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



**CHEMICAL COMPANY** 

May 23, 2011

Mary Barnett, Ecologist Water Division Arkansas Department of Environmental Quality 5301 Northshore Drive North Little Rock, AR. 72118-5317

Re: Semi-Annual Status Report Sub-lethal Response (SLR): Outfall 001 El Dorado Chemical Company NPDES Permit # AR 00000752; AFIN 70-00

Dear Ms. Barnett:

As required by the Sub-lethal Response (SLR) Study Plan– Revision 2.1 (dated April 19, 2010), this letter provides the 2<sup>nd</sup> in the series of semi-annual status updates related to the implementation of the SLR for Outfall 001. El Dorado Chemical Company (EDCC) initiated the implementation of the SLR study after receipt of ADEQs notice of the SLR plan approval. The initial status report was submitted to ADEQ on November 23,2010.

Activities completed during the period from November 2010- May 2011included:

- 1) Continued the baseline WET testing and analytical chemistry on a monthly basis with particular attention to the sub-lethal endpoints and the effect of the UV treatment on the 100% effluent exposure.
- 2) Continued the assemblage of facility discharge data, including flow, TDS, chloride, sulfate, TOC, storm amounts and pH.

Electronic copies (pdf files) of the individual monthly WET test reports are provided in **Attachment 1**.

In addition, the results of the November 2010 WET tests are included in this status report (the November 2010 tests were completed but results were not available for inclusion in the initial status report). Additional details of the activities completed during this reporting period are provided below:

# Continued the routine baseline toxicity testing and associated analytical chemistry.

During this reporting period (November 2010 to May 2011) the routine WET tests were completed monthly. There was no discharge from Outfall 001 during the month of April 2011: therefore, no WET testing was completed during April.

The monthly WET tests during this reporting period continued the consecutive string of 13 **PASSED** tests with sub-lethal (growth endpoint) NOECs of 100% effluent for the fathead minnow, stretching back to November 2009.

However, the water flea monthly WET tests demonstrated sub-lethal failures in the Outfall 001 100% effluent during this period, temporarily interrupting the consecutive string of **PASSED** tests. During this reporting period, sub-lethal NOECs of <32% effluent were recorded. However, the most recent WET test results for the period (March 2011) once again passed the water flea sub-lethal endpoint with a NOEC of 100% effluent.

The failures of the sub-lethal water flea endpoints during this reporting period were caused by elevated pH as reported in the WET test reports and as reported in the facility NPDES non-compliance report submitted along with the November 2010 discharge monitoring report (DMR) (**Attachment 2**). The non-compliance reports indicated that the cause of the elevated pH was due to the late winter/early spring algal bloom.

Although the water flea failed the sub-lethal WET test endpoint during this period, the effluent samples used in the WET testing had to be filtered to remove native daphnids from the 100% effluent prior to the test initiation. Clearly, the effluent was not toxic since the effluent was supporting both increased algae production and increased populations of native invertebrates (including native Daphnia).

Another factor that may have contributed to the significant differences in the control and the effluent exposures may be the increased sensitivities of the lab cultures used in the WET testing. According to the reference toxicity testing during this reporting period (as reported in the individual WET test reports), the water flea lab cultures demonstrated a trend of increasing sensitivities during this period (December 2010 through February 2011).

Also continued during the WET tests were the ultra-violet (UV) light treatments to kill native pathogens that may be present in the effluent samples. The WET testing completed on the effluent samples treated with UV radiation were either not different from the control or the performance of the UV treated effluents were less than the untreated effluents. These results indicate that native pathogens were not contributing to the WET test performance during this reporting period. Due to the season (late winter/early spring with the colder water temperatures), it was not anticipated that native pathogens would be present to the magnitude that could

adversely impact lab cultures. However, as ambient water temperatures increase, the native pathogens have the potential to adversely impact the WET test performance; therefore, the UV treatments will continue.

**Continued the assemblage of facility data** including the monitoring of routine discharge data with particular attention to facility conditions during the WET monitoring period. The information will be utilized as a baseline for comparison should sub-lethal test failures recur.

Due to the results during this monitoring period (the consecutive failures of the sublethal endpoint), efforts to identify the cause of future sub-lethal test failures will be completed using the toxicity identification evaluations (TIE) as described in the SLR Plan.

EDCC will continue the monthly WET monitoring, tracking both the effect of UV treatments and the routine analytical chemistry. EDCC is prepared to implement additional tasks as described in the SLR Study Plan should consistent and significant WET test failures reoccur.

Please do not hesitate to contact me if you have any questions or require additional information regarding the flow evaluation required as part of the NPDES permit.

Respectfully submitted,

unt Parker

Brent Parker EDCC Environmental Technician

Attachments

ecc: John Carver, LSB Industries w/o attachments Greg Withrow, EDCC General Manager w/o attachments Kyle Wimsett, EDCC EHS Manager w/o attachments Cindy Garner, ADEQ NPDES Enforcement, w attachments Roland McDaniel, GBMc & Associates, w/o attachments

# Attachment 1

#### Bio-Analytical Laboratories (BAL) ADEQ Certificate #88-0630 Project X4233

#### **Bio-Analytical Laboratories' Executive Summary**

Permittee:	El Dorado Chemical Company 4500 Northwest Avenue El Dorado, AR 71731
Project #:	X4233
Outfall:	001
Permit #:	AR0000752/ AFIN #70-00040
Contact:	David Sartain
<b>Test Dates:</b>	November 15 - 22, 2010
Test Type:	<ul> <li>Chronic Static Renewal Survival and Reproduction Test using <i>Ceriodaphnia dubia</i> (EPA Method 1002.0).</li> <li>Chronic Static Renewal Survival and Growth Test using <i>Pimephales promelas</i> (EPA Method 1000.0).</li> </ul>

#### **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 - 37.93%.

# Note: The UV treated 100% dilution showed no lethal effects, but did show nonlethal effects.

#### 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- 1.

3. Report the NOEC value for survival, Parameter TOP6C - 100%

4. Report the NOEC value for growth, Parameter TPP6C - 0%

5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 31.90%

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

This report contains a total of 60 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 NELAC and ADEQ.

## **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

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

AT

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

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

EPA Methods 1000.0 and 1002.0

Project X4233

**Test Dates: November 15 - 22, 2010** 

Report Date: December 6, 2010

Prepared for: David Sartain 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

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#### **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 dilution water hardness prior to test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were run a minimum of once monthly in order to document test organism sensitivity. Monthly chronic reference toxicant tests, using NaCl, were also conducted in order to document organism sensitivity and testing technique.

#### **2.3 Dilution Water**

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

#### **2.4 Test Concentrations**

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

#### 2.5 Sample Collection

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on November 15, 17 and 19, 2010. Upon collection and completion of each composite, the samples were chilled to 4<sup>o</sup> 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  $25\pm1^{0}$  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. The effluent was filtered through a 60 micron plankton net in order to remove any organisms that might interfere with the tests. It was also 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  $25\pm1^{\circ}$  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  $25\pm1^{\circ}$  Celsius. AEMC<sup>R</sup> data-loggers were used to monitor diurnal test temperature. Test temperatures were récorded 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.

#### 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 and the growth data was analyzed using Dunnett's Test, a parametric test. The IC<sub>25</sub> value for reproduction was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC<sub>50</sub> values (that concentration of a substance which is lethal to 50 percent of the test organisms after continuous exposure for the duration of the test) in the reference toxicant tests were obtained by approved EPA methods of analysis.

#### 3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. One hundred percent survival occurred in the control and in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 24.0 and 6.6, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively (p=.05). One hundred percent survival and an average of 5.8 neonates was noted in the 100 percent UV treated dilution.

The fathead minnow test results can be found in Table 2. One hundred percent survival occurred in the control and 80 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.458 milligram (mg), while the average in the critical dilution was 0.393 mg. The NOEC for survival and growth in this test was zero percent effluent. An erratic dose response occurred in the both the survival and growth of this test. Random mortality occurred in all of the effluent dilutions, which may have been caused by pathogen interference. Eighty-five percent survival and an average weight of 0.363 mg was noted in the UV treated dilution.

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates - Total	Sig.*
Control	100.0		24.0	24.0	
32.0	100.0		13.4	13.4	*
42.0	100.0		11.8	11.8	*
56.0	100.0		10.1	10.1	*
75.0	90.0		8.7	8.8	*
100.0	100.0		6.6	6.6	*
100.0 UV	100.0		5.8	5.8	*

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

\*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.

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	100.0		0.458	
32.0	32.5	*	0.093	*
42.0	45.0	*	0.178	*
56.0	47.5	*	0.190	*
75.0	50.0	*	0.190	*
100.0	80.0		0.383	
100.0 UV	85.0		0.363	

#### Table 2: Results of the Chronic Definitive Fathead Minnow Test

\*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 48-hour reference toxicant test results can be found in Table 3 below. The acute test results indicate that the test organisms were within the respective sensitivity range. The monthly chronic reference toxicant tests also showed those test organisms to be within the respective sensitivity range. The graphs of the results of the acute and chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC <sub>50</sub>	Upper and Lower CUSUM Chart Limits
Ceriodaphnia dubia	11/23/10 - 11/25/10 10:15 - 10:00 hours	1.28	1.79 - 1.01
Pimephales promelas	11/23/10 - 11/25/10 10:25 - 10:05 hours	6.09	7.95 - 4.02

Table 3: Results of the 48-hour	<b>Reference Toxicant Tests</b>	- g/L
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#### 4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on November 15, 17 and 19, 2010, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven of exposure (p=.05). Nonlethal effects (i.e., lack of reproduction) were noted in the critical dilution in the *Ceriodaphnia* test (p=.05). Treating the effluent with ultraviolet light did not decrease the nonlethal effect in the *Ceriodaphnia* test. Pathogen interference was suspected in the fathead minnow, resulting in random mortality throughout the effluent dilutions of the test. Treating the effluent with ultraviolet light decreased the lethal and nonlethal effect (i.e. lack of growth) noted in the fathead minnow test.

#### 5.0 Reference

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.

## APPENDIX A CHAIN-OF-CUSTODY DOCUMENTS

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

CHAIN OF CUSTODY

Company: El Dorado Cl	Company: El Dorado Chemical Company	Яu	₽ 87 87	Phone: (870) 863-1484	ęż		Amalysis:	sis:							Project Number:
Address: 4500 Northw	Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1	Dorado,	AR 71731	Fax: ii (870) 863-1	1499					Acute	Acute	Fecal (	Total (		X4/333
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CHAIN OF CUSTODY

Bio-Analytical Laboratories 3249 Spurgin Road Doyline, ILA 71023 (318) 745-2772, Fax (318) 745-277:

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### APPENDIX B RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Provident X4223	<u>3</u> Date start		a: 11/22/10
	DOFADO Che	2 micial	
Client/Contact_ <b>EL</b>	- LOTHDO Che		0, 0, 721
Address 4500	Jorthwest Ave	E, El Dovado,	Hrk. 11121
NPDES# AR0000	152 AFIN-	10-00040	
Sample Descriptio	n_001	_ Dilution Water S	oft reconstituted
Test Temperature(	°C) <u>25±1°C</u>	Technicians Bris	95, Haushton, Zeagler Callaban
Adults isolated:	Date_11115110	Time: 0920	
Neonates collecte Dissolved Oxygen	ed: Date 111510 Meter: Model YSI5	Time: 1425 50A Serial #06 230A+ Serial #02	20273
Conductivity Mete	I: MOUEL CONCL	0 _ 0 _ 1	# 80277924
Amperometric Titr	Aerate?/Minutes /Final D.O.	<u>er-Porter Serial</u> Receiving Water	Aerate?/Minutes
Effluent Initial D.O.	/Final D.O.	Initial D.O.	/Final D.O. <u>(mg/L &amp; %)/Tech</u>
(mg/L & %)/Tech	Ind/L & ST/TCCK		
0.10.2/118.7%/RC	0. Y/10/8.2/96.0%/RC		0
1.109/131.0% Rc	1. Y/ 10/8.4/97.9%/RS	1	1
2.10.81126.99/012/By	2. VIIS18.3197.7968	h <sup>2</sup>	2
3.10.1119.70/015/01mg	3.411018.41100.4%18.8%		3
4.10.6/125.1020/RC	4. Y/10/8.3/98.4% /RC	4	4
5.10.3/119.10/01/08/2	5. 4/10/8.10/100390/86m	5	5
6.10.9/122,10/18.97	6 y 115 18.1199.9% Kithy	6	б
710.6/124,5% RC	7. <u>Y/15</u>	7	7
<u>Total Residual</u> <u>Chlorine(mg/L)/</u> <u>Tech</u>	<u>Dechlorinated?</u> Amount?/Tech	<u>Ammonia (NH3)</u> (mg/L)/Tech	BAL Sample # date
1. <0.01/RC	1. No /RC	1. 0.25/RC	1.C1910 11/15/18
2. <u>20.01 [ 813mg</u>	2. NULLANX	2. Qasherm	2. <u>C1932 111840</u>
	3. Noldam	3. D.25/28/	3 CIQLO 1120/10
3. <u>Lo. 01 199</u>	s. <u>no na ri</u>	0	

Comments:

Tillered effluent thru 60 um plankton net to remove any live organisms.

#### BIO-ANALYTICAL LABORATORIES NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # <u>X4233</u>

Test Dates 11115/10 - 11/02/10

Client EI Dorado Chemical

Replicate			%	Concentra	tion		
	0.	39	42	56	75	100	100 NV
A	57	14	19	8	11	4	6
В	23	8	15	12	6	5	5
С	21	12	11	19	12	3	I
D	33	22	12	8	ID.	8	7
Е	15	19 :	13	14	10	4	4
F	99	1)	9	11	10	8	б
G	24	15	}	<b>-</b>	8	6	7
Н	76	]]	Q	10	7	9	6
I	99	17	10	12	X <sup>10</sup>	9	5
J	26	ろ	9	7	4	10	8
Surviving Mean		13.4	11.8	10.1	8.7	6.6	5,8
Total Mean	24.0	13.4	11.8	10,1	8.8	6.6	5.8
CV%*	19.74	38.09	27.04	24.45	29.98	37.93	21.19

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

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Key: M=male; X=dead adult

Calculated by: <u>SB</u> b		6	2/10	
Calculations checked by:_	AH	14	23/10	
¥ -			• · · · · · · · · · · · · · · · · · · ·	

<b>-</b>	BIO-ANALYTICAL LA CERIODAPHNIA DUBIA SURVIVAL	
Client	EL Dorado Chemical	Test ended: Date 1/22/0 Time 1005
	an: Day0 Att 1 AL 2 RC 3 Att 4 Day0 1589 1 1040 2 1230 3 1305 ure: Day0 AHS 1 249 2 345 3 344	4 1405 5 237 6 20 7 1240 8
t Conc.	Day A B C D E F G	#T.ive   Total Live
0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
32	2 3 3 3 3 3 3 3 3 3 3 3 3 3	3 4 0 10 
42	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
54	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
15	1     1       2     0       3     0       4     4       7     0       5     0       7     3       8     8	$ \begin{array}{c}                                     $
100	1 2 3 4 5 0 6 4 5 0 6 4 5 0 6 4 5 0 6 4 5 0 6 4 5 0 6 4 5 0 6 6 6 6 6 6 6 6 6 6 6 6 6	6 0 0 10

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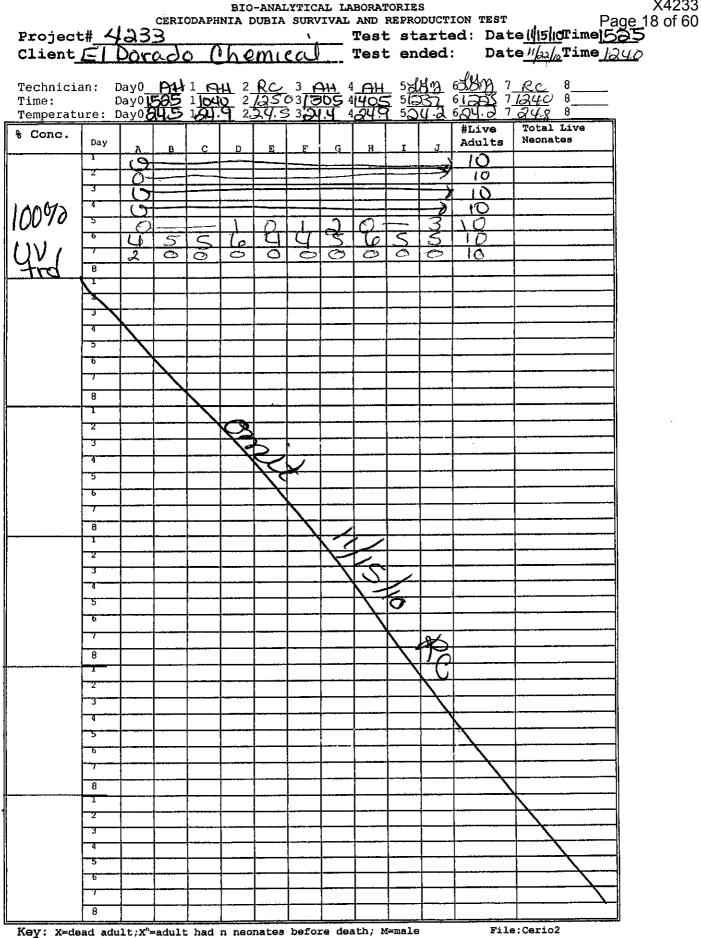
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BIU-ANA roject# <u>423</u> lient <u>EL Dora</u>				ES /-L est sta	NAY WAT	EK QUP Date <u>l</u>	LITI L 1510 Time	)ATA ≘ <b>1525</b> ⇒ 1240 P	X423 2 age 19 of 6
rganism Ceric	<u>do (</u> Truh	henu hus	cal Te	est end	iea:	Date <u>n</u>		= 18.42	
Day/# water used	3095	1	3100	3	4	5	6	7	8
Concentration: Cor		P+					· · · · · · · · · · · · · · · · · · ·		
pH	8.0	8.98.1	10	22.6	8.7.9	2.1.8	81 9	8.1	
DO (mg/1)	8.1	8284	8.8.2	6.82	298.2	1983	808.1	7.9	
Cond (umhos/cm);	171.9	111.0	159.4	1567	160.0	141.0	1.59.6		
Alkalinitý(mg/L)	32		328						
Hardness (mg/L)	44		30	<u> </u>		<u> </u>			
Concentration: 3.	290				RC	1/19/2		01.2	·····
рH	9.2	29.3	201.1	830	897	8.8.3	8.4	8.0	
DO (mg/1)	8.0	8:8.3	8.8.2	3% a	188.1	798.3	58.2	8.1	
Cond (umhos/cm)	285	287	a78	1272	280	284	21		
Concentration: 4	270	<u> </u>	<u> </u>					027	
рН	9.4	Dary	8.9.4	8.8.7	829.3	8.28.9	889	8.3	
DO (mg / 1)	8.0	8.8.3	8.3	8/8,2	288.1	7.98.3	8.0	8.0	
Cond (umhos/cm)	317	320	318	309	314	34	309		L
Concentration: 5	620		~~~~~						
рH	9.5	19,5	8-9-5	8.g.1	69.1	8.0.2	<u>ga</u>	8.4	
DO(mg/l) ;	8.1	8.8.2	8.8.2	8.2.2	2.8.1	2.98.4	818, 3	8.1	
Cond (umbos/cm)	368	370	3109	358	365	369	362		
Concentration:	<u>1590</u>	)	<del></del>			<del>-6 2 -</del>	627		<b></b>
рH	9.6	89.6	82.6	0.3	619.5	8.9.4	\$9.3	8.7	
DO (mg/1)	8.1	8-8.2	8.8.3	8.8.2	1.8.1	28.4	884	8.1	
Cond(umhos/cm)	433	434	434	1428	422	432	1428	<u> </u>	L
Concentration:	607	<u>ð</u>						1067	
рн	9.1	8.9.1	8.2.6	N.Q.E	8.274	9.5	89.4	8,0	
DO(mg/1)	8.1	8.38.2	8.8.2	8.8.2	218,2	185	8-8-le	8.1	<b> </b>
Cond (umhos/cm)	521	526	534	517	529	1525	518		<b>   </b>
Tech-prerenewal	RC	OH	RC	AH	AH	KKM	AND.	KC	
Tech-postrenewal		RC	den	PH	I RC.	Hor Int	5812		
Hardness(mg/l)	40			192		40.0	1		<u></u>
that drive by find	loD	1		112		1240			

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BLU-ANA Project# <b>123</b> lient <u>&amp; Dor</u>	<b>3</b> 7			.ES /-L est sta	AY WAY	Date <u></u>	<u>ijio</u> rim	e <b>1995</b>	X4 Page 20 c
lient <u>EL Dor</u>	daph	Chemi	Cal. Te	est end	ded:	Date <u>u</u>	<u>/22///</u> 11100	e <u><i>lex40</i> .</u>	
rganism Cerio	1 <u> </u>	n sa				5	6	7	8
Day/# water used	8095 11/30/15		2	3	4	<u> </u>	0		
Concentration: Con	terol 10	0% ()	V trd		247	hu7.	133/	04/	
рн	9.6	896	Dig.le	54.5	8. Jaly	8.015	GG.S		
DO(mg/l)	7.9	8-81	1.9	88.2	281	184	1.8.4	1.8	
Cond (umhos/cm)	523	523	534	<u>513</u>	531	516	525		
Alkalinitý(mg/L)					<u></u>				
Hardness (mg/L)					L	L			
Concentration:				····			~~~>		
рН	$\sum$			$\angle$	$\leq$		$\angle$		
DO (mg/1)									
Cond (umhos/cm)						<u> </u>	L		
Concentration:	r	$\rightarrow$					~		
рH		X	$\angle$	$\angle$	$\angle$	$\leq$			
DO (mg/l)				$\angle$	$\angle$				
Cond(umhos/cm)			12	42		<u> </u>			
Concentration:			<u> </u>	<u>,`</u>				· · · · · · · · · · · · · · · · · · ·	
pH									
DO(mg/1) i				$\sum$					
Cond (umhos/cm)					10	<u> </u>	·		
Concentration:									
рH					$\boldsymbol{X}$				
DO(mg/l)						Pa			
Cond (umhos/cm)						$\square$	<u> </u>	ļ]	
Concentration:						<u>\</u>			
pH									
DO(mg/l)							X		
Cond (umhos/cm)		r				0.0		n	
Tech-prerenewal	RC	AH	RC	10H	AH	Hom-	KR13	RC	
	1	Dr	LAND	عم	Rc.	KKM	1 year		
Tech-postrenewal		In	$\underline{\mathbf{D}}$		$\square \bigcirc$	VX V.A		<u></u>	
Tech-postrenewal Hardness(mg/l)									

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PIMEPHALI	BIO-ANALYTICAL ES PROMELAS SURVIV	LABORATORÍES VAL AND GROWTH DAI		age 21 of 60
Project# <u>1423</u>	<b>3</b> Date started:	1/15/10 Date ende	a 11/22/1	<u> </u>
Client/Contact	1 Dorado Che	emical		
Address 4500	Northwest A	12 El Doradio	AR 7173	
npdes# <u>AROOOC</u>	715a/AFIN 7	0-00040		<u> </u>
Sample Descripti		_ Dilution Water <u>6</u>	_	
				i Caroler Galaran
Test organism ag	e4 hrs	Vendor/ID# <u>8AL/</u>	<u>111510</u>	
Day Tec	<u>Feeding</u> hnician/Time/Amou	<u>Times</u> nt (per replicate)	)	
		NON RC	- 11600/0.2	oml
	00/0.10ml RC/		H115:35/0.100	Q
		104010101011	<u>C1/34510,10</u> H114401010	
		50/0.10ml RC	<u>1410/0.10</u>	Iml
71.	slojoni —		14 <u>1135010.20</u> m 14.1133510.201	
Dissolved Oxygen Met	er: Model YSI550A	Serial #06E208	89	· (t. )
pH Meter: Conductivity Meter:	Model Orion 230A Model Control Con			
Amperometric Titrato			<u>3766</u>	
Effluent	Aerate?/Minutes	Receiving Water	Aerate?/Minu	ites
Initial <u>DO(mg/L&amp;%)/Tech</u>	/Final DO <u>(mg/L</u> &%)/Tech	Initial DO <u>(mg/L &amp; %)/Tech</u>	/Final DO <u>(mg/L &amp; %)/1</u>	lech
0.10.2/118.790 RC	·Y/10/8.2/96.02	, <u>NA</u>	0	<u>}</u>
110.9/131.0% /Rc			1	
2.10.8/126.92/AH	2. 4/15/8.3/97.7%/	\$ <u>5</u> 2	2	<del></del>
3.10.1119.79/2019	3.4/10/8.4/100.496188	· <sup>1</sup> / <sub>2</sub> 3	3	
4.10.6/125.720/RC	4. Y/10/8.3/98.4% R		4	,
5.10.3/ 119.19/01/2017	5. 4101 8.6100.390 28	5	5	
6.10.91122.7961464	6. 41151 8.7199.990102	mg	6	
<u>Total Residual</u> <u>Chlorine(mg/L)/</u> <u>Tech</u>	<u>Dechlorinated?</u> <u>Amount?/Tech</u>	Ammonia(NH3) (mg/L)/Tech	<u>BAL Sample </u>	1 Date
1.50.01/Rc	1. NO/RC	1.0.25/RC	101910	1415/10
2. <u>&lt;0.01/RC</u>	2. No/RC.	2.0.25/RC	2 <u>C1932</u>	<u> </u>
3. <u>20.01</u> ally	3. NO Story	3. D. 251 26th	3 <u>CIQLOD</u>	11/20/10
Comments:				al

Filtered effluent thru 60 um plankton net to remove any live organisms.

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BIO-ANA	LYTIC	AL LABO	ORATORI	ES 7-D	AY CHRO	ONIC MI	NNOW SU	JRVIVAL	DATA	
Project# Client Technician Time: Temperature	Dor Day0 Day0	$\frac{33}{100}$	$\frac{2}{5}$	RC 3	Test	start ended RC 1040 24.0	ed: Dat : Dat 5 <u>1005</u> 5 <u>1005</u>	e <u>//s/a</u> Ti eu/aa//aTi 6 <u>7/073</u> 6 <u>7/55</u> 6 <u>7/55</u>	me 555 me 0932 7 0932 7 0932 7 0932	
	e Day0				05.1 4 Day 3	Day 4	Day 5	Day 6	Day 7	
Conc. 2	Rep.	Day 0	Day 1	Day 2	S S	8	8	8	8	
	<u>A</u>	8	8	8	8	8	8	8	8	
	B C	8	8	8	8	8	8	8	8	
		8	8	8	8	8	8	8	8	
	Е	8	8	8	8	8	8	2	8	
	A	8	8	8 8	$ \underline{8} $	2	5		2	
	В	8	<u> </u>	8	<u> </u>	8		$-\frac{4}{1}$		
20	С	<u> </u>	8	8	<u><u> </u></u>	8	87	1a	2	diting 113010
0a	D	0	8	8	<u> </u>	8	8	5	4	119010
	Е	8	8	8	<u> </u>		8	2	S I	
	A	8	8	8	<u> </u>	8-	· · · · · · · · · · · · · · · · · · ·		3	
	В	8	8	8	8		8	6	3	
42	С		<u>×</u>	8	$+ \delta$			5	<u> </u>	
	D	8		8	<del>  §</del>	15	+		2	
	E	8	8	8		1-2-	8	S S	3	
	A	8	8	8	<u>  §</u>	+e	l C	4		
	В	8	8	8	8	4	8	1-	5	
56	С	8	<u>  8</u>	8		X	8	4	3	
	D	8	8	8	8	+2		17	36	
	E	8	8	- <u>- 2</u>	18	8	8	16	35	
		8	0	12	18	8	8	5	5	
	B	8	8	18	R	8	<u>``</u>	4	4	
75		8	8	8		8	8	_5_	3 5	
	E	8	8	8	8	8	- 8-	<u>S</u>	<u> 5</u>	
	 A		8	800000000000000000000000000000000000000	18	8	the second s		<u>ل</u> ا ک	
l	В	R R R	8	<u> </u>	8	8	8		13	
100	С	8		8	<u> </u>	18	8	8	8	-1
	D	8	8	45	<u> </u>		8	<u> </u>	-12-	-11
	E	8	<u> </u>	8	File: M	innow2	and the second secon	<u> </u>	<u> </u>	#J

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File: Minnow2

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BIO-ANA	TALIC	AL LAB	ORATORI	ES 7-D	AY CHRO	ONIC MI	NNOW SU	JRVIVAL	DATA	
Project# Client Technician Time: Temperatur	X42	33	homi	100 100 100 100 100 100 100 100 100 100	Test Test	start ended <u>RC</u>	ed: Dat	e <u>// s/ 0</u> Ti e <u>// s/ 0</u> Ti 6 <u>5</u> 6 M 6 <u>115 5</u> 6 <u>7</u> 5 M	me <b>/555</b> ime 0 932 7 Dc 7 0 733 7 0 733 7 0 733	
Temperatur	e Day0	26.31	25.7 2	<u>25.3' 3</u>		24,0		Day 6	Day 7	
Conc. 2	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5		6	
100 UV. Hrtd	A B C D E	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	8	8 8 8 8 8 8	0000000	0 8 8 8	3 8 8 9	8 8 7 10	7 8 7 6	
	<u>A</u>									
	B D E A D E A B C D C D									
ļ	E		<u>_</u>							
	<u>A</u>									
	В						>			
		_								
	<u>E</u>								$\lambda$	_
	<u>A</u>								$-\lambda$	
	<u> </u>								$\perp$	
										-XK
	D E									
L	<u> </u>		س		File: N	1innow2				

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# BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client/4333 [EDC \_\_\_\_\_ Test Dates 11/15/10-\_\_\_\_\_

<u>Oven</u>	<u> Temperatu</u>	re (° Celsiu	s) (00°c			·	
Conc. Z	Replicate/ Pan number	Wt. of pan(g)/ Date weighed:11/10/10 Tech: Y.H.B	Wt. of pan + larvae(g) Date 11(931)O weighed 93 (m 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*
	A 91	1.1802	1.18474	00.0042		0.525	
	вЧД	1.1781		20.0038	8	0.475	
O	c93	1.1785		0.0030	8	0.375	
	DQU	1.1842	1.180-20	P800.0 <sup>#</sup>	8	0.488	
	EQS	1.1781	1.1815	0.0034	8	0.425	
	A 96	1.1800	1.1804	0.0004	8	0.050	
	вQ7	1.1817	1.1835	0.0018	8	0.225	
33	<u>c 98</u>	1.1834	1.1834	0	8	-0-038	
	DQ d	1.1787	1.1790	0.0003		0.038	
	e 100	1.1762	1.1774	0.0012	8	0.150	
	A 101	1.1836	1.1868	0.0032	8	0.400	
	B 102	1.1762	1.1773	0.0011	8	0.138	
42	c 103	1.1778	1.1788	0.0010	8	0.125	
	D 104	1.1740	1.1756	0.0016	8	0.200	
	E 105	1.1864	1.1866	0.000a	8	0.025	
	A 106	1.1821	1.1833	0.0012	<u> </u>	0.150	
	в 107	1.1787	1.1790	0.0003	8	0.038	
56	c 108	1.1779	1.1.808	0.0022	8	0.275	
	D 109	1.1887	1.1905	0.0018	8	0.275	
	e liO	1.1785	🚗	0.0021	8	0. 263	
	A	1.1710	1.1723	0.0013	8	0.163	
	в 112	1.1804	1.1819	0.0015	8	0,188	
75	c 113	1.1828	1.1843	0.0015	8	0.188	
	D 114	1.1794	1.1806	0.0012	8	0.150	
	e 115	1.1790	1.1811	0.0021	8	0.263	
	A 116	1881	1.1912	0.0031	8	0.388	
	в 117	1.1776	1.1804	0.0028	8	0.350	
100	c 118	1.1913	1.1960	0.0047	8_	0.588	
	D 119	1.1778	1.1803	0.0005	8	0.313	
	E 120	1.1754	1.1776	0.0002	8	0.275	
* Test acc		of weight based on s			d by: EGO	11124	1.0
Cancula							

onc. 7	Replicate/ Pan number	t XHO.33 re (° Celsiu Wt. of pan(g)/ Date weighed: 11 [19]10 Tech: HONY	Wt. of pan +	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*
	× 121	1.1751	1.1776	0,0025	8	0.313	
$\sim$	B JAA	1.1707	1.1740	0.0033	8	0.413	
Ç	c 123	1.1702	1.1738	0.0036	8	0.450	
	D124	1.1838	1.1864	0.0026	8	0.325	
	E 125	1.1864	1.1889	0.0095	8	0.313	
	А						
Y	В						
	c						
	D						
	Е						
	А						
	В		<u> </u>				
	с	X	hin				
	D		Y 12				
	Е						
	A			11			
	В			81			
	с			X =			
	D						
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	А				<u> </u>		
	В						
	С		· · · · · · · · · · · · · · · · · · ·			<u> </u>	-
	D						-
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	A						
	В						-
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	E			nd of test. Iculations checke		· ·	

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Hardness (mg/L)       UU       30       Rc       Why low         concentration: 302       Rc       Why low       Rc       Why low         pH       9.2       9.3       1.1       1.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0       1.4       0.0 </th <th>oject<u>#_<b>X4</b>0</u>_</th> <th>53</th> <th></th> <th>OKATOR</th> <th>LES /- Cest st</th> <th>UAY WA arted:</th> <th>Date</th> <th>ALITY ALITY Maturin</th> <th>DATA le_<b>1551</b> a 0932</th> <th>ر age 26<sup>p</sup>age</th>	oject <u>#_<b>X4</b>0</u> _	53		OKATOR	LES /- Cest st	UAY WA arted:	Date	ALITY ALITY Maturin	DATA le_ <b>1551</b> a 0932	ر age 26 <sup>p</sup> age
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	ient <u>FIDOROC</u> ganism P. OVOR	nelos	10micc	ا <u>سلا</u> د	l'est en	ded:	Daten	<u>193/18</u> 1111	e <u>012</u> ¢	
Concentration: Control SOR         pH       9.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0       9.1       9.0 <t< td=""><td></td><td></td><td>1</td><td>1.3100</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></t<>			1	1.3100	3	4	5	6	7	8
pf       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       8.0       9.1       9.			<u><u> </u></u>				/	C	- <u></u>	······
Cond (umhos/cm)       1119       1720       1594       151.       160.0141.0       159.4         Alkalinitý(mg/L)       33       38       38       38       38       38         Hardness (mg/L)       44       33       82       160.0141.0       159.4         Concentration:       37.2       82       160.0141.0       180.0       180.0         pH       9.2       9.3       1.1       80.0       180.0       180.0       180.0         cond (umhos/cm)       88       287.078       280.084.0       31.4       31.4       31.4         cond (umhos/cm)       88       287.078       280.084.0       31.4       31.4       31.4         cond (umhos/cm)       317.3       320.318.3       280.0       31.4       31.4       31.4       31.4       31.4         cond (umhos/cm)       317.3       320.318.3       309.314       31.4       31.4       31.4       31.4       31.4         cond (umhos/cm)       317.3       320.318.3       309.314       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4       31.4 <td></td> <td>8.0</td> <td>28</td> <td>1.8.1</td> <td>2.2.1</td> <td>ning</td> <td>2.1.8</td> <td>1.29</td> <td>7.7</td> <td></td>		8.0	28	1.8.1	2.2.1	ning	2.1.8	1.29	7.7	
Concentration:       Conce	0(mg/1) RC 45/	8119	184	218.0	28.2	6.8.2	1.38.3	1.8.1	7.1	]
Hardness (mg/L)       UU       30       RC       I/I/I/0         Concentration: 302       RC       I/I/I/0       R3	ond (umhos/cm);	111.9	1720	1594	A156.	160.0	ILel.D	159.4	2	
Concentration: 307       PC       I/Ho         pH       9.2 <td>lkalinitý(mg/L)</td> <td>32</td> <td></td> <td>98</td> <td></td> <td></td> <td><u> </u></td> <td><u> </u></td> <td></td> <td></td>	lkalinitý(mg/L)	32		98			<u> </u>	<u> </u>		
рн 9.2 14.1 14.0 18.0 18.3 8.4 18 D0 (mg/1) 8.0 18.3 8.2 8.2 2.3 18.3 18.3 18.3 18.3 18.3 18.3 18.3 18	ardness (mg/L)	44	<u> </u>	32		1			<u> </u>	L
DO (mg/1) 8.0 23.3 28.2 28.7 27.8 2 28.1 28.3 28.7 18.3 28.7 27.8 2 28.7 27.8 2 28.7 27.8 2 28.7 27.8 2 28.7 28.7	oncentration: 式	32	A	······	2	RC	11/19/10	<del> </del>	1.0.7	<del>r-</del>
0:0       0	HI	9.2	19.2	1.1	280	2.8.0	8.3	18.4	1.8	<u> </u>
Concentration: 422 pH 9.4 9.4 9.4 9.4 9.4 9.4 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5 9.5	)(mg/1)	8.0	1.28.3	6.8.2	68.2	698.1	18.3	1.80	1.2	
pH       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.4       9.5       9.5       9.5       9.5       9.5       9.5       9.5       9.5       9.5       9.5       9.4       9.5       9.5       9.5       9.4       9.5       9.5       9.5       9.4       9.5       9.5       9.4       9.5       9.5       9.4       9.5       9.5       9.4       9.5       9.5       9.4       9.5       9.5       9.5       9.4       9.5       9.5       9.4       9.5       9.5       9.4       9.	ond (umhos/cm)	285	281	1278	lana	280	1984	1911		
D0 (mg/1) Cond (unhos/cm) 3/7 320 3/8 309 3/4 3/4 309 Concentration: 5/7 pH 9.5 9.5 9.5 9.5 9.1 9.4 3/4 309 Concentration: 5/7 Cond (unhos/cm) 3/8 370 3/9 358 3/6 5 3/9 4 3/9 Concentration: 757 pH 9.6 9.7 9.6 3/9 358 3/6 5 3/9 4 3/9 Concentration: 757 pH 9.6 9.7 9.6 3/9 3/8 3/8 5 3/9 4 3/9 Concentration: 757 pH 9.6 9.7 9.6 3/8 3/8 5 3/9 4 3/9 Concentration: 757 pH 9.6 9.7 9.7 9.7 9.8 3/8 5 3/9 Concentration: 757 pH 9.6 9.7 9.7 9.7 9.7 9.7 9.7 9.7 9.7 9.7 9.7	oncentration: 43	<u>}7</u>	<u>⊢ A</u> →	<del></del>		101-7	$\frac{1}{2}$	1-1		
Cond (unhos/cm)       368       370       369       358       365       364       369         Concentration:       757       9 <t< td=""><td>I</td><td>9.4</td><td>19.4</td><td>1-g.4</td><td>2.87</td><td>193</td><td>1009</td><td>28.9</td><td>118</td><td></td></t<>	I	9.4	19.4	1-g.4	2.87	193	1009	28.9	118	
$\begin{array}{c} \begin{array}{c} \mbox{Concentration: } 567 \\ \mbox{pH} & 9.5 & 9.5 & 9.5 & 9.5 & 9.1 & 9.4 & 9$	)(mg/l)	8.0	1.8.3	68.2	6.8.2	6.8.1	183	18.3	6.9	
pH       9.5       9.	ond (umhos/cm)	<u>317</u>	320	318	309	314	314	1309		
D0 (mg/1)       8, 1       9, 2       9, 3       9, 3       9, 4	oncentration: 50	07	<u> </u>					<del>,</del>	<del></del>	
Cond (umhos/cm)       368       370       369       358       365       364       369         Concentration:       757       9 <t< td=""><td>[</td><td>9.5</td><td>19.5</td><td>10.5</td><td>119.1</td><td>1:6.4</td><td>1.0.2</td><td>19.2</td><td>1.8</td><td>, , ,</td></t<>	[	9.5	19.5	10.5	119.1	1:6.4	1.0.2	19.2	1.8	, , ,
Cond (unhos/cm)       Sol S/O       Sol S/	)(mg/l)	8.1	1.8.2	68.2	<u> </u>	8.1	484	283	68	
pH       9.6       9.6       9.6       9.6       9.6       9.7       9.	ond(umhos/cm)	368	370	369	358	365	344	363		
pH       9.6       9.6       9.1       9.3       9.	ncentration: 7	57	<u> </u>				·······	- <del>.</del>		
Cond (umhos/cm)       Y33 439 439 439 438       Y35 439 439 438         Concentration:       1002         pfi       9,7 9,7 9,1 9,0 9,5 19,6 8,5 8,9 48         po(mg/l)       8,1 8,2 8,3 9,3 8,3 18,5 18,0 9         Cond (umhos/cm)       S21 526 534 517 539 555 518         Fech-prerenewal       RC RC RC RC AL RC SMA SMA RC         Tech-postrenewal       RC RC RC AL RC SMA SMA RC		9.6	9.6	1.1	293	1.9.5	1.9.1	293	14	
Concentration:         1002           pH         9.7         9.7         9.7         9.7         9.6         9.5         9.6         9.7         9.7           DO (mg/1)         8.1         8.2         8.2         8.3         8.3         8.3         18.5          18.5         18.5 <td>(mg/l)</td> <td>8.1</td> <td>6.8.2</td> <td>6.8.2</td> <td>68.5</td> <td>68.1</td> <td>1.84</td> <td>2.4</td> <td>6.8</td> <td></td>	(mg/l)	8.1	6.8.2	6.8.2	68.5	68.1	1.84	2.4	6.8	
PH     9.7     9.7     9.7     9.6 <td>nd(umhos/cm)</td> <td>433</td> <td>439</td> <td>439</td> <td>428</td> <td>435</td> <td>432</td> <td>428</td> <td></td> <td></td>	nd(umhos/cm)	433	439	439	428	435	432	428		
Interference       Interference <th< td=""><td>ncentration: 10</td><td>500</td><td><del></del></td><td><del>na -</del></td><td><del></del></td><td></td><td></td><td></td><td></td><td></td></th<>	ncentration: 10	500	<del></del>	<del>na -</del>	<del></del>					
Cond (umbos/cm)       S2       S34       S17       S29       S35       S18         Tech-prerenewal       RC       RC       RC       RC       RC       RC       RC         Tech-postrenewal       RC       RC       RC       RC       RC       RC       S17       S29       S55       S18		9.7	29.7	1.9.6	Das	P.G	0015	8.9.4	8.0	
Tech-prerenewal RC RC RC AL RC SIM SIM RC	(mg/l)	8.1	6.8.2	6.8.2	1083	6.8.2	185		6.1	
Tech-postrenewal RCDOBLEAR	nd (umhos/cm)	Sal	526	534	1517	529	525	518		
	ch-prerenewal	RC	RC	RC	AL	RC	Som	Solo	RC	
	ch-postrenewal		RC	States	RAN	RC	des p	Son		
(ardness(mg/1)) (a) $(a)$ $(a)$ $(a)$ $(a)$	rdness(mg/l)	60			192		40.ŏ	ע		
Alkalinity $(mg/1)$ (0) $HR = 1/2.0$ $1/24.0$					HRCS	112.0	124.0			

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BIO-ANA Project# <u>X43</u> lient <u>FIO0000</u>	55 10 Ch	omia		LES /-L est sta est end	JAY WAT arted: ded:	TER QUA Date Date	LLTTI ISCOTIM ISCOTIM	JATA e <b>_/55</b> y e <u>_09</u> 33	age 27
Day/# water used	\$3695		2	3	4	5	6	7	8
Concentration: Cor			N-trt	4	<u> </u>				a
рН	9.6	84.6	80.6	29,5	8.9.6	9.5	Q.5	8.1	ļ
DO(mg/1)	7.9	62.1	03.9	6.8.2	6.8.1	69.4	2.84	6.9	
Cond(umhos/cm)i	523	523	534	513	531	SIL	522		<b></b>
Alkalinitý(mg/L)									<u> </u>
Hardness (mg/L)		[					<u> </u>		
Concentration:				······································			r	·	
pH									
DO (mg/1)									
Cond (umhos/cm)				<u> </u>			<u> </u>		
Concentration:	$\sum$				,,	······	· · · · · · · · · · · · · · · · · · ·		<del></del>
рН		Xn.							
DO (mg/1)		X	6						
Cond (umhos/cm)			R		<u> </u>				
Concentration:			X	XII-					
рH				X					
DO(mg/l) <sup>;</sup>					$\mathbf{X}$				
Cond(umhos/cm)						Κ	1		<u> </u>
Concentration:							1		
рН									]
DO (mg/1)							$\ge$		
Cond (umhos/cm)								$\square$	
Concentration:						·	; ;		a
рH									
DO (mg/l)									
Cond (umbos/cm)			$\sim$			0010	e Dala		<b> </b>
Tech-prerenewal	RC.	RC	KC	AU	RC	5630	PIQ D	LRC	
Tech-postrenewal		RC	ARA	<u>48672</u>	RC	1907	<u>AND</u>		<u> </u>
Hardness(mg/l)									
trees on the second second									

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## **BIO-ANALYTICAL LABORATORIES**

## REFERENCE TOXICANT TEST QUALITY DATA

Date start: 1123110		Date end: 11 255/10
EE Test organism: <u>C. daphai</u>	erisda	phoia Oubia
Age: 4 24hr		
Source and ID#: RALI Ru	<u></u>	
Dilution Water used: Type:	<u> +</u> *	Jug #: <u>3099</u>
Reference Toxicant: <u>Naci</u>	+	Units: <u>\ () () g</u> /Lug/L
Manufacturer: <u>ACROS</u>	, 	Lot: <u>BD13D390</u>
48-hour LC <sub>50</sub> : <u>/, 28g/</u>	L	Statistical Method: 15k_^
() Upper and Lower CUSUM Chart		19-1.01
Test Number (for the year): 23	)	
We verify that this data is true and o	correct:	
Technician: Sun &	Briggo	·
Statistician: and Ha	uahtm	
Quality Control Officer: Our	B	
*MH- Moderately hard S-Soft H - Hard	+NaCI - Sodium Chl CuSO <sub>4</sub> - Copper So	

#### File: Ref Tox Cover

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

+ 1 1 1 1 1 1 1 1					, , , ,				a E	Test st	started:		ate (I	Date (IladiO		Time	- 7015	<u> </u>		
client PCL	<u>. To</u>	X					1 1		ι 1 1		ended:		arel	Date 11/25/10		Time	Time/000	<b>•</b> 1		
Sample Description. Technician: Time: Temerature ( <sup>o</sup> C):	iption_ (°C):	10001 Ohour 2016 Ohour 2016	-leve	NOUC 24hour 24hour		000	48hour 48hour 48hour	48hour <u>600</u> 48hour <u>1000</u> 48hour <u>24, 5</u>		Test Species 72hour 72hour 72hour			C.dar 96hour 96hour 96hour	C. da Mn.a. 96hour 96hour			ID# BAC/RU	4r	R le	
Test	plicate	Test Salinity	1	# Live	Live Organisms	1i sms		Di	ssolved	Dissolved Oxygen	Ę			Нď			ů	Conductivity	LVIEY.	
		1CP	o hr o	24	48	72 9	96 0	24	48	72	96	0	24 4	48 72	96		24	48	72	96
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. 96 ID# BAC/RLG Conductivity 12 199 68 63 48 lon<sup>34</sup>9655 Time 1000 anca Win THUN SOLO TimelolS 24 0 96 <u>C.dannia</u> Date 11/25/10 22 Test started: Date<u>11</u>2300 MARCELE CO нd 96hour\_ 96hour\_ 96hour 48 5.6 0 5 24 12.0 -So Test Species 0 Test ended: 9 9 72hour 72hour\_ Dissolved Oxygen 72 AND FURTER 48 48hour 1000 48hour 34.5 48hour EOS ----ຊ 8  $\infty$  $\infty$ 24 8.0 <u>بر</u> مح ÷ ¢ 96 24hour 1030 24hour 24hour # Live Organisms 24hour EGD 72 SS 48  $\bigcirc$  $\mathcal{O}$ C C  $\mathbb{C}$  $\bigcirc$ C C  $\bigcirc$  $\bigcirc$ prerenewal/postrenewal 6 24  $\mathcal{N}$  $\mathcal{V}$ 20 S S S 5  $\mathcal{V}$ 20  $\mathcal{V}$ Tech Shour L'Ant ohour 24. lo 20 20 o ž Ohour 1015 10001 Test Salinīty nemistry Д XCL Sample Description\_ Replicate Temperature (<sup>0</sup>C):  $\square$ د) ₫  $\propto$  $\mathfrak{O}$  $\mathcal{L}$ 0 0 D  $\mathbb{C}$  $\triangleleft$ client <u>Ne</u> L. Technician: Test Dilution Project# U  $\mathcal{C}$ Time:

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

## **BIO-ANALYTICAL LABORATORIES**

## REFERENCE TOXICANT TEST QUALITY DATA

Date start: 11 2310	Date end: 1125/10
Test organism: P. promela	2
Age: ~ 5 days	
Source and ID#: BALL 111810	)
Dilution Water used: Type:	14 * Jug #: <u>3099</u>
Reference Toxicant:	+ Units: <u>  () g</u> /Lug/L
Manufacturer: <u>ACROS</u>	Lot: B0130290
48-hour LC <sub>50</sub> : <u>6.099</u>	L Statistical Method: <u>5k</u> ^
	Control Limits: 7.95-4.02
Test Number (for the year):	
We verify that this data is true and co	prrect:
Technician: CAN	$\underline{Dnqq}$
Statistician: Une H	ughton
Quality Control Officer:	: St Bruggs
*MH- Moderately hard S-Soft H - Hard	+NaCl - Sodium Chloride <sup>'</sup> P - Probit CuSO <sub>4</sub> - Copper Sulfate SK - Spearman Karber TSK -Trimmed Spearman Karber G - Graphical

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

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	started: Date	ended:	Test Species 72hour 72hour 72hour 72hour		96													
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			48hour <u>FSS</u> 48hour <u>1 ° °</u> 48hour <u>24,4</u>		•	8.0		8.0		Q.%		0.8		<u>°.</u> 0.8		8.8		16
		ļ		1	96													
			CLS Shar	Organisms	72	0	0	0	Q.		5							
			24hour 24hour 24hour	Live OI	48	0		10	0	Q	0	0	0	D	0	0	0	
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1			cian ature	u uo	<u></u>			5				σ				3		
	Project#	Client_ <u>FC+</u>	Sample Description Technician: Time: Temperature ( <sup>0</sup> C):	Test Dilution				11						-				

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### APPENDIX C STATISTICAL ANALYSIS

		1 age 04 01 00								
11/15/2010	)	Test ID:	X4233CD			Sample IC	);	1		
11/22/2010	)	Lab ID:	ADEQ 880	)630		Sample Ty	ype:	EFF2-Indu	ustrial	
11/15/2010	)	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	taphnia dub	pia
1	2	3	4	5	6	7	8	9	10	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
	11/22/2010 11/15/2010 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000	1.0000         1.0000           1.0000         1.0000           1.0000         1.0000           1.0000         1.0000           1.0000         1.0000           1.0000         1.0000	11/15/2010         Test ID:           11/22/2010         Lab ID:           11/15/2010         Protocol:           1         2         3           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880           11/15/2010         Protocol:         EPAFW02           1         2         3         4           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880630           11/15/2010         Protocol:         EPAFW02-EPA/821           1         2         3         4         5           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880630           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01           1         2         3         4         5         6           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	11/15/2010         Test ID:         X4233CD         Sample ID           11/22/2010         Lab ID:         ADEQ 880630         Sample TY           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Spect           1         2         3         4         5         6         7           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	11/15/2010         Test ID:         X4233CD         Sample ID:           11/22/2010         Lab ID:         ADEQ 880630         Sample Type:           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:           1         2         3         4         5         6         7         8           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	11/22/2010         Lab ID:         ADEQ 880630         Sample Type:         EFF2-Indu           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:         EFF2-Indu           1         2         3         4         5         6         7         8         9           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000 <td< td=""><td>Ceriodaphnia Survival and Reproduction Test-7 Day Survival           11/15/2010         Test ID: X4233CD         Sample ID:         1           11/22/2010         Lab ID: ADEQ 880630         Sample Type:         EFF2-Industrial           11/15/2010         Protocol: EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriodaphnia dub           1         2         3         4         5         6         7         8         9         10           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.00</td></td<>	Ceriodaphnia Survival and Reproduction Test-7 Day Survival           11/15/2010         Test ID: X4233CD         Sample ID:         1           11/22/2010         Lab ID: ADEQ 880630         Sample Type:         EFF2-Industrial           11/15/2010         Protocol: EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriodaphnia dub           1         2         3         4         5         6         7         8         9         10           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.00

		<u> </u>		Not			Fisher's	1-Tailed	
Conc-%	Mean	N-Mean	Resp	Resp	Total	N	Exact P	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	0,9000	0.9000	1	9	10	10	0.5000	0.0500	
100	1.0000	1,0000	0	10	10	10	1.0000	0.0500	
100UV	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



			Ceriod	aphnia Su	rvival and	l Reprodu	uction Tes	st-Repro	duction		
Start Date:	11/15/2010	)	Test ID:	t ID: X4233CD			Sample ID	):	1		
End Date:	11/22/2010	)	Lab ID:	ADEQ 880	0630		Sample Ty	ype:	EFF2-Indu	ustrial	
Sample Date:	11/15/2010	)	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dub	bia
Comments:											
Conc-%	1	2	3	4	5	6	7	8	9		
D-Control	27.000	23.000	21.000	33.000	15.000	22.000	24.000	27.000	22.000	26.000	
32	14.000	8.000	12,000	22.000	19.000	11.000	15.000	11.000	17.000	5.000	
42	19.000	15.000	11.000	12.000	13.000	9.000	11.000	9.000	10.000	9.000	
56	8.000	12.000	12.000	8.000	14.000	11.000	7.000	10.000	12.000	7.000	
75	11.000	6.000	12.000	10.000	10.000	10.000	8.000	7.000	4.000		
100	4.000	5.000	3.000	8.000	4.000	8.000	6.000	9.000	9.000	10.000	
100UV	6,000	5.000	5.000	7.000	4.000	5.000	7.000	6.000	5.000	8.000	

