

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X4801

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4801

Outfall: Outfall 007

Permit #: AR0000752/ AFIN #70-00040

Contact: Ms. Larken Pennington

Test Dates: July 11 - 13, 2012

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%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 1.
2. Report the NOEC for survival, Parameter TOM6C - 100%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 1.
2. Report the NOEC for survival, Parameter TOM3D - 100%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 0.00%.

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



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-259-1246
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 X4801

**Test Dates: July 11 - 13, 2012
Report Date: August 7, 2012**

Prepared for:
Ms. Larken Pennington
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 X4801

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ADEQ #88-0630
Project X4801

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

All methods followed were according to the latest edition of "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012).

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately nine days old at test initiation. The *Daphnia pulex* test organisms were raised in-house 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, 75.0, 56.0, 50.0, 42.0 and 32.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 007 was collected by El Dorado Chemical personnel on July 10, 2012. Upon completion of collection, the sample was chilled to 4^o Celsius and personally delivered to Bio-Analytical Laboratories.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1^o Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen, pH and conductivity measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity and hardness levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

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

2.8 Data Analysis

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

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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 noted in the critical dilutions in both tests ($p=.05$). The NOEC value for both tests was zero percent effluent ($p=.05$). The 48-hour LC_{50} value for both tests was 5.6 percent.

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism		
Control	100.0	100.0
32.0	0.0	0.0
42.0	0.0	0.0
50.0	0.0	0.0
56.0	0.0	0.0
75.0	0.0	0.0
100.0	0.0	0.0

The 48-hour reference toxicant test results indicate 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 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on July 10, 2012, was found to be lethally toxic to the *Daphnia pulex* test organisms and the fathead minnow test organisms in the 100 percent critical dilution after 24 hours of exposure ($p=.05$). The 48-hour LC_{50} value for both tests was 5.6 percent effluent.

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5.0 Reference

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.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Erin G Briggs <bioanalytical@wildblue.net>

Fwd: RE: storm water samples

1 message

Erin G Briggs <gingerbriggs@wildblue.net>
To: bioanalytical@wildblue.net

Thu, Aug 2, 2012 at 1:43 PM

----- Forwarded message -----

From: "Larken Pennington" <LPennington@edc-ark.com>
Date: Aug 1, 2012 2:14 PM
Subject: RE: storm water samples
To: "Erin G Briggs" <gingerbriggs@wildblue.net>

Ginger,

I found this exact email. Samples were collected on the afternoon (4:10pm and 4:20pm) of July 10. Sorry for the confusion.

Thanks,

Larken

From: Erin G Briggs [mailto:gingerbriggs@wildblue.net]
Sent: Wednesday, August 01, 2012 2:07 PM
To: Larken Pennington
Subject: Fwd: storm water samples

Found your email dated July 10. The COCs say the 9th. Please send me an email confirming date ...



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3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 746-2772
1-800-236-1246
Fax: (318) 748-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:				Project Number: X4801 Temp. upon arrival: 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		
Permit #: AR0000752/AFIN 70-00040		Purchase Order:		Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:		
Sampler's Signature/Printed Name/Affiliation: <i>Larken Pennington</i> / Larken Pennington / EDEC									
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification			Preservative: (below)	
7/9/12	4:20pm		X	6 half gallon	outfall 007		CS821	ice	
Relinquished by/Affiliation: <i>Larken Pennington</i>				Date: 7/11/12	Time: 1100	Received by/Affiliation: <i>Erin S. Brugg</i>		Date: 7/11/12	Time: 1100
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:									
Temperature upon arrival: 1.9 Thermometer #: 29 Tech: RC Date: 7/11/12									

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X4801

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 Outfall 007

Technicians: EGB/AH/LGZ/RC

Test initiated: Date 7/11/12 Time 1430

Test terminated: Date 7/13/12 Time 1240

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AU

pH Meter: Model #Orion 230A+ Serial #105253

Conductivity Meter: Model # Control Co. Serial #80277924

Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/Final D.O.(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
C5821	8.9/101.8%	Y/10 8.5/98.5%	20.01	NO	6.0	N/A	100% 9400 3330 At 7/12/12	100% 24.0	AH/LGZ
↓			↓	↓	↓	↓	↓	↓	
C5821	8.4/100.8%	No	<0.01	↓	6.0	↓	↓	↓	RC

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	3350	N/A	N/A	N/A	N/A	7.6	68.0	40.0	AH
								AH 7/12/12 68.0	

Test Species Information

Test Species Info.	Species: <u>D.pulex</u> ID#: <u>041 X3-Z3</u>	Species: <u>P.pinnacis</u> ID#: <u>041 7212</u>	Species: ID#:	Species: ID#:
Age	24h	9 days		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	VCT: Algae	Artemia		
Amount	Fed 2hr prior to test initiation			
Aeration?	NA	NA		
Amount				
Condition of survivors	Good AH	Good AH/LGZ		

Comments: 7/13/12 7/13/12

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

Project# X4801

Test started: Date 7/11/12 Time 1440

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1240

Sample Description 007

Test Species D. Pulex ID# BALX3-23

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

Time: 0hour 1440 24hour 1440 48hour 1240 72hour 96hour

Temperature (°C): 0hour 24.3 24hour 24.2 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	NA	8	8	8			8.0	8.1	8.2			7.7	7.6	7.8			1834	1854	1866	2244		
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	8																		
32	A		8	0				8.1	8.1	—			7.0	6.6	—			3700	3480	3500	—		
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
Chemistry Tech prerenewal/postrenewal								AL/RC/AL					AL/RC/AL					AL/RC/AL					

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

Project# X4801

Test started: Date 7/11/12

Time 1440

client El Dorado Chemical

Test ended: Date 7/13/12

Time 1240

Sample Description 007

Test Species D. PULEX

ID# BAL X3-23

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

Time: 0hour 1440 24hour 1440 48hour 1240 72hour 96hour

Temperature (°C): 0hour 24.3 24hour 24.2 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			
42	A	NA	8	0				82	80/83	—					7.0	6.5/7.0	—						4810	4360/440	—
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
50	A		8	0				82	80/84	—				6.9	6.5/6.9	—							5570	5290/560	—
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
Chemistry Tech prerenewal/postrenewal																									

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

Project# X4801

Test started: Date 7/11/12

Time 1440

client El Dorado Chemical

Test ended: Date 7/13/12

Time 1240

Sample Description 007

Test Species D. pulex

ID# BAL X3-23

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

Time: 0hour 1440 24hour 1440 48hour 1240 72hour 96hour

Temperature (°C): 0hour 24.3 24hour 24.2 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			
100	A	NA	8	0				8.4	1.8 8.3	-					6.8	6.2 6.7	-						11310	10050 10630	-
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
	A		8																						
	B		8																						
	C		8																						
	D		8																						
	E		8																						
Chemistry Tech prerenewal/postrenewal								RC AH							RC AH								RC AH		

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

Project# X4801

Test started: Date 7/11/12 Time 1430

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1830

Sample Description 007

Test Species P. promelas ID# SAL/7212

Technician: 0hour DM 24hour DM 48hour DM 72hour DM 96hour DM
 Time: 0hour 1430 24hour 1325 48hour 1230 72hour DM 96hour DM
 Temperature (°C): 0hour 21.6 24hour 24.4 48hour 24.3 72hour DM 96hour DM

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		8	8	8			8.0	7.8	7.9			7.7	7.8	7.7			1834	1840	1840		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32	A		8	0				8.1	7.3				7.0	6.9			3700	3780				
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal																						

ACUTE2 020809 Rev.

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

Project# X4801

Test started: Date 7/1/12 Time 1430

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1230

Sample Description 007

Test Species P. promelas ID# BAL/7212

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

Time: 0hour 1430 24hour 1325 48hour 1230 72hour DM 96hour DM

Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.2 72hour DM 96hour DM

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	
42	A	NA	8	0				8.2	7.3/8.3					7.0	6.8/7.0			4810	4820/4860				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
50	A		8	0				8.2	7.2/8.4					6.9	6.7/6.9			5510	5520/5600				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
Chemistry Tech prerenewal/postrenewal																							

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

Project# X4801

Test started: Date 11/1/12 Time 1430

Client El Dorado Chemical

Test ended: Date 1/13/12 Time 1230

Sample Description 007

Test Species P. promelas ID# BA1/7012

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

Time: 0hour 1430 24hour 1335 48hour 1230 72hour SM 96hour SM

Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.3 72hour SM 96hour SM

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity										
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96						
56	A	NA	8	0				8.2	7.2							6.9	6.7						6210	6280				
	B		8	0																								
	C		8	0																								
	D		8	0																								
	E		8	0																								
75	A		8	0				8.3	7.2							6.8	6.5						7910	8000				
	B		8	0																								
	C		8	0																								
	D		8	0																								
	E		8	0																								
Chemistry Tech prerenewal/postrenewal																												

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

Project# X4801

Test started: Date 7/11/12 Time 1430

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1220

Sample Description 007

Test Species P. promelas ID# BA1/7212

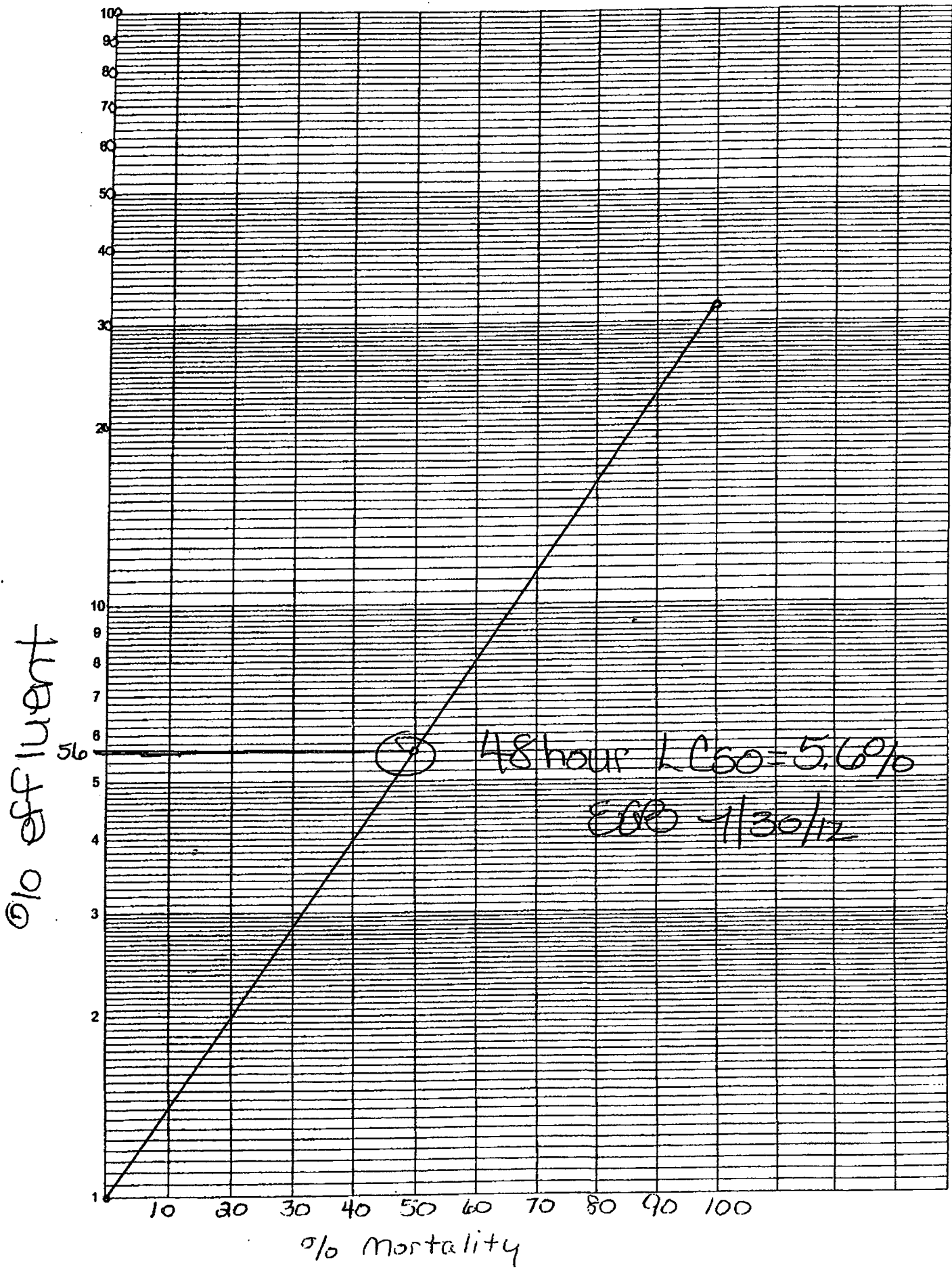
Technician: 0hour SM 24hour SM 48hour SM 72hour SM 96hour SM
 Time: 0hour 1420 24hour 1325 48hour 1230 72hour SM 96hour SM
 Temperature (°C): 0hour 24.6 24hour 24.4 48hour 24.3 72hour SM 96hour SM

