4500 NORTH WEST AVE. • P. O. BOX 231 • EL DORADO, AR 71731 • (870) 863-1400

EL DORADO

CHEMICAL COMPANY

June 24, 2013

Arkansas Department of Environmental Quality
Water Enforcement Branch
5301 Northshore Drive
North Little Rock, AR 72118-5317

RE: NPDES Permit AR0000752 Discharge Monitoring Report for period ending May 31, 2013.

Enclosed you will find the Discharge Monitoring Report ending May 31, 2013.
If you have any questions regarding this report, please contact Larken Pennington at (870) 863-1125.

Sincerely,

Greg Withrow
General Manager

Enclosures

NON-COMPLIANCE REPORT

Facility Name: El Dorado Chemical Company

Permit Number: AR0000752 **AFIN:** 70-00040

Month / Year: May-13

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
Outfall 001 / pH maximum (9.05 su)	pH Maximum - 9.0 su	5/9/2013	Due to warmer temperatures, an algal growth in EDCC's final lake that discharges to Outfall 001 led to a high pH.	EDCC stopped discharge from this outfall until the pH was back within permit limits.
Outfall 001 / TDS Monthly Average (260.0 mg/L)	237.0 mg/L - Monthly Average	5/1/2013	Unknown	
Outfall 006 / TDS Monthly Average (610.0 mg/L)	291.0 mg/L Monthly Average	5/16/2013	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / TDS Daily Max (610.0 mg/L)	436.5 mg/L Daily Max	5/16/2013	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / Zinc Monthly Average (1190.0 ug/L)	115.62 ug/L Monthly Average	5/16/2013	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 006 / Zinc Daily Max (1190 ug/L)	231.99 ug/L Daily Max	5/16/2013	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 007 / TDS Monthly Average (1300.0 ug/L)	291.0 mg/L Monthly Average	5/16/2013	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / TDS Daily Max (1300.0 ug/L)	436.5 mg/L Daily Max	5/16/2013	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Lead Monthly Average (15.9 ug/L)	3.8 ug/L Monthly Average	5/16/2013	Unknown	EDCC continues to monitor and evaluate potential sources of the Lead exceedance.
Outfall 007 / Lead Daily Max (15.9 ug/L)	7.62 ug/L Daily Max	5/16/2013	Unknown	EDCC continues to monitor and evaluate potential sources of the Lead exceedance.
Outfall 007 / Zinc Monthly Average (396.0 ug/L)	115.62 ug/L Monthly Average	5/16/2013		EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 007 / Zinc Daily Max (396.0 ug/L)	231.99 ug/L Daily Max	5/16/2013	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.

I CERTIFY THAT UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C 1001 AND 33 U.S.C. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)

Signature / Date 6/24/13

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5106

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5106
Outfall: Outfall 006 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Ms. Larken Pennington
Test Dates: May 17 - 19, 2013
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 - 0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 6.06%.

-Note: Adjusting the pH of the sample to 6.0-9.0 reduced toxicity, but was still significantly different from the control.

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 -0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 0.00%.

-Note: Adjusting the pH of the sample to 6.0-9.0 reduced the toxicity in the sample.
-Note: Due to lack of available test organisms the proper age, only the 0 and 100% test dilutions were used in the daphnid test.

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 X5106

Test Dates: May 17 - 19, 2013
Report Date: June 7, 2013

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 X5106

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X5106

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately seven 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.

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the fathead minnow test were 100, 75.0, 56.0, 42.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to the lack of available daphnids the correct age, the only concentrations used in the *Daphnia pulex* test were 100 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 May 17, 2013. Upon completion of collection, the sample was chilled to 4^0 Celsius and delivered to Bio-Analytical Laboratories by BAL personnel.

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 ± 1^0 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. The pH was less than 6.0. It was adjusted to a range of 6.0-9.0 using 1 Normal Sodium Hydroxide solution (1.0 N NaOH). An extra 100 percent concentration was run on the pH adjusted sample. 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 ± 1^0 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.

BAL
ADEQ #88-0630
Project X5106

2.8 Data Analysis

The NOEC and LC_{50} values values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in the 100 percent critical dilution after 48 hours of exposure (p=.05). The NOEC value for both tests was zero percent effluent (p=.05). Increasing the pH of the sample reduced the toxicity to the test organisms.

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas* (Fathead Minnow)	*Daphnia pulex*
Control	97.5	100.0
22.0	37.5	-----
32.0	0.0	-----
42.0	0.0	-----
56.0	0.0	-----
75.0	0.0	-----
100.0	0.0	0.0
100.0 pH adj	25.0	92.5

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 X5106

4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on May 17, 2013, 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 48 hours of exposure (p=.05). Raising the pH of the sample reduced the toxicity in the daphnid test, but not significantly enough in the fathead minnow test (p=.05).

BAL
ADEQ #88-0630
Project X5106

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

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023
(318) 745-2772
1-800-209-1248
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company	**Phone:** (870) 863-1484	**Analysis:**
Address: 4500 Norwest Ave., El Dorado, AR 71731	**Fax:** (870) 863-7499	
Permit #: AR0000752/AFIN 70-00040	**Purchase Order:**	
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC		

Project Number: X5106

Temp. upon arrival: Temperature upon arrival: 1.6°C
Thermometer #: 29
Tech: PH
Date: 5/17/13

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Preservative: (below)
5/16/13 - 5/17/13	9:30pm - 1:30am	X		6 half gallon	006			X	X				C7384	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington / EDCC	5/17/13	1025	[signature]	5/17/13	1025
[signature]	5/17/13	1215	[signature]	5/17/13	1215

Method of Shipment: ✓ Lab ____ Bus ____ Fed Ex ____ DHL ____ UPS ____ Client ____ Other Tracking #________

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5106

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 Outfall 006

Technicians: EGB/AH/LGZ/GW

Test initiated: Date 5/17/13 Time ~~1428~~ 1420 AH 5/17/13

Test terminated: Date 5/19/13 Time 1530

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
C7384	9.4/110.7%	Y/30 8.6/98.4%	<0.01	NO	3.0	N/A	120.0	28.0	AH
↓	9.9/118.1%	Y/30 8.4/97.6%	EGB ↓	↓	↓	↓			↓

Dilution Water Information

Dilution Water	ID#	Initial D.O (mg/L & %)	Aerate? Minutes/D.O (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft H2O	3196	NA	NA	NA	NA	7.1	50.0	32.0	LC
↓	↓								

Test Species Information

Test Species Info.	Species: D. pulex ID#: BAL Ho-J1	Species: P. promelas ID#: BAL 5/10/13	Species: ID#:	Species: ID#:
Age	<24h	7 days		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT. Algae	Artemia		
Amount	Fed 2hrs prior to test initiation			
Aeration? Amount	NA	NA		
Condition of survivors	Good AH 5/19/13			

Comments:

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

Project# X5106

Client El Dorado Chemical

Sample Description DDA

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

Time: Ohour 1425 24hour 1330 48hour 1522 72hour ____ 96hour ____

Temperature (°C): Ohour 24.2 24hour 24.2 48hour 24.1 72hour ____ 96hour ____

Test started: Date 5/17/13 Time 1425

Test ended: Date 5/19/13 Time 1522

Test Species D. pulex ID# Batch-J1

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	8.0/8.2	8.4			7.5	7.4/7.5	7.6			187.5	191/186	183		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
100 ~~50~~	A		8	0				8.4	8.4				4.4	4.4				188	200			
AH 5/17/13	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

ACUTE2 020809 Rev.

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

Project# X5106

Client El Dorado Chemical

Sample Description 006

Test started: Date 5/17/13 Time 1425

Test ended: Date 5/19/13 Time 1522

Test Species D pulex ID# BA/H0-J1

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

Time: 0hour 1425 24hour 1330 48hour 1522 72hour ___ 96hour ___

Temperature (°C): 0hour 24.2 24hour 24.2 48hour 24.1 72hour ___ 96hour ___

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100 pH Adj. ~~32~~ AH 5/17/13	A	NA	8	8	7			8.4	8.4/8.3	8.3			7.2	7.1/6.9	6.9			1248	1438/1238	1505		
	B		8	7	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	7	7																	
~~42~~ AH 5/17/13	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

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

Project# X5106

Client El Dorado Chemical

Sample Description 006

Test started: Date 5/17/13 Time 1420

Test ended: Date 5/19/13 Time 1530

Test Species P. promelas ID# BAY 51013

Technician: 0hour [illegible] 24hour AH 48hour AH 72hour — 96hour —

Time: 0hour 1420 24hour 1310 48hour 1530 72hour — 96hour —

Temperature (°C): 0hour 25.8 24hour 25.3 48hour 25 72hour — 96hour —

Test Dilution	Replicate	Test Salinity	# Live Organisms 0 hr	24	48	72	96	Dissolved Oxygen 0	24	48	72	96	pH 0	24	48	72	96	Conductivity 0	24	48	72	96
		NA																				
0	A		8	8	~~3~~ 8	5/19/13 AH		8.0	8.4/8.2	8.7			7.5	6.7/7.5	7.6			187.5	196.8/186.4	205		
	B		8	8	8																	
	C		8	7	~~8~~ 7																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	3			8.1	8.5/8.2	8.8			6.6	6.3/5.0	6.4			448	470/547	560		
	B		8	7	4																	
	C		8	7	3																	
	D		8	8	5																	
	E		8	7	0																	
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

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

Project# X5106

Client El Dorado Chemical

Sample Description DCD

Test started: Date 5/17/13 Time 1400

Test ended: Date 5/19/13 Time 1530

Test Species P. promelas ID# BAL 5103

Technician: Ohour JMM 24hour AH 48hour AH 72hour ____ 96hour ____

Time: Ohour 1400 24hour 1310 48hour 1520 72hour ____ 96hour ____

Temperature (°C): Ohour 25.8 24hour 25.3 48hour 25 72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		MA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56	A		8	0				8.3	8.5				8.7	8.8				842	842			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
75	A		8	0				8.3	8.5				8.5	8.4				1278	1244			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH				AH	AH				AH	AH			

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

Project# X5106

Client El Dorado Chemical

Sample Description DCO

Test started: Date 3/17/13 Time 1420

Test ended: Date 3/19/13 Time 1530

Test Species P. promelas ID# BAL 3/1013

Technician:	Ohour [illegible]	24hour AH	48hour AH	72hour	96hour
Time:	Ohour 1420	24hour 1320	48hour 1530	72hour	96hour
Temperature (°C):	Ohour 25.8	24hour 25.3	48hour 25	72hour	96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A		8	0				8.4	8.5				4.4	4.4				1884	1899			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
1																						
100	A		8	7	2			8.4	8.4/8.3	8.1			7.2	10.0/10.9	10.1			1248	1330/1389	1313		
PH Adj	B		8	8	5																	
	C		8	8	5																	
	D		8	8	4																	
	E		8	7	5																	
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

ACUTE2 020809 Rev.

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5106DP	Sample ID:	6
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	0.8750	0.8750	1.0000	1.0000	0.8750

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
100PHADJ	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5	20.00	19.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.81451	0.842	0.68465	-0.2143
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Wilcoxon Two-Sample Test indicates no significant differences				
Treatments vs D-Control				

Reviewed by: EOB 10/16/13

Daphnid Acute Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5106DP	Sample ID:	6
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	0.8750	0.8750	1.0000	1.0000	0.8750

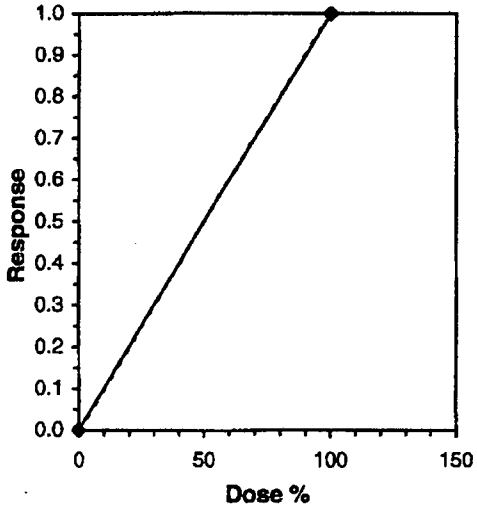
			Transform: Arcsin Square Root					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	1.0000	1.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100PHADJ	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.81451	0.842	0.68465	-0.2143
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	5.000	0.000	5.000	5.000	1.0076
IC10*	10.000	0.000	10.000	10.000	#DIV/0!
IC15*	15.000	0.000	15.000	15.000	#DIV/0!
IC20*	20.000	0.000	20.000	20.000	#DIV/0!
IC25*	25.000	0.000	25.000	25.000	#DIV/0!
IC40*	40.000	0.000	40.000	40.000	#DIV/0!
IC50*	50.000	0.000	50.000	50.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



Reviewed by: EAB 6/6/13

Acute Fish Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5106PP	Sample ID:	6
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	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	0.8750	1.0000	1.0000
22	0.3750	0.5000	0.3750	0.6250	0.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	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
100PHADJ	0.2500	0.6250	0.6250	0.5000	0.6250

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
*22	0.3750	0.3846	0.6386	0.1777	0.9117	43.553	5	15.00	18.00
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
*100PHADJ	0.5250	0.5385	0.8088	0.5236	0.9117	20.842	5	15.00	18.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.85271	0.881	-1.3907	2.45957
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)

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

ToxCalc v5.0.23

Reviewed by: 10/10/13

Acute Fish Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5106PP	Sample ID:	6
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	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	0.8750	1.0000	1.0000
22	0.3750	0.5000	0.3750	0.6250	0.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	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
100PHADJ	0.2500	0.6250	0.6250	0.5000	0.6250

