



**Arkansas Electric
Cooperative Corporation**

Certified Mail N° 7011 3500 0001 6675 7894
RETURN RECEIPT REQUESTED

January 12, 2015

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

RE: Discharge Monitoring Report
Magnet Cove Generating Station
Permit Number AR0049611

To Whom It May Concern:

Attached, please find the Monthly Discharge Monitoring Reports listed in the table below:

Discharge Number	Monitoring Period (year, month, day)
AR0049611 - 01A A	2014 / 12 / 01 - 2014 / 12 / 31
AR0049611 - 001 A	2014 / 12 / 01 - 2014 / 12 / 31
AR0049611 - 01B A	2014 / 12 / 01 - 2014 / 12 / 31

Attached, please find the Quarterly Discharge Monitoring Reports listed in the table below:

Discharge Number	Semi-Annual Period (year, month, day)
TX1 Q	2014 / 10 / 01 - 2014 / 12 / 31

If you have any questions, please feel free to contact me at 501-467-3232 ext 104, or Rob Smith at 501-467-3232 ext 102.

Sincerely,

John M Morgan
Assistant Plant Manager

JM: jmm

Cc: File 8.5.12 - 2014

Direct Line: 501-467-3232 ext 104
Direct Fax: 501-467-3233
Email: john.morgan@aecc.com

Arkansas Analytical, Inc.

Toxicity Test Results
AECC – Magnet Cove Plant
August 2014
AFIN #30-00337

Pimephales promelas, Acute Toxicity, EPA-821-R-02-012, October 2002

Daphnia pulex, Acute Toxicity, EPA-821-R-02-012, October 2002

Prepared for: **Mr. John Morgan**
AECC – Magnet Cove
410 Henderson
Malvern, AR 72104

Prepared by: Arkansas Analytical, Inc.
11701 I-30, Bldg 1, Suite 115
Little Rock, Arkansas 72209
Lab Number K1408002

Monday, August 18, 2014

Introduction

This report contains test results for the toxicity testing of AECC – Magnet Cove Plant. The NPDES permit number is AR0049611. The permit requires acute biomonitoring testing semi annually for both *Daphnia pulex* and *Pimephales promelas*. The test results in this report represent the testing for the second half of 2014.

The facility is located 6.5 miles North of Malvern and 2.3 miles South of Magnet Cove near Highway 270 in Section 28, Township 3 South, Range 17 West in Hot Spring County, Arkansas. The discharge is to receiving waters named Ouachita River in Segment 2F of the Ouachita River Basin.

Plant Operations

To be provided by permittee.

Source of Effluent and Dilution Water

The samples were 24-hour composites collected at the final discharge of Outfall 001. Mean daily discharge is to be provided by permittee.

Effluent samples were collected as follows:

Sample Collection:	Date, Time Started	Date, Time Ended	Date, Time Received	Storage Temperature (°C)
SAMPLE A:	8-11-14, 1000	8-12-14, 0900	8-12-14, 1130	3
SAMPLE B:	8-12-14, 1000	8-13-14, 0900	8-13-14, 1100	4

The dilution water used was soft synthetic water prepared in the lab.

Chain of custody documentation and flow documentation are located in Appendix A.

Both effluent samples and dilution water samples were analyzed for pH, hardness, total alkalinity, and conductivity. Results are provided in Appendix B.

Dilution Series

Five dilutions in addition to a control (0% effluent) were used in the toxicity tests. The dilutions, which were made with soft synthetic water, were 5%, 7%, 10%, 13%, and 17%. The low-flow effluent concentration (**critical dilution**) was defined as **13% effluent**.

Test Methods

The analyses performed were 48 Hour Static Renewal Acute Toxicity Tests using the fathead minnow, *Pimephales promelas*, and the daphnid, *Daphnia pulex*. The tests were conducted according to EPA-821-R-02-012, October 2002. The endpoint of the test is death, established by either no movement or no reaction to gentle prodding. Raw data is provided in Appendix B. Statistics are provided in Appendix C.

	<i>Daphnia Pulex</i>	<i>Pimephales promelas</i>
Deviation from method:	None	None
Date, Time Started	8-13-14, 1600	8-13-14, 1545
Date, Time Ended	8-15-14, 1430	8-15-14, 1415
Type and volume of test chambers:	1-ounce plastic cups	500 ml plastic cups
Volume of solution per chamber:	25 milliliters	250 milliliters
Number of organisms per chamber:	8	10
Number of replicates:	5	5
Feeding frequency and amount:	None	None
Acclimation temperature of organisms:	25 degrees Centigrade	25 degrees Centigrade
Test temperature:	25 degrees Centigrade	25 degrees Centigrade

Test Organisms

Scientific name:	<i>Daphnia pulex</i>	<i>Pimephales promelas</i>
Age:	< 24 hours old	5 days old
Source:	In house culture	Aquatox
Diseases and treatment	None	None

Organism History is provided in Appendix D.

