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Control Number: 1606010233	Composite Date: 06/14/16 - 06/14/16	Collected By: ANNETTE STRICKL
Customer Name : CAMDEN WATER & WASTEWATER UTILTY	Sample Time : 1000-1500	Delivery By : TMO
Customer Number : 1550	Sample Type : COMPOSITE WATER	Work Order :
Report Date : 06/27/16	Sample From : FINAL EFFLUENT	Purchase Order :


Laboratory Analysis

Analysis						Quality Assurance			
Date	Time	By	Parameter	Result	Notes	Quantity	Method	Precision	Accuracy
								% RPD	% Recovery
06/21	0700	CLB	Phosphorous, Total (as P)	0.40 mg/L			EPA 365.3	0.00	97.0
06/16	1200	NTR	Nitrate + Nitrite	4.29 mg/L			SM 2000 4500-NO3 E	1.06	94.5 *

* 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 X6073

Bio-Analytical Laboratories' Executive Summary

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

Project #: X6073

Outfall: Outfall 002 (treated municipal wastewater)

Permit #: AR0022365/ AFIN 52-00073

Contact: David Richardson

Test Dates: June 15 - 17, 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:

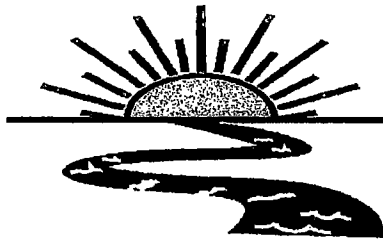
For *Daphnia pulex*:

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 - 20.73%.

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 - 6.06%.

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



Bio-Analytical Laboratories

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**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 X6073

Test Dates: June 15 - 17, 2016

Report Date: July 15, 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 X6073

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BAL
ADEQ #88-0630
Project X6073

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 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 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 seven days at test initiation. Forty-eight hour reference toxicant tests were conducted monthly in order to document organism sensitivity and demonstration of capability.

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Project X6073

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 June 14 and 15, 2016. 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 was -0.8° Celsius.

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 $25 \pm 1^{\circ}$ Celsius. The total residual chlorine level was measured with a Capital Controls^R amperometric titrator (SM 4500-Cl D 1997) and recorded if present. The total ammonia level was measured using a HACH^R test strip. Dissolved oxygen (SM 4500-0 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 $25 \pm 1^{\circ}$ 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 values were obtained by approved EPA methods of analysis, using the ToxCalc statistical program.

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Project X6073

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 LC₅₀ 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	<i>Daphnia pulex</i>	Fathead minnow
Control	95.0	97.5
12.0	77.5	100.0
16.0	77.5	97.5
21.0	85.0	100.0
28.0	85.0	100.0
37.0	80.0	100.0

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

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4.0 Conclusions

The two composite samples of Outfall 002 collected from Camden Water Utilities, Camden, Arkansas, on June 14 and 15, 2016, were not found to be lethally toxic to the fathead minnow test organisms nor the *Daphnia pulex* test organisms in the 28.0 percent critical dilution after 48 hours of exposure ($p=.05$).

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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

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

Laboratory Use Only:

Company: Camden Water Utilities		Phone: (870) 836-4329		Analysis:				Fecal Coliform	Lab Control Number:	Project Number: X6073		
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	Temp. upon arrival: -0.8°C
Permit #: AR0022365/ AFIN 52-00073		Purchase Order:										Therm #29 EMB 6/15/16
Sampler's Signature/Printed Name/Affiliation:												Preservative: (below)
Date Start Date End	Time Start Time End	C	G	# and type of container	Sample Identification							
6-13-16 6-14-16	8:00 A 8:00 A	X		2 half gallons	002		X	X			C12562	Ice
6-14-16 6-15-16	8:00 8:00	C		2 half gallons	002		X	X			C12563	d
Relinquished by/Affiliation: <i>Annette Abuelcal</i>		Date: 6-15-16	Time: 9:00 AM	Received by/Affiliation: <i>R. C. Bepp</i>		Date: 6/15/16	Time: 0900					
Relinquished by/Affiliation: <i>R. C. Bepp</i>		Date: 6/15/16	Time: 1140	Received by/Affiliation: <i>R. C. Bepp</i>		Date: 6/15/16	Time: 1240					
Relinquished by/Affiliation:		Date:	Time:	Received by/Affiliation:		Date:	Time:					
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:												
COC Rev. 3.0												

