MENA WASTEWATER TREATMENT PLANT- AR003662
323 POLK 53, MENA AR, 71953
PHONE 479-394-1239 FAX 479-394-5053

January 2015

VIOLATION EXPLANATION

PERMITTEE: City of Mena Wastewater Treatment Plant
DATES OF VIOLATION: Various dates January 2015
PARAMETR VIOLATED: Ammonia Nitrogen in concentration and pounds.
REPORTED DISCHARGE: NH3N

This violation letter is to inform your office Mena Wastewater Treatment Plant has exceeded its discharge limit for the month of January 2015 on the following parameters.

	Reported Value	Permit Limit
A. NH3N Pounds	**184**	**153**
B. NH3N Mo. Avg	**10**	**5.9**
C. NH3N 7-Davg	**14**	**12**

The NH3N violation is approximately 12 out of 31 days in January. The total effluent discharge was approximately 73mgd. Troubleshooting plant it has been determined that excessive sludge buildup in primary lagoon is 5.5 feet deep of a 6 foot deep lagoon. This is removing approximately 35% or our treatment capability. This sludge is storing nitrogen and releasing it , in troubleshooting testing has determined an Influent of 1 mg/l and an outlet of lagoon one reveals a 7 mg/l of NH3N, thus generated across the lagoon. Also with the effluent temperature recorded as low as 3 Celsius biological activity has ceased during this time.

The Utility Manager has addressed a letter to Mr. Baily to request permission to feed bacteria in attempt to temporary correct the NH3N problem until funding can be established to remove the sludge or incorporate a sludge management plan. Currently as of the last two weeks of January ,NH3N results have dropped to 4/5 mg/l with no results for February 2015. A duplicate copy of this letter will be sent to the bio-monitoring division with an attached letter from wet testing lab confirming the high levels.

Sincerely;

3 Feb 15

Mike Spencer
Plant Supervisor

Cc: Charles Pitman, Manager

HUTHER AND ASSOCIATES, INC.
environmental toxicologists, biologists, consultants

February 2, 2015

Mike Spencer
City of Mena WWTF
323 Polk
Mena, AR 71953

Mike,

As you are aware, the recent toxicity tests both failed survival at the critical low flow concentration (100% effluent). We screened each of the three samples and sample one had the greater toxicity. Sample one also had the highest level of ammonia at 14.7 mg/L. Typically, ammonia levels of 10.0 mg/L and greater are toxic to aquatic organisms (sub-lethal effects, growth and reproduction inhibition, will occur at lower levels) so all indications were that ammonia was the primary cause of toxicity. Since TRE procedures are not required at this time, I can not say for certain that ammonia was the only toxicant present.

The discharge permit requires that after a failure, you must pass three consecutive months (Page 7 of Part II, c.). Therefore tests must be conducted in February, March and April. If you pass all three, the April test will also count as your second quarter tests. Someone from our office will call in a few days to schedule the tests.

Sincerely,

Bruce Huther

Bruce Huther

1156 North Bonnie Brae Street Denton, TX 76201 Phone: (940) 387-1025 Fax: (940) 387-1036

CITY OF MENA WWTF
OUTFALL 001

Chronic Biomonitoring Report
Permit Number NPDES AR0036692
AFIN Number: 57-00042

Ceriodaphnia dubia
Pimephales promelas

January 20, 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 Mena WWTF
Permit No. ..... NPDES AR0036692
Sample .....Outfall 001

Laboratory I.D. 23284
Begin Date ..... January 20, 2015

Results: **Fail** *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 Mena WWTF were picked up by Huther & Associates personnel on January 19, January 21 and January 23, 2015. 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, 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 1530 hours, January 20, 2015. 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 Prairie 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 1530 hours, January 27, 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

Utilization of the Fishers Exact test on *C. dubia* survival data detected a statistically significant difference between the control and the 100% effluent concentration.

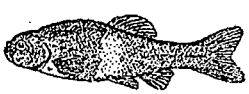
LOEC: 100% Effluent
NOEC: 75% Effluent

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 (13.28) without data transformations. Therefore, a parametric test was used to test for statistical differences between the control and the effluent concentrations which did not have statistical differences for survival. 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 tested.

LOEC: Not Applicable **PMSD: 6.3%**
NOEC: 75% Effluent

TEST SETUP
Pimephales promelas



The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1500 hours, January 20, 2015. 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 Prairie 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 1500 hours, January 27, 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% mortality to *P. promelas* in the 75% and 100% effluent concentrations after seven days. These data are not included in the statistical analysis of survival. *P. promelas* survival data failed Shapiro Wilk's test for normality at the 0.01 alpha level (0.868) after the arc sine (square root (Y)) transformation. Bartlett's test for homogeneity is sensitive to non-normal data and should not be performed if data fail Shapiro Wilk's test. Therefore, a nonparametric test was performed on the data. Steel's Many-One Rank test on *P. promelas* survival data demonstrated that there were no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: 75% Effluent
NOEC: 56% Effluent

GROWTH
Pimephales promelas

P. promelas growth data were normally distributed at the 0.01 alpha level (0.868) using Shapiro Wilk's test for normality. Growth data were homogeneous using Bartlett's test at the 0.01 alpha level (11.34) without data transformations. Therefore, a parametric test was used to test for statistical differences between the control and the effluent concentrations which did not have statistical differences for survival. Dunnett's test on *P. promelas* growth data demonstrated that there was a statistically significant difference between the control and the 56% effluent concentration.

LOEC: 56% Effluent **PMSD: 15.2%**
NOEC: 42% Effluent

SUMMARY

There were 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 AR0036692 for City of Mena WWTF, Outfall 001 **failed** for this testing period.

