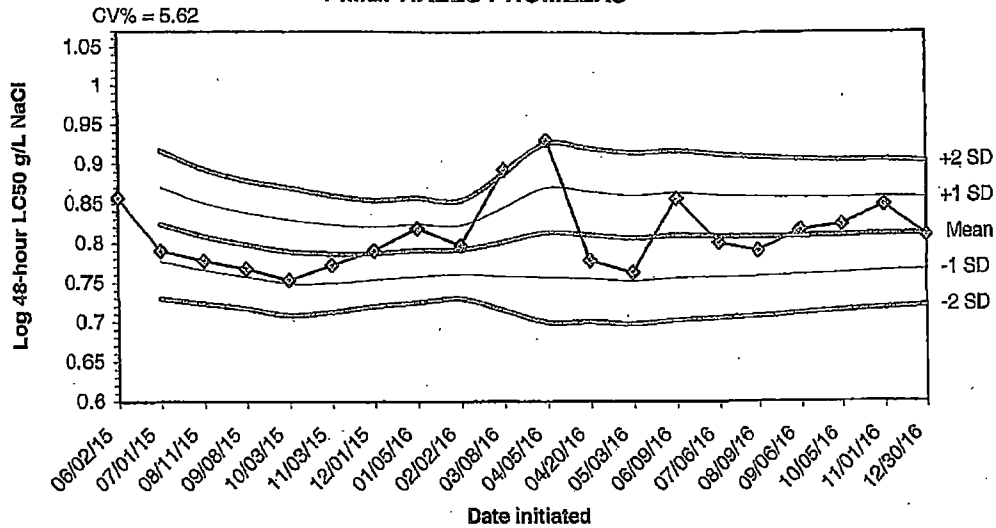
APPENDIX D
QUALITY ASSURANCE CHARTS

2016 48 HOUR ACUTE REFERENCE TOXICANT TEST RESULTS -
DAPHNIA PULEX



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/02/15	0.3892					
07/02/15	0.3636	0.3764	0.3583	0.3403	0.3945	0.4125
08/04/15	0.2695	0.3408	0.2777	0.2147	0.4038	0.4668
09/08/15	0.1335	0.2890	0.1733	0.0576	0.4046	0.5203
10/01/15	0.0899	0.2491	0.1151	0.0000	0.3832	0.5172
11/03/15	0.2014	0.2412	0.1197	0.0000	0.3626	0.4841
12/02/15	0.1492	0.2281	0.1119	0.0000	0.3442	0.4604
01/05/16	0.3181	0.2393	0.1271	0.0149	0.3515	0.4637
02/02/16	0.2695	0.2427	0.1372	0.0318	0.3481	0.4535
03/08/16	0.3892	0.2573	0.1477	0.0380	0.3670	0.4766
04/19/16	0.0607	0.2394	0.1197	0.0000	0.3592	0.4789
04/26/16	0.2923	0.2438	0.1287	0.0135	0.3590	0.4742
05/17/16	0.2695	0.2458	0.1353	0.0248	0.3563	0.4668
06/07/16	0.1732	0.2406	0.1327	0.0248	0.3485	0.4565
07/12/16	0.1239	0.2328	0.1246	0.0163	0.3411	0.4494
08/17/16	0.1644	0.2286	0.1226	0.0166	0.3346	0.4406
09/07/16	0.2430	0.2294	0.1267	0.0240	0.3321	0.4348
10/04/16	0.1761	0.2264	0.1260	0.0256	0.3269	0.4273
11/16/16	0.0828	0.2189	0.1159	0.0129	0.3219	0.4249
12/30/16	0.1492	0.2154	0.1139	0.0125	0.3169	0.4183

2016 48 HOUR ACUTE REFERENCE TOXICANT TEST RESULTS -
PIMEPHALES PROMELAS



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/02/15	0.8573					
07/01/15	0.7910	0.8242	0.7772	0.7303	0.8711	0.9180
08/11/15	0.7782	0.8088	0.7663	0.7238	0.8513	0.8938
09/08/15	0.7679	0.7986	0.7583	0.7180	0.8389	0.8792
10/03/15	0.7536	0.7896	0.7493	0.7090	0.8299	0.8701
11/03/15	0.7723	0.7867	0.7500	0.7133	0.8234	0.8601
12/01/15	0.7910	0.7873	0.7538	0.7202	0.8209	0.8544
01/05/16	0.8189	0.7913	0.7583	0.7253	0.8243	0.8573
02/02/16	0.7973	0.7919	0.7610	0.7301	0.8229	0.8538
03/08/16	0.8932	0.8021	0.7587	0.7154	0.8454	0.8887
04/05/16	0.9309	0.8138	0.7572	0.7007	0.8703	0.9269
04/20/16	0.7789	0.8109	0.7560	0.7012	0.8657	0.9206
05/03/16	0.7642	0.8073	0.7532	0.6991	0.8614	0.9155
06/09/16	0.8573	0.8109	0.7572	0.7035	0.8645	0.9182
07/06/16	0.8014	0.8102	0.7584	0.7067	0.8620	0.9138
08/09/16	0.7910	0.8090	0.7588	0.7085	0.8593	0.9095
09/06/16	0.8169	0.8095	0.7608	0.7121	0.8582	0.9069
10/05/16	0.8241	0.8103	0.7629	0.7156	0.8577	0.9050
11/01/16	0.8488	0.8123	0.7655	0.7186	0.8592	0.9061
12/30/16	0.8102	0.8122	0.7666	0.7210	0.8578	0.9035

