Bio-Analytical Laboratories (BAL)
ADEQ Certificate #88-0630
Project X5002

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
4500 Northwest Avenue
El Dorado, AR 71731
Project #: X5002
Outfall: 001
Permit #: AR0000752/ AFIN #70-00040
Contact: Larken Pennington
Test Dates: January 22 - 29, 2013
Test Type: Chronic Static Renewal Survival and Reproduction Test using *Ceriodaphnia dubia* (EPA Method 1002.0).
Chronic Static Renewal Survival and Growth Test using *Pimephales promelas* (EPA Method 1000.0).

Results:

For *Ceriodaphnia dubia:*

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter TLP3B - 0.
2. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter TGP3B - 0.
3. Report the NOEC value for survival, Parameter TOP3B - 100%.
4. Report the NOEC value for reproduction, Parameter TPP3B - 100%.
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP3B - 30.32%.

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% (based on 100% UV)
5. Report the largest % coefficient of variation between the control and the critical dilution, Parameter TQP6C - 24.17%

Note: Treating with UV light reduced the non-lethal effect.
The IC25 for growth in the non-UV treated test was >100%

This report contains a total of 49 pages, including this page. The results in the report pertain only to the samples documented in the enclosed chain of custody documents, and meet the standards set forth by TNI and ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

Bio-Analytical Laboratories

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THE RESULTS OF TWO CHRONIC DEFINITIVE TOXICITY TESTS FOR OUTFALL 001

AT

EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas

NPDES #AR0000752
AFIN #70-00040

EPA Methods 1000.0 and 1002.0

Project X5002

Test Dates: January 22 - 29, 2013

Report Date: February 4, 2013

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

Prepared by:
Ginger Briggs
Bio-Analytical Laboratories
P.O. Box 527
Doyline, LA 71023
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BAL
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Project X5002

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1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

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

2.3 Dilution Water

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

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2.4 Test Concentrations

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

2.5 Sample Collection

Three 24-hour composite samples of Outfall 001 were collected by El Dorado Chemical personnel on January 21, 23 and 25, 2013. Upon collection and completion of each composite, the samples were chilled to 4^0 Celsius. The samples were delivered to the laboratory by BAL personnel.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, the samples were warmed to 25 ± 1^0 Celsius. Total residual chlorine levels were measured with a Capital Controls^R amperometric titrator and recorded if present. Total ammonia levels were measured using a HACH^R test strip. Portions of the effluent were treated with an 18 watt ultraviolet light (UV) at a rate of 113 ml per minute. An extra 100 percent concentration was run in the tests to determine if any toxicity was due to 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, while the growth data was analyzed using Dunnett's Test, a parametric test. The test endpoints in the reference toxicant tests and any other quality control test endpoints were obtained by approved EPA methods of analysis.

3.0 Results and Discussion

The results of the *Ceriodaphnia dubia* test can be found in Table 1. After seven days of exposure, 100 percent survival occurred in the control and in all of the effluent dilutions. The average number of neonates per female after three broods in the control was 20.4, while the average number of neonates in the 100 percent critical dilution was 23.7. The No-Observed-Effect-Concentration (NOEC) for survival and reproduction in this test was 100 percent effluent (p=.05). Toxic effects were not noted in the UV-treated critical dilution.

The fathead minnow test results can be found in Table 2. Ninety-seven-point-five percent survival occurred in the control, 85 percent survival occurred in the 100 percent critical dilution and 95 percent survival occurred in the UV treated critical dilution after seven days of exposure. The average weight gained per minnow in the control was 0.353 milligram (mg), 0.280 mg in the critical dilution and 0.323 mg in the UV treated critical dilution. The NOEC for survival and growth in this test was 100 percent effluent (p=.05). Treating with UV light reduced the non-lethal effect (i.e. lack of growth) in this test, thus the NOEC value for growth was based upon the UV-treated dilution. It should be noted that the Inhibition Concentration at 25 percent value (IC25) for growth in the non-UV treated portion of the test was >100 percent. The IC25 value is usually more accurate than the NOEC value.

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

Percent Effluent	Percent Survival	Sig.*	Mean # Neonates-Surviving	Mean # Neonates -Total	Sig.*
Control	100.0		20.4	20.4	
32.0	100.0		27.0	27.0	
42.0	100.0		26.1	26.1	
56.0	100.0		24.7	24.7	
75.0	100.0		25.3	25.3	
100.0	100.0		26.2	26.2	
100.0 UV	100.0		23.7	23.7	

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

Table 2: Results of the Chronic Definitive Fathead Minnow Test

Percent Effluent	Percent Survival	Sig.*	Mean Dry Weight (mg)	Sig.*
Control	97.5		0.353/0.362+	
32.0	100.0		0.340	
42.0	95.0		0.330	
56.0	100.0		0.305	
75.0	92.5		0.313	
100.0	85.0		0.280	*
100.0 UV	95.0		0.323	

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

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

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4.0 Conclusions

The three composite samples of Outfall 001 collected from El Dorado Chemical Company, El Dorado, Arkansas, on January 21, 23 and 25, 2013, were not found to be lethally toxic to the *Ceriodaphnia dubia* test organisms in the 100 percent critical dilution after seven days of exposure (p=.05). Nonlethal effects (i.e., lack reproduction) were not noted in the *Ceriodaphnia dubia* test (p=.05). The samples were not found to be lethally toxic to the fathead minnow test organisms in the 100 percent dilution after seven days of exposure (p=05). Non-lethal effects (i.e. lack of growth) were noted in the critical dilution in the fathead minnow test; however, treating the effluent with UV light reduced the nonlethal effect (p=.05). It should be noted that the IC25 value for growth in the non-UV treated test was >100 percent (p=.05). The IC25 value tends to be more accurate than the NOEC value.

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5.0 References

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

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

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

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

Laboratory Use Only:

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

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Project Number: / Temp. upon arrival: / Preservative: (below)
1/20/13 - 1/21/13	8:30 - 8:30	X		8 EDB 1/21/13 6 half gallon	001	X	X	X	X				C68826	X5002 / 1.8°C #29 EDB 1/21/13 / ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington / EDCC	1/21/13	10:00	Brendan Walter BAL	1/21/13	10:00
Brendan Walter BAL	1/21/13	12:15	Bill Bunn BAL	1/21/13	1215
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:

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

Comments:

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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: X5002
Permit #: AR0000752	Purchase Order:										Temp. upon arrival: 4.0°C #25 EB 1/23/13
Sampler's Signature/Printed Name/Affiliation: Karen Pennington | Karen Pennington | EDCC											Preservative: (below)
Date Start / Date End	Time Start / Time End	C	G	# containers	Sample Identification						
1-22-13 / 1-23-13	8:30 / 8:30	X		8	001	X	X				C6843	ice

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Karen Pennington | EDCC	1/23/13	0930	Erin L Bregg BR	1/23/13	0930
Relinquished by/Affiliation: Erin L Bregg BR	1/23/13	1215	Jeagler	1/23/13	1215
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:

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

Comments:

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NELAP 01975, ADEQ #88-0630, EPA LA00917

CHAIN OF CUSTODY

Laboratory Use Only:

Company:	Phone:
El Dorado Chemical Company	(870) 863-1484
Address:	**Fax:**
4500 Northwest Avenue, El Dorado, AR 71731	(870) 863-1499
Permit #:	**Purchase Order:**
AR0000752	

Sampler's Signature/Printed Name/Affiliation: Larken Pennington/Larken Pennington/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)
1-24-13 / 1-25-13	8:30 / 8:30	X		8	001	X	X							CL6861	ice

Temperature upon arrival: 2.7
Thermometer #: 09
Tech: LM
Date: 1/25/13

Project Number: X5002

Temp. upon arrival:

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Larken Pennington/EDCC	1/25/13	09:35	Brenden Walter	1/25/13	09:35
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Brenden Walter	1/25/13	12:05	Lmgaugler	1/25/13	1205
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:

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# X5002 Date start: 1/22/13 Date end: 1/29/13

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

Adults isolated: Date 1/22/13 Time: 0645

Neonates collected: Date 1/22/13 Time: 1410 Board: V32S
Dissolved Oxygen Meter: Model YSI55D Serial #06E2089 AU
pH Meter: Model Orion 230A+ Serial #105253
Conductivity Meter: Model Control Company Serial# 80277924
Amperometric Titrator: Model Fischer-Porter Serial # 92W445766

Effluent Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech	Receiving Water Initial D.O. (mg/L & %)/Tech	Aerate?/Minutes /Final D.O. (mg/L & %)/Tech
0. 11.1/131.3%/KMy	0. Y/20/8.1/94.0%/KMy	0. NA	0. NA
1. 11.0/135.1%/KMy	1. Y/20/8.4/98.1%/KMy	1.	1.
2. 11.5/131.9%/RC	2. Y/20/8.6/100.1%/RC	2.	2.
3. 11.4/135.8%/AH	3. Y/20/8.5/99.7%/AH	3.	3.
4. 11.2/135.1%/AH	4. Y/20/8.5/99.3%/AH	4.	4.
5. 12.1/146.3%/AH	5. Y/20/8.6/99.9%/AH	5.	5.
6. 11.4/136.8%/KMy	6. Y/20/8.5/100%/KMy	6.	6.
7.	7.	7.	7.

Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in Use
1. <0.01/KMy	1. NO/KMy	1. 1.0/KMy	1. C10826 1/22/13
2. <0.01/RC	2. No/RC	2. 1.0/RC	2. C6843 1/24/13
3. <0.01/AH	3. NO/AH	3. 1.0/AH	3. C10861 1/26/13

Comments:

BIO-ANALYTICAL LABORATORIES
NUMBER NEONATES PER BROOD CERIODAPHNIA

Project # X5002 Test Dates 11/22/13 - 11/29/13

Client El Dorado chemical

Replicate	% Concentration						
	0	32	42	56	75	100	100UV
A	24	28	28	30	30	27	16
B	18	24	16	12	20	30	24
C	28	29	27	26	24	26	27
D	23	29	23	28	29	11	22
E	13	20	27	26	18	27	26
F	24	28	32	27	26	25	24
G	7	28	30	27	25	27	25
H	21	20	24	19	28	30	29
I	23	29	25	28	25	31	26
J	23	35	29	24	28	28	18
Surviving Mean	20.4	27.0	26.1	24.7	25.3	26.2	23.7
Total Mean	20.4	27.0	26.1	24.7	25.3	26.2	23.7
CV%*	30.32	16.84	17.18	26.68	15.26	21.65	17.00

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

Key: M=male; X=dead adult

Calculated by: LHM 11/30/13

Calculations checked by: PM 11/30/13

BIO-ANALYTICAL LABORATORIES
CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION TEST

Project# X5002 Test started: Date 1/30 Time 1510
Client El Dorado Chemical Test ended: Date 2/6 Time 1505

Technician:	Day0 JM	1 AH	2 AH	3 AH	4 AH	5 AH	6 JM	7 JM	8
Time:	Day0 1510	1 1430	2 1440	3 1350	4 1400	5 1405	6 1415	7 1505	8
Temperature:	Day0 24.0	1 24.9	2 24.9	3 24.6	4 24.9	5 24.6	6 24.5	7 24.4	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	2	3	4	0	4	0	3	4	4	10	
	5	9	0	0	8	3	7	3	6	0	8	10	
	6	0	8	10	0	0				7	0	10	
	7	11	8	15	11	10	13	4	12	12	11	10	
	8												
32	1	0										10	
	2	0										10	
	3	0										10	
	4	4	0	0	3	4	4	4	4	3	4	10	
	5	0	3	3	9	8	9	9	0	0	0	10	
	6	9	6	10	0					9	13	10	
	7	15	15	16	17	8	15	15	16	17	18	10	
	8												
42	1	0										10	
	2	0										10	
	3	0										10	
	4	4	0	4	4	4	0	0	0	0	4	10	
	5	9	5	8	7	8	4	3	8	8	8	10	
	6	0	11	0			11	11	0			10	
	7	15	0	15	12	15	17	16	16	17	17	10	
	8												
56	1	0										10	
	2	0										10	
	3	0										10	
	4	4	3	4	4	3	4	4	4	4	3	10	
	5	9	0	9	9	9	9	10	0	9	9	10	
	6	1	0									10	
	7	16	9	13	15	14	14	13	15	15	12	10	
	8												
75	1	0										10	
	2	0										10	
	3	0										10	
	4	4	4	0	4	4	2	2	4	0	4	10	
	5	10	10	3	9	10	10	8	9	8	8	10	
	6	0	1	7	0					3	0	10	
	7	16	5	14	16	4	14	15	15	14	16	10	
	8												
100	1	0										10	
	2	0										10	
	3	0										10	
	4	0	4	3	0	3	2	4	4	4	4	10	
	5	10	10	9	4	8	8	10	11	10	8	10	
	6	0			7	8					9	10	
	7	17	16	14	0	16	15	13	15	17	15	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# X5002 Test started: Date 1/22/13 Time 1510
Client El Dorado Chemical Test ended: Date 1/29/13 Time 1505

Technician: Day0 LLM 1 AH 2 AH 3 AH 4 AH 5 AH 6 LLM 7 LLM 8 ____
Time: Day0 1510 1 1430 2 1440 3 1250 4 1750 5 1845 6 1450 7 1508 8 ____
Temperature: Day0 24.0 1 24.9 2 24.9 3 24.5 4 24.9 5 24.6 6 24.5 7 24.4 8

% Conc.	Day	A	B	C	D	E	F	G	H	I	J	#Live Adults	Total Live Neonates
100 UV-tr't'd	1	0	—	—	—	—	—	—	—	—	—	10	
	2	0	—	—	—	—	—	—	—	—	—	10	
	3	0	—	—	—	—	—	—	—	—	—	10	
	4	3	4	4	4	4	3	4	0	4	4	10	
	5	0	6	9	6	0	10	8	3	10	0	10	
	6	0	—	—	—	11	0	0	12	0	—	10	
	7	13	14	14	12	11	11	13	14	12	14	10	
	8												
	1												
	2												
	3												
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	4												
	5												
	6												
	7												
	8												

Only AH 1/21/13

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# X5002 Test started: Date 1/8/13 Time 1510

