

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



CHEMICAL COMPANY

March 20, 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 February 29, 2012.

Enclosed you will find the Discharge Monitoring Report ending February 29, 2012.  
If you have any questions regarding this report, please contact Larken Pennington at (870) 863-1125.

Sincerely,

A handwritten signature in cursive script that reads "Greg Withrow".

Greg Withrow  
General Manager

Enclosures

# NON-COMPLIANCE REPORT

**Facility Name:** El Dorado Chemical Company  
**Permit Number:** AR0000752 **AFIN:** 70-00040  
**Month / Year:** Feb-11

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
Outfall 001 / TDS Monthly Average (280.0 mg/l)	237 mg/l Monthly Average	2/6/2012		
Outfall 006 / Zinc Monthly Average (130.0 ug/l)	115.62 ug/L Monthly Average	2/3/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 006 / TDS Monthly Average and Daily Max (1100.0 mg/l)	291.0 mg/l Monthly Average/ 436.5 ug/L Daily Max	2/3/2012	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 and Daily Max (977.0 ug/l)	115.62 ug/l Monthly Average/ 231.99 ug/L Daily Max	2/3/2012	Unknown	EDCC continues to monitor and evaluate potential sources of the Zinc exceedance.
Outfall 007 / TDS Monthly Average and Daily Max (2900.0 mg/l)	291.0 mg/l Monthly Average/ 436.5 ug/L Daily Max	2/3/2012	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>Greg Withrow</i> 3/20/12</p> <p>Signature / Date</p>

Bio-Analytical Laboratories (BAL)  
ADEQ Certificate #88-0630  
Project X4652

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X4652

**Outfall:** 001

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

**Contact:** Larken Pennington

**Test Dates:** February 14 - 21, 2012

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

#### Results:

##### For *Ceriodaphnia dubia*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0.
2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 1.
3. Report the NOEC value for survival, Parameter TOP3B - 100%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 0%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 79.51%.

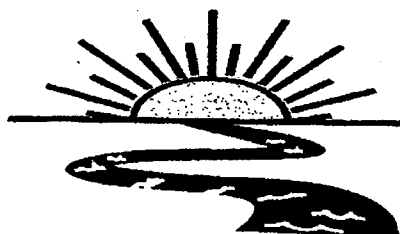
**Note: The UV treated 100% dilution showed no lethal effects, but non-lethal effects were noted.**

##### For *Pimephales promelas*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP6C - 0.
2. If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP6C - 0.
3. Report the NOEC value for survival, Parameter TOP6C - 100%
4. Report the NOEC value for growth, Parameter TPP6C - 100%
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 20.18%

**Note: The UV treated 100% dilution showed no lethal or nonlethal effects.**

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



## **Bio-Analytical Laboratories**

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1-800-259-1248  
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### **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 X4652**

**Test Dates: February 14 - 21, 2012**

**Report Date: March 8, 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 X4652

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ADEQ #88-0630  
Project X4652

## 1.0 Introduction

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

## 2.0 Methods and Materials

### 2.1 Test Methods

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

### 2.2 Test Organisms

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

### 2.3 Dilution Water

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

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## 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 February 13, 15 and 17, 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<sup>R</sup> amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH<sup>R</sup> 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 both tests to determine if any toxicity was due to a potential pathogen. Dissolved oxygen and pH measurements were measured on the control and each concentration at test initiation, at test renewal and at test termination. Conductivity measurements were also taken at test initiation and at each renewal. Alkalinity and hardness levels were measured on the control and the undiluted effluent samples.

## 2.7 Monitoring of the Tests

The cladoceran test was run in a Precision<sup>R</sup> 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<sup>R</sup> heated liquid circulator to keep a constant temperature of  $25 \pm 1^{\circ}$  Celsius. AEMC<sup>R</sup> 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 Steel's Many-One Rank Test, a nonparametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Steel's Many-One Rank Test, while the growth data was analyzed using Dunnett's Test, a parametric test. The test endpoints in the reference toxicant tests and any other quality control test endpoints were obtained by approved EPA methods of analysis.

## 3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. One hundred percent survival occurred in the control and 90 percent survival occurred in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 19.6 and 1.1, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively ( $p=.05$ ). Treating with UV light did not reduce the toxicity.

The fathead minnow test results can be found in Table 2. Ninety-seven-point-five percent survival occurred in the control and 90 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.553 milligram (mg), while the average in the critical dilution was 0.633 mg. The NOEC for survival and growth in this test was 100 percent effluent.



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**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		19.6	19.6	
32.0	100.0		3.9	3.9	*
42.0	100.0		1.8	1.8	*
56.0	100.0		0.8	0.8	*
75.0	100.0		1.3	1.3	*
100.0	90.0		1.2	1.1	*
100.0 UV	100.0		0.8	0.8	*

\*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		0.553/0.567+	
32.0	97.5		0.540	
42.0	92.5		0.548	
56.0	95.0		0.575	
75.0	95.0		0.588	
100.0	90.0		0.633	
100.0 UV	95.0		0.538	

\*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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#### 4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 13, 15 and 17, 2012, were not found to be lethally toxic to the fathead minnow test organisms nor the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven days of exposure ( $p=.05$ ). Nonlethal effects (i.e., lack of growth or reproduction) were not noted in the critical dilution in the minnow test, but were noted in the *Ceriodaphnia dubia* test ( $p=.05$ ). Treating the sample with UV light did not reduce the nonlethal effects in the *Ceriodaphnia dubia* test.

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### **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 Spargia Road  
 Doyline, LA 71023  
 (318) 745-2772, Fax (318) 745-2773  
 bioanalytical@at.net

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

<b>Company:</b> El Dorado Chemical Company		<b>Phone:</b> (870) 863-1484		<b>Analysis:</b>						<b>Project Number:</b> X4652  <b>Temp. upon arrival:</b>  <b>Preservative: (below)</b> ice		
<b>Address:</b> 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		<b>Fax:</b> (870) 863-1499		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia		Fecal Coliform	Total Coliform
<b>Permit #:</b> AR0000752		<b>Purchase Order:</b>		<b>Sampler's Signature/Printed Name/Affiliation:</b> Larken Pennington / Larken Pennington / EDCO								
<b>Date Start</b>	<b>Date End</b>	<b>C</b>	<b>G</b>	<b># containers</b>	<b>Sample Identification</b>							
2/12/12	2/13/12	X		8	001	X	X					C5018
<b>Relinquished by/Affiliation:</b> Larken Pennington		<b>Date:</b> 2/13/12		<b>Time:</b> 1015		<b>Received by/Affiliation:</b> [Signature]		<b>Date:</b> 2/13/12		<b>Time:</b> 1015		
<b>Relinquished by/Affiliation:</b>		<b>Date:</b>		<b>Time:</b>		<b>Received by/Affiliation:</b>		<b>Date:</b>		<b>Time:</b>		
<b>Relinquished by/Affiliation:</b> [Signature]		<b>Date:</b> 2/13/12		<b>Time:</b> 1240		<b>Received by/Affiliation:</b> R Callahan		<b>Date:</b> 2/13/12		<b>Time:</b> 1240		
<b>Method of Shipment:</b> <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other <input type="checkbox"/> Tracking # _____												
<b>Comments:</b> Temperature upon arrival: 2.2 Thermometer #: 29 Tech: RC Date: 2/13/12												

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 bioanalytical@batl.net

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

<b>Company:</b> El Dorado Chemical Company		<b>Phone:</b> (870) 863-1484		<b>Analysis:</b>						<b>Project Number:</b> X46052	<b>Temp. upon arrival:</b>								
<b>Address:</b> 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		<b>Fax:</b>		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia			Fecal Coliform	Total Coliform						
<b>Permit #:</b> AR0000752		<b>Purchase Order:</b>												<b>Lab Control Number:</b> CS027	<b>Preservative:</b> (below) ice				
<b>Sampler's Signature/Printed Name/Affiliation:</b> Karken Pennington / Karken Pennington / ECCC																			
<b>Date Start</b> Date End	<b>Time Start</b> Time End	<b>C</b>	<b>G</b>							<b># containers</b>	<b>Sample Identification</b>								
2/14/12 2/15/12	8:30am 8:30am	X		8	001		X X												
<b>Relinquished by/Affiliation:</b> Karken Pennington				<b>Date:</b> 2/15/12	<b>Time:</b> 8:50 am	<b>Received by/Affiliation:</b> [Signature]				<b>Date:</b> 2/15/12	<b>Time:</b> 0945								
<b>Relinquished by/Affiliation:</b>				<b>Date:</b>	<b>Time:</b>	<b>Received by/Affiliation:</b>				<b>Date:</b>	<b>Time:</b>								
<b>Relinquished by/Affiliation:</b> [Signature]				<b>Date:</b> 2/15/12	<b>Time:</b> 1210	<b>Received by/Affiliation:</b> J Meagler				<b>Date:</b> 2/15/12	<b>Time:</b> 1210								
<b>Method of Shipment:</b> <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking #																			
<b>Comments:</b>										<b>Temperature upon arrival:</b> Thermometer #: 2.9°C Tech: [Signature] Date: 2/15/12									

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CHAIN OF CUSTODY

NELAP 01975, ADEQ #89-0630, EPA LA00917

Company: El Dorado Chemical Company						Phone: (870) 863-1484		Analysis:							Project Number: X4652		
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	Temperature upon arrival: 0.2	Thermometer #: 29
Permit #: AR0000752			Purchase Order:			Lab Control Number:	Preservative: (below)										
Sampler's Signature/Printed Name/Affiliation: Larken Pennington / Larken Pennington / EDCC																	
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification												
2/16/12 2/17/12	8:00am - 8:30am	X		8	001	X	X								CS044	Ice	
Relinquished by/Affiliation: Larken Pennington					Date: 2/17/12	Time: 0925	Received by/Affiliation: J B's					Date: 2/17/12	Time: 0925				
Relinquished by/Affiliation:					Date:	Time:	Received by/Affiliation:					Date:	Time:				
Relinquished by/Affiliation: J B's					Date: 2/17/12	Time: 1150	Received by/Affiliation: James Adkinson					Date: 2/17/12	Time: 1150				
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# X4652 Date start: 2/14/12 Date end: 2/21/12

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave. El Dorado AR 71731

NPDES# AR0000752/AFIN 70-00040

Sample Description 001 Dilution Waters of reconstituted

Test Temperature (°C) 25±1°C Technicians Hughton, Zoopler, Callahan

Adults isolated: Date 2/18/12 Time: 2315

Neonates collected: Date 2/14/12 Time: 0630 Board: U155

Dissolved Oxygen Meter: Model YSI550A Serial # 06E2089

pH Meter: Model Orion 230A+ Serial # 020273

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>11.6/139.5%/RC</u>	0. <u>Y/20/8.0/91.6%/oblong</u>	0. <u>N/A</u>	0. <u>N/A</u>
1. <u>11.6/138.8%/AH</u>	1. <u>Y/20/8.2/98.5%/AH</u>	1. _____	1. _____
2. <u>11.4/137.6%/RC</u>	2. <u>Y/20/8.0/96.2%/RC</u>	2. _____	2. _____
3. <u>9.7/117.4%/AH</u>	3. <u>Y/20/8.1/96.8%/AH</u>	3. _____	3. _____
4. <u>11.5/141.8%/RC</u>	4. <u>Y/20/7.9/95.9%/RC</u>	4. _____	4. _____
5. <u>11.8/141.2%/RC</u>	5. <u>Y/20/8.2/97.3%/RC</u>	5. _____	5. _____
6. <u>11.2/125.2%/AH</u>	6. <u>Y/20/8.1/97.1%/AH</u>	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____

Total Residual Chlorine (mg/L)/Tech

Dechlorinated? Amount?/Tech

Ammonia (NH3) (mg/L)/Tech

BAL Sample #

Date

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

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

1. 1.0/RC  
2. 1.0/RC  
3. 1.0/RC

1. C5018 2/14/12  
2. C5627 2/16/12  
3. C5044 2/18/12

Comments:

BIO-ANALYTICAL LABORATORIES  
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4652 Test Dates 2/14-21/12

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100uv
A	23	12	1	1	2	2	1
B	17	5	1	1	2	0	2
C	17	2	1	0	1	1	0
D	22	2	1	0	1	2	1
E	17	2	3	1	2	0	0
F	11	7	3	3	2	2	1
G	25	2	1	0	0	0	2
H	17	1	4	0	0	X	0
I	15	3	2	0	1	2	1
J	32	3	1	2	2	2	0
Surviving Mean	19.6	3.9	1.8	0.8	1.3	1.2	0.8
Total Mean	19.6	3.9	1.8	0.8	1.3	1.1	0.8
CV%*	30.54	85.85	63.07	129.10	63.33	79.51	98.60

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

Key: M=male; X=dead adult

Calculated by: PH 2/21/12

Calculations checked by: RC 2/21/12

BIO-ANALYTICAL LABORATORIES  
 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4652 Test started: Date 2/14/12 Time 1305  
 Client El Dorado Chemical Test ended: Date 2/14/12 Time 1320

Technician: Day 0 AM 1 PH 2 RC 3 PH 4 RC 5 RC 6 RC 7 RC 8  
 Time: Day 0 1305 1 1045 2 1105 3 1505 4 1250 5 1330 6 1235 7 1320 8  
 Temperature: Day 0 24.5 1 24.2 2 24.8 3 24.4 4 24.3 5 24.6 6 24.3 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	2	(3)	3	2	4	2	3	2	2	5	10	
	5	6	(1)	3	6	(1)	7	8	3	8	0	10	
	6	2	0	0	0	(2)	2	0	0	5	10	10	
	7	13	13	11	14	10	0	14	12	0	17	10	
	8												
32	1	0										10	
	2	0										10	
	3	0										10	
	4	1	2	0	1	1	2	0	0	0	0	10	
	5	0	0	0	0	0	1	0	0	0	0	10	
	6	2	0	0	0	1	2	0	1	0	1	10	
	7	9	3	2	1	0	2	2	0	3	2	10	
	8												
40	1	0										10	
	2	0										10	
	3	0										10	
	4	0										10	
	5	0					1	1	0			10	
	6	0	1	0	0	1	0	0	0	0	1	10	
	7	1	0	1	1	1	2	1	0	2	0	10	
	8												
56	1	0										10	
	2	0										10	
	3	0										10	
	4	0										10	
	5	0						2	0			10	
	6	0									2	10	
	7	1	1	0	0	1	1	0	0	0	0	10	
	8												
75	1	0										10	
	2	0										10	
	3	0										10	
	4	0										10	
	5	0	1	0		2	0					10	
	6	0	1	0			1	0				10	
	7	2	0	1	1	0	1	0	0	1	2	10	
	8												
100	1	0										10	
	2	0										10	
	3	0										10	
	4	0										10	
	5	0						1	0	0	X	9	
	6	0								0		9	
	7	2	0	1	2	0	1	0		1	2	9	
	8												

