ADEQ

ARKANSAS
Department of Environmental Quality

June 16, 2016

Greg L. Withrow, General Mgr.
El Dorado Chemical
P.O. Box 231
El Dorado, AR 71730

RE: NPDES Permit Number AR0000752, AFIN 70-00040
Delinquent DMRs

Dear Mr. Withrow,

The Discharge Monitoring Reports (DMRs) for the March 2016, Monitoring Period, Discharge Numbers 001-A, 002-A, 003-A, 003-Q, 006-A, 007-A, 010-A, SUM-A, TX1-A, TX2-B, TX6-B, TX7-B and TXA-Q have not been received by the Department. Please submit two legible copies of the DMRs with an original signature and date by the Cognizant Official on at least one copy. The DMRs should be received by the Department no later than July 1, 2016.

This letter serves as a reminder that all Discharge Monitoring Reports (DMRs) and associated parameters required by your permit are required to be completed and either postmarked or electronically submitted to the Department by the 25th of the month following the end of the monitoring period. **Failure to do so is a violation of the conditions of your permit (as referenced in Part III Section C.5).**

Please note that any future late DMR or parameter submittals may result in a proposed enforcement action that will include, but not be limited to, the assessment of a civil penalty.

Thank you for your attention to this matter. Should you have any questions, feel free to contact me at 501-682-0664 or via e-mail at pemberton@adeq.state.ar.us.

Sincerely,

Layne Pemberton

Layne Pemberton
Enforcement Analyst
NPDES Enforcement Section

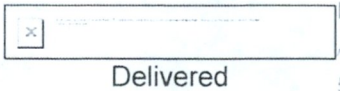
Eddie Pearson

From: trackingupdates@fedex.com
Sent: Tuesday, March 22, 2016 8:29 AM
To: Eddie Pearson
Subject: FedEx Shipment 775922235062 Delivered

Your package has been delivered

Tracking # 775922235062

Ship date:
Mon, 3/21/2016
Eddie Pearson
ELDORADO CHEMICAL COMPANY
ELDORADO, AR 71730
US



Delivered

Delivery date:
Tue, 3/22/2016 8:24 am
Water Enforcement Branch
ADEQ
5301 NORTHSHORE DR
NORTH LITTLE ROCK, AR 72118
US

Shipment Facts

Our records indicate that the following package has been delivered.

Tracking number:	775922235062
Status:	Delivered: 03/22/2016 08:24 AM Signed for By: C.HITCH
Signed for by:	C HITCH
Delivery location:	NORTH LITTLE ROCK, AR
Delivered to:	Receptionist/Front Desk
Service type:	FedEx Priority Overnight
Packaging type:	FedEx Box
Number of pieces:	1
Weight:	2.00 lb.

Special handling/Services:	Deliver Weekday

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 7:29 AM CDT on 03/22/2016.

To learn more about FedEx Express, please go to fedex.com.

All weights are estimated.

To track the latest status of your shipment, click on the tracking number above, or go to fedex.com.

This tracking update has been sent to you by FedEx at your request. FedEx does not validate the authenticity of the requestor and does not validate, guarantee, or warrant the authenticity of the request, the requestor's message, or the accuracy of this tracking update. For tracking results and terms of use, go to fedex.com.

Thank you for your business.

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

EL DORADO
CHEMICAL COMPANY

June 27, 2016

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

RE: NPDES Permit AR0000752 Discharge Monitoring Report for period ending March 31, 2016.

Enclosed you will find the Discharge Monitoring Reports ending March 31, 2016.

If you have any questions regarding this report, please contact Edward L Pearson at (870) 863-1400.

Sincerely,

Edward L Pearson

Environmental Technician

Enclosures

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

EL DORADO
CHEMICAL COMPANY

April 20, 2016

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

RE: NPDES Permit AR0000752 Discharge Monitoring Report for period ending March 31, 2016.

Enclosed you will find the Discharge Monitoring Reports ending March 31, 2016.

If you have any questions regarding this report, please contact Edward L Pearson at (870) 863-1400.

Sincerely,

Edward L Pearson

Edward L Pearson

Environmental Technician

Enclosures

NON-COMPLIANCE REPORT

Facility Name: El Dorado Chemical Company

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

Month / Year: March 31,2016

Type of Violation	Permit Limit	Date of Violation	Cause of Violation	Corrective Action or Other Narrative
Outfall 006 / Lead Monthly Average(18ug/L)	3.8 ug/L Monthly Average	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006 / Lead Daily Max. (18ug/L)	7.62 ug/L Daily Max.	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006/ Zinc Monthly Average (300ug/L)	115.62 ug/L Monthly Average	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 006/ Zinc Daily Max.(300 ug/L)	231.99 ug/L Daily Max.	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 006 in an effort to promote vegetative cover.
Outfall 007 / Lead Monthly Average(14ug/L)	3.8 ug/L Monthly Average	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007 / Lead Daily Max. (14ug/L)	7.62 ug/L Daily Max.	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
Outfall 007/ Zinc Monthly Average (170ug/L)	115.62 ug/L Monthly Average	3/9/2016	Unknown	EDCC has applied pelletized lime in the area of outfall 007 in an effort to promote vegetative cover.
I CERTIFY THAT UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C 1001 AND 33 U.S.C. 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)				Signature / Date 4-19-16

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

EL DORADO
CHEMICAL COMPANY

April 20, 2016

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

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Environmental Technician

Enclosures

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Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5983

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5983
Outfall: Outfall 006 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Mr. Eddie Pearson
Test Dates: March 11 - 14, 2016
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 (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0- **Pass.**
2. Report the NOEC for survival, Parameter TOM6C - 100.0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

For *Daphnia pulex:*

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0- **Pass.**
2. Report the NOEC for survival, Parameter TOM3D -100.0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 7.84%.

Note: Due to lack of available organisms at test initiation, this test was abbreviated.

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

Bio-Analytical Laboratories

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 X5983

Test Dates: March 11 - 14, 2016
Report Date: March 29, 2016

Prepared for:
Mr. Eddie Pearson
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 X5983

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X5983

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),"Standard Methods for The Examination of Water and Wastewater. 20th Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately seven days old at test initiation. The minnows were acclimated to dilution water hardness prior to testing. The *Daphnia pulex* test organisms were also raised in-house at test temperature 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 X5983

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 100.0, 75.0, 56.0, 45.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to lack of available daphnids at test initiation, the test concentrations used in the *Daphnia pulex* test were 100.0 and 56.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100.0 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

Two samples of Outfall 006 were collected by El Dorado Chemical personnel on March 9 and 10, 2016 at 1800 hours. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. Due to hazardous road conditions caused by flooding, the samples were not picked up until March 11, 2016. The temperature upon arrival was 1.2 and 1.4^0 Celsius, respectively.

2.6 Sample Preparation

Upon arrival, each sample was logged in, given an identification number and refrigerated unless needed. Prior to use, each sample was warmed to 25 ± 1^0 Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/) with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a HACH^R test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements (in mg/L, standard units and umhos/cm, respectively) were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity (SM2320-B 1997) and hardness (SM2340-C 1997) levels were measured in mg/L as $CaCO_3$ 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.

BAL
ADEQ #88-0630
Project X5983

2.8 Data Analysis

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

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the critical dilution in either test after 48 hours of exposure (p=.05). The NOEC value for the fathead and *Daphnia pulex* tests was 100.0 percent effluent (p=.05). The 48-hour LC_{50} values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration.

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas*	*Daphnia pulex*
Control	100.0	100.0
22.0	100.0	100.0
32.0	100.0	------
45.0	100.0	------
56.0	100.0	------
75.0	100.0	------
100.0	100.0	92.5

The 48-hour reference toxicant test results indicated 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 X5983

4.0 Conclusions

The samples of Outfall 006 collected from El Dorado Chemical Company, El Dorado, Arkansas, on March 9 and 10, 2016, were not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 100.0 percent critical dilution after 48 hours of exposure (p=.05). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in the effluent dilutions (p=.05).

BAL
ADEQ #88-0630
Project X5983

5.0 References

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.

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.

EPA, 2000. Method Guidance and Recommendations for Whole Effluent (WET) Testing. EPA-821-B-00-04, Office of Water

APHA, 1998. Standard Methods for The Examination of Water and Wastewater. 20th Edition.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

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

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

Laboratory Use Only:

Company: El Dorado Chemical Company				**Phone:** (870) 863-1484		**Analysis:**												**Project Number:** X5983	
Address: 4500 Norwest Ave., El Dorado, AR 71731				**Fax:** (870) 863-7499														**Temp. upon arrival:** 1.2C	
Permit #: AR0000752/AFIN 70-00040				**Purchase Order:**														Temperature upon arrival: 1.2C Thermometer #: 29 Tech: EC Date: 3/11/16	
Sampler's Signature/Printed Name/Affiliation: David Austin / David Saxton / EDCC																			
Date Start / **Date End**	**Time Start** / **Time End**	**C**	**G**	**# and type of container**	**Sample Identification**													**Lab Control Number:**	**Preservative: (below)**
3-8-16 - 3-9-16	2000 - 1800	X		3 @ half gallon	006									X	X			C12165	ICE
Relinquished by/Affiliation: David Austin / David Saxton / EDCC					**Date:** 3/11/16	**Time:** 9:45AM	**Received by/Affiliation:**											**Date:** 3/11/16	**Time:** 1000
Relinquished by/Affiliation:					**Date:**	**Time:**	**Received by/Affiliation:**											**Date:**	**Time:**
Relinquished by/Affiliation:					**Date:** 3/11/16	**Time:** 1335	**Received by/Affiliation:** R Callahan											**Date:** 3/11/16	**Time:** 1335

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

Comments:

COC Rev. 3.0

X5983
Page 11 of 33

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

NELAP/LELAP 01975, ADEQ 88-0630, TCEQ T104704278, OKDEQ 1420

Laboratory Use Only:

Company: El Dorado Chemical Co **Phone:** 870 863 1484

Address: 4500 Northwest Ave El Dorado Ar 71730 **Fax:** 870 863 17499

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

Sampler's Signature/Printed Name/Affiliation: Edward L Pearson / Edward L Pearson / EDCC

Analysis: Chronic Ceriodaphnia; Chronic minnow; Acute minnow(fresh/marine); Acute Daphnia species; Acute Mysid; Acute Ceriodaphnia; Fecal Coliform

Temperature upon arrival: 1.4°C
Thermometer #: 29
Tech: RC
Date: 3/11/16

Project Number: X5983

Temp. upon arrival:

Lab Control Number:

Preservative: (below)

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)
3-9-16 / 3-10-16	2000 / 1800	✓		3 half gallon	006			x	x				C12166	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Edward L Pearson / EDCC	3/11/16	7:45AM	[signature]	3/11/16	1000
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 3/11/16	Time: 1335	Received by/Affiliation: R Cullum	Date: 3/11/16	Time: 1335

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

Comments:

COC Rev. 3.1

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5983

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 006

Technicians: EGB/RC/MM

D. pulex

Test initiated: Date 3/11/16 Time 1750 — 3/12/16 — 1500

Test terminated: Date 3/13/16 Time 1620 — 3/14/16 — 1650

Dissolved Oxygen Meter: Model # YSI550A Serial #06E2089 AV
pH Meter: Model #Orion 230A+ Serial #015253
Conductivity Meter: Model # Control Co. Serial #122175539
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
RC 3/11/16 C12165 C12166	9.7 / 113.9%	Y/2/8.2 97.4%	<0.01	NO	NSA *	N/A	56.0	24.0	RC
C12166	9.6 / 110.3%	Y/2/8.5 99.3%	<0.01	|	NSA	|	68.0	32.0	RC
↓	9.7 / 113.3%	Y/2/8.1 94.1%	|	|	|	|			RC

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
		N/A	N/A						
Soft H2O	3838	|	|	N/A	N/A	7.2	58.0	28.0	RC
	|	|	|	|	|	|				

Test Species Information

Test Species Info.	Species: D. pulex E13-ID#: BAL/G-15	Species: P. promelas ID#: BAL/030416	Species: ID#:	Species: ID#:
Age	<24 hrs	7 days		
Test Container Size	30 ml	300 ml		
Test volume	25 ml	250 ml		
Feeding: Type	2 hrs	prior to		
Amount	test	~~inacti~~ RC 3/11/16 initiation		
Aeration?	N/A	N/A		
Amount	|	|		
Condition of survivors	Good RC 3/14/16	Good RC 3/13/16		

Comments: * NSA = No strips available

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1650

Test Species D. pulex ID# BAL/E13-G15

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1500	24hour 1600	48hour 1650	72hour /	96hour /
Temperature (°C):	Ohour 24.4	24hour 24.6	48hour 24.9	72hour	96hour /

Test Dilution %	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		N/A								RC 3/14/16												
0.50 FT	A		8	8	8			8.0	7.9 / 8.2	8.3 / 8.1			7.3	7.4 / 7.4	7.4			173.2	201 / 196	207		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22.0	A		8					8.0 /					7.2 /					183.7 /				
	B		8																			
	C		8										omit 3/12/16 RC									
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	RC / RC	RC			RC	RC / RC	RC			RC	RC / RC	RC		

ACUTE2 Rev 1.0

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1650

Test Species D. pulex ID# BAL/E 13-G15

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1500	24hour 1600	48hour 1650	72hour /	96hour /
Temperature (°C):	Ohour 24.4	24hour 24.6	48hour 24.9	72hour	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
%		N/A	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56.0	A		8	8	8			8.0	8.0/8.0	8.2			7.2	7.3/7.2	7.3			X44.0	218/200	209		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
75.0	A		8					7.9	/				7.1	/				200	/			
	B		8																			
	C		8										omit 3/12/16					RC				
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

ACUTE2 Rev 1.0

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1650

Test Species D. pulex ID# BAL/E13-G15

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

Time: Ohour 1500 24hour 1600 48hour 1650 72hour ___/___ 96hour ___/___

Temperature (°C): Ohour 24.4 24hour 24.6 48hour 24.9 72hour ___/___ 96hour ___/___

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0%		N/A																				
100.0	A		8	8	8			7.9	8.0/8.0	8.2			7.1	7.2/7.1	7.2			218	226/222	223		
	B		8	8	8																	
	C		8	7	7																	
	D		8	7	7																	
	E		8	7	7																	
~~100.0~~ pH Adj	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 Rev 1.0

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/11/16 Time 1756

Test ended: Date 3/13/16 Time 1620

Test Species P. promelas ID# BAL 030416

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1750	24hour 1925	48hour 1620	72hour /	96hour /
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 24.6	72hour	96hour

Test Dilution %	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		N/A																				
0.56 FT	A		8	8	8			8.1	7.4/8.0	7.4			7.3	7.2/7.3	7.1			175.5	198/173.7	181.5		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
22.0	A		8	8	8			8.0	7.3/8.0 RC 3/12/16	7.5			7.1	6.9/8.0 1.2 RC 3/12/16	7.0			163.4	182.2/183.2	193.4		
	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 Rev 1.0

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/11/16 Time 1750

Test ended: Date 3/13/16 Time 1620

Test Species P. promelas ID# BAL 030416

Technician:	Ohour RC	24hour RC	48hour RC	72hour / 96hour /
Time:	Ohour 1750	24hour 1925	48hour 1620	72hour / 96hour /
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 24.6	72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
%		N/A																				
32.0	A		8	8	8			8.0	7.3/8.0	7.4			7.1	6.9/7.2	7.0			157.7	178.8/182.6	195.8		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
45.0	A		8	8	8			8.0	7.2/8.0	7.5			7.1	6.9/7.2	7.0			153.7	174.9/192.6	200		
	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 Rev 1.0

X5983 Page 33

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/11/16 Time 1750

Test ended: Date 3/13/16 Time 1620

Test Species P. promelas ID# BAL 030416

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1756	24hour 1925	48hour 1620	72hour /	96hour /
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 24.6	72hour /	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
%		N/A	0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
56.0	A		8	8	8			8.0	7.2 / 8.0	7.4			7.0	6.8 / 7.2	7.0			147.0	167.1 / 144.9	199		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
													RC 3/12 7.1	6.8 / 6.8								
75.0	A		8	8	8			8.0	7.2 / 7.9	7.4			6.9	7.1	7.0			140.9	161.0 / 209	202		
	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 Rev 1.0

X5983 Page 19 of 33

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

Project# X5983

Client EDCC

Sample Description 006

Test started: Date 3/11/16 Time 1750

Test ended: Date 3/13/16 Time 1620

Test Species P. promelas ID# BAL/030416

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /	
Time:	Ohour 1750	24hour 1925	48hour 1620	72hour /	96hour /	
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 24.6	72hour /	96hour /	

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0%		N/A																				
100.0	A		8	8	8			7.9	7.1/7.9	7.3			6.8	6.7/7.1	7.0			129.7	148.6/218	212		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
100.0 pH Adj	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		

X5983 Page 33

ACUTE2 Rev 1.0

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

Start Date: 3/12/2016	Test ID: x5983DP	Sample ID:	AR0000752-006
End Date: 3/14/2016	Lab ID: ADEQ880630	Sample Type:	EFF2-Industrial
Sample Da 3/10/2016	Protocol: EPAAW02-EPA/821/R-02-012	Test Species:	DP-Daphnia pulex
Comments			

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	0.8750	0.8750	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		
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	18.00
100	0.9250	0.9250	1.2829	1.2094	1.3931	7.841	5	20.00	18.00

Auxiliary Tests					Statistic	Critical	Skew
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)					0.744818	0.881	0.788227
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: EAB 3/23/16

