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

EL DORADO

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 2nd 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 sub-lethal 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,

Brent 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
Test Dates: November 15 - 22, 2010
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 - 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

BAL
ADEQ #88-0630
Project X4233

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BAL
ADEQ #88-0630
Project X4233

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 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. 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^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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_{25} value for reproduction was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC_{50} 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.

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Project X4233

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		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	*

*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.

Table 2: Results of the Chronic Definitive Fathead Minnow Test

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	

*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.

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Project X4233

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.

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

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC_{50}	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

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.

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Project X4233

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

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

Address: 4500 Northwest Avenue, El Dorado, AR 71731
Fax: (870) 863-1499

Permit #: AR0000752
Purchase Order:

Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Project Number: / Temp. upon arrival: / Preservative: (below)
11-14-10 / 11-15-10	0800 – 0800	X		8	001	X	X							C1910	X4233 / 2.5°C Therm #29 RC 11/15/10 / ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain / EDCC	11-15-10	0940		11-15-10	0940
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
	11-15-10	1200	R. Callahan	11/15/10	1200

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

Comments:

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:									
Address: 4500 Northwest Avenue, El Dorado, AR 71731 (870) 863-1499	Fax:	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Project Number: X4237
Permit #: AR0000752	Purchase Order:										Temp. upon arrival:
Sampler's Signature/Printed Name/Affiliation: David Sartain/DAVID SARTAIN/EDCC											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification										
11-16-10 - 11-17-10	0730 - 0730	X		8	001	X	X							C1932	ice

Temperature upon arrival: 2.3
Thermometer #: 29
Tech: RC
Date: 11/17/10

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain/EDCC	11-17-10	0930		11-17-10	0920
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
	11-17-10	1210	R Callahan	11/17/10	1210

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

Comments:

X4233

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

CHAIN OF CUSTODY

NELAP 01975, ADEQ #88-0630, EPA LA00917

Laboratory Use Only:

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

Address: 4500 Northwest Avenue, El Dorado, AR 71731 — Fax: (870) 863-1499

Permit #: AR0000752 — Purchase Order:

Sampler's Signature/Printed Name/Affiliation: [signature] / DAVID SARTAIN / EDCC

Project Number: ~~X4237~~ 4233 RC 11/19/10

Temp. upon arrival:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
11-18-10 / 11-19-10	0720- / 0720	X		8	001	X	X							C1960	ice

Temperature upon arrival: 1.2
Thermometer #: 29
Tech: RC
Date: 11/19/10

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
[signature] /EDCC	11-19-10	0900	[signature]	11-19-10	0900
[signature]	11-19-10	1130	R. Callahan	11/19/10	1130

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4233 Date start: 11/15/10 Date end: 11/22/10

Client/Contact EL Dorado Chemical

Address 4500 Northwest Ave, El Dorado, Ark. 71731

NPDES# AR0000752 / AFIN 70-00040

Sample Description 001 Dilution Water Soft reconstituted

Test Temperature(°C) 25±1°C Technicians Briggs, Haughton, Zeagler, Callahan

Adults isolated: Date 11/15/10 Time: 0920

Neonates collected: Date 11/15/10 Time: 1425 Board: R5/R5S

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial# 80277924
Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

	Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0.	10.2/118.7%/RC	Y/10/8.2/96.0%/RC		
1.	10.9/131.0%/RC	Y/10/8.4/97.9%/RC		
2.	10.8/126.9%/LBHz	Y/15/8.3/97.7%/LBHz		
3.	10.1/119.7%/LBHz	Y/10/8.4/100.4%/LBHz		
4.	10.6/125.7%/RC	Y/10/8.3/98.4%/RC		
5.	10.3/119.1%/LBHz	Y/10/8.6/100.3%/LBHz		
6.	10.9/122.1%/LBHz	Y/15/8.7/99.9%/LBHz		
7.	10.6/124.5%/RC	Y/15		

	Total Residual Chlorine (mg/L)/Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	date
1.	<0.01/RC	No/RC	0.25/RC	C1910	11/15/10
2.	<0.01/LBHz	NO/LBHz	0.25/LBHz	C1932	11/18/10
3.	<0.01/LBHz	NO/LBHz	0.25/LBHz	C1960	11/20/10

Comments:

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

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4233 Test Dates 11/15/10 - 11/22/10

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100 rv
A	27	14	19	8	11	4	6
B	23	8	15	12	6	5	5
C	21	12	11	12	12	3	5
D	33	22	12	8	10	8	7
E	15	19	13	14	10	4	4
F	22	11	9	11	10	8	5
G	24	15	11	7	8	6	7
H	27	11	9	10	7	9	6
I	22	17	10	12	X[10]	9	5
J	26	5	9	7	4	10	8
Surviving Mean	24.0	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)

Key: M=male; X=dead adult

Calculated by: [signature] 11/22/10

Calculations checked by: AH 11/23/10

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4233 Test started: Date 11/15/10 Time 1585
Client El Dorado Chemical Test ended: Date 11/22/10 Time 1240

Technician:	Day0 AH	1 AH	2 RC	3 AH	4 AH	5 JBM	6 JBM	7 RC	8
Time:	Day0 1585	1 1010	2 1230	3 1305	4 1405	5 1237	6 1225	7 1240	8
Temperature:	Day0 24.5	1 24.9	2 24.5	3 24.4	4 24.9	5 24.2	6 24.2	7 24.8	8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	4	4	2	4	4	0	4	4	1	2	10	
	5	0										10	
	6	9	6	1	8	9	5	8	10	9	11	10	
	7	14	13	18	21	7	17	12	13	12	13	10	
	8												
32	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	3	0	2	4	3	2	4	3	4	0	10	
	5	0	3	0			0	0				10	
	6	7	5	7	8	8	6	5	6	7	5	10	
	7	4	0	3	10	8	1	6	2	6	0	10	
	8												
42	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	3	3	2	3	4	0	3	3	3	0	10	
	5	0					2	0			1	10	
	6	8	6	7	5	6	5	5	6	6	8	10	
	7	8	6	2	4	3	2	3	0	1	0	10	
	8												
56	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	4	3	3	3	4	0	2	0	4	0	10	
	5	0					3	0			1	10	
	6	3	7	7	4	6	8	3	6	5	6	10	
	7	1	2	2	1	4	0	2	4	3	0	10	
	8												
75	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	4	0	3	3	3	0	0	0	3	0	10	
	5	0	1	0			3	3	1	0		10	
	6	4	5	6	3	5	7	5	6	5	4	10	
	7	3	0	3	4	2	0	0	0	X2	0	9	
	8												
100	1	0									→	10	
	2	0									→	10	
	3	0									→	10	
	4	0									→	10	
	5	0			3	0	2	0	2	3	2	10	
	6	4	5	3	5	4	6	6	7	6	8	10	
	7	0	0	0	0	0	0	0	0	0	0	10	
	8												

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

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# 4233 Test started: Date 11/15/10 Time 1525
Client El Dorado Chemical Test ended: Date 11/22/10 Time 1240

	Day0	1	2	3	4	5	6	7	8
Technician:	AH	AH	RC	AH	AH	LHM	LHM	RC	
Time:	1525	1040	1250	1305	1405	1237	1225	1240	
Temperature:	24.5	24.9	24.5	24.4	24.9	24.2	24.2	24.8	

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

omit 11/15/10 RC

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

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# 4233 Test started: Date 11/5/10 Time 1525
Client El Dorado Chemical Test ended: Date 11/12/10 Time 1240
Organism Ceriodaphnia

Day/# water used	3095	1	2 3100	3	4	5	6	7	8
Concentration: Control Soft									
pH	8.0	8.0 / 8.1	7.9 / 8.0	7.7 / 7.6	8.2 / 7.9	8.1 / 7.8	8.1 / 7.9	8.1	
DO (mg/l)	8.1	8.2 / 8.4	8.0 / 8.2	8.1 / 8.2	7.9 / 8.2	7.9 / 8.3	8.0 / 8.1	7.9	
Cond (umhos/cm)	171.9	177.0	159.4	156.7	160.0	161.0	159.6		
Alkalinity (mg/L)	32		28						
Hardness (mg/L)	44		32						
Concentration: 32%					RC 11/9/10				
pH	9.2	7.9 / 9.2	7.9 / 9.1	8.1 / 8.0	8.2 / 8.0	8.1 / 8.3	8.1 / 8.4	8.2	
DO (mg/l)	8.0	8.2 / 8.3	8.1 / 8.2	8.1 / 8.2	7.8 / 8.1	7.9 / 8.3	8.0 / 8.2	8.1	
Cond (umhos/cm)	285	287	278	272	280	284	277		
Concentration: 42%									
pH	9.4	7.9 / 9.4	8.2 / 9.4	8.2 / 8.7	8.2 / 9.3	8.2 / 8.9	8.1 / 8.9	8.3	
DO (mg/l)	8.0	8.2 / 8.3	8.1 / 8.2	8.1 / 8.2	7.8 / 8.1	7.9 / 8.3	8.0 / 8.3	8.0	
Cond (umhos/cm)	317	320	318	309	314	314	309		
Concentration: 56%									
pH	9.5	7.9 / 9.5	8.2 / 9.5	8.2 / 9.1	8.2 / 9.4	8.2 / 9.2	8.2 / 9.2	8.4	
DO (mg/l)	8.1	8.2 / 8.2	8.2 / 8.2	8.2 / 8.2	7.8 / 8.1	7.9 / 8.4	8.0 / 8.3	8.1	
Cond (umhos/cm)	368	370	369	358	365	364	362		
Concentration: 75%									
pH	9.6	8.0 / 9.6	8.3 / 9.6	8.3 / 9.3	8.3 / 9.5	8.3 / 9.4	8.2 / 9.3	8.4	
DO (mg/l)	8.1	8.2 / 8.2	8.2 / 8.2	8.2 / 8.2	7.7 / 8.1	7.9 / 8.4	8.0 / 8.4	8.1	
Cond (umhos/cm)	433	439	439	428	435	432	428		
Concentration: 100%									
pH	9.7	8.0 / 9.7	8.4 / 9.6	8.3 / 9.5	8.3 / 9.6	8.3 / 9.5	8.3 / 9.4	8.5	
DO (mg/l)	8.1	8.2 / 8.2	8.2 / 8.2	8.2 / 8.3	7.6 / 8.2	7.8 / 8.5	8.0 / 8.6	8.1	
Cond (umhos/cm)	521	526	534	517	529	525	518		
Tech-prerenewal	RC	AH	RC	AH	AH	[illegible]	[illegible]	RC	
Tech-postrenewal	———	RC	[illegible]	AH	RC	[illegible]	[illegible]		
Hardness (mg/l)	LO			192		40.0			
Alkalinity (mg/l)	LO			112		124.0			

11/9/10

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# 4233 Test started: Date 11/15/10 Time 1325
Client El Dorado Chemical Test ended: Date 11/22/10 Time 1240
Organism Cerio daphnia

Day/# water used	0 3095	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ EGB 11/30/10 100% UV trd									
pH	9.6	8.3/9.6	8.4/9.6	8.4/9.5	8.4/9.6	8.4/9.5	8.3/9.5	8.4	
DO (mg/l)	7.9	8.1/8.1	7.9/7.9	8.2/8.2	7.5/8.1	7.4/8.4	7.9/8.4	7.8	
Cond (umhos/cm)	523	523	534	513	531	516	525		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	AH	RC	AH	AH	[illegible]	[illegible]	RC	
Tech-postrenewal	—	RC	[illegible]	AH	RC	[illegible]	[illegible]		
Hardness (mg/l)									
Alkalinity (mg/l)									

Omit 11/15/10 RC

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4233 Date started: 11/15/10 Date ended 11/22/10

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave El Dorado AR 71731

NPDES# AR0000752 / AFIN 70-00040

Sample Description 001 Dilution Water soft reconstituted

Test Temperature (°C) 25±1°c Technicians Briggs, Haughton, Zeagler, Callahan

Test organism age <24 hrs Vendor/ID# BAL/111510

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			RC/1600/0.20ml
1	EGB/0700/0.10ml	RC/1110/0.10ml	AH/1535/0.10ml
2	EGB/0700/0.10ml	AH/1100/0.10ml	RC/1345/0.10ml
3	EGB/0700/0.10ml	JBS/1040/0.10ml	AH/1440/0.10ml
4	EGB/0650/0.10ml	RC/1050/0.10ml	RC/1410/0.10ml
5	dBM/1010/0.20ml		dBM/1350/0.20ml
6	JBS/1005/0.20ml		dBM/1335/0.20ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

	Effluent Initial DO(mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0	10.2/118.7%/RC	Y/10/8.2/96.0%/RC	NA	
1	10.9/131.0%/RC	Y/10/8.4/97.9%/RC		
2	10.8/126.9%/AH	Y/15/8.3/97.7%/dBM		
3	10.1/119.7%/dBM	Y/10/8.4/100.4%/dBM		
4	10.6/125.7%/RC	Y/10/8.3/98.4%/RC		
5	10.3/119.1%/dBM	Y/10/8.6/100.3%/dBM		
6	10.9/122.7%/dBM	Y/15/8.7/99.9%/dBM		

	Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech	BAL Sample #	Date
1	<0.01/RC	No/RC	0.25/RC	C1910	11/15/10
2	<0.01/RC	No/RC	0.25/RC	C1932	11/18/10
3	<0.01/dBM	NO/dBM	0.25/dBM	C1960	11/20/10

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

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4233
Client El Dorado Chemical

Test started: Date 11/5/10 Time 1555
Test ended: Date 11/20/10 Time 0932

Technician: Day0 RC	1 RC	2 RC	3 [illegible]	4 RC	5 [illegible]	6 [illegible]	7 RC
Time: Day0 1555	1 1105	2 1055	3 1035	4 1040	5 1205	6 1155	7 0932
Temperature Day0 26.3	1 25.7	2 25.3	3 25.1	4 24.0	5 24.1	6 25.0	7 25.8

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

dlm 11/30/10

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4233
Client El Dorado Chemical

Test started: Date 11/15/10 Time 1555
Test ended: Date 11/22/10 Time 0932

Technician: Day0 RC 1 RC 2 RC 3 [illegible] 4 RC 5 [illegible] 6 [illegible] 7 RC
Time: Day0 1555 1 1105 2 1025 ~~1100~~ 3 1035 4 1040 5 1005 6 1155 7 0932
Temperature Day0 26.3 1 25.7 2 25.3 3 25.1 4 24.0 5 [illegible] 6 [illegible] 7 25.8

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

AMJ NH 11/15/10

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4233 IEDC Test Dates 11/15/10 - 11/22/10
Oven Temperature (° Celsius) 100°c

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 11/16/10 Tech: SDM	Wt. of pan + larvae(g)/ Date weighed: 11/23/10 Tech: SDM PH	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 91	1.1802	1.1842	0.0040	8	0.525	
	B 92	1.1781	1.1817	0.0038	8	0.475	
	C 93	1.1785	1.1815	0.0030	8	0.375	
	D 94	1.1842	~~1.1880~~ 1.1881	0.0039	8	0.488	
	E 95	1.1781	1.1815	0.0034	8	0.425	
32	A 96	1.1800	1.1804	0.0004	8	0.050	
	B 97	1.1817	1.1835	0.0018	8	0.225	
	C 98	1.1834	1.1834	0	8	~~0.038~~ PH 11/24/10 0.000	
	D 99	1.1787	1.1790	0.0003	8	0.038	
	E 100	1.1762	1.1774	0.0012	8	0.150	
42	A 101	1.1836	1.1868	0.0032	8	0.400	
	B 102	1.1762	1.1773	0.0011	8	0.138	
	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	0.0002	8	0.025	
56	A 106	1.1821	1.1833	0.0012	8	0.150	
	B 107	1.1787	1.1790	0.0003	8	0.038	
	C 108	1.1779	~~1.1788~~ 1.1801 PH 11/24/10	0.0022	8	0.275	
	D 109	1.1887	1.1905	0.0018	8	0.225	
	E 110	1.1785	1.1806	0.0021	8	0.263	
75	A 111	1.1710	1.1723	0.0013	8	0.163	
	B 112	1.1804	1.1819	0.0015	8	0.188	
	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	
100	A 116	1.1881	1.1912	0.0031	8	0.388	
	B 117	1.1776	1.1804	0.0028	8	0.350	
	C 118	1.1913	1.1960	0.0047	8	0.588	
	D 119	1.1778	1.1803	0.0025	8	0.313	
	E 120	1.1754	1.1776	0.0022	8	0.275	

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

Calculated by: PH 11/24/10 Calculations checked by: EGB 11/24/10

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4233 IEDC Test Dates 11/15/10 - 11/22/10
Oven Temperature (° Celsius) 100°C

Conc. %	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 11/19/10 Tech: DDN	Wt. of pan + larvae(g)/ Date weighed: 11/24/10 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*
100 UV	A 121	1.1751	1.1776	0.0025	8	0.313	
	B 122	1.1707	1.1740	0.0033	8	0.413	
	C 123	1.1702	1.1738	0.0036	8	0.450	
	D 124	1.1838	1.1864	0.0026	8	0.325	
	E 125	1.1864	1.1889	0.0025	8	0.313	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

Qual AH 11/18/10

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

Calculated by: AH 11/24/10 Calculations checked by: ECB 11/24/10

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4233 Test started: Date 11/5/10 Time 1555
Client El Dorado Chemical Test ended: Date 11/12/10 Time 0932
Organism P. promelas

Day/# water used	0 3095	1	2 3100	3	4	5	6	7	8
Concentration: Control Soft									
pH	8.0	7.8 / 8.1	7.9 / 8.0	7.7 / 7.6	7.7 / 7.9	7.5 / 7.8	7.5 / 7.9	7.7	
DO (mg/l) RC 11/5/10	8.1 / 7.9	7.7 / 8.4	7.8 / 8.2	7.9 / 8.2	6.9 / 8.2	7.3 / 8.3	7.9 / 8.1	7.1	
Cond (umhos/cm)	171.9	172.0	159.4	156.7	160.0	161.0	159.6		
Alkalinity (mg/L)	32		28						
Hardness (mg/L)	44		32						
Concentration: 32%					RC 11/9/10				
pH	9.2	7.7 / 9.2	7.7 / 9.1	7.6 / 8.0	7.6 / 8.0	7.5 / 8.3	7.5 / 8.4	7.8	
DO (mg/l)	8.0	7.2 / 8.3	6.8 / 8.2	6.8 / 8.2	6.9 / 8.1	7.0 / 8.3	7.2 / 8.2	7.2	
Cond (umhos/cm)	285	287	278	272	280	284	277		
Concentration: 42%									
pH	9.4	7.7 / 9.4	7.7 / 9.4	7.6 / 8.7	7.6 / 9.3	7.6 / 8.9	7.6 / 8.9	7.8	
DO (mg/l)	8.0	7.1 / 8.3	6.7 / 8.2	6.7 / 8.2	6.8 / 8.1	7.0 / 8.3	7.1 / 8.3	6.9	
Cond (umhos/cm)	317	320	318	309	314	314	309		
Concentration: 56%									
pH	9.5	7.8 / 9.5	7.8 / 9.5	7.6 / 9.1	7.7 / 9.4	7.7 / 9.2	7.7 / 9.2	7.8	
DO (mg/l)	8.1	7.0 / 8.2	6.5 / 8.2	6.6 / 8.2	6.7 / 8.1	6.9 / 8.4	7.0 / 8.3	6.8	
Cond (umhos/cm)	368	370	369	358	365	364	362		
Concentration: 75%									
pH	9.6	7.9 / 9.6	7.8 / 9.6	7.7 / 9.3	7.8 / 9.5	7.8 / 9.4	7.8 / 9.3	7.9	
DO (mg/l)	8.1	6.9 / 8.2	6.5 / 8.2	6.9 / 8.2	6.7 / 8.1	7.0 / 8.4	7.0 / 8.4	6.8	
Cond (umhos/cm)	433	439	439	428	435	430	428		
Concentration: 100%									
pH	9.7	8.0 / 9.7	7.9 / 9.6	7.7 / 9.5	7.9 / 9.6	8.1 / 9.5	8.0 / 9.4	8.0	
DO (mg/l)	8.1	6.9 / 8.2	6.5 / 8.2	6.6 / 8.3	6.7 / 8.2	7.0 / 8.5	7.1 / 8.6	6.9	
Cond (umhos/cm)	521	526	534	517	529	525	518		
Tech-prerenewal	RC	RC	RC	AH	RC	[illegible]	[illegible]	RC	
Tech-postrenewal		RC	[illegible]	[illegible]	RC	[illegible]	[illegible]		
Hardness (mg/l)	60			192		40.0			
Alkalinity (mg/l)	60			~~AH~~ 112.0		124.0			

Key: prerenewal/postrenewal

EB 11/12/10

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4233 Test started: Date 11/15/10 Time 1555
Client El Dorado Chemical Test ended: Date 11/22/10 Time 0932
Organism P. promelas

Day/# water used	0 3095	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100% UV-trt'd									
pH	9.6	8.6/9.6	8.0/9.6	7.9/9.5	8.0/9.6	8.2/9.5	8.2/9.5	8.1/	
DO(mg/l)	7.9	6.7/8.1	6.3/7.9	6.5/8.2	6.4/8.1	6.9/8.4	7.8/8.4	6.9/	
Cond(umhos/cm)	523	523	534	513	531	516	525		
Alkalinity(mg/L)									
Hardness (mg/L)									
Concentration:									
pH		/	/	/	/	/	/	/	
DO(mg/l)		/	/	/	/	/	/	/	
Cond(umhos/cm)									
Concentration:									
pH		/	/	/	/	/	/	/	
DO(mg/l)		/	/	/	/	/	/	/	
Cond(umhos/cm)									
Concentration:									
pH		/	/	/	/	/	/	/	
DO(mg/l)		/	/	/	/	/	/	/	
Cond(umhos/cm)									
Concentration:									
pH		/	/	/	/	/	/	/	
DO(mg/l)		/	/	/	/	/	/	/	
Cond(umhos/cm)									
Concentration:									
pH		/	/	/	/	/	/	/	
DO(mg/l)		/	/	/	/	/	/	/	
Cond(umhos/cm)									
Tech-prerenewal	RC	RC	RC	AH	RC	[illegible]	[illegible]	RC	—
Tech-postrenewal	—	RC	[illegible]	[illegible]	RC	[illegible]	[illegible]		
Hardness(mg/l)									
Alkalinity(mg/l)									

Omit RJ 11/15/10

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 11/23/10 **Date end:** 11/25/10

Test organism: ~~C. dapnia~~ EGB 11/30/10 Ceriodaphnia dubia

Age: < 24hr

Source and ID#: BALI Rv

Dilution Water used: Type: MH * **Jug #:** 3099

Reference Toxicant: NaCl + **Units:** 100 g/L ____ ug/L

Manufacturer: ACROS **Lot:** B0130290

48-hour LC_{50}: 1.28g/L **Statistical Method:** TSK ^

Upper and Lower CUSUM Chart Control Limits: 1.79 - 1.01

Test Number (for the year): 22

We verify that this data is true and correct:

Technician: Erin M. Bapp

Statistician: Aimee Haughton

Quality Control Officer: Erin M. Bapp

*MH- Moderately hard
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

File: Ref Tox Cover

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

Project# _____

Client Ref. Tox

Sample Description 100g/L NaCl

Technician: Ohour SBM 24hour EGB 48hour EGB 72hour \ 96hour \

Time: Ohour 1015 24hour 1020 48hour 1000 72hour \ 96hour \

Temperature (°C): Ohour 24.6 24hour 24.7 48hour 24.5 72hour \ 96hour \

Test started: Date 11/23/10 Time 1015

Test ended: Date 11/25/10 Time 1000

Test Species C. dapnia ID# BAL/R6

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A		5	5	4			8.1	—	8.3			8.1	—	8.0			320	—	375		
	B		5	5	4																	
	C		5	5	5																	
	D		5	5	5																	
1	A		5	5	3			8.1	—	8.4			8.1	—	7.9			2410	—	2560		
	B		5	5	3																	
	C		5	5	4																	
	D		5	5	4																	
2	A		5	2	0			8.1	—	8.4			8.1	—	7.9			4330	—	4740		
	B		5	1	0																	
	C		5	1	0																	
	D		5	3	0																	
Chemistry Tech prerenewal/postrenewal								SBM	EGB	EGB			SBM	EGB	EGB			SBM	EGB	EGB		

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

Project# _____

Client Ref. Tox

Sample Description 100g/L NaCl

Test started: Date 11/23/10 Time 1015

Test ended: Date 11/25/10 Time 1000

Test Species C. dapnia ID# BAL/RL

Technician: Ohour LBM 24hour EGB 48hour EGB 72hour ____ 96hour ____

Time: Ohour 1015 24hour 1020 48hour 1000 72hour ____ 96hour ____

Temperature (°C): Ohour 24.6 24hour 24.7 48hour 24.5 72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
3	A		5	0				8.0	8.2				8.1	7.9				6170	6260			
	B		5	0																		
	C		5	0																		
	D		5	0																		
4	A		5	0				8.1	8.1				8.1	7.9				7960	8060			
	B		5	0																		
	C		5	0																		
	D		5	0																		
5	A		5	0				8.1	8.1				8.0	7.9				9730	9830			
	B		5	0																		
	C		5	0																		
	D		5	0																		
Chemistry Tech prerenewal/postrenewal								[illegible] EGB EGB					[illegible] EGB EGB					[illegible] EGB EGB				

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BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 11/23/10 **Date end:** 11/25/10

Test organism: P. promelas

Age: ~5 days

Source and ID#: BAL 111810

Dilution Water used: Type: MH * **Jug #:** 3099

Reference Toxicant: NaCl + **Units:** 100 g/L ____ ug/L

Manufacturer: ACROS **Lot:** B0130290

48-hour LC_{50}: 6.09 g/L **Statistical Method:** SK ^

Upper and Lower CUSUM Chart Control Limits: 7.95-4.02

Test Number (for the year): 21

We verify that this data is true and correct:

Technician: Erin M Briggs

Statistician: Aimee Haughton

Quality Control Officer: Erin M Briggs

***MH- Moderately hard**
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

File: Ref Tox Cover

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

Project# _____

Client Ref Tox

Sample Description 100 g/L

Test started: Date 1/23/10 Time 1025

Test ended: Date 1/25/10 Time 1005

Test Species P. promelas ID# BAL111810

Technician: Ohour AH 24hour EBS 48hour EBS 72hour ___ 96hour ___

Time: Ohour 1025 24hour 1045 48hour 1005 72hour ___ 96hour ___

Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.4 72hour ___ 96hour ___

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
C	A		10	10	10			8.0	-	7.8			8.0	-	7.8			393	-	346		
	B		10	10	10																	
5	A		10	10	10			8.0	-	7.6			7.9	-	7.7			9460	-	9570		
	B		10	10	10																	
7	A		10	4	0			8.0	-	7.6			7.9	-	7.7			13480		13360		
	B		10	10	2																	
9	A		10	0				8.0	7.7				7.9	7.8				16410	16680			
	B		10	0																		
11	A		10	0				8.0	7.7				7.9	7.8				19230	19440			
	B		10	0																		
13	A		10	0				8.0	7.4				7.9	7.7				22200	22500			
	B		10	0																		
Chemistry Tech prerenewal/postrenewal								BBM	EBS	EBS			BBM	EBS	EBS			BBM	EBS	EBS		

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APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	11/15/2010	Test ID:	X4233CD	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

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

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

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/15/2010	Test ID:	X4233CD	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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: Untransformed					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

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/15/2010	Test ID:	X4233CD	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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

			Transform: Untransformed					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

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/15/2010	Test ID:	X4233CD	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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

			Transform: Untransformed					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 Treatments vs D-Control	3.52009	0.14667	376.167	11.246	8.4E-18	6, 63

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/15/2010	Test ID:	X4233CD	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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

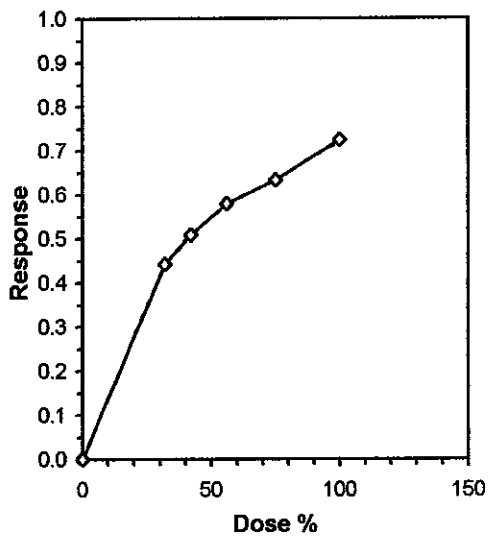
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	24.000	1.0000	24.000	15.000	33.000	19.740	10	24.000	1.0000
32	13.400	0.5583	13.400	5.000	22.000	38.085	10	13.400	0.5583
42	11.800	0.4917	11.800	9.000	19.000	27.036	10	11.800	0.4917
56	10.100	0.4208	10.100	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		

Linear Interpolation (200 Resamples)

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



ToxCalc v5.0.23

Reviewed by

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	11/15/2010	Test ID:	X4233PP	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

Comments:

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

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
*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				

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	11/15/2010	Test ID:	X4233PP	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

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: Untransformed					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	5	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 Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.95485	0.94	0.66155	0.88425
Bartlett's Test indicates equal variances (p = 0.33)	8.07044	18.4753		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates significant differences Treatments vs D-Control	0.13963	0.3052	0.10113	0.00817	1.5E-07	7, 32

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	11/15/2010	Test ID:	X4233PP	Sample ID:	1
End Date:	11/22/2010	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	11/15/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

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

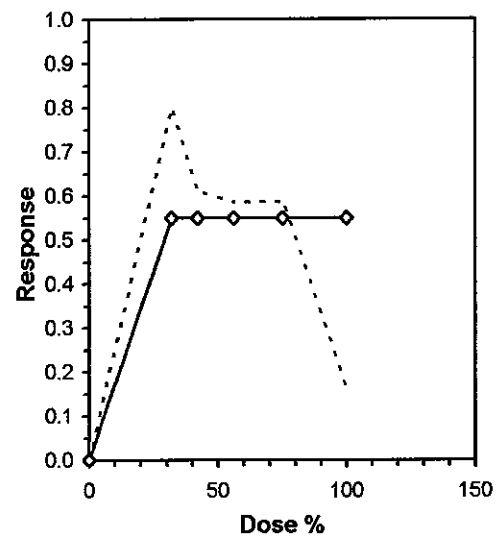
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.4575	1.0000	0.4575	0.3750	0.5250	12.757	5	0.4575	1.0000
32	0.0925	0.2022	0.0925	0.0000	0.2250	100.037	5	0.2065	0.4514
42	0.1775	0.3880	0.1775	0.0250	0.4000	78.482	5	0.2065	0.4514
56	0.1900	0.4153	0.1900	0.0375	0.2750	51.677	5	0.2065	0.4514
75	0.1900	0.4153	0.1900	0.1500	0.2625	22.979	5	0.2065	0.4514
100	0.3825	0.8361	0.3825	0.2750	0.5875	31.903	5	0.2065	0.4514
100UV	0.3625	0.7923	0.3625	0.3125	0.4500	17.751	5		
O-SN	0.4575	1.0000	0.4575	0.3750	0.5250	12.757	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.95485	0.94	0.66155	0.88425
Bartlett's Test indicates equal variances (p = 0.33)	8.07044	18.4753		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	2.916	0.253	2.326	3.712	0.5836
IC10*	5.833	0.506	4.652	7.424	0.5836
IC15*	8.749	0.759	6.978	11.136	0.5836
IC20*	11.665	1.012	9.304	14.848	0.5836
IC25*	14.582	1.264	11.631	18.560	0.5836
IC40*	23.331	2.023	18.609	29.696	0.5836
IC50*	29.163				

* indicates IC estimate less than the lowest concentration



ToxCalc v5.0.23

Reviewed by:

Daphnid Acute Test-48 Hr Survival

Start Date:	11/23/2010	Test ID:	1110CD	Sample ID:	REF-Ref Toxicant
End Date:	11/25/2010	Lab ID:	NELAP 01975	Sample Type:	NACL-Sodium chloride
Sample Date:	11/23/2010	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

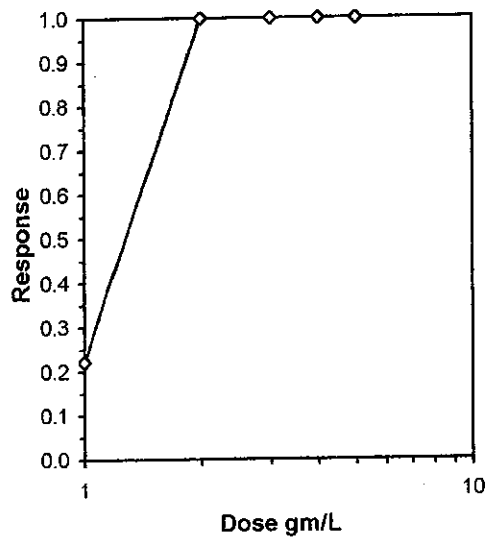
Conc-gm/L	1	2	3	4
D-Control	0.8000	0.8000	1.0000	1.0000
1	0.6000	0.6000	0.8000	0.8000
2	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	0.9000	1.0000	1.2262	1.1071	1.3453	11.212	4	2	20
1	0.7000	0.7778	0.9966	0.8861	1.1071	12.807	4	6	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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
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 Spearman-Karber

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



ToxCalc v5.0.23

Reviewed by AH

Acute Fish Test-48 Hr Survival

Start Date:	11/23/2010	Test ID:	1110PP	Sample ID:	REF-Ref Toxicant
End Date:	11/25/2010	Lab ID:	NELAP 0197	Sample Type:	NACL-Sodium chloride
Sample Date:	11/23/2010	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

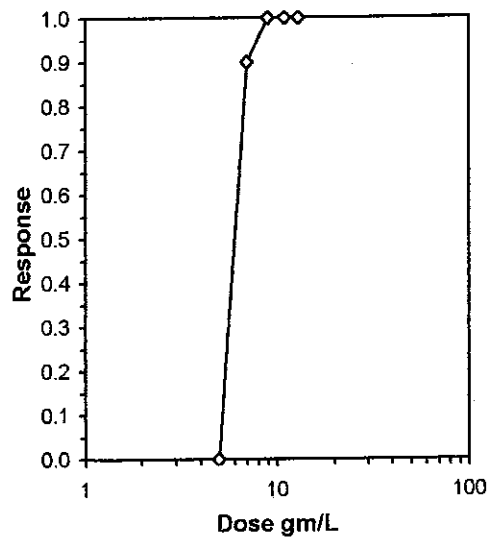
Conc-gm/L	1	2
D-Control	1.0000	1.0000
5	1.0000	1.0000
7	0.0000	0.2000
9	0.0000	0.0000
11	0.0000	0.0000
13	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	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	0.0000	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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

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
20.0%	6.0277	5.8621	6.1980
Auto-0.0%	6.0925	5.8570	6.3376