RC  
 2/14/12

BIO-ANALYTICAL LABORATORIES  
 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4652 Test started: Date 2/14/12 Time 0805  
 Client El Dorado Chemical Test ended: Date 2/15/12 Time 1320

Technician: Day 0 SAH 1 PH 2 PC 3 AH 4 RC 5 PC 6 RC 7 RC 8 \_\_\_\_\_  
 Time: Day 0 1205 1 1045 2 1105 3 1005 4 1250 5 1230 6 1235 7 1320 8 \_\_\_\_\_  
 Temperature: Day 0 24.5 1 24.2 2 24.8 3 24.4 4 24.3 5 24.6 6 24.3 7 24.3 8 \_\_\_\_\_

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

Cont. AH 2/15/12

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4652

Test started: Date 3/11/12 Time 1405

Client El Dorado Chemical

Test ended: Date 3/12/12 Time 1320

Organism C. dubia

Day/# water used	03278	1	2	3	03281	5	6	7	8
Concentration: Control Soft									
pH	7.8	<del>7.5</del> 7.6	<del>8.0</del> 7.9	<del>7.8</del> 7.8	<del>8.1</del> 7.8	<del>8.0</del> 7.8	<del>7.9</del> 7.7	<del>7.7</del> 7.7	<del>7.7</del> 7.7
DO (mg/l)	8.5	<del>8.5</del> 8.5	<del>8.4</del> 8.2	<del>8.4</del> 8.2	<del>8.4</del> 8.5	<del>8.5</del> 8.5	<del>8.7</del> 8.6	<del>8.7</del> 8.6	<del>8.7</del> 8.7
Cond (umhos/cm)	171.9	172.3	177.6	177.8	167.6	171.1	171.1		
Alkalinity (mg/L)	32.0				32.0				
Hardness (mg/L)	48.0				56.0				
Concentration: 322									
pH	7.9	<del>7.7</del> 7.7	<del>8.1</del> 7.9	<del>7.9</del> 7.9	<del>8.2</del> 7.9	<del>8.3</del> 7.8	<del>8.2</del> 7.8	<del>7.8</del> 7.8	<del>7.8</del> 7.8
DO (mg/l)	8.3	<del>8.3</del> 8.3	<del>8.7</del> 8.1	<del>8.6</del> 8.1	<del>8.7</del> 8.2	<del>8.6</del> 8.4	<del>8.5</del> 8.3	<del>9.1</del> 8.3	<del>9.1</del> 8.3
Cond (umhos/cm)	287	284	285	286	282	282	283		
Concentration: 422									
pH	7.9	<del>7.8</del> 7.8	<del>8.0</del> 8.0	<del>7.9</del> 7.9	<del>8.2</del> 8.0	<del>8.3</del> 7.9	<del>8.2</del> 7.9	<del>8.2</del> 7.9	<del>8.2</del> 8.2
DO (mg/l)	8.2	<del>8.2</del> 8.2	<del>8.6</del> 8.1	<del>8.6</del> 8.1	<del>8.6</del> 8.2	<del>8.6</del> 8.3	<del>8.6</del> 8.3	<del>9.0</del> 8.3	<del>9.0</del> 8.3
Cond (umhos/cm)	314	317	319	316	313	314	315		
Concentration: 562									
pH	7.9	<del>7.9</del> 7.9	<del>8.0</del> 8.0	<del>8.0</del> 8.0	<del>8.1</del> 8.0	<del>8.3</del> 7.9	<del>8.3</del> 7.9	<del>8.1</del> 7.9	<del>8.1</del> 8.1
DO (mg/l)	8.2	<del>8.2</del> 8.2	<del>8.2</del> 8.0	<del>8.6</del> 8.1	<del>8.6</del> 8.1	<del>8.4</del> 8.3	<del>8.5</del> 8.2	<del>9.0</del> 8.2	<del>9.0</del> 8.2
Cond (umhos/cm)	360	364	361	360	359	360	363		
Concentration: 752									
pH	7.9	<del>7.9</del> 7.9	<del>8.0</del> 8.0	<del>8.0</del> 8.0	<del>8.1</del> 8.0	<del>8.2</del> 8.0	<del>8.3</del> 8.0	<del>8.1</del> 8.0	<del>8.1</del> 8.1
DO (mg/l)	8.1	<del>8.1</del> 8.1	<del>8.5</del> 8.0	<del>8.6</del> 8.1	<del>8.5</del> 8.0	<del>8.4</del> 8.2	<del>8.6</del> 8.1	<del>9.1</del> 8.1	<del>9.1</del> 8.1
Cond (umhos/cm)	427	427	422	426	427	425	430		
Concentration: 1002									
pH	7.9	<del>7.9</del> 7.9	<del>8.0</del> 8.0	<del>8.1</del> 8.0	<del>8.1</del> 8.0	<del>8.2</del> 8.0	<del>8.0</del> 8.0	<del>8.2</del> 8.0	<del>8.2</del> 8.2
DO (mg/l)	7.9	<del>8.0</del> 8.0	<del>8.1</del> 8.1	<del>8.6</del> 8.0	<del>8.6</del> 7.8	<del>8.4</del> 8.1	<del>8.7</del> 8.0	<del>9.1</del> 8.0	<del>9.1</del> 8.0
Cond (umhos/cm)	514	518	509	509	511	509	520		
Tech-prerenewal	AH	AH	RC	AH	RC	RC	RC	RC	RC
Tech-postrenewal		AH	RC	AH	RC	RC	AH		
Hardness (mg/l)	40.0		64.0		60.0				
Alkalinity (mg/l)	72.0		68.0		52.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4652

Test started: Date 8/11/12 Time 1305

Client El Dorado Chemical

Test ended: Date 8/14/12 Time 1329

Organism C. dubia

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration:	AN 2/13/12 Control 100% LW-THH								
pH	7.8	7.8	8.0	8.1	8.0	8.0	8.0	8.0	8.0
DO (mg/l)	7.8	8.3	8.2	8.5	8.4	8.2	8.4	8.8	8.8
Cond (umhos/cm)	507	511	503	497	509	508	520		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH	Control 8/13/12								
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH	Control 8/13/12								
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH	Control 8/13/12								
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH	Control 8/13/12								
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	AH	AH	RC	AH	RC	RC	RC	RC	
Tech-postrenewal		RC	AH	RC	RC	AH			
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES  
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4652 Date started: 2/14/12 Date ended 2/1/12  
 Client/Contact El Dorado Chemical  
 Address 4500 Northwest Ave. El Dorado AR 71731  
 NPDES# AR0000752 / AFIN 70-00040  
 Sample Description 001 Dilution Water soft reconstituted  
 Test Temperature (°C) 25±1°C Technicians Haughton, Ziegler, Callahan  
 Test organism age 424h Vendor/ID# BAL/21412

Feeding Times

Day	Technician/Time/Amount (per replicate)		
	AM	NOON	PM
0			
1	RC/0830/0.10ml	RC/1100/0.10ml	RC/1540/0.20ml
2	RC/0825/0.10ml	RC/1100/0.10ml	RC/1425/0.10ml
3	RC/0840/0.10ml	RC/1155/0.10ml	RC/1400/0.10ml
4	RC/0840/0.10ml	RC/1210/0.10ml	RC/1340/0.10ml
5	RC/0855/0.10ml	RC/1140/0.10ml	RC/1445/0.10ml
6	RC/0840/0.10ml	RC/1200/0.10ml	RC/1355/0.10ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2082  
 pH Meter: Model Orion 230A+ Serial #020273  
 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. 11.6/139.5% /AH	0. Y/20/8.0/96.6% /AH	NA	NA
1. 11.6/138.8% /RC	1. Y/20/8.2/98.5% /RC		
2. 11.4/137.6% /RC	2. Y/20/8.0/96.2% /RC		
3. 9.7/117.4% /AH	3. Y/20/8.1/96.8% /AH		
4. 11.5/141.8% /RC	4. Y/20/7.9/95.9% /RC		
5. 11.8/141.2% /RC	5. Y/20/8.2/97.3% /RC		
6. 11.2/135.2% /AH	6. Y/20/8.1/97.1% /AH		

Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	Date
1. <0.01 /AH	1. No /AH	1. 1.0 /AH	1. C5018	2/14/12
2. <0.01 /RC	2. No /RC	2. 1.0 /RC	2. C5027	2/16/12
3. <0.01 /RC	3. No /RC	3. 1.0 /RC	3. C5044	2/18/12

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4652

Client El Dorado Chemical

Test started: Date 2/4/15 Time 1215

Test ended: Date 2/11/15 Time 1010

Technician: Day 0 AH 1 RC 2 RC 3 AH 4 RC 5 RC 6 RC 7 RC

Time: Day 0 215 1 1050 2 1033 3 1125 4 1145 5 1120 6 1155 7 1010

Temperature Day 0 25 1 25.3 2 25.1 3 24.6 4 26.0 5 25.8 6 26.0 7 26.0

Conc. $\bar{z}$	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	8	8	8	8	7	7	7	7
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
32	A	8	8	8	8	8	8	8	7
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
56	A	8	8	8	8	7	7	7	7
	B	8	8	8	8	7	7	7	7
	C	8	8	8	8	8	8	7	7
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	7	7	7
75	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	7	7
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	7	7
100	A	8	8	8	8	8	8	7	7
	B	8	8	8	8	8	8	8	7
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	6	6	6

File: Minnow2



BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# ML652 Test started: Date 1/14/12 Time 12:15  
 Client El Dorado Chemical Test ended: Date 1/16/12 Time 10:10  
 Technician: Day0 AH 1 RC 2 RC 3 AH 4 RC 5 RC 6 RC 7 RC  
 Time: Day0 12:15 1 1:00 2 1:05 3 1:25 4 1:45 5 1:50 6 1:55 7 1:10  
 Temperature Day0 25 1 25.3 2 25.1 3 21.6 4 26.0 5 25.8 6 26.0 7 26.0

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

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4652/EI Doradoch. Test Dates 2/14/12 - 2/21/12  
Oven Temperature (° Celsius) 110°C E6B2/22/12

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	1.2856 2/14/12 Jomy	1.2897 2/22/12 AH	0.0041	8	0.513	7) 0.586
	B 32	1.2893	1.2933	0.0040	8	0.500	
	C 33	1.2888	1.2941	0.0053	8	0.663	
	D 34	1.3071	1.3123	0.0052	8	0.650	
	E 35	1.2930	1.2965	0.0035	8	0.438	
32	A 36	1.2906	1.2939	0.0033	8	0.413	
	B 37	1.3033	1.3074	0.0041	8	0.513	
	C 38	1.3005	1.3051	0.0046	8	0.575	
	D 39	1.2798	1.2854	0.0056	8	0.700	
	E 40	1.2892	1.2932	0.0040	8	0.500	
42	A 41	1.2936	1.2974	0.0038	8	0.475	
	B 42	1.2843	1.2883	0.0040	8	0.500	
	C 43	1.3017	1.3068	0.0051	8	0.638	
	D 44	1.2994	1.3045	0.0051	8	0.638	
	E 45	1.2867	1.2906	0.0039	8	0.488	
56	A 46	1.2903	1.2953	0.0050	8	0.625	
	B 47	1.2877	1.2926	0.0049	8	0.613	
	C 48	1.2955	1.2999	0.0044	8	0.550	
	D 49	1.2909	1.2962	0.0053	8	0.663	
	E 50	1.2946	1.2980	0.0034	8	0.425	
75	A 51	1.3045	1.3092	0.0047	8	0.588	
	B 52	1.2991	1.3033	0.0042	8	0.525	
	C 53	1.2916	1.2967	0.0051	8	0.638	
	D 54	1.2948	1.2999	0.0051	8	0.638	
	E 55	1.2983	1.3027	0.0044	8	0.550	
100	A 56	1.2956	1.3000	0.0044	8	0.550	
	B 57	1.2923	1.2962	0.0039	8	0.488	
	C 58	1.3038	1.3094	0.0056	8	0.700	
	D 59	1.2917	1.2982	0.0065	8	0.813	
	E 60	1.3002	1.3051	0.0049	8	0.613	

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

Calculated by: Jomy 2/22/12 Calculations checked by: AH 2/22/12

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4652/EI Doradoch. Test Dates 2/14/12 - 2/21/12  
Oven Temperature (° Celsius)

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: <u>2/16/12</u> Tech:	Wt. of pan + larvae(g)/ Date weighed: <u>2/21/12</u> Tech: <u>PH</u>	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
100 uv trid	A 601	1.2932	1.2973	0.0041	8	0.513	
	B 602	1.2967	1.3012	0.0045	8	0.563	
	C 603	1.2927	1.2972	0.0045	8	0.563	
	D 604	1.3007	1.3054	0.0047	8	0.588	
	E 605	1.3011	1.3048	0.0037	8	0.463	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

DORADOCH

PH

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

Calculated by: PH 2/22/12 Calculations checked by: PH 2/22/12

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# XUV52 Test started: Date 2/11/12 Time 2:15  
 Client El Dorado Chemical Test ended: Date 2/12/12 Time 10:10  
 Organism P. promelas