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity										
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96						
100	A	NA	8	0				8.4	7.2						6.8	6.3							10310	10530				
	B		8	0																								
	C		8	0																								
	D		8	0																								
	E		8	0																								
	A		8																									
	B		8																									
	C		8																									
	D		8																									
	E		8																									
Chemistry Tech prerenewal/postrenewal																												

APPENDIX C
STATISTICAL ANALYSIS

X4801 D. pulex v P. promelas

vs. 007



Daphnid Acute Test-48 Hr Survival

Start Date: 7/11/2012 Test ID: ~~X4800BP~~ X4801DP Sample ID: AR0000752 NPDES 007
 End Date: 7/13/2012 Lab ID: ADEQ880630 218 7/30 Sample Type: EFF2-Industrial
 Sample Date: 7/11/2012 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	0.0000	0.0000	0.0000	0.0000	0.0000
42	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
*32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.934		
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<32	32		
Treatments vs D-Control				

Acute Fish Test-48 Hr Survival

Start Date: 7/11/2012 Test ID: ~~X48000P~~ X4801PP Sample ID: AR0000752 NPDES 007
 End Date: 7/13/2012 Lab ID: ADEQ880630 *216 7/30* Sample Type: EFF2-Industrial
 Sample Date: 7/11/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

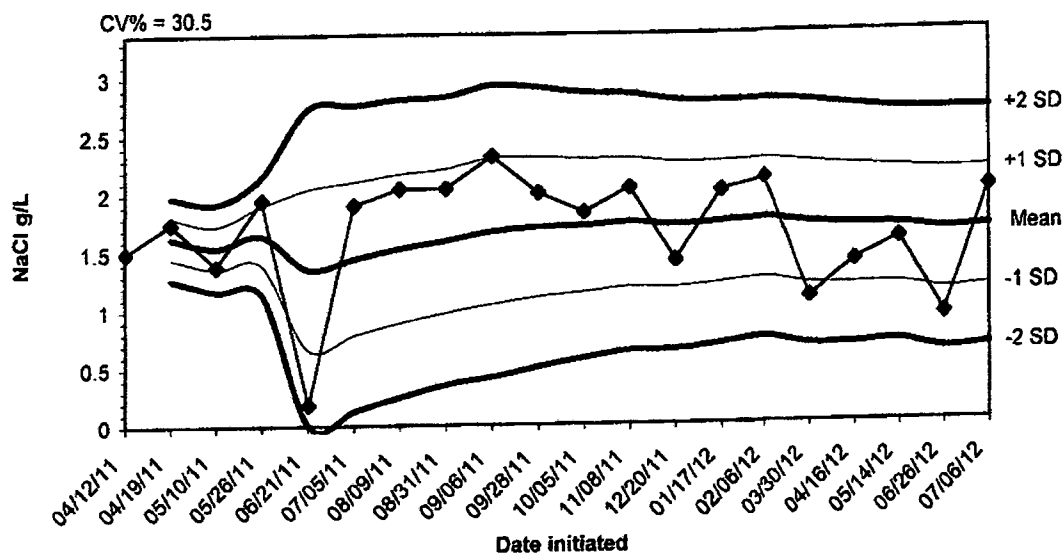
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
*32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.934		
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<32	32		
Treatments vs D-Control				

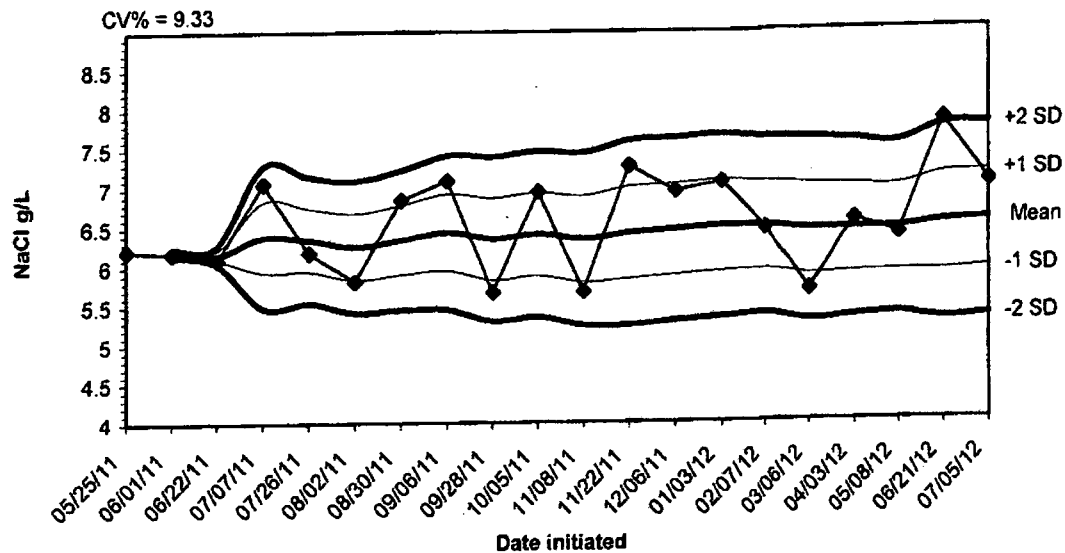
APPENDIX D
QUALITY ASSURANCE CHARTS

2012 48-hour Reference Toxicant Test Results for *Daphnia pulex*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/12/11	1.5000					
04/19/11	1.7500	1.6250	1.4482	1.2714	1.8018	1.9786
05/10/11	1.3800	1.5433	1.3546	1.1658	1.7321	1.9209
05/26/11	1.9500	1.6450	1.3899	1.1347	1.9001	2.1553
06/21/11	0.1800	1.3520	0.6606	0.0000	2.0434	2.7349
07/05/11	1.9000	1.4433	0.7857	0.1280	2.1010	2.7586
08/09/11	2.0400	1.5286	0.8873	0.2459	2.1699	2.8112
08/31/11	2.0400	1.5925	0.9718	0.3512	2.2132	2.8338
09/06/11	2.3200	1.6733	1.0441	0.4150	2.3025	2.9317
09/28/11	2.0000	1.7060	1.1039	0.5017	2.3081	2.9103
10/05/11	1.8300	1.7173	1.1448	0.5724	2.2897	2.8622
11/08/11	2.0400	1.7442	1.1905	0.6368	2.2979	2.8516
12/20/11	1.4100	1.7185	1.1803	0.6421	2.2566	2.7948
01/17/12	2.0100	1.7393	1.2164	0.6935	2.2622	2.7851
02/06/12	2.1100	1.7640	1.2511	0.7382	2.2769	2.7898
03/30/12	1.0800	1.7213	1.1971	0.6729	2.2454	2.7696
04/16/12	1.3900	1.7018	1.1879	0.6741	2.2156	2.7295
05/14/12	1.5800	1.6950	1.1957	0.6963	2.1943	2.6937
06/26/12	0.9200	1.6542	1.1374	0.6206	2.1710	2.6878
07/06/12	2.0100	1.6720	1.1627	0.6534	2.1813	2.6906

2012 48-hour Reference Toxicant Test Results for *Pimephales promelas*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/25/11	6.2100					
06/01/11	6.1800	6.1950	6.1738	6.1526	6.2162	6.2374
06/22/11	6.0900	6.1600	6.0976	6.0351	6.2224	6.2849
07/07/11	7.0600	6.3850	5.9321	5.4792	6.8379	7.2908
07/26/11	6.1800	6.3440	5.9412	5.5384	6.7468	7.1496
08/02/11	5.8100	6.2550	5.8339	5.4128	6.6761	7.0972
08/30/11	6.8500	6.3400	5.8947	5.4493	6.7853	7.2307
09/06/11	7.0900	6.4338	5.9435	5.4533	6.9240	7.4142
09/28/11	5.6700	6.3489	5.8244	5.2999	6.8734	7.3979
10/05/11	6.9500	6.4090	5.8792	5.3496	6.9388	7.4685
11/08/11	5.6700	6.3418	5.7921	5.2423	6.8916	7.4413
11/22/11	7.2700	6.4192	5.8305	5.2418	7.0079	7.5965
12/06/11	6.9500	6.4800	5.8775	5.2949	7.0425	7.6251
01/03/12	7.0600	6.5029	5.9207	5.3385	7.0851	7.6673
02/07/12	6.4600	6.5000	5.9389	5.3777	7.0611	7.6223
03/06/12	5.6700	6.4481	5.8677	5.2872	7.0286	7.6090
04/03/12	6.5600	6.4547	5.8920	5.3293	7.0174	7.5801
05/08/12	6.3700	6.4500	5.9038	5.3575	6.9962	7.5425
06/21/12	7.8200	6.5221	5.9052	5.2883	7.1390	7.7560
07/05/12	7.0300	6.5475	5.9364	5.3253	7.1586	7.7697

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 007

NPDES Permit Number: AR0000752

Composite Collected From: 7/10/12

To: 7/10/12

From:

To:

Test Initiated: 7/11/12

Dilution Water Used: Receiving Water X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32	42	50	56	75	100
24-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
48-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
	Mean	100	0	0	0	0	0	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%) 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} = 5.6% effluent

95 % confidence limits: N/A

Method of LC_{50} calculation: Graphical

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

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

Permittee: El Dorado Chemical - Outfall 007

NPDES Number: AR0000752

Contact: Larken Pennington

Analyst: Haughton, Callahan

Sample Collected

From:

Date 7/10/12

Time 1620

To:

Date 7/10/12

Time 1620

Test Begin

Date 7/11/12

Time 1440

Test End

Date 7/13/12

Time 1240

Parameter	D.O			Temperature			Alkalinity			Hardness			pH			
	Dilut/Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.0	8.2	8.2	24.3	24.2	24.4	40.0			68.0			7.7	7.6	7.8
32		8.1	8.1		24.3	24.2								7.0	6.6	
42		8.2	8.0		24.3	24.2								6.9	6.5	
50		8.2	8.0		24.3	24.2								6.9	6.5	
56		8.2	7.9		24.3	24.2								6.9	6.5	
75		8.3	7.9		24.3	24.2								6.8	6.4	
100		8.4	7.8		24.3	24.2		24.0			940.0			6.8	6.2	

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

**Acute Forms
Fathead Minnow Survival**

Permittee: El Dorado Chemical - Outfall 007

NPDES Permit Number: AR0000752

Composite Collected From: 7/10/12 To: 7/10/12
From: To:

Test Initiated: 7/11/12

Dilution Water Used: Receiving Water X Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32	42	50	56	75	100
24-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
48-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
	Mean	100	0	0	0	0	0	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%)** YES X NO
b.) **½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%)** YES NO

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = 5.6% effluent

95 % confidence limits: N/A

Method of LC₅₀ calculation: Graphical

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

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

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

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

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

Permittee: El Dorado Chemical - Outfall 007

NPDES Number: AR0000752

Contact: Larken Pennington

Analyst: Haughton, Callahan

Sample Collected From: Date 7/10/12 Time 1620

To: Date 7/10/12 Time 1620

Test Begin Date 7/11/12 Time 1440

Test End Date 7/13/12 Time 1240

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut/Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.0	8.2	7.9	24.6	24.4	24.3	40.0			68.0			7.7	7.6	7.7
32		8.1	7.3		24.6	24.4								7.0	6.9	
42		8.2	7.3		24.6	24.4								7.0	6.8	
50		8.2	7.2		24.6	24.4								6.9	6.7	
56		8.2	7.2		24.6	24.4								6.9	6.7	
75		8.3	7.2		24.6	24.4								6.5	6.5	
100		8.4	7.2		24.6	24.4		24.0			940.0			6.8	6.3	

*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 (v. 31612)

Client: El Dorado Chemical-007

Project#: X4801

Chain of Custody Documents Checked by: AH 7/18/12
Technician/Date

Raw Data Documents Checked by: AH 7/18/12
Technician/Date

Statistical Analysis Package Checked by: EOB 4/30/12
Quality Manager/Date

Quality Control Data Checked by: EOB 8/1/12
Quality Manager/Date

Report Checked by: EOB 8/7/12
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.

Curtis L. Bragg, BS
Quality Manager

8/7/12
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 Certificate #88-0630
Project X4809

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
4500 Northwest Avenue
El Dorado, AR 71731

Project #: X4809

Outfall: 001

Permit #: AR0000752/ AFIN #70-00040

Contact: Larken Pennington

Test Dates: July 17 - 24, 2012

Test Type: Chronic Static Renewal Survival and Reproduction Test using *Ceriodaphnia dubia* (EPA Method 1002.0).
Chronic Static Renewal Survival and Growth Test using *Pimephales promelas* (EPA Method 1000.0).

Results:

For *Ceriodaphnia dubia*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0.
2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 1.
3. Report the NOEC value for survival, Parameter TOP3B - 100%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 40.43%.

Note: Treating with UV light did not reduce the non-lethal effect.

For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP6C - 0.
2. If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP6C - 0.
3. Report the NOEC value for survival, Parameter TOP6C - 100%
4. Report the NOEC value for growth, Parameter TPP6C - 100%
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 26.00%

Note: The UV treated 100% dilution showed no lethal or non-lethal effects.