ToxCalc v5.0.23

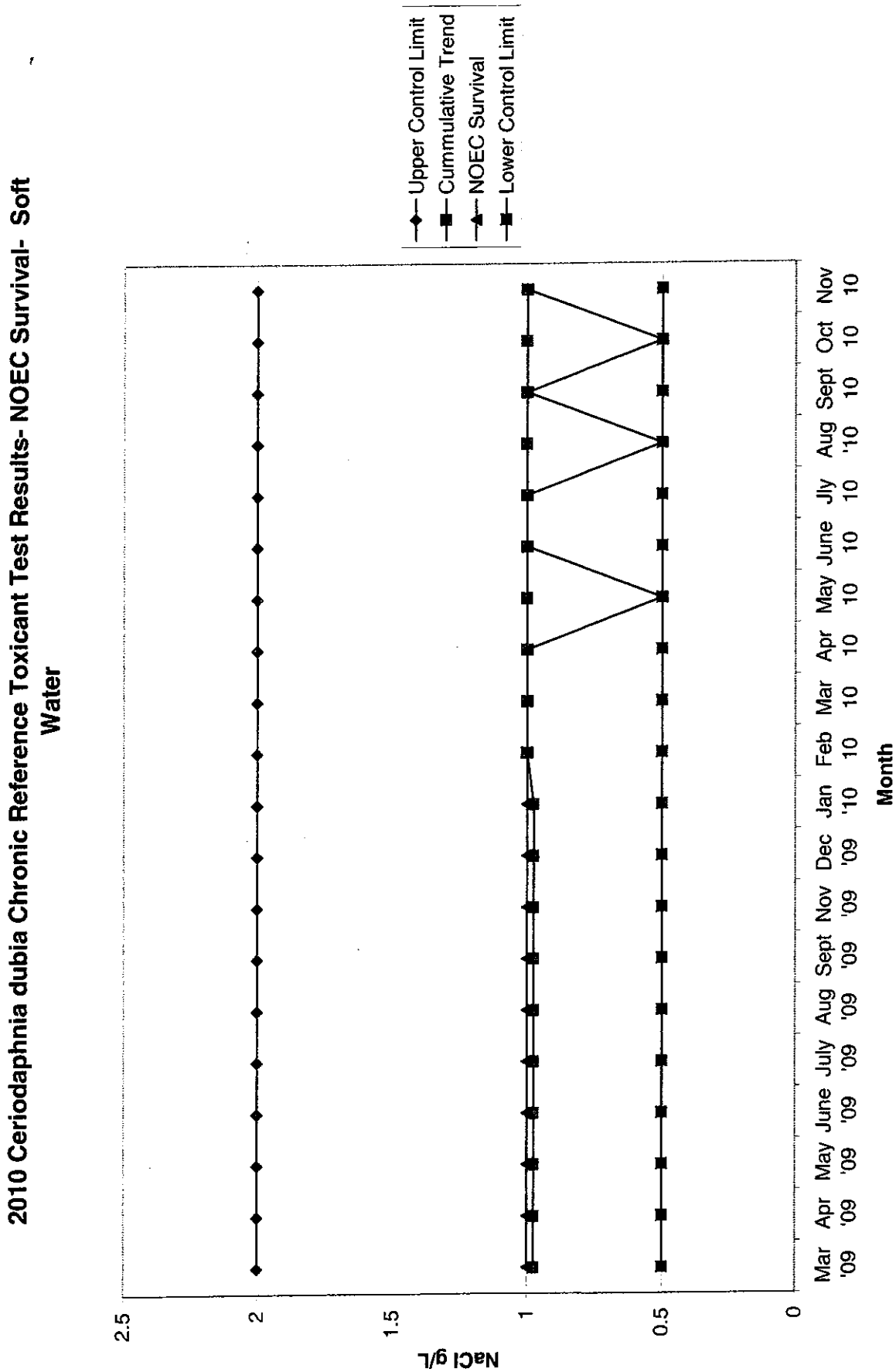
Reviewed by: AH

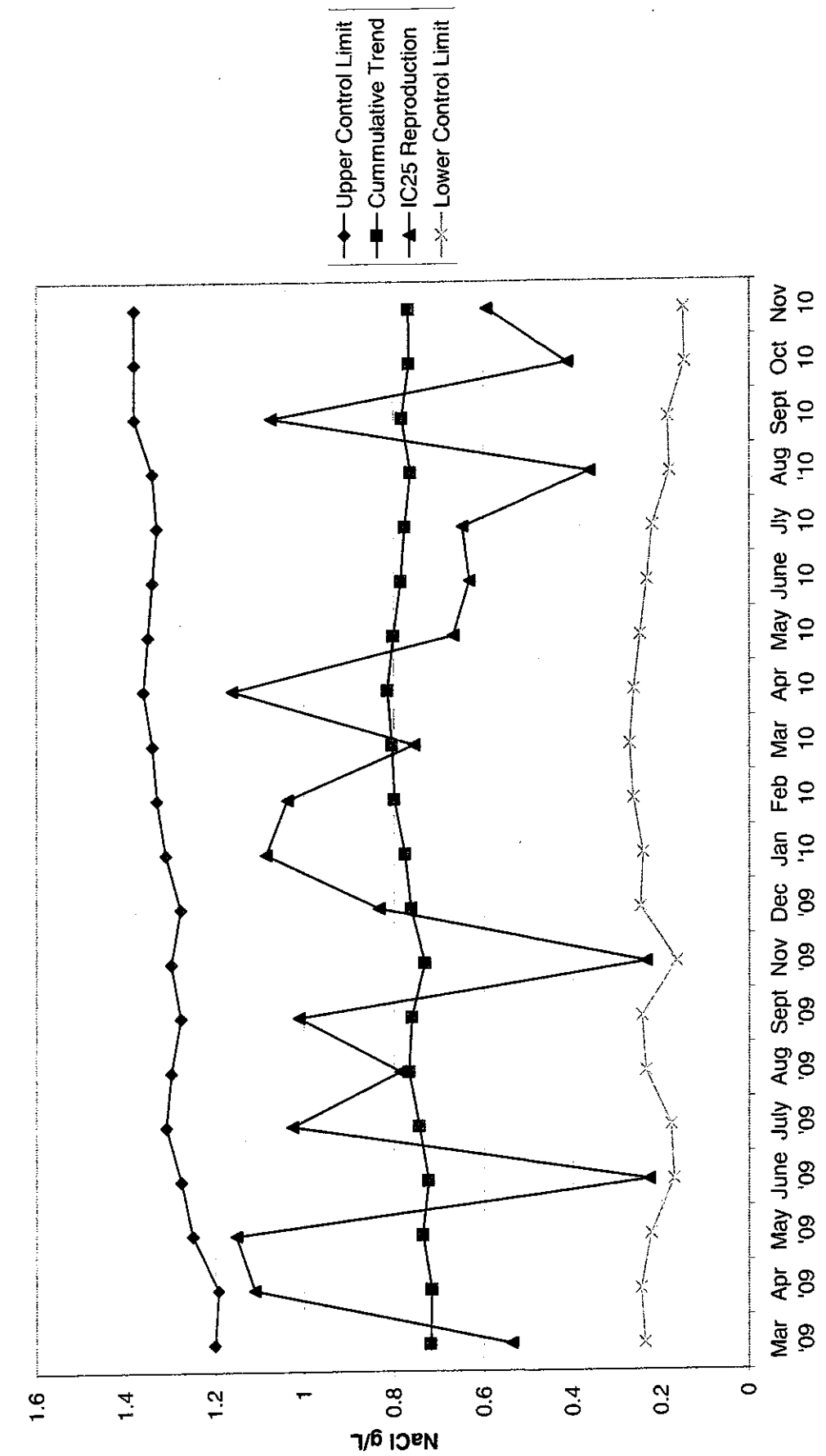
APPENDIX D
QUALITY ASSURANCE CHARTS

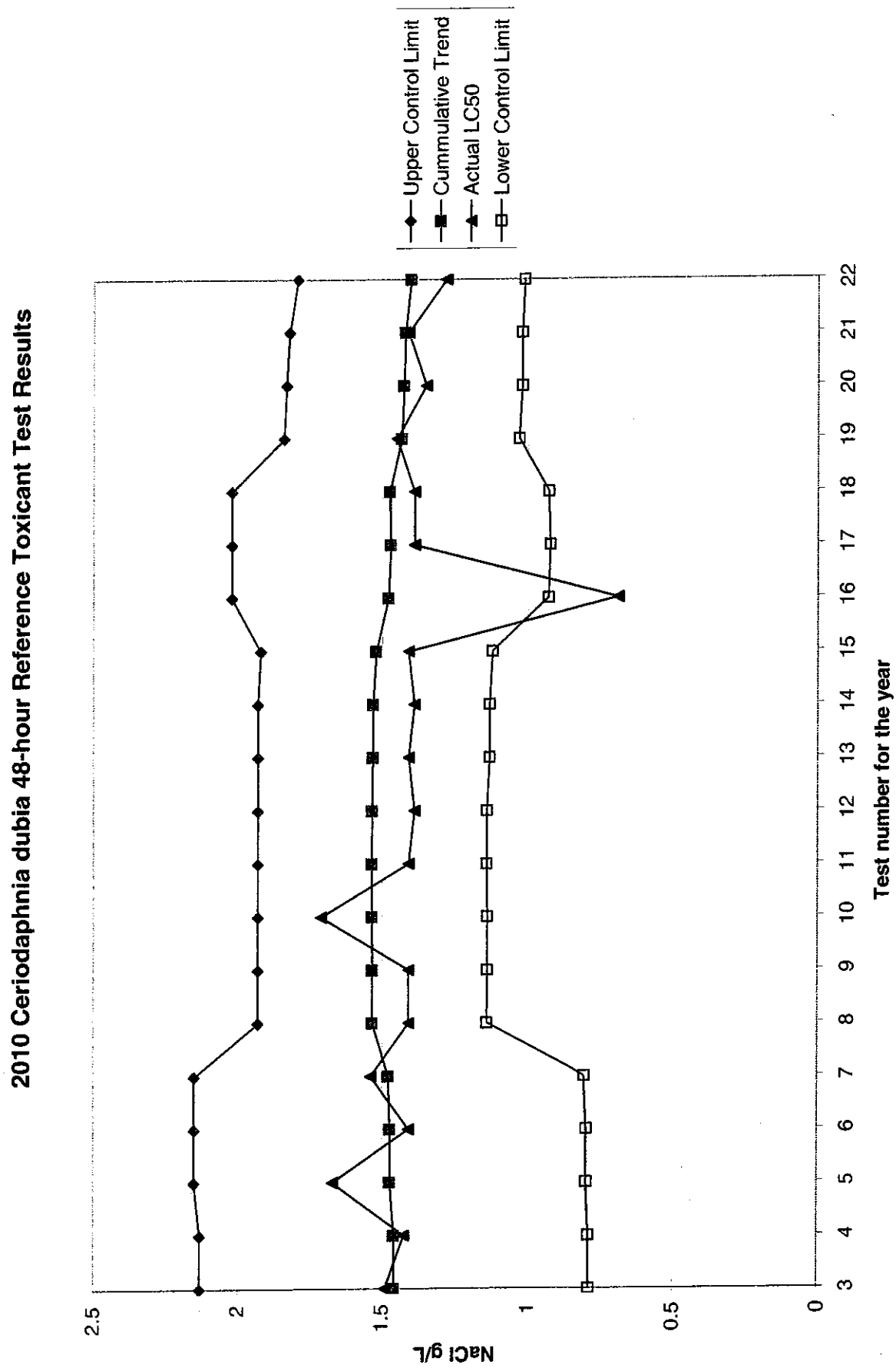
Bio-Analytical Laboratories' 2010 Results of the Monthly Chronic Reference Toxicant Tests

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	
***Ceriodaphnia dubia* (in soft reconstituted water)**												
NOEC survival	1.0	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	
Fathead minnow												
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

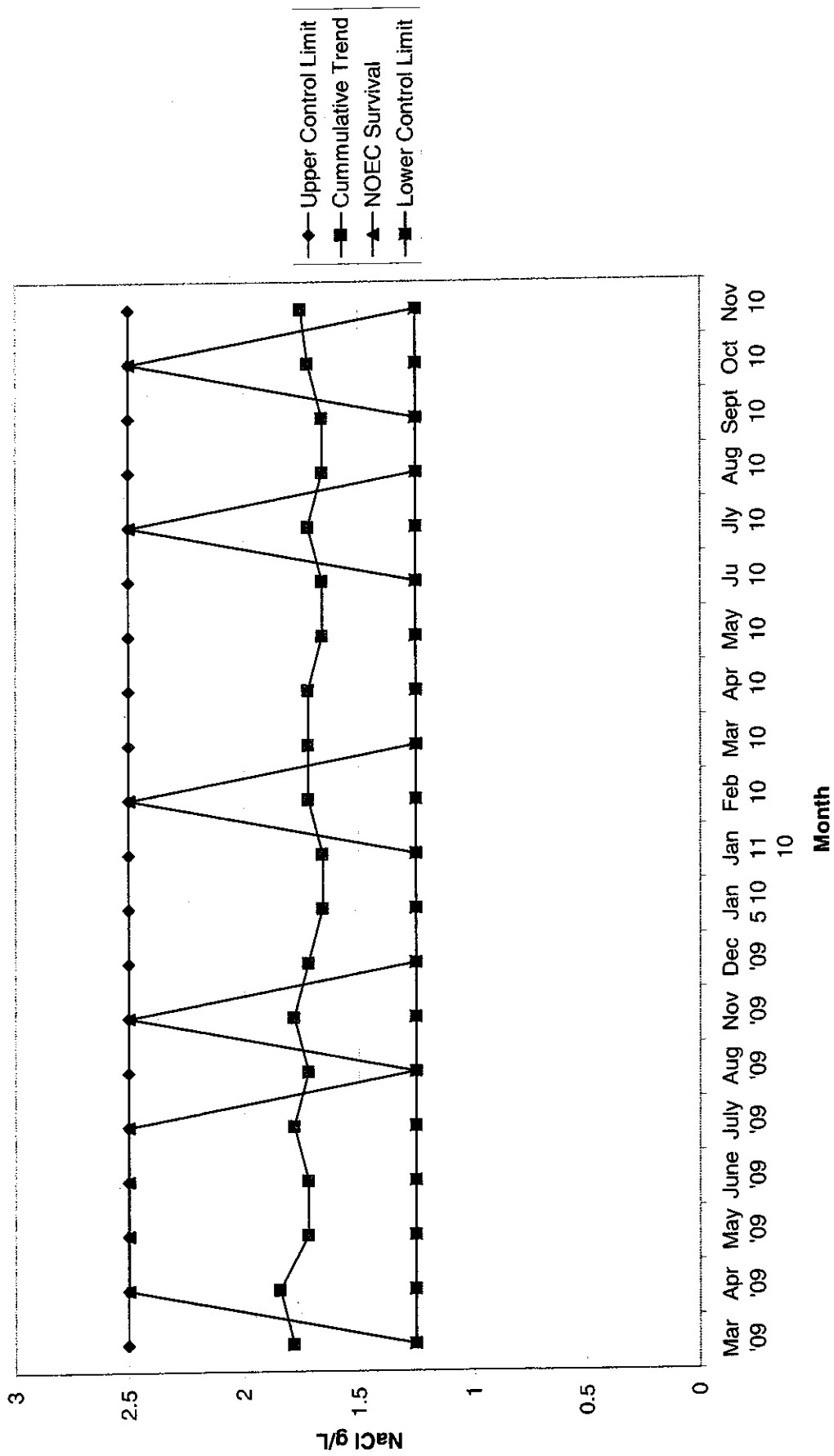
Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.
+Test invalid. Not enough time left in the month to conduct a retest.

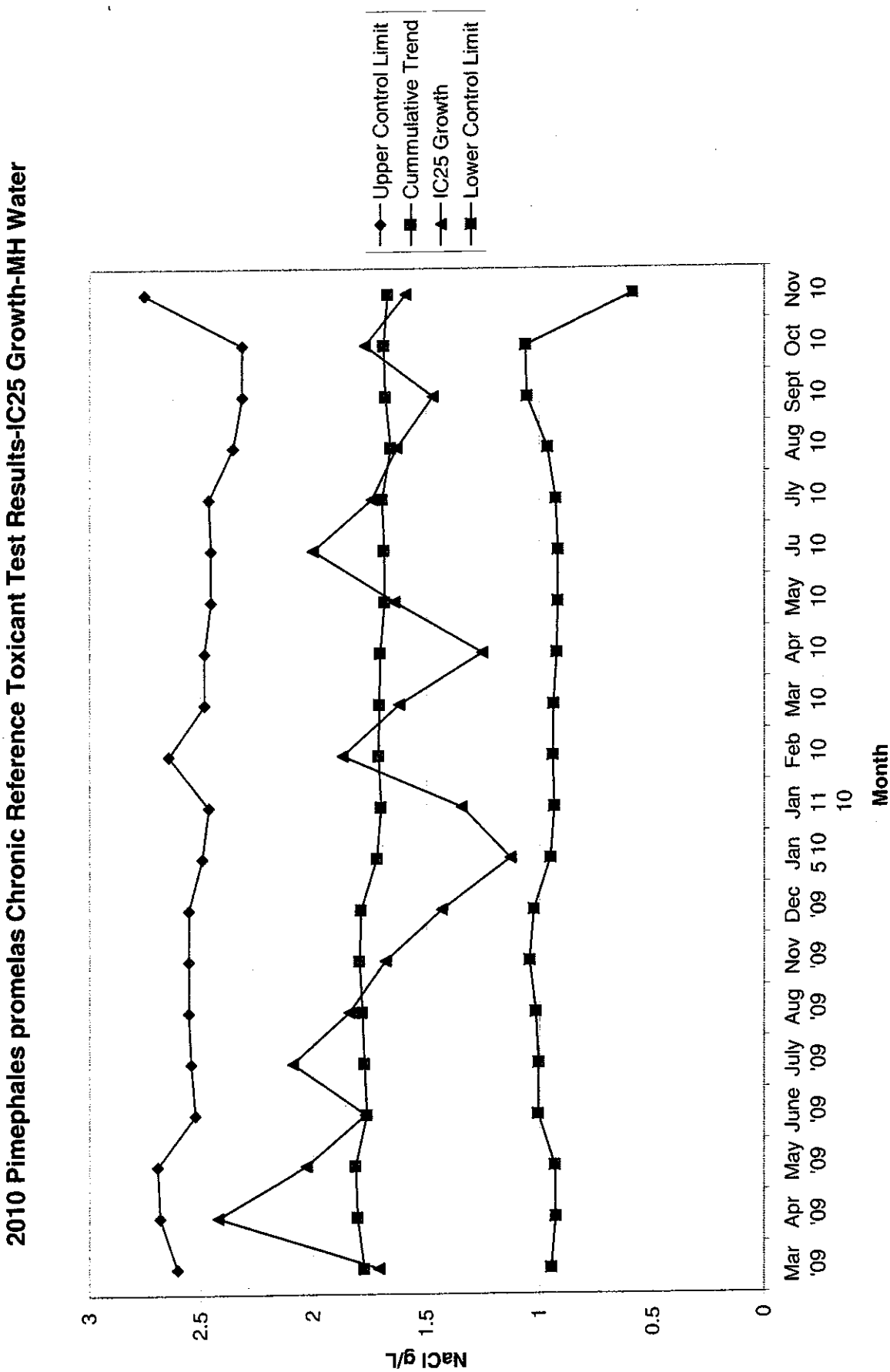

2010 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft Water
Upper Control Limit
Cummulative Trend
NOEC Survival
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
Mar '09
Apr '09
May '09
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Month

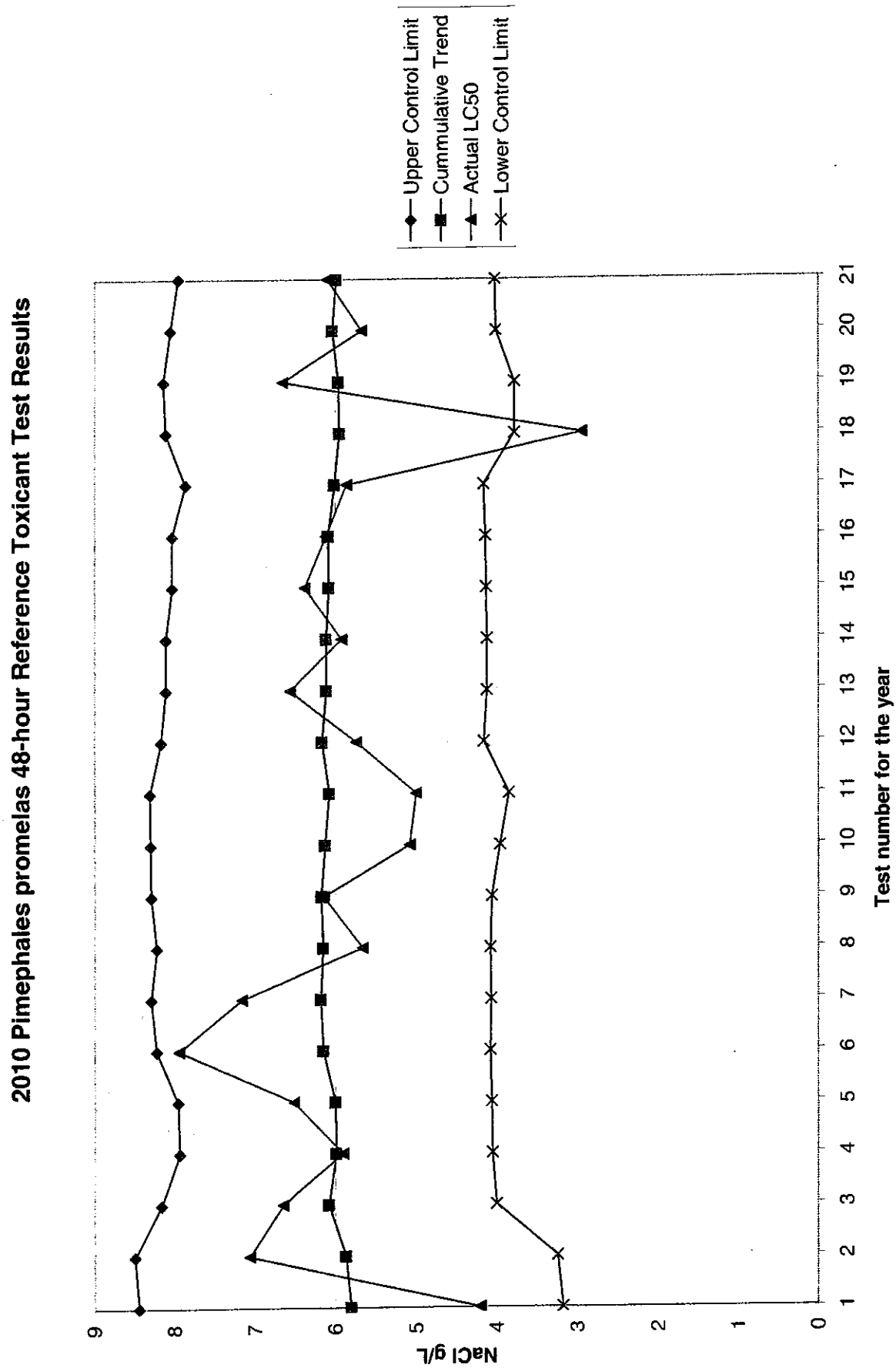

2010 Ceriodaphnia dubia Chronic Reference Toxicant Test Results-IC25 Reproduction- Soft Water
Upper Control Limit
Cummulative Trend
IC25 Reproduction
Lower Control Limit
NaCl g/L
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Mar '09
Apr '09
May '09
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Month


2010 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
Test number for the year

2010 Pimephales promelas Chronic Reference Toxicant Test Results- NOEC Survival- MH Water




2010 Pimephales promelas Chronic Reference Toxicant Test Results-IC25 Growth-MH Water
Upper Control Limit
Cummulative Trend
IC25 Growth
Lower Control Limit
NaCl g/L
3
2.5
2
1.5
1
0.5
0
Mar '09
Apr '09
May '09
June '09
July '09
Aug '09
Nov '09
Dec '09
Jan 5 10
Jan 11 10
Feb 10
Mar 10
Apr 10
May 10
Ju 10
Jly 10
Aug 10
Sept 10
Oct 10
Nov 10
Month


2010 Pimephales promelas 48-hour Reference Toxicant Test Results
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit
NaCl g/L
0
1
2
3
4
5
6
7
8
9
Test number for the year
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

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

	Time	Date	Time	Date
Composite 1 Collected From	**0800**	**11/14/10 To**	**0800**	**11/15/10**
Composite 2 Collected From	**0730**	**11/16/10 To**	**0730**	**11/17/10**
Composite 3 Collected From	**0720**	**11/18/10 To**	**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: **Receiving** X **Reconstituted**

PERCENT SURVIVAL

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

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100	100 UV
A	27	14	19	8	11	4	6
B	23	8	15	12	6	5	5
C	21	12	11	12	12	3	5
D	33	22	12	8	10	8	7
E	15	19	13	14	10	4	4
F	22	11	9	11	10	8	5
G	24	15	11	7	8	6	7
H	27	11	9	10	7	9	6
I	22	17	10	12	D10	9	5
J	26	5	9	7	4	10	8
Surv. Mean	24.0	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. D=dead adult

PMSD = 14.7%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 11/15/10 Time: 0800
Sample No. 2 Collected: Date: 11/17/10 Time: 0730
Sample No. 3 Collected: Date: 11/19/10 Time: 0720
Test Begin: Date: 11/15/10 Time: 1525
Test End: Date: 11/22/10 Time: 1240

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	8.4	8.2	8.2	8.2	8.3	8.1		
pH Initial	8.0	7.9	7.7	8.2	8.1	8.1	8.1	
pH Final	8.1	8.0	7.6	7.9	7.8	7.9		
Alkalinity	32.0	28.0						
Hardness	44.0	32.0						
Conductivity	177.0	159.4	156.7	160.0	161.0	159.6		
Chlorine	<.01	<.01						

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.2	8.2	7.8	7.9	8.0	8.1	
DO Final	8.2	8.2	8.2	8.1	8.4	8.3		
pH Initial	7.9	8.2	8.2	8.2	8.2	8.2	8.4	
pH Final	9.5	9.5	9.1	9.4	9.2	9.2		
Alkalinity								
Hardness								
Conductivity	370	369	358	365	364	362		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.3	8.2	8.2	8.1	8.3	8.2		
pH Initial	7.9	7.9	8.1	8.2	8.1	8.1	8.2	
pH Final	9.2	9.1	8.0	9.0	8.3	8.4		
Alkalinity								
Hardness								
Conductivity	287	278	272	280	284	277		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.2	8.2	7.7	7.9	8.0	8.1	
DO Final	8.2	8.2	8.2	8.1	8.4	8.4		
pH Initial	8.0	8.3	8.3	8.3	8.3	8.2	8.4	
pH Final	9.6	9.6	9.3	9.5	9.4	9.3		
Alkalinity								
Hardness								
Conductivity	439	439	428	435	432	428		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
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 Final	8.3	8.2	8.2	8.1	8.3	8.3		
pH Initial	7.9	8.2	8.2	8.2	8.2	8.1	8.3	
pH Final	9.4	9.4	8.7	9.3	8.9	8.9		
Alkalinity								
Hardness								
Conductivity	320	318	309	314	314	309		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.5	24.4	24.9	24.2	24.2	24.8	
DO Initial	8.2	8.2	8.2	7.6	7.8	8.0	8.1	
DO Final	8.2	8.2	8.3	8.2	8.5	8.6		
pH Initial	8.1	8.4	8.3	8.3	8.3	8.3	8.5	
pH Final	9.7	9.6	9.5	9.6	9.5	9.4		
Alkalinity	60.0		112.0		124.0			
Hardness	60.0		192.0		40.0			
Conductivity	526	534	517	529	525	518		
Chlorine	<.01		<.01					

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

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

	Time	Date	Time	Date
Composite 1 Collected from:	**0800**	**11/14/10 To**	**0800**	**11/15/10**
Composite 2 Collected from:	**0730**	**11/16/10 To**	**0730**	**11/17/10**
Composite 3 Collected from:	**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** **Reconstituted**

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	100	100	100	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. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
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%

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

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

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

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

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

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

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

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 1
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #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**

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 11/15/10 Time: 0800
Sample No. 2 Collected: Date: 11/17/10 Time: 0730
Sample No. 3 Collected: Date: 11/19/10 Time: 0720
Test Begin: Date: 11/15/10 Time: 1555
Test End: Date: 11/22/10 Time: 0932

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	8.4	8.2	8.2	8.2	8.3	8.1		
pH Initial	7.8	7.9	7.7	7.7	7.5	7.5	7.7	
pH Final	8.1	8.0	7.6	7.9	7.8	7.9		
Alkalinity	32.0	28.0						
Hardness	44.0	32.0						
Conductivity	177.0	159.4	156.7	160.0	161.0	159.6		
Chlorine	<.01	<.01						

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	7.0	6.5	6.6	6.7	6.9	7.0	6.8	
DO Final	8.2	8.2	8.2	8.1	8.4	8.3		
pH Initial	7.8	7.8	7.6	7.7	7.7	7.7	7.8	
pH Final	9.5	9.5	9.1	9.4	9.2	9.2		
Alkalinity								
Hardness								
Conductivity	370	369	358	365	364	362		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.3	8.2	8.2	8.1	8.3	8.2		
pH Initial	7.7	7.7	7.6	7.6	7.5	7.5	7.8	
pH Final	9.2	9.1	8.0	9.0	8.3	8.4		
Alkalinity								
Hardness								
Conductivity	287	278	272	280	284	277		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	6.9	6.5	6.0	6.7	7.0	7.0	6.8	
DO Final	8.2	8.2	8.2	8.1	8.4	8.4		
pH Initial	7.9	7.8	7.7	7.8	7.8	7.8	7.9	
pH Final	9.6	9.6	9.3	9.5	9.4	9.3		
Alkalinity								
Hardness								
Conductivity	439	439	428	435	432	428		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
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 Final	8.3	8.2	8.2	8.1	8.3	8.3		
pH Initial	7.7	7.7	7.6	7.6	7.6	7.6	7.8	
pH Final	9.4	9.4	8.7	9.3	8.9	8.9		
Alkalinity								
Hardness								
Conductivity	320	318	309	314	314	309		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.7	25.3	25.1	24.0	24.1	25.0	25.8	
DO Initial	6.9	6.5	6.6	6.7	7.0	7.6	6.9	
DO Final	8.2	8.2	8.3	8.2	8.5	8.6		
pH Initial	8.0	7.9	7.7	7.9	8.1	8.0	8.0	
pH Final	9.7	9.6	9.5	9.6	9.5	9.4		
Alkalinity	60.0		112.0		124.0			
Hardness	60.0		192.0		40.0			
Conductivity	526	534	517	529	525	518		
Chlorine	<.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

Client: El Dorado Chemical Company

Project#: X4233

Proofed First Draft: _____ **Date:** _____

Proofed Final Draft: Eric L. Brupp, BS **Date:** 12/7/10

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.

Eric L. Brupp, BS **Date:** 12/7/10

Quality Assurance Officer

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
Outfall: 001
Permit #: AR0000752/ AFIN #70-00040
Contact: David Sartain
Test Dates: 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 57pages, 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

BAL
ADEQ #88-0630
Project X4270

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X4270

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 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. 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^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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_{25} value for reproduction was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC_{50} 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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ADEQ #88-0630
Project X4270

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		19.5	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	*

*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.

Table 2: Results of the Chronic Definitive Fathead Minnow Test

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	

*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.

BAL
ADEQ #88-0630
Project X4270

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.

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

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC_{50}	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

+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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ADEQ #88-0630
Project X4270

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:									
Address: 4500 Northwest Avenue, El Dorado, AR 71731	Fax: (870) 863-1499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Project Number: X4270
Permit #: AR0000752	Purchase Order:										Temp. upon arrival:
Sampler's Signature/Printed Name/Affiliation: Brent Parker / Brent Parker											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification										
12/28/10	12/29/10	X		8	001	X	X							C2253	ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Brent Parker / EDCC	12/29/10	0935	[signature]	12/29/10	0935
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 12/29/10	Time: 1150	Received by/Affiliation: [signature]	Date: 12/29/10	Time: 1150

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

Comments:

Temperature upon arrival: 2-8
Thermometer #: 29
Tech: RC
Date: 12/29/10

BioAnalytical

From: Brent Parker [BParker@edc-ark.com]
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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:								Lab Control Number:	Project Number: X4270
Address: 4500 Northwest Avenue, El Dorado, AR 71731	Fax: (870) 863-1499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform		Temp. upon arrival:
Permit #: AR0000752	Purchase Order:										
Sampler's Signature/Printed Name/Affiliation: Brent Parker / Brent Parker / EDCC											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
12/30/10 12/31/10	0745 0745	X			001	X	X							12273	ice

Temperature upon arrival: 2.0°C
Thermometer #: 29
Tech: [illegible]
Date: 12/31/10

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Brent Parker EDCC	12/31/10	0850	[signature]	12/31/10	0850
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 12/31/10	Time: 1100	Received by/Affiliation: [signature]	Date: 12/31/10	Time: 1100

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

Comments:

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:									
Address: 4500 Northwest Avenue, El Dorado, AR 71731	**Fax:** (870) 863-1499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Project Number: X4270
Permit #: AR0000752	**Purchase Order:**										Temp. upon arrival:
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification									
1-2-11 - 1-3-11	0730AM - 0730AM	X		8	001	X	X							ice

Temperature upon arrival: 1.5°C
Thermometer #: 29
Tech: BBM
Date: 1/3/11

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain / EDCC	1-3-11	0845		1-3-11	0845
Relinquished by/Affiliation:	**Date:**	**Time:**	**Received by/Affiliation:**	**Date:**	**Time:**
Relinquished by/Affiliation:	**Date:**	**Time:**	**Received by/Affiliation:**	**Date:**	**Time:**
	1-3-11	1045		1/3/11	1045

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4270 Date start: 12/29/10 Date end: 1/5/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave, El Dorado, AR. 71731

NPDES# AR0000752 | AFIN 70-00040

Sample Description 001 Dilution Water soft reconstituted

Test Temperature(°C) 25±1°C Technicians Briggs, Haughton, Coagler, Callahan

Adults isolated: Date 12/28/10 Time: 2300

Neonates collected: Date 12/29/10 Time: 0655 Board: R11 S

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089

pH Meter: Model Orion 230A+ Serial #020273

Conductivity Meter: Model Control Company Serial# 80277924

Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

	Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0.	9.8/118.0%/[illegible]	Y/10/8.3/99.9%/[illegible]	NA	NA
1.	11.4/127.7%/RC	Y/15/8.5/98.4%/RC		
2.	10.3/122.6%/[illegible]	Y/15/8.0/95.9%/[illegible]		
3.	9.8/116.9%/AH	Y/12/7.5/89.1%/AH		
4.	10.7/126.0%/AH	Y/15/8.1/95.8%/AH		
5.	10.2/119.8%/[illegible]	Y/15/7.8/91.5%/[illegible]		
6.	10.2/120.0%/AH	Y/15/7.9/94.3%/AH		
7.				

pH		Total Residual Chlorine (mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	Date
8.8	1.	<0.01/[illegible]	no/[illegible]	2.0/[illegible]	C2253	12/29/10
8.7/AH	2.	<0.01/AH	No/AH	3.0/AH	C2273	1/1/11
8.6/AH	3.	<0.01/AH	No/AH	3.0/AH	C2275	1/4/11

Comments:

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

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4270 Test Dates 12/29/10 - 1/5/11

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100 UV txd
A	16	5	4	4	5	3	X 3
B	23	14	X 0	7	X 0	7	3
C	10	5	8	5	7	6	1
D	29	12	11	12	12	3	3
E	17	9	10	8	X 5	7	4
F	23	7	9	X 3	8	X 3	6
G	17	13	10	9	6	4	2
H	22	9	10	8	X 2	6	X 1
I	13	7	12	X 4	11	4	2
J	25	9	13	2	10	X 2	5
Surviving Mean	19.5	9.0	9.7	6.9	8.4	5.0	3.3
Total Mean	19.5	9.0	8.7	6.2	6.6	4.6	3.0
CV%*	30.02	35.14	26.88	45.63	31.28	33.81	51.36

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

Key: M=male; X=dead adult

Calculated by: RC 1/6/11

Calculations checked by: ECO 1/10/11

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4270 Test started: Date 12/29/10 Time 1445
Client El Dorado Chemical Test ended: Date 1/5/11 Time 1010

	Day0	1	2	3	4	5	6	7	8
Technician:	AH	LBm	[illegible]	AH	AH	RC	LBm	RC	
Time:	1445	1110	1035	1250	1345	1110	1030	1010	
Temperature:	25.2	24.9	24.6	24.6	24.4	24.5	24.7	24.7	

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1	0 →										10	
	2	0 →										10	
	3	0 →										10	
	4	1	4	2	4	4	4	4	3	1	3	10	
	5	2	8	0	10	1	9	2	8	0	1	10	
	6	0	0	1	0	0	0	0	0	2	9	10	
	7	13	11	7	15	12	10	11	11	10	12	10	
	8												
32	1	0 →										10	
	2	0 →										10	
	3	0 →										10	
	4	2	3	3	4	3	3	4	2	3	2	10	
	5	3	6	0	0	0	0	0	4	4	4	10	
	6	0	0	0	3	3	0	4	0	0	0	10	
	7	0	5	2	5	3	4	5	3	0	3	10	
	8												
42	1	0	X	0 →								9	
	2	0	|	0 →								9	
	3	0	|	0 →								9	
	4	3	|	3	4	3	2	3	3	4	3	9	
	5	0	|	3	0	0	2	0	3	2	0	9	
	6	1	|	0	3	4	0	3	0	2	4	9	
	7	0	|	2	4	3	5	4	4	4	6	9	
	8												
56	1	0 →										10	
	2	0 →										10	
	3	0 →										10	
	4	2	3	4	3	3	3	4	3	4	2	10	
	5	0	2	0	0	0	X0	0	2	X0	0	8	
	6	0	0	1	4	3	|	3	0	|	0	8	
	7	2	2	0	5	2	|	2	3	|	0	8	
	8												
75	1	0	X	0 →								9	
	2	0	|	0 →								9	
	3	0	|	0 →								9	
	4	2	|	2	3	3	2	3	2	2	2	9	
	5	3	|	1	RC 1/4/11 0 2	X2	2	0	0	2	2	8	
	6	0	|	0	4	|	3	0	X	3	4	7	
	7	0	|	4	3	|	1	3	|	4	2	7	
	8												
100	1	0 →										10	
	2	0 →										10	
	3	0 →										10	
	4	1	3	2	3	3	3	2	3	2	2	10	
	5	0	0	3	0	0 →					0X	9	
	6	0	0	0	0	3	X	2	3	2	|	8	
	7	2	4	1	0	1	|	0	0	0	|	8	
	8												

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

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4270 Test started: Date 12/29/10 Time 1445
Client El Dorado Chemical Test ended: Date 1/5/11 Time 1010

Technician: Day0 AH 1 [illegible] 2 [illegible] 3 AH 4 AH 5 RC 6 [illegible] 7 RC 8 ____
Time: Day0 1445 1 1110 2 1035 3 1250 4 1345 5 1110 6 1030 7 1016 8 ____
Temperature: Day0 25.2 1 24.9 2 24.1 3 24.6 4 24.4 5 24.6 6 24.7 7 24.7 8 ____

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV-trt'd	1	0 →										10	
	2	0 →										10	
	3	0 →									→	10	
	4	1	2	1	3	2	3	2	1	2	2	10	
	5	X3	0 →					→	X0	0 →	→	8	
	6	|	0 ←			2	3	0	|	0	3	8	
	7	|	1	0	0	0	0	0	|	0	0	8	
	8	|							|				
	1												
	2												
	3												
	4												
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	4												
	5												
	6												
	7												
	8												

omit AH 12/27/10

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

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4270 Test started: Date 12/29/04 Time 1445
Client El Dorado Chemical Test ended: Date 1/5/04 Time 1010
Organism Cdubia