**APPENDIX B
RAW DATA SHEETS**

BIO-ANALYTICAL LABORATORIES
ACUTE TOXICITY TEST WATER QUALITY DATA

X6073
Page 12 of 31

Project# X6073

Client: CMDN/Camden Water Utilities

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

NPDES#AR0022365 Outfall 002

Technicians: EGB/RC/MM

Test initiated: Date 6/15/16 Time 1510

Test terminated: Date 6/17/16 Time 1540

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

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

Conductivity Meter: Model # Control Co. Serial #~~122175539~~ 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
C12562	6.8 / 75.5%	Y 12/1.7 / 87.0%	<0.01	NO	0.50	N/A	37.0%	37.0%	RC
C12563	4.5 / 87.9%	NO	<0.01		1.0		44.0	20.0	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 Recon	3881	N/A	N/A	N/A	N/A	7.3	44.0	28.0	RC

Test Species Information

Test Species Info.	D. Oulex Species: ID#: BAL/N2-39	P. promelas Species: ID#: BAL/060910A	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		
Amount	to test initiation			
Aeration?	N/A	N/A		
Amount				
Condition of survivors	Good 6/17/16 RC	Good RC 6/17/16		

Comments:

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

Project# X6073

Test started: Date 6/15/16

Time 1510

Client Camden

Test ended: Date 6/17/16

Time 1540

Sample Description 002

Test Species D. pulex

ID# BAL/H2-53

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

Time: Ohour 1510 24hour 1630 48hour 1540 72hour / 96hour /

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

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
0%		N/A																				
0.5%	A	N/A	8	8	8			7.9	7.6 7.8	7.8			7.7	7.6 7.6	7.6			187.0	213 185.3	219		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	7																	
	E		8	8	8 [Ⓟ]																	
12.0	A	N/A	8	8	6			7.9	7.6 7.7	7.8			7.5	7.6 7.4	7.6			198.2	221 195	222		
	B		8	8	5																	
	C		8	8	6																	
	D		8	8	7																	
	E		8	8	7																	
Chemistry Tech prerenewal/postrenewal								RC	RC RC	RC			RC	RC RC	RC			RC	RC RC	RC		

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

Project# X6073

Test started: Date 6/15/16 Time 1510

Client Camden

Test ended: Date 6/17/16 Time 1540

Sample Description _____

Test Species D. pulex ID# BAL/H2-J3

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

Time: 0hour 1510 24hour 1630 48hour 1540 72hour / 96hour /

Temperature (°C): 0hour 24.6 24hour 24.7 48hour 24.6 72hour / 96hour /

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
9.0		N/A																				
16.0	A	[Handwritten bracket]	8	8	6			7.9	7.6 7.7	7.9			7.4	7.6 7.2	7.6			202	204 203	202		
	B		8	8	8																	
	C		8	8	4																	
	D		8	8	7																	
	E		8	8	6																	
21.0	A	[Handwritten bracket]	8	8	6			7.9	7.6 7.7	7.9			7.3	7.6 7.2	7.6			206	208 207	208	224	
	B		8	8	8																	
	C		8	8	7																	
	D		8	8	6																	
	E		8	8	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# X6073

Test started: Date 6/15/16 Time 1510

Client Camden

Test ended: Date 6/17/16 Time 1540

Sample Description 002

Test Species D. pulex ID# BAL/112-53

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

Time: Ohour 1510 24hour 1630 48hour 1540 72hour / 96hour /

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

Test Dilution	Replicate	Test Salinity	# Live Organisms					Dissolved Oxygen					pH					Conductivity				
			0 hr	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
90		N/A																				
28.0	A	}	8	8	7			7.9 ^{1.5}	7.7	7.9			7.2 ^{1.5}	7.0	7.6			211 ^{2.24}	214	231		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	4																	
	E		8	8	7																	
37.0	A	}	8	8	5			7.9 ^{1.5}	7.7	7.8			7.1 ^{1.5}	6.9	7.5			218 ^{2.41}	224	243		
	B		8	8	7																	
	C		8	8	7																	
	D		8	8	7																	
	E		8	8	6																	
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# X6073