Acute Fish Test-48 Hr Survival

Start Date: 3/12/2016	Test ID: x5983DP	Sample ID:	AR0000752-006
End Date: 3/14/2016	Lab ID: ADEQ880630	Sample Type:	EFF2-Industrial
Sample Da 3/10/2016	Protocol: EPAAW02-EPA/821/R-02-012	Test Species:	PP-Pimephales promelas
Comments			

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
22	1.0000	1.0000	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
75	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	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		
22	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
32	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
45	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
56	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
75	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00
100	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00

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

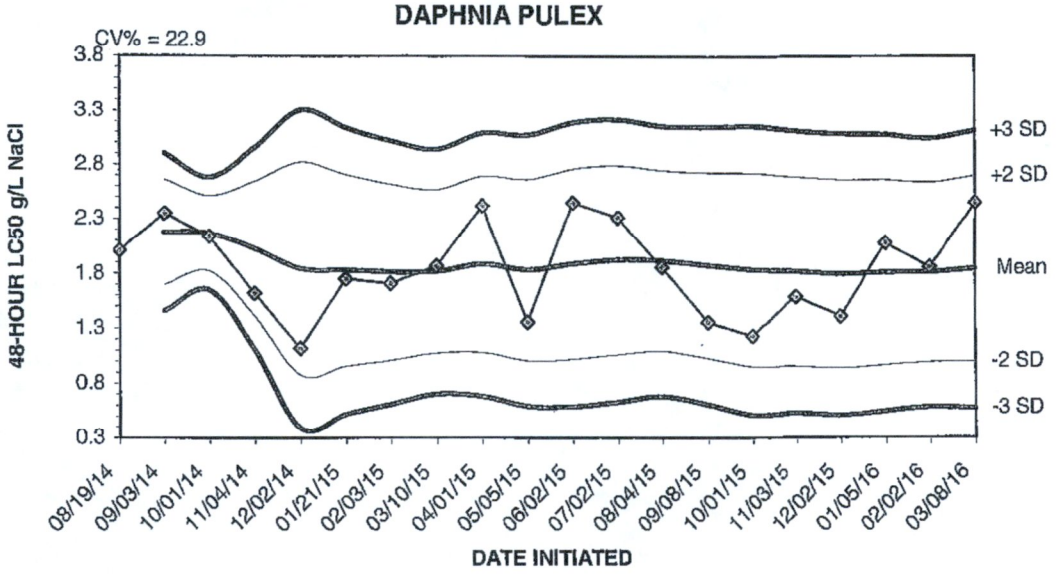
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

ToxCalc v5.0.23

Reviewed by: EVB 3/23/16

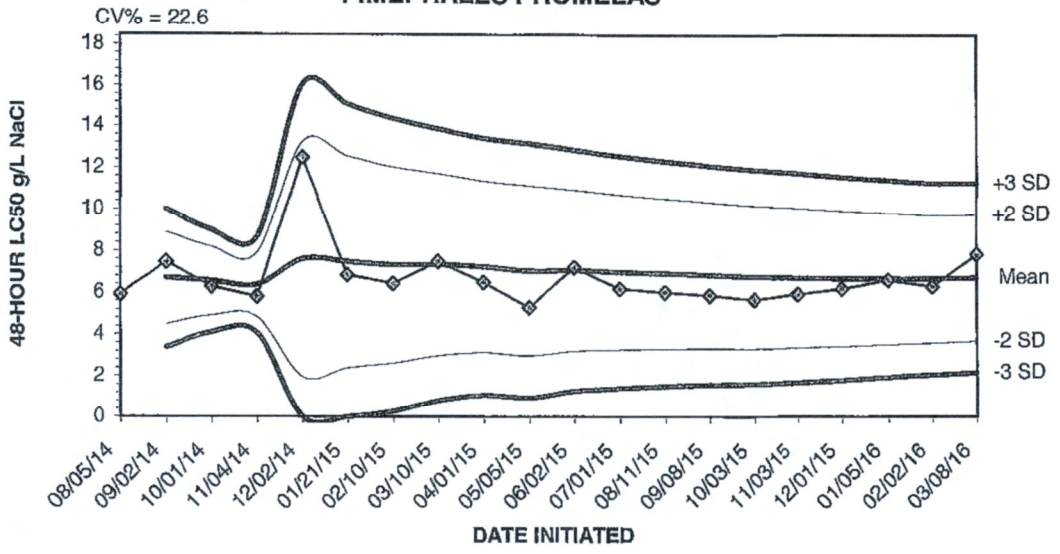
APPENDIX D
QUALITY ASSURANCE CHARTS

2016 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
08/19/14	2.0100					
09/03/14	2.3500	2.1800	1.6992	1.4588	2.6608	2.9012
10/01/14	2.1400	2.1667	1.8235	1.6520	2.5098	2.6814
11/04/14	1.6200	2.0300	1.4157	1.1086	2.6443	2.9514
12/02/14	1.1200	1.8480	0.8756	0.3895	2.8204	3.3065
01/21/15	1.7500	1.8317	0.9583	0.5216	2.7050	3.1417
02/03/15	1.7100	1.8143	1.0117	0.6104	2.6169	3.0181
03/10/15	1.8700	1.8213	1.0772	0.7051	2.5653	2.9374
04/01/15	2.4200	1.8878	1.0854	0.6842	2.6901	3.0913
05/05/15	1.3600	1.8350	1.0082	0.5947	2.6618	3.0753
06/02/15	2.4500	1.8909	1.0232	0.5894	2.7586	3.1924
07/02/15	2.3100	1.9258	1.0639	0.6329	2.7878	3.2187
08/04/15	1.8600	1.9208	1.0947	0.6817	2.7468	3.1598
09/08/15	1.3600	1.8807	1.0324	0.6082	2.7291	3.1533
10/01/15	1.2300	1.8373	0.9535	0.5115	2.7212	3.1631
11/03/15	1.5900	1.8219	0.9591	0.5277	2.6847	3.1161
12/02/15	1.4100	1.7976	0.9387	0.5092	2.6566	3.0861
01/05/16	2.0800	1.8133	0.9694	0.5475	2.6572	3.0792
02/02/16	1.8600	1.8158	0.9954	0.5852	2.6362	3.0464
03/08/16	2.4500	1.8475	1.0001	0.5764	2.6949	3.1186

2016 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR PIMEPHALES PROMELAS



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
08/05/14	5.9200					
09/02/14	7.4800	6.7000	4.4938	3.3907	8.9062	10.0093
10/01/14	6.2800	6.5600	4.9264	4.1095	8.1936	9.0105
11/04/14	5.8100	6.3725	4.8422	4.0771	7.9028	8.6679
12/02/14	12.5000	7.5980	1.9594	0.0000	13.2366	16.0558
01/21/15	6.8500	7.4733	2.3932	0.0000	12.5535	15.0935
02/10/15	6.4200	7.3229	2.6175	0.2648	12.0282	14.3809
03/10/15	7.4800	7.3425	2.9848	0.8059	11.7002	13.8791
04/01/15	6.4800	7.2467	3.1300	1.0717	11.3633	13.4216
05/05/15	5.2900	7.0510	2.9773	0.9404	11.1247	13.1616
06/02/15	7.2000	7.0645	3.1988	1.2660	10.9303	12.8631
07/01/15	6.1800	6.9908	3.2698	1.4093	10.7119	12.5724
08/11/15	6.0000	6.9146	3.3099	1.5075	10.5194	12.3217
09/08/15	5.8600	6.8393	3.3304	1.5759	10.3482	12.1027
10/03/15	5.6700	6.7613	3.3266	1.6092	10.1961	11.9135
11/03/15	5.9200	6.7088	3.3639	1.6915	10.0536	11.7260
12/01/15	6.1800	6.6776	3.4289	1.8045	9.9264	11.5508
01/05/16	6.5900	6.6728	3.5207	1.9447	9.8248	11.4009
02/02/16	6.2700	6.6516	3.5828	2.0484	9.7204	11.2548
03/08/16	7.8200	6.7100	3.6777	2.1615	9.7423	11.2585

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: 3/8/16** **To: 3/9/16**
From: 3/9/16 **To: 3/10/16**
Test Initiated: 3/12/16
Dilution Water Used: **Receiving Water** **X Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	56.0	100.0				
24-hour	A	100.0	100.0	100.0				
	B	100.0	100.0	100.0				
	C	100.0	100.0	87.5				
	D	100.0	100.0	87.5				
	E	100.0	100.0	87.5				
48-hour	A	100.0	100.0	100.0				
	B	100.0	100.0	100.0				
	C	100.0	100.0	87.5				
	D	100.0	100.0	87.5				
	E	100.0	100.0	87.5				
	Mean	100.0	100.0	92.5				

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 (100.0%) **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:
Method of LC_{50} calculation:
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 pulex 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Eddie Pearson
Analyst: Callahan

Sample Collected	**From:**	**Date 3/08/16**	**Time 2000**
	To:	**Date 3/09/16**	**Time 1800**
Test Begin		**Date 3/12/16**	**Time 1500**
Test End		**Date 3/14/16**	**Time 1650**

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	8.0	8.2	8.3	24.4	24.6	24.9	28.0			52.0			7.3	7.4	7.4
56.0	8.0	8.0	8.2	24.4	24.6	24.9							7.2	7.2	7.3
100.0	7.9	8.0	8.2	24.4	24.6	24.9	24.0	32.0		56.0	68.0		7.1	7.1	7.2

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

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 006
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 3/8/16** **To: 3/9/16**
From: 3/9/16 **To: 3/10/16**
Test Initiated: 3/11/16
Dilution Water Used: **Receiving Water** **X Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	22.0	32.0	45.0	56.0	75.0	100.0
24-hour	A	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
48-hour	A	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Mean	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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 (100.0%) **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:
Method of LC_{50} calculation:
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 pulex 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 006
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Eddie Pearson
Analyst: Callahan
Sample Collected **From:** **Date 3/08/16** **Time 2000**
To: **Date 3/09/16** **Time 1800**
Test Begin **Date 3/11/16** **Time 1750**
Test End **Date 3/13/16** **Time 1620**

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	8.1	8.0	7.4	24.6	24.4	24.6	28.0			52.0			7.3	7.3	7.1
22.0	8.0	8.0	7.5	24.6	24.4	24.6							7.1	7.2	7.0
32.0	8.0	8.0	7.4	24.6	24.4	24.6							7.1	7.2	7.0
45.0	8.0	8.0	7.5	24.6	24.4	24.6							7.1	7.2	7.0
56.0	8.0	8.0	7.4	24.6	24.4	24.6							7.0	7.2	7.0
75.0	8.0	7.9	7.4	24.6	24.4	24.6							6.9	7.1	7.0
100.0	7.9	7.9	7.3	24.6	24.4	24.6	24.0	32.0		56.0	68.0		6.8	7.1	7.0

*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

Client: El Dorado Chemical 1006

Project#: X 5983

Chain of Custody Documents Checked by: RC 3/24/16
Technician/Date

Raw Data Documents Checked by: RC 3/24/16
Technician/Date

Statistical Analysis Package Checked by: EGB 3/23/16
Quality Manager/Date

Quality Control Data Checked by: EGB 3/23/16
Quality Manager/Date

Report Checked by: EGB 3/30/16
Quality Manager/Date

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

Erin L. Bruno — 3/30/16

Quality Manager — **Date**

Report Rev. 3.0

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X5984

Bio-Analytical Laboratories' Executive Summary

Permittee: El Dorado Chemical Company
P.O. Box 231
El Dorado, AR 71731
Project #: X5984
Outfall: Outfall 007 (contaminated storm water)
Permit #: AR0000752/ AFIN #70-00040
Contact: Mr. Eddie Pearson
Test Dates: March 11 - 14, 2016
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 (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0- **Pass.**
2. Report the NOEC for survival, Parameter TOM6C - 100.0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 11.68%.

For *Daphnia pulex:*

1. If the NOEC for survival is less than the critical dilution (100.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0- **Pass.**
2. Report the NOEC for survival, Parameter TOM3D -100.0%.
3.Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 16.10%.

Note: Due to lack of available organisms at test initiation, this test was abbreviated.

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

Bio-Analytical Laboratories

3240 Spurgin Road
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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 X5984

Test Dates: March 11 - 14, 2016
Report Date: March 29, 2016

Prepared for:
Mr. Eddie Pearson
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 X5984

TABLE OF CONTENTS

BAL
ADEQ #88-0630
Project X5984

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),"Standard Methods for The Examination of Water and Wastewater. 20th Edition" (APHA 1998. Chemical results using this edition are listed in the report as SM 1997), and BAL's standard operating procedures.

2.2 Test Organisms

The fathead minnows were raised in-house and were approximately three days old at test initiation. The minnows were acclimated to dilution water hardness prior to testing. The *Daphnia pulex* test organisms were also raised in-house at test temperature 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.

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 100.0, 75.0, 56.0, 45.0, 32.0 and 22.0 percent effluent and a reconstituted water control. Due to lack of available daphnids at test initiation, the test concentrations used in the *Daphnia pulex* test were 100.0 and 50.0 percent effluent and a reconstituted water control. The critical dilution was defined as 100.0 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

Two samples of Outfall 007 were collected by El Dorado Chemical personnel on March 9 and 10, 2016 at 1815 hours. Upon completion of collection, the sample was packed in ice and delivered to the laboratory by BAL personnel. Due to hazardous road conditions caused by flooding, the samples were not picked up until March 11, 2016. The temperature upon arrival was 1.2 and 1.4^0 Celsius, respectively.

2.6 Sample Preparation

Upon arrival, each sample was logged in, given an identification number and refrigerated unless needed. Prior to use, each sample was warmed to 25 ± 1^0 Celsius. The total residual chlorine level (SM4500-Cl E 1997) was measured in milligrams/Liter (mg/) with a Capital Controls^R amperometric titrator and recorded if present. The total ammonia level was measured in mg/L using a HACH^R test strip. Dissolved oxygen (SM4500-O G 1997), pH (SM4500-H+ B 1997) and conductivity (SM2510-B 1997) measurements (in mg/L, standard units and umhos/cm, respectively) were taken on the control and each test concentration at test initiation, at each renewal and at test termination. Alkalinity (SM2320-B 1997) and hardness (SM2340-C 1997) levels were measured in mg/L as $CaCO_3$ 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.

BAL
ADEQ #88-0630
Project X5984

2.8 Data Analysis

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

3.0 Results and Discussion

The results of the tests can be found in Table 1. Significant differences in survival were not noted in the critical dilution in either test after 48 hours of exposure (p=.05). The NOEC value for the fathead and *Daphnia pulex* tests was 100.0 percent effluent (p=.05). The 48-hour LC_{50} values could not be calculated in either test because greater than 50.0 percent survival occurred in each effluent concentration.

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

Percent Effluent	Percent Survival	
Test Organism	*Pimephales promelas*	*Daphnia pulex*
Control	95.0	100.0
32.0	100.0	------
45.0	92.5	------
50.0	97.5	97.5
56.0	92.5	------
75.0	90.0	------
100.0	95.0	87.5

The 48-hour reference toxicant test results indicated 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 X5984

4.0 Conclusions

The samples of Outfall 007 collected from El Dorado Chemical Company, El Dorado, Arkansas, on March 9 and 10, 2016, were not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 100.0 percent critical dilution after 48 hours of exposure (p=.05). The 48-hour LC_{50} values could not be calculated because greater than 50.0 percent survival occurred in the effluent dilutions (p=.05).

BAL
ADEQ #88-0630
Project X5984

5.0 References

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.

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.

EPA, 2000. Method Guidance and Recommendations for Whole Effluent (WET) Testing. EPA-821-B-00-04, Office of Water

APHA, 1998. Standard Methods for The Examination of Water and Wastewater. 20th Edition.

