

Environmental Services Company, Inc.

Corporate Office
 13715 West Markham
 Little Rock, AR 72211
 Tel. (501)221-2565 Fax (501)221-1341

Northwest Arkansas Branch
 1107 Century Avenue
 Springdale, AR 72762
 Tel. (479)750-1170 Fax (479)750-1172

Control Number: 1611010277

Customer Name : CAMDEN WATER & WASTEWATER UTILTY

Customer Number : 1550

Report Date : 11/28/16

Composite Date: 11/13/16 - 11/13/16

Sample Time : 1000-1500

Sample Type : COMPOSITE WATER

Sample From : FINAL EFFLUENT

Collected By: AS

Delivery By : TMO

Work Order :

Purchase Order :

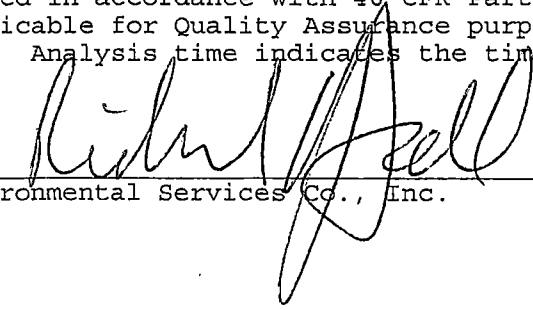
Laboratory Analysis

<u>Analysis</u>				<u>Laboratory Analysis</u>			<u>Quality Assurance</u>		
<u>Date</u>	<u>Time</u>	<u>By</u>	<u>Parameter</u>	<u>Result</u>	<u>Notes</u>	<u>Quantity</u>	<u>Method</u>	<u>Precision</u>	<u>Accuracy</u>
								<u>% RPD</u>	<u>% Recovery</u>
11/22	1430	PJC	Phosphorous, Total (as P)	0.13 mg/L			EPA 365.3	2.48	99.4 *
11/19	1350	NTR	Nitrate + Nitrite	5.26 mg/L			SM 2000 4500-NO3 E	2.17	92.2 *

* QA data shown is from a different sample or standard on the same date.

All equipment used is checked and/or calibrated daily. All NPDES testing is conducted in accordance with 40 CFR Part 136. A minimum of 10% spiked and duplicate samples is run on each parameter where applicable for Quality Assurance purposes. Quality Assurance Plan on file with Arkansas Department of Environmental Quality. Analysis time indicates the time of the start of the analytical batch in which the specific sample was included.

Signature _____


 Environmental Services Co., Inc.

Bio-Analytical Laboratories (BAL)
ADEQ#88-0630
Project X6101

Bio-Analytical Laboratories' Executive Summary

Permittee: Camden Water Utilities
P.O. Drawer J
Camden, AR 71711

Project #: X6101

Outfall: Outfall 002 (treated municipal wastewater)

Permit #: AR0022365/ AFIN 52-00073

Contact: David Richardson

Test Dates: July 20 - August 19, 2016

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

Results:

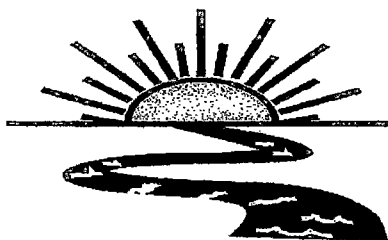
For *Daphnia pulex*:

1. If the NOEC for survival is less than the critical dilution (28.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D- 0 (**Pass**)
2. Report the NOEC for survival, Parameter TOM3D - 37.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM3D - 21.68%.

For *Pimephales promelas* (Fathead Minnow):

1. If the NOEC for survival is less than the critical dilution (28.0%), enter a "1"; otherwise, enter a "0" for Parameter No. TEM6C- 0 (**Pass**).
2. Report the NOEC for survival, Parameter TOM6C - 37.0%.
3. Report the highest (critical dilution or control) Coefficient of Variation, Parameter TQM6C - 0.00%.

This report contains a total of 38 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 results in this report are for monitoring purposes only and should not be included 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
DEFINITIVE TOXICITY TESTS
FOR OUTFALL 002
AT**

**CAMDEN WATER UTILITIES
Camden, Arkansas**

NPDES #AR0022365

EPA Methods 2000.0 and 2021.0

Project X6101

**Test Dates: July 20 - August 19, 2016
Report Date: September 8, 2016**

Prepared for:
Mr. David Richardson
Camden Water Utilities
P.O. Drawer J
Camden, AR 71711

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

BAL
ADEQ #88-0630
Project X6101

TABLE OF CONTENTS

1.0 Introduction	4
2.0 Methods and Materials	4
2.1 Test Methods	4
2.2 Test Organisms	4
2.3 Dilution Water	5
2.4 Test Concentrations	5
2.5 Sample Collection	5
2.6 Sample Preparation	5
2.7 Monitoring of the Tests	5
2.8 Data Analysis	5
3.0 Results and Discussion	6
4.0 Conclusions	7
5.0 References	8
Appendices	
A- Chain-of-Custody Documents	9
B- Raw Data Sheets	14
C- Statistical Analyses	26
D- Quality Assurance Charts	29
E- Agency Forms	32
F- Report Quality Assurance Form	37

BAL
ADEQ #88-0630
Project X6101

1.0 Introduction

Bio-Analytical Laboratories (BAL), Doyline, Louisiana conducted two 48-hour acute definitive toxicity tests for Outfall 002 at Camden Water Utilities, Camden, Arkansas. The test organisms used were the cladoceran, *Daphnia pulex*, and the fathead minnow, *Pimephales promelas*. 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 LC₅₀, the concentration in which 50 percent of the test organisms died.

