

**CITY CORPORATION – RUSSELLVILLE WSS  
 NPDES PERMIT NO. AR0021768  
 BIOMONITORING REPORTING  
 TEST DATE: 07/10/12**

**I. *Ceriodaphnia dubia***

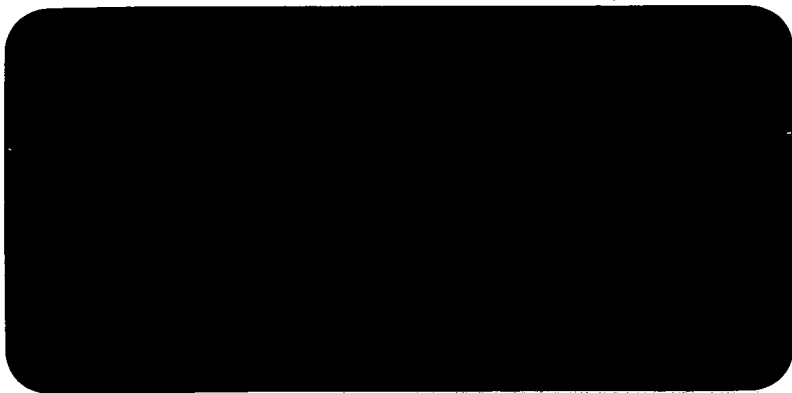
**Response**

(A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TLP3B.	0
(B) ) If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TGP3B.	0
(C) Report the NOEC value for survival, Parameter No. TOP3B.	100%
(D) Report the NOEC value for reproduction, Parameter No. TPP3B.	100%
(E) Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B.	9.14%

**II. *Pimephales promelas* (fathead minnow)**

**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) 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
(C) Report the NOEC value for survival, Parameter No. TOP6C.	100%
(D) Report the NOEC value for growth, Parameter No. TPP6C.	100%
(E) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C.	8.47%



**Huther and Associates, Inc.**

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BY:.....

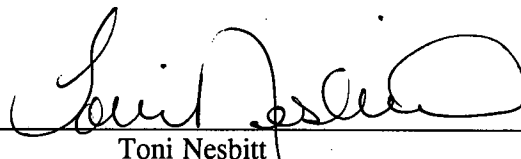
**ENVIRONMENTAL ENTERPRISE GROUP  
CITY CORPORATION - RUSSELLVILLE WWS  
OUTFALL 001**

Chronic Biomonitoring Report  
Permit Number NPDES AR0021768  
AFIN Number 58-00740

*Ceriodaphnia dubia*  
*Pimephales promelas*

July 10, 2012

Reviewed by:



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TOXICITY TEST REPORT - CHRONIC

Client ..... Environmental Enterprise Group      Sample..... Outfall 001  
Facility .... City Corporation – Russellville WWS      Laboratory I.D. .... 19815  
Permit No. .... NPDES AR0021768      Begin Date ..... July 10, 2012

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 Environmental Enterprise Group, City Corporation – Russellville WWS were delivered by United Parcel Service courier to Huther & Associates on July 10, July 12, and July 14, 2012. Effluent samples were collected and composited from Outfall 001 using an automatic sampler. 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, 20<sup>th</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 1435 hours, July 10, 2012. 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 (Whig Creek). 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 1435 hours, July 17, 2012. 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: 9.9%**

**TEST SETUP*****Pimephales promelas***

The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1450 hours, July 10, 2012. 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 (Whig Creek). 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 1450 hours, July 17, 2012. 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: 12.5%**  
**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 AR0021768 for Environmental Enterprise Group, City Corporation - Russellville WWS, Outfall 001 passed for this testing period.

Huthur and Associates

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

CLIENT **EEG, City Corporation - Russellville, WVS**  
 NPDES # **AR0021768**  
 LAB ID # **19815**  
 TEST TYPE **7 Day Chronic**  
 TEST ORGANISM ***Ceriodaphnia dubia***  
 ORGANISM AGE **< 24 Hours**  
 ORGANISM SOURCE **In House**  
 RECEIVING WATER **Whig Creek**  
 DILUTION WATER **Laboratory Adjusted**

SAMPLE TYPE **24 Hour Composite**  
 DATE COLLECTED **07/09/12 07/11/12 07/13/12**  
 DATE RECEIVED **07/10/12 07/12/12 07/14/12**  
 BEGIN DATE/TIME **07/10/12 1435**  
 END DATE/TIME **07/17/12 1435**  
 TEST TEMPERATURE (°C) **25 ± 1**  
 PHOTO PERIOD **16-hr. Light 8-hr. Dark**  
 LIGHT INTENSITY **50-100 ft. cndl.**  
 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
07/11/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/12/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/14/12	A	5	3	2	A	2	A	2	2	3
	0	5	3	2	0	2	0	2	2	3
07/15/12	4	A	A	A	4	A	3	A	A	6
	4	5	3	2	4	2	3	2	2	9
07/16/12	7	9	7	10	8	7	7	6	7	9
	11	14	10	12	12	9	10	8	9	9
07/17/12	14	13	12	13	13	12	13	13	14	12
	25	27	22	25	25	21	23	21	23	21

x # Young 23.3                      C.V. 9.06%  
 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
07/11/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/12/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/14/12	4	2	5	3	3	2	4	3	2	4
	4	2	5	3	3	2	4	3	2	4
07/15/12	7	9	6	6	A	6	A	A	7	A
	11	11	11	9	3	8	4	3	9	4
07/16/12	A	A	A	A	A	9	A	7	7	A
	11	11	11	9	12	8	11	10	9	13
07/17/12	14	13	15	13	14	13	13	14	14	12
	25	24	26	22	26	21	24	24	23	25

x # Young 24.0                      C.V. 6.80%  
 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
07/11/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/12/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/14/12	4	3	5	3	4	5	3	A	3	4
	4	3	5	3	4	5	3	0	3	4
07/15/12	10	8	7	11	A	A	A	3	6	8
	14	11	12	14	4	5	3	3	9	12
07/16/12	A	A	A	A	8	9	7	8	A	A
	14	11	12	14	12	14	10	11	9	12
07/17/12	13	14	15	13	14	14	12	13	14	15
	27	25	27	27	26	28	22	24	23	27

x # Young 25.6                      C.V. 7.86%  
 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
07/11/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/12/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
07/14/12	4	3	3	4	4	5	5	5	4	4
	4	3	3	4	4	5	5	5	4	4
07/15/12	7	6	10	8	A	A	A	A	9	7
	11	9	13	12	4	5	5	5	13	11
07/16/12	A	A	A	A	7	8	7	9	A	A
	11	9	13	12	11	13	12	14	13	11
07/17/12	15	15	15	14	12	14	13	13	14	13
	26	24	28	26	23	27	25	27	27	24

x # Young 25.7                      C.V. 6.37%  
 x% Survival 100%                      C.V. 0.00%