This report contains a total of 48 pages, including this page. The results in the report pertain only to the samples documented in the enclosed chain of custody documents, and meet the standards set forth by TNI and ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

**THE RESULTS OF TWO CHRONIC
DEFINITIVE TOXICITY TESTS
FOR OUTFALL 001**

AT

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

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

EPA Methods 1000.0 and 1002.0

Project X4809

Test Dates: July 17 - 24, 2012

Report Date: August 15, 2012

Prepared for:
Larken Pennington
El Dorado Chemical Company
4500 Northwest Avenue
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 X4809

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ADEQ #88-0630
Project X4809

1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two chronic definitive toxicity tests for Outfall 001 at El Dorado Chemical Company, El Dorado, Arkansas. The test organisms used were the cladoceran, *Ceriodaphnia dubia*, and the fathead minnow, *Pimephales promelas*. The purpose of this study is to determine if appropriately dilute effluent samples adversely affect the survival, reproduction and/or growth of the test organisms. Toxicity is defined as a statistically significant difference at the 95 percent confidence level between the survival, reproduction and/or growth 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, reproduction and/or growth of the test organism in the control. The test endpoint is the No-Observed-Effect-Concentration (NOEC), the highest effluent concentration that is not significantly different from the control.

2.0 Methods and Materials

2.1 Test Methods

All methods followed were according to the latest edition of "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (EPA-821-R-02-013) and BAL's standard operating procedure.

2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnow test organisms were also raised in-house and were less than 24 hours old at test initiation. The minnows were acclimated to test temperature and dilution water hardness prior to test initiation. Monthly chronic reference toxicant tests, were conducted in order to document organism sensitivity and demonstration of capability.

2.3 Dilution Water

Soft reconstituted water, made per method guidelines, was used as the dilution water and the control for the toxicity tests.

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Project X4809

2.4 Test Concentrations

The test concentrations used in the chronic toxicity tests were 100, 75, 56, 42 and 32 percent effluent, and a reconstituted water control. The critical dilution was 100 percent effluent. The *Ceriodaphnia* test was conducted using 10 replicates of one animal each for a total of 10 animals per concentration. The fathead minnow test was conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on July 16, 18 and 20, 2012. Upon collection and completion of each composite, the samples were chilled to 4^o Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25±1^o Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. Portions of the effluent were treated with an 18 watt ultraviolet light (UV) at a rate of 113 ml per minute. An extra 100 percent concentration was run in the tests to determine if any toxicity was due to a potential pathogen. Dissolved oxygen and pH measurements were measured on the control and each concentration at test initiation, at test renewal and at test termination. Conductivity measurements were also taken at test initiation and at each renewal. Alkalinity and hardness levels were measured on the control and the undiluted effluent samples.

2.7 Monitoring of the Tests

The cladoceran test was run in a Precision^R dual-programmable, illuminated incubator at a temperature of 25±1^o Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25±1^o Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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Project X4809

2.8 Data Analysis

Ceriodaphnia dubia survival data was analyzed using Fisher's Exact Test, an equality test comparing concentration data to control data. Reproduction data was analyzed using Steel's Many-One Rank Test, a non-parametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Steel's Many-One Rank Test, while the growth data was analyzed using Dunnett's Test, a parametric test. The test endpoints in the reference toxicant tests and any other quality control test endpoints were obtained by approved EPA methods of analysis.

3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. One hundred percent survival occurred in the control and in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 20.0, while the average number of neonates in the critical dilution was 5.5. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively ($p=.05$). Treating with UV light did not reduce the non-lethal effect.

The fathead minnow test results can be found in Table 2. Ninety-two-point-five percent survival occurred in the control and 95 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.515 milligram (mg), while the average in the critical dilution was 0.503 mg. The NOEC for survival and growth in this test was 100 percent effluent.

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Project X4809

Table 1: Results of the Chronic Definitive *Ceriodaphnia dubia* Test

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		20.0	20.0	
32.0	100.0		15.6	15.6	*
42.0	80.0		11.5	10.5	*
56.0	80.0		9.8	8.2	*
75.0	90.0		5.1	4.6	*
100.0	100.0		5.5	5.5	*
100.0 UV	100.0		3.7	3.7	*

*significant when compared to the control (p=.05). Test validity based on mean number of neonates per surviving female. NOEC value based on total mean number of neonates. +accidental death.

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	92.5		0.515/0.553+	
32.0	97.5		0.515	
42.0	90.0		0.483	
56.0	92.5		0.493	
75.0	95.0		0.493	
100.0	95.0		0.503	
100.0 UV	92.5		0.578	

*significant when compared to the control (p=.05). +Test validity based on mean dry weight per surviving larvae in the control. NOEC value based on mean dry weight per the number of larvae at the start of the test.

The monthly chronic reference toxicant tests showed those test organisms to be within the respective sensitivity range. The graphs of the results of the chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

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ADEQ #88-0630
Project X4809

4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on July 16, 18 and 20, 2012, were not found to be lethally toxic to the fathead minnow test organisms nor the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven days of exposure ($p=.05$). Nonlethal effects (i.e., lack of growth or reproduction) were not noted in the critical dilution in the minnow test, but were noted in the *Ceriodaphnia dubia* test ($p=.05$). Treating the sample with UV light did not reduce the toxicity in the cladoceran test ($p=.05$).

BAL
ADEQ #88-0630
Project X4809

5.0 References

EPA, 2002. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. EPA-821-R-02-013, 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.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772, Fax (318) 745-2773
 bioanalytical@att.net

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:				Project Number: X4809							
Address: 4500 Northwest Avenue, El Dorado, AR 71731		Fax: (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliforms	Total Coliforms	Temperature upon arrival: the thermometer #: 29 29 7/16/12	Preservative: (below) ice		
Permit #: AR0000752		Purchase Order:												Lab Control Number: CS849	
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDEC															
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification										
7/15/12 7/16/12	8:30am- 8:30am	X		8	001		X	X							
Relinquished by/Affiliation: Larken Pennington				Date: 7/16/12	Time: 1050	Received by/Affiliation: [Signature]				Date: 7/16/12	Time: 1050				
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:				
Relinquished by/Affiliation: [Signature]				Date: 7/16/12	Time: 1250	Received by/Affiliation: [Signature]				Date: 7/16/12	Time: 1250				
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:															

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772, Fax (318) 745-2773
 bioanalytical@att.net

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:							Project Number: 4809	Temp. upon arrival:	Preservative: (below)	
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		Fax: (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysisid	Acute Ceriodaphnia	Fecal Coliform				Total Coliform
Permit #: AR0000752		Purchase Order:												
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC														
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification							Lab Control Number:		
7/17/12 - 7/18/12	8:30am - 8:30am	X		8 8:30am 8:30am	001	X	X					C5863	ice	
Relinquished by/Affiliation: Larken Pennington					Date: 7/18/12	Time: 1045	Received by/Affiliation: J R					Date: 7/18/12	Time: 1045	
Relinquished by/Affiliation:					Date:	Time:	Received by/Affiliation:					Date:	Time:	
Relinquished by/Affiliation: J R					Date: 7/18/12	Time: 1:30	Received by/Affiliation: R Callahan					Date: 7/18/12	Time: 1:30	
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: Ice melted														
Temperature upon arrival: 10.2														
Thermometer #: 29														
Tech: RC														
Date: 7/18/12														

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772, Fax (318) 745-2773
 bioanalytical@att.net

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:						Project Number: X4809												
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		Fax: (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia		Fecal Coliform	Total Coliform	Temp. upon arrival: 2.5°C #29 JBY 7/20/12									
Permit #: AR0000752		Purchase Order:												Lab Control Number: CS882	Preservative: (below) ice							
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC																						
Date Start Date End	Time Start Time End	C	G							# containers						Sample Identification						
7-19-12 - 7-20-12	8:30 - 2:30	X		8	001	X	X															
Relinquished by/Affiliation: Larken Pennington				Date: 7/20/12	Time: 1045	Received by/Affiliation: JBY				Date: 7/20/12	Time: 1045											
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:											
Relinquished by/Affiliation: JBY				Date: 7/20/12	Time: 1245	Received by/Affiliation: J Yeagler				Date: 7/20/12	Time: 1245											
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:																						

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4809 Date start: 7/17/12 Date end: 7/24/12

Client/Contact: EDCC/El Dorado Chemical
 Address: 4500 Northwest Avenue El Dorado AR 71731
 NPDES#: AR0000752 AFIN70-00040
 Sample Description: 001 Dilution Water: Soft Reconstituted
 Test Temperature(°C) 25+1° Technicians: EGB/AH/LGZ/RC

Adults isolated: Date 7/16/12 Time: 2300

Neonates collected: Date 7/17/12 Time: 0620 Board: V55
 Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU
 pH Meter: Model Orion 230A+ Serial #105253
 Conductivity Meter: Model Control Company Serial# 80277924
 Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

Effluent	Aerate?/Minutes	Receiving Water	Aerate?/Minutes
Initial D.O.	/Final D.O.	Initial D.O.	/Final D.O.
(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech
0. <u>9.5/111.4% AH</u>	0. <u>4/20/8.5/98.12% AH</u>	0. <u>NA</u>	0. <u>NA</u>
1. <u>8.0/90.2% AH</u>	1. <u>NO AH</u>	1. _____	1. _____
2. <u>6.2/72.7% AH</u>	2. <u>4/20/8.5/97.6% AH</u>	2. _____	2. _____
3. <u>6.4/77.9% EGB</u>	3. <u>4/10/7.3/85.9% EGB</u>	3. _____	3. _____
4. <u>8.0/99.1% EGB</u>	4. <u>NO EGB</u>	4. _____	4. _____
5. <u>9.3/111.5% EGB</u>	5. <u>4/15/8.1/95.0% EGB</u>	5. _____	5. _____
6. <u>9.0/106.9% EGB</u>	6. <u>4/25/8.3/98.2% EGB</u>	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____

Total Residual Chlorine (mg/L)/Tech

Dechlorinated? Amount?/Tech

Ammonia (NH3) (mg/L)/Tech

BAL Sample # Date in Use

1. 20.01|AH
 2. 20.01|AH
 3. 20.01|EGB

1. NO|AH
 2. NO|AH
 3. NO|EGB

1. 0.25|AH
 2. 0.25|AH
 3. 0.25|EGB

1. C5849 7/17/12
 2. C5863 7/19/12
 3. C5882 7/20/12

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4809 Test Dates 7/17-24/12

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100uv
A	16	17	10	3	6	3	4
B	21	19	X ¹²	9	4	5	0
C	17	16	X ¹	X ⁴	4	3	3
D	20	15	13	X	4	10	3
E	21	16	9	11	6	6	3
F	20	14	8	12	3	7	2
G	23	7	15	15	9	6	3
H	22	19	12	10	6	5	2
I	19	19	11	9	X	3	8
J	21	14	14	9	4	7	9
Surviving Mean	20.0	15.6	11.5	9.8	5.1	5.5	3.7
Total Mean	20.0	15.6	10.5	8.2	4.6	5.5	3.7
CV%*	10.80	23.05	21.30	35.00	35.87	40.43	74.35

*coefficient of variation = standard deviation x 100/mean (calculation based on young of the surviving adults)

Key: M=male; X=dead adult

Calculated by: AA 7/25/12
AA 7/25/12

Calculations checked by: AA 7/25/12

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# YU 809 Test started: Date 7/17/85 Time 11:15
Client El Dorado Chemical Test ended: Date 7/21/85 Time 12:55

Technician: Day 0 PH 1 RC 2 PH 3 dlm 4 EB 5 EB 6 dlm 7 PH 8 _____
Time: Day 0 11:15 1 1:35 2 10:40 3 10:55 4 11:00 5 10:55 6 13:40 7 12:55 8 _____
Temperature: Day 0 24.5 1 24.4 2 24.7 3 24.8 4 24.5 5 24.6 6 24.6 7 24.8 8 _____

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	
32	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	
42	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	
56	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	
75	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	
100	1											10	
	2											10	
	3											10	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	0	0	0	0	0	0	0	0	0	0	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8	0	0	0	0	0	0	0	0	0	0	10	

Key: X=dead adult; X'=adult had n neonates before death; M=male

File: Cerio2

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X48129 Test started: Date 7/17/12 Time 1115
Client El Dorado Chemical Test ended: Date 7/19/12 Time 1255

Technician: Day0 AH 1 RC 2 AH 3 MM 4 EG 5 EG 6 MM 7 AH 8 _____
Time: Day0 1115 1 1335 2 1040 3 1055 4 1100 5 1055 6 1340 7 1255 8 _____
Temperature: Day0 21.5 1 24.4 2 24.7 3 24.8 4 24.5 5 24.6 6 24.6 7 24.8 8 _____

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV- Hd	1	0										10	
	2	0										10	
	3	0										10	
	4	0										10	
	5	0	0	0	0	0	0	0	0	0	0	10	
	6	1	0	0	3	0	0	0	0	3	3	10	
	7	3	0	3	0	3	2	3	2	5	6	10	
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												