Day/# water used	0 3110	1	2	3	4	5	6 3116	7	8
Concentration: Control 5%									
pH	8.0	8.0 / 8.0	8.1 / 8.0	8.0 / 8.1	8.1 / 8.0	7.9 / 8.0	7.9 / 7.9	7.9	
DO(mg/l)	7.9	7.7 / 7.8	7.8 / 7.8	7.5 / 7.6	8.3 / 8.5	7.3 / 8.0	7.6 / 7.8	7.6	
Cond(umhos/cm)	167.2	172.0	171.6	171.1	196.9	195.6	169.0		
Alkalinity(mg/L)	28.0						32.0		
Hardness (mg/L)	52.0						40.0		
Concentration: 32%									
pH	8.5	8.8 / 8.4	8.1 / 8.4	8.1 / 8.4	8.1 / 8.3	8.1 / 8.3	8.0 / 8.3	8.1	
DO(mg/l)	8.0	7.7 / 7.9	7.7 / 7.8	7.5 / 7.5	8.2 / 8.3	7.4 / 7.8	7.6 / 7.8	7.9	
Cond(umhos/cm)	280	282	283	286	328	324	291		
Concentration: 42%									
pH	8.6	8.1 / 8.5	8.1 / 8.5	8.1 / 8.4	8.1 / 8.4	8.1 / 8.4	8.1 / 8.4	8.1	
DO(mg/l)	8.0	7.6 / 7.9	7.7 / 7.8	7.4 / 7.5	8.2 / 8.2	7.4 / 7.8	7.6 / 7.8	7.8	
Cond(umhos/cm)	308	317	321	316	363	363	325		
Concentration: 56%									
pH	8.6	8.1 / 8.6	8.2 / 8.6	8.2 / 8.5	8.2 / 8.5	8.2 / 8.5	8.2 / 8.5	8.2	
DO(mg/l)	8.1	7.6 / 8.0	7.6 / 7.8	7.4 / 7.5	8.1 / 8.2	7.4 / 7.7	7.6 / 7.7	7.8	
Cond(umhos/cm)	350	362	370	370	420	414	377		
Concentration: 75%									
pH	8.7	8.2 / 8.6	8.2 / 8.6	8.2 / 8.5	8.2 / 8.6	8.2 / 8.5	8.2 / 8.5	8.2	
DO(mg/l)	8.2	7.6 / 8.0	7.6 / 7.8	7.4 / 7.5	8.1 / 8.1	7.4 / 7.7	7.6 / 7.7	7.9	
Cond(umhos/cm)	413	428	436	434	495	493	449		
Concentration: 100%									
pH	8.7	8.2 / 8.7	8.3 / 8.7	8.3 / 8.6	8.3 / 8.6	8.3 / 8.6	8.3 / 8.6	8.3	
DO(mg/l)	8.4	7.6 / 8.2	7.6 / 7.9	7.4 / 7.5	8.0 / 8.1	7.4 / 7.6	7.6 / 7.7	7.8	
Cond(umhos/cm)	497	512	521	523	597	591	541		
Tech-prerenewal				AH	AH	RC		RC	
Tech-postrenewal		RC			AH		AH		
Hardness(mg/l)	56.0		44.0		44.0				
Alkalinity(mg/l)	98.0		104.0		108.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4270 Test started: Date 12/29/10 Time 1445
Client El Dorado Chemical Test ended: Date 1/5/11 Time 1010
Organism C.dubia

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100% uv-trt'd									
pH	8.6	8.2 / 8.6	8.2 / 8.4	8.2 / 8.5	8.2 / 7.8	8.2 / 8.3	8.2 / 8.3	8.2	
DO (mg/l)	7.9	7.2 / 8.0	7.4 / 7.5	7.3 / 7.2	7.9 / 7.6	7.0 / 7.5	7.3 / 7.4	7.5	
Cond (umhos/cm)	516	517	530	515	598	584	552		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	[illegible]	[illegible]	[illegible]	AH	AH	RC	[illegible]	RC	
Tech-postrenewal		RC	[illegible]	[illegible]	AH	[illegible]	AH		
Hardness (mg/l)									
Alkalinity (mg/l)									

Blank AH 12/29/10

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4270 Date started: 12/29/10 Date ended 1/5/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave., El Dorado, AR 71731

NPDES# AR0000752 | AFIN 70-00040

Sample Description 001 Dilution Water soft reconstituted

Test Temperature (°C) 25±1°C Technicians Briggs, Houghton, Zoogler, Caulahan

Test organism age <48 Vendor/ID# Aquatox | 1648

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			
1	RC/0755/0.10ml	RC/1055/0.10ml	AH/1445/0.20ml AH/1415/0.10ml
2	[illegible]/0815/0.20ml		
3	RC/0800/0.10ml	RC/1130/0.20ml RC 12/31/10	RC/1130/0.20ml
4	RC 12/31/10 [illegible]/0815/0.10ml [illegible]/1415/0.20ml		[illegible]/1340/0.20ml
5	[illegible]/1125/0.2aml		[illegible]/1415/0.20ml
6	RC/0735/0.1aml	AH/1055/0.10ml	AH/1430/0.10ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

	Effluent Initial DO(mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0.	9.8/118.0%/[illegible]	Y/10/8.3/99.9%/[illegible]	N/A	
1.	11.4/127.7%/RC	Y/15/8.5/98.4%/RC		
2.	10.3/122.6%/RC	Y/15/8.0/95.9%/RC		
3.	9.8/116.9%/[illegible]	Y/12/7.5/89.1%/[illegible]		
4.	10.7/126.0%/AH	Y/15/8.1/95.8%/[illegible]		
5.	8.5/100.2%/[illegible] 10.3/119.8%/[illegible]	NO/[illegible] Y/15/7.8/91.3%/[illegible]		
6.	10.2/120.0%/AH	Y/15/7.9/94.3%/AH		

	Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech	BAL Sample #	Date
1.	<0.01/[illegible]	NO/[illegible]	3.0/[illegible]	C2253	12/29/10
2.	<0.01/[illegible]	NO/[illegible]	3.0/[illegible]	C2273	1/1/11
3.	<0.01/AH	NO/AH	3.0/AH	C2275	1/4/11

pH
8.8
8.7
8.6/AH

Comments:

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

Feed 6. RC/0735/0.1aml [illegible]/1035/0.10ml AH/1415/0.10ml

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4270 Test started: Date 1/9/11 Time 1435
Client El Dorado Chemical Test ended: Date 1/15/11 Time 0930

Technician:	Day0 SM	1 RC	2 PC	3 SWm	4 SWm	5 AH	6 AH	7 RC
Time:	Day0 1435	1 1645	2 1120	3 1330	4 1405	5 1010	6 1025	7 0930
Temperature	Day0 24.9	1 25.0	2 25.2	3 24.7	4 24.7	5 24.8	6 24.9	7 24.5

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

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4270 Test started: Date 12/29/10 Time 1435
Client El Dorado Chemical Test ended: Date 1/5/11 Time 0930

	Day0	1	2	3	4	5	6	7
Technician:	[illegible]	RC	RC	[illegible]	[illegible]	AH	AH	RC
Time:	1433	1045	1120	1230	1405	1010	1025	0930
Temperature	24.9	25.0	25.2	24.7	24.7	24.8	24.9	24.5

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

Omit AH 12/27/10

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4270/EDCC Test Dates 1/5/11 12/29/10 - 1/5/11
Oven Temperature (° Celsius) 103°C EGB 1/10/11

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 1/3/11 weighed: Tech: dsm	Wt. of pan + larvae(g)/ Date 1/6/11 weighed: Tech: dsm	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 91	1.3344	1.3419	0.0075	8	0.938	
	B 92	1.3437	1.3506	0.0069	8	0.863	
	C 93	1.3389	1.3466	0.0077	8	0.963	
	D 94	1.3389	1.3461	0.0072	8	0.900	
	E 95	1.3393	1.3472	0.0079	8	0.988	
32	A 96	1.3376	1.3449	0.0073	8	0.913	
	B 97	1.3213	1.3289	0.0076	8	0.950	
	C 98	1.3468	1.3533	0.0065	8	0.813	
	D 99	1.3304	1.3373	0.0069	8	0.863	
	E 100	1.3402	1.3472	0.0070	8	0.875	
42	A 101	1.3549	1.3637	0.0088	8	1.100	
	B 102	1.3546	1.3627	0.0081	8	1.013	
	C 103	1.3513	1.3588	0.0075	8	0.938	
	D 104	1.3479	1.3542	0.0063	8	0.788	
	E 105	1.3495	1.3569	0.0074	8	0.925	
56	A 106	1.3499	1.3577	0.0078	8	0.975	
	B 107	1.3452	1.3541	0.0089	8	1.113	
	C 108	1.3505	1.3582	0.0077	8	0.963	
	D 109	1.3432	1.3512	0.0080	8	1.000	
	E 110	1.3265	1.3345	0.0080	8	1.000	
75	A 111	1.3413	1.3484	0.0071	8	0.888	
	B 112	1.3396	1.3484	0.0088	8	1.100	
	C 113	1.3323	1.3426	0.0103	8	1.288	
	D 114	1.3441	1.3517	0.0076	8	0.950	
	E 115	1.3361	1.3445	0.0084	8	1.050	
100	A 116	1.3444	1.3530	0.0086	8	1.075	
	B 117	1.3324	1.3397	0.0073	8	0.913	
	C 118	1.3299	1.3376	0.0077	8	0.963	
	D 119	1.3514	1.3579	0.0065	8	0.813	
	E 120	1.3496	1.3574	0.0078	8	0.975	

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

Calculated by: dsm 1/6/11 Calculations checked by: EGB 1/10/11

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4270 / EDCC   Test Dates ~~1/5/11~~ 12/29/10 - 1/5/11 EB 1/10/11
Oven Temperature (° Celsius) 103°C

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date 1/3/11 weighed: Tech: [initials]	Wt. of pan + larvae(g)/ Date 1/6/11 weighed: Tech: [initials]	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
100 UV	A 121	1.3483	1.3566	0.0083	8	1.038	
	B 122	1.3491	1.3573	0.0082	8	1.025	
	C 123	1.3378	1.3457	0.0079	8	0.988	
	D 124	1.3572	1.3653	0.0081	8	1.013	
	E 125	1.3533	1.3612	0.0079	8	0.988	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

(Unused rows struck through diagonally: "DNT 12/29/10" [initials])

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

Calculated by: [signature] 1/10/11   Calculations checked by: EB 1/10/11

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4270
Client El Dorado Chemical
Organism P. promelas

Test started: Date 2/24/10 Time 1435
Test ended: Date 3/5/11 Time 0930

Day/# water used	03/10	1	2	3	4	5	63/16	7	8
Concentration: Control Soft									
pH	8.0	7.8 / 8.0	7.8 / 8.0	7.6 / 8.1	7.8 / 8.0	7.6 / 8.0	7.5 / 7.9	7.7	
DO (mg/l)	7.9	6.6 / 7.8	7.9 / 7.8	6.9 / 7.6	7.2 / 8.5	6.6 / 8.0	5.8 / 7.8	5.6	
Cond (umhos/cm)	167.2	172.0	171.6	171.1	196.9	195.6	169.0		
Alkalinity (mg/L)	28.0						32.0		
Hardness (mg/L)	52.0						40.0		
Concentration: 32%									
pH	8.5	7.8 / 8.4	7.9 / 8.4	7.6 / 8.4	7.8 / 8.3	7.6 / 8.3	7.6 / 8.3	7.5	
DO (mg/l)	8.0	6.7 / 7.9	6.9 / 7.8	6.9 / 7.5	7.2 / 8.3	6.0 / 7.8	5.7 / 7.8	5.6	
Cond (umhos/cm)	280	282	283	286	328	324	291		
Concentration: 42%									
pH	8.6	7.8 / 8.5	7.9 / 8.5	7.7 / 8.4	7.9 / 8.4	7.8 / 8.4	7.6 / 8.4	7.5	
DO (mg/l)	8.0	6.7 / 7.9	6.9 / 7.8	6.1 / 7.5	7.1 / 8.2	5.9 / 7.8	5.6 / 7.8	5.5	
Cond (umhos/cm)	308	317	321	316	363	363	325		
Concentration: 56%									
pH	8.6	7.9 / 8.6	7.9 / 8.6	7.8 / 8.5	7.9 / 8.5	7.7 / 8.5	7.6 / 8.5	7.6	
DO (mg/l)	8.1	6.6 / 8.0	6.9 / 7.8	6.2 / 7.5	7.0 / 8.2	6.0 / 7.7	5.5 / 7.7	5.4	
Cond (umhos/cm)	350	362	370	370	420	414	~~449~~ 379		
Concentration: 75%									
pH	8.7	8.0 / 8.6	8.0 / 8.6	7.8 / 8.5	8.0 / 8.6	7.8 / 8.5	7.6 / 8.5	7.7	
DO (mg/l)	8.2	6.7 / 8.0	7.3 / 7.8	6.0 / 7.5	7.0 / 8.1	6.0 / 7.7	5.5 / 7.7	5.6	
Cond (umhos/cm)	413	428	436	434	495	493	449 ~~449~~		
Concentration: 100%									
pH	8.7	8.9 / 8.7	8.7 / 8.7	8.8 / 8.6	8.1 / 8.6	7.8 / 8.6	7.7 / 8.6	7.8	
DO (mg/l)	8.4	6.7 / 8.2	7.9 / 7.9	6.5 / 7.5	7.0 / 8.1	6.0 / 7.6	5.5 / 7.7	5.3	
Cond (umhos/cm)	497	512	521	523	597	591	541		
Tech-prerenewal	RC	RC	RC	[illegible]	[illegible]	AH	AH	RC	
Tech-postrenewal		RC	RC	[illegible]	AH	[illegible]	AH		
Hardness (mg/l)	56.0		44.0		44.0				
Alkalinity (mg/l)	98.0		104.0		108.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4270
Client El Dorado Chemical
Organism P promens

Test started: Date 12/9/10 Time 1435
Test ended: Date ____ Time ____

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~		EDC LW-trtd							
pH	8.2	7.9 / 8.6	8.0 / 8.4	7.9 / 8.5	8.1 / 7.8	8.3	7.8 / 8.3	7.7	
DO (mg/l)	7.9	6.2 / 8.0	6.4 / 7.5	5.7 / 7.2	7.0 / 7.6	7.5	5.4 / 7.4	5.3	
Cond (umhos/cm)	516	517	530	515	598	584	552		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:		Ohio R.							
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	RC	RC	[illegible]	[illegible]	AH	AH	RC	
Tech-postrenewal	———	RC	RC	[illegible]	AH	[illegible]	AH		
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 12/21/10 **Date end:** 12/23/10

Test organism: C. dubia

Age: <24hr

Source and ID#: BAL / R10

Dilution Water used: Type: MH * **Jug #:** 3109

Reference Toxicant: NaCl + **Units:** 100 g/L ____ ug/L

Manufacturer: ACROS **Lot:** B0130290

48-hour LC_{50}: 1.41 g/L **Statistical Method:** G ^

Upper and Lower CUSUM Chart Control Limits: 1.78-1.01

Test Number (for the year): 24

We verify that this data is true and correct:

Technician: Leslie Zeagler

Statistician: Erin P. Bragg

Quality Control Officer: Erin P. Bragg

***MH- Moderately hard**
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

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

Project#_____

Client Ref Tox

Sample Description NaCl 100gL

Technician:

Time:

Temperature (°C):

Test started: Date 12/21/10 Time 1350

Test ended: Date 12/23/10 Time 1420

Test Species C. dubia ID# NaCl R10

	0hour	24hour	48hour	72hour	96hour
Technician:	[illegible]	[illegible]	[illegible]	/	/
Time:	1350	1335	1420	/	/
Temperature (°C):	24.7	24.7	24.6	/	/

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		5	5	5			8.1	—	8.3			8.0	—	8.2			320	—	496		
	B		5	5	5																	
	C		5	5	5																	
	D		5	5	5																	
1	A		5	5	5			8.3	—	8.4			8.0	—	8.2			320	—	3490		
	B		5	5	5																	
	C		5	5	5																	
	D		5	4	5																	
2	A		5	0				8.3	8.8				8.0	8.1				4670	4720			
	B		5	0																		
	C		5	0																		
	D		5	0																		
Chemistry Tech prerenewal/postrenewal								[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]		

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

Project#_____

Client Ref TOX

Sample Description NaCl 100911

Test started: Date 12/2/10 Time 1350

Test ended: Date 12/3/10 Time 1400

Test Species C. dubia ID# BAL Rio

Technician: Ohour SBM 24hour SBM 48hour SBM 72hour / 96hour /

Time: Ohour 1350 24hour 1335 48hour 1400 72hour / 96hour /

Temperature (°C): Ohour 24.7 24hour 24.7 48hour 24.6 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
3	A		5	0				8.3	8.7				8.0	8.1				6440	6410			
	B		5	0																		
	C		5	0																		
	D		5	0																		
4	A		5	0				8.3	8.7				8.0	8.1				8430	8330			
	B		5	0																		
	C		5	0																		
	D		5	0																		
5	A		5	0				8.2	8.7				8.0	8.1				10310	10310			
	B		5	0																		
	C		5	0																		
	D		5	0																		
Chemistry Tech prerenewal/postrenewal								[illegible]	[illegible]				[illegible]	[illegible]				[illegible]	[illegible]			

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APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	12/29/2010	Test ID:	X4270cd	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/29/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

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

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

Reviewed by: ECB 1/10/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/29/2010	Test ID:	X4270cd	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/29/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	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: Untransformed					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

ToxCalc v5.0.23

Reviewed by: EJB 10/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/29/2010	Test ID:	X4270cd	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/29/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	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: Untransformed					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				

ToxCalc v5.0.23

Reviewed by: EGB 1/10/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/29/2010	Test ID:	X4270cd	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/29/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	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: Untransformed					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 normal distribution (p > 0.05)	0.5679	0.895	-0.2283	0.35428
Bartlett's Test indicates equal variances (p = 0.04)	11.4201	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	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										

ToxCalc v5.0.23

Reviewed by: EGB 1/10/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	12/29/2010	Test ID:	X4270cd	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/29/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	16.000	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

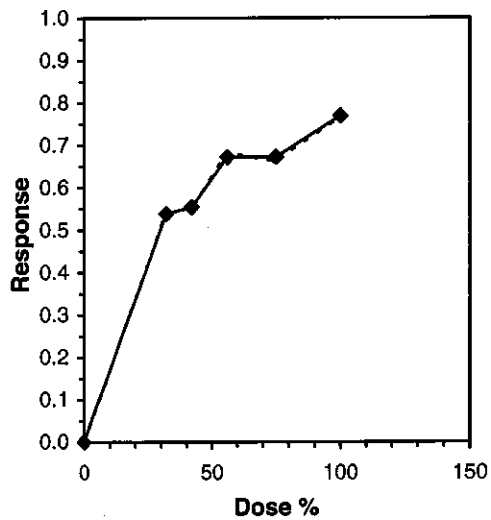
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	19.500	1.0000	19.500	10.000	29.000	30.024	10	19.500	1.0000
32	9.000	0.4615	9.000	5.000	14.000	35.136	10	9.000	0.4615
42	8.700	0.4462	8.700	0.000	13.000	45.025	10	8.700	0.4462
56	6.200	0.3179	6.200	2.000	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		

Linear Interpolation (200 Resamples)

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



ToxCalc v5.0.23

Reviewed by: 1/10/11

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	12/29/2010	Test ID:	X4270pp	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/28/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

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

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
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				

Reviewed by: EQB 1/10/11

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	12/29/2010	Test ID:	X4270pp	Sample ID:	1
End Date:	1/5/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	12/28/2010	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-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: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	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 Treatments vs D-Control	0.13574	0.14595	0.01708	0.00794	0.07867	6, 28

ToxCalc v5.0.23

Reviewed by: 1/10/11

Daphnid Acute Test-48 Hr Survival

Start Date:	12/21/2010	Test ID:	122110cd	Sample ID:	REF-Ref Toxicant
End Date:	12/23/2010	Lab ID:	NELAP 01975	Sample Type:	NACL-Sodium chloride
Sample Date:	12/21/2010	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

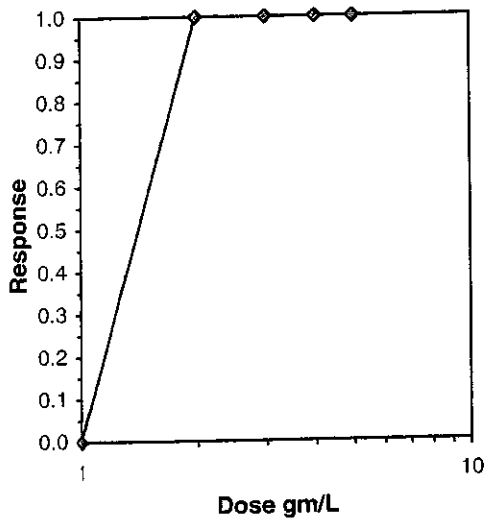
Conc-gm/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
1	1.0000	1.0000	1.0000	1.0000
2	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/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	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	4	0	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

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

Graphical Method

Trim Level	EC50
0.0%	1.4142
	1.4142



Reviewed by: EBB 1/4/11

APPENDIX D
QUALITY ASSURANCE CHARTS

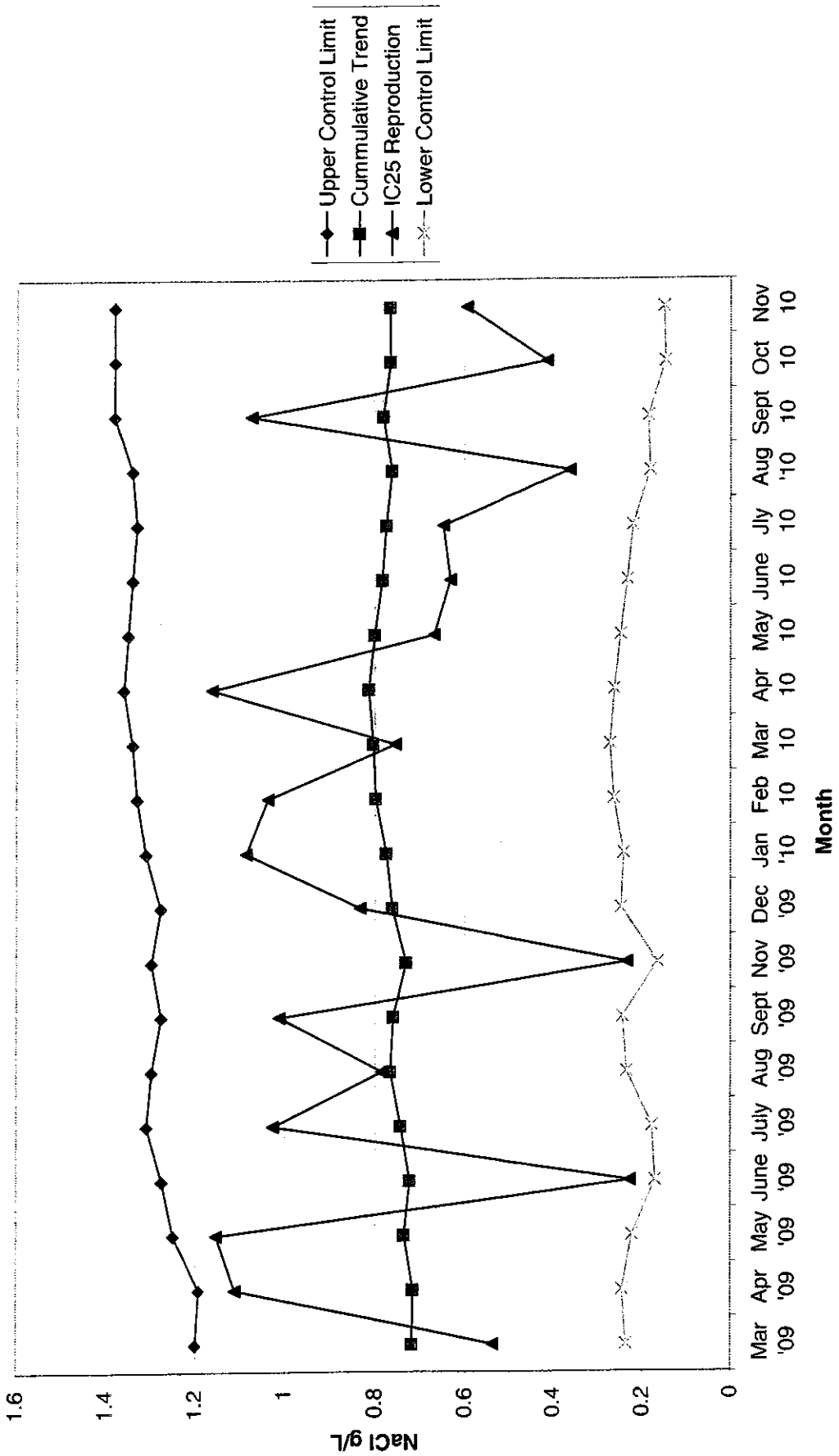
Bio-Analytical Laboratories' 2010 Results of the Monthly Chronic Reference Toxicant Tests

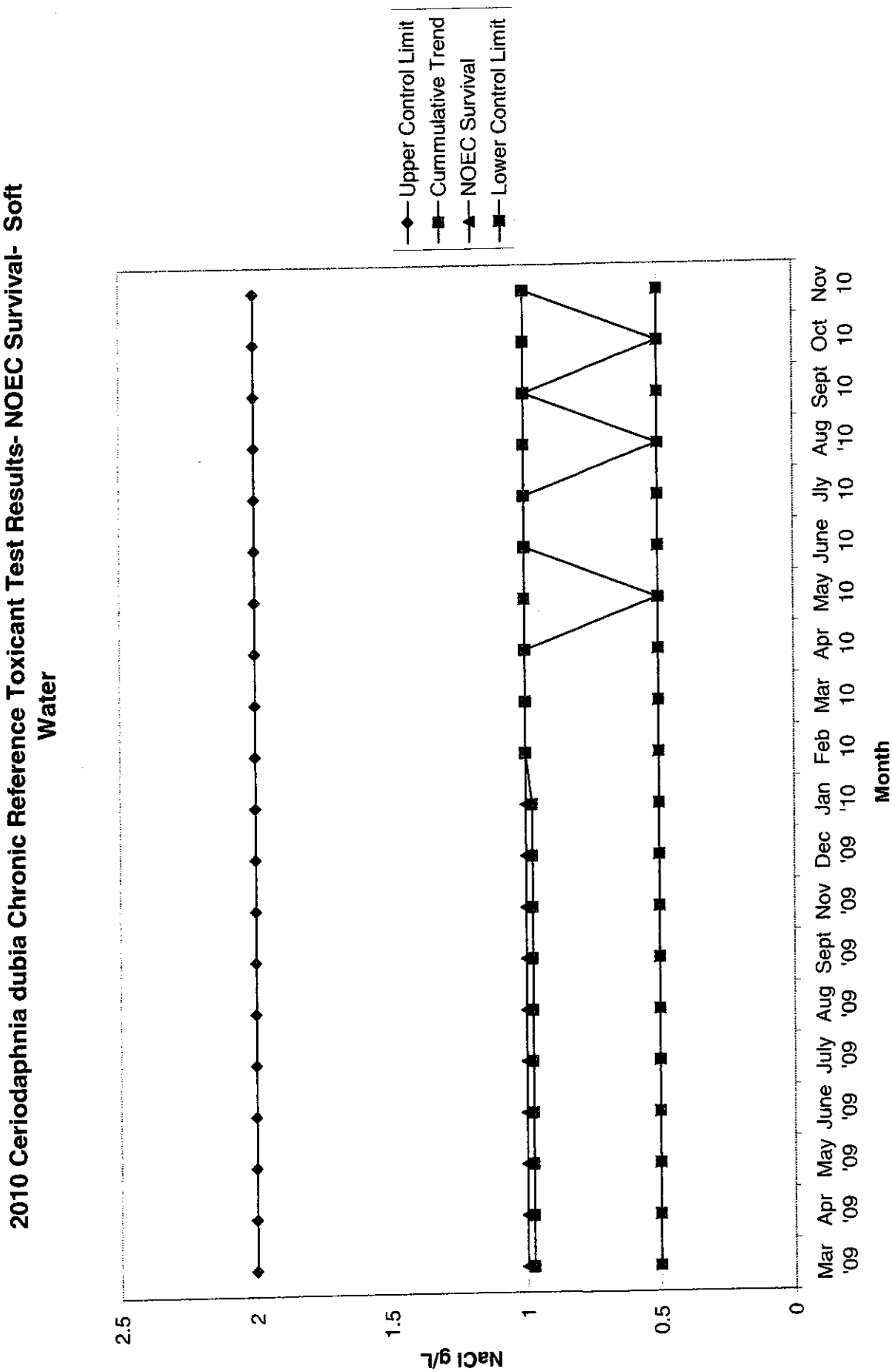
Month Start-End	Jan. 1/5-12/10 14:10-10:25	Feb. 2/2-9/10 10:50-13:35	Mar. 3/11-18/10 09:50-11:00	Apr. 4/22-29/10 10:00-10:20	May 5/4-11/10 15:15-13:30	June 6/29-7/6 14:10-13:05	July 7/6-13 14:40-10:55	Aug 8/3-10 10:50-12:20	Sept. 9/7-14 14:20-12:35	Oct 10/6-13 10:05-13:15	Nov 11/3-10 09:25-09:15	Dec 12/29-1/2	
***Ceriodaphnia dubia* (in soft reconstituted water)**													
NOEC survival	1.0	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	+	

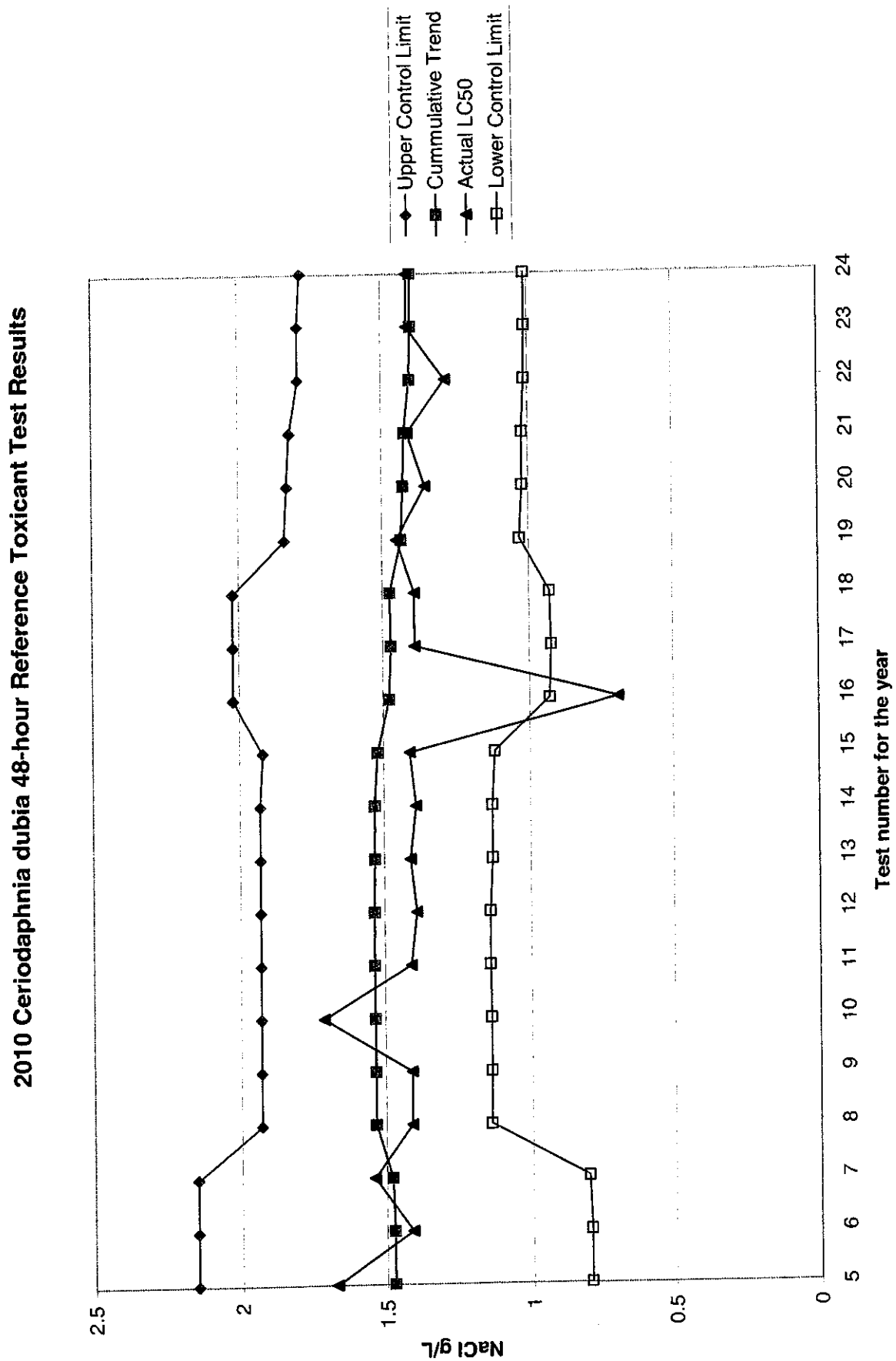
Fathead minnow													
Month Start-End	Jan. 1/5-12/10 13:55-09:50	Jan 1/11-18/10 11:05-09:37	Feb. 2/9-16/10 15:30-09:00	Mar. 3/8-15/10 10:10-08:50	Apr. 4/7-14/10 10:05-09:45	May 5/4-11/10 15:50-10:45	June 6/1-/8/10 16:05-09:20	July 7/20-27 16:00-09:35	Aug 8/2-9 12:30-08:40	Sept 9/10-17 10:25-9:50	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

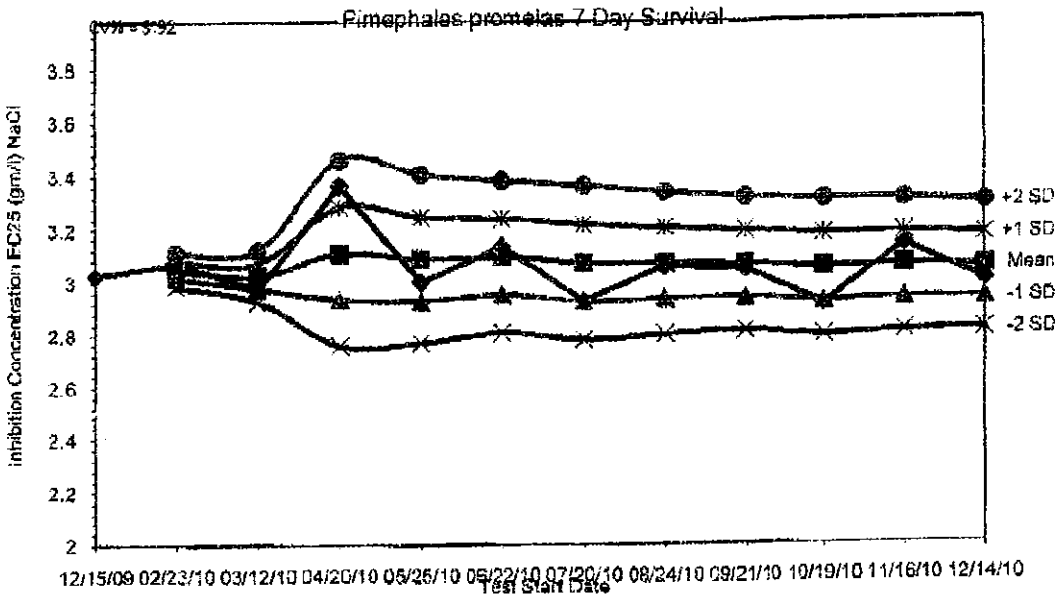
Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.
+Test invalid. Not enough time left in the month to conduct a retest.