Huther and Associates

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

CLIENT	City of Mena WWTF	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0036692	DATE COLLECTED	01/19/15 01/21/15 01/23/15
LAB ID #	23284	DATE RECEIVED	01/19/15 01/21/15 01/23/15
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	01/20/15 1530
TEST ORGANISM	*Ceriodaphnia dubia*	END DATE/TIME	01/27/15 1530
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 Prairie Creek	LIGHT INTENSITY	50-100 ft. cndl
DILUTION WATER	Laboratory Adjusted	TECHNICIAN	Z. Geiger

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
01/21/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/22/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/23/15	0	0	0	0	0	0	0	0	0	0
	3	2	3	3	2	3	4	3	2	3
01/24/15	3	2	3	3	2	3	4	3	2	3
	A	A	A	A	A	A	A	A	A	A
01/25/15	3	2	3	3	2	3	4	3	2	3
	6	9	10	6	7	7	9	7	8	6
01/26/15	9	11	13	9	9	10	13	10	10	9
	14	12	12	13	12	14	12	13	12	14
01/27/15	23	23	25	22	21	24	25	23	22	23

x # Young 23.1 C.V. 5.57%

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
01/21/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/22/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/23/15	0	0	0	0	0	0	0	0	0	0
	3	A	3	3	A	2	3	3	2	3
01/24/15	3	0	3	3	0	2	0	3	2	3
	A	2	A	A	4	A	A	A	A	A
01/25/15	3	2	3	3	4	2	0	3	2	3
	9	6	7	6	8	8	7	8	11	10
01/26/15	12	8	10	9	12	10	10	11	13	13
	12	14	13	13	12	13	12	12	12	13
01/27/15	24	22	23	22	24	23	22	23	25	26

x # Young 23.4 C.V. 5.77%

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
01/21/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/22/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/23/15	0	0	0	0	0	0	0	0	0	0
	3	A	2	3	4	3	2	A	3	2
01/24/15	3	0	2	3	4	3	2	0	3	2
	A	3	A	A	A	A	A	4	A	A
01/25/15	3	3	2	3	4	3	2	4	3	2
	6	9	6	6	7	6	9	6	7	6
01/26/15	9	12	8	9	11	9	11	10	10	8
	12	14	13	14	12	13	12	13	12	12
01/27/15	21	26	21	23	23	22	23	23	22	20

x # Young 22.4 C.V. 7.35%

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
01/21/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/22/15	0	0	0	0	0	0	0	0	0	0
	A	A	A	A	A	A	A	A	A	A
01/23/15	0	0	0	0	0	0	0	0	0	0
	3	2	3	A	A	3	2	4	3	3
01/24/15	3	2	3	0	0	3	2	4	3	3
	A	A	A	3	2	A	A	A	A	A
01/25/15	3	2	3	3	2	3	2	4	3	3
	7	7	8	6	6	6	6	7	7	6
01/26/15	10	9	11	9	8	9	8	11	10	9
	13	12	14	13	13	12	14	12	13	14
01/27/15	23	21	25	22	21	21	22	23	23	23

x # Young 22.4 C.V. 5.65%

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 Mena WWTF | Lab ID# 23284 | Test Date: January 20, 2015

75% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
01/21/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
01/22/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
01/23/15	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
01/24/15	3	4	2	3	A	3	3	A	2	A
	3	4	2	3	0	3	3	0	2	0
01/25/15	A	A	A	A	3	A	A	3	A	4
	3	4	2	3	3	3	3	3	2	4
01/26/15	7	6	6	8	6	10	6	7	9	8
	10	10	8	11	9	13	9	10	11	12
01/27/15	12	13	12	13	14	12	13	12	14	13
	22	23	20	24	23	25	22	22	25	25

x # Young 23.1 C.V. 7.20%

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
01/21/15	D	A	D	A	D	A	D	D	A	D
	0	0	0	0	0	0	0	0	0	0
01/22/15	D	A	D	A	D	A	D	D	D	D
	0	0	0	0	0	0	0	0	0	0
01/23/15	D	A	D	A	D	A	D	D	D	D
	0	0	0	0	0	0	0	0	0	0
01/24/15	D	3	D	A	D	2	D	D	D	D
	0	3	0	0	0	2	0	0	0	0
01/25/15	D	A	D	3	D	A	D	D	D	D
	0	3	0	3	0	2	0	0	0	0
01/26/15	D	6	D	6	D	7	D	D	D	D
	0	9	0	9	0	9	0	0	0	0
01/27/15	D	13	D	12	D	13	D	D	D	D
	D-0	22	D-0	21	D-0	22	D-0	D-0	D-0	D-0

x # Young 21.7 C.V. 2.66%

x% Survival 30% C.V. 161.02%

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 Mena WWTF | Lab ID# 23284 | Test Date: January 20, 2015

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp No	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
01/20/15	Start	25.0	1	7.90	7.87	7.83	7.76	7.72	7.46	CS
01/21/15	24 Hr.	25.0	1	7.76	7.73	7.68	7.65	7.59	7.58	CS
01/21/15	Renew	25.3	1	7.62	7.58	7.54	7.51	7.47	7.43	CS
01/22/15	48 Hr.	25.3	1	7.77	7.75	7.72	7.69	7.67	7.61	CS
01/22/15	Renew	25.2	2	8.02	7.92	7.89	7.86	7.84	7.48	CS
01/23/15	72 Hr.	25.0	2	8.31	7.79	7.59	7.53	7.53	7.56	EMS
01/23/15	Renew	25.0	2	8.63	8.07	7.65	7.54	7.56	7.63	EMS
01/24/15	96 Hr.	25.2	2	7.78	7.76	7.74	7.72	7.68	7.62	CS
01/24/15	Renew	25.0	3	7.99	7.63	7.58	7.52	7.47	7.44	CS
01/25/15	120 Hr.	25.4	3	8.04	7.95	7.84	7.77	7.69	8.18	EMS
01/25/15	Renew	25.4	3	7.96	7.74	7.78	7.95	7.93	7.49	EMS
01/26/15	144 Hr.	25.3	3	7.71	7.58	7.52	7.50	7.50	7.43	EMS
01/26/15	Renew	25.3	3	7.91	7.51	8.23	8.13	8.07	7.95	EMS
01/27/15	168 Hr.	25.4	3	7.98	7.95	7.94	7.93	7.92	7.91	CS

Date	Time	Temp	Samp No	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
01/20/15	Start	25.0	1	8.28	8.76	8.29	8.46	8.55	8.72	CS
01/21/15	24 Hr.	25.6	1	8.41	8.35	8.29	8.52	8.74	8.66	CS
01/21/15	Renew	25.3	1	8.47	8.36	8.42	8.77	8.36	8.01	CS
01/22/15	48 Hr.	25.3	1	8.44	8.32	8.48	8.73	8.66	8.58	CS
01/22/15	Renew	25.2	2	8.87	8.61	8.72	8.29	8.48	8.84	CS
01/23/15	72 Hr.	25.0	2	8.02	8.99	8.20	8.86	8.11	8.82	EMS
01/23/15	Renew	25.0	2	8.08	8.39	8.55	8.26	8.95	8.39	EMS
01/24/15	96 Hr.	25.2	2	8.26	8.34	8.59	8.70	8.19	8.74	CS
01/24/15	Renew	25.0	3	8.67	8.34	8.19	8.25	8.47	8.66	CS
01/25/15	120 Hr.	25.4	3	8.23	8.46	8.45	8.34	8.06	7.99	EMS
01/25/15	Renew	25.4	3	8.16	8.54	8.55	8.64	8.14	7.79	EMS
01/26/15	144 Hr.	25.3	3	8.92	8.72	8.19	8.44	8.50	8.54	EMS
01/26/15	Renew	25.3	3	8.80	7.52	8.86	8.56	8.15	8.76	EMS
01/27/15	168 Hr.	25.4	3	8.65	8.34	8.28	8.11	8.74	8.20	CS