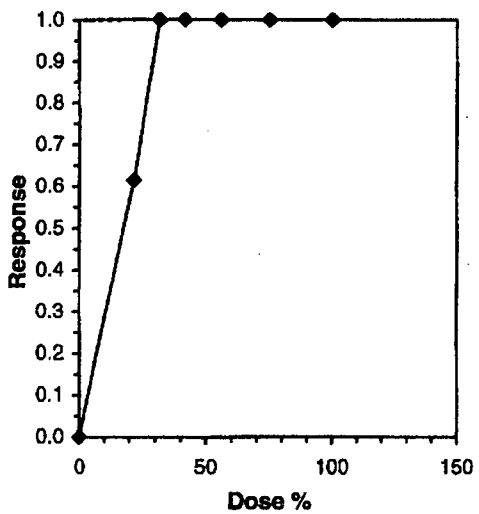
			Transform: Arcsin Square Root					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	0.9750	1.0000
22	0.3750	0.3846	0.6386	0.1777	0.9117	43.553	5	0.3750	0.3846
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100PHADJ	0.5250	0.5385	0.8088	0.5236	0.9117	20.842	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.85271	0.881	-1.3907	2.45957
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	1.788	0.271	1.182	2.681	0.5734
IC10*	3.575	0.541	2.364	5.363	0.5734
IC15*	5.363	0.812	3.546	8.044	0.5734
IC20*	7.150	1.082	4.728	10.725	0.5734
IC25*	8.938	1.353	5.910	13.406	0.5734
IC40*	14.300	2.161	9.456	21.450	0.5595
IC50*	17.875	2.483	11.821	25.134	0.0794

* indicates IC estimate less than the lowest concentration

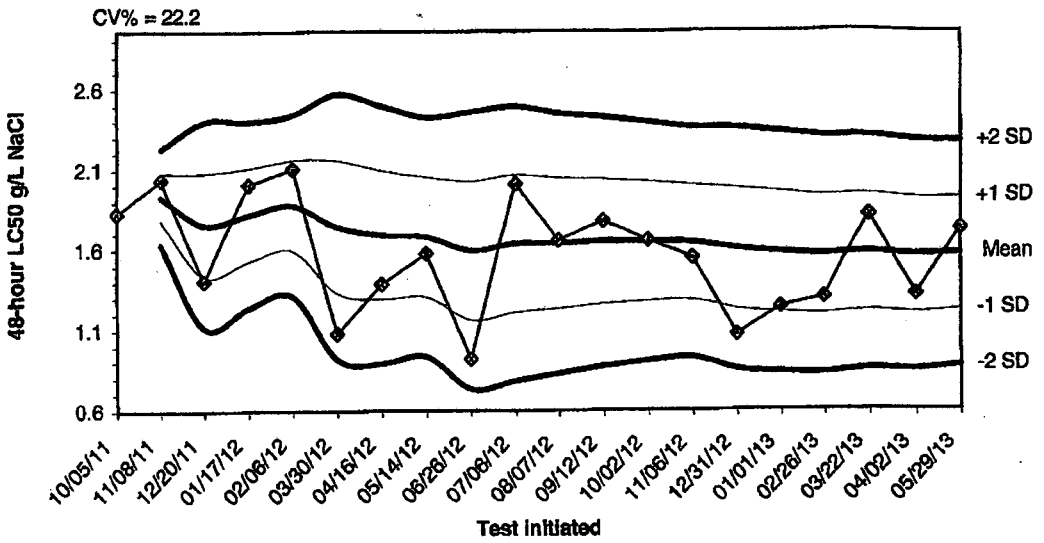


ToxCalc v5.0.23

Reviewed by: ELB 10/10/13

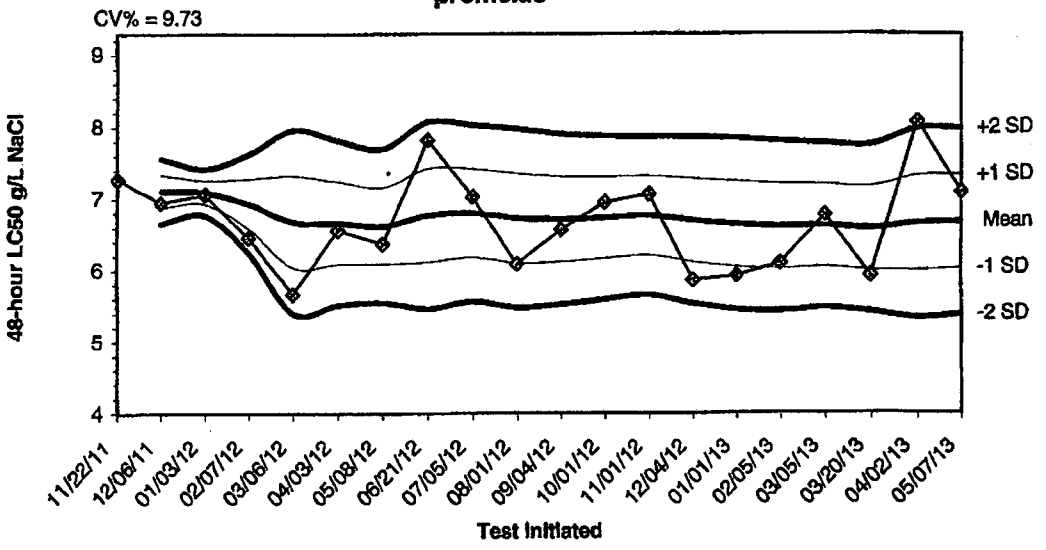
APPENDIX D
QUALITY ASSURANCE CHARTS

2013 48-Hour Acute Reference Toxicant Test Results for Daphnia pulex



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/05/11	1.8300					
11/08/11	2.0400	1.9350	1.7865	1.6380	2.0835	2.2320
12/20/11	1.4100	1.7600	1.4392	1.1184	2.0808	2.4016
01/17/12	2.0100	1.8225	1.5323	1.2421	2.1127	2.4029
02/06/12	2.1100	1.8800	1.5977	1.3154	2.1623	2.4446
03/30/12	1.0800	1.7467	1.3338	0.9210	2.1595	2.5723
04/16/12	1.3900	1.6957	1.2955	0.8952	2.0960	2.4962
05/14/12	1.5800	1.6813	1.3084	0.9356	2.0541	2.4269
06/26/12	0.9200	1.5967	1.1654	0.7341	2.0279	2.4592
07/06/12	2.0100	1.6380	1.2109	0.7838	2.0651	2.4922
08/07/12	1.6600	1.6400	1.2348	0.8295	2.0452	2.4505
09/12/12	1.7800	1.6517	1.2632	0.8747	2.0402	2.4286
10/02/12	1.6600	1.6523	1.2803	0.9084	2.0243	2.3962
11/06/12	1.5500	1.6450	1.2866	0.9282	2.0034	2.3618
12/31/12	1.0700	1.6067	1.2307	0.8548	1.9826	2.3585
01/01/13	1.2400	1.5838	1.2092	0.8346	1.9583	2.3329
02/26/13	1.3000	1.5671	1.1979	0.8288	1.9362	2.3054
03/22/13	1.8100	1.5806	1.2179	0.8552	1.9432	2.3059
04/02/13	1.3200	1.5668	1.2094	0.8519	1.9243	2.2818
05/29/13	1.7300	1.5750	1.2251	0.8753	1.9249	2.2747

2013 48-Hour Acute Reference Toxicant Test Results for Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/22/11	7.2700					
12/06/11	6.9500	7.1100	6.8837	6.6575	7.3363	7.5625
01/03/12	7.0600	7.0933	6.9308	6.7682	7.2559	7.4185
02/07/12	6.4600	6.9350	6.5916	6.2483	7.2784	7.6217
03/06/12	5.6700	6.6820	6.0429	5.4038	7.3211	7.9602
04/03/12	6.5600	6.6617	6.0879	5.5140	7.2355	7.8093
05/08/12	6.3700	6.6200	6.0847	5.5494	7.1553	7.6906
06/21/12	7.8200	6.7700	6.1176	5.4652	7.4224	8.0748
07/05/12	7.0300	6.7989	6.1825	5.5662	7.4153	8.0316
08/01/12	6.0900	6.7280	6.1051	5.4823	7.3509	7.9737
09/04/12	6.5700	6.7136	6.1208	5.5280	7.3064	7.8993
10/01/12	6.9500	6.7333	6.1640	5.5947	7.3027	7.8720
11/01/12	7.0600	6.7585	6.2059	5.6533	7.3110	7.8636
12/04/12	5.8600	6.6943	6.1116	5.5289	7.2770	7.8596
01/01/13	5.9200	6.6427	6.0467	5.4507	7.2387	7.8347
02/05/13	6.0900	6.6081	6.0160	5.4238	7.2003	7.7924
03/05/13	6.7700	6.6176	6.0430	5.4683	7.1923	7.7670
03/20/13	5.9200	6.5789	5.9976	5.4164	7.1602	7.7414
04/02/13	8.0700	6.6574	5.9970	5.3366	7.3178	7.9782
05/07/13	7.0900	6.6790	6.0290	5.3790	7.3290	7.9790

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 5/16/13** **To: 5/17/13**
From: **To:**
Test Initiated: 5/17/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	100	100 pH adj				
24-hour	A	100	0	100				
	B	100	0	87.5				
	C	100	0	100				
	D	100	0	100				
	E	100	0	87.5				
48-hour	A	100	0	87.5				
	B	100	0	87.5				
	C	100	0	100				
	D	100	0	100				
	E	100	0	87.5				
	Mean	100	0	92.5				

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **X YES** **NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES** **NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = 25.0% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: N/A
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 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton

Sample Collected	**From:**	**Date 5/16/13**	**Time 2130**
	To:	**Date 5/17/13**	**Time 0130**
Test Begin		**Date 5/17/13**	**Time 1425**
Test End		**Date 5/19/13**	**Time 1522**

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	8.4	24.2	24.2	24.1	32.0			52.0			7.5	7.5	7.6
100	8.4	8.4		24.2	24.2		28.0			120.0			4.4	4.4	
100 UV	8.4	8.3	8.3	24.2	24.2	24.1							7.2	6.9	6.9

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l $CaCO_3$

Acute Forms
Pimephales promelas (Fathead minnow) Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 5/16/13** **To: 5/17/13**
From: **To:**
Test Initiated: 5/17/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	32	42	56	75	100	100 pH adj
24-hour	A	100	100	100	0	0	0	0	87.5
	B	100	87.5	100	0	0	0	0	100
	C	87.5	87.5	100	0	0	0	0	100
	D	100	100	100	0	0	0	0	100
	E	100	87.5	100	0	0	0	0	87.5
48-hour	A	100	37.5	0	0	0	0	0	25.0
	B	100	50.0	0	0	0	0	0	62.5
	C	87.5	37.5	0	0	0	0	0	62.5
	D	100	62.5	0	0	0	0	0	50.0
	E	100	0.0	0	0	0	0	0	62.5
	Mean	97.5	37.5	0	0	0	0	0	25.0

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%) X YES NO
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) YES NO
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = 8.94% effluent
95 % confidence limits: 13.41 - 5.91
Method of LC_{50} calculation: Linear Interpolation
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 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton, Zeagler
Sample Collected **From:** **Date 5/16/13** **Time 2130**
To: **Date 5/17/13** **Time 0130**
Test Begin **Date 5/17/13** **Time 1420**
Test End **Date 5/19/13** **Time 1530**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.0	8.2	8.7	25.8	25.3	25.0	32.0			52.0			7.5	7.5	7.6
22	8.1	8.2	8.8	25.8	25.3	25.0							6.6	6.3	6.4
32	8.2	8.5	8.8	25.8	25.3	25.0							4.9	4.7	4.7
42	8.2	8.6		25.8	25.3								5.0	5.0	
56	8.3	8.5		25.8	25.3								4.7	4.6	
75	8.3	8.5		25.8	25.3								4.5	4.4	
100	8.4	8.5		25.8	25.3		28.0			120.0			4.4	4.4	
100 UV	8.4	8.3	8.6	25.8	25.3	25.0							7.2	6.9	6.6

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l $CaCO_3$

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#: X5106

Chain of Custody Documents Checked by: AH 5/23/13
Technician/Date

Raw Data Documents Checked by: AH 5/23/13
Technician/Date

Statistical Analysis Package Checked by: EGB 6/6/13
Quality Manager/Date

Quality Control Data Checked by: EGB 6/6/13
Quality Manager/Date

Report Checked by: Erin L. Briggs 6/7/13
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 L. Briggs, BS — Quality Manager

6/7/13 — Date

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5107

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5107
Outfall: Outfall 007 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Ms. Larken Pennington
Test Dates: May 17 - 19, 2013
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 - 0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

-Note: Adjusting the pH of the sample to 6.0-9.0 reduced toxicity.

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 -0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 0.00%.

-Note: Adjusting the pH of the sample to 6.0-9.0 reduced the toxicity in the sample.
-Note: Due to lack of available test organisms the proper age, only the 0 and 100% test dilutions were used in the daphnid test.

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
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Fax: (318) 745-2773

THE RESULTS OF TWO 48-HOUR ACUTE TOXICITY TESTS FOR OUTFALL 007 AT

EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas

NPDES #AR0000752
AFIN #70-00040

EPA Methods 2000.0 and 2021.0

Project X5107

Test Dates: May 17 - 19, 2013
Report Date: June 7, 2013

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 X5107

TABLE OF CONTENTS

APPENDIX B
RAW DATA SHEETS

BAL
ADEQ #88-0630
Project X5107

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately seven 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 X5107

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the fathead minnow test were 100, 75.0, 56.0, 50.0, 42.0 and 32.0 percent effluent and a reconstituted water control. Due to the lack of available daphnids the correct age, the only concentrations used in the *Daphnia pulex* test were 100 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 May 17, 2013. Upon completion of collection, the sample was chilled to 4^0 Celsius and delivered to Bio-Analytical Laboratories by BAL personnel.

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 ± 1^0 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. The pH was less than 6.0. It was adjusted to a range of 6.0-9.0 using 1 Normal Sodium Hydroxide solution (1.0 N NaOH). An extra 100 percent concentration was run on the pH adjusted sample. 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 ± 1^0 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.