Day/# water used	03078	1	2	3	438	5	6	7	8
Concentration: Control soft									
pH	7.8	7.3 / 7.6	7.5 / 7.9	7.6 / 7.8	7.5 / 7.8	7.5 / 7.8	7.4 / 7.7	7.5 / 7.5	
DO (mg/l)	8.5	7.2 / 8.5	6.5 / 8.2	6.6 / 8.2	6.4 / 8.5	6.5 / 8.5	6.7 / 8.6	7.1 / 7.1	
Cond (umhos/cm)	171.9	172.3	172.6	177.8	167.6	171.1	171.1		
Alkalinity (mg/L)	32.0				32.0				
Hardness (mg/L)	48.0				56.0				
Concentration: 322									
pH	7.9	7.4 / 7.7	7.5 / 7.9	7.5 / 7.9	7.5 / 7.9	7.4 / 7.8	7.4 / 7.8	7.5 / 7.5	
DO (mg/l)	8.3	7.3 / 8.3	6.4 / 8.1	6.6 / 8.1	6.2 / 8.2	6.1 / 8.4	6.2 / 8.3	7.0 / 7.0	
Cond (umhos/cm)	287	284	285	281	282	282	283		
Concentration: 422									
pH	7.9	7.4 / 7.8	7.4 / 8.0	7.5 / 7.9	7.5 / 8.0	7.4 / 7.9	7.3 / 7.9	7.4 / 7.4	
DO (mg/l)	8.2	7.2 / 8.2	6.4 / 8.1	6.6 / 8.1	6.4 / 8.2	6.1 / 8.3	6.0 / 8.3	6.8 / 6.8	
Cond (umhos/cm)	314	317	319	316	313	314	315		
Concentration: 562									
pH	7.9	7.5 / 7.9	7.4 / 8.0	7.5 / 8.0	7.5 / 8.0	7.4 / 7.9	7.2 / 7.9	7.3 / 7.3	
DO (mg/l)	8.2	7.3 / 8.2	6.5 / 8.0	6.5 / 8.1	6.5 / 8.1	6.0 / 8.3	6.0 / 8.2	6.7 / 6.7	
Cond (umhos/cm)	360	364	361	360	359	360	363		
Concentration: 752									
pH	7.9	7.0 / 7.9	7.4 / 8.0	7.5 / 8.0	7.5 / 8.0	7.4 / 8.0	7.2 / 8.0	7.3 / 7.3	
DO (mg/l)	8.1	7.4 / 8.1	6.5 / 8.0	6.5 / 8.1	6.3 / 8.0	6.1 / 8.2	5.7 / 8.1	6.4 / 6.4	
Cond (umhos/cm)	427	427	422	426	427	425	430		
Concentration: 1002									
pH	7.9	7.0 / 7.9	7.5 / 8.0	7.5 / 8.0	7.5 / 8.0	7.4 / 8.0	7.2 / 8.0	7.3 / 7.3	
DO (mg/l)	7.9	7.4 / 8.0	6.7 / 8.1	6.4 / 8.0	6.3 / 7.8	5.8 / 8.1	5.1 / 8.0	6.8 / 6.8	
Cond (umhos/cm)	514	518	509	509	511	509	520		
Tech-prerenewal	AH	AH	AH	AH	RC	RC	RC	RC	
Tech-postrenewal		RC	RC	AH	RC	RC	AH		
Hardness (mg/l)	40.0		64.0		52.0				
Alkalinity (mg/l)	72.0		108.0		160.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4652 Test started: Date 2/4/12 Time 1215  
 Client El Dondo Chemical Test ended: Date 26/12 Time 1010  
 Organism P. promelas

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: <sup>AH/12/12</sup> Control	100% WW-ttd								
pH	7.8	7.7	7.5	7.9	7.5	7.9	7.6	7.8	7.5
DO (mg/l)	7.8	7.3	7.8	6.0	7.1	6.4	7.8	6.3	7.6
Cond (umhos/cm)	507	511	503	497	509	508	520		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH	Omit AH 2/13/12								
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	AH	RC	RC	RC	RC	RC	RC	RC	RC
Tech-postrenewal	RC	AH	RC	RC	RC	AH			
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

**APPENDIX C**  
**STATISTICAL ANALYSIS**

**Ceriodaphnia Survival and Reproduction Test-7 Day Survival**

Start Date: 2/14/2012      Test ID: X4652cd      Sample ID: AR0000752-NPDES Permit #001  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      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	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
100 UV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

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

**Hypothesis Test (1-tail, 0.05)**

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

**Ceriodaphnia Survival and Reproduction Test-Reproduction**

Start Date: 2/14/2012      Test ID: X4652cd      Sample ID: AR0000752-NPDES Permit #001  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      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	23.000	17.000	17.000	22.000	17.000	11.000	25.000	17.000	15.000	32.000
32	12.000	5.000	2.000	2.000	2.000	7.000	2.000	1.000	3.000	3.000
42	1.000	1.000	1.000	1.000	3.000	3.000	1.000	4.000	2.000	1.000
56	1.000	1.000	0.000	0.000	1.000	3.000	0.000	0.000	0.000	2.000
75	2.000	2.000	1.000	1.000	2.000	2.000	0.000	0.000	1.000	2.000
100	2.000	0.000	1.000	2.000	0.000	2.000	0.000	2.000	2.000	
100 UV	1.000	2.000	0.000	1.000	0.000	1.000	2.000	0.000	1.000	0.000

Conc-%	Mean	N-Mean	Transform: Untransformed				Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%		
D-Control	19.600	1.0000	19.600	11.000	32.000	30.537	10	
*32	3.900	0.1990	3.900	1.000	12.000	85.854	10	56.00 73.00
*42	1.800	0.0918	1.800	1.000	4.000	63.072	10	55.00 73.00
*56	0.800	0.0408	0.800	0.000	3.000	129.099	10	55.00 73.00
*75	1.300	0.0663	1.300	0.000	2.000	63.329	10	55.00 73.00
*100	1.222	0.0624	1.222	0.000	2.000	79.513	9	45.00 60.00
*100 UV	0.800	0.0408	0.800	0.000	2.000	98.601	10	55.00 73.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.73853	0.895	1.56397	9.075
Bartlett's Test indicates unequal variances (p = 9.83E-14)	73.0156	16.8119		
<b>Hypothesis Test (1-tail, 0.05)</b>				
Wilcoxon Rank Sum Test indicates significant differences				
Treatments vs D-Control				

*EBB*  
 2/24/12



**Ceriodaphnia Survival and Reproduction Test-Reproduction**

Start Date: 2/14/2012      Test ID: X4652cd      Sample ID: AR0000752-NPDES Permit #001  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      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	23.000	17.000	17.000	22.000	17.000	11.000	25.000	17.000	15.000	32.000
32	12.000	5.000	2.000	2.000	2.000	7.000	2.000	1.000	3.000	3.000
42	1.000	1.000	1.000	1.000	3.000	3.000	1.000	4.000	2.000	1.000
56	1.000	1.000	0.000	0.000	1.000	3.000	0.000	0.000	0.000	2.000
75	2.000	2.000	1.000	1.000	2.000	2.000	0.000	0.000	1.000	2.000
100	2.000	0.000	1.000	2.000	0.000	2.000	0.000	0.000	2.000	2.000
100 UV	1.000	2.000	0.000	1.000	0.000	1.000	2.000	0.000	1.000	0.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%				
D-Control	19.600	1.0000	19.600	11.000	32.000	30.537	10			
*32	3.900	0.1990	3.900	1.000	12.000	85.854	10	56.00	74.00	
*42	1.800	0.0918	1.800	1.000	4.000	63.072	10	55.00	74.00	
*56	0.800	0.0408	0.800	0.000	3.000	129.099	10	55.00	74.00	
*75	1.300	0.0663	1.300	0.000	2.000	63.329	10	55.00	74.00	
*100	1.100	0.0561	1.100	0.000	2.000	90.403	10	55.00	74.00	
*100 UV	0.800	0.0408	0.800	0.000	2.000	98.601	10	55.00	74.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.75662	0.895	1.56918	9.16956
Bartlett's Test indicates unequal variances (p = 6.57E-14)	73.8648	16.8119		
<b>Hypothesis Test (1-tail, 0.05)</b>				
Steel's Many-One Rank Test indicates significant differences Treatments vs D-Control				

**Ceriodaphnia Survival and Reproduction Test-Reproduction**

Start Date: 2/14/2012      Test ID: X4652cd      Sample ID: AR0000752  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      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	23.000	17.000	17.000	22.000	17.000	11.000	25.000	17.000	15.000	32.000
32	12.000	5.000	2.000	2.000	2.000	7.000	2.000	1.000	3.000	3.000
42	1.000	1.000	1.000	1.000	3.000	3.000	1.000	4.000	2.000	1.000
56	1.000	1.000	0.000	0.000	1.000	3.000	0.000	0.000	0.000	2.000
75	2.000	2.000	1.000	1.000	2.000	2.000	0.000	0.000	1.000	2.000
100	2.000	0.000	1.000	2.000	0.000	2.000	0.000	0.000	2.000	2.000
100 UV	1.000	2.000	0.000	1.000	0.000	1.000	2.000	0.000	1.000	0.000

Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD
			Mean	Min	Max	CV%					
D-Control	19.600	1.0000	19.600	11.000	32.000	30.537	10				
*32	3.900	0.1990	3.900	1.000	12.000	85.854	10	12.921	2.347	2.852	
*42	1.800	0.0918	1.800	1.000	4.000	63.072	10	14.649	2.347	2.852	
*56	0.800	0.0408	0.800	0.000	3.000	129.099	10	15.472	2.347	2.852	
*75	1.300	0.0663	1.300	0.000	2.000	63.329	10	15.060	2.347	2.852	
*100	1.100	0.0561	1.100	0.000	2.000	90.403	10	15.225	2.347	2.852	
*100 UV	0.800	0.0408	0.800	0.000	2.000	98.601	10	15.472	2.347	2.852	

Auxiliary Tests	Statistic	Critical	Skew	Kurt		
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.75662	0.895	1.56918	9.16956		
Bartlett's Test indicates unequal variances (p = 6.57E-14)	73.8648	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	2.85206	0.14551	478.581	7.38254	6.0E-25	6, 63

**Larval Fish Growth and Survival Test-7 Day Survival**

Start Date: 2/14/2012      Test ID: X4652pp      Sample ID: AR0000752 NPDES #001  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      Protocol: EPAFW02-EPA/821/R-02-01      Test Species: PP-Pimephales promelas

Comments:

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

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%		
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	
32	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50
42	0.9250	0.9487	1.2829	1.2094	1.3931	7.841	5	22.50
56	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00
75	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00
100	0.9000	0.9231	1.2504	1.0472	1.3931	11.683	5	22.00
100 UV	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00

**Auxiliary Tests**

	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p \leq 0.05$ )	0.89916	0.934	-0.4358	-1.0418
Bartlett's Test indicates equal variances ( $p = 0.94$ )	1.803	16.8119		

**Hypothesis Test (1-tail, 0.05)**

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

**Larval Fish Growth and Survival Test-7 Day Growth**

Start Date: 2/14/2012      Test ID: X4652pp      Sample ID: AR0000752 NPDES #001  
 End Date: 2/21/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/13/2012      Protocol: EPAFW02-EPA/821/R-02-01      Test Species: PP-Pimephales promelas  
 Comments:

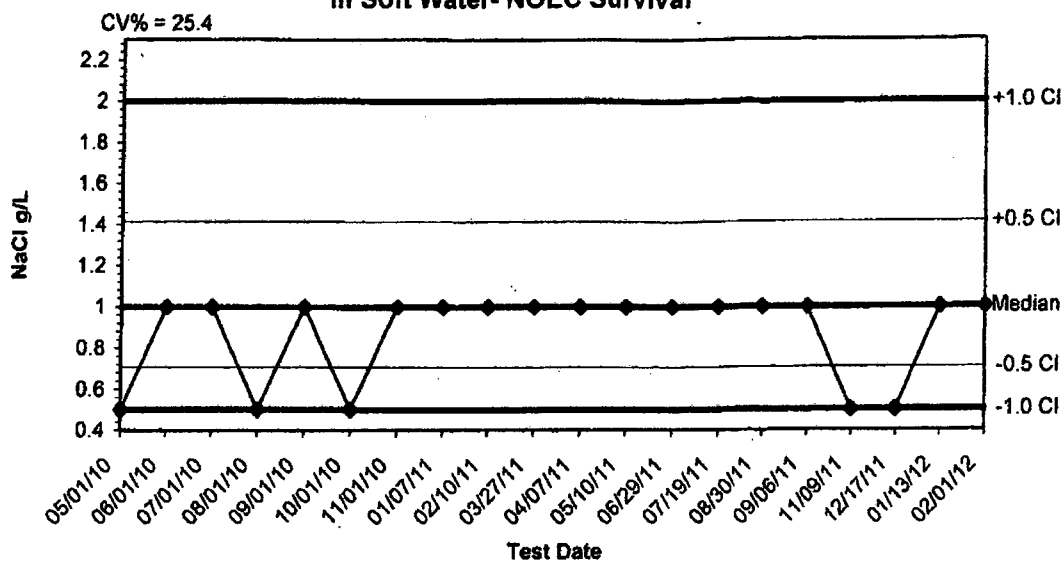
Conc-%	1	2	3	4	5
D-Control	0.5125	0.5000	0.6625	0.6500	0.4375
32	0.4125	0.5125	0.5750	0.7000	0.5000
42	0.4750	0.5000	0.6375	0.6375	0.4875
56	0.6250	0.6125	0.5500	0.6625	0.4250
75	0.5875	0.5250	0.6375	0.6375	0.5500
100	0.5500	0.4875	0.7000	0.8125	0.6125
100 UV	0.5125	0.5625	0.5625	0.5875	0.4625
OSN	0.5857	0.5000	0.6625	0.6500	0.4375

Conc-%	Mean	N-Mean	Transform: Untransformed				N	t-Stat	1-Tailed	
			Mean	Min	Max	CV%			Critical	MSD
D-Control	0.5525	1.0000	0.5525	0.4375	0.6625	17.915	5			
32	0.5400	0.9774	0.5400	0.4125	0.7000	19.737	5	0.215	2.443	0.1418
42	0.5475	0.9910	0.5475	0.4750	0.6375	15.093	5	0.086	2.443	0.1418
56	0.5750	1.0407	0.5750	0.4250	0.6625	16.195	5	-0.387	2.443	0.1418
75	0.5875	1.0633	0.5875	0.5250	0.6375	8.643	5	-0.603	2.443	0.1418
100	0.6325	1.1448	0.6325	0.4875	0.8125	20.183	5	-1.378	2.443	0.1418
100 UV	0.5375	0.9729	0.5375	0.4625	0.5875	9.302	5	0.258	2.443	0.1418
OSN	0.5671	1.0265	0.5671	0.4375	0.6625	17.099	5	-0.252	2.443	0.1418

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96917	0.94	0.08795	-0.6464
Bartlett's Test indicates equal variances (p = 0.66)	4.99242	18.4753		
<b>Hypothesis Test (1-tail, 0.05)</b>	<b>MSDu</b>	<b>MSDp</b>	<b>MSB</b>	<b>MSE</b>
Dunnett's Test indicates no significant differences Treatments vs D-Control	0.14183	0.2567	0.00497	0.00843
			0.75905	7, 32

