Forrest City Water Utility
303 N. Rosser St
Forrest City, AR 72335

4/22/2015

Transmittal Letter

Arkansas Department of Environmental Quality
5301 North Shore Dr.
North Little Rock, AR 72118-5317
ATTN: Michael Greenway-District 3 Field Inspector-Water Division

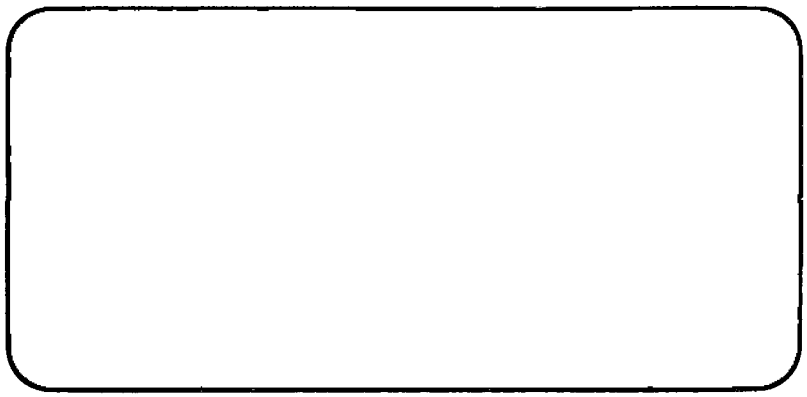
Please find Enclosed for your distribution the following:

June 2015 - DMR

June 2015 – 1 of 2 Bio Monitoring Report

Sincerely,

Forrest City Water Utility
W.H. Calvin Murdock, Manager
(870)633-2921 – Office
(870)261-2849 Cell
WHCM2@Forrestcitywater.com



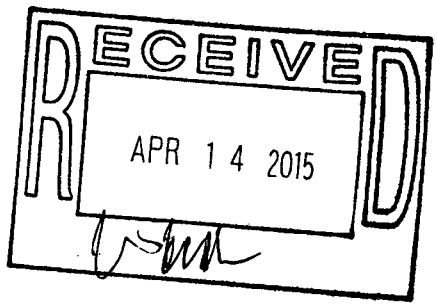
Huther and Associates, Inc.

CITY OF FORREST CITY WWTP
OUTFALL 001

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

Ceriodaphnia dubia
Pimephales promelas

March 24, 2015



Reviewed by: _____

Bruce Huther, Technical Director
Huther & Associates, Inc.
1156 North Bonnie Brae
Denton, Texas 76201
(940) 387-1025, Fax: (940) 387-1036

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TOXICITY TEST REPORT - CHRONIC

Client ..... City of Forrest City WWTP
Permit No. ..... NPDES AR0020087
Sample 001

Laboratory I.D. 23942
Begin Date .....March 24, 2015

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 WWTP were delivered by Greyhound Package Express courier to Huther & Associates on March 24, March 26 and March 28, 2015. 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, 22nd 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 1430 hours, March 24, 2015. Five concentrations were prepared (32%, 42%, 56%, 75%, 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of 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 1430 hours, March 31, 2015. 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.

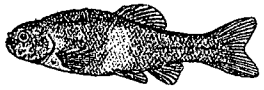
LOEC: Not Applicable
NOEC: 100% Effluent

REPRODUCTION
Ceriodaphnia dubia

C. dubia reproduction data failed Chi-Square test for normality at the 0.01 alpha level (13.277). Bartlett's test for homogeneity is sensitive to non-normal data and should not be performed on the non-normally distributed data. Therefore, a nonparametric test was performed on the data. Steel's Many-One Rank 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 **PMSD: 5.5%**
NOEC: 100% Effluent

TEST SETUP
Pimephales promelas



The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1630 hours, March 24, 2015. Five concentrations were prepared (32%, 42%, 56%, 75%, 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of 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 1630 hours, March 31, 2015. 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: 10.6%**
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 WWTP, 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 WWTP	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0020087	DATE COLLECTED	03/23/15 03/25/15 03/27/15
LAB ID #	23942	DATE RECEIVED	03/24/15 03/26/15 03/28/15
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	03/24/15 1430
TEST ORGANISM	*Ceriodaphnia dubia*	END DATE/TIME	03/31/15 1430
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 cndl
DILUTION WATER	Laboratory	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
	A	A	A	A	A	A	A	A	A	A
03/25/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/26/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/27/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/28/15	0	0	0	0	0	0	0	0	0	0
	2	2	3	2	4	2	3	3	2	4
03/29/15	2	2	3	2	4	2	3	3	2	4
	7	6	7	7	8	6	7	7	9	6
03/30/15	9	8	10	9	12	8	10	10	11	10
	13	14	12	12	13	15	12	12	13	13
03/31/15	22	22	22	21	25	23	22	22	24	23

x # Young 22.6 C.V. 5.19%

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
	A	A	A	A	A	A	A	A	A	A
03/25/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/26/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/27/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/28/15	0	0	0	0	0	0	0	0	0	0
	3	2	3	4	3	4	2	4	3	2
03/29/15	3	2	3	4	3	4	2	4	3	2
	8	7	6	6	9	7	7	8	7	10
03/30/15	11	9	9	10	12	11	9	12	10	12
	13	12	14	13	12	13	12	14	12	12
03/31/15	24	21	23	23	24	24	21	26	22	24

x # Young 23.2 C.V. 6.68%

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
	A	A	A	A	A	A	A	A	A	A
03/25/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/26/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/27/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/28/15	0	0	0	0	0	0	0	0	0	0
	2	3	2	2	3	4	3	2	5	2
03/29/15	2	3	2	2	3	4	3	2	5	2
	8	7	9	7	7	6	8	7	6	10
03/30/15	10	10	11	9	10	10	11	9	11	12
	13	12	14	12	13	14	12	12	13	12
03/31/15	23	22	25	21	23	24	23	21	24	24

x # Young 23.0 C.V. 5.80%

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
	A	A	A	A	A	A	A	A	A	A
03/25/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/26/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/27/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
03/28/15	0	0	0	0	0	0	0	0	0	0
	2	3	2	3	2	3	3	2	3	4
03/29/15	2	3	2	3	2	3	3	2	3	4
	7	7	9	6	7	7	8	7	6	7
03/30/15	9	10	11	9	9	10	11	9	9	11
	13	12	12	14	13	13	12	13	14	12
03/31/15	22	22	23	23	22	23	23	22	23	23

x # Young 22.6 C.V. 2.28%

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 WWTP | Lab ID# 23942 | Test Date: March 24, 2015

