

Arkansas Analytical, Inc.

Toxicity Test Results

ENTERGY ARKANSAS, INC.

WHITE BLUFF

Outfall 001

October, 2010

AFIN # 35-00110

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. Barry Snow**
Entergy Arkansas, Inc.
1100 White Bluff Road
Redfield, AR 72132

Prepared by: Arkansas Analytical, Inc.
11701 I-30, Bldg 1, Suite 115
Little Rock, Arkansas 72209
Lab Number K1010008

Monday, November 08, 2010

Introduction

This report contains test results for the toxicity testing of Entergy Arkansas, Inc.- White Bluff Plant. The NPDES permit number is AR0036331. The permit requires acute biomonitoring testing bi-annually for *Daphnia pulex* and *Pimephales promelas*. The test results in this report represent the testing for the fourth quarter of 2010.

The plant is located in Section 30, Township 3 South, Range 10 West in Jefferson County, Arkansas. The discharge is to receiving waters named the Arkansas River in Segment 3C of the Arkansas River Basin.

Plant Operations

To be provided by permittee.

Source of Effluent and Dilution Water

Samples were collected at the final discharge of Outfall 001, which is located at the cooling tower blowdown pipeline (down line of cooling tower sump). The samples were 24-hour flow-weighted composites. 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:	10-25-10, 1130	10-26-10, 1030	10-26-10, 1603	4
Sample B:	10-26-10, 1430	10-27-10, 1330	10-27-10, 1535	4

The receiving water samples were grab samples collected approximately 200 yards upstream from the final discharge of Outfall 001. Stream flow at the time of sampling and 7Q10 information is to be provided by the permittee.

Receiving water samples were collected as follows:

Sample Collection:	Date, Time Collected	Date, Time Received	Storage Temperature (°C)
Receiving Water:	10-26-10, 1445	10-26-10, 1603	4

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

Both effluent samples and receiving 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 receiving water, were 19%, 25%, 33%, 44%, and 59%. The low-flow effluent concentration (**critical dilution**) was defined as **44% 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	10-27-10, 1530	10-27-10, 1540
Date, Time Ended	10-29-10, 1405	10-29-10, 1400
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	6 days old
Source:	In house culture	Aquatox, Inc.
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	100%	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>		<i>Pimephales promelas</i>	
Date performed:	9/15-17/10	Date performed:	9/15-17/10
NOEC Survival:	500 ppm KCl	NOEC Survival:	500 ppm KCl
LOEC Survival:	1000 ppm KCl	LOEC Survival:	1000 ppm KCl
LC50:	731 ppm KCl	LC50:	1037 ppm KCl

Quality Assurance charts are provided in Appendix E.

SUMMARY FORMS FOR ACUTE BIOMONITORING
 FATHEAD MINNOW LARVAE SURVIVAL
Pimephales promelas

PERMITTEE: Entergy Arkansas, Inc. --White Bluff Plant

NPDES #: AR0036331

Sample Collection:	Date, Time Started	Date, Time Ended
Sample A:	10-25-10, 1130	10-26-10, 1030
Sample B:	10-26-10, 1430	10-27-10, 1330

Test initiated (date, time): 10-27-10, 1540 Test terminated (date, time): 10-29-10, 1400

Dilution water used: Receiving Water

DATA TABLE FOR FATHEAD MINNOW SURVIVAL

Percent Survival in Replicate Chambers

Mean Percent Survival

Effluent Conc %	A	B	C	D	E		24 hours	48 hours	CV %
0%	100	100	100	100	90		98	98	4.56
19%	100	100	100	90	100		100	98	
25%	100	100	100	100	90		100	98	
33%	100	100	90	90	100		100	96	
44%	100	100	100	100	100		100	100	0.00
59%	100	100	100	100	100		100	100	

