

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

EL DORADO

CHEMICAL COMPANY

December 19, 2012

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 November 30, 2012.

Enclosed you will find the Discharge Monitoring Report ending November 30, 2012.
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: Nov-12

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
Outfall 001 / pH Maximum (9.10 su)	pH Maximum - 9.0 su	11/17, 11/26, 11/28, 11/29/11/30	Warm temperatures, temperature excursions due to ambient temperature	Daily maximum temperature readings calculated from hourly measurements are utilized as a representative daily maximum temperature for DMR preparation.
Outfall 001 / TDS Monthly Average (300.0 mg/L)	237.0 mg/L - Monthly Average	11/5/2012	Unknown	
Outfall 006 / Zinc Monthly Average (711.0 ug/L)	115.62 ug/L Monthly Average	11/4/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 006 / Zinc Daily Max (711.0 ug/L)	231.99 ug/L Daily Max	11/4/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 006 / Lead Monthly Average (9.7 ug/L)	3.8 ug/L Monthly Average	11/4/2012	Unknown	EDCC will continue to monitor and evaluate potential sources of the Lead exceedance.
Outfall 006 / Lead Daily Max (9.7 ug/L)	7.62 Daily Max	11/4/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Lead exceedance.
Outfall 006 / TDS Monthly Average (2500 mg/L)	291 mg/L Monthly Average	11/4/2012	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 (2500 mg/L)	436.5 mg/L Daily Max	11/4/2012	Unknown	EDCC has land applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 007 / Zinc Monthly Average (661.0 ug/L)	115.62 ug/L Monthly Average	11/4/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 007 / Zinc Daily Max (661.0 ug/L)	231.99 ug/L Daily Max	11/4/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 007 / Lead Monthly Average (7.35 ug/L)	3.8 ug/L Monthly Average	11/4/2012	Unknown	EDCC will continue to monitor and evaluate potential sources of the Lead exceedance.
Outfall 007 / TDS Monthly Average (2100 mg/L)	291 mg/L Monthly Average	11/4/2012	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 (2100 mg/L)	436.5 mg/L Daily Max	11/4/2012	Unknown	EDCC has land applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
<p>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.)</p>				<p style="text-align: center;"><i>Gregory A. Brown</i> 12/20/12</p> <p>Signature / Date</p>

Bio-Analytical Laboratories (BAL)
ADEQ Certificate #88-0630
Project X4930

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4930

Outfall: 001

Permit #: AR0000752/ AFIN #70-00040

Contact: Larken Pennington

Test Dates: November 13 - 20, 2012

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

Results:

For *Ceriodaphnia dubia*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0.
2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 1.
3. Report the NOEC value for survival, Parameter TOP3B - 100%. (based on 100%UV)
4. Report the NOEC value for reproduction, Parameter TPP3B - 0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 23.07%.

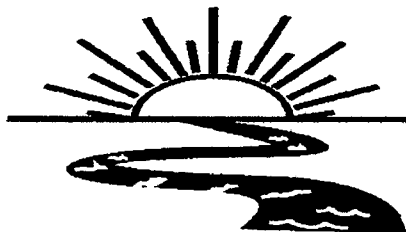
Note: Treating with UV light reduced the lethal effect but not the non-lethal effect.

For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP6C - 1.
2. If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP6C - 1.
3. Report the NOEC value for survival, Parameter TOP6C - 75%
4. Report the NOEC value for growth, Parameter TPP6C - 0%
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 6.06%

Note: Not enough available test organisms to set up UV-treated 100% for this test.

This report contains a total of 46 pages, including this page. The results in the report pertain only to the samples documented in the enclosed chain of custody documents, and meet the standards set forth by TNI and ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

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

AT

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

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

EPA Methods 1000.0 and 1002.0

Project X4930

Test Dates: November 13 - 20, 2012

Report Date: December 10, 2012

Prepared for:
Larken Pennington
El Dorado Chemical Company
4500 Northwest Avenue
El Dorado, AR 71731

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

BAL
ADEQ #88-0630
Project X4930

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BAL
ADEQ #88-0630
Project X4930

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnow test organisms were obtained from Aquatic Biosystems, Fort Collins, Colorado, 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.

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ADEQ #88-0630
Project X4930

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 November 12, 14 and 16, 2012. Upon collection and completion of each composite, the samples were chilled to 4° 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 $25 \pm 1^{\circ}$ 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 *Ceriodaphnia dubia* test to determine if any toxicity was due to a potential pathogen. Not enough test organisms were available to conduct a 100 percent UV concentration in the fathead minnow test. 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 $25 \pm 1^{\circ}$ Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of $25 \pm 1^{\circ}$ 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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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 Dunnett's Test, a parametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Dunnett's Test, while the growth data was analyzed using Steel's Many-One Rank Test, a non-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, 100 percent survival occurred in the control, 30 percent survival occurred in the 100 percent critical dilution and 70 percent survival occurred in the 100 percent dilution treated with UV light. The average number of neonates per female after three broods in the control was 23.8, while the average number of neonates in the UV treated critical dilution was 9.1. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively ($p=.05$). Treating with UV light reduced the lethal effect but not the non-lethal effect.

The fathead minnow test results can be found in Table 2. Ninety-seven-point-five percent survival occurred in the control and 65 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.713 milligram (mg). An erratic dose response occurred in the survival data. After further investigation, it was determined that the NOEC for survival and growth in this test was 75 and zero percent effluent, respectively ($p=.05$). A UV-treated 100 percent dilution was not run with this test due to lack of available test organisms. Though the obvious sign of pathogen interference was not noted in the test dilutions (i.e. fungal-type hyphae present in the minnow's gills upon death, which causes suffocation), random mortality was noted from Days 4 through 7. This can also be an indication of pathogen interference.

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ADEQ #88-0630
Project X4930

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		23.8	23.8	
32.0	100.0		12.4	12.4	*
42.0	80.0		11.1	9.1	*
56.0	80.0		8.3	7.4	*
75.0	80.0		8.1	6.7	*
100.0	30.0	*	-----	-----	*
100.0 UV	70.0		12.0	9.1	*

*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	97.5		0.713/0.733+	
32.0	80.0		0.515	*
42.0	65.0	*	0.448	*
56.0	75.0		0.573	*
75.0	85.0		0.548	*
100.0	65.0	*	-----	

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

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

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ADEQ #88-0630
Project X4930

4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on November 12, 14 and 16, 2012, were found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven days of exposure; however, treating the sample with UV light reduced the lethal effect in this test ($p=.05$). Nonlethal effects (i.e., lack reproduction) were noted in the *Ceriodaphnia dubia* test ($p=.05$). Treating the sample with UV light did not reduce the nonlethal effect in the cladoceran test ($p=.05$). The samples were found to be lethally toxic to the fathead minnow test organisms in the 100 percent dilution after seven days of exposure ($p=.05$). UV light was not used in the fathead minnow test due to lack of available test organisms.

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Project X4930

5.0 References

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

EPA, 2000. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. EPA-833-R-00-003, Office of Wastewater Management.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

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

CHAIN OF CUSTODY

NELAP 01973, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:						Project Number: X4930														
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		Fax: (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Temp. upon arrival: Thermometer #: 29												
Permit #: AR0000752		Purchase Order:										Temperature upon arrival		Tech: PH										
Sampler's Signature/Printed Name/Affiliation: <i>Larken Pennington / Larken Pennington / EDCC</i>												Date: 11/12/12		Preservative: (below)										
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:									
11/11/12 - 11/12/12	8:30 - 8:30	X		8	001											X	X							06443
Relinquished by/Affiliation: <i>Larken Pennington / EDCC</i>				Date: 11/12/12	Time: 0940	Received by/Affiliation: <i>L B J</i>				Date: 11/12/12	Time: 0940													
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:													
Relinquished by/Affiliation: <i>L B J</i>				Date: 11/12/12	Time: 1200	Received by/Affiliation: <i>Quinn Haugster</i>				Date: 11/12/12	Time: 1200													
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____																								
Comments:																								

Bio-Analytical Laboratories
 3240 Spurgin Road
 Doyline, LA 71023
 (318) 745-2772, Fax (318) 745-2773

CHAIN OF CUSTODY

bioanalytical@att.net

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:							Project Number: X4930		
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		Fax:		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Temp. upon arrival:	
Permit #: AR0000752		Purchase Order:										Thermometer #: 29	
Sampler's Signature/Printed Name/Affiliation: <i>Larken Pennington</i> / Larken Pennington / EDCC												Tech: AM	
Date Start Date End		Time Start Time End		C	G	# containers	Sample Identification		Lab Control Number:	Date: 11/14/12		Preservative: (below)	
11-7-12- 1-4-12		8:30- 8:30		X		8	001			C10450	ice		
Relinquished by/Affiliation: <i>Larken Pennington</i> / EDCC				Date: 11/14/12	Time: 0945	Received by/Affiliation: <i>[Signature]</i>				Date: 11/14/12	Time: 0945		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:		
Relinquished by/Affiliation: <i>[Signature]</i>				Date: 11/14/12	Time: 1230	Received by/Affiliation: <i>Gene Haughton</i>				Date: 11/14/12	Time: 1230		
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking #													
Comments:													

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

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:						Project Number: X4930 Temp. upon arrival: Temperature upon arrival Thermometer #: 29 Tech: AH Date: 11/16/12 Lab Control Number: C0483 Preservative: (below) ice			
Address: 4500 Northwest Avenue, El Dorado, AR 71731		Fax: (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia		Fecal Coliform	Total Coliform	
Permit #: AR0000752		Purchase Order:											
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC													
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification								
11-15-12- 14-12	8:30- 8:30	X		8	001	X	X						
Relinquished by/Affiliation: Larken Pennington / EDCC					Date: 11/16/12	Time: 0920	Received by/Affiliation: L. B. S.					Date: 11/16/12	Time: 0920
Relinquished by/Affiliation:					Date:	Time:	Received by/Affiliation:					Date:	Time:
Relinquished by/Affiliation: L. B. S.					Date: 11/16/12	Time: 1200	Received by/Affiliation: Dennis Haughton					Date: 11/16/12	Time: 1200
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____													
Comments:													

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4930 Date start: 11/13/12 Date end: 11/20/12

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

Adults isolated: Date 11/12/12 Time: 2330

Neonates collected: Date 11/13/12 Time: 0640 Board: V025

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

Effluent	Aerate?/Minutes	Receiving Water	Aerate?/Minutes
Initial D.O.	/Final D.O.	Initial D.O.	/Final D.O.
(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech	(mg/L & %)/Tech

0. <u>11.3/134.3%/RC</u>	0. <u>Y/20/8.5/97.9%/RC</u>	<u>NA</u>	0. <u>NA</u>
1. <u>12.1/145.1%/AH</u>	1. <u>Y/20/8.3/97.5%/AH</u>		1. _____
2. <u>11.7/145.4%/AH</u>	2. <u>Y/20/8.2/98.3%/AH</u>		2. _____
3. <u>12.1/142.4%/AH</u>	3. <u>Y/20/8.5/98.5%/AH</u>		3. _____
4. <u>12.0/162.0%/AH</u>	4. <u>Y/20/8.1/97.4%/AH</u>		4. _____
5. <u>12.2/153.6%/AH</u>	5. <u>Y/20/8.4/98.2%/AH</u>		5. _____
6. <u>12.2/145.0%/RC</u>	6. <u>Y/20/8.4/97.6%/RC</u>		6. _____
7. _____	7. _____	<u>↓</u>	7. <u>↓</u>

Total Residual Chlorine (mg/L)/Tech

Dechlorinated? Amount?/Tech

Ammonia (NH3) (mg/L)/Tech

BAL Sample # Date in Use

1. <0.01/RC
 2. 40.01/AH
 3. <0.01/RC

1. No/RC
 2. No/AH
 3. No/RC

1. 1.0/RC
 2. 0.5/AH
 3. 0.5/RC

1. C6443 11/13/12
 2. C6456 11/15/12
 3. C6483 11/17/12

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4930 Test Dates 11/13/12 - 11/20/12

Client E I Dorado chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100uv
A	18	10	14	12	11	X	15
B	20	14	X ²	4	3	X	X ⁵
C	22	14	2	8	10	X	11
D	22	11	8	8	11	9	X
E	25	14	9	10	6	X ³	12
F	26	6	7	8	8	12	8
G	26	12	15	X	X ²	X	16
H	26	15	23	7	X	X	12
I	26	15	X	X ⁸	8	X	X ²
J	27	13	11	9	8	10	10
Surviving Mean	23.8	12.4	11.1	8.3	8.1	10.3	12.0
Total Mean	23.8	12.4	9.1	7.4	6.7	3.4	9.1
CV%*	12.96	22.56	56.74	28.26	33.18	14.78	23.07

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

Key: M=male; X=dead adult

Calculated by: [Signature] 11/20/12

Calculations checked by: [Signature] 11/20/12

BIO-ANALYTICAL LABORATORIES
 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4930
 Client EDCC

Test started: Date 11/16 Time 1510
 Test ended: Date 11/17 Time 1450

Technician: Day0 slony 1 rc 2 mt 3 slony 4 slony 5 slony 6 mt 7 rc 8 _____
 Time: Day0 1510 1 1300 2 1315 3 1100 4 1105 5 1125 6 1050 7 1450 8 _____
 Temperature: Day0 24.1 1 24.1 2 24.1 3 24.3 4 24.3 5 24.4 6 24 7 24.3 8 _____

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1	0										10	
	2	0										10	
	3	0										10	
	4	1	1	2	2	3	2	2	3	2		10	
	5	6	6	7	9	8	7	0				10	
	6	6						10	12	13	13	10	
	7	11	13	14	11	13	16	14	12	10	12	10	
	8												
32	1	0										10	
	2	0										10	
	3	0										10	
	4	2	3	1	2	3	2	1	2	3	3	10	
	5	4	7	6	5	7	4	0				10	
	6	0	1	4	1	0		11	12	8	10	10	
	7	4	3	3	3	4	0	0	1	4	0	10	
	8												
42	1	0										10	
	2	0										10	
	3	0										10	
	4	2	X	2	1	2	2	3	3	X	2	10	
	5	3		0	3	4	5	4	0			10	
	6	3		0	2	3	0	8	10		0	10	
	7	3		0	2	3	0	0	10		0	10	
	8												
56	1	0						X	0			9	
	2	0							0			9	
	3	0							0			9	
	4	3	2	3	1	2	2		3	3	2	9	
	5	0				3	0		9			9	
	6	0	0	5	7	3	6		4	5	7	9	
	7	4	2	0	0	2	0		0	X	0	9	
	8												
75	1	0										10	
	2	0										10	
	3	0										10	
	4	2	2	3	3	1	3	2	X	2	2	9	
	5	6	0	3	4	3	3	X		0	1	9	
	6	0		2	3	2	0			0	6	9	
	7	3	1	0	1	0	2			0	0	9	
	8												
100	1	X	X	X				X	X			9	
	2			X								9	
	3			X								9	
	4			X	0	2	2			X	2	4	
	5			X	6	0	2				2	4	
	6			X	1	1	10				2	4	
	7			X	2	X	0					3	
	8			X									