2010 Ceriodaphnia dubia Chronic Reference Toxicant Test Results-IC25 Reproduction- Soft Water

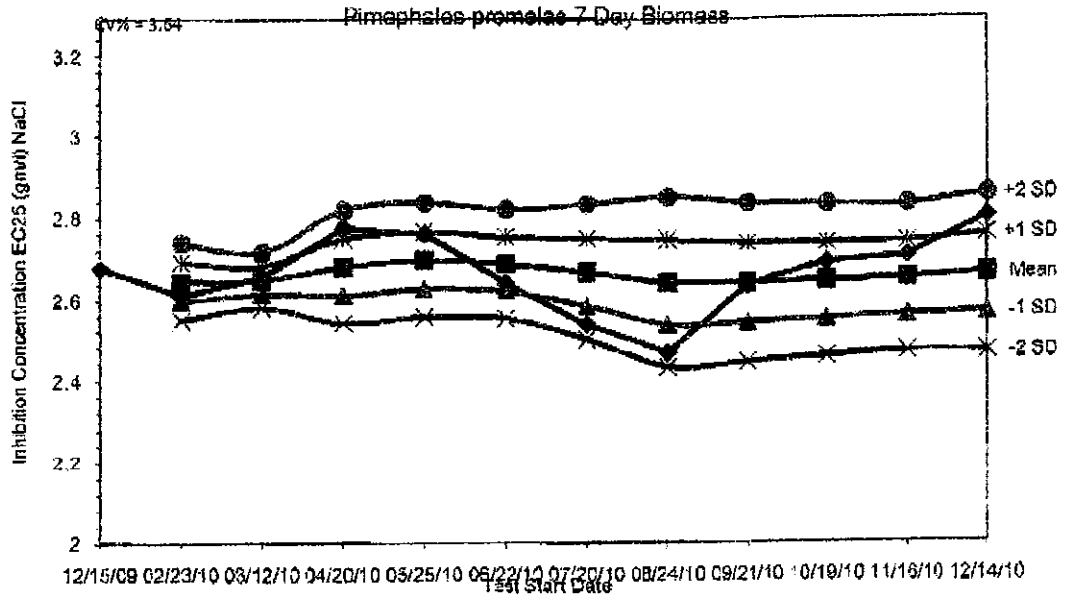



2010 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft Water
Upper Control Limit
Cummulative Trend
NOEC Survival
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
Mar '09
Apr '09
May '09
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Month

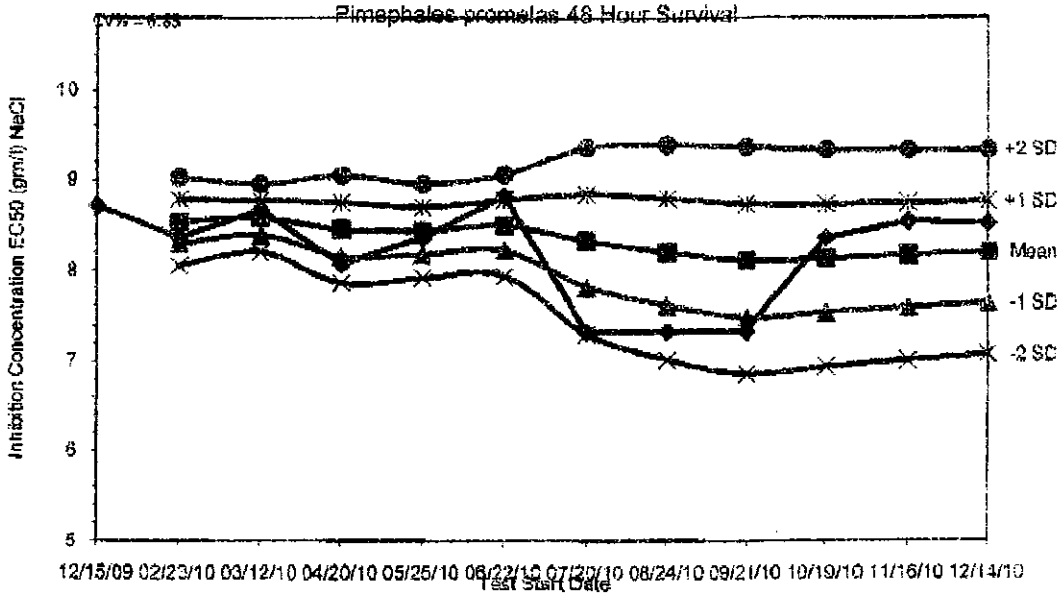

2010 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
Test number for the year



Dates	Values	Mean	-1 SD	-2 SD	+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	2.9285	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
09/21/10	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
11/16/10	3.1346	3.0597	2.9354	2.8111	3.1840	3.3083
12/14/10	3.0000	3.0547	2.9350	2.8152	3.1745	3.2943



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	2.7736	2.6814	2.6119	2.5424	2.7508	2.8203
05/25/10	2.7624	2.6976	2.6273	2.5571	2.7678	2.8380
06/22/10	2.6408	2.6881	2.6212	2.5542	2.7551	2.8220
07/20/10	2.5373	2.6866	2.5830	2.4994	2.7501	2.8337
08/24/10	2.4666	2.6416	2.5366	2.4319	2.7464	2.8512
09/21/10	2.6345	2.6408	2.5427	2.4446	2.7389	2.8369
10/19/10	2.6907	2.6458	2.5520	2.4582	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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
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	8.3614	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	8.9950	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	7.8148	7.0233	8.7978	9.3893
09/21/10	7.3333	8.1093	7.4842	6.8590	8.7345	9.3596
10/19/10	8.3636	8.1347	7.5399	6.9450	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

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

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

	Time	Date	Time	Date
Composite 1 Collected From	**0830**	**12/28/10 To**	**0830**	**12/29/10**
Composite 2 Collected From	**0745**	**12/30/10 To**	**0745**	**12/31/10**
Composite 3 Collected From	**0730**	**01/02/11 To**	**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: **Receiving** X **Reconstituted**

PERCENT SURVIVAL

Time of Reading	Percent 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

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100
A	16	5	4	4	5	3
B	23	14	D	7	D	7
C	10	5	8	5	7	6
D	29	12	11	12	12	3
E	17	9	10	8	D5	7
F	23	7	9	D3	8	D3
G	17	13	10	9	6	4
H	22	9	10	8	D2	6
I	13	7	12	D4	11	4
J	25	9	13	2	10	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	6.6	4.5
CV%*	30.02	35.14	26.88	45.63	31.28	33.81

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

PMSD = 20.0%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 12/19/10 Time: 0830
Sample No. 2 Collected: Date: 12/31/10 Time: 0745
Sample No. 3 Collected: Date: 01/03/11 Time: 0730
Test Begin: Date: 12/29/10 Time: 1445
Test End: Date: 01/05/11 Time: 1010

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	7.8	7.8	7.6	8.5	8.0	7.8		
pH Initial	8.0	8.1	8.0	8.1	7.9	7.9	7.9	
pH Final	8.0	8.0	8.1	8.0	8.0	7.9		
Alkalinity	28.0					32.0		
Hardness	52.0					40.0		
Conductivity	172.0	171.6	171.1	196.9	195.6	169.0		
Chlorine	<.01					<.01		

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.6	24.6	24.4	24.5	24.7	24.7	
DO Initial	7.6	7.6	7.4	8.1	7.4	7.6	7.8	
DO Final	8.0	7.8	7.5	8.2	7.7	7.7		
pH Initial	8.1	8.2	8.2	8.2	8.2	8.2	8.2	
pH Final	8.6	8.6	8.5	8.5	8.5	8.5		
Alkalinity								
Hardness								
Conductivity	362	370	370	420	414	377		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	7.9	7.8	7.5	8.3	7.8	7.8		
pH Initial	8.0	8.1	8.1	8.1	8.1	8.0	8.1	
pH Final	8.4	8.4	8.4	8.3	8.3	8.3		
Alkalinity								
Hardness								
Conductivity	282	283	286	328	324	291		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.6	24.6	24.4	24.5	24.7	24.7	
DO Initial	7.6	7.6	7.4	8.1	7.4	7.6	7.9	
DO Final	8.0	7.8	7.5	8.1	7.7	7.7		
pH Initial	8.2	8.2	8.2	8.2	8.2	8.2	8.2	
pH Final	8.6	8.6	8.5	8.6	8.5	8.5		
Alkalinity								
Hardness								
Conductivity	428	436	434	495	493	449		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
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	
DO Final	7.9	7.8	7.5	8.2	7.8	7.8		
pH Initial	8.1	8.1	8.1	8.1	8.1	8.1	8.1	
pH Final	8.5	8.5	8.4	8.4	8.4	8.4		
Alkalinity								
Hardness								
Conductivity	317	321	316	363	363	325		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.6	24.6	24.4	24.6	24.7	24.7	
DO Initial	7.6	7.6	7.4	8.0	7.4	7.6	7.8	
DO Final	8.2	7.9	7.5	8.1	7.6	7.7		
pH Initial	8.2	8.3	8.3	8.3	8.3	8.3	8.3	
pH Final	8.7	8.7	8.6	8.6	8.6	8.6		
Alkalinity	98.0	104.0		108.0				
Hardness	56.0	44.0		44.0				
Conductivity	512	521	523	597	591	541		
Chlorine	<.01	<.01		<.01				

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

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

	Time	Date	Time	Date
Composite 1 Collected from:	**0830**	**12/28/10 To**	**0830**	**12/29/10**
Composite 2 Collected from:	**0745**	**12/30/10 To**	**0745**	**12/31/10**
Composite 3 Collected from:	**0730**	**01/02/11 To**	**0730**	**01/03/11**

Test initiated:	1435	**am/pm**	12/29/10	**date**
Test terminated:	0930	**am/pm**	01/05/11	**date**
Dilution water used:		**Receiving**	**X**	**Reconstituted**

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	100	100	100	100	100	100	100	0.00
32	100	100	100	87.5	100	100	100	97.5	6.06
42	100	100	100	87.5	100	100	100	97.5	6.06
56	100	100	100	100	100	100	100	100	0.00
75	87.5	100	100	100	100	100	100	97.5	6.06
100	100	100	100	87.5	100	100	100	97.5	6.06

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
0	0.938	0.863	0.963	0.900	0.988	0.930	5.34
32	0.913	0.950	0.813	0.863	0.875	0.883	5.89
42	1.100	1.013	0.938	0.788	0.925	0.953	12.15
56	0.975	1.113	0.963	1.000	1.000	1.010	5.90
75	0.888	1.100	1.288	0.950	1.050	1.055	14.62
100	1.075	0.913	0.963	0.813	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 corresponding to:

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

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

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

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

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 0
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #TEP6C.
6. Enter response to item 4 on DMR Form, parameter #TFP6C.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

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

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: El Dorado Chemical
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 12/29/10 Time: 0830
Sample No. 2 Collected: Date: 12/31/10 Time: 0745
Sample No. 3 Collected: Date: 01/03/11 Time: 0730
Test Begin: Date: 12/29/10 Time: 1435
Test End: Date: 01/05/11 Time: 0930

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	7.8	7.8	7.6	8.5	8.0	7.8		
pH Initial	7.7	7.8	7.6	7.8	7.6	7.5	7.7	
pH Final	8.0	8.0	8.1	8.0	8.0	7.9		
Alkalinity	28.0					32.0		
Hardness	52.0					40.0		
Conductivity	172.0	171.6	171.1	196.9	195.6	169.0		
Chlorine	<.01					<.01		

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initial	6.6	6.9	6.2	7.0	6.0	5.5	5.4	
DO Final	8.0	7.8	7.5	8.2	7.7	7.7		
pH Initial	7.9	7.9	7.8	7.9	7.7	7.6	7.6	
pH Final	8.6	8.6	8.5	8.5	8.5	8.5		
Alkalinity								
Hardness								
Conductivity	362	370	370	420	414	377		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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	
DO Final	7.9	7.8	7.5	8.3	7.8	7.8		
pH Initial	7.8	7.9	7.6	7.8	7.6	7.6	7.5	
pH Final	8.4	8.4	8.4	8.3	8.3	8.3		
Alkalinity								
Hardness								
Conductivity	282	283	286	328	324	291		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initial	6.7	7.2	6.0	7.0	6.0	5.5	5.6	
DO Final	8.0	7.8	7.5	8.1	7.7	7.7		
pH Initial	8.0	8.0	7.8	8.0	7.8	7.6	7.7	
pH Final	8.6	8.6	8.5	8.6	8.5	8.5		
Alkalinity								
Hardness								
Conductivity	428	436	434	495	493	449		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initial	6.7	6.9	6.1	7.1	5.9	5.6	5.5	
DO Final	7.9	7.8	7.5	8.2	7.8	7.8		
pH Initial	7.8	7.9	7.7	7.9	7.6	7.6	7.5	
pH Final	8.5	8.5	8.4	8.4	8.4	8.4		
Alkalinity								
Hardness								
Conductivity	317	321	316	363	363	325		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	25.2	24.7	24.7	24.8	24.9	24.5	
DO Initial	6.7	7.0	9.1	7.0	6.0	5.5	5.3	
DO Final	8.2	7.9	7.5	8.1	7.6	7.7		
pH Initial	8.0	8.1	8.0	8.1	7.8	7.7	7.8	
pH Final	8.7	8.7	8.6	8.6	8.6	8.6		
Alkalinity	98.0	104.0		108.0				
Hardness	56.0	44.0		44.0				
Conductivity	512	521	523	597	591	541		
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

Client: El Dorado Chemical

Project#: X4270

Proofed First Draft: — **Date:** —

Proofed Final Draft: Erin L. Bergo **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.

Erin L. Bergo **Date:** 1/17/11

Quality Assurance Officer

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
Test Dates: January 18 - 25, 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 - 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 TQP6C - 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

BAL
ADEQ #88-0630
Project X4285

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X4285

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 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. 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^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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ADEQ #88-0630
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2.8 Data Analysis

Ceriodaphnia dubia survival data was analyzed using Fisher's Exact Test, an equality test comparing concentration data to control data. Reproduction data was analyzed using Steel's Many-One Rank Test, a nonparametric test comparing concentration data to control data. Fathead minnow survival data was analyzed using Steel's Many-One Rank Test and the growth data was analyzed using Dunnett's Test, a parametric test. The IC_{25} value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC_{50} 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.

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	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	*

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

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	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	

*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.

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ADEQ #88-0630
Project X4285

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.

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

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC_{50}	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

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.

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ADEQ #88-0630
Project X4285

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

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

Address: 4500 Northwest Avenue, El Dorado, AR 71731
Fax: (870) 863-1499

Permit #: AR0000752
Purchase Order:

Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
1-16-11 / 1-17-11	0700 - 0700	X		8	001	X	X							C2354	ice

Project Number: X4285

Temp. upon arrival:

		Date:	Time:
Relinquished by/Affiliation:	David Sartain / EDCC	1-17-11	1005
Received by/Affiliation:		1-17-11	1005
Relinquished by/Affiliation:			
Received by/Affiliation:			
Relinquished by/Affiliation:		1-17-11	1250
Received by/Affiliation:	J Seagler	1/17/11	1250

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

Comments:

Temperature upon arrival:
Thermometer #:
Tech:
Date:

X4285

Temperature upon arrival: 1.8
Thermometer #: 29
Tech: RC
Date: 1/19/11

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company				**Phone:** (870) 863-1484	**Analysis:**									**Project Number:** X4285	
Address: 4500 Northwest Avenue, El Dorado, AR 71731				**Fax:** (870) 863-1499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform		**Temp. upon arrival:**	
Permit #: AR0000752				**Purchase Order:**											
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC															
Date Start / **Date End**	**Time Start** / **Time End**	**C**	**G**	**# containers**	**Sample Identification**									**Lab Control Number:**	**Preservative: (below)**
1-18-11 / 1-19-11	0740 AM / 0740 AM	X		8	001	X	X							C2376	ice

Relinquished by/Affiliation: David Sartain / EDCC	**Date:** 1-19-11	**Time:** 0930	**Received by/Affiliation:**	**Date:** 1-19-11	**Time:** 0935
Relinquished by/Affiliation:	**Date:**	**Time:**	**Received by/Affiliation:**	**Date:**	**Time:**
Relinquished by/Affiliation:	**Date:** 1-19-11	**Time:** 1215	**Received by/Affiliation:** R Callahan	**Date:** 1/19/11	**Time:** 1215

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

Comments:

X4285

Bio-Analytical Laboratories
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Doyline, LA 71023
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NELAP 01975, ADEQ #88-0630, EPA LA00917

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Permit #: AR0000752	Purchase Order:										Temp. upon arrival:
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification										
1-20-11 / 1-21-11	0730AM - 0730AM	X		8	001	X	X							C2409	ice
					Temperature upon arrival: 2.0										
					Thermometer #: 29										
					Tech: RC										
					Date: 1/21/11										

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain / EDCC	1-21-11	0915		1-21-11	0915
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 1-21-11	Time: 1145	Received by/Affiliation: R Callahan	Date: 1/21/11	Time: 1145

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4285 Date start: 1/18/11 Date end: 1/25/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave, El Dorado, AR, 71731

NPDES# AR0000752 ~~6~~ ERG 1/18/11 | AFIN ~~AR0000752~~ 70-00040 ERG 2/21/11

Sample Description 001 Dilution Water Soft Reconstituted

Test Temperature(°C) 25±1°C Technicians Briggs, Haughton, Zeagler, Callahan

Adults isolated: Date 1/17/11 Time: 2300

Neonates collected: Date 1/18/11 Time: 0625 Board: R149

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial# 80277924
Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0. 10.2/121.3%/RC	0. Y/25/8.0/95.8%/RC	0.	0.
1. 11.1/132.3%/RC	1. Y/25/8.2/97.6%/RC	1.	1.
2. 11.1/133.6%/RC	2. Y/25/8.1/96.7%/RC	2.	2.
3. 11.0/132.2%/RC	3. Y/25/8.0/94.9%/RC	3.	3.
4. 11.4/132.9%/RC	4. Y/20/8.2/96.6%/RC	4.	4.
5. 11.2/134.1%/RC	5. Y/25/8.1/97.0%/RC	5.	5.
6. 11.2/137.9%/RC	6. Y/25/8.0/96.2%/RC	6.	6.
7.	7.	7.	7.

Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #
1. <0.01/RC	1. No/RC	1. 1.0/RC	1. C2354 1/18/11
2. <0.01/RC	2. No/RC	2. 1.0/RC	2. C2376 1/20/11
3. <0.01/RC	3. No/RC	3. 3.0/RC	3. C2309 1/22/11

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4285 Test Dates 1/18/11-1/25/11

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100uv
A	23	22	17	9	*	X	8
B	21	X	11	7	|	X2	13
C	23	13	8	X	|	10	2
D	24	12	3	8	|	5	MO
E	21	13	9	13	|	6	7
F	30	11	13	8	|	8	8
G	X9	8	15	8	|	7	X
H	28	7	12	10	|	9	X
I	21	17	X	8	|	5	6
J	X5	12	17	X	|	5	9
Surviving Mean	23.9	12.8	11.7	8.9	|	6.9	6.6
Total Mean	20.5	11.5	10.5	7.1	|	5.7	5.3
CV%*	14.24	35.39	39.05	21.24	*	28.50	61.41

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

Key: M=male; X=dead adult

Calculated by: ESB 2/2/11

Calculations checked by: AH 2/7/11

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4285 **Test started: Date** 1/18/11 **Time** 1450
Client El Dorado Chemical **Test ended: Date** 1/25/11 **Time** 1220
RC 1/22/11 1300

Technician:	Day0 LMM	1 LMM	2 AH	3 EGB	4 RC	5 RC	6 LMM	7 RC	8
Time:	Day0 1450	1 1245	2 1310	3 1200	4 1200	5 1340	6 1105	7 1220	8
Temperature:	Day0 24.7	1 24.5	2 24.6	3 24.4	4 24.3	5 24.5	6 24.7	7 24.7	8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1	10										10	
	2	10									→	10	
	3	10										10	
	4	4	3	2	4	3	3	2	3	4	1	10	
	5	7	6	3	6	8	0	0	0	0	0	10	
	6	12	0			4	X9	X7	9	8	X4	8	dump 1/24/11
	7	0	12	18	14	6	18		16	9		8	
	8												
32	1	10										10	
	2	10									→	10	
	3	10										10	
	4	4	X0	1	3	0	1	0	2	2	1	9	
	5	6		0	0	4	0	0	0	0	0	9	
	6	0		0			6	3	0	7	4	9	
	7	12		12	9	9	4	5	5	8	7	9	
	8												
42	1	10										10	
	2	10								→	X	0	9
	3	10										0	0
	4	3	2	0	0	0	0	0	2		2	9	
	5	5	3	3	3	2	0	0	0		2	9	
	6	0				7	8	9	4		6	9	
	7	9	6	5	0	0	5	6	6		7	9	
	8												
56	1	10										10	
	2	10									→	10	
	3	10										8	
	4	0	0	0	0	0	0	0	0	0	0	10	
	5	2	3	X0	3	4	0	0	2	2	X0	8	
	6	1	1		0	1	2	4	5	3		8	
	7	6	3		5	8	6	4	3	3		8	
	8												
75	1	10										10	
	2	0									→	0	* no neonate in cup AH 1/20/11
	3	X											
	4												
	5												
	6												
	7												
	8												
100	1	10										10	
	2	10									→	10	
	3	10						⊗				10	
	4	X0	0	0	0	0	0	0	0	0	0	9	
	5		X2	3	2	2	0	0	1	0	0	8	
	6			1	0	0	6	7	4	5	5	8	
	7			6	3	4	2	0	04	40	0	8	* RC 1/25/11
	8												

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

File:Cerio2

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4285 **Test started:** Date 1/18/11 Time 1450
Client EDCC ~~Hardness Adj.~~ EGB 1/18/11 **Test ended:** Date 1/25/11 Time 1220

Technician: Day0 YHm 1 YHm 2 AH 3 EGB 4 RC (1/24/11 RC 1300) 5 RC 6 YHm 7 RC 8 ____
Time: Day0 1450 1 1245 2 1310 3 1220 4 1200 5 1340 6 1105 7 1220 8 ____
Temperature: Day0 24.7 1 24.5 2 24.6 3 24.4 4 24.3 5 24.5 6 24.7 7 24.7 8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV	1	0	—	—	—	—	—	—	—	—	—	10	
	2	0	→	→	→	→	→	X	0	→	→	9	
	3	0	—	—	—	—	—	|	6	—	—	9	
	4	0	0	0	0	2	2	0	X0	0	0	8	
	5	3	2	0	0	2	0	|	|	0	0	8	
	6	0	6	2	0	—	5	|	|	6	7	8	
	7	5	3	0	0	3	1	|	|	0	2	8	
	8												
	1												
	2												
	3												
	4												
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	5												
	6												
	7												
	8												

EGB 1/18/11 EGB

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

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4285 Test started: Date 1/18/11 Time 1050

Client El Dorado Chemical Test ended: Date 1/25/11 Time 1220

Organism C. dubia

Day/# water used	0 3/20	1	2	3	4	5 3/22	6	7	8
Concentration: Control Soft									
pH	7.9	7.9 / 8.3	7.8 / 8.0	8.2 / 7.9	7.8 / 7.9	7.8 / 7.9	7.7 / 8.0	8.0 / 8.0 R 1/25/11	
DO (mg/l)	8.1	8.1 / 8.2	8.3 / 8.5	7.9 / 8.4	8.1 / 8.4	8.0 / 8.4	7.8 / 8.2	8.2	
Cond (umhos/cm)	163.1	166.5	164.7	164.9	165.6	169.4	169.4		
Alkalinity (mg/L)	36.0					32.0			
Hardness (mg/L)	56.0					44.0			
Concentration: 32									
pH	8.1	8.0 / 8.3	8.0 / 8.1	8.2 / 8.1	7.9 / 8.1	7.8 / 8.1	7.8 / 8.2	8.1	
DO (mg/l)	8.0	8.1 / 8.1	8.2 / 8.3	7.9 / 8.3	7.9 / 8.3	7.9 / 8.3	7.8 / 8.1	8.2	
Cond (umhos/cm)	290	288	276	291	293	299	291		
Concentration: 42									
pH	8.2	8.1 / 8.3	8.1 / 8.2	8.2 / 8.2	8.0 / 8.1	7.9 / 8.1	7.9 / 8.2	8.1	
DO (mg/l)	8.0	8.1 / 8.1	8.2 / 8.2	7.8 / 8.2	7.9 / 8.3	7.9 / 8.2	7.8 / 8.1	8.2	
Cond (umhos/cm)	323	324	327	332	335	331	291		
Concentration: 56							RC 330 1/24/11		
pH	8.2	8.1 / 8.3	8.1 / 8.2	8.1 / 8.2	8.1 / 8.2	8.0 / 8.1	8.1 / 8.2	8.2	
DO (mg/l)	8.0	8.1 / 8.1	8.2 / 8.1	7.9 / 8.1	8.0 / 8.2	8.0 / 8.1	8.0 / 8.1 *	8.2	
Cond (umhos/cm)	371	376	375	391	387	387	380		
Concentration: 75							* RC 1/24/11		
pH	8.2	8.2 / 8.3	8.2 / 8.2	8.1 / 8.3	8.2	omit 1/22 LC RC			
DO (mg/l)	8.0	8.1 / 8.1	8.2 / 8.1	8.0 / 8.0	8.1				
Cond (umhos/cm)	445	451	447	465	461				
Concentration: 100									
pH	8.3	8.3 / 8.4	8.2 / 8.3	8.1 / 8.3	8.2 / 8.2	8.1 / 8.2	8.1 / 8.2	8.1	
DO (mg/l)	7.9	8.0 / 8.0	8.1 / 8.0	8.4 / 7.9	7.9 / 8.0	8.0 / 8.0	7.7 / 7.9	8.2	
Cond (umhos/cm)	546	548	555	560	563	560	550		
Tech-prerenewal	RC	[illegible]	AH	BB	RC	RC	[illegible]	RC	—
Tech-postrenewal	—	RC	RC	AH	RC	RC	RC		
Hardness (mg/l)	44.0		48.0		44.0				
Alkalinity (mg/l)	96.0		100.0		100.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4285 Test started: Date 1/18/11 Time 1450
Client EDCC Test ended: Date 1/25/11 Time 1220
Organism C. dubia

Day/# water used	0 3120	1	2	3	4	5 3122	6	7	8
Concentration: ~~Control~~ 100UV									
pH	8.1	8.2/8.3	8.2/8.2	8.1/8.2	8.1/8.1	8.0/8.1	8.0/8.2	8.2	
DO (mg/l)	7.6	7.8/7.8	7.9/7.8	8.4/7.7	7.5/7.8	7.6/7.9	7.4/7.9	7.9	
Cond (umhos/cm)	551	543	557	554	574	547	553		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	[illegible]	AH	EB	RC	RC	[illegible]	RC	—
Tech-postrenewal	—	RC	RC	AH	RC	RC	RC		
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4285 Date started: 1/18/11 Date ended 1/25/11

Client/Contact Eldorado Chemical

Address 4500 Northwest Ave., Eldorado, AR. 71731

NPDES# AR0000752 | AFIN AR0000752 EDS 2/21/11 AFIN-70-00040

Sample Description 001 Dilution Water Soft Reconstituted

Test Temperature(°C) 25±1°C Technicians Briggs, Haughton Zeagler, Callahan

Test organism age < 24 hours Vendor/ID# BAL | 11711A

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			RC/1605/0.20ml
1	EGB/0650/0.10ml	RC/1100/0.10ml	RC/1530/0.10ml
2	EGB/0715/0.10ml	AH/1100/0.10ml	RC/1510/0.10ml
3	EGB/0700/0.10ml	RC/1065/0.10ml	RC/1425/0.10ml
4	EGB/0750/0.20ml		RC/1520/0.10ml RC 1/24/11
5	RC/0900/0.10ml		RC/1520/~~0.10ml~~ 0.20ml
6	EGB/0645/0.10ml	AH/1110/0.10ml	RC/1340/0.10ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

	Effluent Initial DO(mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0.	10.2/121.3%/RC	Y/25/8.0/95.8%/RC	N/A	N/A
1.	11.1/132.3%/RC	Y/25/8.2/97.6%/RC		
2.	11.1/133.6%/RC	Y/25/8.1/96.2%/RC		
3.	11.0/132.2%/AH	Y/25/8.0/94.9%/AH		
4.	11.4/132.9%/RC	Y/20/8.2/96.6%/RC		
5.	11.2/134.1%/RC	Y/25/8.1/97.0%/RC		
6.	11.2/137.9%/RC	Y/25/8.0/96.2%/RC		

	Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech	BAL Sample #
1.	<0.01/RC	No/RC	1.0/RC	C2354 1/18/11
2.	<0.01/RC	No/RC	1.0/RC	C2376 1/20/11
3.	<0.01/RC	No/RC	3.0/RC	~~C2309~~ 1/22/11 C2409 RC 1/23/11

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4285
Client EDCC 001

Test started: Date 1/18/11 Time 1445
Test ended: Date 1/25/11 Time 0930

Technician: Day0 ECB	1 AWO	2 RC	3 AH	4 RC	5 RC	6 AH	7 RC
Time: Day0 1445	1 1045	2 1028	3 1100	4 1135	5 1145	6 1035	7 0930
Temperature Day0 25.3	1 24.5	2 25.1	3 24.2	4 24.0	6 24.3	6 24.4	7 25.0

Conc.	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	7	7	7	7
	C	8	7	7	7	7	7	6	6
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	7	7
32	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
42	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	7	7	6	6
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8 RC 1/24/11	7	7	7	7
56	A	8	8	8	8	8	8	7	7
	B	8	8	8	8	8	8	7	7
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	7	7	7	7
	E	8	8	8	8	8	8	7	7
75	A	8	8	8	8	8	8	7	7
	B	8	8	8	8	7	7	7	7
	C	8	8	8	8	8	8	8	8
	D	8	8	8	7	7	6	6	6
	E	8	8	8	8	8	8	8	8
100	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4285 | Test started: Date 1/18/11 Time 1445
Client EDCC-001 | Test ended: Date 1/25/11 Time 0920

	Day 0	1	2	3	4	5	6	7
Technician:	EGB	DBM	RC	AH	RC	RC	AH	RC
Time:	1445	1045	1025	1100	1135	1145	1035	0920
Temperature	25.3	24.5	25.1	24.2	24.0	24.3	24.4	25.0

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

DMW 1/19/11 DBM

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4285/El Dorado Test Dates 1/18/11 - 1/25/11
Oven Temperature (° Celsius) 60

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 1/20/11 Tech: LBM	Wt. of pan + larvae(g)/ Date weighed: 1/26/11 Tech: LBM	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 31	1.3423	1.3485	0.0062	8	0.775	
	B 32	1.3160	1.3201	0.0041	8	0.513	7) 0.586
	C 33	1.3216	1.3264	0.0048	8	0.600	6) 0.800
	D 34	1.3095	1.3153	0.0058	8	0.725	
	E 35	1.3095	1.3138	0.0043	8	0.538	5) 0.614
32	A 36	1.3136	1.3178	0.0042	8	0.525	
	B 37	1.3066	1.3098	0.0032	8	0.400	
	C 38	1.3239	1.3287	0.0048	8	0.600	
	D 39	1.3212	1.3266	0.0054	8	0.675	
	E 40	1.3276	1.3326	0.0050	8	0.625	
42	A 41	1.3313	1.3372	0.0059	8	0.738	
	B 42	1.3385	1.3439	0.0054	8	0.675	
	C 43	1.3325	1.3356	0.0031	8	0.388	
	D 44	1.3264	1.3314	0.0050	8	0.625	
	E 45	1.3313	1.3350	0.0037	8	0.463	
56	A 46	1.3321	1.3364	0.0043	8	0.538	
	B 47	1.3260	1.3312	0.0052	8	0.650	
	C 48	1.3281	1.3340	0.0059	8	0.738	
	D 49	1.3268	1.3312	0.0044	8	0.550	
	E 50	1.3252	1.3302	0.0050	8	0.625	
75	A 51	1.3313	1.3352	0.0039	8	0.488	
	B 52	1.3362	1.3414	0.0052	8	0.650	
	C 53	1.3188	1.3247	0.0059	8	0.738	
	D 54	1.3265	1.3312	0.0047	8	0.588	
	E 55	1.3269	1.3331	0.0062	8	0.775	
100	A 56	1.3362	1.3416	0.0054	8	0.675	
	B 57	1.3261	1.3306	0.0045	8	0.563	
	C 58	1.3208	1.3268	0.0060	8	0.750	
	D 59	1.3232	1.3287	0.0055	8	0.688	
	E 60	1.3177	1.3225	0.0048	8	0.600	

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

Calculated by: EOD 1/28/11 Calculations checked by: ToxCalc/EOD 2/8/11

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4285/El Dorado Test Dates 1/18/11 - 1/25/11

Oven Temperature (° Celsius)

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 1/20/11 Tech: LLM	Wt. of pan + larvae(g)/ Date weighed: 1/26/11 Tech: LLM	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
100 UV	A 61	1.3127	1.3185	0.0058	8	0.725	
	B 62	1.3140	1.3180	0.0040	8	0.500	
	C 63	1.3218	1.3287	0.0069	8	0.863	
	D 64	1.3112	1.3164	0.0052	8	0.650	
	E 65	1.3064	1.3117	0.0053	8	0.663	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

Check 1/20/11 LLM

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

Calculated by: EOB 1/28/11 Calculations checked by: 10xCalc EOB 2/8/11

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4285 Test started: Date 1/18/11 Time 1445
Client EDCC-001 Test ended: Date 1/25/11 Time 0920
Organism P. promelas

Day/# water used	03120	1	2	3	4 RC 1/23/11 3122	5 3122	6	7	8
Concentration: Control									
pH	7.9	7.6 / 8.3	7.5 / 8.0	7.4 / 8.2	7.4 / 7.9	7.4 / 7.9	7.3 / 8.0	7.6	
DO (mg/l)	8.1	6.0 / 8.2	4.8 / 8.5	5.1 / 7.8	5.0 / 8.4	5.4 / 8.4	5.5 / 8.2	6.6	
Cond (umhos/cm)	165.1	166.5	164.7	164.9	165.6	169.4	169.4		
Alkalinity (mg/L)	316.0					32.0			
Hardness (mg/L)	96.0					44.0			
Concentration: 32									
pH	8.1	7.6 / 8.3	7.4 / 8.1	7.4 / 8.1	7.3 / 8.1	7.2 / 8.1	7.4 / 8.2	7.5	
DO (mg/l)	8.0	6.0 / 8.1	5.4 / 8.3	5.0 / 8.3	4.9 / 8.3	5.0 / 8.3	5.8 / 8.1	6.7	
Cond (umhos/cm)	290	288	276	291	293	299	291		
Concentration: 42									
pH	8.2	7.6 / 8.3	7.5 / 8.2	7.4 / 8.2	7.3 / 8.1	7.2 / 8.1	7.5 / 8.2	7.6	
DO (mg/l)	8.0	6.1 / 8.1	5.5 / 8.2	5.1 / 8.2	5.0 / 8.3	5.0 / 8.2	6.0 / 8.1	6.6	
Cond (umhos/cm)	323	324	327	332	335	331	330		
Concentration: 56									
pH	8.2	7.8 / 8.3	7.5 / 8.2	7.5 / 8.2	7.4 / 8.2	7.3 / 8.1	7.5 / 8.2	7.6	
DO (mg/l)	8.0	6.4 / 8.1	5.6 / 8.1	5.1 / 8.1	5.0 / 8.2	5.1 / 8.1	5.9 / 8.0	6.1	
Cond (umhos/cm)	371	376	375	391	387	387	380		
Concentration: 75									
pH	8.2	7.9 / 8.3	7.6 / 8.2	7.5 / 8.3	7.6 / 8.2	7.6 / 8.2	7.6 / 8.3	7.6	
DO (mg/l)	8.0	6.4 / 8.1	5.7 / 8.1	5.1 / 8.0	5.0 / 8.1	5.1 / 8.1	5.9 / 8.0	6.2	
Cond (umhos/cm)	445	451	447	465	461	460	450		
Concentration: 100									
pH	8.3	8.0 / 8.4	7.7 / 8.3	7.6 / 8.3	7.6 / 8.2	7.6 / 8.2	7.6 / 8.2	7.7	
DO (mg/l)	7.9	6.4 / 8.0	5.8 / 8.0	5.1 / 7.9	5.0 / 8.0	5.0 / 8.0	5.9 / 7.9	6.5	
Cond (umhos/cm)	546	548	555	560	563	560	550		
Tech-prerenewal	RC	RC	AH	AH	RC	RC	AH	RC	
Tech-postrenewal		RC	RC	AH	RC	RC	RC	1/25/11 RC RC	
Hardness (mg/l)	44.0		48.0		44.0				
Alkalinity (mg/l)	96.0		100.0		100.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4285 Test started: Date 1/18/11 Time 1445
Client EDCC-001 Test ended: Date 1/25/11 Time 0920
Organism P. promelas

Day/# water used	0 3120	1	2	3	4	5 3122	6	7	8
Concentration: ~~Control~~ 100%V									
pH	8.1	7.9/8.3	7.8/8.2	7.7/8.2	7.8/8.1	7.6/8.1	7.7/8.2	7.9	
DO(mg/l)	7.6	6.1/7.8	5.9/7.8	5.0/7.7	5.2/7.8	5.1/7.9	5.8/7.9	6.7	
Cond(umhos/cm)	551	543	557	554	574	547	553		
Alkalinity(mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Tech-prerenewal	RC	RC	AH	AH	RC	RC	AH	RC	
Tech-postrenewal	—	RC	RC	AH	RC	RC	RC		
Hardness(mg/l)									
Alkalinity(mg/l)									

Only 1/18/11 RC

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 1/4/11 **Date end:** 1/6/11

Test organism: C. dubia

Age: ~~48~~ <24h (AH 1/4/11)

Source and ID#: BAL/ Ri2^{S}-Ri2

Dilution Water used: Type: MH * **Jug #:** 3115

Reference Toxicant: NaCl + **Units:** 100 g/L ____ ug/L

Manufacturer: ACROS **Lot:** B0130290

48-hour LC_{50}: 1.30 g/L **Statistical Method:** TSK ^

Upper and Lower CUSUM Chart Control Limits: 1.75 - 1.01

Test Number (for the year): 1

We verify that this data is true and correct:

Technician: Anne Haughton

Statistician: Erin D. Briggs

Quality Control Officer: Erin D. Briggs

*MH- Moderately hard
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

File: Ref Tox Cover

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

Project# _____

Client Ref Tox

Sample Description 1000g/L NaCl

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

Time: Ohour 1345 24hour 1245 48hour 1435 72hour ___ 96hour ___

Temperature (°C): Ohour 24.9 24hour 25 48hour 24.7 72hour ___ 96hour ___

Test started: Date 1/4/11 Time 1345

Test ended: Date 1/6/11 Time 1435

Test Species C. dubia ID# BAL/R12S/R12

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		5	5	5			7.8		8.0			8.1		8.1			316		357		
	B		5	5	5																	
	C		5	5	5																	
	D		5	5	5																	
1	A		5	4	4			7.7		8.0			8.1		8.1			2460		2870		
	B		5	4	4																	
	C		5	5	6																	
	D		5	5	4																	
2	A		5	2	0			7.7		8.0			8.1		8.1			4350		4990		
	B		5	3	0																	
	C		5	4	0																	
	D		5	3	0																	
Chemistry Tech prerenewal/postrenewal								AH		AH			AH		AH			AH		AH		

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

Project# _____

Client Ref Tox

Sample Description 100g/L NaCl

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

Time: Ohour 1345 24hour 1345 48hour 1435 72hour ____ 96hour ____

Temperature (°C): Ohour 24.9 24hour 25 48hour 24.7 72hour ____ 96hour ____

Test started: Date 1/4/11 Time 1345

Test ended: Date 1/6/~~10~~ 11 AH 1/6/11 Time 1435

Test Species C. dubia ID# BAL/R12S/R12

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
3	A		5	2	0			7.7		7.9			8.0		8.1			1613		1776		
	B		5	1	0																	
	C		5	1	0																	
	D		5	1	0																	
4	A		5	0				7.7	7.9				8.0	7.9				8154	8210			
	B		5	0																		
	C		5	0																		
	D		5	0																		
5	A		5	0				7.8	7.9				8.0	8.0				10010	9850			
	B		5	0																		
	C		5	0																		
	D		5	0																		
Chemistry Tech prerenewal/postrenewal								AH	AH	AH			AH	AH	AH			AH	AH	AH		

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BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 1/7/11 **Date end:** 1/9/11

Test organism: P. promelas

Age: ~2 days

Source and ID#: BAL

Dilution Water used: Type: MH * **Jug #:** 3115

Reference Toxicant: 100 ppt NaCl + **Units:** ✓ g/L ____ ug/L

Manufacturer: Acros **Lot:** B0130290

48-hour LC_{50}: 6.59 g/L **Statistical Method:** P ^

Upper and Lower CUSUM Chart Control Limits: 7.91 - 4.02

Test Number (for the year): 1

We verify that this data is true and correct:

Technician: Erin M. Bruce

Statistician: Erin M. Bruce

Quality Control Officer: Erin M. Bruce

*MH- Moderately hard
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

File: Ref Tox Cover

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

Project# —

Client Ref. Tox.