· · · · · · · · · · · · · · · · · · ·				Transform	n: Untran	sformed	Rank	1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	24.000	1.0000	24.000	15.000	33.000	19.740	10			
*32	13.400	0.5583	13.400	5.000	22.000	38.085	10	60.50	73.00	
*42	11.800	0.4917	11.800	9.000	19.000	27.036	10	56.50	73.00	
*56	10.100	0.4208	10.100	7.000	14.000	24.454	10	55.00	73.00	
*75	8.667	0.3611	8.667	4.000	12.000	29.978	9	45.00	60.00	
*100	6.600	0.2750	6,600	3.000	10.000	37.929	10	55.00	73.00	
*100UV	5.800	0.2417	5.800	4.000	8.000	21.194	10	55.00	73.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.80372	0.895	0.16336	1.41638
Bartlett's Test indicates unequal variances (p = 2.74E-03)	20.0267	16.8119		
Hypothesis Test (1-tail, 0.05)				

Wilcoxon Rank Sum Test indicates significant differences

Treatments vs D-Control

Reviewed by

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		Cerioda	aphnia Su	rvival and	l Reprod	uction Tes	st-Repro	duction		90.00
11/15/2010	)	Test ID:	X4233CD			Sample ID	):	1		
11/22/2010	)	Lab ID:	_ab ID: ADEQ 880630			Sample Type:			ıstrial	
11/15/2010	}	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia	
1	2	3	4	5	6	7	8	9	10	
27.000	23.000	21.000	33.000	15.000	22.000	24.000	27.000	22.000	26.000	
14.000	8.000	12.000	22.000	19.000	11.000	15.000	11.000	17.000	5.000	
19.000	15.000	11.000	12.000	13.000	9.000	11.000	9.000	10.000	9.000	
8.000	12.000	12.000	8.000	14.000	11.000	7.000	10.000	12.000	7.000	
11.000	6.000	12.000	10.000	10.000	10.000	8.000	7.000	10.000	4.000	
4.000	5.000	3.000	8.000	4.000	8.000	6.000	9.000	9.000	10.000	
6.000	5.000	5.000	7.000	4.000	5.000	7.000	6.000	5.000	8.000	
•	11/22/2010 11/15/2010 27.000 14.000 19.000 8.000 11.000 4.000	27.000 23.000 14.000 8.000 19.000 15.000 8.000 12.000 11.000 6.000 4.000 5.000	11/15/2010         Test ID:           11/22/2010         Lab ID:           11/22/2010         Lab ID:           11/15/2010         Protocol:           1         2         3           27.000         23.000         21.000           14.000         8.000         12.000           19.000         15.000         11.000           8.000         12.000         12.000           11.000         6.000         12.000           4.000         5.000         3.000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880           11/15/2010         Protocol:         EPAFW02           1         2         3         4           27.000         23.000         21.000         33.000           14.000         8.000         12.000         22.000           19.000         15.000         11.000         12.000           8.000         12.000         8.000         10.000           4.000         5.000         3.000         8.000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880630           11/22/2010         Protocol:         EPAFW02-EPA/821           1         2         3         4         5           27.000         23.000         21.000         33.000         15.000           14.000         8.000         12.000         22.000         19.000           19.000         15.000         11.000         12.000         13.000           8.000         12.000         12.000         10.000         14.000           11.000         6.000         12.000         8.000         14.000           14.000         3.000         8.000         14.000         14.000	11/15/2010         Test ID:         X4233CD           11/22/2010         Lab ID:         ADEQ 880630           11/22/2010         Protocol:         EPAFW02-EPA/821/R-02-01           1         2         3         4         5         6           27.000         23.000         21.000         33.000         15.000         22.000           14.000         8.000         12.000         22.000         19.000         11.000           19.000         15.000         11.000         12.000         13.000         9.000           8.000         12.000         10.000         10.000         10.000         10.000           11.000         6.000         12.000         8.000         4.000         8.000	11/15/2010         Test ID:         X4233CD         Sample IE           11/22/2010         Lab ID:         ADEQ 880630         Sample T           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Spect           1         2         3         4         5         6         7           27.000         23.000         21.000         33.000         15.000         22.000         24.000           14.000         8.000         12.000         22.000         19.000         11.000         15.000           19.000         15.000         12.000         8.000         14.000         11.000         7.000           11.000         6.000         12.000         8.000         14.000         11.000         7.000           11.000         6.000         12.000         8.000         14.000         10.000         8.000           4.000         5.000         3.000         8.000         4.000         8.000         6.000	11/15/2010         Test ID:         X4233CD         Sample ID:           11/22/2010         Lab ID:         ADEQ 880630         Sample Type:           11/22/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:           1         2         3         4         5         6         7         8           27.000         23.000         21.000         33.000         15.000         22.000         24.000         27.000           14.000         8.000         12.000         22.000         19.000         15.000         11.000           19.000         15.000         11.000         12.000         13.000         9.000         11.000           8.000         12.000         10.000         10.000         10.000         10.000           11.000         6.000         12.000         8.000         14.000         8.000         7.000           11.000         6.000         12.000         10.000         10.000         9.000         10.000           11.000         6.000         12.000         10.000         10.000         9.000           11.000         6.000         12.000         10.000         10.000         9.000	11/22/2010         Lab ID:         ADEQ 880630         Sample Type:         EFF2-Indu           11/15/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriod           1         2         3         4         5         6         7         8         9           27.000         23.000         21.000         33.000         15.000         22.000         24.000         27.000         22.000           14.000         8.000         12.000         22.000         19.000         15.000         11.000         17.000           19.000         15.000         11.000         12.000         13.000         9.000         11.000         10.000           8.000         12.000         12.000         10.000         11.000         7.000         10.000           11.000         6.000         12.000         10.000         10.000         10.000         10.000           11.000         5.000         3.000         8.000         4.000         8.000         7.000         9.000	11/15/2010         Test ID:         X4233CD         Sample ID:         1           11/22/2010         Lab ID:         ADEQ 880630         Sample Type:         EFF2-Industrial           11/22/2010         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriodaphnia dubia           1         2         3         4         5         6         7         8         9         10           27.000         23.000         21.000         33.000         15.000         22.000         24.000         27.000         22.000         26.000           14.000         8.000         12.000         22.000         11.000         15.000         22.000         26.000           19.000         15.000         12.000         13.000         9.000         11.000         17.000         5.000           8.000         12.000         12.000         13.000         9.000         10.000         12.000         7.000           11.000         6.000         12.000         10.000         10.000         8.000         4.000           4.000         5.000         3.000         8.000         4.000         9.000         10.000         4.000

				Transform	n: Untran	sformed	Rank	1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	24.000	1.0000	24.000	15.000	33.000	19.740	10			
*32	13.400	0.5583	13.400	5.000	22.000	38.085	10	60.50	74.00	
*42	11.800	0.4917	11.800	9.000	19.000	27.036	10	56.50	74.00	
*56	10.100	0.4208	10.100	7.000	14.000	24.454	10	55.00	74.00	
*75	8.800	0.3667	8.800	4.000	12,000	28.244	10	55.00	74.00	
*100	6.600	0.2750	6.600	3.000	10.000	37.929	10	55.00	74.00	
*100UV	5.800	0.2417	5.800	4.000	8.000	21.194	10	55.00	74.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.80554	0.895	0.15491	1.46533
Bartlett's Test indicates unequal variances (p = 2.28E-03)	20.4786	16.8119		
Hypothesis Test (1-tail, 0.05)				

Steel's Many-One Rank Test indicates significant differences

Treatments vs D-Control

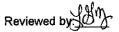
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			Ceriod	aphnia Su	Ceriodaphnia Survival and Reproduction Test-Reproduction												
Start Date:	11/15/2010		Test ID:	X4233CD			Sample IC	):	1								
End Date:	11/22/2010	l	Lab ID:	ID: ADEQ 880630			Sample T	уре:	EFF2-Indu	ustrial							
Sample Date:	11/15/2010	l	Protocol:	EPAFW02	2-EPA/821	I/R-02-01	Test Spec	ies:	CD-Cerioo	daphnia dub	ia						
Comments:																	
Conc-%	1	2	3	4	5	6	7	8	9	10							
D-Control	27.000	23.000	21.000	33.000	15.000	22.000	24.000	27.000	22.000	26.000							
32	14.000	8.000	12.000	22.000	19.000	11.000	15.000	11.000	17.000	5.000							
42	19.000	15.000	11.000	12.000	13.000	9.000	11.000	9.000	10.000	9.000							
56	8.000	12.000	12.000	8.000	14.000	11.000	7.000	10.000	12.000	7.000							
75	11.000	6.000	12.000	10.000	10.000	10.000	8.000	7.000	10.000	4.000							
100	4.000	5.000	3.000	8.000	4.000	8.000	6.000	9.000	9.000	10.000							
100UV	6.000	5.000	5.000	7.000	4.000	5.000	7.000	6.000	5.000	8.000							

			•	Fransform	n: Untran	sformed			1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	
D-Control	24.000	1.0000	24.000	15.000	33.000	19.740	10				
*32	13.400	0.5583	13.400	5.000	22.000	38.085	10	7.068	2.347	3.520	
*42	11.800	0.4917	11.800	9.000	19.000	27.036	10	8.135	2.347	3.520	
*56	10.100	0.4208	10.100	7.000	14.000	24.454	10	9.268	2.347	3.520	
*75	8.800	0.3667	8.800	4.000	12.000	28.244	10	10.135	2.347	3.520	
*100	6.600	0.2750	6.600	3.000	10.000	37.929	10	11.602	2.347	3.520	
*100UV	5,800	0.2417	5.800	4.000	8.000	21.194	10	12.135	2.347	3.520	

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.80554		0.895		0.15491	1.46533
Bartlett's Test indicates unequal variances (p = 2.28E-03)	20.4786		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences	3.52009	0.14667	376.167	11.246	8.4E-18	6, 63
Treatments vs D-Control						



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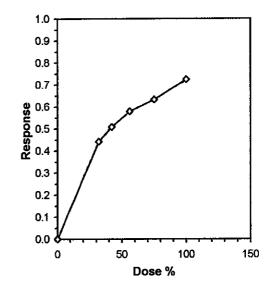
······			Ceriod	aphnia Su	rvival and	I Reprod	uction Te	st-Repro	duction		
Start Date:	11/15/2010	)	Test ID:	X4233CD			Sample IC	):	1		
End Date:	11/22/2010	)	Lab ID:	ADEQ 880	0630		Sample T	ype:	EFF2-Indu	ustrial	
Sample Date:	11/15/2010	)	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubi	a
Comments:											
Conc-%	1	2	3	4	5	6	7	8	9	10	
D-Control	27.000	23.000	21.000	33.000	15.000	22.000	24.000	27.000	22.000	26.000	
32	14.000	8.000	12.000	22,000	19.000	11.000	15.000	11.000	17.000	5.000	
42	19.000	15.000	11.000	12.000	13.000	9.000	11.000	9.000	10.000	9.000	
56	8,000	12.000	12.000	8.000	14.000	11.000	7.000	10.000	12.000	7.000	
75	11.000	6.000	12.000	10.000	10.000	10.000	8.000	7.000	10.000	4.000	
100		5.000	3.000	8.000	4,000	8.000	6.000	9.000	9.000	10.000	
100UV		5.000	5.000	7.000	4.000	5.000	7.000	6.000	5.000	8.000	

				Fransform	n: Untran	sformed		Isote	onic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	24.000	1.0000	24.000	15.000	33.000	19.740	10	24.000	1.0000
32	13,400	0.5583	13.400	5.000	22.000	38.085	10	13.400	0.5583
42	11.800	0.4917	11.800	9.000	19.000	27.036	10	11.800	0.4917
56	10,100	0.4208	10,100	7.000	14.000	24.454	10	10.100	0.4208
75	8.800	0.3667	8.800	4.000	12.000	28.244	10	8.800	0.3667
100	6.600	0.2750	6.600	3.000	10.000	37.929	10	6.600	0.2750
100UV	5.800	0.2417	5.800	4.000	8.000	21.194	10		

Auxiliary Tests	Statistic	Critical	Skew Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.80554	0.895	0.15491 1.46533
Bartlett's Test indicates unequal variances (p = 2.28E-03)	20.4786	16.8119	
	tion (200 Resamples)		

				LINGS	n interpor
Point	%	SD	95%	CL	Skew
IC05*	3.623	0.615	2.920	5.398	0.8468
IC10*	7.245	1.229	5.840	10.795	0.8468
IC15*	10.868	1.844	8.759	16.193	0.8468
IC20*	14.491	2.459	11.679	21.591	0.8468
IC25*	18.113	3.073	14.599	26.989	0.8468
IC40*	28.981	4.629	23.358	40.138	0.6753
IC50	40.750	7.975	29.198	58.329	0.6681

\* indicates IC estimate less than the lowest concentration



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			Lar	val Fish G	irowth and	Survival Test-7 Day Su	urvival	
Start Date:	11/15/201	0	Test ID:	X4233PP		Sample ID:	1	
End Date:	11/22/2010	0	Lab ID:	ADEQ 880	0630	Sample Type:	EFF2-Industrial	
Sample Date:	11/15/201	0	Protocol:	EPAFW02	2-EPA/821/	R-02-01 Test Species:	PP-Pimephales pron	nelas
Comments:								
Conc-%	1	2	3	4	5			
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000			
32	0.2500	0.5000	0.1250	0.2500	0.5000			
42	0.6250	0.3750	0.3750	0.6250	0.2500			
56	0.3750	0.2500	0.6250	0.3750	0.7500			
75	0.3750	0.6250	0.5000	0.3750	0.6250			
100	0.7500	0.6250	1.0000	0.7500	0.8750			
100UV	0.7500	0.8750	1.0000	0.8750	0.7500			

			Tra	ansform:	Arcsin So	quare Roo	t	Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5			
*32	0.3250	0.3250	0.5959	0.3614	0.7854	31.090	5	15.00	16.00	
*42	0.4500	0.4500	0.7330	0.5236	0.9117	23.498	5	15.00	16.00	
*56	0.4750	0.4750	0.7601	0.5236	1.0472	28.044	5	15.00	16.00	
*75	0.5000	0.5000	0.7854	0.6591	0.9117	16.086	5	15.00	16.00	
100	0.8000	0.8000	1.1217	0.9117	1.3931	16.470	5	17.50	16.00	
100UV	0.8500	0.8500	1.1813	1.0472	1.3931	12.150	5	17.50	16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.94602	0.934	0.28839	-0.8219
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences		•		
Treatments vs D-Control				

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			La	rval Fish (	Browth a	nd Surviv	al Test-7	Day Grov	wth		Page	<del>40 of 6</del> 0
Start Date:	11/15/201	0		X4233PP			Sample IC		1			
End Date:	11/22/201		Lab ID:	ADEQ 880	0630		Sample T		EFF2-Ind	ustrial		
Sample Date:	11/15/201	10	Protocol:	EPAFW02		1/R-02-01			PP-Pime	phales pro	melas	
Comments:							•					
Conc-%	1	2	3	4	5							
D-Control	0.5250	0.4750	0.3750	0.4875	0.4250							
32	0.0500	0.2250	0.0000	0.0375	0.1500							
42	0.4000	0.1375	0.1250	0.2000	0.0250							
56	0.1500	0.0375	0.2750	0.2250	0.2625							
75	0.1625	0.1875	0.1875	0.1500	0.2625							
100	0.3875	0.3500	0.5875	0.3125	0.2750							
100UV	0.3125	0.4125	0.4500	0.3250	0.3125							
O-SN	0.5250	0.4750	0.3750	0.4875	0.4250							
				Transform	n: Untrar				1-Tailed			
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD		
D-Control	0.4575	1.0000	0.4575	0.3750	0.5250	12.757	5					
*32	0.0925	0.2022	0.0925	0.0000	0.2250	100.037	5	6.385	2.443	0.1396		
*42	0.1775	0.3880	0.1775	0.0250	0.4000	78.482		4.898	2.443	0.1396		
*56	0.1900	0.4153	0.1900	0.0375	0.2750	51.677	5	4.679	2.443	0.1396		
*75	0.1900	0.4153	0.1900	0.1500	0.2625	22.979	5	4.679	2.443	0.1396		
100	0.3825	0.8361	0.3825	0.2750	0.5875	31.903	5	1.312	2.443	0.1396		
100UV	0.3625	0.7923	0.3625	0.3125	0.4500	17.751	5	1.662	2.443	0.1396		
O-SN	0.4575	1.0000	0.4575	0.3750	0.5250	12.757	5	0.000	2.443	0.1396		
Auxiliary Tes	ts						Statistic		Critical		Skew	Kurt
Shapiro-Wilk's		ates nor	mal distrib	ution (p > (	0.05)	· · · · ·	0.95485		0.94		0.66155	0.88425
Bartlett's Test					•		8.07044		18.4753			
Hypothesis T							MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test			nt differen	ces			0.13963	0.3052	0.10113	0.00817	1.5E-07	7, 32

Treatments vs D-Control

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			La	rval Fish (	Growth a	nd Surviv	al Test-7 Day G	irowth	Page	41 of 6
Start Date:	11/15/20	10		X4233PP			Sample ID:	1		
End Date:	11/22/20		Lab ID:	ADEQ 880	0630		Sample Type:	EFF2-Industrial		
Sample Date:			Protocol:	EPAFW02	2-EPA/82 <sup>-</sup>	I/R-02-01	Test Species:	PP-Pimephales p	romelas	
Comments:										<u> </u>
Conc-%	1	2	3	4	5					
D-Control	0.5250	0.4750	0.3750	0.4875	0.4250					
32	0.0500	0.2250	0.0000	0.0375	0.1500					
42	0.4000	0.1375	0.1250	0.2000	0.0250					
56	0.1500	0.0375	0.2750	0.2250	0.2625					
75	0.1625	0.1875	0.1875	0.1500	0.2625					
100	0.3875	0.3500	0.5875	0.3125	0.2750					
100UV	0.3125	0.4125	0.4500	0.3250	0.3125					
O-SN	0.5250	0.4750	0.3750	0.4875	0.4250					
				Transform	n· IIntran	sformed			Isot	onic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N		Mean	N-Mean
D-Control		1.0000			0.5250	12.757			0.4575	1.0000
32		0.2022			0.2250	100.037			0.2065	0.4514
42		0.3880			0.4000	78.482			0.2065	0.4514
56		0.4153			0.2750	51.677			0.2065	0.4514
75		0.4153			0.2625	22.979	5		0.2065	0.4514
100		0.8361			0.5875	31.903	5		0.2065	0.4514
100UV		0.7923	0.3625	0.3125	0.4500	17.751	5			
O-SN		1.0000	0.4575	0.3750	0.5250	12.757	5 .			
	_						04-41-41-	Critical	Skew	Kurt
Auxiliary Tes				all and for both	0.05		<b>Statistic</b> 0.95485	0.94		0.88425
Shapiro-Wilk's					0.05)		0.95465 8.07044	18.4753	0.00100	0.00420
Bartlett's Test	indicates	equal var	iances (p		- Inforno	lation (2)	00 Resamples)	10.4755		
Point	%	SD	95% 0	Linea L(Exp)	Skew	iation (2	o Resamples)			
1005*	2.916	0.253			0.5836		· · · · · · · · · · · · · · · · · · ·			
IC10*	5.833	0.200			0.5836					
IC15*	8.749	0.759			0.5836		1.0			
IC20*	11.665	1.012			0.5836		-			
1020	11.000	1.012	. 0.007	1.040	0.0000		0.9 -		1	

0.5836

0.5836

18.560

29.696

IC50\* 29.163 \* indicates IC estimate less than the lowest concentration

1.264

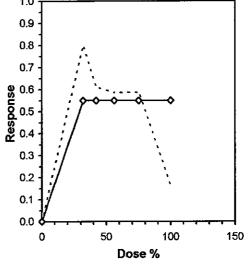
2.023

11.631

18.609

14.582

23.331



IC25\*

IC40\*

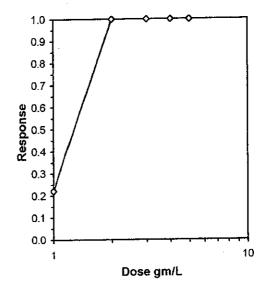
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				Daphn	id Acute Test-48 Hr Survival	
Start Date: End Date: Sample Date: Comments:	11/23/2010 11/25/2010 11/23/2010	)	Lab ID.	1110CD NELAP 0197	Sample ID: REF-Ref Toxicant	
Conc-gm/L	1	2	3	4		
D-Control	0.8000	0.8000	1.0000	1.0000		
1	0.6000	0.6000	0.8000	0.8000		
2	0.0000	0.0000	0.0000	0.0000		
3	0.0000	0.0000	0.0000	0.0000		
4	0.0000	0.0000	0.0000	0.0000		
5	0.0000	0.0000	0.0000	0.0000		

<u> </u>		<u></u>	Tra	ansform:	Arcsin So	uare Roo	t	Number	Total
Conc-am/L	Mean	N-Mean	Mean	Min	Мах	CV%	N	Resp	Number
D-Control	0.9000	1.0000	1.2262	1.1071	1.3453	11.212	4	2	20 20
1	0.7000	0.7778	0.9966	0.8861	1.1071	12.807	4	6 20	20
2	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
3	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
4	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
5	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4 ·	20	20

	Statistic	Critical	Skew Kurt
Auxiliary Tests Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.69251	0.818	1.7E-16 -2.7884
F-Test indicates equal variances (p = 0.91)	1.16032	47.4672	
Trimmed Spea	rman-Karber		

Trim Level	EC50	95%	CL	
0.0%				
5.0%				
10.0%				
20.0%				
Auto-22.2%	1.2809	1.1515	1.4249	



				Acute	Fish Test-48	Hr Survival	······································	
Start Date: End Date: Sample Date:	11/23/201 11/25/201 11/23/201	0	Lab ID:	1110PP NELAP 0197 EPAAW02-EP	PA/821/R-02-0	Sample ID: Sample Type: 1 Test Species:	REF-Ref Toxicant NACL-Sodium chloride PP-Pimephales promelas	
Comments:								
Conc-gm/L	1	<u> </u>						
D-Control	1.0000	1.0000	j .					
5	1.0000	1.0000						
7	0.0000	0.2000						
9	0.0000	0.0000						
11	0.0000	0.0000						
13	0.0000	0.0000						

			Tra	ansform:	Arcsin So	quare Roo	t	Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	Ν	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
7	0 1000	0.1000	0.3112	0.1588	0.4636	69.269	2	18	20
9	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20
11	0.0000		0,1588	0.1588	0.1588	0.000	2	20	20
13	0.0000		0.1588	0.1588	0.1588	0.000	2	20	20

Auxiliary Test	<u> </u>			Statistic	Critical	Skew	Kurt
lormality of the		cannot be	confirmed				
Equality of vari	ance cann	not be cont	firmed				
				Trimmed Spearman-Karber			
Trim Level	EC50	95%	CL				
0.0%	6.0925	5.8570	6.3376				
5.0%	6.0456	5.8132	6.2874				
10.0%	6.0277	5.8621	6.1980	1.0 <del></del>	<u>poo</u>		
20.0%	6.0277	5.8621	6.1980	0.9	6 .		
Auto-0.0%	6.0925	5.8570	6.3376	4	ļ		
				0.8			
				0.7 -	1		
				<b>g</b> 0.6 -			
				<b>Ü</b> 0.5 -			
				ອເດດ 0.5 ອາດ ອີດ.4			
				0.3			
				. 0.2			

0.1

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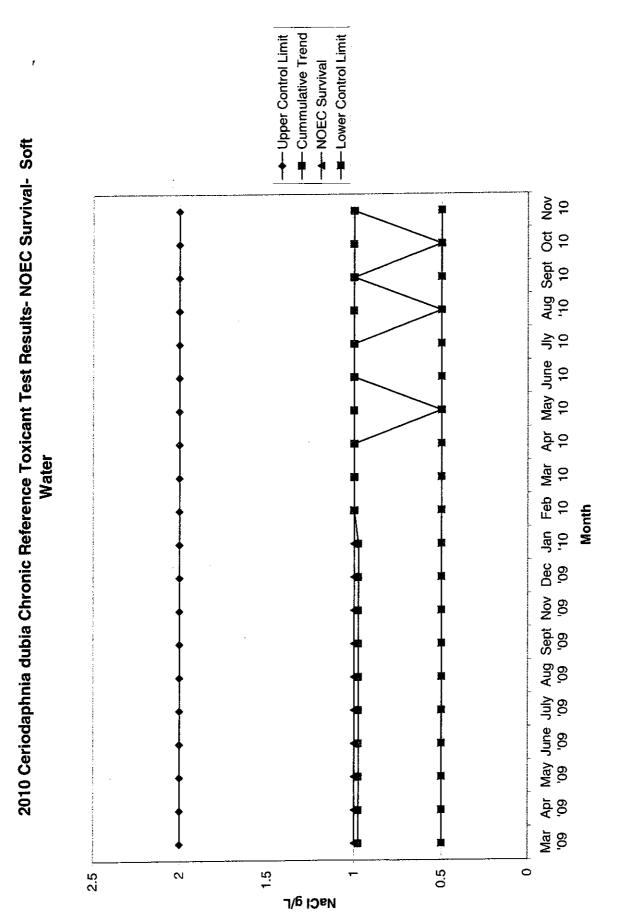
Dose gm/L

100

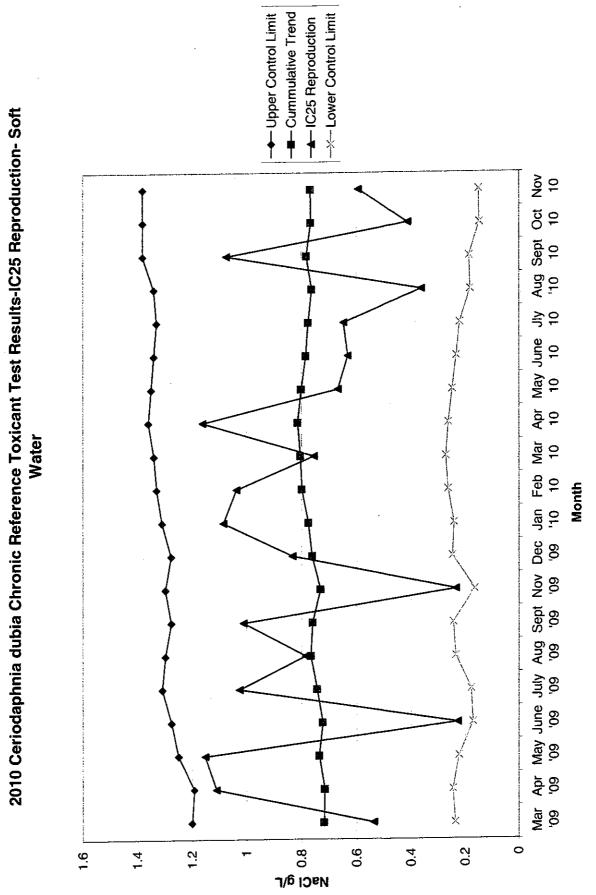
### APPENDIX D QUALITY ASSURANCE CHARTS

		Bio-	Analytical	Laboratori	es' 2010 Re	<b>Bio-Analytical Laboratories' 2010 Results of the Monthly Chronic Reference Toxicant Tests</b>	Monthly C	hronic Refe	stence Toxi	cant Tests		
Month Start-End	Jan. 1/5-12/10 14:10-10:25	Feh. 2/2-9/10 10:50- 13:35	Mar. 3/11-18/10 09:50- 11:00	Apr. 4/22-29/10 10:00- 10:20	May 5/4-11/10 15:15- 13:30	June 6/29-7/6 14:10- 13:05	Juły 7/6-13 14:40- 10:55	Aug 8/3-10 10:50- 12:20	Sept. 9/7-14 14:20- 12:35	Oct 10/6-13 10:05- 13:15	Nov 11/3-10 09:25- 09:15	
				Ceriodaphn	phnia dubi	ia dubia (in soft reconstituted water)	constituted	water)				
NOEC survival	1.0	1.0	1.0	1.0	0.5	0.1	1.0	0.5	1.0	0.5	1.0	
IC25 repro.	1.081	1.0361	0.7545	1.16	0.6680	0.6316	0.6474	0.3603	1.073	0.4111	0.5939	
PMSI) repro.	15.15	18.39	20.03	22.8	32.8	22.8	25.5	24.5	18.2	34.9	19.6	
Avg. repro. control	16.8	21.9	19.4	23.6	18.6	27.0	23.0	24.1	25.6	21.7	35.9	
					Fa	Fathead minnow	мо					
Month Start-End	Jan. 1/5-12/10 13:55-09:50	Jan 1/11-18/10 11:05- 09:37	Feb. 2/9-16/10 15:30- 09:00	Mar. 3/8-15/10 10:10- 08:50	Apr. 4/7-14/10 10:05- 09:45	May 5/4-11/10 15:50- 10:45	June 6/1-/8/10 16:05- 09:20	July 7/20-27 16:00- 09:35	Aug 8/2-9 12:30- 08:40	Sept 9/10-17 10:25- 9:50	Oct 10/5-12 15:45- 08:55	Nov 11/1-8 13:25- 09:05
NOEC survival	1.25	1.25	2.5	1.25	1.25	1.25	1.25	2.5	1.25	1.25	2.5	1.25
IC25 growth	1.13	1.34	1.87	1.62	1.24	1.64	2.00	1.74	1.63	1.47	1.77	1.59
PMSD growth	19.3	12.8	24.2	27.0	27.8	21.8	38.0 ·	22.0	25.5	31.9	23.9	22.8
Avg. growth control	0.805	0.738	0.734	1.0004	0.700	0.905	0.613	0.610	0.728	0.592	0.425	0.504
Reference +Test inva	Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month. +Test invalid. Not enough time left in the month to conduct a retest.	0 g/L sodium ( gh time left in	chloride (NaC the month to	<ol> <li>*In-house o conduct a retes</li> </ol>	rganisms not t t.	sed this month	ć					

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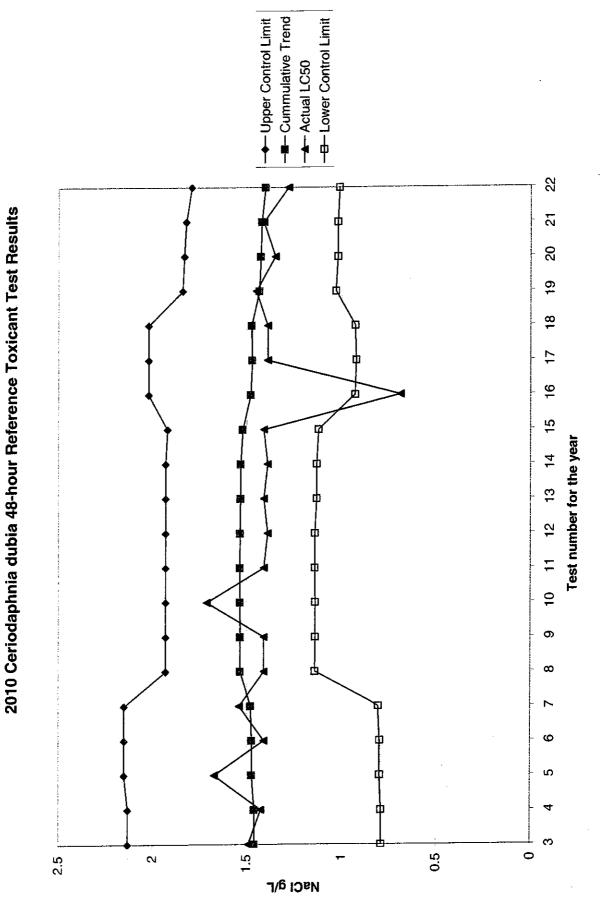


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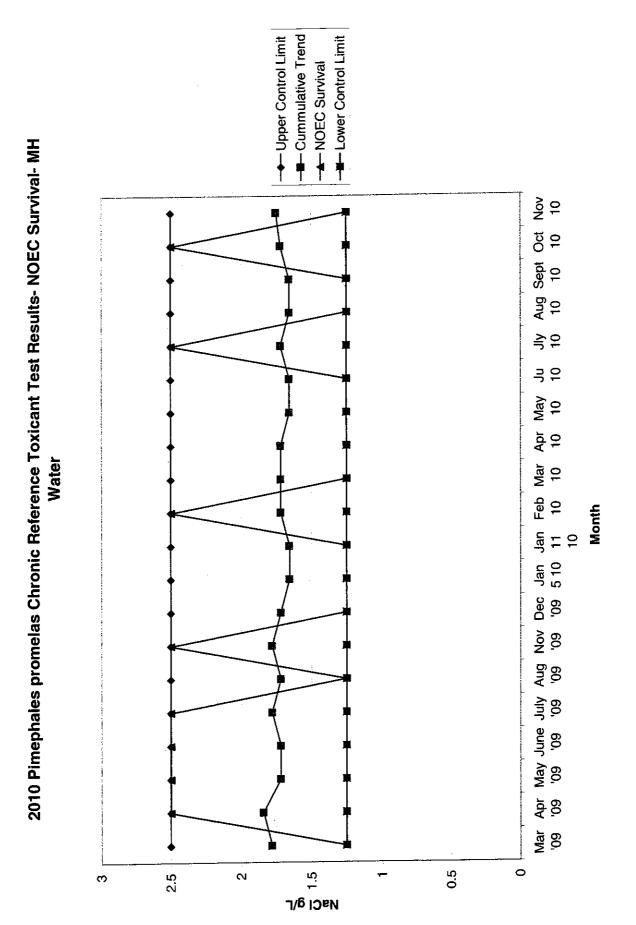
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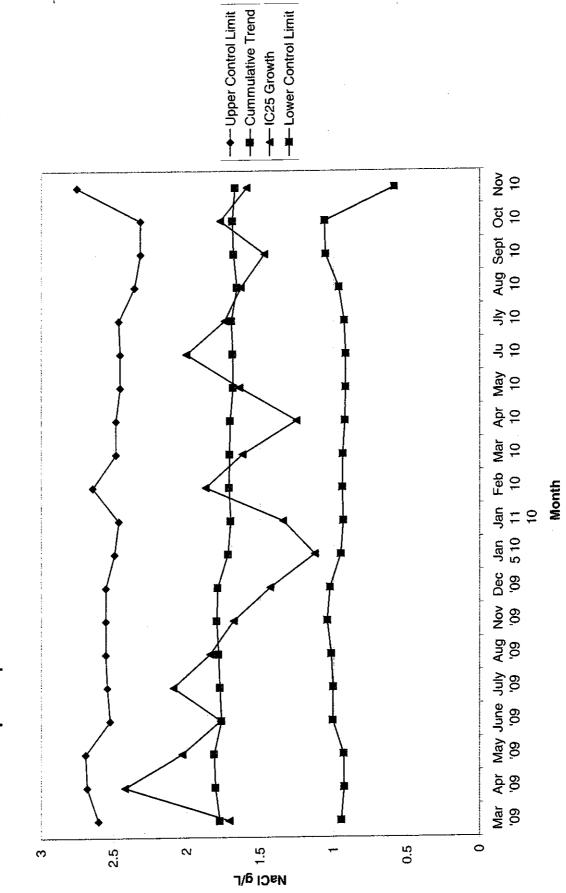


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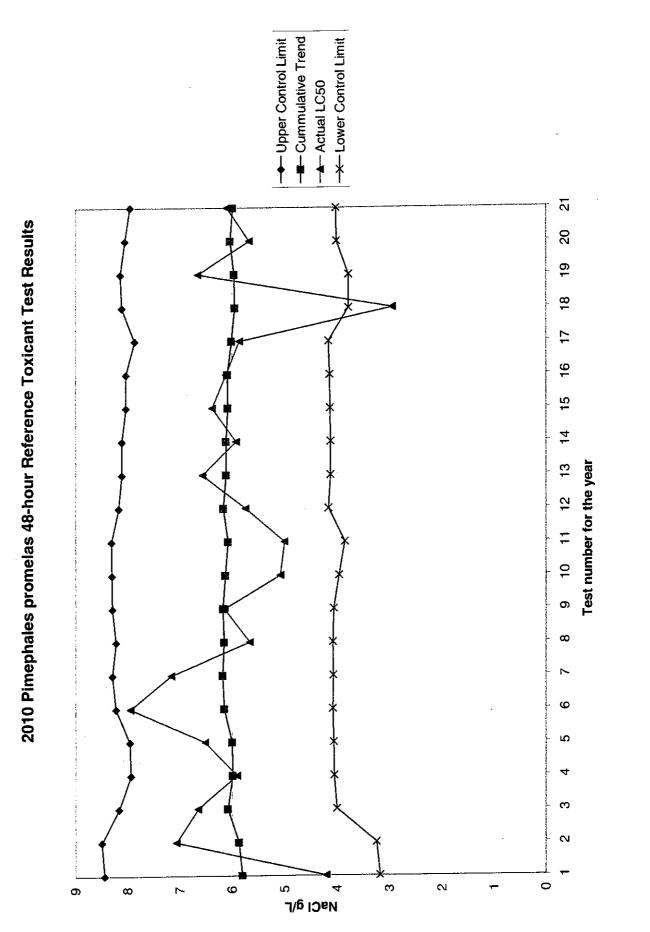


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2010 Pimephales promelas Chronic Reference Toxicant Test Results-IC25 Growth-MH Water

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APPENDIX É AGENCY FORMS

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### SUMMARY REPORTING FORMS CHRONIC BIOMONITORING

### Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Cher	nical	NPDES	No.: AR0000752	
Outfall 001		AFIN: 7	70-00040	
	Time	Date	Time	Date
<b>Composite 1 Collected Fro</b>	m 0800	11/14/10 To	0800	11/15/10
<b>Composite 2 Collected Fro</b>	m 0730	11/16/10 To	0730	11/17/10
<b>Composite 3 Collected Fro</b>	m 0720	<b>11/18/10 To</b>	0720	11/19/10
Test initiated:	1525	am/pm	11/15/10	date
Test terminated:	1240	am/pm	11/22/10	date
Dilution water used:	Receiv	ving X l	Reconstituted	
	]	PERCENT SURVIVAI	L	

Time of Readi	ng						P	ercent Efi	flue	nt		
		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
NU	J <b>MBEF</b>	R OF	YOU	NG P	ROD	UCED	) PE	R FEM	[A]	LE @ EN	D OF TES	T
Rep	0		32		42		56		75	j	100	100 UV
A	27		14		19		8		11		4	6
В	23		8		15		12		6		5	5
С	21		12		11		12		12		3	5
D	33		22		12		8		10	)	8	7
Ē	15		19		13		14		10	)	4	4
F	22		11		9		11		10		8	5
G	24		15		11		7		8		6	7
Н	27		11		9		t0		7		9	6
I	22	-	17		10		12		D	10	9	5
J	26		5		9		7		4		10	8
Surv. Mean	24.0		13.4		11.8		10.	1	8.1	7	6.6	5.8
Total Mean	24.0		13.4		11.8		10.	1	8.	8	6.6	5.8
CV%*	19.74		38.09		27.0	4	24.	45	29	.98	37.93	21.19

\*coefficient of variation = standard deviation x 100/mean. D=dead adult PMSD = 14.7%

### <u>Ceriodaphnia dubia</u> Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of	the test significant	tly different (p	<b>)=.05</b> ) th	an the
control survival for the % effluen	it corresponding to	(lethality):		
a) LOW FLOW OR CRITICAL DILUT	'ION (100%):	YES	Х	NO
b) <sup>1</sup> / <sub>2</sub> 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 DILUTI	ON (100%):	X	YES	NO
b) <sup>1</sup> /2 LOW FLOW DILUTION	(N/A%):		YES	NO

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

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

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

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

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

a) NOEC survival:	100% effluent
b) NOEC reproduction:	0% effluent
c) LOEC survival:	N/A% effluent
d) LOEC reproduction:	32% effluent

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#### Biomonitoring Form Chronic Toxicity Summary Form <u>Ceriodaphnia dubla</u> Chemical Parameters Chart

Permittee: El Dorado NPDES No.: AR0000 Contact: David Sarta Analyst: Haughton, 2	752/ AFIN in							Sample No		11/17/10	T T T	ime: 0800 ime: 0730 ime: 0720 ime: 1525 ime: 1240					
Dilution: 0		Day:							Dilution: 5	6	;	Dayı					
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.9	24.5	24.4	24.9	24.2	24.2	24.8		Temp(C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.0	8.1	7.9	7.9	8.0	7,9	**************************************	DO Initial	8.2	8.2	8.2	7.8	7,9	8.0	8.1	
DO Final	8.4	8.2	8.2	8.2	8.3	8.1			DO Final	8.2	8.2	8.2	8.1	8,4	8.3		
pH Initial	8.0	7.9	7.7	8.2	8.1	8.1	8.1		pH Initial	7.9	8.2	8.2	8.2	8.2	8.2	8.4	
pH Final	8.1	8.0	7.6	7.9	7.8	7,9			pH Final	9.5	9.5	9,1	9.4	9,2	9.2		
Alkalinity	32.0	28.0							Alkalinity								
Hardness	44.0	32.0							Hardness								
Conductivity	177.0	159,4	156.7	160.0	161.0	159.6			Conductivity	370	369	358	365	364	362		
Chiorine	<.01	<.01							Chlorine								
Dilution: 32		Day							Dilution: 75	;	n	lay					
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.9	24.5	24.4	24.9	24.2	24.2	24.8		Temp(C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.1	8.1	7.8	7.9	8.0	8.1		DO Initial	8.2	8.2	8,2	7.7	7.9	8.0	8.1	
DO Final	8.3	8.2	8.2	8.1	8.3	8.2			DO Final	R,2	8.2	8.2	8.1	8.4	8.4		
pH Initial	7.9	7.9	8.1	8.2	8.1	8.1	8.2		pH Initial	8.0	8,3	8,3	8.3	8.3	8.2	8.4	
pH Final	9.2	9.1	8.0	9.0	8.3	8.4			pH Final	9.6	9.6	9.3	9.5	9.4	9.3		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	287	278	272	280	284	277			Conductivity	439	439	428	435	432	428		
Chlorine									Chlorine								
Dilution:	42		1	Day					Dilution: 190	)			Dag	/			
	1	2	3	4	5	6	7	Comments		ι	2	3	4	5	6	7	Comments
Temp ( C )	24.9	24.5	24.4	24.9	24.2	24.2	24.8		Temp (C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.1	8.1	7.8	7.9	8.0	8.0		DO Initial	8.2	8.2	8.2	7.6	7.8	8.0	8.1	
DO Final	8.3	8.2	8.2	8.1	8.3	8.3			DO Final	8.2	8.2	8.3	8.2	8.5	8.6		
pH Initial	7.9	8.2	8.2	8.2	8.2	8.1	8.3		pH Initial	8.1	8.4	8.3	8.3	8.3	8.3	8.5	
pH Final	9.4	9.4	8.7	9.3	8,9	8.9			pH Final	9,7	9.6	9.5	9.6	9.5	9.4		
Alkalinity									Alkalinity	60.0		112.0		124.0			
Hardness									Hardness	60.0		192.0		40.0			
Conductivity	320	318	309	314	314	309			Conductivity	526	534	517	529	525	518		
Chlorine									Chlorine	<.01	L	<.01					

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

Permittee: El Dorado Ch	emical	NPDE	ES No.: AROO	00752
Outfall 001	L	AFIN	: 70-00040	
	Time	Date	Time	Date
<b>Composite 1 Collected fr</b>	om: 0800	11/14/10 To	0800	11/15/10
Composite 2 Collected fr	om: 0730	11/16/10 To	0730	11/17/10
<b>Composite 3 Collected fr</b>	om: 0720	11/18/10 To	0720	11/19/10
Test initiated:	1555	am/pm	11/15/10	date
Test terminated:	0932	am/pm	11/22/10	date
Dilution water used:		Receiving	X Reco	onstituted
	DATA	<b>A TABLE FOR SUR</b>	VIVAL	

Effluent Conc. %	Per	rcent Surv	ival in Rep	olicate Cha	Mea	Mean Percent Survival			
	A	В	C	D	Е	24h	48h	7 days	
0	100	100	100	100	100	100	100	100	0.00
32	25.0	50.0	12.5	25.0	50.0	100	100	32.5	31.09
42	62.5	37.5	37.5	62.5	25.0	100	100	45.0	23.50
56	37.5	25.0	62.5	37.5	75.0	100	100	47.5	28.04
75	37.5	62.5	50.0	37.5	62.5	100	100	50.0	16.09
100	75.0	62.5	100	75.0	87.5	100	100	80.0	16.47
100 UV	75.0	87.5	100	87.5	75.0	100	100	85.0	12.15

### DATA TABLE FOR GROWTH

Effluent Conc. %	Ave	erage Dry Wei	Mean Dry Weight mg	CV*			
	A	В	С	D	Е		
0	0.525	0.475	0.375	0.488	0.425	0.458	12.76
32	0.050	0.225	0.000	0.038	0.150	0.093	100.04
42	0.400	0.138	0.125	0.200	0.025	0.178	78.48
56	0.150	0.038	0.275	0.225	0.263	0.190	51.68
75	0.163	0.188	0.188	0.150	0.263	0.190	22.98
100	0.388	0.350	0.588	0.313	0.275	0.383	31.90
100 UV	0.313	0.413	0.450	0.325	0.313	0.363	17.75

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

**PMSD =** 30.5%

NO

YES

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

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

Is the mean survival at 7 days significantly different (p=.05) than the control survival for the % effluent corresponding to: a) LOW FLOW OR CRITICAL DILUTION (100 %) X YES NO

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

b) <sup>1</sup>/<sub>2</sub> LOW FLOW DILUTION

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):

(N/A%)

a) LOW FLOW OR CRITICAL DILUTI	ON (100%)	Х	YES	NO
b) <sup>1</sup> / <sub>2</sub> LOW FLOW DILUTION	(N/A %)		YES	NO

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

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

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

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

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

a.) NOEC survival	0% effluent.
b.) NOEC growth	0% effluent.
c.) LOEC survival	32% effluent
d.) LOEC growth	32% effluent

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#### Biomonitoring Form Chronic Toxicity Summary Form <u>Pimephales promelas</u> Chemical Parameters Chart

NPDES No.: AR0000752/ AFIN 70-00040 Sample No. 2							11/17/10	T T T	ime: 0800 ime: 0730 ime: 0720 ime: 1555 ime: 0932	) 1 5								
Dilution:	0	Day:								Dilution: 56	6	1	Day:					
	E	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp(C)	25.7	25.3	25.1	24.0	24.1	25.0	25.8	•		Temp ( C )	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	7.4	7.1	6.9	6.9	7.3	7.4	7.1			DO Initial	7.0	6.5	6,6	6.7	6.9	7.0	6.8	
DO Final	8.4	8.2	8.2	<b>8</b> .2	8.3	8.1				DO Final	8.2	8.2	8.2	8.1	8.4	8.3		
pH Initial	7.8	7.9	7.7	7.7	7.5	7.5	7.7			pH Initial	7.8	7.8	7.6	7.7	7.7	7.7	7.8	
pH Final	8.1	8.0	7.6	7.9	7.8	7.9				pH Final	9.5	9.5	9.1	9.4	9.2	9.2		
Alkalinity	32.0	28.0								Alkalinity								
Hardness	44.0	32.0								Hardness		***						
Conductivity	177.0	159.4	156.7	t60.0	161.0	159.6				Conductivity	370	369	358	365	364	362		
Chlorine	<.01	<.01								Chlorine								
Dilution: 32 Day					Dilution: 7	5	D	ay										
	1	2	3	4	5	6	7	Comments			ł	2	3	4	5	6	7	Comments
Temp ( C )	25.7	25.3	25.1	24.0	24.1	25.0	25.8			Temp(C)	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	7.2	6.8	6.8	6.9	7.0	7.2	7.2			DO Initial	6.9	6.5	6.0	6.7	7.0	7.0	6.8	
DO Final	8.3	8.2	8,2	8,1	8.3	8.2				DO Final	8.2	8.2	8.2	8.1	8.4	8.4		
pH Initial	7.7	7.7	7.6	7.6	7.5	7.5	7,8			pH Initial	7.9	7.8	7.7	7,8	7.8	7.8	7.9	
pH Final	9.2	9.1	8.0	9.0	8,3	8.4				pH Final	9.6	9.6	9,3	9.5	9.4	9.3		
Alkalinity										Alkelinity								
Hardness										Hardness								
Conductivity	287	278	272	280	284	277				Conductivity	439	439	428	435	432	428		
Chlorine										Chlorine								
Dilution:	42		1	Day						Dilution: 100 Day								
	1	2	3	4	5	6	7	Comments			L	2	3	4	5	6	7	Comments
Temp ( C )	25.7	25.3	25.1	24.0	24,1	25.0	25.8			Temp ( C )	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	7,1	6.7	6.7	6.8	7.0	7.1	6.9			DO Initial	6.9	6.5	6.6	6.7	7.0	7.6	6.9	
DO Final	8.3	8.2	8.2	8.1	8.3	8.3				DO Final	8.2	8.2	8.3	8.2	8.5	8.6		
pH Initial	7.7	7,7	7.6	7.6	7.6	7.6	7.8			pH Initial	8.0	7.9	7.7	7.9	8.1	8.0	8.0	
pH Final	9.4	9.4	8,7	9.3	8.9	8.9				pH Final	9.7	9.6	9,5	9.6	9.5	9,4		
Alkalinity										Alkalinity	60.0		112.0		t 24.0			
Hardness										Hardness	60.0		192,0		40.0			
Conductivity	320	318	309	314	314	309				Conductivity	526	534	517	529	525	518		
Chlorine										Chlorine	<.01		<.01					

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### 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 Company Project#: X4233\_\_\_\_\_

Proofed First Draft:	Date:
Proofed Final Draft: Sun D. Brugp 185	Date: 10/7/10

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.

BS

Date: 10/7/10

Quality Assurance Officer

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



Bio-Analytical Laboratories (BAL) ADEQ Certificate #88-0630 Project X4270

### **Bio-Analytical Laboratories' Executive Summary**

Permittee:	El Dorado Chemical Company
	4500 Northwest Avenue
	El Dorado, AR 71731
Project #:	X4270
<b>Outfall:</b>	001
Permit #:	AR0000752/ AFIN #70-00040
Contact:	David Sartain
<b>Test Dates:</b>	December 29, 31, 2010 and January 3, 2011
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 - 33.81%.

# Note: The UV treated 100% dilution showed no lethal effects, but did show nonlethal effects.

### 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 - 10.11%

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

This report contains a total of 57 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 NELAC and ADEQ.

## **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

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

AT

EL DORADO CHEMICAL COMPANY El Dorado, Arkansas

> NPDES #AR0000752 AFIN #70-00040

EPA Methods 1000.0 and 1002.0

Project X4270

Test Dates: December 29, 2010 - January 5, 2011

Report Date: January 17, 2011

Prepared for: David Sartain 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

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BAL ADEQ #88-0630 Project X4270

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#### **1.0 Introduction**

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

### 2.0 Methods and Materials

#### 2.1 Test Methods

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

#### 2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnow test organisms were obtained from Aquatox Incorporated, Hot Springs, Arkansas, and were less than 48 hours old at test initiation. The minnows were acclimated to dilution water hardness prior to test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were run a minimum of once monthly in order to document test organism sensitivity. Monthly chronic reference toxicant tests, using NaCl, were also conducted in order to document organism sensitivity and testing technique. Monthly acute and chronic reference toxicant tests, using NaCl, were conducted monthly by Aquatox.

#### 2.3 Dilution Water

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

### **2.4 Test Concentrations**

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

### **2.5 Sample Collection**

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on December 29, 31, 2010 and January 3, 2011. Upon collection and completion of each composite, the samples were chilled to 4<sup>o</sup> 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  $25\pm1^{0}$  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. The effluent was filtered through a 60 micron plankton net in order to remove any organisms that might interfere with the tests. It was also 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  $25\pm1^{\circ}$  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  $25\pm1^{\circ}$  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.

### 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 and the growth data was analyzed using Dunnett's Test, a parametric test. The IC<sub>25</sub> value for reproduction was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC<sub>50</sub> values (that concentration of a substance which is lethal to 50 percent of the test organisms after continuous exposure for the duration of the test) in the reference toxicant tests 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 80 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 19.5 and 4.5, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively (p=.05). Eighty percent survival and an average of 3.0 neonates was noted in the 100 percent UV treated dilution.

The fathead minnow test results can be found in Table 2. One hundred percent survival occurred in the control and 97.5 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.930 milligram (mg), while the average in the critical dilution was 0.948 mg. The NOEC for survival and growth in this test was 100 percent effluent. One hundred percent survival and an average weight of 1.010 mg was noted in the UV treated dilution.

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Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		19.5	19.5	
32.0	100.0		9.0	9.0	*
42.0	90.0		9.7	8.7	*
56.0	80.0		6.9	6.2	*
75.0	70.0		8.4	6.6	*
100.0	80.0		5.0	4.5	*
100.0 UV	80.0		3.3	3.0	*

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

\*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.