75% Effluent

Date / #	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/25/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/26/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/27/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/28/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/29/15	2	3	2	4	3	2	3	4	2	2
	2	3	2	4	3	2	3	4	2	2
03/30/15	6	7	7	6	8	8	7	6	9	10
	8	10	9	10	11	10	10	10	11	12
03/31/15	13	12	12	13	12	14	12	13	13	12
	21	22	21	23	23	24	22	23	24	24

x # Young 22.7 C.V. 5.11%

x% Survival 100% C.V. 0.00%

100% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/25/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/26/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/27/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/28/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/29/15	4	3	2	3	2	2	3	5	3	2
	4	3	2	3	2	2	3	5	3	2
03/30/15	6	7	7	8	8	9	7	6	9	8
	10	10	9	11	10	11	10	11	12	10
03/31/15	14	12	12	13	12	12	13	14	12	13
	24	22	21	24	22	23	23	25	24	23

x # Young 23.1 C.V. 5.18%

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 WWTP | Lab ID# 23942 | Test Date: March 24, 2015

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp No	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
03/24/15	Start	25.0	1	8.05	7.96	8.00	8.03	8.12	8.24	TB
03/25/15	24 Hr	25.5	1	7.85	7.94	8.04	8.06	8.10	8.17	TB
03/25/15	Renew	25.5	1	7.97	8.03	8.05	8.11	8.25	8.27	TB
03/26/15	48 Hr	25.6	1	7.99	8.06	8.15	8.18	8.23	8.30	TB
03/26/15	Renew	25.6	2	7.78	7.92	7.98	7.99	8.04	8.28	TG
03/27/15	72 Hr	25.7	2	7.88	8.02	8.08	8.07	8.20	8.21	TG
03/27/15	Renew	25.7	2	8.40	8.09	8.00	7.96	7.91	7.88	TG
03/28/15	96 Hr	25.7	2	7.95	7.98	8.01	8.00	8.07	8.14	TB
03/28/15	Renew	25.7	3	8.05	7.94	7.99	8.02	8.07	8.25	TB
03/29/15	120 Hr	25.7	3	7.87	8.02	8.08	8.14	8.24	8.29	TB
03/29/15	Renew	25.4	3	7.79	7.84	7.89	7.93	7.97	7.92	TB
03/30/15	144 Hr	25.4	3	7.81	7.88	7.88	7.87	7.86	7.90	BL
03/30/15	Renew	25.3	3	7.63	7.72	7.3	7.72	7.73	7.69	BL
03/31/15	168 Hr	25.5	3	8.00	8.11	8.18	8.22	8.30	8.40	BL

Date	Time	Temp	Samp No	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
03/24/15	Start	25.0	1	8.25	8.16	8.36	8.43	8.24	8.05	TB
03/25/15	24 Hr	25.5	1	7.95	7.91	8.22	8.48	8.29	8.02	TB
03/25/15	Renew	25.5	1	8.17	8.22	8.31	8.26	8.12	8.09	TB
03/26/15	48 Hr	25.6	1	7.79	8.00	8.34	8.32	8.11	7.96	TB
03/26/15	Renew	25.6	2	8.37	8.32	8.29	8.05	8.21	8.11	TG
03/27/15	72 Hr	25.7	2	7.8	7.96	8.26	8.40	8.23	8.02	TG
03/27/15	Renew	25.7	2	7.16	7.47	7.95	7.45	7.49	8.26	TG
03/28/15	96 Hr	25.7	2	8.00	7.60	7.79	8.07	7.69	7.63	TB
03/28/15	Renew	25.7	3	8.39	8.52	8.61	8.40	8.36	8.05	TB
03/29/15	120 Hr	25.7	3	7.67	7.86	7.87	7.27	7.46	7.87	TB
03/29/15	Renew	25.4	3	8.47	8.39	8.14	8.33	8.12	8.07	TB
03/30/15	144 Hr	25.4	3	8.01	8.46	8.31	8.44	7.99	8.49	BL
03/30/15	Renew	25.3	3	8.36	8.35	8.43	8.34	8.83	8.72	BL
03/31/15	168 Hr	25.5	3	7.98	7.33	7.33	7.26	7.44	7.47	BL

Huther and Associates

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

City of Forrest City WWTP | Lab ID# 23942 | Test Date: March 24, 2015

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No	pH	DO	Hardness mg/L CaCO3 [1]	Alkalinity mg/L CaCO3 [1]	Conduct umhos/cm [1]	Resid Cl2 mg/L [1]	Dechlor(mL) Na2S2O3 mg/L [1]	Analyst
03/24/15	1	8.24	8.05	260	168	844	<0.01	N/A	TG
03/26/15	2	8.28	8.11	260	164	885	<0.01	N/A	TG
03/28/15	3	8.25	8.05	256	178	904	<0.01	N/A	TG
03/24/15	Con	8.05	8.25	80	78	342	-	-	TG

[1] Measurements taken in 100% solution.