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

EEG, City Corp. - Russellville WWS

Lab ID# 19815

Test Date: July 10, 2012

75% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
07/11/12	A	A	A	A	A	A	A	A	A	A
07/12/12	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
07/14/12	5	3	4	5	5	5	4	2	3	3
07/15/12	10	11	8	11	A	9	11	6	7	9
07/16/12	15	14	12	16	15	14	15	8	10	12
07/17/12	14	14	13	15	14	13	15	13	13	13
07/17/12	29	28	25	31	28	27	30	21	23	25
x# Young		26.7		C.V.		11.85%				
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
07/11/12	A	A	A	A	A	A	A	A	A	A
07/12/12	0	0	0	0	0	0	0	0	0	0
07/13/12	A	A	A	A	A	A	A	A	A	A
07/14/12	4	2	5	5	3	4	5	3	5	3
07/15/12	7	9	11	11	A	10	A	6	8	7
07/16/12	11	11	16	16	3	14	5	9	13	10
07/17/12	15	14	14	14	12	15	13	14	13	15
07/17/12	28	25	30	30	25	29	25	23	26	25
x# Young		26.4		C.V.		9.14%				
x% Survival		100%		C.V.		0.00%				

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

EEG, City Corp. - Russellville WWS

Lab ID# 19815

Test Date: July 10, 2012

**WET CHEMISTRY MEASUREMENTS**

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
07/10/12	Start	25.0	1	8.12	7.87	7.78	7.71	7.64	7.35	STC
07/11/12	24 Hr.	25.3	1	7.76	7.82	7.84	7.85	7.85	7.85	MJ
07/11/12	Renew	25.5	1	7.84	8.22	7.92	7.77	7.68	7.61	MJ
07/12/12	48 Hr.	25.0	1	7.91	7.92	7.92	7.91	7.89	7.89	STC
07/12/12	Renew	25.0	2	8.02	7.90	7.82	7.77	7.69	7.44	STC
07/13/12	72 Hr.	24.9	2	7.99	7.98	7.98	7.98	7.99	8.01	SK
07/13/12	Renew	25.4	2	8.05	7.97	7.85	7.77	7.67	7.53	SK
07/14/12	96 Hr.	24.9	2	8.14	7.96	7.88	7.81	7.73	7.70	SK
07/14/12	Renew	25.0	3	8.09	7.92	7.87	7.80	7.73	7.63	SK
07/15/12	120 Hr.	25.0	3	7.96	7.94	8.07	8.09	8.20	8.32	SK
07/15/12	Renew	25.5	3	8.08	8.10	8.14	8.12	8.11	8.07	SK
07/16/12	144 Hr.	25.0	3	7.97	7.99	8.02	8.03	8.06	8.09	STC
07/16/12	Renew	25.4	3	7.97	7.83	7.76	7.67	7.52	7.51	STC
07/17/12	168 Hr.	25.3	3	7.42	8.09	8.06	8.05	8.05	8.07	MJ

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
07/10/12	Start	25.0	1	7.50	7.52	7.57	7.58	7.72	8.15	STC
07/11/12	24 Hr.	25.3	1	7.82	7.88	7.91	7.88	7.86	7.82	MJ
07/11/12	Renew	25.5	1	8.15	8.23	8.20	8.17	8.15	8.15	MJ
07/12/12	48 Hr.	25.0	1	8.43	8.25	8.09	7.97	7.90	7.85	STC
07/12/12	Renew	25.0	2	8.22	8.24	8.54	8.57	8.74	8.17	STC
07/13/12	72 Hr.	24.9	2	7.70	7.82	7.84	7.80	7.76	7.76	SK
07/13/12	Renew	25.4	2	7.88	8.07	8.27	8.34	8.41	8.36	SK
07/14/12	96 Hr.	24.9	2	8.10	8.13	8.23	8.28	8.44	8.51	SK
07/14/12	Renew	25.0	3	8.05	8.22	8.38	8.42	8.60	8.41	SK
07/15/12	120 Hr.	25.0	3	8.29	8.50	8.54	8.79	8.82	8.83	SK
07/15/12	Renew	25.5	3	8.44	8.45	8.57	8.66	8.69	8.72	SK
07/16/12	144 Hr.	25.0	3	8.98	8.84	8.58	8.49	8.46	8.40	STC
07/16/12	Renew	25.4	3	8.97	8.89	8.96	8.99	8.50	8.52	STC
07/17/12	168 Hr.	25.3	3	8.59	8.71	8.65	8.56	8.42	8.28	MJ

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

EEG, City Corp. - Russellville WWS

Lab ID# 19815

Test Date: July 10, 2012

**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
07/10/12	1	7.35	8.15	52	94	597	<0.01	N/A	TN
07/12/12	2	7.44	8.17	52	98	599	<0.01	N/A	TN
07/14/12	3	7.63	8.41	48	98	602	<0.01	N/A	TN
07/10/12	Con	8.12	7.50	100	64	402	-	-	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	21.000	27.000	23.300
2	32% Effluent	10	21.000	26.000	24.000
3	42% Effluent	10	22.000	28.000	25.600
4	56% Effluent	10	23.000	28.000	25.700
5	75% Effluent	10	21.000	31.000	26.700
6	100% Effluent	10	23.000	30.000	26.400

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V. %
1	Control	4.456	2.111	0.667	9.06
2	32% Effluent	2.667	1.633	0.516	6.80
3	42% Effluent	4.044	2.011	0.636	7.86
4	56% Effluent	2.678	1.636	0.517	6.37
5	75% Effluent	10.011	3.164	1.001	11.85
6	100% Effluent	5.822	2.413	0.763	9.14

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	4	18	15	22	1

Calculated Chi-Square goodness of fit test statistic = 9.6930  
 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 = 5.77

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	91.083	18.217	3.683
Within (Error)	54	267.100	4.946	
Total	59	358.183		

Critical F value = 2.45 (0.05,5,40)  
 Since F > Critical F 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	23.300	23.300		
2	32% Effluent	24.000	24.000	-0.704	
3	42% Effluent	25.600	25.600	-2.312	
4	56% Effluent	25.700	25.700	-2.413	
5	75% Effluent	26.700	26.700	-3.418	
6	100% Effluent	26.400	26.400	-3.117	

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	2.298	9.9	-0.700
3	42% Effluent	10	2.298	9.9	-2.300
4	56% Effluent	10	2.298	9.9	-2.400
5	75% Effluent	10	2.298	9.9	-3.400
6	100% Effluent	10	2.298	9.9	-3.100

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

CLIENT <u>EEG, City Corporation - Russellville, WWS</u>	SAMPLE TYPE <u>24 Hour Composite</u>
NPDES # <u>AR0021768</u>	DATE COLLECTED <u>07/09/12 07/11/12 07/13/12</u>
LAB ID # <u>19815</u>	DATE RECEIVED <u>07/10/12 07/12/12 07/14/12</u>
TEST TYPE <u>7 Day Chronic</u>	BEGIN DATE/TIME <u>07/10/12 1450</u>
TEST ORGANISM <u><i>Pimephales promelas</i></u>	END DATE/TIME <u>07/17/12 1450</u>
ORGANISM AGE <u>&lt; 24 Hours</u>	TEST TEMPERATURE (°C) <u>25 ± 1</u>
ORGANISM SOURCE <u>In House</u>	PHOTO PERIOD <u>16-hr. Light 8-hr. Dark</u>
RECEIVING WATER <u>Whig Creek</u>	LIGHT INTENSITY <u>50-100 ft. cndl</u>
DILUTION WATER <u>Laboratory Adjusted</u>	TECHNICIAN <u>J. Lopez</u>