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

File: Cerio2

BIO-ANALYTICAL LABORATORIES
 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4930
 Client EDCC

Test started: Date 11/12/12 Time 1510
 Test ended: Date 11/27/12 Time 1450

Technician: Day0 dmj 1 rc 2 ah 3 dmj 4 dmj 5 dmj 6 ah 7 rc 8
 Time: Day0 1510 1 1300 2 1315 3 1100 4 1105 5 1125 6 1050 7 1450 8
 Temperature: Day0 24.1 1 24.1 2 24.1 3 24.3 4 24.3 5 24.4 6 24 7 24.3 8

% Conc.	Day	K A	B	^{Re} C	D	E	^x F	^x G	H	I	J	#Live Adults	Total Live Neonates
100 UV tr:td	1	0			X	0						9	
	2	0				0						9	
	3	0				0						9	
	4	3	2	3		2	2	3	3	2	3	9	
	5	5	2	0		0	1	4	0			8	
	6	0	1	0		0	3	7	9	X	7	7	
	7	7		0		2	3	2	0		0	7	
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												

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

File: Cerio2

Project# X4930
 Client EDCC

Test started: Date 11/20/12 Time 15:10
 Test ended: Date 11/20/12 Time 14:50

Organism C. dubia

Day/# water used	1	2	3	4	5	6	7	8
Concentration: Control soft								
pH	7.8	7.8	7.8	7.9	7.9	7.8	7.7	7.8
DO (mg/l)	8.2	8.3	8.3	8.4	8.2	8.6	8.3	8.4
Cond (umhos/cm)	181.4	175.3	178.9	179.2	179.7	178.4	184.9	
Alkalinity (mg/L)	32.0						32.0	
Hardness (mg/L)	52.0						52.0	
Concentration: 32%								
pH	8.1	7.8	7.8	7.9	7.8	7.7	7.8	7.9
DO (mg/l)	8.2	8.3	8.3	8.4	8.1	8.5	8.3	8.5
Cond (umhos/cm)	277	275	272	276	278	273	275	
Concentration: 42%								
pH	8.0	7.9	7.9	7.9	7.9	7.8	7.8	8.0
DO (mg/l)	8.3	8.3	8.3	8.4	8.1	8.4	8.3	8.4
Cond (umhos/cm)	301	297	298	301	304	300	304	
Concentration: 56%								
pH	8.0	7.9	7.9	7.9	7.9	7.8	7.9	8.0
DO (mg/l)	8.3	8.3	8.2	8.4	8.1	8.4	8.3	8.4
Cond (umhos/cm)	338	336	340	339	348	341	344	
Concentration: 75%								
pH	8.1	8.0	7.9	8.0	7.9	8.0	7.9	7.9
DO (mg/l)	8.4	8.3	8.2	8.4	8.0	8.3	8.3	8.4
Cond (umhos/cm)	392	388	394	393	397	396	395	
Concentration: 100%								
pH	8.2	8.1	8.0	8.0	8.0	8.0	7.9	7.9
DO (mg/l)	8.5	8.2	8.2	8.3	8.2	8.4	8.3	8.3
Cond (umhos/cm)	462	468	465	474	472	473	466	
Tech-prerenewal	RC	RC	AH	AH	AH	AH	AH	RC
Tech-postrenewal		AH	AH	AH	AH	AH	AH	
Hardness (mg/l)	48.0		48.0		40.0			
Alkalinity (mg/l)	44.0		48.0		40.0			

Key: prerenewal/postrenewal

Project# 14930

Test started: Date 11/13/10 Time 1510

X4930

Client EDCC

Test ended: Date 11/14/10 Time 1450

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Organism C. dubia

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ^{300 mg/l} General 100 w/w/d									
pH	7.8	7.9	7.7	7.9	7.6	7.7	7.8	7.6	7.7
DO (mg/l)	8.2	8.5	8.3	8.3	8.0	7.8	8.2	8.1	8.1
Cond (umhos/cm)	470	462	454	473	459	451	454		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	RC	AH	slightly	slightly	slightly	AH	RC	
Tech-postrenewal		slightly	AH	AH	slightly	slightly	AH		
Hardness (mg/l)									
Alkalinity (mg/l)									

DO NOT
 USE
 THIS
 DATA

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4930 Date started: 11/13/12 Date ended 11/20/12

Client/Contact EDCC/El Dorado Chemical
Address 4500 Northwest Avenue El Dorado AR 71731
NPDES# AR0000752 AFIN70-00040
Sample Description 001 Dilution Water Soft Reconstituted
Test Temperature (°C) 25+1° Celsius Technicians EGB/AH/LGZ/RC
Test organism age 48h Vendor/ID# ABS/720

Feeding Times

Day	Technician/Time/Amount (per replicate)		
	AM	NOON	PM
0			<u>AH/1110/0.20ml</u>
1	<u>RC/1025/0.10ml</u>	<u>RC/1160/0.10ml</u>	<u>RC/1120/0.20ml</u>
2	<u>RC/1035/0.10ml</u>	<u>RC/1035/0.10ml</u>	<u>RC/1155/0.10ml</u>
3	<u>AH/0845/0.10ml</u>	<u>AH/1130/0.10ml</u>	<u>RC/1430/0.10ml</u>
4	<u>RC/1090/0.10ml</u>		<u>RC/1330/0.20ml</u>
5	<u>RC/1096/0.10ml</u>	<u>RC/1135/0.10ml</u>	<u>RC/1340/0.10ml</u>
6	<u>RC/1025/0.10ml</u>	<u>RC/1050/0.10ml</u>	<u>AH/1325/0.10ml</u>

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. <u>11.3/134.3%/RC</u>	0. <u>Y/20/8.5/97.9%/RC</u>	0. <u>NA</u>	0. <u>NA</u>
1. <u>12.1/145.1%/AH</u>	1. <u>Y/20/8.3/97.5%/AH</u>	↓	1. _____
2. <u>11.7/145.4%/AH</u>	2. <u>Y/20/8.2/98.3%/AH</u>		2. _____
3. <u>12.1/142.4%/AH</u>	3. <u>Y/20/8.5/98.5%/AH</u>		3. _____
4. <u>12.0/152.0%/RC</u>	4. <u>Y/20/8.1/97.4%/RC</u>		4. _____
5. <u>12.7/153.6%/AH</u>	5. <u>Y/20/8.4/98.0%/AH</u>		5. _____
6. <u>12.2/145.0%/AH</u>	6. <u>Y/20/8.4/97.6%/AH</u>		6. _____

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <u><0.01/RC</u>	1. <u>No/RC</u>	1. <u>1.0/RC</u>	1. <u>C6443 11/13/12</u>
2. <u>0.01/AH</u>	2. <u>No/AH</u>	2. <u>0.5/AH</u>	2. <u>C6456 11/15/12</u>
3. <u><0.01/RC</u>	3. <u>No/RC</u>	3. <u>0.5/RC</u>	3. <u>C6483 11/17/12</u>

Comments:
11/13/12 - 100% uv'it'd not set up due to fish shortage. AH

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4930

Test started: Date 11/21/74 Time 1420

Client EDCC

Test ended: Date 11/27/74 Time 1415

Technician: Day0 AH 1 RC 2 RC 3 AH 4 RC 5 RC 6 RC 7 RC
 Time: Day0 1420 1 1455 2 1515 3 1535 4 1030 5 1130 6 1000 7 1415
 Temperature Day0 25 1 25.2 2 25.4 3 25.7 4 25.2 5 25.4 6 25.2 7 25.3

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

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4930/Eldorado Chem Test Dates 11/13/12 - 11/20/12
Oven Temperature (° Celsius) 100°C

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: Tech:	Wt. of pan + larvae(g)/ Date weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 31	1.3159 11/16/12 Jomy	1.3217 11/16/12 Jomy	0.0058	8	0.725	
	B 32	1.3160	1.3214	0.0054	8	0.675	
	C 33	1.3187	1.3246	0.0059	8	0.738	
	D 34	1.3197	1.3255	0.0058	8	0.725	
	E 35	1.3114	1.3170	0.0056	8	0.700	0.800
32	A 36	1.3046	1.3090	0.0044	8	0.550	
	B 37	1.3071	1.3112	0.0041	8	0.513	
	C 38	1.2925	1.2976	0.0051	8	0.638	
	D 39	1.3120	1.3157	0.0037	8	0.463	
	E 40	1.3146	1.3179	0.0033	8	0.413	
42	A 41	1.3154	1.3203	0.0049	8	0.613	
	B 42	1.3083	1.3098	0.0015	8	0.188	
	C 43	1.3083	1.3121	0.0038	8	0.475	
	D 44	1.3091	1.3145	0.0054	8	0.675	
	E 45	1.2975	1.2998	0.0023	8	0.288	
56	A 46	1.3093	1.3122	0.0029	8	0.363	
	B 47	1.3106	1.3163	0.0057	8	0.713	
	C 48	1.3178	1.3236	0.0058	8	0.725	
	D 49	1.3071	1.3109	0.0038	8	0.475	
	E 50	1.3051	1.3098	0.0047	8	0.588	
75	A 51	1.3021	1.3072	0.0051	8	0.638	
	B 52	1.3018	1.3063	0.0045	8	0.563	
	C 53	1.3069	1.3108	0.0039	8	0.488	
	D 54	1.3079	1.3126	0.0047	8	0.588	
	E 55	1.3105	1.3142	0.0037	8	0.463	
100	A 56	1.3159	1.3185	0.0026	8	0.325	
	B 57	1.2975	1.3016	0.0041	8	0.513	
	C 58	1.3038	1.3103	0.0065	8	0.813	
	D 59	1.2927	1.2963	0.0036	8	0.450	
	E 60	1.3113	1.3147	0.0034	8	0.425	

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

Calculated by: Jomy 11/21/12 Calculations checked by: AM 11/21/12

Project# X4930
 Client EDCC
 Organism P. promelas

Test started: Date 11/21/21 Time 1420
 Test ended: Date 11/22/21 Time 1415

Day/# water used	8405	1	2	3	4	5	8419	7	8
Concentration: Control 50%									
pH	7.8	7.6 / 7.8	7.4 / 7.8	7.5 / 7.9	7.4 / 7.8	7.4 / 7.7	7.4 / 7.7	7.5	
DO (mg/l)	8.2	1.6 / 8.3	7.1 / 8.3	7.4 / 8.4	1.2 / 8.2	7.2 / 8.6	6.2 / 8.3	7.0	
Cond (umhos/cm)	181.4	175.3	178.9	179.2	179.7	178.4	184.9		
Alkalinity (mg/L)	32.0						32.0		
Hardness (mg/L)	52.0						52.0		
Concentration: 33%									
pH	8.1	7.3 / 7.8	7.4 / 7.8	7.5 / 7.9	7.3 / 7.8	7.3 / 7.7	7.3 / 7.8	7.4	
DO (mg/l)	8.2	1.6 / 8.3	7.0 / 8.3	7.3 / 8.4	6.6 / 8.1	6.9 / 8.5	5.8 / 8.3	7.0	
Cond (umhos/cm)	277	275	272	276	278	273	275		
Concentration: 42%									
pH	8.0	7.4 / 7.9	7.3 / 7.9	7.5 / 7.9	7.4 / 7.9	7.4 / 7.8	7.3 / 7.8	7.5	
DO (mg/l)	8.3	1.5 / 8.3	6.7 / 8.3	7.3 / 8.4	6.6 / 8.1	6.7 / 8.4	5.6 / 8.3	7.0	
Cond (umhos/cm)	301	297	298	301	304	300	304		
Concentration: 56%									
pH	8.0	7.3 / 7.9	7.4 / 7.9	7.5 / 7.9	7.3 / 7.9	7.4 / 7.8	7.3 / 7.9	7.4	
DO (mg/l)	8.3	1.4 / 8.3	1.0 / 8.2	7.3 / 8.4	6.3 / 8.1	6.8 / 8.4	5.8 / 8.3	6.9	
Cond (umhos/cm)	338	336	340	339	348	341	344		
Concentration: 75%									
pH	8.1	7.6 / 8.0	7.5 / 7.9	7.6 / 8.0	7.3 / 7.9	7.4 / 8.0	7.2 / 7.9	7.4	
DO (mg/l)	8.4	1.5 / 8.3	7.0 / 8.2	7.2 / 8.4	6.3 / 8.0	6.7 / 8.3	5.6 / 8.3	6.8	
Cond (umhos/cm)	392	388	394	393	397	396	395		
Concentration: 100%									
pH	8.2	7.6 / 8.1	7.6 / 8.0	7.6 / 8.0	7.4 / 8.0	7.4 / 8.0	7.3 / 7.9	7.4	
DO (mg/l)	8.5	7.2 / 8.2	6.8 / 8.2	7.2 / 8.4	6.3 / 7.9	6.4 / 8.2	5.8 / 8.3	6.8	
Cond (umhos/cm)	462	468	465	474	472	473	466		
Tech-prerenewal	RC	RC	RC	AH	RC	RC	RC	RC	
Tech-postrenewal		AH	AH	AH	AH	AH	AH		
Hardness (mg/l)	48.0		48.0		40.0				
Alkalinity (mg/l)	44.0		48.0		40.0				

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date: 11/13/2012 Test ID: X4930CD Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