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	100.0		0.930	
32.0	97.5		0.883	
42.0	97.5		0.953	
56.0	100.0		1.010	
75.0	97.5		1.055	
100.0	97.5		0.948	
100.0 UV	100.0		1.010	

### Table 2: Results of the Chronic Definitive Fathead Minnow Test

\*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 48-hour reference toxicant test results can be found in Table 3 below. The acute test results indicate that the test organisms were within the respective sensitivity range. The monthly chronic reference toxicant minnow test also showed those test organisms to be within the respective sensitivity range. The monthly chronic *Ceriodaphnia dubia* reference toxicant tests was invalid and could not be repeated by month's end. The same lot of test organisms were used for both the chronic reference toxicant cladoceran test and for this study. The graphs of the results of the acute and chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC <sub>50</sub>	Upper and Lower CUSUM Chart Limits
Ceriodaphnia dubia	12/21/10 - 12/23/10 13:50 - 14:20 hours	1.41	1.78 - 1.01
Pimephales promelas	12/14/10 - 12/16/10 +	8.52	9.32 - 7.08

Table 3: Results of	the 48-hour	<b>Reference</b> To	oxicant Tests	- g/L
				- <del>-</del>

+Times not given by provider

### 4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on December 29, 31, 2010 and January 3, 2011, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven of exposure (p=.05). Nonlethal effects (i.e., lack of reproduction or growth) were noted in the critical dilution in the *Ceriodaphnia* test but not in the fathead minnow test (p=.05). Treating the effluent with ultraviolet light did not decrease the nonlethal effect in the *Ceriodaphnia* test.

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### 5.0 Reference

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.

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# APPENDIX A CHAIN-OF-CUSTODY DOCUMENTS

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oioanalytical@att.net		AP 01975,	NELAP 01975, ADEQ #83-0630, EPA LA00917	0630, EPA	I.A0091								la.I	Leboratory Use Only:		_
Company: El Dorado Ch	Company: El Dorado Chemical Company	iny.	(8	Phone: (870) 863-1484	-1484		₹	Amalysis:							Project Number:	
Address: 4500 Northwe	Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499	Dorado.	, AR 7173	Fax: 1 (870) :	863-14	6(	Cnroni		Acute	Acute	Acute				DLCHX	
Permit #: AR0000752			Ă	Purchase Ore	Order:			c minno	minnow(	Daphnia		Coliform Ceriodar	Coliform		Temp, upon arrival:	
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<u>Date Start</u> Date End	<u>Time Start</u> Time End	U	<b>U</b>	# contaimers	ners	Sample Identification			ne)		<u> </u>			Lab Control Number:	Freservative: (below)	
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CHAIN OF CUSTODY

Bio-Analytical Laboratories 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Fax (318) 745-277 bioanalytical@att.net

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#### **BioAnalytical**

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Sent: Wednesday, December 29, 2010 1:14 PM

To: BioAnalytical

Subject: RE: Today's sample times for 001

Start Time: 08:30 on 12/28/2010 End Time: 08:30 on 12/29/2010

I'll be away from my office this afternoon so if you need any additional information please call my cell. 870-310-3695

Thanks Ginger!

**From:** BioAnalytical [mailto:bioanalytical@wildblue.net] **Sent:** Wednesday, December 29, 2010 12:29 PM **To:** Brent Parker **Subject:** Today's sample times for 001

Brent, What are the sample times for the 001 sample picked up today?

Sincerely, Ginger Briggs Bio-Analytical Laboratories

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

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NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

			,										Lab	Laboratory Use Only:		
Company: El Dorado Ch	Company: El Dorado Chemical Company	æy	(8; [	Phone: (870) 863-1484			Analysis:	ysis:						· · ·	Project Number:	<u></u>
Address: 4500 Northwe	Address: 4500 Northwest Avenue, El Dorado, AR 71731 (370) 363-1.	)orado, A	1 1 71731	Fax: 1 (870) 863-1	499		Chroni			Acute		Fecal (	Total C		OLCH	
Permit #: AR0000752			Pa	Purchase Order:			c Ceriod	c minno	Daphnia  minnow(		Ceriodar	Coliform	Coliform		Temp. upon arrival:	
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Bio-Analytical Laboratories 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Fax (318) 745-2773 bioanalytical@att.nct

CHAIN OF CUSTODY

vtical@at.act NEK.AP 01975. ADE0 #88-0630. EPA F.A00917

			y I									l a l	Laboratory Use Only:		
Company: El Dorado Ch	Company: El Dorado Chemical Company	ay.	<b>8</b> 8	Рћопе: (870) 863-1484			Amalysis:	sis:						Project Number:	
Address: 4500 Northwe	Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-	)orado,	AR 7173	Fax: 1 (870) 863-1	.1499				Acute	Acute	ļ	┝		OLCHY	
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<u>Date Start</u> Date End	Time Start Time End	ς μ	ۍ_	# containers	Sample Identification	6		ne)			<u>_</u>		Lab Control Number:	Preservative: (below)	
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### APPENDIX B RAW DATA SHEETS

X4270 Page 16 of 57 BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST Date start: 12 29/10 Date end: 1/5/11 Project#X4270 Client/Contact El Dorado Chemica 11731 EIDOMAD AR Address 4500 Northwest Hve.  $\cap^{\cdot}O($ AF NPDES#\_AR Dilution Waterson reconstituted Sample Description\_ TechniciansBriggs Haughton; Zoagler, Test Temperature(<sup>0</sup>C)\_ Caudhan Date 12/28/10 2300 \_Time:\_ Adults isolated: BOARD : KIIS Neonates collected: Date 12/29/10 Time: 0102 Serial #06E2089 Dissolved Oxygen Meter: Model ÝSI550A Model Orion 230A+ Serial <u>#020273</u> pH Meter: Model Control Company Serial# 80277924 Conductivity Meter: Amperometric Titrator: Model Fischer-Porter Serial # 92W445766 Aerate?/Minutes Receiving Water Aerate?/Minutes Effluent /Final D.O. Initial D.O. /Final D.O. Initial D.O. <u>(mg/L & %)/Tech</u> (mq/L & %)/Tech (mg/L & %)/Tech (mg/L & %)/Tech **LID** AL 0.1/1018.3199.9% 50% 0. 0. 09.81 (18.090150m 1. Y/15 18.5/98.49 TRC. 4/121.120 RC 2.10.31122.6%18X1 2.4/15/8.0195.9%1820mg 3. 4/12/2.5/8912/AH 3.9.8/116.97/PH 4.4/15/8/1/95.82/AH 4.10.7/126.02/AH 5. 4/15/-1. 8/91, 5%/8/002. 5.10.21119.800128mg 6. 10.2/120.03 AH 6. 4/15/7.9/94.32 AH Safe <u>BAL Sample #</u> Ammonia (NH3) Dechlorinated? Total Residual (mg/L)/Tech Amount?/Tech Chlorine(mg/L)/ ρН Tech 1. COJS2 1. J.O 1 801 noide 1 20.0L

Comments:

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Filtered effluent thru 60 um plankton net to remove any live organisms,

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3.C/2275

X4270 Page 17 of 57

**BIO-ANALYTICAL LABORATORIES** NUMBER NEONATES PER BROOD CERIODAPHNIA

X4270 Project #\_\_\_\_  $Client_{l}$ 

Test Dates 12/29/10 - 1/5/11

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brado Chemical

Replicate			%	Concentra	tion		
	0	32	42	56	75	100	100 UV tro
A	16	5	4	4	5	3	Χ3
В	23	14	Xo	2	×٥	7	3
С	10	5	8	5	7	6	)
D	29	12	21	12	12	3	3
E	17	9:	10	8	χ 5	7	4
F	23	2	9	X 3	8	X 3	6
G	17	13	10	9	6	4	5
н	22	9	10	8	ха	4	X
I	13	7	12	X4		4	2
J	25	9	13	2	10	x2	5
Surviving Mean	19.5	Q.0	9.7	69	8.4	Б.О	3.3
Total Mean	195	9.0	8.7	6.2	6.6	4.6	3,0
CV%*	30.02	35.14	26.88	4563	31.28	3381	51.36

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

Key: M=male; X=dead adult

16 Calculated by:\_ )<sub>0</sub>. Calculations checked by: EGO 1/10/11

Project Client_	BIO-ANALYTICAL LABORATORIES X427 CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST Page 18 of 5 t#X4270 ETest started: Date/ <u>24/10</u> Time/ <u>1445</u> ETime/ <u>010</u> Test ended: Date/ <u>5/11</u> Time/ <u>010</u>
-	an: Day0 AH 13 $\mathcal{A}$ 2 $\mathcal{A}$ 3 AH 4 AH 5 $\mathcal{R}$ 6 $\mathcal{A}$ 7 $\mathcal{R}$ 8 Day0 $\mathcal{A}$ 1 $\mathcal{A}$ 2 $\mathcal{A}$ 3 $\mathcal{A}$ 3 $\mathcal{A}$ 5 $\mathcal{A}$ 6 $\mathcal{A}$ 6 $\mathcal{A}$ 7 $\mathcal{A}$ 8 Day0 $\mathcal{A}$ 5 $\mathcal{A}$ 1 $\mathcal{A}$ 7 $\mathcal{A}$ 8 ure: Day0 $\mathcal{A}$ 5 $\mathcal{A}$ 1 $\mathcal{A}$ 9 2 $\mathcal{A}$ $\mathcal{A}$ 4 $\mathcal{A}$ 4 $\mathcal{A}$ 4 $\mathcal{A}$ 5 $\mathcal{A}$ 5 $\mathcal{A}$ 6 $\mathcal{A}$ 7 $\mathcal{A}$ 8 $\mathcal{A}$ 7 $\mathcal{A}$ 8
& Conc.	Day A B C D E F G H I J Adults Neonates
0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
32	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
42	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
56	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
75	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
100	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

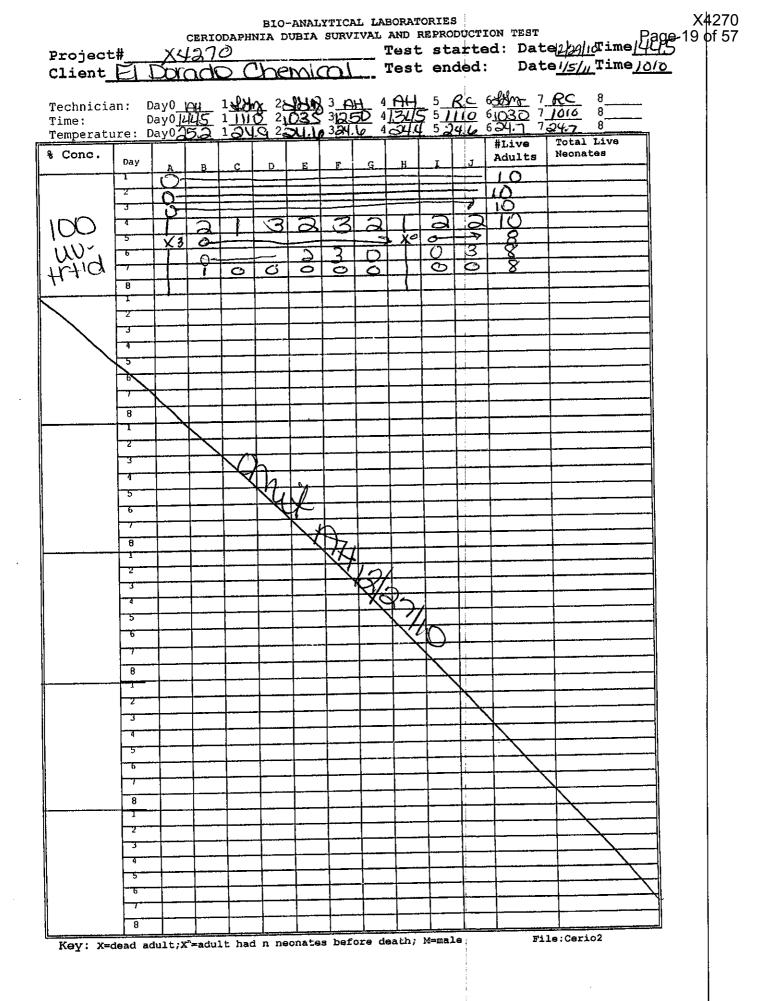
Key: X=dead adult; X"=adult had n neonates before death; M=male

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BLU-ANA	LYTTCA		RATORI To	LES /-I est st	JAY WAT arted: ded:	Date	<u>2940</u> Time	= <u>1445</u>	X Page 20
ient_ <u>EIDOR</u>	<u>jav</u> (	'hem	TOD TO	est en	ded:	Date <u>v</u>	<u>эщ</u> ттше	= <u>-1010</u>	
ganism Odubi	3110	1	2	3	4	5	6 3116	7	8
Day/# water used		L <u>+</u>		<u> </u>	<u>,                                     </u>	• •			
pH	-	WYU-	R.Z.	KQ/	18.00	19	1:10	19	
pn	8.D	8.0		1981	02	13.0	hie-	010	<u></u>
DO(mg/1)	7.9	1.8	1.8	1.6	285	18.D	1.8	1.00	<b></b>
Cond(umhos/cm)i	hez.a	172.0	11.6	171.1	1969	1956	1109.0		
Alkalinitý(mg/L)	28.0			}			32.0		
Hardness (mg/L)	52.0			[	L		40,0	<u>i</u>	
Concentration: 3	22		01/	012	<u> 101 / / / / / / / / / / / / / / / / / /</u>		F. D/	01/	
pH	8.5	5.8,4	8.4	88.4	83	283	28.3	8.1	
DO (mg/1)	8.D	1.79	120	125	8202	147.8	1:48	1.2	
	<u>a80</u>	282	282	2810	328	224	201	<u> </u>	
Cond (umhos/cm)		000	<u>vo</u> 0				<u>· · · · · · · · · · · · · · · · · · · </u>	·	
Concentration: 42		2.1.	8.1	R.L.	18.1.	8.1.	8/1	8.1	
рН	8. Lp	085	18.5	KY4	128,4	28.4	X.H	18/	+
DO(mg/l)	8.D	1.9	2-1.8	15	58.2	18	18	1.0	
Cond(umhos/cm)	308	317	321	316	363	363	325		
	02				****	<u></u>			<del>,</del>
pH	8.6	8-81	Big	BZZ	8.45	125	645	8.2	
		1.0	hle	hy z	0	142	hy	18	
DO(mg/l)	8.1	8.0	1.8	12, 2	28.2	77	<u>7.1</u>	<u>/</u>	
Cond(umhos/cm)	<u>350</u>	362	370	1370	14dC	414	317		
Concentration: 75	52		<del>v d</del> -	502	1022	102	57	8.2	
рH	8.7	38,6	0.8.6	BRIS	08.10	185	D-8.5	0.0	,
DO (mg/l)	8.2	1.00	120	14	8/21	hitr	2:00	1.9	
	<u>u</u> ir	100	4210	1122		492	449	<b>F</b>	
Cond (umhos/cm)	<u></u> 75				<u>, , , , , , , , , , , , , , , , , , , </u>	<u></u>			
Concentration: 10	0 n	R.g.	8.25	23.	1832	83	R.2,	8.3	
рН	0	281	510-	018.0		0.4	2.0	n8/	<b></b>
DO (mg/1)	8.4	182	119	1H,S	18 81	1-16	1217	1.0-	<b></b>
Cond (umhos/cm)	497	512	521	533	1597	591	541	 	<u> </u>
Tech-prerenewal	page	the	AHA	DIL	DH	RC	HHM	RC	
(	NO UN		JAN	Dela		Jeln.	1	······································	
Tech-postrenewal			000	<u> 607</u>	<u>  1-11-1</u>	pag	144_	<u> </u>	<u>+</u>
Hardness(mg/l)	56.0		44.0		<u>44.0</u>	<u></u>	<u> </u>	<b> </b>	
Alkalinity(mg/l)	98.0		104.0	<u>' </u>	108.0	<u> </u>	<u> </u>	1	
y: prerenewal/pos	trenewa.	1.		1	,				

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Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: Con	15-rol-1C	U~50	1- H+C			- <u></u>	<u> </u>		
pH	8.6	8.8.6	8.84	875	8-18	8.3	8.3.3	8.2	
DO(mg/l)	7.9	1.28.0	24.5	13,2	29/10	19.5	1-24	1.3	
Cond(umhos/cm)	316	517	530	SIS	598	<u>584</u>	552		
Alkalinitý(mg/L)		ļ							
Hardness (mg/L)						i		<u> </u>	L
Concentration:		,,					<u> </u>		<u>.</u>
pH									
DO (mg/1)						$\leq$			
Cond (umhos/cm)								<u> </u>	
Concentration:									1
рН		X	2 .				$\square$		
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Cond(umhos/cm)		`	X	$\mathcal{T}_{\mathcal{T}}$					
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DO (mg/1)									
Cond (umhos/cm)	ļ			ļ					
Tech-prerenewal	tom.	HH7	YYYY	AH	AH	RC_	Hol D	RC	
Tech-postrenewal	$\underline{F}$	RC	Horn.	<u>682</u>	Alt	50m	AH	<u> </u>	
Hardness(mg/l)						ļ			
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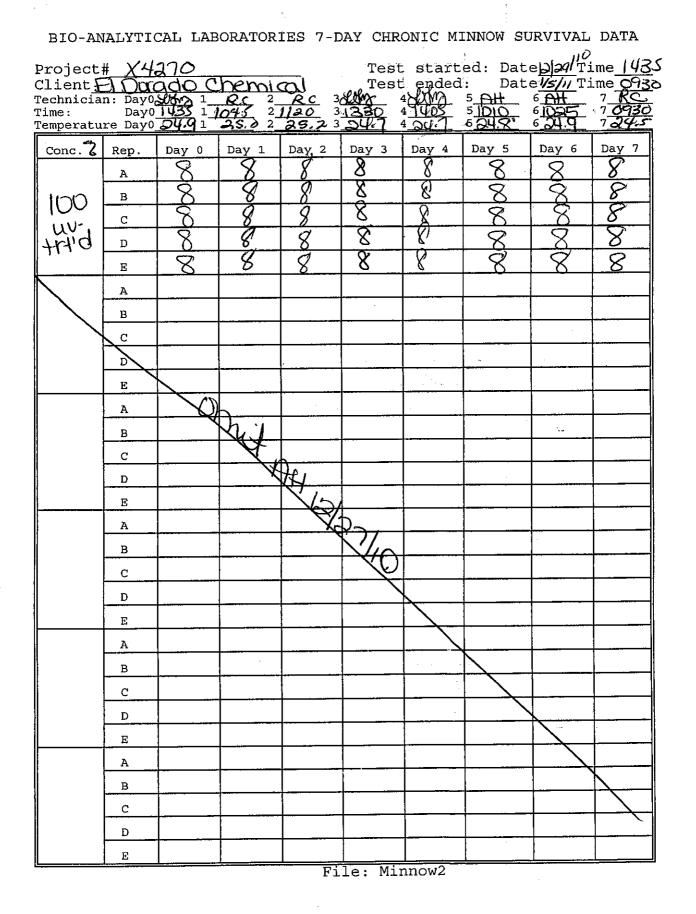
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X4270 Page 22 of 57

**BIO-ANALYTICAL LABORATORIES** PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET Project #  $\chi 4270$ Date started: 12 2910 Date ended 1/5/11 Client/Contact 🗲 "hemica 71731 Address 460  $\Omega^{\circ}$ thw/est NVE., E (DoraNO, N VEIN NPDES#\_HK( 00041 Sample Description\_ OD1\_ Dilution Watersoft reconstituted Test Temperature (°C) <u>35±1°</u> Technicians Brogs, HOUON, Zoogler Callahan \_<48 Vendor/ID#<u>Aquatox 1648</u> Test organism age\_\_\_ Feeding Times <u>Technician/Time/Amount (per replicate)</u> Day ΆM NOON PM0 AH1144510.20ml 0155/0.10ml 105510.10ml 1 AH4141510.10mg 2 21081510.20ml RC 10/3/10 Re 3 0.20ml 080010.10ml 1130/0.20ms 12/31/10 081510.10m 1340,00,00m1 5 1112510.20m1 juis la zomi -6 0735/0.10m 105510.10ml DH1143010.10~ **Dissolved** Oxygen Meter Mode] <u>Serial</u> #06E2089 pH Meter: <u>Serial</u> Model Orion #020273 230A Conductivity Meter <u>Model</u> <u>Control Company</u> Serial #80277924 Amperometric Titrator Model Fischer-Porter #92W445766 Serial Effluent Aerate?/Minutes Receiving Water Aerate?/Minutes Initial /Final DO Initial DO /Final DO DO(mg/L&%)/Tech (mg/L & %)/Tech (mg/L & %)/Tech\_ (mg/L & %)/Tech UА MA 0.9.8/118.09/0130x 0.1/10/8.3/99.90/8820 0. 1.11.4/127.790 RC 1.Y115 8.5 198.4% Rec 1. 2.103/122.6%/RC 2.X115/80/95.9%/R. 2. 39.8/116.906/200g 3.V11217.5 89.1961-1843 4.10:7/126.02/AH 4.4/15/81/95,890/20054 4. NOI TIS MERIAL SUBJEMBY 6. 5. 6.4/15/79/94.38/PH б. <u>Total Residual</u> BAL Sample # Dechlorinated? ote. <u>Ammonia (NH3)</u> <u>Chlorine(mg/L)</u>/ Amount?/Tech (mg/L)/Tech Tech  $1, \angle 0.01$ NORTH 1<u>C</u>2223 40.01 2CƏƏ-3.014 PH3. LO.0 0 NO HA 3.0 44 Comments: Filtered effluent thru 60 um plankton net to remove any live organisms. RC/0735/arome 11035/0.10ml 141510.10ml

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Project Client					Tes	t start	ed: Dat	e <u>0 04/</u> Ti	ime <u>143</u>
Technicia	<u>n: Dav0</u>	<u>くない</u> ときか1	Chem 2	RC 3	des res	t ended 4040 %	.: Dat 5 <b>AH</b>	e <u>////</u> 11 6_ <del>[]]]</del>	ime <u>093</u> 0
Time: Temperatu	Day0	1435 1		1120 3	1330	41405	5 <del>AH</del> 5 <u>1010</u>	°1025	7 0930
· · · · · · · · · · · · · · · · · · ·	re Dayu	<u>surgi</u> I	<u>45.0 2</u>	8/ <u>5, 2</u> 3	24:1	<u>4 QU ]</u>	<u>* 24.8</u>	<u>6724.0</u>	724.5
conc.Z	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
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	с	8	8	8	8	8	8	8	8
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		8	8	- <del>Q</del>	<u> </u>	<u> </u>	$\frac{2}{2}$	$\frac{0}{2}$	8
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	<u>A</u>	<u> </u>	8	8	8	8.	70	<u> </u>	8
	В	8	0	<u> </u>	8	<u> </u>	<u> </u>	<u> </u>	8
	C	8	8	8	8	Š	8	<u> </u>	8
	D	8	8	8	8	K	<u> </u>	8	8
	Е	8	8	8	8	X	8	Ř	8
	A	8	8	8	8	8	S	З Х	7
	в	8	8	8	8	8	K	Ř	8
75	с	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	K	Х Х	8
	E	<u> </u>	8	8		8	Ř	Š.	8
	A	8	2000 CO CO	8	8	8	8 NC	8	8 8 8 8
	в	8	8	8	- X	8	R	8	8
	c	Ř	Ž	8	8	8	Š.	Х С	<u>Z</u>
100	<u>ר</u>	8	8	Ì	8	- X		8	-27
	E	8	8	Ŷ	8	<u> </u>	X	$\rightarrow$	8
ليستعد	<u> </u>	<u> </u>		<u>()</u>					

File: Minnow2



					ອນລາ. ເອດໜາ	H DATA SHEET	X4 Page 25 of	270 of 57
Proje Oven			EDCC	Test Dat	Int	11269/10	-1/5/1	
Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 113111 weighed: Tech: J.H.N.Y	Wt. of pan + larvae(g)/ Date weighed:	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*	
	AQ)	1.3344	1.3419	0.0075	8	0.938		
	вqд	1.3437	1.3506	0.0069	8	0.863		
D	c 93	1.3389	1.3466	0.0077	8	0.943		
	<u> </u>	1.3389	1.3461	<u>0.0012</u>	8	0.900	,	
	EQS	1.3393	1.3472	0.0079	8	0.988	· · · · · · · · · · · · · · · · · · ·	
	A 96	1.3376	1.3449	0.0073	8	0.913		
	в 97	1.3213	1.3389	0.0076	8	0.950		
32	<u>c 98</u>	1.3468	1.3533	0.0065	8	0.813		
	DQQ	1.3304	1.3373	0.0009	8	0.863		
	E LOO	1.3402	1.3472	0.0070	8	0.875		
	A IDI	1.3549	1.3637	8800.0	8	1.100		
	B 10Q	1.3546	1.3627	0.0081	8	1.013		
42	c 103	1.3513	1.3588	0.0075	8	0.938		
	D 104	1.3479	1.3542	0.0003	8	885.0		
	EIDS	1.3495	1.3569	0.0074	8	0.925		
	A 1010	1.3499	1.3577	0.0078	8	0.975		
	B 107	1.3452	1.3541	0.0089	8	1.113		
510	c 108		1.3582	0.000	8	0.963		
-0	D 109		1.3512	0.008C	8	1.000		
	E	1.3215	1.3345	0.0080	8	1.000		
	A 111	1.3413	1.3484	0.0071	8	0.888		
	B 110	1.3396		10.0088	8	1.100		
12	° 113	1.3373	1.3424	0.0103	8	1. 288		
TS	□ 11U	13411	13517	0.0076		0.950		
		1.336	13015	0.0084	X	1,050		
<b> </b> +			1.3530	0.0086	<u>X</u>	1,075	1	
	A 110		1.3397	0 000	X X	0.913	1	
100	BIM	1.3324	1.3376	<u>0.001</u>	<u>X</u>	0.963	1	
	<u>c 118</u>	12211	1.3579	DOUE	1 8	$\overline{0.812}$		
		11.2001	1. Dardi		<u>1                                    </u>	$hg_{75}$		
* Test ac	E 10C				$\Delta$		المح <u>مد معمد المحمد المحمد</u> (	P
Calcula	ited by:	tonz Illel	surviving larvae at en	Iculations checke	ed by: $\underline{\bigcirc}\underline{\bigcirc}$		1	

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		t X4270  E		Test Dat		Mean Dry wt.	Mean Dry wt.
inc.	Replicate/ Pan number	Wt. of pan(g)/ Date 1/3/11 weighed:3/11 Tech: J.B.M	Wt. of pan + larvae(g)/ Date 1 [ [ ] ] weighed: Tech:	Total wt. of larvae (g)	Original # of larvae at test initiation	of larvae (mg)	- surviving larvae (mg) Control Only*
	A 121	1.3483	1.3560	0.0083	8	1.038	
Ы	B122	1.3491	13573	0.0082	8	1.025	
2	c 123	<u>1. 3378</u>	1.3457	0.0079	8	0.988	
	0 124	1.3572	1.3653	0.0081	8	1.013	
	EBS	1.3533	1.3612	0.0079	8	0.988	
	A						
Y	В			·		·····	
	<u>s</u>	·	:				
	D		:			_	
	Е	<b></b>	· · · · · · · · · · · · · · · · · · ·				
	A		·				
	В		· ·				
	С	$\sim$					
	D			<u> </u>			-
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	A			1			-
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	B		· · · · · · · · · · · · · · · · · · ·				
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BIU-AN Project# <u>X42</u> lient <u>FIDM</u>		henni	T	IES /-1 est st est end	arted:	TER QUA Date Date	461711   1 <u>9410</u> Tim <u>5711</u> Tim	JATA e <u>1435</u> e <u>093</u> 0	< Page 27
rganism P. On	mela	<u>۲</u>			·		63116	1	8
Day/# water used	3/10	1	2	]_3	4	5	10110	L	1.º
Concentration: Co	1 1	$\frac{1}{100}$	178/	nte	58	nlo	15	10.97	<b></b>
pH	8.0	18.0	180	81	8.0	1.8.0	19		
DO(mg/l)	1.9	64.8	198	10.26	125	6.8.0	5.8.8	36	
Cond (umhos/cm)	1672	172.0	191.6	171.	1969	195.6			ļ
Alkalinitý(mg/L)	28.0	ļ		ļ			32.0		
Hardness (mg/L)	52.0			<u> </u>			40.0	•	L
Concentration: 3	72	<u> </u>				<u></u>	<del>~ . &gt;</del>		,
рH	8.5	1.8.4	1.8.	7.6	83	1.63	1.8.3	1.5	
DQ (mg/l)	8.0	6-79	617,8	197.5	183	6018	5.1.8	5.0	
Cond (umhos/cm)	280	282	1283	286	328	1324	1941		L
Concentration: 47	22	<u>,                                    </u>	<del>na :</del>				1102	105 /	
pH	8.6	1.85	18.5	1.4.4	48.4	18.4	8.4	11.	<b>  </b>
DO(mg/l)	8.0	6-19	647.8	let.S	18.2	5.1.8	278	25	
Cond (umhos/cm)	308	317	321	3110	303	363	1325	<u> </u>	<b>.</b>
Concentration:5	02		<del>~~/î ~</del> ~	<del></del>				120	
рн	8.6	186	1.86	785	285	185	185	11.00	
DO (mg/l)	8.1	680	6.18	1.5	28.2	6.7.7	5.2.7	5,4	
Cond (umhos/cm)	350	362	370	370	420	414	7447	t	
Concentration: 75	52				<u>~~</u>		377		
pH	8.7	8.06	8.0	7.8.5	8.6	185	18.5	1.1	
DO(mg/l)	8.2	680	1.27.8	10:05	1.8.1	697	5.20	5.0	
Cond (umhos/cm)	413	428	436	434	495	493	1449		
Concentration: 10	50		· · ·				林城市	<del>∂</del>	r
pH	8.7	8.9.7	8.8.7	8.6	8 84	1.8.6	2810	1.8	
DO(mg/1)	8.4	10:8.2	299	125.5	1.8.1	6.1.6	5.1.7	52	<b></b>
Cond (umhos/cm)	K19'I	512	521	1203	247	591	541		╂╌╌╌╾╢
Tech-prerenewal	RC	RC	RC	333	XX2	AH	AH	RC_	 
Tech-postrenewal		RO	RC	<u>697</u>	ATT	KH3	19H		ļ
Hardness(mg/l)	56.0		44.0		44.0		·		
Alkalinity(mg/l) ey: prerenewal/pos	98.0		1040	<u> </u>	108.0		<u> </u>	L	<u>i</u>

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rganism PON Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: Con	terol (	103 U	N-trt	d	<u>~{</u>			- A	<u>.</u>
pH	8.10	Age I.	884	135	618	583	103	11	
DO (mg/l)	79	6-8.0	6.5	5.1.2	1.0	1.5	54	53	
Cond (umhos/cm)i	516	517	530	SIS	598	584	<u>552</u>	-	
Alkalinitý(mg/Ľ)									
Hardness (mg/L)	<u> </u>	·							
encentration:	····	·				r			
рн									
DO (mg/1)									
Cond (umhos/cm)				<u> </u>					
Concentration:		<del>. / ``</del>	·····	>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		1
pH		Xh	in						
DO(mg/1)			Kh						
Cond(umhos/cm)		·	Z	R4		<u> </u>			
Concentration:	·			10	/	, <u> </u>			
рН				X	851			$\angle$	
DO (mg/1)					X			$\leq$	
Cond (umhos/cm)						<u>N_</u>			L
Concentration:	- 				·				
рН							$\mathbf{X}$		
DO (mg/l)					/		$\ge$		
Cond(umhos/cm)		<b></b>							
Concentration:				<b>.</b>					
ρH									
DO (mg/1)									
Cond (umhos/cm)		<u> </u>						=	
Tech-prerenewal	RC	RC	RC	EDA	SAM	AH	AH	RC	
Tech-postrenewal		RC	RCC	18hz	AH	Sist	AH-		
Hardness(mg/l)						<u> </u>			
Alkalinity(mg/l)					<u> </u>				<u> </u>

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# **BIO-ANALYTICAL LABORATORIES**

# REFERENCE TOXICANT TEST QUALITY DATA

Date start: 12/21/10	Date end: 12/03/10
Test organism: <u>C. dubia</u>	
Age: 224hr	
Source and ID#: BALL RIO	
Dilution Water used: Type:	1H * Jug #: 3109
	+ Units: <u>\</u> g/Lug/L
Manufacturer: ACROS	
48-hour LC 50: 1,41914	Statistical Method:^
Upper and Lower CUSUM Chart Co	
Test Number (for the year):	4
We verify that this data is true and cor	
Technician: <u>Auslie</u>	jeagler.
Statistician: <u>Un X</u>	Brigg
Quality Control Officer:	Or Brigg
*MH- Moderately hard +1	NaCl - Sodium Chloride ^P - Probit CuSO <sub>4</sub> - Copper Sulfate SK - Spearman Karber TSK -Trimmed Spearman Karber

G - Graphical

BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA 96 Conductivity 72 3-49 496 10# 1210 48 Time 1350 Time JUS 4611120 I 24 P C C 33.0 o 9 <del>0</del> C. dubio Cullest started: Date Date Started Date 23310 25 <u>ره</u> 120 120 July Нđ <u>م</u> ج 96hour\_\_\_ 96hour\_ 96hour 48 8081 24 0.5 0 24hour VM 48hour VM 72hour 24hour 335 48hour 490 72hour 24hour 94.7 48hour 90.1. 72hour άc ¢ Test ended: 96 Dissolved Oxygen 72 CABLAR CAP 5 3 48 ₽. ⊘ ļ 1 24 15.8 3 8) 0 96 # Live Organisms 72 S  $\mathcal{H}$ 20 10 ហ  $\mathcal{N}$ 2  $\mathcal{O}$ 48 E CO 0 N С  $\mathcal{O}$ S 2 V  $\mathcal{V}$ 24 prerenewal/poscrenewal 2Ñ บ  $\overline{\mathcal{O}}$ N  $\mathcal{Y}$ Ohour 1350 Ohour 1350 Ohour 24 Ń N N Tech N N S NOC ం డ א ה Test Salinity Chemistry **D**OM . Sample Description\_ ACUTE2 020809 Rev. d d d Replicate Temperature (<sup>0</sup>C):  $\mathcal{O}$ ρ  $\square$ J I C )  $\triangleleft$  $\leq$ 1 Ċ Technician: Test Dilution Project#  $\int$ Client. Time:

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ATA														
ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA			0	itγ	96									
LTT			019 ( <del>194</del> 1 R10	Conductivity	12									
QUA	350	90 80	7 J	Condv	48					330				2150
<b>JER</b>	Time <u>1350</u>	Time <mark>lya</mark> O	ਹੈ#dī		24	1440 Pr71				84308330				01501 01501
WAT	Tir	77				<del>ر</del> ع				<u>*</u>				<u> </u>
UND	~	Q	0 1		96							+		
AL /	Date 1 3 10	Date 19]2311D	96hour 96hour 96hour	μà	72									
VIV	e 9	e 19	96hour 96hour 96hour		48	-				-		·		-
SUR		Dat			24	0 8.1		·		8.08				g.D 8.1
ST	ted:	: g	ies_		0	0.8				-24				8
L TE	started:	ended:	Test Species 72hour 72hour 72hour 77hour	raen.	96									
LT'Y	Test	Test	est Spe 72hour_ 72hour_ 72hour_	d Oxy	72									
OXIC	H	۴٦		Dissolved Oxygen	48					۲. می				<u>(</u> , ×
н Н				Di	24	LS 5.2				8.3				US 22
CUT			48hour 48hour 48hour		•	ă.				<u>6</u>				4
					96						, , , , , , , , , , , , , , , , , , ,			<u></u>
RIE:				Live Organisms	72									
ATO			24hour	t Live Or	48			$\overline{\frown}$		- 0	$\overline{\cap}$	0		$\overline{\bigcirc}$
BOR					24	C	$\frac{1}{C}$		S O		2	2	ر ک	5
L LA			2 SSO		0 č	27	$\mathcal{N}$	. <u>)</u> ()	<u>२</u> ()	S	<u> </u>	<u> </u>	5	<u> </u>
BIO-ANALYTICAL LABORATORIES		X	000000 2000	Test	A D D	~								
льут			 29.9 29.9							<u> </u>				
- AN		Bep	ipti,	Replicate		4	0	ن	A	J	6	J	$  \square$	
BIO		-	escr an:	u u										
	Project#,	nt nt	Sample Description N)C/C Technician: Ohour 20 Time: Ohour 25	Temperature Test Re		6				ナ	·			ທ
	Proj	Client.	Sampl Techn Time:				 		<u></u>		<u> </u>			<u> </u>

ACUTE2 020809 Rev.

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Chemistry Tech prerenewal/postrenewal

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## APPENDIX C STATISTICAL ANALYSIS

			Ceriod	aphnia Su	rvival and	Reprod	uction Tes	t-7 Day	Survival	
Start Date:	12/29/2010		Test ID:	X4270cd			Sample ID	);	1	
End Date:	1/5/2011		Lab ID:	<b>ADEQ 880</b>	)630		Sample Ty	/pe:	EFF2-Indu	ustrial
Sample Date:	12/29/2010		Protocol:	EPAFW02	2-EPA/821	I/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia
Comments:										·
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	1.0000
75	1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000
100UV	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000

				Not			Fisher's	1-Tailed	
Conc-%	Mean	N-Mean	Resp	Resp	Total	N	Exact P	Critical	
D-Control	1.0000	1.0000	0	10	10	10			
32	1.0000	1.0000	0	10	10	10	1.0000	0.0500	
42	0.9000	0.9000	1	9	10	10	0.5000	0.0500	
56	0.8000	0.8000	2	8	10	10	0.2368	0.0500	
75	0.7000	0.7000	3	7	10	10	0.1053	0.0500	
100	0.8000	0.8000	2	8	10	10	0.2368	0.0500	
100UV	0.8000	0.8000	2	8	10	10	0.2368	0.0500	

Hypothesis Test (1-tail, 0.05)
Fisher's Exact Test indicates no significant differences
Treatments vs D-Control



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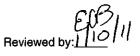
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			Ceriod	aphnia Su	rvival and	l Reprod	uction Tea	st-Repro	duction	
Start Date:	12/29/2010	)	Test ID:	X4270cd			Sample ID	):	1	
End Date:	1/5/2011		Lab ID:	<b>ADEQ 880</b>	630		Sample Ty	/pe:	EFF2-Indu	ustrial
Sample Date:	12/29/2010	)	Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	taphnia dubia
Comments:									_	
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	23.000	10.000	29.000	17.000	23.000	17.000	22.000	13.000	25.000
32	5.000	14.000	5.000	12.000	9.000	7.000	13.000	9.000	7.000	9.000
42	4.000	8.000	11.000	10.000	9.000	10.000	10.000	12.000	13.000	
56	4.000	7.000	5.000	12.000	8.000	9.000	8.000	2.000		
75	5.000	7.000	12.000	8.000	6.000	11.000	10.000			
100	3.000	7.000	6.000	3.000	7.000	4.000	6.000	4.000		
100UV	3.000	1.000	3.000	4.000	6.000	2.000	2.000	5.000		

				Transform	n: Untran	sformed		Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	19.500	1.0000	19.500	10.000	29.000	30.024	10			
*32	9.000	0.4615	9.000	5.000	14.000	35.136	10	59.50	73.00	
*42	9.667	0.4957	9.667	4.000	13.000	26.877	9	50.00	60.00	
*56	6.875	0.3526	6.875	2.000	12.000	45.626	8	37.00	49.00	
*75	8.429	0.4322	8.429	5.000	12.000	31.283	7	30.50	38.00	
*100	5.000	0.2564	5.000	3.000	7.000	33.806	8	36.00	49.00	
*100UV	3.250	0.1667	3.250	1.000	6.000	51.355	8	36.00	49.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.52589	0.895	-0.0659	1.18948
Bartlett's Test indicates unequal variances (p = 6.36E-03)	17.9495	16.8119		
Hypothesis Test (1-tail, 0.05)				
Wilcoxon Rank Sum Test indicates significant differences				

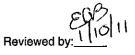
Treatments vs D-Control



			Ceriod	aphnia Su	rvival an	d Reprod	uction Tes	st-Repro	duction		
Start Date:	12/29/2010		Test ID:	X4270cd			Sample ID	):	1		
End Date:	1/5/2011		Lab ID:	<b>ADEQ 880</b>	0630		Sample Ty	/pe:	EFF2-Indu	ustrial	
Sample Date:	12/29/2010		Protocol:	EPAFW02	2-EPA/82	I/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia	
Comments:							-				
Conc-%	1	2	3	4	5	6	7	8	9	10	
D-Control	16.000	23.000	10.000	29.000	17.000	23.000	17.000	22.000	13.000	25.000	
32	5.000	14.000	5.000	12.000	9.000	7.000	13.000	9.000	7.000	9.000	
42	4.000	0.000	8.000	11.000	10.000	9.000	10.000	10.000	12.000	13.000	
56	4.000	7.000	5.000	12.000	8.000	3.000	9.000	8.000	4.000	2.000	
75	5.000	0.000	7.000	12.000	5.000	8.000	6.000	2.000	11.000	10.000	
100	3.000	7.000	6.000	3.000	7.000	3.000	4.000	6.000	4.000	2.000	
100UV	3.000	3.000	1.000	3.000	4.000	6.000	2.000	1.000	2.000	5.000	

				Transform	n: Untran	sformed		Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	_
D-Control	19.500	1.0000	19.500	10.000	29.000	30.024	10			
*32	9.000	0.4615	9.000	5.000	14.000	35.136	10	59.50	74.00	
*42	8.700	0.4462	8.700	0.000	13.000	45.025	10	60.00	74.00	
*56	6.200	0.3179	6.200	2.000	12.000	50.320	10	56.00	74.00	
*75	6.600	0.3385	6.600	0.000	12.000	58.114	10	57.50	74.00	
*100	4.500	0.2308	4.500	2.000	7.000	40.909	10	55.00	74.00	
*100UV	3.000	0.1538	3.000	1.000	6.000	54.433	10	55.00	74.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.64119	0.895	-0.2282	0.69245
Bartlett's Test indicates unequal variances (p = 4.91E-03)	18.5942	16.8119		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				
Treatments vs D-Control				



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			Ceriod	aphnia Su	rvival and	Reprod	uction Tes	st-Repro	duction		
Start Date:	12/29/2010	)	Test ID:	X4270cd			Sample ID:		1		
End Date:	1/5/2011		Lab ID:	ADEQ 880	)630		Sample Ty	/pe:	EFF2-Indu	ustrial	
Sample Date:	12/29/2010	)	Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia	
Comments:											
Conc-%	1	2	3	4	5	6	7_	8	9	10	
D-Control	16.000	23.000	10.000	29.000	17.000	23.000	17.000	22.000	13.000	25.000	
32	5.000	14.000	5.000	12.000	9.000	7.000	13.000	9.000	7.000	9.000	
42	4.000	0.000	8.000	11.000	10.000	9.000	10.000	10.000	12.000	13.000	
56	4.000	7.000	5.000	12.000	8.000	3.000	9.000	8.000	4.000	2.000	
75	5.000	0.000	7.000	12.000	5.000	8.000	6.000	2.000	11.000	10.000	
100	3.000	7.000	6.000	3.000	7.000	3.000	4.000	6.000	4.000	2.000	
100UV	3.000	3.000	1.000	3.000	4.000	6.000	2.000	1.000	2.000	5.000	

				Transform	n: Untran	sformed			1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	_
D-Control	19.500	1.0000	19.500	10.000	29.000	30.024	10				
*32	9.000	0.4615	9.000	5.000	14.000	35.136	10	6.150	2.287	3.904	
*42	8.700	0.4462	8.700	0.000	13.000	45.025	10	6.325	2.287	3.904	
*56	6.200	0.3179	6.200	2.000	12.000	50.320	10	7.790	2.287	3.904	
*75	6.600	0.3385	6.600	0.000	12.000	58.114	10	7.555	2.287	3.904	
*100	4.500	0.2308	4.500	2.000	7.000	40.909	10	8.785	2.287	3.904	
100UV	3.000	0.1538	3.000	1.000	6.000	54.433	10				

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates nor	mal distribu	tion $(p > 0)$	).05)	_	0.5679		0.895		-0.2283	0.35428
Bartlett's Test indicates equal var			-		11.4201/	$\sim$	15.0863			
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDú	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	<32	32			3.90423	0.20022	288.297	14.5759	3.8E-11	5, 54
Treatments vs D-Control						$\searrow$	/			



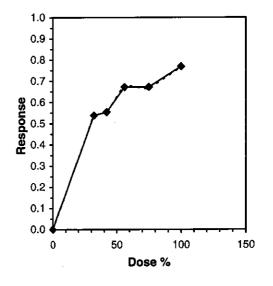
			Ceriod	aphnia Su	rvival and	l Reprod	uction Tes	st-Repro	duction	
Start Date:	12/29/2010	)	Test ID:	X4270cd			Sample ID:		1	
End Date:	1/5/2011		Lab ID:	ADEQ 880	0630		Sample Ty	/pe:	EFF2-Indu	ustrial
Sample Date:	12/29/2010	5	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia
Comments:										
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	23.000	10.000	29.000	17.000	23.000	17.000	22.000	13.000	25.000
32	5.000	14.000	5.000	12.000	9.000	7.000	13.000	9.000	7.000	9.000
42	4.000	0.000	8.000	11.000	10.000	9.000	10.000	10.000	12.000	13.000
56	4.000	7.000	5.000	12.000	8.000	3.000	9.000	8.000	4.000	2.000
75	5.000	0.000	7.000	12.000	5.000	8.000	6.000	2.000	11.000	10.000
100	3.000	7.000	6.000	3.000	7.000	3.000	4.000	6.000	4.000	2.000
100UV	3.000	3.000	1.000	3.000	4.000	6.000	2.000	1.000	2.000	5.000

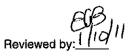
				Transforr	n: Untran	sformed		lsot	onic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	19,500	1.0000	19.500	10.000	29.000	30.024	10	19.500	1.0000
32	9.000	0.4615	9.000	5.000	14.000	35.136	10	9.000	0.4615
42	8.700	0.4462	8.700	0.000	13.000	45.025	10	8.700	0.4462
56	6.200	0.3179	6.200	2.000	12.000	50.320	10	6.400	0.3282
75	6.600	0.3385	6.600	0.000	12.000	58.114	10	6.400	0.3282
100	4.500	0.2308	4.500	2.000	7.000	40.909	10	4.500	0.2308
100UV	3.000	0.1538	3.000	1.000	6.000	54.433	10		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.64119	0.895	-0.2282	0.69245
Bartlett's Test indicates unequal variances (p = 4.91E-03)	18.5942	16.8119		
	tion (200 Resamples)			

				Linea	ir Interpola	ίτιο
Point	%	SD	95%	CL	Skew	
IC05*	2.971	0.421	2.494	4.215	1.3713	
IC10*	5.943	0.842	4.987	8.431	1.3713	
IC15*	8.914	1.262	7.481	12.646	1.3713	
IC20*	11.886-	1.683	9.975	16.861	1.3713	
IC25*	14.857	2.104	12.468	21.077	1.3713	
IC40*	23.771	3.706	19.949	33.825	2.1858	
IC50*	29.714	6.788	24.937	48.228	1.3865	

\* indicates IC estimate less than the lowest concentration





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								<u>,                                    </u>
······			La	rval Fish C	arowth and S	urvival Test-7 Day Su	rvival	
Start Date:	12/29/2010	)	Test ID:	X4270pp		Sample ID:	1	
End Date:	1/5/2011		Lab ID:	ADEQ 880	0630	Sample Type:	EFF2-Industrial	
Sample Date:	12/28/2010	)	Protocol:	EPAFW02	2-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	0.8750	1.0000			
56	1.0000	1.0000	1.0000	1.0000	1.0000			
75	0.8750	1.0000	1.0000	1.0000	1.0000			
100	1.0000	1.0000	1.0000	0.8750	1.0000			
100UV	1.0000	1.0000	1.0000	1.0000	1.0000			

			Tra	ansform:	Arcsin So	quare Root	t	Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5			
32	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00	
42	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00	
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	
75	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00	
100	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00	
100UV	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.5996	0.934	-2.0743	3.30824
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				

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			La	rval Fish (	arowth and	Survival Test-7	Day Growth		
Start Date: End Date: Sample Date:	12/29/2010 1/5/2011 12/28/2010		Test ID: Lab ID:	X4270pp ADEQ 880	630	Sample II Sample T R-02-01 Test Spec	D: ype: EF	1 F2-Industrial -Pimephales promelas	
Comments: Conc-%	1	2	3	4	5				
D-Control	0.9375	0.8625	0.9625	0.9000	0.9875				
32	0.9125	0.9500	0.8125	0.8625	0.8750				
42	1.1000	1.0125	0.9375	0.7875	0.9250				
56	0.9750	1.1125	0.9625	1.0000	1.0000				
75	0.8875	1.1000	1.2875	0.9500	1.0500				
100	1.0750	0.9125	0.9625	0.8125	0.9750				
100UV	1.0375	1.0250	0.9875	1.0125	0.9875				

		_		Transform	n: Untran	sformed		-	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	<b>Critical</b>	MSD
D-Control	0.9300	1.0000	0.9300	0.8625	0.9875	5.343	5			
32	0.8825	0.9489	0.8825	0.8125	0.9500	5.891	5	0.843	2.409	0.1357
42	0.9525	1.0242	0.9525	0.7875	1.1000	12.149	5	-0.399	2.409	0.1357
56	1.0100	1.0860	1.0100	0.9625	1.1125	5.897	5	-1.420	2.409	0.1357
75	1.0550	1.1344	1.0550	0.8875	1.2875	14.622	5	-2.218	2.409	0.1357
100	0.9475	1.0188	0.9475	0.8125	1.0750	10.108	5	-0.311	2.409	0.1357
100UV	1.0100	1.0860	1.0100	0.9875	1.0375	2.214	5	-1.420	2.409	0.1357

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.95668		0.934		0.36014	1.52523
Bartlett's Test indicates equal variances (p = 0.02)	14.7981		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences	0.13574	0.14595	0.01708	0.00794	0.07867	6, 28
Treatments vs D-Control						



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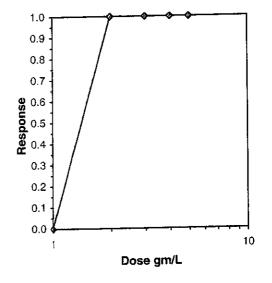
				Dapt	inid Acute Test-	18 Hr Survival	
Start Date: End Date: Sample Date: Comments:	12/21/2010 12/23/2010 12/21/2010	)	Lab ID:	122110cd NELAP 019		Sample ID: Sample Type:	REF-Ref Toxicant NACL-Sodium chloride CD-Ceriodaphnia dubia
Conc-gm/L	1	2	3	4			
D-Control	1.0000	1.0000	1.0000	1.0000			
1	1.0000	1.0000	1.0000	1.0000			
2	0.0000	0.0000	0.0000	0.0000			
3		0.0000	0.0000	0.0000			
4		0.0000	0.0000	0.0000			
5		0.0000	0.0000	0.0000			

								Number	Total
			Tra	anstorm:	Arcsin Sc	uare Root		Resp	Number
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	<u>CV%</u>	<u>N</u>	<u>Resp</u>	20
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	
1	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	
1	0.0000		0.2255	0.2255	0.2255	0.000	4	20	
2	• • • • • •		0.2255	0.2255	0.2255	0.000	4	20	
3	0.0000			0.2255	0.2255	0.000	4	20	20
4	0.0000		0.2255	•		0.000	4	20	20
5	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4		

A Marca Table	Statistic	Critical	Skew Kurt
Auxiliary Tests Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.818	
Equality of variance cannot be confirmed	al Method		

Equa	uity of varia	ance canno	Graphical Method	
Trir	m Level	EC50		-
	0.0%	1.4142		

1.4142

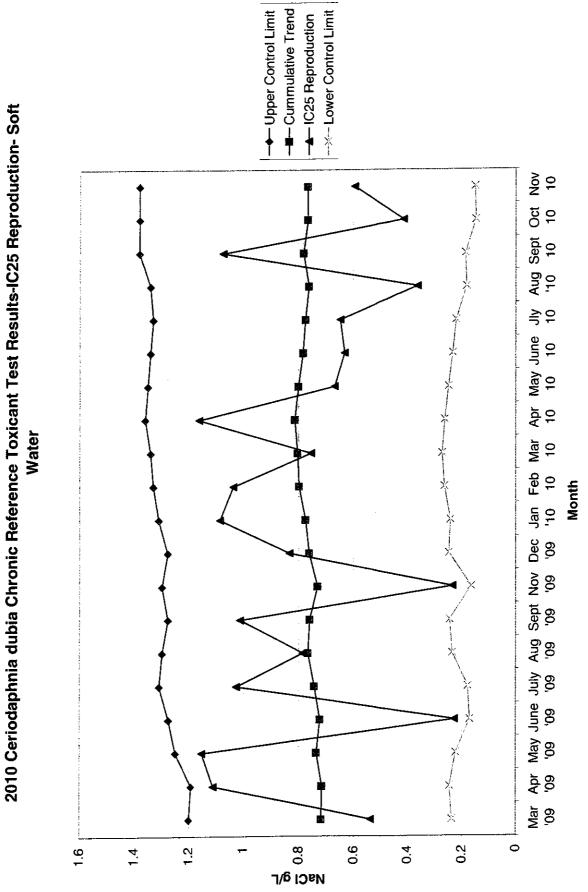


# APPENDIX D QUALITY ASSURANCE CHARTS

		Bi	<b>Bio-Analytical Laboratories'</b>	al Laborat		2010 Results of the Monthly Chronic Reference Toxicant Tests	of the Mon	thly Chron	nic Referen	ice Toxicai	nt Tests		
Month Start-End	Jan. 1/5-12/10 14:10- 10:25	Feb. 2/2-9/10 10:50- 13:35	Mar. 3/11-18/10 09:50- 11:00	Apr. 4/22-29/10 10:00- 10:20	May 5/4-11/10 15:15- 13:30	June 6/29-7/6 14:10- 13:05	July 7/6-13 14:40- 10:55	Aug 8/3-10 10:50- 12:20	Sept. 9/7-14 14:20- 12:35	Oct 10/6-13 10:05- 13:15	Nov 11/3-10 09:25- 09:15	Dec 12/29-1/2	
				Ceriodap	hnia dubia	Ceriodaphnia dubia (in soft reconstituted water)	constitute	d water)					
NOEC survival	0.1	1.0	1.0	1.0	0.5	1.0	1.0	0.5	1.0	0.5	1.0	+	
IC25 repro.	1.081	1.0361	0.7545	1.16	0.6680	0.6316	0.6474	0.3603	1.073	0.4111	0.5939	+	
PMSD repro.	15.15	18.39	20.03	22.8	32.8	22.8	25.5	24.5	18.2	34.9	19.6	+	
Avg. repro. control	16.8	21.9	19.4	23.6	18.6	27.0	23.0	24.1	25.6	21.7	35.9	+	
					Fat	Fathead minnow	MOI						
Month Start-End	Jan. 1/5-12/10 13:55- 09:50	Jan 1/11-18/10 11:05- 09:37	Feb. 2/9-16/10 15:30- 09:00	Mar. 3/8-15/10 10:10- 08:50	Apr. 4/7-14/10 10:05- 09:45	May 5/4-11/10 15:50- 10:45	June 6/1-/8/10 16:05- 09:20	July 7/20-27 16:00- 09:35	Aug 8/2-9 12:30- 08:40	Sept 9/10-17 10:25- 9:50	Oct 10/5-12 15:45- 08:55	Nov 11/1-8 13:25- 09:05	Dec 12/29-1/5 10:35- 08:25
NOEC survival	1.25	1.25	2.5	1.25	1.25	1.25	1.25	2.5	1.25	1.25	2.5	1.25	0.0
IC25 growth	1.13	1.34	1.87	1.62	1.24	1.64	2.00	1.74	1.63	1.47	1.77	1.59	0.1645
PMSD growth	19.3	12.8	24.2	27.0	27.8	21.8	38.0	22.0	25.5	31.9	23.9	22.8	5.6
Avg. growth control	0.805	0.738	0.734	1.0004	0.700	0.905	0.613	0.610	0.728	0.592	0.425	0.504	0.570
Reference +Test inv	e toxicant is alid. Not enc	Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month. +Test invalid. Not enough time left in the month to conduct a retest.	m chloride () t in the month	VaCI). *In-hoi to conduct a	use organism retest.	s not used thi:	s month.						

