



## Forrest City Water Utility

303 NORTH ROSSER ST.  
FORREST CITY, ARKANSAS 72335  
870-633-2921

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July 8, 2014

Amy Schluterman  
ADEQ Enforcement Analyst  
Water Division

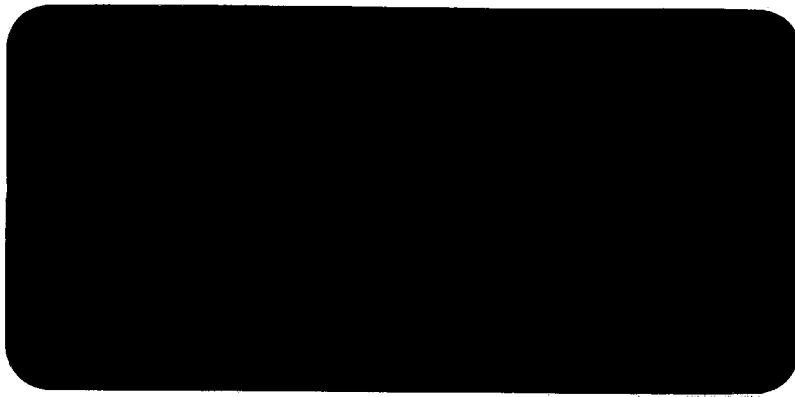
RE: Semi-Annual Chronic Bio-monitoring Report

On July 7, 2014, the Utility resubmitted the Chronic Wet Testing DMR for Jan. 1 2014 thru June 31, 2014. As you know, the resubmission was due to the Utility Manager not being authorized to sign the DMR's. The Utility noticed after mailing the DMR on July 7, 2014 that it did not include a copy of the independent lab Chronic Biomonitoring Report.

Please accept the enclosed copy of the report.

Sincerely,

Joel Thetford  
Plant Operator  
Forrest City Water Utility



1st

2014

Huther and Associates, Inc.


**CITY OF FORREST CITY  
OUTFALL 001**

Chronic Biomonitoring Report  
Permit Number NPDES AR0020087  
AFIN Number 62-00070

*Ceriodaphnia dubia*  
*Pimephales promelas*

April 8, 2014

Reviewed by: \_\_\_\_\_

  
Toni Nesbitt, QA/QC Officer  
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TOXICITY TEST REPORT - CHRONIC

Client .....City of Forrest City                      Laboratory I.D. .... 22229  
Permit No. ....NPDES AR0020087                      Begin Date ..... April 8, 2014  
Sample..... Outfall 001

Results: Pass *Ceriodaphnia dubia* survival and reproduction and *Pimephales promelas* survival and growth at the critical low flow concentration (100% effluent).

SAMPLE COLLECTION

Composite effluent samples from City of Forrest City were delivered by Greyhound Package Express courier to Huther & Associates on April 8, April 10, and April 12, 2014. Effluent samples were collected and composited from Outfall 001 using an automatic sampler by facility personnel. Two toxicity tests were requested: a seven-day *Ceriodaphnia dubia* survival and reproduction test (EPA Method 1002.0), and a seven-day *Pimephales promelas* larval survival and growth test (EPA Method 1000.0). Test organisms, procedures and quality assurance requirements were in accordance with the EPA manual, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

The effluent samples were analyzed for total residual chlorine (Standard Methods, 22<sup>nd</sup> Edition, 4500-Cl D) and contained <0.01 mg/L, <0.01 mg/L, and <0.01 mg/L, respectively. Effluent and laboratory dilution water hardness, alkalinity, conductivity, pH, and dissolved oxygen data were collected and recorded.

TEST SETUP  
*Ceriodaphnia dubia*



The seven-day *Ceriodaphnia dubia* survival and reproduction test was initiated at 1400 hours, April 8, 2014. Five concentrations were prepared (32%, 42%, 56%, 75%, and 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of the L'Anguille River). The test was conducted in 25 mL distilled water rinsed plastic beakers containing 15 mL of solution (one organism per beaker, ten beakers per concentration). *C. dubia* neonates were less than 24 hours old and within eight hours of the same age at test initiation. Neonates were placed in beakers following a randomized block test design. Fresh solutions were prepared and renewed daily. Daily feeding consisted of 0.5 mL *Selenastrum capricornutum* and cerophyll per test chamber. The test proceeded for seven days during which survival, reproduction and water quality data were collected daily.

A control of 10 replicate beakers containing one neonate each in distilled, deionized, reconstituted water (same as diluent) was conducted concurrently with the test. There was 100% survival in the control. The test ended at 1400 hours, April 15, 2014. Survival and reproduction data were statistically analyzed ( $p = 0.05$ ) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

**SURVIVAL**  
*Ceriodaphnia dubia*

There was 100% survival to *C. dubia* in all of the effluent concentrations tested. Therefore, statistical analyses were not required to determine a no effect concentration.

**LOEC: Not Applicable**  
**NOEC: 100% Effluent**

**REPRODUCTION**  
*Ceriodaphnia dubia*

*C. dubia* reproduction data were normally distributed at the 0.01 alpha level (13.277) using Chi-Square test for normality. Reproduction data were homogeneous using Bartlett's test at the 0.01 alpha level (15.09) without data transformations. Therefore, a parametric test was performed on the homogeneous data. Dunnett's test on *C. dubia* reproduction data demonstrated that there were no statistically significant differences between the control and any of the effluent concentrations.

**LOEC: Not Applicable**  
**NOEC: 100% Effluent**

**PMSD: 8.8%**

**TEST SETUP**  
*Pimephales promelas*



The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1420 hours, April 8, 2014. Five concentrations were prepared (32%, 42%, 56%, 75%, and 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of the L'Anguille River). The test was conducted in 300 mL distilled water rinsed plastic beakers containing 250 mL of solution (eight larvae per beaker, five beakers per concentration). *P. promelas* larvae were less than 24-hours old at test initiation and originated from a minimum of three in-house spawnings. Fresh solutions were prepared and renewed daily. Larvae in each test chamber were fed <24-hour-old *Artemia* (brine shrimp) three times per day. The test proceeded for seven days during which survival and water quality data were collected daily.

A control of five replicate chambers containing eight larvae each in distilled, deionized, reconstituted water (same as diluent) was conducted concurrently with the test. There was 100% survival in the control. The test ended at 1420 hours, April 15, 2014. At test termination, all larvae were sacrificed, dried for 24-hours, and weighed. Survival and growth (weight) data were statistically analyzed ( $p = 0.05$ ) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

**SURVIVAL**  
*Pimephales promelas*

There was 100% survival to *P. promelas* in all of the effluent concentrations tested. Therefore, statistical analyses were not required to determine a no effect concentration.

**LOEC: Not Applicable**  
**NOEC: 100% Effluent**

**GROWTH**  
*Pimephales promelas*

*P. promelas* growth data were normally distributed at the 0.01 alpha level (0.900) using Shapiro Wilk's test for normality. Growth data were homogeneous using Bartlett's test at the 0.01 alpha level (15.09) without data transformations. Therefore, a parametric test was performed on the homogeneous data. Dunnett's test on *P. promelas* growth data demonstrated that there were no statistically significant differences between the control and any of the effluent concentrations.