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

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	1.0000	1.0000	0	10	10	10		
32	1.0000	1.0000	0	10	10	10	1.0000	0.0500
42	0.8000	0.8000	2	8	10	10	0.2368	0.0500
56	0.8000	0.8000	2	8	10	10	0.2368	0.0500
75	0.8000	0.8000	2	8	10	10	0.2368	0.0500
*100	0.3000	0.3000	7	3	10	10	0.0015	0.0500
100UV	0.7000	0.7000	3	7	10	10	0.1053	0.0500

Hypothesis Test (1-tail, 0.05)

Fisher's Exact Test indicates significant differences
 Treatments vs D-Control

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 11/13/2012 Test ID: X4930CD Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	18.000	20.000	22.000	22.000	25.000	26.000	26.000	26.000	26.000	27.000
32	10.000	14.000	14.000	11.000	14.000	6.000	12.000	15.000	15.000	13.000
42	14.000	2.000	8.000	9.000	7.000	15.000	23.000	11.000		
56	12.000	4.000	8.000	8.000	10.000	8.000	7.000	9.000		
75	11.000	3.000	10.000	11.000	6.000	8.000	8.000	8.000		
100	9.000	12.000	10.000							
100UV	15.000	11.000	12.000	8.000	16.000	12.000	10.000			

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%					
D-Control	23.800	1.0000	23.800	18.000	27.000	12.958	10				
*32	12.400	0.5210	12.400	6.000	15.000	22.555	10	7.295	2.483	3.880	
*42	11.125	0.4674	11.125	2.000	23.000	56.736	8	7.647	2.483	4.115	
*56	8.250	0.3466	8.250	4.000	12.000	28.055	8	9.381	2.483	4.115	
*75	8.125	0.3414	8.125	3.000	11.000	33.180	8	9.457	2.483	4.115	
*100	10.333	0.4342	10.333	9.000	12.000	14.783	3	5.854	2.483	5.711	
*100UV	12.000	0.5042	12.000	8.000	16.000	23.074	7	6.852	2.483	4.275	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.74373	0.895	0.20928	2.75498		
Bartlett's Test indicates equal variances (p = 0.05)	12.5762	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences Treatments vs D-Control	4.27537	0.17964	266.103	12.211	4.6E-12	6, 47

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 11/13/2012 Test ID: X4930CD Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	18.000	20.000	22.000	22.000	25.000	26.000	26.000	26.000	26.000	27.000
32	10.000	14.000	14.000	11.000	14.000	6.000	12.000	15.000	15.000	13.000
42	14.000	2.000	2.000	8.000	9.000	7.000	15.000	23.000	0.000	11.000
56	12.000	4.000	8.000	8.000	10.000	8.000	0.000	7.000	8.000	9.000
75	11.000	3.000	10.000	11.000	6.000	8.000	2.000	0.000	8.000	8.000
100	0.000	0.000	0.000	9.000	3.000	12.000	0.000	0.000	0.000	10.000
100UV	15.000	5.000	11.000	0.000	12.000	8.000	16.000	12.000	2.000	10.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%	Critical			MSD	
D-Control	23.800	1.0000	23.800	18.000	27.000	12.958	10				
*32	12.400	0.5210	12.400	6.000	15.000	22.555	10	5.597	2.347	4.780	
*42	9.100	0.3824	9.100	0.000	23.000	77.262	10	7.217	2.347	4.780	
*56	7.400	0.3109	7.400	0.000	12.000	44.683	10	8.052	2.347	4.780	
*75	6.700	0.2815	6.700	0.000	11.000	57.613	10	8.396	2.347	4.780	
*100	3.400	0.1429	3.400	0.000	12.000	144.886	10	10.016	2.347	4.780	
*100UV	9.100	0.3824	9.100	0.000	16.000	58.482	10	7.217	2.347	4.780	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.82626	0.895	0.14716	0.57165		
Bartlett's Test indicates equal variances (p = 0.06)	11.9924	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs D-Control	4.78049	0.20086	430.857	20.7413	2.9E-13	6, 63

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 11/13/2012 Test ID: X4930CD Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	18.000	20.000	22.000	22.000	25.000	26.000	26.000	26.000	26.000	27.000
32	10.000	14.000	14.000	11.000	14.000	6.000	12.000	15.000	15.000	13.000
42	14.000	2.000	2.000	8.000	9.000	7.000	15.000	23.000	0.000	11.000
56	12.000	4.000	8.000	8.000	10.000	8.000	0.000	7.000	8.000	9.000
75	11.000	3.000	10.000	11.000	6.000	8.000	2.000	0.000	8.000	8.000
100	0.000	0.000	0.000	9.000	3.000	12.000	0.000	0.000	0.000	10.000
100UV	15.000	5.000	11.000	0.000	12.000	8.000	16.000	12.000	2.000	10.000

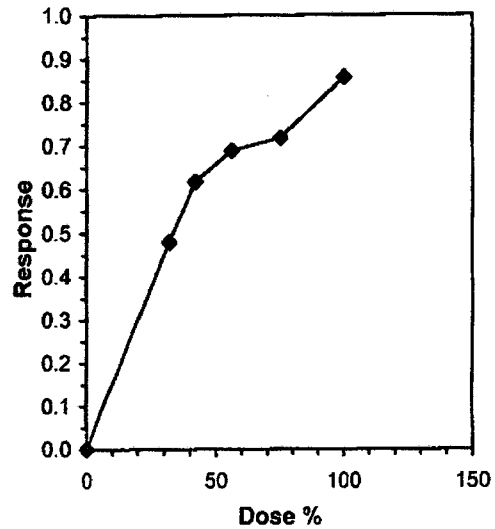
Conc-%	Transform: Untransformed							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	23.800	1.0000	23.800	18.000	27.000	12.958	10	23.800	1.0000
32	12.400	0.5210	12.400	6.000	15.000	22.555	10	12.400	0.5210
42	9.100	0.3824	9.100	0.000	23.000	77.262	10	9.100	0.3824
56	7.400	0.3109	7.400	0.000	12.000	44.683	10	7.400	0.3109
75	6.700	0.2815	6.700	0.000	11.000	57.613	10	6.700	0.2815
100	3.400	0.1429	3.400	0.000	12.000	144.886	10	3.400	0.1429
100UV	9.100	0.3824	9.100	0.000	16.000	58.482	10		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.82626	0.895	0.14716	0.57165
Bartlett's Test indicates equal variances (p = 0.06)	11.9924	16.8119		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL		Skew
IC05*	3.340	0.304	2.853	4.040	0.6158
IC10*	6.681	0.608	5.706	8.080	0.6158
IC15*	10.021	0.912	8.559	12.120	0.6158
IC20*	13.361	1.216	11.411	16.160	0.6158
IC25*	16.702	1.520	14.264	20.200	0.6158
IC40*	26.723	2.554	22.823	32.306	1.2215
IC50	33.515	3.987	28.528	44.770	1.2761

* indicates IC estimate less than the lowest concentration



Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 11/13/2012 Test ID: X4930PP Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.8750
32	0.8750	0.8750	0.8750	0.7500	0.6250
42	0.8750	0.3750	0.6250	1.0000	0.3750
56	0.5000	1.0000	0.8750	0.6250	0.7500
75	0.8750	0.8750	0.8750	0.8750	0.7500
100	0.5000	0.7500	0.8750	0.5000	0.6250

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				CV%	N	t-Stat	1-Tailed	
			Mean	Min	Max	MSD				Critical	MSD
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5				
32	0.8000	0.8205	1.1174	0.9117	1.2094	12.059	5	1.933	2.360	0.2917	
*42	0.6500	0.6667	0.9685	0.6591	1.3931	34.044	5	3.155	2.360	0.2917	
56	0.7500	0.7692	1.0694	0.7854	1.3931	22.443	5	2.322	2.360	0.2917	
75	0.8500	0.8718	1.1770	1.0472	1.2094	6.164	5	1.451	2.360	0.2917	
*100	0.6500	0.6667	0.9478	0.7854	1.2094	19.193	5	3.305	2.360	0.2917	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96111	0.927	0.27676	0.14263						
Bartlett's Test indicates equal variances (p = 0.04)	11.4783	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	32	42	36.6606	3.125	0.18973	0.19873	0.11367	0.03819	0.03141	5, 24

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 11/13/2012 Test ID: X4930PP Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4	5
D-Control	0.7250	0.6750	0.7375	0.7250	0.7000
32	0.5500	0.5125	0.6375	0.4625	0.4125
42	0.6125	0.1875	0.4750	0.6750	0.2875
56	0.3625	0.7125	0.7250	0.4750	0.5875
75	0.6375	0.5625	0.4875	0.5875	0.4625
100	0.3250	0.5125	0.8125	0.4500	0.4250
0-SN	0.7250	0.6750	0.7375	0.7250	0.8000

Conc-%	Mean	N-Mean	Transform: Untransformed				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.7125	1.0000	0.7125	0.6750	0.7375	3.509	5		
*32	0.5150	0.7228	0.5150	0.4125	0.6375	16.675	5	15.00	16.00
*42	0.4475	0.6281	0.4475	0.1875	0.6750	46.465	5	15.50	16.00
56	0.5725	0.8035	0.5725	0.3625	0.7250	27.157	5	20.00	16.00
*75	0.5475	0.7684	0.5475	0.4625	0.6375	13.155	5	15.00	16.00
100	0.5050	0.7088	0.5050	0.3250	0.8125	36.572	5	20.00	16.00
0-SN	0.7325	1.0281	0.7325	0.6750	0.8000	6.105	5	31.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97403	0.934	0.27136	0.84112
Bartlett's Test indicates unequal variances (p = 3.36E-03)	19.5288	16.8119		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 11/13/2012 Test ID: X4930PP Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

Conc-%	1	2	3	4	5
D-Control	0.7250	0.6750	0.7375	0.7250	0.7000
32	0.5500	0.5125	0.6375	0.4625	0.4125
42	0.6125	0.1875	0.4750	0.6750	0.2875
56	0.3625	0.7125	0.7250	0.4750	0.5875
75	0.6375	0.5625	0.4875	0.5875	0.4625
100	0.3250	0.5125	0.8125	0.4500	0.4250
0-SN	0.7250	0.6750	0.7375	0.7250	0.8000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%	Critical			MSD	
D-Control	0.7125	1.0000	0.7125	0.6750	0.7375	3.509	5				
*32	0.5150	0.7228	0.5150	0.4125	0.6375	16.675	5	2.418	2.409	0.1967	
*42	0.4475	0.6281	0.4475	0.1875	0.6750	46.465	5	3.245	2.409	0.1967	
56	0.5725	0.8035	0.5725	0.3625	0.7250	27.157	5	1.714	2.409	0.1967	
75	0.5475	0.7684	0.5475	0.4625	0.6375	13.155	5	2.021	2.409	0.1967	
*100	0.5050	0.7088	0.5050	0.3250	0.8125	36.572	5	2.541	2.409	0.1967	
0-SN	0.7325	1.0281	0.7325	0.6750	0.8000	6.105	5	-0.245	2.409	0.1967	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97403	0.934	0.27136	0.84112		
Bartlett's Test indicates unequal variances ($p = 3.36E-03$)	19.5288	16.8119				
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs D-Control	0.19669	0.27606	0.05769	0.01667	0.01102	6, 28

Larval Fish Growth and Survival Test-7 Day Growth

Start Date: 11/13/2012 Test ID: X4930PP Sample ID: 1
 End Date: 11/20/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/13/2012 Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

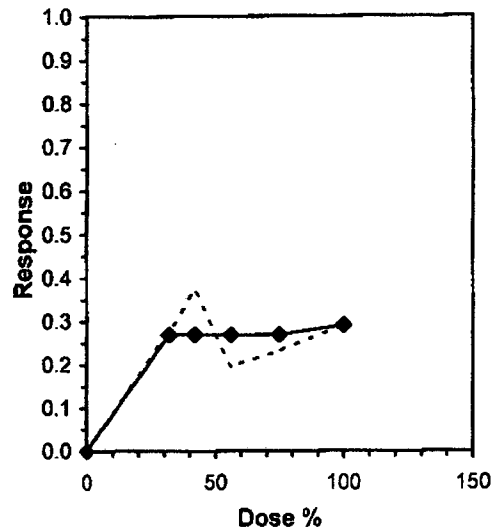
Conc-%	1	2	3	4	5
D-Control	0.7250	0.6750	0.7375	0.7250	0.7000
32	0.5500	0.5125	0.6375	0.4625	0.4125
42	0.6125	0.1875	0.4750	0.6750	0.2875
56	0.3625	0.7125	0.7250	0.4750	0.5875
75	0.6375	0.5625	0.4875	0.5875	0.4625
100	0.3250	0.5125	0.8125	0.4500	0.4250
0-SN	0.7250	0.6750	0.7375	0.7250	0.8000

Conc-%	Transform: Untransformed						Isotonic		
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.7125	1.0000	0.7125	0.6750	0.7375	3.509	5	0.7125	1.0000
32	0.5150	0.7228	0.5150	0.4125	0.6375	16.675	5	0.5206	0.7307
42	0.4475	0.6281	0.4475	0.1875	0.6750	46.465	5	0.5206	0.7307
56	0.5725	0.8035	0.5725	0.3625	0.7250	27.157	5	0.5206	0.7307
75	0.5475	0.7684	0.5475	0.4625	0.6375	13.155	5	0.5206	0.7307
100	0.5050	0.7088	0.5050	0.3250	0.8125	36.572	5	0.5050	0.7088
0-SN	0.7325	1.0281	0.7325	0.6750	0.8000	6.105	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97403	0.934	0.27136	0.84112
Bartlett's Test indicates unequal variances ($p = 3.36E-03$)	19.5288	16.8119		

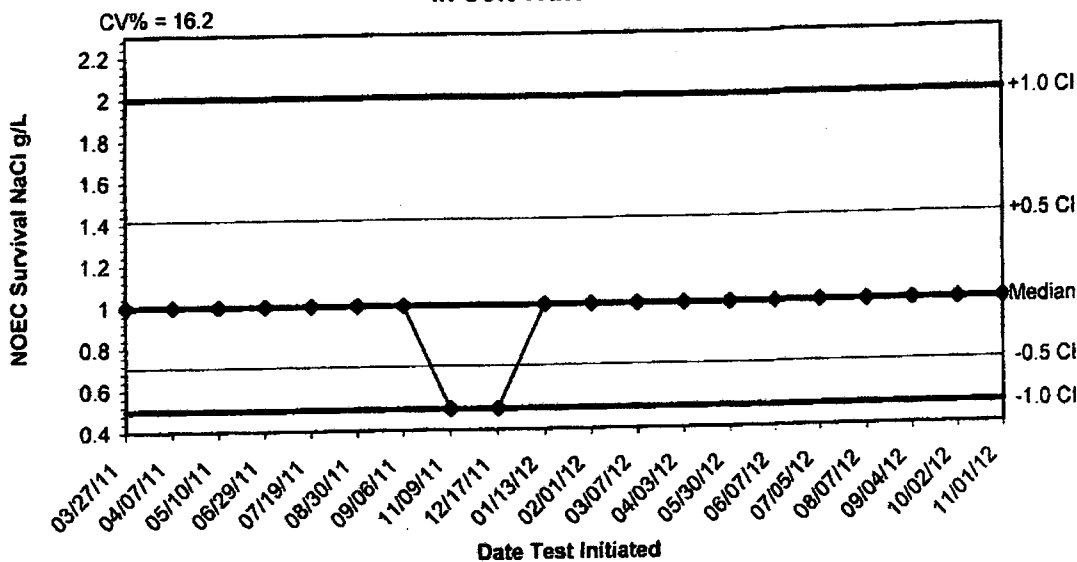
Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)		Skew
IC05*	5.941	1.283	4.706	12.297	1.2756
IC10*	11.883	2.566	9.412	24.594	1.2756
IC15*	17.824	5.170	14.118	36.891	3.9342
IC20*	23.765				
IC25*	29.707				
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration.