**SURVIVAL SUMMARY**

Conc.	07/11/12					07/12/12					07/13/12					07/14/12					07/15/12				
	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

Conc.	07/16/12					07/17/12					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	0.4180	0.4720	0.5020	0.4230	0.4210	0.4472	8.47
32%	0.4650	0.4950	0.4280	0.5040	0.4600	0.4704	6.44
42%	0.4190	0.4360	0.5020	0.4710	0.4980	0.4652	7.94
56%	0.4560	0.4070	0.5040	0.4960	0.4160	0.4558	9.75
75%	0.5020	0.4480	0.4690	0.5030	0.4230	0.4690	7.39
100%	0.4650	0.4830	0.4190	0.5020	0.4150	0.4568	8.46

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

EEG, City Corp. - Russellville WWS

Lab ID# 19815

Test Date: July 10, 2012

**WET CHEMISTRY MEASUREMENTS**

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
07/10/12	Start	25.0	1	8.12	7.87	7.78	7.71	7.64	7.35	STC
07/11/12	24 Hr.	26.0	1	8.18	8.16	8.11	8.06	8.03	7.98	MJ
07/11/12	Renew	25.5	1	7.84	8.22	7.92	7.77	7.68	7.61	MJ
07/12/12	48 Hr.	25.6	1	8.27	8.14	8.09	8.09	8.05	7.97	STC
07/12/12	Renew	25.0	2	8.02	7.90	7.82	7.77	7.69	7.44	STC
07/13/12	72 Hr.	25.6	2	7.98	7.84	7.81	7.77	7.69	7.70	SK
07/13/12	Renew	25.4	2	8.05	7.97	7.85	7.77	7.67	7.53	SK
07/14/12	96 Hr.	25.6	2	8.11	8.06	8.04	8.04	8.01	8.00	SK
07/14/12	Renew	25.0	3	8.09	7.92	7.87	7.80	7.73	7.63	SK
07/15/12	120 Hr.	25.7	3	8.21	8.16	8.12	8.11	8.07	8.06	SK
07/15/12	Renew	25.5	3	8.08	8.10	8.14	8.12	8.11	8.07	SK
07/16/12	144 Hr.	25.7	3	7.68	7.63	7.65	7.59	7.60	7.53	STC
07/16/12	Renew	25.4	3	7.97	7.83	7.76	7.67	7.52	7.51	STC
07/17/12	168 Hr.	26.0	3	7.67	7.62	7.60	7.59	7.60	7.57	STC

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
07/10/12	Start	25.0	1	7.50	7.52	7.57	7.58	7.72	8.15	STC
07/11/12	24 Hr.	26.0	1	8.38	8.52	8.50	8.51	8.53	8.51	MJ
07/11/12	Renew	25.5	1	8.15	8.23	8.20	8.17	8.15	8.15	MJ
07/12/12	48 Hr.	25.6	1	8.44	8.47	8.39	8.29	8.26	8.21	STC
07/12/12	Renew	25.0	2	8.22	8.24	8.54	8.57	8.74	8.17	STC
07/13/12	72 Hr.	25.6	2	8.07	8.32	8.42	8.47	8.06	7.78	SK
07/13/12	Renew	25.4	2	7.88	8.07	8.27	8.34	8.41	8.36	SK
07/14/12	96 Hr.	25.6	2	8.10	8.40	8.41	8.50	8.46	8.44	SK
07/14/12	Renew	25.0	3	8.05	8.22	8.38	8.42	8.60	8.41	SK
07/15/12	120 Hr.	25.7	3	8.00	8.21	8.27	8.35	8.37	8.34	SK
07/15/12	Renew	25.5	3	8.44	8.45	8.57	8.66	8.69	8.72	SK
07/16/12	144 Hr.	25.7	3	7.85	7.90	8.32	8.17	7.89	7.61	STC
07/16/12	Renew	25.4	3	8.97	8.89	8.96	8.99	8.50	8.52	STC
07/17/12	168 Hr.	26.0	3	8.00	8.13	8.29	8.41	8.40	8.39	STC

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

EEG, City Corp. - Russellville WWS

Lab ID# 19815

Test Date: July 10, 2012

**INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT**

Date	Samp. No.	pH	DO	Hardness mg/L CaCO <sub>3</sub>	Alkalinity mg/L CaCO <sub>3</sub>	Conduct. umhos/cm	Resid. Cl <sub>2</sub> mg/L	Dechlor(mL) Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> /mg/L	Analyst
07/10/12	1	7.35	8.15	52	94	597	<0.01	N/A	TN
07/12/12	2	7.44	8.17	52	98	599	<0.01	N/A	TN
07/14/12	3	7.63	8.41	48	98	602	<0.01	N/A	TN
07/10/12	Con	8.12	7.50	100	64	402	-	-	TN

Measurements taken in 100% solution.

**PIMEPHALES PROMELAS STATISTICAL ANALYSES**  
 Growth

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	0.418	0.502	0.447
2	32% Effluent	5	0.428	0.504	0.470
3	42% Effluent	5	0.419	0.502	0.465
4	56% Effluent	5	0.407	0.504	0.456
5	75% Effluent	5	0.423	0.503	0.469
6	100% Effluent	5	0.415	0.502	0.457

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.001	0.038	0.017	8.47
2	32% Effluent	0.001	0.030	0.014	6.44
3	42% Effluent	0.001	0.037	0.017	7.94
4	56% Effluent	0.002	0.044	0.020	9.75
5	75% Effluent	0.001	0.035	0.015	7.39
6	100% Effluent	0.001	0.039	0.017	8.46

Shapiro - Wilk's Test For Normality

D = 0.034

W = 0.907

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 = 0.58

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	0.290
Within (Error)	24	0.034	0.001	
Total	29	0.036		

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	T Stat	Sig
			Calculated In Original Units		
1	Control	0.447	0.447		
2	32% Effluent	0.470	0.470	-0.981	
3	42% Effluent	0.465	0.465	-0.761	
4	56% Effluent	0.456	0.456	-0.364	
5	75% Effluent	0.469	0.469	-0.922	
6	100% Effluent	0.457	0.457	-0.406	

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	0.056	12.5	-0.023
3	42% Effluent	5	0.056	12.5	-0.018
4	56% Effluent	5	0.056	12.5	-0.009
5	75% Effluent	5	0.056	12.5	-0.022
6	100% Effluent	5	0.056	12.5	-0.010



**APPENDIX A  
RAW DATA**

7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

PAGE 1 OF 2

CLIENT EEG Russellville

START DATE/TIME 7-10-12 112 1435

OUTFALL 001

END DATE/TIME 7-17-12 112 1435

LAB ID # 19815

Con

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	KD	1435
7/12	A	A	A	A	A	A	A	A	A	A	KD	1415
7/13	A	A	A	A	A	A	A	A	A	A	KD	1130
7/14	A	5	3	2	A	2	A	2	2	3	MH	1425
7/15	4	A	A	A	4	A	3	A	A	6	MH	0940
7/16	7	9	7	10	8	7	7	6	7	A	KD	1145
7/17	14	13	12	13	13	12	13	13	14	12	112	1435
	25	27	22	25	25	21	23	21	23	21		