Client El Dorado Chemical Test ended: Date 1/9/13 Time 1525

Organism C. dubia

Day/# water used	3439 0	1	2	3	4	5	3443 6	7	8
Concentration: Control SOft									
pH	7.6	7.8/7.6	7.8/7.7	7.8/7.8	7.9/7.9	7.9/7.8	8.0/7.8	7.7	
DO (mg/l)	7.9	8.3/8.5	8.7/8.8	8.5/8.5	8.3/8.4	8.4/8.5	8.6/8.6	8.4	
Cond(umhos/cm)	183	177	177.1	175.5	182.1	184.1	168.2		
Alkalinity(mg/L)	32.0						32.0		
Hardness (mg/L)	44.0						72.0		
Concentration: 32									
pH	7.9	7.7/7.6	7.7/7.8	7.7/7.8	7.8/7.9	7.9/7.9	7.8/7.8	7.7	
DO (mg/l)	7.9	8.3/8.4	8.6/8.8	8.4/8.5	8.2/8.4	8.3/8.5	8.0/8.6	8.3	
Cond(umhos/cm)	292	288	288	280	288	288	277		
Concentration: 42									
pH	7.9	7.7/7.7	7.7/7.8	7.7/7.8	7.8/7.9	7.9/7.9	7.8/7.8	7.6	
DO (mg/l)	8.0	8.3/8.4	8.6/8.8	8.3/8.5	8.1/8.4	8.3/8.5	8.5/8.5	8.2	
Cond(umhos/cm)	320	319	314	313	318	318	308		
Concentration: ~~52~~ 56									
pH	7.9	7.7/7.7	7.7/7.8	7.7/7.8	7.8/7.9	7.9/7.9	7.8/7.8	7.7	
DO (mg/l)	8.0	8.3/8.4	8.6/8.8	8.3/8.5	8.1/8.4	8.3/8.6	8.5/8.5	8.2	
Cond(umhos/cm)	364	365	364	357	359	361	354		
Concentration: 75									
pH	7.8	7.7/7.8	7.7/7.8	7.7/7.9	7.7/7.9	7.9/7.9	7.7/7.8	7.5	
DO (mg/l)	8.0	8.3/8.4	8.6/8.9	8.2/8.5	8.1/8.4	8.2/8.6	8.4/8.5	8.1	
Cond(umhos/cm)	427	427	425	418	422	422	417		
Concentration: 100									
pH	7.8	7.7/7.8	7.7/7.8	7.7/7.9	7.7/7.9	7.9/8.0	7.6/7.8	7.6	
DO (mg/l)	8.0	8.3/8.4	8.6/8.9	8.3/8.5	8.0/8.3	8.2/8.6	8.4/8.4	8.1	
Cond(umhos/cm)	508	512	507	498	505	498	499		
Tech-prerenewal	YMJ	AH	AH	AH	AH	AH	YMJ		
Tech-postrenewal		YMJ	RC	AH	AH	AH	AH	YMJ	
Hardness(mg/l)	52.0		48.0		60.0				
Alkalinity(mg/l)	32.0		44.0		76.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X5002 Test started: Date 1/22/13 Time 1510
Client El Dorado Chemical Test ended: Date [illegible] Time 1505
Organism C. dubia

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100% Lab (AH 1/21/13)									
pH	7.6	7.5/7.6	7.4/7.6	7.7/7.6	7.8/7.6	7.9/7.5	7.6/7.4	7.5	
DO (mg/l)	7.8	8.1/8.1	8.4/8.5	8.2/8.2	7.9/8.2	8.1/8.4	8.3/8.1	7.9	
Cond (umhos/cm)	516	517	513	510	523	531	507		
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]	AH	AH	AH	AH	AH	[illegible]		
Tech-postrenewal		[illegible]	RC	AH	AH	AH	AH	[illegible]	
Hardness (mg/l)									
Alkalinity (mg/l)									

Omit AH 1/21/13

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES
PIMEPHALES PROMELAS SURVIVAL AND GROWTH DATA SHEET

Project# X5002 Date started: 1/22/13 Date ended 1/29/13

Client/Contact EDCC/El Dorado Chemical
Address 4500 Northwest Avenue El Dorado AR 71731
NPDES# AR0000752 AFIN70-00040
Sample Description 001 Dilution Water Soft Reconstituted
Test Temperature (°C) 25+1° Celsius Technicians EGB/AH/LGZ/RC
Test organism age < 24 hrs Vendor/ID# BAL/12213

Feeding Times
Technician/Time/Amount (per replicate)

Day	AM	NOON	PM
0			RC/1705/0.20ml
1	AH/0830/0.10ml	LGZ/1100/0.10ml	RC/1625/0.10ml
2	RC/0830/0.10ml	RC/1655/0.10ml	LGZ/1725/0.10ml
3	LGZ/1085/0.10ml	AH/1100/0.10ml	LGZ/1515/0.10ml
4		AH/1130/0.20ml	AH/1515/0.20ml
5		AH/1200/0.20ml	AH/1600/0.20ml
6	LGZ/0840/0.10ml	AH/1045/0.10ml	LGZ/1035/0.10ml

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

Effluent Initial DO(mg/L&%)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech	Receiving Water Initial DO (mg/L & %)/Tech	Aerate?/Minutes /Final DO (mg/L & %)/Tech
0. 11.1/131.3%/LGZ	0. Y/20/8.1/94.0%/LGZ	0. N/A	0.
1. 11.0/135.1%/LGZ	1. Y/20/8.4/98.6%/LGZ	1.	1.
2. 11.5/131.9%/RC	2. Y/20/8.6/100.1%/RC	2.	2.
3. 11.4/135.8%/AH	3. Y/20/8.5/99.7%/AH	3.	3.
4. 11.2/135.1%/AH	4. Y/20/8.5/99.3%/AH	4.	4.
5. 12.1/140.3%/AH	5. Y/20/8.6/99.9%/AH	5.	5.
6. 11.4/136.8%/AH	6. Y/20/8.5/100.0%/AH	6.	6.

Total Residual Chlorine(mg/L)/ Tech	Dechlorinated? Amount?/Tech	Ammonia (NH3) (mg/L)/Tech	BAL Sample # Date in use
1. <0.01/LGZ	1. NO/LGZ	1. 1.0/LGZ	1 C68260 1/22/13
2. <0.01/RC	2. No/RC	2. 1.0/RC	2 C6843 1/24/13
3. <0.01/AH	3. No/AH	3. 1.0/AH	3 C68601 1/26/13

Comments:

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X5002
Client El Dorado Chemical

Test started: Date 11/1/13 Time 1700
Test ended: Date 11/8/13 Time 1030

		Day0	1	2	3	4	5	6	7
Technician:	Day0	RC	BH	RC	[illegible]	AM	AM	AM	[illegible]
Time:	Day0	1700	1305	1450	1030	1450	1545	1320	1030
Temperature	Day0	25.2	25.3	25.1	24.9	24.6	24.7	24.7	24.7

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	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	6	6
	C	8	8	8	8	8	8	8	8
	D	8	8	8	6	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	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	6	8	8	8	8
	B	8	8	8	8	7	7	6	6
	C	8	8	7	7	7	7	7	7
	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	6	6
	B	8	8	8	8	8	8	6	6
	C	8	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8	8
	E	8	8	8	7	7	7	6	6

File: Minnow2

BIO-ANALYTICAL LABORATORIES 7-DAY CHRONIC MINNOW SURVIVAL DATA

Project# X5002
Client El Dorado Chemical

Test started: Date 1/22/13 Time 1700
Test ended: Date 1/29/13 Time 1030

	Day0	1	2	3	4	5	6	7
Technician:	RC	AH	RC	[illegible]	AH	AH	AH	[illegible]
Time:	1706	1305	1450	1050	1450	1645	1330	1030
Temperature	25.2	25.3	25.1	24.9	24.6	24.7	24.7	24.7

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	8
	B	8	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8	8
	D	8	8	7	7	7	7	7	7
	E	8	8	7	7	7	7	7	7
	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								

Only AH 1/31/13

File: Minnow2

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X5002/EDCC Test Dates 1/22/13 - 1/29/13

Oven Temperature (° Celsius) 100°C

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 1/28/13 Tech: JAM	Wt. of pan + larvae(g)/ Date weighed: 1/30/13 Tech: JAM	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 61	0.96163	0.9691	0.0028	8	0.350	
	B 62	1.0171	1.0198	0.0027	8	0.338	
	C 63	0.9854	0.9882	0.0028	8	0.350	
	D 64	1.0095	1.0126	0.0031	8	0.388	
	E 65	1.0205	1.0232	0.0027	8	0.338	0.3386
32	A 66	0.9638	0.9665	0.0027	8	0.338	
	B 67	1.0289	1.0316	0.0027	8	0.338	
	C 68	1.0135	1.0158	0.0023	8	0.288	
	D 69	1.0274	1.0301	0.0027	8	0.338	
	E 70	1.0522	1.0554	0.0032	8	0.400	
42	A 71	1.0077	1.0101	0.0024	8	0.300	
	B 72	1.0370	1.0394	0.0024	8	0.300	
	C 73	1.0085	1.0111	0.0026	8	0.325	
	D 74	1.0254	1.0283	0.0029	8	0.363	
	E 75	1.0089	1.0118	0.0029	8	0.363	
56	A 76	1.0300	1.0327	0.0027	8	0.338	
	B 77	1.0287	1.0312	0.0025	8	0.313	
	C 78	1.0320	1.0342	0.0022	8	0.275	
	D 79	1.0050	1.0073	0.0023	8	0.288	
	E 80	0.9966	0.9991	0.0025	8	0.313	
75	A 81	1.0031	1.0058	0.0027	8	0.338	
	B 82	1.0246	1.0266	0.0020	8	0.250	
	C 83	0.9962	0.9987	0.0025	8	0.313	
	D 84	0.9937	0.9966	0.0029	8	0.363	
	E 85	1.0043	1.0067	0.0024	8	0.300	
100	A 86	1.0014	1.0033	0.0019	8	0.238	
	B 87	1.0131	1.0151	0.0020	8	0.250	
	C 88	1.0402	1.0432	0.0030	8	0.375	
	D 89	0.9901	0.9927	0.0026	8	0.325	
	E 90	1.0003	1.0020	0.0017	8	0.213	

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

Calculated by: AH 1/30/13 Calculations checked by: JAM 1/31/13

BIO-ANALYTICAL LABORATORIES MINNOW LARVAL GROWTH DATA SHEET

Project#/Client X5002 | EDC Test Dates 1/22/13 - 1/29/13

Oven Temperature (° Celsius) 100°C

Conc.	Replicate/ Pan number	Wt. of pan(g)/ Date weighed: 1/28/13 Tech: DMy	Wt. of pan + larvae(g)/ Date weighed: 1/30/13 Tech: DMy	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 uL	A 91	1.0138	1.0165	0.0027	8	0.338	
	B 92	1.0056	1.0083	0.0027	8	0.338	
	C 93	1.0054	1.0078	0.0024	8	0.300	
	D 94	1.0184	1.0211	0.0027	8	0.338	
	E 95	1.0058	1.0082	0.0024	8	0.300	
	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: AH 1/30/13 Calculations checked by: DMy 1/30/13

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X5002 Test started: Date 12/3 Time 1700
Client El Dorado Chemical Test ended: Date 12/13 Time 1030
Organism P. promelas

Day/# water used	3439	1	2	3	4	5	6 3443	7	8
Concentration: Control soft									
pH	7.6	7.4 / 7.6	7.5 / 7.7	7.4 / 7.8	7.4 / 7.9	7.4 / 7.8	7.4 / 7.8	7.4	
DO (mg/l)	7.9	7.4 / 8.5	7.9 / 8.8	7.7 / 8.5	7.2 / 8.4	7.3 / 8.5	7.2 / 8.6	7.1	
Cond (umhos/cm)	183	177	177.1	175.5	182.1	184.1	168.2		
Alkalinity (mg/L)	32.0						32.0		
Hardness (mg/L)	44.0						72.0		
Concentration: 32									
pH	7.9	7.5 / 7.6	7.4 / 7.8	7.4 / 7.8	7.4 / 7.9	7.4 / 7.9	7.3 / 7.8	7.4	
DO (mg/l)	7.9	7.3 / 8.4	7.1 / 8.8	7.5 / 8.5	7.1 / 8.4	7.3 / 8.5	7.2 / 8.6	7.8	
Cond (umhos/cm)	292	288	288	280	288	288	277		
Concentration: 42									
pH	7.9	7.4 / 7.7	7.4 / 7.8	7.5 / 7.8	7.4 / 7.9	7.4 / 7.9	7.3 / 7.8	7.4	
DO (mg/l)	8.0	7.3 / 8.4	7.4 / 8.8	7.5 / 8.5	7.2 / 8.4	7.3 / 8.5	7.2 / 8.5	7.8	
Cond (umhos/cm)	320	319	314	313	318	318	308		
Concentration: 56									
pH	7.9	7.4 / 7.7	7.4 / 7.8	7.5 / 7.8	7.4 / 7.9	7.4 / 7.9	7.3 / 7.8	7.5	
DO (mg/l)	8.0	7.4 / 8.4	7.3 / 8.8	7.4 / 8.5	7.2 / 8.4	7.3 / 8.6	7.2 / 8.5	7.8	
Cond (umhos/cm)	364	365	364	357	359	361	354		
Concentration: 75									
pH	7.8	7.5 / 7.8	7.5 / 7.8	7.5 / 7.9	7.4 / 7.9	7.4 / 7.9	7.4 / 7.8	7.1	
DO (mg/l)	8.0	7.5 / 8.4	7.4 / 8.9	7.5 / 8.5	7.2 / 8.4	7.3 / 8.6	7.4 / 8.5	6.9	
Cond (umhos/cm)	427	427	425	418	422	422	417		
Concentration: 100									
pH	7.8	7.5 / 7.8	7.5 / 7.8	7.5 / 7.9	7.4 / 7.9	7.4 / 8.0	7.3 / 7.8	6.9	
DO (mg/l)	8.0	7.4 / 8.4	7.4 / 8.9	7.4 / 8.5	7.0 / 8.3	7.1 / 8.6	6.9 / 8.4	6.5	
Cond (umhos/cm)	508	512	507	498	505	498	499		
Tech-prerenewal	YMJ	AH	RC	YMJ	AH	AH	AH		
Tech-postrenewal		YMJ	RC	AH	AH	AH	AH	YMJ	
Hardness (mg/l)	52.0		48.0		60.0				
Alkalinity (mg/l)	32.0		44.0		76.0				