Quality Assurance

Test Acceptability

TEST ACCEPTANCE CRITERIA for *Daphnia pulex*

Control Criteria	Results	Pass	Fail
Greater than or equal to 90% survival	98%	X	

TEST ACCEPTANCE CRITERIA for *Pimephales promelas*

Control Criteria	Results	Pass	Fail
Greater than or equal to 90% survival	100%	X	

Reference Toxicant

The reference toxicant used was Potassium Chloride prepared in-house. The tests were performed using moderately hard synthetic as dilution water. The results of the reference toxicant were:

REFERENCE TOXICANT

<i>Daphnia pulex</i> 7/9/14 – 7/11/14		<i>Pimephales promelas</i> 7/9/14 – 7/11/14	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000 ppm KCl
LC50:	544 ppm KCl	LC50:	888 ppm KCl

Quality Assurance charts are provided in Appendix E.

Summary of Results AECC – Magnet Cove Plant

<i>Daphnia pulex</i>			<i>Pimephales promelas</i>		
NOEC / LOEC Survival	17% / NA	PASS	NOEC / LOEC Survival	17% / NA	PASS
LC50	NA	NA	LC50	NA	NA

Conclusion

EPA-821-R-02-012, October 2002, *Pimephales promelas*

The permit issued to AECC – Magnet Cove, permit AR0049611, specifies that the **critical dilution is 13% effluent**. The effluent samples **did not** exhibit acute toxicity at the critical dilution, and, as such, the effluent samples **passed** the test. Therefore, there is no further action to be taken.

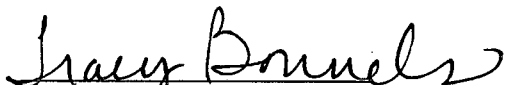
EPA-821-R-02-012, October 2002, *Daphnia pulex*

The permit issued to AECC – Magnet Cove, permit AR0049611, specifies that the **critical dilution is 13% effluent**. The effluent samples **did not** exhibit acute toxicity at the critical dilution, and, as such, the effluent samples **passed** the test. Therefore, there is no further action to be taken.

Biomonitoring Analyst:

Ryan Hudgin

Reviewed by:


Tracy Bouds, lab manager

ACUTE FORMS
FATHEAD MINNOW SURVIVAL RESULTS
(Pimephales promelas)

PERMITTEE: AECC – Magnet Cove

NPDES #: AR0049611

Sample Collection:	Date, Time Started	Date, Time Ended
SAMPLE A:	8-11-14, 1000	8-12-14, 0900
SAMPLE B:	8-12-14, 1000	8-13-14, 0900

Test initiated (date, time): 8-13-14, 1545 Test terminated (date, time): 8-15-14, 1415

Dilution water used: Soft Synthetic

DATA TABLE FOR FATHEAD MINNOW SURVIVAL

Effluent Conc %	Percent Survival in Replicate Chambers					Mean Percent Survival			
	A	B	C	D	E		24 hours	48 hours	CV %
Control	100	100	100	100	100		100	100	0.00
5%	100	100	100	100	100		100	100	
7%	100	100	100	100	90		100	98	
10%	100	100	100	100	100		100	100	
13%	100	100	100	100	100		100	100	0.00
17%	100	100	90	100	100		98	98	

Coefficient of Variation = standard deviation / mean * 100

SUMMARY REPORTING FORMS FOR ACUTE BIOMONITORING
FATHEAD MINNOW LARVAE SURVIVAL
48 hr Acute
Pimephales promelas

1. 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:

a) LOW FLOW OR CRITICAL DILUTION, (100%) YES _____ NO X

2. If you answered NO to 1a. enter [0] otherwise enter [1]: 0

3. Enter the response to item 2 on DMR Form, parameter #TEM6C.

4. Enter percentage for the corresponding parameters below:

a.) Survival NOEC (parameter TOM6C): 17 % effluent.

b.) Coefficient of variation (parameter TQM6C): 0.00 %.

ACUTE FORMS
Daphnia pulex SURVIVAL RESULTS

Permittee: AECC – Magnet Cove

NPDES #: AR0049611

Sample Collection:	Date, Time Started	Date, Time Ended
SAMPLE A:	8-11-14, 1000	8-12-14, 0900
SAMPLE B:	8-12-14, 1000	8-13-14, 0900

Test initiated (date, time): 8-13-14, 1600 Test terminated (date, time): 8-15-14, 1430

Dilution water used: Soft Synthetic

DATA TABLE FOR *Daphnia pulex* SURVIVAL

Effluent Conc %	Percent Survival in Replicate Chambers					Mean Percent Survival		
	A	B	C	D	E	24 hours	48 hours	CV %
Control	100	100	100	87.5	100	100	97.5	5.73
5%	100	100	100	100	100	100	100	
7%	100	100	100	100	87.5	100	97.5	
10%	100	100	100	100	100	100	100	
13%	87.5	100	100	100	100	100	97.5	5.73
17%	100	100	100	100	100	100	100	

Coefficient of Variation = standard deviation/ mean * 100

SUMMARY REPORTING FORMS FOR ACUTE BIOMONITORING
Daphnia pulex SURVIVAL
48 hr Acute

1. 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:

a) LOW FLOW OR CRITICAL DILUTION, (100%) YES _____ NO X_____

2. If you answered NO to 1a. Enter [0] otherwise enter [1]: _____ 0 _____

3. Enter the response to item 2 on DMR Form, parameter #TEM3D.

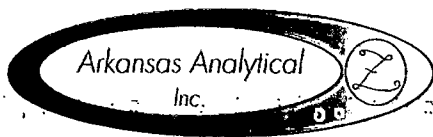
4. Enter percentage corresponding to the parameters below:

a.) Survival NOEC (parameter TOM3D): _____ 17 _____ % effluent.

b.) Coefficient of variation (parameter TQM3D): _____ 5.73 _____ %.

