



Certified Mail N° 7011 3500 0001 6675 8075
RETURN RECEIPT REQUESTED

January 14, 2016

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	2015 / 12 / 01 – 2015 / 12 / 31
AR0049611 – 001 A	2015 / 12 / 01 – 2015 / 12 / 31
AR0049611 – 01B A	2015 / 12 / 01 – 2015 / 12 / 31

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

Discharge Number	Quarterly Period (year, month, day)
TX1 Q	2015 / 07 / 01 – 2015 / 12 / 31

If you have any questions, please feel free to contact me at 501-618-4374, or Rob Smith at 501-618-4373.

Sincerely,

John M Morgan
Assistant Plant Manager

JM: jmm

Cc: File 8.5.13 – 2015

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
October 2015
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 K1510003

Thursday, October 22, 2015

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 2015.

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:	10-12-15, 1458	10-13-15, 1358	10-14-15, 0837	1
SAMPLE B:	10-13-15, 1707	10-14-15, 1607	10-15-15, 0830	2

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	10-14-15, 1515	10-14-15, 1540
Date, Time Ended	10-16-15, 1600	10-16-15, 1630
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

	<i>Daphnia pulex</i>	<i>Pimephales promelas</i>
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	97.5%	X	

TEST ACCEPTANCE CRITERIA for *Pimephales promelas*

Control Criteria	Results	Pass	Fail
Greater than or equal to 90% survival	98%	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> 9/9/15 – 9/11/15		<i>Pimephales promelas</i> 9/9/15 – 9/11/15	
NOEC Survival:	500 ppm KCl	NOEC Survival:	500ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000 ppm KCl
LC50:	780 ppm KCl	LC50:	763 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 Bounds, 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:	10-12-15, 1458	10-13-15, 1358
SAMPLE B:	10-13-15, 1707	10-14-15, 1607

Test initiated (date, time): 10-14-15, 1540 Test terminated (date, time): 10-16-15, 1630

Dilution water used: Soft Synthetic

DATA TABLE FOR FATHEAD MINNOW SURVIVAL

Effluent Conc %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E		24 hours	48 hours	
Control	100	100	100	100	90		98	98	4.56
5%	100	80	100	100	100		96	96	
7%	100	100	100	90	100		98	98	
10%	100	100	100	90	100		98	98	
13%	100	100	100	100	100		100	100	0.00
17%	100	100	100	100	100		100	100	

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): 4.56 %.

ACUTE FORMS
***Daphnia pulex* SURVIVAL RESULTS**

Permittee: AECC – Magnet Cove

NPDES #: AR0049611

Sample Collection:	Date, Time Started	Date, Time Ended
SAMPLE A:	10-12-15, 1458	10-13-15, 1358
SAMPLE B:	10-13-15, 1707	10-14-15, 1607

Test initiated (date, time): 10-14-15, 1515 Test terminated (date, time): 10-16-15, 1600

Dilution water used: Soft Synthetic

DATA TABLE FOR *Daphnia pulex* SURVIVAL

Effluent Conc %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%
	A	B	C	D	E	24 hours	48 hours		
Control	100	100	87.5	100	100		97.5	97.5	5.73
5%	87.5	100	100	100	100		100	97.5	
7%	100	100	100	100	100		100	100	
10%	100	100	100	100	100		100	100	
13%	100	100	100	100	100		100	100	0.00
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.

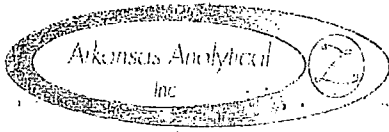
4. Enter percentage corresponding to the parameters below:

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

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

APPENDIX A

Chain of Custody Forms

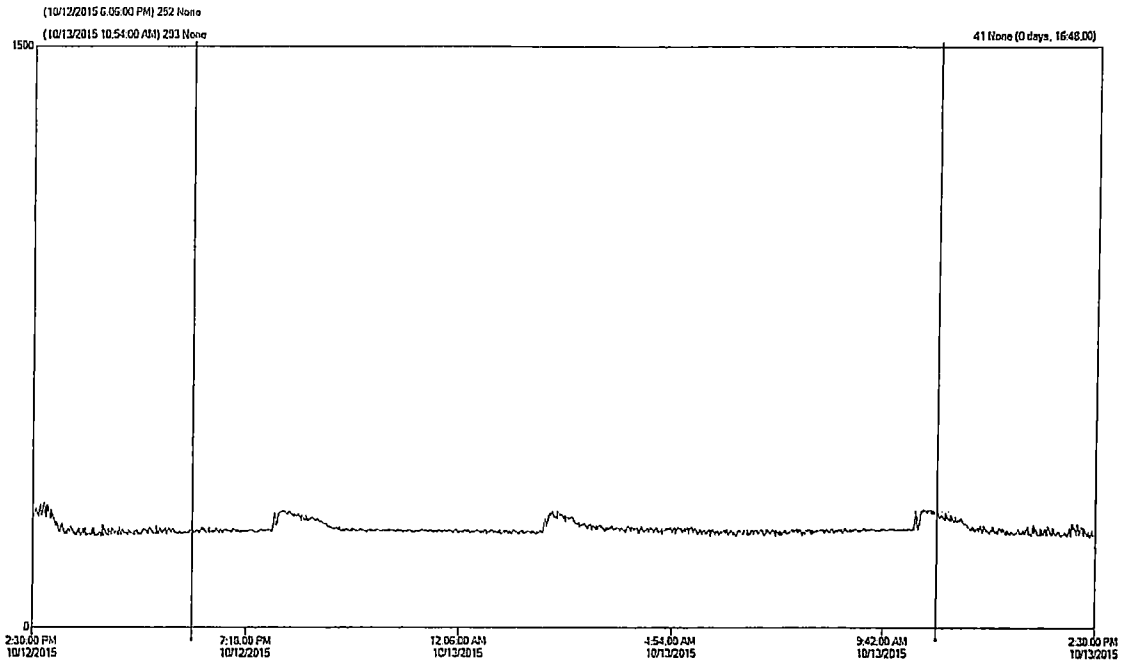


11701 Interstate 30, Bldg. 1, Ste. 115
 Little Rock, AR 72209
 PHONE: 501-455-3233
 FAX: 501-455-6118

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				Preservative Code:		TEST PARAMETERS										Bottle Type Code	
			Fax: 501-467-3233				Bottle Type:												G = Glass; P = Plastic	
			Email: john.morgan@aecc.com; john.mehlin@aecc.com																V = Septum; A = Amber	
 Sampler(s) Signature			 Sampler(s) Printed														Arkansas Analytical Work Order Number:			
Field Number	SAMPLE COLLECTION		Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION				Acute Biomonitoring									
	Date/s	Time/s					Outfall 001				X							K1510003 A		
	10/12-13/15	1458-1358		X	24	Water														
1. Relinquished by: (Signature)			Date/Time		2. Received by: (Signature)				SAMPLE CONDITION UPON RECEIPT BY LAB				REMARKS / SAMPLE COMMENTS							
			0837 10-14-15						1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No											
3. Relinquished by: (Signature)			Date/Time		4. Received by lab: (Signature)				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: 1°C											
									6. TEMPERATURE GUN ID: HHT #2											
FORM COMPLETED BY LAB ONLY																				

Outfall Flow



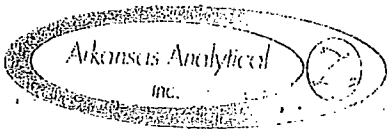
HOTWY-01W-19GMASCF101.XQ01 [BestFit - 00 00:06:14.655]

Tag Name	Description	Number	Server	Color	Units	Minimum	Maximum	ID Address	Time Offset	Source Tag	Source Server	Value at X1	Value at X2
<input checked="" type="checkbox"/> 19GMASCF101.XQ01	COMBINED EFFLUENT BLOWDOWN	1	HOTWY.	2	None	0	1500	\\utvm02ep\FPSGate	0 00:00:000			252	253