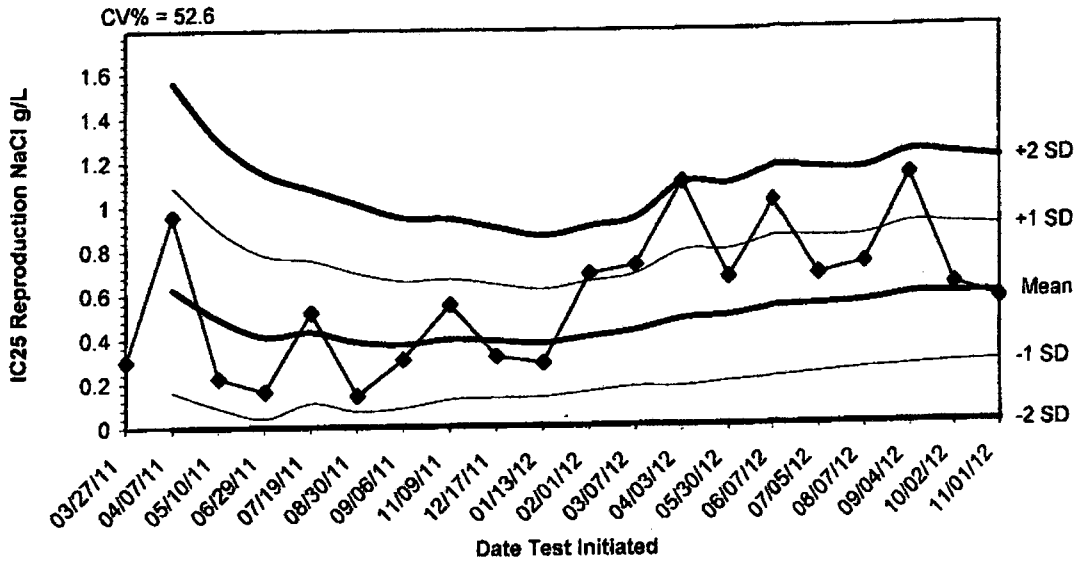
APPENDIX D
QUALITY ASSURANCE CHARTS

2012 Chronic Reference Toxicant Test Results for Ceriodaphnia dubia in Soft Water



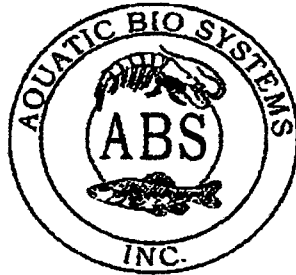
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
03/27/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/07/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/10/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/29/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/19/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000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

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



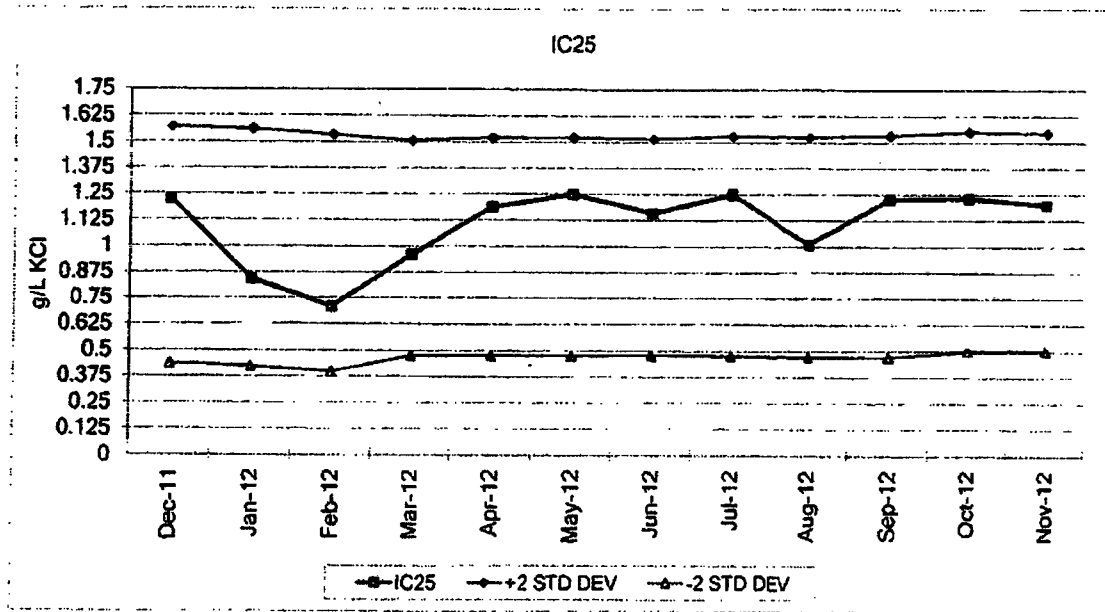
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/27/11	0.2984					
04/07/11	0.9552	0.6268	0.1624	0.0000	1.0912	1.5557
05/10/11	0.2227	0.4921	0.0893	0.0000	0.8949	1.2978
06/29/11	0.1608	0.4093	0.0410	0.0000	0.7775	1.1458
07/19/11	0.5187	0.4312	0.1085	0.0000	0.7538	1.0765
08/30/11	0.1390	0.3825	0.0702	0.0000	0.6947	1.0070
09/06/11	0.3034	0.3712	0.0845	0.0000	0.6578	0.9444
11/09/11	0.5489	0.3934	0.1207	0.0000	0.6661	0.9388
12/17/11	0.3138	0.3845	0.1281	0.0000	0.6410	0.8975
01/13/12	0.2835	0.3744	0.1305	0.0000	0.6183	0.8622
02/01/12	0.6864	0.4028	0.1530	0.0000	0.6526	0.9024
03/07/12	0.7233	0.4295	0.1740	0.0000	0.6850	0.9405
04/03/12	1.1000	0.4811	0.1738	0.0000	0.7884	1.0956
05/30/12	0.6660	0.4943	0.1950	0.0000	0.7936	1.0929
06/07/12	1.0102	0.5287	0.2110	0.0000	0.8464	1.1641
07/05/12	0.6765	0.5379	0.2288	0.0000	0.8471	1.1562
08/07/12	0.7250	0.5489	0.2462	0.0000	0.8517	1.1544
09/04/12	1.1229	0.5808	0.2574	0.0000	0.9042	1.2276
10/02/12	0.6225	0.5830	0.2686	0.0000	0.8974	1.2118
11/01/12	0.5553	0.5816	0.2755	0.0000	0.8877	1.1938

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)
Jun-12	0.50	1.0
Jul-12	0.50	1.0
Aug-12	0.50	1.0
Sep-12	0.50	1.0
Oct-12	0.50	1.0
Nov-12	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
Jun-12	1.158	1.256 0.673	0.997	1.516	0.478
Jul-12	1.250	1.250 0.250	1.002	1.529	0.475
Aug-12	1.011	1.394 0.483	0.999	1.524	0.473
Sep-12	1.226	1.265 0.863	1.002	1.533	0.472
Oct-12	1.232	1.261 0.949	1.026	1.550	0.502
Nov-12	1.201	1.265 1.091	1.024	1.545	0.503

**Current Test Dates: 11/7-14/2012

Aquatic BioSystems, Inc • Quality Research Organisms

APPENDIX E
AGENCY FORMS

**SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING**

Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Chemical
Outfall 001

NPDES No.: AR0000752
AFIN: 70-00040

	Time	Date	Time	Date
Composite 1 Collected From	0830	11/11/12 To	0830	11/12/12
Composite 2 Collected From	0830	11/13/12 To	0830	11/14/12
Composite 3 Collected From	0830	11/15/12 To	0830	11/16/12
Test initiated:	1510 am/pm		11/13/12	date
Test terminated:	1450 am/pm		11/20/12	date
Dilution water used:	Receiving	X	Reconstituted	

PERCENT SURVIVAL

Time of Reading	Percent Effluent						
	0	32	42	56	75	100	100UV
24h	100	100	100	90	100	60	90
48h	100	100	100	90	100	60	90
End of test	100	100	80	80	80	30	70

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100	100UV
A	18	10	14	12	11	D	15
B	20	14	D2	4	3	D	D5
C	22	14	2	8	10	D	11
D	22	11	8	8	11	9	D
E	25	14	9	10	6	D3	12
F	26	6	7	8	8	12	8
G	26	12	15	D	D2	D	16
H	26	15	23	7	D	D	12
I	26	15	D	D8	8	D	D2
J	27	13	11	9	8	10	10
Surv. Mean	23.8	12.4	11.1	8.3	8.1	10.3	12.0
Total Mean	23.8	12.4	9.1	7.4	6.7	3.4	9.1
CV%*	12.96	22.56	56.74	28.06	33.18	14.78	23.07

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

PMSD = 20.1%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

5. Enter response to item 3 on DMR Form, parameter #TEP3B.

6. Enter response to item 4 on DMR Form, parameter #TFP3B.

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

a) NOEC survival:	100% effluent (based on 100% UV)
b) NOEC reproduction:	0% effluent
c) LOEC survival:	32% effluent
d) LOEC reproduction:	32% effluent

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

Permittee: El Dorado Chemical
Outfall 001

NPDES No.: AR0000752
AFIN: 70-00040

	Time	Date	Time	Date
Composite 1 Collected from:	0830	11/11/12 To	0830	11/12/12
Composite 2 Collected from:	0830	11/13/12 To	0830	11/14/12
Composite 3 Collected from:	0830	11/15/12 To	0830	11/16/12

Test initiated: 1420 am/pm 11/13/12 date
 Test terminated: 1415 am/pm 11/20/12 date
 Dilution water used: Receiving X Reconstituted

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	100	100	100	87.5	100	100	97.5	6.06
32	87.5	87.5	87.5	75.0	62.5	100	100	80.0	12.06
42	87.5	37.5	62.5	100	37.5	100	97.5	65.0	34.04
56	50.0	100	87.5	62.5	75.0	100	100	75.0	22.44
75	87.5	87.5	87.5	87.5	75.0	100	100	85.0	6.16
100	50.0	75.0	87.5	50.0	62.5	100	97.5	65.0	19.19

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	0.725	0.675	0.738	0.725	0.700	0.713	3.51
32	0.550	0.513	0.638	0.463	0.413	0.515	16.68
42	0.613	0.188	0.475	0.675	0.288	0.448	46.47
56	0.363	0.713	0.725	0.475	0.588	0.573	27.16
75	0.638	0.563	0.488	0.588	0.463	0.548	13.16
0-SN	0.725	0.675	0.738	0.725	0.800	0.733	6.11

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

PMSD = 27.6

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%) | X | YES | NO |
| b) 1/2 LOW FLOW DILUTION (N/A %) | | YES | NO |

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

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

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

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

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

5. Enter response to item 3 on DMR Form, parameter #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 | 75% effluent. |
| b.) NOEC growth | 0% effluent. |
| c.) LOEC survival | 100% effluent |
| d.) LOEC growth | 32% effluent |

Bio-monitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Facility: El Dorado Chemical - Outfall 001
DES No.: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Houghton, Callahan

Sample No. 1 Collected: Date: 11/12/12 Time: 0830
Sample No. 2 Collected: Date: 11/14/12 Time: 0830
Sample No. 3 Collected: Date: 11/16/12 Time: 0830
Test Begin: Date: 11/13/12 Time: 1510
Test End: Date: 11/20/12 Time: 1450

Dilution: 0									Dilution: 56								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3		Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3	
DO Initial	7.6	7.1	7.4	7.2	7.2	6.2	7.0		DO Initial	7.4	7.0	7.3	6.3	6.8	5.8	6.9	
DO Final	8.3	8.3	8.4	8.2	8.6	8.3			DO Final	8.3	8.2	8.4	8.1	8.4	8.3		
pH Initial	7.6	7.4	7.5	7.4	7.4	7.4	7.5		pH Initial	7.5	7.4	7.5	7.3	7.4	7.3	7.4	
pH Final	7.8	7.8	7.9	7.8	7.7	7.7			pH Final	7.9	7.9	7.9	7.9	7.8	7.9		
Alkalinity	32.0					32.0			Alkalinity								
Hardness	52.0					52.0			Hardness								
Conductivity	175.3	178.9	179.2	179.7	178.4	184.9			Conductivity	336	340	339	348	341	344		
Chlorine	<.01					<.01			Chlorine								
Dilution: 32									Dilution: 75								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3		Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3	
DO Initial	7.6	7.0	7.3	6.6	6.9	5.8	7.0		DO Initial	7.5	7.0	7.2	6.5	6.7	5.6	6.8	
DO Final	8.3	8.3	8.4	8.1	8.5	8.3			DO Final	8.3	8.2	8.4	8.0	8.3	8.3		
pH Initial	7.5	7.4	7.5	7.5	7.5	7.3	7.4		pH Initial	7.6	7.5	7.6	7.3	7.4	7.2	7.4	
pH Final	7.8	7.8	7.9	7.8	7.7	7.8			pH Final	8.0	7.9	8.0	7.9	8.0	7.9		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	275	272	276	278	273	275			Conductivity	388	394	393	397	396	395		
Chlorine									Chlorine								
Dilution: 42									Dilution: 100								
Day:									Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3		Temp (C)	25.2	25.4	25.7	25.2	25.4	25.2	25.3	
DO Initial	7.5	6.7	7.3	6.6	6.7	5.6	7.0		DO Initial	7.2	6.8	7.2	6.5	6.4	5.8	6.8	
DO Final	8.3	8.3	8.4	8.1	8.4	8.3			DO Final	8.2	8.2	8.4	7.9	8.2	8.3		
pH Initial	7.6	7.3	7.5	7.4	7.4	7.3	7.5		pH Initial	7.6	7.6	7.6	7.4	7.4	7.2	7.4	
pH Final	7.9	7.9	7.9	7.9	7.8	7.8			pH Final	8.1	8.0	8.0	8.0	8.0	7.9		
Alkalinity									Alkalinity	44.0	48.0		40.0				
Hardness									Hardness	48.0	48.0		40.0				
Conductivity	297	298	301	304	300	304			Conductivity	468	465	474	472	473	466		
Chlorine									Chlorine	<.01	<.01		<.01				

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#: X4930

Chain of Custody Documents Checked by: AH 11/27/12
Technician/Date

Raw Data Documents Checked by: AH 11/27/12
Technician/Date

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

Quality Control Data Checked by: EGB 11/26/12
Quality Manager/Date

Report Checked by: EGB 12/11/12
Quality Manager/Date

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

Erin H. Bragg, BS
Quality Manager

12/11/12
Date

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

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X4921

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4921

Outfall: Outfall 006

Permit #: AR0000752/ AFIN #70-00040

Contact: Ms. Larken Pennington

Test Dates: November 5 - 8, 2012

Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

For *Pimephales promelas*:

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

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 - 6.06%.