The tests were initiated on July 20, 2016; however, the *Daphnia pulex* test was invalid. A retest was started on August 17, 2016. This report summarizes the valid test results. All valid and invalid test data can be found in the appendices.

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 procedure.

2.2 Test Organisms

The *Daphnia pulex* test organisms were raised in-house at test temperature and were less than 24 hours old at test initiation. The fathead minnow test organisms were also raised in-house at test temperature and were approximately four days at test initiation. Forty-eight hour reference toxicant tests were conducted monthly in order to document organism sensitivity and demonstration of capability.

BAL
ADEQ #88-0630
Project X6101

2.3 Dilution Water

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

2.4 Test Concentrations

The test concentrations used in the acute toxicity tests were 37.0, 28.0, 21.0, 16.0 and 12.0 percent effluent and a control. The critical dilution was defined as 28.0 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 24-hour composite samples of Outfall 002 were collected by Camden Water Utilities personnel on July 19 and 20, 2016, at 0800 hours for the fathead minnow test, and on August 16 and 17, 2016 at 0800 hours, for the valid *Daphnia pulex* test. Upon completion of collection, the samples were chilled then packed in ice and delivered to Bio-Analytical Laboratories by BAL personnel. Sample temperature upon arrival for each set of samples was 2.7, 2.7, 1.7 and 1.7^o Celsius, respectively.

2.6 Sample Preparation

Upon arrival, the samples were logged in, given an identification number and refrigerated unless needed. Prior to use, each sample was warmed to 25±1^o Celsius. The total residual chlorine levels were measured with a Capital Controls^R amperometric titrator (SM 4500-C1 D 1997) and recorded if present. The total ammonia levels were measured using a test strip. Dissolved oxygen (SM 4500-O G 1997) and pH (SM 4500-H+ B 1997) measurements were measured on the control and each concentration at test initiation, at test renewal and at test termination. Conductivity (SM 2510 B 1997) measurements were also taken at test initiation and at each renewal. Alkalinity (SM 2320 B 1997) and hardness (SM 2340 C 1997) levels were measured on the control and the highest effluent concentration.

2.7 Monitoring of the Tests

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

2.8 Data Analysis

The NOEC and LC₅₀ values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

BAL
ADEQ #88-0630
Project X6101

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 28.0 percent critical dilution in either test. The NOEC value for both tests was 37.0 percent effluent ($p=.05$). The 48-hour LC_{50} value for both tests was >37.0 percent effluent ($p=.05$).

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

Percent Effluent	Percent Survival	
	<i>Daphnia pulex</i>	Fathead minnow
Test Organism		
Control	95.0	100.0
12.0	95.0	100.0
16.0	82.5	100.0
21.0	85.0	100.0
28.0	90.0	100.0
37.0	90.0	97.5

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

BAL
ADEQ #88-0630
Project X6101

4.0 Conclusions

The two composite samples of Outfall 002 collected from Camden Water Utilities, Camden, Arkansas, on July 19 and 20, 2016, were not found to be lethally toxic to the fathead minnow test organisms in the 28.0 percent critical dilution after 48 hours of exposure ($p=.05$). The two composite samples of Outfall 002 collected on August 16 and 17, 2016, were not found to be lethally toxic to the *Daphnia pulex* test organisms in the 28.0 percent critical dilution after 48 hours of exposure ($p=.05$). The 48-hour LC_{50} value for each test was >37.0 percent effluent ($p=.05$).

BAL
ADEQ #88-0630
Project X6101

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
Coyline, LA 71125

(318) 745-2772
1-800-255-1243
Fax: (318) 745-2773

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

Laboratory Use Only:

Company: Camden Water Utilities		Phone: (870) 836-4329		Analysis:				Project Number: X6101 Temp. upon analysis: Temperature upon arrival: 2.7 ^o Thermometer #: 29 Tech: EC Date: 7/20/16 Lab Control Number: Preservative: (below) ICE
Address: P.O. Box J, Camden, AR 71711		Fax: (870) 836-5190		Chronic Ceriodaphnia Chronic minnow Acute minnow(fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform				
Permit #: AR0022365/ AFIN 52-00073		Purchase Order:						
Sampler's Signature/Printed Name/Affiliation: Annette Strickland Annette Strickland								
Date Start Date End	Time Start Time End	C	G		# and type of container	Sample Identification		
7-18-16 7-19-16	8:00 AM 8:00 AM	X		2 half gallons	002			
Relinquished by/Affiliation: Annette Strickland				Date: 7-20-16	Time: 0930	Received by/Affiliation: J. B. ...	Date: 7-20-16	Time: 0930
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:	Date:	Time:
Relinquished by/Affiliation: J. B. ...				Date: 7-20-16	Time: 1200	Received by/Affiliation: R. Callahan	Date: 7/20/16	Time: 1210
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____								
Comments:								



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71023

(318) 745-2772
1-800-258-1248
Fax: (318) 745-2775

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

Laboratory Use Only:

Company: Camden Water Utilities		Phone: (870) 836-4329		Analysis:							Project Number: X6101	
Address: P.O. Box J, Camden, AR 71711		Fax: (870) 836-5190		Chronic Ceriodaphnia	Chronic minnow	Acute minnow (fresh/marine)	Acute Daphnia species	Acute Mysid	Acute Ceriodaphnia	Fecal Coliform	Temp. upon arrival: 2.7°C	
Permit #: AR0022365/ AFIN 52-00073		Purchase Order:									Thermometer #: 29	
Sampler's Signature/Printed Name/Affiliation: Annette Strickland Annette Strickland		Tech: EC Date: 7/20/16									Lab Control Number:	
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification							
7-19-16 7-20-16	8:00 A 8:30 A	X		2 half gallons	002			X	X			C12770 Ice
Relinquished by/Affiliation: Annette Strickland				Date: 7-20-16	Time: 0930	Received by/Affiliation: J. Byers				Date: 7-20-16	Time: 0930	
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:	
Relinquished by/Affiliation: J. Byers				Date: 7-20-16	Time: 1210	Received by/Affiliation: R. C. Cullen				Date: 7/20/16	Time: 1210	
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking # _____												
Comments:												



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Doyline, LA 71028

(318) 745-2772
1-800-288-1248
Fax: (318) 748-2773

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

Laboratory Use Only:

Company: Camden Water Utilities		Phone: (870) 836-4329		Analysis:				Project Number: X6101	
Address: P.O. Box J, Camden, AR 71711		Fax: (870) 836-5190		Chronic Ceriodaphnia Chronic minnow Acute minnow (fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform				Temp. upon arrival: 1.70C Therm 29 ECB 8/17/16 Preservative: (below)	
Permit #: AR0022365/ AFIN 52-00073		Purchase Order:							Lab Control Number:
Sampler's Signature/Printed Name/Affiliation:									
Date Start Date End	Time Start Time End	C	G						# and type of container
8-16-16 8-16-16	8:00 AM 8:00 AM	X		2 half gallons	002			C12860/CE	
Relinquished by/Affiliation: <i>[Signature]</i>				Date: 8-17-16	Time: 1025	Received by/Affiliation: <i>[Signature]</i>		Date: 8-17-16	Time: 1025
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:		Date:	Time:
Relinquished by/Affiliation: <i>[Signature]</i>				Date: 8-17-16	Time: 1315	Received by/Affiliation: CENL <i>[Signature]</i>		Date: 8/17/16	Time: 1315
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other Tracking #									
Comments:									



Bio-Analytical Laboratories

3240 Spurgin Road
Post Office Box 527
Coyline, LA 71028

(518) 745-2772
1-800-289-1248
Fax: (518) 745-2773

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

Laboratory Use Only:

Company: Camden Water Utilities		Phone: (870) 836-4329		Analysis: Chronic Ceriodaphnia Chronic minnow Acute minnow/fresh/marine) Acute Daphnia species Acute Mysid Acute Ceriodaphnia Fecal Coliform							Project Number: X6101	
Address: P.O. Box J, Camden, AR 71711		Fax: (870) 836-5190									Temp. upon arrival: 1.7°C	
Permit #: AR0022365/ AFIN 52-00073		Purchase Order:									Therm 29 EC08/17/16	
Sampler's Signature/Printed Name/Affiliation:		Lab Control Number:									Preservative: (below)	
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification							
8-16-16 8-17-16	8:00 AM 8:00 AM	X		2 half gallons	002			X	X			C12861 ICE
Relinquished by/Affiliation: [Signature]				Date: 8-17-16	Time: 1045	Received by/Affiliation: [Signature]				Date: 8-17-16	Time: 1045	
Relinquished by/Affiliation:				Date:	Time:	Received by/Affiliation:				Date:	Time:	
Relinquished by/Affiliation: [Signature]				Date: 8-17-16	Time: 1315	Received by/Affiliation: [Signature]				Date: 8/17/16	Time: 1315	
Method of Shipment: <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Bus <input type="checkbox"/> Fed Ex <input type="checkbox"/> DHL <input type="checkbox"/> UPS <input type="checkbox"/> Client <input type="checkbox"/> Other <input type="checkbox"/> Tracking # _____												
Comments:												

APPENDIX B
RAW DATA SHEETS

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X6101
Page 15 of 38

Project# X6101

Client: CMDN/Camden Water Utilities

Address: P.O. Box J, Camden, AR 71711

NPDES#AR0022365 Outfall 002

Technicians: EGB/RC/MM

Test initiated: Date 7/20/16 Time 1320

Test terminated: Date 7/22/16 Time 1335

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AV

pH Meter: Model #Orion 230A+ Serial #015253

Conductivity Meter: Model # Control Co. Serial #130168768

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
C12769	7.2 / 12.1%	No	<0.01	NO	3.0	N/A	72.0	44.0	RC
C12770	6.0 / 10.1%	YES 30 min	<0.01		3.0		72.0	50.0	MM

Dilution Water Information

Dilution Water	ID#	Initial D.O (mg/L & %)	Aerate? Minutes/D.O (mg/L & %)	Total Residual Chlorine (mg/L)	Ammonia (NH3) mg/L	pH	Hardness	Alkalinity	Tech
Soft recon	3894	N/A	N/A	N/A	N/A	7.4	44.0	32.0	RC

Test Species Information

Test Species Info.	Species: ID#	Species: ID#	Species: ID#	Species: ID#
Age	<24 hrs	4 days		
Test Container Size	30ml	300ml		
Test volume	25ml	250 ml		
Feeding: Type	2 hrs	prior to		
Amount	test	initiation		
Aeration?	N/A	N/A		
Amount				
Condition of survivors - good - MM 7/22/16				