10-12-15 to 10-13-15
 14:30 14:30
 255 GPM

Arkansas Analytical # K1510003 A
Magnet Cove
Flow Composite Information

Date	Time	Sample #	Volume (mL)	Flow (GPM)
10/12/2015	1500	1	50	255
10/12/2015	1600	2	50	255
10/12/2015	1700	3	50	255
10/12/2015	1800	4	50	255
10/12/2015	1900	5	50	255
10/12/2015	2000	6	50	255
10/12/2015	2100	7	50	255
10/12/2015	2200	8	50	255
10/12/2015	2300	9	50	255
10/13/2015	2400	10	50	255
10/13/2015	0100	11	50	255
10/13/2015	0200	12	50	255
10/13/2015	0300	13	50	255
10/13/2015	0400	14	50	255
10/13/2015	0500	15	50	255
10/13/2015	0600	16	50	255
10/13/2015	0700	17	50	255
10/13/2015	0800	18	50	255
10/13/2015	0900	19	50	255
10/13/2015	1000	20	50	255
10/13/2015	1100	21	50	255
10/13/2015	1200	22	50	255
10/13/2015	1300	23	50	255
10/13/2015	1400	24	50	255
TOT VOL=			1200	

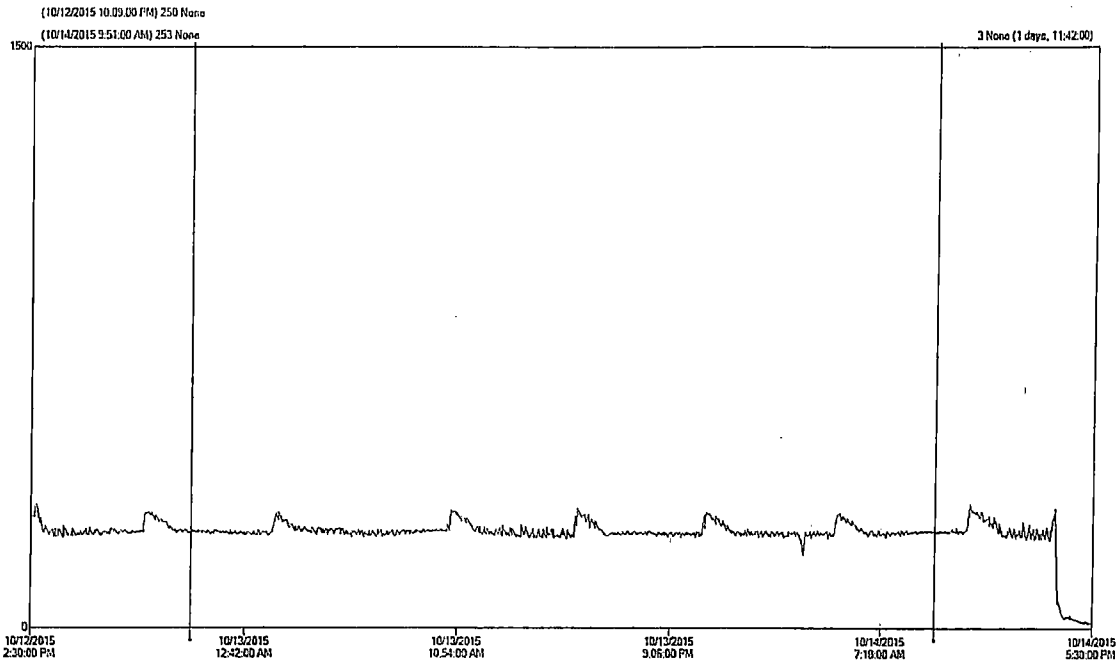


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CHAIN OF CUSTODY RECORD

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: 501-487-3232			Preservative Code: 1		TEST PARAMETERS								Bottle Type Code	
				Fax: 501-467-3233			Bottle Type: P										G = Glass; P = Plastic V = Septum; A = Amber	
				Email: john.morgan@aecc.com; john.mehlin@aecc.com														
Allen Parker				Allen Parker			Acute Biomonitoring										Arkansas Analytical Work Order Number:	
Sampler(s) Signature				Sampler(s) Printed														
Field Number	SAMPLE COLLECTION		Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION											
	Date/s	Time/s																
	10/13-14/15	1707-1607		X	24	Water	Outfall 001										K/S100038	
1. Relinquished by: (Signature)			Date/Time		2. Received by: (Signature)			SAMPLE CONDITION UPON RECEIPT BY LAB				REMARKS / SAMPLE COMMENTS						
Allen Parker			0830 10-15-15		/			1. CUSTODY SEALS: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										
3. Relinquished by: (Signature)			Date/Time		4. Received by lab: (Signature)			2. CONTAINERS CORRECT: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										
/			/		Z.P.S.			3. COC/LABELS AGREE: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										
								4. RECEIVED ON ICE: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										
								5. TEMPERATURE ON RECEIPT: 20°C										
								6. TEMPERATURE GUN ID: HHT#2										
FOR COMPLETION BY LAB ONLY																		

Outfall Flow