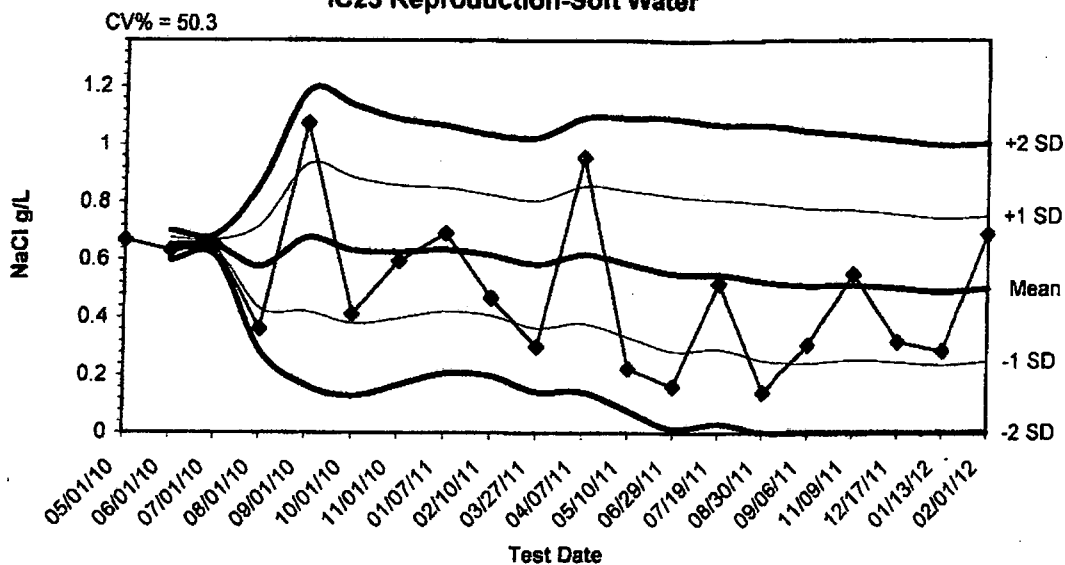
**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

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



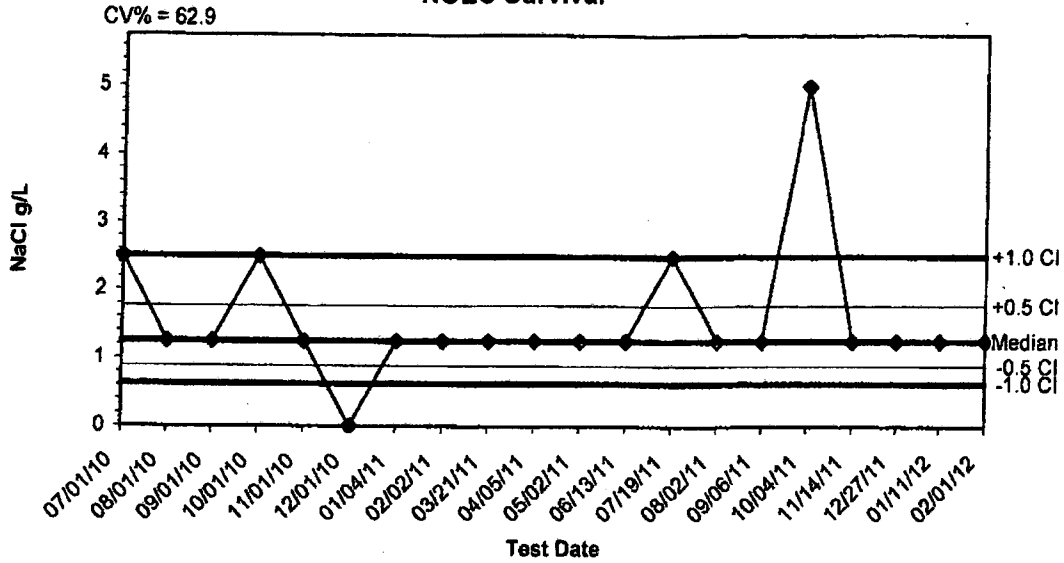
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
05/01/10	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
06/01/10	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/01/10	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
08/01/10	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
09/01/10	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000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

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/01/10	0.6680					
06/01/10	0.6316	0.6498	0.6241	0.5983	0.6755	0.7013
07/01/10	0.6474	0.6490	0.6307	0.6125	0.6673	0.6855
08/01/10	0.3603	0.5768	0.4317	0.2866	0.7219	0.8671
09/01/10	1.0725	0.6760	0.4211	0.1663	0.9308	1.1856
10/01/10	0.4111	0.6318	0.3796	0.1273	0.8841	1.1363
11/01/10	0.5939	0.6264	0.3957	0.1649	0.8571	1.0879
01/07/11	0.6913	0.6345	0.4197	0.2048	0.8494	1.0642
02/10/11	0.4674	0.6159	0.4074	0.1989	0.8245	1.0330
03/27/11	0.2984	0.5842	0.3634	0.1426	0.8050	1.0257
04/07/11	0.9552	0.6179	0.3805	0.1430	0.8554	1.0928
05/10/11	0.2227	0.5850	0.3315	0.0779	0.8385	1.0920
06/29/11	0.1608	0.5524	0.2826	0.0129	0.8221	1.0918
07/19/11	0.5187	0.5500	0.2906	0.0313	0.8093	1.0686
08/30/11	0.1390	0.5226	0.2511	0.0000	0.7940	1.0655
09/06/11	0.3034	0.5089	0.2409	0.0000	0.7768	1.0447
11/09/11	0.5489	0.5112	0.2516	0.0000	0.7708	1.0304
12/17/11	0.3138	0.5002	0.2441	0.0000	0.7564	1.0125
01/13/12	0.2835	0.4888	0.2350	0.0000	0.7427	0.9965
02/01/12	0.6864	0.4987	0.2477	0.0000	0.7497	1.0006

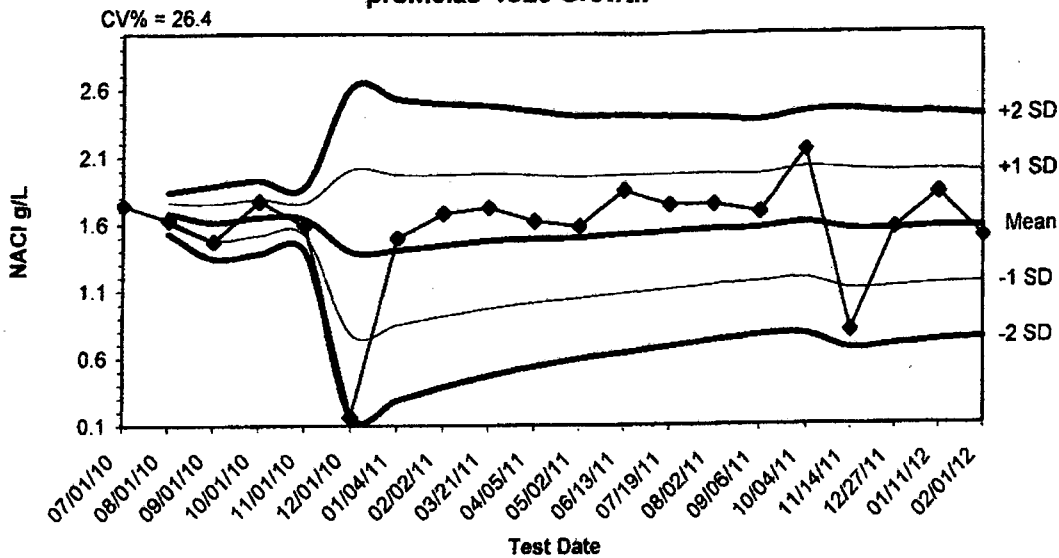
2012 Chronic Reference Toxicant Test Results for *Pimephales promelas*  
NOEC Survival



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



2012 Chronic Reference Toxicant Test Results for Pimephales  
promelas- IC25 Growth



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/01/10	1.7400					
08/01/10	1.6300	1.6850	1.6072	1.5294	1.7628	1.8406
09/01/10	1.4700	1.6133	1.4776	1.3418	1.7491	1.8849
10/01/10	1.7700	1.6525	1.5168	1.3810	1.7882	1.9240
11/01/10	1.5900	1.6400	1.5192	1.3983	1.7608	1.8817
12/01/10	0.1845	1.3941	0.7821	0.1701	2.0061	2.6181
01/04/11	1.4953	1.4085	0.8486	0.2886	1.9685	2.5285
02/02/11	1.6800	1.4425	0.9152	0.3880	1.9697	2.4970
03/21/11	1.7200	1.4733	0.9715	0.4697	1.9751	2.4769
04/05/11	1.6200	1.4880	1.0126	0.5373	1.9633	2.4387
05/02/11	1.5800	1.4963	1.0445	0.5927	1.9482	2.4000
06/13/11	1.8500	1.5258	1.0831	0.6404	1.9685	2.4113
07/19/11	1.7400	1.5423	1.1143	0.6862	1.9703	2.3983
08/02/11	1.7400	1.5564	1.1418	0.7272	1.9710	2.3856
09/06/11	1.6800	1.5647	1.1639	0.7631	1.9655	2.3663
10/04/11	2.1400	1.6006	1.1875	0.7745	2.0137	2.4267
11/14/11	0.7959	1.5533	1.1082	0.6632	1.9983	2.4433
12/27/11	1.5600	1.5537	1.1219	0.6902	1.9854	2.4171
01/11/12	1.8182	1.5676	1.1436	0.7197	1.9915	2.4155
02/01/12	1.4900	1.5637	1.1507	0.7377	1.9767	2.3897

**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

	<b>Time</b>	<b>Date</b>	<b>Time</b>	<b>Date</b>
Composite 1 Collected From	0830	2/12/12 To	0830	2/13/12
Composite 2 Collected From	0830	2/14/12 To	0830	2/15/12
Composite 3 Collected From	0830	2/16/12 To	0830	2/17/12
Test initiated:	1305 am/pm		2/14/12	date
Test terminated:	1320 am/pm		2/21/12	date
Dilution water used:	Receiving	X	Reconstituted	

**PERCENT SURVIVAL**

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

**NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST**

Rep	0	32	42	56	75	100	100 UV
A	23	12	1	1	2	2	1
B	17	5	1	1	2	0	2
C	17	2	1	0	1	1	0
D	22	2	1	0	1	2	1
E	17	2	3	1	2	0	0
F	11	7	3	3	2	2	1
G	25	2	1	0	0	0	2
H	17	1	4	0	0	D	0
I	15	3	2	0	1	2	1
J	32	3	1	2	2	2	0
Surv. Mean	19.6	3.9	1.8	0.8	1.3	1.2	0.8
Total Mean	19.6	3.9	1.8	0.8	1.3	1.1	0.8
CV%*	30.54	85.85	63.07	129.10	63.33	79.51	98.60

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

PMSD = 14.6

Ceriodaphnia dubia  
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

- |  |     |   |    |
|--|-----|---|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%): | YES | X | NO |
| b) ½ LOW FLOW DILUTION (N/A%):           | YES |   | NO |

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

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

- |  |   |     |    |
|--|---|-----|----|
| a) LOW FLOW OR CRITICAL DILUTION (100%): | X | YES | NO |
| b) ½ LOW FLOW DILUTION (N/A%):           |   | YES | NO |

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



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

Permittee: El Dorado Chemical  
Outfall 001

NPDES No.: AR0000752  
AFIN: 70-00040

	<b>Time</b>	<b>Date</b>	<b>Time</b>	<b>Date</b>
Composite 1 Collected from:	0830	2/12/12 To	0830	2/13/12
Composite 2 Collected from:	0830	2/14/12 To	0830	2/15/12
Composite 3 Collected from:	0830	2/16/12 To	0830	2/17/12
Test initiated:	1215	am/pm	2/14/12	date
Test terminated:	1010	am/pm	2/21/12	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	87.5	100	100	100	100	100	100	97.5	6.06
32	87.5	100	100	100	100	100	100	97.5	6.06
42	100	87.5	87.5	100	87.5	100	100	92.5	7.84
56	100	100	87.5	100	87.5	100	100	95.0	7.62
75	100	87.5	100	87.5	100	100	100	95.0	7.62
100	87.5	100	100	87.5	75.0	100	100	90.0	11.68
100 UV	87.5	100	100	100	87.5	100	100	95.0	7.62

**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	0.513	0.500	0.663	0.650	0.438	0.553	17.92
32	0.413	0.513	0.575	0.700	0.500	0.540	19.74
42	0.475	0.500	0.638	0.638	0.488	0.548	15.09
56	0.625	0.613	0.550	0.663	0.425	0.575	16.20
75	0.588	0.525	0.638	0.638	0.550	0.588	8.64
100	0.550	0.488	0.700	0.813	0.613	0.633	20.18
100 UV	0.513	0.563	0.563	0.588	0.463	0.538	9.30
0-SN	0.586	0.500	0.663	0.650	0.438	0.567	17.10

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

PMSD = 25.7%

**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:**

<b>a) LOW FLOW OR CRITICAL DILUTION (100%)</b>	<b>YES</b>	<b>X</b>	<b>NO</b>
<b>b) ½ LOW FLOW DILUTION (N/A %)</b>	<b>YES</b>		<b>NO</b>

**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):**

<b>a) LOW FLOW OR CRITICAL DILUTION (100%)</b>	<b>YES</b>	<b>X</b>	<b>NO</b>
<b>b) ½ LOW FLOW DILUTION (N/A %)</b>	<b>YES</b>		<b>NO</b>

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

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

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

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

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

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





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



## Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

(318) 745-2772  
1-800-269-1246  
Fax: (318) 745-2773

### REPORT QUALITY ASSURANCE FORM

Client: Eldorado Chemical

Project#: X4652

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.

Ronald H. Brugg, BS  
Quality Manager

3/8/12  
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 X4641

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X4641

**Outfall:** Outfall 006

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

**Contact:** Ms. Larken Pennington

**Test Dates:** February 4 - 6, 2012

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

**Results:**

**For *Pimephales promelas*:**

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0.
2. Report the NOEC for survival, Parameter TOM6C - 100%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 6.06%.

**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 - 75%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 11.58%.

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



## Bio-Analytical Laboratories

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

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

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

**EPA Methods 2000.0 and 2021.0**

**Project X4641**

**Test Dates: February 4 - 6, 2012  
Report Date: March 8, 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 X4641

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BAL  
ADEQ #88-0630  
Project X4641

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

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ADEQ #88-0630  
Project X4641

### **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 acute toxicity 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 February 3, 2012. Upon completion of collection, the sample was chilled to 4° Celsius and delivered to Bio-Analytical Laboratories by BAL personnel.

### **2.6 Sample Preparation**

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

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

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

### **2.8 Data Analysis**

The NOEC and LC<sub>50</sub> values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

BAL  
ADEQ #88-0630  
Project X4641

### 3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the critical dilutions in the minnow test but were noted in the daphnid test ( $p=.05$ ). The NOEC value in the minnow test was 100 percent effluent and the NOEC for survival in the *Daphnia pulex* test was 75 percent effluent ( $p=.05$ ).