Huther and Associates

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

City of Mena WWTF | Lab ID# 23284 | Test Date: January 20, 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
01/20/15	1	7.46	8.72	40	42	126	<0.01	N/A	TG
01/22/15	2	7.48	8.84	56	44	128	<0.01	N/A	TG
01/24/15	3	7.44	8.66	60	42	134	<0.01	N/A	TG
01/20/15	Con	7.90	8.28	44	26	140	-	-	TG

[1] Measurements taken in 100% solution.

Huther and Associates, Inc.
Begin Date: January 20, 2015
Lab I.D.# 23284

CERIODAPHNIA DUBIA STATISTICAL ANALYSES
Survival

Fisher's Exact Test

Identification	Number of Alive	Dead	Total
Control	10	0	10
32% Effluent	10	0	10
Total	20	0	20

Critical fisher's value (10,10,10) (p=0.05) is 6. B value is 10.
Since B is greater than 6 there is No Significant Difference between control and treatment at the 0.05 level.

Fisher's Exact Test

Identification	Number of Alive	Dead	Total
Control	10	0	10
75% Effluent	10	0	10
Total	20	0	20

Critical fisher's value (10,10,10) (p=0.05) is 6. B value is 10.
Since B is greater than 6 there is No Significant Difference between control and treatment at the 0.05 level.

Fisher's Exact Test

Identification	Number of Alive	Dead	Total
Control	10	0	10
42% Effluent	10	0	10
Total	20	0	20

Critical fisher's value (10,10,10) (p=0.05) is 6. B value is 10.
Since B is greater than 6 there is No Significant Difference between control and treatment at the 0.05 level.

Fisher's Exact Test

Identification	Number of Alive	Dead	Total
Control	10	0	10
100% Effluent	3	7	10
Total	13	7	20

Critical fisher's value (10,10,10) (p=0.05) is 6. B value is 3.
Since B is less than or equal to 6 there is a significant difference between control and treatment at the 0.05 level.

Fisher's Exact Test

Identification	Number of Alive	Dead	Total
Control	10	0	10
56% Effluent	10	0	10
Total	20	0	20

Critical fisher's value (10,10,10) (p=0.05) is 6. B value is 10.
Since B is greater than 6 there is No Significant Difference between control and treatment at the 0.05 level.

Summary of Fisher's Exact Tests

Grp	Identification	Number Exposed	Number Dead	Sig (P=0.5)
	Control	10	0	
1	32% Effluent	10	0	
2	42% Effluent	10	0	
3	56% Effluent	10	0	
4	75% Effluent	10	0	
5	100% Effluent	10	7	*

*Statistically significant difference

Huther and Associates, Inc.
Begin Date: January 20, 2015
Lab I.D.# 23284

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	23.100
2	32% Effluent	10	22.000	26.000	23.400
3	42% Effluent	10	20.000	26.000	22.400
4	56% Effluent	10	21.000	25.000	22.400
5	75% Effluent	10	20.000	25.000	23.100

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	1.656	1.287	0.407	5.57
2	32% Effluent	1.822	1.350	0.427	5.77
3	42% Effluent	2.711	1.647	0.521	7.35
4	56% Effluent	1.600	1.265	0.400	5.65
5	75% Effluent	2.767	1.663	0.526	7.20

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	3.350	12.100	19.100	12.100	3.350
Observed	2	14	23	8	3

Calculated Chi-Square goodness of fit test statistic = 3.0645
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 = 1.27

Table Chi-square value = 13.28 (alpha = 0.01, DF = 4)
Table Chi-square value = 9.49 (alpha = 0.05, DF = 4)

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

ANOVA Table

SOURCE	DF	SS	MS	F
Between	4	8.280	2.070	0.981
Within (Error)	45	95.000	2.111	
Total	49	103.280		

Critical F value = 2.61 (0.05,4,40)
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	23.100	23.100		
2	32% Effluent	23.400	23.400	-0.462	
3	42% Effluent	22.400	22.400	1.077	
4	56% Effluent	22.400	22.400	1.077	
5	75% Effluent	23.100	23.100	0.000	

Dunnett table value = 2.23 (1 Tailed Value, P=0.05, DF=40,4)
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	1.449	6.3	-0.300
3	42% Effluent	10	1.449	6.3	0.700
4	56% Effluent	10	1.449	6.3	0.700
5	75% Effluent	10	1.449	6.3	0.000

Huther and Associates

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

CLIENT	City of Mena WWTF	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0036692	DATE COLLECTED	01/19/15 01/21/15 01/23/15
LAB ID #	23284	DATE RECEIVED	01/19/15 01/21/15 01/23/15
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	01/20/15 1500
TEST ORGANISM	*Pimephales promelas*	END DATE/TIME	01/27/15 1500
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 Prairie Creek	LIGHT INTENSITY	50-100 ft cndl
DILUTION WATER	Laboratory Adjusted	TECHNICIAN	M. Horner

SURVIVAL SUMMARY

Conc.	01/21/15					01/22/15					01/23/15					01/24/15					01/25/15				
	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	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	7	8	8	8	8	7	8	8
56%	6	8	4	8	8	5	7	4	8	8	5	7	4	8	8	5	7	4	7	8	5	7	4	7	8
75%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conc.	01/26/15					01/27/15					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	7	8	8	8	8	7	8	8	97.5	5.73
56%	5	7	4	7	8	5	7	4	7	8	77.5	26.50
75%	0	0	0	0	0	0	0	0	0	0	0.0	0.00
100%	0	0	0	0	0	0	0	0	0	0	0.0	0.00

MEAN DRY WEIGHT PER REP

% Effluent	Rep A	Rep B	Rep C	Rep D	Rep E	x	C.V.%
Con	0.4410	0.4720	0.4960	0.4830	0.4290	0.4642	6.10
32%	0.4480	0.4820	0.4560	0.5010	0.4760	0.4726	4.47
42%	0.5020	0.4950	0.4020	0.4770	0.4520	0.4656	8.69
56%	0.2860	0.3560	0.2020	0.3750	0.4160	0.3270	25.76
75%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00
100%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