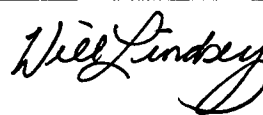




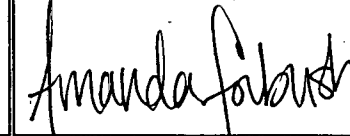
APPENDIX A

Chain of Custody Forms

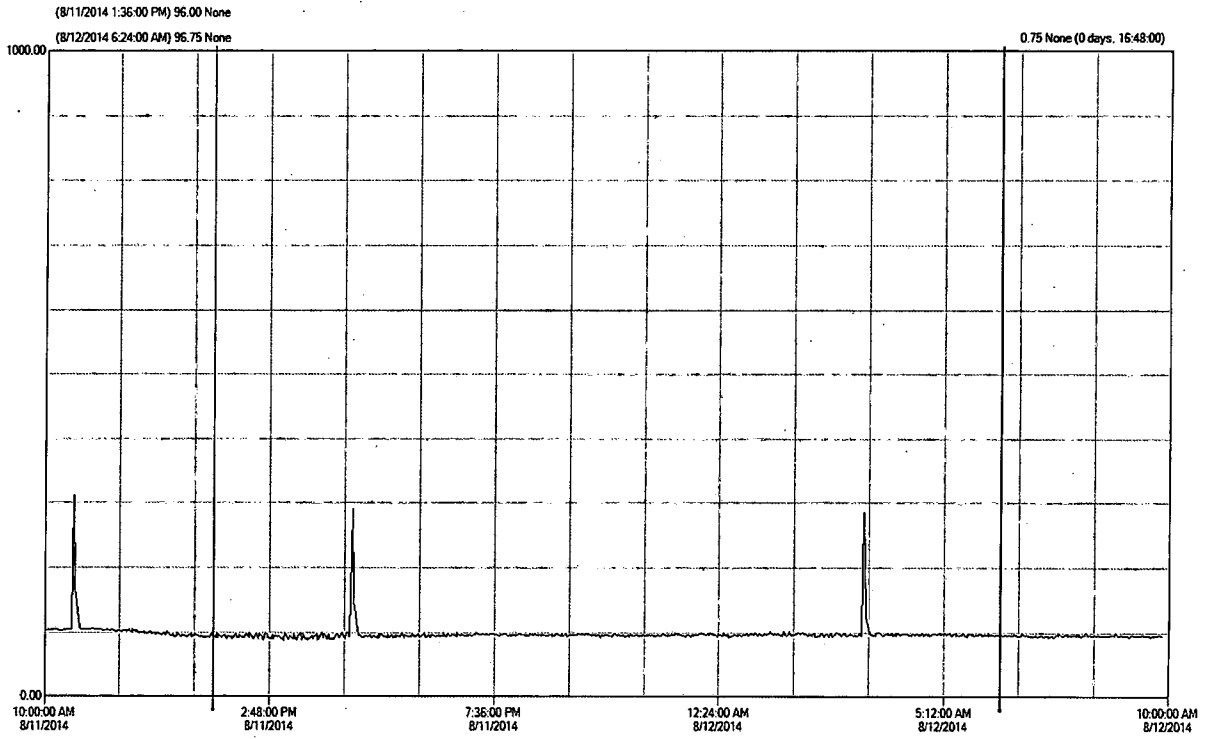


11701 Interstate 30, Bldg. 1, Ste. 115
 Little Rock, AR 72209
 PHONE: 501-455-3233
 FAX: 501-455-6118

CHAIN OF CUSTODY RECORD

CLIENT INFORMATION			Project Description				Turnaround Time		Preservation Codes:										
AECC - Magnet Cove Plant			Acute Toxicity				1 Day (100%)		1. Cool, 4 Degrees Centigrade			4. Thiosulfate for Dechlorination							
410 Henderson Rd.							2 Day (50%)		2. Sulfuric Acid (H ₂ SO ₄), pH < 2			5. Hydrochloric Acid(HCl)							
Malvern, AR 72109			Reporting Information				3 Day (25%)		3. Nitric Acid (HNO ₃), pH < 2			6. Sodium Hydroxide (NaOH), pH > 12							
Attn: John Morgan			Telephone: 501-467-3232				Routine		TEST PARAMETERS										
			Fax: 501-467-3233				Preservative Code: 1		Bottle Type Code										
			Email: john.morgan@aecc.com; john.mehlin@aecc.com				Bottle Type: P		G = Glass; P = Plastic V = Septum; A = Amber										
 Sampler(s) Signature			 Sampler(s) Printed										Acute Biomonitoring Arkansas Analytical Work Order Number:						
Field Number	SAMPLE COLLECTION		Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION												
K1408002	8/11-8/12/14	1000-0900		X	24	Water	Outfall 001			X									
1. Relinquished by: (Signature)			Date/Time		2. Received by: (Signature)				SAMPLE CONDITION UPON RECEIPT IN LAB						REMARKS / SAMPLE COMMENTS				
			8/12/14 1130						1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes ___ No 2. CONTAINERS CORRECT: <input type="checkbox"/> Yes ___ No 3. COC/LABELS AGREE: <input type="checkbox"/> Yes ___ No 4. RECEIVED ON ICE: <input type="checkbox"/> Yes ___ No 5. TEMPERATURE ON RECEIPT: 3°C 6. TEMPERATURE GUN ID: HHT#2										
3. Relinquished by: (Signature)			Date/Time		4. Received by lab: (Signature)				FOR COMPLETION BY LAB ONLY										
																			