BAL
ADEQ #88-0630
Project X5107

2.8 Data Analysis

The NOEC and LC_{50} values values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in the 100 percent critical dilution after 48 hours of exposure (p=.05). The NOEC value for both tests was zero percent effluent (p=.05). Increasing the pH of the sample reduced the toxicity to the test organisms.

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas* (Fathead Minnow)	*Daphnia pulex*
Control	97.5	100.0
22.0	0.0	-----
32.0	0.0	-----
42.0	0.0	-----
56.0	0.0	-----
75.0	0.0	-----
100.0	0.0	0.0
100.0 pH adj	82.5	97.5

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 X5107

4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on May 17, 2013, 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 48 hours of exposure (p=.05). Raising the pH of the sample reduced the toxicity in both tests (p=.05).

BAL
ADEQ #88-0630
Project X5107

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

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 627
Doyline, LA 71023
(318) 745-2772
1-800-488-1248
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:							Project Number: X5107
Address: 4500 Norwest Ave., El Dorado, AR 71731	Fax: (870) 863-7499								Temp. upon arrival: Temperature upon arrival: 3.0°c
Permit #: AR0000752/AFIN 70-00040	Purchase Order:								Thermometer #: 29
Sampler's Signature/Printed Name/Affiliation: Karen Pennington / Karen Pennington/EDCC									Tech: DH
									Date: 5/17/13

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Preservative: (below)
5/16/13-5/17/13	9:35pm-1:35am	X		6 half gallon	007			X	X				C7385	ICE

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: Karen Pennington / EDCC	5/17/13	1025	Received by/Affiliation:	5/17/13	1025
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 5/17/13	Time: 1215	Received by/Affiliation: Renee Haughton	5/17/13	1215

Method of Shipment: ____ Lab ____ Bus ____ Fed Ex ____ DHL ____ UPS ____ Client ____ Other Tracking #_____

Comments:

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5107

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 007

Technicians: EGB/AH/LGZ/GW

Test initiated: Date 5/17/13 Time 1445

Test terminated: Date 5/19/13 Time 1535

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
C7385	9.8/117.2%	4/20 8.5/98.8%	<0.01	NO	3.0	N/A	248.0	NA	AH
↓	9.6/114.7%	Y/20/8.6 97.4%/E/B	↓	↓	↓	↓			↓
				↓		↓			

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				
Soft H2O	31916					7.1	52.0	32.0	dC
↓	↓								

Test Species Information

Test Species Info.	Species: D.pulex ID#: BAL Ho-J1	Species: P.promelas ID#: BAL 5/013	Species: ID#:	Species: ID#:
Age	<24h	7 days		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT, Algae	Artemia		
Amount	Fed 2hrs prior to test initiation			
Aeration?	NA	NA		
Amount				
Condition of survivors	GOOD AH 5/19/13			

Comments:

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/17/13 Time 1445

Test ended: Date 5/19/13 Time 1525

Test Species D. pulex ID# BAL/Ho-J1

Technician:	Ohour AH	24hour AH	48hour AH	72hour	96hour	
Time:	Ohour 1445	24hour 1325	48hour 1525	72hour	96hour	
Temperature (°C):	Ohour 24.2	24hour 24.5	48hour 24.1	72hour	96hour	

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		8	8	8			8.1	8.2 / 8.2	8.4			7.3	7.2 / 7.6	7.6			1883	1944 / 1865	1857		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
100 / 50 AH 5/17/13	A		8	6				8.4	8.4 /				4.5	4.6 /				1308	1399 /			
	B		8	6																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH / AH	AH			AH	AH / AH	AH			AH	AH / AH	AH		

ACUTE2 020809 Rev.

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/7/13 Time 1445

Test ended: Date 5/9/13 Time 1525

Test Species D. pulex ID# BAL Ho-3,

Technician:	Ohour AH	24hour AH	48hour AH	72hour	96hour
Time:	Ohour 1445	24hour 1525	48hour 1525	72hour	96hour
Temperature (°C):	Ohour 24.2	24hour 24.2	48hour 24.1	72hour	96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
100 pH Adj 32 5/9/13	A		8	8	8			8.4	8.4	8.3			7.4	7.4 / 7.1	7.2			1005	1129 / 1003	1148		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	7																	
~~42~~	A		8						/					/					/			
AH 5/7/13	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								AH	AH / AH	AH			AH	AH / AH	AH			AH	AH / AH	AH		

ACUTE2 020809 Rev.

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/17/13 Time 1445

Test ended: Date 5/21/13 Time 1535

Test Species P. promelas ID# BBL 5/013

Technician: Ohour AM 24hour AH 48hour AH 72hour ____ 96hour ____

Time: Ohour 1445 24hour 1315 48hour 1535 72hour ____ 96hour ____

Temperature (°C): Ohour 25.8 24hour 25.3 48hour 25 72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A		8	8	8			8.1	8.4/8.9	8.7			7.3	7.0/7.6	7.6			188	209/180	194		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8																	
32	A		8	0				8.1	8.5				4.6	4.6				743	748			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

ACUTE2 020809 Rev.

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/10/13 Time 1445

Test ended: Date 5/19/13 Time 1535

Test Species P. promelas ID# BPL 51013

Technician: Ohour KM 24hour AH 48hour AH 72hour ____ 96hour ____

Time: Ohour 1405 24hour 1315 48hour 1535 72hour ____ 96hour ____

Temperature (°C): Ohour 25.8 24hour 25.3 48hour 25 72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		HA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
42	A		8	0				8.2	8.5				4.5	4.5				900	980			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
50	A		8	0				8.2	8.5				4.5	4.5				1035	1029			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH				AH	AH				AH	AH			

ACUTE2 020809 Rev.

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/17/13 Time 1445

Test ended: Date 5/19/13 Time 1535

Test Species P. promelas ID# BBL 5/013

Technician:	Ohour AM	24hour AH	48hour AH	72hour	96hour	
Time:	Ohour 1445	24hour 1315	48hour 1535	72hour	96hour	
Temperature (°C):	Ohour 25.8	24hour 25.3	48hour 25	72hour	96hour	

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56	A		8	0				8.2	8.5				4.5	4.5				1134	1440			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
75	A		8	0				8.3	8.8				4.5	4.5				1118	1330			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH				AH	AH				AH	AH			

ACUTE2 020809 Rev.

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

Project# X5107

Client El Dorado Chemical

Sample Description 007

Test started: Date 5/17/13 Time 1445

Test ended: Date 5/19/13 Time 1535

Test Species P. promelas ID# BPL 5/10/13

Technician:	Ohour [illegible]	24hour AH	48hour AH	72hour	96hour	
Time:	Ohour 1445	24hour 1315	48hour 1535	72hour	96hour	
Temperature (°C):	Ohour 25.8	24hour 25.3	48hour 25	72hour	96hour	

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A		8	0				8.4	8.8				4.5	4.5				1368	1371			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
100	A		8	8	8			8.4	8.4/8.4	8.10			7.4	6.5/6.7	7.0			1005	987/1003	1055		
pH Adj.	B		8	8	5																	
	C		8	8	7																	
	D		8	8	7																	
	E		8	8	6																	
Chemistry Tech prerenewal/postrenewal								AH	AH/AH	AH			AH	AH/AH	AH			AH	AH/AH	AH		

ACUTE2 020809 Rev.

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5107DP	Sample ID:	7
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.8750
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	1.0000	1.0000	1.0000	1.0000	0.8750

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5		
100PHADJ	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	19.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.50963	0.842	-1.7788	1.40625
F-Test indicates equal variances (p = 1.00)	1	23.1545		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates no significant differences
Treatments vs D-Control

ECB 10/10/13

Daphnid Acute Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5107DP	Sample ID:	7
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.8750
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	1.0000	1.0000	1.0000	1.0000	0.8750

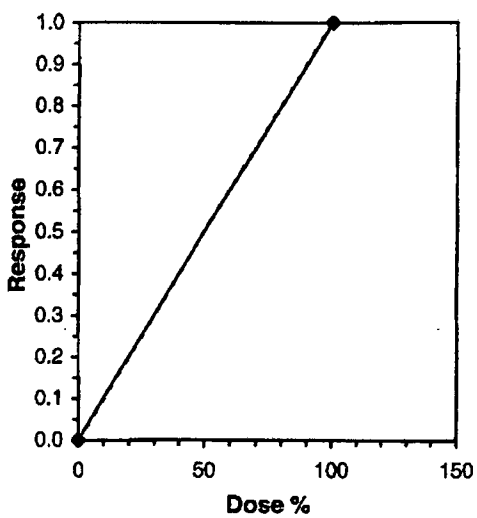
			Transform: Arcsin Square Root					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	0.9750	1.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100PHADJ	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.50963	0.842	-1.7788	1.40625
F-Test indicates equal variances (p = 1.00)	1	23.1545		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	5.000	0.000	5.000	5.000	1.2093
IC10*	10.000	0.000	10.000	10.000	0.8298
IC15*	15.000	0.000	15.000	15.000	-0.2939
IC20*	20.000	0.000	20.000	20.000	-3.5623
IC25*	25.000	0.000	25.000	25.000	0.7230
IC40*	40.000	0.000	40.000	40.000	#DIV/0!
IC50*	50.000	0.000	50.000	50.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



ToxCalc v5.0.23

Reviewed by: EDB 10/10/13

Acute Fish Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5107PP	Sample ID:	7
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	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	0.8750	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
100PHADJ	1.0000	0.6250	0.8750	0.8750	0.7500

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5			
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			
*100PHADJ	0.8250	0.8462	1.1542	0.9117	1.3931	15.823	5	2.258	1.860	0.1665

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.88859	0.842	-0.2612	0.70184
F-Test indicates equal variances (p = 0.15)	4.94386	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences Treatments vs D-Control	0.09296	0.09737	0.10219	0.02005	0.05392	1, 8

ToxCalc v5.0.23

Reviewed by: EGB 10/10/13

Acute Fish Test-48 Hr Survival

Start Date:	5/17/2013	Test ID:	X5107PP	Sample ID:	7
End Date:	5/19/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/17/2013	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	0.8750	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
100PHADJ	1.0000	0.6250	0.8750	0.8750	0.7500

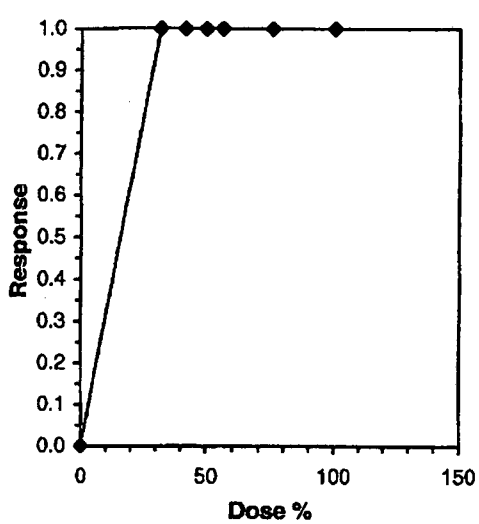
			Transform: Arcsin Square Root					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	0.9750	1.0000
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
50	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
100PHADJ	0.8250	0.8462	1.1542	0.9117	1.3931	15.823	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.88859	0.842	-0.2612	0.70184
F-Test indicates equal variances (p = 0.15)	4.94386	23.1545		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	1.600	0.000	1.600	1.600	-1.5015
IC10*	3.200	0.000	3.200	3.200	-1.1201
IC15*	4.800	0.000	4.800	4.800	1.0100
IC20*	6.400	0.000	6.400	6.400	-1.0085
IC25*	8.000	0.000	8.000	8.000	1.1207
IC40*	12.800	0.000	12.800	12.800	-1.0095
IC50*	16.000	0.000	16.000	16.000	#DIV/0!