**LOEC: Not Applicable**                      **PMSD: 8.6%**  
**NOEC: 100% Effluent**

**SUMMARY**

There were no statistically significant differences between the control and the critical low flow concentration (100% effluent) for *C. dubia* survival and reproduction and *P. promelas* survival and growth. Based on biomonitoring requirements for Outfall 001 contained in Permit Number NPDES AR0020087 for City of Forrest City, Outfall 001 **passed** for this testing period.

Huther and Associates

7-Day/3 Brood *Ceriodaphnia dubia* Survival and Reproduction Chronic Toxicity Test

CLIENT City of Forrest City SAMPLE TYPE 24 Hour Composite  
 NPDES # AR0020087 DATE COLLECTED 04/07/14 04/09/14 04/11/14  
 LAB ID # 22229 DATE RECEIVED 04/08/14 04/10/14 04/12/14  
 TEST TYPE 7 Day Chronic BEGIN DATE/TIME 04/08/14 1400  
 TEST ORGANISM *Ceriodaphnia dubia* END DATE/TIME 04/15/14 1400  
 ORGANISM AGE < 24 Hours TEST TEMPERATURE (°C) 25 ± 1  
 ORGANISM SOURCE In House PHOTO PERIOD 16-hr. Light 8-hr. Dark  
 RECEIVING WATER unnamed tributary of L'Anguille River LIGHT INTENSITY 50-100 ft. candl.  
 DILUTION WATER Laboratory Adjusted TECHNICIAN N. Lehr

SURVIVAL & REPRODUCTION SUMMARY

Control

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
04/09/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/12/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/13/14	3	2	4	3	2	3	4	4	5	3
	3	2	4	3	2	3	4	4	5	3
04/14/14	6	6	7	6	6	7	8	6	7	8
	9	8	11	9	8	10	12	10	12	11
04/15/14	13	13	12	11	12	12	12	14	13	12
	22	21	23	20	20	22	24	24	25	23

x # Young 22.4 C.V. 7.65%  
 x% Survival 100% C.V. 0.00%

32% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
04/09/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/12/14	3	A	A	2	A	A	A	A	A	4
	3	0	0	2	0	0	0	0	0	4
04/13/14	6	4	5	6	5	4	5	2	5	8
	9	4	5	6	5	4	5	2	5	12
04/14/14	A	9	7	A	10	7	10	8	9	A
	9	13	12	8	15	11	15	10	14	12
04/15/14	12	12	13	13	12	13	12	14	12	13
	21	25	25	21	27	24	27	24	26	25

x # Young 24.5 C.V. 8.66%  
 x% Survival 100% C.V. 0.00%

42% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
04/09/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/12/14	A	A	A	2	A	A	A	3	A	A
	0	0	0	2	0	0	0	3	0	0
04/13/14	3	2	4	6	5	5	5	7	3	5
	3	2	4	8	5	5	5	10	3	5
04/14/14	9	10	7	A	9	10	9	A	6	7
	12	12	11	8	14	15	14	10	9	12
04/15/14	12	13	12	13	12	12	14	13	14	13
	24	25	23	21	26	27	28	23	23	25

x # Young 24.5 C.V. 8.66%  
 x% Survival 100% C.V. 0.00%

56% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
04/09/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
04/12/14	A	A	A	A	A	A	A	A	3	A
	0	0	0	0	0	0	0	0	3	0
04/13/14	4	5	5	4	2	4	3	5	8	5
	4	5	5	4	2	4	3	5	11	5
04/14/14	7	10	8	7	6	8	7	10	A	8
	11	15	13	11	8	12	10	15	11	13
04/15/14	13	13	12	14	14	13	13	12	14	14
	24	28	25	25	22	25	23	27	25	27

x # Young 25.1 C.V. 7.38%  
 x% Survival 100% C.V. 0.00%

where: A = Alive  
 5 = Alive, 5 young  
 D = Dead  
 D5 = 5 Young, Female died

ex 1: 

A	alive today
4	total young to date

ex 2: 

5	alive, 5 young today
12	total young to date



Huther and Associates  
7-Day/3 Brood *Ceriodaphnia dubia* Survival and Reproduction Chronic Toxicity Test

City of Forrest City

Lab ID# 22229

Test Date: April 8, 2014

75% Effluent											
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
04/09/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/12/14	3	2	A	A	A	4	A	A	A	A	2
	3	2	0	0	0	4	0	0	0	0	2
04/13/14	7	6	3	4	3	9	3	4	4	4	6
	10	8	3	4	3	13	3	4	4	4	8
04/14/14	A	A	9	8	9	A	7	9	8	A	
	10	8	12	12	12	13	10	13	12	8	
04/15/14	13	13	13	13	12	13	15	12	14	12	
	23	21	25	25	24	26	25	25	26	20	
<p>x# Young 24.0                      C.V. 8.56%</p> <p>x% Survival 100%                      C.V. 0.00%</p>											

100% Effluent											
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10	
04/09/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/10/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/11/14	A	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0	0
04/12/14	3	A	2	A	A	A	A	4	A	4	4
	3	0	2	0	0	0	0	0	4	0	4
04/13/14	7	4	6	4	4	3	2	7	2	8	
	10	4	8	4	4	3	2	11	2	12	
04/14/14	A	8	A	8	7	7	10	A	6	A	
	10	12	8	12	11	10	12	11	8	12	
04/15/14	12	13	13	13	14	12	12	13	15	12	
	22	25	21	25	25	22	24	24	23	24	
<p>x# Young 23.5                      C.V. 6.10%</p> <p>x% Survival 100%                      C.V. 0.00%</p>											

where: A = Alive  
5 = Alive, 5 young  
D = Dead  
D5 = 5 Young, Female died

ex 1: 

A
4

 alive today  
total young to date

ex 2: 

5
12

 alive, 5 young today  
total young to date

Huthner and Associates  
7-Day/3 Brood *Ceriodaphnia dubia* Survival and Reproduction Chronic Toxicity Test

City of Forrest City

Lab ID# 22229

Test Date: April 8, 2014

**WET CHEMISTRY MEASUREMENTS**

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
04/08/14	Start	25.0	1	8.03	7.97	7.98	7.95	7.95	7.89	STC
04/09/14	24 Hr.	24.0	1	7.99	8.02	8.08	8.15	8.23	8.31	GZK
04/09/14	Renew	24.0	1	7.90	7.95	7.98	7.99	8.01	7.89	GZK
04/10/14	48 Hr.	24.2	1	7.96	8.12	8.24	8.31	8.39	8.46	STC
04/10/14	Renew	25.0	2	7.91	7.89	7.87	7.85	7.83	7.80	STC
04/11/14	72 Hr.	24.5	2	8.15	8.32	8.41	8.47	8.53	8.60	STC
04/11/14	Renew	24.3	2	7.88	7.79	7.79	7.78	7.77	7.74	STC
04/12/14	96 Hr.	24.9	2	8.29	8.12	8.11	8.06	8.03	7.97	RWU
04/12/14	Renew	25.0	3	8.14	7.96	7.93	7.89	7.85	7.77	RWU
04/13/14	120 Hr.	25.2	3	7.81	7.92	8.05	8.13	8.21	8.31	RWU
04/13/14	Renew	25.0	3	8.01	7.88	7.90	7.91	7.87	7.85	RWU
04/14/14	144 Hr.	24.9	3	7.96	8.09	8.18	8.24	8.33	8.42	RWU
04/14/14	Renew	24.3	3	8.17	8.05	8.06	8.09	8.07	8.04	RWU
04/15/14	168 Hr.	24.0	3	8.05	8.15	8.23	8.28	8.36	8.44	STC