This test was not initiated within 36 hours after collection, but within 53 hours after sample collection, due to unavailable test organisms <24 hours old.

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



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

**THE RESULTS OF TWO 48-HOUR ACUTE
TOXICITY TESTS
FOR OUTFALL 006
AT**

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

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

EPA Methods 2000.0 and 2021.0

Project X4921

**Test Dates: November 5 - 7, 2012
Report Date: November 30, 2012**

Prepared for:
Ms. Larken Pennington
El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

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

BAL
ADEQ #88-0630
Project X4921

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BAL
ADEQ #88-0630
Project X4921

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 eight days old at test initiation. The *Daphnia pulex* test organisms were raised in-house and were less than 24 hours old at test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were conducted monthly in order to document organism sensitivity and demonstration of capability.

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ADEQ #88-0630
Project X4921

2.3 Dilution Water

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

2.4 Test Concentrations

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

2.5 Sample Collection

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

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1° 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. Any pH adjustments (pH range should be 6.0-9.0) were made using 1.0 Normal Sodium Hydroxide or 1.0 Normal Hydrochloric Acid. 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° Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

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

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ADEQ #88-0630
Project X4921

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in all of the effluent dilutions after 24 hours in both tests ($p=.05$). The NOEC value for both tests was zero percent effluent ($p=.05$). The 48-hour LC_{50} value for the fathead minnow and the *Daphnia pulex* tests was 11.5 and 20.8 percent effluent, respectively ($p=.05$).

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i> (Fathead Minnow)	<i>Daphnia pulex</i>
Control	97.5	97.5
22.0	0.0	40.0
32.0	0.0	5.0
42.0	0.0	0.0
56.0	0.0	0.0
75.0	0.0	0.0
100.0	0.0	0.0
100.0 pH adj.	N/A	0.0

The 48-hour reference toxicant test results indicate that the test organisms were within the respective sensitivity range. The graphs of the acute reference toxicant tests can be found in Appendix D.

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ADEQ #88-0630
Project X4921

4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on November 4, 2012, was found to be lethally toxic to the *Daphnia pulex* test organisms and the fathead minnow test organisms after 48 hours of exposure ($p=.05$). The 48-hour LC_{50} value for the daphnid and minnow tests was 20.8 and 11.5 percent effluent, respectively ($p=.05$).

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ADEQ #88-0630
Project X4921

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
Moyline, LA 71078

(318) 745-2772
1-800-258-1244
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: X4921			
Address: 4500 Norwest Ave., El Dorado, AR 71731		Fax: (870) 863-7499		Chronic Ceriodaphnia Chronic minnow Acute minnow/fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform				Temp. upon arrival: Temperature upon arrival: 2.8 Thermometer #: 29 Tech: AM Date: 11/6/12 Lab Control Number:	Preservative: (below) ice		
Permit #: AR0000752/AFIN 70-00040		Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC											
Date Start Date End	Time Start Time End	G	# and type of container	Sample Identification							
11/4/12	8:50	X	6 half gallon	006			X	X		06404	ice
Relinquished by/Affiliation: Larken Pennington				Date: 11/5/12	Time: 1248	Received by/Affiliation: Ceme Houghton		Date: 11/5/12	Time: 1248 11/5/12		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:		
Method of Shipment: <input type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input checked="" type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____											
Comments:											

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X4921

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/AH/LGZ/RC

Test initiated: PP Date 11/5/12 Time 1445 End Date 11/7/12 Time 1425

Test ~~terminated~~ ^{initiated} DP* Date 11/6/12 Time 1320 - End Date 11/8/12 Time 1300

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
PP C6404	11.0/132.3%	4/25 8.3/97.3%	0.01	NO	>6.0	N/A	108.0 72.0	100.0 4.0	AH
PP/DP ↓	9.6/112.6%	4/25 8.4/98.0%	↓	↓	↓	↓			↓
DP ↓	9.4/114.9%	4/29 8.3/97.3%		↓					

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	3400	NA	NA	NA	NA	7.8	64.0	40.0	ELB
↓	↓								

Test Species Information

Test Species Info.	Species ID#	Species ID#	Species ID#	Species ID#
Age	<u>D. pulex</u> BAL1A5-C5	<u>Protonias</u> BAL102812		
Test Container Size	200ml	~8d		
Test volume	30ml	250ml		
Feeding: Type	25ml	200ml		
Amount	YCT: Algae	Artemia		
Aeration?	Fed 2hrs prior to test initiation			
Amount	NA	NA		
Condition of survivors	GOOD RC	Good		

Comments:

*D. pulex test set up out of holding time ^{ELB} 11/8/12 ACUTE1 020809 Rev.

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

Project# X4921

Test started: Date 11/6/12

Time 1300

Client El Dorado Chemical

Test ended: Date 11/8/12

Time 1300

Sample Description 006

Test Species D. pulex

ID# BALAS-05

Technician: Ohour AM 24hour RC 48hour RC 72hour RC 96hour RC
 Time: Ohour 1300 24hour 1410 48hour 1300 72hour RC 96hour RC
 Temperature (°C): Ohour 24.9 24hour 24.8 48hour 24.9 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity							
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96			
0	A	NA	8	8	7			8.3	8.4 8.4	8.5			7.8	7.8 7.8	7.9			180.9	183.0 183.0	182.4					
	B		8	8	8																				
	C		8	8	8																				
	D		8	8	8																				
	E		8	8	8																				
22	A		8	6	5			8.3	8.4 8.3	8.6			6.5	6.9 6.6	6.8			188.5	186.4 186.4	197.3					
	B		8	5	3																				
	C		8	5	4																				
	D		8	3	0																				
	E		8	5	4																				
Chemistry Tech prerenewal/postrenewal							AM	RC	RC	RC			AM	RC	RC	RC			AM	RC	RC	RC			

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

Project# X4921

Test started: Date 11/6/12

Time 1320

client El Dorado Chemical

Test ended: Date 11/8/12

Time 1300

Sample Description 006

Test Species D. pulex

ID# BA1/A5-C5

Technician: 0hour AH 24hour RC 48hour RC 72hour 96hour
 Time: 0hour 1320 24hour 1410 48hour 1300 72hour 96hour
 Temperature (°C): 0hour 24.9 24hour 24.8 48hour 24.9 72hour 96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr.	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
32	A	NA	8	5	0			8.3	8.5 8.3	8.6			6.2	6.1 6.4	6.5			2630	2640 2590	2890				
	B		8	2	0																			
	C		8	2	0																			
	D		8	2	0																			
	E		8	2	2																			
42	A		8	0	1			8.3	8.5 8.2	-			5.9	6.4 6.1	-			3020	3170 3330	-				
	B		8	0	1																			
	C		8	0	1																			
	D		8	0	1																			
	E		8	0	1																			
Chemistry Tech prerenewal/postrenewal								AH	RC RC	RC			AH	RC RC	RC			AH	RC RC	RC				

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

Project# X4921

Test started: Date 11/6/12 Time 1320

Client El Dorado Chemical

Test ended: Date 11/8/12 Time 1300

Sample Description 006

Test Species D. pulex ID# BA/A5-C5

Technician: 0hour AM 24hour RC 48hour RC 72hour 96hour
 Time: 0hour 1320 24hour 140 48hour 1300 72hour 96hour
 Temperature (°C): 0hour 24.9 24hour 24.8 48hour 24.9 72hour 96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56	A	NA	8	0	-			8.3	8.5 8.3	-			5.4	6.0 5.6	-			4180	4170 4290	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
	F		8	0	-																	
75	A		8	0	-			8.3	8.4	-			4.9	5.6	-			5280	5270 5290	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
	F		8	0	-																	
Chemistry Tech prerenewal/postrenewal							AM/RC	RC				AM/RC	RC				AM/RC	RC				

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

Project# X4921

Test started: Date 11/10/12

Time 1320

Client El Dorado Chemical

Test ended: Date _____

Time 1300

Sample Description 006

Test Species Daphnia

ID# BALAS-C5

Technician: Ohour AH 24hour RC 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1320 24hour 1410 48hour 1300 72hour _____ 96hour _____
 Temperature (°C): Ohour 24.9 24hour 24.8 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	0	-			8.4	8.4	-			4.6	5.1	-			7.0	7.0	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
100	A		8	0	-			8.4	8.3	-			6.8	5.6	-			7.1	7.0	-		
PH Adj.	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
Chemistry Tech prerenal/postrenewal							AH	RC	RC			AH	RC	RC			AH	RC	RC			

RC 11/12

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

Project# X4921

Test started: Date 11/5/12 Time 1445

Client El Dorado Chemical

Test ended: Date 11/7/12 Time 1425

Sample Description 006

Test Species P. promelas ID# BA1102812

Technician: Ohour AH 24hour RC 48hour Wm 72hour --- 96hour ---
 Time: Ohour 1445 24hour 1315 48hour 1425 72hour --- 96hour ---
 Temperature (°C): Ohour 25 24hour 25.1 48hour 24.8 72hour --- 96hour ---

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	NA	8	8	8			8.2	7.4	7.7			7.0	7.3	7.1			189.3	227	197.5		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	0				8.2	7.2				6.9	6.8				150.0	411.0			
	B		8	0																		
	C		8	0																		
	D		8	0																		
	E		8	0																		
Chemistry Tech prerenewal/postrenewal			AH RC Wm					AH RC Wm					AH RC Wm									

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

Project# X4921

Test started: Date ^{fish} 11/15/12 Time 1445

Client El Dorado Chemical

Test ended: Date 11/11/12 Time 1425

Sample Description 006

Test Species P. promelas ID# BA/102812

Technician: 0hour AH 24hour RC 48hour AH 72hour RC 96hour RC
 Time: 0hour 1445 24hour 1315 48hour 1425 72hour RC 96hour RC
 Temperature (°C): 0hour 25 24hour 25 48hour 24.8 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
32	A	NA	8	0				8.2	7.2					6.8	6.7			5.3	5.6				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
42	A		8	0				8.2	7.5					6.7	6.5			7.0	7.1				
	B		8	0																			
	C		8	0																			
	D		8	0																			
	E		8	0																			
Chemistry Tech prerenewal/postrenewal							AH	RC					AH	RC					AH	RC			

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

Project# X4921

Test started: Date 1/5/12 Time 1445

Client El Dorado Chemical

Test ended: Date 1/7/12 Time 1425

Sample Description 006

Test Species P. promelas ID# BAU102812

Technician: 0hour AH 24hour RC 48hour dkh 72hour 96hour
 Time: 0hour 1445 24hour 1315 48hour 1425 72hour 96hour
 Temperature (°C): 0hour 25 24hour 25.1 48hour 24.8 72hour 96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity							
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96			
56	A	NA	8	0				8.2	7.6					6.6	6.4					0.580	0.200				
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
75	A		8	0				8.2	7.7					6.6	6.4					0.710	0.200				
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
Chemistry Tech prerenewal/postrenewal									AH	RC					AH	RC					AH	RC			

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date: 11/6/2012 Test ID: X4921DP Sample ID: 6
 End Date: 11/8/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 11/6/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	0.8750	1.0000	1.0000	1.0000	1.0000
22	0.6250	0.3750	0.5000	0.0000	0.5000
32	0.0000	0.0000	0.0000	0.0000	0.2500
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
100 pH	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%	Critical			MSD	
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5				
*22	0.4000	0.4103	0.6639	0.1777	0.9117	43.092	5	5.654	2.110	0.2584	
*32	0.0500	0.0513	0.2469	0.1777	0.5236	62.654	5	9.058	2.110	0.2584	
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				
100 pH	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5				

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.8882	0.881	-1.1324	3.30212						
Bartlett's Test indicates equal variances (p = 0.08)	4.98459	9.21034								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	<22	22			0.16215	0.16984	1.57027	0.0375	3.9E-06	2, 12
Treatments vs D-Control										

Daphnid Acute Test-48 Hr Survival

Start Date: 11/6/2012 Test ID: X4921DP Sample ID: 6
 End Date: 11/8/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 11/6/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

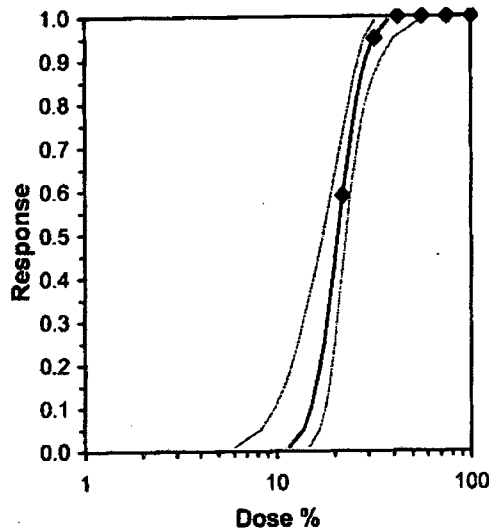
Comments:

Conc-%	1	2	3	4	5
D-Control	0.8750	1.0000	1.0000	1.0000	1.0000
22	0.6250	0.3750	0.5000	0.0000	0.5000
32	0.0000	0.0000	0.0000	0.0000	0.2500
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
100 pH	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	1	40
22	0.4000	0.4103	0.6639	0.1777	0.9117	43.092	5	24	40
32	0.0500	0.0513	0.2469	0.1777	0.5236	62.654	5	38	40
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40
100 pH	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	40	40

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.8882	0.881	-1.1324	3.30212
Bartlett's Test indicates equal variances (p = 0.08)	4.98459	9.21034		

Parameter	Value	SE	95% Fiducial Limits		Maximum Likelihood-Probit						
			Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter		
Slope	9.12281	2.13162	4.94464	13.3006	0.025	0.15353	9.48773	0.9972	1.3187	0.10962	3
Intercept	-7.03	2.9705	-12.852	-1.2078							
TSCR	0.02506	0.02471	-0.0234	0.0735							
Point	Probits	%	95% Fiducial Limits								
EC01	2.674	11.5796	6.05369	14.8367							
EC05	3.355	13.7529	8.28928	16.7457							
EC10	3.718	15.0737	9.79327	17.8764							
EC15	3.964	16.0358	10.9534	18.6922							
EC20	4.158	16.844	11.9673	19.3758							
EC25	4.326	17.5697	12.906	19.9909							
EC40	4.747	19.5402	15.5655	21.6917							
EC50	5.000	20.8306	17.3609	22.8649							
EC60	5.253	22.2061	19.2642	24.2256							
EC75	5.674	24.6966	22.4164	27.2456							
EC80	5.842	25.7607	23.5658	28.8366							
EC85	6.036	27.059	24.8101	31.0202							
EC90	6.282	28.786	26.2675	34.2655							
EC95	6.645	31.5505	28.3274	40.0735							
EC99	7.326	37.4723	32.2332	54.4282							



Acute Fish Test-48 Hr Survival

Start Date: 11/5/2012 Test ID: X4921PP Sample ID: 6
 End Date: 11/7/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/5/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	0.0000	0.0000	0.0000	0.0000	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

Conc-%	Transform: Arcsin Square Root							Rank Sum	1-Tailed Critical
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	15.00	16.00
*22	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*56	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.934		
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<22	22		
Treatments vs D-Control				

Acute Fish Test-48 Hr Survival

Start Date: 11/5/2012 Test ID: X4921PP Sample ID: 6
 End Date: 11/7/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial
 Sample Date: 11/5/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	0.0000	0.0000	0.0000	0.0000	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

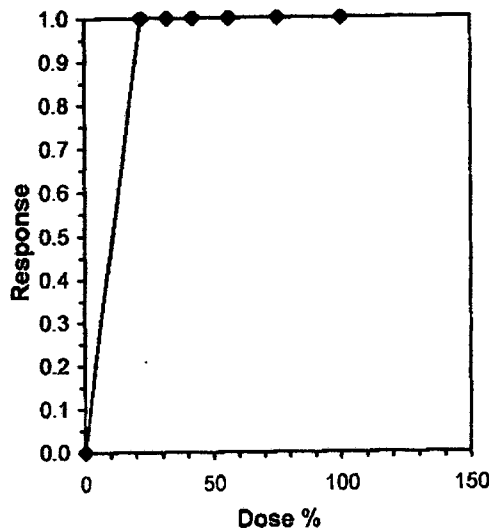
Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	1.0000	1.0000
22	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.934		
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

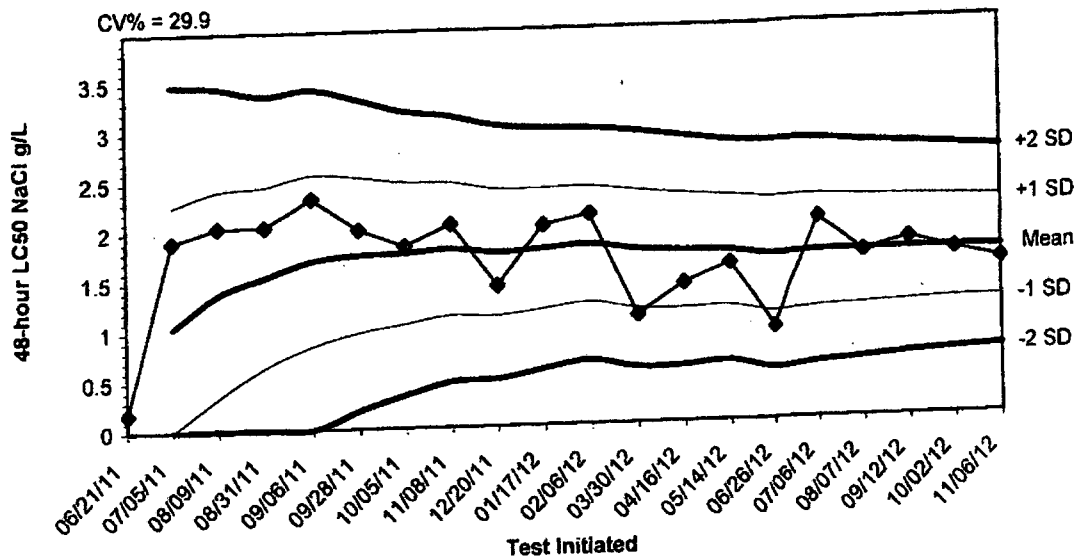
Point	%	SD	95% CL(Exp)		Skew
IC05*	1.100	0.000	1.100	1.100	1.0076
IC10*	2.200	0.000	2.200	2.200	1.0076
IC15*	3.300	0.000	3.300	3.300	1.0076
IC20*	4.400	0.000	4.400	4.400	1.0076
IC25*	5.500	0.000	5.500	5.500	#DIV/0!
IC40*	8.800	0.000	8.800	8.800	1.0076
IC50*	11.000	0.000	11.000	11.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



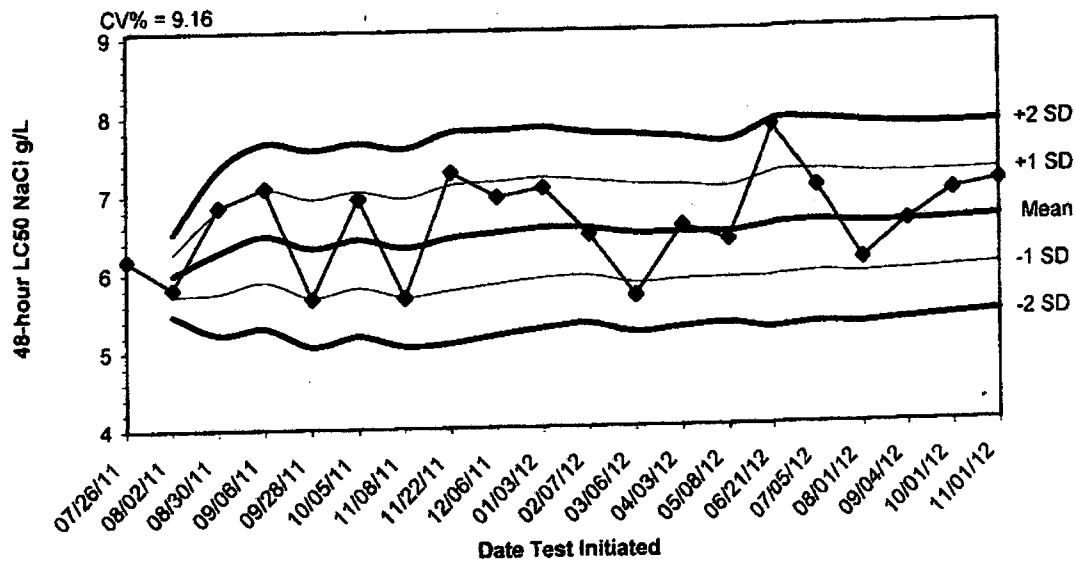
APPENDIX D
QUALITY ASSURANCE CHARTS

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/21/11	0.1800				2.2562	3.4724
07/05/11	1.9000	1.0400	0.0000	0.0000	2.4092	3.4450
08/09/11	2.0400	1.3733	0.3375	0.0000	2.4491	3.3581
08/31/11	2.0400	1.5400	0.6309	0.0000	2.5571	3.4182
09/06/11	2.3200	1.6960	0.8349	0.0000	2.5268	3.3069
09/28/11	2.0000	1.7467	0.9665	0.1864	2.4714	3.1843
10/05/11	1.8300	1.7586	1.0457	0.3329	2.4612	3.1286
11/08/11	2.0400	1.7938	1.1263	0.4589	2.4612	3.1286
12/20/11	1.4100	1.7511	1.1138	0.4765	2.3884	3.0257
01/17/12	2.0100	1.7770	1.1706	0.5642	2.3834	2.9898
02/06/12	2.1100	1.8073	1.2233	0.6393	2.3912	2.9752
03/30/12	1.0800	1.7467	1.1516	0.5565	2.3417	2.9368
04/16/12	1.3900	1.7192	1.1410	0.5627	2.2975	2.8757
05/14/12	1.5800	1.7093	1.1525	0.5957	2.2661	2.8229
06/26/12	0.9200	1.6567	1.0827	0.5088	2.2306	2.8046
07/06/12	2.0100	1.6788	1.1173	0.5558	2.2402	2.8017
08/07/12	1.6600	1.6776	1.1340	0.5903	2.2213	2.7650
09/12/12	1.7800	1.6833	1.1553	0.6273	2.2113	2.7393
10/02/12	1.6600	1.6821	1.1690	0.6558	2.1953	2.7084
11/06/12	1.5500	1.6755	1.1752	0.6748	2.1758	2.6762

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/26/11	6.1800	5.9950	5.7334	5.4717	6.2566	6.5183
08/02/11	5.8100	6.2800	5.7528	5.2257	6.8072	7.3343
08/30/11	6.8500	6.4825	5.8915	5.3005	7.0735	7.6645
09/06/11	7.0900	6.3200	5.6923	5.0646	6.9477	7.5754
09/28/11	5.6700	6.4250	5.8075	5.1899	7.0425	7.6601
10/05/11	6.9500	6.3171	5.6853	5.0535	6.9490	7.5808
11/08/11	5.6700	6.4363	5.7612	5.0862	7.1113	7.7863
11/22/11	7.2700	6.4933	5.8391	5.1848	7.1476	7.8018
12/06/11	6.9500	6.5500	5.9077	5.2653	7.1923	7.8347
01/03/12	7.0600	6.5418	5.9318	5.3219	7.1518	7.7618
02/07/12	6.4600	6.4692	5.8355	5.2017	7.1029	7.7366
03/06/12	5.6700	6.4762	5.8689	5.2616	7.0834	7.6907
04/03/12	6.5600	6.4686	5.8845	5.3003	7.0527	7.6368
05/08/12	6.3700	6.5587	5.8964	5.2342	7.2209	7.8832
06/21/12	7.8200	6.5881	5.9376	5.2870	7.2387	7.8892
07/05/12	7.0300	6.5588	5.9174	5.2761	7.2002	7.8416
08/01/12	6.0900	6.5594	5.9372	5.3150	7.1817	7.8039
09/04/12	6.5700	6.5800	5.9687	5.3574	7.1913	7.8026
10/01/12	6.9500	6.6040	5.9994	5.3948	7.2086	7.8132
11/01/12	7.0600					

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: 11/04/12

To: 11/04/12

From:

To:

Test Initiated: 11/06/12

Dilution Water Used:

Receiving Water

X

Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	32	42	56	75	100	100 pH adj.
24-hour	A	100	75.0	62.5	0	0	0	0	0
	B	100	62.5	25.0	0	0	0	0	0
	C	100	62.5	25.0	0	0	0	0	0
	D	100	37.5	25.0	0	0	0	0	0
	E	100	62.5	25.0	0	0	0	0	0
48-hour	A	87.5	62.5	0	0	0	0	0	0
	B	100	37.5	0	0	0	0	0	0
	C	100	50.0	0	0	0	0	0	0
	D	100	0.0	0	0	0	0	0	0
	E	100	50.0	25.0	0	0	0	0	0
	Mean		97.5	40.0	5.0	0	0	0	0

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

- a.) **LOW FLOW OR CRITICAL DILUTION (100%)** **X** **YES** **NO**
b.) **½ LOW FLOW OR 2X CRITICAL DILUTION (N/A %)** **YES** **NO**

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = 20.8% effluent

95 % confidence limits: 22.9 - 17.4

Method of LC₅₀ calculation: Probit

- 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, Callahan
 Sample Collected

From: Date 11/4/12 Time 0850
 To: Date 11/4/12 Time 0850
 Date 11/6/12 Time 1320
 Date 11/8/12 Time 1300

Test Begin
 Test End

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.3	8.4	8.5	24.9	24.8	24.9	40.0			64.0			7.8	7.8	7.9
22		8.3	8.3	7.6	24.9	24.8	24.9							6.5	6.6	6.8
32		8.3	8.3	8.6	24.9	24.8	24.9							6.2	6.4	6.5
42		8.3	8.2		24.9	24.8								5.9	6.1	
56		8.3	8.3		24.9	24.8								5.4	5.6	
75		8.3	8.4		24.9	24.8								4.9	5.6	
100		8.4	8.4		24.9	24.8		4.0			72.0			4.6	5.1	
100 pH adj		8.4	8.3		24.9	24.8								6.8	6.0	

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

Acute Forms
Pimephales promelas (Fathead Minnow) Survival

Permittee: El Dorado Chemical - Outfall 006

NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected

From: 11/04/12

To: 11/04/12

From:

To:

Test Initiated: 11/05/12

Dilution Water Used:

Receiving Water

X

Reconstituted Water

Dilution Series Results - Percent Survival

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

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

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

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = 11.5% effluent

95 % confidence limits: N/A

Method of LC₅₀ calculation: Graphical

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

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

**Permittee: El Dorado Chemical - Outfall 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton, Zeagler, Callahan
Sample Collected**

**From: Date 11/4/12 Time 0850
To: Date 11/4/12 Time 0850
Test Begin Date 11/5/12 Time 1445
Test End Date 11/7/12 Time 1425**

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		8.2	8.3	7.7	25.0	25.1	24.8	40.0			64.0			7.6	7.8	7.1
22		8.2	7.2		25.0	25.1								6.9	6.8	
32		8.2	7.2		25.0	25.1								6.7	6.7	
42		8.2	7.5		25.0	25.1								6.7	6.5	
56		8.2	7.6		25.0	25.1								6.6	6.4	
75		8.2	7.7		25.0	25.1								6.6	6.4	
100		8.2	7.7		25.0	25.1		4.0			72.0			6.5	6.2	

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

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-258-1246
Fax: (318) 745-2773

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical 006

Project#: X4921

Chain of Custody Documents Checked by: AH 11/16/12
Technician/Date

Raw Data Documents Checked by: AH 11/16/12
Technician/Date

Statistical Analysis Package Checked by: EGB 11/20/12
Quality Manager/Date

Quality Control Data Checked by: EGB 11/26/12
Quality Manager/Date

Report Checked by: EGB 11/30/12
Quality Manager/Date

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

Cristina S. Beppis, BS
Quality Manager

11/30/12
Date

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

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X4922

Bio-Analytical Laboratories' Executive Summary

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

Project #: X4922

Outfall: Outfall 007

Permit #: AR0000752/ AFIN #70-00040

Contact: Ms. Larken Pennington

Test Dates: November 5 - 8, 2012

Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

For *Pimephales promelas*:

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

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 - 6.06%.