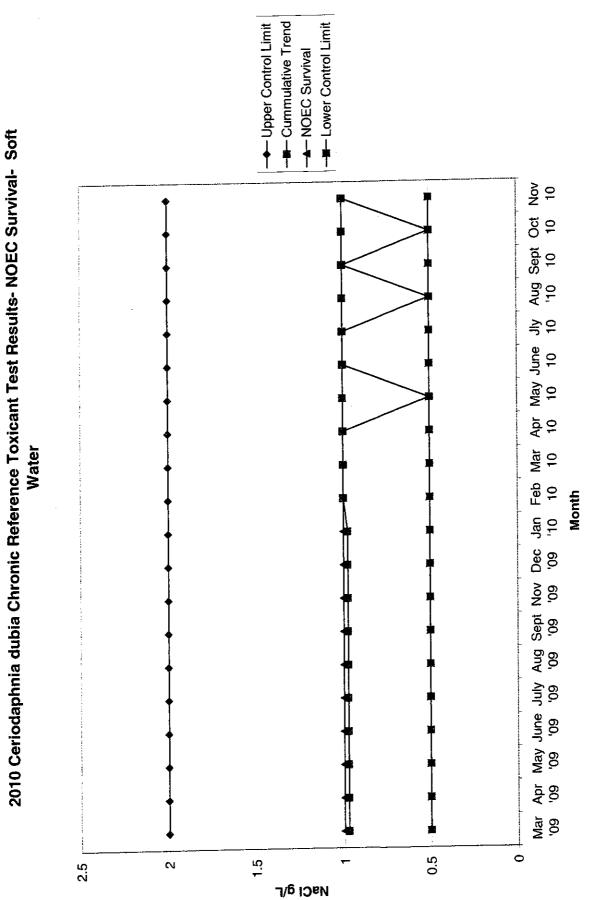
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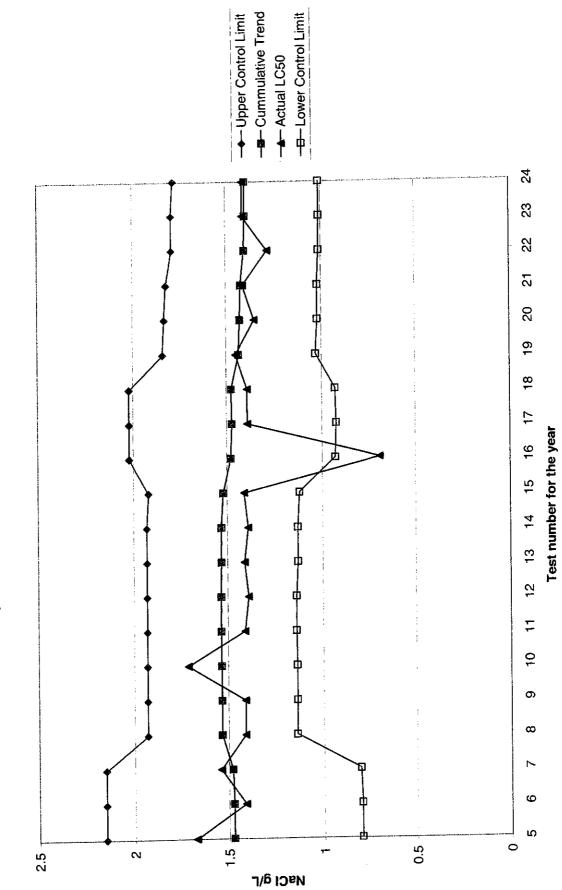


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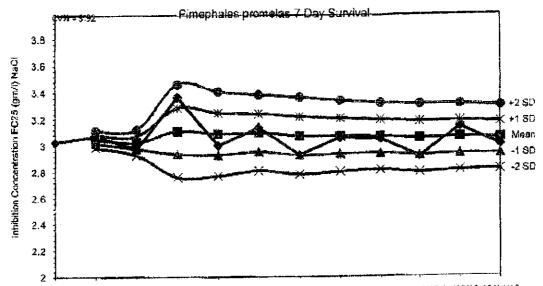
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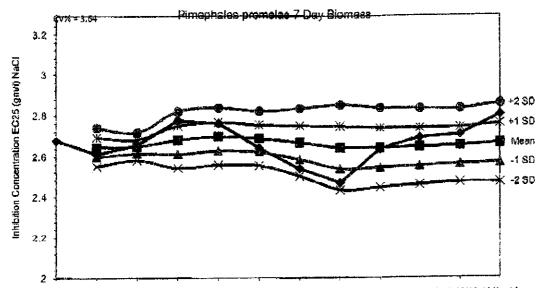
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<sup>12/15/09 02/23/10 03/12/10 04/20/10 05/25/10 05/22/10 07/20/10 08/24/10 09/21/10 10/19/10 11/16/10 12/14/10</sup> 

Dates	Values	Mean	-1 SD	-2 \$D	+1 SD	+2 SD
12/15/09	3.0263					
02/23/10	3.0727	3.0495	3.0167	2,9839	3.0823	3.1152
03/12/10	2,9744	3.0245	2.9753	2.9260	3.0737	3,1229
04/20/10	3,3646	3,1095	2.9348	2,7600	3.2842	3.4590
05/25/10	3.0000	3.0876	2.9235	2,7695	3,2466	3.4057
06/22/10	3.1346	3.0954	2,9519	2.8083	3.2390	3.3825
07/20/10	2,9286	3 0716	2.9262	2,7807	3,2170	3.3625
08/24/10	3.0588	3.0700	2.9363	2,8006	3.2047	3,3394
03/24/10	3.0469	3.0674	2.9412	2.8149	3,1937	3.3199
10/19/10	2.9154	3.0522	2.9238	2,7955	3,1808	3.3090
	3,1346	3.0597	2.9354	2.8111	3,1840	3.3063
11/16/10 12/14/10	3.0000	3.0547	2.9350	2.8152	3.1745	3,2943



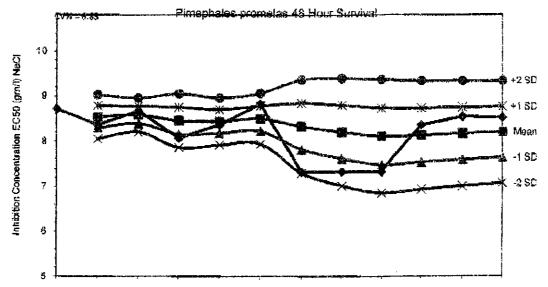
12/15/09 02/23/10 03/12/10 04/20/10 05/25/10 05/22/10 07/20/10 08/24/10 09/21/10 10/19/10 11/16/10 12/14/10

Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/15/09	2.6794					
02/23/10	2.6118	2.6456	2.5978	2.5500	2.6934	2.7412
03/12/10	2.6576	2.6496	2,6151	2.5806	2.6841	2.7186
04/20/10	2.7766	2.6814	2.6119	2.5424	2.7508	2.8203
05/25/10	2.7824	2.6976	2.6273	2.5571	2.7678	2.8350
06/22/10	2.6408	2.6881	2.6212	2.5542	2.7551	2.8220
07/20/10	2,5373	2.6666	2.5830	2,4994	2.7501	2.8337
08/24/10	2.4666	2.6418	2,5368	2,4319	2,7464	2.8512
09/21/10	2.6345	2.8408	2,5427	2.4446	2.7389	2.8369
10/19/10	2.6907	2.6458	2.5520	2.4682	2,7396	2.8334
11/16/10	2.7050	2.6512	2,5604	2.4696	2,7419	2.8327
12/14/10	2.8019	2.6637	2.5668	2.4700	2.7606	2.8574

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12/15/09 02/23/10 03/12/10 04/20/10 05/25/10 08/22/10 07/20/10 08/24/10 09/21/10 10/19/10 11/16/10 12/14/10

Dates	Values	Mean	1 SD	-2 SD	+1 SD	+2 30
12/15/09	8.7083					
02/23/10	8.3636	8.5360	8.2922	8.0485	8.7797	9.0235
03/12/10	8.6667	8.5795	8.3914	8.2033	8.7677	8.9558
04/20/10	8.0708	8,4524	8.1552	7.8581	8.7495	9.0466
05/25/10	8.3636	8.4346	8.1743	7.9139	8.6950	8.9554
06/22/10	8.8200	8.4989	8.2178	7.9368	8.7799	9.0609
07/20/10	7.3239	8.3310	7.8182	7.3053	8.8439	9.3567
08/24/10	7.3333	8.2063	7.6148	7.0233	8.7978	9.3893
09/21/10	7.3333	8.1093	7.4842	<b>6.8590</b>	8.7345	9.3696
10/19/10	8,3636	8.1347	7.5399	<del>8</del> .9450	8.7296	9.3245
11/16/10	8.5435	8.1719	7.5943	7.0166	8.7495	9.3272
12/14/10	8.5217	8.2010	7.6411	7.0812	8.7610	9.3209

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# APPENDIX E AGENCY FORMS

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## SUMMARY REPORTING FORMS CHRONIC BIOMONITORING

# Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Che	mical	N	NPDES No.: AR0000752								
Outfall 001		AI	AFIN: 70-00040								
	Time	Date		Time	Date						
<b>Composite 1 Collected Fro</b>	m 0830	12/28/10	То	0830	12/29/10						
<b>Composite 2 Collected Fro</b>	m 0745	12/30/10	То	0745	12/31/10						
<b>Composite 3 Collected Fro</b>	m 0730	01/02/11	То	0730	01/03/11						
Test initiated:	1445	am/pm		12/29/10	date						
Test terminated:	1010	am/pm		01/05/11	date						
Dilution water used:	Receiv	ving X	]	Reconstituted							
PERCENT SURVIVAL											

Time of Readi	ng					Perc	ent	Effluent			
		0		32		42		56		75	100
24h		100		100		90		100		90	100
48h		100		100		90		100		90	100
End of test		100	100			90		80		70	80
NU	J <b>MBE</b> F	R OF Y	<u>'OUN</u>	G PRO	DUC	ED PER	FF	MALE @	9 E	END OF T	EST
Rep	0		32		42		56		7	5	100
A	16		5		4		4		5		3
В	23		14		D		7		Г	)	7
С	10		5	5 8		5		7			6
D	29		12		11		12	12		2	3
E	17		9		10		8		E	95	7
F	23		7		9		D3	i	8		D3
G	17		13		10		9	-	6		4
н	22		9		10		8		Г	02	6
I	13		7		12		D4		1	1	4
J	25		9		13		2		1	0	D2
Surv. Mean	19.5		9.0		9.7		6.9	)	8	.4	5.0
Total Mean	19.5		9.0		8.7		6.2	2	6	.6	4.5
CV%*	30.02		35.14		26.8	8	45.	.63	3	1.28	33.81

\*coefficient of variation = standard deviation x 100/mean. D=dead adult PMSD = 20.0%

#### <u>Ceriodaphnia dubia</u> 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 DILUT	CION (100%):	YES	Х	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 DILUT	ION (100%):	Χ	YES	NO
b) <sup>1</sup> / <sub>2</sub> 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

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Cerlodaphnla dubia</u> Chemical Parameters Chart

Permittee: El Dorad NPDES No.: AR000 Contact: David Sari Analyst: Haughton,	0752/ AFIN ain	1 70-00040						Sample N		: 12/31/10	ר י י י	řime: 083 řime: 074 řime: 073 řime: 144 řime: 101	5 0 5				
Dilution:	0	Day:							Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.9	24.6	24.6	24.4	24.5	24.7	24.7		Temp (C)	24.9	24.6	24.6	24.4	24.5	24.7	24.7	
DO Initial	7.7	7.8	7.5	8.3	7.3	7.6	7.6		DO Initial	7.6	7.6	7.4	8.1	7.4	7.6	7.8	
DO Final	7.8	7.8	7.6	8.5	8.0	7.8	1		DO Final	8.0	7.8	7.5	8.2	7.7	7.7		
pH Initial	8.0	8.1	8.0	8.1	7.9	7.9	7.9		pH Initial	8.1	8,2	8,2	8.2	8.2	8.2	8.2	
pH Final	8.0	8.0	8.1	8.0	8.0	7.9			pH Final	8.6	8.6	8,5	8.5	8.5	8.5		
Alkalinity	28.0		<u> </u>		1	32.0			Alkalinity					1		<u> </u>	·
Hardness	52.0					40.0			Hardness	1					<u> </u>		
Conductivity	172.0	171.6	171.1	196.9	195.6	169.0			Conductivity	362	370	370	420	414	377		
Chlorine	<.01					<.01			Chlorine								
Dilution: 32		Day							Dilution: 7	5	1	) ay		••••	•		
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp(C)	24.9	24.6	24.6	24.4	24.5	24.7	24.7		Temp ( C )	24.9	24.6	24.6	24.4	24.5	24.7	24.7	
DO Initial	7.7	7.7	7.5	8.2	7,4	7.6	7.9		DO Initial	7.6	7.6	7.4	8.1	7.4	7.6	7.9	
DO Final	7.9	7.8	7.5	8.3	7.8	7.8			DO Final	8.0	7.8	7.5	8.1	7.7	7.7		
pH Initial	8.0	8.1	8.1	8.1	8.1	8.0	8.1		pH Initial	8.2	8.2	8.2	8.2	8.2	8.2	8.2	
pH Final	8.4	8.4	8.4	8.3	8.3	8.3			pH Final	8.6	8.6	8.5	8.6	8.5	8.5		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	282	283	286	328	324	291			Conductivity	428	436	434	495	493	449		
Chlorine									Chlorine								
Dilution:	42		1	Day					Dilution: 10	00			Da	y			
	ı	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.6	24.6	24.4	24.6	24,7	24.7		Temp ( C )	24.9	24.6	24.6	24.4	24.6	24.7	24.7	
DO Initial	7.6	7.7	7.4	8.2	7.4	7,6	7.8		<b>DO Initial</b>	7.6	7.6	7.4	8.0	7.4	7.6	7.8	
DO Final	7.9	7.8	7.5	8.2	7.8	7.8			DO Final	8.2	7.9	7.5	8.1	7.6	7.7		
pH Initial	8.1	8.1	8.1	8.1	8.1	8.1	8.1		pH Initiai	8.2	8,3	8.3	8.3	8.3	8.3	8.3	
øH Finat	8.5	8.5	8.4	8.4	8,4	8.4			pH Final	8,7	8.7	8.6	8.6	8.6	8.6		
Alkalinity									Aikalinity	98.0	104.0		108.0				
Hardness									Hardness	\$6.0	44.0		44,0				
Conductivity	317	321	316	363	363	325			Conductivity	512	521	523	597	591	541		
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee:	Permittee: El Dorado Chemical Outfall 001							NPDES No.: AR0000752 AFIN: 70-00040				2		
Composite Composite Composite	5	12/28/10 To 12/30/10 To			Tir 083 074 073	30 45		Date 12/2 12/3 01/0	9/10 1/10					
Test initiated:1435 am/pm12/29/10dateTest terminated:0930 am/pm01/05/11dateDilution water used:ReceivingXReconstitutedDATA TABLE FOR SURVIVAL														
Effluent Conc. % Percent Survival in Replicate Chambers Mean Percent S								rcent Su	rvival	-	CV%*			
		A	В	с	D		E		24h	4	8h	7 day	'S	
0		100	100	100	00 100		100	100		100		100		0.00
32		100	100	100	87.5		100		100	1	00	97.5		6.06
42		100	100	100	87.5		100		100	1	00	97.5		6.06
56		100	100	100	100		100		100	100		100		0.00
75		87.5	100	100	100 100		100		100 100		00	97.5		6.06
100		100	100	100	100 87.5 100			100 100 97.5					6.06	
	r		DA	ТА ТАВ	LE	FOR	GRO	WI	ſH					
Effluent Conc. %		Averag	ge Dry Weigh	ıt in milligr	ams i	in rep	licate ch	am	bers		Mean Weigh	•	CV	/*
	A		В	C		D		E	2					
0	0.938		0.863	0.963		0.90	0	0	.988		0.930		5.3	4
32	0.913		0.950	0.813		0.86	3	0	.875		0.883		5.8	19
42	1.100	.100 1.013		0.938	0.938		8	0	.925		0.953		12	.15
56	0.975	0.975 1.113		0.963	0.963		0	1	.000		1.010		5.90	
75	0.888		1.100	1.288	1.288 0.9		0	1.	.050		1.055		14.62	
100 *coefficient	1.075		0.913	0.963		0.81		0.	.975		0.948		10.	.11

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

**PMSD** = 14.6%

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

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

Is the mean survival at 7 days significantly different (p=.05) than the control										
survival for the % effluent corre	sponding to:									
a) LOW FLOW OR CRITICAL DILUT	FION (100 %)	YES	Х	NO						
b) <sup>1</sup> / <sub>2</sub> LOW FLOW DILUTION	(N/A %)	YES		NO						

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

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

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

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

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

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

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

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

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

\_

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Pimephales promelas</u> Chemical Parameters Chart

Permittee: El Dorado NPDES No.: AR0000 Contact: David Sarta Analyst: Haughton, 2	752/ AFIN in	70-00040						Sample No		12/31/10	T T T	me: 0830 me: 0745 me: 0730 me: 1435 me: 0930					
Dilution: 0	•	Day:							Dilution: 56		1	Dayı					
	1	2	3	4	5	6	7	Comments		j	2	3	4	5	6	7	Comments
Temp(C)	25.0	25.2	24,7	24.7	24.8	24.9	24.5		Temp ( C )	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initial	6.6	7.0	6.2	7.2	6.1	5.8	5.6		DO Initial	6.6	6.9	6.2	7.0	6.0	5.5	5.4	
DO Final	7.8	7.8	7.6	8.5	8.0	7.8			DO Final	8.0	7.8	7.5	8.2	7.7	7.7		
pH Initial	7.7	7.8	7.6	7,8	7.6	7.5	7.7		pH Initial	7.9	7.9	7.8	7.9	7.7	7.6	7.6	
pH Final	8.0	8.0	8.1	8.0	8.0	7.9			pH Final	8.6	8.6	8.5	8.5	8.5	8.5		
Alkalinity	28.0					32.0			Alkalinity								
Hardness	52.0					40.0			Hardness								
Conductivity	172.0	171.6	171.1	196.9	195.6	169.0			Conductivity	362	370	370	420	414	377		
Chlorine	<.01					<.01			Chlorine								
Dilution: 32		Day							Dilution: 7:	5	D	ay					
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp(C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5		Temp(C)	25.0	25.2	24,7	24.7	24.8	24.9	24.5	
DO Initial	6.7	6.9	6.2	7.2	6.0	5.7	5.6		BO Initial	6.7	7.2	6.0	7.0	6.0	5.5	5.6	
DO Final	7.9	7.8	7.5	8.3	7.8	7.8		· · · · · · · · · · · · · · · · · · ·	DO Final	8.0	7.8	7,5	8.1	7.7	7.7		
p <b>#f Ini</b> tial	7.8	7.9	7.6	7.8	7.6	7,6	7.5		pH Initial	8.0	8.0	7.8	8.0	7.8	7.6	7.7	
pH Final	8.4	8.4	8.4	8.3	8.3	8.3			pH Final	8.6	8.6	8,5	8.6	8.5	8.5		
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity	282	283	286	328	324	291			Conductivity	428	436	434	495	493	449		
Chlorine									Chlorine								
Dilution: 42 Day						Dilution: 100 Day											
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	25.0	25.2	24.7	24.7	24.8	24.9	24.5		Temp(C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initlal	6.7	6.9	6.1	7.1	5.9	5.6	5.5		DO Initial	6.7	7.0	9.1	7.0	6.0	5.5	5.3	
DO Final	7.9	7.8	7.5	8.2	7.8	7.8			DO Final	8.2	7.9	7.5	8.1	7.6	7.7		
pH Initial	7.8	7.9	7.7	7.9	7.6	7.6	7.5		pH Initial	8,0	8.1	8.0	8.1	7,8	7.7	7.8	
pH Final	8.5	8.5	8.4	8.4	8.4	8.4			pH Final	8.7	8.7	8.6	8.6	8.6	8.6		
Alkelinity									Alkelinity	98,0	104.0		108.0	<u> </u>		L	
Hardness									Hardness	56.0	44.0		44.0				
Conductivity	317	321	316	363	363	325			Conductivity	512	521	523	597	591	541	L	
Chlorine									Chlorine	<.01	<.01		<.01			L	

.

# 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

ElDorado Chemical **Client**: Project#: \_\_\_\_\_\_X4270\_\_\_\_\_

Proofed First Draft:		Date:	
Proofed Final Draft	in St. Beigg	Date: 1/17/11	

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.

Date: 1/17/11

Quality Assurance Officer

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



Bio-Analytical Laboratories (BAL) ADEQ Certificate #88-0630 Project X4285

## **Bio-Analytical Laboratories' Executive Summary**

Permittee:	El Dorado Chemical Company 4500 Northwest Avenue El Dorado, AR 71731
Project #:	X4285
Outfall:	001
Permit #:	AR0000752/ AFIN #70-00040
Contact:	David Sartain
<b>Test Dates:</b>	January 18 - 25, 2011
Test Type:	<ul> <li>Chronic Static Renewal Survival and Reproduction Test using <i>Ceriodaphnia dubia</i> (EPA Method 1002.0).</li> <li>Chronic Static Renewal Survival and Growth Test using <i>Pimephales promelas</i> (EPA Method 1000.0).</li> </ul>

#### **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 - 28.50%.

# Note: The UV treated 100% dilution showed no lethal effects, but did show nonlethal effects.

## 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 TOP6C - 18.33%

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

This report contains a total of 60 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 NELAC and ADEQ. The chemical data contained in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

# **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

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

AT

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

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

EPA Methods 1000.0 and 1002.0

Project X4285

Test Dates: January 18 - 25, 2011

Report Date: February 22, 2011

Prepared for: David Sartain 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

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#### **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 dilution water hardness prior to test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were run a minimum of once monthly in order to document test organism sensitivity. Monthly chronic reference toxicant tests, using NaCl, were also conducted in order to document organism sensitivity and testing technique.

#### 2.3 Dilution Water

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

#### **2.4 Test Concentrations**

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

#### 2.5 Sample Collection

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on January 17, 19 and 21, 2011. Upon collection and completion of each composite, the samples were chilled to 4<sup>o</sup> 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  $25\pm1^{0}$  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. The effluent was filtered through a 60 micron plankton net in order to remove any organisms that might interfere with the tests. It was also 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  $25\pm1^{0}$  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  $25\pm1^{0}$  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.

#### 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 and the growth data was analyzed using Dunnett's Test, a parametric test. The IC<sub>25</sub> value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC<sub>50</sub> values (that concentration of a substance which is lethal to 50 percent of the test organisms after continuous exposure for the duration of the test) in the reference toxicant tests 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. Eighty percent survival occurred in the control and in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 20.5 and 5.7, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and zero percent effluent, respectively (p=.05). Eighty percent survival and an average of 5.3 neonates was noted in the 100 percent UV treated dilution.

The fathead minnow test results can be found in Table 2. Ninety percent survival occurred in the control and 100 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.630 milligram (mg), while the average in the critical dilution was 0.655 mg. The NOEC for survival and growth in this test was 100 percent effluent. Ninety-five percent survival and an average weight of 0.680 mg was noted in the UV treated dilution.

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	80.0		23.9	20.5	
32.0	90.0		12.8	11.5	*
42.0	90.0		11.7	10.5	*
56.0	80.0		8.9	7.1	*
75.0	+		+	+	
100.0	80.0		6.9	5.7	*
100.0 UV	80.0		6.6	5.3	*

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

\*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.

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	90.0		0.630/0.700+	
32.0	100.0		0.565	
42.0	92.5		0.578	
56.0	90.0		0.620	
75.0	90.0		0.648	
100.0	100.0		0.655	
100.0 UV	95.0		0.680	

# Table 2: Results of the Chronic Definitive Fathead Minnow Test

\*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 48-hour reference toxicant test results can be found in Table 3 below. The acute test results indicate that the test organisms were within the respective sensitivity range. The monthly chronic reference toxicant tests also showed those test organisms to be within the respective sensitivity range. The graphs of the results of the acute and chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC <sub>50</sub>	Upper and Lower CUSUM Chart Limits
Ceriodaphnia dubia	1/4/11 - 1/6/11 13:45 - 14:35 hours	1.30	1.75 - 1.01
Pimephales promelas	1/7/11 - 1/9/11 9:25 - 8:45 hours	6.59	7.91 - 4.02

# Table 3: Results of the 48-hour Reference Toxicant Tests - g/L

#### 4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on January 17, 19 and 21, 2011 were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after seven of exposure (p=.05). Nonlethal effects (i.e., lack of reproduction or growth) were noted in the critical dilution in the *Ceriodaphnia* test but not in the fathead minnow test (p=.05). Treating the effluent with ultraviolet light did not decrease the nonlethal effect in the *Ceriodaphnia* test.

# 5.0 Reference

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.

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# APPENDIX A CHAIN-OF-CUSTODY DOCUMENTS

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

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Laboratory Use Only:					Lab Control Number:	(23341			Date:	11-11	Date:	Date: \\[7/11	
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		Acute	Daphnia	species		1				Z	<b>finia</b> t	Affiliation: AQ (01	
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CHAIN OF CUSTODY

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io-Analytical Laboratories 240 Spurgin Road Doyline, LA 71023 318) 745-2772, Fax (318) 745-2773 MET A D	- Одик - 560 ро	) 	CEAIN OF CUSTODY	AGOI			ð t ð Q	Tempe Thermo Tech: ( Date: )	erature to meter $R_{L_{ij}}$	er the	Temperature upon arrivat: ). Thermometer #: $\Im^{q}$ Tech: $\Re c$ Date: $y_{i_{1}q_{1}/i_{1}}$	$\sim$	
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Bio-Analytical Laboratories 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Far (318) 745-2773

CHAIN OF CUSTODY

<u>bioanalvtical@att.net</u> NELAP 01975, ADEQ #88-0630, EPA LA00917

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# APPENDIX B RAW DATA SHEETS

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# BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Date start: 11811 \_\_\_\_\_ Date end: 1/25/11 Project# X4285 client/contact ElDorado Chemica Address 4500 NorthWest Ave Fildoras 2 = 60 18 11 10-0004D NPDES# 00007  $x^{+}$ Reconstituted Dilution Water\_ 00 Sample Description\_ Briggs, Haughton, Technicians zeogler, Callahan 25±1°C Test Temperature(<sup>0</sup>C)\_\_  $\cap$ Adults isolated: Date Time: 0003 Board: K149 Neonates collected: Date 1118/11 Serial #06E2089 Dissolved Oxygen Meter: Model YSI550A Model Orion 230A+ Serial #020273 pH Meter: Model Control Company Serial# 80277924 Conductivity Meter: Amperometric Titrator: Model Fischer-Porter Serial # 92W445766 Aerate?/Minutes Receiving Water Aerate?/Minutes Effluent /Final D.O. Initial D.O. Initial D.O. /Final D.O. (mq/L & %)/Tech (mg/L & %)/Tech (mg/L & %)/Tech (mg/L & %)/Tech 125/8.0/95870/RO.\_\_\_\_ 0.\_\_\_\_ 0.10.2/121,320/RC  $0 \mathbf{Y}$ 1. 14/25/8 97.6% RC 1.11.1/ 132.3% RC 24/25/8 96.7% Bc\_\_\_\_\_ 2.11.1/ 133.6% RC 2.\_\_\_\_\_ 3 X/25/8.0 4.9% RE:\_\_\_\_\_ 3.11.0/ 132.2% /RC 3.\_\_\_\_ 4×120/8,219668 BC\_\_\_\_\_ 411.4/132.9%/RC 4.\_\_\_\_ 5. Y/25/8.1197.0%/RE.\_\_\_\_ 5.11.2/134.180 RC 5.\_\_\_\_\_ 6. Y/25/80/96-290 /RS.\_ 6.11.2/137.9% /RO 6. 7.\_\_\_\_ 7.\_ 7. BAL Sample # <u>Ammonia (NH3)</u> Dechlorinated? Total Residual (mg/L)/Tech Amount?/Tech Chlorine(mg/L)/ Tech 1/18/11 1.(2354)1.0 1. <0.01/RC Nolre 1/30/11 ca31b1.6/R 2. 50.01/RC Yalali 3. C2309 3.0 /RC 1RC  $_{3}$  < 0.01/Rc

Comments:

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#### BIO-ANALYTICAL LABORATORIES NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # <u>X4</u>	385			Test D	ates_1 [19	8/11-1	1/25/11
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Replicate			% (	Concentra	tion		
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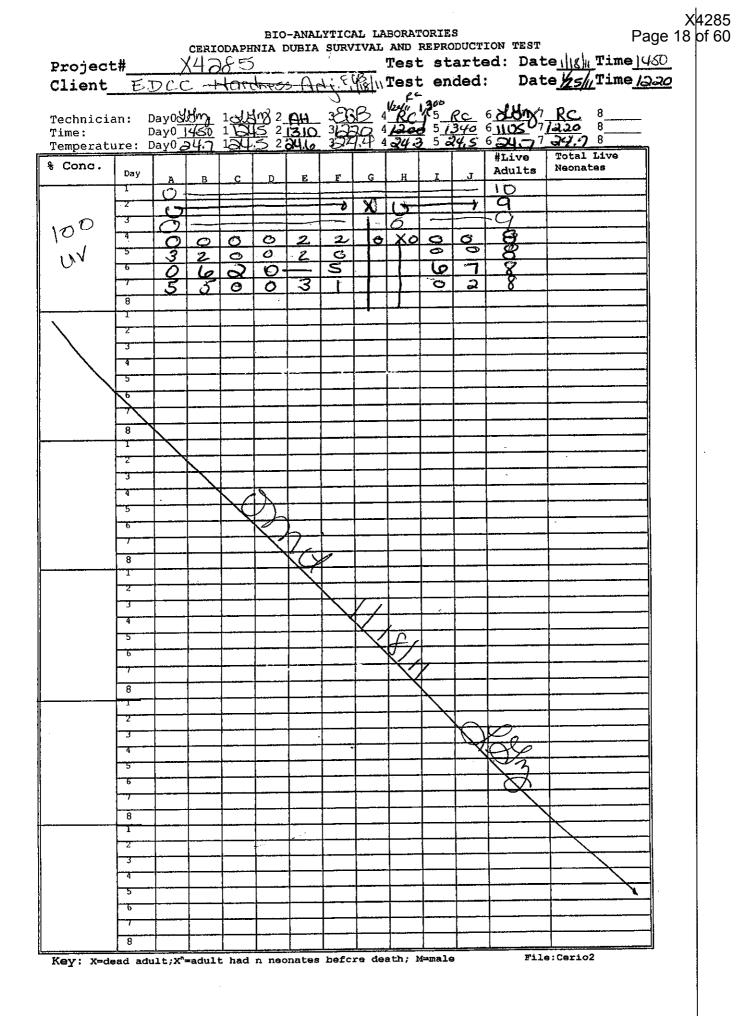
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\*coefficient of variation = standard deviation x 100/mean (calculation based on young of the surviving adults)

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Key: M=male; X=dead adult BA Calculated by:\_\_\_\_ Calculations checked by: <u>HH</u> 2 

CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST Project# Project# X4385 Client_ <u>EIDorado Chemical</u> Test ended: Date///s//, Time/226 RC/22/1/1300 Technician: Dayo AM 16/402 AH 38684 Rc 6 Rc 6 dd 7 7 Rc 8	
Client <u>El Docado Chemical</u> Test ended: Date 5/1, Time 1220	
Technician: Day (141) 1 2 AH 386/ 4 RC 6 21 7 RC 8	
RC 124/130*         Technician: Day0 14/1 10/14/2 AH       360 4 RC 6 RC 6 H       7 RC 8         Time: Day0 1450 1 AU       21210 3/200 4 Jaco 5 1340 6 1105 7 1300 8         Temperature: Day0 04. 134. 2015 134. 4 24.3 534.5 6 34.7 7 84. 9	
* Conc. Day Adults Neonates	
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8     8       Key: X=dead adult;X <sup>n</sup> =adult had n neonates before death; M=male     File:Cerio2	



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DO (mg/1)	8.1	88.7	838.5	178,4	8.18.4	8.8.4	182	8.2			
Cond(umhos/cm)	163.1	166.5	164.	1649	165.4		169.4	<u> </u>			
Alkalinity(mg/L)	360				<u> </u>	320			ļ	-	
Hardness (mg/L)	56.0				<u> </u>	44.0		<u> </u>		-	
Concentration: 3	<u>a</u>			<u>-1-</u>			68/	0.1 2	r	-	
рH	8.1	8.83	8.8.1	8.1	1.98,1	1.08,1	8,7	8.1		-	
DO (mg/1)	8.0	8.181	88.3	1.8.3	1.8.3	283	1.8.1	8.2			
Cond (umhos/cm)	290	288	276	291	293	299	291			-	
Concentration: 4	<u> </u>	<u></u>		AL			AC		<b></b>		
рн	8,2	8.3	818.2	88.2	8.81	2.8.1	8.2	Y.I			
DO (mg/1)	8.0	8.8.1	88.2	18.2	2.8.3	28.2	2.8.1	8.2			
Cond(umhos/cm)	323	324	327	332	335	331	291			4	
Concentration: 51	_0					RC	380				
рн	8.2	8:8.3	8, 8.2	08.2	8.1	808	8.9.2	8.2			
DO (mg/l)	8.0	818.1	828.1	1.8.1	8.8.2	8.8.1	8-8-1	8.2			
Cond (umhos/cm)	311	376	375	391	387	381	380				
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DO(mg/1)	8.0	8.8.1	8-81	880	8.1	- ma	100	40			
Cond (umhos/cm)	445	451	447	465	461	•					
Concentration: 100	>	<del></del>									
pH	8,3	3-8.4	8-8.3	0.83	8.8.2	8.2	\$ 8,2	8.1			
DO (mg/l)	7.9	8.0 8.C	8.18.0	8:49	298.0	8.08.0	1.19	8.2			
Cond (umhos/cm)	546	548	SSS	560	563	560	550				
Tech-prerenewal	RC	SA	AH	ES)	RC	RC	えみか	RC			
Tech-postrenewal		RČ	RC	PH	RC	RC	RČ				
Hardness(mg/1)	440		48.0		440						
	96.0		100.0		100.0						

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Key: prerenewal/postrenewal

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Day/# water used	3120		2	3	4	53122	6	7	8
Concentration: Sc	100U	v 			<del></del>			<u> </u>	r
PH	8.1	8.83	8.8.2	8.8.2	8.8.1	8.8.1	8.0	8.2	
DO (mg / 1)	7.6	289.8	1.98	8.47	151.8	14,9	149	1.9	
Cond(umhos/cm)	551	543	357	554	514	547	553	[	
Alkalinity(mg/L)		ļ			<u>.</u>				<b> </b>
Hardness (mg/L)		<u> </u>	l	<u> </u>	I	<u> </u>		I,	L
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DO (mg/1)							$\angle$		
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Tech-postrenewal		<u>1 KC</u>	IRC_	IGA .	IRC.	RC	<u>RC</u>	<u> </u>	
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Key: prerenewal/postrenewal

X4285

Page 21 of 60 **BIO-ANALYTICAL LABORATORIES** PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET Date ended 1/25/11 Date started: 1/18/11 Project#<u>X4285</u> client/Contact EIDoca  $\mathcal{O}$ nemi Address 450 AFIN 10-00040 NPDES# HR 000a Soft Dilution Water Reconstituted Sample Description\_ OOBriggs, Haughton Test Temperature( $^{\circ}C$ ) <u> $\partial 5 \pm 1 \circ C$ </u> zea<u>aler, Callabar</u> Technicians 117111 224 hours Vendor/ID# Test organism age\_\_\_ Feeding Times Technician/Time/Amount (per replicate) Day AM NOON PM 05/0.20ml 0 B10650,0,10m) RC 1100/D.10ml 1 53010 10mi 68/0715/0.10m1 10ml 51010. 2 AH1100 0.10ml 2510.10ml 105510.10ml 0700/0.10m 3 520/0.10ml 0750 0.20ml RC /24/11 4 520/a-10m 0.20ml 5 Iom 1340/0,10ml 2.10m/1 H111010.10m KC 6 Model YSI550A <u>#06E2089</u> Dissolved Oxygen Meter <u>Serial</u> <u>#02027</u>3 pH Meter: Model Orion 230A+ Serial #80277924 Model Control Company Serial Conductivity Meter: <u>Model</u> Fischer-Porter Serial #92W445766 Amperometric Titrator Receiving Water Aerate?/Minutes Effluent Aerate?/Minutes Initial Initial DO /Final DO /Final DO (mg/L & %)/Tech DO(mq/L&%)/Tech (mg/L & %)/Tech (mq/L & %)/Tech N/A 10,2/121,3%/RC 14 0. 0. 95.8% RC 0.Y1.1/132.3% Acc 5/8.2/97.6% /RC 1. 1. 33.620 (RC 16.2% /Rc2. 2 Ì 2. 32.22/AH 3.11 1.98/ABI. 3. 132.9%/RC 4.11.4 96.6% /RA. 4. 5 11.2/134.1% RC 19518 4.6% RG. 5. 5. 6.11.2/ 137.9% RC 12518.0196.2%|RC. 6. BAL Sample # Total Residual Dechlorinated? Ammonia(NH3) Chlorine(mg/L)/ Amount?/Tech (mq/L)/Tech Tech 1. <0.01/ 2250 No /RC .0 1.\_\_ 10.01/ No, 1.0 2. 2 1/22/11 3. 30.01/ RC No /RC 69 3. 3.0/RC З. Comments:

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Project Client Technician Time: Temperatu	EDC( n: Day0 Day0	<u>866</u> 10 1445 1	1978 2 045 2 54.5 2	RC 3 1025 3 25.1 3	Test	ended <u>RC</u> 1135		e <u>'hs/11</u> Ti e <u>X35/11</u> Ti 6 <u>AU</u> 6 10355 6 20 U	me <u>144</u> 5 me <u>092</u> 7 <u>672</u> 7 <u>672</u> 7 <u>672</u> 7 <u>23.</u> 2
Conc.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	A	8	8	8	8		8	8	8
	в	8	8	8	8_	_7_	7	7	7
0	с	88	<u> </u>	7	7	7	7	6	<u> </u>
	D	8	8	8	8	<u> </u>	8	8	8
	Е	8	8	8	8	8	8	7	7
	А	8	8	8	_ 8_	8	8	8	8
	в	8	8	8	8	8	8	8	8
32	с	8	8	8	<i>S</i>	8	8	8	8
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	A	8	8	8	8	8	8	$ \underline{\lambda} $	8
	в	8	8	8	8	8	8	$ \lambda $	8
	С	8	8	8	8	1	7	4	6
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	A	8	8	8	8	8	8	7	7
	в	8	8	8	8	8	8	-7	7
	с	8	8	8	8	8	8	8_	8
56	D	8	8	8	8	7	1	7	7
	Е	8	8	8	8	8	8	<u> </u>	
	A	S	8	8	8	8	8	7	17-1
	в	8	8	8	8	7	7	17	7
15	с	8	8	8	8	8	8	<u>  X</u> _	8
	D	8	8	8	2	7	6	<u> </u>	6 8
	Е	8	8	8	8	8	8	8	8
	А	8	8	8	$ \underline{X} $	8,	8	8	8
	В	8	8	8	8	8	0	<u> </u>	8
100	С	Ř	8	8	8	8	8	<u> </u>	
	D	8	8	8	8	8	8	<u> </u>	8
	Е	8	8	8	l 8 le: Mi	nnow2	8	<u> </u>	8

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

File: Minnow2

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BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project Client Technician Time: Temperatus	TT C	c ~ 00	$\begin{array}{c} 1 \\ \frac{1}{2} \\ \frac{1}{$	RC 3 1025 3 851 3	Test	start ended <u>4 Cc</u> 4 (135 4 24,0	ed: Dat : Dat 5 <u>R(</u> 5 <u>1145</u> 5 <u>24,3</u>	e <u>ı<i>lıs ıı</i></u> Ti e <u><i>İəsiii</i>Ti 6 Au 6 IDƏS 6 Au 6 Au</u>	.me/445 .me/ <b>923</b> 0 7 Ro 7 <b>Ro</b> 7 <b>0920</b> 7 <b>25.0</b>
Conc.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	A	ж	8	8	8	2	7	7	1
	В	6	8	8	8	8	7	17	7
100	C	8	8	8	R	8	8	8	8
100 VV	 D	8	8	8	Ř	8	8	8	8
	 E	8	8	8	R	8	8	8	8
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	 D					10			
	E		1			CS -			
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<u>المحمد المحمد المحم</u>				E.	le: Mi	nnow2			

File: Minnow2

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X4285 Page 24 of 60

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET Project#/Client\_XU285/EIDyado\_ Test Dates\_1/18/11 - 1/25/11

<u>)ven</u>	<u>remperatu</u>	re (° Celsiu	s) [0]			<u> </u>	<u> </u>
Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 1120111 Tech: XXMX	Wt. of pan + larvae(g) Date weighed: WWW 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*
	× 31	1.3423	1.3485	0.0062	8	0775	
	B 32	1.3160	1.3201	0.0041_	8	0.513	76.586
D	0 33	1.3216	1.3264	0.0048	8	0,600	603.00
	D 24	1.3095	1.3153	0.0058	8	0.725	5 ( 1)
	E 35	1.3095	1.3138	0.0043	8	0.538	30,614
	A 36	1.3136	1.3178	0.0042	8	0,525	
	в 37	1.3066	1. 3098	0.0032	8	0.400	
32	c 38	1.3239	1.3287	0.0048	8	0.600	
	D 39	1.3212	1.3266	0.0084	8	0.675	-
	E 40	1.2276	1.3326	0.0000	8	0.625	-
<b> </b>	A 41	1.3313	1.3372	0.0059	8	0.738	
	B 42	1.3385	1.3439	0.0054	8	0.675	
42	c 43	1.332	1.3356	0.0031	8	0.388	
	D 44	1.3264	1.3314	1.0050	8	0.005	
	E 45		1.3350	0.0087	8	0.463	
	× 46	1.3321	1.3364	0.0043	5 8	0.638	
	вЦЛ	1.3266	1.3312	0.0052	8	0.650	
Sla			1.3340	0.0059	8	0.738	
	$\mathbf{D}$ $\mathbf{U}$	<u></u>	1.3312	0.0044	8	0.550	
	E 50	1.3252		0.0050	Ta	0.625	
		1.3313	1.3352		0	0,488	
	AS BSQ			0.0052	8	0.650	
75	<u>• उद</u> • ठउ		1.3247	0.0059	R	0.738	
	<u> </u>	1.3265		0.004	7 8	0.588	
	<u>∎ 5</u> 3		1.3331	0.006	2 8	0.775	
	. ~1	1.00.0		0.0054	8	0.675	
	~ ¬	1.3261	1.33010	non4.	5 8	O.Mo3	
100		1.3208			7 8	0.750	
		1.3232	1.3287	0.005	5 8	0.688	
	D 59		1.3225	0 0000	8	0.600	
* Test #	E DD	1.3177 atrolweight based or					B2/8/1
Calcu	lated by:	perol weight based or	<u>[n]</u> c	end of test. alculations check	ked by: <u>7 () X (</u>	Juli	A CATAL
		l					

X4285 Page 25 of 60

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET lient Y4285 E1 Dorado Test Dates 118 11 - 1/25/11

Project#/Cl	lient X	10 <u>60 E</u>	1 40 000
Oven Temper	rature (°	<u>Celsius</u> )	

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed:1120111 Tech: H.S.m	Wt. of pan + larvae(g)/ Date 1/2/0/1/ weighed: Tech: Jym	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*
	A LOI	1.3127	1.3185	0.0058	8	0.725	
	B UQ	1.3140	1.3180	0.0040	8	0.500	
00	c 63	1.3218	1.3287	0.0069	3	0.863	
٦V	D 64	1.3112	1.3164	0.0082	8	0.60	
	E US	1.3064	1.3117	0.0063	8	b.603	
	A						
	В				 		
	c						-
	D		1				-1
	E						-
	А			` <u> </u>			
	В	$\square$	,				-1
	С		<u>b</u>				-1
	D		1 St				
	E			·			-{
	A		X	<u></u>			
	В			Q/			-1
	с			1			_
	D				( <u></u>		_
	Е			<u> </u>	Jere		_
_	A				12-		-1
	B					<u> </u>	
	с						
	D						
	Е					\	_
	A					<u> </u>	
	B						
	c	······································					
	D						<del>,  </del>
							<u>`</u>
Test	cceptance of or	purol weight based/o	n surviving larvae a	t end of test. Calculations chec	Inv	CORTE	FRAR

1 ient       ED(C-02)       Test ended:       Date Safu Time Gas       Det Converter         0 rganism       0 (2000)       2       3       0 (2000)       0         0 (ap/)* writer used       0 (2001)       2       3       0 (2000)       0       0         pi       0.9       9       3       0       1       2       3       0 (2000)       0       0         pi       0.9       9       3       0       1       2       0	BIO-AN	ALYTIC	AL LAB	ORATOR:	ES 7-I	DAY WAT	TER QUA	ALITY I	DATA e 1445	X
rganism C connet(5) 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		- 001		T	est st est en	ded:	Date	<b>≶∥</b> Tim	e 0930	Page 26
Day / Water used (0,201). 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1: 1:	)rganism P. pr	<u>ime lo</u>	5			<u>pc 123</u>	1	<u> </u>	1	<u></u>
pH       7.9       18.2       18.0       14.2       7.9       14.2       7.9       14.2       7.9       14.2       7.9       14.2       7.9       14.2       7.9       14.2       7.9	Day/# water used	03120	1	2	3	8122	53122	6	7	8
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Concentration: Co	ntrol					<u> </u>	T 4 2		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	рН	7.9	1.83	1.8.0	1419	27.9	1.4 19	1:8.0	7.6	
Concentration: 30 Pit 8.1 18.3 18.1 18.1 18.1 18.1 18.1 18.1	DO (mg/1)	8.1	0.08.2	48.5	5:45	5.8.4	5.48.4	58.2	6.6	
Rardness (mg/L)       Sip. G       G       G         Concentration: 33       pH       8.1       18.3       18.1       18.3       18.1       18.3       18.1       18.3       18.1       18.3 <td< td=""><td>Cond(umhos/cm)</td><td>165.1</td><td>166.5</td><td>164.7</td><td>1649</td><td>165.6</td><td>169.4</td><td>169.4</td><td> </td><td></td></td<>	Cond(umhos/cm)	165.1	166.5	164.7	1649	165.6	169.4	169.4		
Rardness (mg/L)       Sip. G       G       G         Concentration: 33       pH       8.1       18.3       18.1       18.3       18.1       18.3       18.1       18.3       18.1       18.3 <td< td=""><td>Alkalinity(mg/L)</td><td>360</td><td></td><td>ļ</td><td></td><td>;</td><td><u>32.0</u></td><td> </td><td></td><td></td></td<>	Alkalinity(mg/L)	360		ļ		;	<u>32.0</u>			
рн 8.1 18.3 18.1 18.1 18.1 18.1 18.1 18.2 12 DO (mg/1) 8.0 88.1 58.3 58.3 48.3 58.3 58.1 64 Cond (umhos/cm) 290 288 276 291 293 299 291 Concentration: H2 pH 8.2 18.3 18.2 18.3 18.2 18.3 18.1 18.2 18.1 18.2 16 DO (mg/1) 8.0 68.1 58.2 58.3 58.3 58.3 58.3 16 Cond (umhos/cm) 323 324 321 323 335 331 330 Concentration: 50 pH 8.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.2 18.4 18.4 18.4 18.4 18.4 18.4 18.4 18.4	Hardness (mg/L)		<b>)</b>	<u> </u>			144.0	l		
рн 8.1 18.3 18.1 18.1 18.1 18.1 18.1 18.2 12 DO (mg/1) 8.0 88.1 58.3 58.3 48.3 58.3 58.1 64 Cond (umhos/cm) 290 288 276 291 293 299 291 Concentration: H2 pH 8.2 18.3 18.2 18.3 18.2 18.3 18.1 18.2 18.1 18.2 16 DO (mg/1) 8.0 68.1 58.2 58.3 58.3 58.3 58.3 16 Cond (umhos/cm) 323 324 321 323 335 331 330 Concentration: 50 pH 8.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.2 18.4 18.4 18.4 18.4 18.4 18.4 18.4 18.4	Concentration: 3	<u>a</u>						- +		. <u></u>
$\begin{array}{c ccccc} 0.0 & 0.1 & 0.2 & 8.3 & 0.3 & 0.1 & 0.1 \\ \hline 0.0 & 0.88 & 276 & 291 & 293 & 299 & 291 \\ \hline 0.0 & 0.0 & 0.88 & 276 & 291 & 293 & 299 & 291 \\ \hline 0.0 & 0.0 & 0.0 & 0.1 & 0.0 & 0.1 & 0.0 & 0.1 & 0.0$	рH		1.8.3	1.8.1	1.4	18.1	2.8.1	1.8.2	1.5	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	DO (mg/1)	8.0	6.8.1	5-8.3	5.0	4.8.3	5.8.3	5.8.1	bil	
pH       8.2       18.3       18.3       18.3       18.1       18.2       18.3       18.3       18.1       18.2       18.3       <	Cond(umhos/cm)	290	288	276	291	293	299	291		L
pH       8.2       18.3       18.3       18.3       18.1       18.2       18.3       18.3       18.1       18.2       18.3       <	Concentration: H	a			-	· · · · · · · · · · · · · · · · · · ·				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	рH		2.8.3	1.82	14	1.8.1	7.8.1	158.2	1.00	
$\begin{array}{c} \begin{array}{c} \mbox{Concentration: } 5 \mbox{$(p_{\rm H}$)$} \\ \mbox{$(p_{\rm H}$)$} \\ \mbox{$(mg/1)$} \\ \mbox{$(0,mg/1)$} \\ $$	DO (mg/l)	8.0	6.8.1	5.82	5.8.2	5.8.3	5.8.2	18.1	6.6	
$\begin{array}{c} \begin{array}{c} \mbox{Concentration: } 5 \mbox{$(p_{\rm H}$)$} \\ \mbox{$(p_{\rm H}$)$} \\ \mbox{$(mg/1)$} \\ \mbox{$(0,mg/1)$} \\ $$	Cond(umhos/cm)	323	324	327	332	335	331	330		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		6								
$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c}$	pH	_	1.8.3	28.2	1.2.2	1:8.2	7.38.1	1.8.2	26	
$\begin{array}{c ccccc} \hline Cond (unhos/cm) & S & S & S & S & S & S & S & S & S & $	DO (mg/l)	8.0	6.8.1	518.1	5.8.1	5.8.2	5.18.1	58.0	6.1	
$\begin{array}{c c} Concentration: 75 \\ pH & 8.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.2 18.3 18.3 18.2 18.3 18.3 18.2 18.3 18.3 18.2 18.3 18.3 18.3 18.2 18.3 18.3 18.2 18.3 18.3 18.2 18.3 18.3 18.3 18.3 18.3 18.3 18.3 18.3$	Cond(umhos/cm)	371	376	375	391	387	387	380		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		5								
$\frac{Cond (umhos/cm)}{VVS} = \frac{VVS}{VS1} = \frac{VV7}{VY1} = \frac{VV5}{VV1} = \frac{VV7}{VV5} = \frac{VV7}{VV1} = $	рH	8.2	19.3	1.8.2	18.3	1.8.2	268.2	28.3	26	
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $	DO(mg/l)	8.0	6.8.1	5.8.1	5.8.0	5.08.1	3.18.1	5.8.0	6.2	
Concentration:       ) OO         pH       8.3       1.8.4       1.8.3 <t< td=""><td>Cond(umhos/cm)</td><td>445</td><td>451</td><td>441</td><td>465</td><td>461</td><td>460</td><td>450</td><td></td><td></td></t<>	Cond(umhos/cm)	445	451	441	465	461	460	450		
pH       8.3       8.4       8.3       8.3       8.3       8.3       8.3       8.3       8.3       8.3       18.2 <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>l</td>		0								l
$\frac{19}{19} \frac{18}{80} \frac{80}{80} \frac{80}{80} \frac{19}{80} \frac{80}{80} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{10} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{80} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{80} \frac{80}{10} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{80}{10} \frac{11}{10}$ $\frac{19}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{11}{10}$ $\frac{10}{80} \frac{10}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{11}{10}$ $\frac{10}{80} \frac{10}{80} \frac{80}{80} \frac{80}{80} \frac{80}{80} \frac{10}{80} \frac{10}{80}$ $\frac{10}{80} \frac{10}{80} 10$	pH		8.0	1: 8.3	283	180	2.6	18.2	11	
$\frac{CONTR}{CONTR} = \frac{1}{2} + \frac{1}{2$	DO(mg/l)	7.9	6.8.0	5.8.0	5:49	5.8.0	5.0	2.1.1	6.5	
$\frac{\text{Tech-prerenewal}}{\text{Tech-postrenewal}} = \frac{RC}{RC} = \frac{RH}{RH} = \frac{RC}{RC} = \frac{RC}{R$	Cond (umhos/cm)	546	548	ડડડ	560	363	560	550		
$\frac{1}{10000000000000000000000000000000000$	Tech-prerenewal	_	RC	AH	Att	RC	RC	AH	RC	
	Tech-postrenewal		.RC	RC	AH	RC	RC	RC	RC	
	Hardness(mg/l)	44.0		48,0		440				
	Alkalinity(mg/1)	76.0	· · ·	100.0		100.0				