Huther and Associates, Inc.
Begin Date: March 24, 2015
Lab I.D.# 23942

CERIODAPHNIA DUBIA STATISTICAL ANALYSES
Reproduction

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	10	21.000	25.000	22.600
2	32% Effluent	10	21.000	26.000	23.200
3	42% Effluent	10	21.000	25.000	23.000
4	56% Effluent	10	22.000	23.000	22.600
5	75% Effluent	10	21.000	24.000	22.700
6	100% Effluent	10	21.000	25.000	23.100

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	1.378	1.174	0.371	5.19
2	32% Effluent	2.400	1.549	0.490	6.68
3	42% Effluent	1.778	1.333	0.422	5.80
4	56% Effluent	0.267	0.516	0.163	2.28
5	75% Effluent	1.344	1.160	0.367	5.11
6	100% Effluent	1.433	1.197	0.379	5.18

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	1	22	13	21	3

Calculated Chi-Square goodness of fit test statistic = 13.5663
Table Chi-Square value (alpha = 0.01) = 13.277

Data **Fail** normality test. Try another transformation.

Steel's Many-One Rank Test - Ho:Control < Treatment

Grp	Identification	Transformed Mean	Rank Sum	Crit. Value	Df	Sig
1	Control	22.600				
2	32% Effluent	23.200	117.50	75.00	10.00	
3	42% Effluent	23.000	115.50	75.00	10.00	
4	56% Effluent	22.600	111.00	75.00	10.00	
5	75% Effluent	22.700	109.50	75.00	10.00	
6	100% Effluent	23.100	118.50	75.00	10.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05
No statistically significant difference

Huther and Associates

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

CLIENT	City of Forrest City WWTP	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0020087	DATE COLLECTED	03/23/15 03/25/15 03/27/15
LAB ID #	23942	DATE RECEIVED	03/24/15 03/26/15 03/28/15
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	03/24/15 1630
TEST ORGANISM	*Pimephales promelas*	END DATE/TIME	03/31/15 1630
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'Anguille River	LIGHT INTENSITY	50-100 ft. cndl
DILUTION WATER	Laboratory	TECHNICIAN	Z. Geiger

SURVIVAL SUMMARY

Conc.	03/25/15					03/26/15					03/27/15					03/28/15					03/29/15				
	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.	03/30/15					03/31/15					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	0.4250	0.4710	0.4950	0.4120	0.4350	0.4476	7.68
32%	0.4470	0.4620	0.4850	0.4200	0.4670	0.4562	5.34
42%	0.5020	0.4450	0.4760	0.4350	0.4620	0.4640	5.70
56%	0.4850	0.5040	0.4960	0.4200	0.4710	0.4752	7.00
75%	0.4560	0.4270	0.5060	0.4810	0.4260	0.4592	7.56
100%	0.4950	0.4260	0.4810	0.4350	0.5020	0.4678	7.49

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

City of Forrest City WWTP | Lab ID# 23942 | Test Date: March 24, 2015

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
03/24/15	Start	25.0	1	8.05	7.96	8.00	8.03	8.12	8.24	TB
03/25/15	24 Hr	25.5	1	8.10	7.86	7.89	7.96	8.06	8.14	TB
03/25/15	Renew	25.5	1	7.97	8.03	8.05	8.11	8.25	8.27	TB
03/26/15	48 Hr	25.6	1	7.66	7.70	7.73	7.78	7.82	7.85	TG
03/26/15	Renew	25.6	2	7.78	7.92	7.98	7.99	8.04	8.28	TG
03/27/15	72 Hr	25.7	2	7.98	8.01	8.08	8.13	8.16	8.19	TG
03/27/15	Renew	25.7	2	8.40	8.09	8.00	7.96	7.91	7.88	TG
03/28/15	96 Hr	25.3	2	8.04	7.98	8.08	8.04	8.02	8.12	TB
03/28/15	Renew	25.5	3	8.05	7.94	7.99	8.02	8.07	8.25	TB
03/29/15	120 Hr	25.2	3	8.00	7.86	7.79	7.98	8.04	8.07	TB
03/29/15	Renew	25.3	3	7.79	7.84	7.89	7.93	7.97	7.92	TB
03/30/15	144 Hr	25.3	3	8.09	8.45	8.33	8.39	8.28	8.36	BL
03/30/15	Renew	25.3	3	7.63	7.72	7.3	7.72	7.73	7.69	BL
03/31/15	168 Hr	25.1	3	7.90	8.19	8.16	8.17	8.12	8.23	BL

Date	Time	Temp	Samp No	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
03/24/15	Start	25.0	1	8.25	8.16	8.36	8.43	8.24	8.05	TB
03/25/15	24 Hr	25.5	1	8.12	8.20	8.19	8.32	8.18	8.17	TB
03/25/15	Renew	25.5	1	8.17	8.22	8.31	8.26	8.12	8.09	TB
03/26/15	48 Hr	25.6	1	8.28	8.30	8.28	8.23	8.19	8.11	TG
03/26/15	Renew	25.6	2	8.37	8.32	8.29	8.05	8.21	8.11	TG
03/27/15	72 Hr	25.7	2	8.12	8.21	8.38	8.29	8.10	8.30	TG
03/27/15	Renew	25.7	2	7.16	7.47	7.95	7.45	7.49	8.26	TG
03/28/15	96 Hr	25.3	2	8.23	8.36	8.20	8.31	8.16	8.14	TB
03/28/15	Renew	25.5	3	8.39	8.52	8.61	8.40	8.36	8.05	TB
03/29/15	120 Hr	25.2	3	8.34	8.39	8.24	8.39	8.09	8.16	TB
03/29/15	Renew	25.3	3	8.47	8.39	8.14	8.33	8.12	8.07	TB
03/30/15	144 Hr	25.3	3	8.40	8.46	8.51	8.49	8.44	8.40	BL
03/30/15	Renew	25.3	3	8.36	8.35	8.43	8.34	8.83	8.72	BL
03/31/15	168 Hr	25.1	3	8.07	7.98	7.00	7.03	7.11	7.79	BL

Huther and Associates

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

City of Forrest City WWTP | Lab ID# 23942 | Test Date: March 24, 2015

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp No	pH	DO	Hardness mg/L CaCO3 [1]	Alkalinity mg/L CaCO3 [1]	Conduct [1] umhos/cm	Resid Cl2 mg/L [1]	Dechlor(mL) Na2S2O3 mg/L [1]	Analyst
03/24/15	1	8.24	8.05	260	168	844	<0.01	N/A	TG
03/26/15	2	8.28	8.11	260	164	885	<0.01	N/A	TG
03/28/15	3	8.25	8.05	256	178	904	<0.01	N/A	TG
03/24/15	Con	8.05	8.25	80	78	342	-	-	TG

[1] Measurements taken in 100% solution.