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Control	100.0	100.0
22.0	100.0	92.5
32.0	100.0	90.0
42.0	100.0	92.5
56.0	100.0	97.5
75.0	100.0	92.5
100.0	97.5	82.5

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



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ADEQ #88-0630  
Project X4641

#### 4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 3, 2012, was not found to be lethally toxic to the *Daphnia pulex* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after 48 hours of exposure ( $p=.05$ ).

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ADEQ #88-0630  
Project X4641

### 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  
 Doyline, LA 71023  
 (318) 745-2772, Fax (318) 745-2773  
 bioanalytical@atc.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:  X4641			
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: 1.10C #29 2/3/12	
Permit #: AR0000752		Purchase Order:												Lab Control Number:
Sampler's Signature/Printed Name/Affiliation: Karen Pennington / EDCC														
Date Start Date End	Time Start Time End	C	G	# containers	Sample Identification									
2/3/12 - 2/3/12	1:20		X	10	Outfall 006							C4982	ice	
Relinquished by/Affiliation: Canel Hendricks EDCC		Date:	Time:	Received by/Affiliation:		Date:	Time:							
				Canel Hendricks EDCC		2/3/12	1640	Canel Hendricks EDCC		2/3/12	1640			
Relinquished by/Affiliation:		Date:	Time:	Received by/Affiliation:		Date:	Time:							
Relinquished by/Affiliation:		Date:	Time:	Received by/Affiliation:		Date:	Time:							
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DEL <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# X4641  
 client E1 Dorado chemical  
 Address 4500 Northwest Ave., E Dorado, AR. 71731  
 NPDES# AR0000752/AFTN 70-0016 Outfall 006

Technicians Haughton, Zeagler, Callahan

Test initiated: Date 2/4/12 Time 1245

Test terminated: Date 2/6/12 Time 1315

Dissolved Oxygen Meter: Model # YSI 550A Serial #06E2089  
 pH Meter: Model # Orion 230A+ Serial #020273  
 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
<del>C4982</del>	<del>9.9</del>	<del>123% 8.2/100%</del>	<del>&lt;0.01</del>	<del>NO</del>	<del>1.0</del>	<del>NA</del>	<del>100%</del>	<del>100%</del>	<del>EBB</del>
↓	7.3	86%	↓	↓	↓	↓			

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 H <sub>2</sub> O							100%	100%	
↓	3375	NA	NA	NA	NA	7.5	48.0	32.0	EBB

Test Species Information

Test Species Info.	Species: <u>D. pulcr</u> ID#: <u>BA C12303</u>	Species: <u>P. promelas</u> ID#: <u>BA C112</u>	Species: ID#:	Species: ID#:
Age	<u>&lt;24h</u>	<u>~3 day</u>		
Test Container Size	<u>30ml</u>	<u>250ml</u>		
Test volume	<u>25ml</u>	<u>200ml</u>		
Feeding: Type	<u>2: Algae/1: VFA</u>	<u>Artemia</u>		
Amount	<u>0.1ml</u>	<u>0.1ml</u>		
Aeration? Amount	<u>NA</u>	<u>NA</u>		
Condition of survivors	<u>GOOD RC</u>	<u>GOOD RC</u>		

Comments: \* acclimation only EBB 2/4/12

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

Project# X4641

Test started: Date 2/4/12 Time 1150

Client El Dorado Chemical

Test ended: Date 2/6/12 Time 1225

Sample Description 006

Test Species D. pulley ID# BAU/m3-03

Technician: 0hour EB 24hour EB 48hour RC 72hour / 96hour /

Time: 0hour 1150 24hour 1200 48hour 1225 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	NA	8	8	8			8.4	8.2	8.2			7.6	7.9	7.9			169.1	189	220		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	7			8.3	8.1	8.1			7.3	7.7	7.7			452	459	488		
	B		8	8	7																	
	C		8	8	7																	
	D		8	8	8																	
	E		8	8	8																	
			Chemistry Tech prerenewal/postrenewal																			
			<u>EB/RC</u>					<u>EB/RC</u>					<u>EB/RC</u>									

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

Project# X4641

client El Dorado Chemical

Test started: Date 2/4/12 Time 1150

Test ended: Date 2/6/12 Time 1225

Sample Description 006

Test Species D. DULL ID# BAL/m3-03

Technician: Ohour EBB 24hour EBB 48hour RC 72hour          96hour           
 Time: Ohour 1150 24hour 1200 48hour 1225 72hour          96hour           
 Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour          96hour         

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH				Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
32	A	NA	8	8	8			8.2	8.1	7.9			7.6	7.1	7.8			569	589	591		
	B		8	8	8																	
	C		8	8	7																	
	D		8	8	6																	
	E		8	8	7																	
42	A		8	8	8			8.2	8.1	8.0			7.6	7.9	7.9			669	673	697		
	B		8	8	7																	
	C		8	8	7																	
	D		8	8	8																	
	E		8	8	7																	
			Chemistry Tech prerenewal/postrenewal EBB EB RC      EBB EB RC      EBB EB RC																			



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

Project# X4641

client EI Dorado Chemical

Test started: Date 2/4/12 Time 1150

Test ended: Date 2/6/12 Time 1225

Sample Description 006

Technician: Ohour EB 24hour EB 48hour RC 72hour RC 96hour RC  
 Test Species D. pulch ID# BAL/M3-03

Time: Ohour 1150 24hour 1200 48hour 1225 72hour 1225 96hour 1225  
 Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour 24.1 96hour 24.1

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
S6	A	NA	8	8	8			8.2	8.1	7.9			7.7	7.7	7.9			816	857	841		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	7																	
75	A		8	8	7			8.1	8.1	7.9			7.6	7.6	7.9			1048	857	1045		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	6																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X4641

client El Dorado Chemical

Test started: Date 2/4/12 Time 1150

Test ended: Date 2/6/12 Time 1225

Sample Description DO6

Technician: Ohour ESB 24hour ESB 48hour RC 72hour / 96hour / Test Species D. pullex ID# BAL/M3-03

Time: Ohour 1150 24hour 1300 48hour 1225 72hour / 96hour /

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
			100	A	NA	8	8	7			8.1	8.2	8.4	7.9			7.6	7.0	7.5	7.9			1322	1200
	B		8	8	7																			
	C		8	8	7																			
	D		8	8	5																			
	E		8	8	7																			
	A		8																					
	B		8																					
	C		8																					
	D		8																					
	E		8																					
			<p style="text-align: center;">↓</p> <p style="text-align: center;">Omit 2/3/12</p>																					
Chemistry Tech prerenewal/postrenewal			ESB/ADRC					ESB/ADRC					ESB/ADRC											

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

Project# X4641

client El Dorado Chemical

Test started: Date 2/4/12 Time 1245

Test ended: Date 2/6/12 Time 1315

Sample Description 006

Technician: 0hour EUS 24hour EUS 48hour RC 72hour / 96hour /

Test Species P. promelas ID# BAL/2112

Time: 0hour 1245 24hour 110 48hour 1315 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

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			8.4	7.5	7.8			7.6	7.7	7.7			169.1	189	189.6		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	8			8.3	7.5	7.8			7.3	7.4	7.5			452	467	481		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal																						

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

Project# X4641

Test started: Date 2/4/12 Time 12:15

client EI Dorado Chemical

Test ended: Date 2/6/12 Time 13:15

Sample Description 006

Test Species P. promelas ID# BAL/2112

Technician: 0hour EBP 24hour EBB 48hour RC 72hour / 96hour /

Time: 0hour 24.5 24hour 11.0 48hour 13.5 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
32	A	NA	8	8	8			8.274	7.1			7.16	7.76			569	581	581					
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	8																		
42	A		8	8	8			8.274	7.8			7.4	7.7			669	686	714					
	B		8	8	8																		
	C		8	8	8																		
	D		8	8	8																		
	E		8	8	8																		
			Chemistry Tech prerenewal/postrenewal																				
			EBP/EBB/RC					EBP/EBB/RC					EBP/EBB/RC										

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

Project# X4641

Test started: Date 2/4/12 Time 1245

Client El Dorado Chemical

Test ended: Date 2/6/12 Time 1315

Sample Description 006

Test Species P. promelas ID# BALB112

Technician: Ohour EB 24hour EB 48hour RC 72hour / 96hour /  
 Time: Ohour 1245 24hour 1110 48hour 1315 72hour / 96hour /  
 Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
			Chemistry Tech prerenewal/postrenewal																					
S6	A	NA	8	8	8			8.1	7.4	7.6			7.7	7.4	7.1			8.1	8.1	8.1				
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
75	A		8	8	8			8.1	7.3	7.6			7.6	7.4	7.1			10.4	10.2	10.2				
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			

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

Project# X4641

Test started: Date 2/4/12 Time 1245

Client EI Dorado Chemical

Test ended: Date 2/6/12 Time 1315

Sample Description 006

Test Species P. promelas ID# BAU2112

Technician: 0hour 245 24hour 203 48hour RC 72hour / 96hour /

Time: 0hour 1245 24hour 1110 48hour 1315 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
100	A	NA	8	8	8			8.1	8.4	7.5			7.6	7.7					1344	1342	1017	1154		
	B		8	8	8														1332	983	1112			
	C		8	8	7																			
	D		8	8	8																			
	E		8	8	8																			
	A		8																					
	B		8																					
	C		8																					
	D		8																					
	E		8																					
			omit 2/3/12																					
			Omit																					
Chemistry Tech prerenewal/postrenewal																								

**APPENDIX C**  
**STATISTICAL ANALYSIS**

Daphnid Acute Test-48 Hr Survival

Start Date: 2/4/2012      Test ID: X4641dp      Sample ID: AR0000752 NPDES #006  
 End Date: 2/6/2012      Lab ID: NELAP01975      Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012      Protocol: EPAAW02-EPA/821/R-02-01      Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	0.8750	0.8750	0.8750	1.0000	1.0000
32	1.0000	1.0000	0.8750	0.7500	0.8750
42	1.0000	0.8750	0.8750	1.0000	0.8750
56	1.0000	1.0000	1.0000	1.0000	0.8750
75	0.8750	1.0000	1.0000	0.7500	1.0000
100	0.8750	0.8750	0.8750	0.6250	0.8750

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5	20.00	16.00
32	0.9000	0.9000	1.2504	1.0472	1.3931	11.683	5	20.00	16.00
42	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5	20.00	16.00
56	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00
75	0.9250	0.9250	1.2872	1.0472	1.3931	12.116	5	22.50	16.00
*100	0.8250	0.8250	1.1499	0.9117	1.2094	11.578	5	15.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.91682	0.934	-0.7432	0.06132
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	75	100	86.6025	1.33333
Treatments vs D-Control				



Acute Fish Test-48 Hr Survival

Start Date: 2/4/2012      Test ID: X4641pp      Sample ID: AR0000752 NPDES #006  
 End Date: 2/6/2012      Lab ID: NELAP01975      Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012      Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

Comments:

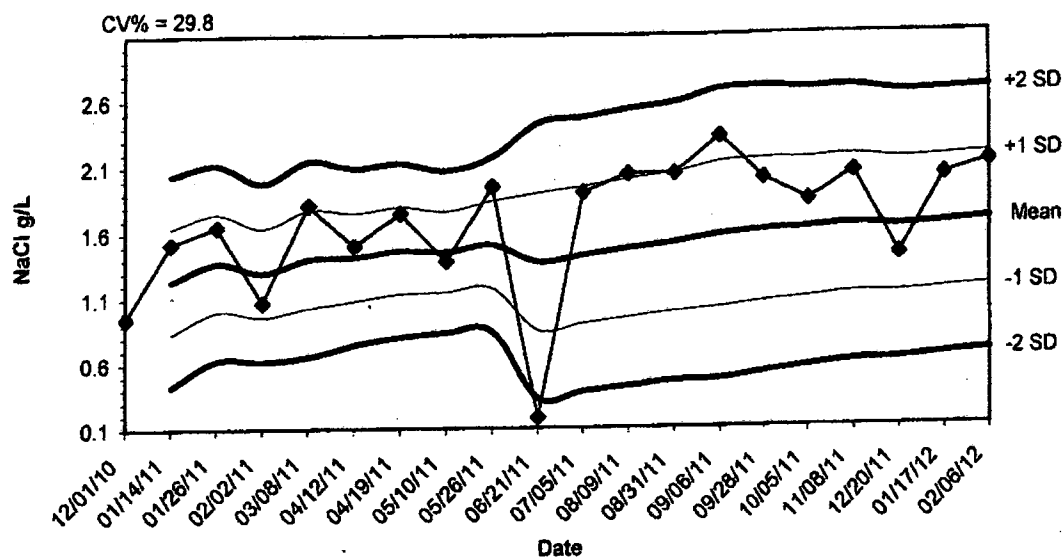
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	0.8750	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50 16.00	
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50 16.00	
42	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50 16.00	
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50 16.00	
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50 16.00	
100	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00 16.00	

Auxillary 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				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

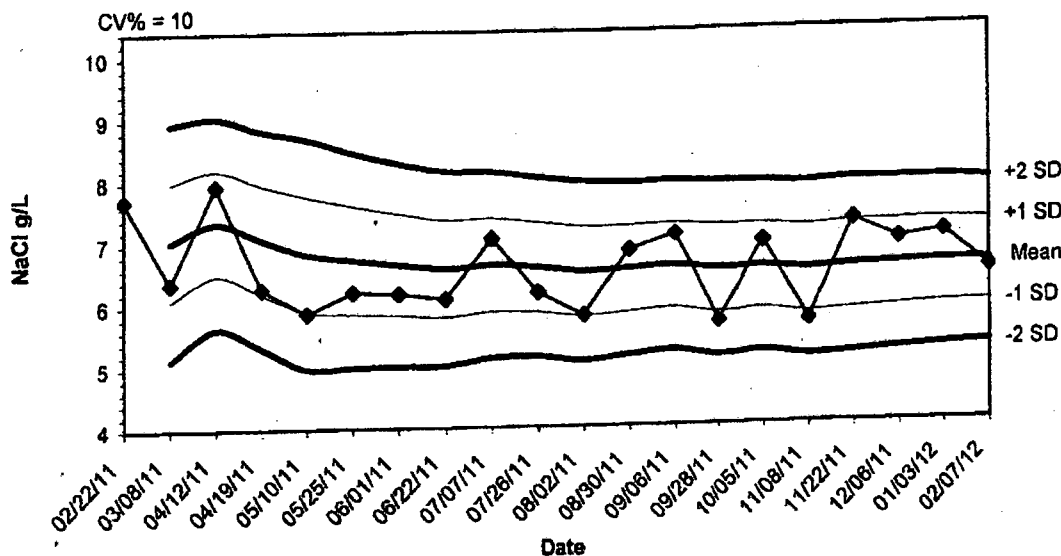
**APPENDIX D**  
**QUALITY ASSURANCE CHARTS**