Sample Description NaCl

Test started: Date 1/7/11 Time 0925

Test ended: Date 1/9/11 Time 0845

Test Species P. promelas ID# 1511

Technician:	Ohour EGB	24hour EGB	48hour EGB	72hour ____ 96hour ____
Time:	Ohour 0925	24hour 0920	48hour 0845	72hour ____ 96hour ____
Temperature (°C):	Ohour 24.4	24hour 24.5	48hour 24.6	72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	N/A	10	10	10			8.1	—	7.1			8.1	—	8.0			306	—	390		
	B		10	10	10																	
5	A		10	10	9			8.1	—	6.9			7.9	—	7.9			9959	—	12010		
	B		10	10	10																	
7	A		10	9	5			8.1	—	7.0			7.9	—	7.8			14419	—	16920 EGB 16940 1/9/11		
	B		10	10	3																	
9	A		10	6	0			7.9	—	7.1			7.9	—	7.8			16940	—	19710		
	B		10	7	0																	
11	A		10	0				7.9	6.9				8.1	7.6				20209	22200			
	B		10	0																		
13	A		10	0				7.9	6.6				8.2	7.6				24600	26900			
	B		10	0																		
Chemistry Tech prerenewal/postrenewal								EGB	EGB	EGB			EGB	EGB	EGB			EGB	EGB	EGB		

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APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	1/18/2011	Test ID:	X4285CD	Sample ID:	1
End Date:	1/25/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/18/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

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

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical
D-Control	0.8000	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

 Reviewed by EJR 2/9/11

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 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/18/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	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	

			Transform: Untransformed						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 Treatments vs D-Control	4.37512	0.18325	330.389	13.1376	6.9E-12	5, 44

Reviewed by: ESB 3/9/11

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 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/18/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	23.000	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: Untransformed					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

ToxCalc v5.0.23

Reviewed by: EAB 5/9/11

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 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/18/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	23.000	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: Untransformed					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 Treatments vs D-Control	5.50456	0.26852	323.36	28.9741	2.1E-07	5, 54

Reviewed by: 9/11

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 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/18/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	23.000	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

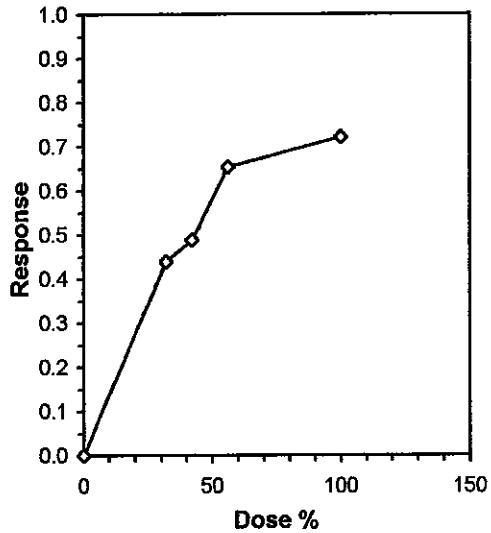
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	20.500	1.0000	20.5000	5.0000	30.0000	37.942	10	20.500	1.0000
32	11.500	0.5610	11.5000	0.0000	22.0000	51.075	10	11.500	0.5610
42	10.500	0.5122	10.5000	0.0000	17.0000	53.922	10	10.500	0.5122
56	7.100	0.3463	7.1000	0.0000	13.0000	57.672	10	7.100	0.3463
100	5.700	0.2780	5.7000	0.0000	10.0000	53.629	10	5.700	0.2780
100UV	5.300	0.2585	5.3000	0.0000	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 (200 Resamples)

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
IC25*	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



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Reviewed by: 2/11/11

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	1/18/2011	Test ID:	X4285pp	Sample ID:	1
End Date:	1/25/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/17/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

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

			Transform: Arcsin Square 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				

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	1/18/2011	Test ID:	X4285pp	Sample ID:	1
End Date:	1/25/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/17/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales 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: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.6300	1.0000	0.6300	0.5125	0.7750	18.325	5			
32	0.5650	0.8968	0.5650	0.4000	0.6750	18.929	5	0.927	2.443	0.1713
45	0.5775	0.9167	0.5775	0.3875	0.7375	25.492	5	0.749	2.443	0.1713
56	0.6200	0.9841	0.6200	0.5375	0.7375	13.113	5	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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96241	0.94	-0.1586	-0.9329
Bartlett's Test indicates equal variances (p = 0.92)	2.62301	18.4753		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences Treatments vs D-Control	0.17128	0.27188	0.0109	0.01229	0.52822	7, 32

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Reviewed by: 2/9/11

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	1/18/2011	Test ID:	X4285pp	Sample ID:	1
End Date:	1/25/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/17/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

Comments:

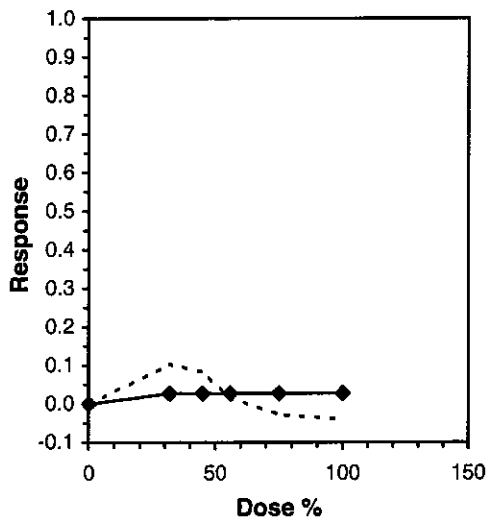
Conc-%	1	2	3	4	5
D-Control	0.7750	0.5125	0.6000	0.7250	0.5375
32	0.5250	0.4000	0.6000	0.6750	0.6250
45	0.7375	0.6750	0.3875	0.6250	0.4625
56	0.5375	0.6500	0.7375	0.5500	0.6250
75	0.4875	0.6500	0.7375	0.5875	0.7750
100	0.6750	0.5625	0.7500	0.6875	0.6000
100UV	0.7250	0.5000	0.8625	0.6500	0.6625
0-SN	0.7750	0.5857	0.8000	0.7250	0.6143

			Transform: Untransformed					Isotonic	
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	5	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	5	0.6130	0.9730
56	0.6200	0.9841	0.6200	0.5375	0.7375	13.113	5	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 Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96241	0.94	-0.1586	-0.9329
Bartlett's Test indicates equal variances (p = 0.92)	2.62301	18.4753		

Linear Interpolation (200 Resamples)

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



ToxCalc v5.0.23

Reviewed by: 2/9/11

Daphnid Acute Test-48 Hr Survival

Start Date:	1/4/2011	Test ID:	1411cd	Sample ID:	REF-Ref Toxicant
End Date:	1/6/2011	Lab ID:	NELAP 01975	Sample Type:	NACL-Sodium chloride
Sample Date:	1/4/2011	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

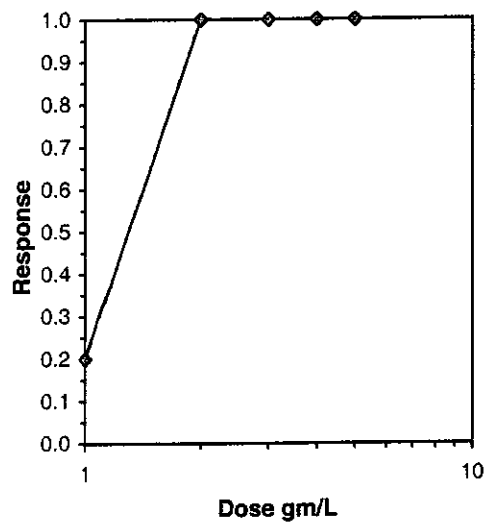
Conc-gm/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
1	0.8000	0.8000	0.8000	0.8000
2	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/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

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

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%			
20.0%	1.2968	1.1771	1.4288
Auto-20.0%	1.2968	1.1771	1.4288



Reviewed by: EVB 1/10/11

Acute Fish Test-48 Hr Survival

Start Date:	1/7/2011	Test ID:	1711pp	Sample ID:	REF-Ref Toxicant
End Date:	1/9/2011	Lab ID:	NELAP 01975	Sample Type:	NACL-Sodium chloride
Sample Date:	1/7/2011	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

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
11	0.0000	0.0000
13	0.0000	0.0000

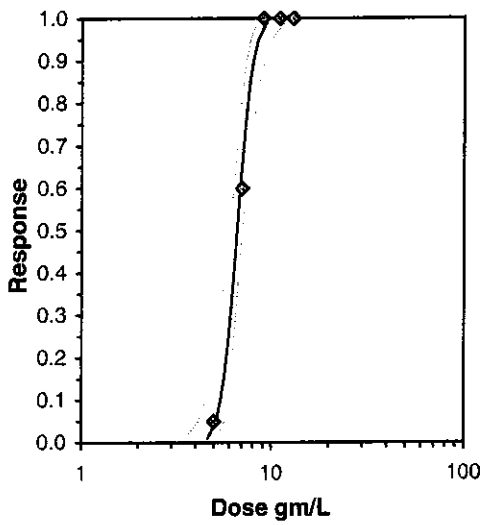
			Transform: Arcsin Square Root					Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
5	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
7	0.4000	0.4000	0.6825	0.5796	0.7854	21.317	2	12	20
9	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
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											

Point	Probits	gm/L	95% Fiducial Limits	
EC01	2.674	4.64061	3.53542	5.25765
EC05	3.355	5.14353	4.17814	5.68628
EC10	3.718	5.43355	4.56064	5.93747
EC15	3.964	5.63841	4.83369	6.11904
EC20	4.158	5.80672	5.05833	6.27222
EC25	4.326	5.95511	5.25548	6.4114
EC40	4.747	6.34607	5.76181	6.80564
EC50	5.000	6.59352	6.06378	7.08443
EC60	5.253	6.85061	6.35539	7.40504
EC75	5.674	7.30036	6.80737	8.04548
EC80	5.842	7.48692	6.97617	8.33781
EC85	6.036	7.71041	7.16744	8.70506
EC90	6.282	8.00111	7.4025	9.20642
EC95	6.645	8.45226	7.74578	10.0281
EC99	7.326	9.36827	8.39466	11.8266



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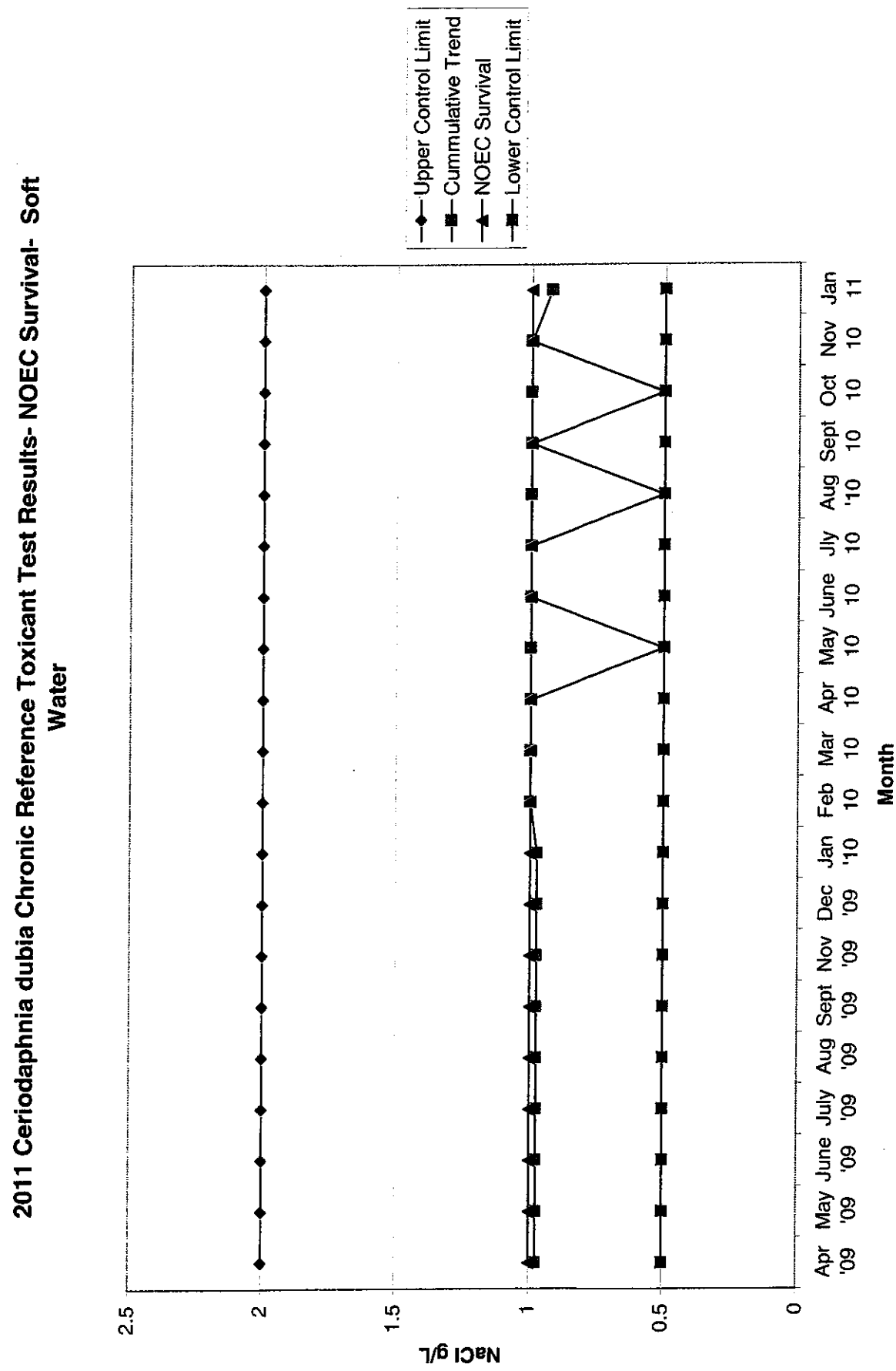
Reviewed by: 1/10/11

APPENDIX D
QUALITY ASSURANCE CHARTS

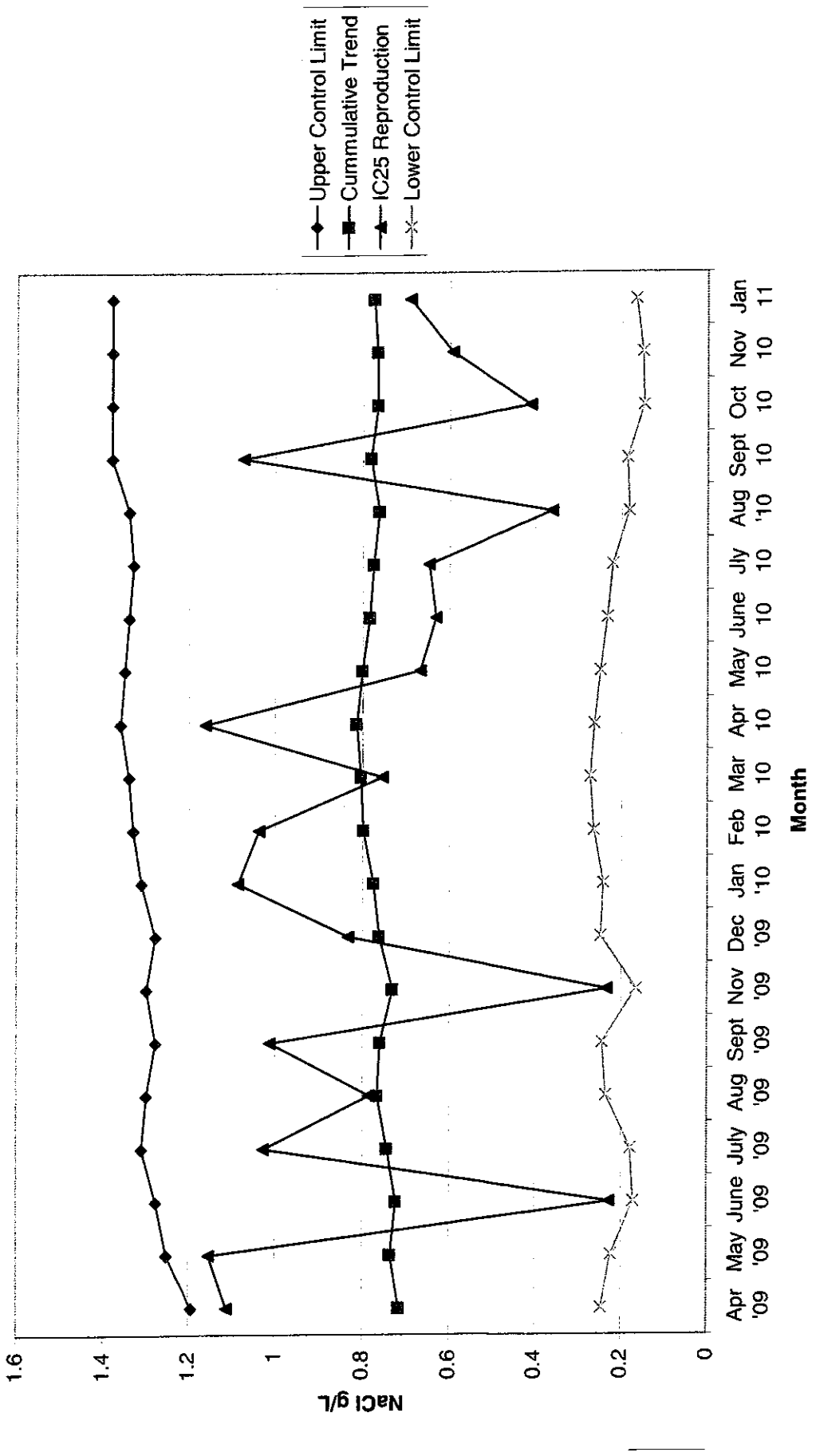
Bio-Analytical Laboratories' 2011 Results of the Monthly Chronic Reference Toxicant Tests

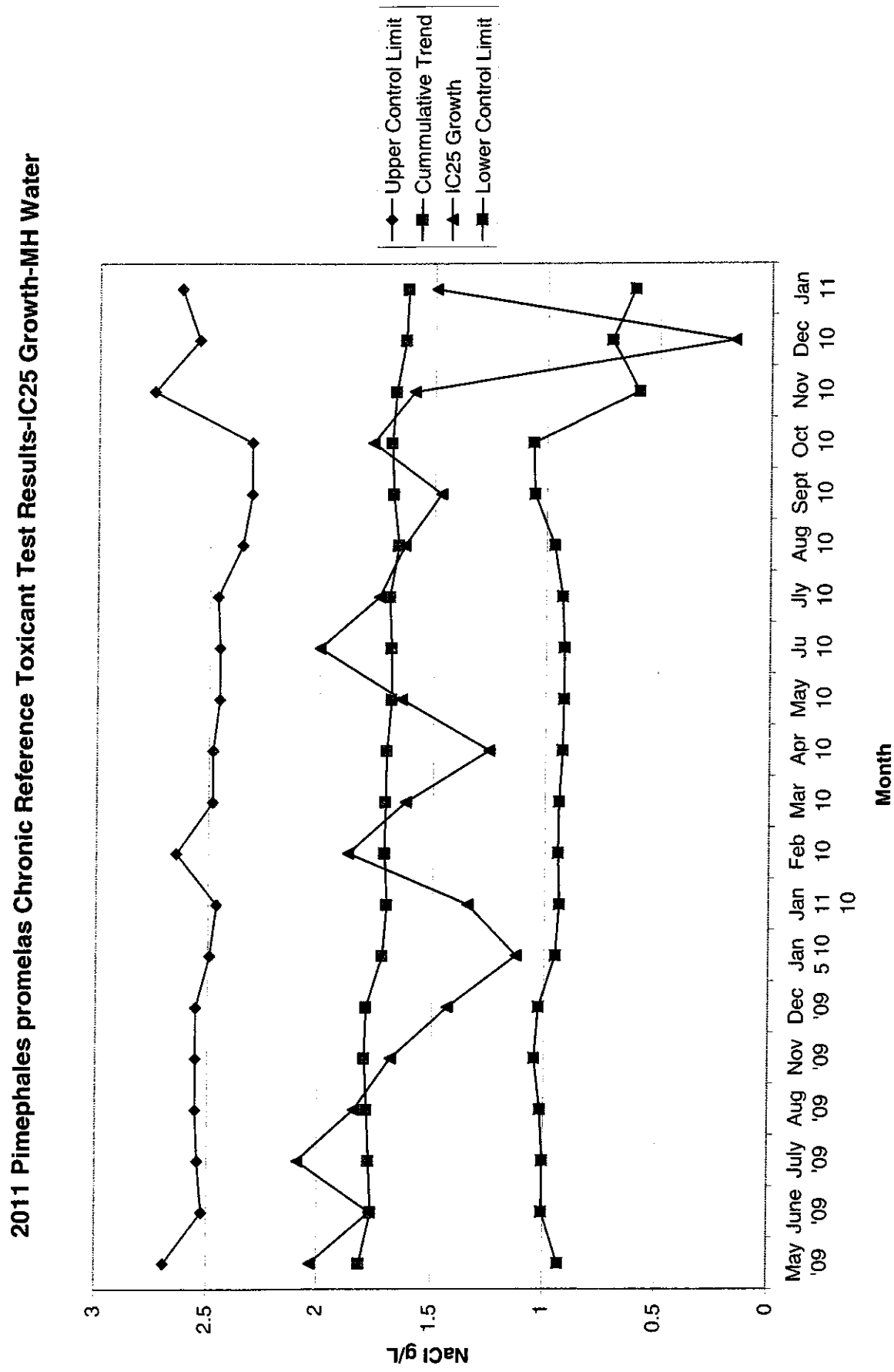
Month Start-End	**Jan 1/7-1/14 13:45-13:10**											
***Ceriodaphnia dubia* (in soft reconstituted water)**												
NOEC survival	1.0											
IC25 repro.	0.6913											
PMSD repro.	21.9											
Avg. repro. control	20.7											
Fathead minnow												
Month Start-End	**Jan 1/4-1/11 11:15-13:00**											
NOEC survival	1.25											
IC25 growth	1.4953											
PMSD growth	20.2											
Avg. growth control	0.850											

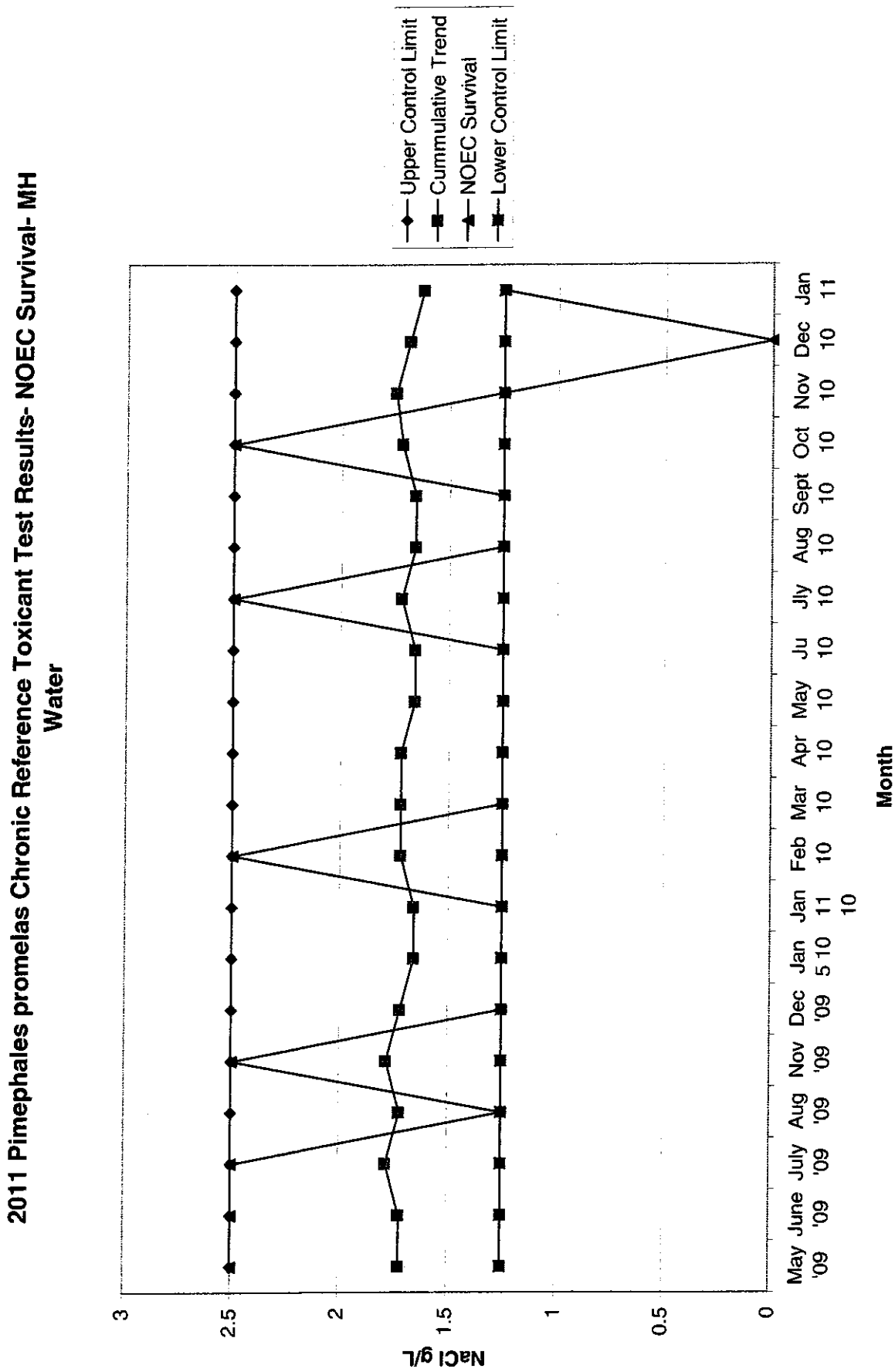
Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.
+Test invalid. Not enough time left in the month to conduct a retest.

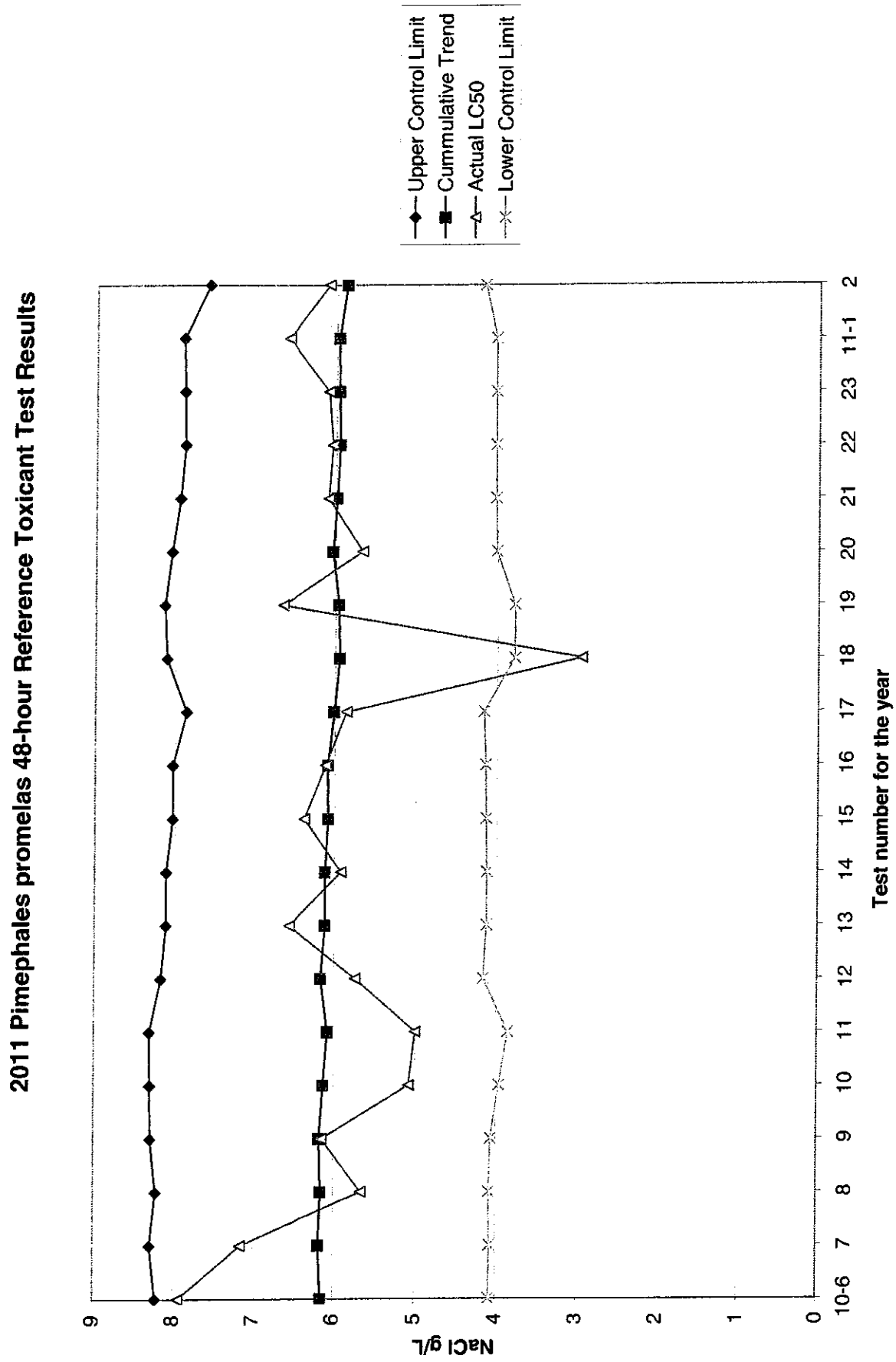

2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft Water
Upper Control Limit
Cummulative Trend
NOEC Survival
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
Apr '09
May '09
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Jan 11
Month

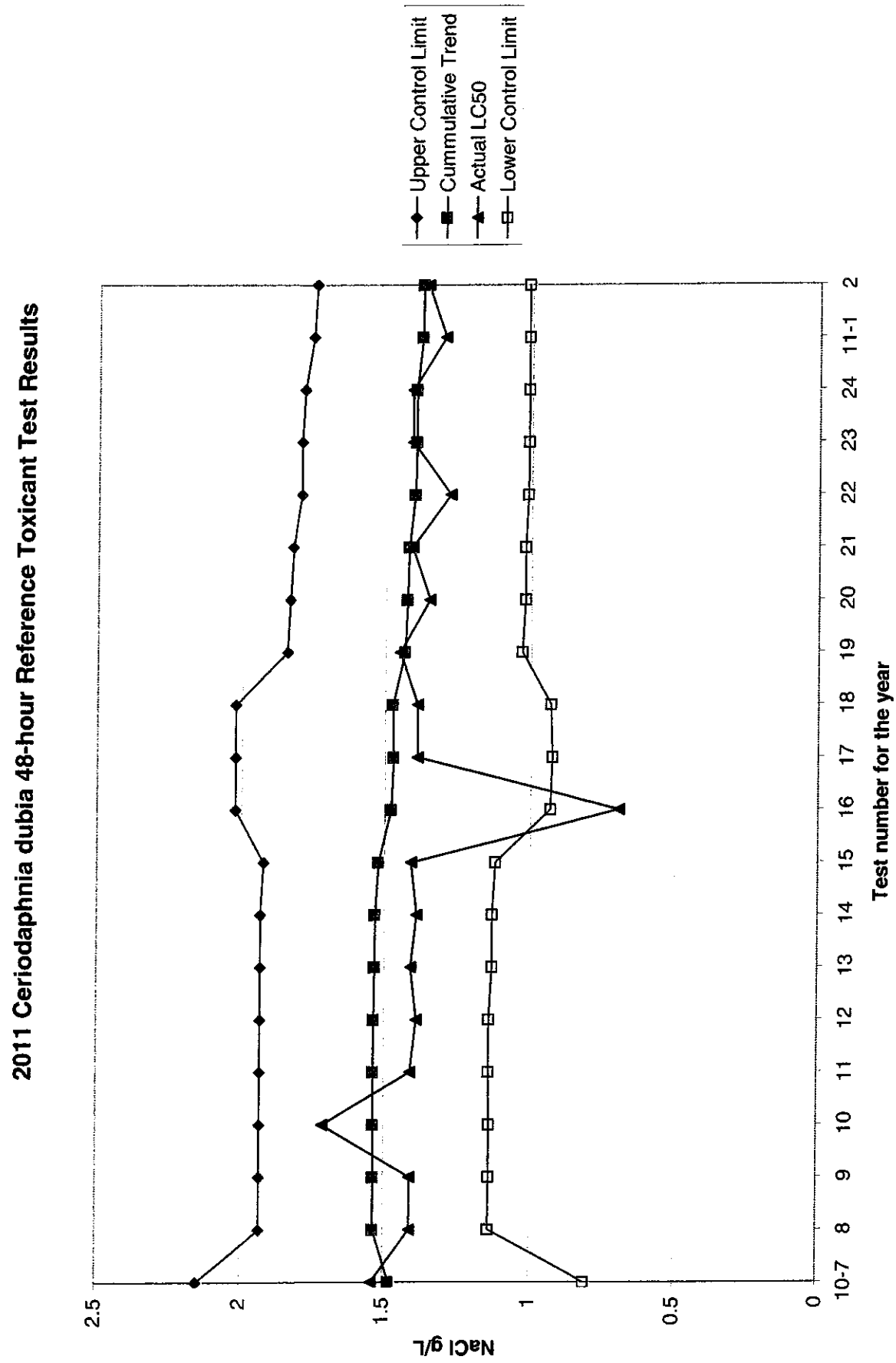
2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results-IC25 Reproduction- Soft Water




2011 Pimephales promelas Chronic Reference Toxicant Test Results-IC25 Growth-MH Water
Upper Control Limit
Cummulative Trend
IC25 Growth
Lower Control Limit
NaCl g/L
3
2.5
2
1.5
1
0.5
0
May '09
June '09
July '09
Aug '09
Nov '09
Dec '09
Jan 10
Jan 10
Feb 10
Mar 10
Apr 10
May 10
Ju 10
Jly 10
Aug 10
Sept 10
Oct 10
Nov 10
Dec 10
Jan 11
Month


2011 Pimephales promelas Chronic Reference Toxicant Test Results- NOEC Survival- MH
Water
Upper Control Limit
Cummulative Trend
NOEC Survival
Lower Control Limit
NaCl g/L
3
2.5
2
1.5
1
0.5
0
May '09
June '09
July '09
Aug '09
Nov '09
Dec '09
Jan 10
Jan 10
Feb 10
Mar 10
Apr 10
May 10
Ju 10
Jly 10
Aug 10
Sept 10
Oct 10
Nov 10
Dec 10
Jan 11
Month


2011 Pimephales promelas 48-hour Reference Toxicant Test Results
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit
NaCl g/L
0
1
2
3
4
5
6
7
8
9
10-6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
11-1
2
Test number for the year


2011 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
10-7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
11-1
2
Test number for the year

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

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

	Time	Date	Time	Date
Composite 1 Collected From	**0700**	**1/16/11 To**	**0700**	**1/17/11**
Composite 2 Collected From	**0740**	**1/18/11 To**	**0740**	**1/19/11**
Composite 3 Collected From	**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: **Receiving** X **Reconstituted**

PERCENT SURVIVAL

Time of Reading	Percent 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
C	23	13	8	D	+	10
D	24	12	3	8	+	5
E	21	13	9	13	+	6
F	30	11	13	8	+	8
G	D9	8	15	8	+	7
H	28	7	12	10	+	9
I	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%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: El Dorado Chemical - Outfall 001
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Briggs, Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 1/17/11 Time: 0700
Sample No. 2 Collected: Date: 1/19/11 Time: 0740
Sample No. 3 Collected: Date: 1/21/11 Time: 0730
Test Begin: Date: 1/18/11 Time: 1450
Test End: Date: 1/25/11 Time: 1220

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.5	8.4	8.4	8.4	8.2		
pH Initial	7.9	7.8	8.2	7.8	7.8	7.7	8.0	
pH Final	8.3	8.0	7.9	7.9	7.9	8.0		
Alkalinity	36.0				32.0			
Hardness	56.0				44.0			
Conductivity	166.5	164.7	164.9	165.6	169.4	169.4		
Chlorine	<.01				<.01			