APPENDIX A
CHAIN-OF-CUSTODY DOCUMENTS

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 627
Doyline, LA 71023
(318) 745-2772
1-800-259-1246
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company
Phone: (870) 863-1484
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: David Sartain / EDCC

Analysis: Chronic Ceriodaphnia; Chronic minnow; Acute minnow(fresh/marine); Acute Daphnia species; Acute Mysid; Acute Ceriodaphnia; Fecal Coliform

Project Number: X5984
Temp. upon arrival: 1.2°C
Thermometer #: 39
Tech: RC
Date: 3/11/16

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)
3-8-16 - 3-9-16	2015 - 1815	✓		3 half gallon	007			X	X				C12167	ICE

	Date:	Time:		Date:	Time:
Relinquished by/Affiliation: D. Sartain / EDCC	3/11/16	945AM	Received by/Affiliation: [signature]	3/11/16	1000
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	3/11/16	1335	Received by/Affiliation: R Callahan	3/11/16	1335

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

COC Rev. 3.0

Bio-Analytical Laboratories
3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023
(318) 745-2772
1-800-259-1248
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: El Dorado Chemical Company	Phone: (870) 863-1484	Analysis:								Project Number: X5984
Address: 4500 Norwest Ave., El Dorado, AR 71731	Fax: (870) 863-7499	Chronic Ceriodaphnia	Chronic minnow	Acute minnow(fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform		Temperature upon arrival: 1.4°C Thermometer #: 29 Tech: EC Date: 3/11/16
Permit #: AR0000752/AFIN 70-00040	Purchase Order:									
Sampler's Signature/Printed Name/Affiliation: Edward L Pearson / Edward L Pearson / 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)
3-9-16 / 3-10-16	2015 - 1815	X		3 half gallons	007			X	X				C12168	ICE

Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Edward L Pearson / EDCC	3/11/16	9:45AM	[signature]	3/11/16	1000
Relinquished by/Affiliation:	Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: [signature]	Date: 3/11/16	Time: 1335	Received by/Affiliation: R Callahan	Date: 3/11/16	Time: 1335

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

Comments:

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APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X5984

Client: EDCC/El Dorado Chemical Company

Address: 4500 Northwest Ave El Dorado AR 71731

NPDES#AR0000752 Outfall 007

Technicians: EGB/RC/MM

D. pulex

Test initiated: Date 3/11/16 Time 1800 — 3/12/16 1500

Test terminated: Date 3/13/16 Time 1645 — 3/14/16 1653

Dissolved Oxygen Meter: Model # YSI550A Serial #06E2089 AV
pH Meter: Model #Orion 230A+ Serial #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
C12167	9.2/106.6%	Y/2/8.1 96.4%	<0.01	NO	*NSA	N/A	52.0	20.0	RC
C12168	10.1/113.7%	Y/2/8.5 98.3%	<0.01	|	NSA	|	1370	240	RC
↓	9.8/115.6%	Y/2/8.1 97.0%	|	|	|	|			RC

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
		N/A							
Soft H2O	3838	|	N/A	N/A	N/A	7.2	52.6	28.0	EGB
	|	|	|	|	|	|				

Test Species Information

Test Species Info.	Species: D. pulex ID#: BAL/GIS E13-	Species: P. promelas ID#: BAL030816	Species: ID#:	Species: ID#:
Age	<24 hrs	~3days		
Test Container Size	30 ml	300 ml		
Test volume	25 ml	250 ml		
Feeding: Type	2 hr	prior to		
Amount	test	initiation		
Aeration?	N/A	N/A		
Amount	|	|		
Condition of survivors	RC 3/14/16 Good	Good RC 3/13/16		

Comments: *NSA = No strips available

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1653

Test Species D. pulex ID# BAL/E13-G15

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1500	24hour 1610	48hour 1653	72hour /	96hour /
Temperature (°C):	Ohour 24.4	24hour 24.6	48hour 24.9	72hour /	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0	A	N/A	8	8	8			8.0	7.9/8.1	8.4			7.3	7.3/7.3	7.4			176	211/210			
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
ec 0/1 15 ₹	E		8	8	8																	
32.0	A		8					8.0	/				7.2	/				259	/			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

omit 3/12/16 RC

ACUTE2 Rev 1.0

X5984 Page 14 of 33

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1653

Test Species D. pulex ID# BAL/EB-G15

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /	
Time:	Ohour 1500	24hour 1610	48hour 1653	72hour /	96hour /	
Temperature (°C):	Ohour 24.4	24hour 24.6	48hour 24.9	72hour /	96hour /	

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0		N/A																				
45.0	A		8					8.0	/				7.2	/				288	/			
	B		8																			
	C		8																			
	D		8																			
	E		8																			
56.0	A		8	8	8			8.0	7.9/8.0	8.3			7.2	7.3/7.1	7.2			301	314/303	324		
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

omit 3/12/16 RC

ACUTE2 Rev 1.0

X5984 Page 15 of 33

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/12/16 Time 1500

Test ended: Date 3/14/16 Time 1653

Test Species D. pulex ID# BAL/E 13-615

Technician:	Ohour RC	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1500	24hour 1610	48hour 1653	72hour /	96hour /
Temperature (°C):	Ohour 24.4	24hour 24.6	48hour 24.9	72hour /	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		N/A																				
100.0	A		8	8	8			8.0	8.0 8.0 8.2				7.0	7.0 7.0	7.2			424	432 429	433		
	B		8	8	8																	
	C		8	7	7																	
	D		8	5	5																	
	E		8	7	7																	
pH adj 100.0	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		

Omit 3/12/16 RC

X5984 Page 16 of 33

ACUTE2 Rev 1.0

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/11/16 Time 1800

Test ended: Date 3/13/16 Time 1645

Test Species P. pramelas ID# BAL/030816

Technician:	Ohour EW3	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1800	24hour 1810	48hour 1645	72hour /	96hour /
Temperature (°C):	Ohour 24.7	24hour 24.4	48hour 24.6	72hour /	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0%		N/A																				
0 SOFF	A		8	8	8			8.1	7.6/8.0	7.8			7.3	7.3/7.3	7.3			176.3	196.0/176.0	193.3		
	B		8	6	6																	
	C		8	8	8																	
	D		8	8	8																	
EC 8/1/15 F	E		8	8	8																	
32.0	A		8	8	8			8.0	7.6/8.0	7.7			7.2	7.1/7.2	7.2			164.9	180.6/159	260		
	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 Rev 1.0

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/11/16 Time 1800

Test ended: Date 3/13/16 Time 1645

Test Species P. promelas ID# BAL/030816

	0hour	24hour	48hour	72hour	96hour
Technician:	EVB	EC	EC	/	/
Time:	1800	1810	1645	/	/
Temperature (°C):	24.6 EVB	24.4	24.6		

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24 RC 182.7 / RC 182.8	48	72	96
C/D		N/A																				
45.0	A		8	8	8			8.0	1.5 / 8.0	7.7			7.1	1.0 / 7.2	7.2			162.5	288	285		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	5	5																	
56.0	A		8	7	7			8.0	1.5 / 8.0	7.7			7.1	1.0 / 7.2	7.2			160.1	301	299		
	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 Rev 1.0

X5984 Page 18 of 33

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/11/16 Time 1800

Test ended: Date 3/13/16 Time 1648

Test Species P. promelas ID# BAL/030816

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

Time: Ohour 1600 24hour 1810 48hour 1645 72hour / 96hour /

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

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
90		N/A																				
56.0	A		8	7	7			8.0	7.4/8.0	7.6			7.1	7.0/7.2	7.2			151.8	173.7/308	302		
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	7	7																	
75.0	A		8	6	6			8.0	7.5/8.0	7.7			7.0	6.9/7.1	7.1			1425	167.0/369	344		
	B		8	8	8																	
	C		8	8	8																	
	D		8	7	7																	
	E		8	7	7																	
Chemistry Tech prerenewal/postrenewal								RC	RC/RC	RC			RC	RC/RC	RC			RC	RC/RC	RC		

ACUTE2 Rev 1.0

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

Project# X5984

Client EDCC

Sample Description 007

Test started: Date 3/11/16 Time 1800

Test ended: Date 3/11 3/13/16 RC Time 1645

Test Species P. promelas ID# BAL1030816

Technician:	Ohour EB	24hour RC	48hour RC	72hour /	96hour /
Time:	Ohour 1800	24hour 1810	48hour 1645	72hour /	96hour /
Temperature (°C):	Ohour 24.6	24hour 24.4	48hour 24.6	72hour /	96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
		N/A																				
100.0	A		8	6	6			8.0	7.4 / 8.0	7.6			6.8	6.8 / 7.0	7.1			129.6	153.4 / 424	403		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
~~pH adj~~ 100.0	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 Rev 1.0

APPENDIX C
STATISTICAL ANALYSES

Daphnid Acute Test-48 Hr Survival

Start Date: 3/12/2016	Test ID: X5984DP	Sample ID:	AR0000752-007
End Date: 3/14/2016	Lab ID: ADEQ880630	Sample Type:	EFF2-Industrial
Sample Da 3/10/2016	Protocol: EPAAW02-EPA/821/R-02-012	Test Species:	DP-Daphnia pulex
Comments			

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
50	1.0000	1.0000	1.0000	0.8750	1.0000
100	1.0000	1.0000	0.8750	0.6250	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		
50	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	18.00
100	0.8750	0.8750	1.2234	0.9117	1.3931	16.097	5	20.00	18.00

Auxiliary Tests					Statistic	Critical	Skew
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)					0.805294	0.881	-1.303369
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							

Reviewed by: EVB 3/23/16

Acute Fish Test-48 Hr Survival

Start Date:	3/11/2016	Test ID:	X5984PP	Sample ID:	AR0000752
End Date:	3/13/2016	Lab ID:	ADEQ880630	Sample Type:	EFF2-Industrial
Sample Date:	3/9/2016	Protocol:	EPAAW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4	5
D-Control	1.0000	0.7500	1.0000	1.0000	1.0000
32	1.0000	1.0000	1.0000	1.0000	1.0000
45	1.0000	1.0000	1.0000	1.0000	0.6250
50	0.8750	1.0000	1.0000	1.0000	1.0000
56	0.8750	1.0000	1.0000	0.8750	0.8750
75	0.7500	1.0000	1.0000	0.8750	0.8750
100	0.7500	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	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5		
32	1.0000	1.0526	1.3931	1.3931	1.3931	0.000	5	30.00	16.00
45	0.9250	0.9737	1.2968	0.9117	1.3931	16.600	5	27.00	16.00
50	0.9750	1.0263	1.3564	1.2094	1.3931	6.055	5	28.00	16.00
56	0.9250	0.9737	1.2829	1.2094	1.3931	7.841	5	24.00	16.00
75	0.9000	0.9474	1.2504	1.0472	1.3931	11.683	5	23.50	16.00
100	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5	27.50	16.00

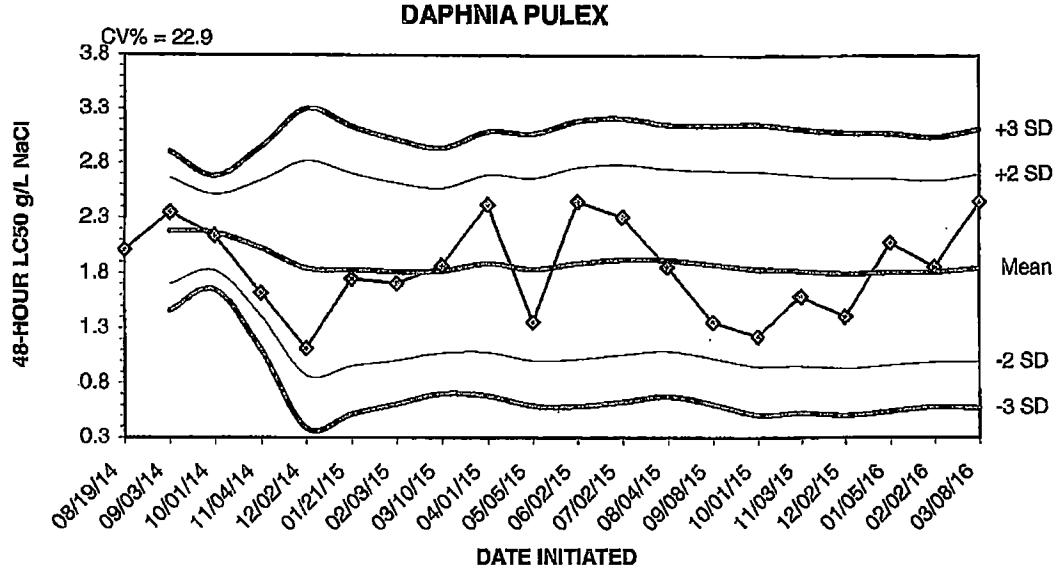
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.83072	0.934	-1.5641	2.15956
Equality of variance cannot be confirmed				

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

Reviewed by: EGB 3/23/16

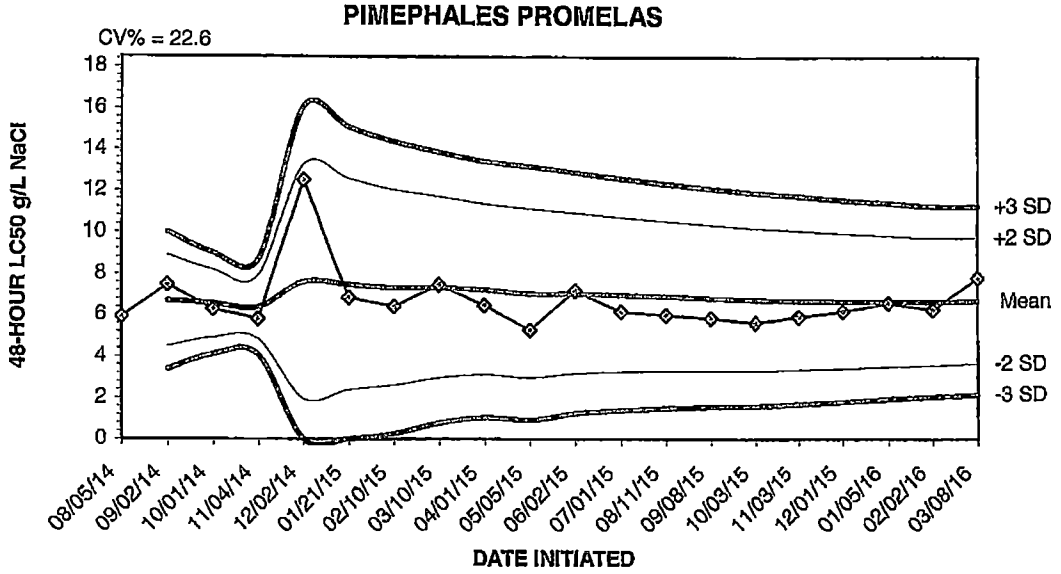
APPENDIX D
QUALITY ASSURANCE CHARTS

2016 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
08/19/14	2.0100					
09/03/14	2.3500	2.1800	1.6992	1.4588	2.6608	2.9012
10/01/14	2.1400	2.1667	1.8235	1.6520	2.5098	2.6814
11/04/14	1.6200	2.0300	1.4157	1.1086	2.6443	2.9514
12/02/14	1.1200	1.8480	0.8756	0.3895	2.8204	3.3065
01/21/15	1.7500	1.8317	0.9583	0.5216	2.7050	3.1417
02/03/15	1.7100	1.8143	1.0117	0.6104	2.6169	3.0181
03/10/15	1.8700	1.8213	1.0772	0.7051	2.5653	2.9374
04/01/15	2.4200	1.8878	1.0854	0.6842	2.6901	3.0913
05/05/15	1.3600	1.8350	1.0082	0.5947	2.6618	3.0753
06/02/15	2.4500	1.8909	1.0232	0.5894	2.7586	3.1924
07/02/15	2.3100	1.9258	1.0639	0.6329	2.7878	3.2187
08/04/15	1.8600	1.9208	1.0947	0.6817	2.7468	3.1598
09/08/15	1.3600	1.8807	1.0324	0.6082	2.7291	3.1533
10/01/15	1.2300	1.8373	0.9535	0.5115	2.7212	3.1631
11/03/15	1.5900	1.8219	0.9591	0.5277	2.6847	3.1161
12/02/15	1.4100	1.7976	0.9387	0.5092	2.6566	3.0861
01/05/16	2.0800	1.8133	0.9694	0.5475	2.6572	3.0792
02/02/16	1.8600	1.8158	0.9954	0.5852	2.6362	3.0464
03/08/16	2.4500	1.8475	1.0001	0.5764	2.6949	3.1186

2016 48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS FOR PIMEPHALES PROMELAS



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
08/05/14	5.9200					
09/02/14	7.4800	6.7000	4.4938	3.3907	8.9062	10.0093
10/01/14	6.2800	6.5600	4.9264	4.1095	8.1936	9.0105
11/04/14	5.8100	6.3725	4.8422	4.0771	7.9028	8.6679
12/02/14	12.5000	7.5980	1.9594	0.0000	13.2366	16.0558
01/21/15	6.8500	7.4733	2.3932	0.0000	12.5535	15.0935
02/10/15	6.4200	7.3229	2.6175	0.2648	12.0282	14.3809
03/10/15	7.4800	7.3425	2.9848	0.8059	11.7002	13.8791
04/01/15	6.4800	7.2467	3.1300	1.0717	11.3633	13.4216
05/05/15	5.2900	7.0510	2.9773	0.9404	11.1247	13.1616
06/02/15	7.2000	7.0645	3.1988	1.2660	10.9303	12.8631
07/01/15	6.1800	6.9908	3.2698	1.4093	10.7119	12.5724
08/11/15	6.0000	6.9146	3.3099	1.5075	10.5194	12.3217
09/08/15	5.8600	6.8393	3.3304	1.5759	10.3482	12.1027
10/03/15	5.6700	6.7613	3.3266	1.6092	10.1961	11.9135
11/03/15	5.9200	6.7088	3.3639	1.6915	10.0536	11.7260
12/01/15	6.1800	6.6776	3.4289	1.8045	9.9264	11.5508
01/05/16	6.5900	6.6728	3.5207	1.9447	9.8248	11.4009
02/02/16	6.2700	6.6516	3.5828	2.0484	9.7204	11.2548
03/08/16	7.8200	6.7100	3.6777	2.1615	9.7423	11.2585

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: 3/8/16** **To: 3/9/16**
From: 3/9/16 **To: 3/10/16**
Test Initiated: 3/12/16
Dilution Water Used: **Receiving Water** **X Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	50.0	100.0				
24-hour	A	100.0	100.0	100.0				
	B	100.0	100.0	100.0				
	C	100.0	100.0	87.5				
	D	100.0	87.5	62.5				
	E	100.0	100.0	87.5				
48-hour	A	100.0	100.0	100.0				
	B	100.0	100.0	100.0				
	C	100.0	100.0	87.5				
	D	100.0	87.5	62.5				
	E	100.0	100.0	87.5				
	Mean	100.0	97.5	87.5				

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 (100.0%) **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:
Method of LC_{50} calculation:
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 pulex 48 hour Acute Static Renewal
Chemical Parameters Chart*

Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Eddie Pearson
Analyst: Callahan
Sample Collected **From:** **Date 3/8/16** **Time 2015**
To: **Date 3/9/16** **Time 1815**
Test Begin **Date 3/12/16** **Time 1500**
Test End **Date 3/14/16** **Time 1653**