$\bar{x}$  # Young w/o Dead = 23.3 CV% = 9.06

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

$\bar{x}$  % Survival = 100.0 CV% = 0.00

32

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	KD	1435
7/12	A	A	A	A	A	A	A	A	A	A	KD	1415
7/13	A	A	A	A	A	A	A	A	A	A	KD	1130
7/14	4	2	5	3	3	2	4	3	2	4	MH	1425
7/15	7	9	6	6	A	6	A	A	7	A	MH	0940
7/16	A	A	A	A	9	A	7	7	A	9	KD	1145
7/17	14	13	15	13	14	13	13	14	14	12	112	1435
	25	24	26	22	26	21	24	24	23	25		

$\bar{x}$  # Young w/o Dead = 24.0 CV% = 6.80

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

$\bar{x}$  % Survival = 100.0 CV% = 0.00

42

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	KD	1435
7/12	A	A	A	A	A	A	A	A	A	A	KD	1415
7/13	A	A	A	A	A	A	A	A	A	A	KD	1130
7/14	4	3	5	3	4	5	3	A	3	4	MH	1425
7/15	10	8	7	11	A	A	A	3	6	8	MH	0940
7/16	A	A	A	A	8	9	7	8	A	A	KD	1145
7/17	13	14	15	13	14	14	12	13	14	15	112	1435
	27	25	27	27	26	28	22	24	23	27		

$\bar{x}$  # Young w/o Dead = 25.6 CV% = 7.86

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

$\bar{x}$  % Survival = 100.0 CV% = 0.00

56

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	KD	1435
7/12	A	A	A	A	A	A	A	A	A	A	KD	1415
7/13	A	A	A	A	A	A	A	A	A	A	KD	1130
7/14	4	3	3	4	4	5	5	5	4	4	MH	1425
7/15	7	6	10	8	A	A	A	A	9	7	MH	0940
7/16	A	A	A	A	7	8	7	9	A	A	KD	1145
7/17	15	15	15	14	12	14	13	13	14	13	112	1435
	26	24	28	26	23	27	25	27	27	24		

$\bar{x}$  # Young w/o Dead = 25.7 CV% = 6.37

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

$\bar{x}$  % Survival = 100.0 CV% = 0.00

7-DAY CERIODAPHНИЯ DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

PAGE 2 OF 2

CLIENT EEG Russellville

START DATE/TIME 7-10-12 712 1435

OUTFALL 001

END DATE/TIME 7-17-12 712 1435

LAB ID # 19815

75

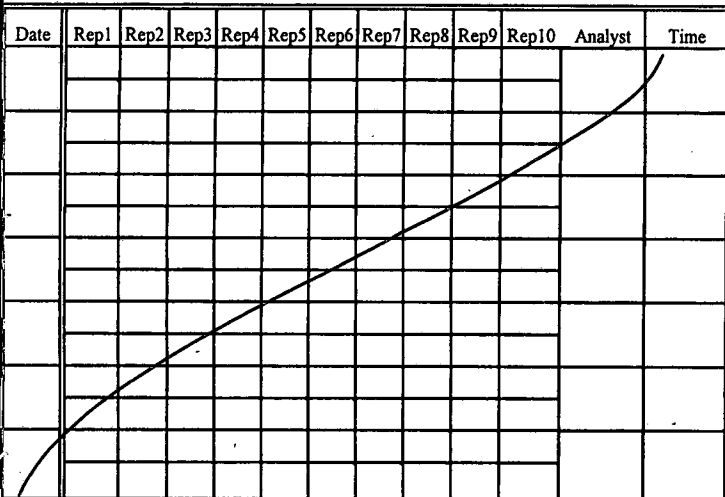
Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	WD	1435
7/12	A	A	A	A	A	A	A	A	A	A	WD	1415
7/13	A	A	A	A	A	A	A	A	A	A	WD	1130
7/14	5	3	4	5	5	5	4	2	3	3	MH	1425
7/15	10	11	8	11	9	11	6	7	9		MH	0940
7/16	A	A	A	A	9	A	A	A	A		WD	1145
7/17	14	14	13	15	14	13	15	13	13	13	M2	1435
	29	28	25	31	28	27	30	21	23	25		

$\bar{x}$  # Young w/o Dead = 26.7 CV% = 11.85  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100.0 CV% = 0.00

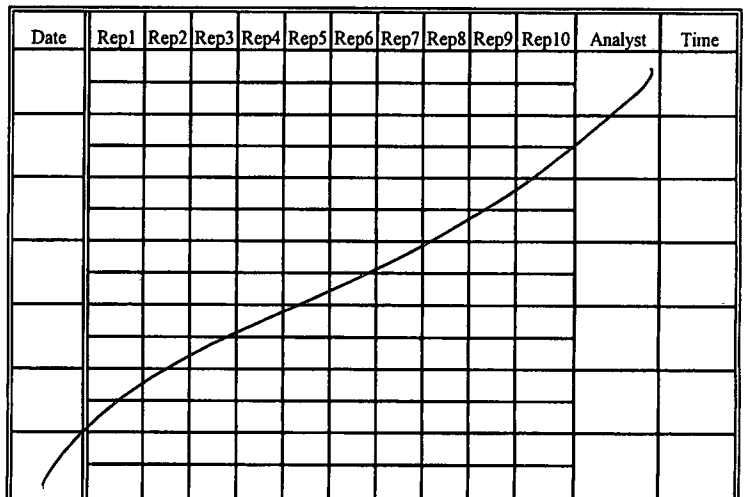
100

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
7/11	A	A	A	A	A	A	A	A	A	A	WD	1435
7/12	A	A	A	A	A	A	A	A	A	A	WD	1415
7/13	A	A	A	A	A	A	A	A	A	A	WD	1130
7/14	4	2	5	5	3	4	5	3	5	3	MH	1425
7/15	7	9	11	11	9	10	6	8	7		MH	0940
7/16	A	A	A	A	10	A	7	A	A	A	WD	1145
7/17	15	14	14	14	12	15	13	14	13	15	M2	1435
	26	25	30	30	25	29	25	23	26	25		

$\bar{x}$  # Young w/o Dead = 26.4 CV% = 9.14  
 $\bar{x}$  # Young w/Dead = CV% =  
 $\bar{x}$  % Survival = 100.0 CV% = 0.00



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



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

Chronic Toxicity Summary Form

Permitee: EEG Russellville  
 Or fall: 001  
 ID No.: 19815  
 in Time/Date: 7-10-12 1435