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
04/08/14	Start	25.0	1	8.68	8.85	8.50	8.82	8.97	8.69	STC
04/09/14	24 Hr.	24.0	1	8.35	8.36	8.52	8.53	8.50	8.27	GZK
04/09/14	Renew	24.0	1	8.96	8.98	8.99	8.99	8.92	8.69	GZK
04/10/14	48 Hr.	24.2	1	8.67	8.67	8.66	8.59	8.60	8.57	STC
04/10/14	Renew	25.0	2	8.90	8.88	8.06	7.88	8.48	8.67	STC
04/11/14	72 Hr.	24.5	2	8.02	8.32	8.37	8.31	8.32	8.63	STC
04/11/14	Renew	24.3	2	8.01	8.15	8.21	8.21	8.22	8.34	STC
04/12/14	96 Hr.	24.9	2	8.96	8.95	8.97	8.97	8.98	8.87	RWU
04/12/14	Renew	25.0	3	8.97	8.96	8.95	8.95	8.48	8.60	RWU
04/13/14	120 Hr.	25.2	3	7.54	7.94	7.74	7.85	7.71	7.63	RWU
04/13/14	Renew	25.0	3	8.95	8.85	8.82	8.98	8.87	8.95	RWU
04/14/14	144 Hr.	24.9	3	7.81	7.80	7.81	7.65	7.52	7.52	RWU
04/14/14	Renew	24.3	3	8.16	8.16	7.99	8.15	8.21	8.00	RWU
04/15/14	168 Hr.	24.0	3	8.13	8.19	8.22	8.25	7.95	7.87	STC

Huther and Associates  
7-Day/3 Brood *Ceriodaphnia dubia* Survival and Reproduction Chronic Toxicity Test

City of Forrest City

Lab ID# 22229

Test Date: April 8, 2014

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH	DO	Hardness mg/L CaCO <sub>3</sub> <sup>1</sup>	Alkalinity mg/L CaCO <sub>3</sub> <sup>1</sup>	Conduct. umhos/cm <sup>1</sup>	Resid. Cl <sub>2</sub> mg/L <sup>1</sup>	Dechlor(mL) Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> mg/L <sup>1</sup>	Analyst
04/08/14	1	7.89	8.69	212	222	889	<0.01	N/A	TN
04/10/14	2	7.80	8.67	212	226	888	<0.01	N/A	TN
04/12/14	3	7.77	8.60	216	224	874	<0.01	N/A	TN
04/08/14	Con	8.03	8.68	84	56	305	-	-	TN

<sup>1</sup> Measurements taken in 100% solution.

**CERIODAPHNIA DUBIA STATISTICAL ANALYSES**  
 Reproduction

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	10	20.000	25.000	22.400
2	32% Effluent	10	21.000	27.000	24.500
3	42% Effluent	10	21.000	28.000	24.500
4	56% Effluent	10	22.000	28.000	25.100
5	75% Effluent	10	20.000	26.000	24.000
6	100% Effluent	10	21.000	25.000	23.500

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V. %
1	Control	2.933	1.713	0.542	7.65
2	32% Effluent	4.500	2.121	0.671	8.66
3	42% Effluent	4.500	2.121	0.671	8.66
4	56% Effluent	3.433	1.853	0.586	7.38
5	75% Effluent	4.222	2.055	0.650	8.56
6	100% Effluent	2.056	1.434	0.453	6.10

Chi-Square Test For Normality: Actual And Expected Frequencies

Interval	< -1.5	-1.5 to -0.5	-0.5 to 0.5	> 0.5 to 1.5	> 1.5
Expected	4.020	14.520	22.920	14.520	4.020
Observed	6	11	26	14	3

Calculated Chi-Square goodness of fit test statistic = 2.5199  
 Table Chi-Square value (alpha = 0.01) = 13.277

Data Pass normality test. Continue analysis.

Bartlett's Test For Homogeneity of Variance

Calculated B1 statistic = 1.89

Table Chi-square value = 15.09 (alpha = 0.01, DF = 5)

Table Chi-square value = 11.07 (alpha = 0.05, DF = 5)

Data Pass B1 homogeneity test at 0.01 level. Continue analysis.

ANOVA Table

SOURCE	DF	SS	MS	F
Between	5	45.200	9.040	2.506
Within (Error)	54	194.800	3.607	
Total	59	240.000		

Critical F value = 2.45 (0.05,5,40)  
 Since F > Critical F Fail REJECT Ho: All equal

Dunnett's Test - Table 1 of 2 Ho: Control < Treatment

Grp	Identification	Mean		T Stat	Sig
		Transformed Mean	Calculated In Original Units		
1	Control	22.400	22.400		
2	32% Effluent	24.500	24.500	-2.472	
3	42% Effluent	24.500	24.500	-2.472	
4	56% Effluent	25.100	25.100	-3.179	
5	75% Effluent	24.000	24.000	-1.884	
6	100% Effluent	23.500	23.500	-1.295	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, DF=40,5)  
 No statistically significant difference

Dunnett's Test - Table 1 of 2 Ho: Control < Treatment

Grp	Identification	Num of Reps	Minimum Sig Diff (In Orig. Units)	% of Control	Difference from
					Control
1	Control	10			
2	32% Effluent	10	1.962	8.8	-2.100
3	42% Effluent	10	1.962	8.8	-2.100
4	56% Effluent	10	1.962	8.8	-2.700
5	75% Effluent	10	1.962	8.8	-1.600
6	100% Effluent	10	1.962	8.8	-1.100

Huther and Associates

7-Day *Pimephales promelas* Survival and Growth Chronic Toxicity Test

CLIENT City of Forrest City SAMPLE TYPE 24 Hour Composite  
 NPDES # AR0020087 DATE COLLECTED 04/07/14 04/09/14 04/11/14  
 LAB ID # 22229 DATE RECEIVED 04/08/14 04/10/14 04/12/14  
 TEST TYPE 7 Day Chronic BEGIN DATE/TIME 04/08/14 1420  
 TEST ORGANISM *Pimephales promelas* END DATE/TIME 04/15/14 1420  
 ORGANISM AGE < 24 Hours TEST TEMPERATURE (°C) 25 ± 1  
 ORGANISM SOURCE In House PHOTO PERIOD 16-hr. Light 8-hr. Dark  
 RECEIVING WATER unnamed tributary of the L'Angeuille River LIGHT INTENSITY 50-100 ft. candl.  
 DILUTION WATER Laboratory Adjusted TECHNICIAN M. Horner

SURVIVAL SUMMARY

Conc.	04/09/14					04/10/14					04/11/14					04/12/14					04/13/14				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Con	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	8	8	8	8	6	8	8	8	8
32%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
42%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
56%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
75%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
100%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Conc.	04/14/14					04/15/14					x % Survival	C.V. %
	A	B	C	D	E	A	B	C	D	E		
Con	8	8	8	8	8	8	8	8	8	8	100.0	0.00
32%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
42%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
56%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
75%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
100%	8	8	8	8	8	8	8	8	8	8	100.0	0.00