* indicates IC estimate less than the lowest concentration

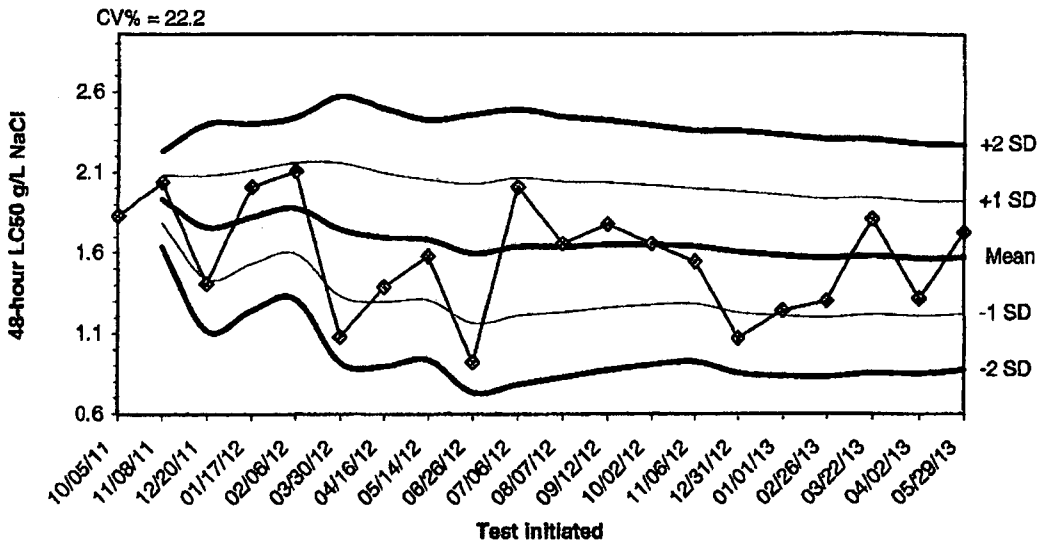


ToxCalc v5.0.23

Reviewed by: ECB 07/08/13

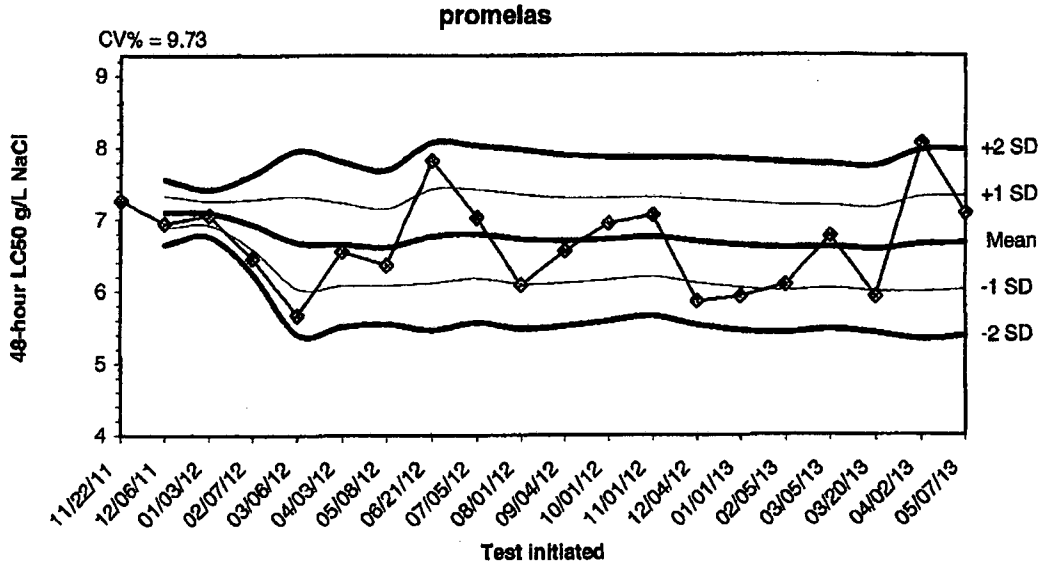
APPENDIX D
QUALITY ASSURANCE CHARTS

2013 48-Hour Acute Reference Toxicant Test Results for Daphnia pulex



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/05/11	1.8300					
11/08/11	2.0400	1.9350	1.7865	1.6380	2.0835	2.2320
12/20/11	1.4100	1.7600	1.4392	1.1184	2.0808	2.4016
01/17/12	2.0100	1.8225	1.5323	1.2421	2.1127	2.4029
02/06/12	2.1100	1.8800	1.5977	1.3154	2.1623	2.4446
03/30/12	1.0800	1.7467	1.3338	0.9210	2.1595	2.5723
04/16/12	1.3900	1.6957	1.2955	0.8952	2.0960	2.4962
05/14/12	1.5800	1.6813	1.3084	0.9356	2.0541	2.4269
06/26/12	0.9200	1.5967	1.1654	0.7341	2.0279	2.4592
07/06/12	2.0100	1.6380	1.2109	0.7838	2.0651	2.4922
08/07/12	1.6600	1.6400	1.2348	0.8295	2.0452	2.4505
09/12/12	1.7800	1.6517	1.2632	0.8747	2.0402	2.4286
10/02/12	1.6600	1.6523	1.2803	0.9084	2.0243	2.3962
11/06/12	1.5500	1.6450	1.2866	0.9282	2.0034	2.3618
12/31/12	1.0700	1.6067	1.2307	0.8548	1.9826	2.3585
01/01/13	1.2400	1.5838	1.2092	0.8346	1.9583	2.3329
02/26/13	1.3000	1.5671	1.1979	0.8288	1.9362	2.3054
03/22/13	1.8100	1.5806	1.2179	0.8552	1.9432	2.3059
04/02/13	1.3200	1.5668	1.2094	0.8519	1.9243	2.2818
05/29/13	1.7300	1.5750	1.2251	0.8753	1.9249	2.2747

2013 48-Hour Acute Reference Toxicant Test Results for Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/22/11	7.2700					
12/06/11	6.9500	7.1100	6.8837	6.6575	7.3363	7.5625
01/03/12	7.0600	7.0933	6.9308	6.7682	7.2559	7.4185
02/07/12	6.4600	6.9350	6.5916	6.2483	7.2784	7.6217
03/06/12	5.6700	6.6820	6.0429	5.4038	7.3211	7.9602
04/03/12	6.5600	6.6617	6.0879	5.5140	7.2355	7.8093
05/08/12	6.3700	6.6200	6.0847	5.5494	7.1553	7.6906
06/21/12	7.8200	6.7700	6.1176	5.4652	7.4224	8.0748
07/05/12	7.0300	6.7989	6.1825	5.5662	7.4153	8.0316
08/01/12	6.0900	6.7280	6.1051	5.4823	7.3509	7.9737
09/04/12	6.5700	6.7136	6.1208	5.5280	7.3064	7.8993
10/01/12	6.9500	6.7333	6.1640	5.5947	7.3027	7.8720
11/01/12	7.0600	6.7585	6.2059	5.6533	7.3110	7.8636
12/04/12	5.8600	6.6943	6.1116	5.5289	7.2770	7.8596
01/01/13	5.9200	6.6427	6.0467	5.4507	7.2387	7.8347
02/05/13	6.0900	6.6081	6.0160	5.4238	7.2003	7.7924
03/05/13	6.7700	6.6176	6.0430	5.4683	7.1923	7.7670
03/20/13	5.9200	6.5789	5.9976	5.4164	7.1602	7.7414
04/02/13	8.0700	6.6574	5.9970	5.3366	7.3178	7.9782
05/07/13	7.0900	6.6790	6.0290	5.3790	7.3290	7.9790

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 5/16/13** **To: 5/17/13**
From: **To:**
Test Initiated: 5/17/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	100	100 pH adj				
24-hour	A	100	0	100				
	B	100	0	100				
	C	100	0	100				
	D	100	0	100				
	E	100	0	100				
48-hour	A	100	0	100				
	B	100	0	100				
	C	100	0	100				
	D	100	0	100				
	E	100	0	87.5				
	Mean	100	0	97.5				

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **X YES** **NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES** **NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = 25.0% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: N/A
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/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton

Sample Collected	**From:**	**Date 5/16/13**	**Time 2133**
	To:	**Date 5/17/13**	**Time 0135**
Test Begin		**Date 5/17/13**	**Time 1445**
Test End		**Date 5/19/13**	**Time 1525**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.1	8.2	8.4	24.2	24.2	24.1	32.0			52.0			7.3	7.6	7.6
100	8.4	8.4		24.2	24.2		0.0			248.0			4.5	4.6	
100 UV	8.4	8.4	8.3	24.2	24.2	24.1							7.4	7.1	7.2

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l $CaCO_3$

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 5/16/13** **To: 5/17/13**
From: **To:**
Test Initiated: 5/17/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32	42	50	56	75	100	100 pH adj
24-hour	A	100	0	0	0	0	0	0	100
	B	100	0	0	0	0	0	0	100
	C	100	0	0	0	0	0	0	100
	D	100	0	0	0	0	0	0	100
	E	100	0	0	0	0	0	0	100
48-hour	A	100	0	0	0	0	0	0	100
	B	100	0	0	0	0	0	0	62.5
	C	100	0	0	0	0	0	0	87.5
	D	87.5	0	0	0	0	0	0	87.5
	E	100	0	0	0	0	0	0	75.0
	Mean	97.5	0	0	0	0	0	0	82.5

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **X YES** **NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES** **NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = 8.0% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: Linear Interpolation
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/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton, Zeagler

Sample Collected	**From:**	**Date 5/16/13**	**Time 2133**
	To:	**Date 5/17/13**	**Time 0135**
Test Begin		**Date 5/17/13**	**Time 1445**
Test End		**Date 5/19/13**	**Time 1535**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.1	8.2	8.7	25.8	25.3	25.0	32.0			52.0			7.3	7.6	7.6
32.0	8.1	8.5		25.8	25.3								4.6	4.6	
42.0	8.2	8.5		25.8	25.3								4.5	4.5	
50.0	8.2	8.5		25.8	25.3								4.5	4.5	
56.0	8.2	8.5		25.8	25.3								4.5	4.5	
75.0	8.3	8.5		25.8	25.3								4.5	4.5	
100.0	8.4	8.6		25.8	25.3		0.0			248.0			4.5	4.5	
100.0 pH	8.4	8.4	7.6	25.8	25.3	25.0							7.4	7.1	7.0

*This Form is to be submitted with each DMR.
Alkalinity and hardness to be reported as mg/l $CaCO_3$

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#: X5107

Chain of Custody Documents Checked by: AH 5/23/13
Technician/Date

Raw Data Documents Checked by: AH 5/23/13
Technician/Date

Statistical Analysis Package Checked by: EGB 6/10/13
Quality Manager/Date

Quality Control Data Checked by: EGB 6/10/13
Quality Manager/Date

Report Checked by: EGB 6/7/13
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.

Brian K. Beggs, BS — 6/7/13
Quality Manager — Date

Bio-Analytical Laboratories (BAL)
ADEQ Certificate #88-0630
Project X5108

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
4500 Northwest Avenue
El Dorado, AR 71731
Project #: X5108
Outfall: 001 (treated process and contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Larken Pennington
Test Dates: May 21 - 28, 2013
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 - 0.
3. Report the NOEC value for survival, Parameter TOP3B - 100%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 100%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 29.78%.

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 - 17.44%.

This report contains a total of 49 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.

BAL
ADEQ #88-0630
Project X5108

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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 X5108

Test Dates: May 21 - 28, 2013

Report Date: June 17, 2013

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 X5108

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 dilution water hardness 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 obtained from Aquatic Biosystems, Fort Collins, Colorado (ABS) and were less than 48 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.

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 May 20, 22 and 24, 2013. Upon collection and completion of each composite, the samples were chilled to 4^0 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 ± 1^0 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 pathogen interference. 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 ± 1^0 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 ± 1^0 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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ADEQ #88-0630
Project X5108

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 nonparametric test comparing concentration data to control data. Fathead minnow survival and growth data was analyzed using Dunnett's Test, a parametric test comparing concentration data to control data. 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. After seven days of exposure, 90 percent survival occurred in the control and 100 percent survival occurred in the critical dilution. The average number of neonates per female after three broods in the control was 19.9, while the average number of neonates in the 100 percent critical dilution was 18.6. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 percent effluent (p=.05). Toxic effects were not noted in the UV-treated critical dilution.

The fathead minnow test results can be found in Table 2. Ninety-two-point-five percent survival occurred in the control and in the 100 percent critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.443 milligram (mg) and the average weight gained in the critical dilution was 0.440 mg. A non-monotonic response occurred in both the survival and the growth data. The NOEC for survival and growth in this test was 100 percent effluent (p=.05). Toxic effects were not noted in the UV-treated critical dilution.

BAL
ADEQ #88-0630
Project X5108

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	90.0		22.1	19.9	
32.0	90.0		23.4	21.1	
42.0	100.0		24.7	24.7	
56.0	100.0		22.4	22.4	
75.0	80.0		21.5	17.2	
100.0	100.0		18.6	18.6	
100.0 UV	70.0		17.4	12.2	

*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		0.443/0.480+	
32.0	85.0		0.445	
42.0	85.0		0.433	
56.0	90.0		0.478	
75.0	95.0		0.513	
100.0	92.5		0.440	
100.0 UV	97.5		0.448	

*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.

BAL
ADEQ #88-0630
Project X5108

4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on May 20, 22 and 24, 2013, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after seven days of exposure (p=.05). Sub-lethal effects (i.e., lack reproduction or growth) were not noted in the critical dilution in either test (p=.05).

BAL
ADEQ #88-0630
Project X5108

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
Post Office Box 627
Doyline, LA 71023
(318) 746-2772
1-800-259-1246
Fax: (318) 746-2773

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

Company: El Dorado Chemical Company
Phone: (870) 863-1484

Address: 4500 Norwest Ave., El Dorado, AR 71731
Fax: (870) 863-7499

Permit #: AR0000752/AFIN 70-00040
Purchase Order:

Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC

Analysis:

Laboratory Use Only:
Project Number: X5108
Temp upon arrival:
Temperature upon arrival: 3.4°C
Thermometer #: 29
Tech: LC
Date: 5/20/13

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number	Preservatives (below)
5-19-13 – 5-20-13	8:30 – 8:30	x		8 half gallons	001	X	X						C7387	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington / EDCC	5/20/13	0935	[illegible]	5/20/13	0935
[illegible]	5/20/13	1130	L Zeagler	5/20/13	1130

Method of Shipment: ____ Lab ____ Bus ____ Fed Ex ____ DHL ____ UPS ____ Client ____ Other ✓ Tracking #____________

Comments:

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-259-1240
Fax: (318) 745-2773

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

Laboratory Use Only:

Temperature upon arrival: 2.6°c
Thermometer #: X5108
Tech:
Date: 5/22/13

Company: El Dorado Chemical Company	Phone: (870) 863-1484
Address: 4500 Norwest Ave., El Dorado, AR 71731	Fax: (870) 863-7499
Permit #: AR0000752/AFIN 70-00040	Purchase Order:

Sampler's Signature/Printed Name/Affiliation: Larken Pennington | Larken Pennington | EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number	Preservative (below)
5-21-13 - 5-22-13	8:30 - 8:30	x		8 half gallons	001	X	X						C7435	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington	5/22/13	10:00	[signature]	5/22/13	1000
[signature]	5/22/13	1150	[signature]	5/22/13	1150

Method of Shipment: ✓ Lab ✓ Bus ___ Fed Ex ___ DHL ___ UPS ___ Client ___ Other Tracking # ________

Comments:

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

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

Company: El Dorado Chemical Company
Phone: (870) 863-1484

Address: 4500 Norwest Ave., El Dorado, AR 71731
Fax: (870) 863-7499

Permit #: AR0000752/AFIN 70-00040
Purchase Order:

Sampler's Signature/Printed Name/Affiliation: Larken Pennington | Larken Pennington | EDCC

Analysis:

Laboratory Use Only:
Project Number: X5108
Temp upon arrival: 1.8°C EGB 5/24/13

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Preservative: (below)
5-23-13 - 5-24-13	8:30am - 8:30am	x		8 half gallons	001	X	X						~~C7445~~ C7450 EGB	ICE 5/24/13

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington / EDCC	5/24/13	0940	[signature]	5/24/13	0940
[signature]	5-24-13	1130	Eric Briggs EGB	5/24/13	1130

Method of Shipment: ✓ Lab ____ Bus ____ Fed Ex ____ DHL ____ UPS ____ Client ____ Other Tracking # ________

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X5108 Date start: 5/21/13 Date end: 5/28/13

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/LC/GW

Adults isolated: Date 5/20/13 Time: 2300

Neonates collected: Date 5/21/13 Time: 0630 Board: LOW 6S
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 D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0.	9.4/111.23/AH	0 4/20/8.5/97.82/AH	0. N/A	0. N/A
1.	10.1/118.8%/LC	1. 4/20/8.5/97.5%/LC	1.	1.
2.	9.2/106.82/AH	2 4/20/8.6/97.8%/LC	2.	2.
3.	9.7/115.2%/LC	3. 4/20/8.4/97.3%/LC	3.	3.
4.	9.0/110.5%/LC	4 4/20/8.3/97.3%/LC	4.	4.
5.	8.5/99.8%/LC	5. NO/LC	5.	5.
6.	9.2/110.83/AH	6 4/20/8.3/96.6/AH	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.	<0.01/AH	1. NO/AH	1. 1.0/AH	1. C7387 5/21/13
2.	<0.01/LC	2. NO/LC	2. 1.0/AH	2. C7435 5/23/13
3.	<0.01/LC	3. NO/LC	3. 1.0/LC	3. C7450 5/25/13

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X5108 Test Dates 5|21-28|13

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100UV
A	33	36	26	23	26	21	X
B	18	17	18	24	X	13	X
C	19	17	17	17	X	18	16
D	11	26	24	27	19	17	17
E	22	22	29	23	20	24	20
F	X	20	27	21	18	22	13
G	28	24	20	28	22	23	19
H	20	X	27	17	25	9	X
I	20	24	26	17	26	23	19
J	28	25	33	27	16	16	18
Surviving Mean	22.1	23.4	24.7	22.4	21.5	18.6	17.4
Total Mean	19.9	21.1	24.7	22.4	17.2	18.6	12.2
CV%*	29.78	24.51	20.38	19.20	17.93	26.49	13.60

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

Key: M=male; X=dead adult

Calculated by: PH 5|30|13

Calculations checked by: JC 5|30|13

BIO-ANALYTICAL LABORATORIES

CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST-LIVE NEONATE PRODUCTION

Project# X5108 Test started: Date 5/9/13 Time 1255

Client FDCC Test ended: Date 5/15/13 Time 1330

Technician: Day0 AH 1 AH 2 JC 3 JC 4 JC 5 JC 6 JC 7 JC 8 ____

Time: Day0 1255 1 1255 2 1050 3 1000 4 1125 5 1515 6 0950 7 1330 8 ____

Temp. (°C): Day0 24.6 1 24.9 2 24.5 3 24.6 4 24.7 5 24.7 6 25.0 7 25.5 8 ____

Conc %	Day	A	B	C	D	E	F	G	H	I	J	Number of Live Adults
0	1	0										10
	2	0					X	0				9
	3	0						0				9
	4	3	2	3	2	0		3	1	1	3	9
	5	10	0	6	7	8		11	1	0		9
	6	0	6	0	0	8		0	6	10	12	9
	7	20	10	10	2	14		14	12	9	13	9
	8											
32	1	0							X			9
	2	0								0		9
	3	0								0		9
	4	5	4	4	4	3	0	3		3	4	9
	5	1	0	8	9	1	5	8		1	0	9
	6	12	6	0	0	7	1	0		0	7	9
	7	18	10	6	13	11	14	13		15	14	9
	8											
42	1	0										10
	2	0										10
	3	0										10
	4	3	0	2	2	4	3	2	3	4	4	10
	5	9	0	5	7	0				6	0	10
	6	0	4	0	1	10	10	16	9	0	11	10
	7	15	14	10	14	15	14	12	15	16	18	10
	8											
56	1	0										10
	2	0										10
	3	0										10
	4	2	2	1	3	3	2	3	1	3	4	10
	5	0	5	5	8	1	2	0	1	0		10
	6	2	4	0	0	6	8	10	5	6	11	10
	7	19	13	11	16	13	9	15	10	8	12	10
	8											
75	1	0										10
	2	0										10
	3	0		X	0							9
	4	1	X	|	0	3	3	2	4	4	3	8
	5	6	|	|	5	0						8
	6	4	|	|	3	6	8	8	11	9	8	8
	7	15	|	|	12	11	9	12	10	13	5	8
	8											
100	1	0										10
	2	0										10
	3	0										10
	4	1	0	1	2	3	3	3	4	3	3	10
	5	0	5	4	5	0	1	0		7	0	10
	6	8	0	1	0	8	9	11	5	0	4	10
	7	12	8	12	10	13	9	9	0	13	9	10
	8											

Key: X=dead adult, X^n=adult had n neonates before death, M=male CERIO2 Rev.2.0

BIO-ANALYTICAL LABORATORIES

CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST-LIVE NEONATE PRODUCTION

Project# X5108 Test started: Date 5/21/13 Time 1255
Client EDCC Test ended: Date 5/28/13 Time 1330
Technician: Day0 [illegible] 1 [illegible] 2 JC 3 [illegible] 4 JC 5 JC 6 [illegible] 7 [illegible] 8
Time: Day0 1255 1 1055 2 1050 3 1000 4 1125 5 1215 6 1130 7 1330 8
Temp. (°C): Day0 24.6 1 24.9 2 24.5 3 24.6 4 24.7 5 24.7 6 25.0 7 25.0 8

Conc %	Day	A	B	C	D	E	F	G	H	I	J	Number of Live Adults
100 UV trtd	1	X	X	—	—	—	—	—	X	—	—	7
	2			0	—	—	—	—		0	—	7
	3			0	—	—	—	—		0	—	7
	4			0	3	1	2	3		4	2	7
	5			3	3	0	—	1		0	5	7
	6			0	1	7	7	5		4	1	7
	7			13	11	12	4	10		11	10	7
	8											
	1											
	2											
	3											
	4											
	5											
	6											
	7											
	8											
	1											
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	2											
	3											
	4											
	5											
	6											
	7											
	8											

[illegible] 04/30/2013

Key: X=dead adult, X^n=adult had n neonates before death, M=male CERIO2 Rev.2.0

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA

Project# X5108 Test started: Date 5/21 Time 1325
Client EDC Test ended: Date 5/28 Time 1330
Organism C. dubia

Day/# water used	0 3499	1	2	3	4	5	6 3500	7	8
Concentration: Control Soft									
pH	7.4	7.8 7.6	7.5 7.7	7.8 7.6	7.7 7.5	7.8 7.5	7.8 7.4	7.7	
DO(mg/l)	8.2	8.3 8.3	8.4 8.2	8.3 8.3	8.3 8.2	8.4 8.1	8.2 8.1	8.4	
Cond(umhos/cm)	180.5	184	180.9	181.6	181.2	182.3	183.3		
Alkalinity(mg/L)	39.0						38.0		
Hardness (mg/L)	52.0						48.0		
Concentration: 32									
pH	7.8	7.5 7.8	7.4 7.6	7.3 7.6	7.4 7.6	7.6 7.6	7.8 7.6	7.8	
DO(mg/l)	8.3	8.4 8.4	8.4 8.3	8.2 8.3	8.2 8.2	8.3 8.2	8.2 8.1	8.4	
Cond(umhos/cm)	274	272	273	272	275	274	275		
Concentration: 42									
pH	7.9	7.7 7.9	7.5 7.8	7.4 7.7	7.6 7.7	7.6 7.7	7.8 7.7	7.8	
DO(mg/l)	8.3	8.1 8.4	8.3 8.4	8.1 8.3	8.2 8.2	8.4 8.4	8.2 8.1	8.3	
Cond(umhos/cm)	300	301	300	302	307	300	300		
Concentration: 56									
pH	8.0	7.8 8.0	7.6 7.8	7.4 7.8	7.7 7.7	7.7 7.8	7.8 7.8	7.9	
DO(mg/l)	8.3	8.1 8.4	8.3 8.4	8.1 8.3	8.1 8.2	8.3 8.5	8.2 8.1	8.4	
Cond(umhos/cm)	341	340	342	341	342	338	340		
Concentration: 75									
pH	8.1	7.8 8.0	7.5 7.9	7.4 7.8	7.7 7.8	7.7 7.9	7.9 7.9	7.9	
DO(mg/l)	8.3	8.4 8.4	8.2 8.4	8.0 8.3	8.1 8.2	8.3 8.5	7.9 8.2	8.4	
Cond(umhos/cm)	394	392	395	397	393	388	391		
Concentration: 100									
pH	8.1	7.9 8.1	7.5 8.0	7.5 7.9	7.8 7.9	7.7 7.8	7.9 7.9	8.0	
DO(mg/l)	8.4	8.0 8.4	8.2 8.5	8.0 8.4	8.2 8.2	8.3 8.5	8.0 8.2	8.4	
Cond(umhos/cm)	464	464	468	466	466	468	461		
Tech-prerenewal		SW	JC	JC	JC	JC	SW	SW	
Tech-postrenewal	AH	SW	JC	JC	JC	JC	AH		
Alkalinity(mg/l)	~~44.0~~ 48.0	46/13	100.0		60.0				
Hardness(mg/l)	48.0		56.0		48.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA

Project# X5108 Test started: Date 5/21/13 Time 1055
Client FDCC Test ended: Date 5/28/13 Time 1330
Organism C. dubia

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ AH5/21/13 100 UW									
pH	7.8	7.7/8.0	7.0/7.7	7.5/7.6	7.8/7.7	7.7/7.6	8.2/7.6	8.0/	
DO (mg/l)	8.2	7.9/8.2	8.1/8.2	7.9/8.1	8.0/8.0	8.1/8.3	8.0/7.9	8.4/	
Cond (umhos/cm)	473	469	472	470	471	471	470		
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)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal		JW	LC	LC	LC	LC	JW	JW	
Tech-postrenewal	AH	JW	LC	LC	LC	LC	AH		
Alkalinity (mg/l)									
Hardness (mg/l)									

[illegible] AH 5/21/13

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X5108 Date started: 5/21/13 Date ended 5/28/13

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/LC/GW
Test organism age <48hr Vendor/ID# ABS/740

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			
1	~~DW~~/0840/0.10ml	~~AH~~ LC/1030/0.10ml	DW/1525/0.20ml
2	~~PM~~/0835/0.10ml	~~AH~~/1045/0.10ml	LC/1445/0.10ml
3	~~EGB~~/0730/0.10ml	~~EGB~~/1100/0.10ml	LC/1420/0.10ml
4	LC/0845/0.20ml	LC/1130/0.20ml	LC/1340/0.10ml
5	LC/1030/0.20ml		LC/1300/0.20ml
6	~~AH~~/0735/0.10ml	~~AH~~/1010/0.20ml	

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. 9.4/111.2%/AH	0. Y/20/8.5/97.8%/AH	0. N/A	0.
1. 10.1/118.8%/DW	1. Y/20/8.5/97.5%/DW	1.	1.
2. 9.2/106.8%/LC	2. Y/20/8.6/97.8%/LC	2.	2.
3. 9.1/115.2%/LC	3. Y/20/8.4/97.3%/LC	3.	3.
4. 9.0/110.4%/LC	4. Y/20/8.3/97.3%/LC	4.	4.
5. 8.5/99.8%/LC	5. NO/LC	5.	5.
6. 9.2/110.3%/AH	6. Y/20/8.3/96.6%/AH	6.	6.

Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <0.01/AH	1. NO/AH	1. 1.0/AH	1 C7387 5/21/13
2. <0.01/LC	2. NO/LC	2. 1.0/LC	2 C7435 5/23/13
3. <0.01/LC	3. NO/LC	3. 1.0/LC	3 C7480 5/25/13

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X5108
Client EDCC

Test started: Date 5/13 Time 1505
Test ended: Date 5/19 Time 1125

Technician:	Day0 RJEW	1 JC	2 AU	3 JC	4 JC	5 JC	6 AU	7 AU
Time:	Day0 1505	1 1035	2 1025	3 0935	4 1000	5 1135	6 0850	7 1125
Temperature	Day0 24.9	1 25	2 25.2	3 25.2	4 24.9	5 25.5	6 25.3	7 25.0

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	7	7	7	7
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	7
	E	8	8	8	8	8	8	8	7
32	A	8	8	8	8	8	8	6	6
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	6	6
	D	8	8	8	8	8	8	8	7
	E	8	8	8	8	8	8	7	7
42	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	6	6
	C	8	8	8	8	8	8	7	7
	D	8	8	8	8	8	8	7	7
	E	8	8	7	7	7	7	6	6
56	A	8	8	8	8	8	8	8	8
	B	8	7	7	7	7	7	7	7
	C	8	8	7	7	7	7	7	7
	D	8	8	8	8	8	8	7	7
	E	8	8	8	8	8	8	7	7
75	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	7	7	7	7	6	6
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
100	A	8	8	8	8	8	8	8	8
	B	8	7	7	7	6	6	6	6
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	7	7

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X5108 — Test started: Date 5/1/13 Time 1505
Client EDCC — Test ended: Date 5/8/13 Time 1125

	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Technician:	JC/GW	JC	AH	JC	JC	JC	BH	GW
Time:	1505	1035	1035	0935	1000	1135	0850	1125
Temperature	24.9	25	25.2	25.2	24.9	25.5	25.3	25.2

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

Omit RM 5/20/13

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X5108 / EDCC Test Dates 5/21/13 - 5/28/13

Oven Temperature (Celsius) 105°C JC 5/29/13

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 5/28/13 Tech: JC	Wt. of pan + larvae(g)/ Date weighed: 5/29/13 Tech: SW	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 31	0.9361	0.9390	0.0029	8	0.363	
	B 32	0.9227	0.9264	0.0037	8	0.463	1) 0.529
	C 33	0.9251	0.9294	0.0043	8	0.538	
	D 34	0.9361	0.9395	0.0034	8	0.425	1) ~~0.489~~ 0.486 SW 5/29/13
	E 35	0.9358	0.9392	0.0034	8	0.425	1) 0.486
32	A 36	0.9369	0.9404	0.0035	8	0.438	
	B 37	0.9360	0.9402	0.0042	8	0.525	
	C 38	0.9329	0.9359	0.0030	8	0.375	
	D 39	0.9325	0.9363	0.0038	8	0.475	
	E 40	0.9300	0.9333	0.0033	8	0.413	
42	A 41	0.9280	0.9321	0.0041	8	0.513	
	B 42	0.9252	0.9281	0.0029	8	0.363	
	C 43	0.9232	0.9268	0.0036	8	0.450	
	D 44	0.9182	0.9215	0.0033	8	0.413	
	E 45	0.9166	0.9200	0.0034	8	0.425	
56	A 46	0.9140	0.9182	0.0042	8	0.525	
	B 47	0.9113	0.9159	0.0046	8	0.575	
	C 48	0.9125	0.9158	0.0033	8	0.413	
	D 49	0.9153	0.9181	0.0028	8	0.350	
	E 50	0.9190	0.9232	0.0042	8	0.525	
75	A 51	0.9463	0.9501	0.0038	8	0.475	
	B 52	0.9451	0.9502	0.0051	8	0.638	
	C 53	0.9456	0.9490	0.0034	8	0.425	
	D 54	0.9444	0.9488	0.0044	8	0.550	
	E 55	0.9442	0.9480	0.0038	8	0.475	
100	A 56	0.9213	0.9250	0.0037	8	0.463	
	B 57	0.9269	0.9297	0.0028	8	0.350	
	C 58	0.9322	0.9352	0.0030	8	0.375	
	D 59	0.9336	0.9379	0.0040	8	0.500	
	E 60	0.9371	0.9409	0.0038	8	0.475	

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

Calculated by: SW 5/30/13 Calculations checked by: AA 5/30/13

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X5108 / EDCC Test Dates 5/21/13 - 5/28/13
Oven Temperature (° Celsius) 102°C

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 5/22/13 Tech: JC	Wt. of pan + larvae(g)/ Date weighed: 5/29/13 Tech: DW	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 LIV	A 61	0.9409	0.9437	0.0028	8	0.350	
	B 62	0.9441	0.9479	0.0038	8	0.475	
	C 63	0.9451	0.9492	~~0.0041~~ 0.0041 DW 5/30/13	8	0.513	
	D 64	0.9450	0.9483	0.0033	8	0.413	
	E 65	0.9478	0.9517	0.0039	8	0.488	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

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

Calculated by: DW 5/30/13 Calculations checked by: PH 5/30/13

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA

Project# X5108 Test started: Date 5/2/13 Time 1505
Client EDCC Test ended: Date 5/9/13 Time 1125
Organism P. promelas

Day/# water used	0 3499	1	2	3	4	5	6 3500	7	8
Concentration: Control Soft									
pH	7.4	7.5 / 7.6	6.9 / 7.7	7.3 / 7.6	6.9 / 7.5	7.0 / 7.5	7.1 / 7.4	7.4	
DO(mg/l)	8.2	8.1 / 8.3	6.9 / 8.2	6.8 / 8.3	7.0 / 8.2	7.0 / 8.1	6.6 / 8.1	6.9	
Cond(umhos/cm)	180.5	178.4	180.9	181.6	181.2	182.3	183.3		
Alkalinity(mg/L)	32.0						28.0		
Hardness (mg/L)	52.0						48.0		
Concentration: 32									
pH	7.8	7.3 / 7.8	7.0 / 7.6	7.2 / 7.6	7.0 / 7.6	7.0 / 7.6	7.2 / 7.6	7.2	
DO(mg/l)	8.3	8.0 / 8.4	6.7 / 8.3	6.7 / 8.3	7.0 / 8.2	6.9 / 8.2	6.6 / 8.1	6.8	
Cond(umhos/cm)	274	272	273	270	275	274	275		
Concentration: 42									
pH	7.9	7.3 / 7.9	7.0 / 7.8	7.2 / 7.7	7.0 / 7.7	7.0 / 7.7	7.2 / 7.7	7.1	
DO(mg/l)	8.3	7.7 / 8.4	6.7 / 8.4	6.8 / 8.3	7.0 / 8.2	6.9 / 8.4	6.5 / 8.1	6.5	
Cond(umhos/cm)	300	301	300	302	307	300	300		
Concentration: 56									
pH	8.0	7.3 / 8.0	7.2 / 7.8	7.2 / 7.8	7.1 / 7.7	7.1 / 7.8	7.2 / 7.8	7.2	
DO(mg/l)	8.3	7.6 / 8.4	6.8 / 8.4	6.8 / 8.3	6.8 / 8.2	6.7 / 8.5	6.6 / 8.1	6.2	
Cond(umhos/cm)	341	340	342	341	342	338	340		
Concentration: 75									
pH	8.1	7.3 / 8.0	7.2 / 7.9	7.2 / 7.8	7.1 / 7.8	7.0 / 7.9	7.2 / 7.9	7.2	
DO(mg/l)	8.3	7.7 / 8.4	6.6 / 8.4	6.7 / 8.3	6.7 / 8.2	6.7 / 8.5	6.3 / 8.2	5.8	
Cond(umhos/cm)	394	392	395	397	393	388	391		
Concentration: 100									
pH	8.1	7.4 / 8.1	7.2 / 8.0	7.2 / 7.9	7.2 / 7.9	7.1 / 7.8	7.2 / 7.9	7.1	
DO(mg/l)	8.4	7.7 / 8.4	6.8 / 8.5	6.7 / 8.4	6.6 / 8.2	6.6 / 8.5	6.3 / 8.2	5.9 / 6.5	6.2 / 6.0
Cond(umhos/cm)	464	464	468	466	466	468	461		
Tech-prerenewal		LC	AH	LC	LC	LC	AH	SW	
Tech-postrenewal	AH	SW	LC	LC	LC	LC	AH		
Alkalinity(mg/l)	64.0		60.0		60.0				
Hardness(mg/l)	48.0		56.0		48.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES CHRONIC WATER QUALITY DATA

Project# X5108 Test started: Date 5/21/13 Time 1505
Client ESCC Test ended: Date 5/28/13 Time 1126
Organism P. promelas

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ AH 5/20/13 100% WW									
pH	7.8	7.4/8.0	7.4/7.7	7.2/7.6	7.2/7.7	7.4/7.6	7.5/7.6	7.6	
DO (mg/l)	8.2	7.7/8.2	6.7/8.2	6.5/8.1	6.7/8.0	6.6/8.3	6.7/7.9	6.7	
Cond (umhos/cm)	473	469	472	470	471	471	470		
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)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal		LC	AH	LC	LC	LC	AH	SW	
Tech-postrenewal	AH	SW	LC	LC	LC	LC	AH		
Alkalinity (mg/l)									
Hardness (mg/l)									

Omit AH 5/20/13

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	5/21/2013	Test ID:	X5108CD	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	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	0.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100UV	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	0.9000	1.0000	1	9	10	10		
32	0.9000	1.0000	1	9	10	10	0.7632	0.0500
42	1.0000	1.1111	0	10	10	10	0.5000	0.0500
56	1.0000	1.1111	0	10	10	10	0.5000	0.0500
75	0.8000	0.8889	2	8	10	10	0.5000	0.0500
100	1.0000	1.1111	0	10	10	10	0.5000	0.0500
100UV	0.7000	0.7778	3	7	10	10	0.2910	0.0500

Hypothesis Test (1-tail, 0.05)

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

 Reviewed by: EBB 6/11/13

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	5/21/2013	Test ID: X5108CD	Sample ID: 1
End Date:	5/28/2013	Lab ID: ADEQ880630	Sample Type: EFF2-Industrial
Sample Date:	5/21/2013	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	33.000	18.000	19.000	11.000	22.000	28.000	20.000	20.000	28.000	
32	36.000	17.000	17.000	26.000	22.000	20.000	24.000	24.000	25.000	
42	26.000	18.000	17.000	24.000	29.000	27.000	20.000	27.000	26.000	33.000
56	23.000	24.000	17.000	27.000	23.000	21.000	28.000	17.000	17.000	27.000
75	26.000	19.000	20.000	18.000	22.000	25.000	26.000	16.000		
100	21.000	13.000	18.000	17.000	24.000	22.000	23.000	9.000	23.000	16.000
100UV	16.000	17.000	20.000	13.000	19.000	19.000	18.000			

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	22.111	1.0000	22.111	11.000	33.000	29.781	9			
32	23.444	1.0603	23.444	17.000	36.000	24.513	9	-0.574	2.468	5.737
42	24.700	1.1171	24.700	17.000	33.000	20.382	10	-1.143	2.468	5.592
56	22.400	1.0131	22.400	17.000	28.000	19.196	10	-0.128	2.468	5.592
75	21.500	0.9724	21.500	16.000	26.000	17.928	8	0.255	2.468	5.914
100	18.600	0.8412	18.600	9.000	24.000	26.485	10	1.550	2.468	5.592
100UV	17.429	0.7882	17.429	13.000	20.000	13.601	7	1.884	2.468	6.133

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.53261	0.895	0.09376	0.16602
Bartlett's Test indicates equal variances (p = 0.33)	6.93643	16.8119		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates no significant differences Treatments vs D-Control	6.13324	0.27738	57.8923	24.3165	0.04051	6, 56

Reviewed by: 6/11/13

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	5/21/2013	Test ID:	X5108CD	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	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	33.000	18.000	19.000	11.000	22.000	0.000	28.000	20.000	20.000	28.000
32	36.000	17.000	17.000	26.000	22.000	20.000	24.000	0.000	24.000	25.000
42	26.000	18.000	17.000	24.000	29.000	27.000	20.000	27.000	26.000	33.000
56	23.000	24.000	17.000	27.000	23.000	21.000	28.000	17.000	17.000	27.000
75	26.000	0.000	0.000	19.000	20.000	18.000	22.000	25.000	26.000	16.000
100	21.000	13.000	18.000	17.000	24.000	22.000	23.000	9.000	23.000	16.000
100UV	0.000	0.000	16.000	17.000	20.000	13.000	19.000	0.000	19.000	18.000

			Transform: Untransformed					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	19.900	1.0000	19.900	0.000	33.000	46.988	10		
32	21.100	1.0603	21.100	0.000	36.000	43.520	10	109.00	74.00
42	24.700	1.2412	24.700	17.000	33.000	20.382	10	118.00	74.00
56	22.400	1.1256	22.400	17.000	28.000	19.196	10	110.00	74.00
75	17.200	0.8643	17.200	0.000	26.000	56.288	10	96.50	74.00
100	18.600	0.9347	18.600	9.000	24.000	26.485	10	98.00	74.00
100UV	12.200	0.6131	12.200	0.000	20.000	70.807	10	77.00	74.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.07846	0.895	-0.9385	1.01824
Bartlett's Test indicates equal variances (p = 0.07)	11.7764	16.8119		

Hypothesis Test (1-tail, 0.05)

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

EGB 6/4/13

Reviewed by:

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	5/21/2013	Test ID:	X5108CD	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	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	33.000	18.000	19.000	11.000	22.000	0.000	28.000	20.000	20.000	28.000
32	36.000	17.000	17.000	26.000	22.000	20.000	24.000	0.000	24.000	25.000
42	26.000	18.000	17.000	24.000	29.000	27.000	20.000	27.000	26.000	33.000
56	23.000	24.000	17.000	27.000	23.000	21.000	28.000	17.000	17.000	27.000
75	26.000	0.000	0.000	19.000	20.000	18.000	22.000	25.000	26.000	16.000
100	21.000	13.000	18.000	17.000	24.000	22.000	23.000	9.000	23.000	16.000
100UV	0.000	0.000	16.000	17.000	20.000	13.000	19.000	0.000	19.000	18.000

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	19.900	1.0000	19.900	0.000	33.000	46.988	10			
32	21.100	1.0603	21.100	0.000	36.000	43.520	10	-0.351	2.347	8.016
42	24.700	1.2412	24.700	17.000	33.000	20.382	10	-1.406	2.347	8.016
56	22.400	1.1256	22.400	17.000	28.000	19.196	10	-0.732	2.347	8.016
75	17.200	0.8643	17.200	0.000	26.000	56.288	10	0.791	2.347	8.016
100	18.600	0.9347	18.600	9.000	24.000	26.485	10	0.381	2.347	8.016
100UV	12.200	0.6131	12.200	0.000	20.000	70.807	10	2.255	2.347	8.016

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.07846	0.895	-0.9385	1.01824
Bartlett's Test indicates equal variances (p = 0.07)	11.7764	16.8119		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs D-Control	8.01582	0.4028	162.562	58.3159	0.01811	6, 63

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	5/21/2013	Test ID:	X5108CD	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