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	8.0	8.1	8.4	24.4	24.6	24.9	28.0			52.0			7.3	7.3	7.4
50.0	8.0	8.0	8.3	24.4	24.6	24.9							7.2	7.1	7.2
100.0	8.0	8.0	8.2	24.4	24.6	24.9	20.0	24.0		52.0	132.0		7.0	7.0	7.2

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

Acute Forms
Pimephales promelas Survival

Permittee: El Dorado Chemical - Outfall 007
NPDES Permit Number: AR0000752/ AFIN 70-00040
Composite Collected **From: 3/8/16** **To: 3/9/16**
From: 3/9/16 **To: 3/10/16**
Test Initiated: 3/11/16
Dilution Water Used: **Receiving Water** **X Reconstituted Water**

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	32.0	45.0	50.0	56.0	75.0	100.0
24-hour	A	100.0	100.0	100.0	87.5	87.5	75.0	75.0
	B	75.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	87.5	87.5	100.0
	E	100.0	100.0	62.5	100.0	87.5	87.5	100.0
48-hour	A	100.0	100.0	100.0	87.5	87.5	75.0	75.0
	B	75.0	100.0	100.0	100.0	100.0	100.0	100.0
	C	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	D	100.0	100.0	100.0	100.0	87.5	87.5	100.0
	E	100.0	100.0	62.5	100.0	87.5	87.5	100.0
	Mean	95.0	100.0	92.5	97.5	92.5	90.0	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 (100.0%) **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:
Method of LC_{50} calculation:
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*

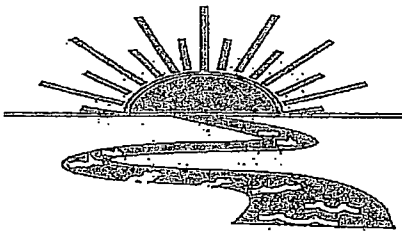
Permittee: El Dorado Chemical - Outfall 007
NPDES Number: AR0000752/ AFIN 70-00040
Contact: Eddie Pearson
Analyst: Callahan

Sample Collected	**From:**	**Date 3/8/16**	**Time 2015**
	To:	**Date 3/9/16**	**Time 1815**
Test Begin		**Date 3/11/16**	**Time 1800**
Test End		**Date 3/13/16**	**Time 1645**

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	8.1	8.0	7.8	24.6	24.4	24.6	28.0			52.0			7.3	7.3	7.3
32.0	8.0	8.0	7.7	24.6	24.4	24.6							7.2	7.2	7.2
45.0	8.0	8.0	7.7	24.6	24.4	24.6							7.1	7.2	7.2
50.0	8.0	8.0	7.7	24.6	24.4	24.6							7.1	7.2	7.2
56.0	8.0	8.0	7.6	24.6	24.4	24.6							7.1	7.2	7.2
75.0	8.0	8.0	7.7	24.6	24.4	24.6							7.0	7.1	7.1
100.0	8.0	8.0	7.6	24.6	24.4	24.6	20.0	24.0		52.0	132.0		6.8	7.0	7.1

*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

Client: El Dorado Chemical 1007

Project#: X5984

Chain of Custody Documents Checked by: RC 3/24/16
Technician/Date

Raw Data Documents Checked by: RC 3/24/16
Technician/Date

Statistical Analysis Package Checked by: EGB 3/23/16
Quality Manager/Date

Quality Control Data Checked by: EGB 3/23/16
Quality Manager/Date

Report Checked by: EGB 3/30/16
Quality Manager/Date

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

Erin L. Bragg
Quality Manager

3/30/16
Date

Report Rev. 3.0

February 18, 2016

Test Results of
First Quarter
Acute 48 hour Renewal
Biomonitoring Testing
for
Outfall 010

Control No. 199178-1

Prepared for:

Mr. Eddie Pearson
El Dorado Chemical Company
4500 North West Avenue
El Dorado, AR 71730

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

El Dorado Chemical Company
ATTN: Mr. Eddie Pearson
4500 North West Avenue
El Dorado, AR 71730

Re: Acute 48 hour Renewal Biomonitoring utilizing *Pimephales promelas* (Fathead Minnow) and *Daphnia pulex*
Outfall 010
Client NPDES Permit No. AR0000752

Dear Mr. Eddie Pearson:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the appropriate Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" EPA-821-R-02-012, Fifth Edition, October 2002. Test results are summarized below:

Acute *Pimephales promelas* (Fathead Minnow) Survival Test: The No Observable Effects Concentration (NOEC) for survival was 23% effluent, and the LC-50 value was >23% effluent; the sample, therefore, **PASSED** at low flow of 17% effluent for lethal effects.

Acute *Daphnia pulex* Survival Test: The No Observable Effects Concentration (NOEC) for survival was 23% effluent, and the LC-50 value was >23% effluent; the sample, therefore, **PASSED** at low flow of 17% effluent for lethal effects.

AMERICAN INTERPLEX CORPORATION

John Overbey
Chief Operating Officer

PDF cc: El Dorado Chemical Company
ATTN: Mr. Eddie Pearson
epearson@edc-ark.com

El Dorado Chemical Company
ATTN: Ms. Vee Ann Poole
vapoole@edc-ark.com

Table of Contents

I. Introduction and Summary

Biomonitoring testing of 48-hour renewal definitive toxicity tests using *Daphnia pulex* and *Pimephales promelas* were performed.

The *Daphnia pulex* test was conducted from February 11, 2016 at 1315 to February 13, 2016 at 1500.

The *Pimephales promelas* test was conducted from February 11, 2016 at 1620 to February 13, 2016 at 1425.

The tests were performed in accordance with EPA-821-R-02-012. Statistical analyses were performed on the observed data.

The tests were conducted in temperature and light cycle controlled environmental chamber. The test temperature was 25 degrees C +/- 1 degree for the *Daphnia pulex* and 25 degrees C +/- 1 degree for the *Pimephales promelas*.

II. Control Acceptance Criteria

ORGANISM	CRITERIA	RESULTS	PASS/FAIL
Daphnia pulex	Control Survival >= 90%	100	PASS
Pimephales promelas	Control Survival >= 90%	100	PASS

III. Outlined Report

A. Introduction

1. Permit Number: AR0000752
2. Test Requirements: 48-hour renewal definitive toxicity test using:
   Daphnia pulex
   Pimephales promelas

B. Source of Effluent/Dilution Water

1. Effluent Samples:
   a. Sampling Point: Outfall 010
      February 11
   b. Chemical Data:

Analysis	Sample 1	Sample 2
Dissolved oxygen (mg/l)	7.5	8.4
pH (standard units)	6.4	6.7
Alkalinity (mg/l as CaCO3)	22	24
Hardness (mg/l as CaCO3)	35	32
Conductivity (umhos/cm)	470	470
Residual Chlorine (mg/l)	<0.05	<0.05

2. Dilution Water Samples: Synthetic Soft Water #4301
   a. Dates Collected/Prepared: February 11 through February 25, 2016
   b. Chemical Data:

Analysis	Sample 1	Sample 2
Dissolved oxygen (mg/l)	8.4	8.0
pH (standard units)	7.2	7.2
Alkalinity (mg/l as CaCO3)	32	33
Hardness (mg/l as CaCO3)	47	41
Conductivity (umhos/cm)	150	140
Residual Chlorine (mg/l)	<0.05	<0.05

C. Test Methods
1. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, (Fifth Ed.), EPA-821-R-02-012, 48-hour acute definitive test.
   a. Endpoints:
      Death; the criteria employed to establish death are:
      i. No movement
      ii. No reaction to gentle prodding

Criteria	*Pimephales promelas*	*Daphnia pulex*
Type and Volume of Test Chamber	500 ml disposable beaker	30 ml disposable beaker
Volume of Sample	250 ml	25 ml
Organisms per chamber	8	8
Replicates per dilution	5	5
Test Temperature	25 deg. C	25 deg. C
Test Initiated	February 11, 2016 at 1620	February 11, 2016 at 1315
Test Terminated	February 13, 2016 at 1425	February 13, 2016 at 1500
Feeding	None required	None required
Age of Test Organisms	9 days	<24 hours

2. Chemical Methods Employed:

Analysis	Method
Dissolved oxygen (mg/l)	SM 4500-O C
pH (standard units)	SM 4500-H+ B
Alkalinity (mg/l as CaCO3)	SM 2320 B
Hardness (mg/l as CaCO3)	EPA 200.7
Conductivity (umhos/cm)	EPA 120.1
Residual Chlorine (mg/l)	SM 4500-CL- F
Temperature (deg.C)	EPA 170.1

D. Test Organisms
1. Scientific Name
Daphnia pulex
Pimephales promelas

2. Acclimation of test organisms:
Daphnia pulex
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water.
Pimephales promelas
Organisms were obtained from in-house cultures. The organisms were raised in moderately hard reconstituted water.

E. Quality Assurance
1. Toxicity Tests
a. Reference Toxicant: Sodium Chloride
b. Date of test:
Daphnia pulex: February 2, 2016 at 1355 to February 4, 2016 at 1450
Pimephales promelas: February 2, 2016 at 1405 to February 4, 2016 at 1210
c. Synthetic moderately hard dilution water used

Organism	LC50	Warning Limits
Daphnia pulex	2.04 g/l	1.24-2.54 g/l
Pimephales promelas	5.61 g/l	5.64-8.90 g/l

2. Chemical and Physical Analyses

Analysis	% Recovery	Relative % Difference
Alkalinity	NA	0.694
Hardness	97.8	4.26
pH	101	0.402
Conductivity	101	0.678

F. Organism History
Daphnia pulex
Date: February 11, 2016 at 1315
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C
Pimephales promelas (Fathead minnow)
Date: February 11, 2016 at 1620
Age: 9 days
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

IV. Results Summary

Daphnia pulex and *Pimephales promelas* are exposed in a static renewal system to different concentrations of effluent and dilution water. Effluent dilutions for this test were 7%, 10%, 13%, 17%, 23%. The low-flow concentration was 17%. Test results were based on survival.

Daphnia pulex

The *Daphnia pulex* test was conducted from February 11, 2016 at 1315 to February 13, 2016 at 1500.

Statistical analyses:

NOEC = 23%
LC50 = >23%

Concentration	24 hour % Survival	48 hour % Survival
Control	100	100
7%	100	100
10%	100	100
13%	100	100
17%	100	100
23%	100	100

Pimephales promelas

The *Pimephales promelas* test was conducted from February 11, 2016 at 1620 to February 13, 2016 at 1425.

Statistical analyses:

NOEC = 23%
LC50 = >23%

Concentration	24 hour % Survival	48 hour % Survival
Control	100	100
7%	100	100
10%	100	100
13%	100	100
17%	100	100
23%	100	100

Appendix: A1

Daphnia pulex
Survival Data

Number of organisms per chamber: 8
Volume of test chamber: 30 ml

Age of organisms: <24 hours
Volume of test solution: 25 ml

Effluent Concentration		Number of Survivors 24 Hours	48 Hours	% Survival	CV %
Control	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
7%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
10%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
13%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
17%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
23%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		

CV = Coefficient of variance = standard deviation X 100/mean

Appendix: A1

Pimephales promelas
Survival Data

Number of organisms per chamber: 8
Volume of test chamber: 500 ml

Age of organisms: 9 days
Volume of test solution: 250 ml

Effluent Concentration		Number of Survivors 24 Hours	Number of Survivors 48 Hours	% Survival	CV %
Control	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
7%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
10%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
13%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
17%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		
23%	rep. A	8	8	100	0.00
	rep. B	8	8		
	rep. C	8	8		
	rep. D	8	8		
	rep. E	8	8		

CV = Coefficient of variance = standard deviation X 100/mean

Appendix A2: Statistics

Daphnia pulex

		Transformation of Data		Transform: Arc Sin(Square Root(Y))
Group	Identification	Rep	Value	Transformed
1	Control	1	1.00000	1.39310
1	Control	2	1.00000	1.39310
1	Control	3	1.00000	1.39310
1	Control	4	1.00000	1.39310
1	Control	5	1.00000	1.39310
2	7%	1	1.00000	1.39310
2	7%	2	1.00000	1.39310
2	7%	3	1.00000	1.39310
2	7%	4	1.00000	1.39310
2	7%	5	1.00000	1.39310
3	10%	1	1.00000	1.39310
3	10%	2	1.00000	1.39310
3	10%	3	1.00000	1.39310
3	10%	4	1.00000	1.39310
3	10%	5	1.00000	1.39310
4	13%	1	1.00000	1.39310
4	13%	2	1.00000	1.39310
4	13%	3	1.00000	1.39310
4	13%	4	1.00000	1.39310
4	13%	5	1.00000	1.39310
5	17%	1	1.00000	1.39310
5	17%	2	1.00000	1.39310
5	17%	3	1.00000	1.39310
5	17%	4	1.00000	1.39310
5	17%	5	1.00000	1.39310
6	23%	1	1.00000	1.39310
6	23%	2	1.00000	1.39310
6	23%	3	1.00000	1.39310
6	23%	4	1.00000	1.39310
6	23%	5	1.00000	1.39310

Appendix A2: Statistics

Daphnia pulex

Shapiro - Wilk's Test for Normality	Transform: Arc Sin(Square Root(Y))
D = 0	
W = 0	
Critical W = 0.9	(alpha = 0.01, N = 30)
Critical W = 0.927	(alpha = 0.05, N = 30)
Data FAIL normality test (alpha = 0.01).	

Steel's Many-One Rank Test				Transform: Arc Sin(Square Root(Y))	
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	7%	27.50	16.00	5.00	
3	10%	27.50	16.00	5.00	
4	13%	27.50	16.00	5.00	
5	17%	27.50	16.00	5.00	
6	23%	27.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Pimephales promelas

		Transformation of Data		Transform: Arc Sin(Square Root(Y))
Group	Identification	Rep	Value	Transformed
1	Control	1	1.00000	1.39310
1	Control	2	1.00000	1.39310
1	Control	3	1.00000	1.39310
1	Control	4	1.00000	1.39310
1	Control	5	1.00000	1.39310
2	7%	1	1.00000	1.39310
2	7%	2	1.00000	1.39310
2	7%	3	1.00000	1.39310
2	7%	4	1.00000	1.39310
2	7%	5	1.00000	1.39310
3	10%	1	1.00000	1.39310
3	10%	2	1.00000	1.39310
3	10%	3	1.00000	1.39310
3	10%	4	1.00000	1.39310
3	10%	5	1.00000	1.39310
4	13%	1	1.00000	1.39310
4	13%	2	1.00000	1.39310
4	13%	3	1.00000	1.39310
4	13%	4	1.00000	1.39310
4	13%	5	1.00000	1.39310
5	17%	1	1.00000	1.39310
5	17%	2	1.00000	1.39310
5	17%	3	1.00000	1.39310
5	17%	4	1.00000	1.39310
5	17%	5	1.00000	1.39310
6	23%	1	1.00000	1.39310
6	23%	2	1.00000	1.39310
6	23%	3	1.00000	1.39310
6	23%	4	1.00000	1.39310
6	23%	5	1.00000	1.39310

Appendix A2: Statistics

Pimephales promelas

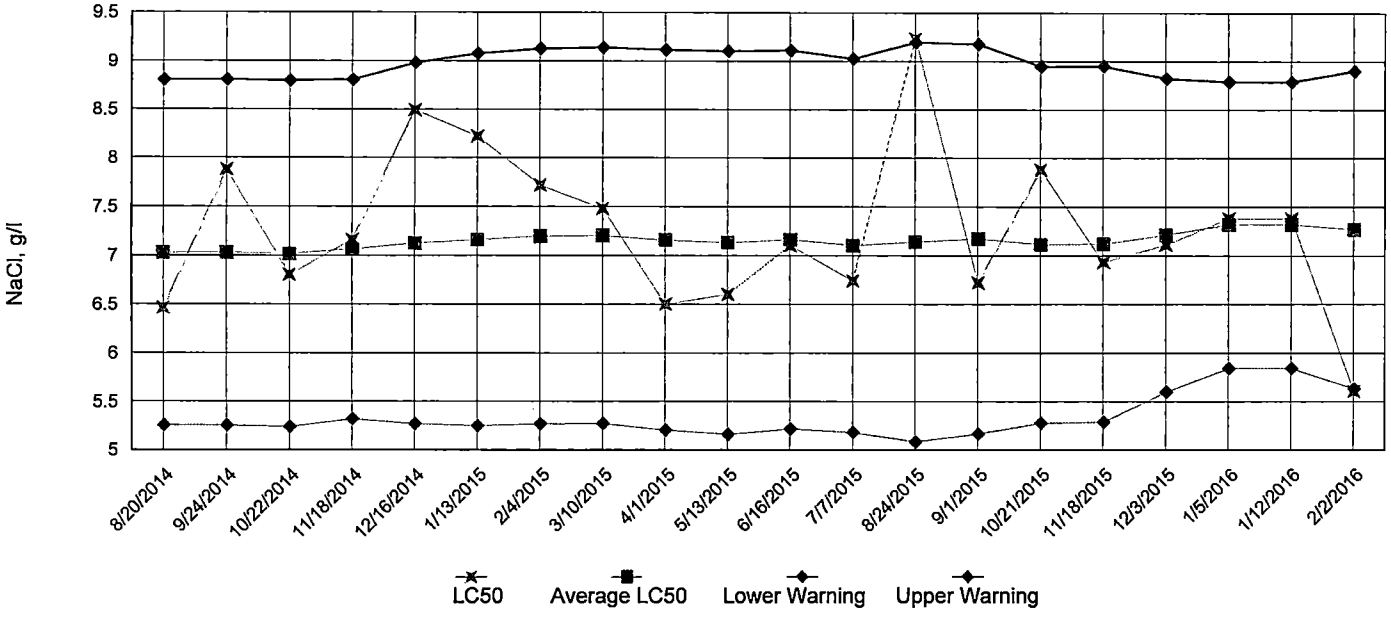
Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
D = 0		
W = 0		
Critical W = 0.9	(alpha = 0.01, N = 30)	
Critical W = 0.927	(alpha = 0.05, N = 30)	
Data FAIL normality test (alpha = 0.01).		