Outfall Flow



HOTVW01WP:19GMA98CF101.XQ01 [BestFit - 00 00:06:29.516]

Tag Name	Description	Number	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset	Source Tag	Source Server	Value at X1	Value at X2
<input checked="" type="checkbox"/> 19GMA98C...	COMBINED EFFLUENT...	1	HOTVW...		None	0.00	1000.00	\\HOTVW02WPFVFSG...	0:00:00.000			96.00	96.75

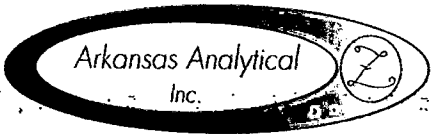
97.48 gpm AVG

8/12/2014 9:52:47 AM

P:\Documents\Trends\Outfall Flow.aaTrend

Arkansas Analytical # K1408002 A
Magnet Cove
Flow Composite Information

Date	Time	Sample #	Volume (mL)	Flow (GPM)
8/11/2014	1000	1	57	100
8/11/2014	1100	2	57	100
8/11/2014	1200	3	57	100
8/11/2014	1300	4	57	100
8/11/2014	1400	5	57	100
8/11/2014	1500	6	57	100
8/11/2014	1600	7	57	100
8/11/2014	1700	8	57	100
8/11/2014	1800	9	57	100
8/11/2014	1900	10	57	100
8/11/2014	2000	11	57	100
8/11/2014	2100	12	57	100
8/11/2014	2200	13	57	100
8/11/2014	2300	14	57	100
8/12/2014	2400	15	57	100
8/12/2014	0100	16	57	100
8/12/2014	0200	17	57	100
8/12/2014	0300	18	57	100
8/12/2014	0400	19	57	100
8/12/2014	0500	20	57	100
8/12/2014	0600	21	57	100
8/12/2014	0700	22	57	100
8/12/2014	0800	23	57	100
8/12/2014	0900	24	57	100
		TOT VOL=	1364	



11701 Interstate 30, Bldg. 1, Ste. 115
Little Rock, AR 72209
PHONE: 501-455-3233
FAX: 501-455-6118

CHAIN OF CUSTODY RECORD

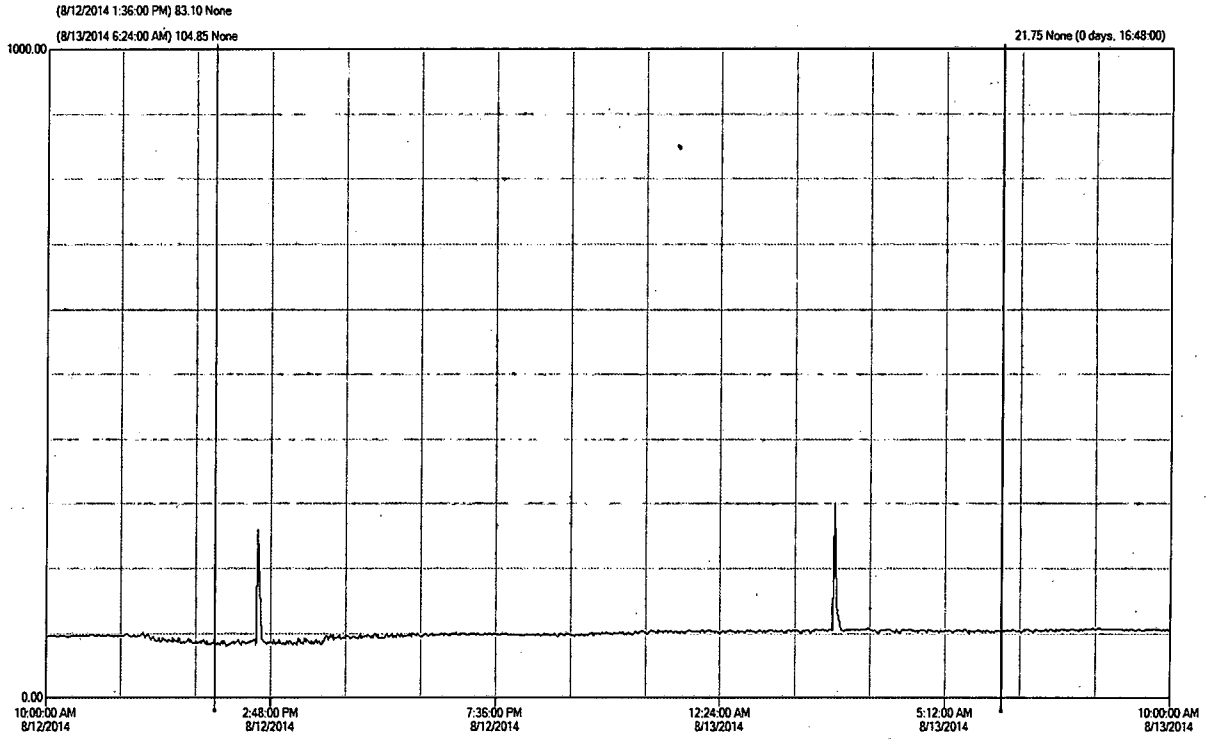
CLIENT INFORMATION		Project Description	Turnaround Time	Preservation Codes:							
AECC - Magnet Cove Plant		Acute Toxicity	1 Day (100%)	1. Cool, 4 Degrees Centigrade 2. Sulfuric Acid (H ₂ SO ₄), pH < 2 3. Nitric Acid (HNO ₃), pH < 2	TEST PARAMETERS						4. Thiosulfate for Dechlorination
410 Henderson Rd.											2 Day (50%)
Malvern, AR 72109		Reporting Information	3 Day (25%)								6. Sodium Hydroxide (NaOH), pH > 12
Attn: John Morgan		Telephone: 501-467-3232	Routine	Bottle Type Code: G = Glass; P = Plastic V = Septum; A = Amber							
		Fax: 501-467-3233	Preservative Code: 1								
		Email: john.morgan@aecc.com; john.mehlin@aecc.com	Bottle Type: P								