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

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

Composite Collected From: 12/3/16 To: 12/4/16
From: To:

Test Initiated: 12/5/16

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	87.5	100.0	100.0	100.0	100.0	100.0	100.0
	E	75.0	87.5	100.0	100.0	87.5	100.0	25.0
48-hour	A	100.0	75.0	100.0	75.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	87.5	100.0	100.0	100.0
	C	100.0	62.5	100.0	100.0	100.0	100.0	100.0
	D	87.5	100.0	100.0	100.0	100.0	87.5	100.0
	E	75.0	87.5	100.0	75.0	87.5	100.0	25.0
	Mean	92.5	85.0	100.0	87.5	97.5	97.5	85.0

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_{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
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: Carter
Sample Collected **From:** **Date 12/3/16** **Time 1015**
 To: **Date 12/4/16** **Time 2415**
Test Begin **Date 12/5/16** **Time 1540**
Test End **Date 12/7/16** **Time 1445**

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	8.3	8.1	7.7	24.8	24.4	24.6	28.0				44.0			7.5	7.5	7.4
22.0	8.2	8.1	7.6	24.8	24.4	24.6								7.4	7.4	7.3
32.0	8.2	8.0	7.6	24.8	24.4	24.6								7.3	7.3	7.3
45.0	8.1	8.1	7.6	24.8	24.4	24.6								7.3	7.5	7.2
56.0	8.1	8.1	7.7	24.8	24.4	24.6								7.3	7.3	7.2
75.0	8.0	8.1	7.7	24.8	24.4	24.6								7.3	7.3	7.2
100.0	7.8	8.2	7.7	24.8	24.4	24.6	36.0				80.0			7.3	7.2	7.1

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

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 12/3/16 To: 12/4/16
From: To:

Test Initiated: 12/5/16

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	75.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	87.5	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	87.5	100.0
	E	100.0	100.0	100.0	87.5	100.0	87.5	100.0
48-hour	A	100.0	87.5	75.0	100.0	100.0	62.5	*
	B	87.5	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	87.5	87.5	100.0
	D	100.0	87.5	100.0	100.0	100.0	75.0	87.5
	E	100.0	100.0	100.0	75.0	87.5	87.5	100.0
	Mean	97.5	95.0	95.0	95.0	95.0	82.5	96.9

*Dropped replicate

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

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

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = N/A % effluent

95 % confidence limits:

Method of LC₅₀ calculation:

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

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

Permittee: El Dorado Chemical - Outfall 006

NPDES Number: AR0000752/ AFIN 70-00040

Contact: Eddie Pearson

Analyst: Carter

Sample Collected

From: Date 12/3/16 Time 1015

To: Date 12/4/16 Time 2415

Test Begin Date 12/5/16 Time 1710

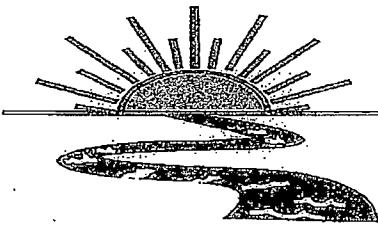
Test End Date 12/7/16 Time 1610

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	8.3	8.1	7.5	24.8	24.4	24.7	28.0				44.0			7.5	7.5	7.1
22.0	8.2	8.1	7.4	24.8	24.4	24.7								7.4	7.4	7.1
32.0	8.2	8.0	7.4	24.8	24.4	24.7								7.3	7.3	7.1
45.0	8.1	8.1	7.4	24.8	24.4	24.7								7.3	7.5	7.1
56.0	8.1	8.1	7.4	24.8	24.4	24.7								7.3	7.3	7.1
75.0	8.0	8.1	7.4	24.8	24.4	24.7								7.3	7.3	7.1
100.0	7.8	8.2	7.3	24.8	24.4	24.7	36.0				80.0			7.3	7.2	7.1

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM

Client: Eldorado Chemical

Project#: X6228

Chain of Custody Documents Checked by: EBB/12-20-16
Technician/Date

Raw Data Documents Checked by: EBB/12-20-16
Technician/Date

Statistical Analysis Package Checked by: EBB/12-20-16
Quality Manager/Date

Quality Control Data Checked by: EBB/12-20-16^{EB} 1/3/17
Quality Manager/Date

Report Checked by: EBB/1-5-17
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.

Cecil J. Burpp, BS
Quality Manager

1-5-17
Date

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