Comments: Daphnia pulex test in valid.
Control survival < 90%. EGB 7/22/16

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

Project# X6101

Test started: Date 7/20/16

Time 1350

Client Camden

Test ended: Date 7/22/16

Time 1400

Sample Description 002

Test Species D. pulex

ID# BAL/H7-J9

Technician: Ohour PC 24hour PC 48hour MM 72hour / 96hour /

Time: Ohour 1350 24hour 1330 48hour 1400 72hour / 96hour /

Temperature (°C): Ohour 24.8 24hour 24.9 48hour 25.2 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
0.10		NIA																				
0.5	A	}	8	8	7			7.6	1.8 7.3	8.0			7.1	7.1 7.3	7.1			225	251 223	245		
	B		8	8	2																	
	C		8	8	3																	
	D		8	8	3*																	
	E		8	8	7																	
12.0	A	}	8	8	3			1.6	1.9 7.3	8.2			7.2	7.3 7.3	7.3			215	254 251	251		
	B		8	8	6																	
	C		8	8	1																	
	D		8	6	5*																	
	E		8	8	8																	
		Chemistry Tech prerenewal/postrenewal						PC <u>PC</u> <u>MM</u> <u>MM</u>					PC <u>PC</u> <u>MM</u> <u>MM</u>					PC <u>PC</u> <u>MM</u> <u>MM</u>				

day 2
accidental
death
in traffic
be on side
of cup

day 2
accidental
death
in traffic
be on side
of cup

Invalid EGB 7/22/16

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

Project# X6101
 Client Camden

Test started: Date 7/20/16 Time 1350
 Test ended: Date 7/22/16 Time 1400
 Test Species D. pulex ID# BAL147-59

Sample Description 002
 Technician: RC 24hour RC 48hour MM 72hour / 96hour /
 Time: 1350 24hour 1330 48hour 1400 72hour / 96hour /
 Temperature (°C): 24.8 24hour 24.9 48hour 25.2 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	
0/0		N/A																					
16.0	A	}	8	7	4			7.6	7.5	8.1			7.1	7.3	7.4			224	260	217	254		
	B		8	8	3																		
	C		8	8	4																		
	D		8	7	5																		
	E		8	7	4																		
21.0	A	}	8	8	8			7.5	7.4	8.0			7.1	7.4	7.4			233	262	224	258		
	B		8	8	6																		
	C		8	7	0																		
	D		8	8	2																		
	E		8	8	6																		
Chemistry Tech prerenewal/postrenewal			RC/RC MM/MM					RC/RC MM/MM					RC/RC MM/MM										

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

Project# X6101

Test started: Date 7/20/16 Time 1350

Client Camden

Test ended: Date 7/22/16 Time 1400

Sample Description 002

Test Species D. pulex ID# BAL/H7-59

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

Time: 0hour 1350 24hour 1330 48hour 1400 72hour / 96hour /

Temperature (°C): 0hour 24.8 24hour 24.9 48hour 25.2 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			
96 28.0	A	N/A	8	8	5			1.5	1.7	1.4	1.8			1.0	1.4	1.3	1.5			246	264	235	262		
	B		8	8	0																				
	C		8	8	5																				
	D		8	4	2																				
	E		8	8	3																				
37.0	A	N/A	8	8	0			1.5	1.9	1.7	1.8			1.0	1.4	1.3	1.5			263	274	251	279		
	B		8	8	2																				
	C		8	7	4																				
	D		8	8	2																				
	E		8	8	2																				
Chemistry Tech prerenewal/postrenewal			RC RC MM MM					RC RC MM MM					RC RC MM MM												

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

Project# X6101

Test started: Date 7/20/16 Time 1320

Client Camdon

Test ended: Date 7/22/16 Time 1335

Sample Description 002

Test Species P. promelas ID# BAL/071616

Technician: Ohour RC 24hour MM 48hour MM 72hour / 96hour /
 Time: Ohour 1320 24hour 1220 48hour 1335 72hour / 96hour /
 Temperature (°C): Ohour 24.8 24hour 25.3 48hour 25.2 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
			0/0		NIA																	
0.5	A	[Handwritten bracket]	8	8	8			7.6	7.5 7.3	7.9			7.1	7.0 7.3	7.0			22.5	22.1 22.3	22.1		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
12.0	A	[Handwritten bracket]	8	8	8			7.6	7.5 7.3	8.0			7.2	7.2 7.3	7.3			21.5	21.0 21.0	22.1		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			RC <u>MM</u>					RC <u>MM</u>					RC <u>MM</u>									

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

Project# X6101

Test started: Date 7/20/16 Time 1320

Client Camden

Test ended: Date 7/24/16 Time 1335

Sample Description 002

Test Species P. promelas ID# BAL071616

Technician: Ohour RC 24hour MM 48hour MM 72hour / 96hour /
 Time: Ohour 1320 24hour 1220 48hour 1335 72hour / 96hour /
 Temperature (°C): Ohour 24.8 24hour 25.3 48hour 23.2 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																				
16.0	A	}	8	8	8			1.6	7.3	7.5	7.9		1.1	7.3	7.3		224	249	217	231		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
21.0	A	}	8	8	8			1.5	7.4	7.3	7.8		7.1	7.3	7.4		233	253	224	244		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			RC <u>MM</u>					RC <u>MM</u>					RC <u>MM</u>									

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

Project# X6101
 Client Camden

Test started: Date 7/20/16 Time 1320

Test ended: Date 7/24/16 Time 1335

Sample Description 002
 Technician: 0hour RC 24hour MM 48hour MM 72hour / 96hour /
 Time: 0hour 1320 24hour 1220 48hour 1335 72hour / 96hour /
 Temperature (°C): 0hour 24.8 24hour 25.3 48hour 25.2 72hour / 96hour /