Sampler(s) Signature <i>Will Lindsey</i>		Sampler(s) Printed WILL LINDSEY								Arkansas Analytical Work Order Number:
---	--	------------------------------------	--	--	--	--	--	--	--	--

Field Number	SAMPLE COLLECTION		Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Acute Biomonitoring	TEST PARAMETERS											
	Date/s	Time/s																		
K1408002	8/12-8/13/14	1000-0900		X	24	Water	Outfall 001	X												

1. Relinquished by: (Signature) <i>Will Lindsey</i>	Date/Time 8/13/14 1100	2. Received by: (Signature) 	SAMPLE CONDITION UPON RECEIPT IN LAB		REMARKS / SAMPLE COMMENTS
			1. CUSTODY SEALS:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
2. CONTAINERS CORRECT:	<input type="checkbox"/> Yes <input type="checkbox"/> No				
3. COC/LABELS AGREE:	<input type="checkbox"/> Yes <input type="checkbox"/> No				
4. RECEIVED ON ICE:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
5. TEMPERATURE ON RECEIPT:	4°C				
3. Relinquished by: (Signature) 	Date/Time	4. Received by lab: (Signature) <i>Sydney James</i>	6. TEMPERATURE GUN ID:	HHT#2	
FOR COMPLETION BY LAB ONLY					

Outfall Flow



HDTW\ND1V\19GMA98CF101.XQ01 (BestFit - 00:00:07.05:060)

Tag Name	Description	Number	Server	Color	Units	Minimum	Maximum	IO Address	Time Offset	Source Tag	Source Server	Value at X1	Value at X2
<input checked="" type="checkbox"/> 19GMA98C...	COMBINED EFFLUENT...	1	HOTWW...		None	0.00	1000.00	\\HDTWW02WPFSG...	0:00:00.000			83.10	104.85

99.38 GPM AVG

8/13/2014 10:01:02 AM

P:\Documents\Trends\Outfall Flow.aaTrend

Arkansas Analytical # K1408002 B
Magnet Cove
Flow Composite Information

Date	Time	Sample #	Volume (mL)	Flow (GPM)
8/12/2014	1000	1	57	100
8/12/2014	1100	2	57	100
8/12/2014	1200	3	57	100
8/12/2014	1300	4	57	100
8/12/2014	1400	5	57	100
8/12/2014	1500	6	57	100
8/12/2014	1600	7	57	100
8/12/2014	1700	8	57	100
8/12/2014	1800	9	57	100
8/12/2014	1900	10	57	100
8/12/2014	2000	11	57	100
8/12/2014	2100	12	57	100
8/12/2014	2200	13	57	100
8/12/2014	2300	14	57	100
8/13/2014	2400	15	57	100
8/13/2014	0100	16	57	100
8/13/2014	0200	17	57	100
8/13/2014	0300	18	57	100
8/13/2014	0400	19	57	100
8/13/2014	0500	20	57	100
8/13/2014	0600	21	57	100
8/13/2014	0700	22	57	100
8/13/2014	0800	23	57	100
8/13/2014	0900	24	57	100
TOT VOL=			1364	

APPENDIX B

Physical, Chemical, and Raw Data for Fathead Minnow and *Daphnia pulex*

Biomonitoring Report
Acute 24/48 Hour Static Test

Lab Number: K1408002	Test Organism: <i>Pimephales promelas</i>
Client: Magnet Cove	Age of Organism: 5 days old
Date/ Time Started: 8-13-14 1545	Source of Organism: Aquatox
Date/ Time Ended: 8-15-14 1415	Dilution Water: SS