Key: X=dead adult; Xⁿ=adult had n neonates before death; M=male File: Cerio2

Project# X4809
 Client El Dorado Chemical
 Organism C. dubia

Test started: Date 7/1/12 Time 1115
 Test ended: Date 7/1/12 Time 1255

Day/# water used	03352	1	2	3355	4	5	6	7	8
Concentration: Control 304									
pH	7.9	7.9 / 7.9	8.0 / 7.8	7.9 / 7.8	7.9 / 7.6	8.0 / 7.7	7.9 / 7.7	7.6	
DO (mg/l)	8.1	8.1 / 8.1	8.3 / 8.0	8.1 / 7.8	7.8 / 7.7	7.6 / 7.7	7.9 / 8.1	8.0	
Cond (umhos/cm)	178.2	178.5	179	180.1	170.6	179.7	172.9		
Alkalinity (mg/L)	48.0			52.0					
Hardness (mg/L)	48.0			52.0					
Concentration: 32									
pH	8.3	8.1 / 8.7	8.1 / 9.1	7.9 / 7.9	7.9 / 9.0	7.9 / 8.5	7.9 / 8.6	7.7	
DO (mg/l)	8.2	8.4 / 8.2	8.2 / 8.1	8.1 / 7.7	7.8 / 7.8	7.6 / 7.8	7.7 / 8.1	7.9	
Cond (umhos/cm)	246	247	245	248	249	249	244		
Concentration: 42									
pH	8.8	8.2 / 8.8	8.2 / 9.3	8.1 / 9.3	8.0 / 9.2	7.9 / 9.0	7.9 / 8.9	7.9	
DO (mg/l)	8.2	8.3 / 8.2	8.2 / 8.2	8.0 / 7.8	7.7 / 7.8	7.6 / 7.8	7.6 / 8.1	7.9	
Cond (umhos/cm)	270	269	266	268	267	268	261		
Concentration: 56									
pH	8.9	8.2 / 8.9	8.2 / 9.4	8.2 / 9.3	8.0 / 9.2	8.0 / 9.1	8.0 / 9.0	8.0	
DO (mg/l)	8.2	8.3 / 8.3	8.2 / 8.2	8.0 / 7.8	7.9 / 7.9	7.9 / 7.9	7.6 / 8.1	7.8	
Cond (umhos/cm)	298	298	293	297	290	300	294		
Concentration: 75									
pH	9.0	8.3 / 9.0	8.3 / 9.5	8.2 / 9.5	8.0 / 9.3	8.0 / 9.2	8.0 / 9.1	8.1	
DO (mg/l)	8.3	8.3 / 8.3	8.1 / 8.3	7.9 / 7.6	7.4 / 7.9	7.4 / 7.9	7.4 / 8.1	7.8	
Cond (umhos/cm)	342	338	331	340	330	338	350		
Concentration: 100									
pH	9.1	8.3 / 9.1	8.3 / 9.6	8.3 / 9.5	8.1 / 9.3	8.1 / 9.2	8.1 / 9.2	8.2	
DO (mg/l)	8.4	8.2 / 8.5	8.1 / 8.4	7.8 / 7.8	7.4 / 8.0	7.4 / 8.0	7.4 / 8.1	7.8	
Cond (umhos/cm)	389	387	380	390	393	391	393		
Tech-prerenewal	AH	RC	AH	EBB	EBB	EBB	EBB		
Tech-postrenewal		EBB	EBB	EBB	EBB	EBB	EBB	AH	
Hardness (mg/l)	90.0		40.0		36.0				
Alkalinity (mg/l)	110.0		110.0		116.0				

Key: prerenewal/postrenewal

Project# X4809
 Client El Dorado Chemical
 Organism C. dubia

Test started: Date 7/14/12 Time 1115
 Test ended: Date 7/14/12 Time 1255

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ^{AM 7/10/12} Control 100µM - 100µM									
pH	8.9	8.3 / 8.0	8.3 / 8.4	8.3 / 9.6	8.2 / 9.2	8.1 / 9.2	8.2 / 8.9	8.2 / 8.2	
DO (mg/l)	8.1	8.0 / 7.8	8.0 / 8.2	7.7 / 7.4	7.3 / 8.2	7.3 / 7.8	7.4 / 7.9	7.7 / 7.7	
Cond (umhos/cm)	396	386	465	397	390	400	400		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	AM	RC	AM	EBB	EBB	EBB	EBB		
Tech-postrenewal		EBB	EBB	EBB	EBB	EBB	EBB	AM	
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4809 Date started: 7/16/12 Date ended 7/23/12

Client/Contact EDCC/El Dorado Chemical
Address 4500 Northwest Avenue El Dorado AR 71731
NPDES# AR0000752 AFIN70-00040
Sample Description 001 Dilution Water Soft Reconstituted
Test Temperature(°C) 25+1° Celsius Technicians EGB/AH/LGZ/RC
Test organism age 24h Vendor/ID# BAL 71612

Feeding Times

Day	Technician/Time/Amount (per replicate)		
	AM	NOON	PM
0			dy 11510/0.10ml
1	RC/0815/0.10ml	PH/1235/0.10ml	RC/1510/0.10ml
2	RC/0823/0.10ml	dy 1115/0.10ml	AH/1510/0.10ml
3	dy 1082/0.10ml	AH/1120/0.10ml	dy 1122/0.10ml
4	EGB/0730/0.10ml	dy 1133/0.10ml	dy 1115/0.10ml
5	EGB/1030/0.20ml		EGB/1105/0.20ml
6	EGB/1010/0.20ml		EGB/1105/0.20ml

Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU
pH Meter: Model Orion 230A+ Serial #105253
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

Effluent Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0. 8.7/102.9%/dy	0. y/15/8.2/97.0%/dy	0. NA	0. NA
1. 9.5/111.4%/dy	1. y/20/8.5/98.1%/dy	1. _____	1. _____
2. 8.0/90.2%/dy	2. NO/dy	2. _____	2. _____
3. 6.2/72.7%/AH	3. y/20/8.5/97.6%/AH	3. _____	3. _____
4. 6.4/77.9%/EGB	4. y/10/7.3/85.9%/EGB	4. _____	4. _____
5. 8.0/99.1%/EGB	5. NO/EGB	5. _____	5. _____
6. 9.3/111.5%/EGB	6. y/15/8.1/95.9%/EGB	6. _____	6. _____

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <0.01/dy	1. NO/dy	1. 0.25/dy	1. C5849 7/16/12
2. <0.01/AH	2. NO/AH	2. 0.25/AH	2. C5863 7/19/12
3. <0.01/EGB	3. NO/EGB	3. 0.25/EGB	3. C5882 7/21/12

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4809 Test started: Date 1/16/12 Time 1510
 Client El Dorado Chemical Test ended: Date 1/17/12 Time 1150
 Technician: Day 0 FAH/AM 1 FAH 2 FAH 3 FAH 4 AM 5 AS 6 AS 7 AM
 Time: Day 0 1510 1 1025 2 0940 3 1005 4 1010 5 1005 6 0910 7 1150
 Temperature Day 0 26.1 1 24.8 2 24.6 3 24.9 4 24.6 5 25.3 6 24.3 7 24.4

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
30	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
42	A	8	8	8	8	7	7	7	7
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	6	6	6	6
	E	8	8	8	8	8	8	8	7
56	A	8	8	8	8	7	7	7	7
	B	8	7	7	7	7	7	7	7
	C	8	8	8	8	7	7	7	7
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	7	7	7	7
75	A	8	8	8	8	8	8	8	7
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	7
	E	8	8	8	8	7	7	7	7
100	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	7
	D	8	8	8	8	8	8	8	7
	E	8	8	8	8	8	8	8	8

File: Minnow2

8/1/12

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4809

Test started: Date 7/16/15 Time 1510

Client El Dorado Chemical

Test ended: Date 7/17/15 Time 1150

Technician: Day 0 AH 1 BH 2 AH 3 Att 4 AM 5 EGG 6 EGG 7 AH

Time: Day 0 1510 1 1035 2 0940 3 1005 4 1010 5 1005 6 0910 7 1150

Temperature Day 0 24.1 1 24.8 2 24.6 3 24.9 4 24.8 5 25.3 6 24.3 7 24.4

Conc. %	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
100 uv. trtd	A	8	8	7	7	7	7	7	7
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	6	6	8	6
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
	A								
	B								
	C								
	D								
	E								
	A								
	B								
	C								
	D								
	E								
	A								
	B								
	C								
	D								
	E								
	A								
	B								
	C								
	D								
	E								

Omit AH 7/16/15

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client: X4809/EDCC Test Dates: 7/16/12-7/23/12
Oven Temperature (Celsius): 16°C

Conc. %	Replicate/ Pan number	Wt. of pan(g) Date weighed: Tech:	Wt. of pan + larvae(g) Date weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 91	0.9416 7/17/12 RC	0.9454 7/26/12 JMS	0.0038	8	0.475	
	B 92	0.9459	0.9508	0.0049	8	0.613	
	C 93	0.9460	0.9484	0.0024	8	0.300	0.400
	D 94	0.9445	0.9495	0.0050	8	0.625	0.714
	E 95	0.9427	0.9472	0.0045	8	0.563	
32	A 96	0.9399	0.9439	0.0040	8	0.500	
	B 97	0.9395	0.9437	0.0042	8	0.525	
	C 98	0.9386	0.9421	0.0035	8	0.438	
	D 99	0.9395	0.9440	0.0045	8	0.563	
	E 100	0.9455	0.9499	0.0044	8	0.550	
42	A 101	0.9481	0.9520	0.0039	8	0.488	
	B 102	0.9505	0.9552	0.0047	8	0.588	
	C 103	0.9512	0.9550	0.0038	8	0.475	
	D 104	0.9453	0.9488	0.0035	8	0.438	
	E 105	0.9436	0.9470	0.0034	8	0.425	
56 JMS 7/26/12	A 106	0.9399	0.9436	0.0037	8	0.463	
	B 107	0.9405	0.9435	0.0030	8	0.375	
	C 108	0.9646	0.9696	0.0050	8	0.625	
	D 109	0.9629	0.9678	0.0039	8	0.488	
	E 110	0.9635	0.9676	0.0041	8	0.513	
75	A 111	0.9636	0.9677	0.0041	8	0.513	
	B 112	0.9610	0.9648	0.0038	8	0.475	
	C 113	0.9582	0.9619	0.0037	8	0.463	
	D 114	0.9535	0.9576	0.0041	8	0.513	
	E 115	0.9480	0.9520	0.0040	8	0.500	
100	A 116	0.9461	0.9494	0.0033	8	0.413	
	B 117	0.9448	0.9492	0.0044	8	0.550	
	C 118	0.9442	0.9483	0.0041	8	0.513	
	D 119	0.9447	0.9481	0.0034	8	0.425	
	E 120	0.9485	0.9534	0.0049	8	0.613	

* Test acceptance of control weight based on surviving larvae at end of test.

Calculated by: JMS 7/26/12 Calculations checked by: AH 7/26/12

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4809/EDCC Test Dates 7/16/12-7/23/12
 Oven Temperature (° Celsius) 100°C

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date Weighed: <u>7/17/12</u> Tech: <u>RC</u>	Wt. of pan + larvae(g)/ Date weighed: <u>7/26/12</u> Tech: <u>slm</u>	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
100 uv	A 121	0.9581	0.9622	0.0041	8	0.513	
	B 122	0.9594	0.9635	0.0041	8	0.513	
	C 123	0.9597	0.9636	0.0039	8	0.488	
	D 124	0.9611	0.9669	0.0058	8	0.725	
	E 125	0.9608	0.9660	0.0052	8	0.650	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

Omit PH 7/26/12

* Test acceptance of control weight based on surviving larvae at end of test.
 Calculated by: slm 7/26/12 Calculations checked by: PH 7/26/12

Project# Y4829 Test started: Date 7/16/12 Time 15:10
 Client El Dorado Chemical Test ended: Date 7/22/12 Time 16:00
 Organism P. Dimmelis

Day/# water used	3353	1	2	3	3355	4	5	6	7	8
Concentration: Controls										
pH	7.8	7.9	7.9	7.6	7.8	7.6	7.7	7.1	7.7	7.5
DO (mg/l)	8.0	8.1	8.1	8.0	7.8	7.7	6.5	6.2	7.7	5.3
Cond (umhos/cm)	174.0	178.0	178.5	179.0	180.1	176.6	179.7			
Alkalinity (mg/L)	48.0				50.0					
Hardness (mg/L)	48.0				50.0					
Concentration: 30										
pH	9.1	7.7	7.7	7.7	7.5	7.5	7.5	7.5	7.3	
DO (mg/l)	8.1	8.2	8.2	8.1	6.1	6.2	6.0	7.8	7.8	5.4
Cond (umhos/cm)	240	246	247	245	248	249	249			
Concentration: 42										
pH	9.3	7.8	7.7	7.7	7.5	7.5	7.5	7.5	7.3	
DO (mg/l)	8.1	7.9	7.8	7.1	6.7	6.0	5.9	7.8	5.3	
Cond (umhos/cm)	261	270	269	264	267	267	268			
Concentration: 56										
pH	9.0	7.9	7.7	7.8	7.6	7.5	7.5	7.5	7.3	
DO (mg/l)	8.1	7.9	7.8	7.1	6.6	5.8	5.7	7.9	5.1	
Cond (umhos/cm)	295	298	298	293	297	296	300			
Concentration: 75										
pH	9.0	7.9	7.7	7.8	7.6	7.5	7.5	7.5	7.4	
DO (mg/l)	8.1	7.8	7.8	7.0	6.6	5.7	5.4	7.9	5.1	
Cond (umhos/cm)	336	342	338	331	340	336	338			
Concentration: 100										
pH	9.6	8.0	7.8	7.9	7.7	7.6	7.5	7.5	7.4	
DO (mg/l)	8.2	7.7	7.2	7.0	6.5	5.6	5.3	8.0	4.9	
Cond (umhos/cm)	383	389	387	380	390	393	391			
Tech-prerenewal	AT	AT	AT	AT	EBB	EBB	EBB			
Tech-postrenewal		AT	AT	AT	EBB	EBB	EBB	AT		
Hardness (mg/l)	90.0		40.0		36.0					
Alkalinity (mg/l)	110.0		112.0		116.0					