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/01/10	0.9500					
01/14/11	1.5200	1.2350	0.8319	0.4289	1.6381	2.0411
01/26/11	1.6500	1.3733	1.0010	0.6287	1.7457	2.1180
02/02/11	1.0700	1.2975	0.9578	0.6180	1.6372	1.9770
03/08/11	1.8100	1.4000	1.0270	0.6541	1.7730	2.1459
04/12/11	1.5000	1.4167	1.0808	0.7445	1.7527	2.0888
04/19/11	1.7500	1.4643	1.1326	0.8010	1.7959	2.1276
05/10/11	1.3800	1.4538	1.1453	0.8368	1.7622	2.0707
05/26/11	1.9500	1.5089	1.1763	0.8436	1.8415	2.1741
08/21/11	0.1800	1.3760	0.8517	0.3273	1.9003	2.4247
07/05/11	1.9000	1.4236	0.9017	0.3798	1.9456	2.4675
08/09/11	2.0400	1.4750	0.9465	0.4180	2.0035	2.5320
08/31/11	2.0400	1.5185	0.9888	0.4591	2.0482	2.5779
09/06/11	2.3200	1.5757	1.0235	0.4714	2.1279	2.6800
09/28/11	2.0000	1.6040	1.0608	0.5175	2.1472	2.6905
10/05/11	1.8300	1.6181	1.0903	0.5624	2.1460	2.6738
11/08/11	2.0400	1.6429	1.1217	0.6005	2.1642	2.6854
12/20/11	1.4100	1.6300	1.1214	0.6127	2.1386	2.6473
01/17/12	2.0100	1.6500	1.1481	0.6461	2.1519	2.6539
02/06/12	2.1100	1.6730	1.1737	0.6745	2.1723	2.6715

2012 48-hour Reference Toxicant Test Results for Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/22/11	7.7100	7.0400	6.0925	5.1450	7.9875	8.9350
03/08/11	6.3700	7.3400	6.4921	5.6442	8.1879	9.0358
04/12/11	7.9400	7.0725	6.1976	5.3227	7.9474	8.8223
04/19/11	6.2700	6.8340	5.9074	4.9809	7.7606	8.6871
05/10/11	5.8800	6.7300	5.8630	4.9960	7.5970	8.4640
05/25/11	6.2100	6.8514	5.8331	5.0148	7.4697	8.2881
06/01/11	6.1800	6.5813	5.7981	5.0149	7.3644	8.1476
06/22/11	6.0900	6.6344	5.8847	5.1349	7.3842	8.1340
07/07/11	7.0600	6.5890	5.8676	5.1463	7.3104	8.0317
07/26/11	6.1800	6.5182	5.7947	5.0711	7.2417	7.9652
08/02/11	5.8100	6.5458	5.8494	5.1529	7.2423	7.9388
08/30/11	6.8500	6.5877	5.9040	5.2203	7.2714	7.9551
09/08/11	7.0900	6.5221	5.8210	5.1198	7.2233	7.9245
09/28/11	5.6700	6.5507	5.8210	5.1198	7.2353	7.9199
10/05/11	6.9500	6.4956	5.7985	5.1014	7.1927	7.8898
11/08/11	5.6700	6.5412	5.8406	5.1400	7.2418	7.9424
11/22/11	7.2700	5.8774	5.8774	5.1909	7.2504	7.9369
12/06/11	6.9500	5.9132	5.9132	5.2364	7.2668	7.9436
01/03/12	7.0600	5.9241	5.9241	5.2648	7.2429	7.9022
02/07/12	6.4600					

**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: 2/3/12      To: 2/3/12  
From:      To:

Test Initiated: 2/4/12

Dilution Water Used:      Receiving Water      X      Reconstituted Water

**Dilution Series Results - Percent Survival**

TIME OF READING	REP	0	22	52	42	56	75	100
24-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	100	100	100	100
48-hour	A	100	87.5	100	100	100	87.5	87.5
	B	100	87.5	100	87.5	100	100	87.5
	C	100	87.5	87.5	87.5	100	100	87.5
	D	100	100	75.0	100	100	75.0	62.5
	E	100	100	87.5	87.5	87.5	100	87.5
	Mean	100	92.5	90.0	92.5	97.5	92.5	82.5

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

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

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

LC<sub>50</sub> =      N/A% effluent

95 % confidence limits: N/A

Method of LC<sub>50</sub> calculation: N/A

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

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

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

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

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

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

**Sample Collected      From:      Date 2/3/12      Time 1320  
   To:      Date 2/3/12      Time 1320  
Test Begin                              Date 2/4/12      Time 1150  
Test End                                 Date 2/6/12      Time 1225**

Parameter	DO			Temperature			Alkalinity			Hardness			pH				
	Dilution	Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0			8.4	8.2	8.2	24.5	24.0	24.1	32.0			48.0			7.6	7.7	7.9
22			8.3	8.0	8.1	24.5	24.0	24.1							7.3	7.4	7.7
32			8.2	7.9	7.9	24.5	24.0	24.1							7.6	7.2	7.8
42			8.2	7.9	8.0	24.5	24.0	24.1							7.6	7.1	7.9
56			8.2	7.7	7.9	24.5	24.0	24.1							7.7	7.0	7.9
75			8.1	7.9	7.9	24.5	24.0	24.1							7.6	6.9	7.9
100			8.1	8.4	7.9	24.5	24.0	24.1	88.0			548.0			7.6	6.8	7.9

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

**Acute Forms**  
**Pimephales promelas Survival**

**Permittee: El Dorado Chemical - Outfall 006**

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

**Composite Collected**

**From: 2/3/12**

**To: 2/3/12**

**From:**

**To:**

**Test Initiated: 2/4/12**

**Dilution Water Used:**

**Receiving Water**

**X**

**Reconstituted Water**

**Dilution Series Results - Percent Survival**

<b>TIME OF READING</b>	<b>REP</b>	<b>0</b>	<b>22</b>	<b>32</b>	<b>42</b>	<b>56</b>	<b>75</b>	<b>100</b>
24-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	100	100	100	100
48-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	87.5
	D	100	100	100	100	100	100	100
	E	100	100	100	100	100	100	100
	Mean		100	100	100	100	100	100

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

a.) **LOW FLOW OR CRITICAL DILUTION (100%)**      YES      X      NO

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

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

LC<sub>50</sub> =      N/A% effluent

95 % confidence limits: N/A

Method of LC<sub>50</sub> calculation: N/A

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

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

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

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



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

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

**Contact: Larken Pennington**

**Analyst: Briggs, Callahan**

**Sample Collected From: Date 2/3/12 Time 1320**

**To: Date 2/3/12 Time 1320**

**Test Begin Date 2/4/12 Time 1245**

**Test End Date 2/6/12 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		8.4	8.2	7.8	24.5	24.0	24.1	32.0			48.0			7.6	7.7	7.7
22		8.3	8.0	7.8	24.5	24.0	24.1							7.3	7.4	7.5
32		8.2	7.9	7.7	24.5	24.0	24.1							7.6	7.2	7.6
42		8.2	7.9	7.8	24.5	24.0	24.1							7.6	7.1	7.7
56		8.2	7.7	7.6	24.5	24.0	24.1							7.7	7.0	7.7
75		8.1	7.9	7.6	24.5	24.0	24.1							7.6	6.9	7.7
100		8.1	8.4	7.5	24.5	24.0	24.1	88.0			548.0			7.6	6.8	7.7

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

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



## Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

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

### REPORT QUALITY ASSURANCE FORM

Client: Eldorado Chemical

Project#: X41641

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.

Gene H. Bragg, BS  
Quality Manager

3/8/12  
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 X4642

### Bio-Analytical Laboratories' Executive Summary

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

**Project #:** X4642

**Outfall:** Outfall 007

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

**Contact:** Ms. Larken Pennington

**Test Dates:** February 4 - 6, 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 - 56%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

##### For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 1.
2. Report the NOEC for survival, Parameter TOM3D - 56%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 12.12%.

**This report contains a total of 37 pages, including this page. The results pertain only to the samples listed in the chain of custody documents in Appendix A. The information contained within meets the requirements set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.**

BAL  
ADEQ #88-0630  
Project X4642

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## **Bio-Analytical Laboratories**

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

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

**THE RESULTS OF TWO 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 X4642**

**Test Dates: February 4 - 6, 2012**

**Report Date: March 8, 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 X4642

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

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ADEQ #88-0630  
Project X4642

### **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 acute toxicity 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 February 3, 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<sup>R</sup> amperometric titrator and recorded if present. The total ammonia level was measured using a HACH<sup>R</sup> test strip. The pH was less than 6.0; therefore, it was adjusted to the limits of 6.0-9.0 and an extra 100 percent concentration was conducted. 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<sup>R</sup> dual controlled illuminated incubator at a temperature of 25±1° Celsius. An AEMC<sup>R</sup> data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

### **2.8 Data Analysis**

The NOEC and LC<sub>50</sub> values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.



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ADEQ #88-0630  
Project X4642

### 3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in the critical dilutions in both tests ( $p=.05$ ). The NOEC value in both tests was 56 percent effluent ( $p=.05$ ). Adjusting the pH reduced the lethal effect in the effluent, but not enough to pass the tests.

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

Percent Effluent	Percent Survival	
	<i>Pimephales promelas</i>	<i>Daphnia pulex</i>
Test Organism		
Control	100.0	92.5
32.0	97.5	97.5
42.0	95.0	97.5
50.0	90.0	77.5
56.0	67.5	75.0
75.0	0.0	0.0
100.0	0.0	0.0
100.0 pH	27.5	60.0

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 X4642

#### 4.0 Conclusions

The sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 3, 2012, was found to be lethally toxic to the *Daphnia pulex* test organisms and the fathead minnow test organisms in the 100 percent critical dilution after 48 hours of exposure ( $p=.05$ ).

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ADEQ #88-0630  
Project X4642

### **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  
 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:  X4642				
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: 1.1°C #29 EB 2/3/12		
Permit #: AR0000752		Purchase Order:												Lab Control Number:  C4983	Preservative: (below)  ice
Sampler's Signature/Printed Name/Affiliation:  Farker Pennington / EDCC															
Date Start Date End	Time Start Time End	C	G								# containers				
2/3/12 - 2/3/12	1:05 PM		X	6	Outfall 007		X	X							
Relinquished by/Affiliation:  C. H. Hendricks EDCC		Date:	Time:	Received by/Affiliation:  C. H. Hendricks BR		Date:	Time:								
		Date:	Time:			Date:	Time:								
		Date:	Time:			Date:	Time:								
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 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# X4642

Client EI Dorado Chemical

Address 4500 Northwest Ave. EI Dorado, AR. 71731

NPDES# AR0000752 / AFIN 70-00010 outfall 007

Technicians Waughton, Zeagler, Callahan

Test initiated: Date 2/4/12 Time 1315

Test terminated: Date 2/6/12 Time 1335

Dissolved Oxygen Meter: Model # YSI 550A Serial # 06E2089

pH Meter: Model # Orion 230A+ Serial # 020273

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)	Dechlor inated? Amount?	Ammonia (NH3) mg/L	Salinity	Hard- ness	Alkal- inity	Tech
<u>CH083</u>	<u>11.0</u> <u>133%</u>	<u>11/15</u> <u>8.4/99%</u>	<u>10.01</u>	<u>NO</u>	<u>6.0</u>	<u>NA</u>	<u>1176.0</u>	<u>200</u>	<u>EB</u>
<u>↓</u>	<u>10.6</u> <u>130%</u>	<u>11/15</u> <u>8.0/95%</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>			<u>↓</u>

Dilution Water Information

Dilution Water	ID#	Initial D.O. (mg/L & %)	Aerate? Minutes/D.O. (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hard- ness	Alkal- inity	Tech
<u>Soft H<sub>2</sub>O</u>	<u>3275</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>7.5</u>	<u>48.0</u>	<u>32.0</u>	<u>EB</u>
		<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>				

Test Species Information

Test Species Info.	Species: <u>D. pulchellus</u> ID#: <u>BAUM303</u>	Species: <u>P. promelas</u> ID#: <u>BAU1812</u>	Species: <u>OMIX 01/31/12</u> ID#:	Species: <u>OMIX 01/31/12</u> ID#:
Age	<u>&lt; 24h</u>	<u>~ 3 days</u>		
Test Container Size	<u>30ml</u>	<u>250ml</u>		
Test volume	<u>2.5ml</u>	<u>20.0ml</u>		
Feeding: Type	<u>A. Algae 1:vat</u>	<u>Artemia</u>		
Amount	<u>0.1ml</u>	<u>0.1ml</u>		
Aeration?	<u>NA</u>	<u>NA</u>		
Amount				
Condition of survivors	<u>GOOD</u> <u>RE</u>	<u>GOOD</u> <u>RE</u>		

Comments: ⊗ acclimation only EB 2/4/12  
pH before aeration: 4.7 / after aeration: 4.7 / EB 2/4/12  
Foaming when aerated EB 2/4/12  
Adjusted pH to range 6-9 using 1.0 N NaOH / RICCA / 1180 EB 2/4/12

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

Project# X4642

Client El Dorado chemical

Sample Description 007

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

Time: 0hour 1200 24hour 1140 48hour 1245 72hour RC 96hour RC

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour RC 96hour RC

Test started: Date 2/4/12

Time 1200

Test ended: Date 2/6/12

Time 1245

Test Species D. Pulex

ID# BAL/M3-03

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			8.3	8.3	8.1			7.6	7.8	7.9			173	175	178			238			
	B		8	8	6																					
	C		8	8	8																					
	D		8	8	8																					
	E		8	8	7																					
32	A		8	8	8			8.4	8.3	8.0			6.7	7.7	7.2			1495	1625	1625			1625			
	B		8	8	8																					
	C		8	8	8																					
	D		8	8	7																					
	E		8	8	8																					
Chemistry Tech prerenewal/postrenewal																										



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

Project# X4642

Client El Dorado chemical

Sample Description 007

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

Time: Ohour 1200 24hour 1140 48hour 1245 72hour 1245 96hour 1245

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour 24.1 96hour 24.1

Test started: Date 2/4/12 Time 1200

Test ended: Date 2/6/12 Time 1245

Test Species D. RIVER ID# BAL/M3-03

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	8	8			8.4	8.4	8.0			6.4	6.5	6.3	6.1			1858	1870	1820	2040			
	B		8	8	7																				
	C		8	8	8																				
	D		8	8	8																				
	E		8	8	8																				
50	A		8	8	7			8.4	8.3	8.1			6.3	6.2	6.1	6.9			2080	2100	2130	2090			
	B		8	8	7																				
	C		8	8	8																				
	D		8	8	5																				
	E		8	8	4																				
Chemistry Tech prerenewal/postrenewal			ELB/RC					ELB/RC					ELB/RC												

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

Project# X4642

client El Dorado chemical

Test started: Date 2/4/12 Time 1200

Test ended: Date 2/6/12 Time 1245

Sample Description 007

Technician: Ohour 218 24hour 213 48hour RC 72hour / 96hour /

Test Species D. DULY ID# BAL/M3-03

Time: Ohour 1200 24hour 1140 48hour 1245 72hour / 96hour /

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
			56	A	NA	8	8	7			84	8.0	8.1			55	5.7	6.7			2070	2300	2540	
	B		8	8	4																			
	C		8	8	7																			
	D		8	8	7																			
	E		8	8	5																			
75	A		8	0	-			83	8.4	-			4.9	4.9	-			2920	3000	-				
	B		8	0	-																			
	C		8	0	-																			
	D		8	0	-																			
	E		8	0	-																			
Chemistry Tech prerenewal/postrenewal								EJ [Signature] RC					EJ [Signature] RC					EJ [Signature] RC						

ACUTE2 020809 Rev.