Key: prerenewal/postrenewal

BIO-ANALYTICAL LABORATORIES 7-DAY WATER QUALITY DATA

Project# X5002 Test started: Date 1/22/13 Time 1700
Client El Dorado Chemical Test ended: Date 1/29/13 Time 1030
Organism P. promelas

Day/# water used	0	1	2	3	4	5	6	7	8
Concentration: ~~Control~~ 100UW trt'd (AH 1/21/13)									
pH	7.6	7.5/7.6	7.3/7.4	7.5/7.6	7.4/7.6	7.4/7.5	7.3/7.4	7.3	
DO (mg/l)	7.8	7.4/8.1	7.3/8.5	7.4/8.2	7.1/8.2	7.1/8.4	7.1/8.1	7.7	
Cond (umhos/cm)	516	517	513	510	523	531	507		
Alkalinity (mg/L)									
Hardness (mg/L)									

Concentration: / pH / DO (mg/l) / Cond (umhos/cm) blocks (5 repeats) — crossed out: OMIT AH 1/21/13

	0	1	2	3	4	5	6	7	8
Tech-prerenewal	[illegible]	AH	RC	[illegible]	AH	AH	AH		
Tech-postrenewal	—	[illegible]	RC	AH	AH	AH	AH	[illegible]	
Hardness (mg/l)									
Alkalinity (mg/l)									

Key: prerenewal/postrenewal

APPENDIX C
STATISTICAL ANALYSIS

Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	1/22/2013	Test ID:	X5002CD	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

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

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

Reviewed by: EDB 9/4/13

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	1/22/2013	Test ID:	X5002CD	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc%	1	2	3	4	5	6	7	8	9	10
D-Control	24.000	18.000	28.000	23.000	13.000	24.000	7.000	21.000	23.000	23.000
32	28.000	24.000	29.000	29.000	20.000	28.000	28.000	20.000	29.000	35.000
42	28.000	16.000	27.000	23.000	27.000	32.000	30.000	24.000	25.000	29.000
56	30.000	12.000	26.000	28.000	26.000	27.000	27.000	19.000	28.000	24.000
75	30.000	20.000	24.000	29.000	18.000	26.000	25.000	28.000	25.000	28.000
100	27.000	30.000	26.000	11.000	27.000	25.000	27.000	30.000	31.000	28.000
100UV	16.000	24.000	27.000	22.000	26.000	24.000	25.000	29.000	26.000	18.000

			Transform: Untransformed					Rank	1-Tailed
Conc%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	20.400	1.0000	20.400	7.000	28.000	30.324	10		
32	27.000	1.3235	27.000	20.000	35.000	16.837	10	137.50	74.00
42	26.100	1.2794	26.100	16.000	32.000	17.177	10	137.00	74.00
56	24.700	1.2108	24.700	12.000	30.000	21.681	10	132.00	74.00
75	25.300	1.2402	25.300	18.000	30.000	15.257	10	134.50	74.00
100	26.200	1.2843	26.200	11.000	31.000	21.651	10	140.50	74.00
100UV	23.700	1.1618	23.700	16.000	29.000	17.000	10	125.50	74.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.54333	0.895	-1.3082	1.71389
Bartlett's Test indicates equal variances (p = 0.77)	3.29438	16.8119		

Hypothesis Test (1-tail, 0.05)

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

Reviewed by: EGB 2/4/13

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	1/22/2013	Test ID:	X5002CD	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	24.000	18.000	28.000	23.000	13.000	24.000	7.000	21.000	23.000	23.000
32	28.000	24.000	29.000	29.000	20.000	28.000	28.000	20.000	29.000	35.000
42	28.000	16.000	27.000	23.000	27.000	32.000	30.000	24.000	25.000	29.000
56	30.000	12.000	26.000	28.000	26.000	27.000	27.000	19.000	28.000	24.000
75	30.000	20.000	24.000	29.000	18.000	26.000	25.000	28.000	25.000	28.000
100	27.000	30.000	26.000	11.000	27.000	25.000	27.000	30.000	31.000	28.000
100UV	16.000	24.000	27.000	22.000	26.000	24.000	25.000	29.000	26.000	18.000

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	20.400	1.0000	20.400	7.000	28.000	30.324	10			
32	27.000	1.3235	27.000	20.000	35.000	16.837	10	-2.986	2.347	5.188
42	26.100	1.2794	26.100	16.000	32.000	17.177	10	-2.579	2.347	5.188
56	24.700	1.2108	24.700	12.000	30.000	21.681	10	-1.945	2.347	5.188
75	25.300	1.2402	25.300	18.000	30.000	15.257	10	-2.217	2.347	5.188
100	26.200	1.2843	26.200	11.000	31.000	21.651	10	-2.624	2.347	5.188
100UV	23.700	1.1618	23.700	16.000	29.000	17.000	10	-1.493	2.347	5.188

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.54333	0.895	-1.3082	1.71389
Bartlett's Test indicates equal variances (p = 0.77)	3.29438	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	5.18838	0.25433	48.8571	24.4317	0.07889	6, 63

Reviewed by: EAB 2/4/13

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	1/22/2013	Test ID:	X5002CD	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia
Comments:					

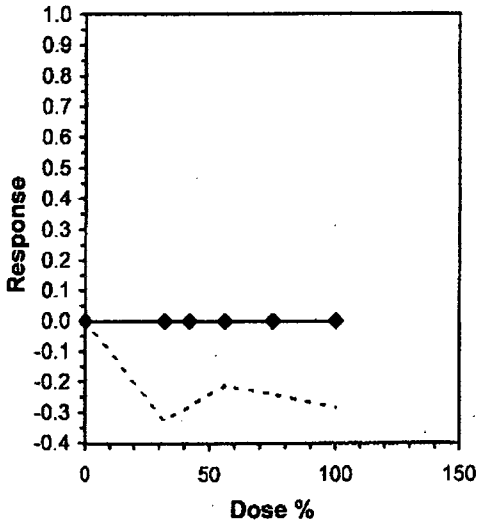
Conc-%	1	2	3	4	5	6	7	8	9	10
D-Control	24.000	18.000	28.000	23.000	13.000	24.000	7.000	21.000	23.000	23.000
32	28.000	24.000	29.000	29.000	20.000	28.000	28.000	20.000	29.000	35.000
42	28.000	16.000	27.000	23.000	27.000	32.000	30.000	24.000	25.000	29.000
56	30.000	12.000	26.000	28.000	26.000	27.000	27.000	19.000	28.000	24.000
75	30.000	20.000	24.000	29.000	18.000	26.000	25.000	28.000	25.000	28.000
100	27.000	30.000	26.000	11.000	27.000	25.000	27.000	30.000	31.000	28.000
100UV	16.000	24.000	27.000	22.000	26.000	24.000	25.000	29.000	26.000	18.000

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	20.400	1.0000	20.400	7.000	28.000	30.324	10	24.950	1.0000
32	27.000	1.3235	27.000	20.000	35.000	16.837	10	24.950	1.0000
42	26.100	1.2794	26.100	16.000	32.000	17.177	10	24.950	1.0000
56	24.700	1.2108	24.700	12.000	30.000	21.681	10	24.950	1.0000
75	25.300	1.2402	25.300	18.000	30.000	15.257	10	24.950	1.0000
100	26.200	1.2843	26.200	11.000	31.000	21.651	10	24.950	1.0000
100UV	23.700	1.1618	23.700	16.000	29.000	17.000	10		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.05)	1.54333	0.895	-1.3082	1.71389
Bartlett's Test indicates equal variances (p = 0.77)	3.29438	16.8119		

Linear Interpolation (200 Resamples)

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



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Reviewed by: EXB 2/4/13

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	1/22/2013	Test ID:	X5002PP	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

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

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5		
32	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
42	0.9500	0.9744	1.3239	1.0472	1.3931	11.684	5	27.00	16.00
56	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
75	0.9250	0.9487	1.2872	1.0472	1.3931	12.116	5	24.50	16.00
100	0.8500	0.8718	1.1856	1.0472	1.3931	15.980	5	21.00	16.00
100UV	0.9500	0.9744	1.3196	1.2094	1.3931	7.623	5	25.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.9296	0.934	-0.6049	0.53078
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: EBB 2/4/13

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	1/22/2013	Test ID:	X5002PP	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4	5
D-Control	0.3500	0.3375	0.3500	0.3875	0.3375
32	0.3375	0.3375	0.2875	0.3375	0.4000
42	0.3000	0.3000	0.3250	0.3625	0.3625
56	0.3375	0.3125	0.2750	0.2875	0.3125
75	0.3375	0.2500	0.3125	0.3625	0.3000
100	0.2375	0.2500	0.3750	0.3250	0.2125
100UV	0.3375	0.3375	0.3000	0.3375	0.3000
0-SN	0.3500	0.3375	0.3500	0.3875	0.3857

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.3525	1.0000	0.3525	0.3375	0.3875	5.827	5			
32	0.3400	0.9645	0.3400	0.2875	0.4000	11.742	5	0.535	2.443	0.0571
42	0.3300	0.9362	0.3300	0.3000	0.3625	9.508	5	0.963	2.443	0.0571
56	0.3050	0.8652	0.3050	0.2750	0.3375	7.989	5	2.033	2.443	0.0571
75	0.3125	0.8865	0.3125	0.2500	0.3625	13.565	5	1.712	2.443	0.0571
*100	0.2800	0.7943	0.2800	0.2125	0.3750	24.165	5	3.103	2.443	0.0571
100UV	0.3225	0.9149	0.3225	0.3000	0.3375	6.369	5	1.284	2.443	0.0571
0-SN	0.3621	1.0274	0.3621	0.3375	0.3875	6.328	5	-0.413	2.443	0.0571

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.98112	0.94	0.39959	0.62353
Bartlett's Test indicates equal variances (p = 0.17)	10.3127	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	0.05706	0.16188	0.00355	0.00136	0.03034	7, 32

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Reviewed by: EOB 2/4/13

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	1/22/2013	Test ID:	X5002PP	Sample ID:	1
End Date:	1/29/2013	Lab ID:	ADEQ 880630	Sample Type:	EFF2-Industrial
Sample Date:	1/22/2013	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

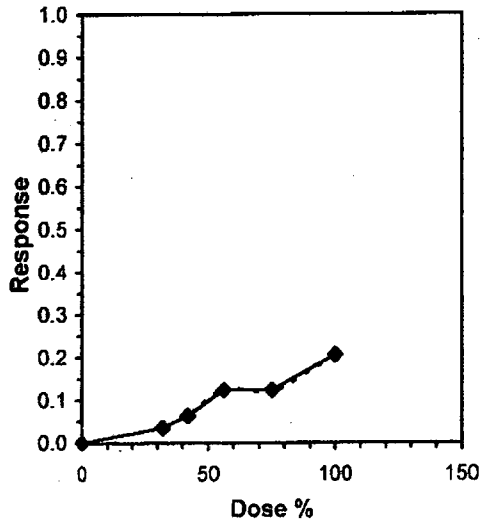
Conc-%	1	2	3	4	5
D-Control	0.3500	0.3375	0.3500	0.3875	0.3375
32	0.3375	0.3375	0.2875	0.3375	0.4000
42	0.3000	0.3000	0.3250	0.3625	0.3625
56	0.3375	0.3125	0.2750	0.2875	0.3125
75	0.3375	0.2500	0.3125	0.3625	0.3000
100	0.2375	0.2500	0.3750	0.3250	0.2125
100UV	0.3375	0.3375	0.3000	0.3375	0.3000
0-SN	0.3500	0.3375	0.3500	0.3875	0.3857

			Transform: Untransformed					Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Mean	N-Mean
D-Control	0.3525	1.0000	0.3525	0.3375	0.3875	5.827	5	0.3525	1.0000
32	0.3400	0.9645	0.3400	0.2875	0.4000	11.742	5	0.3400	0.9645
42	0.3300	0.9362	0.3300	0.3000	0.3625	9.508	5	0.3300	0.9362
56	0.3050	0.8652	0.3050	0.2750	0.3375	7.989	5	0.3088	0.8759
75	0.3125	0.8865	0.3125	0.2500	0.3625	13.565	5	0.3088	0.8759
100	0.2800	0.7943	0.2800	0.2125	0.3750	24.165	5	0.2800	0.7943
100UV	0.3225	0.9149	0.3225	0.3000	0.3375	6.369	5		
0-SN	0.3621	1.0274	0.3621	0.3375	0.3875	6.328	5		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.98112	0.94	0.39959	0.62353
Bartlett's Test indicates equal variances (p = 0.17)	10.3127	18.4753		

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	37.125	10.794	4.117	57.491	0.0682
IC10	50.400				
IC15	82.935				
IC20	98.261				
IC25	>100				
IC40	>100				
IC50	>100				



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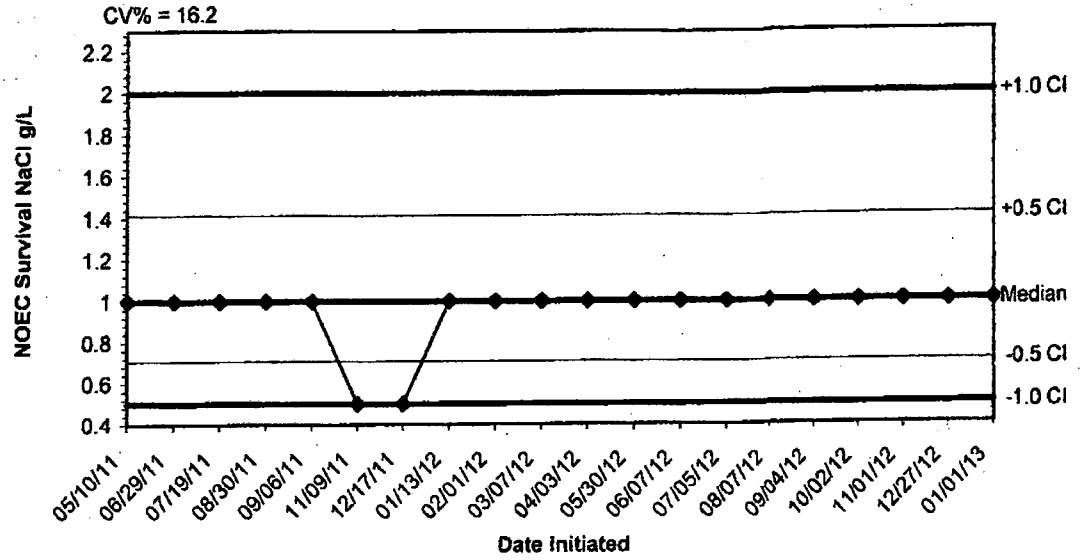
Reviewed by: EOB 2/4/13