Test Species P. promelas ID# BAL/071616

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
96		N/A																				
28.0	A	}	8	8	8			1.5	7.4	7.8			1.0	7.3	7.5			246	235	264		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
31.0	A	}	8	8	8			1.5	7.7	7.7			1.0	7.3	7.5			263	275	281		
	B		8	7	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			RC <u>MM</u>					RC <u>MM</u>					RC <u>MM</u>									

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

Project# X6101

Client: CMDN/Camden Water Utilities

Address: P.O. Box J, Camden, AR 71711

NPDES#AR0022365 Outfall 002

Technicians: EGB/RC/MM

Test initiated: Date 8/17/16 Time 1435

Test terminated: Date 8/19/16 Time 1450

Dissolved Oxygen Meter: Model # YSI 55D Serial #06E2089 AV

pH Meter: Model #Orion 230A+ Serial #015253

Conductivity Meter: Model # Fisher Serial #130168768

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
							31.08	37%	
CL2860	7.2/36.9%	No	<0.01	NO	3.0	N/A	48.0	24.0	RC
CL2861	7.8/33.0%	No	<0.01		3.0		44.0	24.0	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
Soft recen	3905	N/A	N/A	N/A	N/A	7.2	44.0	44.0	RC

Test Species Information

Test Species Info.	Species: ID#:	Species: ID#:	Species: ID#:	Species: ID#:
	D. pullex	P. promelas		
Age	BAL/10-90	BAL1	RC 8/17/16	-not needed retest
Test Container Size	30ml	300ml		D.p. only
Test volume	25ml	250ml		
Feeding: Type	2 hrs	prior to		
Amount	test	initiation		
Aeration?	N/A	N/A		
Amount				
Condition of survivors	6000 RC 8/19/16			

Comments:

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

Project# X6101
 Client Camden

Test started: Date 8/17/16 Time 1435

Test ended: Date 8/19/16 Time 1450

Sample Description 002 Test Species D. pulex ID# BAL/Ka-Po
 Technician: Ohour RC 24hour RC 48hour RC 72hour / 96hour /
 Time: Ohour 1435 24hour 1620 48hour 1450 72hour / 96hour /
 Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.7 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	A	}	8	8	8			7.7	7.7	7.8			7.4	7.5	7.5			203	254	193	238	
Soft	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	6																	
12%	A	}	8	8	8			7.7	7.6	7.9			7.4	7.5	7.5			213	267	207	242	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	6																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			RC/RC/RC					RC/RC/RC					RC/RC/RC									

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

Project# X6101

Test started: Date 8/17/16 Time 1435

Client Camden

Test ended: Date 8/18/16 Time 1450

Sample Description 002

Test Species D. pulex ID# BAL1ka-P

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

Time: Ohour 1435 24hour 1629 48hour 1450 72hour / 96hour /

Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.7 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																				
16%	A	}	8	8	6			7.7	7.6	7.8			7.2	7.5	7.5			216	258	250		
	B		8	8	8																	
	C		8	8	7																	
	D		8	7	7																	
	E		8	7	5																	
21%	A	}	8	8	8			7.7	7.6	7.8			7.2	7.5	7.5			219	259	239		
	B		8	7	5																	
	C		8	8	8																	
	D		8	8	6																	
	E		8	7	7																	
Chemistry Tech prerenewal/postrenewal			RC/RC/RC					RC/RC/RC					RC/RC/RC									

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

Project# X6101
 Client Camden

Test started: Date 8/17/16 Time 1435

Test ended: Date 8/19/16 Time 1450

Sample Description 002
 Technician: Ohour RC 24hour RC 48hour RC 72hour / 96hour /
 Time: Ohour 1435 24hour 1620 48hour 1450 72hour / 96hour /
 Temperature (°C): Ohour 24.9 24hour 24.9 48hour 24.9 72hour / 96hour /

Test Species D. pulex ID# BAL/ta-A

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																				
28%	A	}	8	8	5			7.7	7.5	7.7			7.1	7.4	7.5			224	257	239		
	B		8	8	5																	
	C		8	8	8																	
	D		8	8	6																	
	E		8	8	8																	
37%	A	}	8	7	8			7.6	7.5	7.7			6.9	7.4	7.5			230	261	246		
	B		8	8	6																	
	C		8	8	8																	
	D		8	8	6																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	RC	RC			RC	RC	RC			RC	RC	RC		

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date: 8/17/2016 Test ID: X6101DP Sample ID: AR0022365
 End Date: 8/19/2016 Lab ID: ADEQ880630 Sample Type: EFF1-POTW
 Sample Date: 8/16/2016 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: DP-Daphnia pulex