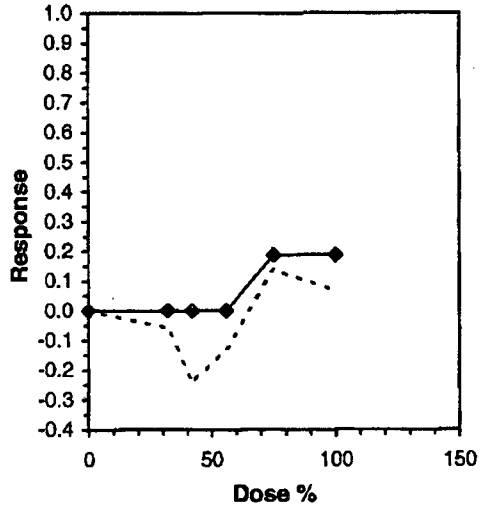
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	33.000	18.000	19.000	11.000	22.000	0.000	28.000	20.000	20.000	28.000
32	36.000	17.000	17.000	26.000	22.000	20.000	24.000	0.000	24.000	25.000
42	26.000	18.000	17.000	24.000	29.000	27.000	20.000	27.000	26.000	33.000
56	23.000	24.000	17.000	27.000	23.000	21.000	28.000	17.000	17.000	27.000
75	26.000	0.000	0.000	19.000	20.000	18.000	22.000	25.000	26.000	16.000
100	21.000	13.000	18.000	17.000	24.000	22.000	23.000	9.000	23.000	16.000
100UV	0.000	0.000	16.000	17.000	20.000	13.000	19.000	0.000	19.000	18.000

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	19.900	1.0000	19.900	0.000	33.000	46.988	10	22.025	1.0000
32	21.100	1.0603	21.100	0.000	36.000	43.520	10	22.025	1.0000
42	24.700	1.2412	24.700	17.000	33.000	20.382	10	22.025	1.0000
56	22.400	1.1256	22.400	17.000	28.000	19.196	10	22.025	1.0000
75	17.200	0.8643	17.200	0.000	26.000	56.288	10	17.900	0.8127
100	18.600	0.9347	18.600	9.000	24.000	26.485	10	17.900	0.8127
100UV	12.200	0.6131	12.200	0.000	20.000	70.807	10		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.07846	0.895	-0.9385	1.01824
Bartlett's Test indicates equal variances (p = 0.07)	11.7764	16.8119		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	61.072			
IC10	66.145			
IC15	71.217			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



EGB 6/11/13

ToxCalc v5.0.23

Reviewed by:____

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	5/21/2013	Test ID:	X5108PP	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

Comments:

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

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.9250	1.0000	1.2829	1.2094	1.3931	7.841	5			
32	0.8500	0.9189	1.1813	1.0472	1.3931	12.150	5	1.264	2.409	0.1936
42	0.8500	0.9189	1.1813	1.0472	1.3931	12.150	5	1.264	2.409	0.1936
56	0.9000	0.9730	1.2462	1.2094	1.3931	6.591	5	0.457	2.409	0.1936
75	0.9500	1.0270	1.3239	1.0472	1.3931	11.684	5	-0.510	2.409	0.1936
100	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5	-0.053	2.409	0.1936
100UV	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	-0.914	2.409	0.1936

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96202	0.934	-0.3995	-0.044
Bartlett's Test indicates equal variances (p = 0.76)	3.37754	16.8119		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences	0.13385	0.14558	0.0225	0.01615	0.25203	6, 28
Treatments vs D-Control						

ToxCalc v5.0.23

Reviewed by: EGB 6/11/13

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	5/21/2013	Test ID:	X5108PP	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	0.3625	0.4625	0.5375	0.4250	0.4250
32	0.4375	0.5250	0.3750	0.4750	0.4125
42	0.5125	0.3625	0.4500	0.4125	0.4250
56	0.5250	0.5750	0.4125	0.3500	0.5250
75	0.4750	0.6375	0.4250	0.5500	0.4750
100	0.4625	0.3500	0.3750	0.5375	0.4750
100UV	0.3500	0.4750	0.5125	0.4125	0.4875
O-SN	0.3625	0.5286	0.5375	0.4857	0.4857

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.4425	1.0000	0.4425	0.3625	0.5375	14.487	5			
32	0.4450	1.0056	0.4450	0.3750	0.5250	12.964	5	-0.055	2.443	0.1107
42	0.4325	0.9774	0.4325	0.3625	0.5125	12.697	5	0.221	2.443	0.1107
56	0.4775	1.0791	0.4775	0.3500	0.5750	19.449	5	-0.772	2.443	0.1107
75	0.5125	1.1582	0.5125	0.4250	0.6375	16.179	5	-1.545	2.443	0.1107
100	0.4400	0.9944	0.4400	0.3500	0.5375	17.443	5	0.055	2.443	0.1107
100UV	0.4475	1.0113	0.4475	0.3500	0.5125	14.701	5	-0.110	2.443	0.1107
O-SN	0.4800	1.0847	0.4800	0.3625	0.5375	14.560	5	-0.828	2.443	0.1107

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97064	0.94	-0.124	-0.8135
Bartlett's Test indicates equal variances (p = 0.98)	1.67289	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	0.11066	0.25009	0.00379	0.00513	0.64128	7, 32

Reviewed by: 6/11/13

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	5/21/2013	Test ID:	X5108PP	Sample ID:	1
End Date:	5/28/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	5/21/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

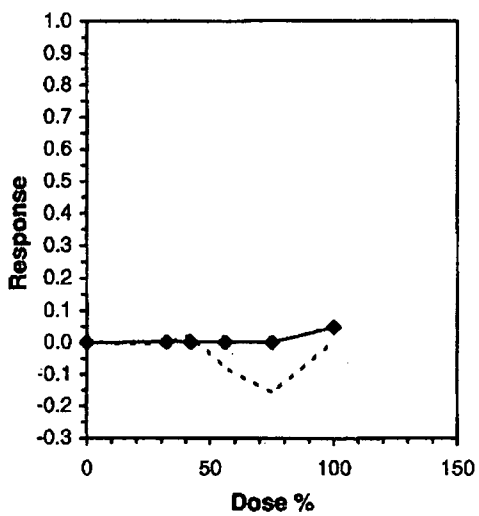
Conc-%	1	2	3	4	5
D-Control	0.3625	0.4625	0.5375	0.4250	0.4250
32	0.4375	0.5250	0.3750	0.4750	0.4125
42	0.5125	0.3625	0.4500	0.4125	0.4250
56	0.5250	0.5750	0.4125	0.3500	0.5250
75	0.4750	0.6375	0.4250	0.5500	0.4750
100	0.4625	0.3500	0.3750	0.5375	0.4750
100UV	0.3500	0.4750	0.5125	0.4125	0.4875
O-SN	0.3625	0.5286	0.5375	0.4857	0.4857

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.4425	1.0000	0.4425	0.3625	0.5375	14.487	5	0.4620	1.0000
32	0.4450	1.0056	0.4450	0.3750	0.5250	12.964	5	0.4620	1.0000
42	0.4325	0.9774	0.4325	0.3625	0.5125	12.697	5	0.4620	1.0000
56	0.4775	1.0791	0.4775	0.3500	0.5750	19.449	5	0.4620	1.0000
75	0.5125	1.1582	0.5125	0.4250	0.6375	16.179	5	0.4620	1.0000
100	0.4400	0.9944	0.4400	0.3500	0.5375	17.443	5	0.4400	0.9524
100UV	0.4475	1.0113	0.4475	0.3500	0.5125	14.701	5		
O-SN	0.4800	1.0847	0.4800	0.3625	0.5375	14.560	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97064	0.94	-0.124	-0.8135
Bartlett's Test indicates equal variances (p = 0.98)	1.67289	18.4753		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

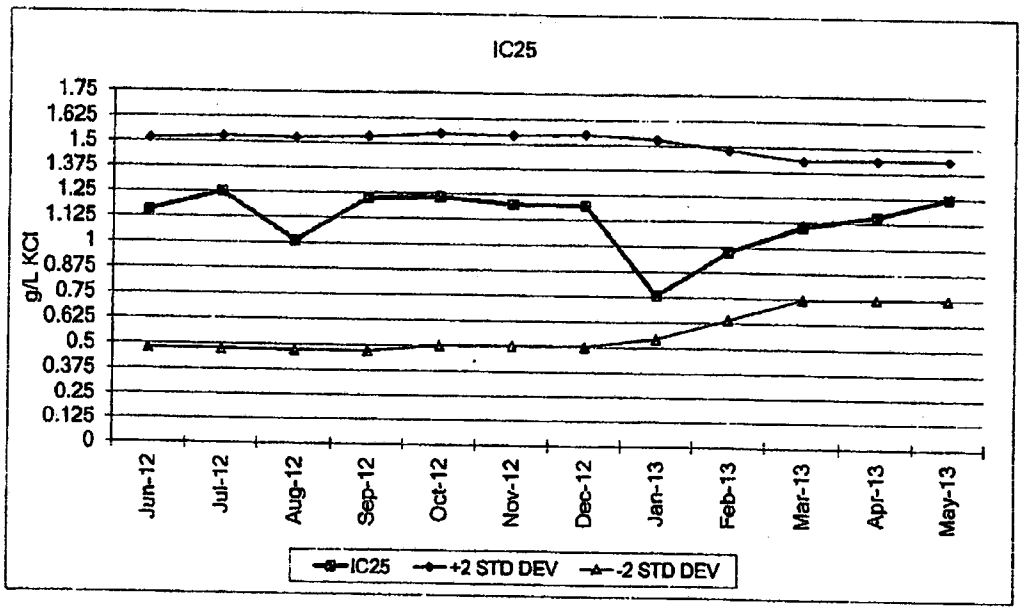
Reviewed by: EAB 6/11/13

APPENDIX D
QUALITY ASSURANCE CHARTS

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel:970/484-5091 Fax:970/484-2514

Pimephales promelas



Chronic 7 Day Survival Test Data

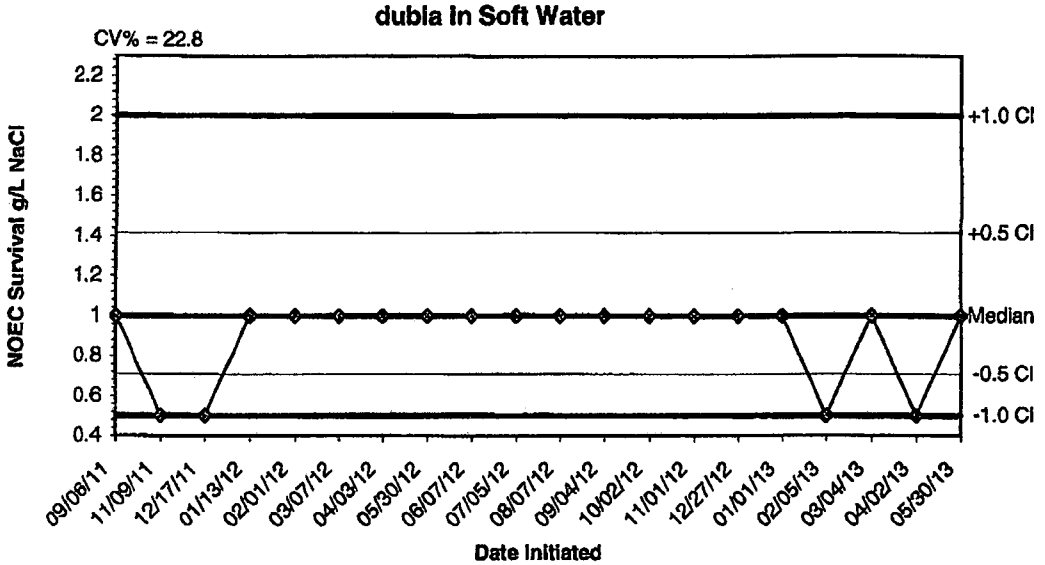
Date	NOEC (g/L KCl)	LOEC (g/L KCl)
Dec-12	0.50	1.0
Jan-13	0.50	1.0
Feb-13	0.50	1.0
Mar-13	0.50	1.0
Apr-13	0.50	1.0
May-13	0.50	1.0

IC 25 for Growth Test

Date	IC25 g/L KCl	95% Confidence (upper)	(lower)	Avg. IC25 g/L KCl	+2 STD DEV	-2 STD DEV
Dec-12	1.197	1.282	0.019	1.027	1.551	0.503
Jan-13	0.760	1.474	0.362	1.037	1.530	0.544
Feb-13	0.977	1.414	0.439	1.062	1.482	0.643
Mar-13	1.103	1.288	0.885	1.090	1.433	0.746
Apr-13	1.158	1.283	0.930	1.095	1.439	0.751
May-13	1.250	1.250	1.152	1.095	1.439	0.751