*Ceriodaphnia dubia*  
Chemical Parameters Chart

End Date/Time: 7-17-12 1435

Date	Time	Temp.	Samp. No.	pH of Solution						Analyst
				CON	32	42	56	75	100	
7/10	Start	25.0	1	8.12	7.87	7.78	7.71	7.64	7.35	SG
<del>7/10</del>	24 Hr.	25.3	1	7.76	7.82	7.84	7.85	7.85	7.85	SG
7/11	Renew	25.5	1	7.84	8.22	7.92	7.77	7.68	7.61	SG
7/12	48 Hr.	25.0	1	7.91	7.92	7.92	7.91	7.82	7.82	SG
7/12	Renew	25.0	2	8.02	7.80	7.82	7.77	7.69	7.44	SG
7/13	72 Hr.	24.9	2	7.99	7.98	7.98	7.98	7.99	8.01	SK
7/13	Renew	25.4	2	8.05	7.97	7.85	7.77	7.67	7.53	SK
7/14	96 Hr.	24.9	2	8.14	7.96	7.88	7.81	7.73	7.70	SK
7/14	Renew	25.0	3	8.09	7.92	7.87	7.80	7.73	7.63	SK
7/15	120 Hr.	25.0	3	7.96	7.94	8.07	8.09	8.20	8.32	SK
7/15	Renew	25.5	3	8.08	8.10	8.14	8.12	8.11	8.07	SK
7/16	144 Hr.	<del>25.0</del> 25.4	<del>3</del> 3	<del>7.97</del> 7.97	<del>7.98</del> 7.83	<del>8.02</del> 7.76	<del>7.80</del> 7.67	<del>7.806</del> 7.52	<del>7.809</del> 7.56	SG
7/16	Renew	25.4	3	7.97	7.83	7.76	7.67	7.52	7.51	SG
7/17	168 Hr.	25.3	3	7.42	8.09	8.06	8.05	8.05	8.07	SG

Date	Time	Temp.	Samp. No.	DO(mg/L) of Solution						Analyst
				CON	32	42	56	75	100	
7/10	Start	25.0	1	7.50	7.52	7.57	7.58	7.72	8.15	SG
7/11	24 Hr.	25.3	1	7.82	7.88	7.91	7.88	7.86	7.82	SG
7/11	Renew	25.5	1	8.15	8.23	8.20	8.17	8.15	8.15	SG
7/12	48 Hr.	25.0	1	8.43	8.25	8.09	7.97	7.90	7.85	SG
7/12	Renew	25.0	2	8.22	8.24	8.54	8.57	8.74	8.17	SG
7/13	72 Hr.	24.9	2	7.70	7.82	7.84	7.80	7.76	7.76	SK
7/13	Renew	25.4	2	7.88	8.07	8.27	8.34	8.41	8.36	SK
7/14	96 Hr.	24.9	2	8.10	8.13	8.23	8.28	8.44	8.51	SK
7/14	Renew	25.0	3	8.05	8.22	8.38	8.42	8.60	8.41	SK
7/15	120 Hr.	25.0	3	8.29	8.50	8.54	8.79	8.82	8.83	SK
7/15	Renew	25.5	3	8.44	8.45	8.57	8.66	8.69	8.72	SK
7/16	144 Hr.	<del>25.0</del> 25.4	<del>3</del> 3	<del>8.97</del> 8.97	<del>8.88</del> 8.88	<del>8.56</del> 8.56	<del>8.49</del> 8.49	<del>8.56</del> 8.56	<del>8.40</del> 8.50	SG
7/16	Renew	25.4	3	8.97	8.89	8.96	8.99	8.80	8.52	SG
7/17	168 Hr.	25.3	3	8.59	8.71	8.65	8.56	8.42	8.28	SG

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

CLIENT/FACILITY EEG Russellville  
 OUTFALL # 001 PROJECT # 19815  
 ORGANISM ID# PP0-12-191

DATE/TIME STARTED 7-10-12 JL 1450  
 DATE/TIME ENDED 7-17-12 JL 1450

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	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	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	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	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	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	8	8	8	8	8
Initials Date/Time	7-11-12 JL 0805					7-12-12 JL 0835					7-13-12 JL 0945					7-14-12 MH 0835					7-15-12 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	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
Initials Date/Time	7-16-12 JL 0820					7-17-12 JL 1450						



### Chronic Toxicity Summary Form

Permittee: EEG Russellville  
 Outfall: 001  
 ID No.: 19815  
 Begin Time/Date: 7-10-12

*Pimephales promelas*  
**Chemical Parameters Chart**

End Date/Time: 7-17-12 1450

Date	Time	Temp.	Samp. No.	pH of Solution						Analyst
				CON	32	42	56	75	100	
7/10	Start	25.0	1	8.12	7.87	7.78	7.71	7.64	7.35	SG
7/11	24 Hr.	26.0	1	8.18	8.16	8.11	8.06	8.03	7.98	SG
7/11	Renew	25.5	1	7.84	8.22	7.92	7.77	7.68	7.61	SG
7/12	48 Hr.	25.6	1	8.27	8.14	8.09	8.09	8.05	7.97	SG
7/12	Renew	25.0	2	8.02	7.90	7.82	7.77	7.69	7.44	SG
7/13	72 Hr.	25.6	2	7.98	7.84	7.81	7.77	7.69	7.70	SK
7/13	Renew	25.4	2	8.05	7.97	7.85	7.77	7.67	7.53	SK
7/14	96 Hr.	25.6	2	8.11	8.06	8.04	8.04	8.01	8.00	SK
7/14	Renew	25.0	3	8.09	7.92	7.87	7.80	7.73	7.63	SK
7/15	120 Hr.	25.7	3	8.21	8.16	8.12	8.11	8.07	8.06	SK
7/15	Renew	25.5	3	8.08	8.10	8.14	8.12	8.11	8.07	SK
7/16	144 Hr.	25.7	3	7.68	7.63	7.65	7.59	7.60	7.53	SG
7/16	Renew	25.4	3	7.87	7.83	7.76	7.67	7.52	7.51	SG
7/17	168 Hr.	26.0	3	7.67	7.62	7.60	7.59	7.60	7.57	SG

Date	Time	Temp.	Samp. No.	DO(mg/L) of Solution						Analyst
				CON	32	42	56	75	100	
7/10	Start	25.0	1	7.50	7.52	7.57	7.58	7.72	8.15	SG
7/11	24 Hr.	26.0	1	8.38	8.52	8.50	8.51	8.53	8.51	SG
7/11	Renew	25.5	1	8.15	8.23	8.20	8.17	8.15	8.15	SG
7/12	48 Hr.	25.6	1	8.44	8.47	8.39	8.29	8.26	8.21	SG
7/12	Renew	25.0	2	8.22	8.24	8.54	8.57	8.74	8.17	SG
7/13	72 Hr.	25.6	2	8.07	8.32	8.42	8.47	8.06	7.778	SK
7/13	Renew	25.4	2	7.88	8.07	8.27	8.34	8.41	8.36	SK
7/14	96 Hr.	25.6	2	8.10	8.40	8.41	8.50	8.46	8.44	SK
7/14	Renew	25.0	3	8.05	8.22	8.38	8.42	8.60	8.41	SK
7/15	120 Hr.	25.7	3	8.00	8.21	8.27	8.35	8.37	8.34	SK
7/15	Renew	25.5	3	8.44	8.45	8.57	8.66	8.69	8.72	SK
7/16	144 Hr.	25.7	3	7.85	7.90	8.32	8.17	7.89	7.61	SG
7/16	Renew	25.4	3	8.97	8.82	8.96	8.99	8.50	8.52	SG
7/17	168 Hr.	26.0	3	8.00	8.13	8.24	8.41	8.40	8.39	SG

Client / Facility EEG Russellville  
 Lab ID Number 19815  
 Outfall Number 001  
 Test Date 7-10-12