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

City of Mena WWTF | Lab ID# 23284 | Test Date: January 20, 2015

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
01/20/15	Start	25.0	1	7.90	7.87	7.83	7.76	7.72	7.46	CS
01/21/15	24 Hr.	25.7	1	7.92	7.87	7.82	7.79	7.85	7.82	CS
01/21/15	Renew	25.3	1	7.62	7.58	7.54	7.51	7.47	7.43	CS
01/22/15	48 Hr.	25.6	1	7.66	7.65	7.62	7.58	7.54	7.51	CS
01/22/15	Renew	25.2	2	8.02	7.92	7.89	7.86	7.84	7.48	CS
01/23/15	72 Hr.	25.7	2	7.84	7.65	7.62	7.59	DEAD	DEAD	EMS
01/23/15	Renew	25.7	2	8.63	8.07	7.65	7.54	DEAD	DEAD	EMS
01/24/15	96 Hr.	25.5	2	7.92	7.86	7.82	7.78	DEAD	DEAD	CS
01/24/15	Renew	25.0	3	7.99	7.63	7.58	7.52	DEAD	DEAD	CS
01/25/15	120 Hr.	25.8	3	8.07	7.62	7.94	8.01	DEAD	DEAD	EMS
01/25/15	Renew	25.8	3	7.96	7.74	7.78	7.95	DEAD	DEAD	EMS
01/26/15	144 Hr.	25.5	3	7.58	7.51	7.57	7.53	DEAD	DEAD	EMS
01/26/15	Renew	25.5	3	7.91	7.51	8.23	8.13	DEAD	DEAD	EMS
01/27/15	168 Hr.	25.7	3	7.61	7.58	7.55	7.52	DEAD	DEAD	CS

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	32%	42%	56%	75%	100%	
01/20/15	Start	25.0	1	8.28	8.76	8.29	8.46	8.55	8.72	CS
01/21/15	24 Hr.	25.7	1	8.59	8.48	8.36	8.50	8.79	8.03	CS
01/21/15	Renew	25.3	1	8.47	8.36	8.42	8.77	8.36	8.01	CS
01/22/15	48 Hr.	25.6	1	8.87	8.66	8.75	8.23	8.41	8.22	CS
01/22/15	Renew	25.2	2	8.87	8.61	8.72	8.29	8.48	8.84	CS
01/23/15	72 Hr.	25.7	2	7.89	8.26	8.86	7.62	DEAD	DEAD	EMS
01/23/15	Renew	25.7	2	8.08	8.39	8.55	8.26	DEAD	DEAD	EMS
01/24/15	96 Hr.	25.5	2	8.62	8.31	7.59	8.20	DEAD	DEAD	CS
01/24/15	Renew	25.0	3	8.67	8.34	8.19	8.25	DEAD	DEAD	CS
01/25/15	120 Hr.	25.8	3	8.35	8.41	8.18	8.61	DEAD	DEAD	EMS
01/25/15	Renew	25.8	3	8.16	8.54	8.55	8.64	DEAD	DEAD	EMS
01/26/15	144 Hr.	25.5	3	8.92	8.44	8.69	8.70	DEAD	DEAD	EMS
01/26/15	Renew	25.5	3	8.80	7.52	8.86	8.56	DEAD	DEAD	EMS
01/27/15	168 Hr.	25.7	3	8.56	8.47	8.32	8.54	DEAD	DEAD	CS

Huther and Associates

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

City of Mena WWTF | Lab ID# 23284 | Test Date: January 20, 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
01/20/15	1	7.46	8.72	40	42	126	<0.01	N/A	TG
01/22/15	2	7.48	8.84	56	44	128	<0.01	N/A	TG
01/24/15	3	7.44	8.66	60	42	134	<0.01	N/A	TG
01/20/15	Con	7.90	8.28	44	26	140	-	-	TG

[1] Measurements taken in 100% solution.

Huther and Associates, Inc.
Begin Date: January 20, 2015
Lab I.D.# 23284

PIMEPHALES PROMELAS STATISTICAL ANALYSES
Survival

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	1.393	1.393	1.393
2	32% Effluent	5	1.393	1.393	1.393
3	42% Effluent	5	1.209	1.393	1.356
4	56% Effluent	5	0.785	1.393	1.102

Shapiro - Wilk's Test For Normality

D = 0.271

W = 0.818

Critical W (P = 0.05) (n = 20) = 0.905
Critical W (P = 0.01) (n = 20) = 0.868
Data Fail normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.000	0.000	0.000	0.00
2	32% Effluent	0.000	0.000	0.000	0.00
3	42% Effluent	0.007	0.082	0.037	6.06
4	56% Effluent	0.061	0.247	0.111	22.43

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

Grp	Identification	Transformed Mean	Rank Sum	Crit. Value	Df	Sig
1	Control	1.393				
2	32% Effluent	1.393	27.50	17.00	5.00	
3	42% Effluent	1.356	25.00	17.00	5.00	
4	56% Effluent	1.102	17.50	17.00	5.00	

Critical values use k = 3, are 1 tailed, and alpha = 0.05
No statistically significant difference

Huther and Associates, Inc.
Begin Date: January 20, 2015
Lab I.D.# 23284

PIMEPHALES PROMELAS STATISTICAL ANALYSES
Growth

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	0.429	0.496	0.464
2	32% Effluent	5	0.448	0.501	0.473
3	42% Effluent	5	0.402	0.502	0.466
4	56% Effluent	5	0.202	0.416	0.327

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.001	0.028	0.013	6.10
2	32% Effluent	0.000	0.021	0.009	4.47
3	42% Effluent	0.002	0.040	0.018	8.69
4	56% Effluent	0.007	0.084	0.038	25.76

Shapiro - Wilk's Test For Normality

D = 0.040

W = 0.945

Critical W (P = 0.05) (n = 20) = 0.905
Critical W (P = 0.01) (n = 20) = 0.868
Data Pass normality test at P=0.01 level. Continue analysis.