Coefficient of Variation = standard deviation / mean * 100

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

Permittee: Entergy Arkansas, Inc. --White Bluff Plant

NPDES #: AR0036331

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, (44%) YES _____ NO X_____

2. If you answered NO to 1a. enter [0] otherwise enter [1] parameter #TEM6C: _____ 0 _____

3. Enter percent effluent corresponding to the parameter below:

NOEC for *Pimephales promelas* (parameter #TOM6C) = _____ 59 _____ % effluent

Coefficient of variation (parameter #TQM6C) = _____ 4.56 _____ %

SUMMARY FORMS FOR ACUTE BIOMONITORING
Daphnia pulex SURVIVAL RESULTS

Permittee: Entergy Arkansas, Inc. --White Bluff Plant

NPDES #: AR0036331

Sample Collection:	Date, Time Started	Date, Time Ended
Sample A:	10-25-10, 1130	10-26-10, 1030
Sample B:	10-26-10, 1430	10-27-10, 1330

Test initiated (date, time): 10-27-10, 1530 Test terminated (date, time): 10-29-10, 1405

Dilution water used: Receiving Water

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 %
0%	100	100	100	100	100		100	100	0.00
19%	100	100	100	87.5	100		100	98	
25%	100	100	87.5	100	100		100	98	
33%	100	100	100	100	100		100	100	
44%	100	87.5	100	100	100		100	98	5.73
59%	100	100	100	100	100		100	100	

Coefficient of Variation = standard deviation/ mean * 100

SUMMARY REPORTING FORMS FOR ACUTE BIOMONITORING
Daphnia pulex SURVIVAL

Permittee: Entergy Arkansas, Inc. --White Bluff Plant

NPDES #: AR0036331

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, (44%) YES _____ NO X _____

2. If you answered NO to 1a. enter [0] otherwise enter [1], parameter #TEM3D: _____ 0 _____

3. Enter percent effluent corresponding to the parameter below:

NOEC for *Daphnia pulex* (parameter #TOM3D) = _____ 59 _____ % effluent

Coefficient of variation (parameter #TQM3D) = _____ 5.73 _____ %

Summary of Results
Entergy Arkansas, Inc. -- White Bluff Plant

<i>Daphnia pulex</i>			<i>Pimephales promelas</i>		
NOEC / LOEC Survival	59% / NA	PASS	NOEC / LOEC survival	59% / NA	PASS
LC50	NA	NA	LC50	NA	NA

Conclusion

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

The permit issued to the Entergy Arkansas, Inc.- White Bluff Plant, AR0036331, specifies that the **critical dilution is 44% 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 the Entergy Arkansas, Inc.- White Bluff Plant, AR0036331, specifies that the **critical dilution is 44% 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 Analysts:



 Kenneth Pigue

APPENDIX A

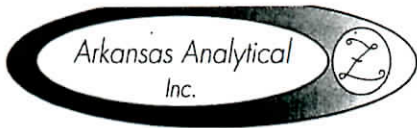
Chain of Custody Forms



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:														
Entergy Arkansas, White Bluff Plant			White Bluff Biomonitoring			24 Hour	1. Cool, 4 Degrees Centigrade					4. Thiosulfate for Dechlorination									
1100 White Bluff Rd.						48 Hour	2. Sulfuric Acid (H ₂ SO ₄), pH < 2					5. Hydrochloric Acid(HCl)									
Redfield, AR 72132			Reporting Information			72 Hour	3. Nitric Acid (HNO ₃), pH < 2					6. Sodium Hydroxide (NaOH), pH > 12									
Attn: Barry Snow			Telephone: 501-688-7220			Routine	TEST PARAMETERS										Bottle Type Code				
			Fax: 501-688-7271			Preservative Code: 1	1														
			Email: BSNOW@entergy.com			Bottle Type: P	P														
Allen Parker <i>[Signature]</i>			Allen Parker <i>[Signature]</i>																		
Sampler(s) Signature			Sampler(s) Printed			Arkansas Analytical Work Order Number: K101008															
Field Number	SAMPLE COLLECTION		Grab	Comp	Number of Bottles	Sample Matrix	SAMPLE IDENTIFICATION/ DESCRIPTION	Acute Biomonitoring													
	10/25-26/10	1530-1030		X	24	Water	Outfall	X													
1. Relinquished by: (Signature)			Date/Time		2. Received by: (Signature)			SAMPLE CONDITION UPON RECEIPT IN LAB				REMARKS / SAMPLE COMMENTS									
<i>[Signature]</i>			10/26/10 1603		<i>[Signature]</i>			1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes ___ No				RIVER W/O ALSO COLLECTED ON 10/26/10. Temp = 11°C e 1445.									
3. Relinquished by: (Signature)			Date/Time		4. Received by lab: (Signature)			2. CONTAINERS CORRECT: <input checked="" type="checkbox"/> Yes ___ No													
<i>[Signature]</i>			10/26/10 1603		<i>[Signature]</i>			3. COC/LABELS AGREE: <input checked="" type="checkbox"/> Yes ___ No													
								4. PRESERVATION CONFIRMED: <input checked="" type="checkbox"/> Yes ___ No													
								5. RECEIVED ON ICE: <input checked="" type="checkbox"/> Yes ___ No													
								6. TEMPERATURE ON RECEIPT: 17°C													
FOR COMPLETION BY LAB ONLY																					