This test was not initiated within 36 hours after collection, but within 53 hours after sample collection, due to unavailable test organisms <24 hours old.

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



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

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

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

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

EPA Methods 2000.0 and 2021.0

Project X4922

Test Dates: November 5 - 7, 2012

Report Date: November 30, 2012

Prepared for:

Ms. Larken Pennington
El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731

Prepared by:

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

BAL
ADEQ #88-0630
Project X4922

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BAL
ADEQ #88-0630
Project X4922

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 eight 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 X4922

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the tests were 100, 75.0, 56.0, 50.0, 42.0 and 32.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

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

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25±1^o Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Any pH adjustments (pH range should be 6.0-9.0) were made using 1.0 Normal Sodium Hydroxide or 1.0 Normal Hydrochloric Acid. Dissolved oxygen, pH and conductivity measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity and hardness levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

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

2.8 Data Analysis

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

BAL
ADEQ #88-0630
Project X4922

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in all of the effluent dilutions after 24 hours in both tests ($p=.05$). The NOEC value for both tests was zero percent effluent ($p=.05$). The 48-hour LC_{50} value for the fathead minnow and the *Daphnia pulex* tests was 16.0 percent effluent ($p=.05$).

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i> (Fathead Minnow)	<i>Daphnia pulex</i>
Control	97.5	97.5
22.0	0.0	0.0
32.0	0.0	0.0
42.0	0.0	0.0
56.0	0.0	0.0
75.0	0.0	0.0
100.0	0.0	0.0
100.0 pH adj.	N/A	0.0

The 48-hour reference toxicant test results indicate that the test organisms were within the respective sensitivity range. The graphs of the acute reference toxicant tests can be found in Appendix D.

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ADEQ #88-0630
Project X4922

4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on November 4, 2012, was found to be lethally toxic to the *Daphnia pulex* test organisms and the fathead minnow test organisms after 48 hours of exposure ($p=.05$). The 48-hour LC_{50} value for the daphnid and minnow tests was 16.0 percent effluent ($p=.05$).

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Project X4922

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
Covington, LA 71028

(510) 745-2173
(510) 745-1548
Fax: (510) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company		Phone: (870) 863-1484		Analysis:					Project Number: X4922				
Address: 4500 Norwest Ave., El Dorado, AR 71731		Fax: (870) 863-7499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Temperature upon arrival: 29 Thermometer #20 Tech: AW Date: 11/5/12	Preservative: (below) ice	
Permit #: AR0000752/AFIN 70-00040		Purchase Order:											Lab Control Number:
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC													
Date Start Date End	Time Start Time End	D	G	# and type of container	Sample Identification								
11/4/12	9:05		X	6 half gallon	007						06405		
Relinquished by/Affiliation: Larken Pennington				Date: 11/5/12	Time: 1248	Received by/Affiliation: Caleb Houghton				Date: 11/5/12	Time: 1248		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:		
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:		
Method of Shipment: ___ Lab ___ Bus ___ Fed Ex ___ DHL ___ UPS <input checked="" type="checkbox"/> Client ___ Other ___ Tracking # _____													
Comments:													

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X4922

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 Outfall 007

Technicians: EGB/AH/LGZ/RC

Test initiated: PP Date 11/5/12 Time 1455 DP Date 11/7/12 Time 1430

Test initiated: DP Date 11/6/12 Time 1345 DP Date 11/8/12 Time 1315

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
PP C16405	10.0 / 119.7%	4125 / 84.97.7%	0.01	NO	>6.0	N/A	100%	100%	AH
DP ↓	9.4 / 109.8%	4125 / 85.18.2%	↓	↓	↓	↓	↓	↓	↓
DP ↓									

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	3400	NA	NA	NA	NA	7.8	111.0	420	RC
↓	↓								

Test Species Information

Test Species Info.	Species: <u>D. pulex</u> ID#: <u>PA1</u>	Species: <u>P. promelas</u> ID#: <u>PA1/102812</u>	Species: ID#:	Species: ID#:
Age	424h	~8d		
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 RC	GOOD RC		

Comments:

*D. pulex test set up out of holding time. ^{egg} 11/8/12 ACUTE1 020809 Rev.

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

Project# X4922

Test started: Date 11/6/12

Time 1345

Client El Dorado Chemical

Test ended: Date 11/8/12

Time 1315

Sample Description 007

Test Species D. pulex

ID# BAL A5-C5

Technician: Ohour AH 24hour RC 48hour RC 72hour _____ 96hour _____
 Time: Ohour 1345 24hour 1425 48hour 1315 72hour _____ 96hour _____
 Temperature (°C): Ohour 21.9 24hour 24.8 48hour 24.9 72hour _____ 96hour _____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH				Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		8	8	7			83	83	84			27	28	29			173	173	173		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32	A		8	0	-			83	84	-			6.4	6.5	-			3420	3410	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
Chemistry Tech prerenewal/postrenewal							AH	RC	RC			AH	RC	RC			AH	RC	RC			

ACUTE2 020809 Rev.

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

Project# X4922

Test started: Date 11/6/12

Time 1315

Client El Dorado Chemical

Test ended: Date 11/8/12

Time 1315

Sample Description 007

Test Species D. pulex

ID# BR1A5-C5

Technician: 0hour AH 24hour RC 48hour RC 72hour RC 96hour RC
 Time: 0hour 1345 24hour 1425 48hour 1315 72hour RC 96hour RC
 Temperature (°C): 0hour 24.9 24hour 24.8 48hour 24.9 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
42	A	NA	8	0	-			83	84	-			6.1	6.1	-			46.70	48.20	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
50	A		8	0	-			83	84	-			5.9	6.0	-			55.00	51.80	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
Chemistry Tech prerenewal/postrenewal							FN	RC	RC			ALL	RC	RC			FN	RC	RC			

ACUTE2 020809 Rev.

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

Project# X4922

Test started: Date 1/6/12

Time 1345

Client El Dorado Chemical

Test ended: Date 1/8/12

Time 1315

Sample Description 007

Test Species D. pulex

ID# BR/A5-C5

Technician:

Ohour NA 24hour RC 48hour RC 72hour RC 96hour RC

Time:

Ohour 1345 24hour 1405 48hour 1315 72hour RC 96hour RC

Temperature (°C):

Ohour 24.9 24hour 24.8 48hour 24.9 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
56	A	NA	8	0	-			8.3 8.4	-					5.0	5.9	-			1220 1260	-			
	B		8	0	-																		
	C		8	0	-																		
	D		8	0	-																		
	E		8	0	-																		
75	A		8	0	-			8.3 8.3	-					5.1	5.6	-			1030 1000	-			
	B		8	0	-																		
	C		8	0	-																		
	D		8	0	-																		
	E		8	0	-																		
Chemistry Tech prerenewal/postrenewal								PH RC		RC				PH RC		RC			PH RC		RC		

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

Project# X4922

Test started: Date 11/6/12

Time 1315

Client El Dorado Chemical

Test ended: Date 11/8/12

Time 1315

Sample Description 007

Test Species D. pulex

ID# BAU175-C5

Technician:

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

Time:

0hour 1315 24hour 1455 48hour 1315 72hour RC 96hour RC

Temperature (°C):

0hour 20.0 24hour 24.8 48hour 24.9 72hour RC 96hour RC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	0	-			8.4	8.2	-			4.7	5.2	-			10300	10050	-		
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
100	A		8	0	-			8.4	8.2	-			6.8	5.9	-			10580	9910	-		
PHADj	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
Chemistry Tech prerenewal/postrenewal							AH	RC	RC				AH	RC	RC			AH	RC	RC		

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

Project# X4922

Test started: Date 11/15/12 Time 1455

Client El Dorado Chemical

Test ended: Date 11/17/12 Time 1430

Sample Description 007

Test Species D. promelas ID# BAL102812

Technician: Ohour AM 24hour RC 48hour AM 72hour AM 96hour AM
 Time: Ohour 1455 24hour 1325 48hour 1430 72hour AM 96hour AM
 Temperature (°C): Ohour 25 24hour 25.1 48hour 24.8 72hour AM 96hour AM

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity							
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96			
0	A	NA	8	8	8			8.2	8.1	8.3	7.7			7.0	7.5	7.7	7.2			174	173	173	170	170	
	B		8	8	8																				
	C		8	8	8																				
	D		8	8	8																				
	E		8	8	8																				
32	A		8	0				8.2	7.2					6.7	6.7					6.0	6.0				
	B		8	0																					
	C		8	0																					
	D		8	0																					
	E		8	0																					
Chemistry Tech prerenewal/postrenewal							AM	RC	AM	AM			AM	RC	AM	AM			AM	RC	AM	AM			

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

Project# X4922

Test started: Date 11/12/12

Time 1455

Client El Dorado Chemical

Test ended: Date 11/12/12

Time 1430

Sample Description 007

Test Species D. promelas ID# BAU 102812

Technician: 0hour AM 24hour PC 48hour AM 72hour PC 96hour PC
 Time: 0hour 1455 24hour 1325 48hour 1430 72hour PC 96hour PC
 Temperature (°C): 0hour 25 24hour 25.1 48hour 24.8 72hour PC 96hour PC

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
42	A	NA	8	0				8.2	7.9				6.7	6.5			1000	980						
	B		8	0																				
	C		8	0																				
	D		8	0																				
	E		8	0																				
50	A		8	0				8.2	7.6				6.6	6.5			990	920						
	B		8	0																				
	C		8	0																				
	D		8	0																				
	E		8	0																				
Chemistry Tech prerenewal/postrenewal																								
							AM	PC					AM	PC			AM	PC						

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

Project# X4922

Test started: Date 11/5/12

Time 1455

Client El Dorado Chemical

Test ended: Date 11/12

Time 1430

Sample Description 007

Test Species D. promelas ID# BAU 1032

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

Time: 0hour 1455 24hour 1325 48hour 1450 72hour dm 96hour dm

Temperature (°C): 0hour 25 24hour 25.1 48hour 24.8 72hour dm 96hour dm

1032 20012 11/5/12

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity												
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96								
100	A	NA	8	0				8.2	7.8									6.3	6.2					16948	17212					
	B		8	0																										
	C		8	0																										
	D		8	0																										
	E		8	0																										
UNID			A	8																										
UNID			B	8																										
UNID			C	8																										
UNID			D	8																										
UNID			E	8																										
Chemistry Tech prerenewal/postrenewal																														

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APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date: 11/8/2012 Test ID: X4922DP Sample ID: 7
 End Date: 11/8/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/6/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	0.8750	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				CV%	N	Rank Sum	1-Tailed Critical
			Mean	Min	Max					
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	15.00	19.00	
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	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.62485	0.842	-2.5156	7.15179

Equality of variance cannot be confirmed

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates significant differences
 Treatments vs D-Control

Daphnid Acute Test-48 Hr Survival

Start Date: 11/6/2012 Test ID: X4922DP Sample ID: 7
 End Date: 11/8/2012 Lab ID: ADEQ 88063 Sample Type: EFF2-Industrial
 Sample Date: 11/6/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	0.8750	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100PHADJ	0.0000	0.0000	0.0000	0.0000	0.0000

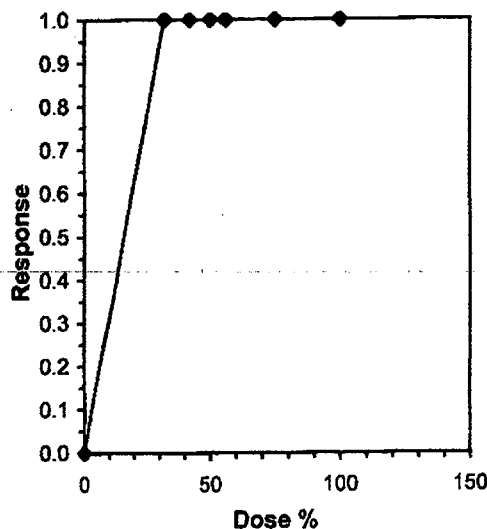
Conc-%	Transform: Arcsin Square Root							Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	0.9750	1.0000
32	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
42	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000
50	0.0000	0.0000	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	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.38831	0.934	-4.1486	23.0852
Equality of variance cannot be confirmed				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew	
IC05*	1.600	0.000	1.600	1.600	-1.5436
IC10*	3.200	0.000	3.200	3.200	-1.1782
IC15*	4.800	0.000	4.800	4.800	1.0097
IC20*	6.400	0.000	6.400	6.400	-1.0097
IC25*	8.000	0.000	8.000	8.000	0.9737
IC40*	12.800	0.000	12.800	12.800	-1.0118
IC50*	16.000	0.000	16.000	16.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