Steel's Many-One Rank Test				Transform: Arc Sin(Square Root(Y))
Ho:Control<Treatment				
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	7%	27.50	16.00	5.00	
3	10%	27.50	16.00	5.00	
4	13%	27.50	16.00	5.00	
5	17%	27.50	16.00	5.00	
6	23%	27.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix: A3

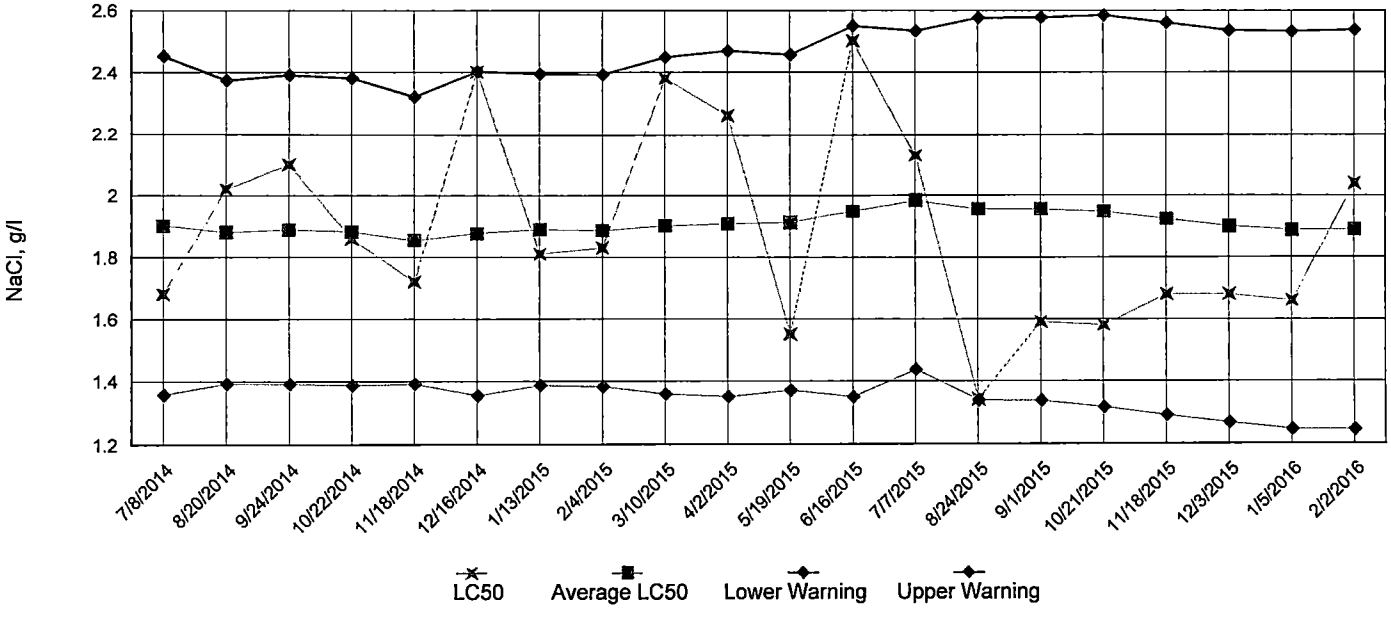
Acute Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



Acute Reference Toxicant, *Daphnia pulex*

LC50 Survival Data



Appendix: A4

Chemical Data for
Pimephales promelas
and
Daphnia pulex

Day 1		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.4	8.1	8.2	8.1	8.2	8.1
DO, mg/l	Final 1*	8.0	7.7	7.9	8.1	8.0	7.7
DO, mg/l	Final 2*	8.0	8.0	8.6	8.0	8.0	8.0
pH, su	Initial	7.2	7.1	7.1	7.0	7.0	7.0
pH, su	Final 1*	7.2	7.2	7.2	7.2	7.2	7.1
pH, su	Final 2*	7.2	7.1	7.2	7.1	7.1	7.1
Alkalinity, mg/l		32	NA	NA	NA	30	NA
Hardness, mg/l		47	NA	NA	NA	42	NA
Conductivity, umho/cm		150	170	180	180	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

Day 2		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.0	8.3	8.4	8.4	8.2	8.4
DO, mg/l	Final 1*	7.9	8.0	8.2	8.2	8.0	8.0
DO, mg/l	Final 2*	8.2	8.4	8.7	8.3	8.3	8.4
pH, su	Initial	7.2	7.2	7.2	7.1	7.1	7.1
pH, su	Final 1*	7.3	7.2	7.2	7.2	7.1	7.1
pH, su	Final 2*	7.4	7.4	7.5	7.4	7.4	7.4
Alkalinity, mg/l		33	NA	NA	NA	33	NA
Hardness, mg/l		41	NA	NA	NA	39	NA
Conductivity, umho/cm		140	160	160	170	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

*1 data from *Pimephales promelas*
*2 data from *Daphnia pulex*

Appendix: B

Daphnia pulex Survival Data

Permitee:	El Dorado Chemical Company	Critical Dilution:	17%
NPDES No:	AR0000752	Sample Source:	Outfall 010
Contact:	Mr. Eddie Pearson	Species Age:	<24 hours
Test Type:	48-hour renewal definitive toxicity test	Analysts:	280, 304, 310, 314
Dilution Water:	Synthetic Soft Water #4301		
Test Initiated:	February 11, 2016 at 1315		
Test Terminated:	February 13, 2016 at 1500		

PERCENT SURVIVAL

24 hours	Control	7%	10%	13%	17%	23%
Rep. A	100	100	100	100	100	100
Rep. B	100	100	100	100	100	100
Rep. C	100	100	100	100	100	100
Rep. D	100	100	100	100	100	100
Rep. E	100	100	100	100	100	100

48 hours	Control	7%	10%	13%	17%	23%
Rep. A	100	100	100	100	100	100
Rep. B	100	100	100	100	100	100
Rep. C	100	100	100	100	100	100
Rep. D	100	100	100	100	100	100
Rep. E	100	100	100	100	100	100

Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:

a) Low Flow 17%: _____ Yes X No
b) 1/2 Low Flow (NA): _____ Yes _____ No

Pass/Fail #TEM3D. 0

NOEL *Daphnia pulex* lethality #TOM3D: 23%

Coefficient of variation for *Daphnia pulex* survival #TQM3D: 0

Enter percent effluent corresponding to LC-50 below.

LC-50 effluent: >23%
Method of LC-50 calculation: NA

Reference Toxicity Test Performed on February 2, 2016 at 1355 to February 4, 2016 at 1450:

LC-50 effluent: 2.04 g/l
Warning Limits: 1.24 to 2.54 g/l

Appendix: B

Daphnia pulex Chemical Parameters Chart

Permitee:	El Dorado Chemical Company	Critical Dilution:	17%
NPDES No:	AR0000752	Sample Source:	Outfall 010
Contact:	Mr. Eddie Pearson	Species Age:	<24 hours
Test Type:	48-hour renewal definitive toxicity test	Analysts:	280, 304, 310, 314
Dilution Water:	Synthetic Soft Water #4301		
Test Initiated:	February 11, 2016 at 1315		
Test Terminated:	February 13, 2016 at 1500		

Day 1		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.4	8.1	8.2	8.1	8.2	8.1
DO, mg/l	Final	8.0	8.0	8.6	8.0	8.0	8.0
pH, su	Initial	7.2	7.1	7.1	7.0	7.0	7.0
pH, su	Final	7.2	7.1	7.2	7.1	7.1	7.1
Alkalinity, mg/l		32	NA	NA	NA	30	NA
Hardness, mg/l		47	NA	NA	NA	42	NA
Conductivity, umho/cm		150	170	180	180	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

Day 2		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.0	8.3	8.4	8.4	8.2	8.4
DO, mg/l	Final	8.2	8.4	8.7	8.3	8.3	8.4
pH, su	Initial	7.2	7.2	7.2	7.1	7.1	7.1
pH, su	Final	7.4	7.4	7.5	7.4	7.4	7.4
Alkalinity, mg/l		33	NA	NA	NA	33	NA
Hardness, mg/l		41	NA	NA	NA	39	NA
Conductivity, umho/cm		140	160	160	170	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

Appendix: B

Pimephales promelas Survival Data

Permitee:	El Dorado Chemical Company	Critical Dilution:	17%
NPDES No:	AR0000752	Sample Source:	Outfall 010
Contact:	Mr. Eddie Pearson	Species Age:	9 days
Test Type:	48-hour renewal definitive toxicity test	Analysts:	280, 304, 310, 314
Dilution Water:	Synthetic Soft Water #4301		
Test Initiated:	February 11, 2016 at 1620		
Test Terminated:	February 13, 2016 at 1425		

PERCENT SURVIVAL

24 hours	Control	7%	10%	13%	17%	23%
Rep. A	100	100	100	100	100	100
Rep. B	100	100	100	100	100	100
Rep. C	100	100	100	100	100	100
Rep. D	100	100	100	100	100	100
Rep. E	100	100	100	100	100	100

48 hours	Control	7%	10%	13%	17%	23%
Rep. A	100	100	100	100	100	100
Rep. B	100	100	100	100	100	100
Rep. C	100	100	100	100	100	100
Rep. D	100	100	100	100	100	100
Rep. E	100	100	100	100	100	100

Dunnett's Procedure or Steel's Many-One Rank Test as appropriate. Is the mean survival at 48 hours significantly different (p=0.05) than the control survival for the % effluent corresponding to:

a) Low Flow 17%: _____ Yes X No
b) 1/2 Low Flow (NA): _____ Yes _____ No

Pass/Fail #TEM6C. 0

NOEL *Pimephales promelas* lethality #TOM6C: 23%

Coefficient of variation for *Pimephales promelas* survival #TQM6C: 0

Enter percent effluent corresponding to LC-50 below.
LC-50 effluent: >23%
Method of LC-50 calculation: NA

Reference Toxicity Test Performed on February 2, 2016 at 1405 to February 4, 2016 at 1210:
LC-50 effluent: 5.61 g/l
Warning Limits: 5.64 to 8.90 g/l

Appendix: B

Pimephales promelas Chemical Parameters Chart

Permitee: El Dorado Chemical Company
NPDES No: AR0000752
Contact: Mr. Eddie Pearson
Test Type: 48-hour renewal definitive toxicity test
Dilution Water: Synthetic Soft Water #4301
Test Initiated: February 11, 2016 at 1620
Test Terminated: February 13, 2016 at 1425

Critical Dilution: 17%
Sample Source: Outfall 010
Species Age: 9 days
Analysts: 280, 304, 310, 314

Day 1		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.4	8.1	8.2	8.1	8.2	8.1
DO, mg/l	Final	8.0	7.7	7.9	8.1	8.0	7.7
pH, su	Initial	7.2	7.1	7.1	7.0	7.0	7.0
pH, su	Final	7.2	7.2	7.2	7.2	7.2	7.1
Alkalinity, mg/l		32	NA	NA	NA	30	NA
Hardness, mg/l		47	NA	NA	NA	42	NA
Conductivity, umho/cm		150	170	180	180	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

Day 2		Control	7%	10%	13%	17%	23%
DO, mg/l	Initial	8.0	8.3	8.4	8.4	8.2	8.4
DO, mg/l	Final	7.9	8.0	8.2	8.2	8.0	8.0
pH, su	Initial	7.2	7.2	7.2	7.1	7.1	7.1
pH, su	Final	7.3	7.2	7.2	7.2	7.1	7.1
Alkalinity, mg/l		33	NA	NA	NA	33	NA
Hardness, mg/l		41	NA	NA	NA	39	NA
Conductivity, umho/cm		140	160	160	170	190	210
Residual Chlorine, mg/l		<0.05	NA	NA	NA	<0.05	NA

AMERICAN INTERPLEX CORPORATION LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Co
Project Reference: Quarterly Permit AR000752
Project Manager: Edward L Pearson
Sampled By: Edward L Pearson

PO No.

MATRIX

ANALYSES REQUESTED: Acute FTH DP Minnow / Daphnia

AIC CONTROL NO: 199178
AIC PROPOSAL NO:
Carrier: Rush
Received Temperature, C.: 1.0

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	Acute FTH DP Minnow / Daphnia	Remarks
1	010	02-10-16 1000		X	X		2	X	
		Container Type						P	Field pH calibration
		Preservative						NO	on _____ @ _____ Buffer:

G = Glass, P = Plastic, V = VOA vials, H = HCl to pH2, T = Sodium Thiosulfate
NO = none, S = Sulfuric acid pH2, N = Nitric acid pH2, B = NaOH to pH12, Z = Zinc acetate, A=$(NH_4)_2SO_4$, NH_4OH

Turnaround Time Requested: (Please circle)
NORMAL or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions:
Phone: _____ Fax:
Report Attention to:
Report Address to:
Email Address:

Relinquished By:	Date/Time	Received By:	Date/Time
Edward L Pearson	02-10-16 1200		
Relinquished By:	Date/Time	Received in Lab By: Tiffany Hayden	Date/Time 2-10-16 1420

Comments:

9/2014

FORM 0060

AMERICAN INTERPLEX CORPORATION LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Co
Project Reference: Quarter 14 Permit 0000752
Project Manager: Edward L Pearson
Sampled By: Edward L Pearson

PO No.

MATRIX

AIC CONTROL NO: 199178
AIC PROPOSAL NO:
Carrier:
Received Temperature- C: 0.1 CS

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	Acute FHDP Mineral Suplate	Remarks
2	010	02-11-16 1000		X	X		2	X	
		Container Type						P	Field pH calibration
		Preservative						NO	on _____ @ _____ Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A=$(NH_4)_2SO_4$, NH_4OH

Turnaround Time Requested: (Please circle)
~~NORMAL~~ or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions:
Phone:_____ Fax:
Report Attention to:
Report Address to:

Email Address:

Relinquished By:	Date/Time	Received By:	Date/Time
Edward L Pearson	02-11-16 1200		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			2/11/16 1445

Comments:

9/2014

FORM 0060

February 18, 2016

Test Results of
First Quarter
Chronic 7-Day Renewal
Biomonitoring Testing
for
Outfall 010
El Dorado, AR

Control No. 199094-1

Prepared for:

Mr. Eddie Pearson
El Dorado Chemical Company
4500 North West Avenue
El Dorado, AR 71730

Prepared by:

AMERICAN INTERPLEX CORPORATION
8600 Kanis Road
Little Rock, AR 72204-2322

El Dorado Chemical Company
ATTN: Mr. Eddie Pearson
4500 North West Avenue
El Dorado, AR 71730

Re: Chronic 7-Day Renewal utilizing *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia*
Outfall 010 - El Dorado, AR
NPDES Permit No. AR0000752

Dear Mr. Eddie Pearson:

This report is the analytical results and supporting information for the samples submitted to American Interplex Corporation (AIC). The following results are applicable only to the sample identified by the control number referenced above. Accurate assessment of the data requires access to the entire document. Each section of the report has been reviewed and approved by the Chief Operating Officer or qualified designee.

Testing procedures and Quality Assurance were in accordance with "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013, Fourth Edition, October 2002. Test results are summarized below:

Method 1000.0 Chronic *Pimephales promelas* (Fathead minnow) Survival and Growth Test: The No Observable Effects Concentration (NOEC) for survival occurred at 2.1 % effluent, which is above the critical dilution of 1.6 %. Any statistical difference with sublethal effects cannot be considered toxic due to the minimum significant difference (PMSD) calculated result being below the lower PMSD bounds. **The sample, therefore PASSED both lethal and sub-lethal effects for the Fathead minnow test.**

Method 1002.0 Chronic *Ceriodaphnia dubia* Survival and Reproduction Test: The No Observable Effects Concentration (NOEC) for survival occurred at 2.1 % effluent, which is above the critical dilution of 1.6 %. The NOEC for reproduction occurred at 2.1 % effluent, which is above the critical dilution of 1.6 %. **The sample, therefore, PASSED both lethal and sub-lethal effects for the *Ceriodaphnia dubia* test.**

AMERICAN INTERPLEX CORPORATION

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Table of Contents

I. Control Acceptance Criteria

Pimephales promelas (Fathead minnow) Method 1000.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Growth > or = 0.25 mg per Surviving minnow	0.291	PASS
Control Growth CV < or = 40%	8.40	PASS
Growth Minimum Significant Difference 12 to 30%	11.1	BELOW
Critical Dilution CV < or = 40%	5.69	PASS

Ceriodaphnia dubia Method 1002.0

CRITERIA	RESULTS	PASS/FAIL
Control Survival > or = 80%	100	PASS
Control Reproduction > or = 15 per Surviving Female	23.8	PASS
Control CV < or = 40% per Surviving Female	11.2	PASS
Reproduction Minimum Significant Difference 13 to 47%	16.1	PASS
Critical Dilution CV < or = 40%	15.7	PASS

II. Outlined Report

A. Introduction

1. Permit Number: AR0000752
2. Test Requirements:
   Test Methods 1000.0 and 1002.0
3. Receiving Stream:

B. Source of Effluent/Dilution Water

1. Effluent Samples:
   a. Sampling Point: Outfall 010
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	7.3	8.4	8.6
pH (standard units)	6.4	6.5	7.2
Alkalinity (mg/l as CaCO3)	22	22	23
Hardness (mg/l as CaCO3)	37	33	47
Conductivity (umhos/cm)	470	470	460
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05
Ammonia as N (mg/l)	13	12	12

2. Dilution Water Samples: Synthetic Soft Water #4299
   a. Dates Prepared: February 4 through February 18, 2016
   b. Chemical Data:

Analysis	Sample 1	Sample 2	Sample 3
Dissolved oxygen (mg/l)	8.1	8.2	8.1
pH (standard units)	7.0	7.0	7.3
Alkalinity (mg/l as CaCO3)	35	33	32
Hardness (mg/l as CaCO3)	46	41	48
Conductivity (umhos/cm)	150	140	160
Residual Chlorine (mg/l)	<0.05	<0.05	<0.05

C. Test Methods
1. Test methods used:
Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA-821-R-02-013; test Methods 1000.0 and 1002.0, Fathead Minnow Survival and Growth and *Ceriodaphnia dubia* Survival and Reproduction.
2. Endpoint: No Observable Effects Concentration (NOEC)
3. Test Conditions:

Pimephales promelas (Fathead minnow) Survival and Growth Method 1000.0

Date & Time Test Initiated:	February 9, 2016 at 1610
Date & Time Test Terminated:	February 16, 2016 at 1430
Type & Volume of Test Chamber:	500 ml disposable beaker
Volume of Sample:	250 ml
Number of Organisms per replicate:	8
Number of Replicates per dilution:	5

Ceriodaphnia dubia Survival and Growth Method 1002.0

Date & Time Test Initiated:	February 9, 2016 at 1510
Date & Time Test Terminated:	February 16, 2016 at 1550
Type & Volume of Test Chamber:	30 ml disposable beaker
Volume of Sample:	15 ml
Number of Organisms per replicate:	1
Number of Replicates per dilution:	10

4. Acclimation of test organisms: Obtained from in-house cultures
5. Test Temperature: 25 +/- 1 degree Celsius

D. Test Organisms
1. Scientific Name
a. Test 1000.0 *Pimephales promelas*
b. Test 1002.0 *Ceriodaphnia dubia*

III. Data Analysis

The data was analyzed using American Interplex Corporation's Laboratory Information Management Software based on Toxstat.