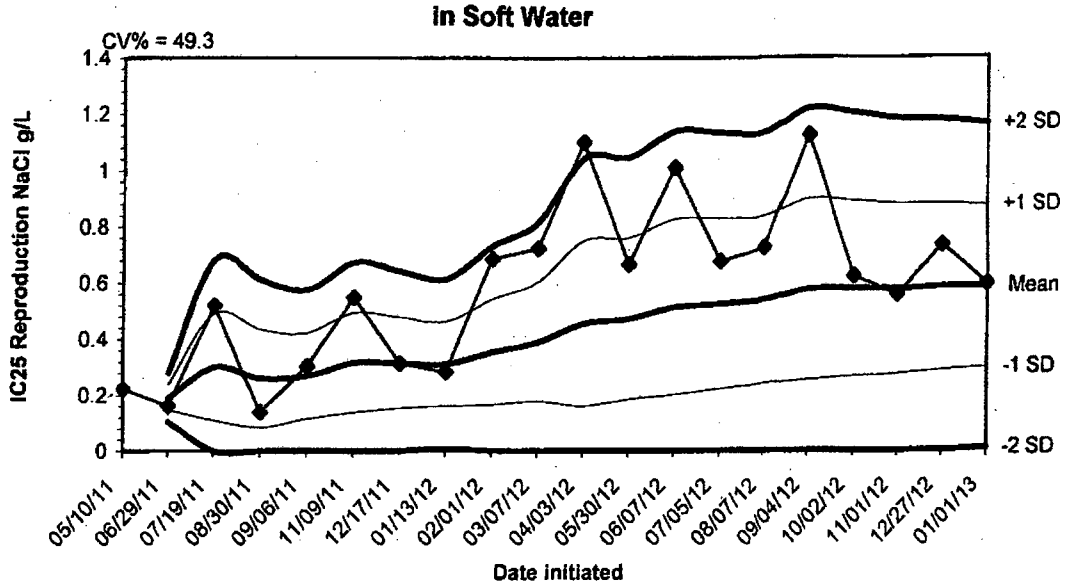
APPENDIX D
QUALITY ASSURANCE CHARTS

2013 Chronic Reference Toxicant Test Data using Ceriodaphnia dubia in Soft Water



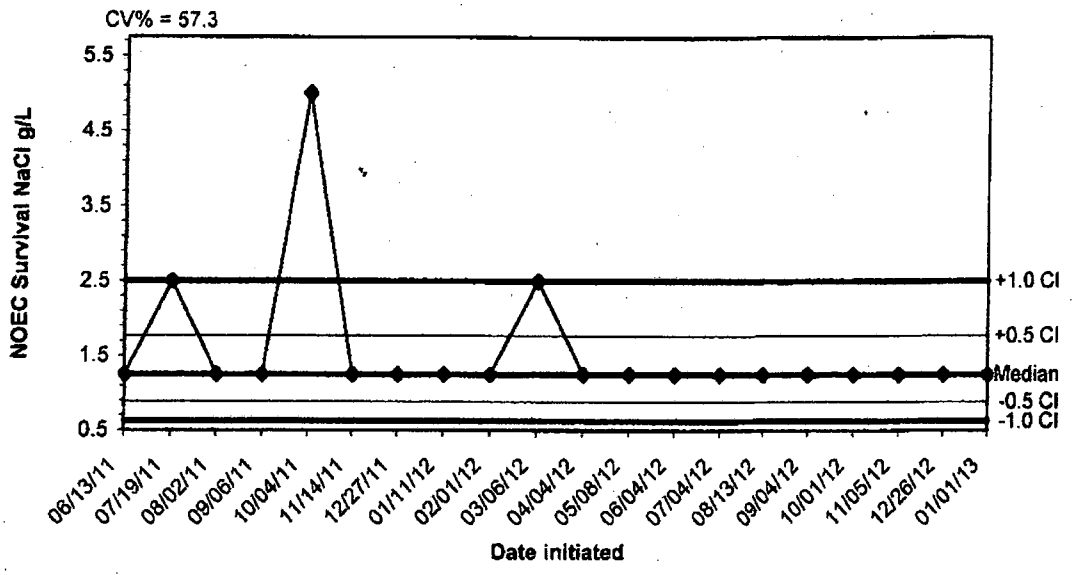
Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
05/10/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/29/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/19/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
08/30/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
09/06/11	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
11/09/11	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
12/17/11	0.5000	1.0000	0.7071	0.5000	1.4142	2.0000
01/13/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
02/01/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
03/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
04/03/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
05/30/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
06/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
07/05/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
08/07/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
09/04/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
10/02/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
11/01/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
12/27/12	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000
01/01/13	1.0000	1.0000	0.7071	0.5000	1.4142	2.0000

2013 Chronic Reference Toxicant Test Data using Ceriodaphnia dubia in Soft Water



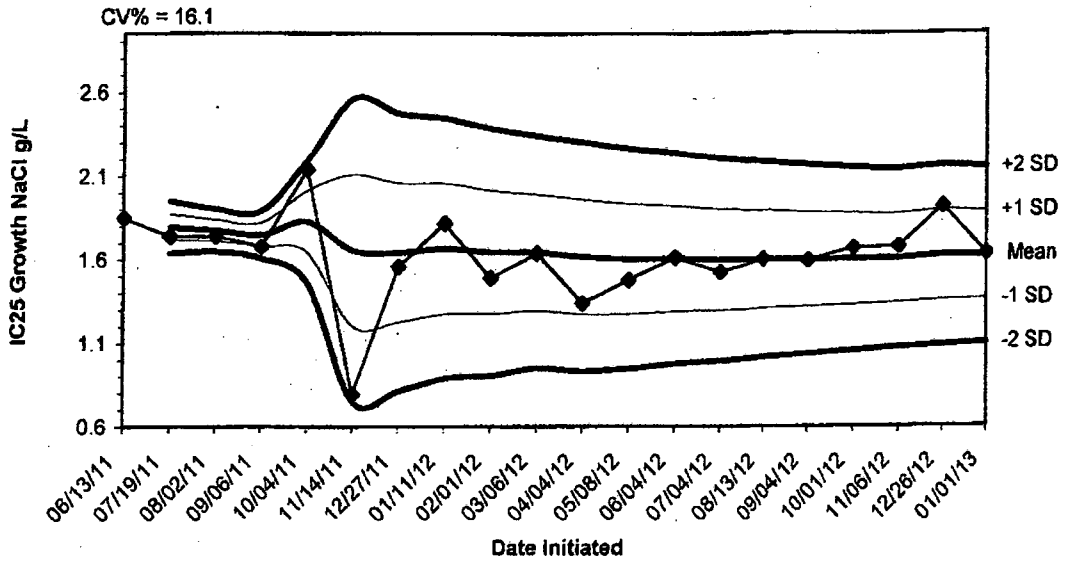
Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/10/11	0.2227					
06/29/11	0.1608	0.1918	0.1480	0.1042	0.2355	0.2793
07/19/11	0.5187	0.3007	0.1094	0.0000	0.4920	0.6833
08/30/11	0.1390	0.2603	0.0844	0.0000	0.4362	0.6121
09/06/11	0.3034	0.2689	0.1154	0.0000	0.4224	0.5760
11/09/11	0.5489	0.3156	0.1369	0.0000	0.4942	0.6729
12/17/11	0.3138	0.3153	0.1522	0.0000	0.4784	0.6415
01/13/12	0.2835	0.3114	0.1599	0.0085	0.4628	0.6142
02/01/12	0.6864	0.3530	0.1641	0.0000	0.5419	0.7309
03/07/12	0.7233	0.3901	0.1769	0.0000	0.6032	0.8164
04/03/12	1.1000	0.4546	0.1601	0.0000	0.7491	1.0435
05/30/12	0.6660	0.4722	0.1849	0.0000	0.7595	1.0469
06/07/12	1.0102	0.5136	0.2006	0.0000	0.8265	1.1395
07/05/12	0.6765	0.5252	0.2214	0.0000	0.8290	1.1329
08/07/12	0.7250	0.5385	0.2413	0.0000	0.8358	1.1331
09/04/12	1.1229	0.5751	0.2529	0.0000	0.8973	1.2195
10/02/12	0.6225	0.5779	0.2657	0.0000	0.8900	1.2022
11/01/12	0.5553	0.5766	0.2737	0.0000	0.8795	1.1824
12/27/12	0.7326	0.5848	0.2883	0.0000	0.8814	1.1779
01/01/13	0.5948	0.5853	0.2967	0.0080	0.8740	1.1626

2013 Chronic Reference Toxicant Test Data using Pimephales promelas



Dates	Values	Median	-0.5 CI	-1.0 CI	+0.5 CI	+1.0 CI
06/13/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
07/19/11	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
08/02/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
09/06/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
10/04/11	5.0000	1.2500	0.8839	0.6250	1.7678	2.5000
11/14/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
12/27/11	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
01/11/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
02/01/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
03/06/12	2.5000	1.2500	0.8839	0.6250	1.7678	2.5000
04/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
05/08/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
06/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
07/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
08/13/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
09/04/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
10/01/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
11/05/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
12/26/12	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000
01/01/13	1.2500	1.2500	0.8839	0.6250	1.7678	2.5000

2013 Chronic Reference Toxicant Test Data using Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/13/11	1.8500					
07/19/11	1.7400	1.7950	1.7172	1.6394	1.8728	1.9506
08/02/11	1.7400	1.7767	1.7132	1.6496	1.8402	1.9037
09/06/11	1.6800	1.7525	1.6816	1.6107	1.8234	1.8943
10/04/11	2.1400	1.8300	1.6462	1.4623	2.0138	2.1977
11/14/11	0.7959	1.6577	1.2046	0.7515	2.1107	2.5638
12/27/11	1.5600	1.6437	1.2285	0.8132	2.0589	2.4742
01/11/12	1.8182	1.6655	1.2762	0.8868	2.0549	2.4442
02/01/12	1.4900	1.6460	1.2771	0.9083	2.0149	2.3838
03/06/12	1.6400	1.6454	1.2976	0.9498	1.9932	2.3410
04/04/12	1.3400	1.6176	1.2751	0.9326	1.9602	2.3027
05/08/12	1.4800	1.6062	1.2772	0.9482	1.9352	2.2642
06/04/12	1.6119	1.6066	1.2916	0.9766	1.9216	2.2366
07/04/12	1.5255	1.6008	1.2974	0.9940	1.9042	2.2077
08/13/12	1.6031	1.6010	1.3086	1.0162	1.8934	2.1858
09/04/12	1.5956	1.6006	1.3182	1.0357	1.8831	2.1656
10/01/12	1.6692	1.6047	1.3307	1.0566	1.8787	2.1527
11/06/12	1.6773	1.6087	1.3423	1.0759	1.8751	2.1415
12/26/12	1.9167	1.6249	1.3566	1.0882	1.8933	2.1616
01/01/13	1.6322	1.6253	1.3641	1.1029	1.8865	2.1477

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**	**1/20/13 To**	**0830**	**1/21/13**
Composite 2 Collected From	**0830**	**1/22/13 To**	**0830**	**1/23/13**
Composite 3 Collected From	**0830**	**1/24/13 To**	**0830**	**1/25/13**

Test initiated: 1510 **am/pm** 1/22/13 **date**
Test terminated: 1505 **am/pm** 1/29/13 **date**
Dilution water used: **Receiving** **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	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ END OF TEST

Rep	0	32	42	56	75	100	100 UV
A	24	28	28	30	30	27	16
B	18	24	16	12	20	30	24
C	28	29	27	26	24	26	27
D	23	29	23	28	29	11	22
E	13	20	27	26	18	27	26
F	24	28	32	27	26	25	24
G	7	28	30	27	25	27	25
H	21	20	24	19	28	30	29
I	23	29	25	28	25	31	26
J	23	35	29	24	28	28	18
Surv. Mean	20.4	27.0	26.1	24.7	25.3	26.2	23.7
Total Mean	20.4	27.0	26.1	24.7	25.3	26.2	23.7
CV%*	30.32	16.84	17.18	21.68	15.26	21.65	17.00

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

PMSD = 25.4%

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: Larken Pennington
Analyst: Haughton, Zeagler

Sample No. 1 Collected: Date: 1/21/13 Time: 0830
Sample No. 2 Collected: Date: 1/23/13 Time: 0830
Sample No. 3 Collected: Date: 1/25/13 Time: 0830
Test Begin: Date: 1/22/13 Time: 1510
Test End: Date: 1/29/13 Time: 1505

Dilution: 0

	Day: 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.3	8.7	8.5	8.3	8.4	8.6	8.4	
DO Final	8.5	8.8	8.5	8.4	8.5	8.6		
pH Initial	7.8	7.8	7.8	7.9	7.9	8.0	7.7	
pH Final	7.6	7.7	7.8	7.9	7.8	7.8		
Alkalinity	32.0					32.0		
Hardness	44.0					72.0		
Conductivity	177	177.1	175.5	182.1	184.1	168.2		
Chlorine	<.01					<.01		

Dilution: 56

	Day: 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.2	8.6	8.3	8.1	8.3	8.5	8.2	
DO Final	8.4	8.8	8.5	8.4	8.6	8.5		
pH Initial	7.7	7.7	7.7	7.8	7.9	7.8	7.7	
pH Final	7.7	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	365	364	357	359	361	354		
Chlorine								