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.6	24.4	24.3	24.5	24.7	24.7	
DO Initial	8.1	8.2	7.9	8.0	8.0	7.7	8.2	
DO Final	8.1	8.1	8.1	8.2	8.1	8.0		
pH Initial	8.1	8.1	8.1	8.1	8.0	8.2	8.2	
pH Final	8.1	8.1	8.1	8.2	8.1	8.0		
Alkalinity								
Hardness								
Conductivity	376	375	391	387	387	380		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.3	8.3	8.3	8.3	8.1		
pH Initial	8.0	8.0	8.2	7.9	7.8	7.8	8.1	
pH Final	8.3	8.1	8.1	8.1	8.1	8.2		
Alkalinity								
Hardness								
Conductivity	288	276	291	293	299	291		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.6	24.4	24.3	24.5	24.7	24.7	
DO Initial	8.0	8.1	8.4	7.9	8.0	7.7	8.2	
DO Final	8.0	8.0	7.9	8.0	8.0	7.9		
pH Initial	8.3	8.2	8.1	8.2	8.1	8.1	8.1	
pH Final	8.4	8.3	8.3	8.2	8.2	8.2		
Alkalinity	96.0	100.0		100.0				
Hardness	44.0	48.0		44.0				
Conductivity	548	555	560	563	560	550		
Chlorine	<.01	<.01		<.01				

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	24.6	24.4	24.3	24.5	24.7	24.7	
DO Initial	8.1	8.2	7.8	7.9	7.9	7.8	8.2	
DO Final	8.1	8.2	8.2	8.3	8.2	8.1		
pH Initial	8.1	8.1	8.2	8.0	7.9	7.9	8.1	
pH Final	8.3	8.2	8.2	8.1	8.1	8.2		
Alkalinity								
Hardness								
Conductivity	324	327	332	335	331	350		
Chlorine								

Dilution:

Day	1	2	3	4	5	6	7	Comments
Temp (C)								
DO Initial								
DO Final								
pH Initial								
pH Final								
Alkalinity								
Hardness								
Conductivity								
Chlorine								

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

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

	Time	Date	Time	Date
Composite 1 Collected from:	**0700**	**1/16/11 To**	**0700**	**1/17/11**
Composite 2 Collected from:	**0740**	**1/18/11 To**	**0740**	**1/19/11**
Composite 3 Collected from:	**0730**	**1/20/11 To**	**0730**	**1/21/11**

Test initiated:	1445	**am/pm**	1/18/11	**date**
Test terminated:	0920	**am/pm**	1/25/11	**date**
Dilution water used:		**Receiving**	**X**	**Reconstituted**

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	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. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
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 corresponding to:

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

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

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

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

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 0
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #TEP6C.
6. Enter response to item 4 on DMR Form, parameter #TFP6C.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

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

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: El Dorado Chemical - Outfall 001
NPDES No.: AR0000752/ AFIN 70-00040
Contact: David Sartain
Analyst: Briggs, Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 1/17/11 Time: 0700
Sample No. 2 Collected: Date: 1/19/11 Time: 0740
Sample No. 3 Collected: Date: 1/21/11 Time: 0730
Test Begin: Date: 1/18/11 Time: 1445
Test End: Date: 1/25/11 Time: 0920

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.5	8.4	8.4	8.4	8.2		
pH Initial	7.6	7.5	7.4	7.4	7.4	7.3	7.6	
pH Final	8.3	8.0	7.9	7.9	7.9	8.0		
Alkalinity	36.0				32.0			
Hardness	56.0				44.0			
Conductivity	166.5	164.7	164.9	165.6	169.4	169.4		
Chlorine	<.01				<.01			

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	25.1	24.2	24.0	24.3	24.4	25.0	
DO Initial	6.4	5.6	5.1	5.0	5.1	5.9	6.1	
DO Final	8.1	8.1	8.1	8.2	8.1	8.0		
pH Initial	7.8	7.5	7.5	7.4	7.3	7.5	7.6	
pH Final	8.3	8.2	8.2	8.2	8.1	8.2		
Alkalinity								
Hardness								
Conductivity	376	375	391	387	387	380		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.3	8.3	8.3	8.3	8.1		
pH Initial	7.6	7.4	7.4	7.3	7.2	7.4	7.5	
pH Final	8.3	8.1	8.1	8.1	8.1	8.2		
Alkalinity								
Hardness								
Conductivity	324	327	332	335	331	330		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	25.1	24.2	24.0	24.3	24.4	25.0	
DO Initial	6.4	5.7	5.1	5.0	5.1	5.9	6.2	
DO Final	8.1	8.1	8.0	8.1	8.1	8.0		
pH Initial	7.9	7.6	7.5	7.6	7.6	7.6	7.6	
pH Final	8.3	8.2	8.3	8.2	8.2	8.3		
Alkalinity								
Hardness								
Conductivity	451	447	465	461	460	450		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	25.1	24.2	24.0	24.3	24.4	25.0	
DO Initial	6.1	5.5	5.1	5.0	5.0	6.0	6.6	
DO Final	8.1	8.2	8.2	8.3	8.2	8.1		
pH Initial	7.6	7.5	7.4	7.3	7.2	7.5	7.6	
pH Final	8.3	8.2	8.2	8.1	8.1	8.2		
Alkalinity								
Hardness								
Conductivity	324	327	332	335	331	330		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.5	25.1	24.2	24.0	24.3	24.4	25.0	
DO Initial	6.6	5.8	5.1	5.0	5.0	5.9	6.5	
DO Final	8.0	8.0	7.9	8.0	8.0	7.9		
pH Initial	8.0	7.7	7.6	7.6	7.6	7.6	7.7	
pH Final	8.4	8.3	8.3	8.2	8.2	8.2		
Alkalinity	96.0	100.0		100.0				
Hardness	44.0	48.0		44.0				
Conductivity	548	555	560	563	560	550		
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

Client: El Dorado Chemical

Project#: X4285

Proofed First Draft: _____ **Date:** _____

Proofed Final Draft: Erin L. Bruppo **Date:** 2/22/11

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.

Erin L. Bruppo, BS **Date:** 2/22/11

Quality Assurance Officer

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
Test Dates: February 8 - 15, 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 - 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 TQP6C - 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

BAL
ADEQ #88-0630
Project X4310

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X4310

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 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. 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^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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_{25} value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC_{50} 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.

BAL
ADEQ #88-0630
Project X4310

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		19.9	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	*

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

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	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	

*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.

BAL
ADEQ #88-0630
Project X4310

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.

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

Test Organisms	Date Started-Date Ended Time Started-Time Ended	LC_{50}	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

+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.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
3240 Spurgin Road
Doyline, LA 71023
(318) 745-2772, Fax (318) 745-2773
bioanalytical@att.net NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Temperature upon arrival: 1.2
Thermometer #: 29
Tech: RC
Date: 2/7/11

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:								Lab Control Number:	Project Number: X4310
Address: 4500 Northwest Avenue, El Dorado, AR 71731	Fax: (870) 863-1499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform		Temp. upon arrival:
Permit #: AR0000752	Purchase Order:										
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC											Preservative: (below)

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
2-6-11 / 2-7-11	0730AM - 0730AM	X		8	001	X	X							C2551	ice

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: David Sartain / EDCC	2-7-11	0945	Received by/Affiliation:	2-7-11	0945
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 2-7-11	Time: 1140	Received by/Affiliation: R Callahan	Date: 2/7/11	Time: 1140

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

Bio-Analytical Laboratories
3240 Spurgin Road
Doyline, LA 71023
(318) 745-2772, Fax (318) 745-2773
bioanalytical@att.net
NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company
Phone: (870) 863-1484
Address: 4500 Northwest Avenue, El Dorado, AR 71731
Fax: (870) 863-1499
Permit #: AR0000752
Purchase Order:
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
2-8-11 / 2-9-11	0715 - 0715	X		8	001	X	X							C2504	ice

Project Number: X4310
Temp. upon arrival:

Temperature upon arrival: 0.8°C
Thermometer #: 29
Tech: BJM
Date: 2/9/11

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain / EDCC	2-9-11	0845		2-9-11	0845
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
	2-9-11	1045			

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

Bio-Analytical Laboratories
3240 Spurgin Road
Doyline, LA 71023
(318) 745-2772, Fax (318) 745-2773
bioanalytical@att.net **NELAP 01975, ADEQ #88-0630, EPA LA00917**

CHAIN OF CUSTODY

Laboratory Use Only:

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

Address: 4500 Northwest Avenue, El Dorado, AR 71731 **Fax:** (870) 863-1499

Permit #: AR0000752 **Purchase Order:**

Sampler's Signature/Printed Name/Affiliation: David Sartain /EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Project Number: X4310 / Temp. upon arrival: / Preservative: (below)
2-10-11 / 2-11-11	0745am / 0745am	X		8	001	X	X							C2583	ice

Temperature upon arrival: 1.3°C
Thermometer #: 29
Tech: [illegible]
Date: 2/11/11

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: David Sartain /EDCC	2-11-11	0900	**Received by/Affiliation:** [signature]	2-11-11	0908
Relinquished by/Affiliation:			**Received by/Affiliation:**		
Relinquished by/Affiliation: [signature]	2-11-11	1125	**Received by/Affiliation:** [signature]	2/11/11	1125

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4310 Date start: 2/8/11 Date end: 2/15/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave., El Dorado, AR 71731

NPDES# AR0000752 / AFIN 70-00040

Sample Description 001 Dilution Water soft reconstituted

Test Temperature (°C) 25±1°C Technicians Briggs, Haughton, Zoogler, Gallahan

Adults isolated: Date 2/7/11 Time: 2300

Neonates collected: Date 2/8/11 Time: 0630 Board: R1-S

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089

pH Meter: Model Orion 230A+ Serial #020273

Conductivity Meter: Model Control Company Serial# 80277924

Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

	Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0.	10.4/122.9%/BBm	Y/15/8.1/95.5%/BBm		
1.	10.4/125.1%/BBm	Y/15/8.1/96.5%/BBm		
2.	11.2/129.5%/RC	Y/15/8.1/95.3%/RC		
3.	10.3/125.5%/AH	Y/15/8.0/95.4%/RC		
4.	10.9/127.1%/BBm	Y/15/8.2/96.6%/BBm		
5.	10.8/129.3%/BBm	Y/15/8.0/95.8%/BBm		
6.	11.1/131.9%/RC	Y/15/8.1/96.4%/RC		
7.				

	Total Residual Chlorine (mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	Date
1.	<0.01/BBm	NO/BBm	3.0/BBm	C2551	2/8/11
2.	<0.01/RC	No/RC	3.0/RC	C2564	2/10/11
3.	<0.01/BBm	NO/BBm	1.0/BBm	C2583	2/12/11

Comments:

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

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4310 Test Dates 2/8/11 - 2/15/11

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	UV trd 100
A	19	15	15	16	11	7	X
B	20	20	17	12	12	13	8
C	24	21	24	15	14	14	~~3~~ 13
D	17	18	11	14	13	9	11
E	24	18	17	13	9	12	16
F	17	15	13	13	7	15	14
G	20	18	14	14	18	15	13
H	19	13	13	17	13	10	2
I	16	17	12	19	13	13	12
J	23 ~~22~~	18	8	14	10	14	7
Surviving Mean	19.9	17.3	14.4	14.7	12.0	12.2	10.7
Total Mean	19.9	17.3	14.4	14.7	12.0	12.2	9.6
CV%*	14.69	13.91	30.04	14.36	25.15	22.13	40.32

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

Key: M=male; X=dead adult

Calculated by: RC 2/15/11

Calculations checked by: AH 2/16/11

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4310 Test started: Date 2/8/11 Time 1235
Client El Dorado Chemical Test ended: Date 2/15/11 Time 1025

Technician:	Day0 [illegible]	1 [illegible]	2 AH	3 [illegible]	4 [illegible]	5 [illegible]	6 AH	7 RC	8	
Time:	Day0 1235	1 1035	2 1015	3 0920	4 1240	5 1235	6 0955	7 1025	8	
Temperature:	Day0 24.3	1 24.8	2 24.5	3 24.3	4 24.4	5 24.7	6 24.5	7 25.2	8	

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

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

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4310 Test started: Date 2/8/11 Time 1235
Client El Dorado Chemical Test ended: Date 2/15/11 Time 1025

Technician:	Day0		1		2	AH	3		4		5		6	AH	7	RC	8
Time:	Day0	1233	1	1035	2	1015	3	0920	4	1240	5	1235	6	0955	7	1025	8
Temperature:	Day0	24.3	1	24.8	2	24.5	3	24.3	4	24.4	5	24.7	6	24.5	7	25.2	8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV. trt'd	1	X	0									9	
	2		0								0	9	
	3		0									9	
	4		2	1	2	3	3	2	2	4	3	9	
	5		0		4	0	0	5	0	4	0	9	
	6		6	7	0	7	6	0	0	0	0	9	
	7		0	5	5	6	5	6	0	4	4	9	
	8												
	1–8												
	1–8												
	1–8												
	1–8												
	1–8												

Control Rep 1 Rep 2

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

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4310 Test started: Date 2/28 Time 1235

Client El Dorado Chemical Test ended: Date 3/15/4 Time 1025

Organism C. dubia

Day/# water used	03/28	1	3/31	3	4	5	6	7	8
Concentration: Control soft									
pH	8.1	7.7 / 8.0	7.9 / 7.9	7.8 / 7.9	7.8 / 7.9	8.0 / 7.6	7.9 / 7.9	7.8	
DO (mg/l)	8.4	8.0 / 8.3	8.2 / 8.3	8.2 / 8.4	8.0 / 8.2	8.2 / 8.3	8.1 / 8.1	8.0	
Cond (umhos/cm)	170.4	173.3	164.3	167.1	169.1	166.4	168.7		
Alkalinity (mg/L)	36.0		32.0						
Hardness (mg/L)	48.0		48.0						
Concentration: 32%									
pH	8.0	7.8 / 8.0	8.0 / 7.9	7.9 / 8.0	7.9 / 7.9	8.0 / 7.8	7.9 / 8.0	7.9	
DO (mg/l)	8.3	8.0 / 8.2	8.1 / 8.2	8.2 / 8.2	8.0 / 8.2	8.1 / 8.2	8.0 / 8.0	7.9	
Cond (umhos/cm)	303	313	303	307	302	309	302		
Concentration: 42%									
pH	8.1	8.0 / 8.0	8.0 / 8.0	8.0 / 8.0	8.0 / 8.0	7.9 / 8.0	8.0 / 8.0	7.9	
DO (mg/l)	8.2	8.0 / 8.2	8.1 / 8.1	8.1 / 8.1	8.0 / 8.1	7.9 / 8.2	8.0 / 8.0	7.9	
Cond (umhos/cm)	343	348	344	346	342	347	343		
Concentration: 56%									
pH	8.1	8.0 / 8.1	8.1 / 8.0	8.0 / 8.0	8.0 / 8.0	7.9 / 8.0	8.0 / 8.0	8.0	
DO (mg/l)	8.2	7.9 / 8.1	8.0 / 8.1	8.0 / 8.1	8.0 / 8.1	7.9 / 8.1	8.0 / 8.0	7.9	
Cond (umhos/cm)	400	406	403	406	408	405	399		
Concentration: 75%									
pH	8.1	8.1 / 8.1	8.1 / 8.1	8.1 / 8.0	8.1 / 8.1	7.9 / 8.1	8.1 / 8.0	8.0	
DO (mg/l)	8.1	7.9 / 8.1	8.0 / 8.1	8.0 / 8.0	8.0 / 8.1	7.9 / 8.0	8.0 / 8.0	7.8	
Cond (umhos/cm)	479	486	483	487	487	482	480		
Concentration: 100%									
pH	8.1	8.1 / 8.1	8.2 / 8.1	8.1 / 8.1	8.1 / 8.1	8.0 / 8.1	8.1 / 8.1	8.1	
DO (mg/l)	8.0	7.9 / 8.0	8.0 / 8.1	8.0 / 8.0	8.0 / 8.1	7.9 / 8.0	7.9 / 8.0	7.8	
Cond (umhos/cm)	581	593	591	593	591	593	586		
Tech-prerenewal	RC	[illegible]	AH	[illegible]	[illegible]	[illegible]	AH	RC	
Tech-postrenewal		[illegible]	RC	RC	[illegible]	[illegible]	RC		
Hardness (mg/l)	44.0		52.0		56.0				
Alkalinity (mg/l)	92.0		88.0		96.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4310 Test started: Date 3/8/11 Time 1235
Client El Dorado Chemical Test ended: Date 3/15/11 Time 1025
Organism C. dubia

Day/# water used	0 3128	1	2 3131	3	4	5	6	7	8
Concentration: Control [illegible] 100% [illegible]									
pH	7.8	8.1/8.0	8.1/8.1	8.1/8.1	8.1/8.0	8.0/8.0	8.1/8.0	8.1	
DO (mg/l)	7.8	7.7/7.8	7.9/7.8	7.9/7.7	7.8/7.9	7.9/7.8	7.8/7.8	7.5	
Cond (umhos/cm)	581	587	581	587	581	587	579		
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	RC	[illegible]	AH	[illegible]	[illegible]	[illegible]	AH	RC	
Tech-postrenewal	—	[illegible]	RC	RC	[illegible]	[illegible]	AH		

Hardness (mg/l)									
Alkalinity (mg/l)									

[illegible] (unused sections crossed out)

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4310 Date started: 2/8/11 Date ended 2/15/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave., El Dorado, AR 71731

NPDES# AR0000752 | AFIN 70-00040

Sample Description 001 Dilution Water Soft reconstituted

Test Temperature (°C) 25±1°c Technicians Briggs, Haughton, Zeagler, Callahan

Test organism age < 48hr Vendor/ID# ABS/653

Feeding Times

Technician/Time/Amount (per replicate)

Day	AM	NOON	PM
0			
1	EGB/0830/0.10ml	BBm/1045/0.10ml	BBm/1355/0.20ml
2	EGB/0845/0.10ml	RC/1045/0.10ml	BBm/1350/0.10ml
3	RC/0750/0.10ml	AH/1055/0.10ml	AH/1325/0.10ml
4	BBm/1110/0.20ml		BBm/1220/0.20ml
5	BBm/1145/0.20ml		BBm/1310/0.20ml
6	EGB/0840/0.10ml	RC/1055/0.10ml	BBm/1250/0.20ml
			RC/1430/0.10ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

	Effluent Initial DO (mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0.	10.4/122.9%/BBm	Y/15/8.1/95.5%/BBm	NA	
1.	10.4/125.1%/BBm	Y/15/8.1/96.5%/BBm		
2.	11.2/129.5%/RC	Y/15/8.1/95.3%/RC		
3.	10.3/125.5%/RC	Y/15/8.0/95.4%/RC		
4.	10.9/127.1%/BBm	Y/15/8.2/96.6%/BBm		
5.	10.8/129.3%/BBm	Y/15/8.0/95.8%/BBm		
6.	11.1/131.9%/RC	Y/15/8.1/96.4%/RC		

	Total Residual Chlorine (mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	Date
1.	<0.01/BBm	NO/BBm	3.0/BBm	C2551	2/8/11
2.	<0.01/RC	No/RC	3.0/RC	C2564	2/10/11
3.	<0.01/BBm	NO/BBm	1.0/BBm	C2583	2/15/11

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

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4310
Client El Dorado Chemical

Test started: Date 2/8/11 Time 1345
Test ended: Date 2/15/11 Time 0950

		Day 0	1	2	3	4	5	6	7
Technician:		RC	[illegible]	RC	RC	[illegible]	[illegible]	RC	[illegible]
Time:		1345	0913	1035	0920	1200	1155	0950	0980
Temperature		25.1	24.4	24.6	24.6	24.3	24.7	24.7	24.8

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

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4310 Test started: Date 2/8/11 Time 1345
Client El Dorado Chemical Test ended: Date 2/15/11 Time 0950

	Day 0	1	2	3	4	5	6	7
Technician:	RC	[illegible]	RC	RC	[illegible]	[illegible]	RC	[illegible]
Time:	1345	0915	1035	0920	1230	1155	0950	0950
Temperature	25.1	24.4	24.6	24.6	24.3	24.7	24.7	24.8

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

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4310 / EL DORADO Chemical Test Dates 2/8/11 - 2/15/11

Oven Temperature (° Celsius) 102°

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 2/10/11 Tech: AH	Wt. of pan + larvae(g)/ Date weighed: 2/16/11 Tech: JDM	Total wt. of larvae (g)	Original # of larvae at test initiation	Mean Dry wt. of larvae (mg)	Mean Dry wt. - surviving larvae (mg) Control Only*
0	A 31	0.9601	0.9659	0.0058	8	0.725	7) 0.829
	B 32	0.9567	0.9623	0.0056	8	0.700	
	C 33	0.9476	0.9530	0.0054	8	0.675	7) 0.771
	D 34	0.9431	0.9482	0.0051	8	0.638	
	E 35	0.9414	0.9467	0.0053	8	0.663	
32	A 36	0.9523	0.9573	0.0050	8	0.625	
	B 37	0.9389	0.9460	0.0071	8	0.888	
	C 38	0.9307	0.9365	0.0058	8	0.725	
	D 39	0.9288	0.9345	0.0057	8	0.713	
	E 40	0.9292	0.9335	0.0043	8	0.538	
42	A 41	0.9338	0.9408	0.0070	8	0.875	
	B 42	0.9350	0.9420	0.0070	8	0.875	
	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	
56	A 46	0.9522	0.9592	0.0070	8	0.875	
	B 47	0.9569	0.9643	0.0074	8	0.925	
	C 48	0.9573	0.9623	0.0050	8	0.625	
	D 49	0.9578	0.9633	0.0055	8	0.688	
	E 50	0.9632	0.9690	0.0058	8	0.725	
75	A 51	0.9664	0.9740	0.0076	8	0.950	
	B 52	0.9602	0.9713	0.0051	8	0.638	
	C 53	0.9676	0.9756	0.0080	8	1.000	
	D 54	0.9704	0.9764	0.0060	8	0.750	
	E 55	0.9728	0.9802	0.0074	8	0.925	
100	A 56	0.9703	0.9782	0.0079	8	0.988	
	B 57	0.9607	0.9727	0.0060	8	0.750	
	C 58	0.9638	0.9719	0.0081	8	1.013	
	D 59	0.9600	0.9658	0.0058	8	0.725	
	E 60	0.9565	0.9635	0.0070	8	0.875	

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

Calculated by: RC 2/16/11 Calculations checked by: ECB 2/23/11

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X4310/EL DORADO Chemical Test Dates 2/8/11 - 2/15/11

Oven Temperature (° Celsius)

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 2/10/11 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*
100 UV trd	A 61	0.9527	0.9581	0.0054	8	0.675	
	B 62	0.9482	0.9534	0.0052	8	0.650	
	C 63	0.9437	0.9491	0.0054	8	0.675	
	D 64	0.9419	0.94463	0.00444	8	0.550	
	E 65	0.9410	0.9471	0.0061	8	0.763	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

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

Calculated by: EOB 2/23/11 Calculations checked by: TaxCalc EOB 2/23/11

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4310 Test started: Date 3/8/11 Time 1345

Client El Dorado Chemical Test ended: Date 3/15/11 Time 0950

Organism P. promelas

Day/# water used	0 3128	1	3131	3	4	5	6	7	8
Concentration: Control soft									
pH	8.1	7.8 / 8.0	7.6 / 7.9	7.4 / 7.9	7.7 / 7.9	7.5 / 7.6	7.9 / 7.9	7.5	
DO (mg/l)	8.4	7.6 / 8.3	6.9 / 8.3	6.1 / 8.4	6.8 / 8.2	6.7 / 8.3	6.3 / 8.1	5.3	
Cond (umhos/cm)	170.4	173.3	164.3	167.1	169.1	166.4	168.7		
Alkalinity (mg/L)	36.0		32.0						
Hardness (mg/L)	48.0		48.0						
Concentration: 32 %									
pH	8.0	7.8 / 8.0	7.6 / 7.9	7.5 / 8.0	7.6 / 7.9	7.6 / 7.8	7.5 / 8.0	7.4	
DO (mg/l)	8.3	7.7 / 8.2	6.6 / 8.2	5.5 / 8.2	6.7 / 8.2	6.7 / 8.2	6.0 / 8.0	5.4	
Cond (umhos/cm)	303	313	303	307	302	309	302		
Concentration: 42 %									
pH	8.1	7.9 / 8.0	7.7 / 8.0	7.5 / 8.0	7.6 / 8.0	7.6 / 8.0	7.5 / 8.0	7.3	
DO (mg/l)	8.2	7.6 / 8.2	6.6 / 8.1	5.6 / 8.1	6.8 / 8.1	6.6 / 8.2	5.8 / 8.0	5.1	
Cond (umhos/cm)	343	348	344	346	342	347	343		
Concentration: 56 %									
pH	8.1	7.9 / 8.1	7.7 / 8.0	7.6 / 8.0	7.8 / 8.0	7.6 / 8.0	7.5 / 8.0	7.3	
DO (mg/l)	8.2	7.6 / 8.1	6.4 / 8.1	5.5 / 8.1	6.8 / 8.1	6.5 / 8.1	5.8 / 8.0	5.2	
Cond (umhos/cm)	400	406	403	406	408	405	399		
Concentration: 75 %									
pH	8.1	7.9 / 8.1	7.8 / 8.1	7.7 / 8.0	7.7 / 8.1	7.6 / 8.1	7.5 / 8.0	7.3	
DO (mg/l)	8.1	7.6 / 8.1	6.4 / 8.1	5.7 / 8.0	6.8 / 8.1	7.5 / 8.0	5.3 / 8.0	4.6	
Cond (umhos/cm)	479	486	483	487	487	482	480		
Concentration: 100 %									
pH	8.1	8.0 / 8.1	7.9 / 8.1	7.8 / 8.1	7.7 / 8.1	7.7 / 8.1	7.6 / 8.1	7.4	
DO (mg/l)	8.0	7.6 / 8.0	6.5 / 8.1	5.8 / 8.0	6.8 / 8.1	6.5 / 8.0	5.3 / 8.0	4.6	
Cond (umhos/cm)	581	593	591	593	591	593	586		
Tech-prerenewal	YMM	YMM	RC	RC	YMM	YMM	RC		
Tech-postrenewal		YMM	RC	RC	YMM	YMM	RC	YMM	
Hardness (mg/l)	44.0		52.0		56.0				
Alkalinity (mg/l)	92.0		88.0		96.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4310 Test started: Date 2/8/11 Time 1345
Client El Dorado Chemical Test ended: Date 2/15/11 Time 0930
Organism P. promelas

Day/# water used	0	1	2 3131	3	4	5	6	7	8
Concentration: ~~Control~~ 100% UV									
pH	7.8	8.0/8.0	7.9/8.1	7.7/8.1	7.8/8.0	7.8/8.0	7.7/8.0	7.6	
DO(mg/l)	7.8	7.4/7.8	6.5/7.8	5.5/7.7	6.0/7.9	6.1/7.8	5.4/7.8	4.5	
Cond(umhos/cm)	581	587	581	587	581	587	579		
Alkalinity(mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Tech-prerenewal	LGZ	LGZ	RC	RC	LGZ	LGZ	RC		
Tech-postrenewal	—	LGZ	RC	RC	LGZ	LGZ	RC	LGZ	
Hardness(mg/l)									
Alkalinity(mg/l)									

Omit KH 2/7/11

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES

REFERENCE TOXICANT TEST QUALITY DATA

Date start: 2/1/11 **Date end:** 2/3/11

Test organism: C. dubia

Age: <24hr

Source and ID#: BAL | R16

Dilution Water used: Type: MH * **Jug #:** 3126

Reference Toxicant: NaCl + **Units:** 100 g/L ____ ug/L

Manufacturer: ACROS **Lot:** B0130290

48-hour LC_{50}: 1.39 g/L **Statistical Method:** TSK ^

Upper and Lower CUSUM Chart Control Limits: 1.72-1.01

Test Number (for the year): 3

We verify that this data is true and correct:

Technician: Leslie Ziegler

Statistician: Erin M. Briggs

Quality Control Officer: Erin M. Briggs

*MH- Moderately hard
S-Soft
H - Hard

+NaCl - Sodium Chloride
$CuSO_4$ - Copper Sulfate

^P - Probit
SK - Spearman Karber
TSK -Trimmed Spearman Karber
G - Graphical

File: Ref Tox Cover

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

Project# ____________

Client Ref Tox

Sample Description NaCl 100 g/L

Technician: 0hour ELB 24hour [illegible] 48hour [illegible] 72hour / 96hour /

Time: 0hour 1530 24hour 1415 48hour 1330 72hour / 96hour /

Temperature (°C): 0hour 24.4 24hour 24.8 48hour 24.8 72hour / 96hour /

Test started: Date 2/1/11 Time 1530

Test ended: Date 2/3/11 Time 1330

Test Species C. dubia ID# BAL R16

Test Dilution	Replicate	Test Salinity	# Live Organisms 0 hr	24	48	72	96	Dissolved Oxygen 0	24	48	72	96	pH 0	24	48	72	96	Conductivity 0	24	48	72	96
0	A	NA	5	5	5			8.2	–	8.1			8.1	–	8.1			323	–	443		
	B		5	5	5																	
	C		5	5	5																	
	D		5	5	5																	
1	A		5	5	5			8.2	–	8.1			8.1	–	8.0			2400	–	2910		
	B		5	5	5																	
	C		5	5	4																	
	D		5	5	5																	
2	A		5	1	0			8.2	–	8.1			8.1	–	8.0			4510	–	5350		
	B		5	1	0																	
	C		5	0	0																	
	D		5	0	0																	
Chemistry Tech prerenewal/postrenewal								ELB	[illegible]	[illegible]			ELB	[illegible]	[illegible]			ELB	[illegible]	[illegible]		

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

Project# _____ Test started: Date 2/1/11 Time 1530

Client Ref TOX Test ended: Date 2/2/11 Time 1330

Sample Description NaCl 100g/L Test Species C. dubia ID# BAL1 R16

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

Time: Ohour 1530 24hour 1415 48hour 1330 72hour / 96hour /

Temperature (°C): Ohour 24.4 24hour 24.8 48hour 24.8 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
3	A		5	0				8.0	7.7	—			8.1	7.9	—			6340	6780	—		
	B		5	0																		
	C		5	0																		
	D		5	0																		
4	A		5	0				8.2	7.7	—			8.1	7.9	—			8180	8740	—		
	B		5	0																		
	C		5	0																		
	D		5	0																		
5	A		5	0				8.3	7.6	—			8.0	7.9	—			10470	10400	—		
	B		5	0																		
	C		5	0																		
	D		5	0																		
Chemistry Tech prerenewal/postrenewal								EB	SDM				EB	SDM	SDM			EB	SDM	SDM		

ACUTE2 020809 Rev.

X4310

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 880630	Sample Type:	EFF2-Industrial
Sample Date:	2/8/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

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

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

Ceriodaphnia Survival and Reproduction Test-Reproduction

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-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
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	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: Untransformed					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 Treatments vs D-Control	3.61284	0.18155	103.024	10.2113	9.2E-08	6, 62

ToxCalc v5.0.23

Reviewed by: EDP 3/15/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

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-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
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	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	0.000	8.000	13.000	11.000	16.000	14.000	13.000	2.000	12.000	7.000

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	19.900	1.0000	19.900	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 Treatments vs D-Control	3.58654	0.18023	120.533	11.6746	6.1E-08	6, 63

ToxCalc v5.0.23

Reviewed by: 3/15/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

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-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

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	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	0.000	8.000	13.000	11.000	16.000	14.000	13.000	2.000	12.000	7.000

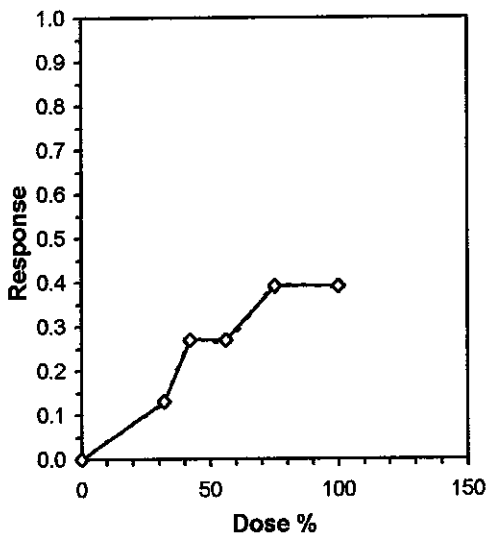
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	19.900	1.0000	19.900	16.000	24.000	14.689	10	19.900	1.0000
32	17.300	0.8693	17.300	13.000	21.000	13.908	10	17.300	0.8693
42	14.400	0.7236	14.400	8.000	24.000	30.039	10	14.550	0.7312
56	14.700	0.7387	14.700	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
IC20	37.018	6.183	28.766	57.154	1.4623
IC25	40.636	9.013	35.228	64.711	0.7944
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration



ToxCalc v5.0.23

Reviewed by: EJB 3/15/11

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	2/8/2011	Test ID:	X4310pp	Sample ID:	1
End Date:	2/15/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	2/7/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

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

			Transform: Arcsin Square 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				
Treatments vs D-Control				

ToxCalc v5.0.23

Reviewed by: BJB 3/15/11

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	2/8/2011	Test ID:	X4310pp	Sample ID:	1
End Date:	2/15/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	2/7/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
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

			Transform: Untransformed						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.6800	1.0000	0.6800	0.6375	0.7250	4.967	5			
32	0.6975	1.0257	0.6975	0.5375	0.8875	18.684	5	-0.262	2.443	0.1631
42	0.8525	1.2537	0.8525	0.7875	0.9000	5.327	5	-2.584	2.443	0.1631
56	0.7675	1.1287	0.7675	0.6250	0.9250	16.593	5	-1.311	2.443	0.1631
75	0.8525	1.2537	0.8525	0.6375	1.0000	17.910	5	-2.584	2.443	0.1631
100	0.8700	1.2794	0.8700	0.7250	1.0125	15.158	5	-2.846	2.443	0.1631
100UV	0.6625	0.9743	0.6625	0.5500	0.7625	11.477	5	0.262	2.443	0.1631
0-SN	0.7200	1.0588	0.7200	0.6375	0.8286	10.968	5	-0.599	2.443	0.1631

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.98419	0.94	-0.0803	-0.4613
Bartlett's Test indicates equal variances (p = 0.11)	11.7799	18.4753		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences	0.16305	0.23978	0.03616	0.01114	0.01022	7, 32
Treatments vs D-Control						

Daphnid Acute Test-48 Hr Survival

Start Date:	2/1/2011	Test ID:	02111cd	Sample ID:	REF-Ref Toxicant
End Date:	2/3/2011	Lab ID:	NELAP 01975	Sample Type:	NACL-Sodium chloride
Sample Date:	2/1/2011	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

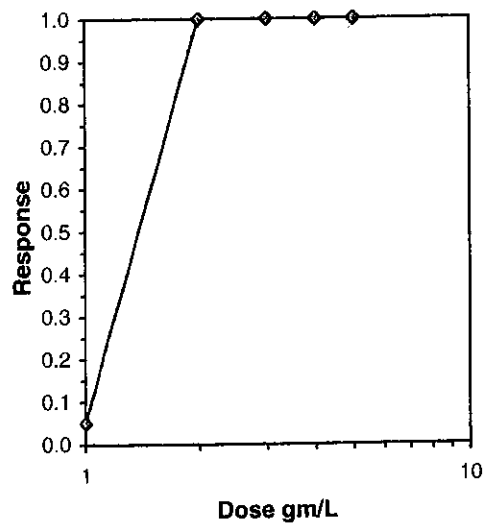
Conc-gm/L	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
1	1.0000	1.0000	0.8000	1.0000
2	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/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

Auxiliary Tests	Statistic	Critical	Skew	Kurt
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



Reviewed by: EGB 3/10/11

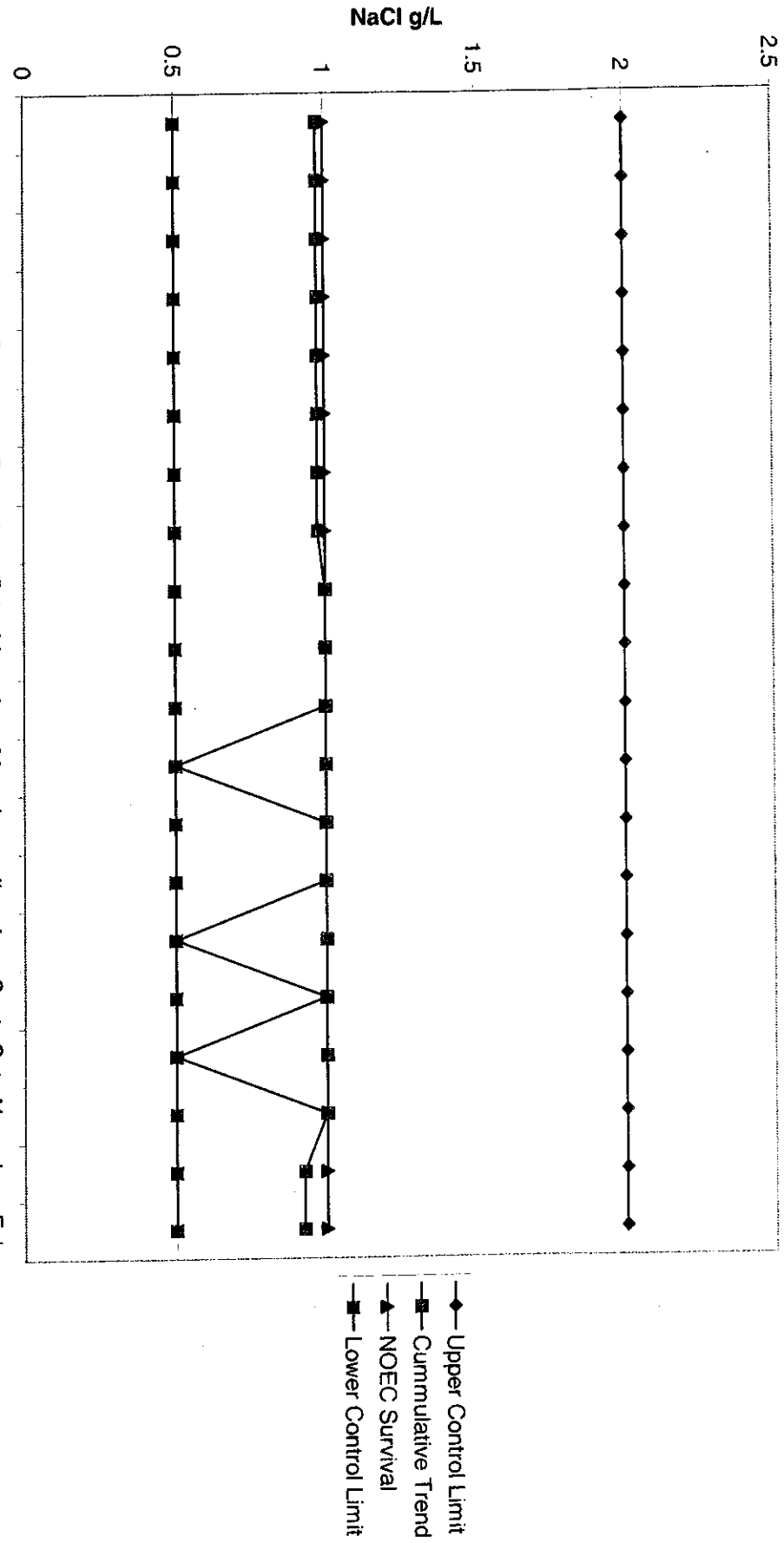
APPENDIX D
QUALITY ASSURANCE CHARTS

Bio-Analytical Laboratories' 2011 Results of the Monthly Chronic Reference Toxicant Tests