HOTW-WQW-19GNA9BCF101XQ01 (BestFit - 00 00:13:16.150)

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"/> 19GNA9BCF101XQ01	COMBINED EFFLUENT BLOWDOWN	1	HOTW...		None	0	1500	Wstwr02mpVFSGate...	0 00:00:000			250	253

10-12-15 TO 10-14-15
 14:30 17:30
 255 GPM AVG.

Arkansas Analytical # K1510003 B
Magnet Cove
Flow Composite Information

Date	Time	Sample #	Volume (mL)	Flow (GPM)
10/13/2015	1700	1	50	255
10/13/2015	1800	2	50	255
10/13/2015	1900	3	50	255
10/13/2015	2000	4	50	255
10/13/2015	2100	5	50	255
10/13/2015	2200	6	50	255
10/13/2015	2300	7	50	255
10/14/2015	2400	8	50	255
10/14/2015	0100	9	50	255
10/14/2015	0200	10	50	255
10/14/2015	0300	11	50	255
10/14/2015	0400	12	50	255
10/14/2015	0500	13	50	255
10/14/2015	0600	14	50	255
10/14/2015	0700	15	50	255
10/14/2015	0800	16	50	255
10/14/2015	0900	17	50	255
10/14/2015	1000	18	50	255
10/14/2015	1100	19	50	255
10/14/2015	1200	20	50	255
10/14/2015	1300	21	50	255
10/14/2015	1400	22	50	255
10/14/2015	1500	23	50	255
10/14/2015	1600	24	50	255
		TOT VOL=	1200	

APPENDIX B

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

Biomonitoring Report
Acute 24/48 Hour Static Test

Lab Number: K1519003	Test Organism: <i>Pimephales promelas</i>
Client: Manna Cove	Age of Organism: 5 days old
Date/ Time Started: 10-14-15 1540	Source of Organism: Aquatex
Date/ Time Ended: 10-16-15 1630	Dilution Water: 55

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
55	A	10	10	10	7.6	7.2	8.5	2.4	34	+	40	+	299	+	60.05	+
	B		10		7.5	6.8	7.1	7.7								
	C		10													
	D		10	+	22	23										
	E	+	10	9	25	25					≤ All dilutions	3				
5	A	10	10	10	7.5	7.2	8.2	2.4	46	152	124	142	676	641	60.05	+
	B		10	8	7.6	6.8	7.3	3.0								
	C		10	10												
	D		10	10	22.2	22.6										
	E	+	10	10	25	25										
7	A	10	10	10	7.6	7.3	8.5	1.5								
	B		10	10	7.5	6.9	7.4	7.6								
	C		10	10												
	D		9	9	22.2	22.6										
	E	+	10	10	25	25										
10	A	10	10	10	7.7	7.4	8.5	2.6								
	B		10	0	7.6	7.0	7.5	7.6								
	C		10	0												
	D		9	9	22.4	22.6										
	E	+	10	10	25	25										
13	A	10	10	10	7.8	7.4	8.5	2.0								
	B		10	10	7.6	7.6	7.4	7.4								
	C		10	10		7.0										
	D		10	10	22.5	22.4										
	E	+	10	10	25	25										
17	A	10	10	10	7.8	7.5	8.5	1.7								
	B		10	10	7.5	7.0	7.5	7.6								
	C		10	10												
	D		10	10	22.6	22.7										
	E	+	10	10	25	25										