Test started: Date 6/15/16 Time 1510

Client Camden

Test ended: Date 6/17/16 Time 1520

Sample Description 002

Test Species P. promelas ID# BAL/060916A

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

Time: Ohour 1510 24hour 1155 48hour 1520 72hour / 96hour /

Temperature (°C): Ohour 24.6 24hour 24.6 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% 0.001		N/A																				
	A	}	8	8	8			7.9	7.7 7.8	7.7			7.7	7.4 7.6	7.5			187.0	185.0 185.7	186.0		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	7																	
12.0	A	}	8	8	8			7.9	7.7 7.7	7.8			7.5	7.4 7.4	7.4			188.2	185.0 185.5	186.0		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC	BV/RC RC	RC			RC	BV/RC RC	RC			RC	BV/RC RC	RC		

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

Project# X6073

Test started: Date 6/15/16 Time 1510

Client Camden

Test ended: Date 6/17/16 Time 1520

Sample Description 002

Test Species P. promelas ID# BAL1060916A

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

Time: 0hour 1510 24hour 1158 48hour 1520 72hour / 96hour /

Temperature (°C): 0hour 24.6 24hour 24.6 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
9.0		N/A																				
16.0	A	}	8	8	8			7.9	7.7	7.9			7.4	7.4	7.4			202	211	208		
	B		8	7	7																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
21.0	A	}	8	8	8			7.9	7.7	7.4			7.3	7.2	7.9			206	215	208	219	
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal			RC B/RC RC					RC B/RC RC					RC B/RC RC									

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

Project# X6073

Test started: Date 6/15/16 Time 1510

Client Camden

Test ended: Date 6/17/16 Time 1320

Sample Description 002

Test Species P. promelas ID# BAL/060916A

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

Time: Ohour 1510 24hour 1155 48hour 1520 72hour / 96hour /

Temperature (°C): Ohour 24.4 24hour 24.6 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																				
28.0	A	}	8	8	8			7.9 ^{7.6}	7.7	7.4			7.2 ^{7.4}	7.0	7.8			211 ²²¹	214	231		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
37.0	A	}	8	8	8			7.9 ^{7.6}	7.7	7.4			7.1 ^{7.3}	6.9	7.4			218 ²³³	224	247		
	B		8	8	8																	
	C		8	8	8																	
	D		8	8	8																	
	E		8	8	8																	
Chemistry Tech prerenewal/postrenewal								RC ^{BJ}	RC	RC			RC ^{BJ}	RC	RC			RC ^{BJ}	RC	RC		

APPENDIX C
STATISTICAL ANALYSIS

Daphnid Acute Test-48 Hr Survival

Start Date: 6/15/2016 Test ID: X6073DP Sample ID: AR0022365
 End Date: 6/17/2016 Lab ID: ADEQ880630 Sample Type: EFF1-POTW
 Sample Date: 6/14/2016 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	0.8750	0.8750
12	0.7500	0.6250	0.7500	0.8750	0.8750
16	0.7500	1.0000	0.5000	0.8750	0.7500
21	0.7500	1.0000	0.8750	0.7500	0.8750
28	0.8750	1.0000	1.0000	0.5000	0.8750
37	0.6250	0.8750	0.8750	0.8750	0.7500

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	1-Tailed		
			Mean	Min	Max	CV%	t-Stat		Critical	MSD	
D-Control	0.9500	1.0000	1.3196	1.2094	1.3931	7.623	5				
12	0.7750	0.8158	1.0850	0.9117	1.2094	11.644	5	2.159	2.360	0.2564	
16	0.7750	0.8158	1.0965	0.7854	1.3931	20.514	5	2.054	2.360	0.2564	
21	0.8500	0.8947	1.1813	1.0472	1.3931	12.150	5	1.273	2.360	0.2564	
28	0.8500	0.8947	1.1981	0.7854	1.3931	20.725	5	1.119	2.360	0.2564	
37	0.8000	0.8421	1.1174	0.9117	1.2094	12.059	5	1.861	2.360	0.2564	

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.97114	0.927	-0.6115	0.61835						
Bartlett's Test indicates equal variances ($p = 0.47$)	4.57474	15.0863								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	37	>37		2.7027	0.1745	0.18599	0.03862	0.02951	0.29365	5, 24
Treatments vs D-Control										