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

Project# X4642

Test started: Date 2/4/12 Time 1200

Client El Dorado chemical

Test ended: Date 2/6/12 Time 1245

Sample Description 007

Test Species D. pulex ID# BAL/M3-03

Technician: Ohour EBB 24hour EBB 48hour RC 72hour / 96hour /

Time: Ohour 1200 24hour 1140 48hour 1245 72hour / 96hour /

Temperature (°C): Ohour 24.3 24hour 24 48hour 24.1 72hour / 96hour /

72hour / 96hour /  
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	-			8.3	8.4	-			4.9	4.9	-			290	290
	B		8	0	-																	
	C		8	0	-																	
	D		8	0	-																	
	E		8	0	-																	
	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal																						

*omit 2/3/12 D. pulex*

*EBB/RC EBB/RC EBB/RC*

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

Project# X4642

Test started: Date 2/4/12 Time 1200

client El Dorado chemical

Test ended: Date 2/6/12 Time 1245

Sample Description 007

Test Species D. pulex ID# BAL/M33

Technician: 0hour EB 24hour EB 48hour RC 72hour / 96hour /

Time: 0hour 1200 24hour 1140 48hour 1245 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	8	5			8.1	8.4	8.1			8.0	7.1	6.9			3870	3950	4230		
PH Adj	B		8	8	5																	
	C		8	8	6																	
	D		8	8	2																	
	E		8	8	6																	
	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			

*Handwritten notes:* 0.1 M/L 2/3/12 1.1 M/L

Chemistry Tech prerenewal/postrenewal EB/RC EB/RC EB/RC

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

Project# X4642

Test started: Date 2/4/12 Time 1315

Client El Dorado chemical

Test ended: Date 2/6/12 Time 1335

Sample Description 007

Test Species P. promelas ID# BAL/2112

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

Time: 0hour 1315 24hour 1130 48hour 1335 72hour RC 96hour RC

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 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		
			<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p>Chemistry Tech prerenewal/postrenewal</p> </div> <div style="width: 20%; text-align: center;"> <p><u>EB</u> <u>EB</u> <u>RC</u></p> </div> <div style="width: 20%; text-align: center;"> <p><u>EB</u> <u>EB</u> <u>RC</u></p> </div> <div style="width: 20%; text-align: center;"> <p><u>EB</u> <u>EB</u> <u>RC</u></p> </div> </div>																					
0	A	NA	8	8	8			8.3	7.6	8.2	7.9			7.10	7.1	7.1			210	180	180	180		
	B		8	8	8														173					
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	8																			
32	A		8	8	8			8.4	7.6	8.2	7.8			6.7	6.7	7.2			1405	1500	1500	1500		
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	7																			
	E		8	8	8																			

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

Project# X4642

Test started: Date 2/4/12 Time 1315

Client El Dorado chemical

Test ended: Date 2/6/12 Time 1335

Sample Description 007

Test Species P. promelas ID# BAL/2112

Technician: Ohour EB 24hour EB 48hour RC 72hour / 96hour /

Time: Ohour 1315 24hour 1130 48hour 1335 72hour / 96hour /

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
42	A	NA	8	8	8			8.4	7.8	8.1	7.8			6.7	6.7	6.7			1855	1860	1855	1855		
	B		8	8	8																			
	C		8	8	8																			
	D		8	8	8																			
	E		8	8	6																			
50	A		8	8	8			8.4	7.8	8.1	7.8			6.3	6.7	6.7			2080	2120	2120	2120		
	B		8	8	7																			
	C		8	8	7																			
	D		8	8	6																			
	E		8	8	8																			
Chemistry Tech prerenewal/postrenewal			EB/RC					EB/RC					EB/RC											

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

Project# X4642

client El Dorado chemical

Sample Description 007

Technician: Ohour ELB 24hour EB 48hour RC 72hour RC 96hour RC

Time: Ohour 1315 24hour 130 48hour 1335 72hour RC 96hour RC

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour RC 96hour RC

Test started: Date 2/4/12 Time 1315

Test ended: Date 2/6/12 Time 1335

Test Species P. promelas ID# BAL/2112

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity						
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96		
56	A	NA	8	8	1			8.47	8.018			5.50	6.4			2070	239							
	B		8	7	6																			
	C		8	8	6																			
	D		8	8	8																			
	E		8	8	6																			
75	A		8	0	-			8.319				4.965				2920	2910							
	B		8	0	-																			
	C		8	0	-																			
	D		8	0	-																			
	E		8	0	-																			
Chemistry Tech prerenewal/postrenewal																								

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

Project# X4642

Test started: Date 2/4/12 Time 1315

Client El Dorado chemical

Test ended: Date 2/6/12 Time 1335

Sample Description 007

Test Species P. promelas ID# BAL/2112

Technician: 0hour ESB 24hour ELB 48hour RC 72hour / 96hour /

Time: 0hour 1315 24hour 1330 48hour 1335 72hour / 96hour /

Temperature (°C): 0hour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity					
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	
100	A	NA	8	0	-			8.3	7.7				4.9	4.8				2900	3750				
	B		8	0	-																		
	C		8	0	-																		
	D		8	0	-																		
	E		8	0	-																		
	A		8																				
	B		8																				
	C		8																				
	D		8																				
	E		8																				
Chemistry Tech prerenewal/postrenewal			ESB/ELB/RC					ESB/ELB/RC					ESB/ELB/RC										



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

Project# X4642

Client El Dorado chemical

Test started: Date 2/4/12 Time 1315

Test ended: Date 2/6/12 Time 1335

Sample Description 007

Technician: Ohour EJB 24hour EJB 48hour RC 72hour / 96hour /

Test Species P. Anmelas ID# BAL12112

Time: Ohour 1315 24hour 1130 48hour 1335 72hour / 96hour /

Temperature (°C): Ohour 24.5 24hour 24 48hour 24.1 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A	NA	8	4	3			8.1	7.9	7.9			8.0	7.6	6.6			387	387	387		
PH Body	B		8	4	3																	
	C		8	1	0																	
	D		8	5	5																	
	E		8	2	0																	
				8																		
	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal																						

**APPENDIX C**  
**STATISTICAL ANALYSIS**

**Daphnid Acute Test-48 Hr Survival**

X4042  
Page 24 of 37

Start Date: 2/4/2012      Test ID: X4642dp      Sample ID: AR0000752 NPDES #007  
 End Date: 2/6/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012      Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	0.7500	1.0000	1.0000	0.8750
32	1.0000	1.0000	1.0000	0.8750	1.0000
42	1.0000	0.8750	1.0000	1.0000	1.0000
50	0.8750	0.8750	1.0000	0.6250	0.5000
56	0.8750	0.5000	0.8750	0.8750	0.6250
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100 pH	0.6250	0.6250	0.7500	0.2500	0.7500

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%		
D-Control	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5	
32	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	30.50
42	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	30.50
50	0.7750	0.8378	1.1018	0.7854	1.3931	22.427	5	21.50
56	0.7500	0.8108	1.0651	0.7854	1.2094	19.025	5	19.50
*75	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00
*100	0.0000	0.0000	0.1777	0.1777	0.1777	0.000	5	15.00
*100 pH	0.6000	0.6486	0.8883	0.5236	1.0472	24.184	5	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.90603	0.94	-0.8694	0.89371
Equality of variance cannot be confirmed				
<b>Hypothesis Test (1-tail, 0.05)</b>				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				

Daphnid Acute Test-48 Hr Survival

X4642

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Start Date: 2/4/2012 Test ID: X4642dp Sample ID: AR0000752 NPDES #007  
 End Date: 2/6/2012 Lab ID: ADEQ880630 Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

Comments:

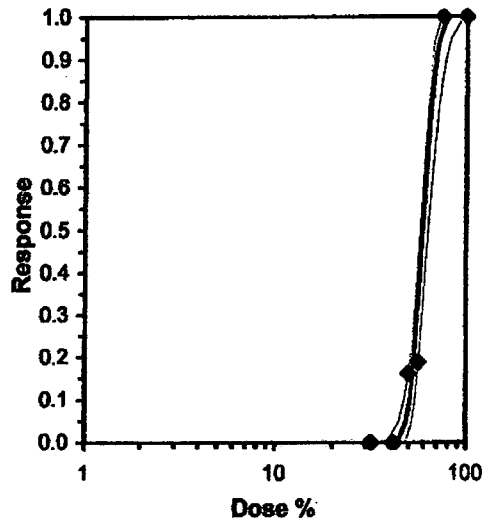
Conc-%	1	2	3	4	5
D-Control	1.0000	0.7500	1.0000	1.0000	0.8750
32	1.0000	1.0000	1.0000	0.8750	1.0000
42	1.0000	0.8750	1.0000	1.0000	1.0000
50	0.8750	0.8750	1.0000	0.6250	0.5000
56	0.8750	0.5000	0.8750	0.8750	0.6250
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100 pH	0.6250	0.6250	0.7500	0.2500	0.7500

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				CV%	N	Number Resp	Total Number
			Mean	Min	Max					
D-Control	0.9250	1.0000	1.2872	1.0472	1.3931	12.116	5	3	40	
32	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	1	40	
42	0.9750	1.0541	1.3564	1.2094	1.3931	6.055	5	1	40	
50	0.7750	0.8378	1.1018	0.7854	1.3931	22.427	5	9	40	
56	0.7500	0.8108	1.0851	0.7854	1.2094	19.025	5	10	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	0.6000	0.6486	0.8883	0.5236	1.0472	24.184	5			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p \leq 0.05$ )	0.91124	0.918	-0.5656	-0.3207
Bartlett's Test indicates equal variances ( $p = 0.16$ )	6.62753	13.2767		

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	19.6526	3.42074	12.9479	26.3572	0.075	7.68831	9.48773	0.10369	1.77031	0.05088	9
Intercept	-29.791	6.00495	-41.561	-18.021							
TSCR	0.04946	0.01995	0.01036	0.08855							
Point	Probits	%	95% Fiducial Limits								
EC01	2.674	44.8681	39.1257	48.2401							
EC05	3.355	48.5976	43.9843	51.4117							
EC10	3.718	50.7109	46.7459	53.2671							
EC15	3.964	52.1884	48.6544	54.615							
EC20	4.158	53.3933	50.181	55.7611							
EC25	4.326	54.4491	51.4851	56.8117							
EC40	4.747	57.2032	54.668	59.8261							
EC50	5.000	58.9266	56.4649	61.9476							
EC60	5.253	60.702	58.1662	64.3147							
EC75	5.674	63.7723	60.8428	68.7506							
EC80	5.842	65.0334	61.875	70.6674							
EC85	6.036	66.5349	63.069	73.0055							
EC90	6.282	68.4734	64.5676	76.1005							
EC95	6.645	71.451	66.8013	80.9954							
EC99	7.326	77.3901	71.0939	91.1805							



**Acute Fish Test-48 Hr Survival**

Start Date: 2/4/2012      Test ID: X4642pp      Sample ID: AR0000752 NPDES #007  
 End Date: 2/6/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012      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	1.0000	1.0000	1.0000	0.8750	1.0000
42	1.0000	1.0000	1.0000	1.0000	0.7500
50	1.0000	0.8750	0.8750	0.7500	1.0000
56	0.1250	0.7500	0.7500	1.0000	0.7500
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100 pH	0.3750	0.3750	0.0000	0.6250	0.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
32	0.9750	0.9750	1.3664	1.2094	1.3931	6.055	5	25.00	16.00
42	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	25.00	16.00
50	0.9000	0.9000	1.2504	1.0472	1.3931	11.683	5	20.00	16.00
56	0.6750	0.6750	0.9792	0.3614	1.3931	38.445	5	17.50	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
*100 pH	0.2750	0.2750	0.5171	0.1777	0.9117	63.146	5	15.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ( $p \leq 0.05$ )	0.83064	0.94	-1.0011	4.18336
Equality of variance cannot be confirmed				
<b>Hypothesis Test (1-tail, 0.05)</b>				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				

*EBB*  
2/24/12

**Acute Fish Test-48 Hr Survival**

X4642

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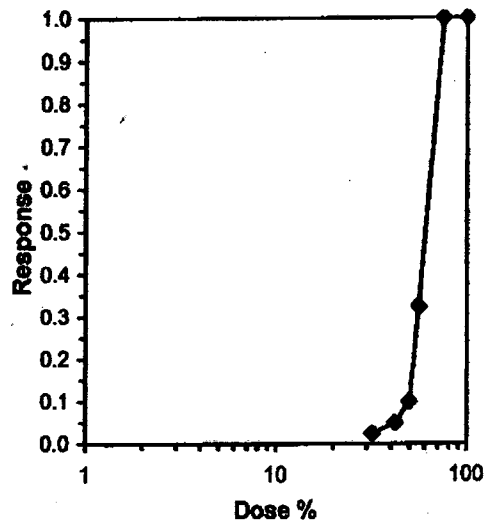
Start Date: 2/4/2012      Test ID: X4642pp      Sample ID: AR0000752 NPDES #007  
 End Date: 2/6/2012      Lab ID: ADEQ880630      Sample Type: EFF2-Industrial  
 Sample Date: 2/3/2012      Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas  
 Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	0.8750	1.0000
42	1.0000	1.0000	1.0000	1.0000	0.7500
50	1.0000	0.8750	0.8750	0.7500	1.0000
56	0.1250	0.7500	0.7500	1.0000	0.7500
75	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000
100 pH	0.3750	0.3750	0.0000	0.6250	0.0000