Pimephales promelas (Fathead minnow) survival data was transformed using the Arc Sine transformation. Normality and homogeneity of variance were checked using Shapiro-Wilk's. The survival data was then analyzed using Steel's Many-One Rank Test to determine the No Observable Effects Concentration (NOEC).

Fathead minnow growth data was analyzed for normality and homogeneity of variance using Shapiro-Wilk's and Bartlett's test. Dunnett's Test was used to determine the No Observable Effects Concentration (NOEC) for growth.

Ceriodaphnia dubia survival data was analyzed with Fisher's Exact Test. Reproduction data was analyzed using Kolmogorov's Test for Normality and Bartlett's test and analyzed with Dunnett's Test to determine the No Observable Effects Concentration (NOEC) for Reproduction.

IV. Standard Reference Toxicants

American Interplex Corporation has an ongoing test organism culturing program. The sensitivity of the offspring is determined by performing a standard reference toxicant test with each effluent test. Sodium chloride in synthetic moderately hard water is used as prescribed in EPA-821-R-02-013.

Pimephales promelas (Fathead minnow)

Chronic reference tests are performed monthly.
A chronic reference test was performed on February 2, 2016 at 1425 to February 9, 2016 at 1340
The results were as follows: (Control No. 198842-1.)
Survival LC-50: 4893 mg/l
Growth IC-25: 3633 mg/l
Growth PMSD: 14.2

Ceriodaphnia dubia

Chronic reference tests are performed monthly.
A chronic reference test was performed on February 2, 2016 at 1610 to February 8, 2016 at 1450
The results were as follows: (Control No. 198842-2.)
Survival LC-50: 1777 mg/l
Growth IC-25: 720.1 mg/l
Growth PMSD: 21.4

V. Chemical Analysis/Quality Control

Parameter	Method	% Recovery	Relative % Difference
Alkalinity	SM 2320 B	NA	0.694
Hardness	EPA 200.7	97.8	4.26
pH	SM 4500-H+ B	101	0.402
Conductivity	EPA 120.1	101	0.678

VI. Organism History

Pimephales promelas (Fathead minnow)

Date: February 9, 2016
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

Ceriodaphnia dubia

Date: February 9, 2016
Age: <24 hours
Source: In-house culture
Water Chemistry Record:
Alkalinity: 57-64 mg/l
Hardness: 80-100 mg/l
Temperature: 25 deg.C

VII. Results Summary *Pimephales promelas*, Fathead minnow Larval Survival and Growth Test -- Method 1000.0

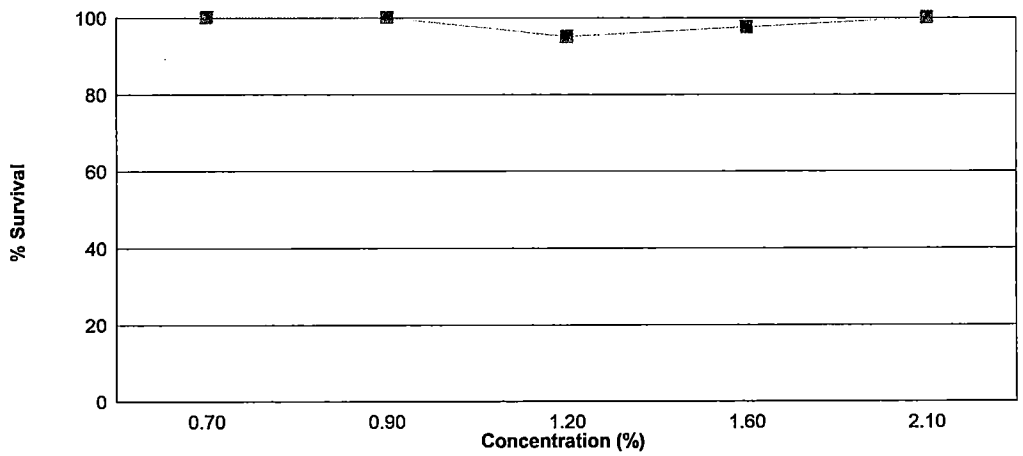
Larvae are exposed in a static renewal system for seven days to different concentrations of effluent with dilution water. Test results are based on the survival and growth (increase in weight) of the larvae.

Effluent dilutions for this test were 0.7 %, 0.9 %, 1.2 %, 1.6 %, 2.1 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 1.6 % effluent.

The test was initiated on February 9, 2016 at 1610 and continued through February 16, 2016 at 1430. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 2.1 % effluent
b.) NOEC growth = 2.1 % effluent



Summary of the 7-day Fathead Minnow Survival and Growth		
Concentration	Percent Survival	Mean Growth (mg)
Control	100	0.291
0.7 %	100	0.308
0.9 %	100	0.310
1.2 %	95.0	0.305
1.6 %	97.5	0.327
2.1 %	100	0.343

VII. Results Summary *Ceriodaphnia dubia*, Cladoceran Survival and Reproduction Test -- Method 1002.0

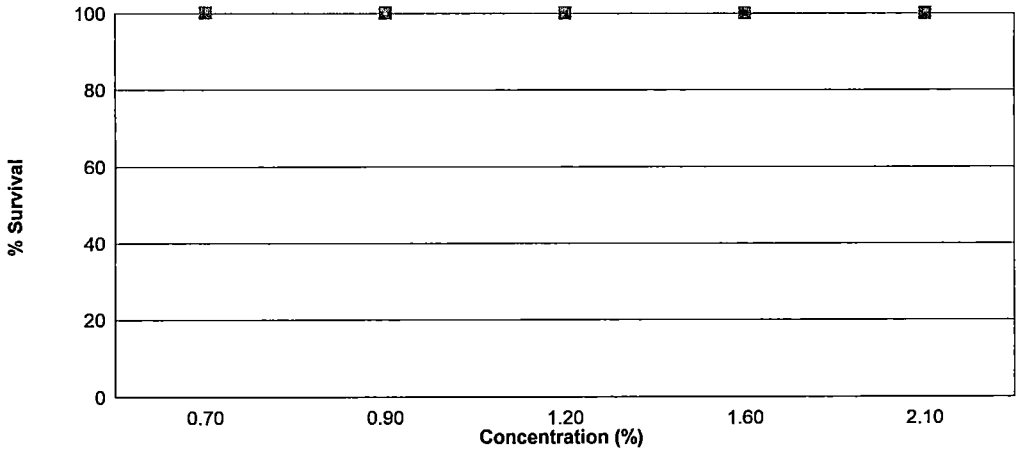
Neonates are exposed in a static renewal system to different concentrations of effluent with dilution water until 60% of surviving control organisms have three broods of offspring with an average of at least 15 young per female.

Effluent dilutions for this test were 0.7 %, 0.9 %, 1.2 %, 1.6 %, 2.1 % in accordance with the NPDES permit.

The low flow or 'critical' dilution is specified in the NPDES permit as 1.6 % effluent.

The test was initiated on February 9, 2016 at 1510 and continued through February 16, 2016 at 1550. Statistical analyses were performed on the observed data and the no observable effects concentrations (NOECs) were as follows:

a.) NOEC survival = 2.1 % effluent
b.) NOEC reproduction = 2.1 % effluent



Summary of the 7-day *Ceriodaphnia dubia* Survival and Reproduction Data		
Concentration	Percent Survival	Mean Reproduction
Control	100	23.8
0.7 %	100	29.1
0.9 %	100	24.5
1.2 %	100	26.1
1.6 %	100	26.2
2.1 %	100	23.9

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Survival

Date and Time Test Initiated: February 9, 2016 at 1610
Date and Time Test Terminated: February 16, 2016 at 1430

Concentration	Replicate	Number of Survivors						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Control	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
0.7 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
0.9 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
1.2 %	A	8	8	8	8	8	8	8
	B	8	8	7	7	7	7	7
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	7	7
	E	8	8	8	8	8	8	8
1.6 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	7	7	7
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8
2.1 %	A	8	8	8	8	8	8	8
	B	8	8	8	8	8	8	8
	C	8	8	8	8	8	8	8
	D	8	8	8	8	8	8	8
	E	8	8	8	8	8	8	8

Appendix A1: Test 1000.0

Pimephales promelas (Fathead Minnow) 7-Day Growth

Test Initiated: February 9, 2016 at 1610
Test Terminated: February 16, 2016 at 1430
Drying Started: February 16, 2016 at 1100
Drying Ended: February 17, 2016 at 1545

Concentration	Replicate	Weight of pan	Weight of pan + fish	Total weight of fish (g)	Original # of fish	Mean dry weight (mg)
Control	A	.94306	.94559	0.00253	8	0.316
	B	.94285	.94502	0.00217	8	0.271
	C	.93698	.93923	0.00225	8	0.281
	D	.94098	.94313	0.00215	8	0.269
	E	.94331	.94586	0.00255	8	0.319
0.7 %	A	.94875	.95101	0.00226	8	0.282
	B	.94236	.94503	0.00267	8	0.334
	C	.94120	.94352	0.00232	8	0.290
	D	.94256	.94495	0.00239	8	0.299
	E	.94033	.94302	0.00269	8	0.336
0.9 %	A	.94254	.94526	0.00272	8	0.340
	B	.93599	.93842	0.00243	8	0.304
	C	.94063	.94324	0.00261	8	0.326
	D	.93699	.93951	0.00252	8	0.315
	E	.93585	.93798	0.00213	8	0.266
1.2 %	A	.93893	.94138	0.00245	8	0.306
	B	.93797	.94048	0.00251	8	0.314
	C	.94212	.94473	0.00261	8	0.326
	D	.94302	.94537	0.00235	8	0.294
	E	.94387	.94614	0.00227	8	0.284
1.6 %	A	.93706	.93990	0.00284	8	0.355
	B	.94192	.94451	0.00259	8	0.324
	C	.94242	.94490	0.00248	8	0.310
	D	.93535	.93785	0.00250	8	0.312
	E	.94322	.94591	0.00269	8	0.336
2.1 %	A	.94590	.94850	0.00260	8	0.325
	B	.94977	.95254	0.00277	8	0.346
	C	.94440	.94718	0.00278	8	0.348
	D	.94506	.94775	0.00269	8	0.336
	E	.93987	.94275	0.00288	8	0.360

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: February 9, 2016 at 1510
Date and Time Test Terminated: February 16, 2016 at 1550

Concentration: Control													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	4	0	0	0	0	0	4	10	0.400
4	3	4	5	4	0	4	4	4	4	4	36	10	3.60
5	11	11	11	11	9	10	10	12	8	9	102	10	10.2
6	1	11	10	0	9	10	0	5	5	14	65	10	6.50
7	10	0	0	8	12E	0	10	0	2	1	31	10	3.10
8													
TOTAL	25	26	26	23	22	24	24	21	19	28	238	10	23.8

E = Excluded fourth brood neonates

Concentration: 0.7 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	4	0	0	0	0	0	4	10	0.400
4	4	4	0	4	0	4	4	0	5	2	27	10	2.70
5	10	11	10	9	10	9	10	10	11	11	101	10	10.1
6	11	13	14	0	15	0	11	13	0	14	91	10	9.10
7	2	0	13	10	8	10	0	13	12	0	68	10	6.80
8													
TOTAL	27	28	37	23	37	23	25	36	28	27	291	10	29.1

Concentration: 0.9 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	2	0	0	0	0	0	0	0	2	10	0.200
4	4	4	0	4	4	4	4	4	4	4	36	10	3.60
5	7	8	11	8	10	8	12	9	11	9	93	10	9.30
6	9	11	13	8	13	11	0	11	0	13	89	10	8.90
7	0	0	13E	0	0	0	14	0	11	0	25	10	2.50
8													
TOTAL	20	23	26	20	27	23	30	24	26	26	245	10	24.5

E = Excluded fourth brood neonates

Appendix A1: Test 1002.0

Ceriodaphnia dubia Survival and Reproduction

Date and Time Test Initiated: February 9, 2016 at 1510
Date and Time Test Terminated: February 16, 2016 at 1550

Concentration: 1.2 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	3	0	0	0	0	0	0	0	3	10	0.300
4	8	4	0	4	4	4	4	3	4	5	40	10	4.00
5	9	12	10	10	8	10	11	9	10	9	98	10	9.80
6	11	0	13	0	11	11	14	12	0	7	79	10	7.90
7	1	10	3	10	1	0	0	0	11	5	41	10	4.10
8													
TOTAL	29	26	29	24	24	25	29	24	25	26	261	10	26.1

Concentration: 1.6 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	0	0	0	0	2	0	0	0	0	0	2	10	0.200
4	2	5	5	4	0	4	4	3	6	6	39	10	3.90
5	8	11	11	10	8	8	10	9	11	11	97	10	9.70
6	15	0	12	1	14	0	11	14	0	12	79	10	7.90
7	0	11	1	8	10E	8	0	9	8	0	45	10	4.50
8													
TOTAL	25	27	29	23	24	20	25	35	25	29	262	10	26.2

E = Excluded fourth brood neonates

Concentration: 2.1 %													
Day	Replicate										No. of Young	No. of Adults	Young per Adult
	1	2	3	4	5	6	7	8	9	10			
1	0	0	0	0	0	0	0	0	0	0	0	10	0.00
2	0	0	0	0	0	0	0	0	0	0	0	10	0.00
3	3	2	0	0	0	0	0	0	0	0	5	10	0.500
4	0	0	4	3	4	4	4	5	4	6	34	10	3.40
5	10	10	9	7	9	11	12	10	8	9	95	10	9.50
6	13	13	13	2	11	10	0	12	0	10	84	10	8.40
7	14E	13E	11E	4	0	0	8	1	7	1	21	10	2.10
8													
TOTAL	26	25	26	16	24	25	24	28	19	26	239	10	23.9

E = Excluded fourth brood neonates

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

		Transformation of Data		Transform: Arc Sin(Square Root(Y))
Group	Identification	Rep	Value	Transformed
1	Control	1	1.00000	1.39310
1	Control	2	1.00000	1.39310
1	Control	3	1.00000	1.39310
1	Control	4	1.00000	1.39310
1	Control	5	1.00000	1.39310
2	0.7 %	1	1.00000	1.39310
2	0.7 %	2	1.00000	1.39310
2	0.7 %	3	1.00000	1.39310
2	0.7 %	4	1.00000	1.39310
2	0.7 %	5	1.00000	1.39310
3	0.9 %	1	1.00000	1.39310
3	0.9 %	2	1.00000	1.39310
3	0.9 %	3	1.00000	1.39310
3	0.9 %	4	1.00000	1.39310
3	0.9 %	5	1.00000	1.39310
4	1.2 %	1	1.00000	1.39310
4	1.2 %	2	0.87500	1.20940
4	1.2 %	3	1.00000	1.39310
4	1.2 %	4	0.87500	1.20940
4	1.2 %	5	1.00000	1.39310
5	1.6 %	1	1.00000	1.39310
5	1.6 %	2	1.00000	1.39310
5	1.6 %	3	0.87500	1.20940
5	1.6 %	4	1.00000	1.39310
5	1.6 %	5	1.00000	1.39310
6	2.1 %	1	1.00000	1.39310
6	2.1 %	2	1.00000	1.39310
6	2.1 %	3	1.00000	1.39310
6	2.1 %	4	1.00000	1.39310
6	2.1 %	5	1.00000	1.39310

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Survival

Shapiro - Wilk's Test for Normality		Transform: Arc Sin(Square Root(Y))
D = 0.06749		
W = 0.7138		
Critical W = 0.9	(alpha = 0.01, N = 30)	
Critical W = 0.927	(alpha = 0.05, N = 30)	
Data FAIL normality test (alpha = 0.01).		