Key: prerenewal/postrenewal

Project# X4809 Test started: Date 7/14/12 Time 1510
 Client El Dorado Chemical Test ended: Date 7/21/12 Time 1150
 Organism P. promelas

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ^{AH 7/14/12} Control ^{100uv-told}									
pH	9.5	8.9	7.9	7.9	7.8	7.7	7.6	7.5	
DO (mg/l)	7.9	7.8	7.8	7.0	6.4	5.0	5.2	4.8	
Cond (umhos/cm)	392	396	386	465	397	390	400		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	EH	AH	AH	AH	EB	EB	EB		
Tech-postrenewal		EH	EH	AH	EB	EB	EB	AH	
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 7/17/2012 Test ID: X4809CD Sample ID: AR0000752 NPDES 001
 End Date: 7/24/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100 UV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	1.0000	1.0000	0	10	10	10		
32	1.0000	1.0000	0	10	10	10	1.0000	0.0500
42	0.8000	0.8000	2	8	10	10	0.2368	0.0500
56	0.8000	0.8000	2	8	10	10	0.2368	0.0500
75	0.9000	0.9000	1	9	10	10	0.5000	0.0500
100	1.0000	1.0000	0	10	10	10	1.0000	0.0500
100 UV	1.0000	1.0000	0	10	10	10	1.0000	0.0500

Hypothesis Test (1-tail, 0.05)

Fisher's Exact Test indicates no significant differences
 Treatments vs D-Control

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 7/17/2012 Test ID: X4809CD Sample ID: AR0000752 NPDES 001
 End Date: 7/24/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	21.000	17.000	20.000	21.000	20.000	23.000	22.000	19.000	21.000
32	17.000	19.000	16.000	15.000	16.000	14.000	7.000	19.000	19.000	14.000
42	10.000	13.000	9.000	8.000	15.000	12.000	11.000	14.000		
56	3.000	9.000	11.000	12.000	15.000	10.000	9.000	9.000		
75	6.000	4.000	4.000	4.000	6.000	3.000	9.000	6.000	4.000	
100	3.000	5.000	3.000	10.000	6.000	7.000	6.000	5.000	3.000	7.000
100 UV	4.000	0.000	3.000	3.000	3.000	2.000	3.000	2.000	8.000	9.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%					
D-Control	20.000	1.0000	20.000	16.000	23.000	10.801	10				
*32	15.600	0.7800	15.600	7.000	19.000	23.053	10	3.650	2.465	2.972	
*42	11.500	0.5750	11.500	8.000	15.000	21.300	8	6.648	2.465	3.152	
*56	9.750	0.4875	9.750	3.000	15.000	34.997	8	8.017	2.465	3.152	
*75	5.111	0.2556	5.111	3.000	9.000	35.870	9	12.022	2.465	3.053	
*100	5.500	0.2750	5.500	3.000	10.000	40.429	10	12.029	2.465	2.972	
*100 UV	3.700	0.1850	3.700	0.000	9.000	74.345	10	13.522	2.465	2.972	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.70439	0.895	-0.4436	1.48935		
Bartlett's Test indicates equal variances (p = 0.44)	5.8256	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences Treatments vs D-Control	2.97187	0.14859	357.266	7.26533	5.9E-21	6, 58

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 7/17/2012 Test ID: X4809CD Sample ID: AR0000752 NPDES 001
 End Date: 7/24/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	21.000	17.000	20.000	21.000	20.000	23.000	22.000	19.000	21.000
32	17.000	19.000	16.000	15.000	16.000	14.000	7.000	19.000	19.000	14.000
42	10.000	12.000	1.000	13.000	9.000	8.000	15.000	12.000	11.000	14.000
56	3.000	9.000	4.000	0.000	11.000	12.000	15.000	10.000	9.000	9.000
75	6.000	4.000	4.000	4.000	6.000	3.000	9.000	6.000	0.000	4.000
100	3.000	5.000	3.000	10.000	6.000	7.000	6.000	5.000	3.000	7.000
100 UV	4.000	0.000	3.000	3.000	3.000	2.000	3.000	2.000	8.000	9.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%				
D-Control	20.000	1.0000	20.000	16.000	23.000	10.801	10			
*32	15.600	0.7800	15.600	7.000	19.000	23.053	10	65.00	74.00	
*42	10.500	0.5250	10.500	1.000	15.000	37.896	10	55.00	74.00	
*56	8.200	0.4100	8.200	0.000	15.000	55.380	10	55.00	74.00	
*75	4.600	0.2300	4.600	0.000	9.000	51.444	10	55.00	74.00	
*100	5.500	0.2750	5.500	3.000	10.000	40.429	10	55.00	74.00	
*100 UV	3.700	0.1850	3.700	0.000	9.000	74.345	10	55.00	74.00	

Auxiliary Tests

	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution ($p \leq 0.05$)	1.04922	0.895	-0.7524	1.47255
Bartlett's Test indicates equal variances ($p = 0.15$)	9.4803	16.8119		

Hypothesis Test (1-tail, 0.05)

Steel's Many-One Rank Test indicates significant differences
 Treatments vs D-Control

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 7/17/2012 Test ID: X4809CD Sample ID: AR0000752 NPDES 001
 End Date: 7/24/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	21.000	17.000	20.000	21.000	20.000	23.000	22.000	19.000	21.000
32	17.000	19.000	16.000	15.000	16.000	14.000	7.000	19.000	19.000	14.000
42	10.000	12.000	1.000	13.000	9.000	8.000	15.000	12.000	11.000	14.000
56	3.000	9.000	4.000	0.000	11.000	12.000	15.000	10.000	9.000	9.000
75	6.000	4.000	4.000	4.000	6.000	3.000	9.000	6.000	0.000	4.000
100	3.000	5.000	3.000	10.000	6.000	7.000	6.000	5.000	3.000	7.000
100 UV	4.000	0.000	3.000	3.000	3.000	2.000	3.000	2.000	8.000	9.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%	Critical			MSD	
D-Control	20.000	1.0000	20.000	16.000	23.000	10.801	10				
*32	15.600	0.7800	15.600	7.000	19.000	23.053	10	3.064	2.347	3.370	
*42	10.500	0.5250	10.500	1.000	15.000	37.896	10	6.616	2.347	3.370	
*56	8.200	0.4100	8.200	0.000	15.000	55.380	10	8.218	2.347	3.370	
*75	4.600	0.2300	4.600	0.000	9.000	51.444	10	10.725	2.347	3.370	
*100	5.500	0.2750	5.500	3.000	10.000	40.429	10	10.098	2.347	3.370	
*100 UV	3.700	0.1850	3.700	0.000	9.000	74.345	10	11.352	2.347	3.370	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.04922	0.895	-0.7524	1.47255		
Bartlett's Test indicates equal variances (p = 0.15)	9.4803	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs D-Control	3.37034	0.16852	372.39	10.3095	1.3E-18	6, 63

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 7/16/2012 Test ID: X4809PP Sample ID: AR0000752 NPDES 001
 End Date: 7/23/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	0.7500	0.8750	1.0000
32	1.0000	1.0000	0.8750	1.0000	1.0000
42	0.8750	1.0000	1.0000	0.7500	0.8750
56	1.0000	0.8750	0.8750	1.0000	0.8750
75	1.0000	0.8750	1.0000	1.0000	0.8750
100	1.0000	1.0000	0.8750	0.8750	1.0000
100UV	0.8750	1.0000	0.7500	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%	N		
D-Control	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5		
32	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	30.50	16.00
42	0.9000	0.9730	1.2504	1.0472	1.3931	11.683	5	25.50	16.00
56	0.9250	1.0000	1.2829	1.2094	1.3931	7.841	5	26.50	16.00
75	0.9500	1.0270	1.3196	1.2094	1.3931	7.623	5	28.50	16.00
100	0.9500	1.0270	1.3196	1.2094	1.3931	7.623	5	28.50	16.00
100UV	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5	27.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.8872	0.934	-0.6319	-0.7146
Bartlett's Test indicates equal variances (p = 0.82)	2.91658	16.8119		

Hypothesis Test (1-tail, 0.05)

Steel's Many-One Rank Test indicates no significant differences
 Treatments vs D-Control

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 7/16/2012 Test ID: X4809PP Sample ID: AR0000752 NPDES 001
 End Date: 7/23/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 7/16/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

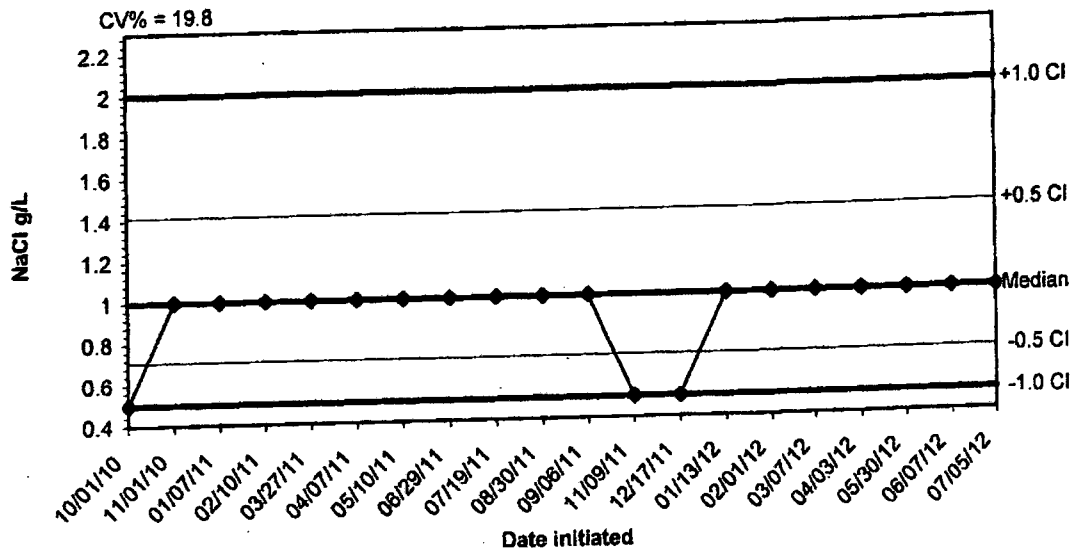
Conc-%	1	2	3	4	5
D-Control	0.4750	0.6125	0.3000	0.6250	0.5625
32	0.5000	0.5250	0.4375	0.5625	0.5500
42	0.4875	0.5875	0.4750	0.4375	0.4250
56	0.4625	0.3750	0.6250	0.4875	0.5125
75	0.5125	0.4750	0.4625	0.5125	0.5000
100	0.4125	0.5500	0.5125	0.4250	0.6125
100UV	0.5125	0.5125	0.4875	0.7250	0.6500
OSN	0.4750	0.6125	0.4000	0.7143	0.5625

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%			Critical	MSD
D-Control	0.5150	1.0000	0.5150	0.3000	0.6250	25.995	5			
32	0.5150	1.0000	0.5150	0.4375	0.5625	9.617	5	0.000	2.443	0.1403
42	0.4825	0.9369	0.4825	0.4250	0.5875	13.286	5	0.566	2.443	0.1403
56	0.4925	0.9583	0.4925	0.3750	0.6250	18.355	5	0.392	2.443	0.1403
75	0.4925	0.9583	0.4925	0.4625	0.5125	4.611	5	0.392	2.443	0.1403
100	0.5025	0.9757	0.5025	0.4125	0.6125	16.816	5	0.218	2.443	0.1403
100UV	0.5775	1.1214	0.5775	0.4875	0.7250	18.071	5	-1.088	2.443	0.1403
OSN	0.5529	1.0735	0.5529	0.4000	0.7143	21.993	5	-0.659	2.443	0.1403

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.98367	0.94	-0.1686	0.14439		
Bartlett's Test indicates equal variances (p = 0.11)	11.6953	18.4753				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs D-Control	0.1403	0.27242	0.00539	0.00825	0.70848	7, 32