Bartlett's Test For Homogeneity of Variance

Calculated B1 statistic = 8.09

Table Chi-square value = 11.34 (alpha = 0.01, DF = 3)
Table Chi-square value = 7.81 (alpha = 0.05, DF = 3)

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

ANOVA Table

SOURCE	DF	SS	MS	F
Between	3	0.074	0.025	9.914
Within (Error)	16	0.040	0.002	
Total	19	0.114		

Critical F value = 3.24 (0.05,3,16)
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	0.464	0.464		
2	32% Effluent	0.473	0.473	-0.266	
3	42% Effluent	0.466	0.466	-0.044	
4	56% Effluent	0.327	0.327	4.343	*

Dunnett table value = 2.23 (1 Tailed Value, P=0.05, DF=16,3)
***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	0.070	15.2	-0.008
3	42% Effluent	5	0.070	15.2	-0.001
4	56% Effluent	5	0.070	15.2	0.137

APPENDIX A
RAW DATA

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

CLIENT Mena
OUTFALL 001
LAB ID # 23284

START DATE/TIME 1-20-15 2G 1530
END DATE/TIME 1-27-15 2G 1530

Con

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/21	A	A	A	A	A	A	A	A	A	A	2G	1530
1/22	A	A	A	A	A	A	A	A	A	A	NL	1430
1/23	A	A	A	A	A	A	A	A	A	A	NL	1115
1/24	3	2	3	3	2	3	4	3	2	3	2G	1200
1/25	A	A	A	A	A	A	A	A	A	A	2G	1030
1/26	6	9	10	6	7	7	9	7	8	6	MH	1110
1/27	14	12	12	13	12	14	12	13	12	14	2G	1530
	23	23	25	22	21	24	25	23	22	23		

x̄ # Young w/o Dead = 23.1 CV% = 5.57
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100.0 CV% = ~~100.0~~ D 0.00

32

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/21	A	A	A	A	A	A	A	A	A	A	2G	1530
1/22	A	A	A	A	A	A	A	A	A	A	NL	1430
1/23	A	A	A	A	A	A	A	A	A	A	NL	1115
1/24	3	A	3	3	A	2	5	3	2	3	2G	1200
1/25	A	2	A	A	4	A	A	A	A	A	2G	1030
1/26	9	6	7	6	8	8	7	8	11	10	MH	1110
1/27	12	14	13	13	12	13	12	12	12	13	2G	1530
	24	22	23	22	24	23	22	23	25	26		

x̄ # Young w/o Dead = 23.4 CV% = 5.77
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100.0 CV% = 0.00

42

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/21	A	A	A	A	A	A	A	A	A	A	2G	1530
1/22	A	A	A	A	A	A	A	A	A	A	NL	1430
1/23	A	A	A	A	A	A	A	A	A	A	NL	1115
1/24	3	A	2	3	4	3	2	A	3	2	2G	1200
1/25	A	3	A	A	A	A	A	4	A	A	2G	1030
1/26	6	9	6	6	7	6	9	6	7	6	MH	1110
1/27	12	14	13	14	12	13	12	13	12	12	2G	1530
	21	26	21	23	23	23	23	23	22	20		

x̄ # Young w/o Dead = ② 22.4 CV% = 7.35
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100.0 CV% = 0.00

56

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/21	A	A	A	A	A	A	A	A	A	A	2G	1530
1/22	A	A	A	A	A	A	A	A	A	A	NL	1430
1/23	A	A	A	A	A	A	A	A	A	A	NL	1115
1/24	3	2	3	A	A	3	2	4	3	3	2G	1200
1/25	A	A	A	3	2	A	A	A	A	A	2G	1030
1/26	7	7	8	6	6	6	6	7	7	6	MH	1110
1/27	13	12	14	13	13	12	14	12	13	14	2G	1530
	23	21	25	22	21	21	22	23	23	23		

x̄ # Young w/o Dead = 22.4 CV% = 5.65
x̄ # Young w/Dead = CV% =
x̄ % Survival = 100.0 CV% = 0.00

① EW 4/28/15
② LH 4/29/15

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

CLIENT Mena
OUTFALL 001
LAB ID # 23284

START DATE/TIME 1-20-15 2G 1530
END DATE/TIME 1-27-15 2G 1530

75

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/21	A	A	A	A	A	A	A	A	A	A	2G	1530
1/22	A	A	A	A	A	A	A	A	A	A	NC	1430
1/23	A	A	A	A	A	A	A	A	A	A	NC	1115
1/24	3	4	2	3	A	3	3	A	2	A	2G	1200
1/25	A	A	A	A	3	A	A	3	A	4	2G	1030
1/26	7	6	6	8	6	10	6	7	9	8	MH	1110
1/27	12	13	12	13	14	12	13	12	14	13	2G	1530
	22	23	20	24	23	25	22	22	25	25		

$\bar{x}$ # Young w/o Dead = 23.1 CV% = 7.20

$\bar{x}$ # 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
1/21	D	A	D	A	D	A	D	D	A	D	2G	1530
1/22	-	A	-	A	-	A	-	-	D	-	NC	1430
1/23	-	A	-	A	-	A	-	-	-	-	NC	1115
1/24	-	3	-	A	-	2	-	-	-	-	2G	1200
1/25	-	A	-	3	-	A	-	-	-	-	2G	1030
1/26	-	6	-	6	-	7	-	-	-	-	MH	1110
1/27	-	13	-	12	-	13	-	-	-	-	2G	1530
	D-b	22	DO	21	DO	22	DO	DO	DO	DO		

$\bar{x}$ # Young w/o Dead = 21.7 CV% = 2.66

$\bar{x}$ # Young w/Dead = 6.5 CV% = 161.07

$\bar{x}$ % Survival = 30.0 CV% = 161.02

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: Mena

OUTFALL #: 001 PROJECT #: 23284

ORGANISM ID#: PPO-15-019

DATE/TIME STARTED: 1-20-15 MH 1500

DATE/TIME ENDED: 1-27-15 2G 1500

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	7	8	8	8	8	7	8	8
56	6	8	4	8	8	5	7	4	8	8	5	7	4	8	8	5	7	4	7	8	5	7	4	7	8
75	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
100	0	0	0	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Initials Date/Time	1-21-15 MH 1500					1-22-15 MH 0925					1-23-15 MH 1000					1-24-15 TG 0800					1-25-15 2G 0910				

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	0.00
32	8	8	8	8	8	8	8	8	8	8	100.0	0.00
42	8	8	7	8	8	8	8	7	8	8	97.5	5.73
56	5	7	4	7	8	5	7	4	7	8	77.5	26.50
75	–	–	–	–	–	–	–	–	–	–	0.0	0.0
100	–	–	–	–	–	–	–	–	–	–	0.0	0.0
Initials Date/Time	1-26-15 MH 0810					1-27-15 2G 1500						

Huther and Associates, Inc.