Steel's Many-One Rank Test					Transform: Arc Sin(Square Root(Y))
Ho:Control<Treatment					
Group	Identification	Rank Sum	Critical Value	DF	Sig 0.05
1	Control				
2	0.7 %	27.50	16.00	5.00	
3	0.9 %	27.50	16.00	5.00	
4	1.2 %	22.50	16.00	5.00	
5	1.6 %	25.00	16.00	5.00	
6	2.1 %	27.50	16.00	5.00	
Critical values are 1 tailed (k=5)					

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

Shapiro - Wilk's Test for Normality		No Transformation
D = 0.01125		
W = 0.9478		
Critical W = 0.9	(alpha = 0.01, N = 30)	
Critical W = 0.927	(alpha = 0.05, N = 30)	
Data PASS normality test (alpha = 0.01).		

Bartlett's Test for Homogeneity of Variance		No Transformation
Calculated B1 statistic = 2.824		
Critical B = 15.086	(alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.		

Appendix A2: Statistics

Pimephales promelas (Fathead minnow) Growth

ANOVA Table				No Transformation
SOURCE	DF	SS	MS	F
Between	5	0.008365	0.001673	3.566
Within (Error)	24	0.01126	0.0004692	
Total	29	0.01962		

Critical F = 3.9 (alpha = 0.01, df = 5,24)
2.62 (alpha = 0.05, df = 5,24)

Since F > Critical F REJECT Ho: All equal (alpha = 0.05)

Dunnett's Test - Table 1 of 2					No Transformation
Ho:Control<Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	0.2912	0.2912		
2	0.7 %	0.3082	0.3082	-1.241	
3	0.9 %	0.3102	0.3102	-1.387	
4	1.2 %	0.3048	0.3048	-0.9927	
5	1.6 %	0.3274	0.3274	-2.642	
6	2.1 %	0.343	0.343	-3.781	

Dunnett's critical value = 2.36 (1 Tailed, alpha = 0.05, df = 5,24)

Dunnett's Test - Table 2 of 2					No Transformation
Ho:Control<Treatment					
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control
1	Control	5			
2	0.7 %	5	0.03233	11.1	-0.017
3	0.9 %	5	0.03233	11.1	-0.019
4	1.2 %	5	0.03233	11.1	-0.0136
5	1.6 %	5	0.03233	11.1	-0.0362
6	2.1 %	5	0.03233	11.1	-0.0518

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
0.7 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
0.9 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
1.2 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Fisher's Exact Test

Identification	Alive	Dead	Total Animals
Control	10	0	10
1.6 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Appendix A2: Statistics

Ceriodaphnia dubia Survival

Fisher's Exact Test			
Identification	Alive	Dead	Total Animals
Control	10	0	10
2.1 %	10	0	10
Total	20	0	20

Critical Fisher's value (10,10,10) (alpha=0.05) is 6. b value is 10. Since b is greater than 6 there is NO SIGNIFICANT DIFFERENCE between CONTROL and TREATMENT at the 0.05 level.

Summary of Fisher's Exact Test				
Group	Identification	Exposed	Dead	Sig 0.05
0	Control	10	0	
1	0.7 %	10	0	
2	0.9 %	10	0	
3	1.2 %	10	0	
4	1.6 %	10	0	
5	2.1 %	10	0	

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

Kolmogorov Test for Normality		No Transformation
D = 0.0894		
D* = 0.7014		
Critical D* = 1.035	(alpha = 0.01, N = 60)	
Data PASS normality test (alpha = 0.01).		

Bartlett's Test for Homogeneity of Variance		No Transformation
Calculated B1 statistic = 9.608		
Critical B = 15.086	(alpha = 0.01, df = 5)	
Data PASS B1 homogeneity test at 0.01 level.		

Appendix A2: Statistics

Ceriodaphnia dubia Reproduction

ANOVA Table				No Transformation
SOURCE	DF	SS	MS	F
Between	5	202	40.4	2.955
Within (Error)	54	738.4	13.67	
Total	59	940.4		

Critical F = 3.38 (alpha = 0.01, df = 5,54)
2.38 (alpha = 0.05, df = 5,54)

Since F > Critical F REJECT Ho: All equal (alpha = 0.05)

Dunnett's Test - Table 1 of 2					No Transformation
Ho:Control<Treatment					
Group	Identification	Transformed Mean	Mean In Original Units	T Stat	Sig 0.05
1	Control	23.8	23.8		
2	0.7 %	29.1	29.1	-3.205	
3	0.9 %	24.5	24.5	-0.4233	
4	1.2 %	26.1	26.1	-1.391	
5	1.6 %	26.2	26.2	-1.451	
6	2.1 %	23.9	23.9	-0.06048	

Dunnett's critical value = 2.31 (1 Tailed, alpha = 0.05, df [used] = 5,40) (Actual df = 5,54)

Dunnett's Test - Table 2 of 2					No Transformation
Ho:Control<Treatment					
Group	Identification	Num of Reps	Min Sig Diff (In Orig. Units)	% of Control	Difference From Control
1	Control	10			
2	0.7 %	10	3.82	16.1	-5.3
3	0.9 %	10	3.82	16.1	-0.7
4	1.2 %	10	3.82	16.1	-2.3
5	1.6 %	10	3.82	16.1	-2.4
6	2.1 %	10	3.82	16.1	-0.1

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: February 9, 2016 at 0843
Date and Time Test Terminated: February 16, 2016 at 1550

Effluent Conc.: Control		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.1	8.2	8.2	8.1	8.1	8.1	8.0
	Final *1	8.1	7.2	7.2	7.7	7.8	7.6	6.7
	Final *2	8.1	8.3	8.2	8.7	8.0	7.8	7.8
pH, units	Initial	7.0	6.9	7.0	7.2	7.3	7.0	6.8
	Final *1	7.3	6.7	7.0	7.1	7.3	7.1	6.6
	Final *2	7.6	7.1	7.4	7.1	7.6	7.0	7.2
Alkalinity, mg CaCO3/l		35	NA	33	NA	32	NA	NA
Hardness, mg CaCO3/l		46	NA	41	NA	48	NA	NA
Conductivity, umhos/cm		150	150	140	150	160	160	150
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

Effluent Conc.: 0.7 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.4	8.1	8.3	8.3	8.0	7.8	8.3
	Final *1	8.0	6.8	7.4	7.6	7.8	7.6	6.7
	Final *2	8.2	8.2	8.3	8.9	7.9	8.0	7.9
pH, units	Initial	7.1	7.0	7.0	7.2	7.2	7.0	6.9
	Final *1	7.2	6.7	7.0	7.1	7.2	7.1	6.7
	Final *2	7.6	7.1	7.3	7.1	7.5	7.1	7.2

Effluent Conc.: 0.9 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.3	8.2	8.3	8.3	8.3	8.0	8.3
	Final *1	8.0	7.2	7.6	7.7	7.8	7.5	6.7
	Final *2	8.1	8.0	8.3	8.8	8.0	8.0	8.0
pH, units	Initial	7.1	7.0	7.1	7.2	7.2	7.1	6.9
	Final *1	7.2	6.8	7.0	7.0	7.2	7.0	6.7
	Final *2	7.6	7.1	7.3	7.2	7.5	7.1	7.3

Appendix A3: Water Chemistry

Routine Chemical and Physical Data

Date and Time Test Initiated: February 9, 2016 at 0843
Date and Time Test Terminated: February 16, 2016 at 1550

Effluent Conc.: 1.2 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	8.3	8.2	8.3	8.2	7.7	8.3
	Final *1	7.9	6.7	7.3	7.4	7.7	7.5	7.1
	Final *2	8.3	7.8	8.2	8.7	7.8	8.0	7.7
pH, units	Initial	7.1	7.0	7.1	7.1	7.2	7.1	7.0
	Final *1	7.2	6.7	7.0	7.0	7.2	7.0	6.9
	Final *2	7.5	7.2	7.3	7.1	7.5	7.1	7.3

Effluent Conc.: 1.6 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.2	8.3	7.9	8.2	8.3	7.9	8.3
	Final *1	8.1	7.2	7.3	7.3	7.8	7.6	7.1
	Final *2	8.2	7.5	8.3	8.8	7.8	7.8	7.8
pH, units	Initial	7.1	7.1	7.1	7.1	7.2	7.1	7.0
	Final *1	7.3	6.8	7.0	7.0	7.2	7.0	7.0
	Final *2	7.6	7.2	7.3	7.1	7.5	7.2	7.3
Alkalinity, mg CaCO3/l		30	NA	31	NA	39	NA	NA
Hardness, mg CaCO3/l		47	NA	41	NA	35	NA	NA
Conductivity, umhos/cm		150	150	140	140	160	150	160
Res. Chlorine, mg/l		<0.05	NA	<0.05	NA	<0.05	NA	NA

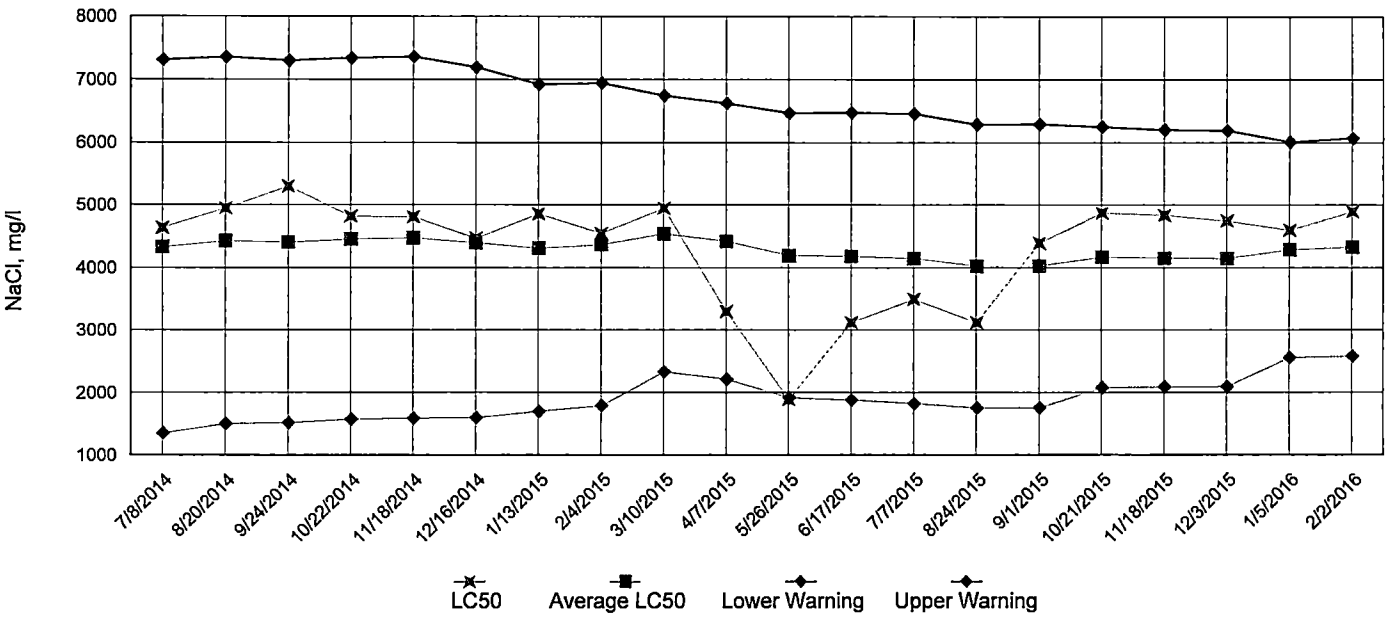
Effluent Conc.: 2.1 %		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
DO, mg/l	Initial	8.0	8.2	8.3	8.2	8.3	7.9	8.4
	Final *1	8.2	7.2	7.1	7.5	7.7	7.6	6.9
	Final *2	8.2	8.0	8.2	8.8	7.9	8.0	7.9
pH, units	Initial	7.1	7.0	7.2	7.2	7.2	7.1	7.1
	Final *1	7.3	6.9	7.0	7.0	7.2	7.0	6.9
	Final *2	7.5	7.2	7.3	7.2	7.5	7.2	7.4

*1 = data from the *Pimephales promelas* (Fathead Minnow) test *2 = data from the *Ceriodaphnia dubia* test

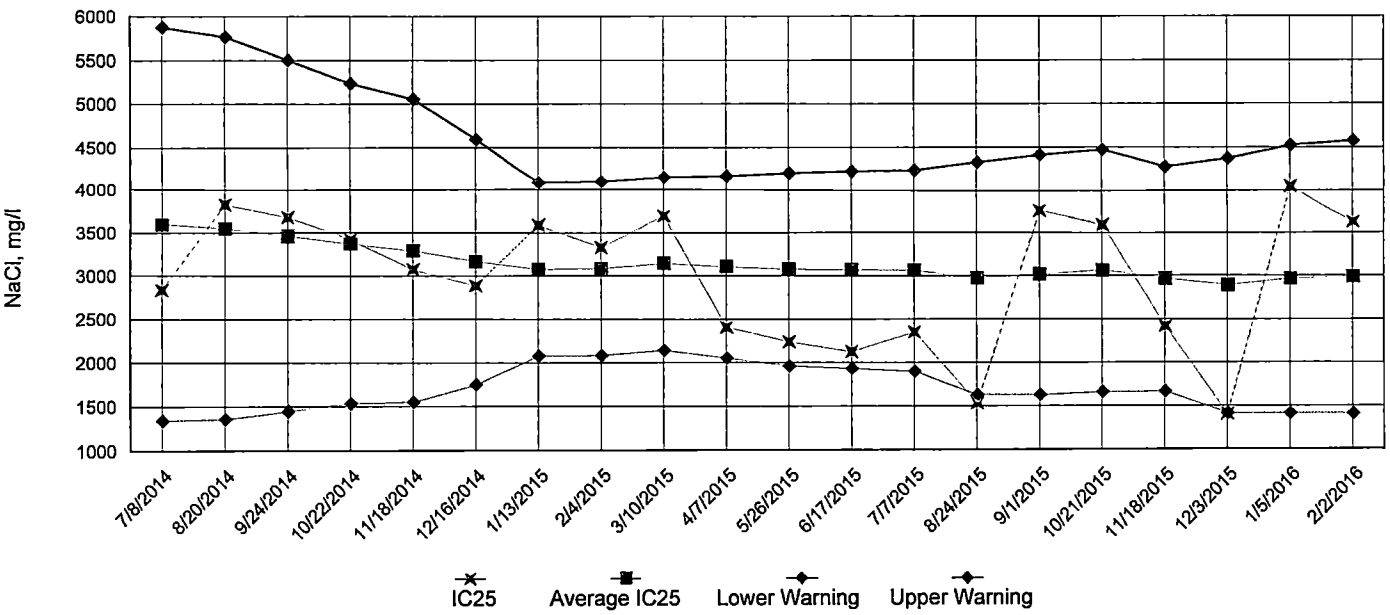
Appendix A4: Test 1000.0

Chronic Reference Toxicant, *Pimephales promelas* (Fathead Minnow)