**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
7/10	1	7.35	8.15	52	94	597	6.01	Na	TN
7/12	2	7.44	8.17	52	98	599	~	~	~
7/14	3	7.63	8.41	48	98	602	~	~	~
7/10	CON	8.12	7.50	100	64	402	—	—	~

**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: 7

TEST DATE/TIME: 07/02/12 - 07/09/12  
1415 Hrs - 1415 Hrs

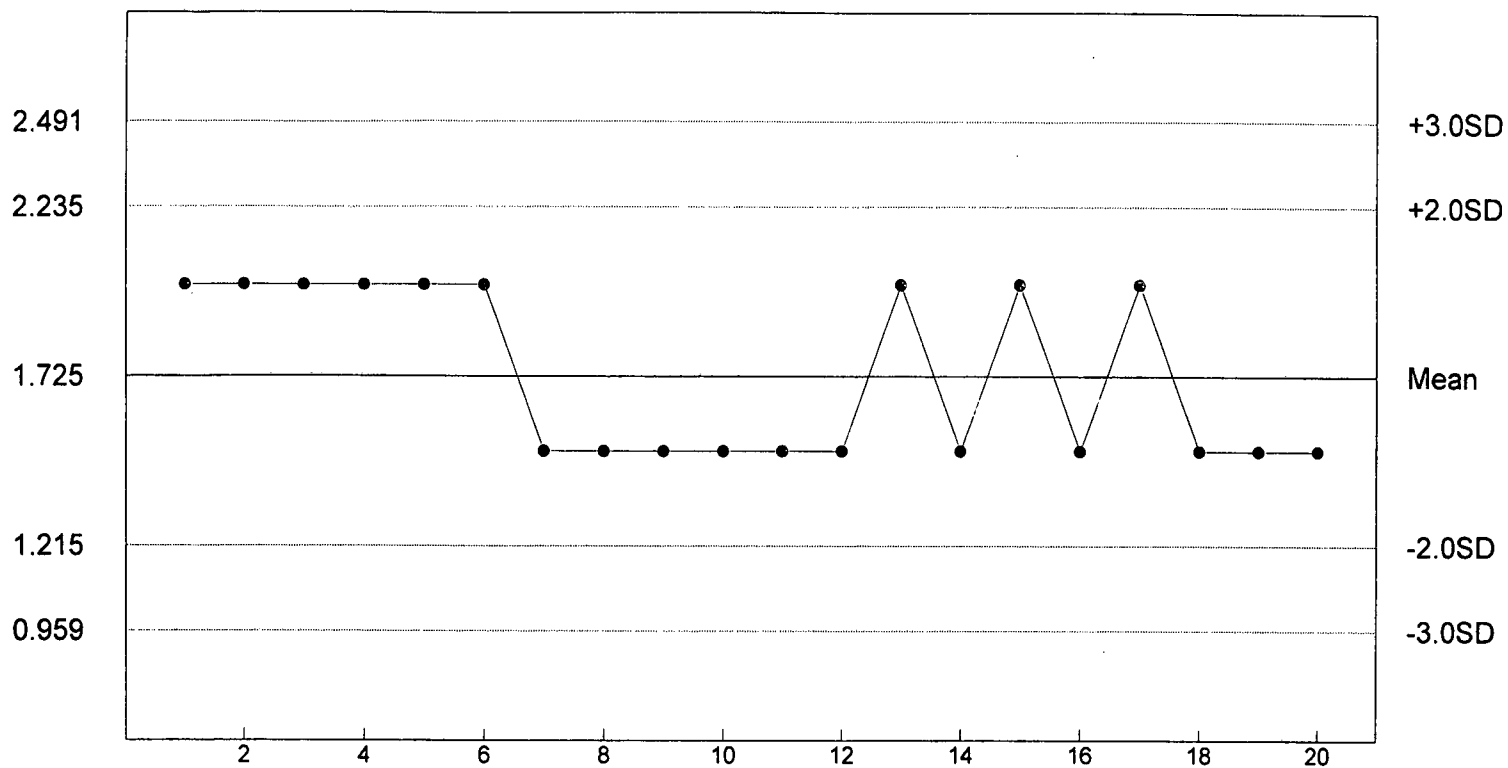
STATISTICAL METHOD: Fishers, Dunnetts/Steels