environmental toxicologists, biologists, consultants

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

Client Nona

Project# 23254

Date/Time Start 1/20/15 1500

Date/Time End 1/27/15 1500

% Effluent	Rep A	Rep B	Rep C	Rep D	Rep E	$\bar{x}$	C.V.%	Analyst
Con	.4410	.4720	.4960	.4830	.4290	.4642	6.10	BH
32	.4480	.4820	.4560	.5010	.4760	.4726	4.47	
42	.5020	.4950	.4020	.4770	.4520	.4656	8.69	
56	.2860	.3560	.2020	.3750	.4160	.3270	25.76	
75	—	—	—	—	—	.0000	0.00	
100	—	—	—	—	—	.0000	0.00	

Huther and Associates, Inc.

environmental toxicologists, biologists, and consultants

Client / Facility Mena

Lab ID Number 23284

Outfall Number 001

Test Date 1-20-15

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
1/20	1	7.46	8.72	40	42	126	<0.01	Na	TG
1/22	2	7.48	8.84	56	44	128	"	"	"
1/24	3	7.44	8.66	60	42	134	"	"	"
1/20	Con	7.90	8.28	44	26	140	—	—	"

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:	1
TEST DATE:	01/02/15 - 01/09/15 1100 Hrs - 1100 Hrs
STATISTICAL METHOD:	Dunnetts/Steels

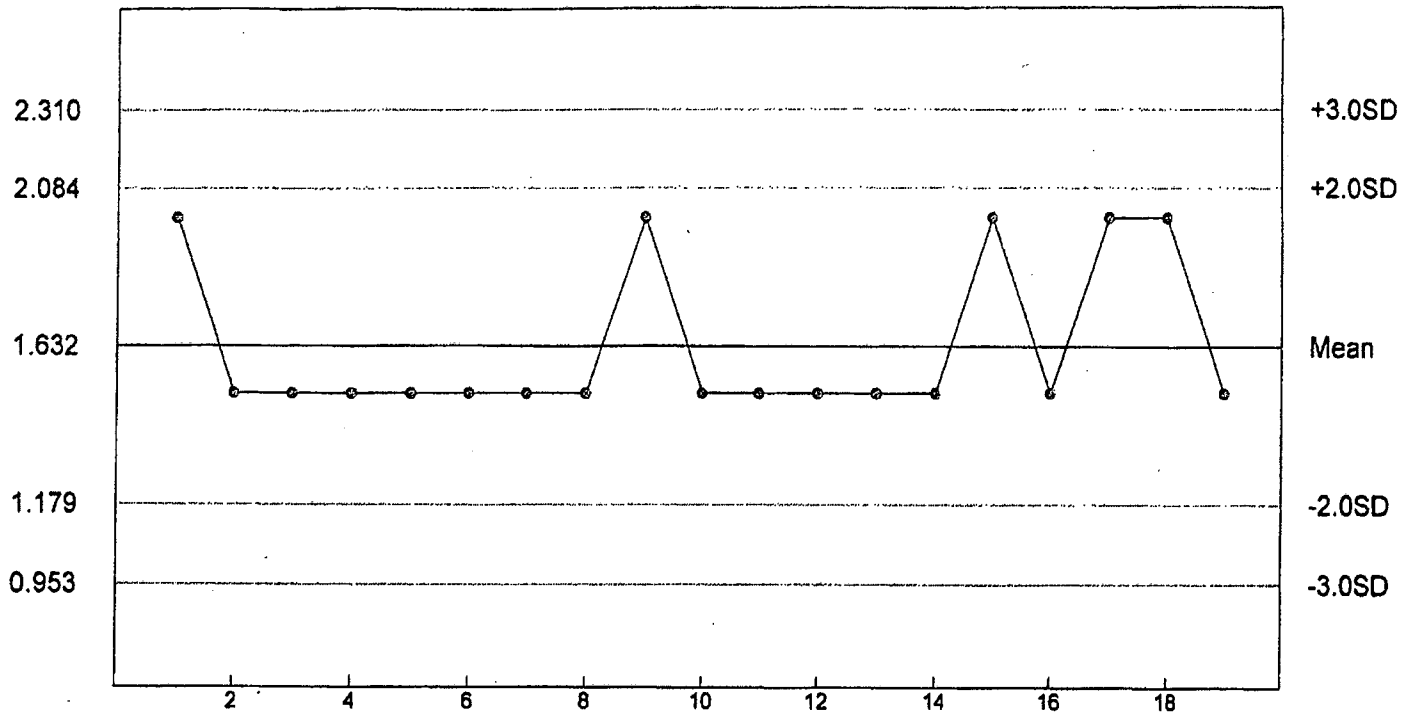
CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	0
2.0	10	6
2.5	10	10
3.0	10	10