Biomonitoring Report
Acute 24/48 Hour Static Test

Lab Number: K1510003	Test Organism: <i>Daphnia pulex</i>
Client: Mosaic Corp.	Age of Organism: <24 hrs old.
Date/ Time Started: 10-14-15 1515	Source of Organism: In house culture
Date/ Time Ended: 10-16-15 1600	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
55	A	8	8	8	7.5	7.2	8.2	8.4	37	4	40	4	299	4	10.05	4
	B	8	8	8	7.7	7.2	8.2	8.0								
	C	7	7													
	D	8	8		22.2	23										
	E	8	8	8	25	25										
5	A	8	8	7	7.5	7.2	8.2	8.4	146	152	124	142	676	641	10.05	4
	B	8	8	8	7.7	7.2	8.3	7.9								
	C	8														
	D	8	8	8	22.2	22.6										
	E	8	8	8	25	25										
7	A	8	8	8	7.6	7.3	8.5	8.5								
	B	8	8	8	7.7	7.3	8.3	8.2								
	C	8														
	D	8	8	8	22.2	22.6										
	E	8	8	8	25	25										
10	A	8	8	8	7.7	7.4	8.5	8.6								
	B	8	8	8	7.7	7.3	8.3	8.2								
	C	8														
	D	8	8	8	22.4	22.0										
	E	8	8	8	25	25										
13	A	8	8	8	7.8	7.4	8.5	8.6								
	B	8	8	8	7.8	7.4	8.3	8.2								
	C	8														
	D	8	8	8	22.5	22.4										
	E	8	8	8	25	25										
17	A	8	8	8	7.8	7.5	8.5	8.7								
	B	8	8	8	7.8	7.4	8.3	8.2								
	C	8														
	D	8	8	8	22.6	22.2										
	E	8	8	8	25	25										

APPENDIX C

Fathead Minnow and *Daphnia pulex* Statistics

AA #K1510003,PIMEPHALES PROMELAS, 48 HR ACUTE,10-14-15

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

Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.138

W = 0.682

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.

TITLE: AA #K1510003,PIMEPHALES PROMELAS, 48 HR ACUTE,10-14-15

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	0.9000	1.2490
2	5 % EFFLUENT	1	1.0000	1.4120
2	5 % EFFLUENT	2	0.8000	1.1071
2	5 % EFFLUENT	3	1.0000	1.4120
2	5 % EFFLUENT	4	1.0000	1.4120
2	5 % EFFLUENT	5	1.0000	1.4120
3	7 % EFFLUENT	1	1.0000	1.4120
3	7 % EFFLUENT	2	1.0000	1.4120
3	7 % EFFLUENT	3	1.0000	1.4120
3	7 % EFFLUENT	4	0.9000	1.2490
3	7 % EFFLUENT	5	1.0000	1.4120
4	10 % EFFLUENT	1	1.0000	1.4120
4	10 % EFFLUENT	2	1.0000	1.4120
4	10 % EFFLUENT	3	1.0000	1.4120
4	10 % EFFLUENT	4	0.9000	1.2490
4	10 % EFFLUENT	5	1.0000	1.4120
5	13 % EFFLUENT	1	1.0000	1.4120
5	13 % EFFLUENT	2	1.0000	1.4120
5	13 % EFFLUENT	3	1.0000	1.4120
5	13 % EFFLUENT	4	1.0000	1.4120
5	13 % EFFLUENT	5	1.0000	1.4120
6	17 % EFFLUENT	1	1.0000	1.4120

6	17 %	EFFLUENT	2	1.0000	1.4120
6	17 %	EFFLUENT	3	1.0000	1.4120
6	17 %	EFFLUENT	4	1.0000	1.4120
6	17 %	EFFLUENT	5	1.0000	1.4120

AA #K1510003, PIMEPHALES PROMELAS, 48 HR ACUTE, 10-14-15

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	1.379				
2	5 % EFFLUENT	1.351	27.00	16.00	5.00	
3	7 % EFFLUENT	1.379	27.50	16.00	5.00	
4	10 % EFFLUENT	1.379	27.50	16.00	5.00	
5	13 % EFFLUENT	1.412	30.00	16.00	5.00	
6	17 % EFFLUENT	1.412	30.00	16.00	5.00	