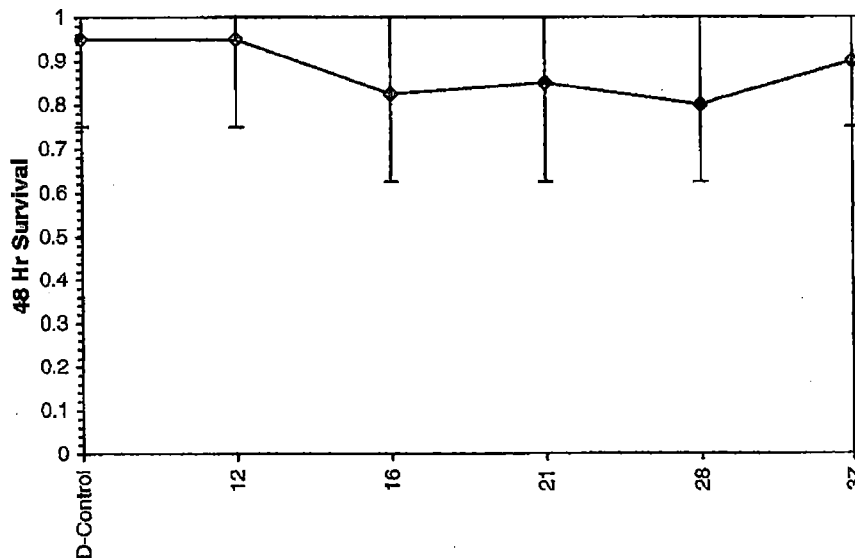
Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.7500
12	1.0000	1.0000	1.0000	0.7500	1.0000
16	0.7500	1.0000	0.8750	0.8750	0.6250
21	1.0000	0.6250	1.0000	0.7500	0.8750
28	0.6250	0.6250	1.0000	0.7500	1.0000
37	1.0000	0.7500	1.0000	0.7500	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%			
D-Control	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5		
12	0.9500	1.0000	1.3239	1.0472	1.3931	11.684	5	27.50	16.00
16	0.8250	0.8684	1.1542	0.9117	1.3931	15.823	5	20.50	16.00
21	0.8500	0.8947	1.1909	0.9117	1.3931	17.846	5	22.50	16.00
28	0.8000	0.8421	1.1314	0.9117	1.3931	21.676	5	21.50	16.00
37	0.9000	0.9474	1.2547	1.0472	1.3931	15.099	5	25.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.89473	0.927	-0.3114	-1.1958
Bartlett's Test indicates equal variances (p = 0.94)	1.20935	15.0863		
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	37	>37		2.7027
Treatments vs D-Control				

Dose-Response Plot



Acute Fish Test-48 Hr Survival

Start Date: 7/20/2016 Test ID: X6101PP Sample ID: AR0022365
 End Date: 7/22/2016 Lab ID: ADEQ880630 Sample Type: EFF1-POTW
 Sample Date: 7/19/2016 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas

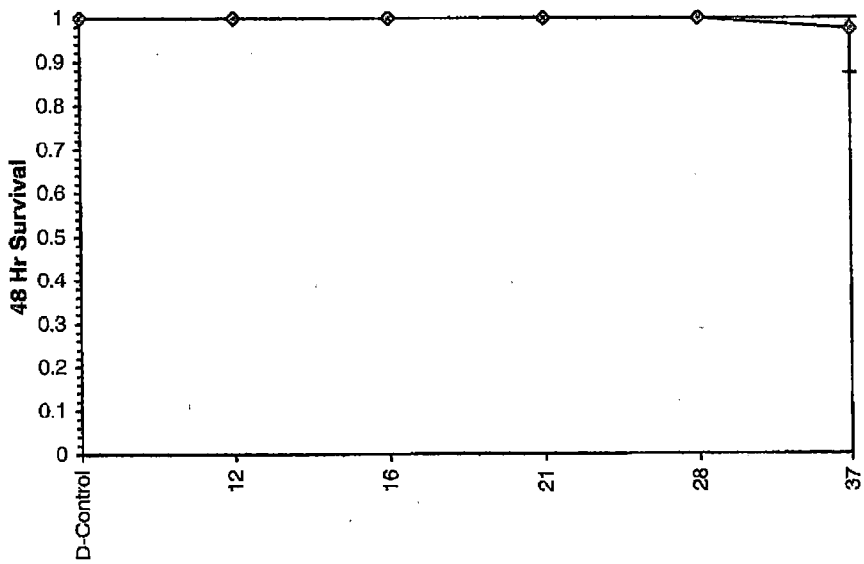
Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
12	1.0000	1.0000	1.0000	1.0000	1.0000
16	1.0000	1.0000	1.0000	1.0000	1.0000
21	1.0000	1.0000	1.0000	1.0000	1.0000
28	1.0000	1.0000	1.0000	1.0000	1.0000
37	1.0000	0.8750	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				CV%	N	Rank Sum	1-Tailed Critical
			Mean	Min	Max					
D-Control	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5			
12	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	
16	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	
21	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	
28	1.0000	1.0000	1.3931	1.3931	1.3931	0.000	5	27.50	16.00	
37	0.9750	0.9750	1.3564	1.2094	1.3931	6.055	5	25.00	16.00	

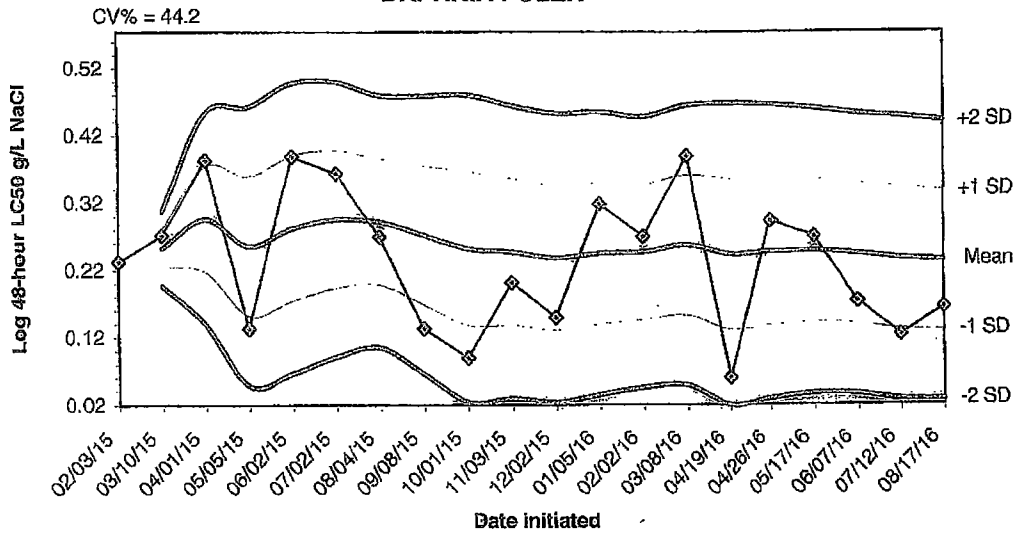
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p <= 0.05$)	0.41613	0.927	-3.8705	19.8512
Equality of variance cannot be confirmed				
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	37	>37		2.7027
Treatments vs D-Control				