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:											
Entergy Arkansas, White Bluff Plant 1100 White Bluff Rd. Redfield, AR 72132 Attn: Barry Snow			White Bluff Biomonitoring				24 Hour 48 Hour 72 Hour Routine		1. Cool, 4 Degrees Centigrade 2. Sulfuric Acid (H ₂ SO ₄), pH < 2 3. Nitric Acid (HNO ₃), pH < 2					4. Thiosulfate for Dechlorination 5. Hydrochloric Acid(HCl) 6. Sodium Hydroxide (NaOH), pH > 12						
			Reporting Information				Preservative Code: 1 Bottle Type: P		TEST PARAMETERS										Bottle Type Code	
			Telephone: 501-688-7220 Fax: 501-688-7271 Email: BSNOW@entergy.com																G = Glass, P = Plastic V = Septum, A = Amber	
Allen Parker			Allen Parker																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				Acute Biomonitoring									
	10/26-27/10	1430-1530		X	24	Water	Outfall				X									K1010008B
1. Relinquished by: (Signature)			Date/Time		2. Received by: (Signature)			SAMPLE CONDITION UPON RECEIPT IN LAB						REMARKS / SAMPLE COMMENTS						
Allen Parker			10/27/10 1535					1. CUSTODY SEALS: <input checked="" type="checkbox"/> Yes ___ No 2. CONTAINERS CORRECT: <input checked="" type="checkbox"/> Yes ___ No 3. COC/LABELS AGREE: <input checked="" type="checkbox"/> Yes ___ No 4. PRESERVATION CONFIRMED: <input checked="" type="checkbox"/> Yes ___ No 5. RECEIVED ON ICE: <input checked="" type="checkbox"/> Yes ___ No 6. TEMPERATURE ON RECEIPT: 15°C												
3. Relinquished by: (Signature)			Date/Time		4. Received by lab: (Signature)			FOR COMPLETION BY LAB ONLY												
					Suah & Rouse															

APPENDIX B

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

Biomonitoring Report

Acute 24/48 Hour Static Test

Lab Number: K1010008	Test Organism: P promelas
Client: White Bluff	Age of Organism: 6 days old
Date/Time Started: 10/27/10, 1540	Source of Organism: Aqueduct
Date/Time Ended: 10/29/10, 1400	Dilution Water: River Water

Conc:	Rep #	# Live Organisms			pH		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
0	A	10	10	10	76	76	70	76	98	-1	132	-1	522	-1	6005	-1
	B		10	10	80	79	82	81								
	C		10	10												
	D		10	10												
	E		9	9												
19	A	10	10	10	77	74	73	82								
	B		10	10	80	76	82	79								
	C		10	10												
	D		10	9												
	E		10	10												
25	A	10	10	10	78	74	76	83								
	B		10	10	80	76	83	79								
	C		10	10												
	D		10	10												
	E		10	9												
33	A	10	10	10	78	75	76	84								
	B		10	10	79	77	83	78								
	C		10	9												
	D		10	9												
	E		10	10												
44	A	10	10	10	79	76	78	85								
	B		10	10	79	77	83	79								
	C		10	10												
	D		10	10												
	E		10	10												
59	A	10	10	10	79	78	81	86	68	56	2600	2600	2470	2440	6005	6005
	B		10	10	79	77	82	79								
	C		10	10												
	D		10	10												
	E		10	10												