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Key: prerenewal/postrenewal

BIO-AN Project#X	ALYTICA	AL LAB	DRATOR	IES 7-1 est st	DAY WAI arted:	TER QUA	LITY I	DATA e <u>1445</u>	X2 Page 27 o
Client <u>EDCC</u> Drganism <u>P.PC</u>	-001 Ompli	15	<sup>1</sup>	est en	aea:	Dater		e <u>0700</u>	
Day/# water_used	03120	1	2	3	4	53122	6	7	8
Concentration: Go		$\frac{1}{2}$	<u> </u>	<u> </u>		<u></u>			
pH	8.1	18.3	1.8.2	222	2.8.1	2.8	1.8.2	29	
DO (mg/l)	7.6	le 1.8	59 7.8	527	5.27.8	5.10	5.9.9	61	
Cond (umhos/cm)	551	543	557	594	514	541	553		
Alkalinity(mg/L)				L		ļ			
Hardness (mg/L)			[	<u> </u>				<u> </u>	<u> </u>
Concentration:				·····	······				
рН									
DO (mg/l)									
Cond(umhos/cm)		$\Box$		<u> </u>	l	<u> </u>		L	L
Concentration:		$\rightarrow$	~~~						<b>_</b>
рH		$\angle$	X						
DO(mg/1)		$\angle$		A					
Cond (umhos/cm)		·						l	L
Concentration:				·	l de la				
рH		$\leq$			X				
DO(mg/l)						C.			
Cond(umhos/cm)				<u> </u>	l	1 Az		L	L
Concentration:	<u></u>					$\neg A$		/	
РH		$\angle$		$\square$					
DO(mg/l)		$\angle$					$\left \right\rangle$		
Cond(umhos/cm)					L+	<u> </u>		Ļ	└╢│
Concentration:								$\rightarrow$	<b></b>
pH			$\langle \rangle$	$\square$				$\square$	<b>_</b>
DO (mg/l)									
Cond (umhos/cm)			L						<u> </u>
Tech-prerenewal	RC	RC	PH	PH	RC	RC	AH	RC	·
Tech-postrenewal		.Rc	RC	AH	RC	RC	RC		
Hardness(mg/l)									<b> </b>
Alkalinity(mg/l)						L	<u> </u>		

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Key: prerenewal/postrenewal

# **BIO-ANALYTICAL LABORATORIES**

# **REFERENCE TOXICANT TEST QUALITY DATA**

Date start: 1/4/11		Date end: 1/10/11
Test organism: <u>C. dubia</u>		
Age: <u>248-2246</u>		
Source and ID#: BAL RI25	-Ria	
Dilution Water used: Type:	<u>1H</u> *	Jug#: <u>3115</u>
Reference Toxicant: <u>NaCI</u>	+	Units:g/Lug/L
Manufacturer: <u>ACROS</u>	х 2	Lot: <u>BD130290</u>
48-hour LC <sub>50</sub> : 1. 30g1L	······································	Statistical Method: TSK
Upper and Lower CUSUM Chart C	ontrol Limits:	75-1.01
Test Number (for the year):		
We verify that this data is true and co	prrect:	
Technician: almed Hal	lahton_	
Statistician. Ch. A.	Brigg	>
Quality Control Officer: Out	Z.B.	ang)
*MH- Moderately hard S-Soft H - Hard	NaCl - Sodium Chl CuSO₄ - Copper S	

ş

G - Graphical

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

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in ly		Conductivity	48	5.8				2.C				LPQV				\$	
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Time		: 	0	ale				376				Nº34				E	
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Date <u>44</u> 11 Date 110/11	96hour		24 48	<u>~</u>	<del></del>			30		· · · ·		00					
			0	1.8				R.V				8.1				the	
started: ended:	Species our our	<b>†</b>	96		 ,												
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Test Test		olved (	48	0.9				60	-			Q.S				T.	
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X	1DDD Ohour Ohour	Te: Sali	_2	-												Chemistry renewal/po	
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Project# Client Re(	Sample Description <u> O</u> Technician: Oho Time: Oho Temperature (°C): Oho	Tesc Dilution		С	)							3					ACUTE2 02
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X4285 Page 29 of 60

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

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rime <u>1345</u> rime <u>1435</u> ro# <u>BAU</u> R1a5/R13	Conductivity	24	NUN DEN				area as				DO DEO					
started: Date  4 11 ended: Date  4 20 Species 0. 0100 Dur 96hour 00r 96hour 96hour	μđ	0 24 48 72 96	80 BV		· · · · · · · · · · · · · · · · · · ·		60 03		, , , ,		0,20,3				THE HEAL	
Test started Test ended: Test Species 48hour 41 72hour 48hour 240 72hour	Dissolved Oxygen	0 24 48 72 96	V VV				5VVV				VOV SV				HU HUHU	
L NOCI HE 24hour AH 24hour AH 24hour AE	# Live Organisms	0 24 48 72 96 hr	5 3 0	510	510	510	50	50	50	50	0	50	50	50	Tech strenewal	
TOX ption_IDD01 Ohour_1 Ohour_1	Replicate Test Salinity	NA	đ	8	C)	9	đ	8	C (	Δ	Ŭ	B	5		Chemistry Tech prerenewal/postrenewal	020809 Rev.
Project# client <u>Ref</u> Sample Descri Technician: Time: Temperature (	Test Dilution		M				+			. <u></u>	Ŋ		·			ACUTE2 (

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# **BIO-ANALYTICAL LABORATORIES**

# **REFERENCE TOXICANT TEST QUALITY DATA**

Date start: 1 - 11	Date end: 1/9/11
Test organism: <u>P. prome</u>	2105
Age: No days	
Source and ID#: BAL	-
Dilution Water used: Type:	H* Jug #: <u>3115</u>
Reference Toxicant: 100 ppt	Na C-1+ Units:g/Lug/L
Manufacturer: <u>ACCOS</u>	Lot: <u>B0130290</u>
48-hour LC <sub>50</sub> : <u>6.59914</u>	Statistical Method:^
	ontrol Limits: 7.91 - 4.02
Test Number (for the year):	
We verify that this data is true and co Technician:	rrect: Bugg ,
Statistician: Other St.	Brigg
Quality Control Officer: <u>CU</u>	SP Brugg
*MH- Moderately hard + S-Soft H - Hard	NaCl - Sodium Chloride ^P - Probit CuSO <sub>4</sub> - Copper Sulfate SK - Spearman Karber TSK -Trimmed Spearman Karber

# G - Graphical

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

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	N X O X	NO Ohour EG Ohour 29	Test Salinity		N/A	$\overline{\ }$				$\square$	$\square$		$\geq$			$\leq$	Chemistry enewal/po	
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	Kef	Description :ian: tture ( <sup>0</sup> C):	Replicate		$\overline{\Delta}$	9	ĊŢ.	Ą	$\triangleleft$	Ю	đ	$\mathcal{C}$	Ĥ	9	$\square$	S)		020809
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Project#	Client	Sample Desci Technician: Time: Temperature	Test Dilution		O		Ŋ		5		σ		=		9			ACUTE2
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# APPENDIX C STATISTICAL ANALYSIS

1/18/2011		Test ID:	VIDOCOD						
4/05/0044		TOOLID.	X4285CD			Sample ID	);	1	
1/20/2011		Lab ID:	ADEQ 880	)630		Sample Ty	/pe:	EFF2-Indu	Istrial
1/18/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	<b>Test Speci</b>	ies:	CD-Ceriod	laphnia dubia
1	2	3	4	5	6	7	8	9	10
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000
1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000
	1.0000 1.0000 1.0000 1.0000 0.0000	1/18/2011           1         2           1.0000         1.0000           1.0000         0.0000           1.0000         1.0000           1.0000         1.0000           0.0000         0.0000           0.0000         0.0000	1/18/2011         Protocol:           1         2         3           1.0000         1.0000         1.0000           1.0000         0.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           0.0000         0.0000         0.0000	1/18/2011         Protocol: EPAFW02           1         2         3         4           1.0000         1.0000         1.0000         1.0000           1.0000         0.0000         1.0000         1.0000           1.0000         0.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000	1/18/2011         Protocol:         EPAFW02-EPA/821           1         2         3         4         5           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         0.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         0.0000         1.0000         1.0000         1.0000	1/18/2011         Protocol:         EPAFW02-EPA/821/R-02-01           1         2         3         4         5         6           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         0.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         0.0000         1.0000         1.0000         1.0000         1.0000	1/18/2011         Protocol: EPAFW02-EPA/821/R-02-01 Test Spect           1         2         3         4         5         6         7           1.0000         1.0000         1.0000         1.0000         1.0000         0.0000         0.0000           1.0000         0.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         0.0000         1.0000         1.0000         1.0000         1.0000         1.0000	1/18/2011         Protocol: EPAFW02-EPA/821/R-02-01 Test Species:           1         2         3         4         5         6         7         8           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         0.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         0.0000         1.0000         1.0000         1.0000         1.0000         1.0000	1/18/2011         Protocol: EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriod           1         2         3         4         5         6         7         8         9           1.0000

				Not			Fisher's	1-Tailed	
Conc-%	Mean	N-Mean	Resp	Resp	Total	Ν	Exact P	Critical	
D-Control	0.8000	1.0000	2	8	10	10			
32	0.9000	1.1250	1	9	10	10	0.5000	0.0500	
42	0.9000	1.1250	1	9	10	10	0.5000	0.0500	
56	0.8000	1.0000	2	8	10	10	0.7090	0.0500	
100	0.8000	1.0000	2	8	10	10	0.7090	0.0500	
100UV	0.8000	1.0000	2	8	10	10	0.7090	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:	1/18/2011	Test ID: X4285CD					Sample ID	);	1			
End Date:	1/25/2011		Lab ID:	<b>ADEQ 880</b>	)630	Sample Type:		ype:	EFF2-Industrial			
Sample Date:	1/18/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Ceriodaphnia dubia			
Comments:												
Conc-%	1	2	3	4	5	6	7	8	9			
D-Control	23.000	21.000	23.000	24.000	21.000	30.000	28.000	21.000				
32	22.000	13.000	12.000	13.000	11.000	8.000	7.000	17.000	12.000			
42	17.000	11.000	8.000	3.000	9.000	13.000	15.000	12.000	17.000			
56	9.000	7.000	8.000	13.000	8.000	8.000	10.000	8.000				
100	10.000	5.000	6.000	8.000	7.000	9.000	5.000	5.000				
100UV	8.000	13.000	2.000	0.000	7.000	8.000	6.000	9.000				

				Transforn	n: Untran	sformed			1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	23.875	1.0000	23.875	21.000	30.000	14.237	8			
*32	12.778	0.5352	12.778	7.000	22.000	35.386	9	6.301	2.414	4.252
*42	11.667	0.4887	11.667	3.000	17.000	39.045	9	6.932	2.414	4.252
*56	8.875	0.3717	8.875	7.000	13.000	21.240	8	8.277	2.414	4.375
*100	6.875	0.2880	6.875	5.000	10.000	28.501	8	9.380	2.414	4.375
*100UV	6.625	0.2775	6.625	0.000	13.000	61.413	8	9.518	2.414	4.375

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97877		0.947		0.19571	0.66159
Bartlett's Test indicates equal variances (p = 0.10)	9.3532		15.0863			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences	4.37512	0.18325	330.389	13.1376	6.9E-12	5, 44
Treatments vs D-Control						



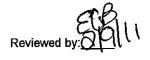
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		Ceriodaphnia Survival and Reproduction Test-Reproduction											
Start Date:	1/18/2011		Test ID:	X4285CD			Sample ID	):	1				
End Date:	1/25/2011		Lab ID:	ADEQ 880	0630		Sample Ty	уре:	EFF2-Indu	ıstrial			
Sample Date:	1/18/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dul	bia		
Comments:													
Conc-%	1	2	3	4	5	6	7	8	9	10			
D-Control	23.000	21.000	23.000	24.000	21.000	30.000	9.000	28.000	21.000	5.000			
32	22.000	0.000	13.000	12.000	13.000	11.000	8.000	7.000	17.000	12.000			
42	17.000	11.000	8.000	3.000	9.000	13.000	15.000	12.000	0.000	17.000			
56	9.000	7.000	0.000	8.000	13.000	8.000	8.000	10.000	8.000	0.000			
100	0.000	2.000	10.000	5.000	6.000	8.000	7.000	9.000	5.000	5.000			
100UV	8.000	13.000	2.000	0.000	7.000	8.000	0.000	0.000	6.000	9.000			

				Transfor	m: Untran	sformed		Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	20.500	1.0000	20.5000	5.0000	30.0000	37.942	10			
*32	11.500	0.5610	11.5000	0.0000	22.0000	51.075	10	74.00	75.00	
*42	10,500	0.5122	10.5000	0.0000	17.0000	53.922	10	69.50	75.00	
*56	7.100	0.3463	7.1000	0.0000	13.0000	57.672	10	65,50	75.00	
*100	5.700	0.2780	5.7000	0.0000	10.0000	53.629	10	63.00	75.00	
*100UV	5.300	0.2585	5.3000	0.0000	13.0000	85.798	10	62.50	75.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.27574	0.895	-0.7277	0.8885
Bartlett's Test indicates equal variances (p = 0.12)	8.6626	15.0863		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				

Treatments vs D-Control



		Ceriodaphnia Survival and Reproduction Test-Reproduction												
Start Date:	1/18/2011		Test ID:	X4285CD		Sample ID:			1					
End Date:	1/25/2011		Lab ID:	ADEQ 880	630		Sample Ty	ype:	EFF2-Indu	ustrial				
Sample Date:	1/18/2011		Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubi	а			
Comments:														
Conc-%	1	2	3	4	5	6	7	8	9	10				
D-Control	23.000	21.000	23.000	24.000	21.000	30.000	9.000	28.000	21.000	5.000				
32	22,000	0.000	13.000	12.000	13.000	11.000	8,000	7.000	17.000	12.000				
42	17.000	11.000	8.000	3.000	9.000	13.000	15.000	12.000	0.000	17.000				
56	9.000	7.000	0.000	8.000	13.000	8.000	8.000	10.000	8.000	0.000				
100	0.000	2.000	10.000	5.000	6.000	8.000	7.000	9.000	5.000	5.000				
100UV	8.000	13.000	2.000	0.000	7.000	8.000	0.000	0.000	6.000	9.000				

•				Transform	m: Untran	sformed			1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	20.500	1.0000	20.5000	5.0000	30.0000	37.942	10			
*32	11.500	0.5610	11.5000	0.0000	22.0000	51.075	10	3.739	2.287	5.5046
*42	10.500	0.5122	10.5000	0.0000	17.0000	53.922	10	4.154	2.287	5.5046
*56	7,100	0.3463	7.1000	0.0000	13.0000	57.672	10	5.567	2.287	5.5046
*100	5,700	0.2780	5,7000	0.0000	10.0000	53.629	10	6.148	2.287	5.5046
*100UV	5.300	0.2585	5.3000	0.0000	13.0000	85.798	10	6.314	2.287	5.5046

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.27574		0.895		-0.7277	0.8885
Bartlett's Test indicates equal variances (p = 0.12)	8.6626		15.0863			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences	5.50456	0.26852	323.36	28.9741	2.1E-07	5, 54
Treatments vs D-Control						



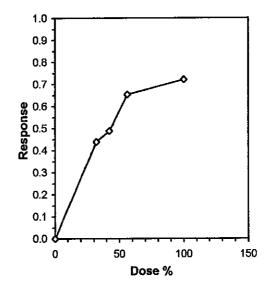
		Ceriodaphnia Survival and Reproduction Test-Reproduction												
Start Date:	1/18/2011		Test ID:	X4285CD			Sample ID:			_				
End Date:	1/25/2011		Lab ID:	ADEQ 880630 Sample Type:				EFF2-Indu	istrial					
Sample Date:	1/18/2011		Protocol:	EPAFW02	2-EPA/821	I/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia				
Comments:			_											
Conc-%	1	2	3	4	5	6	7	8	9	10				
D-Control	23.000	21.000	23.000	24.000	21.000	30.000	9.000	28.000	21.000	5.000				
32	22.000	0.000	13.000	12.000	13.000	11.000	8,000	7.000	17.000	12.000				
42	17.000	11.000	8.000	3.000	9.000	13.000	15.000	12.000	0.000	17.000				
56		7.000	0.000	8,000	13.000	8.000	8.000	10.000	8.000	0.000				
100		2.000		5,000	6.000	8.000	7.000	9.000	5.000	5.000				
100UV		13.000		0.000	7.000	8.000	0.000	0.000	6.000	9.000				

			Transform: Untransformed						Isote	onic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean	
D-Control	20,500	1.0000	20.5000	5.0000	30.0000	37.942	10	20.500	1.0000	
32	11.500	0.5610	11.5000	0.0000	22.0000	51.075	10	11.500	0.5610	
42	10.500	0.5122	10.5000	0.0000	17.0000	53.922	10	10.500	0.5122	
56	7.100		7.1000	0.0000	13.0000	57.672	10	7.100	0.3463	
100	5 700		5,7000	0.0000	10.0000	53.629	10	5.700	0.2780	
100UV	5.300	0.2585	5.3000		13.0000	85.798	10			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.93556	0.947	-0.8174	1.04451
Bartlett's Test indicates equal variances (p = 0.09)	8.14477	13.2767		
Linear Interpolation	1 (200 Resamples)	)		

				Linca	n nurei hou
Point	%	SD	95%	CL	Skew
IC05*	3.644	1.140	2.764	7.079	2.9396
IC10*	7.289	2.280	5.527	14.158	2.9396
IC15*	10.933	3.349	8.291	21.237	2.7186
IC20*	14.578	4.115	11.054	28.315	2.0938
1C25*	18.222	4.601	13.818	33.155	1.5164
IC40*	29.156	6.821	22.109	45.671	0.8938
IC50	43.029	8.318	27.636	56.813	0.2320

\* indicates IC estimate less than the lowest concentration





			La	rval Fish C	arowth an	nd Surviv	al Test- <u>7</u> Day Si	urvival	
Start Date:	1/18/2011		Test ID:	X4285pp			Sample ID:	1	
End Date:	1/25/2011		Lab ID:	<b>ADEQ 880</b>	0630		Sample Type:	EFF2-Industrial	
Sample Date:	1/17/2011		Protocol:	EPAFW02	2-EPA/821	1/R-02-01	Test Species:	PP-Pimephales promelas	
Comments:									
Conc-%	1	2	3	4	5				
D-Control	1.0000	0.8750	0.7500	1.0000	0.8750				
32	1.0000	1.0000	1.0000	1.0000	1.0000				
45	1.0000	1.0000	0.7500	1.0000	0.8750				
56	0.8750	0.8750	1.0000	0.8750	0.8750				
75	0.8750	0.8750	1.0000	0.7500	1.0000				
100	1.0000	1.0000	1.0000	1.0000	1.0000				
100UV	0.8750	0.8750	1.0000	1.0000	1.0000				

,

		_	Tra	ansform:	Arcsin Se	quare Root	Rank	1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	0.9000	1.0000	1.2504	1.0472	1.3931	11.683	5			
32	1.0000	1.1111	1.3931	1.3931	1.3931	0.000	5	35.00	16.00	
45	0.9250	1.0278	1.2872	1.0472	1.3931	12.116	5	29.50	16.00	
56	0.9000	1.0000	1.2462	1.2094	1.3931	6.591	5	27.00	16.00	
75	0.9000	1.0000	1.2504	1.0472	1.3931	11.683	5	27.50	16.00	
100	1.0000	1.1111	1.3931	1.3931	1.3931	0.000	5	35.00	16.00	
100UV	0.9500	1.0556	1.3196	1.2094	1.3931	7.623	5	31.00	16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.91812	0.934	-0.4678	0.20024
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				



· · · · · · · · · · · · · · · · · · ·			La	rval Fish (	Growth ar	nd Surviv	al Test-7	Day Grow	<u>/th</u>			
Start Date:	1/18/2011			X4285pp			Sample I		1			
End Date:	1/25/2011			ADEQ 880			Sample 1	74	EFF2-Ind			
Sample Date:	1/17/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spe	cies:	PP-Pime	phales pro	melas	
Comments:												
Conc-%	1	2	3	4	5							
D-Control	0.7750	0.5125	0.6000	0.7250	0.5375							
32	0.5250	0.4000	0.6000	0.6750	0.6250		,					
45	0.7375	0.6750	0.3875	0.6250	0.4625							
56	0.5375	0.6500	0.7375	0.5500	0.6250							
75	0.4875	0.6500	0.7375	0.5875	0.7750							
100	0.6750	0.5625	0.7500	0.6875	0.6000							
100UV	0.7250	0.5000	0.8625	0.6500	0.6625							
0-SN	0.7750	0.5857	0.8000	0.7250	0.6143							
										-		
				Transform					1-Tailed			
Conc-%		N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD		
D-Control	0.6300	1.0000			0.7750	18.325						
32	0.5650	0.8968	0.5650	0.4000	0.6750	18.929	5	0.927	2.443			
45	0.5775	0.9167	0.5775	0.3875	0.7375	25.492		0.749	2.443	0.1713		
56	0.6200	0.9841	0.6200		0.7375	13.113		0.143	2.443	0.1713		
75	0.6475	1.0278	0.6475	0.4875	0.7750	17.871	5	-0.250	2.443	0.1713		
100	0.6550	1.0397	0.6550	0.5625	0.7500	11.339	5	-0.357	2.443	0.1713		
100UV	0.6800	1.0794	0.6800	0.5000	0.8625	19.306	5	-0.713	2.443	0.1713		
0-SN	0.7000	1.1111	0.7000	0.5857	0.8000	13.676	5	-0.998	2.443	0.1713		
August Tool			<u>    .    .                           </u>				Statistic		Critical		Skew	Kurt
Auxiliary Test Shapiro-Wilk's		too nom	al dietribu	tion (n > 0)	05)		0.96241		0.94		-0.1586	-0.9329
Bartlett's Test					.007		2.62301		18.4753		0.1000	5.5020
Hypothesis Test			ances (p =	0.92)			MSDu	MSDp	MSB	MSE	F-Prob	df
Liunnott'e Loei	indicatee r	no eianiti/	cant differe	ences			0.17128	0.27188	0.0109	0.01229	0.52822	7, 32

Treatments vs D-Control



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Start Date:	1/18/2011		Test ID:				Sample ID:	1		
End Date:	1/25/2011		Lab ID:	ADEQ 880	0630		Sample Type:	EFF2-Industria		
Sample Date:	1/17/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Species:	PP-Pimephales	s promelas	
Comments:										
Conc-%	1	2	3	4	5					
D-Control	0.7750	0.5125	0.6000	0.7250	0.5375					
32	0.5250	0.4000	0.6000	0.6750	0.6250					
45	0.7375	0.6750	0.3875	0.6250	0.4625					
56	0.5375	0.6500	0.7375	0.5500	0.6250					
75	0.4875	0.6500	0.7375	0.5875	0.7750					
100	0.6750	0.5625	0.7500	0.6875	0.6000					
100UV	0.7250	0.5000	0.8625	0.6500	0.6625					
0-SN	0.7750	0.5857	0.8000	0.7250	0.6143					
				Transform	n: Untran	sformed				onic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N		Mean	N-Mean
D-Control	0.6300	1.0000	0.6300	0.5125	0.7750	18.325			0.6300	1.0000
32	0.5650	0.8968	0.5650	0.4000	0.6750	18.929	5		0.6130	0.9730
45	0.5775	0.9167	0.5775	0.3875	0.7375	25.492			0.6130	0.9730
56	0.6200	0.9841	0.6200	0.5375	0.7375	13.113			0.6130	0.9730
75	0.6475	1.0278	0.6475	0.4875	0.7750	17.871	5		0.6130	0.9730
100	0.6550	1.0397	0.6550	0.5625	0.7500	11.339	5		0.6130	0.9730
100UV	0.6800	1.0794	0.6800	0.5000	0.8625	19.306	5			
0-SN	0.7000	1.1111	0.7000	0.5857	0.8000	13.676	5			
Auxiliary Test	te						Statistic	Critical	Skew	Kurt
	10									
Shapiro-Wilk's		ates norn	nal distribu	ition ( $p > 0$	.05)		0.96241	0.94	-0.1586	-0.9329

Larval Fish Growth and Survival Test-7 Day Growth

Auxiliary 16515	Otationo	
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96241	0.9
Bartlett's Test indicates equal variances (p = 0.92)	2.62301	18.47

			Line	ear Interpolation (200 Re	esamples)	
Point	%	SD	95% CL(Exp)	Skew		
IC05	>100					
IC10	>100					
IC15	>100				1.0	
IC20	>100				0.9	
IC25	>100				4 1	
IC40	>100				0.8	
IC50	>100				0.7 -	
				A	0.6	
				Dise	0.5	
				Response	• 0.4	
				e e	0.3	

0.2 0.1 0.0 -0.1

0



150

100

50

Dose %

Kurt

Skew

				Daphnid	Acute Test-4	8 Hr Survival		
Start Date: End Date: Sample Date: Comments:	1/4/2011 1/6/2011 1/4/2011		Test ID: Lab ID: Protocol:	1411cd NELAP 01975 EPAAW02-EPA	₩821/R-02-01	Sample ID: Sample Type: Test Species:	REF-Ref Toxicant NACL-Sodium chloride CD-Ceriodaphnia dubia	
Conc-gm/L	1	2	3	4				<u> </u>
D-Control	1.0000	1.0000	1.0000	1.0000				
1	0.8000	0.8000	0.8000	0.8000				
2	0.0000	0.0000	0.0000	0.0000				
3	0.0000	0.0000	0.0000	0.0000				
4	0.0000	0.0000	0.0000	0.0000				
5	0.0000	0.0000	0.0000	0.0000				

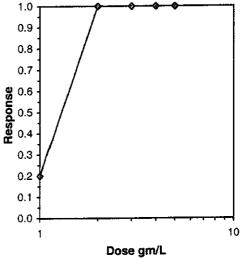
	• • • •		Tra	ansform:	Arcsin So	uare Root		Number	Total
Conc-am/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
1	0.8000	0.8000	1.1071	1.1071	1.1071	0.000	4	4	20
2	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
3	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
4	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
5	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

Statistic

1

Auxiliary Tests Shapiro-Wilk's Test indicates normal distribution (p > 0.05) Equality of variance cannot be confirmed

			Trimmed Spearman-Karber
Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%			1.0
20.0%	1.2968	1.1771 1.4288	0.9
Auto-20.0%	1.2968	1.1771 1.4288	4 /
······			0.8 /



Critical

0.818

Kurt

Skew

				Acute Fish Test-48	Hr Survival	
Start Date: End Date: Sample Date: Comments:	1/7/2011 1/9/2011 1/7/2011		Lab ID:	1711pp NELAP 01975 EPAAW02-EPA/821/R-02-01	Sample ID: Sample Type: Test Species:	REF-Ref Toxicant NACL-Sodium chloride PP-Pimephales promelas
Conc-gm/L	1	2				
D-Control	1.0000	1.0000				
5	0.9000	1.0000				
7	0.5000	0.3000				
9	0.0000	0.0000				
	0.0000	0.0000				
11	0.0000	0.0000				

		·	Tra	ansform:	Arcsin So	uare Root		Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Mîn	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
5	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
7	0.4000	0.4000	0.6825	0.5796	0.7854	21.317	2	12	20
9	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20
11	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20
13	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

Statistic

Critical

Auxiliary Tests Normality of the data set cannot be confirmed Equality of variance cannot be confirmed

				Max	umum Likeliho	od-Probit					
Parameter	Value	SE	95% Fidu	cial Limits	Control	Chi-Sq	Critical	P-value	Mu	Sigma	lter
Slope	15.2505	3.12624	9.12309	21.378	0	0.83487	7.81473	0.84111	0.81912	0.06557	4
Intercept	-7.492	2.61356	-12.615	-2.3694							
TSCR						1.0 T			3	<u> </u>	
Point	Probits	gm/L_	95% Fidu	cial Limits		0.9					
EC01	2.674	4.64061	3.53542	5.25765		4		1			
EC05	3.355	5.14353	4.17814	5.68628		0.8 -		1			
EC10	3.718	5.43355	4.56064	5.93747		0.7					
EC15	3.964	5.63841	4.83369	6.11904		-		1		Í	
EC20	4.158	5.80672	5.05833	6.27222		<b>9</b> .0.6		P			
EC25	4.326	5.95511	5.25548	6.4114		<b>es</b> 0.6 0.5 <b>es</b> 0.4		- t			
EC40	4.747	6.34607	5.76181	6.80564		<b>1</b> 0.4		- F			
EC50	5.000	6.59352	6.06378	7.08443		<u>م</u> ۳.4 ]		- <u> </u>			
EC60	5.253	6.85061	6.35539	7.40504		0.3					
EC75	5.674	7.30036	6.80737	8.04548		0.2		- 1			
EC80	5.842	7.48692	6.97617	8.33781							
EC85	6.036	7.71041	7.16744	8.70506		0.1		a l			
EC90	6.282	8.00111	7.4025	9.20642		0.0 ]		<u>/ )/</u>			
EC95	6.645	8.45226	7.74578	10.0281		1		10		100	
EC99	7.326	9.36827	8.39466	11.8266				Dose g	m/ł		

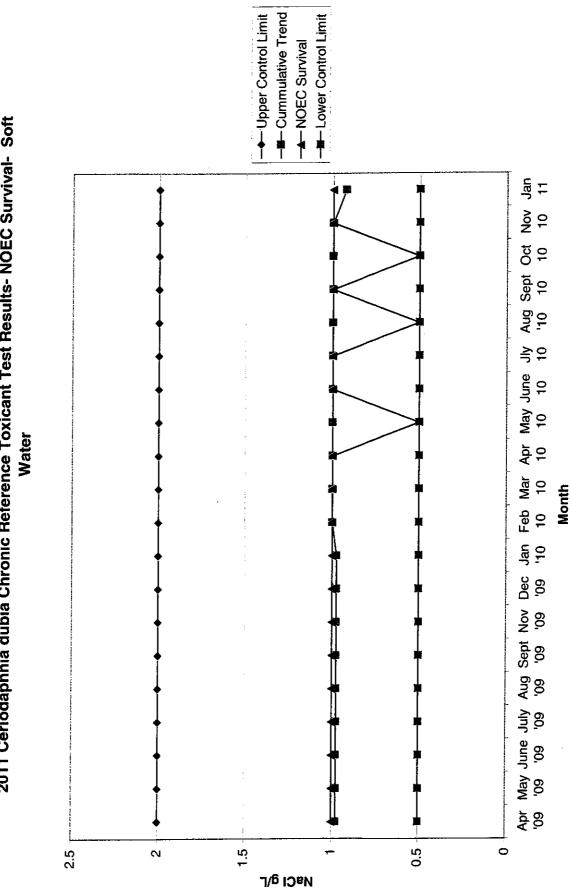


# APPENDIX D QUALITY ASSURANCE CHARTS

		Bio-Analytical Laboratories' 2011 Results of the Monthly Chronic Reference Toxicant Tests	2011 Results	of the Mon	thly Chron	iic Referei	nce Toxicant	Tests	
Month Start- End	Jan 1/7-1/14 13:45-13:10								
		Ceriodaphnia dubia (in soft reconstituted water)	n soft reconsi	tituted wal	(er)				
NOEC survival	1.0								
IC25 repro.	0.6913								
PMSD repro.	21.9								
Avg. repro. control	20.7								
		Fathe	Fathead minnow						
Month Start- End	Jan 1/4-1/11 11:15-13:00								
NOEC survival	1.25								
IC25 growth	1.4953								
PMSD growth	20.2								
Avg. growth control	0.850								
Refere	nce toxicant is 100 a	Reference toxicant is 100 o/1 sodium chloride (NaC1) *In-house organisms not used this month	ieme not need this	c month					

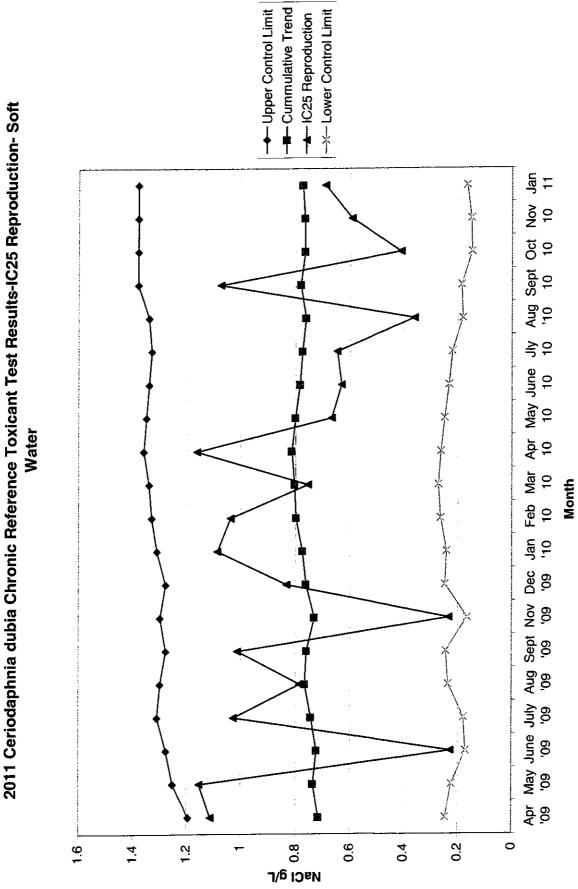
Reference toxicant is 100 g/L sodium chloride (NaCl). \*In-house organisms not used this month. +Test invalid. Not enough time left in the month to conduct a retest.

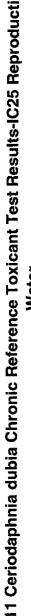
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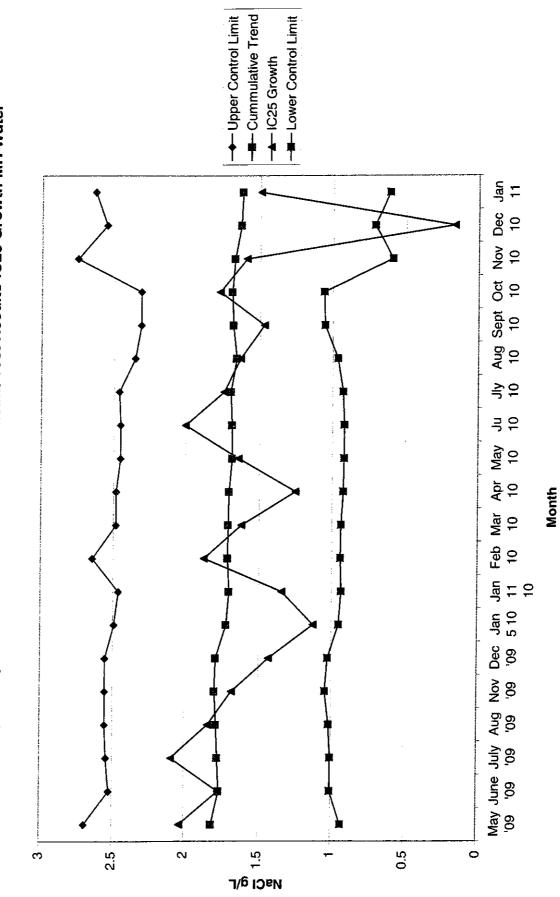
2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft

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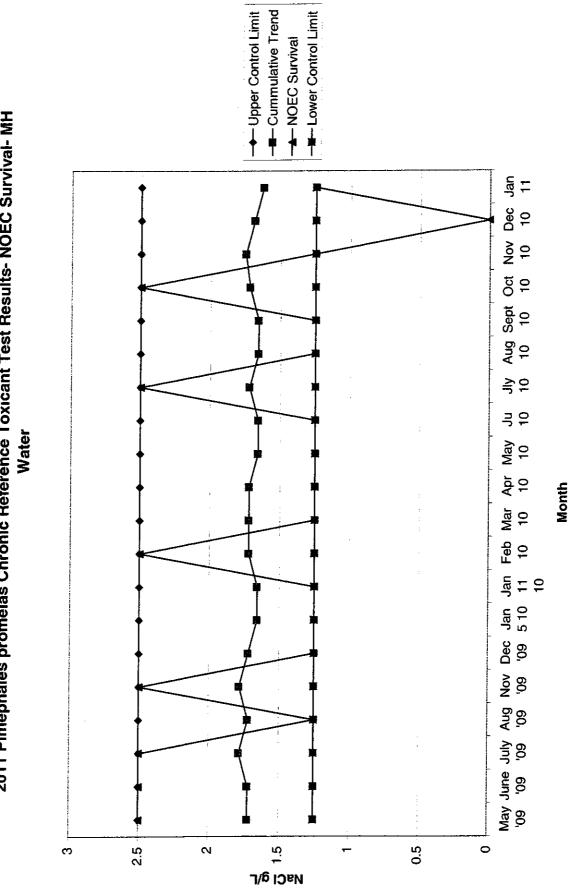


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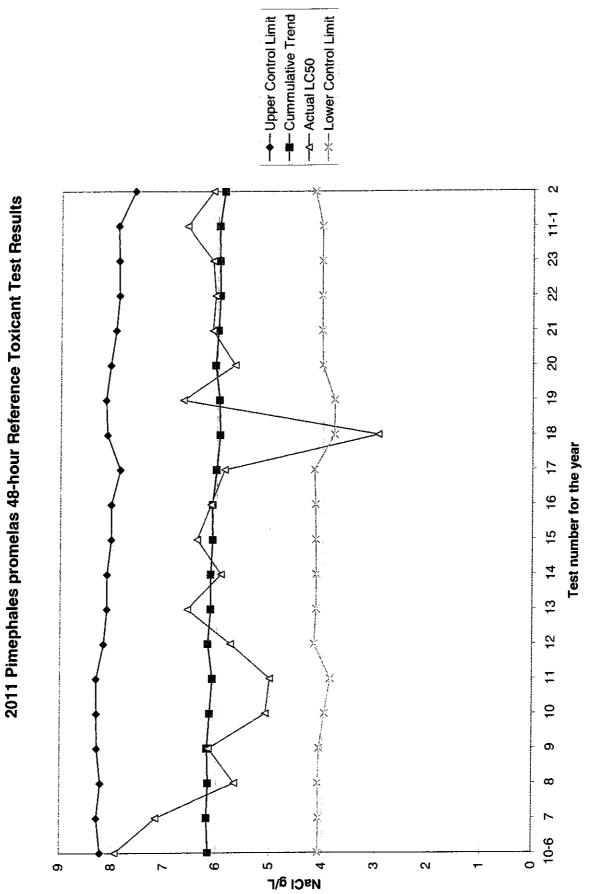


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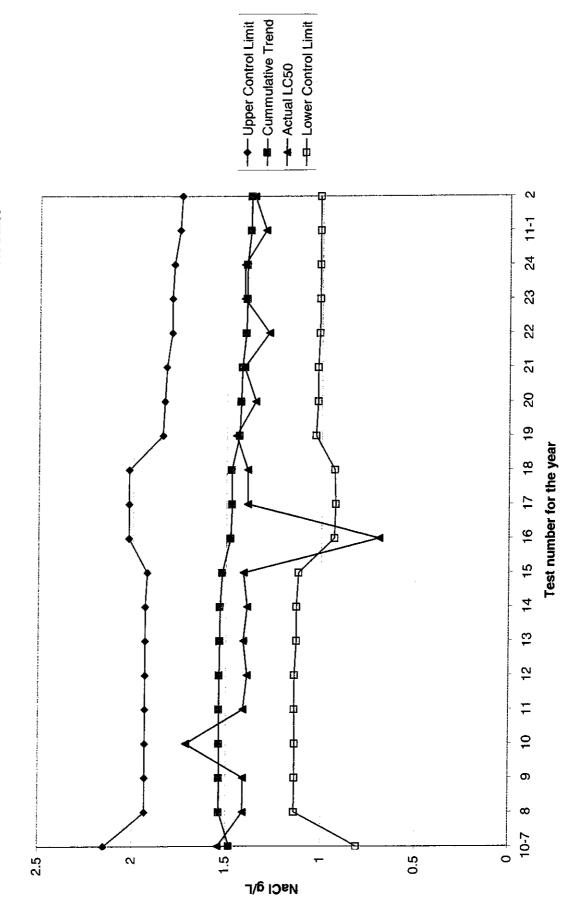


2011 Pimephales promelas Chronic Reference Toxicant Test Results- NOEC Survival- MH

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2011 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results

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### SUMMARY REPORTING FORMS CHRONIC BIOMONITORING

## Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Che	mical		]	NPDE	S No.: AR0000752	
Outfall 001				AFIN	: 70-00040	
	Time		Date		Time	Date
<b>Composite 1 Collected Fro</b>	om 0700		1/16/11	To	0700	1/17/11
<b>Composite 2 Collected Fro</b>	om 0740		1/18/11	То	0740	1/19/11
Composite 3 Collected Fro	om 0730		1/20/11	To	0730	1/21/11
Test initiated:	1450	am/pm			1/18/11	date
Test terminated:	1220	am/pm			1/25/11	date
Dilution water used:	Receiv	ving _		X	Reconstituted	
	J	PERCE	NT SUF	<b>NIV</b>	AL	

Time of Reading			Per	cent Effluent		
	0	32	42	56	75	100
24h	100	100	100	100	*	100
48h	100	100	90	100	*	100
End of test	80	90	90	80	*	80

\*Dilution accidentally lost.

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100
A	23	22	17	9	+	D
B	21	D	11	7	+	D2
с С	23	13	8	D	+	10
D	24	12	3	8	+	5
Е	21	13	9	13	+	6
F	30	11	13	8	+	8
G	D9	8	15	8	+	7
Н	28	7	12	10	+	9
Ι	21	17	D	8	+	5
J	D5	12	17	D	+	5
Surv. Mean	23.9	12.8	11.7	8.9	+	6.9
Total Mean	20.5	11.5	10.5	7.1	+	5.7
CV%*	14.24	35.39	39.05	21.24	+	28.50

\*coefficient of variation = standard deviation x 100/mean. D=dead adult. +accidental death PMSD = 26.9%

#### <u>Ceriodaphnia dubia</u> Survival and Reproduction (cont)

**1. Fisher's Exact Test:** 

Is the mean survival at the end of	f the test significant	tly different	( <b>p=.05</b> ) ti	han the
control survival for the % efflue	nt corresponding to	(lethality):		
a) LOW FLOW OR CRITICAL DILUT	TION (100%):	YES	Х	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 DILUT	ION (100%):	Х	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

-

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#### Biomonitoring Form Chronic Toxicity Summary Form <u>Ceriodaphnia dubia</u> Chemical Parameters Chart

.

Permittee: El Dorad NPDES No.: AR000 Contact: David Sart Analyst: Briggs, Hau	)752/ AFIN aln	70-00040						Sample		: 1/19/11	1 1 1	ime: 0700 ime: 0740 ime: 0730 ime: 1450 ime: 1220	0 ) 0				
Dilution: (	)	Day:							Dilution:	56		Day:			-		
	1	2	3	4	5	6	7	Comments		i	2	3	4	5	6	7	Comments
Temp(C)	24.5	24.6	24.4	24.3	24.5	24.7	24.7		Temp ( C )	24.5	24.6	24.4	24.3	24.5	24.7	24.7	
DO Initial	8.1	8.3	7.9	8.1	8.0	7.8	8.2		DO Initial	8.1	8.2	7.9	8.0	8.0	7.7	8.2	
DO Final	8.2	8.5	8.4	8.4	8.4	8.2			DO Final	8.1	8.1	8.1	8.2	8,1	8.0		
pH Initial	7.9	7.8	8.2	7.8	7.8	7.7	8.0		p <b>II</b> Initial	8.1	8,1	8.1	8.1	8.0	8.2	8.2	
pH Final	8.3	8.0	7.9	7.9	7.9	8.0			pH Final	8.1	8.1	8.1	8.2	8.1	8.0		
Alkalinity	36.0				32.0				Alkalinity								
Hardness	56.0				44.0				Hardness								
Conductivity	166.5	164.7	164.9	165.6	169.4	169.4			Conductivity	376	375	391	387	387	380		
Chlorine	<.01				<.01				Chlorine								
Dilution: 32		Day							Dilution: 1	00	1	lay					
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Conments
Temp ( C )	24.5	24.6	24.4	24.3	24.5	24.7	24.7		Temp ( C )	24.5	24.6	24.4	24.3	24.5	24.7	24.7	
DO Initial	8.1	8.2	7.9	7.9	7.9	7.8	8.2		DO Initial	8.0	8.1	8.4	7.9	8.0	7.7	8.2	
DO Final	8,1	8.3	8.3	8.3	8.3	8.1			DO Final	8.0	8.0	7.9	8,0	8.0	7.9		
pH Initial	8.0	8.0	8.2	7.9	7.8	7.8	8.1		pH Initial	8.3	8.2	8.1	8.2	8.1	8.1	8.1	
pH Final	8.3	8.1	8.1	8.1	8.1	8.2			pH Final	8.4	8.3	8.3	8.2	8.2	8.2		
Alkalinity									Aikalinity	96.0	100.0		100.0				
Hardness									Hardness	44.0	48.0		44.0				
Conductivity	288	276	291	293	299	291			Conductivity	548	555	560	563	560	550		
Chlorine									Chlorine	<.01	<.01		<.01				
Dilution:	42		1	Day					Dilution:				Daj	y	•	·	
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Conuments
Temp ( C )	24.5	24.6	24.4	24.3	24.5	24.7	24.7		Temp ( C )			-					
DO Initial	8.1	8.2	7,8	7.9	7.9	7.8	8.2		DO Initial								
DO Final	8.1	8.2	8.2	8.3	8.2	8.1			DO Final								
pH Initial	8.1	8.1	8.2	8.0	7.9	7.9	8.1		pH Initial								
pH Final	8.3	8.2	8.2	8,1	8.1	8.2		_	pH Final								
Alkalinity									Alkalinity								· · · · · · · · · · · · · · · · · · ·
Hardness									Hardness								
Conductivity	324	327	332	335	331	350			Conductivity								
Chlorine									Chlorine								

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

Permittee: El Dorado Cher Outfall 001	nical		NPDES No AFIN: 70-0	<b>.: AR0000752</b> 0040
<b>Composite 1 Collected from</b> <b>Composite 2 Collected from</b> <b>Composite 3 Collected from</b>	n: 0740	Date 1/16/11 To 1/18/11 To 1/20/11 To	Time 0700 0740 0730	Date 1/17/11 1/19/11 1/21/11
Test initiated: Test terminated:	1445 0920	am/pm am/pm	1/18/11 1/25/11	date date

Dilution water used:

ReceivingXReconstitutedDATA TABLE FOR SURVIVAL

Effluent Conc. %	Pe	rcent Surv	ival in Reg	olicate Cha	Mea	CV%*			
	A	В	С	D	Ē	24h	48h	7 days	
0	100	87.5	75.0	100	87.5	97.5	97.5	90.0	11.68
32	100	100	100	100	100	100	100	100	0.00
42	100	100	75.0	100	87.5	100	100	92.5	12.12
56	87.5	87.5	100	87.5	87.5	100	100	90.0	6.59
75	87.5	87.5	100	75.0	100	100	100	90.0	11.68
100	100	100	100	100	100	100	100	100	0.00

## DATA TABLE FOR GROWTH

Effluent Conc. %	Ave	rage Dry Wei	Mean Dry Weight mg	CV*			
	A	В	С	D	Е		
0	0.775	0.513	0.600	0.725	0.538	0.630	18.33
32	0.525	0.400	0.600	0.675	0.625	0.565	18.93
42	0.738	0.675	0.388	0.625	0.463	0.578	25.49
56	0.538	0.650	0.738	0.550	0.625	0.620	13.11
75	0.488	0.650	0.738	0.588	0.775	0.648	17.87
100	0.675	0.563	0.750	0.688	0.600	0.655	11.34
0-SN	0.775	0.586	0.800	0.725	0.614	0.700	13.68

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

**PMSD =** 27.2%

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

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

Is the mean survival at 7 days significantly different (p=.05) than the control										
survival for the % effluent corre	sponding to:									
a) LOW FLOW OR CRITICAL DILUT	Г <b>ION (100 %)</b>	YES	X	NO						
b) <sup>1</sup> / <sub>2</sub> LOW FLOW DILUTION	(N/A%)	YES		NO						

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

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

a) LOW FLOW OR CRITICAL DILUTIO	YES	Х	NO	
b) <sup>1</sup> / <sub>2</sub> LOW FLOW DILUTION	(N/A%)	YES		NO

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

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

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

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

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

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

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Pimephales prometas</u> Chemical Parameters Chart

.

· .

NPDES No.: AR0000752/ AFIN 70-00040 Sample No																	
Bilution: 0 Day:						Dilution: 56 Day:											
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.5	25.1	24.2	24.0	24.3	24.4	25.0		Temp ( C )	24.5	25.1	24.2	24.0	24.3	24.4	25,0	
DO Initial	6.0	4.8	5.1	5.0	5.4	5.5	6.6		DO Initial	6.4	5.6	5.i	5.0	5.1	5.9	6.1	····
DO Final	8.2	R.5	8.4	8,4	8.4	8.2			DO Final	8.1	8.t	8.1	8.2	8.1	8.0		
pH Initial	7.6	7.5	7.4	7.4	7.4	7.3	7.6		pH Initial	7.8	7.5	7.5	7.4	7.3	7.5	7.6 ·	
pH Final	8.3	8.0	7.9	7.9	7.9	8.0			pH Final	8,3	8.2	8.2	8.2	8.1	8.2		
Alkalinity	36.0				32.0				Alkalinity								
Hardness	56.0				44.0				Hardness								
Conductivity	166,5	164.7	164.9	165.6	169.4	169.4			Conductivity	376	375	391	387	387	380		
Chlorine	<.01				<.01				Chlorine								
Dilution: 32		Day							Dilution; 7	5		Day	•			•	
	1	2	3	4	5	6	7	Comments		L	2	3	4	5	6	7	Comments
Temp ( C )	24.5	25.1	24.2	24.0	24.3	24.4	25.0		Temp(C)	24.5	25.1	24.2	24.0	24.3	24.4	25.0	
DO Initial	6.0	5,4	5.0	4,9	5.0	5.8	6.7		DO Initial	6.4	5.7	5,1	5.0	5.1	5.9	6.2	
DO Final	8.1	8.3	8.3	8.3	8.3	8.1			DO Final	8.1	8.1	8,0	8.1	8.1	8.0		
pH Initial	7.6	7,4	7.4	7.3	7.2	7.4	7.5		pH Initial	7.9	7.6	7.5	7.6	7.6	7.6	7.6	
pH Final	8.3	8.1	8.1	8.1	8.1	8.2			pH Final	8.3	8.2	8.3	8.2	8.2	8.3		
Alkalinity									Alkalinity	-							
Hardness									Hardness								<del></del>
Conductivity	324	327	332	335	331	330	_		Conductivity	451	447	465	461	460	450		
Chtorine									Chlorine								
Dilution:	42		Г	Day					Dilution: £00 Day								
	1	.2	3	4	5	6	7	Comments		t	2	3	4	5	6	7	Comments
Temp ( C )	24.5	25.1	24.2	24.0	24.3	24.4	25.0		Temp (C)	24.5	25.1	24.2	24,0	24.3	24.4	25.0	
DO Initial	6.ł	5.5	5.1	5.0	5.0	6.0	6,6		DO Initial	6.6	5.8	5.1	5,0	5.0	5.9	6.5	
DO Final	8.1	8.2	8.2	8.3	8.2	8.1			DO Final	8.0	X.O	7.9	8.0	8.0	7.9		
pH Initial	7.6	7,5	7.4	7.3	7.2	7.5	7.6		pH Initial	8.0	7.7	7.6	7.6	7.6	7.6	7.7	
pH Finat	8.3	8.2	8.2	8.1	8.1	8.2			pH Final	8,4	8,3	8.3	8.2	8.2	8.2		
Alkalinity									Alkalinity	96.0	100.0		100.0				
Hardness									Hardness	44.0	48.0		44.0				
Conductivity	324	327	332	335	331	330			Conductivity	548	555	560	563	560	550		
Chlorine									Chlorine	<.01	<.01		<.01				

# APPENDIX F REPORT QUALITY ASSURANCE FORM



# **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

# REPORT QUALITY ASSURANCE FORM

IDorado Chemica Client: X4285 Project#:

Proofed First Draft:	
Proofed Final Draft:	AL Briggs

Date:	
Date: 2/20/11	
<u> </u>	<u> </u>

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.