Acute Fish Test-48 Hr Survival

Start Date: 11/5/2012 Test ID: X4922PP Sample ID: 7
 End Date: 11/7/2012 Lab ID: ADEQ 880630 Sample Type: EFF2-Industrial
 Sample Date: 11/5/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

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

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

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

Acute Fish Test-48 Hr Survival

Start Date: 11/5/2012 Test ID: X4922PP Sample ID: 7
 End Date: 11/7/2012 Lab ID: ADEQ 88063 Sample Type: EFF2-Industrial
 Sample Date: 11/5/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

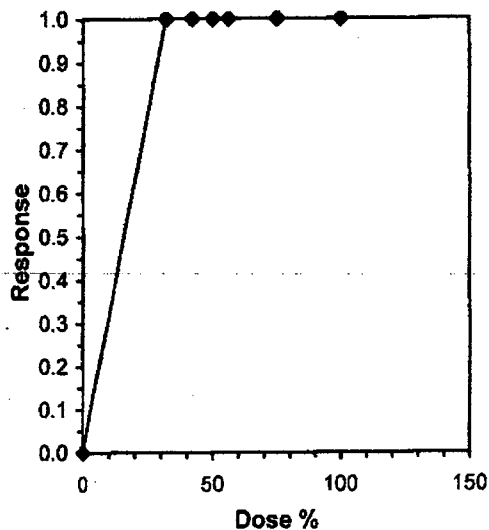
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000
42	0.0000	0.0000	0.0000	0.0000	0.0000
50	0.0000	0.0000	0.0000	0.0000	0.0000
56	0.0000	0.0000	0.0000	0.0000	0.0000
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				Isotonic		
			Mean	Min	Max	CV%	N	Mean	N-Mean
								1.0000	1.0000
								0.0000	0.0000
								0.0000	0.0000
								0.0000	0.0000
								0.0000	0.0000
								0.0000	0.0000
								0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05) Equality of variance cannot be confirmed	0.38831	0.934	-4.1486	23.0852

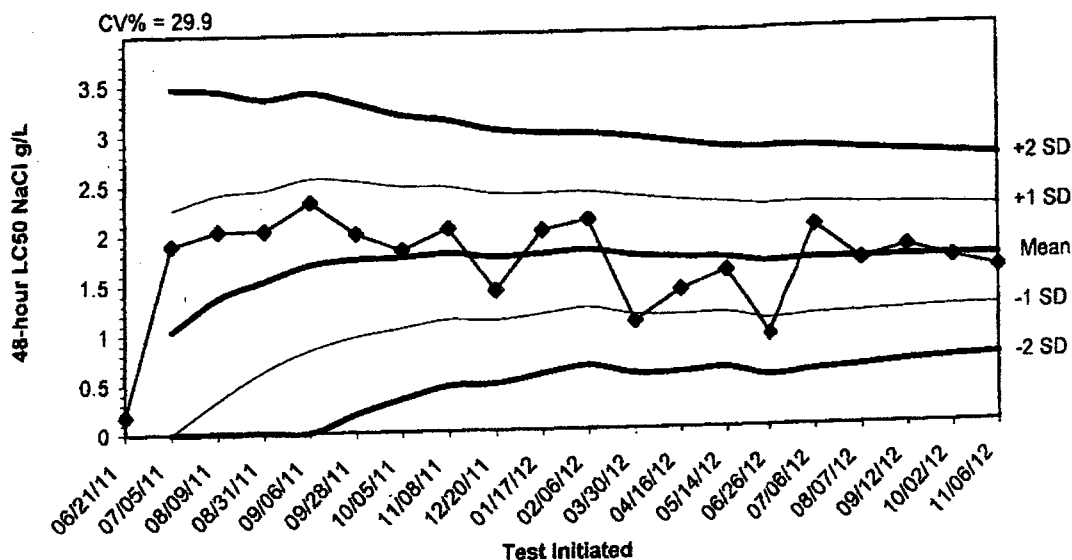
Linear Interpolation (200 Resamples)					
Point	%	SD	95% CL(Exp)	Skew	
IC05*	1.600	0.000	1.600	1.600	#DIV/0!
IC10*	3.200	0.000	3.200	3.200	-1.0076
IC15*	4.800	0.000	4.800	4.800	1.0076
IC20*	6.400	0.000	6.400	6.400	-1.0076
IC25*	8.000	0.000	8.000	8.000	#DIV/0!
IC40*	12.800	0.000	12.800	12.800	-1.0076
IC50*	16.000	0.000	16.000	16.000	#DIV/0!

* indicates IC estimate less than the lowest concentration



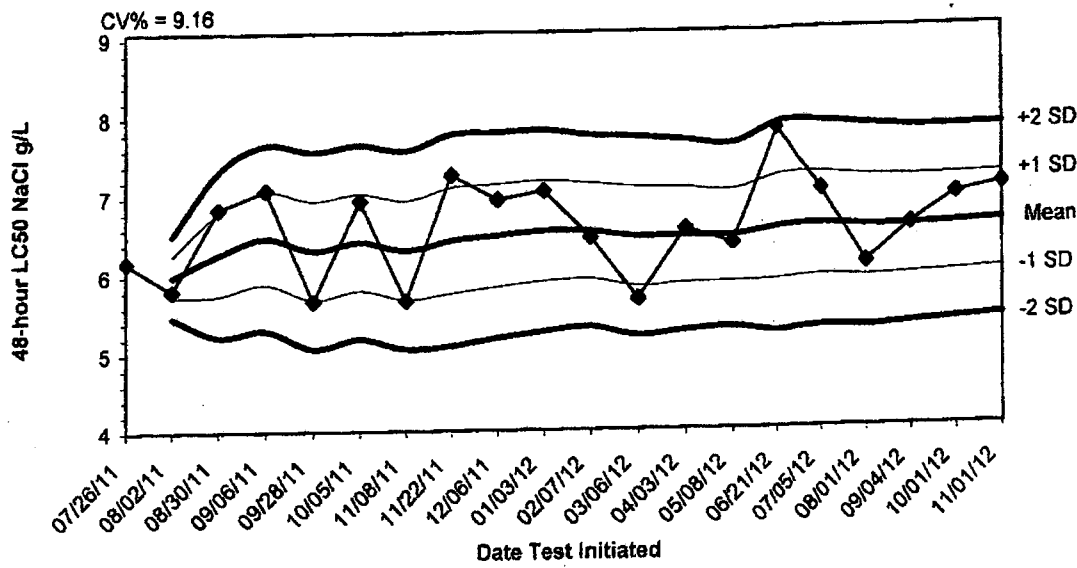
APPENDIX D
QUALITY ASSURANCE CHARTS

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/21/11	0.1800					
07/05/11	1.9000	1.0400	0.0000	0.0000	2.2562	3.4724
08/09/11	2.0400	1.3733	0.3375	0.0000	2.4092	3.4450
08/31/11	2.0400	1.5400	0.6309	0.0000	2.4491	3.3581
09/06/11	2.3200	1.6960	0.8349	0.0000	2.5571	3.4182
09/28/11	2.0000	1.7467	0.9665	0.1864	2.5268	3.3069
10/05/11	1.8300	1.7586	1.0457	0.3329	2.4714	3.1843
11/08/11	2.0400	1.7938	1.1263	0.4589	2.4612	3.1286
12/20/11	1.4100	1.7511	1.1138	0.4765	2.3884	3.0257
01/17/12	2.0100	1.7770	1.1706	0.5642	2.3834	2.9898
02/06/12	2.1100	1.8073	1.2233	0.6393	2.3912	2.9752
03/30/12	1.0800	1.7467	1.1516	0.5565	2.3417	2.9368
04/16/12	1.3900	1.7192	1.1410	0.5627	2.2975	2.8757
05/14/12	1.5800	1.7093	1.1525	0.5957	2.2661	2.8229
06/26/12	0.9200	1.6567	1.0827	0.5088	2.2306	2.8046
07/06/12	2.0100	1.6788	1.1173	0.5558	2.2402	2.8017
08/07/12	1.6600	1.6776	1.1340	0.5903	2.2213	2.7650
09/12/12	1.7800	1.6833	1.1553	0.6273	2.2113	2.7393
10/02/12	1.6600	1.6821	1.1690	0.6558	2.1953	2.7084
11/06/12	1.5500	1.6755	1.1752	0.6748	2.1758	2.6762

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/26/11	6.1800					
08/02/11	5.8100	5.9950	5.7334	5.4717	6.2566	6.5183
08/30/11	6.8500	6.2800	5.7528	5.2257	6.8072	7.3343
09/06/11	7.0900	6.4825	5.8915	5.3005	7.0735	7.6645
09/28/11	5.6700	6.3200	5.6923	5.0646	6.9477	7.5754
10/05/11	6.9500	6.4250	5.8075	5.1899	7.0425	7.6601
11/08/11	5.6700	6.3171	5.6853	5.0535	6.9490	7.5808
11/22/11	7.2700	6.4363	5.7612	5.0882	7.1113	7.7863
12/06/11	6.9500	6.4933	5.8391	5.1848	7.1476	7.8018
01/03/12	7.0600	6.5500	5.9077	5.2653	7.1923	7.8347
02/07/12	6.4600	6.5418	5.9318	5.3219	7.1518	7.7618
03/06/12	5.6700	6.4692	5.8355	5.2017	7.1029	7.7366
04/03/12	6.5600	6.4762	5.8689	5.2616	7.0834	7.6907
05/08/12	6.3700	6.4686	5.8845	5.3003	7.0527	7.6368
06/21/12	7.8200	6.5587	5.8964	5.2342	7.2209	7.8832
07/05/12	7.0300	6.5581	5.9376	5.2870	7.2387	7.8892
08/01/12	6.0900	6.5588	5.9174	5.2761	7.2002	7.8416
09/04/12	6.5700	6.5594	5.9372	5.3150	7.1817	7.8039
10/01/12	6.9500	6.5800	5.9687	5.3574	7.1913	7.8026
11/01/12	7.0600	6.6040	5.9994	5.3948	7.2086	7.8132

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: 11/04/12

To: 11/04/12

From:

To:

Test Initiated: 11/06/12

Dilution Water Used:

Receiving Water

X

Reconstituted Water

Dilution Series Results - Percent Survival

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

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

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

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = 16.0% effluent

95 % confidence limits: N/A

Method of LC₅₀ calculation: Graphical

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

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

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

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

**Biomonitoring
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, Callahan
 Sample Collected

Test Begin
 Test End

From: Date 11/04/12 Time 0905
 To: Date 11/04/12 Time 0905
 Date 11/06/12 Time 1345
 Date 11/08/12 Time 1315

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH			
	Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0		8.3	8.3	8.4	24.9	24.8	24.9	40.0			64.0			7.7	8.3	7.9
32		8.3	8.4		24.9	24.8								6.4	6.5	
42		8.3	8.4		24.9	24.8								6.1	6.1	
50		8.3	8.4		24.9	24.8								5.9	6.0	
56		8.3	8.4		24.9	24.8								5.6	5.9	
75		8.3	8.3		24.9	24.8								5.1	5.6	
100		8.4	8.2		24.9	24.8		4.0			100.0			4.7	5.2	
100 pH adj		8.4	8.2		24.9	24.8								6.8	5.9	

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

Acute Forms
Pimephales promelas (Fathead Minnow) Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040

Composite Collected From: 11/04/12 To: 11/04/12
From: To:

Test Initiated: 11/05/12

Dilution Water Used: Receiving Water Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32	42	50	56	75	100
24-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
48-hour	A	100	0	0	0	0	0	0
	B	100	0	0	0	0	0	0
	C	100	0	0	0	0	0	0
	D	100	0	0	0	0	0	0
	E	100	0	0	0	0	0	0
	Mean	100	0	0	0	0	0	0

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

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

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

LC_{50} = 16.0% effluent

95 % confidence limits: N/A

Method of LC_{50} calculation: Graphical

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

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

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

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

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

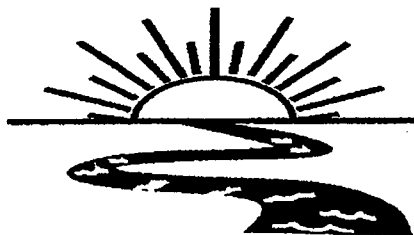
Permittee: El Dorado Chemical - Outfall 007
 NPDES Number: AR0000752/ AFIN 70-00040
 Contact: Larken Pennington
 Analyst: Haughton, Callahan

Sample Collected From: Date 11/04/12 Time 0905
 To: Date 11/04/12 Time 0905
 Test Begin Date 11/06/12 Time 1455
 Test End Date 11/08/12 Time 1430

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	8.2	8.3	7.7	25.0	25.1	24.8	40.0				64.0			7.6	7.7	7.2
32	8.2	7.2		25.0	25.1									6.7	6.7	
42	8.2	7.5		25.0	25.1									6.7	6.5	
50	8.2	7.6		25.0	25.1									6.6	6.5	
56	8.2	7.8		25.0	25.1									6.6	6.4	
75	8.2	7.8		25.0	25.1									6.5	6.4	
100	8.2	7.8		25.0	25.1		4.0				100.0			6.3	6.2	

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

APPENDIX F
REPORT QUALITY ASSURANCE FORM



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical - 007

Project#: X4922

Chain of Custody Documents Checked by: AH 11/16/12
Technician/Date

Raw Data Documents Checked by: AH 11/16/12
Technician/Date

Statistical Analysis Package Checked by: EGB 11/20/12
Quality Manager/Date

Quality Control Data Checked by: EGB 11/21/12
Quality Manager/Date

Report Checked by: EGB 11/30/12
Quality Manager/Date

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

Erin L. Bragg, BS
Quality Manager

11/30/12
Date

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

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

Origin ID: ELDA



J12201208200325

El Dorado, AR 71730

SHIP TO: (501) 682-0655

BILL SENDER

**ADEQ - Water Division Enforcement
5301 Northshore Drive**

NORTH LITTLE ROCK, AR 72118

Ship Date: 20DEC12
ActWgt: 1.0 LB
CAD: 5887030/INET3300

Delivery Address Bar Code



Ref #
Invoice #
PO #
Dept #

**FRI - 21 DEC A4
PRIORITY OVERNIGHT**

TRK# 7943 5993 2172

0201

X2 LITA

72118

AR-US

LIT