Huther and Associates, Inc.
Begin Date: March 24, 2015
Lab I.D.# 23942

PIMEPHALES PROMELAS STATISTICAL ANALYSES
Growth

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	0.412	0.495	0.448
2	32% Effluent	5	0.420	0.485	0.456
3	42% Effluent	5	0.435	0.502	0.464
4	56% Effluent	5	0.420	0.504	0.475
5	75% Effluent	5	0.426	0.506	0.459
6	100% Effluent	5	0.426	0.502	0.468

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.001	0.034	0.015	7.68
2	32% Effluent	0.001	0.024	0.011	5.34
3	42% Effluent	0.001	0.026	0.012	5.70
4	56% Effluent	0.001	0.033	0.015	7.00
5	75% Effluent	0.001	0.035	0.016	7.56
6	100% Effluent	0.001	0.035	0.016	7.49

Shapiro - Wilk's Test For Normality

D = 0.024

W = 0.955

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 = 0.85

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	0.002	0.000	0.459
Within (Error)	24	0.024	0.001	
Total	29	0.026		

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	Transformed Mean	Mean Calculated In Original Units	T Stat	Sig
1	Control	0.448	0.448		
2	32% Effluent	0.456	0.456	-0.430	
3	42% Effluent	0.464	0.464	-0.819	
4	56% Effluent	0.475	0.475	-1.379	
5	75% Effluent	0.459	0.459	-0.579	
6	100% Effluent	0.468	0.468	-1.009	

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)	% of Control	Difference from Control
1	Control	5			
2	32% Effluent	5	0.047	10.6	-0.009
3	42% Effluent	5	0.047	10.6	-0.016
4	56% Effluent	5	0.047	10.6	-0.028
5	75% Effluent	5	0.047	10.6	-0.012
6	100% Effluent	5	0.047	10.6	-0.020

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 # 23942

START DATE/TIME 3-24-15 NL 1430
END DATE/TIME 3-31-15 ZG 1430

Con

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	2	2	3	2	4	2	3	3	2	4	NL	1315
3/30	7	6	7	7	8	6	7	7	9	6	ZG	1200
3/31	13	14	12	12	13	15	12	12	13	13	ZG	1430
	22	22	22	21	25	23	22	22	24	23		

x̄ # Young w/o Dead = 22.6 CV% = 5.19
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100 CV% = 0.00

32

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	3	2	3	4	3	4	2	4	3	2	NL	1315
3/30	8	7	6	6	9	7	7	8	7	10	ZG	1200
3/31	13	12	14	13	12	13	12	14	12	12	ZG	1430
	24	21	23	23	24	24	21	26	22	24		

x̄ # Young w/o Dead = 23.2 CV% = 6.68
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100 CV% = 0.00

42

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	2	3	2	2	3	4	3	2	3	2	NL	1315
3/30	8	7	9	7	7	6	8	7	6	10	ZG	1200
3/31	13	12	14	12	13	14	12	12	13	12	ZG	1430
	23	22	25	21	23	24	23	21	24	24		

x̄ # Young w/o Dead = 23.0 CV% = 5.80
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100 CV% = 0.00

56

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	2	3	2	3	2	3	3	2	3	4	NL	1315
3/30	7	7	9	6	7	7	6	7	6	7	ZG	1200
3/31	13	12	12	14	13	13	12	13	14	12	ZG	1430
	22	22	23	23	22	23	23	22	23	23		

x̄ # Young w/o Dead = 22.6 CV% = 2.28
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100 CV% = 0.00

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

CLIENT Forrest City
OUTFALL 001
LAB ID # 23942

START DATE/TIME 3-24-15 NL 1430
END DATE/TIME 3-31-15 ZG 1430

75

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	2	3	2	4	3	2	3	4	2	2	NL	1315
3/30	6	7	7	6	8	8	7	6	9	10	ZG	1200
3/31	13	12	12	13	12	14	12	13	13	12	ZG	1430
	21	22	21	23	23	24	22	23	24	24		

$\bar{x}$ # Young w/o Dead = 22.7 CV% = 5.11

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

$\bar{x}$ % Survival = 100 CV% = 0.00

100

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/25	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/26	A	A	A	A	A	A	A	A	A	A	NL	1545
3/27	A	A	A	A	A	A	A	A	A	A	ZG	1430
3/28	A	A	A	A	A	A	A	A	A	A	NL	1315
3/29	4	3	2	3	2	2	3	5	3	2	NL	1315
3/30	6	7	7	8	8	9	7	6	9	8	ZG	1200
3/31	14	12	12	13	12	12	13	14	12	13	ZG	1430
	24	22	21	24	22	23	23	25	24	23		

$\bar{x}$ # Young w/o Dead = 23.1 CV% = 5.18

$\bar{x}$ # 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 #: 23942
ORGANISM ID#: PPO-15-082

DATE/TIME STARTED: 3-24-15 2G 1630
DATE/TIME ENDED: 3-31-15 2G 1630

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
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	3-25-15 MH 1630					3-26-15 MH 0915					3-27-15 2G 0830					3-28-15 MH 1015					3-29-15 NL 1945				