Dilution: 32

	Day 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.2	8.6	8.4	8.2	8.3	8.6	8.3	
DO Final	8.4	8.8	8.5	8.4	8.5	8.6		
pH Initial	7.7	7.7	7.7	7.8	7.9	7.8	7.7	
pH Final	7.6	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	288	288	280	288	288	277		
Chlorine								

Dilution: 75

	Day 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.2	8.6	8.2	8.1	8.2	8.4	8.1	
DO Final	8.4	8.9	8.5	8.4	8.6	8.5		
pH Initial	7.7	7.7	7.7	7.7	7.9	7.7	7.5	
pH Final	7.8	7.8	7.9	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	427	425	418	422	422	417		
Chlorine								

Dilution: 42

	Day 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.2	8.6	8.3	8.1	8.3	8.5	8.2	
DO Final	8.4	8.8	8.5	8.4	8.5	8.5		
pH Initial	7.7	7.7	7.7	7.8	7.9	7.8	7.6	
pH Final	7.7	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	319	314	313	318	318	308		
Chlorine								

Dilution: 100

	Day 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.2	8.6	8.2	8.0	8.2	8.4	8.1	
DO Final	8.4	8.9	8.5	8.3	8.6	8.4		
pH Initial	7.7	7.7	7.7	7.7	7.9	7.6	7.6	
pH Final	7.8	7.8	7.9	7.9	8.0	7.8		
Alkalinity	32.0	44.0		76.0				
Hardness	52.0	48.0		60.0				
Conductivity	512	507	498	508	498	499		
Chlorine	<.01	<.01		<.01				

Dilution: 100 UV

	Day 1	2	3	4	5	6	7	Comments
Temp (C)	24.9	24.9	24.5	24.9	24.6	24.5	24.4	
DO Initial	8.1	8.6	8.2	7.9	8.1	8.3	7.9	
DO Final	8.1	8.5	8.2	8.2	8.4	8.1		
pH Initial	7.5	7.6	7.7	7.8	7.9	7.6	7.5	
pH Final	7.6	7.6	7.6	7.6	7.5	7.4		
Alkalinity								
Hardness								
Conductivity	517	513	510	523	531	507		
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:	**0830**		**1/20/13 To**	**0830**	**1/21/13**
Composite 2 Collected from:	**0830**		**1/22/13 To**	**0830**	**1/23/13**
Composite 3 Collected from:	**0830**		**1/24/13 To**	**0830**	**1/25/13**
Test initiated:	1700	**am/pm**		1/22/13	**date**
Test terminated:	1030	**am/pm**		1/29/13	**date**
Dilution water used:	**Receiving**			**Reconstituted**	

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
0	100	100	100	100	87.5	100	100	97.5	6.06
32	100	100	100	100	100	100	100	100	0.00
42	100	75.0	100	100	100	100	100	95.0	11.68
56	100	100	100	100	100	100	100	100	0.00
75	100	75.0	87.5	100	100	100	97.5	92.5	12.12
100	75.0	75.0	100	100	75.0	100	100	85.0	15.98
100 UV	100	100	100	87.5	87.5	100	95.0	95.0	7.62

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight mg	CV*
	A	B	C	D	E		
0	0.350	0.338	0.350	0.338	0.338	0.353	5.83
32	0.338	0.338	0.288	0.338	0.400	0.340	11.74
42	0.300	0.300	0.325	0.363	0.363	0.330	9.51
56	0.338	0.313	0.275	0.288	0.313	0.305	7.99
75	0.338	0.250	0.313	0.363	0.300	0.313	13.57
100	0.238	0.250	0.375	0.325	0.213	0.280	24.17
100 UV	0.338	0.338	0.300	0.338	0.300	0.323	6.37
0-SN	0.350	0.338	0.350	0.388	0.386	0.362	6.33

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

PMSD = 16.2%

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 UV%)	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 (based on UV treated dilution).
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: Larken Pennington
Analyst: Haughton, Zeagler, Callahan

Sample No. 1 Collected: Date: 1/21/13 Time: 0830
Sample No. 2 Collected: Date: 1/23/13 Time: 0830
Sample No. 3 Collected: Date: 1/25/13 Time: 0830
Test Begin: Date: 1/22/13 Time: 1700
Test End: Date: 1/29/13 Time: 1030

Dilution: 0

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.4	7.9	7.7	7.2	7.3	7.2	7.7	
DO Final	8.5	8.8	8.5	8.4	8.5	8.6		
pH Initial	7.4	7.5	7.4	7.4	7.4	7.4	7.4	
pH Final	7.6	7.7	7.8	7.9	7.8	7.8		
Alkalinity	32.0					31.0		
Hardness	44.0					72.0		
Conductivity	177	177.1	175.5	182.1	184.1	168.2		
Chlorine	<.01					<.01		

Dilution: 56

Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.4	7.3	7.4	7.2	7.3	7.2	7.8	
DO Final	8.4	8.8	8.5	8.4	8.6	8.5		
pH Initial	7.4	7.4	7.5	7.4	7.4	7.3	7.5	
pH Final	7.7	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	365	364	357	359	361	354		
Chlorine								

Dilution: 32

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.3	7.1	7.5	7.1	7.3	7.2	7.8	
DO Final	8.4	8.8	8.5	8.4	8.5	8.6		
pH Initial	7.5	7.4	7.4	7.4	7.4	7.3	7.4	
pH Final	7.6	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	288	288	280	288	288	277		
Chlorine								

Dilution: 75

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.5	7.4	7.5	7.2	7.2	7.1	6.9	
DO Final	8.4	8.9	8.5	8.4	8.6	8.5		
pH Initial	7.5	7.5	7.5	7.4	7.4	7.4	7.1	
pH Final	7.8	7.8	7.9	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	427	425	418	422	422	417		
Chlorine								

Dilution: 42

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.3	7.4	7.5	7.2	7.3	7.2	7.8	
DO Final	8.4	8.8	8.5	8.4	8.5	8.5		
pH Initial	7.4	7.4	7.5	7.4	7.4	7.3	7.4	
pH Final	7.7	7.8	7.8	7.9	7.9	7.8		
Alkalinity								
Hardness								
Conductivity	319	314	313	318	318	308		
Chlorine								

Dilution: 100

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.4	7.4	7.4	7.0	7.1	6.9	6.5	
DO Final	8.4	8.9	8.5	8.3	8.6	8.4		
pH Initial	7.5	7.5	7.5	7.4	7.4	7.3	6.9	
pH Final	7.8	7.8	7.9	7.9	8.0	7.8		
Alkalinity	32.0	44.0		76.0				
Hardness	52.0	48.0		60.0				
Conductivity	512	407	498	503	498	499		
Chlorine	<.01	<.01		<.01				

Dilution: 100 UV

Day	1	2	3	4	5	6	7	Comments
Temp (C)	25.3	25.1	24.9	24.6	24.7	24.7	24.7	
DO Initial	7.4	7.5	7.4	7.1	7.1	7.1	7.7	
DO Final	8.1	8.5	8.2	8.2	8.4	8.1		
pH Initial	7.5	7.5	7.5	7.4	7.4	7.3	7.3	
pH Final	7.6	7.6	7.6	7.6	7.5	7.4		
Alkalinity								
Hardness								
Conductivity	517	513	510	523	531	507		
Chlorine								

APPENDIX F
REPORT QUALITY ASSURANCE FORM

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical

Project#: X5002

Chain of Custody Documents Checked by: AH 1/31/13
Technician/Date

Raw Data Documents Checked by: AH 1/31/13
Technician/Date

Statistical Analysis Package Checked by: EGB 2/4/13
Quality Manager/Date

Quality Control Data Checked by: EGB 1/18/13
Quality Manager/Date

Report Checked by: EGB 2/4/13
Quality Manager/Date

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

Quality Manager

2/4/13
Date

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5017

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5017
Outfall: Outfall 006 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Ms. Larken Pennington
Test Dates: February 11 - 13, 2013
Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

For *Pimephales promelas:*

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0.
2. Report the NOEC for survival, Parameter TOM6C - 100%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 7.62%.

For *Daphnia pulex:*

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0.
2. Report the NOEC for survival, Parameter TOM3D -100%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 11.68%.

-Note: Only enough organisms available to set up the control, 22% and 100% dilution series.

This report contains a total of 31 pages, including this page. The results pertain only to the samples listed in the chain of custody documents in Appendix A. The information contained within meets the requirements set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

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

EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas

NPDES #AR0000752
AFIN #70-00040

EPA Methods 2000.0 and 2021.0

Project X5017

Test Dates: February 11 - 13, 2013
Report Date: February 22, 2013

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

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

BAL
ADEQ #88-0630
Project X5017

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BAL
ADEQ #88-0630
Project X5017

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

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

BAL
ADEQ #88-0630
Project X5017

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the fathead minnow test were 100, 75.0, 56.0, 42.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to lack of available daphnid neonates at test initiation, the test concentrations used in the *Daphnia pulex* test were 100 and 22.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 006 was collected by El Dorado Chemical personnel on February 10, 2013. Upon completion of collection, the sample was chilled to 4^0 Celsius and delivered to Bio-Analytical Laboratories by BAL personnel.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25 ± 1^0 Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen, pH and conductivity measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity and hardness levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

The tests were run in a Precision^R dual controlled illuminated incubator at a temperature of 25 ± 1^0 Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

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

BAL
ADEQ #88-0630
Project X5017

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the 100 percent critical dilution after 48 hours of exposure (p=.05). The NOEC value for both tests was 100 percent effluent (p=.05).

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas* (Fathead Minnow)	*Daphnia pulex*
Control	100.0	90.0
22.0	95.0	90.0
32.0	100.0	-----
42.0	92.5	-----
56.0	92.5	-----
75.0	100.0	-----
100.0	95.0	90.0

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

BAL
ADEQ #88-0630
Project X5017

4.0 Conclusions

The sample of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 10, 2013, was not found to be lethally toxic to the *Daphnia pulex* test organisms nor the fathead minnow test organisms in the 100 percent critical dilution after 48 hours of exposure (p=.05).

BAL
ADEQ #88-0630
Project X5017

5.0 Reference

EPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012, Office of Water.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 547
Doyline LA 71023
(318) 745-2774
1-800-259-1244
Fax: (318) 746-2773

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

Laboratory Use Only:

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

Temperature upon arrival: 3.7
Thermometer #: 29
Tech: RC
Date: 2/11/13

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Project Number: X5017 / Temp. upon arrival: / Preservative: (below)
2-10-13	8:00am / 8:00am	X		6 half gallon	006			X	X				46926	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Karen Pennington / EDCC	2/11/13	1020		2/11/13	1020
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation:	Date: 2/11/13	Time: 1430	Received by/Affiliation: Cierra Houghton	Date: 2/11/13	Time: 1430

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5017

Client: EDCC/El Dorado Chemical
Address: 4500 Northwest Avenue, El Dorado, AR 71731

NPDES#AR0000752/ AFIN 70-00040 Outfall 006

Technicians: EGB/AH/LGZ/RC

Test initiated: Date 2/11/13 Time 1340

Test terminated: Date 2/13/13 Time 1400

Dissolved Oxygen Meter: Model # YSI 55D Serial #~~02F0741AH~~ 06E2089 AH
pH Meter: Model #Orion 230A+ Serial #~~020273~~ 015253 AH 2/11/13
Conductivity Meter: Model # Control Co. Serial #80277924
Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/ Final D.O(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
C10920	11.0/ 129.4%	Y/20 8.3/97.3%	<0.01	N/A	1.0	NA	88.0	28.0	AH
↓	10.6/ 128.5%	Y/20 8.2/97.4%	↓	↓	↓	↓			↓

Dilution Water Information

Dilution Water	ID#	Initial D.O (mg/L & %)	Aerate? Minutes/D.O (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft recon	3447	NA	NA	NA	NA	7.7	56.0	32.0	EGB
↓		↓	↓	↓	↓				

Test Species Information

Test Species Info.	Species: D.pulex ID#: BAL 919-C19	Species: P.promelas ID#: BAL 2811	Species: ID#:	Species: ID#:
Age	<24h	~3d		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT. Algae	Artemia		
Amount	Fed 2hrs prior to test initiation			
Aeration?	NA	NA		
Amount				
Condition of survivors	GOOD AH	GOOD RC		

Comments:

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

Project# X5017

Client El Dorado Chemical

Test started: Date 2/11/13 Time 1540

Test ended: Date 2/13/13 Time 1340

Sample Description OOL6

Test Species D. pulex ID# BAL/A19-C19

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

Time: Ohour 1540 24hour 1410 48hour 1340 72hour ____ 96hour ____

Temperature (°C): Ohour 24.6 24hour 24.4 48hour 25 72hour ____ 96hour ____

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		NA																				
0	A		8	8	8			8.2	8.3/8.2	8.0			7.8	7.7/7.5	7.8			180.4	182/178	202		
	B		8	8	6																	
	C		8	7	7																	
	D		8	7	7																	
	E		8	8	8																	
22	A		8	8	6			8.2	8.2/8.3	7.9			7.7	7.5/7.5	7.6			225	227/215	234		
	B		8	8	8																	
	C		8	8	6																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	AH/AH	AH			RC	AH/AH	AH			RC	AH/AH	AH		

ACUTE2 020809 Rev.

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

Project# X5017

Client El Dorado Chemical

Sample Description 006

Test started: Date 2/11/13 Time 1540

Test ended: Date 2/13/13 Time 1340

Test Species D. pulex ID# BA/A19-C19

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

Time: 0hour 1540 24hour 1410 48hour 1340 72hour — 96hour —

Temperature (°C): 0hour 24.6 24hour 24.4 48hour 25 72hour — 96hour —

Test Dilution	Replicate	Test Salinity	# Live Organisms 0 hr	24	48	72	96	Dissolved Oxygen 0	24	48	72	96	pH 0	24	48	72	96	Conductivity 0	24	48	72	96
		NA																				
100	A		8	8	8			8.3	8.1/8.3	7.9			7.6	7.5/7.7	7.4			385	382/379	392		
	B		8	7	6																	
	C		8	8	7																	
	D		8	8	8																	
	E		8	7	7																	
	A		8						/					/					/			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	AH/AH	AH			RC	AH/AH	AH			RC	AH/AH	AH		

ACUTE2 020809 Rev.