MEAN DRY WEIGHT PER REP

% Effluent	Rep A	Rep B	Rep C	Rep D	Rep E	x	C.V. %
Con	0.4650	0.4200	0.4670	0.4520	0.4590	0.4526	4.23
32%	0.5010	0.4460	0.4720	0.4520	0.4650	0.4672	4.60
42%	0.4150	0.4690	0.5020	0.4910	0.4500	0.4654	7.43
56%	0.4760	0.4950	0.4280	0.5040	0.4860	0.4778	6.22
75%	0.4520	0.5040	0.4960	0.4570	0.4910	0.4800	4.96
100%	0.5040	0.4460	0.4820	0.4950	0.5010	0.4856	4.88

Huther and Associates  
7-Day *Pimephales promelas* Survival and Growth Chronic Toxicity Test

City of Forrest City

Lab ID# 22229

Test Date: April 8, 2014

**WET CHEMISTRY MEASUREMENTS**

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
04/08/14	Start	25.0	1	8.03	7.97	7.98	7.95	7.95	7.89	STC
04/09/14	24 Hr.	24.0	1	8.20	8.21	8.58	8.58	8.69	8.67	GZK
04/09/14	Renew	24.0	1	7.90	7.95	7.98	7.99	8.01	7.89	GZK
04/10/14	48 Hr.	24.1	1	7.63	7.82	8.01	8.04	8.16	8.18	STC
04/10/14	Renew	25.0	2	7.91	7.89	7.87	7.85	7.83	7.80	STC
04/11/14	72 Hr.	24.6	2	7.72	7.94	8.05	8.10	8.18	8.24	STC
04/11/14	Renew	24.3	2	7.88	7.79	7.79	7.78	7.77	7.74	STC
04/12/14	96 Hr.	24.7	2	7.65	7.82	7.99	8.00	8.13	8.20	RWU
04/12/14	Renew	25.0	3	8.14	7.96	7.93	7.89	7.85	7.77	RWU
04/13/14	120 Hr.	25.3	3	7.56	7.81	7.93	7.95	8.07	8.09	RWU
04/13/14	Renew	25.0	3	8.01	7.88	7.90	7.91	7.87	7.85	RWU
04/14/14	144 Hr.	24.5	3	7.87	8.17	8.20	8.22	8.35	8.38	RWU
04/14/14	Renew	24.3	3	8.17	8.05	8.06	8.09	8.07	8.04	RWU
04/15/14	168 Hr.	24.0	3	7.53	7.80	7.81	7.85	8.07	8.07	STC

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
04/08/14	Start	25.0	1	8.68	8.85	8.50	8.82	8.97	8.69	STC
04/09/14	24 Hr.	24.0	1	8.78	8.29	8.27	8.77	8.81	8.67	GZK
04/09/14	Renew	24.0	1	8.96	8.98	8.99	8.99	8.92	8.69	GZK
04/10/14	48 Hr.	24.1	1	7.63	7.58	7.63	7.73	7.91	7.93	STC
04/10/14	Renew	25.0	2	8.90	8.88	8.06	7.88	8.48	8.67	STC
04/11/14	72 Hr.	24.6	2	7.66	7.68	7.96	7.65	7.68	7.53	STC
04/11/14	Renew	24.3	2	8.01	8.15	8.21	8.21	8.22	8.34	STC
04/12/14	96 Hr.	24.7	2	8.65	8.42	8.39	8.38	8.26	8.25	RWU
04/12/14	Renew	25.0	3	8.97	8.96	8.95	8.95	8.48	8.60	RWU
04/13/14	120 Hr.	25.3	3	8.76	8.56	8.12	8.15	8.68	8.36	RWU
04/13/14	Renew	25.0	3	8.95	8.85	8.82	8.98	8.87	8.95	RWU
04/14/14	144 Hr.	24.5	3	7.53	7.72	8.08	8.12	8.14	8.14	RWU
04/14/14	Renew	24.3	3	8.16	8.16	7.99	8.15	8.21	8.00	RWU
04/15/14	168 Hr.	24.0	3	8.64	8.68	8.74	8.75	8.74	8.68	STC

Huther and Associates  
7-Day *Pimephales promelas* Survival and Growth Chronic Toxicity Test

City of Forrest City

Lab ID# 22229

Test Date: April 8, 2014

**INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT**

Date	Samp. No.	pH	DO	Hardness mg/L CaCO <sub>3</sub> <sup>1</sup>	Alkalinity mg/L CaCO <sub>3</sub> <sup>1</sup>	Conduct. umhos/cm <sup>1</sup>	Resid. Cl <sub>2</sub> mg/L <sup>1</sup>	Dechlor(mL) Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> mg/L <sup>1</sup>	Analyst
04/08/14	1	7.89	8.69	212	222	889	<0.01	N/A	TN
04/10/14	2	7.80	8.67	212	226	888	<0.01	N/A	TN
04/12/14	3	7.77	8.60	216	224	874	<0.01	N/A	TN
04/08/14	Con	8.03	8.68	84	56	305	-	-	TN

<sup>1</sup>Measurements taken in 100% solution.

Huther and Associates, Inc.  
 Begin Date: April 08, 2014  
 Lab I.D.# 22229

**PIMEPHALES PROMELAS STATISTICAL ANALYSES**  
 Growth

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	0.420	0.467	0.453
2	32% Effluent	5	0.446	0.501	0.467
3	42% Effluent	5	0.415	0.502	0.465
4	56% Effluent	5	0.428	0.504	0.478
5	75% Effluent	5	0.452	0.504	0.480
6	100% Effluent	5	0.446	0.504	0.486

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.000	0.019	0.009	4.23
2	32% Effluent	0.000	0.022	0.010	4.60
3	42% Effluent	0.001	0.035	0.015	7.43
4	56% Effluent	0.001	0.030	0.013	6.22
5	75% Effluent	0.001	0.024	0.011	4.96
6	100% Effluent	0.001	0.024	0.011	4.88

Shapiro - Wilk's Test For Normality

D = 0.016

W = 0.939

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

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

Data Pass normality test at P=0.01 level. Continue analysis.

Bartlett's Test For Homogeneity of Variance

Calculated B1 statistic = 1.78

Table Chi-square value = 15.09 (alpha = 0.01, DF = 5)

Table Chi-square value = 11.07 (alpha = 0.05, DF = 5)

Data Pass B1 homogeneity test at 0.01 level. Continue analysis.