Dose-Response Plot



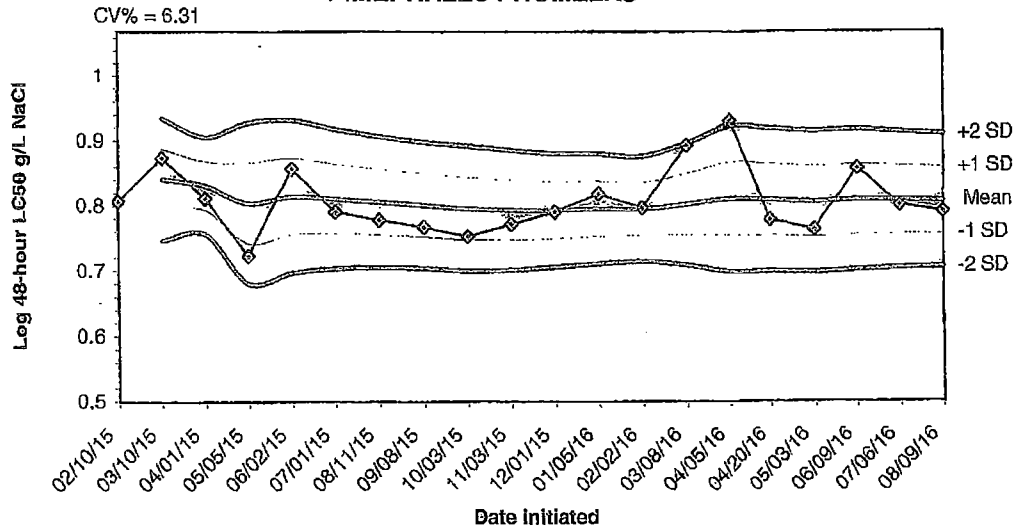
APPENDIX D
QUALITY ASSURANCE CHARTS

**48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS USING
DAPHNIA PULEX**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/03/15	0.2330	0.2524	0.2250	0.1975	0.2799	0.3074
03/10/15	0.2718	0.2962	0.2179	0.1396	0.3745	0.4528
04/01/15	0.3838	0.2555	0.1521	0.0486	0.3590	0.4625
05/05/15	0.1335	0.2823	0.1746	0.0669	0.3900	0.4977
06/02/15	0.3892	0.1939	0.0920	0.3977	0.4996	
07/02/15	0.3636	0.2958	0.1939	0.0920	0.3977	0.4996
08/04/15	0.2695	0.2921	0.1985	0.1050	0.3856	0.4792
09/08/15	0.1335	0.2723	0.1691	0.0659	0.3754	0.4786
10/01/15	0.0899	0.2520	0.1379	0.0299	0.3660	0.4801
11/03/15	0.2014	0.2469	0.1382	0.0295	0.3556	0.4643
12/02/15	0.1492	0.2380	0.1308	0.0235	0.3453	0.4526
01/05/16	0.3181	0.2447	0.1399	0.0350	0.3496	0.4544
02/02/16	0.2695	0.2466	0.1460	0.0454	0.3472	0.4478
03/08/16	0.3892	0.2568	0.1529	0.0490	0.3607	0.4646
04/19/16	0.0607	0.2437	0.1315	0.0193	0.3559	0.4681
04/26/16	0.2923	0.2468	0.1377	0.0286	0.3558	0.4649
05/17/16	0.2695	0.2481	0.1424	0.0366	0.3539	0.4596
06/07/16	0.1732	0.2439	0.1398	0.0357	0.3480	0.4521
07/12/16	0.1239	0.2376	0.1328	0.0279	0.3425	0.4473
08/17/16	0.1644	0.2340	0.1306	0.0272	0.3373	0.4407

**48-HOUR ACUTE REFERENCE TOXICANT TEST RESULTS USING
PIMEPHALES PROMELAS**



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/10/15	0.8075					
03/10/15	0.8739	0.8407	0.7938	0.7469	0.8876	0.9346
04/01/15	0.8116	0.8310	0.7938	0.7566	0.8682	0.9054
05/05/15	0.7235	0.8041	0.7424	0.6806	0.8659	0.9276
06/02/15	0.8573	0.8148	0.7562	0.6977	0.8733	0.9318
07/01/15	0.7910	0.8108	0.7575	0.7043	0.8641	0.9173
08/11/15	0.7782	0.8061	0.7560	0.7058	0.8563	0.9064
09/08/15	0.7679	0.8014	0.7530	0.7046	0.8497	0.8981
10/03/15	0.7536	0.7960	0.7481	0.7001	0.8440	0.8920
11/03/15	0.7723	0.7937	0.7478	0.7020	0.8395	0.8853
12/01/15	0.7910	0.7934	0.7499	0.7064	0.8369	0.8804
01/05/16	0.8189	0.7956	0.7534	0.7113	0.8377	0.8798
02/02/16	0.7973	0.7957	0.7554	0.7150	0.8360	0.8763
03/08/16	0.8932	0.8026	0.7560	0.7093	0.8493	0.8960
04/05/16	0.9309	0.8112	0.7553	0.6995	0.8671	0.9229
04/20/16	0.7789	0.8092	0.7546	0.7000	0.8638	0.9183
05/03/16	0.7642	0.8065	0.7526	0.6986	0.8605	0.9145
06/09/16	0.8573	0.8094	0.7557	0.7019	0.8631	0.9168
07/06/16	0.8014	0.8089	0.7567	0.7045	0.8612	0.9134
08/09/16	0.7910	0.8080	0.7571	0.7061	0.8590	0.9100