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

AA # K1510003, Daphnia pulex, 48 HR ACUTE, 10-14-15
File: C:\COPYTO~1\TOXSTAT\DPULEX5. Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.054

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 # K1510003, Daphnia pulex, 48 HR ACUTE, 10-14-15
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 # K1510003, Daphnia pulex, 48 HR ACUTE, 10-14-15
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	0.8750	1.2094
1	CONTROL	4	1.0000	1.3931
1	CONTROL	5	1.0000	1.3931
2	5 % EFFLUENT	1	0.8750	1.2094
2	5 % EFFLUENT	2	1.0000	1.3931
2	5 % EFFLUENT	3	1.0000	1.3931
2	5 % EFFLUENT	4	1.0000	1.3931
2	5 % EFFLUENT	5	1.0000	1.3931

3	7 %	EFFLUENT	1	1.0000	1.3931
3	7 %	EFFLUENT	2	1.0000	1.3931
3	7 %	EFFLUENT	3	1.0000	1.3931
3	7 %	EFFLUENT	4	1.0000	1.3931
3	7 %	EFFLUENT	5	1.0000	1.3931
4	10 %	EFFLUENT	1	1.0000	1.3931
4	10 %	EFFLUENT	2	1.0000	1.3931
4	10 %	EFFLUENT	3	1.0000	1.3931
4	10 %	EFFLUENT	4	1.0000	1.3931
4	10 %	EFFLUENT	5	1.0000	1.3931
5	13 %	EFFLUENT	1	1.0000	1.3931
5	13 %	EFFLUENT	2	1.0000	1.3931
5	13 %	EFFLUENT	3	1.0000	1.3931
5	13 %	EFFLUENT	4	1.0000	1.3931
5	13 %	EFFLUENT	5	1.0000	1.3931
6	17 %	EFFLUENT	1	1.0000	1.3931
6	17 %	EFFLUENT	2	1.0000	1.3931
6	17 %	EFFLUENT	3	1.0000	1.3931
6	17 %	EFFLUENT	4	1.0000	1.3931
6	17 %	EFFLUENT	5	1.0000	1.3931

AA # K1510003, Daphnia pulex, 48 HR ACUTE, 10-14-15

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 % EFFLUENT	1.356	27.50	16.00	5.00	
3	7 % EFFLUENT	1.393	30.00	16.00	5.00	
4	10 % EFFLUENT	1.393	30.00	16.00	5.00	
5	13 % EFFLUENT	1.393	30.00	16.00	5.00	
6	17 % EFFLUENT	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 10/14/15 CLIENT ARK ANALYTICAL

Purchase Order #: _____

SPECIES: Pimephales promelas

Quantity Shipped: 900+ 300+

Age: HATCHED 10/13/15 5 DAY OLD TODAY

Brood Stock Source: Anderson Farms, AR

Culture Water: Groundwater

Hardness (Mg/l CaCO₃): 160

Dissolved Oxygen (Mg/l): 8.5

Temperature (°C): 25.1

Feeding: ARTEMIA

Comments: _____

Shipped Via: Federal Express UPS Overnight Shuttle

Packaged By: _____



Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: Daphnia pulex
Source: Lab reared Hachery reared _____ Field collected _____
Hatch date 1/06 Receipt date _____
Lot number 01 00 06 DP Strain ARCO
Brood Origination EPA 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: 

1 - 800 - 927 - 1650

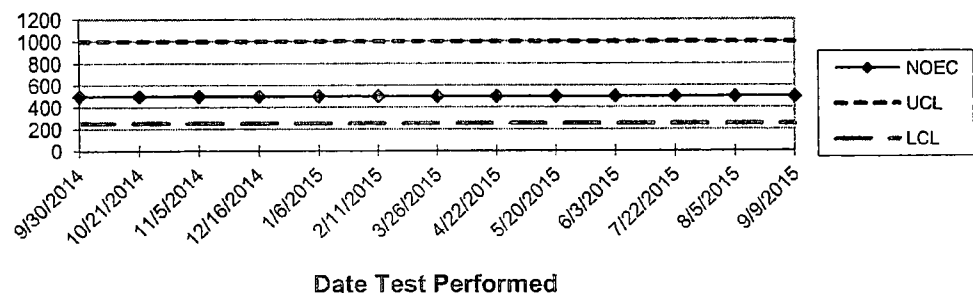
PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