Date: 0/20/

Quality Assurance Officer

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



Bio-Analytical Laboratories (BAL) ADEQ Certificate #88-0630 Project X4310

#### **Bio-Analytical Laboratories' Executive Summary**

Permittee:	El Dorado Chemical Company 4500 Northwest Avenue El Dorado, AR 71731
Project #:	X4310
Outfall:	001
Permit #:	AR0000752/ AFIN #70-00040
Contact:	David Sartain
<b>Test Dates:</b>	February 8 - 15, 2011
Test Type:	<ul> <li>Chronic Static Renewal Survival and Reproduction Test using <i>Ceriodaphnia dubia</i> (EPA Method 1002.0).</li> <li>Chronic Static Renewal Survival and Growth Test using <i>Pimephales promelas</i> (EPA Method 1000.0).</li> </ul>

#### **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 - 32%.

5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 22.13%.

# Note: The UV treated 100% dilution showed no lethal effects, but did show nonlethal effects.

#### 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 TOP6C - 15.16%

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

This report contains a total of 54 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 NELAC and ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

# **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

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

AT

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

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

EPA Methods 1000.0 and 1002.0

Project X4310

Test Dates: February 8 - 15, 2011

Report Date: March 22, 2011

Prepared for: David Sartain 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

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#### **1.0 Introduction**

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

#### 2.0 Methods and Materials

#### 2.1 Test Methods

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

#### 2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnow test organisms were obtained from Aquatic Biosystems, Fort Collins, Colorado and were less than 48 hours old at test initiation. The minnows were acclimated to dilution water hardness prior to test initiation. Forty-eight hour reference toxicant tests, using sodium chloride (NaCl), were run a minimum of once monthly in order to document test organism sensitivity. Monthly chronic reference toxicant tests, using potassium chloride, were also conducted in order to document organism sensitivity and testing technique.

#### **2.3 Dilution Water**

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

#### **2.4 Test Concentrations**

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

#### 2.5 Sample Collection

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on February 7, 9 and 11, 2011. Upon collection and completion of each composite, the samples were chilled to 4<sup>o</sup> 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  $25\pm1^{0}$  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. The effluent was filtered through a 60 micron plankton net in order to remove any organisms that might interfere with the tests. It was also 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  $25\pm1^{0}$  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  $25\pm1^{0}$  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.

#### 2.8 Data Analysis

Ceriodaphnia dubia survival data was analyzed using Fisher's Exact Test, an equality test comparing concentration data to control data. Reproduction data was analyzed using Dunnett's Test, a parametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Steel's Many-One Rank Test and the growth data was analyzed using Dunnett's Test. The IC<sub>25</sub> value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC<sub>50</sub> values (that concentration of a substance which is lethal to 50 percent of the test organisms after continuous exposure for the duration of the test) in the reference toxicant tests were obtained by approved EPA methods of analysis.

#### 3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. One hundred percent survival occurred in the control and in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 19.9 and 12.2, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 and 32 percent effluent, respectively (p=.05). One hundred percent survival and an average of 9.6 neonates was noted in the 100 percent UV treated dilution.

The fathead minnow test results can be found in Table 2. Ninety-five percent survival occurred in the control and 100 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.680 milligram (mg), while the average in the critical dilution was 0.870 mg. The NOEC for survival and growth in this test was 100 percent effluent. Eighty-seven-point-five percent survival and an average weight of 0.663 mg was noted in the UV treated dilution.

	ADIV II IIVOWIND V				
Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates - Total	Sig.*
Control	100.0		19.9	19.9	
32.0	100.0		17.3	17.3	
42.0	100.0		14.4	14.4	*
56.0	100.0		14.7	14.7	*
75.0	100.0		12.0	12.0	*
100.0	100.0		12.2	12.2	*
100.0 UV	90.0		10.7	9.6	*

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

\*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.

Percent Effluent	Percent Survival	Percent Survival Sig.* Mean Dry Weight (mg)		Sig.*
Control	95.0	0.680/0.720+		
32.0	85.0	0.698		
42.0	95.0	0.853		
56.0	90.0	0.768		
75.0	92.5	0.853		
100.0	100.0	0.870		
100.0 UV	87.5		0.663	

### Table 2: Results of the Chronic Definitive Fathead Minnow Test

\*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 48-hour reference toxicant test results can be found in Table 3 below. The acute test results indicate that the test organisms were within the respective sensitivity range. The monthly chronic reference toxicant tests also showed those test organisms to be within the respective sensitivity range. The graphs of the results of the acute and chronic reference toxicant tests can be found in Appendix D- Quality Assurance Charts.

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC <sub>50</sub>	Upper and Lower CUSUM Chart Limits
Ceriodaphnia dubia	2/1/11 - 2/3/11 15:30 - 13:30 hours	1.39	1.72 - 1.01
Pimephales promelas	2/1/11 - 2/3/11 +	1.23	1.26 - 0.726

Table 3: Results of the 48-hour Reference Toxicant Tests       - g/L
--

+Times not given by provider

#### 4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 7, 9 and 11, 2011 were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after seven of exposure (p=.05). Nonlethal effects (i.e., lack of reproduction or growth) were noted in the critical dilution in the *Ceriodaphnia* test but not in the fathead minnow test (p=.05). Treating the effluent with ultraviolet light did not decrease the nonlethal effect in the *Ceriodaphnia* test.

#### 5.0 Reference

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.

X4310 Page 10 of 54

#### APPENDIX A CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Fax (318) 745-2773 <u>bioanalytical@att.net</u> NELAP 01975, ADEQ #88-0630, EPA LA00917	CEAIN OF CUSTODY 917	<u> </u>	Tempe Therm Tech: Date:		Temperature up Thermometer #: Tech: RC Date: 2  7  ,,		upon arrival: #: みっ #: みっ			Lab	Laboratory Use Only:	
Company: Phone: El Dorado Chemical Company (870) 863-1484			Ana	Analysis:						<u> </u>		Project Number:
Fax: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499	[4999		Chroni	Chroni		A cute	Acute I	∙ ətuəA	Fecal (	Total C		X4310
Permit #: AR0000752	er:		c Ceriod	vonnim ə		Binnqa Daphnia		Ceriodap	motiloC	motilo		Temp. upon arrívaí:
Sampler's Signature/Printed Name/Affiliation:	°C		aphnia	<i>N</i>		sətəəds						
Date Start     Time Start     C     G     #       Date End     Time End     C     ocntainers	Sample Identification	On			(ə	<u>.</u>					Lab Control Number:	Preservative: (below)
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Nout Neutri LEDCC	2-7-11	0946				ľΨ	Ϋ́,				1-1-1	0945
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Method of Shipment: <u>X</u> Lab Bus Fed Ex Comments:	ExDHL	UPS			Client_		Other	1	Tracking #	ве #		

bioanalytical@att.net NELAP 01975, ADEQ #88-0630, EPA LA00917	4 LA00917	Lab	Laboratory Use Only:
Company: Phone: Phone: (870) 863-1484	114884	Analysis:	Project Number:
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Sampler's Signature/Printed Name/Affiliation:		resh/r	
Dinnol Soutien Davis SARTAIN 12	-ucc	narino	Procorvative
Date Start         Time Start         C         G         #           Date End         Time End         Time Time Time End         C         #	Sample Identification	6	Lab Control Number: (below)
2-8-11 0715- X D	001	XX	(25104 lice
		Tomperati ine upon drival: 1.80	e
		, bei#	
		Tech AND	
Reinquished by/Afriliation:	Date: Time:	: Received by Affiliation:	Date: Time:
Manual Austram IEDEC	2-9-11 88	15 L12.	2-911 D
od by/Affilia	Date: Time:	: Received by Affiliation:	Date: Time:
Relinquished by/Affiliation:	Date: J-Q-1/ VPAC	Received by/Affiliation:	Date: Time:
Method of Shipment: / X Lab Bus	Fed Ex DHL	UPS ChientOther Tracking #	#

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Bio-Analytical Laboratories CHAI 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Fax (318) 745-2773 <u>bioanalytical@att.net</u> NELAP 01975, ADEQ #88-0630, EPA LA00917	CHAIN OF CUSTODY							Lab	Laboratory Use Only:	
Company: El Dorado Chemical Company (870) 863-1484		Analysis:	ysis:							Project Number:
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499		———————————————————————————————————————			əîuəA	Acute	Fecal (	) IntoT		X4310
Permit #: AR0000752		c Ceriod	)wommn.	sinnqad 		qsboireC	miotilo(	m101ilo		Temp. upon arrival:
Sampler's Signature/Printed Name/Affiliation:			fresh/marin v			Bind	<u> </u>			
C #	Sample Identification		(2)	(8)					Lab Control Number:	Preservative: (below)
2-10-11 0745 Jun X \$ 8 001		×	×			╞──╽			Esse?	ice
	Temperature upon arriv				<u>À</u>	1,3%				
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Relinquished by/Affiliation: Date:	e: Time:	Q		Ned by/Am	liation:	<i>א</i> ָ "			Date:	Time:
Method of Shipment: <u>X</u> Lab <u>V</u> Bus Fed Ex_ Comments:	DHLUPS	žu ž	Client	Ħ	Other		Tracking #	ing #		

X4310 Page 14 of 54

#### APPENDIX B RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project # X4310	Date start	-: 318/11 Date er	nd: 2/15/11
	Dorado Ch		
Address 4500 No	rthwest Ave., t	ElDomolo, FIE	<u> </u>
	2752 AFIN-		
	onOO		
Test Temperature(	°c) <u>35±1°c</u>	TechniciansBrog	s, Houghton, Zachler, Callahan
Adults isolated:	Date 214111	_Time: <u>2300</u>	
Dissolved Oxygen pH Meter: <u>Conductivity Meter</u> <u>Amperometric Titr</u> Effluent Initial D.O. (mg/L & %)/Tech 0.104(122,9%)/Job 1.104(122,9%)/Job 2.11.2/129.52/RC 3.10.3/125.52(AH 4.104(127,1%)/JBZ 5.10.81(29,3%)/JBZ 5.10.81(29,3%)/JBZ	(mg/L & 8)/Tech 0. y/15/8.1/9556/20m 1. y/15/8.1/9656/20m 2. Y/15/8.1/95.3 %/R 3. Y/15/8.0/95.49%/R 4. y/15/8.2/96.88668m 5. y/15/8.0/95.88668m	50A         Serial #00           1         230A+         Serial #00           ol         Company Serial           er-Porter Serial           Receiving Water           Initial D.0.           (mg/L & %)/Tech           0.           1.           22.           3.           4.           5.	<u>5E2089</u> <u>20273</u> <u># 80277924</u> <u># 92W445766</u> Aerate?/Minutes /Final D.O. (mg/L & %)/Tech 0 1 2 3 4 5
6. 11. 1/ 131.92 Re	6. <b>Y/ 15/ 8,1/96.420   R</b> C	c6	6
7	7		
<u>Total Residual</u> <u>Chlorine(mg/L)/</u> Tech	<u>Dechlorinated?</u> <u>Amount?/Tech</u>	<u>Ammonia (NH3)</u> (mg/L)/Tech	BAL Sample # Dotte
1. <u>LO. VI 1887</u>	1. NOblog	1. 3.0/80m	1.02551 21811
2. <0.01/RC	2. No RO	2. <u>3.0/RC</u>	2. C2564 4/10/11
3. <u>&lt;0.01 berny</u>	3. <u>NO Jobby</u>	3. 182 Jalon_	3 (2 58.3 Platin
Comments:		· ·	
	$\sim$ 10	- 1.0	alactor

Filtered effluent thru 60 µm plankton net to remove any live organisms.

X4310 Page 16 of 54

BIO-ANALYTICAL LABORATORIES NUMBER NEONATES PER BROOD CERIODAPHNIA

Project #X \_ 310	Test Dates 2/8/11 - 3/15/11
Client_ <u>El Dorado</u>	Chemical

Replicate			% (	Concentra	tion		
	0	32	42	<u>ی</u> ک	75	100	100
А	19	15	15	16	11	7	X
В	20	20	17	12	12	13	8
С	24	21	24	15	14	14	p13
D	17	18	11	14	13	9.	11
Е	24	18	17	13	9	12	16
F	12	15	13	13	7	15	14
G	20	18	14	14	18	15	13
Н	19	13	13	17	13	10	2
I	16	17	12	19	13	13	12
J Z	AH DIVE	18	8	14	10	14	7
Surviving Mean	19.9	17.3	14,4	14.7	120	12.2	10.7
Total Mean	<b>P</b> . <b>P</b>	17.3	14,4	14.7	12.0	12.2	9.6
CV%*	14.69	13.91	30.04	14.30	2515	20.13	4032

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

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Key: M=male; X=dead ad	4
Calculated by: <u>RC</u>	2/15/11
Calculations checked by:	AH 2/16/11

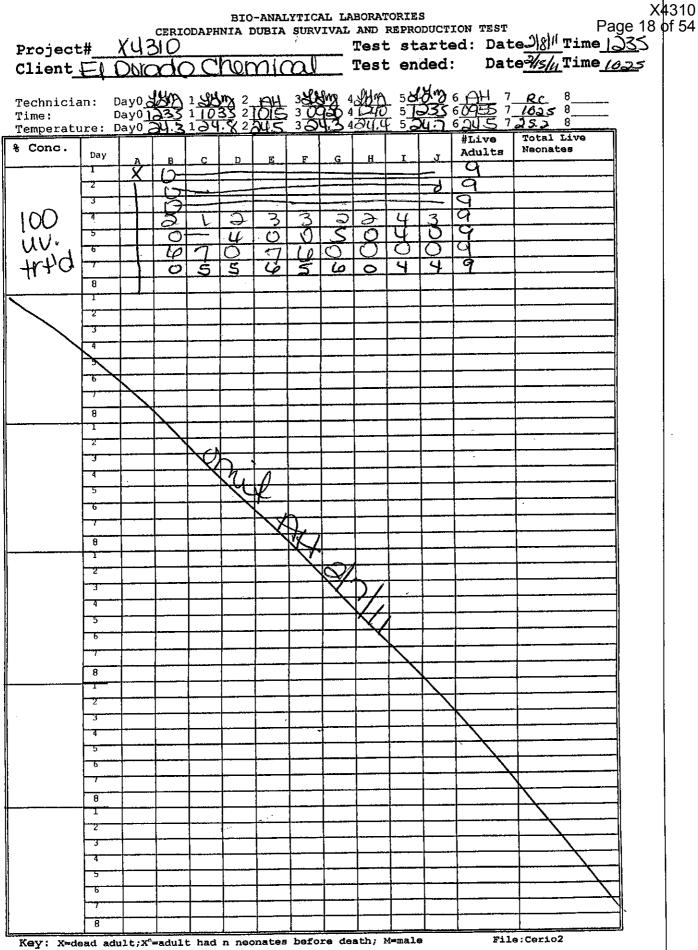
	CERI	BIO- CODAPHNIA DI	ANALYTICAL I JEIA SURVIVA	ABORATORIE L AND REPRO	S ODUCTION TEST	Page	X43 e_17 pf
Project	:# <u>XY3ID</u>	>	, ,	Test st	arted: Dat	Page e_][8/11]Time_12	35
Client	El Dooda	) Char	licol	Test en	ided: Dat	e <u>)////</u> Time /65	25
Technici Time: Temperat	an: Day0	12/27 2 1 51 1035 210 1 24.8 25	14 2000 215 30000 215 30000	4 2400 51 4 240 51 4 240 51	604557 233609557 14-7624.57	RC 8 1035 8 35.2 8	
% Conc.	Day				#L1Ve	Total Live Neonates	
			E E G	<u>H</u>	<u>J</u> Addites		
	2 0				D W		
~		23	<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>		10 a 10		
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	8						

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

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BIO-AN/ Project#	ALYTICI	AL LAB(	DRATOR. T	IES 7-1 'est st	DAY WAI	Dated	LS-ม เป็น เป็น เป็น เป็น เป็น เป็น เป็น เป็น	e 1235	X
lient ELDOM		Nomic	T CO	'est en	ded:	Date 🛃	usly Tim	e <u>/6as</u>	Page 19
rganism C.QU			2101		1	[		]	
Day/# water used	03/28	~	3131	3	4	į 5	6	7	8
Concentration: Con	ntrol <u>S</u>	04	$\overline{a\alpha}$	n 8 /	h8 /	0.02	19/	18/	<u></u>
рH	8.1	8.0	1. K9	19	1.9	0.1.6	19.9	10	· · · · ·
DO(mg/l)	8.4	8.8.3	8.8.3	8.8.4	808.2	8.2.3	8-81	8.0	
Cond(umhos/cm)	NO.4	(73.3	164.3	167.1	1109.1	166.4	168.7		
Alkalinity(mg/L)	36.0		32.0		· · · · · · · · · · · · · · · · · · ·			[	
Hardness (mg/L)	48.0	[	48.0	]					L
Concentration: 3	32	<u> </u>		<del>- A - C</del>					<b></b>
рH	8.0	1.8.0	5199	1.8.0	199	8.4.8	1.8.0	1.9	
DO(mg/1)	83	8.0.2	8.8.2	8.8.2	8.8.2	8.18.2	8.0	2.9	
Cond (umhos/cm)	303	313	303	307	302	309	302		
Concentration: 42	5			<u> </u>			- 77 - 2		
рН	8.1	8. 8. 0	8.8.0	28.0	8.8.0	1.8.0	8.20	1.1	
DO (mg/1)	8.2	8.8.2	8.18.1	8.8.1	8.08.1	1.8.2	8.0	2.9	
Cond (umbos/cm)	343	348	344	346	342	347	343		
Concentration: 5	50	<u> </u>			· // · · /				<del>,</del>
рн	8.1	8.8.1	88.0	8.0	8.8.0	1.98.0	8. 80	8.0	
DO(mg/l)	8,2	1.8.1	8.8.1	8.8.1	8.0 8.1	1.98.1	8.80	1.9	
Cond (umhos/cm)	400	406	403	406	408	YOS	399		
Concentration: TE	52	····		<del></del> >	·		, 	202	·
pH	8.1	8.1	8.8.1	8.8.0	8.8.1	1.8.1	8-80	8.0	
DO (mg/l)	8.1	1.9.1	8.98.1	8.8.0	88	19.0	8.8.0	28	
Cond(umbos/cm)	479	486	483	487	487	482	480		J
Concentration: 10	DZ								
pH	8.1	B. R.1	838.1	8.8.1	8.	8.8.1	818.1	8.1	
DO (mg/1)	8.0	1.20	898.1	8.8.0	808.1	1.9.0	180	28	
Cond (umhos/cm)	581	593	591	<u>593</u>	591	593	586		
Tech-prerenewal	RC	537	AH	SSM .	SELIP	SAN	AA	RC	
Tech-postrenewal		der	RC	RC	form (	HAM 3	RC		
								1	1 II
Hardness(mg/l)	44.0		59.0	(	560				└────╢

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Key: prerenewal/postrenewal

BIO-ANZ	ALYTICA SID	AL LABO	DRATORI	IES 7-E est sta	AY WA1	rer QUA Date <u>ð</u>	LITY L 811 Time	a 1235	X Page 20
lient ELDOYO	$\frac{do C}{bla}$	hemi	m Con	est end	led:	Date	<u>Sh</u> Time	e <u>/035</u> F	Page 20
Devel # up have ugod	212	1	23131	3	4	5	б	7	8
Concentration: Cor	irrol S	SHALL 17	N2 11	UNAT	-1				
-U		R.1	AL.	R-0,	8	8.0 8.1	8.00	8.1	
рH	7.8	8.0	8.1	2.	28.0	0.8-0	80	06/	
DO (mg/l)	7.8	18	1.1.8	1.1	7.9	1.1.8	18	10	
Cond (umhos/cm)	581	587	581	587	281	587	579		
Alkalinity(mg/L)									
Hardness (mg/L)		L		l		<u> </u>		l	L{
Concentration:	r	T	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					~ ~	·
pH									
DO (mg/1)									
Cond (umhos/cm)	<u> </u>					<u> </u>			L
Concentration:		<del>i}</del>							<b></b>
рН		Q.	x				$\angle$		
DO (mg/1)		X	$\mathbf{k}$						
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Concentration:			<u> </u>		<u>,                                     </u>				
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Cond (umhos/cm)		1 Maria	MI	HAMA	HAMA	HOM	1 FAH	RC	
Cond(umhos/cm) Tech-prerenewal	RC	101A	HHT						
	RC	207	RC	RC	Josh .	Gella	AH		
Tech-prerenewal	RC	999	RC	RC	Sesta	SHID	AU		

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X4310 Page 21 of 54 BIO-ANALYTICAL LABORATORIES PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET Date started: 2/8/11 Date ended 2/15/11 Project # XUZO Chemico Client/Contact <u>176</u> 1 FIDOCAC Northura Address 45 NPDES# H Dilution Water Soff reconstituted Sample Description\_ Technicians Brogstbughton, Zeafren, < 48 Vendor/ID#<u>ABS</u> Test organism age\_ Feeding Times <u>Technician/Time/Amount (per replicate)</u> Day PMNOON AM MM1135510.20m1 0 <u>1135010.10ml</u> 2011104510.10ml 100300,0m) 1 132510.10ml 061064510,10m1 CM04510.10ml 2 122010.20m 105510,10ml 07301010ml 3 11310 0120m 1010,20m 4 asoto. Jom 1 5 0,20mi 1430/0.10ml 11055 O. Jame 2114010,10m1 6 Serial #06E2089 YSI550A Meter Model <u>Dissolved</u> #020273 Serial Model Orion 230A+ pH Meter: Serial <u>#80277924</u> Model Control Company Conductivity Meter: #92W445766 Fischer-Porter Serial Amperometric Titrator: Model Aerate?/Minutes Receiving Water Aerate?/Minutes Effluent Initial DO /Final DO /Final DO Initial <u> १)/Tech</u> (mg/L & (mg/L & %)/Tech\_ (mg/L & %)/Tech DO(mg/L&%)/Tech <u>A</u>[ JA 0.10.4/122.9% Hom 0. 4/15/8.1/95,54062000 0. 1.10.4/125.1% den 1. 1 1/15/8.1196.590/000g1 2.11 2/129.5% RC 2×115/8.1/95.3%/RC2 3.10.3/125.5%/RC 5498 100 4.10.9/127.1%/Sloom 4.4/15/812/96.690/88mg 5. VIIS 8. DIQ 5. 890995 129.3420m 5.10.81 5. 6.11.1/131.9% Re 6. 4/15 8,1/96,4%/RG 6.\_ BAL Sample # Total Residual <u>Ammonia(NH3)</u> Dechlorinated?  $\mathcal{O}$ Chlorine(mg/L)/ Amount?/Tech (mg/L)/Tech <u>Tech</u> 10255 40.01 HB ND 2C2564 2. 3.0 /RC 50.01 No 3 C2583 20,01 1820 Comments: Filtered effluent thru 60 um plankton net to remove any live organisms.

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project	<sub>#</sub> χι	1310			Test	: start	ed: Dat	е <sup>2/8</sup> / <sub>И</sub> Ті	Lme/345
Client			hemia	10	Test	: ended	: Dat	e Jish Ti	Lme 0950
Technicia	n: Day0	RC 1	× 2 2	$\frac{RC}{1626}$ 3		4 4 8 8 m 8	5 25 5 5 1155	6 <u>RC</u> 60950	7 J. M. 7 19950
Time: Temperatu	Day0 re Dav0	<u>/345</u> 1 <u>(</u> 25112	$\frac{2Q_{15}}{16.0}$ 2	<u>7635</u> 3 24:6 3	24.6	4 2413	524.7	6 <u>24.7</u>	734.8
				[ <u> </u>		[		T	
Conc.Z	Rep.	Day O	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	A	8	8	7	2	7	1	7	7
	в	8	8	8	8	8	8	8	8
$\sim$	С	8	8	8	7	$\overline{7}$	7	7	7
O		8	8		0	8	8	8	$\overline{\mathbf{Q}}$
	D			8	8	8	8	8	8
	E	8	8						
	A	8	8	8	8	8	8	8	<u>l</u> e
	в	8	8	8	8	8	8	8	8
	С	8_	8	8	8	8	8	8	ጊ _
32	D	8	8	8	8	8	8	8	7
	E	8	8	8	7	7	7	7	6
	A	8	8	8	8	8	8	8	8
		8	8	8	\$	8	8	8	5
	B		8	0	8	8	8	8	
42	C	8	8	8	8	8	8	8	8
			8	<u> </u>	8	8	8	8	8
ļ	E	8	8		8	8	1	8	
	A	8		8		8	8	8	8
	В	8	8	8	8	1	8		8
5	С	8	8	8	8	8	7	7	6
	D	8	8	8	8	<b>ר</b>	7	7	7
	E	8	8	8	8	8	8	ີງ	
	A	- X	8	8	8	8	8	8	8
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75		8	8	8	8 8	18 718	8	8	8
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IDU	C	<u> </u>	0	8	8 8 8	1 1	8	8 8	
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File: Minnow2

BIO-ANALYTICAL	LABORATORIES	7-DAY	CHRONIC	MINNOW	SURVIVAL	DATA
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Project#_	Xu	120			Test	start	ed: Dat	е 🦓 /, Ті	me <u>1345</u> me 0950 7 <del><u>J</u>J<del>1</del> 7 095,0 7 095,0</del>
Client F	DOVO	do U	hennic	D	Test	ended	: Ju Dat	e <u>JIJy</u> Ti	me 0950
Technician	: Day0	RC 18	1000 2	RC 3	<u>Rc</u>	4 <b>407</b>	5 (155	6 RC	7 diting
Client <u>F</u> Technician: Time: Temperature	Day0_ e Day02	<u>1945</u> 1 <u>0</u> またし 1つ	$(\mathbf{U}, \mathbf{U}) = 2$	24.6 3	<u>Rc</u> 0920 34.6	4 2413	5 <u>ali</u>	6 <u>24.7</u>	724.8
		Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
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BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET Project#/Client X4310/EL DORADO Chemical Dates 2/8/11 - 2/15/11

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: Jol 1 Tech: AH	Wt. of pan + larvae(g)/ Date Jijolii weighed: Jyw 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*
	× 31	0.91001	0.9659	6.0058	8	0.725	0,829 (٦
	в За	0.9567	0.9623	6.0056	8	0.700	
0	c 33	0.9476	0.9530	0.0054	8	0.675	10,171 (r
	D 34	0.9431	0.9482	0.0051	8	0,638	
	e 35	0.9414	0.9467	0.0053	8	0.663	
	<u> ^ 36</u>	0.9523	0.9573	6.0050	8	0.625	
	в 37	0.9389	0.9460	0.0071	8	G,888	
32	c 38	0.9307	0.9365	0.0058	8	0.725	
	D 39	0.9288	0.9345	0.0057	<u> </u>	0.713	
	E 40	0.9292	0,9335	0.0043	8	0.538	
	x 41	0.9338	0.9408	0.0070	8	0.875	
	в 42	0.9350	0.9420	0.0070	8	0.875	
42	c 43	0.9380	0.9446	0.0066	8	0.825	
	D 44	0.9450	0.9513	0.0063	8	0.788	
	E 45	0.9479	0.9551	0.0072	8	0.900	
	A 46	0.9522	0.9592	0.0070	8	0.875	
	в 47	0.9569	0.9643	0.0074	8	0.925	
56	<u>c 48</u>	0.9513	0.9623	0,0050	8	6.625	
	D 49	09578	0.9633	0.0055	8	0.688	
	<u>e 50</u>	0.9632	0.9690	0.0058	8	0.725	
	<u>^ 51</u>	0.9604	0.9740	0.0076	8	0.950	
	B 52	0.9602	0.9713	0.0051	<u> </u>	0.638	
75	<u>c 53</u>	0.9676	0.9756	0.0080	<u> </u>	1.000	
	<u> </u>	0.9704	0.9764	0-0060	8	0.750	
	<u>E 55</u>	0.9728	0.9802	0,0074	8	0.925	
	x 56	0.9703	0.9782	0.0019	8	0.988	
	в S7	0.9407	0.9727	0-0060		0.750	
100	c .58		09719	0-0081	<u> </u>	1.013	
	D 59		0.9658		8	0.725	
	E 60		0.9635 surviving larvae at en		8	0.875	

X4310 Page 25 of 54

# BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET Project#/ClientX4310/EL DORADOCHEMIC Test Dates 2/8/11-215/11

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed:0/10/11 Tech: AH	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*
	A 61	0.9527		0.00.54	8	0.1075	
	B 62	0.9482	0.9534	0.0052	8	0.650	
100	° 63	0.9437	0.9491	0.0054	8	0.675	
uv,	D 64	09419	0.9463	h.0044	8	0.550	
trd	E 65	0.9410	0.9471	6.006	8	0,7103	
	X						
	в						
	c						
	D		I .				
	E	8					
	A	B	è i i				
	В	<b>`</b>					
	С		10				
	D		10				
	E						
	A		· · · · · · · · · · · · · · · · · · ·	1 a			
	В		1				
	c						
	D			<b>`</b>			
· · · ·	E						-
	A						
	B				$+ \overline{}$		
	С				- <u> </u> `		1
	D				-	$\uparrow$	-1
	E	<u>_ </u>			-		
	A				_	+	-1
	В					+	
-	c						Ч Ч
	D						-
	Ē	urol weight based or					<u> </u>

1 int El DOrocio Charnical Test ended:       Date March Parcel Date March Parcel	BIO-AN Project#	ALYTICA	AL LABO		(ES 7-1 est sta	DAY WAT arted:		<u>s///</u> Tim	~ 7345	X4
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $	lient El DOYC				est en	ded:	Date	<u>Kin</u> Tim	e <u>093</u> 0	Page 26 p
$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c}$	rganism P. Drox		<u> </u>		<u> </u>		<u></u>	l	l	<u> </u>
pH       8.1       1.8       0.1       9.1       1.9       1.	Day/# water used	3198	1	3131	3	4	5	6	7	8
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Concentration: Con	ntrol S	A			<del>6-1</del> -2	<u> </u>			<b></b>
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	рн	8.1	18.0	1.6.9	1.7.9		7.6	129	25	
$\begin{array}{c} \mbox{cond}(unitors/cm) & \mbox{tr} (u)	DO (mg/l)	8.4	1.10 8.3	698.3	6-8.4	8.2	10.3	638.1	5.3	
Hardness (mg/L)       48.0       48.0       48.0         Concentration: 2.2       2       3	Cond(umhos/cm)	170.4	1733	164.3	167.1	169.1	166.4	168.7		
$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} $	Alkalinity(mg/L)									
$\begin{array}{c cccc} p_{\text{R}} & 8.0 & 3.0 & 9.9 & 8.0 & 9.4 & 9.8 & 9.8 & 0 & 7.4 & 9.8 & 9.8 & 0 & 7.4 & 9.8 & 9.8 & 0 & 7.4 & 9.8 & 0 & 9.4 & 9.8 & 0 & 9.4 & 9.8 & 0 & 9.4 & 9.8 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & $	Hardness (mg/L)	48.0		48.0	j	<u> </u>			<u> </u>	L
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Concentration: 3	22		<del>COL 6 C</del>	1020-2			106 2		<del>,</del>
D0 (mg/1)       8.5       V<8.2	рH	8.0	1. 8.0	1.9	1.8.0	7.9	7.67.8	1.8.0	7.4	
$\begin{array}{c} concentration: 4 \\ \hline cond (unhos/cm) \\ \hline cond (unhos/cm$	DO (mg/1)	8.3	1. 8.2	48.2	5.8.2	4.8.2	10: 8.2		5.4	
$\begin{array}{c cccc} pH & & & & & & & & & & & & & & & & & & $	Cond(umhos/cm)		313	303	307	302	309	302	<u> </u>	<u> </u>
$\begin{array}{c cccc} pH & & & & & & & & & & & & & & & & & & $	Concentration: 42	<u> </u>	<del></del>					1062	19	[]
Cond (umhos/cm)       343       348       344       346       343         Cond (umhos/cm)       343       348       344       346       343         Concentration:       562         pH       8.1       8.1       8.0       8.0       8.0       8.0       7.8         Concentration:       562       9       9       9.1       8.0       1.8 <t< td=""><td>рH</td><td></td><td>1.9</td><td>1.8.0</td><td>120</td><td>8.0</td><td>8.D</td><td>8.0</td><td>-13</td><td></td></t<>	рH		1.9	1.8.0	120	8.0	8.D	8.0	-13	
Cond (umhos/cm)       S43       S48       S44       S44       S44       S44       S44       S45       S46       S44       S45       S46	DO(mg/1)	8.2	1.8.2	6.18.1	5.8.1	6.6.1	6.8.2	5.8.0	5.1	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Cond(umhos/cm)	343	348	344	346	342	347	343		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Concentration: 5	٥٢	<u></u>	- <u>A</u> 2		12 10 2	<u>– – – – – – – – – – – – – – – – – – – </u>	067		┍━━━━━┫┃
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	pH		7.9	1.8.0	8.0	8.0	1.2.0	18.0	2.3	
$\begin{array}{c} \begin{array}{c} \mbox{Concentration:} 752 \\ \mbox{pH} & 8.1 & 8.1 & 8.0 & 81 & 8.1 & 9.0 & 7.3 \\ \mbox{D0 (mg/1)} & 8.1 & 98.1 & 8.1 & 98.0 & 81 & 90 & 538.0 & 4.6 \\ \mbox{Cond (umhos/cm)} & 479 & 486 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 480 & 483 & 487 & 487 & 480 & 480 & 480 & 480 & 483 & 487 & 487 & 480 &$	DO(mg/1)	8.2	18.	6.8.1	5.8.1	18	81	588.0	8.2	
$\begin{array}{c cccc} pH & 8.1 & 7.8 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.0 & 188 & 188 & 188 & 188 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8$	Cond (umhos/cm)	400	406	403	406	408	405	344		
$\begin{array}{c cccc} pH & 8.1 & 7.8 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.1 & 8.1 & 8.1 & 8.0 \\ \hline 8.0 & 188 & 188 & 188 & 188 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8.1 & 8.1 & 8.1 \\ \hline 8.1 & 8$	Concentration: 75	52	<b></b>				······································			<b> </b>
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	рН	t _	7.4	1.8.1	7.8.0	8	7.10	1.8.0	7.3	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	DO(mg/1)	8.1-	7.108.1	6.8.1	5.8.0	1081	250	5.3	4.6	
pH     8.1 <td>Cond(umhos/cm)</td> <td>479</td> <td></td> <td>483</td> <td>487</td> <td>487</td> <td>684</td> <td>480</td> <td>L</td> <td></td>	Cond(umhos/cm)	479		483	487	487	684	480	L	
pH     8.1 <td>Concentration: 10</td> <td>02</td> <td>•</td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td>······</td> <td></td>	Concentration: 10	02	•	<u> </u>					······	
$\frac{100 (mg/1)}{8.0 18.0 98.1 8.0 8.1 8.0 8.1 8.0 5.2 4.6}$ $\frac{100 (mg/1)}{8.0 18.0 98.1 8.0 8.1 8.0 8.1 8.0 5.2 5.0 4.6}$ $\frac{100 (mg/1)}{100 0 8.1 8.0 8.1 8.0 8.1 8.0 5.2 5.6}$ $\frac{100 (mg/1)}{100 0 8.1 8.0 8.1 8.0 8.1 8.0 5.2 5.6}$	pH		8.0	19	1.8.1	1.8.1	2.2.1	1.8.1	2.4	
$\frac{\text{Cond} (\text{umhos/cm})}{\text{Tech-prerenewal}} = \frac{\text{S81}}{\text{M}} \frac{\text{S93}}{\text{M}} \frac{\text{S91}}{\text{RC}} \frac{\text{S93}}{\text{S91}} \frac{\text{S93}}{\text{S93}} \frac{\text{S93}}{\text{S93}} \frac{\text{S93}}{\text{S93}} \frac{\text{S93}}{\text{S93}} \frac{\text{S93}}{\text{S93}} \frac{\text{S93}}{\text{RC}} \text{$	DO (mg/1)		· · · · · · · · · · · · · · · · · · ·	15	58.0	10.00	4.8.0	53.0	4.6	*
Tech-prerenewal Han RC RC HAN DON RC Tech-postrenewal Kong RC RC HAN DON RC THE RE HAND RC HAN	Cond (umbos/cm)	281	593	<u> </u>	593	591	593	586		
Hardness(mg/1) 44.0 580 560 File File File File File File File File	Tech-prerenewal	YOGA	dan	RC	RC_	Lym	6812	RC	- <u></u>	
	Tech-postrenewal		Ken	RC	RC	Am.	6th	Re	Holm	
	Hardness(mg/l)	44.0		530					ļ	<b>  </b>
$M_{\rm M}({\rm mg/l})$ $M_{\rm M}({\rm O})$ $M_{\rm M}({\rm O})$ $M_{\rm M}({\rm O})$	Alkalinity(mg/l)	92.0		0.88		<u>96.0</u>	L			

Key: prerenewal/postrenewal

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BIO-AN Project# 10 Client EL DOC	LYTICA	AL LABC	RATORI) Te	ES 7-D est sta	AY WAI arted:	ER QUA Date	LITY L 3 <u>/1 </u> Time	1345	X
lient EDM	2000	homi	Te Loo	est end	led:	Date	<u>/s//</u> Time	<u>=0450</u> F	Page 27
organism P. Drov			3131			5	6	7	8
Day/# water used	0	1	201011	3	4	5	0		
Concentration: Con			$\frac{1}{69}$	<u>n</u> 17	78/	18/	$n^{\eta}$	11	
рH	7.8	8,8,0	8.1	18.1	8.0	× D	8.0	1.0	
DO(mg/l)	7.8	1.4.8	6.7.8	57.1	9.9	6.1.8	54.8	4,5	
Cond (umbos/cm)	581	587	581	581	58	587	579		
Alkalinity(mg/L)					·				
Hardness (mg/L)									
Concentration:									[
рн					. /.			2	
DO (mg/1)									
Cond (umhos/cm)									
Concentration:	$\sim$					<u> </u>			
рH		XC					$\angle$		
DO (mg/l)		$\nearrow$	XA						
Cond(umhos/cm)				51		<u> </u>	Ĺ	<u> </u>	l
Concentration:	· · ·			₹-	1				
рн				X	1			and the second second	
DO(mg/l)					$\mathbf{X}$				
Cond (umhos/cm)		¢		<u></u>					
	I	<u></u>				$\overline{}$			
Concentration:									
				$\sim$	/		$\sim$		
DO(mg/1)							$\angle $	$\leftarrow$	<b> </b>
Cond (umhos/cm)					<u> </u>	<u> </u>		$\square$	l
Concentration:		· · · · · · · · · · · ·				·····	·······	, <u>_</u>	
pH									
DO (mg/1)									
Cond (umhos/cm)									·
Tech-prerenewal (	HAN	J.87	RC	RC	JAN	BOM A	RC		
Tech-postrenewal		Syn	RC	Re	diam	HABM	RC	HR12	
Hardness(mg/l)								ļ	
Alkalinity(mg/l)			<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	l <u></u>	

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Key: prerenewal/postrenewal

### **BIO-ANALYTICAL LABORATORIES**

## REFERENCE TOXICANT TEST QUALITY DATA

Date start: <u>2111</u>	Dat	e end: <u>21311</u>
Test organism: <u>C. dukia</u>		
Age: Layhr		
Source and ID#: BALL RIL	L	
Dilution Water used: Type:	<u>```</u> * Jug	#:_3136
Reference Toxicant: <u>Mac</u>		its: <u>100 g</u> /Lug/L
Manufacturer: ACKOS		: BO130290
48-hour LC <sub>50</sub> : <u>1.39 g11</u>		tistical Method: <u>SR</u> ^
Upper and Lower CUSUM Chart C	Control Limits: 1.77	2-1.01
Test Number (for the year): 3		
We verify that this data is true and c	orrect:	
Technician: <u>XXXX</u>	P Bride	$\mathcal{O}$
Statistician:	· APB	
Quality Control Officer:	M. M.	app
*MH- Moderately hard	+NaCl - Sodium Chlorid	
S-Soft H - Hard	CuSO4 - Copper Sulfa	TSK -Trimmed Spearman Karber
		G - Graphical

File: Ref Tox Cover

TA		<b></b>	1	: : 		<u></u>										Page
WATER QUALITY DATA	Time 1532 Time 1330 ID# BHU/ RIG	Conductivity	0 24 48 72 96	303 - 1413				aibe - Othe				450 - 530		· · · · · · · · · · · · · · · · · · ·		ECELETANDER
T SURVIVAL AND WATER QUALITY	d: Date <u>2/1/1</u> Date <u>2/1/1</u> s_C_AUDIO 96hour 96hour	Hď	0 24 48 72 96	8.1 - 8.1				8.1 8.0				8.1 - A.V ·				PC-PUMARAA
ACUTE TOXICITY TEST	Test started Test ended: 48hour 200 72hour 48hour 200 72hour 48hour 200 72hour	Dissolve	0 24 48 72 96	1.8 - 68				60 - 81				Fed _ 61				ELES LUXIN LUVIN - 1
LABORATORIES	000 0 1 10 24 hour 4 BM 481 1530 24 hour 1015 481 24 4 24 hour 24 84 481	# Live Organisms	0 24 48 72 96 hr	555	য গ ম	<u>5</u> 5 3	S S S	<u>S</u> S S	S S S	S S it	<u> </u>	S 1 D	0	S () ()	S 0 0	Tech strenewal
BIO-ANALYTICAL	iption IC Ohour E (°C): Ohour	plicate	ND	4	U	J	(A	4	B		(A	4	9		G	Chemistry Tech prerenewal/postrenewal
μ	Project# Client Sample Descr Technician: Time: Temperature	Test Dilution		0								9				

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X4310 B0 of 54 age BIO-ANALYTICAL LABORATORIES ACUTE TOXICITY TEST SURVIVAL AND WATER QUALITY DATA 96 ID# BAU RIG Conductivity 72 Time 1330 48 Time/530 EG AS 12nas 10ºC 16780 24 104100 80  $\frac{3}{5}$ 0 96 C.dubia 72 Date<u>2|2|</u>|| Test started: Date<u>Z///</u>/ ELENBANDEN Ηđ ļ l ١ 96hour\_ 96hour 96hour 48 6. С Г C C 24 -unour Jon Test Species / 48hour JAN 72hour 9 48hour 24.8 72hour 9 <u>ب</u> ک -S  $\overline{\dot{\infty}}$ 0 Test ended: 3 6 22 1 48 E ( Caldren 9 5 24 ς) γ 0 من 0 9 6 24hour & Dro 24hour 1415 24hour 1418 # Live Organisms 72 24hour AU 1000 24hour 48 24 prerenewal/postrenewal J Ŋ ນ Ŋ  $\mathcal{O}$ 5 VI N IJ N  $\mathcal{N}$ V, br 0 Ohour<u>24 U</u> Ohour 1530 NJOC OhourEC Salinity 2 × [-Test Sample Description\_ ACUTE2 020809 Rev. Replicate Temperature (<sup>0</sup>C): Client Rof  $\mathcal{O}$ (A Q  $\triangleleft$  $\odot$ đ  $\mathcal{O}$ Q Ċ)  $\triangleleft$ Technician: Test Dilution Project#  $\mathcal{V}$ N Time:

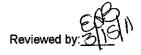
X4310 Page 31 of 54

#### APPENDIX C STATISTICAL ANALYSIS

			Ceriodaphnia Survival and Reproduction Test-7 Day Survival												
Start Date:	2/8/2011		Test ID:	X4310CD			Sample ID	):	1						
End Date:	2/15/2011		Lab ID:	ADEQ 880	)630		Sample Ty	/pe:	EFF2-Indu	ustrial					
Sample Date:	2/8/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	daphnia dub	bia				
Comments:											<u></u>				
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	1.0000	1.0000	1.0000					
100UV	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000					

		·······	·····	Not			Fisher's	1-Tailed	
Conc-%	Mean	N-Mean	Resp	Resp	Total	Ν	Exact P	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	1.0000	1.0000	0	10	10	10	1.0000	0.0500	
100UV	0.9000	0.9000	1	9	10	10	0.5000	0.0500	

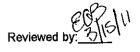
Hypothesis Test (1-tail, 0.05)	
Fisher's Exact Test indicates no significant differences	
Treatments vs D-Control	



			Ceriod	aphnia Su	rvival and	i Reprodu	uction Tes	st-Repro	duction		Page 33 01 54
Start Date:	2/8/2011		Test ID:	X4310CD			Sample ID	<b>)</b> :	1		
End Date:	2/15/2011		Lab ID:	ADEQ 880	0630		Sample Ty	ype:	EFF2-Indu	ustrial	
Sample Date:	2/8/2011		Protocol:	EPAFW02	2-EPA/821	I/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dub	pia
Comments:											
Conc-%	1	2	3	4	5	6	7	8	9	10	
D-Control	19.000	20.000	24.000	17.000	24.000	17.000	20.000	19.000	16.000	23.000	
32	15.000	20.000	21.000	18.000	18.000	15.000	18.000	13.000	17.000	18.000	
42		17.000	24.000	11.000	17.000	13.000	14.000	13.000	12.000	8.000	
56	16.000	12.000	15.000	14.000	13.000	13.000	14.000	17.000	19.000	14.000	
75	11.000	12.000	14.000	13.000	9.000	7.000	18.000	13.000	13.000	10.000	
100	7.000	13,000	14.000	9.000	12.000	15.000	15.000	10.000	13.000	14.000	
100UV		13.000	11.000	16.000	14.000	13.000	2.000	12.000	7.000		

				Transform	n: Untran	sformed			1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	
D-Control	19.900	1.0000	19.900	16.000	24.000	14.689	10				
32	17,300	0.8693	17.300	13.000	21.000	13.908	10	1.819	2.461	3.516	
*42	14,400	0.7236	14.400	8.000	24.000	30.039	10	3.849	2.461	3.516	
*56	14,700	0.7387	14.700	12.000	19.000	14.359	10	3.639	2.461	3.516	
*75	12.000	0.6030	12.000	7.000	18.000	25.154	10	5.528	2.461	3.516	
*100	12.200	0.6131	12.200	7.000	15.000	22.129	10	5.388	2.461	3.516	
*100UV	10.667	0.5360	10.667	2.000	16.000	40.323	9	6.289	2.461	3.613	

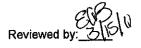
Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.44277		0.895		0.06635	1.02528
Bartlett's Test indicates equal variances (p = 0.26)	7.69969		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences	3.61284	0.18155	103.024	10.2113	9.2E-08	6, 62
Treatments vs D-Control						



			Ceriod	aphnia Su	rvival and	l Reprodu	uction Tea	st-Repro	duction		Page 34 01 54
Start Date:	2/8/2011		Test ID:	X4310CD			Sample ID	):	1		
End Date:	2/15/2011		Lab ID:	ADEQ 880	)630		Sample Ty	ype:	EFF2-Indu		
Sample Date:	2/8/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia du	bia
Comments:									. <u>.</u>		· · · · · · · · · · · · · · · · · · ·
Conc-%	1	2	3	4	5	6	7	8	9	10	
D-Control	19.000	20.000	24.000	17.000	24.000	17.000	20.000	19.000	16.000	23.000	
32		20.000	21.000	18.000	18.000	15.000	18.000	13.000	17.000	18.000	
42	15.000	17.000	24.000	11.000	17.000	13.000	14.000	13.000	12.000	8.000	
56	16.000	12.000	15.000	14.000	13.000	13.000	14.000	17.000	19.000	14.000	
75	11.000	12.000	14.000	13.000	9,000	7.000	18.000	13.000	13.000	10.000	
100	7.000	13.000	14.000	9,000	12.000	15.000	15.000	10.000	13.000	14.000	
100UV		8.000	13.000	11.000	16.000	14.000	13.000	2.000	12.000	7.000	

			•	Transform	n: Untran	sformed		_	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	19.900	1.0000	19,900	16.000	24.000	14.689	10			
32	17.300	0.8693	17.300	13.000	21.000	13.908	10	1.702	2.347	3.587
*42	14,400	0.7236	14.400	8.000	24.000	30.039	10	3.599	2.347	3.587
*56	14,700	0.7387	14.700	12.000	19.000	14.359	10	3.403	2.347	3.587
*75	12.000	0.6030	12.000	7.000	18.000	25.154	10	5.170	2.347	3.587
*100	12.200	0.6131	12.200	7.000	15.000	22.129	10	5.039	2.347	3.587
*100UV	9.600	0.4824	9.600	0.000	16.000	54.945	10	6.741	2.347	3.587

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.43239		0.895		-0.1182	1.01594
Bartlett's Test indicates equal variances (p = 0.07)	11.7062		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences	3.58654	0.18023	120.533	11.6746	6.1E-08	6, 63
Treatments vs D-Control						



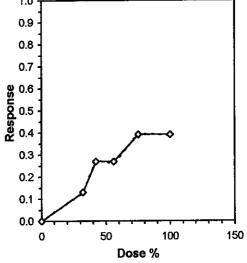
			Ceriod	aphnia Su	rvival and	l Reprodu	uction Tes	st-Repro	duction		Fage 35 01 54
Start Date:	2/8/2011		Test ID: X4310CD			Sample ID:			1		
End Date:	2/15/2011		Lab ID:	ADEQ 880630		Sample Type:		EFF2-Industrial			
Sample Date:	2/8/2011		Protocol:	EPAFW02	2-EPA/821	I/R-02-01	Test Spec	ies:	CD-Cerioo	taphnia dul	bia
Comments:				_			<u> </u>				
Conc-%	1	2	3	4	5	6	7	8	9	10	
D-Control	19.000	20.000	24.000	17.000	24.000	17.000	20.000	19.000	16.000	23.000	
32		20.000	21,000	18.000	18.000	15.000	18.000	13.000	17.000	18.000	
42		17.000	24.000	11.000	17.000	13.000	14.000	13.000	12.000	8.000	
56		12.000	15.000	14,000	13.000	13.000	14.000	17.000	19.000	14.000	
75	•	12.000	14,000	13,000	9.000	7.000	18.000	13.000	13.000	10.000	
100		13.000	14.000	9,000	12.000	15.000	15.000	10.000	13.000	14.000	
100UV		8.000		11.000	16.000	14.000	13.000	2.000	12.000	7.000	

Transform: Untransformed							Isotonic		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	19,900	1.0000	19,900	16.000	24.000	14.689	10	19.900	1.0000
32	17.300	0.8693	17.300	13.000	21.000	13.908	10	17.300	0.8693
42	14,400	0.7236	14.400	8.000	24.000	30.039	10	14.550	0.7312
56	14,700	0.7387	14,700	12.000	19.000	14.359	10	14.550	0.7312
75	12.000	0.6030	12.000	7.000	18.000	25.154	10	12.100	0.6080
100	12.200	0.6131	12.200	7.000	15.000	22.129	10	12.100	0.6080
100UV	9.600	0.4824	9.600	0.000	16.000	54.945	10		

Auxiliary Tests	Statistic	Critical	Skew Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.43239	0.895	-0.1182 1.01594
Bartlett's Test indicates equal variances (p = 0.07)	11,7062	16.8119	

		Linear Interpolation (200 Resamples						
Point	%	SD	95%	CL	Skew			
IC05*	12.246	6.848	7.192	33.766	1.6544			
IC10*	24.492	6.778	14.383	37.487	0.2585			
IC15	33.400	5.530	21.575	42.782	0.2058	1.0		
IC20	37.018	6.183	28.766	57.154	1.4623	0.9		
IC25	40.636	9.013	35.228	64.711	0.7944	0.8		
IC40	>100					0.8 -		
IC50	>100					0.7		

\* indicates IC estimate less than the lowest concentration



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			Lai	rval Fish G	irowth and	nd Survival	Test-7 Day Su	irvival <u> </u>	
Start Date:	2/8/2011		Test ID:	X4310pp		Ś	ample ID:	1	
End Date:	2/15/2011		Lab ID:	ADEQ 880	)630	S	ample Type:	EFF2-Industrial	
Sample Date:	2/7/2011		Protocol:	EPAFW02	-EPA/821/	I/R-02-01 T	est Species:	PP-Pimephales promelas	
Comments:									
Conc-%	1	2	3	4	5				
D-Control	0.8750	1.0000	0.8750	1.0000	1.0000				
32	0.7500	1.0000	0.8750	0.8750	0.7500				
42	1.0000	0.8750	0.8750	1.0000	1.0000				
56	1.0000	1.0000	0.7500	0.8750	0.8750				
75	1.0000	0.6250	1.0000	1.0000	1.0000				
100	1.0000	1.0000	1.0000	1.0000	1.0000				
100UV	0.8750	0.7500	1.0000	0.7500	1.0000				