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

Project# X5017

Client El Dorado Chemical

Sample Description 006

Test started: Date 2/11/13 Time RC 2/11/13 1540

Test ended: Date 2/13/13 Time 1400

Test Species P. promelas ID# EAU 2813

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

Time: Ohour 1540 24hour 1330 48hour 1400 72hour ___ 96hour ___

Temperature (°C): Ohour 24.6 24hour 25.0 48hour 25.0 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
		N/A																				
0	A		8	8	8			8.2	7.4/8.2	7.8			7.8	7.6/7.5	7.6			180.4	179.0/178	180.0		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22	A		8	8	7/8	RC 2/13/13		8.2	7.8/8.3	7.8			7.7	7.5/7.5	7.6			225	224/215	224		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC/Anthony	RC			RC	RC/Anthony	RC			RC	RC/Anthony	RC		

ACUTE2 020809 Rev.

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

Project# X5017

Client El Dorado Chemical

Sample Description 006

Test started: Date 2/11/13 Time 1540

Test ended: Date 2/13/13 Time 1400

Test Species P. promelas ID# EAU 288

Technician:	Ohour RC	24hour RC	48hour RC	72hour	96hour
Time:	Ohour 1540	24hour 1320	48hour 1400	72hour	96hour
Temperature (°C):	Ohour 24.6	24hour 25.0	48hour 25.0	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																				
32	A		8	8	8			8.2	1.6 / 8.0	8.0			7.7	1.5 / 7.6	7.6			246	239 / 234	240		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
42	A		8	8	8			8.2	7.7 / 8.3	7.8			7.7	1.5 / 7.7	7.6			269	260 / 255	259		
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	7	6																	
Chemistry Tech prerenewal/postrenewal								RC	RC / jmm	RC			RC	RC / jmm	RC			RC	RC / jmm	RC		

ACUTE2 020809 Rev.

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

Project# X5017

Client El Dorado Chemical

Sample Description 006

Test started: Date 2/11/13 Time 1540

Test ended: Date 2/13/13 Time 1400

Test Species P. promelas ID# Batch 28B

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

Time: Ohour 1540 24hour 1320 48hour 1400 72hour ____ 96hour ____

Temperature (°C): Ohour 24.6 24hour 25.0 48hour 25.0 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																				
56	A		8	8	8			8.2	7.8/8.2	7.8			7.7	7.5/7.7	7.5			296	286/285	289		
	B		8	8	8																	
	C		8	7	7																	
	D		8	7	7																	
	E		8	8	7																	
75	A		8	8	8			8.3	7.8/8.2	7.7			7.7	7.5/7.7	7.5			339	326/325	329		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

ACUTE2 020809 Rev.

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

Project# X5017

Client El Dorado Chemical

Sample Description OOL

Test started: Date 2/11/13 Time 1540

Test ended: Date 2/13/13 Time 1400

Test Species P. promelas ID# EAU 2817

Technician:	Ohour RC	24hour RC	48hour RC	72hour	96hour
Time:	Ohour 1540	24hour 1320	48hour 1400	72hour	96hour
Temperature (°C):	Ohour 24.6	24hour 25.0	48hour 25.0	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
		N/A																				
100	A		8	8	7			8.3	7.7/8.0	7.6			7.6	7.4/7.7	7.4			395	389/379	385		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	7																	
	A		8																			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

ACUTE2 020809 Rev.

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date:	2/11/2013	Test ID:	X5017DP	Sample ID:	6
End Date:	2/13/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	2/11/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	0.7500	0.8750	0.8750	1.0000
22	0.7500	1.0000	0.7500	1.0000	1.0000
100	1.0000	0.7500	0.8750	1.0000	0.8750

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	0.9000	1.0000	1.2504	1.0472	1.3931	11.683	5		
22	0.9000	1.0000	1.2547	1.0472	1.3931	15.099	5	28.00	18.00
100	0.9000	1.0000	1.2504	1.0472	1.3931	11.683	5	27.50	18.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.78017	0.881	-0.3771	-1.613
Bartlett's Test indicates equal variances (p = 0.84)	0.34018	9.21034		

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

ToxCalc v5.0.23

Reviewed by: EGB 2/21/13

Fathead minnow EGB 2/21/13

~~Daphnid~~ Acute Test-48 Hr Survival

Start Date:	2/11/2013	Test ID:	X5017PP	Sample ID:	6
End Date:	2/13/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	2/11/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

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

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5		
22	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	22.50	16.00
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
42	0.9250	0.9250	1.2872	1.0472	1.3931	12.116	5	22.50	16.00
56	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5	20.00	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	0.9500	0.9500	1.3196	1.2094	1.3931	7.623	5	22.50	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.89482	0.934	-0.7384	0.85237
Equality of variance cannot be confirmed				

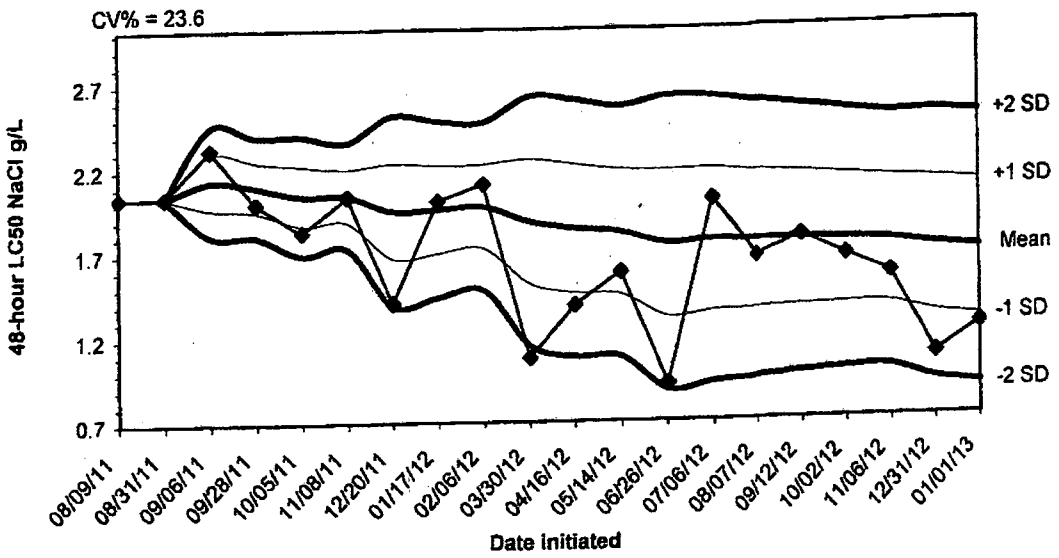
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

ToxCalc v5.0.23

Reviewed by: EGB 2/21/13

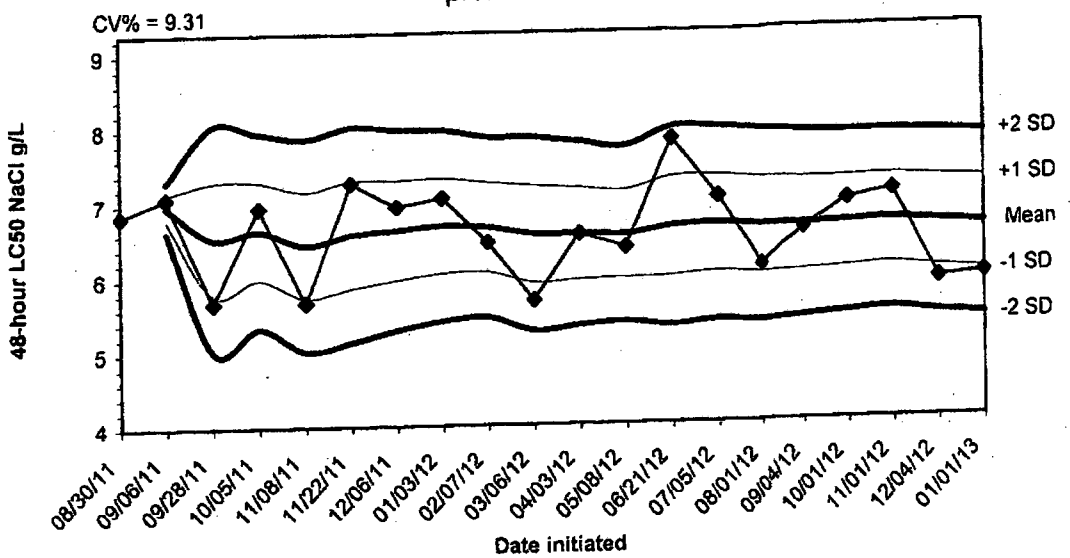
APPENDIX D
QUALITY ASSURANCE CHARTS

2013 48-hour Acute Reference Toxicant Test Data using Daphnia pulex



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/09/11	2.0400					
08/31/11	2.0400	2.0400	2.0400	2.0400	2.0400	2.0400
09/06/11	2.3200	2.1333	1.9717	1.8100	2.2950	2.4566
09/28/11	2.0000	2.1000	1.9521	1.8043	2.2479	2.3957
10/05/11	1.8300	2.0460	1.8700	1.6940	2.2220	2.3980
11/08/11	2.0400	2.0450	1.8876	1.7301	2.2024	2.3599
12/20/11	1.4100	1.9543	1.6745	1.3948	2.2340	2.5138
01/17/12	2.0100	1.9613	1.7015	1.4418	2.2210	2.4807
02/06/12	2.1100	1.9778	1.7298	1.4818	2.2258	2.4737
03/30/12	1.0800	1.8880	1.5202	1.1524	2.2558	2.6236
04/16/12	1.3900	1.8427	1.4629	1.0830	2.2226	2.6024
05/14/12	1.5800	1.8208	1.4508	1.0808	2.1909	2.5609
06/26/12	0.9200	1.7515	1.3180	0.8845	2.1850	2.6186
07/06/12	2.0100	1.7700	1.3478	0.9256	2.1922	2.6144
08/07/12	1.6600	1.7627	1.3548	0.9470	2.1705	2.5783
09/12/12	1.7800	1.7638	1.3697	0.9757	2.1578	2.5518
10/02/12	1.6600	1.7576	1.3753	0.9930	2.1400	2.5223
11/06/12	1.5500	1.7461	1.3720	0.9978	2.1202	2.4944
12/31/12	1.0700	1.7105	1.3152	0.9199	2.1058	2.5011
01/01/13	1.2400	1.6870	1.2881	0.8892	2.0859	2.4848

2013 48-hour Acute Reference Toxicant Test Data using Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/30/11	6.8500					
09/06/11	7.0900	6.9700	6.8003	6.6306	7.1397	7.3094
09/28/11	5.6700	6.5367	5.7766	5.0165	7.2968	8.0568
10/05/11	6.9500	6.6400	5.9859	5.3318	7.2941	7.9482
11/08/11	5.6700	6.4460	5.7325	5.0190	7.1595	7.8730
11/22/11	7.2700	6.5833	5.8619	5.1405	7.3047	8.0261
12/06/11	6.9500	6.6357	5.9627	5.2898	7.3087	7.9817
01/03/12	7.0600	6.6888	6.0479	5.4070	7.3296	7.9705
02/07/12	6.4600	6.6633	6.0590	5.4547	7.2676	7.8719
03/06/12	5.6700	6.5640	5.9134	5.2628	7.2146	7.8652
04/03/12	6.5600	6.5636	5.9464	5.3292	7.1808	7.7981
05/08/12	6.3700	6.5475	5.9564	5.3652	7.1386	7.7298
06/21/12	7.8200	6.6454	5.9784	5.3114	7.3124	7.9794
07/05/12	7.0300	6.6729	6.0238	5.3748	7.3219	7.9709
08/01/12	6.0900	6.6340	5.9907	5.3475	7.2773	7.9205
09/04/12	6.5700	6.6300	6.0083	5.3867	7.2517	7.8733
10/01/12	6.9500	6.6488	6.0419	5.4350	7.2557	7.8626
11/01/12	7.0600	6.6717	6.0750	5.4783	7.2684	7.8651
12/04/12	5.8600	6.6289	6.0199	5.4108	7.2380	7.8470
01/01/13	5.9200	6.5935	5.9799	5.3662	7.2071	7.8208

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 2/10/13** **To: 2/10/13**
From: **To:**

Test Initiated: 2/11/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	100			
24-hour	A	100	100	100			
	B	100	100	87.5			
	C	87.5	100	100			
	D	87.5	100	100			
	E	100	100	87.5			
48-hour	A	100	75.0	100			
	B	75.0	100	75.0			
	C	87.5	75.0	87.5			
	D	87.5	100	100			
	E	100	100	87.5			
	Mean	90.0	90.0	90.0			

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **YES X NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = N/A% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: N/A
3. If you answered NO to 1.a) enter (P) otherwise enter (F): P
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

Biomonitoring
Daphnia 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton

Sample Collected	**From:**	**Date 2/10/13**	**Time 0800**
	To:	**Date 2/10/13**	**Time 0800**
Test Begin		**Date 2/10/13**	**Time 1540**
Test End		**Date 2/11/13**	**Time 1340**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.2	8.2	8.0	24.6	24.4	25.0	32.0			56.0			7.8	7.5	7.8
22	8.2	8.3	7.9	24.6	24.4	25.0							7.7	7.5	7.6
100	8.3	8.2	7.9	24.6	24.4	25.0	28.0			88.0			7.6	7.7	7.4

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

Acute Forms
Pimephales promelas (Fathead Minnow) Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 2/10/13** **To: 2/10/13**
From: **To:**
Test Initiated: 2/11/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22	32	42	56	75	100
24-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	.100
	C	100	100	100	100	87.5	100	100
	D	100	100	100	87.5	87.5	100	100
	E	100	100	100	87.5	100	100	100
48-hour	A	100	87.5	100	100	100	100	87.5
	B	100	100	100	100	100	100	100
	C	100	100	100	100	87.5	100	100
	D	100	87.5	100	87.5	87.5	100	100
	E	100	100	100	75.0	87.5	100	87.5
	Mean	100	95.0	100	92.5	92.5	100	95.0

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **YES X NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = N/A% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: N/A
3. If you answered NO to 1.a) enter (P) otherwise enter (F): P
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

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

Permittee: El Dorado Chemical - Outfall 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Callahan
Sample Collected **From:** **Date 2/10/13** **Time 0800**
To: **Date 2/10/13** **Time 0800**
Test Begin **Date 2/10/13** **Time 1540**
Test End **Date 2/11/13** **Time 1400**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.2	8.2	7.8	24.6	25.0	25.0	32.0			56.0			7.8	7.5	7.6
22	8.2	7.3	7.8	24.6	25.0	25.0							7.7	7.5	7.6
32	8.2	8.2	8.0	24.6	25.0	25.0							7.7	7.6	7.6
42	8.2	8.3	7.8	24.6	25.0	25.0							7.7	7.7	7.6
56	8.2	8.2	7.8	24.6	25.0	25.0							7.7	7.7	7.5
75	8.3	8.2	7.7	24.6	25.0	25.0							7.7	7.7	7.5
100	8.3	8.2	7.6	24.6	25.0	25.0	28.0			88.0			7.6	7.7	7.4

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

APPENDIX F
REPORT QUALITY ASSURANCE FORM

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical

Project#: X5017

Chain of Custody Documents Checked by: AH 2/14/13
Technician/Date

Raw Data Documents Checked by: AH 2/14/13
Technician/Date

Statistical Analysis Package Checked by: EGB 2/21/13
Quality Manager/Date

Quality Control Data Checked by: EGB 1/18/13
Quality Manager/Date

Report Checked by: EGB 2/22/13
Quality Manager/Date

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

Ellen L. Boggs, BS — 2/22/13
Quality Manager — Date

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5018

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5018
Outfall: Outfall 007 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Ms. Larken Pennington
Test Dates: February 11 - 13, 2013
Test Type: 48-hour acute toxicity test using *Pimephales promelas* (EPA 2000.0).
48-hour acute toxicity test using *Daphnia pulex* (EPA 2021.0)

Results:

For *Pimephales promelas:*

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

For *Daphnia pulex:*

1. If the NOEC for survival is less than the critical dilution (100%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 1.
2. Report the NOEC for survival, Parameter TOM3D - 0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 21.10%.