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

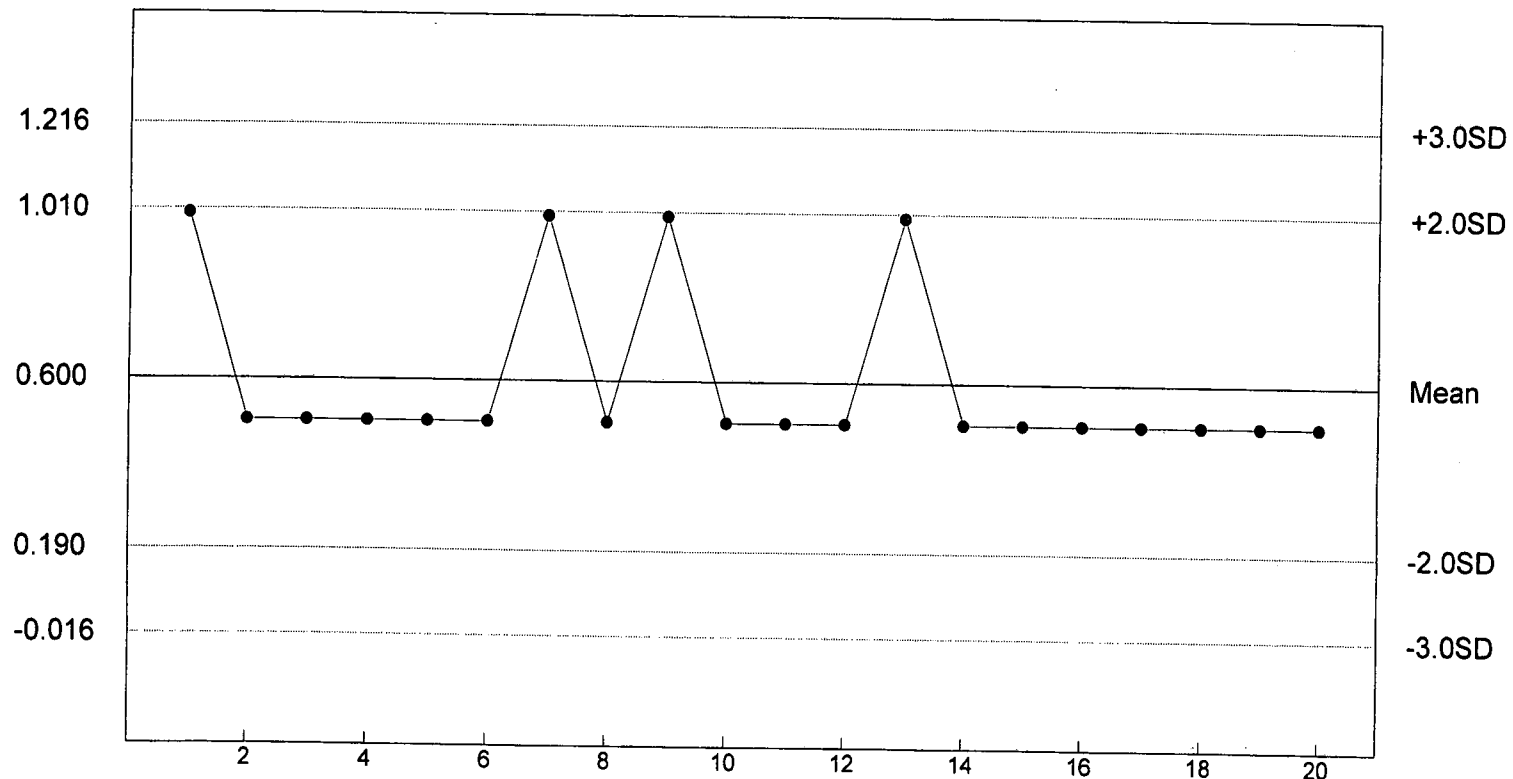
C. dubia Survival - NOEC



n= 20 Mean= 1.725 SD= 0.255 CV= 14.79% Min= 1.500 Max= 2.000

Reference Tox Sodium Chloride g/L

C. dubia Reproduction - NOEC



n= 20 Mean= 0.600 SD= 0.205 CV= 34.20% Min= 0.500 Max= 1.000

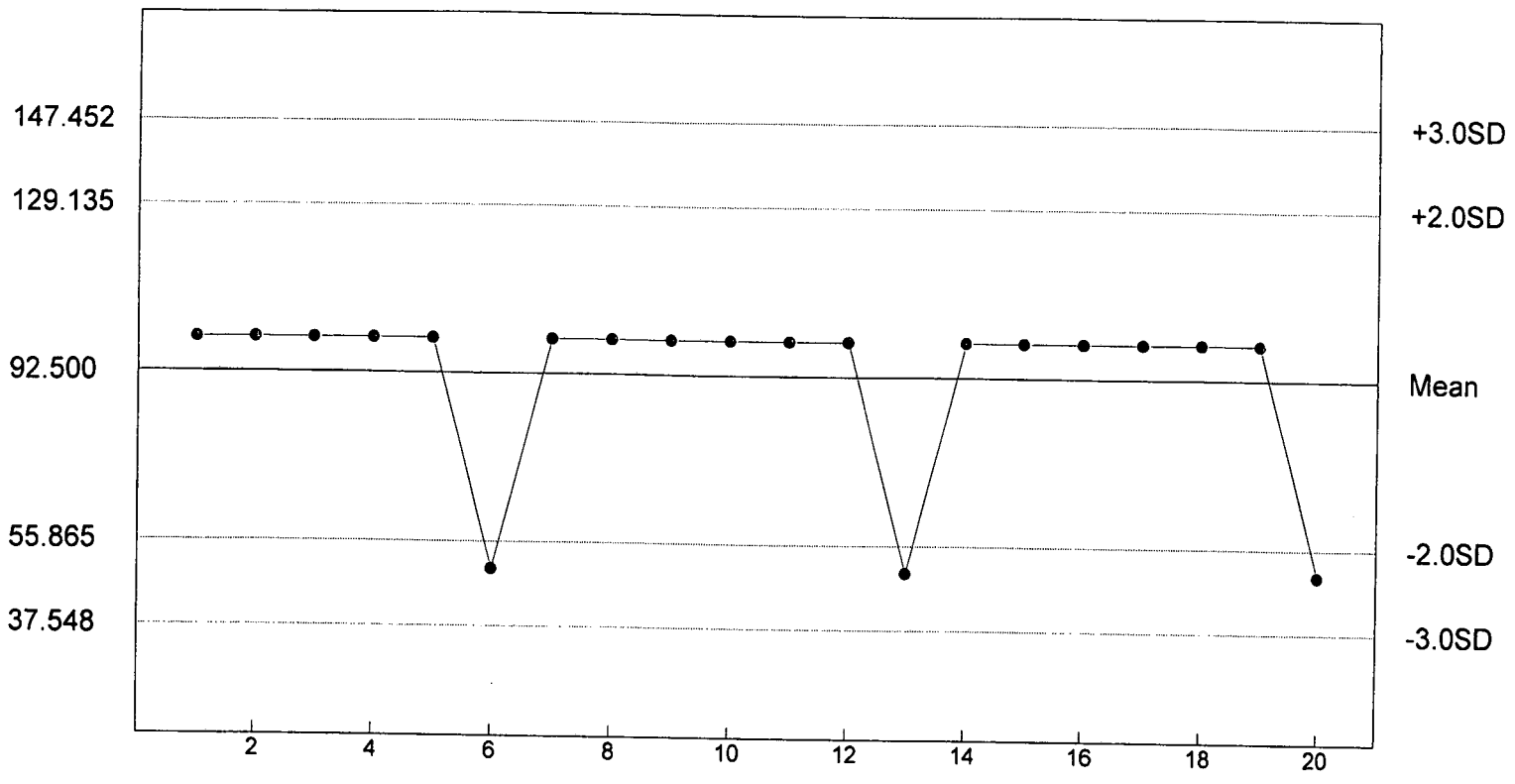
**CHRONIC REFERENCE TOXICANT TEST RESULTS**

SPECIES: *Pimephales promelas*  
 CHEMICAL: Copper Nitrate  
 DURATION: 7-Days  
 TEST NUMBER: 7  
 TEST DATE/TIME: 07/02/12 - 07/09/12  
 1400 Hrs - 1400 Hrs  
 STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	3
50	40	2
100	40	9
200	40	26
400	40	37
800	40	40