Conc-%	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	0	40
32	0.9750	0.9750	1.3664	1.2094	1.3931	6.055	5	1	40
42	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	2	40
50	0.9000	0.9000	1.2504	1.0472	1.3931	11.683	5	4	40
56	0.6750	0.6750	0.9792	0.3614	1.3931	38.445	5	13	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	0.2750	0.2750	0.5171	0.1777	0.9117	63.146	5		

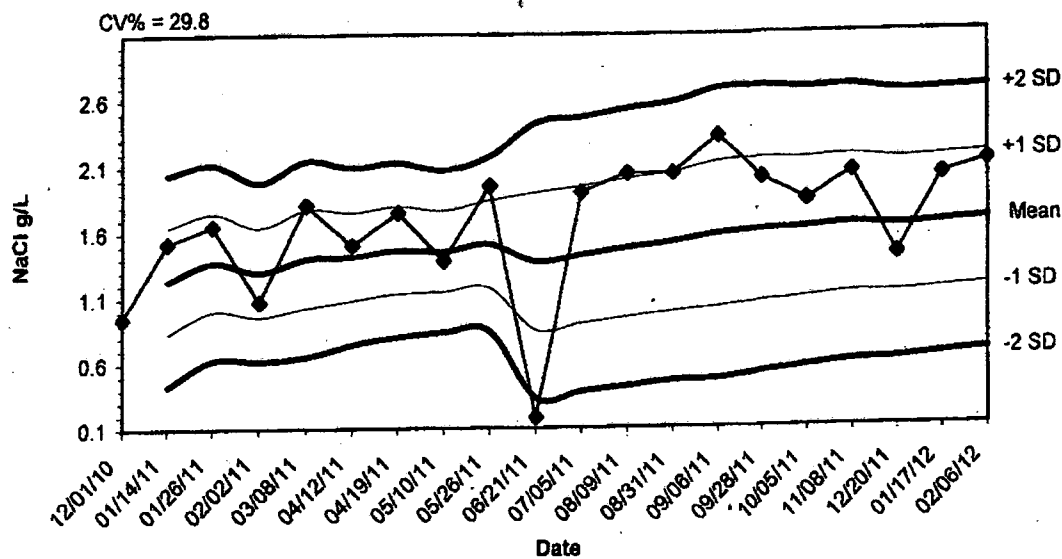
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.88261	0.927	-0.8786	2.48844
Equality of variance cannot be confirmed				

Trimmed Spearman-Kärber			
Trim Level	EC50	95% CL	
0.0%			
5.0%	59.977	57.791	62.246
10.0%	60.271	58.050	62.577
20.0%	60.350	57.423	63.427
Auto-2.5%	59.529	57.257	61.892



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

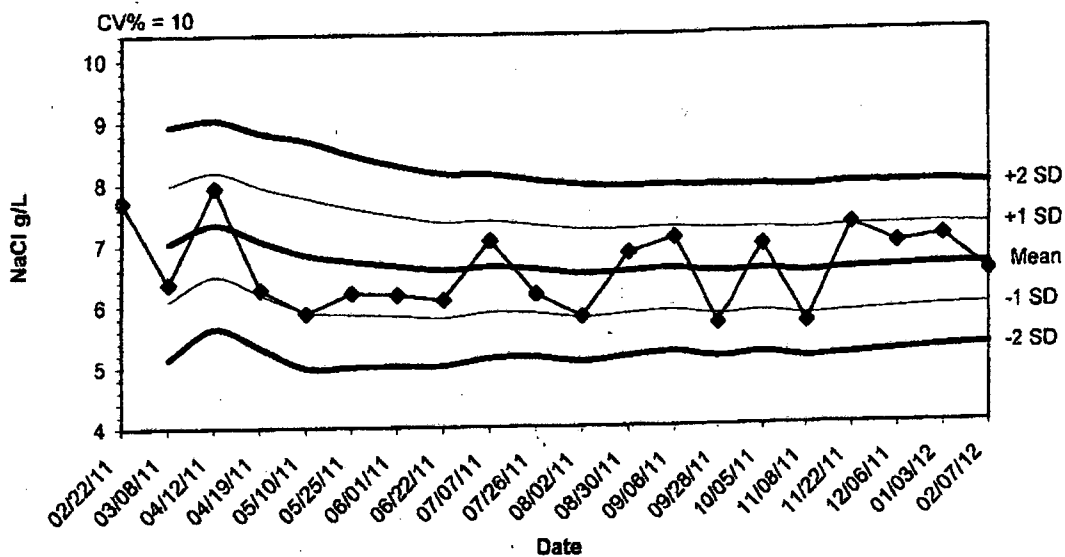
2012 48-hour Reference Toxicant Test Results for *Daphnia pulex*



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/01/10	0.9500					
01/14/11	1.5200	1.2350	0.8319	0.4289	1.6381	2.0411
01/26/11	1.6500	1.3733	1.0010	0.6287	1.7457	2.1180
02/02/11	1.0700	1.2975	0.9578	0.6180	1.6372	1.9770
03/08/11	1.8100	1.4000	1.0270	0.6541	1.7730	2.1459
04/12/11	1.5000	1.4187	1.0806	0.7445	1.7527	2.0888
04/19/11	1.7500	1.4643	1.1328	0.8010	1.7959	2.1276
05/10/11	1.3800	1.4538	1.1453	0.8368	1.7622	2.0707
05/26/11	1.9500	1.5089	1.1763	0.8436	1.8415	2.1741
06/21/11	0.1800	1.3760	0.8517	0.3273	1.9003	2.4247
07/05/11	1.9000	1.4236	0.9017	0.3798	1.9458	2.4675
08/09/11	2.0400	1.4750	0.9465	0.4180	2.0035	2.5320
08/31/11	2.0400	1.5185	0.9888	0.4591	2.0482	2.5779
09/06/11	2.3200	1.5757	1.0235	0.4714	2.1279	2.6800
09/28/11	2.0000	1.6040	1.0608	0.5175	2.1472	2.6905
10/05/11	1.8300	1.6181	1.0903	0.5624	2.1460	2.6738
11/08/11	2.0400	1.6429	1.1217	0.6005	2.1642	2.6854
12/20/11	1.4100	1.6300	1.1214	0.6127	2.1386	2.6473
01/17/12	2.0100	1.6500	1.1481	0.6461	2.1519	2.6539
02/06/12	2.1100	1.6730	1.1737	0.6745	2.1723	2.6715



2012 48-hour Reference Toxicant Test Results for Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/22/11	7.7100					
03/08/11	6.3700	7.0400	6.0925	5.1450	7.9875	8.9350
04/12/11	7.9400	7.3400	6.4921	5.6442	8.1879	9.0358
04/19/11	6.2700	7.0725	6.1976	5.3227	7.9474	8.8223
05/10/11	5.8800	6.8340	5.9074	4.9809	7.7606	8.6871
05/25/11	6.2100	6.7300	5.8630	4.9960	7.5970	8.4640
06/01/11	6.1800	6.6514	5.8331	5.0148	7.4697	8.2881
06/22/11	6.0900	6.5813	5.7981	5.0149	7.3644	8.1476
07/07/11	7.0600	6.6344	5.8847	5.1349	7.3842	8.1340
07/26/11	6.1800	6.5890	5.8676	5.1463	7.3104	8.0317
08/02/11	6.1800	6.5182	5.7947	5.0711	7.2417	7.9652
08/30/11	6.8500	6.5458	5.8494	5.1529	7.2423	7.9388
09/06/11	7.0900	6.5877	5.9040	5.2203	7.2714	7.9551
09/28/11	5.6700	6.5221	5.8210	5.1198	7.2233	7.9245
10/05/11	6.9500	6.5507	5.8660	5.1814	7.2353	7.9199
11/08/11	5.6700	6.4956	5.7985	5.1014	7.1927	7.8898
11/22/11	7.2700	6.5412	5.8406	5.1400	7.2418	7.9424
12/08/11	6.9500	6.5639	5.8774	5.1909	7.2504	7.9369
01/03/12	7.0600	6.5900	5.9132	5.2364	7.2668	7.9436
02/07/12	6.4600	6.5835	5.9241	5.2648	7.2429	7.9022

**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: 2/3/12      To: 1305  
From: 2/3/12      To: 1305

Test Initiated: 2/4/12

Dilution Water Used:      Receiving Water      X      Reconstituted Water

**Dilution Series Results - Percent Survival**

TIME OF READING	REP	0%	12.5%	25%	50%	75%	100%	100%
24-hour	A	100	100	100	100	100	0	100
	B	100	100	100	100	100	0	100
	C	100	100	100	100	100	0	100
	D	100	100	100	100	100	0	100
	E	100	100	100	100	100	0	100
48-hour	A	100	100	100	87.5	87.5	0	62.5
	B	75.0	100	87.5	87.5	50.0	0	62.5
	C	100	100	100	100	87.5	0	75.0
	D	100	87.5	100	62.5	87.5	0	25.0
	E	87.5	100	100	50.0	62.5	0	75.0
	Mean	92.5	97.5	97.5	77.5	75.0	0	60.0

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  $LC_{50}$  below:

$LC_{50}$  =      58.93% effluent  
95 % confidence limits: 61.95 - 56.46  
Method of  $LC_{50}$  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 007  
 NPDES Number: AR0000752/ AFIN 70-00040  
 Contact: Larken Pennington  
 Analyst: Briggs, Callahan  
 Sample Collected

From: Date 2/3/12 Time 1305  
 To: Date 2/3/12 Time 1305  
 Date 2/4/12 Time 1200  
 Date 2/6/12 Time 1245

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	8.2	7.4	24.5	24.0	24.1	32.0			48.0			7.6	7.6	7.9
32		8.4	8.2	8.0	24.5	24.0	24.1							6.7	6.7	7.2
42		8.4	8.4	8.0	24.5	24.0	24.1							6.4	6.3	7.1
50		8.4	8.5	8.1	24.5	24.0	24.1							6.3	5.9	6.9
56		8.4	8.3	8.1	24.5	24.0	24.1							5.5	5.5	6.7
75		8.3	8.4		24.5	24.0								4.9	4.9	
100		8.3	8.4		24.5	24.0		0.0			1176.0			4.9	4.9	
100 pH adj		8.1	8.0	8.1	24.5	24.0	24.1							8.0	7.1	6.9

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

**Acute Forms**  
**Pimephales promelas Survival**

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

Composite Collected      From: 2/3/12      To: 1305  
From: 2/3/12      To: 1305

Test Initiated: 2/4/12

Dilution Water Used:      Receiving Water      X      Reconstituted Water

**Dilution Series Results - Percent Survival**

TIME OF READING	REP	0	32	42	50	56	75	100	100pt
24-hour	A	100	100	100	100	100	0	0	50.0
	B	100	100	100	100	87.5	0	0	50.0
	C	100	100	100	100	100	0	0	12.5
	D	100	100	100	100	100	0	0	62.5
	E	100	100	100	100	100	0	0	25.0
48-hour	A	100	100	100	100	12.5	0	0	37.5
	B	100	100	100	87.5	75.0	0	0	37.5
	C	100	100	100	87.5	75.0	0	0	0
	D	100	87.5	100	75.0	100	0	0	62.5
	E	100	100	75.0	100	75.0	0	0	0
	Mean	100	97.5	95.0	90.0	67.5	0	0	27.5

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

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

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

LC<sub>50</sub> =      59.53% effluent  
95 % confidence limits: 61.89 - 57.26%

Method of LC<sub>50</sub> calculation: Trimmed Spearman Karber

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: Briggs, Callahan

Sample Collected From: Date 2/3/12 Time 1305  
 To: Date 2/3/12 Time 1305  
 Test Begin Date 2/4/12 Time 1315  
 Test End Date 2/6/12 Time 1335

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH				
	Dilution	Time	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0			8.3	8.2	7.9	24.5	24.0	24.1	32.0			48.0			7.6	7.6	7.7
32			8.4	8.2	7.8	24.5	24.0	24.1							6.7	6.7	7.2
42			8.4	8.4	7.8	24.5	24.0	24.1							6.4	6.3	7.0
50			8.4	8.5	7.8	24.5	24.0	24.1							6.3	5.9	6.7
56			8.4	8.3	7.8	24.5	24.0	24.1							5.5	5.5	6.4
75			8.3	7.5		24.5	24.0								4.9	5.5	
100			8.3	7.7		24.5	24.0		0.0			1176.0			4.9	4.8	
100 pH adj			8.1	8.0	7.9	24.5	24.0	24.1							8.0	7.1	6.6

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

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



## Bio-Analytical Laboratories

3240 Spurgin Road  
Post Office Box 527  
Doyline, LA 71023

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

### REPORT QUALITY ASSURANCE FORM

Client: El Dorado Chemical

Project#: X211042

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

3/8/12  
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) 863-1400  
 Greg Withrow  
 El Dorado Chemical Company  
 4500 Northwest Ave.

El Dorado, AR 71730

Origin ID: ELDA

**FedEx**  
Express



J12101112190225

Ship Date: 20MAR12  
 Act/Wgt: 3.0 LB  
 CAD: 5887030/INET3250

Delivery Address Bar Code



SHIP TO: (870) 863-1484

BILL SENDER

**Steve Downs**  
**ADEQ - Water Division Chief**  
**5301 NORTHSHORE DR**

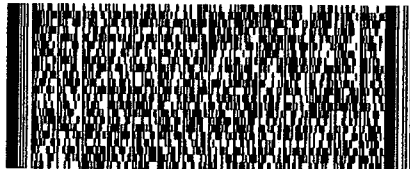
**NORTH LITTLE ROCK, AR 72118**

Ref #  
 Invoice #  
 PO #  
 Dept #

**WED - 21 MAR A4**  
**PRIORITY OVERNIGHT**

TRK# 7933 5684 0687

0201

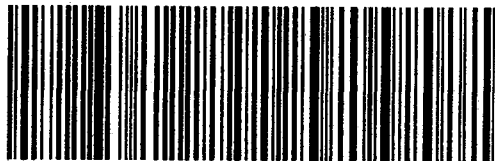


**X2 LITA**

**72118**

AR-US

**MEM**



512G181D6/A278

**After printing this label:**

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

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.