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

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

Reference Tox Sodium Chloride g/L

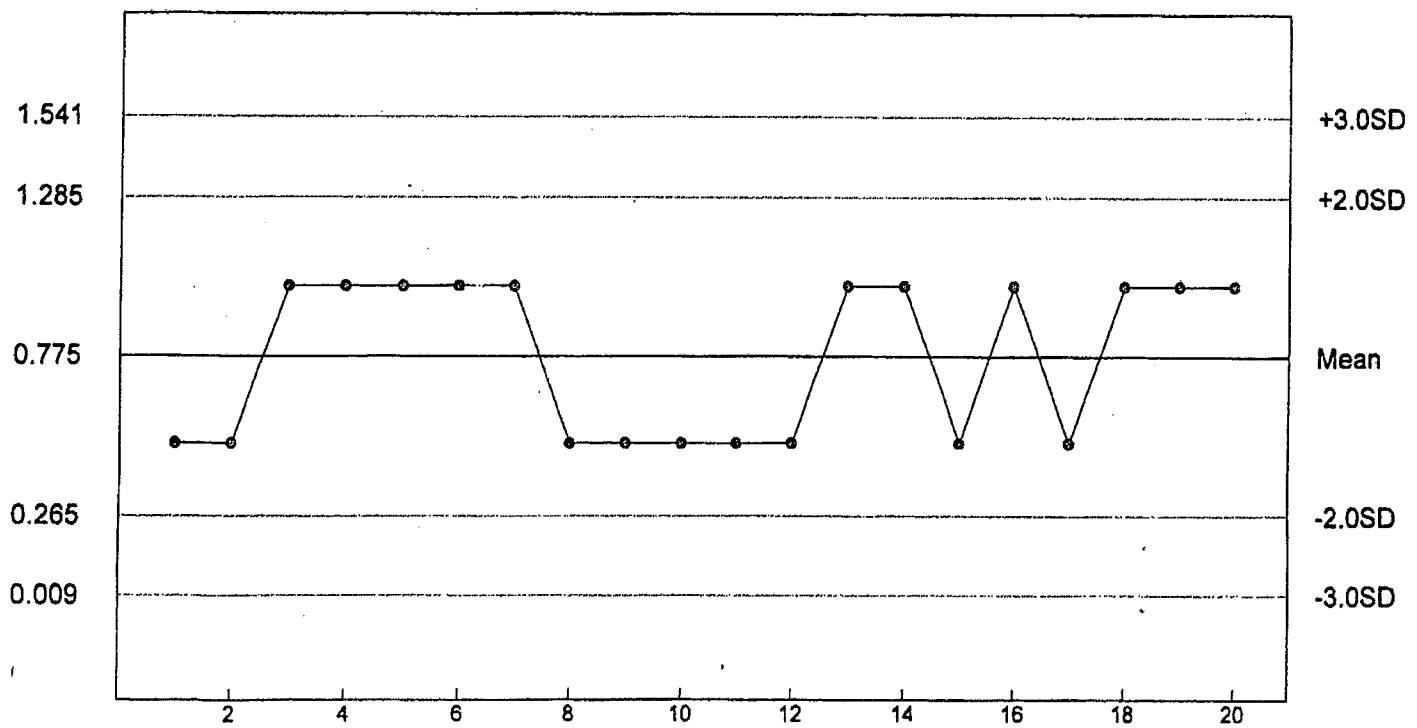
C. dubia Survival - NOEC



n= 19 Mean= 1.632 SD= 0.226 CV= 13.86% Min= 1.500 Max= 2.000

Reference Tox Sodium Cloride g/L

C. dubia Reproduction - NOEC



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

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environmental toxicologists, biologists, consultants

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES:	*Pimephales promelas*
CHEMICAL:	Copper Nitrate
DURATION:	7-Days
TEST NUMBER:	1
TEST DATE:	01/02/15 - 01/09/15 1410 Hrs - 1410 Hrs
STATISTICAL METHOD:	Dunnetts/Steels

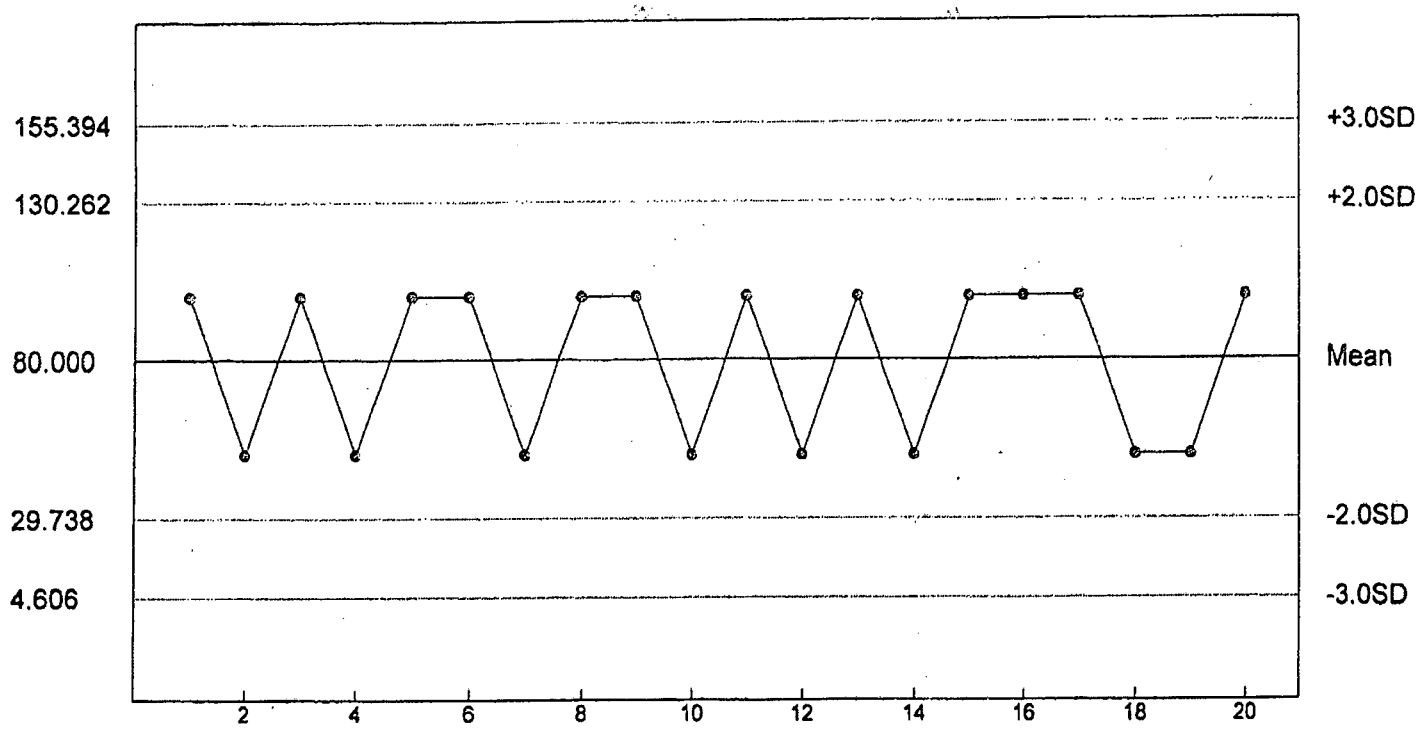
CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
25	40	0
50	40	0
100	40	9
200	40	32
400	40	40
800	40	40