·	· · · · · · · · ·		Tra	ansform:	Arcsin So	uare Root	Rank	1-Tailed	-	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	
D-Control	0.9500	1.0000	1.3196	1.2094	1.3931	7.623	5			
32	0.8500	0.8947	1.1813	1.0472	1.3931	12.150	5	20.50	16.00	
42	0.9500	1.0000	1.3196	1.2094	1.3931	7.623	5	27.50	16.00	
56	0.9000	0.9474	1.2504	1.0472	1.3931	11.683	5	24.00	16.00	
75	0.9250	0.9737	1.2968	0.9117	1.3931	16.600	5	29.00	16.00	
100	1.0000	1.0526	1.3931	1.3931	1.3931	0.000	5	32.50	16.00	
100UV	0.8750	0.9211	1.2180	1.0472	1.3931	14.204	5	23.00	16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.94672	0.934	-0.8064	0.93258
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
The star and a D. Operated				

Treatments vs D-Control

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			La	rval Fish (	Growth ar	d Surviv	al Test-7	Day Grow	vth			<u>37 OT 5</u>
Start Date:	2/8/2011			X4310pp			Sample II		1			
End Date:	2/15/2011		Lab ID:	<b>ADEQ 880</b>	0630		Sample T	ype:	EFF2-Ind	ustrial		
Sample Date:	2/7/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	cies:	PP-Pime	phales pro	melas	
Comments:												
Conc-%	1	2	3	4	5							
D-Control	0.7250	0.7000	0.6750	0.6375	0.6625							
32	0.6250	0.8875	0.7250	0.7125	0.5375							
42	0.8750	0.8750	0.8250	0.7875	0.9000							
56	0.8750	0.9250	0.6250	0.6875	0.7250							
75	0.9500	0.6375	1.0000	0.7500	0.9250							
100	0.9875	0.7500	1.0125	0.7250	0.8750							
100UV	0.6750	0.6500	0.6750	0.5500	0.7625							
0-SN	0.8286	0.7000	0.7714	0.6375	0.6625							
									1-Tailed			
•				Transform			N	+ Ctat	Critical	MSD		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MOD		
D-Control		1.0000	0.6800	0.6375	0.7250	4.967	5	0.000	2.443	0.1631		
32		1.0257	0.6975	0.5375	0.8875	18.684	5	-0.262		0.1631		
42		1.2537	0.8525	0.7875	0.9000	5.327	5	-2.584	2.443 2.443	0.1631		
56		1.1287	0.7675	0.6250	0.9250	16.593	5	-1.311		0.1631		
75		1.2537	0.8525	0.6375	1.0000	17.910	5	-2.584	2.443			
100		1.2794		0.7250	1.0125	15.158	5	-2.846	2.443	0.1631		
			0.6625	0.5500	0.7625	11.477	5	0.262	2.443	0.1631		
100UV		0.9743					~	0 200	0.440	0 4004		
100UV 0-SN		1.0588		0.6375	0.8286	10.968	5	-0.599	2.443	0.1631		
0-SN	0.7200				0.8286	10.968	5 Statistic	-0.599	2.443 Critical	0.1631	Skew	Kurt
0-SN	0.7200 ts	1.0588	0.7200	0.6375		10.968		-0.599 		0.1631	Skew -0.0803	Kurt -0.4613
0-SN Auxiliary Test Shapiro-Wilk's	0.7200 ts Test indic	1.0588 ates norn	0.7200 nal distribu	0.6375 Ition (p > 0		10.968	Statistic	-0.599 	Critical	0.1631		
0-SN Auxiliary Test Shapiro-Wilk's Bartlett's Test	0.7200 ts Test indic indicates e	1.0588 ates norn qual vari	0.7200 nal distribu	0.6375 Ition (p > 0		10.968	<b>Statistic</b> 0.98419		Critical 0.94	0.1631		
0-SN	0.7200 ts Test indic indicates e est (1-tail,	1.0588 ates norm qual vari <b>0.05)</b>	0.7200 nal distribu ances (p =	0.6375 Ition (p > 0 0.11)		10.968	Statistic 0.98419 11.7799	-0.599 MSDp 0.23978	Critical 0.94 18.4753 MSB		-0.0803 <b>F-Prob</b>	-0.4613

				Daphn	id Acute Test-48 Hr	Survival		<u>age ee ei e</u>
Start Date: End Date: Sample Date: Comments:	2/1/2011 2/3/2011 2/1/2011			02111cd NELAP 0197	San	nple ID: nple Type:	REF-Ref Toxicant NACL-Sodium chloride CD-Ceriodaphnia dubia	
Conc-gm/L	1	2	3	4				
D-Control	1.0000	1.0000	1.0000	1.0000				
1	1.0000	1.0000	0.8000	1.0000				
2	0.0000	0.0000	0.0000	0.0000				
3	0.0000	0.0000	0.0000	0.0000				
4	0.0000	0.0000	0.0000	0.0000			,	

			Tra	Number	Total				
Conc-am/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	20
1	0.9500	0.9500	1.2857	1.1071	1.3453	9.261	4	1	20
2	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
3	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
4	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20
5	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4	20	20

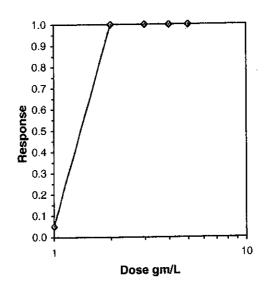
Auviliany Tacto	Statistic	Critical	Skew	Kurt
Auxiliary Tests Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.7064	0.818	-2.0367	4.9
Equality of variance cannot be confirmed				

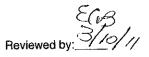
Trimmed Spearman-Karber

Trim Level	EC50	95%	CL
0.0%			
5.0%	1.3887	1.3376	1.4416
10.0%	1.3887	1.3376	1.4416
20.0%	1.3887	1.3376	1.4416
Auto-5.0%	1.3887	1.3376	1.4416

5

0.0000 0.0000 0.0000 0.0000





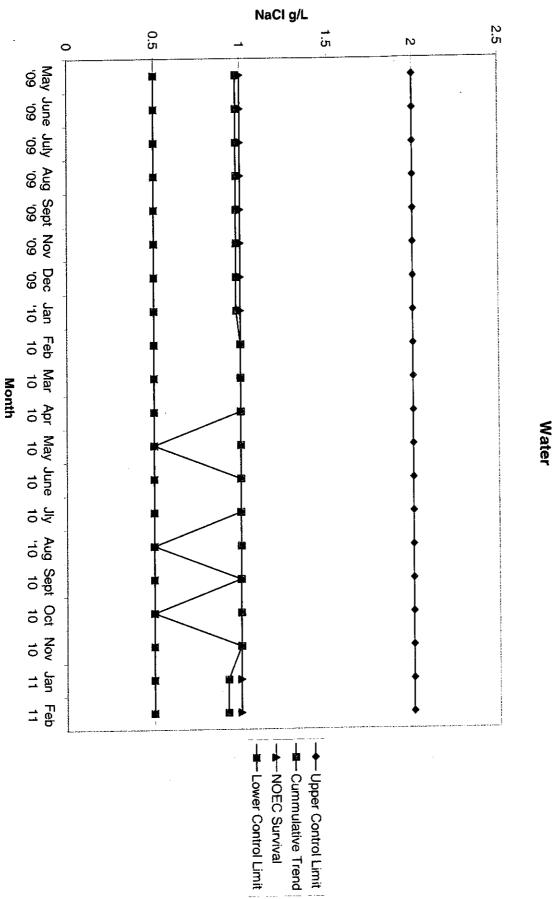
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### APPENDIX D QUALITY ASSURANCE CHARTS

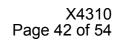
PMSD growth		IC25 growth	NOEC survival	Month Start- End		Avg. repro. control	PMSD repro	IC25 repro.	NOEC survival	Page		4
0.850	20.2	1.4953	1.25	Jan 1/4-1/11 11:15-13:00		20.7	21.9	0.6913	1.0		Jan 1/7-1/14 13:45-13:10	
0.610	13.0	1.68	1.25	Feb 2/2-2/9 12:25-9:00		24.7	24,4	0.4674	1.0		Feb 2/10-2/17 12:40-9:50	Bi
										Ceri		<b>Bio-Analytical Laboratories' 2011 Results of the Month</b>
					-					odaphnia di		d Laborato
					Fathead minnow					Ceriodaphnia dubia (in soft reconstituted water		ries' 2011 H
					innow					t reconstitu		Results of t
					-					ted water)		he Monthly
			 		-							y Chronic I
<u>.                                    </u>						: 						Reference ]
							-					ly Chronic Reference Toxicant Tests
												ests

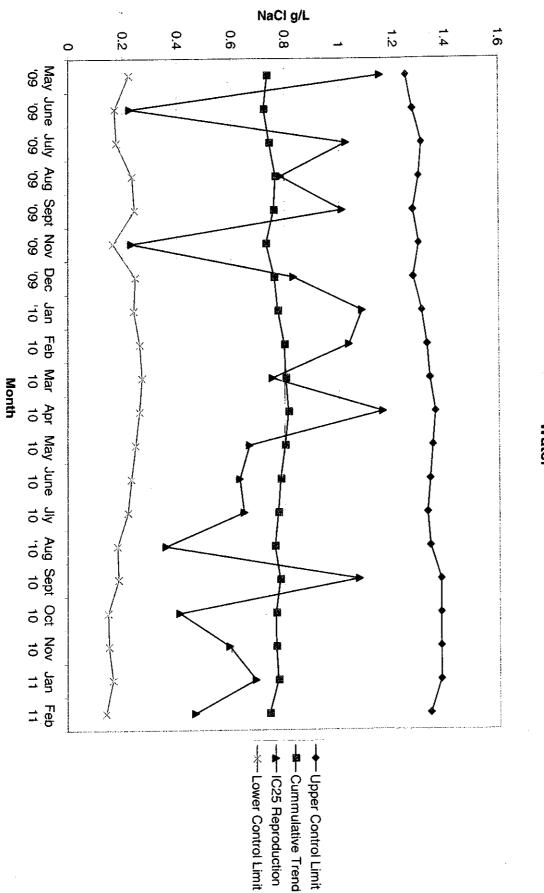
Reference toxicant is 100 g/L sodium chloride (NaCl). \*In-house organisms not used this month. +Test invalid. Not enough time left in the month to conduct a retest.

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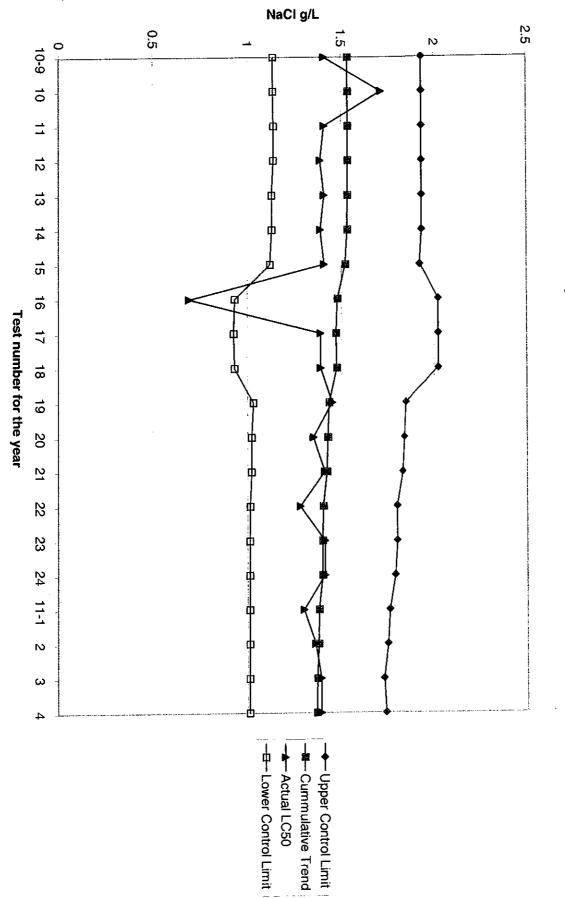
2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft







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2011 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results

1300 Blue Spruce Drive, Suite C

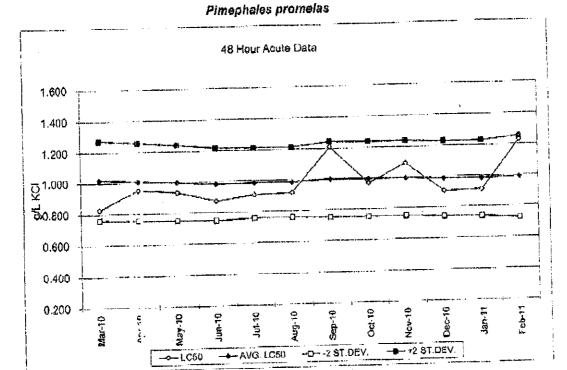
Fort Collins, Colorado 80514

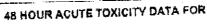
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Tol) Free: 800/331-5916 Tel:970/484-5091 Fax:970/484-2514

### REFERENCE TOXICANT LC50





### Pimephales promelas

DATE	LC50	95% CONFIDENCE		AVG.LC50	METHOD	+2 STD	-2 STD
OATE	(g/L KCI)	(upper)	(lower)	(g/L KCI)			
			1.103	0,999	SPKR	1,2452	0.7534
Sep 10	1.210	1,328	••••==	0.995	SPKR	1.2402	0.7501
Oct 10	0.966	1.079	0.865	• • •	SPKR	1.2401	0.7501
Nov 10	1.091	1.223	0.972	0.095	PROBIT	1,2303	0,7421
Dec 10	<u>0.903</u>	1.006	0.807	0.986		1.2297	0.7373
	0,909	1.022	0.809	0.983	SPKR		0.7256
Jan 11 Feb 11	1.231	1.346	1.127	0.990	SPKR	1.2552	-

\*\*Curront Test Dates:

2/1-3/2011

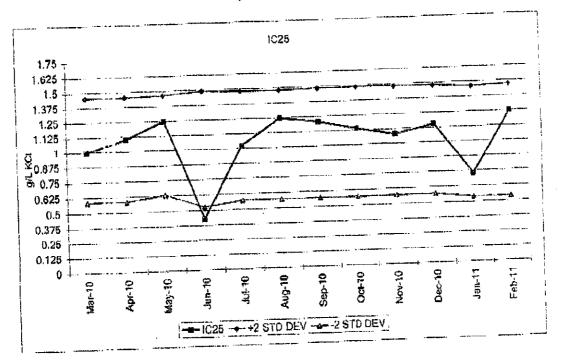
Aquatic BioSystems, Inc

Quality Research Organisms



1300 Blue Spruce Drive, Suite C Fort Collins, Colorado 80524 Toll Free: 800/331-5916 Tel:970/484-5091 Fax:970/484-2514

#### Pimephales promélas



### Chronic 7 Day Survival Test Data

IC 25 for Growth Test

		LOEC	Date	1025	95% Co	nîldence	Avg. (C25	+2 STD	-2 STO
Date	NOEC	(g/L KCl)	·•	g/L KCl	(upper)	(lower)	g/L KCI	DEV	DEY
<del>ن بين در در مرجع بين</del>	(g/_ KCI)	(Arc roos)		THE A CONTRACTOR			4 090	1.487	0.572
	).50	1.0	Sep-10	1.208	1.275	0.785	1.030		0.573
Sep-10			Oct-10	1,139	1 298	0.231	1.030	1,488	
Oct-10	).50	1.0		1,081	1.352	0.289	1.027	1,483	0.572
Nov-10	2.50	1.0	Nov-10			0.997	1.025	1.477	0,573
Dec-10	0,30	1.0	Dec-10				1.001	1,461	0.541
	0.50	1.0	jan-11	0.729	1.072	0.556		1,470	0.539
Jan-11	•	1.0	Feb-11	1.247	1.219	1.108	1.005	1.007.0	
Feb-11	0.50	170							
					A CONCRETE ON A				

\*\*Current Test Dates!

2/1-8/2011

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Quality Research Organisms

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APPENDIX E AGENCY FORMS

### SUMMARY REPORTING FORMS CHRONIC BIOMONITORING

## Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dora Outf	do Chemical all 001		NPDES No.: AR0000752 AFIN: 70-00040					
Composite 1 Collec Composite 2 Collec Composite 3 Collec	Time ted From 073 ted From 071 ted From 074	0 5 5	Date 2/6/11 2/8/11 2/10/1	To To		Time 0730 0715 0745 2/8/11	Date 2/7/11 2/9/11 2/11/11 date	
Test initiated: Test terminated: Dilution water used	1235 1025 d: Rece		l	X RVIV	Recons	2/15/11	date	
Time of Reading	0	32	42	Percen	t Effluent	75	100	

Time of Keau	mg														
		0		32		42		56		75	100				
24h		100		100		100		100		100	100				
48h		100		100		100		100		100	100				
End of test		100		100		100	_	100		100	100				
N	UMBEI	R OF Y	OUN	G PRO	DUC	ED PER	FF	EMALE @	9 F	END OF T	EST				
Rep			32		42		56		7	5	100				
Α	19		15		15	_	16		1	1	7				
В	20		20		17		12		1	2	13				
С	24		21		24		15		1	4	14				
D	17		18		11		14	14		3	9				
E	24		18		17		13		Ģ	-   	12				
F	17	_	15		13		13		7		15				
G	20		18		14		14		18		15				
H	19	13			13	17		17		3	10				
I	16		17		12		19		1	3	13				
J	23		18	18		· · · · · · · · · · · · · · · · · · ·	14			.0	14				
Surv. Mean 19.9		17.3			14.4		14	7	12.0		12.2				
Total Mean	19.9	17.3			14.4	1	14	7	1	2.0	12.2				
CV%*	14.69		13.91	-	30.0	)4	14	.36	2	.5.15	22.13				

\*coefficient of variation = standard deviation x 100/mean. D=dead adult PMSD = 18.0%

### <u>Ceriodaphnia dubia</u> Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of	the test significant	ly different (p	<b>b=.05</b> ) th	an the
control survival for the % effluen	t corresponding to	(lethality):		
a) LOW FLOW OR CRITICAL DILUT	ION (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 DILUT	ION (100%):	Х	YES	NO
b) <sup>1</sup> /2 LOW FLOW DILUTION	(N/A%):		YES	NO

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

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

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

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

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

a) NOEC survival:	0	100% effluent
b) NOEC reproduction:		32% effluent
c) LOEC survival:		N/A% effluent
d) LOEC reproduction:		42% effluent
-		

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Ceriodaphnia dubia</u> Chemical Parameters Chart

NPDES No.: AR0000752/ AFIN 70-00040 Sample N									ple No. ple No. Begin:		2/9/11	T T T	me: 0730 me: 0715 me: 0745 me: 1235 me: 1025				_	
Dilution: 0		Day:								Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp ( C )	24.8	24.5	24.3	24.4	24.7	24.5	25.2			Temp ( C )	24.8	24.5	24.3	24,4	24.7	24.5	25.2	
DO Initial	8.0	8.2	8.2	8.0	8.2	8.1	8.0			DO Initial	7.9	8.0	8.0	8.0	7.9	8.0	7.9	
DO Final	8,3	8.3	8.4	8.2	8.3	8.1				DO Final	8.1	8.L	8.1	8.1	8.1	8.0		
pH Initial	7.7	7.9	7.8	7.8	8.0	7.9	7.8			pH Initial	8.0	8.1	8.0	8.0	7.9	8.0	8.0	
pH Final	8.0	7.9	7.9	7.9	7.6	7.9				pH Final	8.1	8.0	8.0	8.0	8,0	8.0		
Alkalinity	36.0	32.0								Alkalinity								
Hardness	48.0	48.0								Hardness								
Conductivity	173.3	164.3	167.1	169.1	166.4	168.7				Conductivity	406	403	406	408	405	399		
Chlorine	<.01	<.01								Chlorine								
Dilution: 32 Day									Dilution: 75 Day									
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.5	24.3	24.4	24,7	24.5	25.2			Temp ( C )	24.8	24.5	24.3	24.4	24.7	24.5	25.2	
DO Initial	8.0	8.1	8.2	8.0	8.1	8.0	7,9			DO Initial	7.9	8.0	8.0	8.0	7.9	8.0	7.8	<u></u>
DO Final	8.2	8.2	8.2	8.2	8.2	8.0				DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.8	8.0	7.9	7.9	8.0	7.9	7.9			pH Initial	8.1	8.1	8.t	8.1	7.9	8.1	8.0	
pH Final	8.0	7.9	8.0	7.9	7.8	8.0				pH Final	8.1	8.1	8.0	8.1	8.1	8.0		
Alkalinity										Alkalinity								
Hardness	[				Ĺ					Hardness	l							
Conductivity	313	303	307	302	309	302				Conductivity	486	483	487	487	482	480		
Chlorine										Chlorine						L		
Dilution: 42	2		1	Day						Dilution: 10	D <b>O</b>			Da	y	-		
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp ( C )	24.8	24.5	24.3	24.4	24.7	24.5	25.2			Temp(C)	24.8	24.5	24.3	24.4	24.7	24.5	25.2	
DO Initial	8.0	8.1	8.1	8.0	7.9	8.0	7.9			DO Initiat	7.9	8.0	8.0	8.0	7.9	7.9	7.8	
DO Final	8.2	8.1	8.1	8.1	8.2	8.0				DO Final	8.0	8.1	8.0	8.1	8.0	8.0		
pH Initial	8.0	8,0	8.0	8.0	7.9	8.0	7.9			pH Initial	8.1	8,2	8.1	8.1	8.0	8.1	8.1	
pH Final	8.0	8.0	8.0	8.0	8.0	8.0				pH Final	8.1	8.1	8.1	8.1	8.1	8,1	L	
Alkalinity										Alkalinity	92.0	88.0		96.0			ļ	
Hardness										Hardness	44.0	52.0		56.0				
Conductivity	348	344	346	.342	347	343				Conductivity	59.3	591	593	591	593	586		
Chlorine										Chlorine	<.01	<.01		<.01				

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

Permittee: El Dorado Chemical Outfall 001		<b>ES No.: AR</b> 1: 70-00040	0000752
Time	Date	Time	Date
Composite 1 Collected from: 0730	2/6/11 To	0730	2/7/11
Composite 2 Collected from: 0715	2/8/11 To	0715	2/9/11
Composite 3 Collected from: 0745	2/10/11 To	0745	2/11/11

Test initiated:1345am/pm2/8/11dateTest terminated:0950am/pm2/15/11dateDilution water used:ReceivingXReconstitutedDATA TABLE FOR SURVIVAL

Effluent Conc. %	Per	rcent Surv	ival in Rep	licate Cha	Mea	Mean Percent Survival					
	A	В	С	D	E	24h	48h	7 days			
0	87.5	100	87.5	100	100	100	97.5	95.0	7.62		
32	75.0	100	87.5	87.5	75.0	100	100	85.0	12.15		
42	100	87.5	87.5	100	100	100	100	95.0	7.62		
56	100	100	75.0	87.5	87.5	100	100	90.0	11.68		
75	100	62.5	100	100	100	100	97.5	92.5	16.60		
100	100	100	100	100	100	100	100	100	0.00		

### DATA TABLE FOR GROWTH

Effluent Conc. %	Ave	rage Dry Wei	Mean Dry Weight mg	CV*			
	A	B	c	D	Е		
0	0.725	0.700	0.675	0.638	0.663	0.680	4.97
32	0.625	0.888	0.725	0.713	0.538	0.698	18.68
42	0.875	0.875	0.825	0.788	0.900	0.853	5.33
56	0.875	0.925	0.625	0.688	0.725	0.768	16.59
75	0.950	0.638	1.000	0.750	0.925	0.853	17.91
100	0.988	0.750	1.013	0.725	0.875	0.870	15.16
0-SN	0.829	0.700	0.771	0.638	0.663	0.720	10.97

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

**PMSD =** 24.0

### 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 sig	gnificantly different	(p=.05) tha	n the	control
survival for the % effluent corre				
a) LOW FLOW OR CRITICAL DILU		YES	X	NO
b) ½ LOW FLOW DILUTION	(N/A%)	YES		NO

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

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

a) LOW FLOW OR CRITICAL DILUTI	ON (100%)	YES	X	NO
b) <sup>1</sup> / <sub>2</sub> LOW FLOW DILUTION	(N/A%)	YES		NO

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

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

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

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

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

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

#### Biomoniloring Form Chronic Toxicity Summary Form <u>Pimephales promelas</u> Chemical Parameters Chart

Permittee: El Dorado Chemical - Outfall 001 NPDES No.: AR0000752/AFIN 70-00040 Contact: Brent Parker Analysi: Zeagler, Callaban								S S T	iample No. Sample No.		2/9/11	Ti Ti Ti	me: 0730 me: 0715 me: 0745 me: 1345 me: 0950					
Dilution: 0	I	Day:								Dilution: 56 Day:								
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp ( C )	24.4	24.6	24.6	24.3	24.7	24.7	24.8			Temp ( C )	24.4	24.6	24.6	24.3	24.7	24.7	24,8	
DO Initiat	7.6	6.9	6.1	6.8	6.7	6.3	5.3			DO Initial	7.6	6.4	5.5	6.6	6.5	5.8	5.2	
DO Final	8.3	8.3	8.4	8.2	8.3	8.1				DO Final	8.1	8.1	8.1	8.1	8.1	8.0		
eH Initiat	7.8	7.6	7.4	7.7	7.5	7.5	7.5			pH Initial	7.9	7.7	7.6	7.6	7.6	7.5	7.3	
pH Final	8.0	7.9	7.9	7.9	7.6	7.9				pH Final	8.1	8.0	8.0	8.0	8.0	8.0		
Atkalinity	36.0	32.0								Alkalinity								
Hardness	48.0	48.0								Hardness								
Conductivity	173.3	164.3	167.1	169.1	166.4	168.7				Conductivity	406	403	406	408	405	399		
Chlorine	<.01	<.01				-				Chlorine								
Dilution: 32 Day								Dilution: 75 Day										
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp(C)	24.4	24.6	24.6	24.3	24.7	24.7	24.8			Temp ( C )	24.4	24.6	24.6	24.3	24.7	24.7	24.8	
DO Initial	7.7	6.6	5.5	6.7	6.7	6.0	5.4			DO Initial	7.6	6.4	5.7	6.6	7.5	5.3	4.6	
DO Final	8.2	8.2	8,2	8.2	8.2	8.0				DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.8	7.6	7.5	7.6	7.6	7.5	7.4			pH Initial	7.9	7.8	7.7	7.7	7.6	7.5	7,3	
pH Final	8.0	7,9	8.0	7.9	7.8	8.0				pH Finsl	8.1	8.1	8.0	8,1	8.1	8.0		i i
Alkalinity					ĺ					Alkalinity		<u> </u>	ļ	<b> </b>	<b> </b>	<b>_</b>		
Hardness		[				[				Hardness					ļ	ļ		
Conductivity	313	303	307	302	309	302				Conductivity	486	483	487	487	482	480		
Chlorine								ļ		Chlorine	<u> </u>					 		
Dilution: 42				Day						Dilution:	100			Da	y	-		
	1	2	3	4	5	6	7	Comments			1	2	3	4	5	6	7	Comments
Temp ( C )	24.4	24.6	24.6	24.3	24.7	24.7	24.8			Temp (C)	24.4	24.6	24.6	24,3	24.7	24.7	24.8	
DO Initial	7.6	6.6	5.6	6.6	6.6	5.8	5.1			<b>DO Initial</b>	7.6	6.5	5.8	6.6	6.5	5.3	4.6	
DO Final	8.2	8.1	8.1	8.1	8.2	8.0				DO Final	8.0	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.9	7.7	7.5	7.6	7.6	7. <b>5</b>	7.3			pH Initial	8.0	7.9	7.8	7.7	7.7	7.6	7.4	
pH Final	8.0	8.0	8.0	8.0	8.0	8.0				pH Final	8.1	8.1	8.1	8.1	8.1	8.1		
Alkalinity										Alkalinity	92.0	88.0	ļ.	96.0				
Hardness										Hardness	44.0	<b>52</b> .0	1	56.0	<u> </u>	<u> </u>		
Conductivity	348	344	346	342	347	343			<b>-</b>	Conductivity	593	591	593	591	593	586	<u> </u>	
Chlorine					}					Chlorine	<.01	<.01		<.01				

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### 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

prado Chemica Client: Project#:

Proofed First Draft:\_\_\_\_\_\_ Proofed Final Draft The Brigge

Date:		
Date:	3/23/11	

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.

**Quality Assurance Officer** 

Date: <u>3</u>/

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



Bio-Analytical Laboratories (BAL) ADEQ Certificate #88-0630 Project X4353

### **Bio-Analytical Laboratories' Executive Summary**

Permittee:	El Dorado Chemical Company 4500 Northwest Avenue El Dorado, AR 71731
Project #:	X4353
Outfall:	001
Permit #:	AR0000752/ AFIN #70-00040
Contact:	Brent Parker
<b>Test Dates:</b>	March 15 - 23, 2011
Test Type:	Chronic Static Renewal Survival and Reproduction Test using <i>Ceriodaphnia dubia</i> (EPA Method 1002.0). Chronic Static Renewal Survival and Growth Test using <i>Pimephales promelas</i> (EPA Method 1000.0).
_	•

### **Results:**

### For Ceriodaphnia dubia:

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0.

2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 0.

3. Report the NOEC value for survival, Parameter TOP3B - 100%.

4. Report the NOEC value for reproduction, Parameter TPP3B - 100%.

5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 21.41%.

### Note: The UV treated 100% dilution showed lethal or non-lethal effects.

### 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,  $P_{\text{constant}} = TOP(Q_{\text{constant}}) = 11.69\%$ 

Parameter TQP6C - 11.68%

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

This report contains a total of 51 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 NELAC and ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

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## **Bio-Analytical Laboratories**

3240 Spurgin Road Post Office Box 527 Doyline, LA 71023 (318) 745-2772 1-800-259-1246 Fax: (318) 745-2773

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

AT

### EL DORADO CHEMICAL COMPANY El Dorado, Arkansas

### NPDES #AR0000752 AFIN #70-00040

EPA Methods 1000.0 and 1002.0

Project X4353

Test Dates: March 15 - 23, 2011

Report Date: April 18, 2011

Prepared for: Brent Parker 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

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BAL ADEQ #88-0630 Project X4353

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2.2 Test Organisms	4
2.3 Dilution Water	4
2.4 Test Concentrations	5
2.5 Sample Collection	5
2.6 Sample Preparation	5
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#### **1.0 Introduction**

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

### 2.0 Methods and Materials

#### 2.1 Test Methods

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

#### 2.2 Test Organisms

The *Ceriodaphnia dubia* test organisms were cultured in-house at test temperature and were less than 24 hours old at test initiation. The neonates were released within the same 8-hour period. The fathead minnow test organisms were obtained from Aquatox Incorporated, Hot Springs, Arkansas and were less than 48 hours old at test initiation. The minnows were acclimated to dilution water hardness prior to test initiation. Monthly chronic reference toxicant tests, using sodium chloride, were conducted in order to document organism sensitivity and testing technique.

#### 2.3 Dilution Water

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

### **2.4 Test Concentrations**

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

### **2.5 Sample Collection**

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on March 14, 16 and 18, 2011. Upon collection and completion of each composite, the samples were chilled to 4<sup>o</sup> 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  $25\pm1^{0}$  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. The effluent was filtered through a 60 micron plankton net in order to remove any organisms that might interfere with the tests. It was also 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  $25\pm1^{\circ}$  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  $25\pm1^{\circ}$  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.

### 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 and the growth data was analyzed using Dunnett's Test. The IC<sub>25</sub> value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC<sub>50</sub> values (that concentration of a substance which is lethal to 50 percent of the test organisms after continuous exposure for the duration of the test) in the reference toxicant tests 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. Eighty percent survival occurred in the control and in the critical dilution after seven days of exposure. The average number of neonates per female after three broods in the control and in the critical dilution was 20.3 and 19.2, respectively. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 percent effluent (p=.05). Seventy percent survival and an average of 16.2 neonates was noted in the 100 percent UV treated dilution.

The fathead minnow test results can be found in Table 2. Ninety-five percent survival occurred in the control and 97.5 percent survival occurred in the critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.838 milligram (mg), while the average in the critical dilution was 0.815 mg. An erratic dose response occurred in the growth data; however, after further investigation, it was determined that the NOEC for survival and growth in this test was 100 percent effluent. Ninety-seven-point-five percent survival and an average weight of 0.770 mg was noted in the UV treated dilution.

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates - Total	Sig.*
Control	80.0		23.9	20.3	
32.0	90.0		24.3	21.9	-
42.0	90.0		25.1	24.9	
56.0	90.0		23.3	23.5	
75.0	70.0		20.6	21.8	
100.0	80.0		20.3	19.2	
100.0 UV	70.0		16.6	16.2	

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

\*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.

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	95.0		0.838/0.886+	
32.0	90.0		0.718	*
42.0	100.0		0.743	
56.0	90.0		0.698	*
75.0	97.5		0.788	
100.0	97.5		0.815	
100.0 UV	97.5		0.770	

#### Table 2: Results of the Chronic Definitive Fathead Minnow Test

\*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.

### **4.0 Conclusions**

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on March 14, 16 and 18, 2011 were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after seven of exposure (p=.05). Nonlethal effects (i.e., lack of reproduction or growth) were not noted in the critical dilution in either test (p=.05).

### 5.0 Reference

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.

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### APPENDIX A CHAIN-OF-CUSTODY DOCUMENTS

Comments:	iation: (1) AS	Reiimquished by/Affiliation:	AX ht: / EUCC	Refinequisinged by/Africiation:			3-19-11 - Ofform X 8 0	Date Start         Time Start         C         G         #         S           Date End         Time End         C         G         #         S	AIN /	Samoler's Signature/Printed Name/Affiliation:	Permit #: Purchase Order: AR0000752	Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499	Company: El Dorado Chemical Company (870) 863-1484	bioznalvical@att.net NELAP 01975, ADEQ #88-0630, EPA I.A00917	Bio-Analytical Laboratories 3240 Spurgin Road Doyline, LA 71023 (318) 745-2772, Fax (318) 745-2773
	ate: Time: ////////////////////////////////////	Date: Time:	3-14-11 11 30	Date: Time:			001	Sample Identification	Evel			9			CHAIN OF CUSTODY
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	on brival: 0, eq 1330	Date: Time:	3-14-11 11 30	Date: Time:			C2809 ice	Lab Control Freeservauve: Number: (below)			unolilo atrival:	() () () () () () () () () () () () () (	Project Number:	Laboratory Use Only:	

CHAIN OF CUSTODY

	Date: Time: Received by/Affiliation:	Date: Time: Received by Astraliation:		8 001 x x		nīta species řesh/marine ,	mrofilo dasboirs) bisyl e sindas(	Fecal C Acute 0 Acute 1 Acute 1 Acute 1 Acute 1	Phone: (870) 863-1484	CHAIN OF CUSTODY NELAP 01975, ADEQ #88-0630, EPA LA00917
100/11	Date:	Date: 3-16-11		11803	Lab Control Number:	Thermometer #:29 Tech: 2000 Date: 3/10/11	Iemperature upon arrival	Total C	]	Laboratory Use Only:

Sio-Analytical Laboratories ( 1240 Spurgin Road Doyline, I.A 71023 318) 745-2772, Fax (318) 745-2773 <u>110analytical@att.net</u> NELAP 01975, ADEQ #88-0630, EPA LA00917	CHAIN OF CUSTODY 917		4 - - - -	
Company: Phone: El Dorado Chemical Company (870) 863-1484	*	Analysis:	Project Number:	]
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499	1499	Fecal Acute Acute Acute Acute	SchX Xt32	<u> </u>
Permit #: AR0000752	er:	Coliform Cerioday Mysid Daphnia	I Demoerature upon arrival:	<b>miv-1</b>
Sampler's Signature Printed Name/Affiliation:	Edic	nina species (ffesh/marii w		
Date Start         Time Start         C         G         #           Date End         Time End         C         G         #	Sample Identification	(эι	Lab Control Preservative: Number: (below)	ive:
3/17/11 0900 X \$8	001	X	C2870 ice	
Relinquished by/Affiliation:	Date: Time:	Received by/Affiliation:	Date: Time:	
Blust Ventex /EDa	3-18-11 4000	LIZ	JUBAN VANO	
Relinquished by/Affiliation:	Date: Time:	Received by Affiliation:	Ţi	
	Date: 3/10-1/ 1300	Received by/Affiliation:	Date: 318 11 130	
Method of Shipment: <u>(X_Lat6</u> Bus Fed Ex Comments:	ExDHLUPS	Client	#	
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### APPENDIX B RAW DATA SHEETS

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# BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

	Project# <u>X4353</u> Date start: <u>315111</u> Date end: <u>303/11</u>	
	client/contact <u>El Dorado Chemicat</u>	
	Address 4500 Northwest Ave. El Dorodo AR 71731	
	NPDES# AROODO 752 AFIN 70-00040	
	Sample Description OOI Dilution Water <u>Soft reconstitutes</u>	
	Test Temperature ( $^{\circ}C$ ) <u><math>\partial 5\pm 1^{\circ}C</math></u> Technicians <u>Briggs Houghton Zeagle</u>	37, NGHA
	Adults isolated: Date 314111 Time: 0030	
R 3]21		Date
	Chlorine (mg/L) / Amount?/Tech (mg/L)/Tech  1. (D.O.) AH 1. NO AH 1. 3.0 AH 1. C2809	3/15/11
	2. <u>LO.01/08</u> 2. NOISting 2. <u>O.SIsting</u> 2. <u>C.3841</u>	slinly
	3. CO.OI /AH 3. NO/AH 3. 3. 10/AH 3. 20/AH 2.02870	3/19/11
	Comments: Filtered effluent thru 60 um plankton net to remove any live organisms.	

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client EI Dorado Chemical

Replicate			% (	Concentrat	ion		
	0	30	42	JU	75	100	100uv
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С	26	30	26	26	Xag	Ja	15
D	Х٦	33	Sle	x as	<u> </u>	21	17
Е	31	94	24	2]	19	X8	19
F	XIO	ab	67	22	X 22	99	21
G	30	99	86	<u>a</u>	Xay	15	X13
Н	23	Х	24	18	18	20	18
I	17	18	<u>23</u>	99	15	17	17
J	32	22	26	93	21	99	XIA
Surviving Mean	03.9	24.3	25.	23.3	20,6	20.3	16.6
Total Mean	20.3	21.9	24,9	03,5	01.8	192	162
CV%*	al.41	15.65	7.83	13.55	18.80	1391	16.1do

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

Key: M=male; X=dead adult

3/29/11 Calculated by: MCalculations checked by: ECB 331111

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roject# <u>X4357</u> lient <u>ElDorac</u> k	) Une	mical	Te	est sta	ied:	Date	3/1/ Time	<u>1355</u> 1 <u>30</u> 0 F	age 19	0151
rganism <u>C</u> dubi	<u>a</u>								]	
Day/# water used	342	1	2	33144	4	5	6	7	8	
Concentration: Con	trol SC	oft					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		·	
рH	7.9	249	1.2,2	1079	149	281	1.880	1.8.0	8.0	
DO (mg/l)	8.1	8/8/2	818.1	18,1	8.18.1	1.80	181	28.0	8.0	
Cond(umhos/cm)	171.5	169.2		169.1	170.7	172.9	1734	179.8		:
Alkalinity(mg/L)	36.0			30.0						
Hardness (mg/L)	44.0			40,0		ĺ				
Concentration:33	2	<u>^</u>								
рн -	79	7.8	7.4	280	199	1.8.1	180	8.8.0	8.0	
CO(mg/l)	8.1	8.21	8.81	D&I	8.181	1.80	7.9.1	7.8.0	29	
Cond(umhos/cm)	303	300	295	299	293	294	298	290		
Concentration: 40	2	<u></u>								
рН	8.0	280	1.0	2.8.0	287.9	1.88.1	180	8.80	80	
DO (mg/l)	81	8.21	8:81	280	8.8.1	1.8.0	2.8.C		J.B	
Cond(umhos/cm)	340	338	331	291	332	330	332	325		
Concentration: 50	50	<u> </u>	- <del></del>			1.97	202			
рH	8.0	8.0	1.0	2:81	).8.C	1.8.1	8.1	8.8.1	81	
DO(mg/l)	<i>g</i> ,	8.8.1	8.1	28.0	8.8.1	1.8,0	280	1.9	J,8	
Cond(umhos/cm)	398	392	384	384	385	384	388	380		
Concentration:75	2	<u> </u>					002	101		
рН	8.1	848.1	1.8.0	2:8.2	1.8.1	18.2	28.1	0.8.1	8,1	
DO(mg/l)	8-1	8 8.0	8.1	1: 8.0	8.8.1	1:80	18.0	1.9	7.9	
Cond (umhos/cm)	472	466	453	456	458	459	458	453		
Concentration: 10(	5		<del>778 • • • • • •</del>	<del></del>			602	1022		$\sim$
рн	8,1	8.8.2	8.8.2	8.8.2	8.8.1	1.8.2	8.1	08.2	8,2	· · · · ·
DO(mg/1)	8-1	8.20	8:18.1	1:10	8.8.2	1.80	18.0	14.8	1.9	
Cond(umhos/cm)	570	5ldo	547	558	551	555	558	549	Re	R.C 3/23/81
Tech-prerenewal (	Hom.	HKA.	1823	AH	AL	AH	Þ612	KC		3/23/ <b>1</b> 1
Tech-postrenewal		AH	[ AH	AH	1011	AH	RČ.	682	<u>LRC</u>	
Hardness(mg/1)	56.0		560		46:0				ļ	
Alkalinity(mg/1)	120	1	88.0		840			ŀ		

Key: prerenewal/postrenewal

Day/# water used	<i>ଟ୍ଟା</i> 4∂	1	2	3	4	5	6	7	8
Concentration: Gos	<del>trol</del> (ĉ	DUV-	tr'td						
рН	8.0	81 8.1	8:081	88.2	8.09	8.85	8.20	8.2.q	8.1
DO (mg/l)	79	8-19	2819	25.8	1980	1.99	178	14	7.4
Cond (umhos/cm)	SUI	561	549	554	369	573	550	533	
Alkalinity(mg/L)			<u> </u>						
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Tech-prerenewal	lest	BB3	\$12	AH	AH	AH	Homa I	RC	
Tech-postrenewal		AL	AU	AH	b#	AH	RCO	\$3m	RC

X4353 Page 21 of 51 BIO-ANALYTICAL LABORATORIES PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET Date started: 3/15/11\_ Date ended 3/22 Project# <u>X4353</u> client/contact El Dorado Chemical Address 4500 Northwest Ave. El Dorado AR 71731 NPDES# AR000752 \_\_\_\_ Dilution WaterSOA reconstituted Sample Description\_\_\_\_ DOI Test Temperature (°C) <u> 35=1°</u> Technicians <u>Brogs Houghton 2009</u> ler, Callathan Test organism age < 48 hr \_\_ Vendor/ID# Aquatox 658 Feeding Times Technician/Time/Amount (per replicate) Day PM NOON AM RC 155510.20~ 0 AH 11245 010m 144010.10ml 6B1070010,10m1 1 THEIS IN TON AH11500/0100 08/00300,10m 2 RC1 1105 10.10ml AH 1530 0.10ml AH 1930 0.20ml AH 1445 0.20ml 08/063010.10ml 3 AH1134510.20ml 4 H102)/0.20ml 5 RC/1603/0.10mo ELB/064/5/0.10m RC/1120/0.10ml 6 #06E2089 Dissolved Oxygen Meter: Model YSI550A Serial Serial #020273 Model Orion 230A+ pH Meter: Serial #80277924 Model Control Company Conductivity Meter: <u>#92W445766</u> Model Fischer-Porter Serial Amperometric Titrator: Aerate?/Minutes Receiving Water Aerate?/Minutes Effluent /Final DO Initial DO /Final DO Initial <u>(mg/L & %)/Tech</u> /Tech (mg/L & %) (mg/L & %)/Tech DO(mg/L&%)/Tech ΪA JA 0. 11518.3199.000 blog 0. 0.108/130.90/06/01 1. 10.9/134.22/AH 1. 1/15/83/100.22/19/11. 2. VI518,2197.08 AH 2.-2. M. 1 132.22/AH 3.10.9/132.02/AH 3. U/15/8/1/98/72/AH3 .-4. 10.1116.58/AH 4. VI 15/8,39843 AH 5. YIS 8.0 96.38 AH. 5. 10.1/120.621AH 5. 6×15/8.2/98.6%/RC6.\_ 6.10.0/121.120/RC <u>BAL Sample #</u> Nate Total Residual Ammonia (NH3) Dechlorinated? Chlorine(mg/L)/ Amount?/Tech (mg/L)/Tech Tech 1 C28D9 1.20.01 NUM ND  $_{2}$  C284 2. <u>20.01/1911</u> Nola 2.\_\_\_ 3 CASTO 3/19 3. LO. 01/AH NOIAH 3.\_ 3. 3.0 PH Comments: Filtered effluent thru 60 um plankton net to remove any live organisms.

BIO-AN	ITYLA	CAL LAE	ORATOR	IES 7-I	DAY CHR	ONIC M	INNOW SU	JRVIVAL	DATA
Project	# X43	53			Test	start	ed: Dat	e3/15/1, T:	
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Technicia Time:	n: Day0 Dav0	<u>Rc</u> 1 <u>f</u> 1430 1][	<u>44</u> 2 240 2		<u>RC</u> 1035	4 AH 41655	5 <u>111</u> 5 <u>11110</u>	6 <u>RC</u>	7 AH 7 1010
Temperatu	re Day0	<u>24.9</u> 12	<u><u><u></u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	<u>1045</u> 3 ठू <u>4</u> . <u>२</u> ° 3	24.8	4 <u>25.3</u>	5 <u>244</u>	6 246	724.5
Conc. 3	Rep.	Day 0	Day i	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	A	8	8	8	8	$\overline{1}$	7	6	6
	в	8	Ś	Š	8	8	8	R	R
	C	8	- X	R	- Ś	- X	8	8	X
O	 D	- <del> </del> <del> </del>	$\overline{\mathbf{x}}$	- <del>S</del>	- Ž	- <del>X</del>	Š	8	Ř
		$\overline{\mathbf{x}}$	- <del>Q</del>	$\overline{\diamond}$	8	- <del>V</del>	8	8	$\frac{2}{2}$
	E	$\overline{\mathbf{v}}$			8	8	2	n 0	$\frac{0}{10}$
	A	8		2	0	8	- <u>-</u>	8	$\frac{\varphi}{c}$
	В			<u> </u>	X	2-			8
32	C	<u>R</u>	$\frac{2}{2}$	$\sim$	0	-8-	<u> </u>		
	D	<u>g</u>	<u> </u>	<u> </u>	8		<u> </u>	<u> </u>	
	<u> </u>	8	<u> </u>	X	8	<u> </u>	<u> </u>		
	A	8	<u> </u>	8	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
	В	<u> </u>	8	X	<u> </u>		<u> </u>	<u> </u>	
110	C	8	8	8	8	8	8	8	X
40	D	8	Ň.	8	8	<u>&amp;</u>	8	8	8
	E	S S	Ś	T	8	Δ	8	8	Ś
	A	8	8	8	8	8	8	8	8
	B	Ř	8	Ŕ	8	Ŕ	8	8	8
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56	D	Ř		-7	7	$\overline{2}$	$\tilde{0}$	7	7
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	A	× ×	$\langle$	$\overline{\diamond}$	X	×		8	8
-		8	- Ô	Ś	0 (/	$\partial$	8	- X	- <del>S</del>
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	D	$\ominus$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u> </u>	<u> </u>	<u>_</u>	8	N	
┣───┤	E	$\overline{\mathbf{O}}$	$-\bigcirc$		 X	<u>e</u>	No Contraction of the second s	8	-2-
	A		<u> </u>	<u> </u>	0	<u> </u>			
	В	<u> </u>	<u> </u>	<u> </u>	S.	Γ <u></u> ζ	<u> </u>	8	
001	C	8	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	D	<u> </u>	<u> </u>	<u> </u>	<u> </u>	ĽX,	<u> </u>	8	<u> </u>
	Е	X	<u> </u>	<u> </u>	Y le: Mir	inow2	<u> </u>	8	

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4353       Test started: Date	BIO-AN	ALYTI	CAL LAB	ORATOR	IES 7-E		1	INNOW SU		
Technician:         Day O         RC         T <tht< th="">         T         T</tht<>	Brojogel	4 V/15	1-2			Teat	gtart	ed: Dat	3/15/1, TH	meเปลา
Technician:         Day O         RC         T <tht< th="">         T         T</tht<>	Client F		ACC	remico	$\overline{1}$	Test	ended	: Dat	e365/11 Ti	lme <u>1950</u>
Conc, $\overline{A}$ Rep.         Day 0         Day 1         Day 2         Day 3 <sup>4</sup> Day 4         Day 5         Day 6         Day 7           A $\overline{A}$	Technicia	n: Day0	RC 1	<u><u><u>a</u></u><u>H</u> 2/</u>	AH 3	- RC		5 1411	6 RC	7 <u>fff</u>
Conc, $\overline{A}$ Rep.         Day 0         Day 1         Day 2         Day 3 <sup>4</sup> Day 4         Day 5         Day 6         Day 7           A $\overline{A}$	Time: Temperatu:	re Dayu	<u>7430</u> 1 11 24.9 1 2	<u> </u>	<u>245</u> 28	9103.3-00	4 0 m 3	<u>5 244</u>		
A     R     R     R     R     R     R       B     R     R     R     R     R     R     R       C     R     R     R     R     R     R     R       D     R     R     R     R     R     R     R       A     R     R     R     R     R     R       A     R     R     R     R     R       B     R     R     R     R     R       C     R     R     R     R     R       B     R     R     R     R     R       B     R     R     R     R     R       A     R     R     R     R     R       B     R     R     R     R     R       C     R     R     R     R     R       B     R     R     R     R     R       C     R     R     R     R     R       B     R     R     R     R     R       C     R     R     R     R     R       B     R     R     R     R       B     R     R <td></td> <td></td> <td></td> <td></td> <td>Dav 2</td> <td><i>31,31,,</i> Day 3</td> <td>Dav 4</td> <td></td> <td>Day 6</td> <td>Day 7</td>					Dav 2	<i>31,31,,</i> Day 3	Dav 4		Day 6	Day 7
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $			<u>0</u>	~ ~	2		- Contraction of the second se	Ŷ		8
D     R     R     R     R     R     R     R       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     -       B     -     -     -     -     -     -       B     -     -     -     -     -     -       D     -     -     -     -     -     - <td>IDD  </td> <td></td> <td>8</td> <td></td> <td><math>\sim</math></td> <td></td> <td></td> <td></td> <td></td> <td><math>\overline{\mathcal{S}}</math></td>	IDD		8		$\sim$					$\overline{\mathcal{S}}$
E       X       X       X       X       X         A       -       -       -       -       -       -         B       -       -       -       -       -       -       -         C       - </td <td>L'U</td> <td></td> <td>0</td> <td><u> </u></td> <td><del>- &amp;</del></td> <td></td> <td></td> <td><u> </u></td> <td><u> </u></td> <td></td>	L'U		0	<u> </u>	<del>- &amp;</del>			<u> </u>	<u> </u>	
A       A       A         B       A       A         C       A       A         B       A       A         B       A       A         B       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         B       A       A         C       A       A         B       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A	+rto	D	à	<u> </u>	$\frac{0}{C}$		<u> </u>			
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C		<u>A</u>								
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A       A       A         B       A       A         D       A       A         A       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         C       A       A         B       A       A         B       A       A         C       A       A         B       A       A         C       A       A         D       A       A         E       A       A         B       A       A         D       A       A         B       A       A         D       A       A         D       A       A         B       A       A         D       A       A         D       A       A		D							ļ	
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## BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4353 El Dorado

Toot	Datos	211511	-3/22	116
1096	Dates		$\gamma c c \gamma$	

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Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 3[2]] weighed: Tech: J.M.	Wt. of pan + larvae(g)/ Date 308 weighed: Tech AH	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*
	1 lole	0.9442	09500	0.0058	8	0.725	60967
	BUN	0.9480	0.9552	6.0072	8-	0.900	
Ο	c 108	0.9527	0.9595	8000.0	8	<u>0.850</u>	
	D 69	0.9541	0.9612	0.0071	8	0.888	
	E 70	0.9557	0.9623	0.0066	8	0.825	
	A 71	0.9583	0.9635	0.0052	<u> </u>	<u>0.650</u>	
$\gamma \gamma$	вла	0.9606	0.9667	0.0061	8	0.763	
39	<u>c 73</u>	0.9598	0.9655	0.0057	8	0.13	
	<u> 74</u>	0.9584	0.9635	0.005	<u> </u>	0.638	
	<u> </u>	0.9589	0.9455	0.0066	<u> </u>	0.892	
	A 76	0.9580	0.9636	0.0056	8	0.700	
	в 77	0.9560	0.9622	0.0062	8	<u>0.775</u>	
42	c 78	0.9552	0.9612	0.0060	8	0,750	
	D 79	0.9539	0.9603	0.0064	8	0.800	
	e 80	0.9539	0.9594	0.0055	8	0.688	
	1 <u>8 a</u>	0.9539	<u>0.958a</u>	0,0053	8	0.003	
، بہ	в 8д	0.9514	0.9581	0.0067	8	0.838	
TU	<u>c 83</u>	0.9442	0.9487	0.0045	8	0.563	
		0.9378	0,9439	1000.0	8	0.763	
	e 85	0.9353	0.9406	0.0053	8 .	0.003	
	A 86	0.9348	0.9405	0.00SN	8	0,713	
	в &Л	0.9330	09397	0.0067	8	0.838	
15	c <u>88</u>	0.9359	0.9430	0.0011	8	0.888	
	р 89	0.9385	0.9443	0.0058	8	0.725	
	е 9D	0.9389	0.9451	6000.0	ଟ	0.775	
	A QI	0.9420	0.9484	0.0064	8	0.800	
<u></u>	в дд	0.9492	0.9561	0.0069	8	0.863	
M		0.9519	0.9582	0.0063	8	0.788	
	D 94	0.9539	0.9599	0.0060	8	0.750	
	e QS	0.9567	0.9637	0.0070	8	0.875	. <u> </u>
'est acce	ptance of confr	of weight based on s	rviving larvae at end	of test. culations checked	by: EG?	NH1H4	