Conc.	Rep	# Live Organisms			pH/Temp.		Dissolved O ₂ mg/L		Alkalinity mg/L		Hardness mg/L		Conductivity		T Res Cl mg/L	
		#	0 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr
SS	A	10	10	10	7.7	7.8	8.7	8.8	30	+	42	+	241	+	<0.05	+
	B	↓	↓	↓	7.5	7.9	8.2	7.9								
	C	↓	↓	↓												
	D	↓	↓	↓	23	22					100% sample water					
	E	+	+	↓	25	25					All dilutions					
5	A	10	10	10	7.6	8.0	8.7	8.8	60	70	98	104	542	561	<0.05	+
	B	↓	↓	↓	7.5	8.0	8.3	8.0								
	C	↓	↓	↓												
	D	↓	↓	↓	22	22										
	E	+	+	↓	25	25										
7	A	10	10	10	7.7	8.0	8.7	8.7								
	B	↓	↓	10	7.7	8.0	8.2	8.0								
	C	↓	↓	10												
	D	↓	↓	10	22	22										
	E	+	↓	9	25	25										
10	A	10	10	10	7.8	7.9	8.7	8.7								
	B	↓	↓	↓	7.7	8.0	8.3	8.0								
	C	↓	↓	↓												
	D	↓	↓	↓	22	22										
	E	+	+	↓	25	25										
13	A	10	10	10	7.9	7.9	8.7	8.7								
	B	↓	↓	↓	7.8	8.0	7.9	7.8								
	C	↓	↓	↓												
	D	↓	↓	↓	22	22										
	E	↓	+	↓	25	25										
17	A	10	10	10	8.0	7.9	8.7	8.8								
	B	↓	10	10	7.8	8.0	8.0	8.0								
	C	↓	9	9												
	D	↓	10	10	22	22										
	E	↓	10	10	25	25										

Biomonitoring Report
Acute 24/48 Hour Static Test

Lab Number: K1408002	Test Organism: <i>Daphnia pulex</i>
Client: Magnet Cove	Age of Organism: < 24 hrs old
Date/ Time Started: 8-13-14 11:00	Source of Organism: In house culture
Date/ Time Ended: 8-15-14 14:30	Dilution Water: SS

Conc.	Rep #	# Live Organisms			pH/Temp.		Dissolved O ₂ mg/L		Alkalinity mg/L		Hardness mg/L		Conductivity		T Res Cl mg/L	
		0 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr	24 hr	48 hr
SS	A	8	8	8	7.7	7.8	8.7	8.8	30	+	42	+	241	+	<0.05	+
	B			8	7.8	7.7	8.7	8.2								
	C			8												
	D			7	23	22					Σ 100% sample water					
	E	+	+	8	25	25					Σ All dilutions					
5	A	8	8	8	7.6	8.0	8.7	8.8	60	70	98	104	542	561	<0.05	+
	B				7.4	7.9	8.7	8.1								
	C															
	D				22	22										
	E	+	+	+	25	25										
7	A	8	8	8	7.7	8.0	8.7	8.7								
	B			8	7.6	8.0	8.6	8.2								
	C			8												
	D			8	22	22										
	E	+	+	+	25	25										
10	A	8	8	8	7.8	7.9	8.7	8.7								
	B				7.7	8.0	8.6	8.2								
	C															
	D				22	22										
	E	+	+	+	25	25										
13	A	8	8	7	7.9	7.9	8.7	8.7								
	B			8	7.7	8.1	8.6	8.1								
	C			8												
	D			8	22	22										
	E	+	+	8	25	25										
17	A	8	8	8	8.0	7.9	8.7	8.8								
	B				7.8	8.2	8.6	8.1								
	C															
	D				22	22										
	E	+	+	+	25	25										

APPENDIX C

Fathead Minnow and *Daphnia pulex* Statistics

AA #K1408002, PIMEPHALES PROMELAS, 48 HR ACUTE, 8-13-14

File: C:\COPYTO~1\TOXSTAT\PP52B3~1.48H

Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.042

W = 0.547

Critical W (P = 0.05) (n = 30) = 0.927

Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

AA #K1408002, PIMEPHALES PROMELAS, 48 HR ACUTE, 8-13-14

File: C:\COPYTO~1\TOXSTAT\PP52B3~1.48H

Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's test for homogeneity of variance

Bartlett's test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.

Additional transformations are useless.

TITLE: AA #K1408002, PIMEPHALES PROMELAS, 48 HR ACUTE, 8-13-14
 FILE: C:\COPYTO~1\TOXSTAT\PP52B3~1.48H
 TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.4120
1	CONTROL	2	1.0000	1.4120
1	CONTROL	3	1.0000	1.4120
1	CONTROL	4	1.0000	1.4120
1	CONTROL	5	1.0000	1.4120
2	5 %	1	1.0000	1.4120
2	5 %	2	1.0000	1.4120
2	5 %	3	1.0000	1.4120
2	5 %	4	1.0000	1.4120
2	5 %	5	1.0000	1.4120
3	7 %	1	1.0000	1.4120
3	7 %	2	1.0000	1.4120
3	7 %	3	1.0000	1.4120
3	7 %	4	1.0000	1.4120
3	7 %	5	0.9000	1.2490
4	10 %	1	1.0000	1.4120
4	10 %	2	1.0000	1.4120
4	10 %	3	1.0000	1.4120
4	10 %	4	1.0000	1.4120
4	10 %	5	1.0000	1.4120
5	13 %	1	1.0000	1.4120
5	13 %	2	1.0000	1.4120
5	13 %	3	1.0000	1.4120
5	13 %	4	1.0000	1.4120
5	13 %	5	1.0000	1.4120
6	17 %	1	1.0000	1.4120
6	17 %	2	1.0000	1.4120
6	17 %	3	0.9000	1.2490
6	17 %	4	1.0000	1.4120
6	17 %	5	1.0000	1.4120