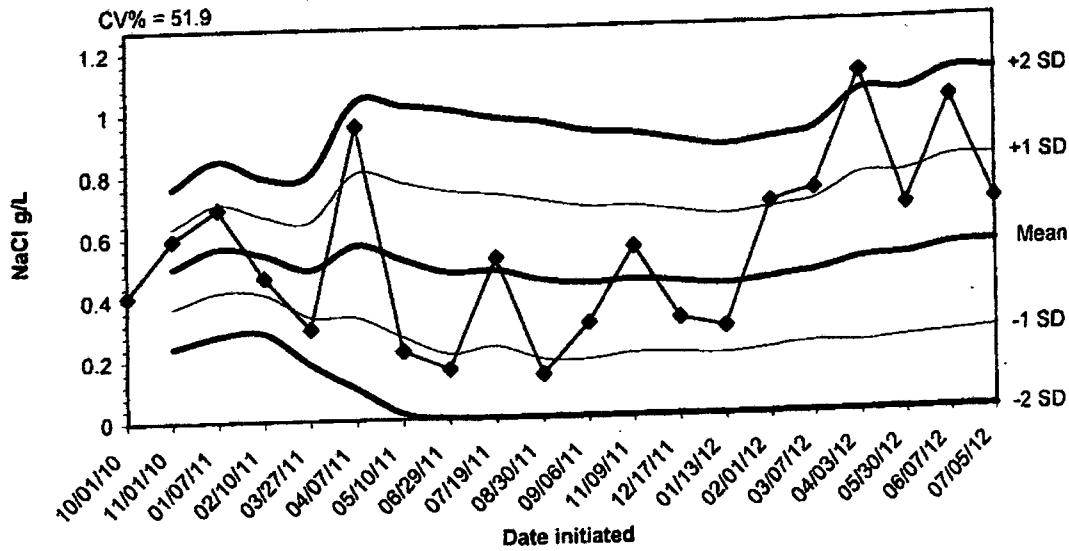
APPENDIX D
QUALITY ASSURANCE CHARTS

**2012 Chronic Reference Toxicant Test Results for Ceriodaphnia dubia
in Soft Water- NOEC Survival**



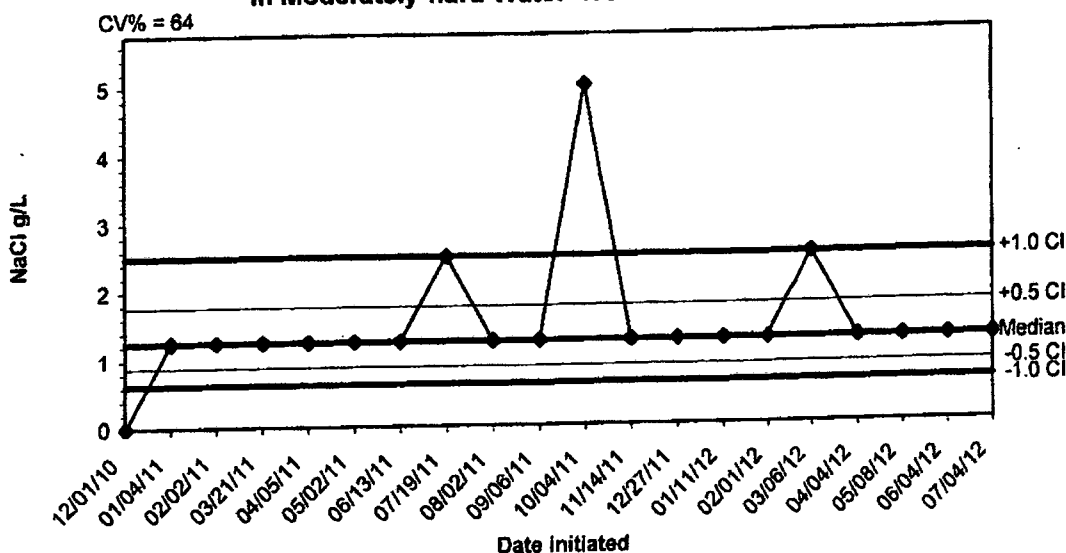
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
10/01/10	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
11/01/10	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
01/07/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
02/10/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
03/27/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/07/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/10/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/29/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/19/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
08/30/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
09/08/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
11/09/11	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
12/17/11	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
01/13/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
02/01/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
03/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/03/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/30/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/05/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000

**2012 Chronic Reference Toxicant Test Results for Ceriodaphnia dubia
in Soft Water- IC25 Reproduction**



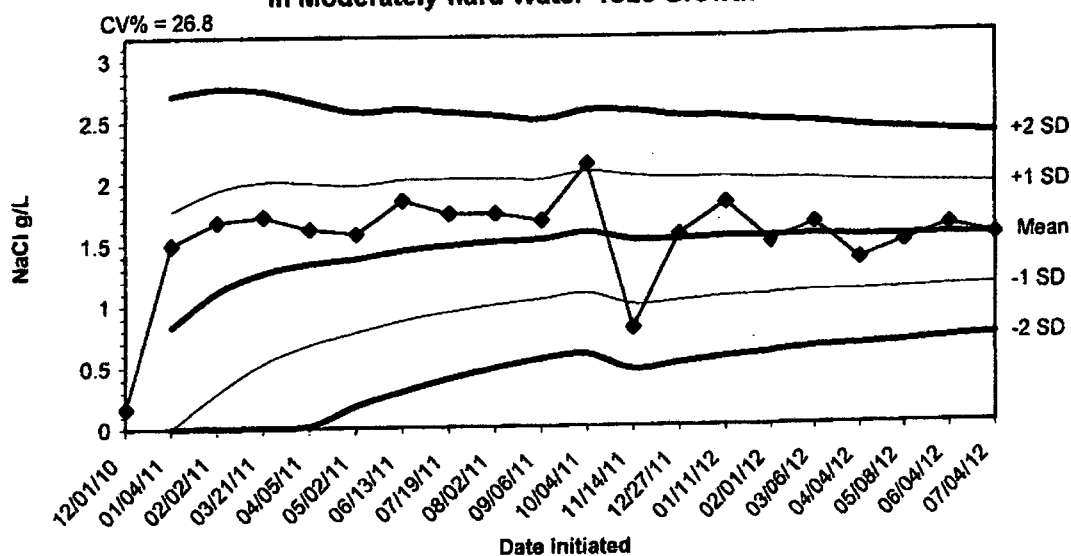
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/01/10	0.4111					
11/01/10	0.5939	0.5025	0.3732	0.2440	0.6318	0.7610
01/07/11	0.6913	0.5654	0.4232	0.2809	0.7077	0.8499
02/10/11	0.4674	0.5409	0.4149	0.2888	0.6670	0.7931
03/27/11	0.2984	0.4924	0.3385	0.1846	0.6463	0.8002
04/07/11	0.9552	0.5696	0.3358	0.1020	0.8033	1.0371
05/10/11	0.2227	0.5200	0.2696	0.0191	0.7704	1.0209
06/29/11	0.1608	0.4751	0.2107	0.0000	0.7395	1.0038
07/19/11	0.5187	0.4799	0.2322	0.0000	0.7277	0.9754
08/30/11	0.1390	0.4459	0.1886	0.0000	0.7031	0.9603
09/06/11	0.3034	0.4329	0.1851	0.0000	0.6807	0.9285
11/09/11	0.5489	0.4426	0.2040	0.0000	0.6812	0.9198
12/17/11	0.3138	0.4327	0.2014	0.0000	0.6639	0.8951
01/13/12	0.2835	0.4220	0.1963	0.0000	0.6477	0.8734
02/01/12	0.6864	0.4396	0.2117	0.0000	0.6676	0.8956
03/07/12	0.7233	0.4574	0.2260	0.0000	0.6887	0.9201
04/03/12	1.1000	0.4952	0.2223	0.0000	0.7681	1.0410
05/30/12	0.6660	0.5047	0.2369	0.0000	0.7725	1.0403
06/07/12	1.0102	0.5313	0.2463	0.0000	0.8162	1.1011
07/05/12	0.6765	0.5385	0.2593	0.0000	0.8178	1.0970

**2012 Chronic Reference Toxicant Test Results for Pimephales promelas
in Moderately-hard Water- NOEC Survival**



Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
12/01/10	0.0000	1.2500	0.8839	0.6250	1.7678	2.5000
01/04/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
02/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
03/21/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
04/05/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
05/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
06/13/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
07/19/11	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
08/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
09/06/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
10/04/11	5.0000	1.2500	0.8839	0.6250	1.7678	2.5000
11/14/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
12/27/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
01/11/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
02/01/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
03/06/12	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
04/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
05/08/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
06/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
07/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000

**2012 Chronic Reference Toxicant Test Results for *Pimephales promelas*
in Moderately-hard Water- IC25 Growth**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/01/10	0.1645					
01/04/11	1.4953	0.8299	0.0000	0.0000	1.7709	2.7119
02/02/11	1.6800	1.1133	0.2864	0.0000	1.9401	2.7669
03/21/11	1.7200	1.2650	0.5248	0.0000	2.0051	2.7452
04/05/11	1.6200	1.3360	0.6756	0.0153	1.9963	2.6567
05/02/11	1.5800	1.3766	0.7777	0.1787	1.9756	2.5746
06/13/11	1.8500	1.4443	0.8689	0.2936	2.0196	2.5949
07/19/11	1.7400	1.4812	0.9384	0.3956	2.0240	2.5668
08/02/11	1.7400	1.5100	0.9950	0.4799	2.0250	2.5400
09/06/11	1.6800	1.5270	1.0384	0.5499	2.0155	2.5041
10/04/11	2.1400	1.5827	1.0837	0.5848	2.0817	2.5806
11/14/11	0.7959	1.5171	0.9900	0.4628	2.0443	2.5715
12/27/11	1.5600	1.5204	1.0156	0.5107	2.0253	2.5302
01/11/12	1.8182	1.5417	1.0502	0.5586	2.0333	2.5248
02/01/12	1.4900	1.5383	1.0644	0.5905	2.0121	2.4860
03/08/12	1.6400	1.5446	1.0861	0.6276	2.0031	2.4616
04/04/12	1.3400	1.5326	1.0859	0.6392	1.9793	2.4260
05/08/12	1.4800	1.5297	1.0961	0.6626	1.9632	2.3968
06/04/12	1.6119	1.5340	1.1122	0.6905	1.9557	2.3775
07/04/12	1.5255	1.5336	1.1231	0.7125	1.9441	2.3546

APPENDIX E
AGENCY FORMS

**SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING**

Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Chemical
Outfall 001

NPDES No.: AR0000752
AFIN: 70-00040

	Time	Date	To	Time	Date
Composite 1 Collected From	0830	7/15/12	0830	0830	7/16/12
Composite 2 Collected From	0830	7/17/12	0830	0830	7/18/12
Composite 3 Collected From	0830	7/19/12	0830	0830	7/20/12
Test initiated:	1115 am/pm			7/17/12	date
Test terminated:	1255 am/pm			7/24/12	date
Dilution water used:	Receiving			Reconstituted	

PERCENT SURVIVAL

Time of Reading	Percent Effluent						
	0	32	42	56	75	100	100 UV
24h	100	100	100	100	100	100	100
48h	100	100	100	100	100	100	100
End of test	100	100	80	80	90	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100	100 UV
A	16	17	10	3	6	3	4
B	21	19	D12	9	4	5	0
C	17	16	D1	D4	4	3	3
D	20	15	13	D	5	10	3
E	21	16	9	11	6	6	3
F	20	14	8	12	3	7	2
G	23	7	15	15	9	6	3
H	22	19	12	10	6	5	2
I	19	19	11	9	D	3	8
J	21	14	14	9	4	7	9
Surv. Mean	20.0	15.6	11.5	9.8	5.1	5.5	3.7
Total Mean	20.0	15.6	10.5	8.2	4.6	5.5	3.7
CV%*	10.80	23.05	21.30	35.00	35.87	40.43	74.35

*coefficient of variation = standard deviation x 100/mean. D=dead adult

PMSD = 16.9%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of the test significantly different ($p=.05$) than the control survival for the % effluent corresponding to (lethality):

a) LOW FLOW OR CRITICAL DILUTION (100%):	YES	X	NO
b) 1/2 LOW FLOW DILUTION (N/A %):	YES		NO

2. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:

Is the mean number of young produced per female significantly different ($p=.05$) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

a) LOW FLOW OR CRITICAL DILUTION (100%):	X	YES	NO
b) 1/2 LOW FLOW DILUTION (N/A %):		YES	NO

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 1
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #TEP3B.
6. Enter response to item 4 on DMR Form, parameter #TFP3B.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:
 - a) NOEC survival: 100% effluent
 - b) NOEC reproduction: 0% effluent
 - c) LOEC survival: N/A% effluent
 - d) LOEC reproduction: 32% effluent

**SUMMARY REPORTING FORMS CHRONIC BIOMONITORING
FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)**

**Permittee: El Dorado Chemical
Outfall 001**

**NPDES No.: AR0000752
AFIN: 70-00040**

	Time	Date	Time	Date
Composite 1 Collected from:	0830	7/15/12 To	0830	7/16/12
Composite 2 Collected from:	0830	7/17/12 To	0830	7/18/12
Composite 3 Collected from:	0830	7/19/12 To	0830	7/20/12

Test initiated: 1510 am/pm 7/16/12 date
Test terminated: 1150 am/pm 7/23/12 date
Dilution water used: Receiving Reconstituted

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	100	75.0	87.5	100	100	100	92.5	12.12
32	100	100	87.5	100	100	100	100	97.5	6.06
42	87.5	100	100	75.0	87.5	100	100	90.0	11.68
56	100	87.5	87.5	100	87.5	97.5	97.5	92.5	7.84
75	100	87.5	100	100	87.5	100	100	95.0	7.62
100	100	100	87.5	87.5	100	100	100	95.0	7.62
100 UV	87.5	100	75.0	100	100	100	97.5	92.5	12.12

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
0	0.475	0.613	0.300	0.625	0.563	0.515	26.00
32	0.500	0.525	0.438	0.563	0.550	0.515	9.62
42	0.488	0.588	0.475	0.738	0.425	0.483	13.29
56	0.463	0.375	0.625	0.488	0.513	0.493	18.36
75	0.513	0.475	0.463	0.513	0.500	0.493	4.61
100	0.413	0.550	0.513	0.425	0.613	0.503	16.82
100 UV	0.513	0.513	0.488	0.725	0.650	0.578	18.07

*coefficient of variation = standard deviation x 100/mean.