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

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

Reference Tox Copper Nitrate ug/L

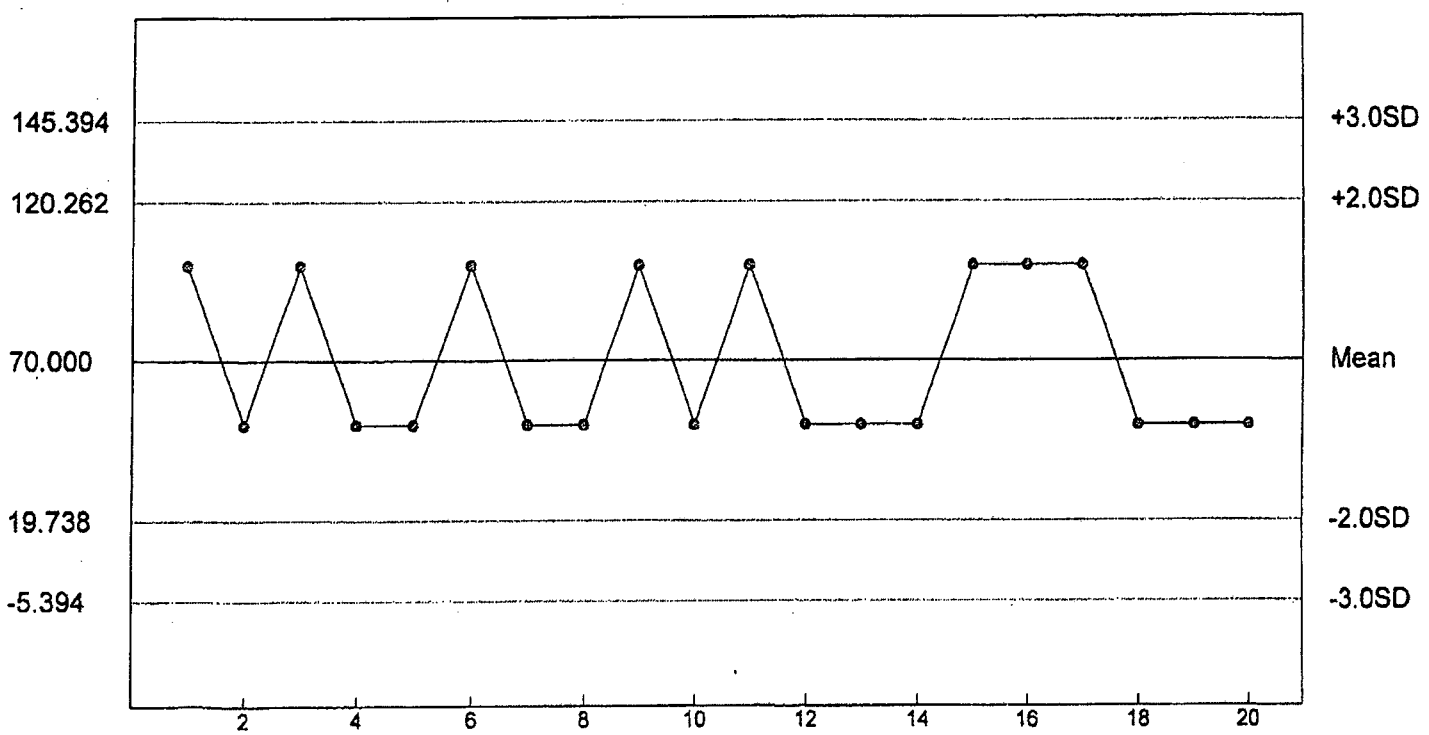
P. promelas Chronic Survival - NOEC



n= 20 Mean= 80.000 SD= 25.131 CV= 31.41% 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 # 23284 PROJECT NAME Mena PERMIT# AR0036692
AFIN 57000412

OUTFALL SAMPLES

24-Hr Flow Weighted Composite X Other _____

					METHODS OF COLLECTION AND COMPOSITE			
OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
ONE	MIKE	0900 19JAN15	0900 19JAN15	24	AUTO			ONE

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG H$_2$O 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 Prairie Creek

DILUTION WATER USED FOR THIS TEST Lab

RELINQUISHED BY: MIKE DATE: 19JAN15 TIME: 1100 RECEIVED BY AT THIS DATE/TIME 1100 19JAN15 TO DANCE

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: Dance Garrott DATE: 1/19/15 TIME: 1830 SAMPLE TEMP. @ RECEIPT. 4°

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

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DENTON, TX 76201
(940) 387-1025 • FAX (940) 387-1036

CHAIN OF CUSTODY RECORD

PROJECT #: 23284 PROJECT NAME: Mena PERMIT#: AR0036692
AFIN 57000042

OUTFALL SAMPLES

24-Hr Flow Weighted Composite: X Other: _____

					METHODS OF COLLECTION AND COMPOSITE			
OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
Outfall 1	M.K.	20 JAN 15 0800	21 JAN 15 0800	24	AUTO	—	—	1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG H$_2$O 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: Prairie Creek
DILUTION WATER USED FOR THIS TEST: Lab

RELINQUISHED BY: Mike Spencer DATE: 21 JAN 15 TIME: 1000 RECEIVED BY AT THIS DATE/TIME: Huther Driver @ B-130

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: Renee Parrott DATE: 1/21/15 TIME: 1830 SAMPLE TEMP. @ RECEIPT: 4°

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 # 23284 PROJECT NAME Mona PERMIT# AR0036692
AFIN 57000042

OUTFALL SAMPLES

24-Hr Flow Weighted Composite X Other _____

					METHODS OF COLLECTION AND COMPOSITE			
OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	# OF CONTAINERS TO BE SHIPPED
OUTFALL 1	Mike	22 JAN 15 0800	23 JAN 15 0800	24	AUTO	—	—	2

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG H$_2$O 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 Prairie Creek
DILUTION WATER USED FOR THIS TEST Lab

RELINQUISHED BY: Mike Spencer DATE: 23 JAN 15 TIME: 1000 RECEIVED BY AT THIS DATE/TIME Huther Driver @ B-Bar

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: Nancy Parrott DATE: 1/23/15 TIME: 1900 SAMPLE TEMP. @ RECEIPT. 5°

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

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

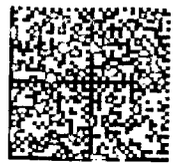
CITY OF MENA WWTF
NPDES PERMIT NO. AR0036692
AFIN 57-00042
BIOMONITORING REPORTING
TEST DATE: 01/20/15

Ceriodaphnia dubia	Response
A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter TLP3B**	1
B. Report the NOEC value for survival. **Parameter TOP3B**	75%
C. Report the NOEC value for reproduction. **Parameter TPP3B**	75%
D. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter TGP3B**	1
E. Report the higher (critical dilution or control) Coefficient of Variation (CV%), **Parameter TQP3B**	5.57%
Report Parameter No. 22414 (lowest NOEC value) for Ceriodaphnia dubia.	75%

Pimephales promelas	Response
A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter TLP6C**	1
B. Report the NOEC value for survival. **Parameter TOP6C**	56%
C. Report the NOEC value for growth. **Parameter TPP6C**	42%
D. If the NOEC for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0". **Parameter TGP6C**	1
E. Report the higher (critical dilution or control) Coefficient of Variation (CV%), **Parameter TQP6C**	6.10%
Report Parameter No. 22414 (lowest NOEC value) for Pimephales promelas.	42%

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

MENA WWTP
323 POLK 53
MENA AR
71953



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NORTH LITTLE ROCK, AR
72118-5317