Biomonitoring Report
 Acute 24/48 Hour Static Test

Lab Number: K1010008	Test Organism: D. pulex
Client: White Bluff	Age of Organism: 24 hrs old
Date/ Time Started: 10/27/10 1530	Source of Organism: Tahara culture
Date/ Time Ended: 10/29/10 1406	Dilution Water: River water

Conc:	Rep #	# Live Organisms			pH		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	48hr	24hr	48 hr	24 hr	48 hr
0	A	8	8	8	76	76	70	75	98	1	132	1	522	1	5005	1
	B	8	8	8	80	80	79	77								
	C	8	8	8				7								
	D	8	8	8												
	E	8	8	8												
19	A	8	8	8	77	74	73	82								
	B	8	8	8	80	80	78	78								
	C	8	8	8												
	D	8	8	7												
	E	8	8	8												
25	A	8	8	8	78	74	76	83								
	B	8	8	8	79	81	79	77								
	C	8	8	7												
	D	8	8	8												
	E	8	8	8												
33	A	8	8	8	78	75	76	84								
	B	8	8	8	79	79	78	77								
	C	8	8	8												
	D	8	8	8												
	E	8	8	8												
44	A	8	8	8	79	76	78	85								
	B	8	8	7	79	79	79	77								
	C	8	8	8												
	D	8	8	8												
	E	8	8	8												
59	A	8	8	8	79	78	81	86	68	56	7600	7600	24700	2440	5005	5005
	B	8	8	8	79	79	79	77								
	C	8	8	8												
	D	8	8	8												
	E	8	8	8												

APPENDIX C

Fathead Minnow and *Daphnia pulex* Statistics

AA # K1010008, Pimphales promelas, 48 HR ACUTE, 10-27-1
File: Z:\TOXSTAT\WBLUFF\FH5. Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.096

W = 0.752

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 # K1010008, Pimphales promelas, 48 HR ACUTE, 10-27-1
File: Z:\TOXSTAT\WBLUFF\FH5. 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 # K1010008, Pimphales promelas, 48 HR ACUTE, 10-27-1
FILE: Z:\TOXSTAT\WBLUFF\FH5.
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	19 % EFFLUENT	1	1.0000	1.4120
2	19 % EFFLUENT	2	1.0000	1.4120
2	19 % EFFLUENT	3	1.0000	1.4120
2	19 % EFFLUENT	4	0.9000	1.2490
2	19 % EFFLUENT	5	1.0000	1.4120

3	25 %	EFFLUENT	1	1.0000	1.4120
3	25 %	EFFLUENT	2	1.0000	1.4120
3	25 %	EFFLUENT	3	1.0000	1.4120
3	25 %	EFFLUENT	4	1.0000	1.4120
3	25 %	EFFLUENT	5	0.9000	1.2490
4	33 %	EFFLUENT	1	1.0000	1.4120
4	33 %	EFFLUENT	2	1.0000	1.4120
4	33 %	EFFLUENT	3	0.9000	1.2490
4	33 %	EFFLUENT	4	0.9000	1.2490
4	33 %	EFFLUENT	5	1.0000	1.4120
5	44 %	EFFLUENT	1	1.0000	1.4120
5	44 %	EFFLUENT	2	1.0000	1.4120
5	44 %	EFFLUENT	3	1.0000	1.4120
5	44 %	EFFLUENT	4	1.0000	1.4120
5	44 %	EFFLUENT	5	1.0000	1.4120
6	59 %	EFFLUENT	1	1.0000	1.4120
6	59 %	EFFLUENT	2	1.0000	1.4120
6	59 %	EFFLUENT	3	1.0000	1.4120
6	59 %	EFFLUENT	4	1.0000	1.4120
6	59 %	EFFLUENT	5	1.0000	1.4120