PMSD = 27.2%

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL (cont)
(Pimephales promelas)

1. Dunnett's Procedure or Steels Many-One Rank Test as appropriate:

Is the mean survival at 7 days significantly different ($p=.05$) than the control survival for the % effluent corresponding to:

- | | | | |
|---|-----|---|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%) | YES | X | NO |
| b) 1/2 LOW FLOW DILUTION (N/A %) | YES | | NO |

2. Dunnett's Procedure (or appropriate test):

Is the mean dry weight (growth) at 7 days significantly different ($p=.05$) than the control's dry weight for the % effluent corresponding to (significant non-lethal effects):

- | | | | |
|---|-----|---|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%) | YES | X | NO |
| b) 1/2 LOW FLOW DILUTION (N/A %) | YES | | NO |

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 0

4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A

5. Enter response to item 3 on DMR Form, parameter #TEP6C.

6. Enter response to item 4 on DMR Form, parameter #TFP6C.

7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

- | | |
|-------------------|----------------|
| a.) NOEC survival | 100% effluent. |
| b.) NOEC growth | 100% effluent. |
| c.) LOEC survival | N/A% effluent |
| d.) LOEC growth | N/A% effluent |

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 (v. 31612)

Client: El Dorado Chemical

Project#: X4809

Chain of Custody Documents Checked by: EGB 7/30/12
Technician/Date

Raw Data Documents Checked by: AH 7/25/12
Technician/Date

Statistical Analysis Package Checked by: EGB 7/30/12
Quality Manager/Date

Quality Control Data Checked by: EGB 8/1/12
Quality Manager/Date

Report Checked by: EGB 8/15/12
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 H. Burgett, BS 8/15/12
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 X4800

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4800

Outfall: Outfall 006

Permit #: AR0000752/ AFIN #70-00040

Contact: Ms. Larken Pennington

Test Dates: July 11 - 13, 2012

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%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0.
2. Report the NOEC for survival, Parameter TOM6C - 100%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0.
2. Report the NOEC for survival, Parameter TOM3D - 100%.
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

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

**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 X4800

**Test Dates: July 11 - 13, 2012
Report Date: August 7, 2012**

Prepared for:
Ms. Larken Pennington
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 X4800

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BAL
ADEQ #88-0630
Project X4800

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 LC₅₀, the concentration in which 50 percent of the test organisms died.

2.0 Methods and Materials

2.1 Test Methods

All methods followed were according to the latest edition of "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA-821-R-02-012).

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately nine days old at test initiation. The *Daphnia pulex* test organisms were raised in-house 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 X4800

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, 75.0, 56.0, 42.0, 32.0 and 22.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 006 was collected by El Dorado Chemical personnel on July 10, 2012. Upon completion of collection, the sample was chilled to 4^o Celsius and personally delivered to Bio-Analytical Laboratories.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1^o Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen, pH and conductivity measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity and hardness levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

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

2.8 Data Analysis

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

BAL
ADEQ #88-0630
Project X4800

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 dilutions in either test ($p=.05$). The NOEC value in both tests was 100 percent effluent ($p=.05$).

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism		
Control	100.0	97.5
22.0	100.0	100.0
32.0	100.0	95.0
42.0	100.0	85.0
56.0	100.0	97.5
75.0	100.0	95.0
100.0	100.0	100.0

The 48-hour reference toxicant test results indicate 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 X4800

4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on July 10, 2012, was not found to be lethally toxic to the *Daphnia pulex* test organisms and the fathead minnow test organisms in the 100 percent critical dilution after 48 hours of exposure ($p=.05$).

BAL
ADEQ #88-0630
Project X4800

5.0 Reference

**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.**

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS



Erin G Briggs <bioanalytical@wildblue.net>

Fwd: RE: storm water samples

1 message

Erin G Briggs <gingerbriggs@wildblue.net>
To: bioanalytical@wildblue.net

Thu, Aug 2, 2012 at 1:43 PM

----- Forwarded message -----

From: "Larken Pennington" <LPennington@edc-ark.com>
Date: Aug 1, 2012 2:14 PM
Subject: RE: storm water samples
To: "Erin G Briggs" <gingerbriggs@wildblue.net>

Ginger,

I found this exact email. Samples were collected on the afternoon (4:10pm and 4:20pm) of July 10. Sorry for the confusion.

Thanks,

Larken

From: Erin G Briggs [mailto:gingerbriggs@wildblue.net]
Sent: Wednesday, August 01, 2012 2:07 PM
To: Larken Pennington
Subject: Fwd: storm water samples

Found your email dated July 10. The COCs say the 9th. Please send me an email confirming date ...



Bio-Analytical Laboratories

3240 Spungin Road
Post Office Box 627
Daytone, LA 71023
(510) 745-2772
1-800-226-1200
Fax: (510) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:				Project Number: X4800 Temp. upon arrival: Preservative: (below) ice			
Address: 4500 Norwest Ave., El Dorado, AR 71731		Fax: (870) 863-7499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species		Acute Mysid	Acute Ceriodaphnia	Fecal Coliform
Permit #: AR0000752/AFIN 70-00040		Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDC											
Date Start Date End	Time Start Time End	C / G	# and type of container					Sample Identification			
7/9/12	4:10PM		X 6 half gallon	outfall 006		C5820					
Relinquished by/Affiliation: Larken Pennington		Date: 7/10/12	Time: 1100	Received by/Affiliation: C. J. Beards		Date: 7/10/12	Time: 1100				
Relinquished by/Affiliation:		Date:	Time:	Received by/Affiliation:		Date:	Time:				
Relinquished by/Affiliation:		Date:	Time:	Received by/Affiliation:		Date:	Time:				
Method of Shipment: Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS <input checked="" type="checkbox"/> Client ___ Other ___ Tracking # _____											
Comments: Temperature upon arrival: 1.8 Thermometer #: 29 Tech: RC Date: 7/11/12											

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X4800

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/AH/LGZ/RC

Test initiated: Date 7/11/12 Time 1415

Test terminated: Date 7/13/12 Time 1235

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AU

pH Meter: Model #Orion 230A+ Serial #105253

Conductivity Meter: Model # Control Co. Serial #80277924

Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/Final D.O.(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
C5820	7.9/89.7%	NO	<0.01	NO	3.0	N/A	100% 332.0	100% 16.0	slg
	↓	↓	↓	↓	↓	↓	↓	↓	
C5820	9.1/109.6	Y/20 8.3/97.7%	<0.01	↓	3.0	↓	↓	↓	RC

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
		NA	NA	NA	NA		100% 100%		
Soft H2O	3350					7.6	68.0	40.0	AH

Test Species Information

Test Species Info.	Species: <u>D. pulex</u> ID#: <u>BALIX3-23</u>	Species: <u>Proameia</u> ID#: <u>BAL 7212</u>	Species: ID#:	Species: ID#:
Age	24h	9 days		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	Ycr: Algae	Artemia		
Amount	Fed hrs prior to test initiation			
Aeration?				
Amount	NA	NA		
Condition of survivors	Good AH	Good slg		

Comments: 7/13/12 7/13/12

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

Project# X4800

Test started: Date 7/11/12

Time 1415

Client El Dorado Chemical

Test ended: Date 7/13/12

Time 1230

Sample Description 056

Test Species D. pulex

ID# BAL X3-23

Technician: 0hour AW 24hour RC 48hour AW 72hour 96hour
 Time: 0hour 1415 24hour 1430 48hour 1230 72hour 96hour
 Temperature (°C): 0hour 24.3 24hour 24.2 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	NA	8	8	8			8.0	8.1 8.2	8.3			7.6	7.8 7.8	7.8			18.9	231 188	223		
	B		8	8	7													RC 112.1	183.2			
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	8			8.0	7.9 8.2	8.2			7.5	7.7 7.6	7.6			311	379 379	413		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC RC					RC RC					RC RC				

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

Project# X4800

Test started: Date 7/11/12

Time 1415

Client El Dorado Chemical

Test ended: Date 7/13/12

Time 1230

Sample Description ODL

Test Species D. Dulex

ID# BAL/X3-23

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

Time: Ohour 1415 24hour 1430 48hour 1230 72hour 1230 96hour 1230

Temperature (°C): Ohour 24.3 24hour 24.2 48hour 24.4 72hour 24.4 96hour 24.4

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
32	A	NA	8	8	7			8.0	7.8 8.2	8.1			7.4	7.7 7.5	7.6			456	474 472	507			
	B		8	8	8																		
	C		8	8	8																		
	D		8	7	8																		
	E		8	7	7																		
42	A		8	7	7			8.0	7.9 8.2	8.1			7.2	7.6 7.5	7.5			511	532 505	598			
	B		8	8	7																		
	C		8	8	7																		
	D		8	5	5																		
	E		8	8	8																		
Chemistry Tech prerenewal/postrenewal									RC/AH					RC/AH					RC/AH				

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

Project# X4800

Test started: Date 7/11/12

Time 415

client El Dorado Chemical

Test ended: Date 7/13/12

Time 1930

Sample Description DD6

Test Species D. DUXEX ID# BAL/X3-23

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

Time: 0hour 1415 24hour 1430 48hour 1230 72hour RC 96hour RC

Temperature (°C): 0hour 21.3 24hour 24.2 48hour 24.4 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
56	A	NA	8	8	8			7.9	7.7	8.0			7.1	7.5	7.4			658	663	674	710		
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	7																		
	E		8	8	8																		
75	A		8	8	7			8.1	7.7	8.0			7.0	7.5	7.3			810	815	818	866		
	B		8	8	7																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	8																		
Chemistry Tech prerenewal/postrenewal																							

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

Project# X4800

Test started: Date 7/11/12

Time 1415

Client El Dorado Chemical

Test ended: Date 7/13/12

Time 1230

Sample Description DDG

Test Species D. DUX

ID# BAL X3-23

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

Time: Ohour 1415 24hour 1430 48hour 1230 72hour RC 96hour RC

Temperature (°C): Ohour 21.3 24hour 24.2 48hour 24.4 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	8	8			8.4	8.0	8.0			6.7	7.1	7.1			1026	1032	1039	1102	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal																						

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

Project# X4800

Test started: Date 7/11/12 Time 1425

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1235

Sample Description 006

Test Species P. promelas ID# 891/7212

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

Time: Ohour 1425 24hour 1345 48hour 1235 72hour 96hour

Temperature (°C): Ohour 21.2 24hour 24.2 48hour 24.3 72hour 96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	NA	8	8	8			8.0	8.1 8.2	8.3			7.6	7.8 7.9	7.7			1819	204 1932	203		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	8			8.0	8.1 8.2	8.1			7.5	7.5 7.6	7.5			371	389 379	392		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC				RC						RC				

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

Project# X4800

Test started: Date 7/11/12 Time 1425

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1235

Sample Description 006

Test Species P. promelas ID# BA/7212

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

Time: Ohour 1425 24hour 1345 48hour 1235 72hour _____ 96hour _____

Temperature (°C): Ohour 24.2 24hour 24.2 48hour 24.3 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
32	A	NA	8	8	8			8.0	7.8	8.0			7.4	7.5	7.4			450	473	488		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
42	A		8	8	8			8.0	7.8	7.9			7.2	7.4	7.4			541	550	580		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X4800

Test started: Date 7/11/12 Time 1425

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1225

Sample Description 006

Test Species P. promelas ID# BA/7212

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

Time: Ohour 1425 24hour 1345 48hour 1025 72hour dm 96hour dm

Temperature (°C): Ohour 24.2 24hour 24.2 48hour 24.3 72hour dm 96hour dm

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56	A	NA	8	8	8			7.9	7.7	7.8			7.1	7.3			6.58	6.71	6.97			
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75	A		8	8	8			8.1	8.2	7.7			7.0	7.2			8.10	8.21	8.45			
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X4800

Test started: Date 7/11/12 Time 1425

Client El Dorado Chemical

Test ended: Date 7/13/12 Time 1235

Sample Description 0016

Test Species P. promelas ID# 891/7212

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

Time: 0hour 1425 24hour 1345 48hour 1235 72hour RC 96hour RC

Temperature (°C): 0hour 24.2 24hour 24.2 48hour 24.3 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	8	8			8.4	7.5	7.5			6.7	7.1	7.0			1026	1033	1029	1064	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
	A		8	8	8																	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC					RC					RC				