APPENDIX E

Quality Assurance Charts

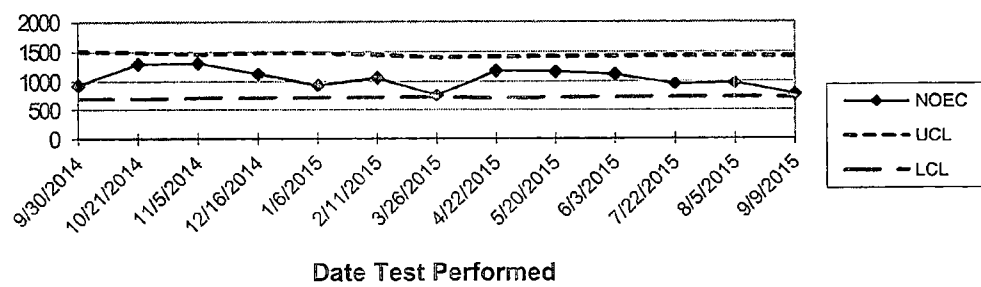
ARKANSAS ANALYTICAL, INC.
FATHEAD MINNOW NOEC
QUALITY ASSURANCE
48 HOUR ACUTE

Reference Toxicant, KCl, ppm



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

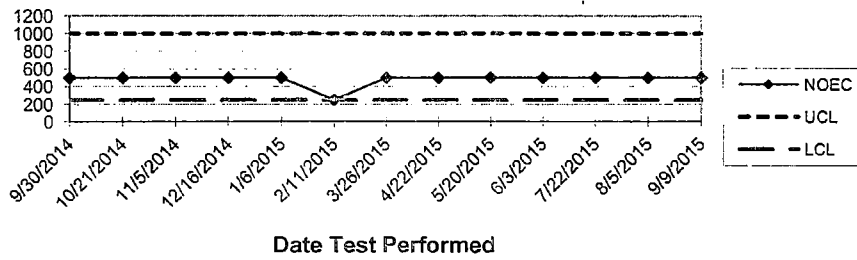
Reference Toxicant, KCl, ppm



ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX NOEC
QUALITY ASSURANCE
48 HOUR ACUTE

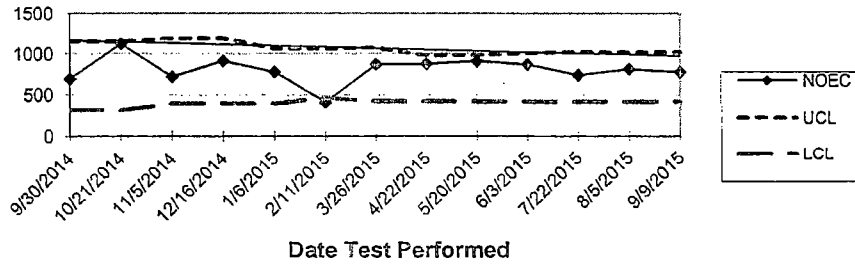
Reference Toxicant, KCl, ppm



ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX LC50
QUALITY ASSURANCE
48 HOUR ACUTE

Reference Toxicant, KCl, ppm



CERTIFIED MAIL™

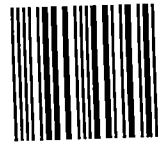
Magnet Cove Generating Station
410 Henderson Road
Malvern, AR 72104



7011 3500 0001 6675 8075



1000



72118

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72104
JAN 14, 16
AMOUNT

\$8.77
R2305E1 24870-04

Arkansas Department of Environmental Quality

NPDES Enforcement Section

5301 Northshore Drive

North Little Rock, AR 72118-5317