BIO-ANALYTICAL	LABORATORIES		GROWTH DATA	

Project#/Client X4353 El Dorado Test Dates 3/15/11 - 3/22/11

X4353 Page 25 of 51

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 321 11 weighed: Tech: J.B.N	Wt. of pan + larvae(g)/ Date weighed:32/3/1/ Tech: AH	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*
	1 96	0.9603	0.9658	0.002-2	8	0.688	
Jun	вQЛ	0.9608	0.9673	0.0065	8-	0.813	
100 V.V	c 98	0.9594	0.9455	0.0061	8	0.763	
Tib		0.9597	0.9661	0.0064	<u>Š</u>	0.800	
•	E 100	0.9584	09647	0.0063	8	0.788	
$\mathbf{n}$	A				•		
	В		· · · · · · · · ·			-	
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	<u>-</u> Е				· · ·		
Test acce		of weight based on s M 304	urviving larvae at en	d of test. culations checke	d hv: ES	2	<u> </u>

BIO-ANA roject# <u>X435</u>	<u>3                                    </u>		T(	ES 7-D est sta est end	arted:	Date <u>yi</u>	LJTY L <u>S/I</u> Time Ø <u>N</u> Time	5 <u>1.420</u>	X Page 26
lient <u>El DOroc</u> rganism <u>P DOro</u> c	pelas	mica	***						
Day/# water used	3142	1	2	33144	4	5	6	7	8
Concentration: Cor	ntrol <u>S</u> (	oft			· · · · · · · · · · · · · · · · · · ·				r{
рH	7.9	1:49	122	249	1.5	1.8.1	1.80	1.4	
DO (mg/l)	8.1	18.2	6.5	6.381	14	1.8.0	1-8.1	63	
Cond(umhos/cm)	171,5	169.2	111.5	169.5	1707	172.9	123.4		
Alkalinity(mg/L)	360			$\mathcal{D}^{\mathcal{O}}$				. <u></u>	
Hardness (mg/L)	44.0			40.0				l	L
Concentration: 32	5	<u>at 2</u>				66/	14/	$\overline{}$	r
pH	7.9	19	1.24	18.0	17.9	181	18.0	13	
DO (mg/1)	8.1	1.0	6.8.1	6.8.1	1.8.1	120	1.8.1	6.1	
Cond(umhos/cm)	303	300	295	299	293	294	298		L
Concentration: 42	2							<u> </u>	┎────┨
рH	&.D	7.6	25	8.0	1.09		1.80	13	
DO (mg/1)	8.1	1.81	28.1	1.0	28.1	280	2.8.0	6.2	 
Cond (umhos/cm)	34D	338	331	291	332	330	332	l	L
Concentration: 50	5								
рH	8,0	1:0	19.8	7.6.1	180	1.8.1	1.8.1	13	
DO (mg/1)	81	1.18.1	0.8.1	6.20	1.8.1	18.0	28.0	6.0	
Cond (umhos/cm)	398	392	384	384	385	उन्ध	388		L
Concentration: 75	52			······		<u></u>	<u>n6-</u>		,
рH	8.1	1.1	120	1.4	218.1	n. Ba	1.8.1	1.4	
DO (mg/l)	8.1	1.0	10.2.1	628.0	18.1	2.80	1.8.0	5.7	
Cond (umhos/cm)	472	466	453	456	458	459	458		L
Concentration: 11	02		<del></del>				66	~~~	┉┈┈╢
pH	8.1	1.2	1.22	A.6 8.2	8.1	8.2	1.8.1	14	<b></b>
DO (mg/1)	8.1	7.1	48.1	6.8.0	28.2	1.80	1.8.0	53	
Cond (umhos/cm)	STD	566	547	558	551	555	558	<b></b>	┟───┨
Tech-prerenewal (	ton	RC	AH	RC	AH	AH	RC		 
Tech-postrenewal	0	AH	AH	AH	AH	1414	RC	1AH	
Hardness(mg/l)	Blo.D		10.0		48.0			<u> </u>	
Alkalinity(mg/1)	120		68.0		84.0				

Key: prerenewal/postrenewal

ł

Concentration:       Concentration:       Concentration:       Concentration:         p#       R.O.       R.I.       R.I.       R.I.       R.I.       R.I.         p#       R.O.       R.I.       R.I.       R.I.       R.I.       R.I.       R.I.         p#       R.O.       R.I.	BIO-ANZ Project <u>#_X435</u>	2,		Te	ES 7-E est sta	AY WAT	ER QUA Date <u>3</u>	LLTY L <u>Is/11</u> Time	ATA = <u>1430</u>   = 1010	< Page 27
Day/# water used       0       1       2       3       4       5       5       7       8         Concentration:       General (D & UU-trt)       -	lient (F) Doro	$\alpha \cup \Box$	nemia	OU = Te	est end	leu:	Dacada	<u>equi</u> 1 ± iii		
Day/8 water used 10 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			1				E	6	7	8
рн 8.0 2.1 2.1 2.2 1.9 2.0 2.0 1.0 bo (mg/1) 7.9 2.9 2.9 2.1 2.0 2.0 2.0 2.0 1.0 cond (unhos/cm) 2.0 5.0 5.1 2.0 5.1 2.0 2.3 5.5 0 Alkalinicy (mg/L) Rardness (mg/L) Concentration: pH Do (mg/1) Concentration: pH Do (mg/1) Concentration: Conc					· · ·	_4	<u> </u>	<u> </u>	L.,	
Cond (unhos/cm)       7.9	Concentration: Con	ntrol (	No n	v - trt	d	682	0102	15/	$\overline{}$	
Cond (umhos/cm)       Sup	рH	8.D	18.1	8.1	28.2	129	80	1.8.0	Tile	
Cond (unhos/cm) Concentration: pH Cond (unhos/cm) Concentration: pH Cond (unhos/cm) Concentration: pH Concentration: Concentration: pH Concentration: Concentration: pH Concentration: pH Concentration: Concentration: pH Concentration: Concen	DO (mg/1)	9.6	2:1,9	67.9	6378	280	1.29	1978	5.8	
Hardness (mg/L)  Degreentration:  pH Do(mg/1) Cond (umhos/cm) Concentration:  Concent	Cond (umhos/cm)	507	<u>561</u>	549	554	El 9	<u>573</u>	550		
Capcentration:         pH         D0(mg/1)         Concentration:         pH         D0(mg/1)         Cond(umhos/cm)         Cond(umh	Alkalinity(mg/L)	<u> </u>								
pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: Concentrat	Hardness (mg/L)	<u> </u>						<u> </u>	L	L
pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pH D0(mg/1) Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: pf Concentration: Concentrat	Concentration:									·····
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Cond (umhos/cm)         pH         D0 (mg/1)         Concentration:         pH         D0 (mg/1)         Cond (umhos/cm)         Cond (umhos/cm)         Tech-prerenewal         MM       RC         PH       PH         PH         Rardness (mg/1)       PH			X							
Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Concentration: pH DO (mg/1) Concentration: PH PH PH PH PH PH PH PH PH PH	DO(mg/1)		$\nearrow$	J/	$\geq$					
Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Concentration: pH DO (mg/1) Concentration: PH PH PH PH PH PH PH PH PH PH	Cond (umhos/cm)	·		B/	1					
pH DO (mg/1) Cond (unhos/cm) Concentration: pH DO (mg/1) Cond (unhos/cm) Concentration: pH DO (mg/1) Concentration: pH DO (mg/1) Concentration: PH PH PH PH PH PH PH PH PH PH				$\sim$	×11					
Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Cond (umhos/cm) Tech-prerenewal Kardness (mg/1)										
Concentration: pH DO (mg/1) Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Tech-prerenewal Tech-prerenewal AH PH AH AH RC AH Hardness (mg/1)	DO (mg/1)	:				$\mathbf{X}$				
pH DO(mg/1) Cond(umhos/cm) Concentration: pH DO(mg/1) Cond(umhos/cm) Tech-prerenewal Tech-prerenewal Hardness(mg/1) Hardness(mg/1)	Cond (umhos/cm)						5			Ĺ
pH DO(mg/1) Cond(umhos/cm) Concentration: pH DO(mg/1) Cond(umhos/cm) Tech-prerenewal Tech-prerenewal Hardness(mg/1) Hardness(mg/1)	Concentration:				<b></b> ,	·	<u> </u>		>	·
Cond (umhos/cm) Concentration: pH DO (mg/1) Cond (umhos/cm) Tech-prerenewal Tech-postrenewal Hardness (mg/1)								X,	$\angle$	
Concentration:         pH         D0 (mg/1)         Cond (umhos/cm)         Tech-prerenewal         DM RC       DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH RC         DH H         <	DO(mg/l)							$\angle$		
pH DO (mg/1) Cond (umhos/cm) Tech-prerenewal Hardness (mg/1) Hardness (mg/1)	Cond(umhos/cm)					<u> </u>	<u> </u>	ļ`	$\sim$	L
DO (mg/1) Cond (umhos/cm) Tech-prerenewal HBM RC OH RC OH AH RC OH Tech-postrenewal DH AH RC OH AH RC OH Hardness (mg/1)	Concentration:	1				~~~	~~~		$\rightarrow$	
Cond (umhos/cm)       Tech-prerenewal       RC       AH       RC       AH       RC       AH       AH       AH       RC       AH       AH       AH       RC       AH	рН			$\angle$			$\square$		$\langle \rangle$	
Tech-prerenewal       Hornor       RC       AH       RC       AH       AH       AH       RC       AH       AH       AH       RC       AH       AH       AH       RC       AH	DO(mg/1)									
Tech-prerenewal       Hornor       RC       AH       RC       AH       AH       AH       RC       AH       AH       AH       RC       AH       AH       AH       RC       AH	Cond (umhos/cm)						ļ		ļ	
Hardness(mg/1)		ABIM	RC	DH	RC	DH	AH	RC	·	
Hardness(mg/l)	Tech-postrenewal		DH4	-191-	AH	19H	AH	RC	AH	
	Handness (mg/1)									
	Alkalinity(mg/1)				[					

Key: prerenewal/postrenewal

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#### APPENDIX C STATISTICAL ANALYSIS

		Cerioda	aphnia Sui	<u>vival and</u>	Reprodu	uction Tes	t-7 Day 9	Survival		
3/15/2011		Test ID:	X4353cd			Sample ID	2	1		
3/23/2011		Lab ID:	ADEQ 880	630		Sample Ty	/pe:	EFF2-Indu	Istrial	
3/14/2011		Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Speci	ies:	CD-Cerioo	laphnia dubia	
1	2	3	4	5	6	7	8	9	10	
1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	
0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	
0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	
	3/23/2011 3/14/2011 1.0000 1.0000 0.0000 1.0000 1.0000 0.0000	3/23/2011 3/14/2011 <b>1 2</b> 1.0000 1.0000 1.0000 1.0000 0.0000 1.0000 1.0000 1.0000 1.0000 1.0000 0.0000 1.0000	3/15/2011         Test ID:           3/23/2011         Lab ID:           3/14/2011         Protocol:           1         2         3           1.0000         1.0000         1.0000           1.0000         1.0000         1.0000           0.0000         1.0000         1.0000           1.0000         1.0000         1.0000           0.0000         1.0000         1.0000           0.0000         1.0000         1.0000           0.0000         1.0000         1.0000           0.0000         1.0000         1.0000	3/15/2011         Test ID:         X4353cd           3/23/2011         Lab ID:         ADEQ 880           3/14/2011         Protocol:         EPAFW02           1         2         3         4           1.0000         1.0000         1.0000         0.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000	3/15/2011         Test ID:         X4353cd           3/23/2011         Lab ID:         ADEQ 880630           3/14/2011         Protocol:         EPAFW02-EPA/821           1         2         3         4         5           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000         0.0000	3/15/2011         Test ID:         X4353cd           3/23/2011         Lab ID:         ADEQ 880630           3/14/2011         Protocol:         EPAFW02-EPA/821/R-02-01           1         2         3         4         5         6           1.0000         1.0000         1.0000         1.0000         0.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	3/15/2011         Test ID:         X4353cd         Sample ID           3/23/2011         Lab ID:         ADEQ 880630         Sample Ty           3/14/2011         Protocol:         EPAFW02-EPA/821/R-02-01         Test Speci           1         2         3         4         5         6         7           1.0000         1.0000         1.0000         0.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         0.0000	3/15/2011         Test ID:         X4353cd         Sample ID:           3/23/2011         Lab ID:         ADEQ 880630         Sample Type:           3/14/2011         Protocol:         EPAFW02-EPA/821/R-02-01         Test Species:           1         2         3         4         5         6         7         8           1.0000         1.0000         1.0000         0.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	3/23/2011         Lab ID:         ADEQ 880630         Sample Type:         EFF2-Indu           3/14/2011         Protocol:         EPAFW02-EPA/821/R-02-01         Test Species:         CD-Cericol           1         2         3         4         5         6         7         8         9           1.0000         1.0000         0.0000         1.0000         0.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           0.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000	3/15/2011         Test ID:         X4353cd         Sample ID:         1           3/23/2011         Lab ID:         ADEQ 880630         Sample Type:         EFF2-Industrial           3/14/2011         Protocol:         EPAFW02-EPA/821/R-02-01 Test Species:         CD-Ceriodaphnia dubia           1         2         3         4         5         6         7         8         9         10           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000         1.0000         1.0000         1.0000         1.0000         1.0000         1.0000           1.0000

				Not			Fisher's	1-Tailed	
Conc-%	Mean	N-Mean	Resp	Resp	Total	Ν	Exact P	Critical	
D-Control	0.8000	1.0000	2	8	10	10			
32	0.9000	1.1250	1	9	10	10	0.5000	0.0500	
42	0.9000	1.1250	1	9	10	10	0.5000	0.0500	
56	0.9000	1.1250	1	9	10	10	0.5000	0.0500	
75	0.7000	0.8750	3	7	10	10	0.5000	0.0500	
100	0.8000	1.0000	2	8	10	10	0.7090	0.0500	
100UV	0.7000	0.8750	3	7	10	10	0.5000	0.0500	

Hypothesis Test (1-tail, 0.05)
Fisher's Exact Test indicates no significant differences
Treatments vs D-Control

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			Ceriod	laphnia Su	rvival and	Reprod	uction Tes	st-Repro	duction
Start Date:	3/15/2011		Test ID:	X4353cd			Sample ID	):	1
End Date:	3/23/2011		Lab ID:	ADEQ 880	)630		Sample T	ype:	EFF2-Industrial
Sample Date:	3/14/2011		Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Spec	ies:	CD-Ceriodaphnia dubia
Comments:							·		
Conc-%	1	2	3	4	5	6	7	8	9
D-Control	20.000	22.000	26.000	21.000	30.000	23.000	17.000	32.000	
32	29.000	26.000	30.000	22.000	24.000	26.000	22.000	18.000	22.000
42	22.000	26.000	26.000	24.000	27.000	28.000	24.000	23.000	26.000
56	25.000	20.000	26.000	27.000	22.000	27.000	18.000	22.000	23.000
75	20.000	26.000	25.000	19.000	18.000	15.000	21.000		
100	23.000	22.000	21.000	22.000	15.000	20.000	17.000	22.000	

18.000

17.000

				Transform	n: Untran	_	1-Tailed				
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	
D-Control	23.875	1.0000	23.875	17.000	32.000	21.408	8				
32	24.333	1.0192	24.333	18.000	30.000	15.649	9	-0.272	2.477	4.172	
42	25.111	1.0518	25.111	22.000	28.000	7.825	9	-0.734	2.477	4.172	
56	23.333	0.9773	23.333	18.000	27.000	13.553	9	0.322	2.477	4.172	
75	20.571	0.8616	20.571	15.000	26.000	18.797	7	1.842	2.477	4.444	
100	20.250	0.8482	20.250	15.000	23.000	13.905	8	2.092	2.477	4.293	
*100UV	16.571	0.6941	16.571	12.000	21.000	16.657	7	4.071	2.477	4.444	

100UV 16.000 15.000 17.000 12.000 21.000

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)	0.41315		0.895		0.09645	-0.2032
Bartlett's Test indicates equal variances (p = 0.27)	7.52746		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences	4.44379	0.18613	70.3115	12.0138	1.1E-04	6, 50
Treatments vs D-Control						

			Ceriod	aphnia Su	rvival and	l Reprod	uction Tea	st-Repro	duction	
Start Date:	3/15/2011		Test ID:	X4353cd		-	Sample ID	):	1	
End Date:	3/23/2011		Lab ID:	ADEQ 880	630		Sample Ty	/pe:	EFF2-Indu	ıstrial
Sample Date:	3/14/2011		Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioc	laphnia dubia
Comments:										
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	20.000	22.000	26.000	2.000	21.000	10.000	30.000	23.000	17.000	32.000
32	29.000	26.000	30.000	22.000	24.000	26.000	22.000	0.000	18.000	22.000
42	23.000	22.000	26.000	26.000	24.000	27.000	28.000	24.000	23.000	26.000
56	25.000	20.000	26.000	25.000	27.000	22.000	27.000	18.000	22.000	23.000
75	20.000	26.000	28.000	25.000	19.000	22.000	24.000	18.000	15.000	21.000
100	22.000	23.000	22.000	21.000	8.000	22.000	15.000	20.000	17.000	22.000
100UV	16.000	21.000	15.000	17.000	12.000	21.000	13.000	18.000	17.000	12.000

		-		Transform	n: Untran	sformed		Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	20.300	1.0000	20.300	2.000	32.000	44.247	10		
32	21.900	1.0788	21.900	0.000	30.000	38.772	10	113.00	74.00
42	24.900	1.2266	24.900	22.000	28.000	7.908	10	126.00	74.00
56	23.500	1.1576	23.500	18.000	27.000	12.884	10	116.50	74.00
75	21.800	1.0739	21.800	15.000	28.000	18.323	10	106.00	74.00
100	19.200	0.9458	19.200	8.000	23.000	24.405	10	97.00	74.00
100UV	16.200	0.7980	16.200	12.000	21.000	20.328	10	82.00	74.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.08193	0.895	-1.5618	5.22514
Bartlett's Test indicates unequal variances (p = 3.89E-05)	30.0265	16.8119		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				



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			Ceriod	aphnia Su	rvival and	Reprod	uction Tes	st-Repro	duction	
Start Date:	3/15/2011		Test ID:	X4353cd			Sample ID	);	1	
End Date:	3/23/2011		Lab ID:	<b>ADEQ 880</b>	630		Sample Ty	/pe:	EFF2-Indu	ustrial
Sample Date:	3/14/2011		Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioo	laphnia dubia
Comments:										
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	20.000	22.000	26.000	2.000	21.000	10.000	30.000	23.000	17.000	32.000
32	29.000	26.000	30.000	22.000	24.000	26.000	22.000	0.000	18.000	22.000
42	23.000	22.000	26.000	26.000	24.000	27.000	28.000	24.000	23.000	26.000
56	25.000	20.000	26.000	25.000	27.000	22.000	27.000	18.000	22.000	23.000
75	20.000	26.000	28.000	25.000	19.000	22.000	24.000	18.000	15.000	21.000
100	22.000	23.000	22.000	21.000	8.000	22.000	15.000	20.000	17.000	22.000
100UV	16.000	21.000	15.000	17.000	12.000	21.000	13.000	18.000	17.000	12.000

				Transform	n: Untran	_	1-Tailed			
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	20.300	1.0000	20.300	2.000	32.000	44.247	10			
32	21.900	1.0788	21.900	0.000	30.000	38.772	10	-0.646	2.347	5.812
42	24.900	1.2266	24.900	22.000	28.000	7.908	10	-1.858	2.347	5.812
56	23.500	1.1576	23.500	18.000	27.000	12.884	10	-1.292	2.347	5.812
75	21.800	1.0739	21.800	15.000	28.000	18.323	10	-0.606	2.347	5.812
100	19.200	0.9458	19.200	8.000	23.000	24.405	10	0.444	2.347	5.812
100UV	16.200	0.7980	16.200	12.000	21.000	20.328	10	1.656	2.347	5.812

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.08193		0.895		-1.5618	5.22514
Bartlett's Test indicates unequal variances (p = 3.89E-05)	30.0265		16.8119			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences	5.81163	0.28629	82.6476	30.654	0.02152	6, 63
Treatments vs D-Control						



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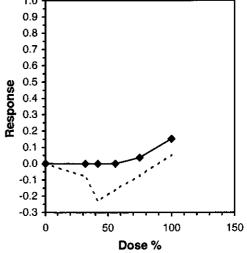
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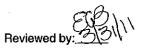
			Ceriod	aphnia Su	rvival and	l Reprodu	uction Tes	st-Repro	duction	
Start Date:	3/15/2011		Test iD:	X4353cd			Sample ID	):	1	
End Date:	3/23/2011		Lab ID:	<b>ADEQ 880</b>	630	-	Sample Ty	/pə:	EFF2-Indu	Istrial
Sample Date:	3/14/2011		Protocol:	EPAFW02	-EPA/821	/R-02-01	Test Spec	ies:	CD-Cerioc	laphnia dubia
Comments:										
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	20.000	22.000	26.000	2.000	21.000	10.000	30.000	23.000	17.000	32.000
32	29.000	26.000	30.000	22.000	24.000	26.000	22.000	0.000	18.000	22.000
42	23.000	22.000	26.000	26.000	24.000	27.000	28.000	24.000	23.000	26.000
56	25.000	20.000	26.000	25.000	27.000	22.000	27.000	18.000	22.000	23.000
75	20.000	26.000	28.000	25.000	19.000	22.000	24.000	18.000	15.000	21.000
100	22.000	23.000	22.000	21.000	8.000	22.000	15.000	20.000	17.000	22.000
100UV	16.000	21.000	15.000	17.000	12.000	21.000	13.000	18.000	17.000	12.000

				Transform	n: Untran	sformed		Isot	onic
Conc-%	Mean	N-Mean	Mean	Min	Max	ČV%	N	Mean	N-Mean
D-Control	20.300	1.0000	20.300	2.000	32.000	44.247	10	22.650	1.0000
32	21.900	1.0788	21.900	0.000	30.000	38.772	10	22.650	1.0000
42	24.900	1.2266	24.900	22.000	28.000	7.908	10	22.650	1.0000
56	23.500	1.1576	23.500	18.000	27.000	12.884	10	22.650	1.0000
75	21.800	1.0739	21.800	15.000	28.000	18.323	10	21.800	0.9625
100	19.200	0.9458	19.200	8.000	23.000	24.405	10	19.200	0.8477
100UV	16.200	0.7980	16.200	12.000	21.000	20.328	10		

Auxiliary Tests	Statistic	Critical	Skew Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.08193	0.895	-1.5618 5.22514
Bartlett's Test indicates unequal variances (p = 3.89E-05)	30.0265	16.8119	

			Li	near Interpolation	n (200 Resamples)	
Point	%	SD	95% CL	Skew		
IC05	77.716					
IC10	88.606					
IC15	99.495				1.0 T	· · · · · · · · · · · · · · · · · · ·
IC20	>100				0.9	
IC25	>100				0.8	
IC40	>100				0.7	
IC50	>100				0.6	
		•			-	
					ω 0.5 -	





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			La	rval Fish G	Frowth and Survi	val Test-7 Day Su	irvival	
Start Date:	3/15/2011		Test ID:	X4353pp		Sample ID:	1	
End Date:	3/22/2011		Lab ID:	<b>ADEQ 880</b>	0630	Sample Type:	EFF2-Industrial	
Sample Date:	3/14/2011		Protocol:	EPAFW02	2-EPA/821/R-02-0	1 Test Species:	PP-Pimephales promelas	
Comments:								
Conc-%	1	2	3	4	5			
D-Control	0.7500	1.0000	1.0000	1.0000	1.0000			
32	0.7500	1.0000	0.8750	0.8750	1.0000			
42	1.0000	1.0000	1.0000	1.0000	1.0000			
56	1.0000	1.0000	0.7500	0.8750	0.8750			
75	1.0000	1.0000	1.0000	1.0000	0.8750			
100	1.0000	0.8750	1.0000	1.0000	1.0000			
100UV	1.0000	1.0000	1.0000	0.8750	1.0000			

			Tra	ansform:	Arcsin So	quare Root	t	Rank	1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	Ν	Sum	Critical	
D-Control	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5			
32	0.9000	0.9474	1.2504	1.0472	1.3931	11.683	5	23.50	16.00	
42	1.0000	1.0526	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
56	0.9000	0.9474	1.2504	1.0472	1.3931	11.683	5	23.50	16.00	
75	0.9750	1.0263	1.3564	1.2094	1.3931	6.055	5	28.00	16.00	
100	0.9750	1.0263	1.3564	1.2094	1.3931	6.055	5	28.00	16.00	
100UV	0.9750	1.0263	1.3564	1.2094	1.3931	6.055	5	28.00	16.00	

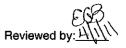
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.87467	0.934	-1.0343	0.90248
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				

			La	nval Fish (	Growth and	d Surviv	al Test-7 Day G	rowth	
Start Date:	3/15/2011		Test ID:	X4353pp			Sample ID:	1	
End Date:	3/22/2011		Lab ID:	ADEQ 88	0630		Sample Type:	EFF2-Industrial	
Sample Date:	3/14/2011		Protocol:	EPAFW02	2-EPA/821/	R-02-01	Test Species:	PP-Pimephales promelas	
Comments:							•		
Conc-%	1	2	3	4	5				
D-Control	0.7250	0.9000	0.8500	0.8875	0.8250				
32	0.6500	0.7625	0.7125	0.6375	0.8250				
42	0.7000	0.7750	0.7500	0.8000	0.6875				
56	0.6625	0.8375	0.5625	0.7625	0.6625				
75	0.7125	0.8375	0.8875	0.7250	0.7750				
100	0.8000	0.8625	0.7875	0.7500	0.8750				
100UV	0.6875	0.8125	0.7625	0.8000	0.7875				
0-SN	0.9667	0.9000	0.8500	0.8875	0.8250				

		_		Transform	n: Untran	sformed			1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.8375	1.0000	0.8375	0.7250	0.9000	8.310	5			
*32	0.7175	0.8567	0.7175	0.6375	0.8250	10.922	5	2.748	2.443	0.1067
42	0.7425	0.8866	0.7425	0.6875	0.8000	6.477	5	2.176	2.443	0.1067
*56	0.6975	0.8328	0.6975	0.5625	0.8375	15.122	5	3.206	2.443	0.1067
75	0.7875	0.9403	0.7875	0.7125	0.8875	9.457	5	1.145	2.443	0.1067
100	0.8150	0.9731	0.8150	0.7500	0.8750	6.453	5	0.515	2.443	0.1067
100UV	0.7700	0.9194	0.7700	0.6875	0.8125	6.453	5	1.546	2.443	0.1067
0-SN	0.8858	1.0577	0.8858	0.8250	0.9667	6.111	5	-1.107	2.443	0.1067

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.9866		0.94		0.02226	-0.428
Bartlett's Test indicates equal variances (p = 0.76)	4.1827		18.4753			
Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences	0.10665	0.12735	0.01999	0.00477	0.00222	7, 32
Treatments vs D-Control						

- ICas >100%



			La	rval Fish (	Growth ar	nd Surviv	al Test-7 Day G	rowth		
Start Date:	3/15/201	1	Test ID:	X4353pp			Sample ID:	1		
End Date:	3/22/201	1	Lab ID:	ADEQ 88	0630		Sample Type:	EFF2-Industrial		
Sample Date:	3/14/201	1	Protocol:	EPAFW02	2-EPA/821	/R-02-01	Test Species:	PP-Pimephales pro	melas	
Comments:										
Conc-%	1	2	3	4	5					_
D-Control	0.7250	0.9000	0.8500	0.8875	0.8250					
32	0.6500	0.7625	0.7125	0.6375	0.8250					
42	0.7000	0.7750	0.7500	0.8000	0.6875					
56	0.6625	0.8375	0.5625	0.7625	0.6625					
75	0.7125	0.8375	0.8875	0.7250	0.7750					
100	0.8000	0.8625	0.7875	0.7500	0.8750					
100UV	0.6875	0.8125	0.7625	0.8000	0.7875					
0-SN	0.9667	0.9000	0.8500	0.8875	0.8250					
				Transform	n: Untran	sformed		· · · · · · · · · · · · · · · · · · ·	Iso	tonic
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N		Mean	N-Mean
D-Control	0.8375	1.0000	0.8375	0.7250	0.9000	8.310	5		0.8375	1.0000

 D-Control	0.8375	1.0000	0.8375	0.7250	0.9000	8.310	5	 0.8375	1.0000
32	0.7175	0.8567	0.7175	0.6375	0.8250	10.922	5	0.7520	0.8979
42	0.7425	0.8866	0.7425	0.6875	0.8000	6.477	5	0.7520	0.8979
56	0.6975	0.8328	0.6975	0.5625	0.8375	15.122	5	0.7520	0.8979
75	0.7875	0.9403	0.7875	0.7125	0.8875	9.457	5	0.7520	0.8979
100	0.8150	0.9731	0.8150	0.7500	0.8750	6.453	5	0.7520	0.8979
100UV	0.7700	0.9194	0.7700	0.6875	0.8125	6.453	5		
0-SN	0.8858	1.0577	0.8858	0.8250	0.9667	6.111	5		

Auxiliary Tests	Statistic	Critical	Skew Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.9866	0.94	0.02226 -0.428
Bartlett's Test indicates equal variances (p = 0.76)	4.1827	18.4753	

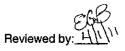
			Line	ear Interpolation (200	Resamples)	
Point	%	SD	95% CL(Exp)	Skew		 
IC05*	15.673					
IC10*	31.345					
IC15	>100				1.0	 1
IC20	>100				0.9	
IC25	>100				0.9	
IC40	>100				0.8 -	
IC50	>100				0.7	
* indicates	IC estimate les	ss than t	he lowest concentra	tion	9.0.6 0.5 0.5 8 0.4	:

0.3 0.2 0.1 0.0

50

Dose %

100



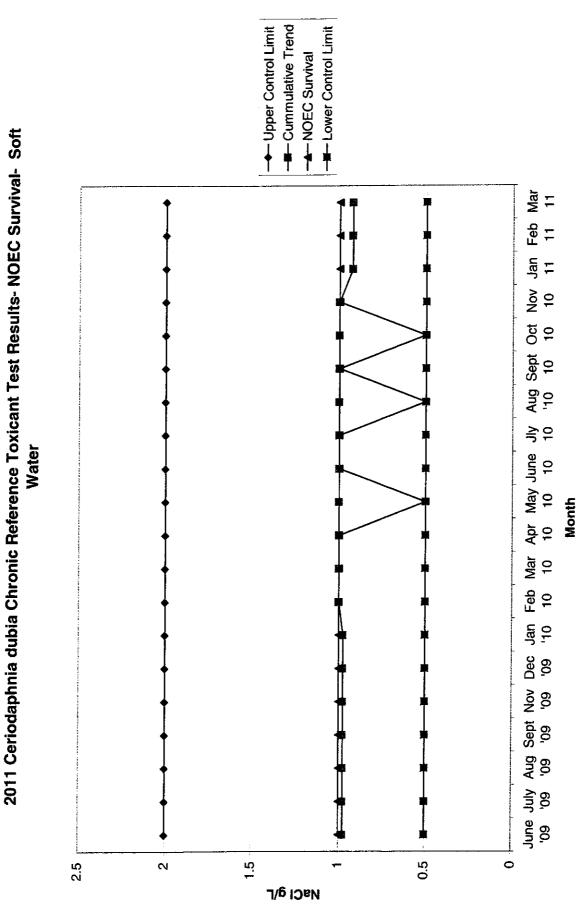
150

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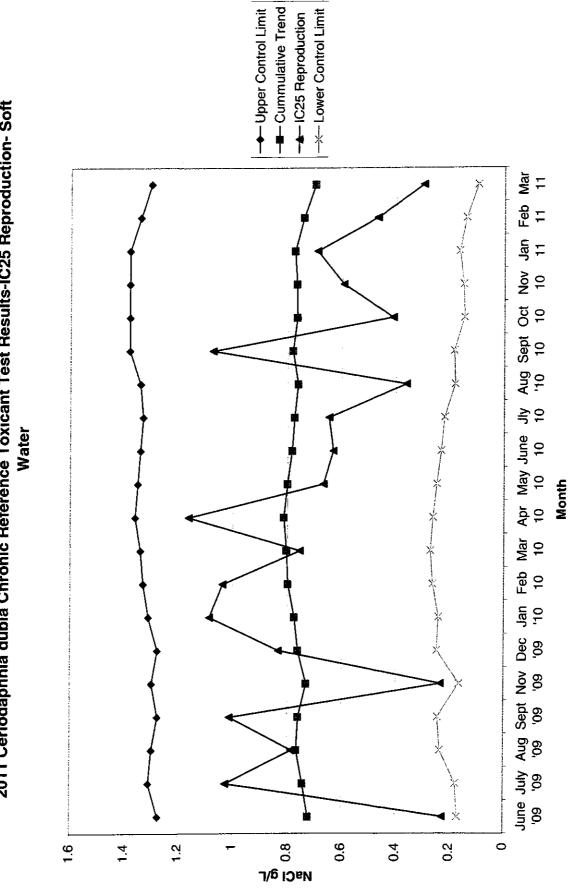
### APPENDIX D QUALITY ASSURANCE CHARTS

			<b>Bio-Analytical La</b>	cal Laboratories' 2011 Results of the Monthly Chronic Reference Toxicant Tests	Reference Toxicant Tests
Month Start- End	Jan 1/7-1/14 13:45-13:10	Feb 2/10-2/17 12:40-9:50	Mar 3/22-3/29 16:05-12:30		
			Cei	Ceriodaphnia dubia (in soft reconstituted water)	
NOEC survival	1.0	1.0	0.1		
IC25 repro.	0.6913	0.4674	0.2894		
PMSD repro.	21.9	24.4	16.5		
Avg. repro. control	20.7	24.7	24.1		
- - - -				Fathead minnow	
Month Start- End	Jan 1/4-1/11 11:15-13:00	Feb 2/2-2/9 12:25-9:00	Mar 3/21-28 15:35-9:15		
NOEC survival	1.25	1.25	1.25		
IC25 growth	1.50	1.68	1.72		
PMSD growth	20.2	13.0	30.0		
Avg. growth control	0.850	0.610	0.398		
Refere	nce toxicant is	100 g/L sodi	Reference toxicant is 100 g/L sodium chloride (NaCl). *	Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.	

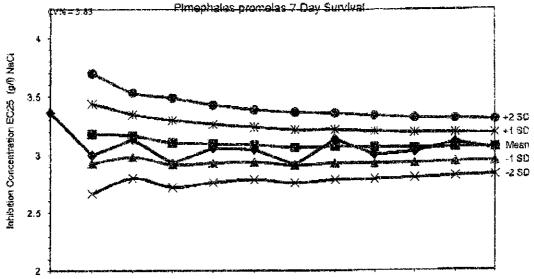
+Test invalid. Not enough time left in the month to conduct a retest.



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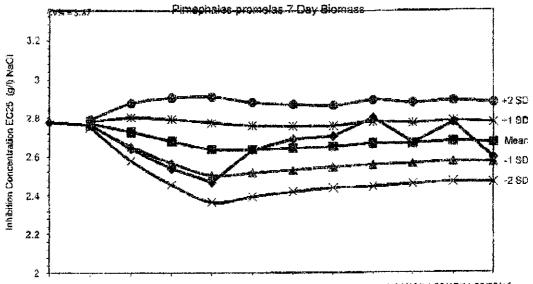


2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results-IC25 Reproduction- Soft



04/20/10 05/25/10 06/22/10 07/20/10 03/24/10 09/21/10 10/19/10 11/16/10 12/14/10 01/18/11 02/15/11 03/08/11

Dates	Values	Mean	-1 30	-2 SD	+1 \$0	+2 SD
04/20/10	3.3646					
05/25/10	3.0000	3.1823	2.9245	2.6667	3.4401	3.6979
06/22/10	3,1346	3,1664	2.9820	2.7977	3.3508	3.5361
07/20/10	2,9286	3,1069	2,9151	2.7233	3,2388	3.4906
08/24/10	3.0588	3.0973	2,9298	2.7623	3.2648	3.4323
09/21/10	3.0469	3,0889	2,9377	2.7864	3.2401	3,3914
10/19/10	2,9154	3.0641	2,9113	2.7584	3.2170	3.3698
11/16/10	3,1346	3.0729	2,9292	2.7856	3.2168	3.3603
12/14/10	3.0000	3.0648	2,9282	2,7917	3.2014	3.3380
01/18/11	3.0270	3.0610	2,9317	2.8024	3,1904	3.3197
02/15/11	3.1111	3.0656	2,9420	2.8184	3,1892	3.3128
03/08/11	3.0526	3.0645	2,9466	2.8287	3,1824	3.3004



04/20/10 05/25/10 06/22/10 07/20/10 08/24/10 09/21/10 10/19/10 11/16/10 12/14/10 01/18/11 02/15/11 03/88/11

Detes	Values	Mean	-1 SD	2 SD	+1 SD	+2 SD
04/20/10	2,7766					
05/25/10	2.7624	2.7695	2.7595	2,7494	2.7796	2.7896
06/22/10	2,6408	2.7266	2.6520	2 5774	2.8012	2.8759
07/20/10	2.5373	2.6793	2.5667	2.4542	2.7919	2.9044
08/24/10	2,4666	2.6368	2.5005	2.3643	2.7730	2.9092
09/21/10	2.6345	2.6364	2.5145	2.3927	2.7582	2.8800
10/19/10	2.8907	2.8441	2.5310	2 4179	2.7572	2.8703
11/16/10	2,7050	2.6517	2,5448	2.4379	2.7586	2.8655
12/14/10	2.8019	2.6684	2.5566	2.4448	2,7802	2.8921
01/18/11	2.6695	2.6685	2,5631	2.4577	2,7740	2.8794
02/15/11	2.7763	2.6783	2.5732	2,4680	2.7835	2,8807
03/08/11	2.5917	2.6711	2.5678	2.4644	2.7745	2.8778

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APPENDIX E AGENCY FORMS

#### SUMMARY REPORTING FORMS CHRONIC BIOMONITORING

### Ceriodaphnia dubia Survival and Reproduction

Permittee: El Dorado Che	mical	NPD	ES No.: AR0000752	
Outfall 001		AFI	N: 70-00040	
	Time	Date	Time	Date
<b>Composite 1 Collected Fre</b>	om 0950	3/13/11 To	0950	3/14/11
<b>Composite 2 Collected Fro</b>	om 0730	3/15/11 To	0730	3/16/11
<b>Composite 3 Collected Fre</b>	om 0900	3/17/11 To	0900	3/18/11
Test initiated:	1355	am/pm	3/15/11	date
Test terminated:	1300	am/pm	3/23/11	date
Dilution water used:	Receiv	ving X	Reconstituted	
	J	PERCENT SURVIV	AL	

Time of Read	ing	-				Perc	cent	Effluent			
		0		32		42		56		75	100
24h		100		100		100		100		100	100
48h		100		100		100		100		100	100
End of test		80		90		90		90		70	80
N	J <b>MBE</b> F	R OF Y	YOUN	G PRO	DUC	ED PER	FF	MALE @	) E	ND OF TH	EST
Rep	0		32		42		56		7:	5	100
Α	20		29		D23		25		2	0	D22
В	22		26		22		20		2	6	23
С	26		30		26		26		D	28	22
D	D2		22		26		D2	5	2:	5	21
E	21	24			24		27		19	9	D8
F	D10	26		27			22		D22		22
G	30	22		28		27		27 Г		24	15
Н	23	D		24		18		18		20	
I	17		18		23	23		22		5	17
J	32		22		26		23	··· ·	2	1	22
Surv. Mean	23.9		24.3		25.1		23.	3	20.6		20.3
Total Mean	20.3		21.9		24.9		23.	5	2	1.8	19.2
CV%*	21.41		15.65		7.83		13.	55	18	3.80	13.91

\*coefficient of variation = standard deviation x 100/mean. D=dead adult **PMSD** = 28.7%

#### <u>Ceriodaphnia dubia</u> Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of	the test significant	ly different	(p=.05	5) than the
control survival for the % effluer	t corresponding to	(lethality):		
a) LOW FLOW OR CRITICAL DILUT	'ION (100%):	YES	Х	NO
b) 1/2 LOW FLOW DILUTION	(N/A%):	YES		NO

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

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

a) LOW FLOW OR CRITICAL DILUTI	ON (100%):	YES	Х	NO
b)½ LOW FLOW DILUTION	(N/A%):	YES		NO

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

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

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

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

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

a) NOEC survival:	100% effluent
b) NOEC reproduction:	100% effluent
c) LOEC survival:	N/A% effluent
d) LOEC reproduction:	N/A% effluent

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Ceriodaphnia dubia</u> Chemical Parameters Chart

ł,

Permittee: El Dorado NPDES No.: AR0000 Contact: Brent Parko Analyst: Callahan, H	752/ AFIN er	70-00040	01					Sample No		3/16/11	1 1 1	'ime: 0950 'ime: 0730 'ime: 0900 'ime: 1359 'ime: 1300	) ) 5				
Dilution: 0		Day:							Dilution:	56		Day:					
	1	2	3	4	5	6	7	Comments		L	2	3	4	5	6	7	Comments
Temp ( C )	25.0	24.7	24.9	24.7	24.9	24.7	25.0		Temp(C)	25.0	24.7	24.9	24.7	24.9	24.7	25.0	
DO Initial	8.2	8.1	7,9	8.1	7.9	7.8	7.6		DO Initiat	8.2	8.1	7.8	8.1	7.8	7.9	7.8	
DO Final	8.2	8.1	8.1	8.1	8.0	8.1	8.0		DO Final	8.1	8.1	8.0	8.1	8.0	8.0	7.9	
pH Initial	7.7	7.5	7.8	7.6	7.7	7.8	7.9		pH Initial	8.0	7.8	7.9	7.8	7.8	7.9	8.1	
pH Final	7.9	7.2	7.9	7.9	8.1	8.0	8.0		pH Final	8.0	7.8	8,1	8.0	8.1	8.1	8.1	
Alkalinity	36.0		32.0						Alkalinity						Ì		
Hardness	44.0		40.0						Hardness								
Conductivity	169,2	171.5	169.1	170.7	172.9	175.4	179.8		Conductivity	392	384	384	385	384	388	380	
Chlorine	<.01		<.01						Chlorine								
Dilution: 32		Day							Ditution: 7	5	I	Day					
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	25.0	24.7	24.9	24.7	24.9	24.7	25.0		Temp(C)	25.0	24,7	24.9	24.7	24.9	24,7	25.0	
DO Initial	8.2	8.1	7.8	8.1	7.8	7.9	7.8		DO Initial	8.1	8.1	7.7	8.1	7.7	7.9	7.9	
DO Final	8.1	8,1	8.1	8.1	8.0	8.L	8.0		DO Final	8.0	8.1	8.0	8.1	8.0	8.0	7,9	
pH Initial	7,8	7.6	7,8	7.7	7.8	7.7	8.0		pH Initial	8.0	7.9	7.9	7.9	7.9	8.0	8,1	
pH Final	7.9	7.4	8.0	7.9	8.1	8.0	8.0		pH Final	8.1	8.0	8.2	8.1	8.2	8.1	8.1	
Atkalinity									Aikalinity								
Hardness									Hardness								
Conductivity	300	295	299	293	294	298	290		Conductivity	466	453	456	458	459	458	453	
Chlorine									Chlorine								_
Dilution: 42 Day					Dilution: 100 Day												
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	25.0	24.7	24.9	24.7	24.9	24.7	25.0		Temp ( C )	25.0	24.7	24,9	24.7	24.9	24.7	25.0	
DO Initial	8.2	8.1	7.8	8.1	7.8	7.9	7.9		DO Initial	8.2	8.1	7.7	8.t	7.7	7.8	7.9	
DO Final	8.1	8.t	8.0	8.1	8.0	8.0	7.9		DO Final	8.0	8.1	8.0	8.2	8.0	8.0	7.8	
pH Initial	7.9	7.8	7.8	7.8	7.8	7.9	8.1		pH Initial	8.0	8.0	8.0	8.0	7.9	8.0	8.2	
pH Final	8.0	7.5	8.0	7.9	8.1	8,0	8.0		pH Final	8.2	8.2	8.2	8.1	8.2	8.1	8.2	
Alkalinity					-				Alkafinity	72.0	88.0		84.0				
Hardness									Hardness	56.0	56.0		48.0				
Conductivity	338	331	291	332	330	332	325		Conductivity	566	547	558	55 t	555	558	549	
Chlorine									Chlorine	<.01	<.01		<.01				

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

Permittee: El Dorado Cl	nemical	NPD	DES No.: ARO	000752
	Time	Date	Time	Date
<b>Composite 1 Collected fu</b>	rom: 0950	3/13/11 To	0950	3/14/11
Composite 2 Collected fr	rom: 0730	3/15/11 To	0730	3/16/11
Composite 3 Collected fr	rom: 0900	3/17/11 To	0900	3/18/11
Test initiated:	1430	am/pm	3/15/11	date
Test terminated:	1010	am/pm	3/22/11	date
Dilution water used:		Receiving	X Rec	onstituted
	DAT	A TABLE FOR SUI	RVIVAL	

Effluent Conc. %	Per	cent Survi	ival in Rep	licate Cha	mbers	Mea	n Percent	Survival	CV%*
	A	В	C	D	Е	24h	48h	7 days	
0	75.0	100	100	100	100	100	100	95.0	11.68
32	75.0	100	87.5	87.5	100	100	100	90.0	11.68
42	100	100	100	100	100	100	100	100	0.00
56	100	100	75.0	87.5	87.5	97.5	97.5	90.0	11.68
75	100	100	100	100	87.5	100	100	97.5	6.06
100	100	87.5	100	100	100	100	100	97.5	6.06

#### DATA TABLE FOR GROWTH

Effluent Conc. %	Ave	erage Dry Wei	Mean Dry Weight mg	CV*			
	A	В	С	D	Е		
0	0.725	0.900	0.850	0.888	0.825	0.838	8.31
32	0.650	0.763	0.713	0.638	0.825	0.718	10.92
42	0.700	0.775	0.750	0.800	0.688	0.743	6.48
56	0.663	0.838	0.563	0.763	0.663	0.698	15.12
75	0.713	0.838	0.888	0.725	0.775	0.788	9.46
100	0.800	0.863	0.788	0.750	0.875	0.815	6.45
0-SN	0.967	0.900	0.850	0.888	0.825	0.886	6.11

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

**PMSD =** 12.8%

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

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

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

a) LOW FLOW OK CRITICAL DILUTIO	)N (100 %)	YES	X	NU
b) ½ LOW FLOW DILUTION	(N/A %)	YES		NO

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

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

a) LOW FLOW OR CRITICAL DILUT	ION (100 %)	YES	Х	NO
b) ½ LOW FLOW DILUTION	(N/A %)	YES		NO

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

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

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

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

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

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

#### Biomonitoring Form Chronic Toxicity Summary Form <u>Pimephates promelas</u> Chemical Parameters Chart

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Permittee: El Dorado Chemical - Outfall 001
NPDES No.: AR0000752/ AFIN 70-00040
Contact: Brent Parker
Analyst: Callahan, Haughton

Sample No. 1 Collected: Date: 3/14/11 Sample No. 2 Collected: Date: 3/16/11 Sample No. 3 Collected: Date: 3/18/11 Test Begin: Date: 3/15/11 Test End: Date: 3/22/11

Time: 0950 Time: 0730 Time: 0900 Time: 1430 Time: 1010

								Test End:	Date	3/22/11	1	ime: 1010	)				
Dilution: 0 Day:							Dilution: 54	5		Day:							
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.7	24,8	24.8	25,3	24,4	24,6	24.5		Temp ( C )	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.0	6.5	6.2	7,4	7.6	7.5	6.3		DO Initial	7.1	6.4	6.2	7.0	7.4	7.4	6.0	
DO Final	8.2	8.1	8.1	8.1	8.0	8,1			DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.9	7.6	7.4	7.5	7.6	7,6	7,4		pH Initial	7.7	7.6	7.6	7.5	7.6	7.5	7.3	
pH Final	7.9	7.2	7.9	7.9	8,1	8.0			pH Final	8.0	7.8	8.1	8.0	8.1	8.1		
Alkalinity	36.0		32.0						Alkalinity								
Hardness	44.0		40.0						Hordness								
Conductivity	169.2	171.5	169.1	170.7	172.9	173.4		_	Conductivity	392	384	384	385	384	388		
Chlorine	<.01		<.01						Chlorine	1							
Dilution: 32 Day					Dilution: 7	5	ſ	lay									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.7	24.8	24.8	25.3	24.4	24.6	24.5		Temp ( C )	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.0	6.2	6.1	7.3	7.5	7.5	6.1		DO Initial	7.0	6.2	6.2	7.0	7.4	7.4	5.7	
DO Final	8.1	8.1	8.1	8.1	8.0	8.1			DO Final	8.0	8.1	8.0	8.6	8.0	8.0		
pH Initial	7.7	7.5	7.4	7.5	7.5	7.4	7.3		pH Initial	7.7	7.7	7.6	7.6	7,7	7.5	7.4	
pH Final	7.9	7.4	8.0	7.9	8.1	8.0			pH Final	8.1	8.0	8,2	8.1	8,2	8.1		
Alkalinity									Alkallnity								
Hardness									Hardness								
Conductivity	300	295	299	293	294	298			Conductivity	466	453	456	458	459	458		
Chlorine									Chlorine						<u> </u>		
Dilution: 4	42		I	Day					Dilution: 100 Day								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp ( C )	24.7	24.8	24.8	25.3	24.4	24.6	24.5		Temp ( C )	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.1	7,1	7.0	7.1	7.5	7.5	6.2		DO Initial	7.1	6.2	6.0	7.0	7.4	7.4	5.5	
DO Final	8.1	8.1	8.0	8.1	8.0	8.0			DO Final	8.0	8. E	8.0	8.2	8.0	8.0		
pH Initial	7.6	7.5	7.4	7.5	7.5	7.4	7.3		pH Initial	7.8	7.7	7.6	7.7	7.7	7.5	7.4	
pH Finat	8.0	7.5	8.0	7.9	8.1	8.0			pH Final	8.2	8.2	8.2	8.1	8,2	8.1		
Aikalinity									Alkalinity	72.0	88.0		84.0				
Hardness									Hardness	56.0	56.0		48.0			· · · · · ·	
Conductivity	338	331	291	332	330	332			Conductivity	566	547	558	551	555	558		
Chlorine									Chlorine	<,01	<.01		<.01				

### APPENDIX F REPORT QUALITY ASSURANCE FORM

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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

## REPORT QUALITY ASSURANCE FORM

Client:	ElDorado Chemical
Project#:	X4353

Proofed First Draft: Proofed Final Draft: Cun PBugg

Date:		
8 Balls		
Date: 5	41811	

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.

Quality Assurance Officer

Date: 4/18

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



# Attachment 2

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



**CHEMICAL COMPANY** 

December 21, 2010

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

RE: NPDES Permit AR0000752 Discharge Monitoring Report for period ending November 30, 2010

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Enclosed you will find the Discharge Monitoring Report ending November 30, 2010. If you have any questions regarding this report, please contact me at (870) 863-1484.

Sincerely,

seg Withrow

Greg Withrow General Manager

Enclosures

## NON-COMPLIANCE REPORT

Facility Name:	El Dorado Chemi	El Dorado Chemical Company					
Permit Number:	AR0000752	AFIN:	70-00040				
Month / Year:	Nov-10						

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Outfall 006 / Zinc Monthly Average and Daily Maximum (276 ug/L)	231.99 ug/L Daily Maximum / 115.62 ug/L Monthly average	11/16/2010	Unknown	EDCC has reseeded the outfall areas with a DOT grass seed mixture and installed several acres of grass sod. We also have applied lime around outfall to promote grass growth. EDCC will continue to monitor this outfall closely.
Outfall 006 / Total Dissolved Solids Monthly Average and Daily Maximum (480 mg/L)	436.5 mg/L Daily Maximum / 291 mg/L Monthly average	11/16/2010	Unknown	EDCC has reseeded the outfall areas with a DOT grass seed mixture and installed several acres of grass sod. We also have applied lime around outfall to promote grass growth. EDCC will continue to monitor this outfall closely.
Outfall 007 / Zinc Monthly Average and Daily Maximum (294 ug/L)	231.99 ug/L Daily Maximum / 115.62 ug/L Monthly average	11/16/2010	Unknown	EDCC has reseeded the outfail areas with a DOT grass seed mixture and installed several acres of grass sod. We also have applied lime around outfail to promote grass growth. EDCC will continue to monitor this outfail closely.
Outfall 001/ Maximum pH (9.5 pH)	9.0 maximum pH	11/10/10 - 11/18/10	Naturally occurring algae bloom in Lake Killdeer.	Upon completion of November's monthly Bio-Monitoring Test, the outfail was blocked in.
AM WITH THE INFORM THOSE INDIVIDU INFORMATION, I BELIE COMPLETE. I AM SUBMITTING FALSE IMPRISONMENT. SEE 1	PENALTY OF LAW THAT I HAVE ATION SUBMITTED HEREIN; AND ALS IMMEDIATELY RESPONSIBLI VE THE SUBMITTED INFORMATIC AWARE THAT THERE ARE SIGNI INFORMATION, INCLUDING THE 8 U.S.C 1001 AND 33 U.S.C. 1319 10,000 and or maximum imprisonm years.)	Shegog Withon		
				Signature / Date 12/21/2010