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date: 7/11/2012	Test ID: X4800DP	Sample ID: AR0000752 NPDES 006
End Date: 7/13/2012	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date: 7/11/2012	Protocol: EPAAW02-EPA/821/R-02-01	Test Species: DP-Daphnia pulex

Comments:

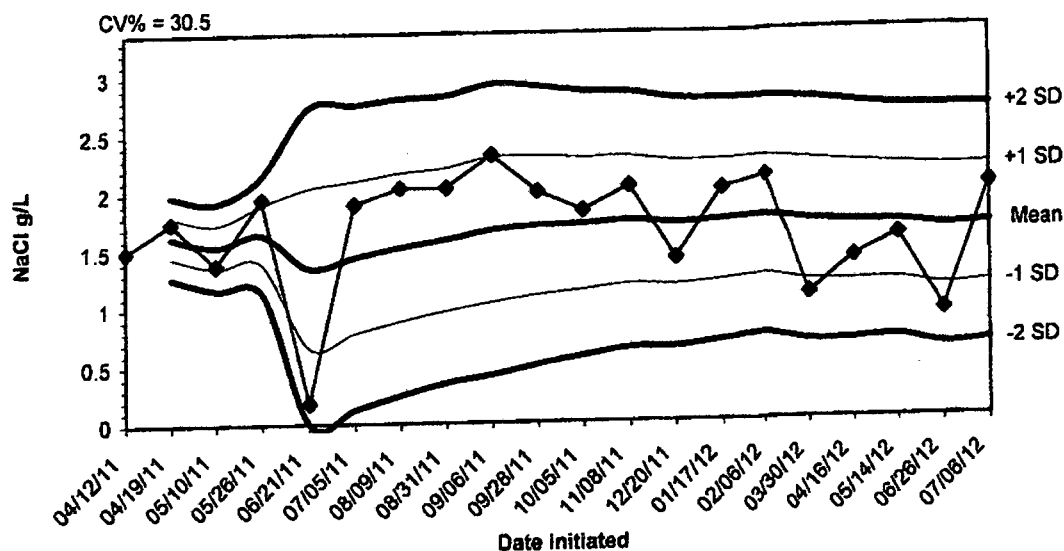
Conc-%	1	2	3	4	5
D-Control	1.0000	0.8750	1.0000	1.0000	1.0000
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.8750	1.0000	1.0000	1.0000	0.8750
42	0.8750	0.8750	0.8750	0.6250	1.0000
56	1.0000	1.0000	1.0000	0.8750	1.0000
75	0.8750	0.8750	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					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	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
32	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00	16.00	
42	0.8500	0.8718	1.1866	0.9117	1.3931	14.581	5	19.50	16.00	
56	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00	
75	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00	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)	0.86626	0.934	-1.0035	2.49472
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				

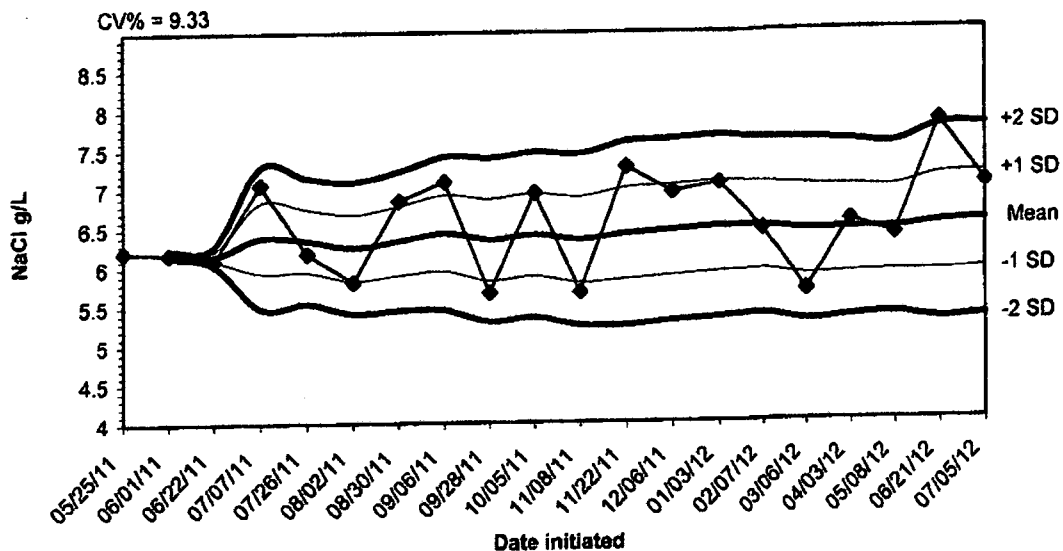
APPENDIX D
QUALITY ASSURANCE CHARTS

2012 48-hour Reference Toxicant Test Results for *Daphnia pulex*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/12/11	1.5000					
04/19/11	1.7500	1.6250	1.4482	1.2714	1.8018	1.9786
05/10/11	1.3800	1.5433	1.3546	1.1658	1.7321	1.9209
05/26/11	1.9500	1.6450	1.3899	1.1347	1.9001	2.1553
06/21/11	0.1800	1.3520	0.6606	0.0000	2.0434	2.7349
07/05/11	1.9000	1.4433	0.7857	0.1280	2.1010	2.7586
08/09/11	2.0400	1.5286	0.8873	0.2459	2.1699	2.8112
08/31/11	2.0400	1.5925	0.9718	0.3512	2.2132	2.8338
09/06/11	2.3200	1.6733	1.0441	0.4150	2.3025	2.9317
09/28/11	2.0000	1.7060	1.1039	0.5017	2.3081	2.9103
10/05/11	1.8300	1.7173	1.1448	0.5724	2.2897	2.8622
11/08/11	2.0400	1.7442	1.1905	0.6368	2.2979	2.8516
12/20/11	1.4100	1.7185	1.1803	0.6421	2.2566	2.7948
01/17/12	2.0100	1.7393	1.2164	0.6935	2.2622	2.7851
02/06/12	2.1100	1.7640	1.2511	0.7382	2.2769	2.7898
03/30/12	1.0800	1.7213	1.1971	0.6729	2.2454	2.7696
04/16/12	1.3900	1.7018	1.1879	0.6741	2.2156	2.7295
05/14/12	1.5800	1.6950	1.1957	0.6963	2.1943	2.6937
06/26/12	0.9200	1.6542	1.1374	0.6206	2.1710	2.6878
07/06/12	2.0100	1.6720	1.1627	0.6534	2.1813	2.6906

2012 48-hour Reference Toxicant Test Results for *Pimephales promelas*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/25/11	6.2100	6.1950	6.1738	6.1526	6.2162	6.2374
06/01/11	6.1800	6.1600	6.0976	6.0351	6.2224	6.2849
06/22/11	6.0900	6.3850	5.9321	5.4792	6.8379	7.2908
07/07/11	7.0600	6.3440	5.9412	5.5384	6.7468	7.1496
07/26/11	6.1800	6.2550	5.8339	5.4128	6.6761	7.0972
08/02/11	5.8100	6.3400	5.8947	5.4493	6.7853	7.2307
08/30/11	6.8500	6.4338	5.9435	5.4533	6.9240	7.4142
09/06/11	7.0900	6.3489	5.8244	5.2999	6.8734	7.3979
09/28/11	5.6700	6.4090	5.8792	5.3495	6.9388	7.4685
10/05/11	6.9500	6.3418	5.7921	5.2423	6.8916	7.4413
11/08/11	5.6700	6.4192	5.8305	5.2418	7.0079	7.5965
11/22/11	7.2700	6.4600	5.8775	5.2949	7.0425	7.6251
12/06/11	6.9500	6.5029	5.9207	5.3385	7.0851	7.6673
01/03/12	7.0600	6.5000	5.9389	5.3777	7.0611	7.6223
02/07/12	6.4600	6.4481	5.8677	5.2872	7.0286	7.6090
03/06/12	5.6700	6.4547	5.8920	5.3293	7.0174	7.5801
04/03/12	6.5600	5.9038	5.9038	5.3575	6.9962	7.5425
05/08/12	6.3700	6.5221	5.9052	5.2883	7.1390	7.7560
06/21/12	7.8200	6.5475	5.9364	5.3253	7.1586	7.7697
07/05/12	7.0300					

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752

Composite Collected

From: 7/10 /12

To: 7/10/12

From:

To:

Test Initiated: 7/11/12

Dilution Water Used:

Receiving Water

X

Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	32	42	56	75	100
24-hour	A	100	100	100	87.5	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	62.5	100	100	100
	E	100	100	87.5	100	100	100	100
48-hour	A	100	100	87.5	87.5	100	87.5	100
	B	87.5	100	100	87.5	100	87.5	100
	C	100	100	100	87.5	100	100	100
	D	100	100	100	62.5	87.5	100	100
	E	100	100	87.5	100	100	100	100
	Mean	97.5	100	95.0	85.0	97.5	95.0	100

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%)** YES X NO
b.) **½ 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: N/A

Method of LC₅₀ calculation: N/A

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 48 hour Acute Static Renewal
Chemical Parameters Chart***

Permittee: El Dorado Chemical - Outfall 006

NPDES Number: AR0000752

Contact: Larken Pennington

Analyst: Haughton, Callahan

Sample Collected From: Date 7/10/12 Time 1610

To: Date 7/10/12 Time 1610

Test Begin Date 7/11/12 Time 1415

Test End Date 7/13/12 Time 1230

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut/Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.0	8.2	8.3	24.3	24.2	24.4	40.0			68.0			7.6	7.8	7.8
22		8.0	8.2	8.2	24.3	24.2	24.4							7.5	7.6	7.6
32		8.0	8.2	8.1	24.3	24.2	24.4							7.4	7.5	7.6
42		8.0	8.2	8.1	24.3	24.2	24.4							7.2	7.5	7.5
56		7.9	8.2	8.0	24.3	24.2	24.4							7.1	7.4	7.4
75		8.1	8.2	8.0	24.3	24.2	24.4							7.0	7.3	7.3
100		8.4	8.2	8.0	24.3	24.2	24.4	16.0			332.0			6.7	7.0	7.1

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

**Acute Forms
Fathead Minnow Survival**

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752

Composite Collected

From: 7/10 /12

To: 7/10/12

From:

To:

Test Initiated: 7/11/12

Dilution Water Used:

Receiving Water

X

Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	32	42	56	75	100
24-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	100	100	100	100
48-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	100	100	100	100
	Mean	100	100	100	100	100	100	100

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%)** YES X NO
b.) **½ 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: N/A

Method of LC₅₀ calculation: N/A

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

Contact: Larken Pennington

Analyst: Houghton, Callahan

Sample Collected From: Date 7/10/12 Time 1610

To: Date 7/10/12 Time 1610

Test Begin Date 7/11/12 Time 1425

Test End Date 7/13/12 Time 1235

Parameter	D.O			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.0	8.2	8.3	24.3	24.2	24.3	40.0			68.0			7.6	7.8	7.7
22		8.0	8.2	8.1	24.3	24.2	24.3							7.5	7.6	7.5
32		8.0	8.2	8.0	24.3	24.2	24.3							7.4	7.5	7.4
42		8.0	8.2	7.9	24.3	24.2	24.3							7.2	7.5	7.9
56		7.9	8.2	7.8	24.3	24.2	24.3							7.1	7.4	7.3
75		8.1	8.2	7.7	24.3	24.2	24.3							7.0	7.3	7.2
100		8.4	8.2	7.3	24.3	24.2	24.3	16.0			332.0			6.7	7.0	6.9

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical - 006

Project#: X4800

Chain of Custody Documents Checked by: AH 7/18/12
Technician/Date

Raw Data Documents Checked by: AH 7/18/12
Technician/Date

Statistical Analysis Package Checked by: EGB 7/30/12
Quality Manager/Date

Quality Control Data Checked by: EGB 8/1/12
Quality Manager/Date

Report Checked by: EGB 8/7/12
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 S. Bragg, BS
Quality Manager

8/7/12
Date

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

From: (870) 863-1125
Larken Pennington
EL DORADO CHEMICAL COMPANY
4500 Northwest Ave.

Origin ID: ELDA



J12201207160325

El Dorado, AR 71730

Ship Date: 21AUG12
ActWgt: 2.0 LB
CAD: 5887030/NET3300

Delivery Address Bar Code



SHIP TO: (501) 682-0744

BILL SENDER

Water Enforcement Branch
ADEQ
5301 NORTSHORE DR

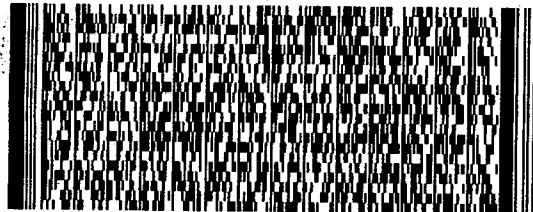
NORTH LITTLE ROCK, AR 72118

Ref #
Invoice #
PO #
Dept #

WED - 22 AUG A4
PRIORITY OVERNIGHT

TRK# 7987 8656 0296

0201



X2 LITA

72118
AR-US
MEM