ANOVA Table

SOURCE	DF	SS	MS	F
Between	5	0.004	0.001	1.076
Within (Error)	24	0.016	0.001	
Total	29	0.020		

Critical F value = 2.62 (0.05,5,24)

Since F < Critical F Fail to Reject Ho: All equal

Dunnett's Test - Table 1 of 2 Ho:Control < Treatment

Grp	Identification	Mean		T Stat	Sig
		Transformed Mean	Calculated In Original Units		
1	Control	0.453	0.453		
2	32% Effluent	0.467	0.467	-0.890	
3	42% Effluent	0.465	0.465	-0.780	
4	56% Effluent	0.478	0.478	-1.536	
5	75% Effluent	0.480	0.480	-1.670	
6	100% Effluent	0.486	0.486	-2.012	

Dunnett table value = 2.36 (1 Tailed Value, P=0.05, DF=24,5)

No statistically significant difference

Dunnett's Test - Table 1 of 2 Ho:Control < Treatment

Grp	Identification	Num of Reps	Minimum Sig Diff (In Orig. Units)	Difference from Control	
				% of Control	Control
1	Control	5			
2	32% Effluent	5	0.039	8.6	-0.015
3	42% Effluent	5	0.039	8.6	-0.013
4	56% Effluent	5	0.039	8.6	-0.025
5	75% Effluent	5	0.039	8.6	-0.027
6	100% Effluent	5	0.039	8.6	-0.033



**APPENDIX A  
RAW DATA**

7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION  
DAILY RAW DATA TABLE  
PAGE 1 OF 2

CLIENT Forrest City  
OUTFALL 001  
LAB ID # 22229

START DATE/TIME 4-8-14 NL 1400  
END DATE/TIME 4-15-14 ZG 1400

Con

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	A	A	A	A	A	A	A	A	A	A	MH	1515
4/13	3	2	4	3	2	3	4	4	3	3	TN	1315
4/14	6	6	7	6	6	7	8	6	7	8	NL	1010
4/15	13	13	12	11	12	12	14	13	12		26	1400
	22	21	23	20	22	24	24	25	23			

$\bar{x}$  # Young w/o Dead = 22.4 CV% = 7.65  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

32

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	3	A	A	2	A	A	A	A	A	4	MH	1515
4/13	6	4	5	6	5	4	5	2	5	8	TN	1315
4/14	A	9	7	A	10	7	10	8	9	A	NL	1010
4/15	12	12	13	13	12	13	12	14	12	13	26	1400
	21	25	25	21	27	24	27	24	26	25		

$\bar{x}$  # Young w/o Dead = 24.5 CV% = 8.66  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

42

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	A	A	A	2	A	A	3	A	A		MH	1515
4/13	3	2	4	6	5	5	7	3	5		TN	1315
4/14	9	10	7	A	9	10	9	A	6	7	NL	1010
4/15	12	13	12	13	12	12	14	13	14	13	26	1400
	24	25	23	21	26	27	28	23	23	25		

$\bar{x}$  # Young w/o Dead = 24.5 CV% = 8.66  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

56

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	A	A	A	A	A	A	A	A	3	A	MH	1515
4/13	4	5	5	4	2	4	3	5	8	5	TN	1315
4/14	7	10	8	7	6	8	7	10	A	8	NL	1010
4/15	13	13	12	14	14	13	13	12	14	14	26	1400
	24	28	25	25	22	25	23	27	25	27		

$\bar{x}$  # Young w/o Dead = 25.1 CV% = 7.38  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

CLIENT Forrest City  
 OUTFALL 001  
 LAB ID # 22229  
75

START DATE/TIME 4-8-14 NL 1400  
 END DATE/TIME 4-15-14 ZG 1400  
100

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	3	2	A	A	A	4	A	A	A	2	MH	1515
4/13	7	6	3	4	3	9	3	4	4	6	TN	1315
4/14	A	A	9	8	9	A	7	9	8	A	NL	1010
4/15	13	13	13	13	12	13	15	12	14	12	ZG	1400
	23	21	25	25	24	26	25	25	26	20		

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
4/9	A	A	A	A	A	A	A	A	A	A	NL	1400
4/10	A	A	A	A	A	A	A	A	A	A	NL	1400
4/11	A	A	A	A	A	A	A	A	A	A	NL	1145
4/12	3	A	2	A	A	A	A	4	A	4	MH	1515
4/13	7	4	6	4	4	3	2	7	2	8	TN	1315
4/14	A	8	A	8	7	7	10	A	6	A	NL	1010
4/15	12	13	13	13	14	12	12	13	15	12	ZG	1400
	20	25	21	25	25	22	24	24	23	24		

$\bar{x}$  # Young w/o Dead = 24.0 CV% = 8.56  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

$\bar{x}$  # Young w/o Dead = 23.5 CV% = 6.10  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100 CV% = 0.00

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time

$\bar{x}$  # Young w/o Dead = CV% =  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = CV% =

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time

$\bar{x}$  # Young w/o Dead = CV% =  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = CV% =

**7-DAY CHRONIC TOXICITY TEST  
PIMEPHALES PROMELAS (fathead minnow) SURVIVAL**

CLIENT/FACILITY Forrest City  
 OUTFALL # 001 PROJECT # 22229  
 ORGANISM ID# PRO-14-097

DATE/TIME STARTED 4-8-14 MH 1420  
 DATE/TIME ENDED 4-15-14 MH 1420

Conc.	A					B					C					D					E				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Con	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
32	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
42	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
56	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
75	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
100	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Initials Date/Time	4-9-14 MH 1420					4-10-14 JK 0805					4-11-14 JK 0800					4-12-14 MH 0830					4-13-14 MH 0800				

Conc.	A					B					Mean Survival	C.V. %
	A	B	C	D	E	A	B	C	D	E		
Con	8	8	8	8	8	8	8	8	8	8	100	0.00
32	8	8	8	8	8	8	8	8	8	8	100	0.00
42	8	8	8	8	8	8	8	8	8	8	100	0.00
56	8	8	8	8	8	8	8	8	8	8	100	0.00
75	8	8	8	8	8	8	8	8	8	8	100	0.00
100	8	8	8	8	8	8	8	8	8	8	100	0.00
Initials Date/Time	JK 4-14-14 0850					4-15-14 MH 1420						



Client / Facility Forrest City  
 Lab ID Number 22229  
 Outfall Number 001  
 Test Date 4-8-14

**INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT**

Date	Samp. No.	pH	DO	Hardness mg/L CaCO <sub>3</sub> <sup>1</sup>	Alkalinity mg/L CaCO <sub>3</sub> <sup>1</sup>	Conduct. umhos/cm <sup>1</sup>	Resid. Cl <sub>2</sub> mg/L <sup>1</sup>	Dechlor(mL) Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> mg/L <sup>1</sup>	Analyst
4/8	1	7.89	8.69	212	222	889	60.01	Na	TN
4/10	2	7.80	8.67	212	226	888	5	5	5
4/12	3	7.77	8.60	216	224	874	5	5	5
4/8	CON	8.03	8.68	84	56	305	—	—	5

**INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER**

Date	Samp. No.	pH	DO	Hardness mg/L CaCO <sub>3</sub> <sup>1</sup>	Alkalinity mg/L CaCO <sub>3</sub> <sup>1</sup>	Conduct. umhos/cm <sup>1</sup>	Resid. Cl <sub>2</sub> mg/L <sup>1</sup>	Dechlor(mL) Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> mg/L <sup>1</sup>	Analyst

Notes:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**APPENDIX B**  
**REFERENCE TOXICANTS**