LC50 Survival Data



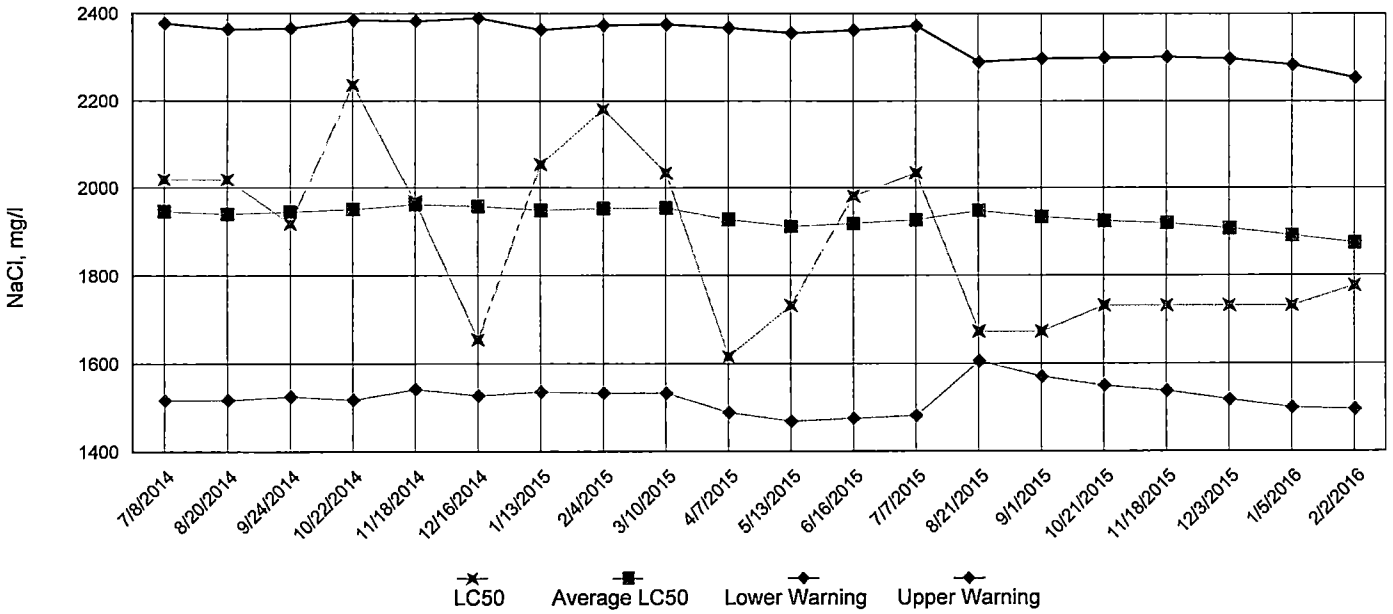
IC25 Growth Data



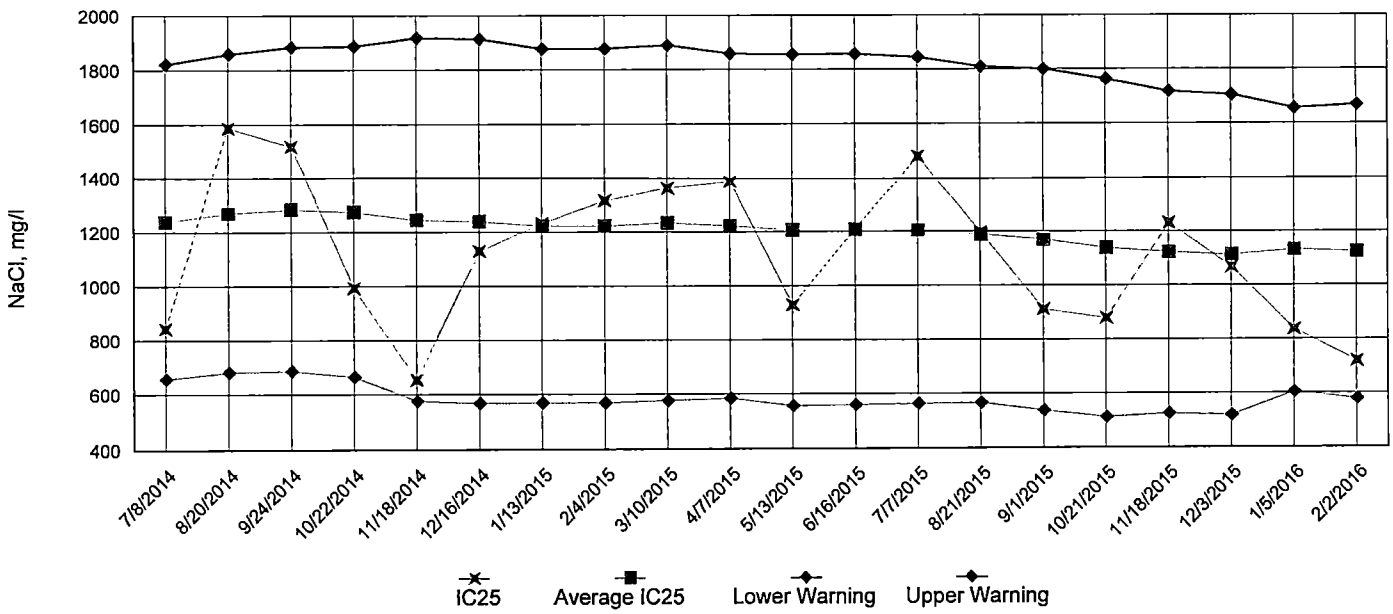
Appendix A4: Test 1002.0

Chronic Reference Toxicant, *Ceriodaphnia dubia*

LC50 Survival Data



IC25 Reproduction Data



Appendix B: Test 1000.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

Permittee: El Dorado Chemical Company

NPDES No.: AR0000752

Date and Time Test Initiated: February 9, 2016 at 1610
Date and Time Test Terminated: February 16, 2016 at 1430
Dilution water used: Synthetic Soft Water #4299

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival in replicate chambers A	B	C	D	E	Mean percent survival 24 hr	48 hr	7 days	CV%
Control	100	100	100	100	100	100	100	100	0.00
0.7 %	100	100	100	100	100	100	100	100	0.00
0.9 %	100	100	100	100	100	100	100	100	0.00
1.2 %	100	87.5	100	87.5	100	100	100	95.0	7.21
1.6 %	100	100	87.5	100	100	100	100	97.5	5.73
2.1 %	100	100	100	100	100	100	100	100	0.00

DATA TABLE FOR GROWTH

Effluent Conc. %	Average dry weight, mg replicate chambers A	B	C	D	E	Mean dry weight, mg	CV%
Control	0.316	0.271	0.281	0.269	0.319	0.291	8.40
0.7 %	0.282	0.334	0.290	0.299	0.336	0.308	8.18
0.9 %	0.340	0.304	0.326	0.315	0.266	0.31	9.05
1.2 %	0.306	0.314	0.326	0.294	0.284	0.305	5.40
1.6 %	0.355	0.324	0.310	0.312	0.336	0.327	5.69
2.1 %	0.325	0.346	0.348	0.336	0.360	0.343	3.85

CV = Coefficient of variation = standard deviation * 100 / mean

Appendix B: Test 1000.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Pimephales promelas (Fathead Minnow)
SURVIVAL AND GROWTH

1. Steel's Many-One Rank Test:

   Is the mean survival significantly different (p=0.05) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

2. Dunnett's Test:

   Is the mean dry weight (growth) significantly different (p=0.05) than the control's dry weight (growth) for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP6C)
4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP6C)
5. NOEC Pimephales Lethality: 2.1 % (TOP6C)
6. LOEC Pimephales Lethality: 2.1 % (TXP6C)
7. NOEC Pimephales Sublethality: 2.1 % (TPP6C)
8. LOEC Pimephales Sublethality: 2.1 % (TYP6C)
9. Coefficient of variation for Pimephales growth: 8.4 (TQP6C)

Appendix B: Test 1000.0

CHRONIC TOXICITY SUMMARY FORM
Pimephales promelas (Fathead minnow)
CHEMICAL PARAMETERS CHART

PERMITTEE: El Dorado Chemical Company
NPDES NO.: AR0000752
CONTACT: Mr. Eddie Pearson
ANALYST: 280, 304, 310, 314

Test Initiated: DATE: February 9, 2016 TIME: 1610
Test Terminated: DATE: February 16, 2016 TIME: 1430

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	8.2	8.1	8.1	8.1	8.0
Final	8.1	7.2	7.2	7.7	7.8	7.6	6.7
pH Initial	7.0	6.9	7.0	7.2	7.3	7.0	6.8
Final	7.3	6.7	7.0	7.1	7.3	7.1	6.6
Alkalinity	35	NA	33	NA	32	NA	NA
Hardness	46	NA	41	NA	48	NA	NA
Conductivity	150	150	140	150	160	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 0.7 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.4	8.1	8.3	8.3	8.0	7.8	8.3
Final	8.0	6.8	7.4	7.6	7.8	7.6	6.7
pH Initial	7.1	7.0	7.0	7.2	7.2	7.0	6.9
Final	7.2	6.7	7.0	7.1	7.2	7.1	6.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	140	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 0.9 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.3	8.2	8.3	8.3	8.3	8.0	8.3
Final	8.0	7.2	7.6	7.7	7.8	7.5	6.7
pH Initial	7.1	7.0	7.1	7.2	7.2	7.1	6.9
Final	7.2	6.8	7.0	7.0	7.2	7.0	6.7
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 1.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	8.2	8.3	8.2	7.7	8.3
Final	7.9	6.7	7.3	7.4	7.7	7.5	7.1
pH Initial	7.1	7.0	7.1	7.1	7.2	7.1	7.0
Final	7.2	6.7	7.0	7.0	7.2	7.0	6.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 1.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	7.9	8.2	8.3	7.9	8.3
Final	8.1	7.2	7.3	7.3	7.8	7.6	7.1
pH Initial	7.1	7.1	7.1	7.1	7.2	7.1	7.0
Final	7.3	6.8	7.0	7.0	7.2	7.0	7.0
Alkalinity	30	NA	31	NA	39	NA	NA
Hardness	47	NA	41	NA	35	NA	NA
Conductivity	150	150	140	140	160	150	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 2.1 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.0	8.2	8.3	8.2	8.3	7.9	8.4
Final	8.2	7.2	7.1	7.5	7.7	7.6	6.9
pH Initial	7.1	7.0	7.2	7.2	7.2	7.1	7.1
Final	7.3	6.9	7.0	7.0	7.2	7.0	6.9
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	150	140	150	150	150	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

Appendix B: Test 1002.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

Permittee: El Dorado Chemical Company

NPDES No.: AR0000752

Date and Time Test Initiated: February 9, 2016 at 1510
Date and Time Test Terminated: February 16, 2016 at 1550
Dilution water used: Synthetic Soft Water #4299

PERCENT SURVIVAL

		Percent Effluent				
Time of Reading	Control	0.7 %	0.9 %	1.2 %	1.6 %	2.1 %
24 hour	100	100	100	100	100	100
48 hour	100	100	100	100	100	100
7 day	100	100	100	100	100	100

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

		Percent Effluent				
Replicates	Control	0.7 %	0.9 %	1.2 %	1.6 %	2.1 %
A	25	27	20	29	25	26
B	26	28	23	26	27	25
C	26	37	26	29	29	26
D	23	23	20	24	23	16
E	22	37	27	24	24	24
F	24	23	23	25	20	25
G	24	25	30	29	25	24
H	21	36	24	24	35	28
I	19	28	26	25	25	19
J	28	27	26	26	29	26
Mean per Adult	23.8	29.1	24.5	26.1	26.2	23.9
Mean per Surviving Adult	23.8	29.1	24.5	26.1	26.2	23.9
CV %	11.2	19.0	12.8	8.17	15.7	15.2

CV = Coefficient of variation = standard deviation * 100 / mean
(calculated based on young produced by surviving females)

Appendix B: Test 1002.0

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING
Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION

1. Fisher's Exact Test:

   Is the mean survival significantly different (p=0.05) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

2. Dunnett's Test:

   Is the mean number of young produced per female significantly different (p=0.05) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION	(1.6 %)	____YES	X NO
b.) 1/2 LOW FLOW DILUTION	(NA)	____YES	____NO

3. If you answered NO to 1.a) enter [0] otherwise enter [1]: 0 (TLP3B)

4. If you answered NO to 2.a) enter [0] otherwise enter [1]: 0 (TGP3B)

5. NOEC Ceriodaphnia Lethality: 2.1 % (TOP3B)

6. LOEC Ceriodaphnia Lethality: 2.1 % (TXP3B)

7. NOEC Ceriodaphnia Sublethality: 2.1 % (TPP3B)

8. LOEC Ceriodaphnia Sublethality: 2.1 % (TYP3B)

9. Coefficient of variation for Ceriodaphnia Reproduction: 15.7 (TQP3B)

Appendix B: Test 1002.0

CHRONIC TOXICITY SUMMARY FORM
Ceriodaphnia dubia
CHEMICAL PARAMETERS CHART

PERMITTEE: El Dorado Chemical Company
NPDES NO.: AR0000752
CONTACT: Mr. Eddie Pearson
ANALYST: 280, 304, 310, 314

Test Initiated: DATE: February 9, 2016 TIME: 1510
Test Terminated: DATE: February 16, 2016 TIME: 1550

DILUTION Control	DAY 1	2	3	4	5	6	7
D.O. Initial	8.1	8.2	8.2	8.1	8.1	8.1	8.0
Final	8.1	8.3	8.2	8.7	8.0	7.8	7.8
pH Initial	7.0	6.9	7.0	7.2	7.3	7.0	6.8
Final	7.6	7.1	7.4	7.1	7.6	7.0	7.2
Alkalinity	35	NA	33	NA	32	NA	NA
Hardness	46	NA	41	NA	48	NA	NA
Conductivity	150	150	140	150	160	160	150
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 0.7 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.4	8.1	8.3	8.3	8.0	7.8	8.3
Final	8.2	8.2	8.3	8.9	7.9	8.0	7.9
pH Initial	7.1	7.0	7.0	7.2	7.2	7.0	6.9
Final	7.6	7.1	7.3	7.1	7.5	7.1	7.2
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	140	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 0.9 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.3	8.2	8.3	8.3	8.3	8.0	8.3
Final	8.1	8.0	8.3	8.8	8.0	8.0	8.0
pH Initial	7.1	7.0	7.1	7.2	7.2	7.1	6.9
Final	7.6	7.1	7.3	7.2	7.5	7.1	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 1.2 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	8.2	8.3	8.2	7.7	8.3
Final	8.3	7.8	8.2	8.7	7.8	8.0	7.7
pH Initial	7.1	7.0	7.1	7.1	7.2	7.1	7.0
Final	7.5	7.2	7.3	7.1	7.5	7.1	7.3
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	150	150	140	140	160	160	160
Chlorine	NA	NA	NA	NA	NA	NA	NA

DILUTION 1.6 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.2	8.3	7.9	8.2	8.3	7.9	8.3
Final	8.2	7.5	8.3	8.8	7.8	7.8	7.8
pH Initial	7.1	7.1	7.1	7.1	7.2	7.1	7.0
Final	7.6	7.2	7.3	7.1	7.5	7.2	7.3
Alkalinity	30	NA	31	NA	39	NA	NA
Hardness	47	NA	41	NA	35	NA	NA
Conductivity	150	150	140	140	160	150	160
Chlorine	<0.05	NA	<0.05	NA	<0.05	NA	NA

DILUTION 2.1 %	DAY 1	2	3	4	5	6	7
D.O. Initial	8.0	8.2	8.3	8.2	8.3	7.9	8.4
Final	8.2	8.0	8.2	8.8	7.9	8.0	7.9
pH Initial	7.1	7.0	7.2	7.2	7.2	7.1	7.1
Final	7.5	7.2	7.3	7.2	7.5	7.2	7.4
Alkalinity	NA	NA	NA	NA	NA	NA	NA
Hardness	NA	NA	NA	NA	NA	NA	NA
Conductivity	140	150	140	150	150	150	150
Chlorine	NA	NA	NA	NA	NA	NA	NA

AMERICAN INTERPLEX CORPORATION
LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company
Project Reference: Quarterly - Permit AR0000752
Project Manager: Mr. Eddie Pearson
Sampled By: Edward L. Pearson
PO No.

AIC CONTROL NO: 199094
AIC PROPOSAL NO:
Carrier: Rush
Received Temperature C: 6.1

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	MATRIX WATER	MATRIX SOIL	NO OF BOTTLES	ANALYSES REQUESTED: Chronic - CD, FH	Remarks
1	010	02-08-16 1000		X	X		1	X	
									Field pH calibration
		Container Type						P	on _____ @ _____
		Preservative						NO	Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A=$(NH_4)_2SO_4$, NH_4OH

Turnaround Time Requested: (Please circle)
~~NORMAL~~ or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions:
Phone 870-312-1397 Fax:
Report Attention to: Mr. Eddie Pearson
Report Address to: 4500 North West Avenue
El Dorado, AR 71730
epearson@edc-ark.com

Relinquished By:	Date/Time	Received By:	Date/Time
Edward L. Pearson	02-08-16 1200		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
		D. Brown	2-8-16 1430

Comments:

FORM 0060

AMERICAN INTERPLEX CORPORATION
LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company
Project Reference: Quarterly - Permit AR0000752
Project Manager: Mr. Eddie Pearson
Sampled By: Edward L Pearson

PO No.

MATRIX

ANALYSES REQUESTED

AIC CONTROL NO: 199094
AIC PROPOSAL NO:
Carrier: Rush
Received Temperature C: 0.1 C

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL		NO OF BOTTLES	Chronic - CD, FH											Remarks
2	010	02-10-16 1000		X	X			1	X											
		Container Type							P											Field pH calibration
		Preservative							NO											on _____ @ _____ Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A=$(NH_4)_2SO_4$, NH_4OH

Turnaround Time Requested: (Please circle)
~~NORMAL~~ or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions:
Phone 870-312-1397 Fax:
Report Attention to: Mr. Eddie Pearson
Report Address to: 4500 North West Avenue
El Dorado, AR 71730
epearson@edc-ark.com

Relinquished By:	Date/Time	Received By:	Date/Time
Edward L Pearson	02-10-16 1202	--	
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			2/10/16 1420

Comments:

FORM 0060

AMERICAN INTERPLEX CORPORATION
LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: El Dorado Chemical Company
Project Reference: Quarterly - Permit AR0000752
Project Manager: Mr. Eddie Pearson
Sampled By: Edward L Pearson

PO No.

AIC CONTROL NO: 159094
AIC PROPOSAL NO:
Carrier: Rush
Received Temperature C: 6.1

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	MATRIX WATER	MATRIX SOIL	NO OF BOTTLES	ANALYSES REQUESTED: Chronic - CD, FH	Remarks
3	010	02-12-16 1000		X	X		1	X	
		Container Type						P	
		Preservative						NO	

Field pH calibration on _____ @ _____
Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate A=$(NH_4)_2SO_4$, NH_4OH

Turnaround Time Requested: (Please circle)
~~NORMAL~~ or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions:
Phone 870-312-1397 Fax:
Report Attention to: Mr. Eddie Pearson
Report Address to: 4500 North West Avenue
El Dorado, AR 71730
epearson@edc-ark.com

Relinquished By:	Date/Time	Received By:	Date/Time
Edward L Pearson	02-12-16 1200		
Relinquished By:	Date/Time	Received in Lab By: Logan Hopton	Date/Time 2-13-16 1440

Comments:

FORM 0060

ORIGIN ID:ELDA (870) 863-1400
EDDIE PEARSON
ELDORADO CHEMICAL COMPANY
4500 NORTH WEST AVE

ELDORADO, AR 71730
UNITED STATES US

SHIP DATE: 29JUN16
ACTWGT: 5.00 LB
CAD: 5887030/INET3730

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5301 NORTHSHORE DRIVE

NORTH LITTLE ROCK AR 72118
(501) 682-0744 REF:
INV:
PO: DEPT:

540J15CBD/727F

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