Acute Fish Test-48 Hr Survival

Start Date: 6/15/2016 Test ID: X6073PP Sample ID: AR0022365
 End Date: 6/17/2016 Lab ID: ADEQ880630 Sample Type: EFF1-POTW
 Sample Date: 6/14/2016 Protocol: EPAAW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments:

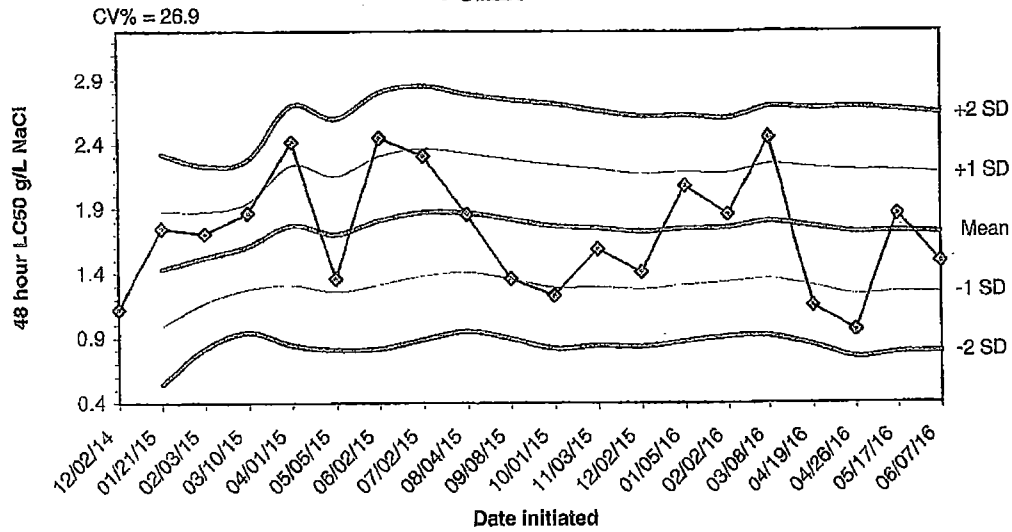
Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	0.8750
12	1.0000	1.0000	1.0000	1.0000	1.0000
16	1.0000	0.8750	1.0000	1.0000	1.0000
21	1.0000	1.0000	1.0000	1.0000	1.0000
28	1.0000	1.0000	1.0000	1.0000	1.0000
37	1.0000	1.0000	1.0000	1.0000	1.0000

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					N	Rank Sum	1-Tailed Critical
			Mean	Min	Max	CV%				
D-Control	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5			
12	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
16	0.9750	1.0000	1.3564	1.2094	1.3931	6.055	5	27.50	16.00	
21	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
28	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	
37	1.0000	1.0256	1.3931	1.3931	1.3931	0.000	5	30.00	16.00	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution ($p \leq 0.05$)	0.5466	0.927	-2.7369	8.25694
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				