**CHRONIC REFERENCE TOXICANT TEST RESULTS**

SPECIES: *Ceriodaphnia dubia*  
CHEMICAL: Sodium Chloride  
DURATION: 7-Days  
TEST NUMBER: 04  
TEST DATE/TIME: 04/03/14 - 04/10/14  
1515 Hrs - 1515 Hrs  
STATISTICAL METHOD: Fishers, Dunnetts/Steels

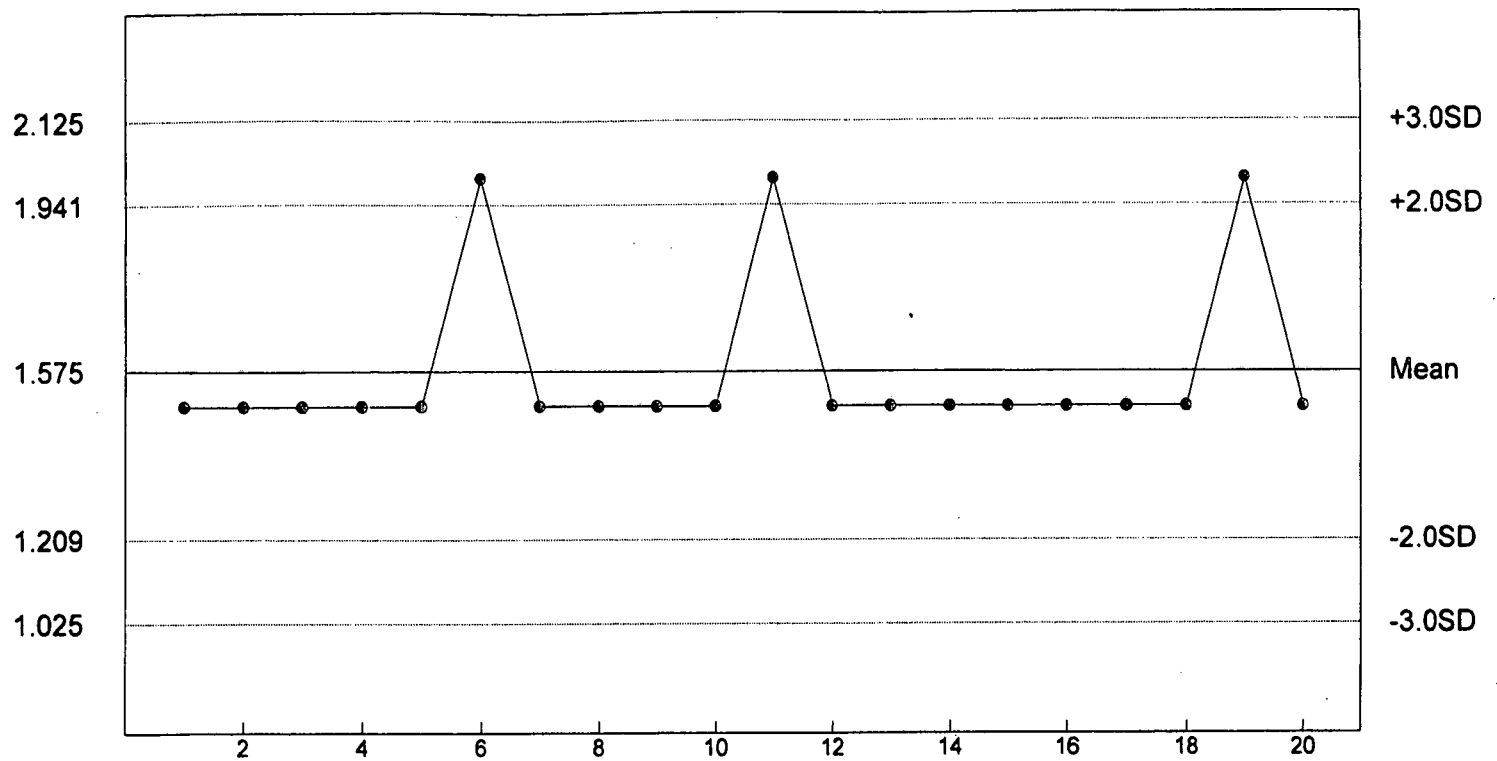
CONCENTRATION (g/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	0
2.0	10	7
2.5	10	10
3.0	10	10
4.0	10	10

LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR REPRODUCTION	NOEC FOR REPRODUCTION
2.0 g/L	1.5 g/L	1.0 g/L	0.5 g/L