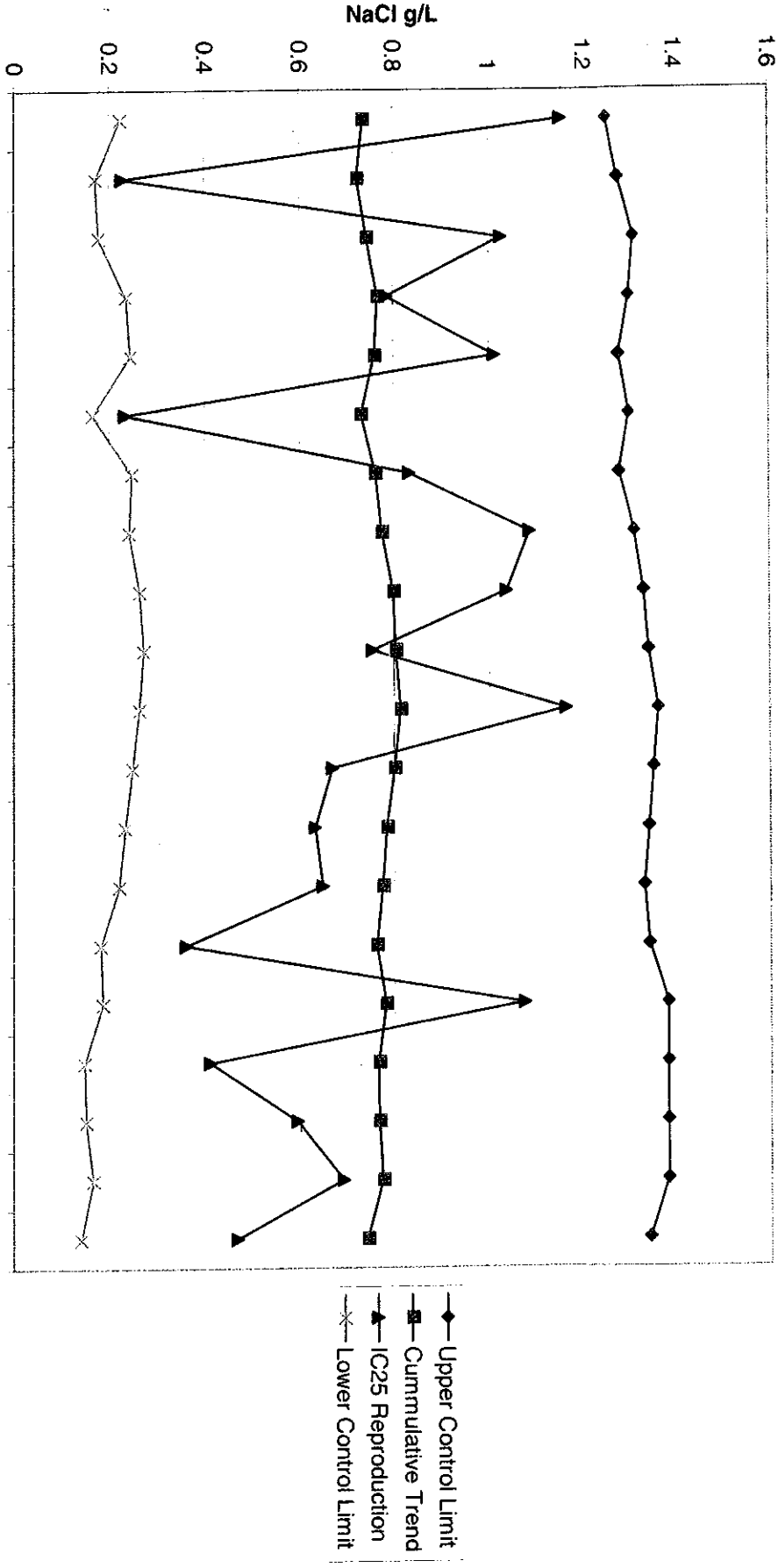
Month Start-End	Jan 1/7-1/14 13:45-13:10	Feb 2/10-2/17 12:40-9:50										
Ceriodaphnia dubia **(in soft reconstituted water)**												
NOEC survival	1.0	1.0										
IC25 repro.	0.6913	0.4674										
PMSD repro.	21.9	24.4										
Avg. repro. control	20.7	24.7										
Fathead minnow												
Month Start-End	Jan 1/4-1/11 11:15-13:00	Feb 2/2-2/9 12:25-9:00										
NOEC survival	1.25	1.25										
IC25 growth	1.4953	1.68										
PMSD growth	20.2	13.0										
Avg. growth control	0.850	0.610										

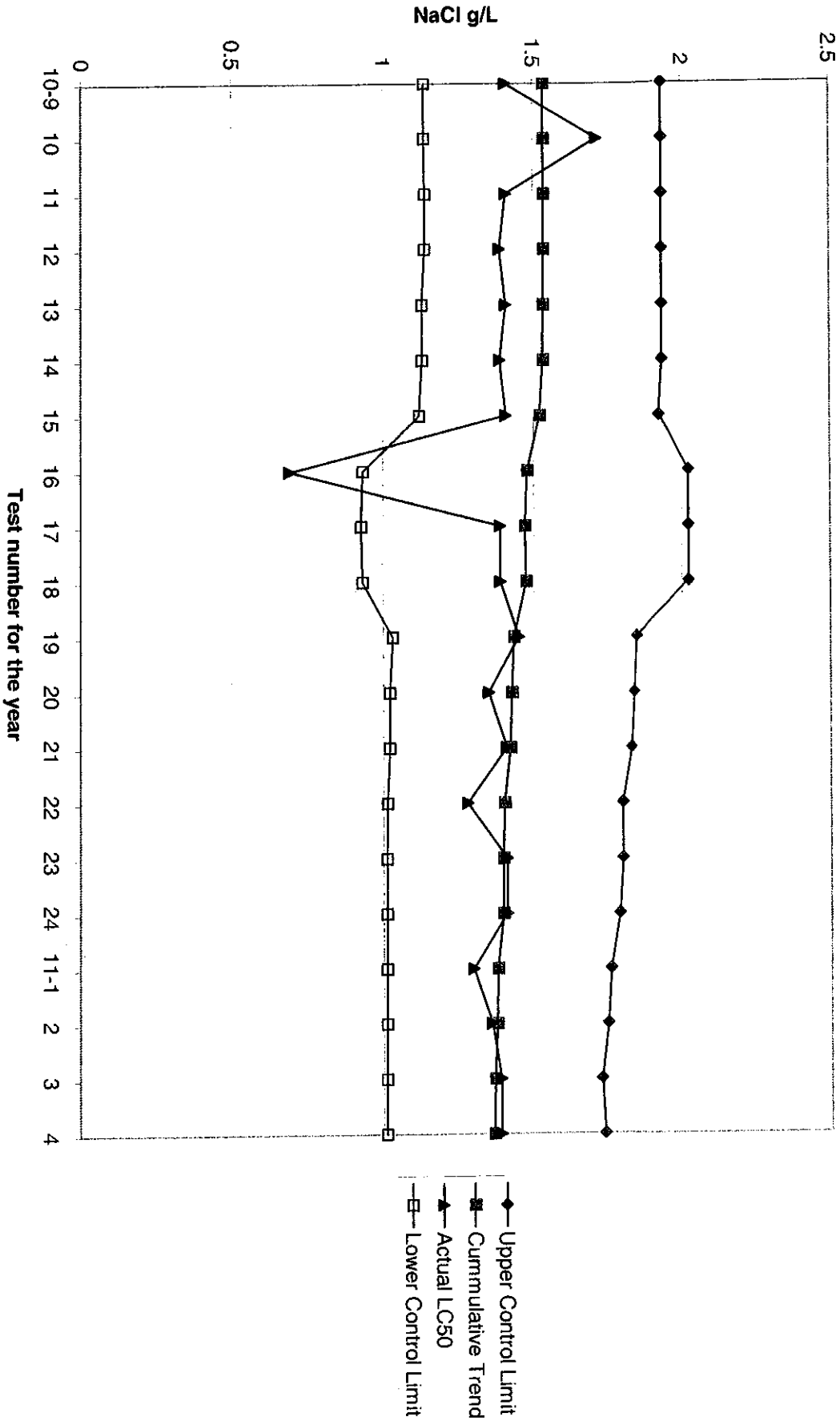
Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.
+Test invalid. Not enough time left in the month to conduct a retest.

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



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



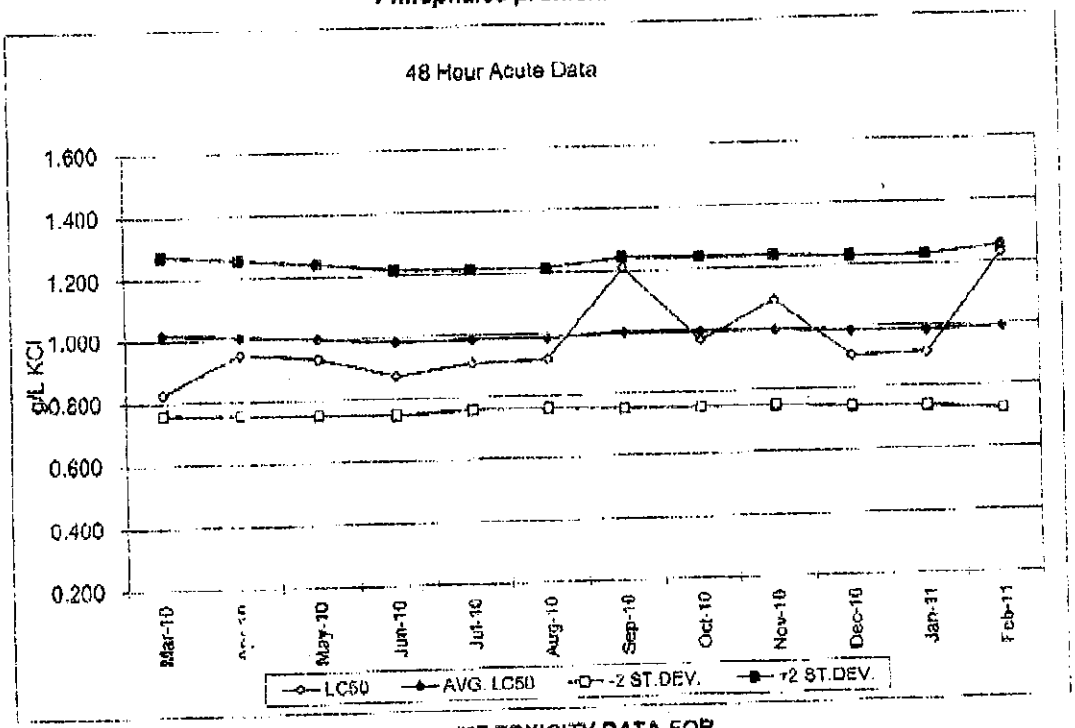

2011 Ceriodaphnia dubia 48-hour Reference Toxicant Test Results
NaCl g/L
2.5
2
1.5
1
0.5
0
10-9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
11-1
2
3
4
Test number for the year
Upper Control Limit
Cummulative Trend
Actual LC50
Lower Control Limit

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

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

REFERENCE TOXICANT LC50

Pimephales promelas



48 HOUR ACUTE TOXICITY DATA FOR

Pimephales promelas

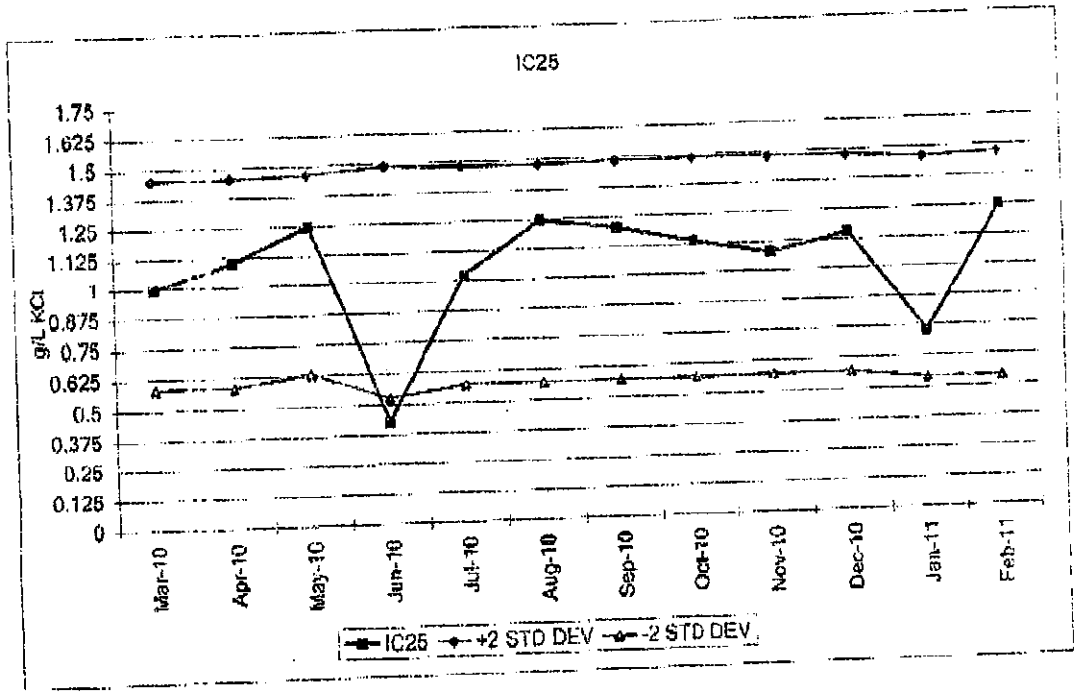
DATE	LC50 (g/L KCl)	95% CONFIDENCE (upper)	(lower)	AVG.LC50 (g/L KCl)	METHOD	+2 STD	-2 STD
Sep 10	1.210	1.328	1.103	0.999	SPKR	1.2452	0.7534
Oct 10	0.966	1.079	0.865	0.995	SPKR	1.2402	0.7501
Nov 10	1.091	1.223	0.972	0.995	SPKR	1.2401	0.7501
Dec 10	0.903	1.006	0.807	0.986	PROBIT	1.2303	0.7421
Jan 11	0.909	1.022	0.809	0.983	SPKR	1.2297	0.7373
Feb 11	1.231	1.346	1.127	0.980	SPKR	1.2552	0.7256

**Current Test Dates: 2/1-3/2011

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

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

Pimephales promelas



Chronic 7 Day Survival Test Data

Date	NOEC (g/L KCl)	LOEC (g/L KCl)
Sep-10	0.50	1.0
Oct-10	0.50	1.0
Nov-10	0.50	1.0
Dec-10	0.50	1.0
Jan-11	0.50	1.0
Feb-11	0.50	1.0

IC 25 for Growth Test

Date	IC25 g/L KCl	95% Confidence (upper)	(lower)	Avg. IC25 g/L KCl	+2 STD DEV	-2 STD DEV
Sep-10	1.208	1.275	0.755	1.030	1.487	0.572
Oct-10	1.139	1.298	0.231	1.030	1.488	0.573
Nov-10	1.081	1.352	0.289	1.027	1.483	0.572
Dec-10	1.155	1.307	0.997	1.025	1.477	0.573
Jan-11	0.729	1.072	0.556	1.001	1.461	0.541
Feb-11	1.247	1.219	1.108	1.005	1.470	0.539

**Current Test Dates: 2/1-8/2011

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

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

	Time	Date		Time	Date
Composite 1 Collected From	**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:	1235 **am/pm**			2/8/11	**date**
Test terminated:	1025 **am/pm**			2/15/11	**date**

Dilution water used: **Receiving** X **Reconstituted**

PERCENT SURVIVAL

Time of Reading	Percent Effluent					
	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

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100
A	19	15	15	16	11	7
B	20	20	17	12	12	13
C	24	21	24	15	14	14
D	17	18	11	14	13	9
E	24	18	17	13	9	12
F	17	15	13	13	7	15
G	20	18	14	14	18	15
H	19	13	13	17	13	10
I	16	17	12	19	13	13
J	23	18	8	14	10	14
Surv. Mean	19.9	17.3	14.4	14.7	12.0	12.2
Total Mean	19.9	17.3	14.4	14.7	12.0	12.2
CV%*	14.69	13.91	30.04	14.36	25.15	22.13

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

PMSD = 18.0%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

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

Sample No. 1 Collected: Date: 2/7/11 Time: 0730
Sample No. 2 Collected: Date: 2/9/11 Time: 0715
Sample No. 3 Collected: Date: 2/11/11 Time: 0745
Test Begin: Date: 2/8/11 Time: 1235
Test End: Date: 2/15/11 Time: 1025

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
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 Final	8.3	8.3	8.4	8.2	8.3	8.1		
pH Initial	7.7	7.9	7.8	7.8	8.0	7.9	7.8	
pH Final	8.0	7.9	7.9	7.9	7.6	7.9		
Alkalinity	36.0	32.0						
Hardness	48.0	48.0						
Conductivity	173.3	164.3	167.1	169.1	166.4	168.7		
Chlorine	<.01	<.01						

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.2	8.2	8.2	8.2	8.0		
pH Initial	7.8	8.0	7.9	7.9	8.0	7.9	7.9	
pH Final	8.0	7.9	8.0	7.9	7.8	8.0		
Alkalinity								
Hardness								
Conductivity	313	303	307	302	309	302		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.1	8.1	8.1	8.2	8.0		
pH Initial	8.0	8.0	8.0	8.0	7.9	8.0	7.9	
pH Final	8.0	8.0	8.0	8.0	8.0	8.0		
Alkalinity								
Hardness								
Conductivity	348	344	346	342	347	343		
Chlorine								

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.5	24.3	24.4	24.7	24.5	25.2	
DO Initial	7.9	8.0	8.0	8.0	7.9	8.0	7.9	
DO Final	8.1	8.1	8.1	8.1	8.1	8.0		
pH Initial	8.0	8.1	8.0	8.0	7.9	8.0	8.0	
pH Final	8.1	8.0	8.0	8.0	8.0	8.0		
Alkalinity								
Hardness								
Conductivity	406	403	406	408	405	399		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.5	24.3	24.4	24.7	24.5	25.2	
DO Initial	7.9	8.0	8.0	8.0	7.9	8.0	7.8	
DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	8.1	8.1	8.1	8.1	7.9	8.1	8.0	
pH Final	8.1	8.1	8.0	8.1	8.1	8.0		
Alkalinity								
Hardness								
Conductivity	486	483	487	487	482	480		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.5	24.3	24.4	24.7	24.5	25.2	
DO Initial	7.9	8.0	8.0	8.0	7.9	7.9	7.8	
DO Final	8.0	8.1	8.0	8.1	8.0	8.0		
pH Initial	8.1	8.2	8.1	8.1	8.0	8.1	8.1	
pH Final	8.1	8.1	8.1	8.1	8.1	8.1		
Alkalinity	92.0	88.0		96.0				
Hardness	44.0	52.0		56.0				
Conductivity	593	591	593	591	593	586		
Chlorine	<.01	<.01		<.01				

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

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

	Time	Date		Time	Date
Composite 1 Collected from:	**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: 1345 **am/pm** 2/8/11 **date**
Test terminated: 0950 **am/pm** 2/15/11 **date**
Dilution water used: **Receiving** **X** **Reconstituted**

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	87.5	100	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. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
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 significantly different (p=.05) than the control survival for the % effluent corresponding to:

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

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

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

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

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 0
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #TEP6C.
6. Enter response to item 4 on DMR Form, parameter #TFP6C.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

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

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

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

Sample No. 1 Collected: Date: 2/7/11 Time: 0730
Sample No. 2 Collected: Date: 2/9/11 Time: 0715
Sample No. 3 Collected: Date: 2/11/11 Time: 0745
Test Begin: Date: 2/8/11 Time: 1345
Test End: Date: 2/15/11 Time: 0950

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.4	24.6	24.6	24.3	24.7	24.7	24.8	
DO Initial	7.6	6.9	6.1	6.8	6.7	6.3	5.3	
DO Final	8.3	8.3	8.4	8.2	8.3	8.1		
pH Initial	7.8	7.6	7.4	7.7	7.5	7.5	7.5	
pH Final	8.0	7.9	7.9	7.9	7.6	7.9		
Alkalinity	36.0	32.0						
Hardness	48.0	48.0						
Conductivity	173.3	164.3	167.1	169.1	166.4	168.7		
Chlorine	<.01	<.01						

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.2	8.2	8.2	8.2	8.0		
pH Initial	7.8	7.6	7.5	7.6	7.6	7.5	7.4	
pH Final	8.0	7.9	8.0	7.9	7.8	8.0		
Alkalinity								
Hardness								
Conductivity	313	303	307	302	309	302		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
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	
DO Final	8.2	8.1	8.1	8.1	8.2	8.0		
pH Initial	7.9	7.7	7.5	7.6	7.6	7.5	7.3	
pH Final	8.0	8.0	8.0	8.0	8.0	8.0		
Alkalinity								
Hardness								
Conductivity	348	344	346	342	347	343		
Chlorine								

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.4	24.6	24.6	24.3	24.7	24.7	24.8	
DO Initial	7.6	6.4	5.5	6.6	6.5	5.8	5.2	
DO Final	8.1	8.1	8.1	8.1	8.1	8.0		
pH Initial	7.9	7.7	7.6	7.6	7.6	7.5	7.3	
pH Final	8.1	8.0	8.0	8.0	8.0	8.0		
Alkalinity								
Hardness								
Conductivity	406	403	406	408	405	399		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.4	24.6	24.6	24.3	24.7	24.7	24.8	
DO Initial	7.6	6.4	5.7	6.6	7.5	5.3	4.6	
DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.9	7.8	7.7	7.7	7.6	7.5	7.3	
pH Final	8.1	8.1	8.0	8.1	8.1	8.0		
Alkalinity								
Hardness								
Conductivity	486	483	487	487	482	480		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.4	24.6	24.6	24.3	24.7	24.7	24.8	
DO Initial	7.6	6.5	5.8	6.6	6.5	5.3	4.6	
DO Final	8.0	8.1	8.0	8.1	8.0	8.0		
pH Initial	8.0	7.9	7.8	7.7	7.7	7.6	7.4	
pH Final	8.1	8.1	8.1	8.1	8.1	8.1		
Alkalinity	92.0	88.0		96.0				
Hardness	44.0	52.0		56.0				
Conductivity	593	591	593	591	593	586		
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

Client: El Dorado Chemical

Project#: X4310

Proofed First Draft: _____ **Date:** _____

Proofed Final Draft: Erin M. Bruno **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.

Erin M. Bruno, BS **Date:** 3/23/11

Quality Assurance Officer

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
Test Dates: March 15 - 23, 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 - 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, 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.

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

BAL
ADEQ #88-0630
Project X4353

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X4353

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 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. 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^R dual-programmable, illuminated incubator at a temperature of 25 ± 1^0 Celsius. The fathead minnow test was run in a circulating waterbath, using a Remcor^R heated liquid circulator to keep a constant temperature of 25 ± 1^0 Celsius. AEMC^R data-loggers were used to monitor diurnal test temperature. Test temperatures were recorded at the beginning of the day, after test renewal and at the end of the day. Light cycles and intensities were recorded twice a month.

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_{25} value was also determined to document the concentration in which a 25 percent reduction in reproduction or growth occurred. The LC_{50} 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.

BAL
ADEQ #88-0630
Project X4353

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

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	

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

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	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	

*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).

BAL
ADEQ #88-0630
Project X4353

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

NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	**Phone:** (870) 863-1484
Address: 4500 Northwest Avenue, El Dorado, AR 71731	**Fax:** (870) 863-1499
Permit #: AR0000752	**Purchase Order:**
Sampler's Signature/Printed Name/Affiliation: [signature] / DAVID SARTAIN / EDCC	

Project Number: X4353

Temp. upon arrival:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
3-13-11 – 3-14-11	0950am 0950am	X		8	001	X	X							C2809	ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
[signature] / EDCC	3-14-11	1130	[signature]	3-14-11	1130
[signature]	3-14-11	1330	L. Yeager	3/14/11	1330

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

Comments:

Temperature upon arrival: 0.8°C
Thermometer #: 39
Tech: LBG
Date: 3/14/11

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Doyline, LA 71023
(318) 745-2772, Fax (318) 745-2773
bioanalytical@att.net NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484
Address: 4500 Northwest Avenue, El Dorado, AR 71731	Fax: (870) 863-1499
Permit #: AR0000752	Purchase Order:
Sampler's Signature/Printed Name/Affiliation: David Sartain / DAVID SARTAIN / EDCC	

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform
3-15-11 / 3-16-11	0730AM / 0730AM	X		8	001	X	X						

Temperature upon arrival: 1.3°C
Thermometer #: 29
Tech: LSM
Date: 3/16/11
Lab Control Number: C2841

Project Number: X4353

Temp. upon arrival: 1.3°C

Preservative: (below) ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
David Sartain / EDCC	3-16-11	0950	[signature]	3-16-11	0950
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 3-16-11	Time: 1300	Received by/Affiliation: J Meagler	Date: 3/16/11	Time: 1300

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

Comments:

Bio-Analytical Laboratories
3240 Spurgin Road
Doyline, LA 71023
(318) 745-2772, Fax (318) 745-2773
bioanalytical@att.net
NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

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

Address: 4500 Northwest Avenue, El Dorado, AR 71731
Fax: (870) 863-1499

Permit #: AR0000752
Purchase Order:

Sampler's Signature/Printed Name/Affiliation: Brent Parker / Brent Parker / EDCC

Analysis:

Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Total Coliform	Lab Control Number:	Preservative: (below)
3/17/11 / 3/18/11	~~0400~~ 0900	X		~~8~~	001	X	X							C2870	ice

Project Number: X4353
Temp. upon arrival: Temperature upon arrival: 3.3
Thermometer #: 29
Tech: AH
Date: 3/18/11

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: Brent Parker / EDCC	3-18-11	~~0900~~	**Received by/Affiliation:**	3-18-11	1000
Relinquished by/Affiliation:	**Date:**	**Time:**	**Received by/Affiliation:**	**Date:**	**Time:**
Relinquished by/Affiliation:	**Date:** 3-18-11	**Time:** 1300	**Received by/Affiliation:** Aimee Haughton	**Date:** 3/18/11	**Time:** 1300

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4353 Date start: 3/15/11 Date end: 3/23/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave. El Dorado AR 71731

NPDES# AR0000752 / AFIN 70-00040

Sample Description 001 Dilution Water soft reconstituted

Test Temperature (°C) 25±1°c Technicians Briggs, Haughton, Zeagler, Callahan

Adults isolated: Date 3/14/11 Time: 2230

Neonates collected: Date 3/15/11 Time: 0615 Board: R22/22S

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089

pH Meter: Model Orion 230A+ Serial #020273

Conductivity Meter: Model Control Company Serial# 80277924

Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

	Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
			NA	NA
0.	10.8/130.9%/AH	0 Y/15/8.3/99.0%/AH	0.	0.
1.	10.9/134.2%/RC	1 Y/15/8.3/100.2%/RC	1.	1.
2.	11.1/132.2%/KWM	2 Y/15/8.2/97.0%/KWM	2.	2.
3.	10.9/132.0%/RC	3 Y/15/8.1/98.7%/RC	3.	3.
4.	10.1/116.5%/AH	4 Y/15/8.3/98.4%/AH	4.	4.
5.	10.1/120.6%/AH	5 Y/15/8.0/96.3%/AH	5.	5.
6.	RS 3/12/11 10.0/121.1%/RC	6 Y/15/8.2/98.6%/RC	6.	6.
7.	10.1/119.9%/KWM	7 Y/15/8.0/95.6%/KWM	7.	7.

	Total Residual Chlorine (mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample #	Date
1.	<0.01/AH	1. NO/AH	1. 3.0/AH	1. C2809	3/15/11
2.	<0.01/KWM	2. NO/KWM	2. 0.5/KWM	2. C2841	3/17/11
3.	<0.01/AH	3. NO/AH	3. 3.0/AH	3. C2870	3/19/11

Comments:

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

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X4353 Test Dates 3/15-23/11 DSM 3/29/11

Client El Dorado Chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100uv
A	20	29	X23	25	20	X22	16
B	22	26	22	20	26	23	X21
C	26	30	26	26	X28	22	15
D	X2	22	26	X25	25	21	17
E	21	24	24	27	19	X8	12
F	X10	26	27	22	X22	22	21
G	30	22	28	27	X24	15	X13
H	23	X	24	18	18	20	18
I	17	18	23	22	15	17	17
J	32	22	26	23	21	22	X12
Surviving Mean	23.9	24.3	25.1	23.3	20.6	20.3	16.6
Total Mean	20.3	21.9	24.9	23.5	21.8	19.2	16.2
CV%*	21.41	15.65	7.83	13.55	18.80	13.91	16.60

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

Key: M=male; X=dead adult

Calculated by: DSM 3/29/11

Calculations checked by: ECB 3/31/11

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4353 Test started: Date 3/13/11 Time 1355
Client El Dorado Chemical Test ended: Date 3/24/11 Time 1300

		0	1	2	3	4	5	6	7	8
Technician:	Day	YM	YM	YM	AH	AH	AH	YM	RC	RC
Time:	Day	1335	1435	1315	1105	1230	1235	1130	1400	1300
Temperature:	Day	24.6	25.0	24.7	24.9	24.7	24.9	24.7	25.0	25.0

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
0	1	0										10	
	2	0										10	
	3	0									→	10	
	4	1	0	0	X2	0	3	2	0	0	0	9	6 AH 3/19/11
	5	0	3	4	|	3	7	0	3	2	4	9	
	6	1	0	0	|	8	X	0	7	5	3	8	
	7	8	7	9	|	10	1	12	13	10	9	8	
	8	10	12	13	|	0	1	16	0	0	16	8	
32	1	0										10	
	2	0										10	
	3	0					→		X	0	→	9	
	4	2	3	4	4	4	4	3	|	4	3	9	
	5	0	7	0	8	0	9	0	|	0	0	9	
	6	11	2	11	0	10	0	10	|	6	7	9	
	7	16	14	15	10	10	13	9	|	8	12	9	
	8	12	14	12	17	14	12	16	|	0	0	9	
42	1	0										10	
	2	0										10	
	3	0									→	10	
	4	4	3	4	4	3	4	4	2	3	4	10	
	5	0	8	0	9	0	8	8	0	0	9	10	
	6	9	0	9	0	10	1	0	11	8	0	10	
	7	10X	11	13	13	11	14	16	11	12	13	9	
	8	1	12	14	11	0	11	10	0	1	13	9	
56	1	0										10	
	2	0										10	
	3	0									→	10	
	4	4	3	3	4	3	3	4	3	4	4	10	
	5	0	9	0	9	0	9	0	0	0	8	10	
	6	7	0	8	0	11	0	10	8	7	0	10	
	7	14	8	15	12	13	10	13	7	11	11	10	
	8	0	14	19	X5	8	14	0	0	0	13	9	
75	1	0										10	
	2	0										10	
	3	0									→	10	
	4	4	4	3	3	3	4	4	4	4	3	10	
	5	0	0	0	9	0	9	0	0	0	0	10	
	6	7	8	10	0	8	0	10	10	7	8	10	
	7	9	14	13	13	8	9	10	8	4	10	10	
	8	12	10	X5	13	0	X9	X4	0	1	0	7	
100	1	0										10	
	2	0										10	
	3	0									→	10	
	4	4	3	4	3	2	3	4	3	3	3	10	
	5	0	0	0	9	0	8	0	0	0	0	10	
	6	7	9	9	0	X10	0	2	9	7	7	9	
	7	11	11	9	9	|	11	9	8	7	8	9	
	8	X4	9	0	0	|	7	0	0	0	4	8	

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

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X4353 Test started: Date 3/15/11 Time 1355
Client El Dorado chemical Test ended: Date 3/23/11 Time 1300

	Day 0	1	2	3	4	5	6	7	8
Technician:	DLM	DLM	DLM	AH	AH	AH	DLM	RC	RC (RC 3/22/11)
Time:	1355	1085	1313	1005	1730	1235	1120	1400	1300
Temperature:	24.6	25.0	24.7	24.9	24.7	24.9	24.7	~~24.9~~ 25.0	25.0

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV Trtd	1	0										10	
	2	0										10	
	3	0									2	10	
	4	3	3	2	3	1	3	3	2	3	2	10	
	5	0	0	0	8	0	9	0	0	0	0	10	
	6	6	9	6	0	6	0	1	6	4	7	10	
	7	7	9	7	6	5	9	9	10	10	3	10	
	8	4	6X	0	5	8	9	X0	0	0	8X	~~8~~ 7 RC 3/22/11	
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	1												
	2												
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	6												
	7												
	8												

DLM 3/15/11 DLM

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

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4353 Test started: Date 3/15/11 Time 1355
Client El Dorado Chemical Test ended: Date 3/23/11 Time 1300
Organism C.dubia

Day/# water used	3142 0	1	2	33144	4	5	6	7	8
Concentration: Control Soft									
pH	7.9	7.7/7.9	7.5/7.2	7.8/7.9	7.6/7.9	7.7/8.1	7.8/8.0	7.9/8.0	8.0
DO (mg/l)	8.1	8.2/8.2	8.1/8.1	7.9/8.1	8.1/8.1	7.9/8.0	7.8/8.1	7.6/8.0	8.0
Cond (umhos/cm)	171.5	169.2	171.5	169.1	170.7	172.9	173.4	179.8	
Alkalinity (mg/L)	36.0			32.0					
Hardness (mg/L)	44.0			40.0					
Concentration: 32%									
pH	7.9	7.8/7.9	7.6/7.4	7.8/8.0	7.7/7.9	7.8/8.1	7.7/8.0	8.0/8.0	8.0
DO (mg/l)	8.1	8.2/8.1	8.1/8.1	7.8/8.1	8.1/8.1	7.8/8.0	7.9/8.1	7.8/8.0	7.9
Cond (umhos/cm)	303	300	295	299	293	294	298	290	
Concentration: 42%									
pH	8.0	7.9/8.0	7.8/7.5	7.8/8.0	7.8/7.9	7.8/8.1	7.9/8.0	8.1/8.0	8.0
DO (mg/l)	8.1	8.2/8.1	8.1/8.1	7.8/8.0	8.1/8.1	7.8/8.0	7.9/8.0	7.9/7.9	7.8
Cond (umhos/cm)	340	338	331	291	332	330	332	325	
Concentration: 56%									
pH	8.0	8.0/8.0	7.8/7.8	7.9/8.1	7.8/8.0	7.8/8.1	7.9/8.1	8.1/8.1	8.1
DO (mg/l)	8.1	8.2/8.1	8.1/8.1	7.8/8.0	8.1/8.1	7.8/8.0	7.9/8.0	7.8/7.9	7.8
Cond (umhos/cm)	398	392	384	384	385	384	388	380	
Concentration: 75%									
pH	8.1	8.0/8.1	7.9/8.0	7.9/8.2	7.9/8.1	7.9/8.2	8.0/8.1	8.1/8.1	8.1
DO (mg/l)	8.1	8.1/8.0	8.1/8.1	7.7/8.0	8.1/8.1	7.7/8.0	7.9/8.0	7.9/7.9	7.9
Cond (umhos/cm)	472	466	453	456	458	459	458	453	
Concentration: 100%									
pH	8.1	8.0/8.2	8.0/8.2	8.0/8.2	8.0/8.1	7.9/8.2	8.0/8.1	8.2/8.2	8.2
DO (mg/l)	8.1	8.2/8.0	8.1/8.1	7.7/8.0	8.1/8.2	7.7/8.0	7.8/8.0	7.9/7.8	7.9
Cond (umhos/cm)	570	560	547	558	551	555	558	549	
Tech-prerenewal				AH	AH	AH		RC	RC
Tech-postrenewal		AH	AH	AH	AH	AH	RC		RC
Hardness (mg/l)	56.0		56.0		48.0				
Alkalinity (mg/l)	72.0		88.0		84.0				