APPENDIX E
AGENCY FORMS

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

**Permittee: Camden Water Utilities
NPDES Number: AR0022365/ AFIN 52-00073**

Contact: David Richardson

Analyst: Callahan

Sample Collected

From:

Date 8/15/16

Time 0800

To:

Date 8/16/16

Time 0800

Test Begin

Date 8/17/16

Time 1435

Test End

Date 8/19/16

Time 1450

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		7.7	7.7	7.8	24.9	24.9	24.7	44.0			44.0			7.4	7.4	7.5
12.0		7.7	7.7	7.9	24.9	24.9	24.7							7.4	7.3	7.5
16.0		7.7	7.7	7.8	24.9	24.9	24.7							7.2	7.2	7.5
21.0		7.7	7.7	7.8	24.9	24.9	24.7							7.2	7.1	7.5
28.0		7.7	7.6	7.7	24.9	24.9	24.7							7.1	7.0	7.5
37.0		7.6	7.6	7.7	24.9	24.9	24.7	24.0	24.0		48.0	44.0		6.9	7.0	7.5

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

Acute Forms
Pimephales promelas Survival

Permittee: Camden Water Utilities

NPDES Permit Number: AR0022365/ AFIN 52-00073

Composite Collected

From: 7/18/16

To: 7/19/16

From: 7/19/16

To: 7/20/16

Test Initiated: 7/20/16

Dilution Water Used:

Receiving Water

Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	REP	0	12.0	16.0	21.0	28.0	37.0
24-hour	A	100.0	100.0	100.0	100.0	100.0	100.0
	B	100.0	100.0	100.0	100.0	100.0	87.5
	C	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
	E	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
	B	100.0	100.0	100.0	100.0	100.0	87.5
	C	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
	E	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

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 (28.0%) YES NO
- b.) 1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A%) YES NO

2. Enter percent effluent corresponding to the LC₅₀ below:

LC₅₀ = >37.0% effluent

95 % confidence limits: N/A

Method of LC₅₀ calculation: N/A

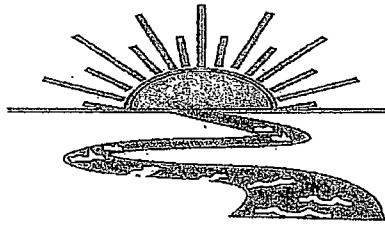
3. If you answered NO to 1.a) enter (P) otherwise enter (F): P

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

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

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

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: Camden Water Utilities

Project#: X6101

Chain of Custody Documents Checked by: RC 8/10/16
Technician/Date

Raw Data Documents Checked by: RC 8/10/16
Technician/Date

Statistical Analysis Package Checked by: EGB 9/1/16
Quality Manager/Date

Quality Control Data Checked by: EGB 8/25/16
Quality Manager/Date

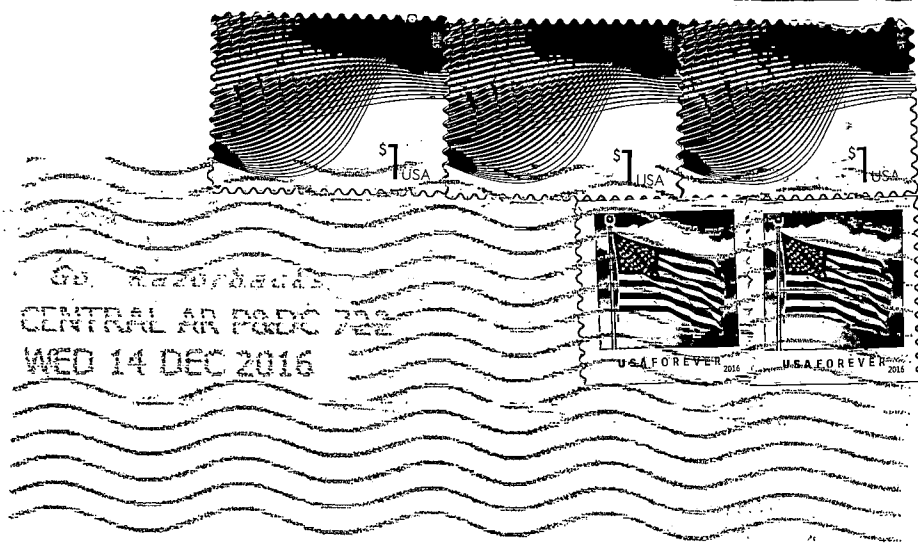
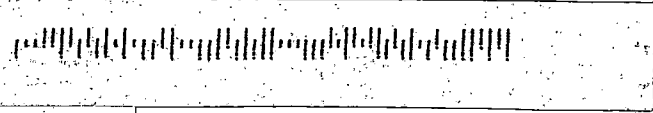
Report Checked by: EGB 9/9/16
Quality Manager/Date

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 S. Bergpp, BS 9/9/16
Quality Manager Date

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

Camden W
PO Box J
Camden, AR 71711



ADEQ
Water Division-Enforcement Branch
5301 Northshore Drive
North Little Rock, AR 72118-5317