Reference Tox Sodium Chloride g/L

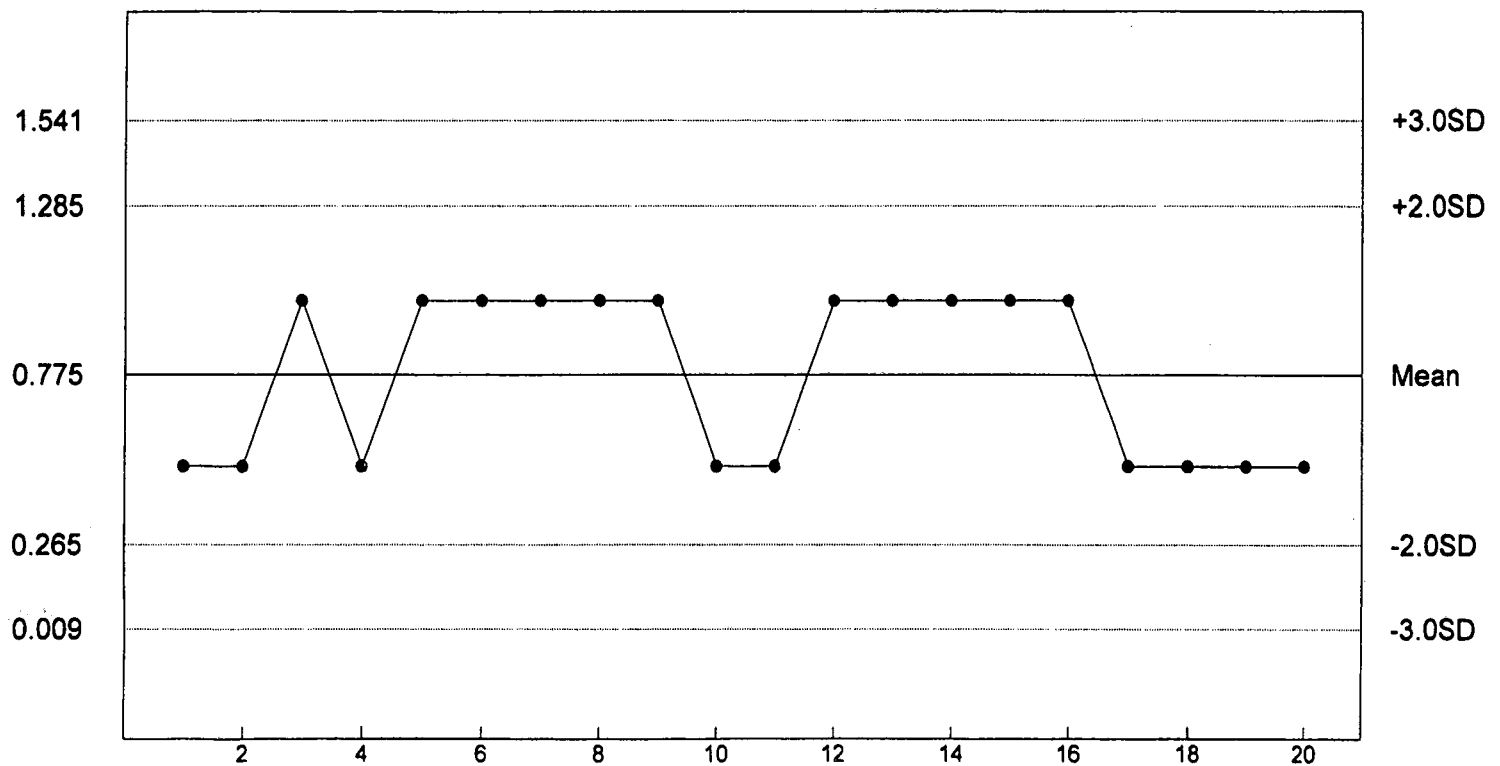
C. dubia Survival - NOEC



n= 20 Mean= 1.575 SD= 0.183 CV= 11.63% Min= 1.500 Max= 2.000

Reference Tox Sodium Chloride g/L

C. dubia Reproduction - NOEC



n= 20 Mean= 0.775 SD= 0.255 CV= 32.93% Min= 0.500 Max= 1.000

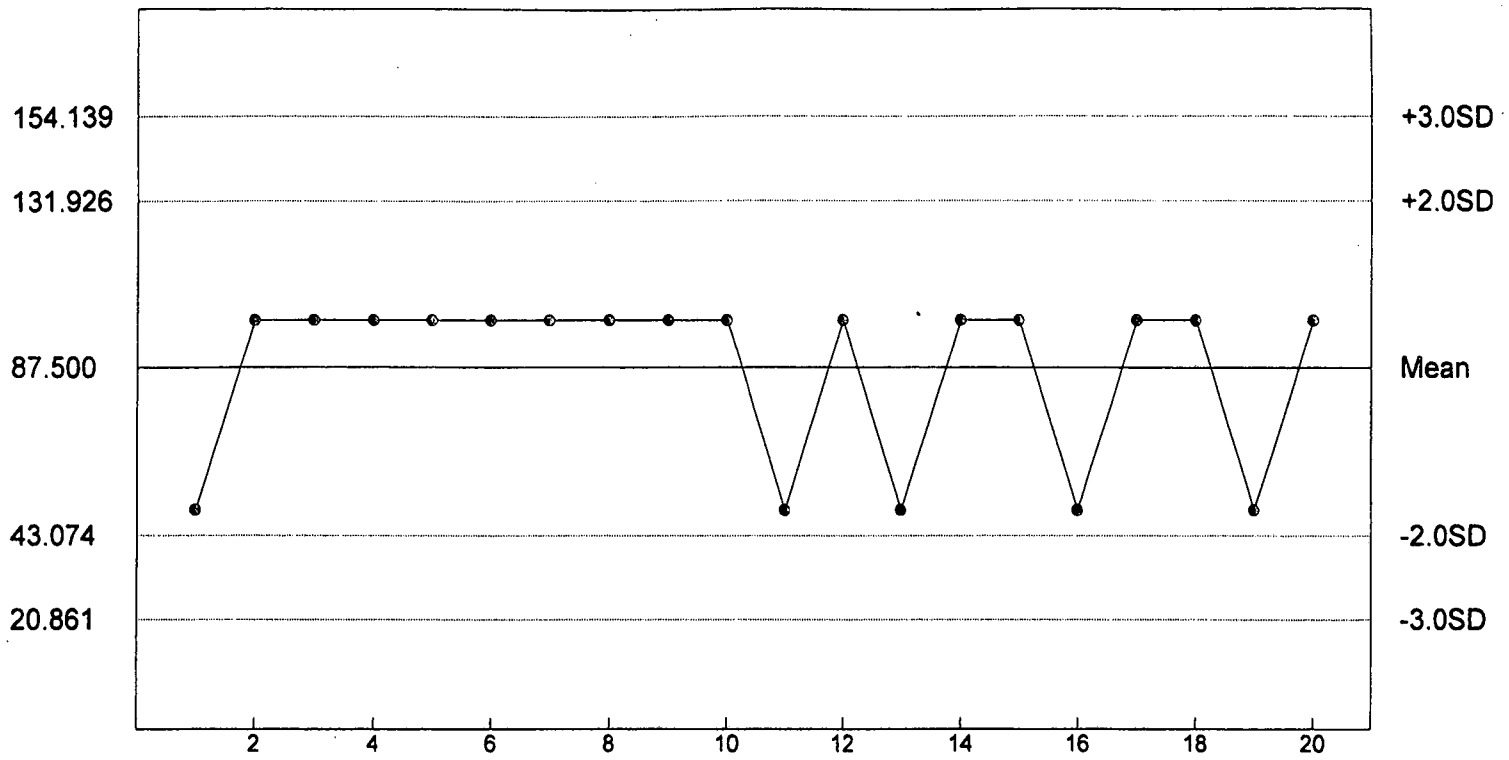
**CHRONIC REFERENCE TOXICANT TEST RESULTS**

SPECIES: *Pimephales promelas*  
 CHEMICAL: Copper Nitrate  
 DURATION: 7-Days  
 TEST NUMBER: 04  
 TEST DATE/TIME: 04/01/13 - 04/08/14  
 1500 Hrs - 1500 Hrs  
 STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	0
50	40	0
100	40	3
200	40	19
400	40	40
800	40	40