AA # K1010008, Pimphales promelas, 48 HR ACUTE, 10-27-1
 File: Z:\TOXSTAT\WBLUFF\FH5. 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	19 % EFFLUENT	1.379	27.50	16.00	5.00	
3	25 % EFFLUENT	1.379	27.50	16.00	5.00	
4	33 % EFFLUENT	1.347	25.00	16.00	5.00	
5	44 % EFFLUENT	1.412	30.00	16.00	5.00	
6	59 % EFFLUENT	1.412	30.00	16.00	5.00	

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

AA # K1010008, DAPHNIA PULEX, 48 HR ACUTE, 10-27-10
File: Z:/toxstat/wbluff\DP5. 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 # K1010008, DAPHNIA PULEX, 48 HR ACUTE, 10-27-10
File: Z:/toxstat/wbluff\DP5. 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 # K1010008, DAPHNIA PULEX, 48 HR ACUTE, 10-27-10
FILE: Z:/toxstat/wbluff\DP5.
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	1.0000	1.3931
1	CONTROL	5	1.0000	1.3931
2	19 % EFFLUENT	1	1.0000	1.3931
2	19 % EFFLUENT	2	1.0000	1.3931
2	19 % EFFLUENT	3	1.0000	1.3931
2	19 % EFFLUENT	4	0.8750	1.2094
2	19 % EFFLUENT	5	1.0000	1.3931

3	25 %	EFFLUENT	1	1.0000	1.3931
3	25 %	EFFLUENT	2	1.0000	1.3931
3	25 %	EFFLUENT	3	1.0000	1.3931
3	25 %	EFFLUENT	4	1.0000	1.3931
3	25 %	EFFLUENT	5	1.0000	1.3931
4	33 %	EFFLUENT	1	1.0000	1.3931
4	33 %	EFFLUENT	2	1.0000	1.3931
4	33 %	EFFLUENT	3	1.0000	1.3931
4	33 %	EFFLUENT	4	1.0000	1.3931
4	33 %	EFFLUENT	5	1.0000	1.3931
5	44 %	EFFLUENT	1	1.0000	1.3931
5	44 %	EFFLUENT	2	0.8750	1.2094
5	44 %	EFFLUENT	3	1.0000	1.3931
5	44 %	EFFLUENT	4	1.0000	1.3931
5	44 %	EFFLUENT	5	1.0000	1.3931
6	59 %	EFFLUENT	1	1.0000	1.3931
6	59 %	EFFLUENT	2	1.0000	1.3931
6	59 %	EFFLUENT	3	1.0000	1.3931
6	59 %	EFFLUENT	4	1.0000	1.3931
6	59 %	EFFLUENT	5	1.0000	1.3931

AA # K1010008, DAPHNIA PULEX, 48 HR ACUTE, 10-27-10
 File: Z:/toxstat/wbluff\DP5. 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	1.393				
2	19 % EFFLUENT	1.356	25.00	16.00	5.00	
3	25 % EFFLUENT	1.393	27.50	16.00	5.00	
4	33 % EFFLUENT	1.393	27.50	16.00	5.00	
5	44 % EFFLUENT	1.356	25.00	16.00	5.00	
6	59 % EFFLUENT	1.393	27.50	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 10-27-10 CLIENT Arkansas Analytical