AA #K1408002, PIMEPHALES PROMELAS, 48 HR ACUTE, 8-13-14
 File: C:\COPYTO~1\TOXSTAT\PP52B3~1.48H Transform: ARC SINE(SQUARE ROOT(Y))

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.412				
2	5 %	1.412	27.50	16.00	5.00	
3	7 %	1.379	25.00	16.00	5.00	
4	10 %	1.412	27.50	16.00	5.00	
5	13 %	1.412	27.50	16.00	5.00	
6	17 %	1.379	25.00	16.00	5.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

AA # K1408002, DAPHNIA PULEX, 48 HR ACUTE, 8-13-14

File: C:\COPYTO~1\TOXSTAT\DPULEX5.

Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.081

W = 0.597

Critical W (P = 0.05) (n = 30) = 0.927

Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

AA # K1408002, DAPHNIA PULEX, 48 HR ACUTE, 8-13-14

File: C:\COPYTO~1\TOXSTAT\DPULEX5.

Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's test for homogeneity of variance

Bartlett's test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.

Additional transformations are useless.

TITLE: AA # K1408002, DAPHNIA PULEX, 48 HR ACUTE, 8-13-14
 FILE: C:\COPYTO~1\TOXSTAT\DPULEX5.
 TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.3931
1	CONTROL	2	1.0000	1.3931
1	CONTROL	3	1.0000	1.3931
1	CONTROL	4	0.8750	1.2094
1	CONTROL	5	1.0000	1.3931
2	5 %	1	1.0000	1.3931
2	5 %	2	1.0000	1.3931
2	5 %	3	1.0000	1.3931
2	5 %	4	1.0000	1.3931
2	5 %	5	1.0000	1.3931
3	7 %	1	1.0000	1.3931
3	7 %	2	1.0000	1.3931
3	7 %	3	1.0000	1.3931
3	7 %	4	1.0000	1.3931
3	7 %	5	0.8750	1.2094
4	10 %	1	1.0000	1.3931
4	10 %	2	1.0000	1.3931
4	10 %	3	1.0000	1.3931
4	10 %	4	1.0000	1.3931
4	10 %	5	1.0000	1.3931
5	13 %	1	0.8750	1.2094
5	13 %	2	1.0000	1.3931
5	13 %	3	1.0000	1.3931
5	13 %	4	1.0000	1.3931
5	13 %	5	1.0000	1.3931
6	17 %	1	1.0000	1.3931
6	17 %	2	1.0000	1.3931
6	17 %	3	1.0000	1.3931
6	17 %	4	1.0000	1.3931
6	17 %	5	1.0000	1.3931

AA # K1408002, DAPHNIA PULEX, 48 HR ACUTE, 8-13-14
 File: C:\COPYTO~1\TOXSTAT\DPULEX5. Transform: ARC SINE(SQUARE ROOT(Y))

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.356				
2	5 %	1.393	30.00	16.00	5.00	
3	7 %	1.356	27.50	16.00	5.00	
4	10 %	1.393	30.00	16.00	5.00	
5	13 %	1.356	27.50	16.00	5.00	
6	17 %	1.393	30.00	16.00	5.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

APPENDIX D

Organism History

AQUATOX, INC.
416 TWIN POINTS ROAD
HOT SPRINGS, ARKANSAS 71913
501-520-0560

TEST ORGANISM HISTORY

DATE SHIPPED 8-13-14 CLIENT Ar Analytical
Dugan

Purchase Order #: _____

SPECIES: Pimephales promelas

Quantity Shipped: 500

Age: 5 days on 8/13/14

Brood Stock Source: Anderson Farms, AR

Culture Water: Groundwater

Hardness (Mg/l CaCO₃): 160

Dissolved Oxygen (Mg/l): 8.2

Temperature (°C): 25.1°C

Feeding: Artu

Comments: _____

Shipped Via: Federal Express UPS Overnight Shuttle

Packaged By: _____



Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: Daphnia pulex

Source: Lab reared Hatchery reared _____ Field collected _____

Hatch date 1/06 Receipt date _____

Lot number 01 0006DP Strain AKO

Brood Origination EPH 04

II. Water Quality

Temperature 23 °C Salinity — ppt DO SAT

pH 7.2 Hardness 275 ppm

III. Culture Conditions

System: Fw static renewal

Diet: Flake Food _____ Phytoplankton Trout Chow _____

Brine Shrimp _____ Rotifers _____ Other YCT

Prophylactic Treatments: _____

Comments: All gravid as of 1:45 pm EST

IV. Shipping Information

Client: ARK ANAK # of Organisms: 1 culture

Carrier: FedEx Date Shipped: 1/27/06

Biologist: [Signature]