-Note: Only enough organisms available to set up the control, 50% and 100% dilution series.

This report contains a total of 31 pages, including this page. The results pertain only to the samples listed in the chain of custody documents in Appendix A. The information contained within meets the requirements set forth by ADEQ. The chemical data in this report is for monitoring purposes only and should not be reported on discharge monitoring reports.

Bio-Analytical Laboratories

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Fax: (318) 745-2773

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

EL DORADO CHEMICAL COMPANY
El Dorado, Arkansas

NPDES #AR0000752
AFIN #70-00040

EPA Methods 2000.0 and 2021.0

Project X5018

Test Dates: February 11 - 13, 2013
Report Date: February 22, 2013

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

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

BAL
ADEQ #88-0630
Project X5018

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X5018

1.0 Introduction

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

2.0 Methods and Materials

2.1 Test Methods

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

2.2 Test Organisms

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

BAL
ADEQ #88-0630
Project X5013

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the fathead minnow test were 100, 75.0, 56.0, 50.0, 42.0 and 32.0 percent effluent and a reconstituted water control. Due to lack of available daphnid neonates at test initiation, the test concentrations used in the *Daphnia pulex* test were 50.0 and 100 percent effluent and a reconstituted water control. The critical dilution was defined as 100 percent effluent. The tests were conducted using five replicates of eight animals each for a total of 40 animals per concentration.

2.5 Sample Collection

One sample of Outfall 007 was collected by El Dorado Chemical personnel on February 10, 2013. Upon completion of collection, the sample was chilled to 4^0 Celsius and delivered to Bio-Analytical Laboratories by BAL personnel.

2.6 Sample Preparation

Upon arrival, the sample was logged in, given an identification number and refrigerated unless needed. Prior to use, the sample was warmed to 25 ± 1^0 Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen, pH and conductivity measurements were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity and hardness levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

The tests were run in a Precision^R dual controlled illuminated incubator at a temperature of 25 ± 1^0 Celsius. An AEMC^R data logger was used to monitor diurnal temperature throughout the testing period. Light cycle and intensity were recorded twice a month.

2.8 Data Analysis

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

BAL
ADEQ #88-0630
Project X5018

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were noted in the 100 percent critical dilution after 48 hours of exposure in the *Daphnia pulex* test (p=.05). A 48-hour LC_{50} value could not be determined in the *Daphnia* test because greater than 50 percent survival occurred in the 100 percent dilution. Significant differences in survival were not noted in the fathead minnow test. The NOEC value for the *Daphnia pulex* test and the fathead minnow test was zero and 100 percent effluent, respectively (p=.05).

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas* (Fathead Minnow)	*Daphnia pulex*
Control	100.0	90.0
32.0	100.0	-----
42.0	100.0	-----
50.0	95.0	65.0
56.0	100.0	-----
75.0	100.0	-----
100.0	97.5	67.5

The 48-hour reference toxicant test results indicate that the test organisms were within the respective sensitivity range, though it is worth noting that the results of the *Daphnia pulex* reference toxicant test were lower than the mean, indicating that the organisms were a little more sensitive than normal. The graphs of the acute reference toxicant tests can be found in Appendix D.

BAL
ADEQ #88-0630
Project X5018

4.0 Conclusions

The 24-hour composite sample of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on February 10, 2013, was not found to be lethally toxic to the fathead minnow test organisms in the 100 percent critical dilution after 48 hours of exposure; however, significant differences were noted in the *Daphnia pulex* test (p=.05).

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ADEQ #88-0630
Project X5018

5.0 Reference

EPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012, Office of Water.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 627
Daphne, LA 71023

(318) 748-2772
1-800-256-1246
Fax: (318) 748-2775

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

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:	Project Number: X5018
Address: 4500 Norwest Ave., El Dorado, AR 71731	Fax: (870) 863-7499		Temp. upon arrival: 3.9
Permit #: AR0000752/AFIN 70-00040	Purchase Order:		Temperature upon Thermometer #: 29 Tech: RC Date: 2/11/13
Sampler's Signature/Printed Name/Affiliation: Karen Pennington / Karen Pennington / EDCC			

Date Start / Date End	Time Start / Time End	C	G	# and type of container	Sample Identification	Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Lab Control Number:	Preservative: (below)
2/10/13	8:15am - 8:15am	X		6 half gallon	007			X	X				C6927	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Karen Pennington / EDCC	2/11/13	1020	[signature]	2/11/13	1020
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 2/11/13	Time: 1430	Received by/Affiliation: Anne Houghton	Date: 2/11/13	Time: 1430

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

Comments:

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5018

Client: EDCC/El Dorado Chemical
Address: 4500 Northwest Avenue, El Dorado, AR 71731

NPDES#AR0000752/ AFIN 70-00040 Outfall 007

Technicians: EGB/AH/LGZ/RC

Test initiated: Date 2/11/13 Time 1540

Test terminated: Date 2/13/13 Time 1355
Dissolved Oxygen Meter: Model # YSI 55D Serial # ~~02F0741AH~~ 06E2089 AU
pH Meter: Model #Orion 230A+ Serial # ~~020273~~ 015253
Conductivity Meter: Model # Control Co. Serial #80277924
Amperometric Titrator: Model #Fischer-Porter Serial #92W445766

Sample Information

Sample ID#	Initial D.O. (mg/L and %)	Aerate? Minutes/ Final D.O(mg/L & %)	Total Residual Chlorine (mg/L)	Dechlorinated? Amount?	Ammonia (NH3) mg/L	Salinity	Hardness	Alkalinity	Tech
				NA		NA			
C10927	10.6/ 126.0%	Y/30 8.3/96.9%	<0.01		1.0		148.0	16.0	EGB
↓	10.6/ 127.7%	Y/20 8.2/97.6%	↓		↓				

Dilution Water Information

Dilution Water	ID#	Initial D.O (mg/L & %)	Aerate? Minutes/D.O (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
		NA	NA	NA	NA				
Soft recon	3447					7.7	56.0	32.0	EGB
↓									

Test Species Information

Test Species Info.	Species: D. pulex ID#: PAL 281 / A19-C19	Species: P. promelas ID#: PAL 2083	Species: ID#:	Species: ID#:
Age	<24h	3 day		
Test Container Size	30ml	250ml		
Test volume	25ml	200ml		
Feeding: Type	YCT. Algae	Artemia		
Amount	Fed 2hrs prior to test initiation			
Aeration?	NA	NA		
Amount				
Condition of survivors	Good AH	Good		

Comments:

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

Project# X5018

Client El Dorado Chemical

Test started: Date 2/11/13 Time 1550

Test ended: Date 2/13/13 Time 1350

Sample Description 007

Test Species D. Dubia ID# BA/AA-C19

Technician:	Ohour AH	24hour AH	48hour AH	72hour	96hour
Time:	Ohour 1550	24hour 1420	48hour 1350	72hour	96hour
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 25	72hour	96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A		8	8	8			8.2	8.3/8.3	8.0			7.8	7.7/7.5	7.7		RC 2/11/13	182.3/180.4	202/201	197.7		
	B		8	8	6																	
	C		8	8	7																	
	D		8	7	7																	
	E		8	8	8																	
50	A		8	8	7			8.2	8.2/8.3	8.0			7.4	7.3/7.4	7.3			572	550/550	557		
	B		8	5	5																	
	C		8	6	4																	
	D		8	7	3																	
	E		8	7	7																	
Chemistry Tech prerenewal/postrenewal								RC	AH/AH	AH			RC	AH/AH	AH			RC	AH/AH	AH			

ACUTE2 020809 Rev.

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

Project# X5018

Client El Dorado Chemical

Sample Description 007

Test started: Date 2/11/13 Time 1550

Test ended: Date 2/13/13 Time 1350

Test Species D. Duell ID# BAL/AA-C19

	0hour	24hour	48hour	72hour	96hour
Technician:	AH	AH	AH		
Time:	1550	1420	1350		
Temperature (°C):	24.6	24.4	25		

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A		8	3	3			8.3	8.1/8.0	8.0			7.1	7.1/7.1	6.9			960	935/936	960		
	B		8	6	5																	
	C		8	8	6																	
	D		8	7	7																	
	E		8	7	6																	
	A		8						/					/					/			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	AH/AH	AH			RC	AH/AH	AH			RC	AH/AH	AH		

Dup B AH 2/11/13

ACUTE2 020809 Rev.

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

Project# X5018 | Test started: Date 2/11/13 | Time 1600

Client El Dorado Chemical | Test ended: Date 2/13/13 | Time 1355

Sample Description 007 | Test Species P. promelas | ID# BAL 2813 [initials] (corrected 2/11/13 [initials])

Technician: 0hour [initials] 24hour RC 48hour [initials] 72hour — 96hour —

Time: 0hour 1600 24hour 1400 48hour 1355 72hour — 96hour —

Temperature (°C): 0hour 24.8 24hour 25.0 48hour 24.8 72hour — 96hour —

Test Dilution	Replicate	Test Salinity	# Live Organisms 0 hr	24	48	72	96	Dissolved Oxygen 0	24	48	72	96	pH 0	24	48	72	96	Conductivity 0	24	48	72	96
0	A	NA	8	8	8			8.2	8.0/8.3	7.8			7.8	7.6/7.5	7.6		RC 2/11/13 [illegible]	182.2	189.0/185.1	186.6		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
32	A		8	8	8			8.2	7.9/8.3	7.8			7.4	7.2/7.5	7.3			442	436/412	428		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC/[initials]	[initials]			RC	RC/[initials]	[initials]			RC	RC/[initials]	[initials]		

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

Project# X5018

Client El Dorado Chemical

Sample Description 007

Technician: Ohour YMM 24hour RC 48hour YMM 72hour ____ 96hour ____

Time: Ohour 1600 24hour 1460 48hour 1355 72hour ____ 96hour ____

Temperature (°C): Ohour 24.8 24hour 25.0 48hour 24.8 72hour ____ 96hour ____

Test started: Date 2/11/13 Time 1600

Test ended: Date 2/13/13 Time 1355

Test Species P. promelas ID# BAL 2413A 2813 YMM 2/13

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																				
42	A		8	8	8			8.2	7.9/8.2	7.7			7.4	7.4/7.4	7.3			511	500/491	507		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
50	A		8	8	8			8.2	7.9/8.2	7.8			7.4	7.4/7.4	7.3			572	556/550	567		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	6	10																	
Chemistry Tech prerenewal/postrenewal								RC	RC/YMM	YMM			RC	RC/YMM	YMM			RC	RC/550	YMM		

ACUTE2 020809 Rev.

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

Project# X5018

Client El Dorado Chemical

Test started: Date 2/11/13 Time 1612

Test ended: Date 2/13/13 Time 1355

Test Species P. promelas ID# BAL 2113A 2/13

Sample Description 007

Technician: Ohour RM 24hour RC 48hour RM 72hour ____ 96hour ____

Time: Ohour 1600 24hour 1480 48hour 1355 72hour ____ 96hour ____

Temperature (°C): Ohour 24.8 24hour 25.0 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																				
50	A		8	8	8 RC 2/12/13			8.2	7.9 8.2	7.7			7.3	7.3 7.4	7.2			620	596 592	572		
	B		8	8	8																	
	C		8 RC 2/12/13	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75	A		8	8 RC 2/12/13	8			8.2	7.9 8.2	7.7			7.3	7.2 7.3	7.2			762	728 738	759		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC 2/13/13				RC	RC 2/13/13				RC	RC 2/13/13			

ACUTE2 020809 Rev.

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

Project# X5018

Client El Dorado Chemical

Test started: Date 2/11/13 Time 1600

Test ended: Date 2/13/13 Time 1355

Test Species P. promelas ID# BBL 2/11/13A 2/13 2/11/13

Sample Description 007

Technician:	Ohour LMS	24hour RC	48hour LMS	72hour	96hour
Time:	Ohour 1600	24hour 1400	48hour 1355	72hour	96hour
Temperature (°C):	Ohour 24.8	24hour 25.0	48hour 24.8	72hour	96hour

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
		NA	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
100	A		8	8	7			8.3	7.9/6.0	7.7			7.1	7.9/7.1	6.9			960	923/966	959		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
	A		8						/					/					/			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	RC/LMS	LMS			RC	RC/LMS	LMS			RC	RC/LMS	LMS		

Omit 2/11/13

ACUTE2 020809 Rev.