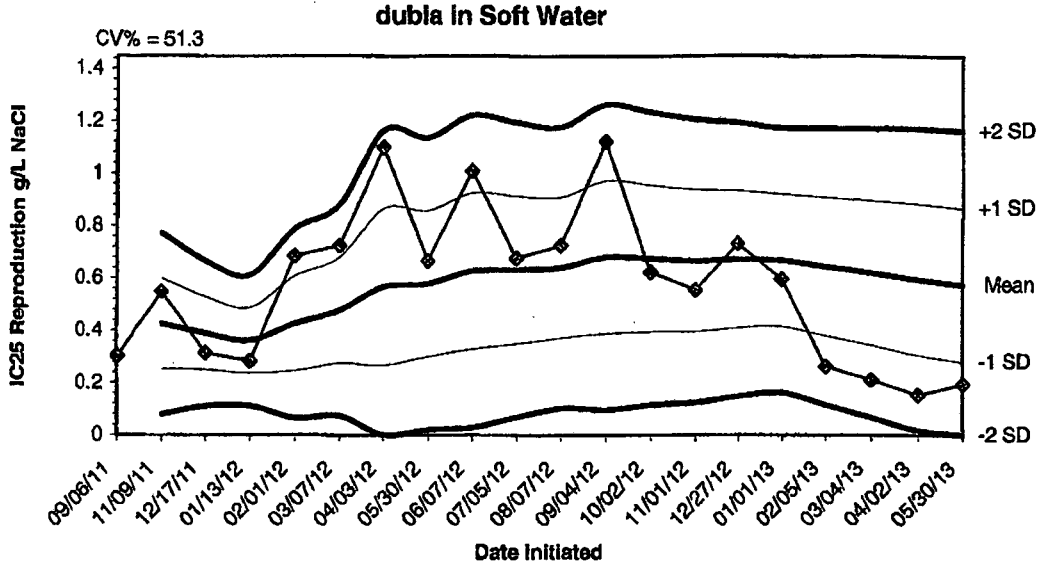
**Current Test Dates: 5/1-8/2013

2013 Chronic Reference Toxicant Test Results Using Ceriodaphnia dubia in Soft Water



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

2013 Chronic Reference Toxicant Test Results Using Ceriodaphnia dubia in Soft Water



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
09/06/11	0.3034					
11/09/11	0.5489	0.4262	0.2526	0.0790	0.5997	0.7733
12/17/11	0.3138	0.3887	0.2499	0.1110	0.5275	0.6664
01/13/12	0.2835	0.3624	0.2374	0.1125	0.4874	0.6123
02/01/12	0.6864	0.4272	0.2463	0.0655	0.6081	0.7889
03/07/12	0.7233	0.4766	0.2746	0.0727	0.6785	0.8804
04/03/12	1.1000	0.5656	0.2664	0.0000	0.8648	1.1640
05/30/12	0.6660	0.5782	0.2989	0.0197	0.8574	1.1367
06/07/12	1.0102	0.6262	0.3279	0.0296	0.9245	1.2227
07/05/12	0.6765	0.6312	0.3495	0.0678	0.9129	1.1946
08/07/12	0.7250	0.6397	0.3710	0.1023	0.9084	1.1772
09/04/12	1.1229	0.6800	0.3883	0.0966	0.9717	1.2634
10/02/12	0.6225	0.6756	0.3958	0.1161	0.9553	1.2351
11/01/12	0.5553	0.6670	0.3963	0.1256	0.9377	1.2084
12/27/12	0.7326	0.6714	0.4100	0.1486	0.9327	1.1941
01/01/13	0.5948	0.6666	0.4133	0.1601	0.9198	1.1731
02/05/13	0.2615	0.6427	0.3786	0.1144	0.9069	1.1711
03/04/13	0.2108	0.6187	0.3430	0.0672	0.8945	1.1703
04/02/13	0.1529	0.5942	0.3057	0.0172	0.8827	1.1712
05/30/13	0.1943	0.5742	0.2795	0.0000	0.8689	1.1637

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Chemical **NPDES No.: AR0000752**
Outfall 001 **AFIN: 70-00040**

	Time	Date	Time	Date
Composite 1 Collected From	**0830**	**5/19/13 To**	**0830**	**5/20/13**
Composite 2 Collected From	**0830**	**5/21/13 To**	**0830**	**5/22/13**
Composite 3 Collected From	**0830**	**5/23/13 To**	**0830**	**5/24/13**
Test initiated:	1255 **am/pm**		5/21/13	**date**
Test terminated:	1330 **am/pm**		5/28/13	**date**
Dilution water used:	**Receiving**		**Reconstituted**	

PERCENT SURVIVAL

Time of Reading	Percent Effluent						
	0	32	42	56	75	100	100 UV
24h	100	90	100	100	100	100	70
48h	90	90	100	100	100	100	70
End of test	90	90	100	100	80	100	70

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100	100 UV
A	33	36	26	23	26	21	D
B	18	17	18	24	D	13	D
C	19	17	17	17	D	18	16
D	11	26	24	27	19	17	17
E	22	22	29	23	20	24	20
F	D	20	27	21	18	22	13
G	28	24	20	28	22	23	19
H	20	D	27	17	25	9	D
I	20	24	26	17	26	23	19
J	28	25	33	27	16	16	18
Surv. Mean	22.1	23.4	24.7	22.4	21.5	18.6	17.4
Total Mean	19.9	21.1	24.7	22.4	17.2	18.6	12.2
CV%*	29.78	24.51	20.38	19.20	17.93	26.49	13.60

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

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) ½ 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%):**	**YES**	**X**	**NO**
b)½ 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 #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:	**100% effluent**
c) LOEC survival:	**N/A% effluent**
d) LOEC reproduction:	**N/A% effluent**

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: Lorken Penningtos
Analyst: Haughton, Cotty, Williams

Sample No. 1 Collected: Date: 5/20/13 Time: 0830
Sample No. 2 Collected: Date: 5/22/13 Time: 0830
Sample No. 3 Collected: Date: 5/24/13 Time: 0830
Test Begin: Date: 5/21/13 Time: 1255
Test End: Date:5/28/13 Time: 1330

Dilution: 0 Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.2	8.4	8.3	8.3	8.4	8.0	8.4	
DO Final	8.3	8.2	8.3	8.2	8.1	8.1		
pH Initial	7.5	7.5	7.5	7.7	7.8	7.9	7.7	
pH Final	7.6	7.7	7.6	7.5	7.5	7.4		
Alkalinity	32.0					28.0		
Hardness	52.0					48.0		
Conductivity	178.4	180.9	181.6	181.2	182.3	183.3		
Chlorine	<.01					<.01		

Dilution: 32 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.1	8.4	8.2	8.2	8.3	8.0	8.4	
DO Final	8.4	8.3	8.3	8.2	8.2	8.1		
pH Initial	7.5	7.4	7.3	7.6	7.6	7.8	7.8	
pH Final	7.8	7.6	7.6	7.6	7.6	7.6		
Alkalinity								
Hardness								
Conductivity	272	273	272	275	274	275		
Chlorine								

Dilution: 42 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.1	8.3	8.1	8.2	8.4	8.0	8.3	
DO Final	8.4	8.4	8.3	8.2	8.4	8.1		
pH Initial	7.7	7.5	7.4	7.6	7.6	7.8	7.8	
pH Final	7.9	7.8	7.7	7.7	7.7	7.7		
Alkalinity								
Hardness								
Conductivity	301	300	302	307	300	300		
Chlorine								

Dilution: 100 UV Day

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	7.9	8.1	7.9	8.0	8.1	8.0	8.4	
DO Final	8.2	8.2	8.1	8.0	8.3	7.9		
pH Initial	7.8	7.6	7.5	7.8	7.7	7.9	8.0	
pH Final	8.0	7.7	7.6	7.7	7.6	7.6		
Alkalinity								
Hardness								
Conductivity	469	472	470	471	471	470		
Chlorine								

Dilution: 56 Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.1	8.3	8.1	8.1	8.3	8.0	8.4	
DO Final	8.4	8.4	8.3	8.2	8.5	8.1		
pH Initial	7.8	7.6	7.4	7.7	7.7	7.8	7.9	
pH Final	8.0	7.8	7.8	7.7	7.8	7.8		
Alkalinity								
Hardness								
Conductivity	340	342	341	342	338	340		
Chlorine								

Dilution: 75 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.1	8.2	8.0	8.1	8.3	7.9	8.4	
DO Final	8.4	8.4	8.3	8.2	8.5	8.2		
pH Initial	7.8	7.5	7.4	7.7	7.7	7.9	7.9	
pH Final	8.0	7.9	7.8	7.8	7.9	7.9		
Alkalinity								
Hardness								
Conductivity	392	395	397	393	388	391		
Chlorine								

Dilution: 100 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.6	24.7	24.7	25.0	25.0	
DO Initial	8.0	8.2	8.0	8.0	8.3	8.0	8.4	
DO Final	8.4	8.5	8.4	8.2	8.5	8.2		
pH Initial	7.9	7.5	7.5	7.8	7.7	7.9	8.0	
pH Final	8.1	8.0	7.9	7.9	7.8	7.9		
Alkalinity	64.0	60.0		60.0				
Hardness	48.0	56.0		48.0				
Conductivity	464	468	466	466	468	461		
Chlorine	<.01	<.01		<.01				

SUMMARY REPORTING FORMS CHRONIC BIOMONITORING FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL

(Pimephales promelas)

Permittee: El Dorado Chemical **NPDES No.: AR0000752**
Outfall 001 **AFIN: 70-00040**

	Time	Date	Time	Date
Composite 1 Collected from:	**0830**	**5/19/13 To**	**0830**	**5/20/13**
Composite 2 Collected from:	**0830**	**5/21/13 To**	**0830**	**5/22/13**
Composite 3 Collected from:	**0830**	**5/23/13 To**	**0830**	**5/24/13**

Test initiated:	1505	**am/pm**	5/21/13	**date**
Test terminated:	1125	**am/pm**	5/28/13	**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	87.5	100	87.5	87.5	100	100	92.5	7.84
32	75.0	100	75.0	87.5	87.5	100	100	85.0	12.15
42	100	75.0	87.5	87.5	75.0	100	97.5	85.0	12.15
56	100	87.5	87.5	87.5	87.5	97.5	95.0	90.0	6.59
75	100	100	75.0	100	100	100	97.5	95.0	11.68
100	100	75.0	100	100	87.5	97.5	97.5	92.5	12.12
100 UV	87.5	100	100	100	100	100	100	97.5	6.06

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	0.363	0.463	0.538	0.425	0.425	0.443	14.49
32	0.438	0.525	0.375	0.475	0.413	0.445	12.96
42	0.513	0.363	0.450	0.413	0.425	0.433	12.70
56	0.525	0.575	0.413	0.350	0.525	0.478	19.45
75	0.475	0.638	0.425	0.550	0.475	0.513	16.18
100	0.463	0.350	0.375	0.500	0.475	0.440	17.44
100 UV	0.350	0.475	0.513	0.413	0.488	0.448	14.70
0-SN	0.363	0.529	0.538	0.486	0.486	0.480	14.56

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

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) ½ 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) ½ 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

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton, Cotty, Williams

Sample No. 1 Collected: Date: 5/20/13 Time: 0830
Sample No. 2 Collected: Date: 5/22/13 Time: 0830
Sample No. 3 Collected: Date: 5/24/13 Time: 0830
Test Begin: Date: 5/21/13 Time: 1505
Test End: Date: 5/28/13 Time: 1125

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	8.1	6.9	6.8	7.0	7.0	6.6	6.9	
DO Final	8.3	8.2	8.3	8.2	8.1	8.1		
pH Initial	7.5	6.9	7.3	6.9	7.0	7.1	7.4	
pH Final	7.6	7.7	7.6	7.5	7.5	7.4		
Alkalinity	64.0	60.0		60.0				
Hardness	48.0	56.0		48.0				
Conductivity	178.4	180.9	181.6	181.2	182.3	183.3		
Chlorine	<.01	<.01		<.01				

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	7.6	6.8	6.8	6.8	6.7	6.6	6.2	
DO Final	8.4	8.4	8.3	8.2	8.5	8.1		
pH Initial	7.3	7.2	7.2	7.1	7.1	7.2	7.2	
pH Final	8.0	7.8	7.8	7.7	7.8	7.8		
Alkalinity								
Hardness								
Conductivity	340	342	341	342	338	340		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	8.0	6.7	6.7	7.0	7.9	6.6	6.8	
DO Final	8.4	8.3	8.3	8.2	8.2	8.1		
pH Initial	7.3	7.0	7.2	7.0	7.0	7.2	7.2	
pH Final	7.8	7.6	7.6	7.6	7.6	7.6		
Alkalinity								
Hardness								
Conductivity	272	273	272	275	274	275		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	7.7	6.6	6.7	6.7	6.7	6.3	5.8	
DO Final	8.4	8.4	8.3	8.2	8.5	8.2		
pH Initial	7.3	7.2	7.2	7.1	7.0	7.2	7.2	
pH Final	8.0	7.9	7.8	7.8	7.9	7.9		
Alkalinity								
Hardness								
Conductivity	392	395	397	393	388	391		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	7.7	6.7	6.8	7.0	6.9	6.5	6.5	
DO Final	8.4	8.4	8.3	8.2	8.4	8.1		
pH Initial	7.3	7.6	7.2	7.0	7.0	7.2	7.1	
pH Final	7.9	7.8	7.7	7.7	7.7	7.7		
Alkalinity								
Hardness								
Conductivity	301	300	302	307	300	300		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	7.7	6.7	6.7	6.6	6.6	6.3	5.9	
DO Final	8.4	8.5	8.4	8.2	8.5	8.2		
pH Initial	7.4	7.2	7.2	7.2	7.1	7.2	7.1	
pH Final	8.1	8.0	7.9	7.9	7.8	7.9		
Alkalinity	64.0	60.0		60.0				
Hardness	48.0	56.0		48.0				
Conductivity	464	468	466	466	468	461		
Chlorine	<.01	<.01		<.01				

Dilution: 100 UV

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	25.2	24.9	25.5	25.3	25.2	
DO Initial	7.7	6.7	6.7	6.6	6.6	6.3	5.9	
DO Final	8.2	8.2	8.1	8.0	8.3	7.9		
pH Initial	7.4	7.4	7.2	7.2	7.1	7.5	7.6	
pH Final	8.0	7.7	7.6	7.7	7.6	7.6		
Alkalinity								
Hardness								
Conductivity	469	472	470	471	471	470		
Chlorine								

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#: X5108

Chain of Custody Documents Checked by: AH 5/31/13
Technician/Date

Raw Data Documents Checked by: AH 5/31/13
Technician/Date

Statistical Analysis Package Checked by: EGB 6/11/13
Quality Manager/Date

Quality Control Data Checked by: EGB 6/11/13
Quality Manager/Date

Report Checked by: EGB 6/17/13
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.

Eric L. Beggs, BS
Quality Manager

6/17/13
Date

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

El Dorado, AR 71730

J13111302120326

Ship Date: 24JUN13
ActWgt: 3.0 LB
CAD: 5887030/INET3370

Delivery Address Bar Code

Ref #
Invoice #
PO #
Dept #

SHIP TO: (870) 863-1484 BILL SENDER

ADEQ - Water Division Enforcement
ADEQ - Water Division Enforcement
5301 NORTHSHORE DR

NORTH LITTLE ROCK, AR 72118

TUE - 25 JUN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7960 7700 7230**

X2 LITA

72118
AR-US
LIT

518G1/D777/83AB

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