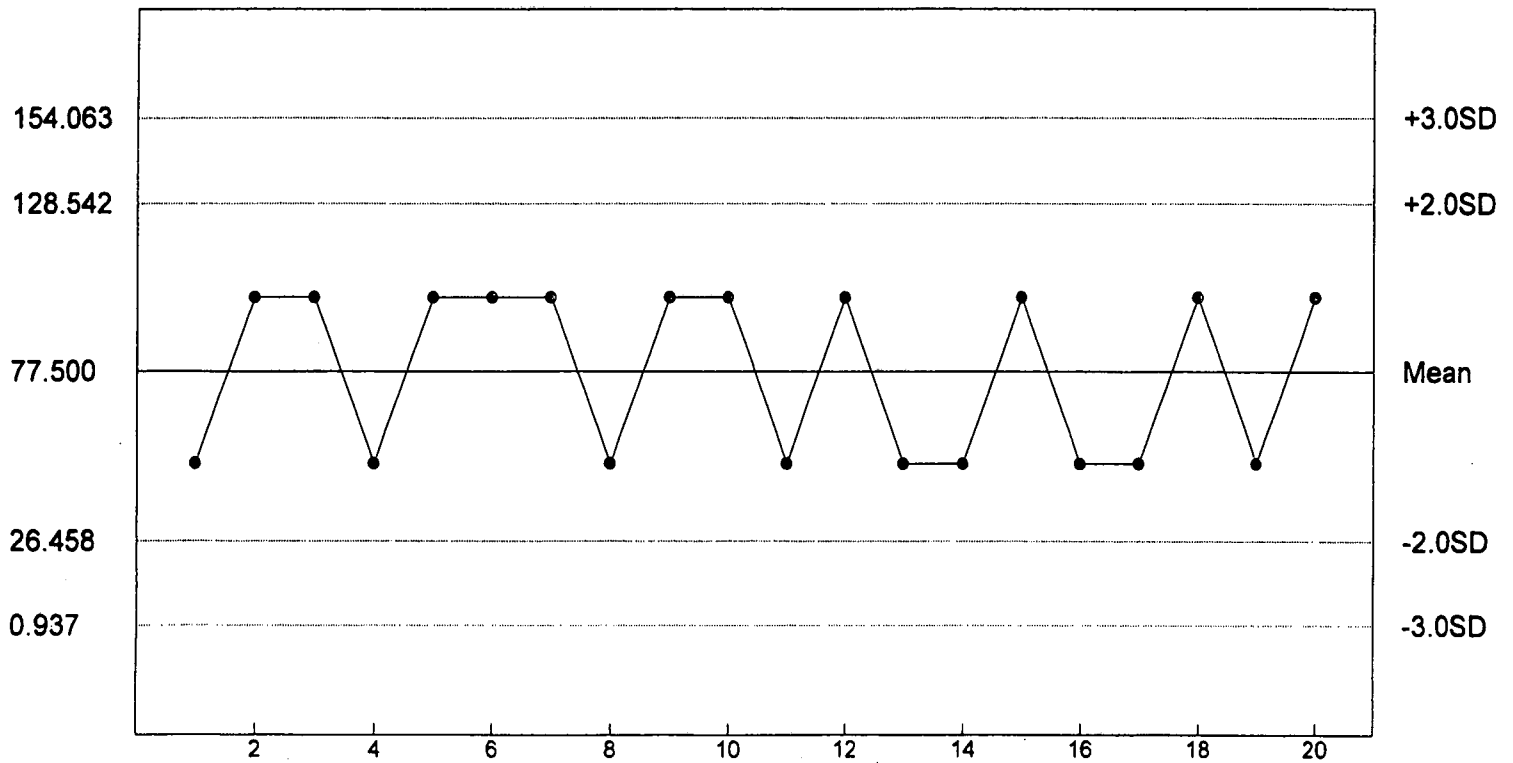
LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR GROWTH	NOEC FOR GROWTH
200 ug/L	100 ug/L	200 ug/L	100 ug/L

Reference Tox Copper Nitrate ug/L  
P. promelas Chronic Survival - NOEC



n= 20 Mean= 87.500 SD= 22.213 CV= 25.39% Min= 50.000 Max= 100.000

Reference Tox Copper Nitrate ug/L  
P. promelas Growth - NOEC



n= 20 Mean= 77.500 SD= 25.521 CV= 32.93% Min= 50.000 Max= 100.000

**APPENDIX C**  
**CHAIN OF CUSTODY SHEETS**

HUTHER & ASSOCIATES  
 1156 NORTH BONNIE BRAE STREET  
 DENTON, TX 76201  
 (940) 387-1025 • FAX (940) 387-1036

CHAIN OF CUSTODY RECORD

PROJECT # 22029 PROJECT NAME Forrest City PERMIT# AP0020087

OUTFALL SAMPLES

24-Hr Flow Weighted Composite  Other \_\_\_\_\_

OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	METHODS OF COLLECTION AND COMPOSITE			# OF CONTAINERS TO BE SHIPPED
					AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	
001	Wayne Howk	4-6-14 10:00AM	4-7-14 10:00AM	313	<input checked="" type="checkbox"/>			1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'G) H <sub>2</sub> O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED
<del>_____</del>				

TYPE OF TEST 7 day CF  
 NAME OF RECEIVING WATER unnamed trib.  
 DILUTION WATER USED FOR THIS TEST lab

RELINQUISHED BY: Wayne Howk DATE: 4-7-14 TIME: 11:00AM RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

METHOD OF SHIPMENT: Greyhound  Pick Up \_\_\_\_\_ Client Delivered \_\_\_\_\_ Other \_\_\_\_\_

RECEIVED: Guy Falkosner DATE: 4-08-14 TIME: 1015 SAMPLE TEMP. @ RECEIPT. -2.4



HUTHER & ASSOCIATES  
 1156 NORTH BONNIE BRAE STREET  
 DENTON, TX 76201  
 (940) 387-1025 • FAX (940) 387-1036

CHAIN OF CUSTODY RECORD

PROJECT # 22229 PROJECT NAME Forrest City PERMIT# AR0020087

OUTFALL SAMPLES

24-Hr Flow Weighted Composite  Other

OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	METHODS OF COLLECTION AND COMPOSITE			# OF CONTAINERS TO BE SHIPPED
					AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	
001	Joc R. Theford	4-10-14 10:00 AM	4-11-14 10:00 AM	246	<input checked="" type="checkbox"/>			1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H <sub>2</sub> O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED

TYPE OF TEST 7 day C/F

NAME OF RECEIVING WATER unnamed trib.

DILUTION WATER USED FOR THIS TEST lab

RELINQUISHED BY: Joc R Theford DATE: 4-11-14 TIME: 10:45 AM RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

RELINQUISHED BY: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ RECEIVED BY AT THIS DATE/TIME \_\_\_\_\_

METHOD OF SHIPMENT: Greyhound  Pick Up \_\_\_\_\_ Client Delivered \_\_\_\_\_ Other \_\_\_\_\_

RECEIVED: Chad Lee DATE: 4/12/14 TIME: 1045 SAMPLE TEMP. @ RECEIPT. 0.4

CITY OF FORREST CITY  
 NPDES PERMIT NO. AR0020087  
 BIOMONITORING REPORTING  
 TEST DATE: 04/08/14

I. *Ceriodaphnia dubia*

- a. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TLP3B.**
- b. Report the NOEC value for survival, **Parameter No. TOP3B.**
- c. Report the NOEC value for reproduction, **Parameter No. TPP3B.**
- d. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TGP3B.**
- e. Report the higher coefficient of variation (critical dilution or control), **Parameter No. TQP3B.**

Response

0
100%
100%
0
7.65%

II. *Pimephales promelas*

- a. If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TLP6C.**
- b. Report the NOEC value for survival, **Parameter No. TOP6C.**
- c. Report the NOEC value for growth, **Parameter No. TPP6C.**
- d. If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TGP6C.**
- e. Report the highest coefficient of variation (critical dilution or control) **Parameter No. TQP6C.**

Response

0
100%
100%
0
4.88%

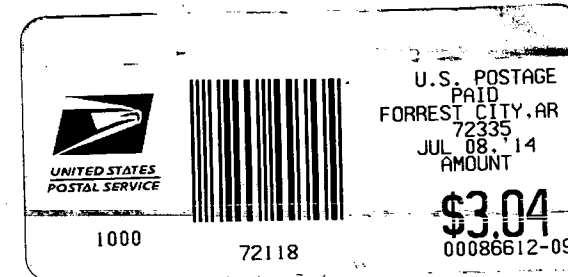


**Forrest City Water Utility**

303 North Rosser St.

P.O. Box 816

Forrest City, AR 72335



**ARKANSAS DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
WATER DIVISION – ENFORCEMENT BRANCH  
5301 NORTSHORE DRIVE  
NORTH LITTLE ROCK, AR 72118-5317**