RC 3/23/11

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4353 Test started: Date 3/15/11 Time 1355
Client El Dorado Chemical Test ended: Date 3/23/11 Time 1300
Organism C. dubia

Day/# water used	0 (3142)	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100 UV tr'td									
pH	8.0	8.1/8.1	8.0/8.1	8.1/8.2	8.0/7.9	8.0/8.0	8.1/8.0	8.2/7.9	8.1
DO (mg/l)	7.9	8.1/7.9	7.8/7.9	7.5/7.8	7.9/8.0	7.6/7.9	7.7/7.8	7.4/7.6	7.4
Cond (umhos/cm)	567	561	549	551	569	573	550	533	
Alkalinity (mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Concentration:									
pH									
DO (mg/l)									
Cond (umhos/cm)									
Tech-prerenewal	[illegible]	[illegible]	[illegible]	AH	AH	AH	[illegible]	RC	
Tech-postrenewal		AH	AH	AH	AH	AH	RC	[illegible]	RC
Hardness (mg/l)									
Alkalinity (mg/l)									

Unused 3/15/11 [illegible]

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X4353 Date started: 3/15/11 Date ended 3/22/11

Client/Contact El Dorado Chemical

Address 4500 Northwest Ave. El Dorado AR 71731

NPDES# AR0000752

Sample Description 001 Dilution Water soft reconstituted

Test Temperature(°C) 25±1°c Technicians Briggs, Haughton, Zeagler, Callahan

Test organism age < 48 hr Vendor/ID# Aquatox/658

Feeding Times

Day	Technician/Time/Amount (per replicate) AM	NOON	PM
0			RC/1555/0.20ml
1	EGB/0700/0.10ml	AH/1045/0.10ml	RC/1440/0.10ml
2	EGB/0830/0.10ml	AH/1045/0.10ml	AH/1500/0.10ml
3	EGB/0630/0.10ml	AH 3/16/11 RC/1105/0.10ml	AH/1530/0.10ml
4		AH/1345/0.20ml	AH/1930/0.20ml
5	AH/1000/0.20ml		AH/1445/0.20ml
6	EGB/0645/0.10ml	RC/1120/0.10ml	RC/1605/0.10ml

Dissolved Oxygen Meter: Model YSI550A Serial #06E2089
pH Meter: Model Orion 230A+ Serial #020273
Conductivity Meter: Model Control Company Serial #80277924
Amperometric Titrator: Model Fischer-Porter Serial #92W445766

	Effluent Initial DO(mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0.	10.8/130.9%/dbh	Y/15/8.3/99.0%/dbh	N/A	
1.	10.9/134.2%/AH	Y/15/8.3/100.2%/AH		
2.	11.1/132.2%/AH	Y/15/8.2/97.0%/AH		
3.	10.9/132.0%/AH	Y/15/8.1/98.7%/AH		
4.	10.1/116.5%/AH	Y/15/8.3/98.4%/AH		
5.	10.1/120.6%/AH	Y/15/8.0/96.3%/AH		
6.	10.0/121.1%/RC	Y/15/8.2/98.6%/RC		

	Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia(NH3) (mg/L)/Tech
1.	<0.01/dbh	ND/dbh	3.0/dbh
2.	<0.01/AH	ND/AH	0.5/AH
3.	<0.01/AH	ND/AH	3.0/AH

	BAL Sample #	Date
1	C2809	3/15/11
2	C2841	3/17/11
3	C2870	3/19/11

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

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4353 — Test started: Date 3/15/11 Time 1430
Client El Dorado Chemical — Test ended: Date 3/22/11 Time 1010

	Day 0	1	2	3	4	5	6	7
Technician:	RC	AH	AH	RC	AH	AH	RC	AH
Time:	1430	1040	1045	1035	1655	1440	1115	1010
Temperature	24.9	24.7	24.8°	24.8	25.3	24.4	24.6	24.5

Conc. g	Rep.	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
0	A	8	8	8	8	7	7	6	6
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8
32	A	8	8	8	8	8	7	7	6
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	7	7
	D	8	8	8	8	8	8	8	7
	E	8	8	8	8	8	8	8	8
42	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	9	8	8	8	8
	E	8	8	8	8	8	8	8	8
56	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	7	6
	D	8	7	7	7	7	7	7	7
	E	8	8	8	8	8	8	8	7
75	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	7
100	A	8	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8	7
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8	8

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X4353 Test started: Date 3/15/11 Time 1430
Client El Dorado Chemical Test ended: Date 3/22/11 Time 1010
Technician: Day0 RC 1 AH 2 AH 3 RC 4 AH 5 AH 6 RC 7 AH
Time: Day0 1430 1 1040 2 1045 3 1039 4 1655 5 1440 6 1115 7 1010
Temperature Day0 24.9 1 24.7 2 24.8 3 24.8 RC 3/18/11 4 25.3 5 24.4 6 24.6 7 24.5

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

Omit AH 3/14/11

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

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

Oven Temperature (° Celsius) 98°

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 3/21/11 Tech: LBM	Wt. of pan + larvae(g)/ Date weighed: 3/23/11 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*
0	A 66	0.9442	0.9500	0.0058	8	0.725	6) 0.967
	B 67	0.9480	0.9552	0.0072	8	0.900	
	C 68	0.9527	0.9595	0.0068	8	0.850	
	D 69	0.9541	0.9612	0.0071	8	0.888	
	E 70	0.9557	0.9623	0.0066	8	0.825	
32	A 71	0.9583	~~0.9635~~ AH 3/23/11	0.0052	8	0.650	
	B 72	0.96006	0.96667	0.0061	8	0.763	
	C 73	0.9598	0.9655	0.0057	8	0.713	
	D 74	0.9584	0.9635	0.0051	8	0.638	
	E 75	0.9589	0.9655	0.0066	8	0.825	
42	A 76	0.9580	0.9636	0.0056	8	0.700	
	B 77	0.9560	0.9622	0.0062	8	0.775	
	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	
56	A 81	0.9529	0.9582	0.0053	8	0.663	
	B 82	0.9514	0.9581	0.0067	8	0.838	
	C 83	0.9442	0.9487	0.0045	8	0.563	
	D 84	0.9378	0.9439	0.0061	8	0.763	
	E 85	0.9353	0.9406	0.0053	8	0.663	
75	A 86	0.9348	0.9405	0.0057	8	0.713	
	B 87	0.9330	0.9397	0.0067	8	0.838	
	C 88	0.9359	0.9430	0.0071	8	0.888	
	D 89	0.9385	0.9443	0.0058	8	0.725	
	E 90	0.9389	0.9451	0.0062	8	0.775	
100	A 91	0.9420	0.9484	0.0064	8	0.800	
	B 92	0.9492	0.9561	0.0069	8	0.863	
	C 93	0.9519	0.9582	0.0063	8	0.788	
	D 94	0.9539	0.9599	0.0060	8	0.750	
	E 95	0.9567	0.9637	0.0070	8	0.875	

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

Calculated by: LBM 3/24/11 Calculations checked by: ECD 4/1/11

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

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

Oven Temperature (° Celsius)

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 3/21/11 Tech: LBG	Wt. of pan + larvae(g)/ Date weighed: 3/23/11 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*
100 UV Trtd	A 96	0.9603	0.9658	0.0055	8	0.688	
	B 97	0.9608	0.9673	0.0065	8	0.813	
	C 98	0.9594	0.9655	0.0061	8	0.763	
	D 99	0.9597	0.9661	0.0064	8	0.800	
	E 100	0.9584	0.9647	0.0063	8	0.788	
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						
	A						
	B						
	C						
	D						
	E						

Omit 3/17/11 LBG

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

Calculated by: LBG 3/24/11 Calculations checked by: EGB 4/1/11

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4353 Test started: Date 3/15/11 Time 1430

Client El Dorado Chemical Test ended: Date 3/22/11 Time 1010

Organism P. promelas

Day/# water used	3143 0	1	2	3144	4	5	6	7	8
Concentration: Control soft									
pH	7.9	7.9 / 7.9	7.6 / 7.2	7.4 / 7.9	7.5 / 7.9	7.6 / 8.1	7.6 / 8.0	7.4	
DO (mg/l)	8.1	7.0 / 8.2	6.5 / 8.1	6.2 / 8.1	7.4 / 8.1	7.6 / 8.0	7.5 / 8.1	6.3	
Cond (umhos/cm)	171.5	169.2	171.5	169.1	170.7	172.9	173.4		
Alkalinity (mg/L)	36.0			32.0					
Hardness (mg/L)	44.0			40.0					
Concentration: 32%									
pH	7.9	7.7 / 7.9	7.5 / 7.4	7.4 / 8.0	7.5 / 7.9	7.5 / 8.1	7.4 / 8.0	7.3	
DO (mg/l)	8.1	7.0 / 8.1	6.2 / 8.1	6.1 / 8.1	7.3 / 8.1	7.5 / 8.0	7.5 / 8.1	6.1	
Cond (umhos/cm)	303	300	295	299	293	294	298		
Concentration: 42%									
pH	8.0	7.6 / 8.0	7.5 / 7.5	7.4 / 8.0	7.5 / 7.9	7.5 / 8.1	7.4 / 8.0	7.3	
DO (mg/l)	8.1	7.1 / 8.1	7.1 / 8.1	7.0 / 8.0	7.1 / 8.1	7.5 / 8.0	7.5 / 8.0	6.2	
Cond (umhos/cm)	340	338	331	291	332	330	332		
Concentration: 56%									
pH	8.0	7.7 / 8.0	7.6 / 7.8	7.6 / 8.1	7.5 / 8.0	7.6 / 8.1	7.5 / 8.1	7.3	
DO (mg/l)	8.1	7.1 / 8.1	6.4 / 8.1	6.2 / 8.0	7.8 / 8.1	7.4 / 8.0	7.4 / 8.0	6.0	
Cond (umhos/cm)	398	392	384	384	385	384	388		
Concentration: 75%									
pH	8.1	7.7 / 8.1	7.7 / 8.0	7.4 / 8.2	7.6 / 8.1	7.7 / 8.2	7.5 / 8.1	7.4	
DO (mg/l)	8.1	7.0 / 8.0	6.2 / 8.1	6.2 / 8.0	7.0 / 8.1	7.4 / 8.0	7.4 / 8.0	5.7	
Cond (umhos/cm)	472	466	453	456	458	459	458		
Concentration: 100%									
pH	8.1	7.8 / 8.2	7.7 / 8.2	7.6 / 8.2	7.7 / 8.1	7.7 / 8.2	7.5 / 8.1	7.4	
DO (mg/l)	8.1	7.1 / 8.0	6.2 / 8.1	6.0 / 8.0	7.8 / 8.2	7.4 / 8.0	7.4 / 8.0	5.5	
Cond (umhos/cm)	570	566	547	558	551	555	558		
Tech-prerenewal		RC	AH	RC	AH	AH	RC		
Tech-postrenewal		AH	AH	AH	AH	AH	RC	AH	
Hardness (mg/l)	56.0		56.0		48.0				
Alkalinity (mg/l)	72.0		88.0		84.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X4353 Test started: Date 3/15/11 Time 1430
Client El Dorado Chemical Test ended: Date 3/22/11 Time 1010
Organism P. promelas

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100% uv-trt'd									
pH	8.0	7.8/8.1	7.7/8.1	7.6/8.2	7.8/7.9	7.6/8.0	7.5/8.0	7.6/	
DO(mg/l)	7.9	7.1/7.9	6.2/7.9	6.2/7.8	7.1/8.0	7.4/7.9	7.4/7.8	5.8/	
Cond(umhos/cm)	567	561	549	554	569	573	550		
Alkalinity(mg/L)									
Hardness (mg/L)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Concentration:									
pH									
DO(mg/l)									
Cond(umhos/cm)									
Tech-prerenewal	[illegible]	RC	AH	RC	AH	AH	RC		
Tech-postrenewal		AH	AH	AH	AH	AH	RC	AH	
Hardness(mg/l)									
Alkalinity(mg/l)									

[illegible] AH 3/14/11

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	3/15/2011	Test ID:	X4353cd	Sample ID:	1
End Date:	3/23/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

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

Conc-%	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed 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

 Reviewed by: EQB 3/31/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	3/15/2011	Test ID:	X4353cd	Sample ID:	1
End Date:	3/23/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	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	
100UV	16.000	15.000	17.000	12.000	21.000	18.000	17.000		

			Transform: Untransformed					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

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 Treatments vs D-Control	4.44379	0.18613	70.3115	12.0138	1.1E-04	6, 50

Reviewed by: EOB 3/31/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	3/15/2011	Test ID:	X4353cd	Sample ID:	1
End Date:	3/23/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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: Untransformed					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

ToxCalc v5.0.23

Reviewed by: EJB 3/31/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	3/15/2011	Test ID:	X4353cd	Sample ID:	1
End Date:	3/23/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	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: Untransformed					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						

Reviewed by: 3/31/11

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	3/15/2011	Test ID:	X4353cd	Sample ID:	1
End Date:	3/23/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

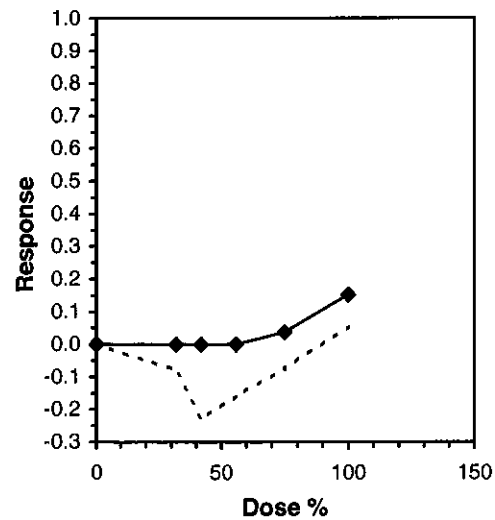
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	20.000	22.000	26.000	2.000	21.000	10.000	30.000	23.000	17.000	32.000
32	29.000	26.000	30.000	22.000	24.000	26.000	22.000	0.000	18.000	22.000
42	23.000	22.000	26.000	26.000	24.000	27.000	28.000	24.000	23.000	26.000
56	25.000	20.000	26.000	25.000	27.000	22.000	27.000	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: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	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		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL	Skew
IC05	77.716			
IC10	88.606			
IC15	99.495			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



ToxCalc v5.0.23

Reviewed by: 3/31/11

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	3/15/2011	Test ID:	X4353pp	Sample ID:	1
End Date:	3/22/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-EPA/821/R-02-01	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

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	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				

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	3/15/2011	Test ID:	X4353pp	Sample ID:	1
End Date:	3/22/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-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: Untransformed					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 Treatments vs D-Control	0.10665	0.12735	0.01999	0.00477	0.00222	7, 32

- IC_{25} > 100%
- %CV not high

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	3/15/2011	Test ID:	X4353pp	Sample ID:	1
End Date:	3/22/2011	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	3/14/2011	Protocol:	EPAFW02-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

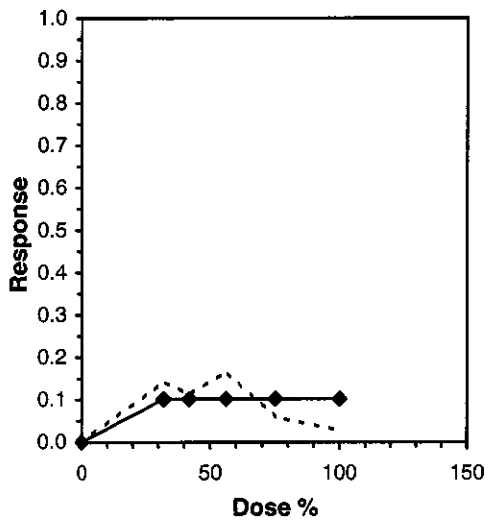
			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.8375	1.0000	0.8375	0.7250	0.9000	8.310	5	0.8375	1.0000
32	0.7175	0.8567	0.7175	0.6375	0.8250	10.922	5	0.7520	0.8979
42	0.7425	0.8866	0.7425	0.6875	0.8000	6.477	5	0.7520	0.8979
56	0.6975	0.8328	0.6975	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		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05*	15.673			
IC10*	31.345			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

* indicates IC estimate less than the lowest concentration



ToxCalc v5.0.23

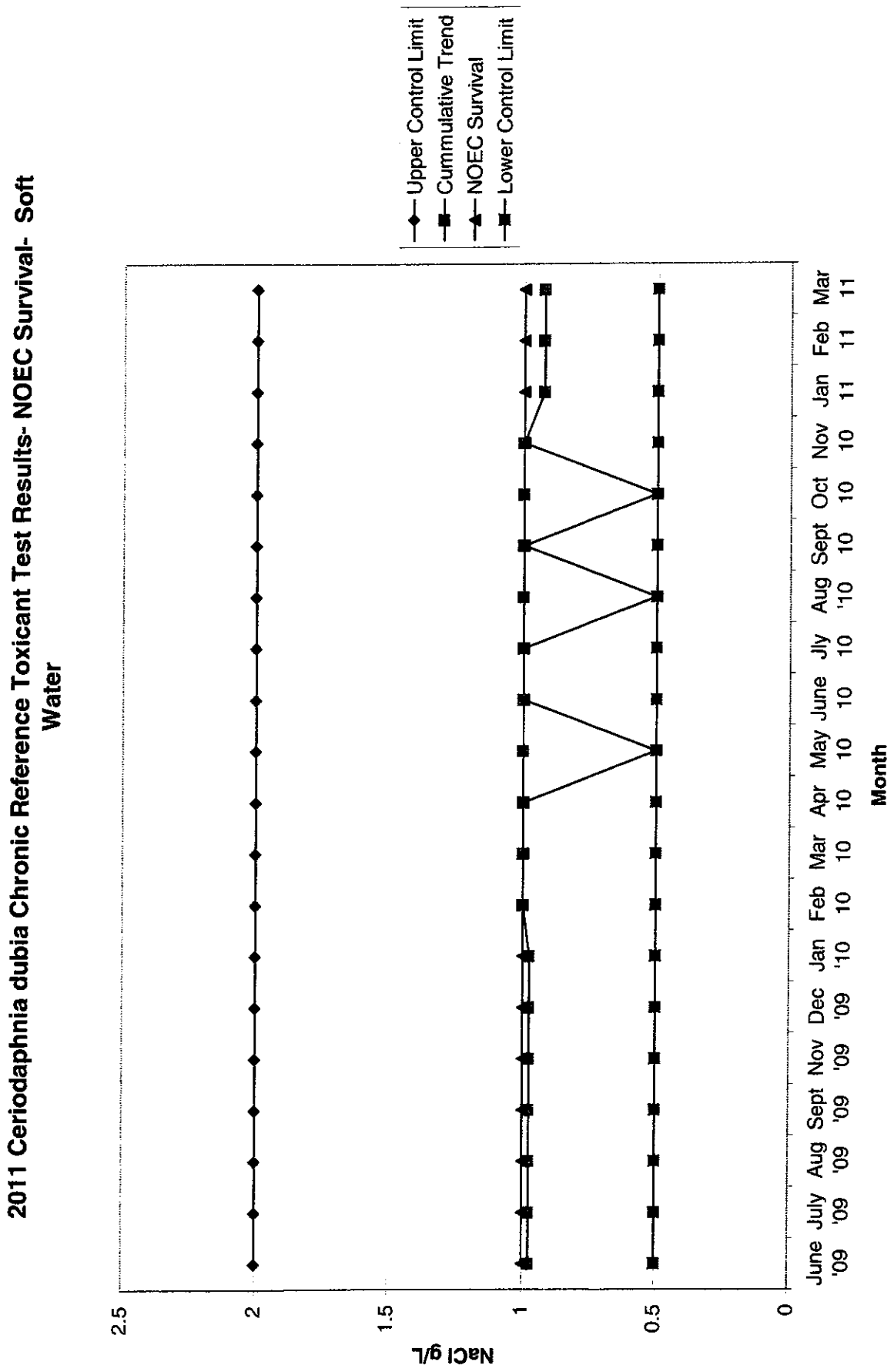
Reviewed by:

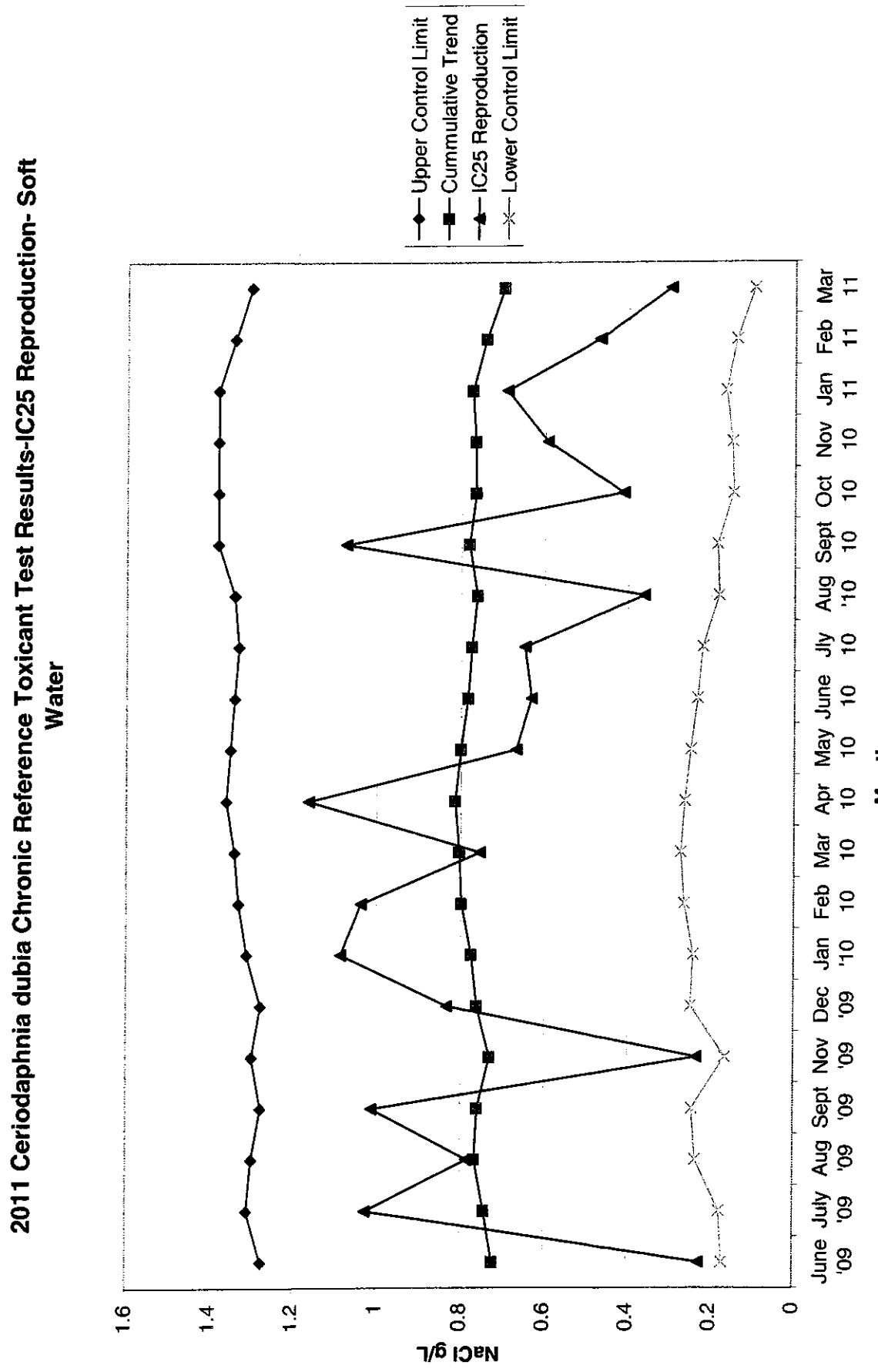
APPENDIX D
QUALITY ASSURANCE CHARTS

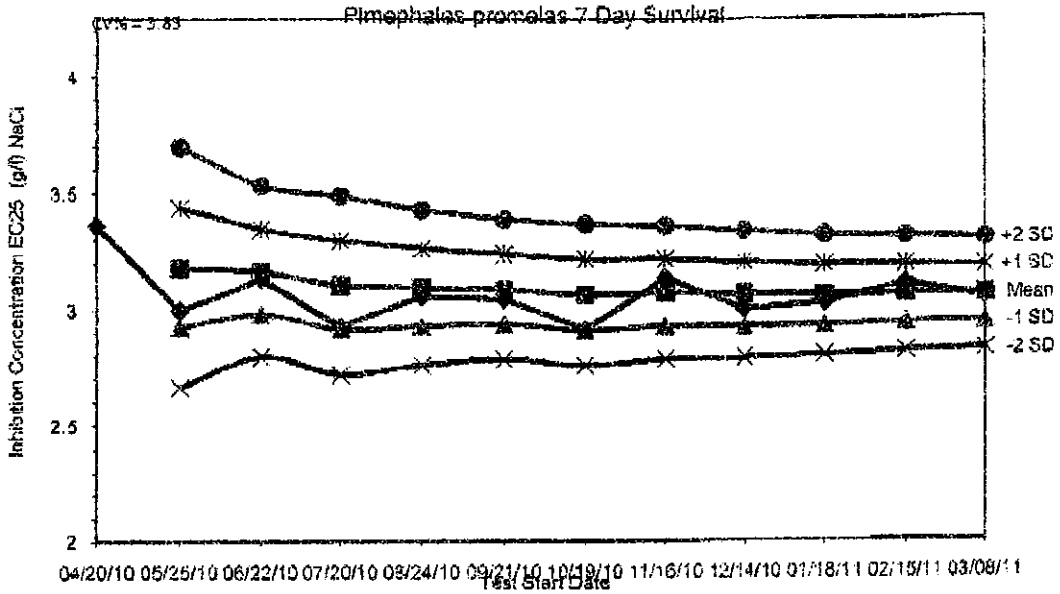
Bio-Analytical Laboratories' 2011 Results of the Monthly Chronic Reference Toxicant Tests

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									
***Ceriodaphnia dubia* (in soft reconstituted water)**												
NOEC survival	1.0	1.0	1.0									
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									

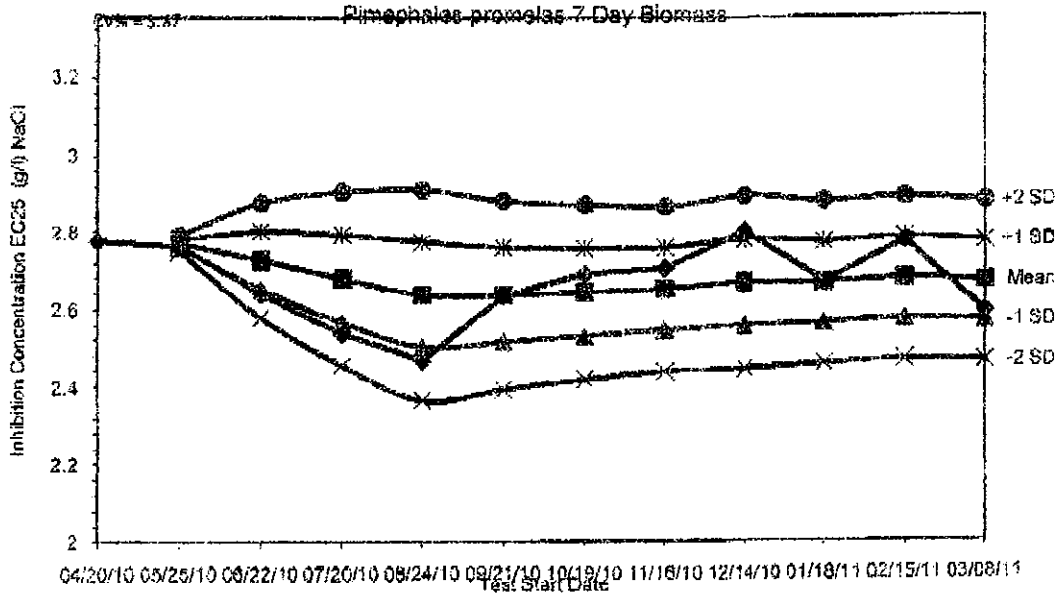
Reference toxicant is 100 g/L sodium chloride (NaCl). *In-house organisms not used this month.
+Test invalid. Not enough time left in the month to conduct a retest.


2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results- NOEC Survival- Soft Water
Upper Control Limit
Cummulative Trend
NOEC Survival
Lower Control Limit
NaCl g/L
2.5
2
1.5
1
0.5
0
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Jan 11
Feb 11
Mar 11
Month


2011 Ceriodaphnia dubia Chronic Reference Toxicant Test Results-IC25 Reproduction- Soft Water
Upper Control Limit
Cummulative Trend
IC25 Reproduction
Lower Control Limit
NaCl g/L
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
June '09
July '09
Aug '09
Sept '09
Nov '09
Dec '09
Jan '10
Feb 10
Mar 10
Apr 10
May 10
June 10
Jly 10
Aug '10
Sept 10
Oct 10
Nov 10
Jan 11
Feb 11
Mar 11
Month



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/20/10	3.3646					
05/25/10	3.0000	3.1823	2.9245	2.6867	3.4401	3.6979
06/22/10	3.1346	3.1664	2.9820	2.7977	3.3508	3.5351
07/20/10	2.9286	3.1089	2.9151	2.7233	3.2968	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	2.7964	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	3.2166	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



Dates	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	2.8408	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	2.6907	2.6441	2.5310	2.4179	2.7572	2.8703
11/16/10	2.7060	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	2.8887
03/08/11	2.5917	2.6711	2.5678	2.4644	2.7745	2.8778

APPENDIX E
AGENCY FORMS

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia Survival and Reproduction

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

	Time	Date	Time	Date
Composite 1 Collected From	**0950**	**3/13/11 To**	**0950**	**3/14/11**
Composite 2 Collected From	**0730**	**3/15/11 To**	**0730**	**3/16/11**
Composite 3 Collected From	**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: **Receiving** X **Reconstituted**

PERCENT SURVIVAL

Time of Reading	Percent 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

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100
A	20	29	D23	25	20	D22
B	22	26	22	20	26	23
C	26	30	26	26	D28	22
D	D2	22	26	D25	25	21
E	21	24	24	27	19	D8
F	D10	26	27	22	D22	22
G	30	22	28	27	D24	15
H	23	D	24	18	18	20
I	17	18	23	22	15	17
J	32	22	26	23	21	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	21.8	19.2
CV%*	21.41	15.65	7.83	13.55	18.80	13.91

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

PMSD = 28.7%

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

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

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

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

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

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

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

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

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

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

Sample No. 1 Collected: Date: 3/14/11 Time: 0950
Sample No. 2 Collected: Date: 3/16/11 Time: 0730
Sample No. 3 Collected: Date: 3/18/11 Time: 0900
Test Begin: Date: 3/15/11 Time: 1355
Test End: Date: 3/23/11 Time: 1300

Dilution: 0 Day:

	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.1	8.1	8.1	8.0	8.1	8.0	
pH Initial	7.7	7.5	7.8	7.6	7.7	7.8	7.9	
pH Final	7.9	7.2	7.9	7.9	8.1	8.0	8.0	
Alkalinity	36.0		32.0					
Hardness	44.0		40.0					
Conductivity	169.2	171.5	169.1	170.7	172.9	175.4	179.8	
Chlorine	<.01		<.01					

Dilution: 56 Day:

	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.1	8.0	8.1	8.0	8.0	7.9	
pH Initial	8.0	7.8	7.9	7.8	7.8	7.9	8.1	
pH Final	8.0	7.8	8.1	8.0	8.1	8.1	8.1	
Alkalinity								
Hardness								
Conductivity	392	384	384	385	384	388	380	
Chlorine								

Dilution: 32 Day

	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.1	8.1	8.1	8.0	8.1	8.0	
pH Initial	7.8	7.6	7.8	7.7	7.8	7.7	8.0	
pH Final	7.9	7.4	8.0	7.9	8.1	8.0	8.0	
Alkalinity								
Hardness								
Conductivity	300	295	299	293	294	298	290	
Chlorine								

Dilution: 75 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	24.7	24.9	24.7	24.9	24.7	25.0	
DO Initial	8.1	8.1	7.7	8.1	7.7	7.9	7.9	
DO Final	8.0	8.1	8.0	8.1	8.0	8.0	7.9	
pH Initial	8.0	7.9	7.9	7.9	7.9	8.0	8.1	
pH Final	8.1	8.0	8.2	8.1	8.2	8.1	8.1	
Alkalinity								
Hardness								
Conductivity	466	453	456	458	459	458	453	
Chlorine								

Dilution: 42 Day

	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.1	8.0	8.1	8.0	8.0	7.9	
pH Initial	7.9	7.8	7.8	7.8	7.8	7.9	8.1	
pH Final	8.0	7.5	8.0	7.9	8.1	8.0	8.0	
Alkalinity								
Hardness								
Conductivity	338	331	291	332	330	332	325	
Chlorine								

Dilution: 100 Day

	1	2	3	4	5	6	7	Comments
Temp (C)	25.0	24.7	24.9	24.7	24.9	24.7	25.0	
DO Initial	8.2	8.1	7.7	8.1	7.7	7.8	7.9	
DO Final	8.0	8.1	8.0	8.2	8.0	8.0	7.8	
pH Initial	8.0	8.0	8.0	8.0	7.9	8.0	8.2	
pH Final	8.2	8.2	8.2	8.1	8.2	8.1	8.2	
Alkalinity	72.0	88.0		84.0				
Hardness	56.0	56.0		48.0				
Conductivity	566	547	558	551	555	558	549	
Chlorine	<.01	<.01		<.01				

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

Permittee: El Dorado Chemical **NPDES No.: AR0000752**

	Time	Date	Time	Date
Composite 1 Collected from:	**0950**	**3/13/11 To**	**0950**	**3/14/11**
Composite 2 Collected from:	**0730**	**3/15/11 To**	**0730**	**3/16/11**
Composite 3 Collected from:	**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**	**Reconstituted**

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	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. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
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%

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

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

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

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

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

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

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

3. If you answered NO to 1. a) and 2. a) enter (0) otherwise enter (1): 0
4. If you answered NO to 1. b) and 2. b) enter (0) otherwise enter (1): N/A
5. Enter response to item 3 on DMR Form, parameter #TEP6C.
6. Enter response to item 4 on DMR Form, parameter #TFP6C.
7. Enter percent effluent corresponding to each NOEC below and circle lowest number:

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

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

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

Sample No. 1 Collected: Date: 3/14/11 Time: 0950
Sample No. 2 Collected: Date: 3/16/11 Time: 0730
Sample No. 3 Collected: Date: 3/18/11 Time: 0900
Test Begin: Date: 3/15/11 Time: 1430
Test End: Date: 3/22/11 Time: 1010

Dilution: 0 Day:	1	2	3	4	5	6	7	Comments
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 Final	8.2	8.1	8.1	8.1	8.0	8.1		
pH Initial	7.9	7.6	7.4	7.5	7.6	7.6	7.4	
pH Final	7.9	7.2	7.9	7.9	8.1	8.0		
Alkalinity	36.0		32.0					
Hardness	44.0		40.0					
Conductivity	169.2	171.5	169.1	170.7	172.9	173.4		
Chlorine	<.01		<.01					

Dilution: 56 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.1	6.4	6.2	7.0	7.4	7.4	6.0	
DO Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.7	7.6	7.6	7.5	7.6	7.5	7.3	
pH Final	8.0	7.8	8.1	8.0	8.1	8.1		
Alkalinity								
Hardness								
Conductivity	392	384	384	385	384	388		
Chlorine								

Dilution: 32 Day	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.1	8.1	8.1	8.0	8.1		
pH Initial	7.7	7.5	7.4	7.5	7.5	7.4	7.3	
pH Final	7.9	7.4	8.0	7.9	8.1	8.0		
Alkalinity								
Hardness								
Conductivity	300	295	299	293	294	298		
Chlorine								

Dilution: 75 Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.0	6.2	6.2	7.0	7.4	7.4	5.7	
DO Final	8.0	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.7	7.7	7.6	7.6	7.7	7.5	7.4	
pH Final	8.1	8.0	8.2	8.1	8.2	8.1		
Alkalinity								
Hardness								
Conductivity	466	453	456	458	459	458		
Chlorine								

Dilution: 42 Day	1	2	3	4	5	6	7	Comments
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 Final	8.1	8.1	8.0	8.1	8.0	8.0		
pH Initial	7.6	7.5	7.4	7.5	7.5	7.4	7.3	
pH Final	8.0	7.5	8.0	7.9	8.1	8.0		
Alkalinity								
Hardness								
Conductivity	338	331	291	332	330	332		
Chlorine								

Dilution: 100 Day	1	2	3	4	5	6	7	Comments
Temp (C)	24.7	24.8	24.8	25.3	24.4	24.6	24.5	
DO Initial	7.1	6.2	6.0	7.0	7.4	7.4	5.5	
DO Final	8.0	8.1	8.0	8.2	8.0	8.0		
pH Initial	7.8	7.7	7.6	7.7	7.7	7.5	7.4	
pH Final	8.2	8.2	8.2	8.1	8.2	8.1		
Alkalinity	72.0	88.0		84.0				
Hardness	56.0	56.0		48.0				
Conductivity	566	547	558	551	555	558		
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

Client: ElDorado Chemical

Project#: X4353

Proofed First Draft: _____ **Date:** _____

Proofed Final Draft: Erin M. Brupp **Date:** EMB 4/18 4/18/11

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.

Erin M. Brupp, BS **Date:** 4/18/11

Quality Assurance Officer

Attachment 2

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

EL DORADO

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

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,

Greg Withrow

Greg Withrow
General Manager

Enclosures

NON-COMPLIANCE REPORT

Facility Name: El Dorado Chemical Company

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

Month / Year: Nov-10

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
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 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 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 outfall was blocked in.

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

Shyog Withrow

Signature / Date 12/21/2010