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date:	2/11/2013	Test ID:	X5018DP	Sample ID:	7
End Date:	2/13/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	2/11/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	CD-Ceriodaphnia dubia

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	0.7500	0.8750	0.8750	1.0000
50	0.8750	0.6250	0.5000	0.3750	0.8750
100	0.3750	0.6250	0.7500	0.8750	0.7500

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.9000	1.0000	1.2504	1.0472	1.3931	11.683	5			
*50	0.6500	0.7222	0.9550	0.6591	1.2094	26.056	5	2.283	2.110	0.2730
*100	0.6750	0.7500	0.9749	0.6591	1.2094	21.096	5	2.129	2.110	0.2730

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)					0.93814		0.881		-0.2279	-0.9968
Bartlett's Test indicates equal variances (p = 0.61)					0.97659		9.21034			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test Treatments vs D-Control	<50	50			0.21349	0.23699	0.13633	0.04185	0.07414	2, 12

ToxCalc v5.0.23

Reviewed by: EBB 2/21/13

Acute Fish Test-48 Hr Survival

Start Date:	2/11/2013	Test ID:	X5018PP	Sample ID:	7
End Date:	2/13/2013	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	2/11/2013	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
42	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000	0.7500
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.8750	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	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
42	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
50	0.9500	0.9500	1.3239	1.0472	1.3931	11.684	5	25.00	16.00
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.54161	0.934	-3.2861	14.0375
Equality of variance cannot be confirmed				

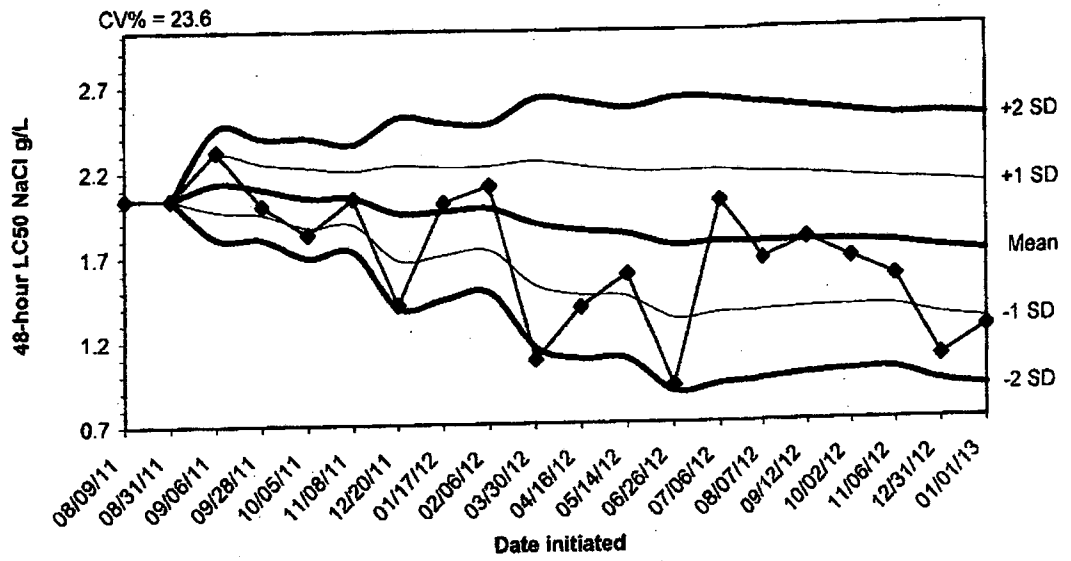
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

ToxCalc v5.0.23

Reviewed by: EGB 3/21/13

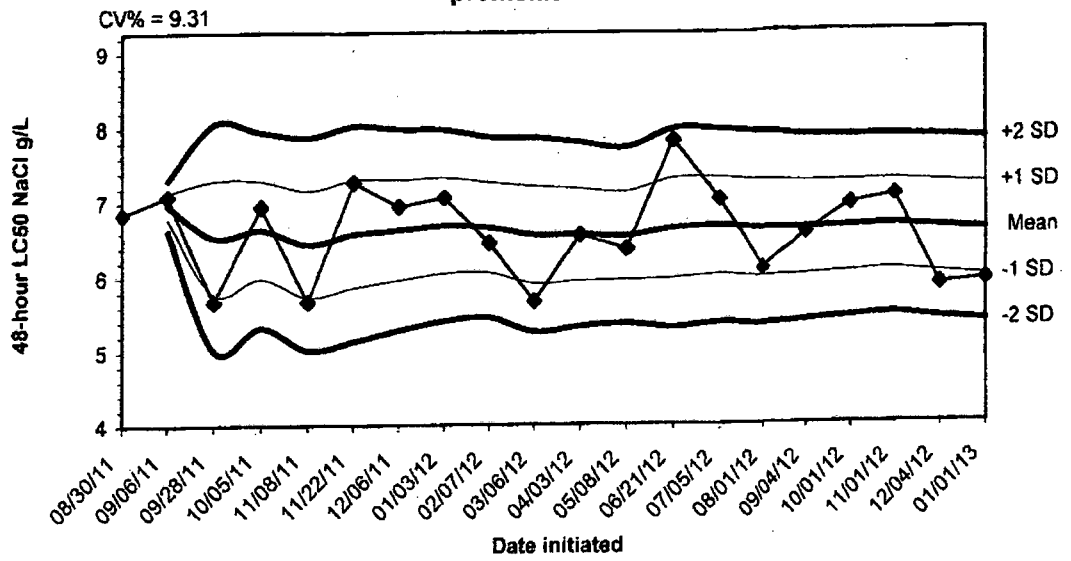
APPENDIX D
QUALITY ASSURANCE CHARTS

2013 48-hour Acute Reference Toxicant Test Data using Daphnia pulex



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/09/11	2.0400					
08/31/11	2.0400	2.0400	2.0400	2.0400	2.0400	2.0400
09/06/11	2.3200	2.1333	1.9717	1.8100	2.2950	2.4566
09/28/11	2.0000	2.1000	1.9521	1.8043	2.2479	2.3957
10/05/11	1.8300	2.0460	1.8700	1.6940	2.2220	2.3980
11/08/11	2.0400	2.0450	1.8876	1.7301	2.2024	2.3599
12/20/11	1.4100	1.9543	1.6745	1.3948	2.2340	2.5138
01/17/12	2.0100	1.9613	1.7015	1.4418	2.2210	2.4807
02/06/12	2.1100	1.9778	1.7298	1.4818	2.2258	2.4737
03/30/12	1.0800	1.8880	1.5202	1.1524	2.2558	2.6236
04/16/12	1.3900	1.8427	1.4629	1.0830	2.2226	2.6024
05/14/12	1.5800	1.8208	1.4508	1.0808	2.1909	2.5609
06/26/12	0.9200	1.7515	1.3180	0.8845	2.1850	2.6186
07/06/12	2.0100	1.7700	1.3478	0.9256	2.1922	2.6144
08/07/12	1.6600	1.7627	1.3548	0.9470	2.1705	2.5783
09/12/12	1.7800	1.7638	1.3697	0.9757	2.1578	2.5518
10/02/12	1.6600	1.7576	1.3753	0.9930	2.1400	2.5223
11/06/12	1.5500	1.7461	1.3720	0.9978	2.1202	2.4944
12/31/12	1.0700	1.7105	1.3152	0.9199	2.1058	2.5011
01/01/13	1.2400	1.6870	1.2881	0.8892	2.0859	2.4848

2013 48-hour Acute Reference Toxicant Test Data using Pimephales promelas



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
08/30/11	6.8500					
09/06/11	7.0900	6.9700	6.8003	6.6306	7.1397	7.3094
09/28/11	5.6700	6.5367	5.7766	5.0165	7.2968	8.0568
10/05/11	6.9500	6.6400	5.9859	5.3318	7.2941	7.9482
11/08/11	5.6700	6.4460	5.7325	5.0190	7.1595	7.8730
11/22/11	7.2700	6.5833	5.8619	5.1405	7.3047	8.0261
12/06/11	6.9500	6.6357	5.9627	5.2898	7.3087	7.9817
01/03/12	7.0600	6.6888	6.0479	5.4070	7.3296	7.9705
02/07/12	6.4600	6.6633	6.0590	5.4547	7.2676	7.8719
03/06/12	5.6700	6.5640	5.9134	5.2628	7.2146	7.8652
04/03/12	6.5600	6.5636	5.9464	5.3292	7.1808	7.7981
05/08/12	6.3700	6.5475	5.9564	5.3652	7.1386	7.7298
06/21/12	7.8200	6.6454	5.9784	5.3114	7.3124	7.9794
07/05/12	7.0300	6.6729	6.0238	5.3748	7.3219	7.9709
08/01/12	6.0900	6.6340	5.9907	5.3475	7.2773	7.9205
09/04/12	6.5700	6.6300	6.0083	5.3867	7.2517	7.8733
10/01/12	6.9500	6.6488	6.0419	5.4350	7.2557	7.8626
11/01/12	7.0600	6.6717	6.0750	5.4783	7.2684	7.8651
12/04/12	5.8600	6.6289	6.0199	5.4108	7.2380	7.8470
01/01/13	5.9200	6.5935	5.9799	5.3662	7.2071	7.8208

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 2/10/13** **To: 2/10/13**
From: **To:**
Test Initiated: 2/11/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	50	100			
24-hour	A	100	100	37.5			
	B	100	62.5	75.0			
	C	100	75.0	100			
	D	87.5	87.5	87.5			
	E	100	87.5	87.5			
48-hour	A	100	87.5	37.5			
	B	75.0	62.5	62.5			
	C	87.5	50.0	75.0			
	D	87.5	37.5	87.5			
	E	100	87.5	75.0			
	Mean	90.0	65.0	67.5			

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **X** **YES** **NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES** **NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = N/A% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: Graph
3. If you answered NO to 1.a) enter (P) otherwise enter (F): F
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

Biomonitoring
Daphnia 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Haughton
Sample Collected **From:** **Date 2/10/13** **Time 0815**
To: **Date 2/10/13** **Time 0815**
Test Begin **Date 2/11/13** **Time 1550**
Test End **Date 2/13/13** **Time 1350**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.2	8.3	8.0	24.6	24.4	25.0	32.0			56.0			7.8	7.5	7.7
50	8.2	8.2	8.0	24.6	24.4	25.0							7.4	7.4	7.3
100	8.3	8.2	8.0	24.6	24.4	25.0	16.0			148.0			7.1	7.1	6.9

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

Acute Forms
Pimephales promelas (Fathead minnow) Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 2/10/13** **To: 2/10/13**
From: **To:**
Test Initiated: 2/11/13
Dilution Water Used: **Receiving Water** **Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32	42	50	56	75	100
24-hour	A	100	100	100	100	100	100	100
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	75.0	100	100	100
48-hour	A	100	100	100	100	100	100	87.5
	B	100	100	100	100	100	100	100
	C	100	100	100	100	100	100	100
	D	100	100	100	100	100	100	100
	E	100	100	100	75.0	100	100	100
	Mean	100	100	100	95.0	100	100	97.5

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate: Is the mean survival at 48 hours significantly different (p=.05) than the control survival for the % effluent corresponding to:
a.) LOW FLOW OR CRITICAL DILUTION (100%) **YES** **X** **NO**
b.)½ LOW FLOW OR 2X CRITICAL DILUTION (N/A%) **YES** **NO**
2. Enter percent effluent corresponding to the LC_{50} below:
LC_{50} = N/A% effluent
95 % confidence limits: N/A
Method of LC_{50} calculation: Graph
3. If you answered NO to 1.a) enter (P) otherwise enter (F): P
4. Enter response to item 3 on DMR Form, parameter TEM3D
5. If you answered NO to 1.b) enter (P) otherwise enter (F): N/A
6. Enter response to item 5 on DMR Form, parameter TFM3D

Biomonitoring
Daphnia 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Larken Pennington
Analyst: Zeagler, Callahan
Sample Collected **From:** **Date 2/10/13** **Time 0815**
To: **Date 2/10/13** **Time 0815**
Test Begin **Date 2/11/13** **Time 1600**
Test End **Date 2/13/13** **Time 1355**

Parameter	D.O.			Temperature			Alkalinity			Hardness			pH		
Dilut./Time	0hrs.	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs	0hrs	24hrs	48hrs
0	8.2	8.3	7.8	24.8	25.0	24.8	32.0			56.0			7.8	7.5	7.6
32	8.2	8.3	7.8	24.8	25.0	24.8							7.4	7.5	7.3
42	8.2	8.2	7.7	24.8	25.0	24.8							7.4	7.4	7.3
50	8.2	8.2	7.8	24.8	25.0	24.8							7.4	7.4	7.3
56	8.2	8.2	7.7	24.8	25.0	24.8							7.3	7.4	7.2
75	8.2	8.2	7.7	24.8	25.0	24.8							7.3	7.2	7.2
100	8.3	8.2	7.7	24.8	25.0	24.8	16.0			148.0			7.1	7.1	6.9

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

APPENDIX F
REPORT QUALITY ASSURANCE FORM

Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

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

REPORT QUALITY ASSURANCE FORM (v. 31612)

Client: El Dorado Chemical

Project#: X5018

Chain of Custody Documents Checked by: AH 2/14/13
Technician/Date

Raw Data Documents Checked by: AH 2/14/13
Technician/Date

Statistical Analysis Package Checked by: EGB 2/21/13
Quality Manager/Date

Quality Control Data Checked by: EGB 1/18/13
Quality Manager/Date

Report Checked by: EGB 2/22/13
Quality Manager/Date

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

Quality Manager

2/22/13
Date

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

El Dorado, AR 71730

J13111302120326

Ship Date: 22MAR13
ActWgt: 2.0 LB
CAD: 5887030/INET3370

Delivery Address Bar Code

SHIP TO: (870) 863-1484 BILL SENDER
ADEQ - Water Division Enforcement
ADEQ - Water Division Enforcement
5301 NORTHSHORE DR

NORTH LITTLE ROCK, AR 72118

Ref #
Invoice #
PO #
Dept #

MON - 25 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7993 4484 6028**

72118
AR-US

SA LITA

LIT

518G2/DCF8/93AB

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