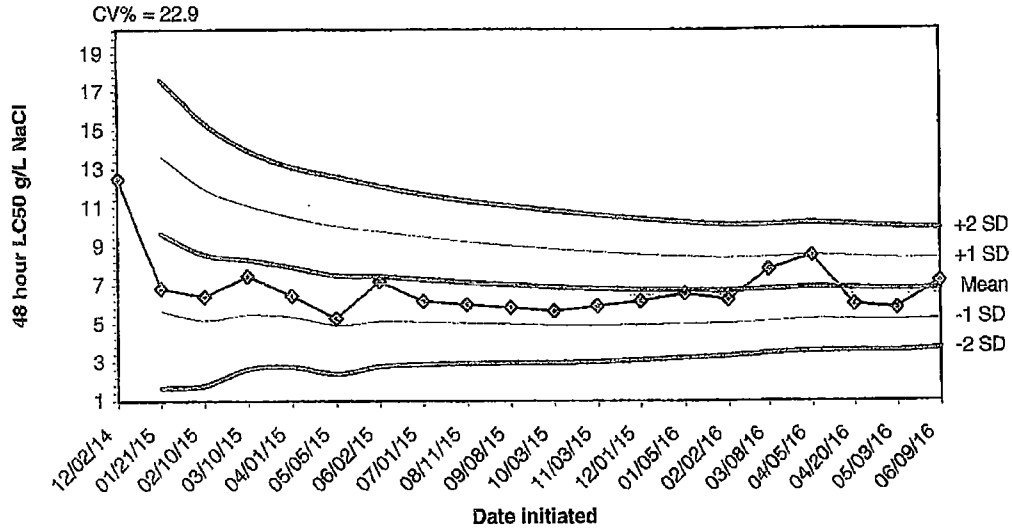
APPENDIX D
QUALITY ASSURANCE CHARTS

2016 ACUTE REFERENCE TOXICANT TEST RESULTS FOR DAPHNIA PULEX



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/02/14	1.1200					
01/21/15	1.7500	1.4350	0.9895	0.5440	1.8805	2.3260
02/03/15	1.7100	1.5267	1.1739	0.8212	1.8794	2.2322
03/10/15	1.8700	1.6125	1.2772	0.9419	1.9478	2.2831
04/01/15	2.4200	1.7740	1.3106	0.8472	2.2374	2.7008
05/05/15	1.3600	1.7050	1.2574	0.8098	2.1526	2.6002
06/02/15	2.4500	1.8114	1.3152	0.8190	2.3077	2.8039
07/02/15	2.3100	1.8738	1.3817	0.8896	2.3658	2.8579
08/04/15	1.8600	1.8722	1.4119	0.9516	2.3325	2.7929
09/08/15	1.3600	1.8210	1.3578	0.8945	2.2842	2.7475
10/01/15	1.2300	1.7673	1.2931	0.8188	2.2415	2.7157
11/03/15	1.5900	1.7525	1.2975	0.8424	2.2075	2.6626
12/02/15	1.4100	1.7262	1.2803	0.8344	2.1721	2.6180
01/05/16	2.0800	1.7514	1.3127	0.8740	2.1901	2.6289
02/02/16	1.8600	1.7587	1.3350	0.9113	2.1824	2.6060
03/08/16	2.4500	1.8019	1.3576	0.9132	2.2462	2.6905
04/19/16	1.1500	1.7635	1.3052	0.8469	2.2219	2.6802
04/26/16	0.9600	1.7189	1.2356	0.7523	2.2022	2.6855
05/17/16	1.8600	1.7263	1.2555	0.7847	2.1971	2.6679
06/07/16	1.4900	1.7145	1.2532	0.7919	2.1758	2.6371

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



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
12/02/14	12.5000					
01/21/15	6.8500	9.6750	5.6798	1.6847	13.6702	17.6653
02/10/15	6.4200	8.5900	5.1970	1.8040	11.9830	15.3760
03/10/15	7.4800	8.3125	5.4871	2.6617	11.1379	13.9633
04/01/15	6.4800	7.9460	5.3655	2.7851	10.5265	13.1069
05/05/15	5.2900	7.5033	4.9533	2.4032	10.0534	12.6034
06/02/15	7.2000	7.4600	5.1293	2.7986	9.7907	12.1214
07/01/15	6.1800	7.3000	5.0953	2.8905	9.5047	11.7095
08/11/15	6.0000	7.1556	5.0482	2.9408	9.2629	11.3703
09/08/15	5.8600	7.0260	4.9973	2.9687	9.0547	11.0833
10/03/15	5.6700	6.9027	4.9352	2.9677	8.8702	10.8377
11/03/15	5.9200	6.8208	4.9236	3.0263	8.7181	10.6154
12/01/15	6.1800	6.7715	4.9464	3.1212	8.5967	10.4219
01/05/16	6.5900	6.7586	5.0043	3.2501	8.5128	10.2670
02/02/16	6.2700	6.7260	5.0309	3.3357	8.4211	10.1163
03/08/16	7.8200	6.7944	5.1340	3.4737	8.4547	10.1150
04/05/16	8.5300	6.8965	5.2347	3.5729	8.5583	10.2201
04/20/16	6.0100	6.8472	5.2216	3.5959	8.4729	10.0986
05/03/16	5.8100	6.7926	5.1949	3.5973	8.3903	9.9880
06/09/16	7.2000	6.8130	5.2553	3.6975	8.3707	9.9285

APPENDIX E
AGENCY FORMS

Acute Forms
Daphnia pulex Survival

Permittee: Camden Water Utilities

NPDES Permit Number: AR0022365/ AFIN 52-00073

Composite Collected

From: 6/13/16

To: 6/14/16

From: 6/14/16

To: 6/15/16

Test Initiated: 6/15/16

Dilution Water Used:

Receiving Water

Reconstituted Water

Dilution Series Results - Percent Survival

TIME OF READING	RBP	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	100.0
	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	75.0	75.0	75.0	87.5	62.5
	B	100.0	62.5	100.0	100.0	100.0	87.5
	C	100.0	75.0	50.0	87.5	100.0	87.5
	D	87.5	87.5	87.5	75.0	50.0	87.5
	E	87.5	87.5	75.0	87.5	87.5	75.0
	Mean	95.0	77.5	77.5	85.0	85.0	80.0

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

2. Enter percent effluent corresponding to the LC_{50} below:

LC_{50} = >37.0% effluent

95 % confidence limits: N/A

Method of LC_{50} calculation: N/A

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

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

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

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

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

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

**Contact: David Richardson
Analyst: Briggs, Callahan, Merritt**

**Sample Collected From: Date 6/13/16 Time 0800
To: Date 6/14/16 Time 0800
Test Begin Date 6/15/16 Time 1510
Test End Date 6/17/16 Time 1540**

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		7.9	7.8	7.8	24.6	24.7	24.6	28.0			44.0			7.7	7.6	7.6
12.0		7.9	7.7	7.8	24.6	24.7	24.6							7.5	7.4	7.6
16.0		7.9	7.7	7.9	24.6	24.7	24.6							7.4	7.2	7.6
21.0		7.9	7.7	7.9	24.6	24.7	24.6							7.3	7.2	7.6
28.0		7.9	7.7	7.9	24.6	24.7	24.6							7.2	7.0	7.6
37.0		7.9	7.7	7.8	24.6	24.7	24.6	24.0	20.0		48.0	44.0		7.1	6.9	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: 6/13/16

To: 6/14/16

From: 6/14/16

To: 6/15/16

Test Initiated: 6/15/16

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	87.5	100.0	100.0	100.0
	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	87.5	100.0	100.0	100.0
	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	87.5	100.0	100.0	100.0	100.0	100.0
	Mean	97.5	100.0	97.5	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 X NO
 b.) 1/2 LOW FLOW OR 2X CRITICAL DILUTION (N/A%) YES NO

2. Enter percent effluent corresponding to the LC_{50} below:

LC_{50} = >37.0% effluent

95 % confidence limits: N/A

Method of LC_{50} calculation: N/A

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

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

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

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

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

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

**Contact: David Richardson
Analyst: Briggs, Callahan, Merritt**

**Sample Collected From: Date 6/13/16 Time 0800
To: Date 6/14/16 Time 0800**

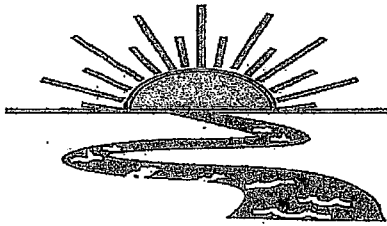
**Test Begin Date 6/15/16 Time 1510
Test End Date 6/17/16 Time 1520**

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		7.9	7.8	7.7	24.6	24.6	24.6	28.0			44.0			7.7	7.6	7.5
12.0		7.9	7.7	7.8	24.6	24.6	24.6							7.5	7.4	7.4
16.0		7.9	7.7	7.9	24.6	24.6	24.6							7.4	7.2	7.4
21.0		7.9	7.7	7.4	24.6	24.6	24.6							7.3	7.2	7.9
28.0		7.9	7.7	7.4	24.6	24.6	24.6							7.2	7.0	7.8
37.0		7.9	7.7	7.7	24.6	24.6	24.6	24.0	20.0		48.0	44.0		7.1	6.9	7.4

*This Form is to be submitted with each DMR.

Alkalinity and hardness to be reported as mg/l CaCO₃

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#: X6073

Chain of Custody Documents Checked by: RC 6/27/16
Technician/Date

Raw Data Documents Checked by: RC 6/27/16
Technician/Date

Statistical Analysis Package Checked by: EOB 6/23/16
Quality Manager/Date

Quality Control Data Checked by: EOB 6/23/16
Quality Manager/Date

Report Checked by: EOB 7/15/16
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.

Chris L. Brupp, BS 7/15/16
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 Water Utilities
P. O. Box J
Camden, AR 71711



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