1 - 800 - 927 - 1650

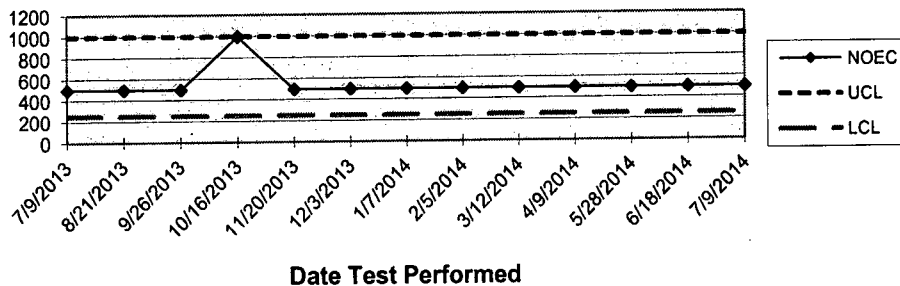
PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

APPENDIX E

Quality Assurance Charts

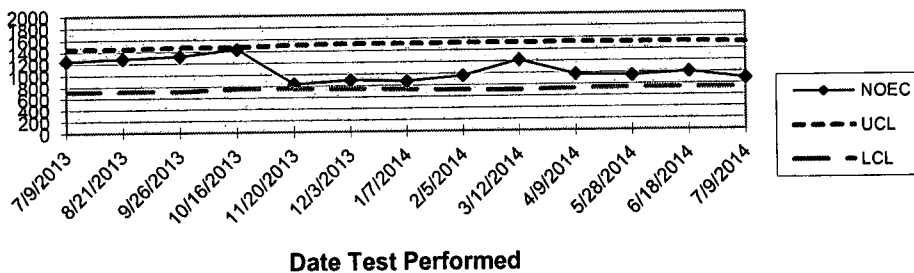
ARKANSAS ANALYTICAL, INC.
FATHEAD MINNOW NOEC
QUALITY ASSURANCE
48 HOUR ACUTE

Reference Toxicant, KCl, ppm



ARKANSAS ANALYTICAL, INC.
FATHEAD MINNOW LC50
QUALITY ASSURANCE
48 HOUR ACUTE

Reference Toxicant, KCl, ppm



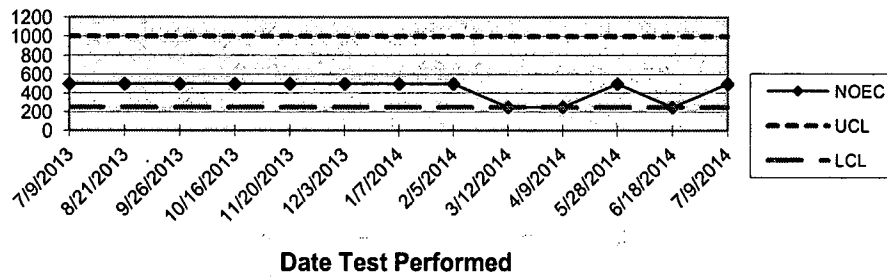
ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX NOEC

QUALITY ASSURANCE

48 HOUR ACUTE

Reference Toxicant, KCl, ppm



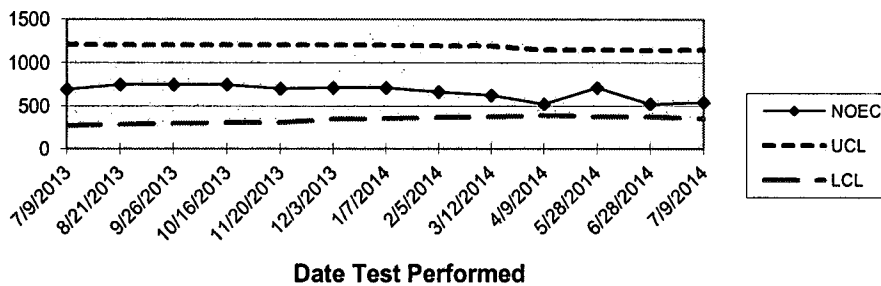
ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX LC50

QUALITY ASSURANCE

48 HOUR ACUTE

Reference Toxicant, KCl, ppm

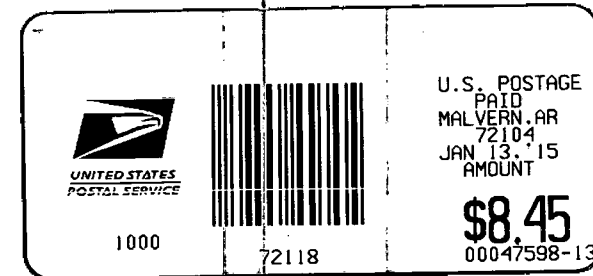


Magnet Cove Generating Station
410 Henderson Road
Malvern, AR 72104

CERTIFIED MAIL™



7011 3500 0001 6675 7894



Arkansas Department of Environmental Quality

NPDES Enforcement Section

5301 Northshore Drive

North Little Rock, AR 72118-5317