Conc.	A	B	C	D	E	A	B	C	D	E	Mean Survival	C.V.%
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	3-30-15 TB 1045					3-31-15 2G 1630						

Huther and Associates, Inc.

environmental toxicologists, biologists, consultants

7-DAY CHRONIC TOXICITY TEST
PIMEPHALES PROMELAS (fathead minnow) MEAN WEIGHT/REP

Client: Forest City

Project#: 23942

Date/Time Start: 3/24/15 1630

Date/Time End: 3/31/15 1630

% Effluent	Rep A	Rep B	Rep C	Rep D	Rep E	$\bar{x}$	C.V.%	Analyst
Ctrl	.4250	.4710	.4950	.4120	.4350	.4476	7.68	BH
32	.4470	.4620	.4650	.4200	.4670	.45162	5.34	
42	.5020	.4450	.4760	.4350	.4620	.4640	5.70	
56	.4650	.5040	.4960	.4200	.4710	.4752	7.00	
75	.4560	.4270	.5060	.4810	.4260	.4592	7.516	
100	.4950	.4260	.4810	.4350	.5020	.4678	7.49	

Huther and Associates, Inc.

environmental toxicologists, biologists, and consultants

Client / Facility Forrest City

Lab ID Number 23942

Outfall Number 001

Test Date 3-24-15

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH	DO	Hardness mg/L CaCO3 [1]	Alkalinity mg/L CaCO3 [1]	Conduct. umhos/cm [1]	Resid.Cl2 mg/L [1]	Dechlor(mL) Na2S2O3 mg/L [1]	Analyst
3/24	1	8.24	8.05	260	168	844	<0.01	NA	TG
3/26	2	8.28	8.11	260	164	885	"	"	"
3/28	3	8.25	8.05	256	178	904	"	"	"
3/24	CoN	8.05	8.25	80	78	342	—	—	"

INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER

Date	Samp. No.	pH	DO	Hardness mg/L CaCO3 [1]	Alkalinity mg/L CaCO3 [1]	Conduct. umhos/cm [1]	Resid.Cl2 mg/L [1]	Dechlor(mL) Na2S2O3 mg/L [1]	Analyst

Notes:

APPENDIX B
REFERENCE TOXICANTS

Huther and Associates, Inc.
environmental toxicologists, biologists, consultants

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES:	*Ceriodaphnia dubia*
CHEMICAL:	Copper Nitrate
DURATION:	7-Days
TEST NUMBER:	3
TEST DATE:	03/04/15 - 03/11/15 1000 Hrs - 1000 Hrs
STATISTICAL METHOD:	Dunnetts/Steels

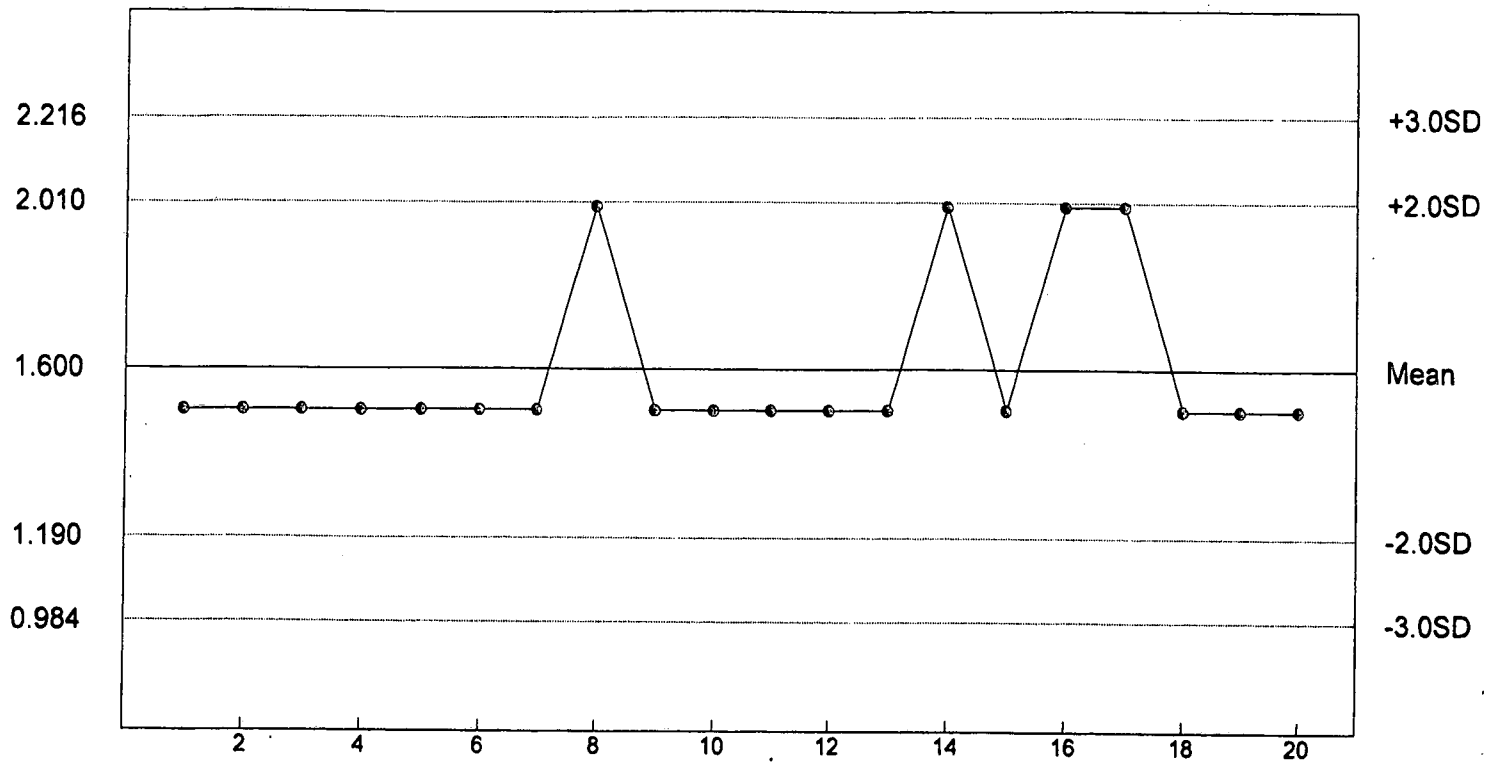
CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	0
2.0	10	5
2.5	10	10
3.0	10	10

LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR GROWTH	NOEC FOR GROWTH
2.0 *ug*/L	**1.5 *ug*/L**	**1.0 *ug*/L**	**0.5 *ug*/L**

1156 Bonnie Brae Denton, Texas 76201 (940) 387-1025

Reference Tox Sodium Chloride g/L

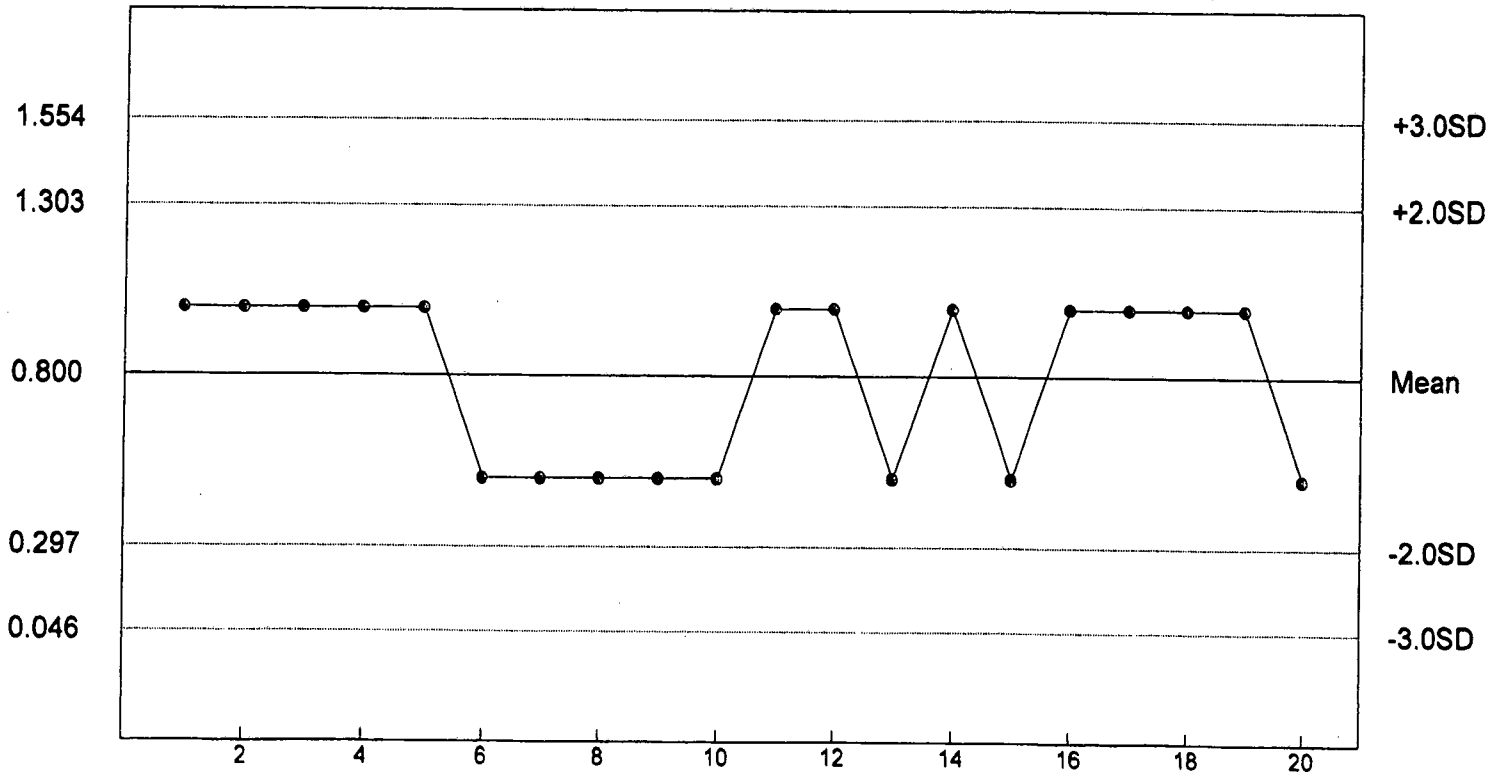
C. dubia Survival - NOEC



n= 20 Mean= 1.600 SD= 0.205 CV= 12.82% Min= 1.500 Max= 2.000

Reference Tox Sodium Cloride g/L

C. dubia Reproduction - NOEC



n= 20 Mean= 0.800 SD= 0.251 CV= 31.41% Min= 0.500 Max= 1.000

Huther and Associates, Inc.
environmental toxicologists, biologists, consultants

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES:	*Pimephales promelas*
CHEMICAL:	Copper Nitrate
DURATION:	7-Days
TEST NUMBER:	3
TEST DATE:	03/04/15 - 03/11/15 1540 Hrs - 1540 Hrs
STATISTICAL METHOD:	Dunnetts/Steels