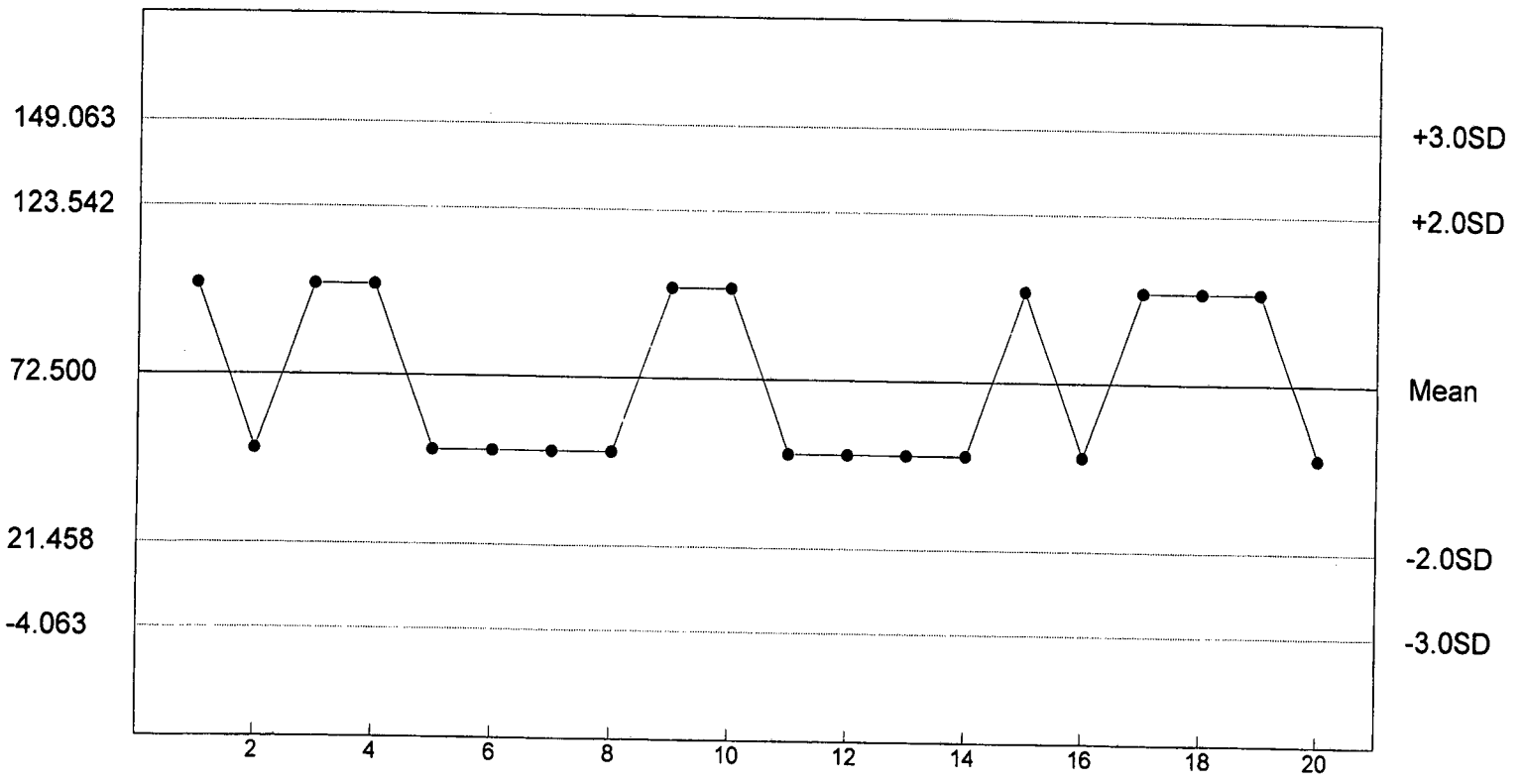
LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR GROWTH	NOEC FOR GROWTH
100 ug/L	50 ug/L	100 ug/L	50 ug/L

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



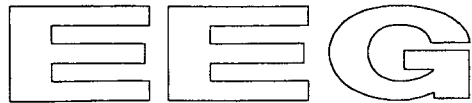
n= 20 Mean= 92.500 SD= 18.317 CV= 19.80% Min= 50.000 Max= 100.000

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



n= 20 Mean= 72.500 SD= 25.521 CV= 35.20% Min= 50.000 Max= 100.000

**APPENDIX C  
CHAIN OF CUSTODY SHEETS**

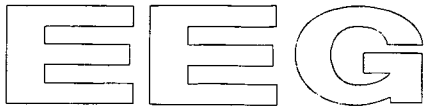


Environmental Enterprise Group, Inc.  
PROVIDING CUSTOMIZED SERVICES NATIONWIDE

L246-045890

Environmental Enterprise Group, Inc.  
220 North Knoxville  
Russellville, Arkansas 72801  
(479) 968-6767 Fax (479) 968-1956

Company Name:										Phone #:										Requested Analysis								Laboratory Control Number		Remarks (Please note special detection limits below.)																													
City Corporation										(479) 968-4989																																																	
Address:										Fax #:																																																	
P.O. Box 3186 Russellville, AR 72811-3186										(479) 968-3430																																																	
Project Name or Number:										Purchase Order #:										WET Testing																																							
WET Testing										WET Testing																																																	
Sampling Personnel Signature(s): <i>Charlotte Petrick</i>										Printed: Charlotte Petrick										WET Testing																																							
Sample I.D.										Method Preserved																Sample Matrix																																	
Date										Cont Type																																																	
Time										# of Containers																																																	
24hr Comp.										H <sub>2</sub> SO <sub>4</sub>																																																	
Grab										HNO <sub>3</sub>																																																	
Plast.										NAOH																																																	
Glass										HCL																																																	
										Ice																																																	
										None																																																	
										Water																																																	
										Soil																																																	
										Air																																																	
										Sludge																																																	
										Other																																																	
Outfall 001										on 7/8/12																																																	
										on 7/9/12																																																	
										on 642																																																	
										off 737																																																	
										x																																																	
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										1																																																	
Relinquished by:										Date:										Time:												Received by:										Date:										Time:							
<i>Charlotte Petrick</i>										7/9/12										754										<i>W. L. ...</i>										7/9/12										0857									
Received by:										Date:										Time:										Relinquished by:										Date:										Time:									
<i>Larry Priddy</i>										7/9/12										0754										<i>W. L. ...</i>										7/9/12										1400									
Relinquished by:										Date:										Time:										Received by Laboratory:										Date:										Time:									
<i>Larry Priddy</i>										7/9/12										0857										<i>Matt Warner</i>										7-10-12										09.50									
Comments:																																																											
3.8°C																																																											



Environmental Enterprise Group, Inc.  
PROVIDING CUSTOMIZED SERVICES NATIONWIDE

L246-05890

Environmental Enterprise Group, Inc.  
220 North Knoxville  
Russellville, Arkansas 72801  
(479) 968-6767 Fax (479) 968-1956

Company Name:		Phone #:					Requested Analysis											Laboratory Control Number	Remarks (Please note special detection limits below.)																					
City Corporation		(479) 968-4989																																						
Address:		Fax #:																																						
P.O. Box 3186 Russellville, AR 72811-3186		(479) 968-3430																																						
Project Name or Number:		Purchase Order #:																																						
Sampling Personnel Signature(s): <i>Charlotte Petrick</i>						Printed: <b>CHARLOTTE PETRICK</b>						WET Testing																												
Sample I.D.	Date	Time	24 Hr Comp. Grab	Cont.Type		# of Containers	Method Preserved												Sample Matrix																					
				Plast.	Glass		H2SO4	HNO3	NAOH	HCL	Ice								None	Water	Soil	Air	Sludge	Other																
Outfall 001	7/14/12	747	X	X		1					X								X							X													071204L	
Relinquished by:		Date:		Time:		Received by:				Date:									Time:																					
<i>Charlotte Petrick</i>		7/11/12		838																																				
Received by:		Date:		Time:		Relinquished by:				Date:		Time:																												
<i>Stuppen</i>		7/11/12		0838																																				
Relinquished by:		Date:		Time:		Received by:				Date:		Time:																												
<i>Stuppen</i>		7/11/12		1600		Laboratory				7-12-12		1000																												
Comments: 3.8°C																																								

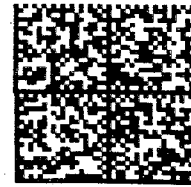




City Corporation  
PO Box 3186  
Russellville, AR 728



7011 0110 0001 6831 3319



049J82054973

\$07.60<sub>0</sub>

08/02/2012

Mailed From 72801  
US POSTAGE

ADEQ  
5301 North Shore Dr  
North Little Rock, AR 72118  
Attn: Alan Anderson