Purchase Order #: _____

SPECIES: Pimephales promelas Mysidopsis bahia Cyprinodon variegates

Quantity Shipped: 450⁺ - 250⁺ _____

Age: 1500⁺
24 hrs 10/27 + 6 Days old 10/27

Brood Stock Source: Anderson Farms, Inc

Culture Water: Groundwater Artificial Salts Artificial Salts

Hardness (Mg/l CaCO₃) 160 Salinity (ppt) _____

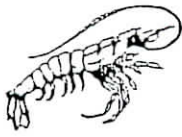
Dissolved Oxygen (Mg/l): B.1 _____

Feeding: ARTIFICIAL

Comments: _____

Shipped Via: Federal Express UPS Overnight SHuttle

Packaged By: CUU



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 00 06 DP Strain ARCO

Brood Origination EPFA 04

II. Water Quality

Temperature 23 °C Salinity — ppt DO SAT

pH 7.2 Hardness ~75 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

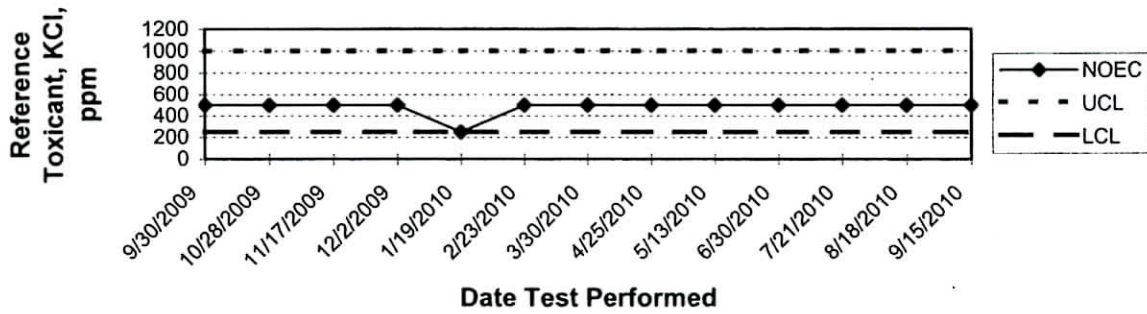
Quality Assurance Charts

ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW NOEC

QUALITY ASSURANCE

48 HOUR ACUTE

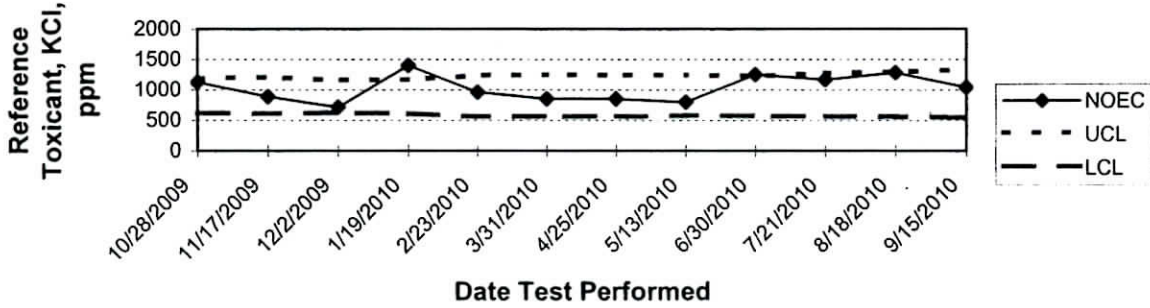


ARKANSAS ANALYTICAL, INC.

FATHEAD MINNOW LC50

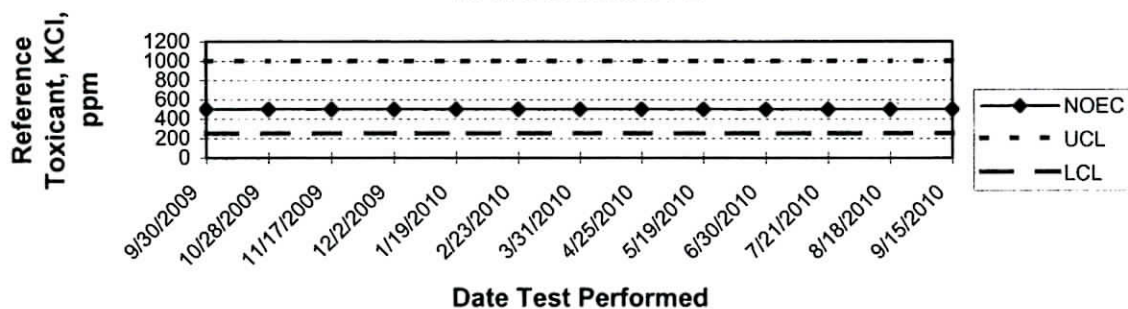
QUALITY ASSURANCE

48 HOUR ACUTE



ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX NOEC QUALITY ASSURANCE 48 HOUR ACUTE



ARKANSAS ANALYTICAL, INC.

DAPHNIA PULEX LC50 QUALITY ASSURANCE 48 HOUR ACUTE