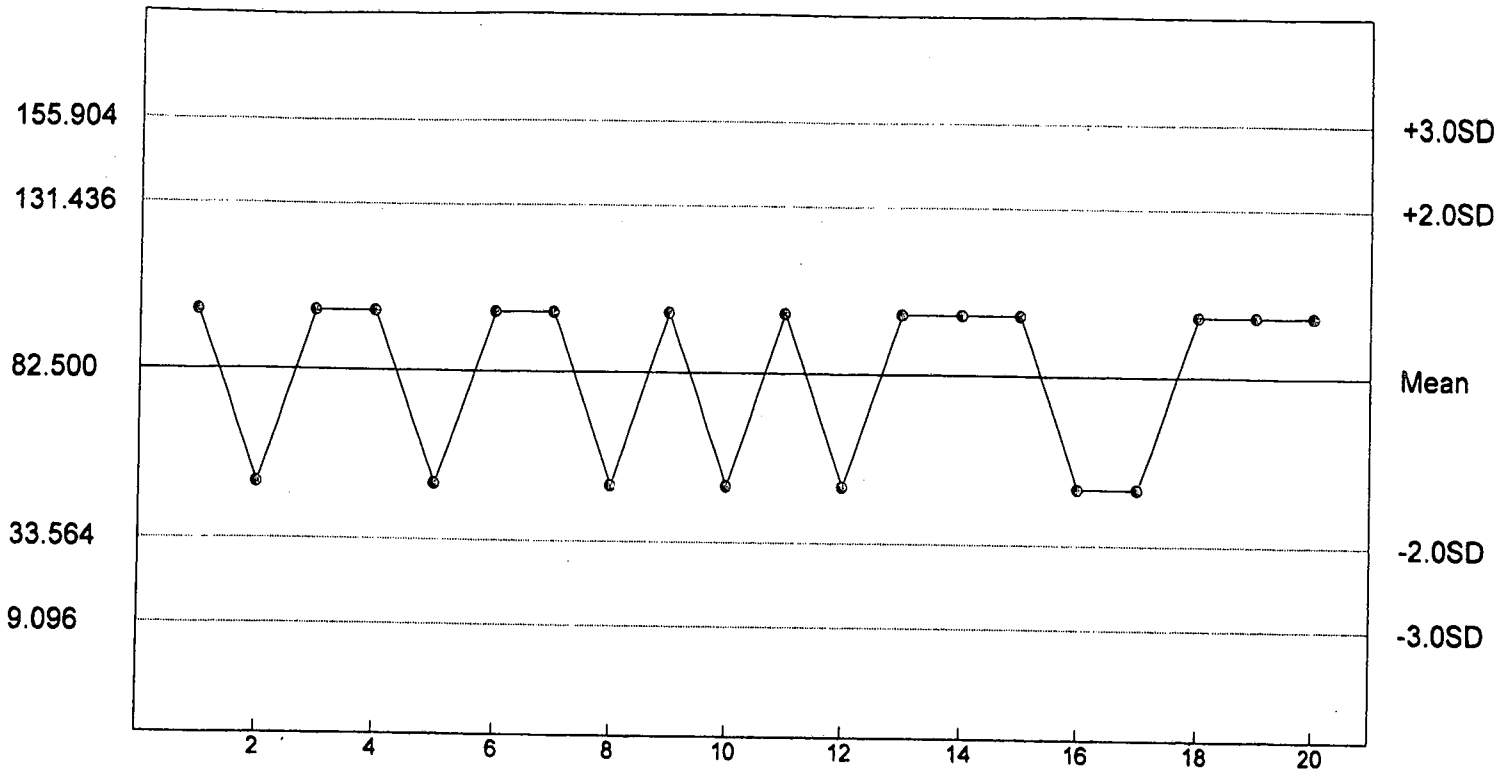
CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
25	40	0
50	40	0
100	40	0
200	40	6
400	40	15
800	40	40

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

1156 Bonnie Brae Denton, Texas 76201 (940) 387-1025

Reference Tox Copper Nitrate ug/L

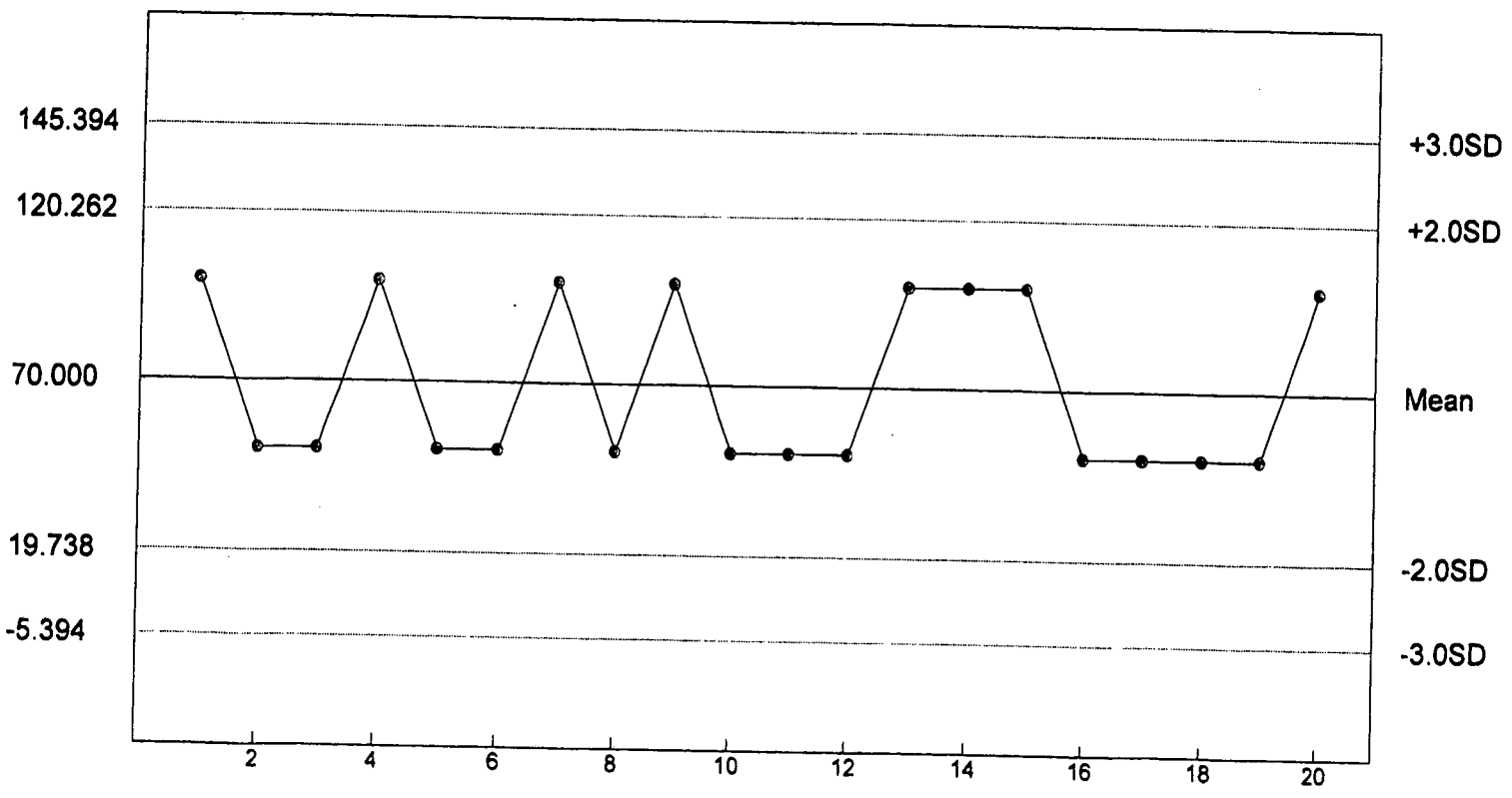
P. promelas Chronic Survival - NOEC



n= 20 Mean= 82.500 SD= 24.468 CV= 29.66% Min= 50.000 Max= 100.000

Reference Tox Copper Nitrate ug/L

P. promelas Growth - NOEC



n= 20 Mean= 70.000 SD= 25.131 CV= 35.90% 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 # 23942 PROJECT NAME Forrest City PERMIT# NPDES 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: AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
001	Joel R. Thetford	3-22-15 10:00AM	3-23-15 10:00AM	293	✓			1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H_2O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED

TYPE OF TEST 7day C/F

NAME OF RECEIVING WATER unnamed trib.

DILUTION WATER USED FOR THIS TEST Lab

RELINQUISHED BY: Joel R Thetford DATE: 3-23-15 TIME: 10:30AM 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 X Pick Up _____ Client Delivered _____ Other _____

RECEIVED: Matt Horner DATE: 3-24-15 TIME: 1215 SAMPLE TEMP. @ RECEIPT. 0.7

1ST PAGE - LAB COPY 2ND PAGE - FACILITY COPY

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

CHAIN OF CUSTODY RECORD

PROJECT # 23942 PROJECT NAME Forrest City PERMIT# NPDES AR0022008

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: AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
001	Joel R. Thetford	3-24-15 10:00Am	3-25-15 10:00Am	234	✓			1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H_2O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED

TYPE OF TEST 7day C/E

NAME OF RECEIVING WATER unnamed trib

DILUTION WATER USED FOR THIS TEST Lab

RELINQUISHED BY: Joel K Thetford DATE: 3-25-15 TIME: 10:30Am 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: Matt Dorner DATE: 3-26-15 TIME: 1105 SAMPLE TEMP. @ RECEIPT. -0.6

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

CHAIN OF CUSTODY RECORD

PROJECT # 23942 PROJECT NAME Forrest City PERMIT# NPDES AR0022008

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: AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
001	Joel R. Thetford	3-26-15 10:00AM	3-27-15 10:00 AM	251	✓			1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H_2O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED

TYPE OF TEST 7day C/F

NAME OF RECEIVING WATER unnamed tr.b.

DILUTION WATER USED FOR THIS TEST Lab

RELINQUISHED BY: Joel R. Thetford DATE: 3-27-15 TIME: 10:45AM 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: Matt Warner DATE: 3-28-15 TIME: 0955 SAMPLE TEMP. @ RECEIPT. 1.8

1ST PAGE - LAB COPY 2ND PAGE - FACILITY COPY

Huther and Associates, Inc.

environmental toxicologists, biologists, and consultants

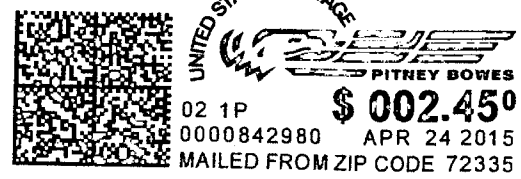
CITY OF FORREST CITY WWTP
NPDES PERMIT NO. AR0020087
BIOMONITORING REPORTING
TEST DATE: 03/24/15

I. *Ceriodaphnia dubia*	**Response**
a. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TLP3B.**	0
b. Report the NOEC value for survival, **Parameter No. TOP3B.**	100%
c. Report the NOEC value for reproduction, **Parameter No. TPP3B.**	100%
d. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter No. TGP3B.**	0
e. Report the higher coefficient of variation (critical dilution or control), **Parameter No. TQP3B.**	5.19%

II. *Pimephales promelas*	**Response**
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.**	0
b. Report the NOEC value for survival, **Parameter No. TOP6C.**	100%
c. Report the NOEC value for growth, **Parameter No. TPP6C.**	100%
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.**	0
e. Report the highest coefficient of variation (critical dilution or control) **Parameter No. TQP6C.**	7.68%

1156 North Bonnie Brae Denton, Texas 76201 Ph: (940) 387-1025 Fax: (940) 387-1036

Forrest City Water Utility
303 N. Rosser Street
Post Office Box 816
Forrest City, AR 72335



Arkansas Department of
Environmental Quality
5301 North Shore Drive
North Little Rock, AR 72118-5317