### CITY OF MENA WWTF OUTFALL 001

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

> Ceriodaphnia dubia Pimephales promelas

> > January 14, 2014

Reviewed by: \_(

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#### TOXICITY TEST REPORT - CHRONIC

Client	City of Mena WWTF	Laboratory I D	21912
			January 14, 2014
	Outfall 001	· ·	·

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

### SAMPLE COLLECTION

Composite effluent samples from City of Mena WWTF were delivered by UPS courier to Huther & Associates on January 14, January 16, and January 20, 2014. Effluent samples were collected from Outfall 001 using an automatic sampler and were manually composited by facility personnel. Two toxicity tests were requested: a seven-day *Ceriodaphnia dubia* survival and reproduction test (EPA Method 1002.0), and a seven-day *Pimephales promelas* larval survival and growth test (EPA Method 1000.0). Test organisms, procedures and quality assurance requirements were in accordance with the EPA manual, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

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

TEST SETUP Ceriodaphnia dubia



The seven-day *Ceriodaphnia dubia* survival and reproduction test was initiated at 1500 hours, January 14, 2014. Five concentrations were prepared (32%, 42%, 56%, 75%, and 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of 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.

Test Date: January 14, 2014

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 1500 hours, January 21, 2014. Survival and reproduction data were statistically analyzed (p = 0.05) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

### SURVIVAL Ceriodaphnia dubia

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

LOEC: Not Applicable NOEC: 100% Effluent

### REPRODUCTION Ceriodaphnia dubia

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

LOEC: Not Applicable NOEC: 100% Effluent

PMSD: 6.6%

TEST SETUP

Pimephales promelas



The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1530 hours, January 14, 2014. Five concentrations were prepared (32%, 42%, 56%, 75%, and 100% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (unnamed tributary of 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.

Test Date: January 14, 2014

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 1530 hours, January 21, 2014. At test termination, all larvae were sacrificed, dried for 24-hours, and weighed. Survival and growth (weight) data were statistically analyzed (p = 0.05) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

### SURVIVAL Pimephales promelas

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

LOEC: Not Applicable NOEC: 100% Effluent

### GROWTH Pimephales promelas

P. promelas growth data failed Shapiro Wilk's test for normality at the 0.01 alpha level (0.900). 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 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: 11.5%

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 AR0036692 for City of Mena WWTF, Outfall 001 passed for this testing period.

CLIENT	ecity of Menaw W.T.E.	SAMPLE TYPE	24-Hour Composite
NPDES #	AR0036692	DATE COLLECTED	7:01/1/3/14/101/15/14/3/01/17/14/
LAB ID#	21912	DATE RECEIVED	01/14/14 01/16/14 01/20/14
TEST TYPE	7. Day Chronic 35	BEGIN DATE/TIME	201/14/19/2(1500)
TEST ORGAN	NISM ZGenidaaphniaidabia	END DATE/TIME	(01/21/14%1500)
ORGANISM A	AGE 24 Hours	TEST TEMPERATUR	RE (°C) 25 ± 1 25 ± 1
ORGANISM S	SOURCE INHOuse 1	PHOTO PERIOD	Al6-hr-abighte8-hr-Dark
RECEIVING	WATER junnamed tributary of Prairie Greek	LIGHT INTENSITY	50-100 ft-end
DILUTION W	WATER Staboratory. Adjusted	TECHNICIAN	No Lehre

### SURVIVAL & REPRODUCTION SUMMARY

				Con	trol					
Date.		Rep 22	eKep i3¢	-Rep;	Kep 254	Kep 6	rKep	Rep 8	Rep.	⊤Rep (10
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/15/14	\$0)E	0.8	¥0%	(0)	<b>€</b> ,0,₹	707	30%	¥0.5	級0年	位00
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/16/14	复0至	聚0氢	第0章	微0数	¥ 0.8	<b>X</b> 0 A	o S	0	÷0.	0
	Α	Α	Α	Α	Α	Α	Α	A	A	Α
01/17/14	※0%	<b>20</b> 3	C.0.	第0章	@ O.	200	<b>10</b> 00	於06	数0次	20億
	Α	Α	Α	A	Α	A	Α	Α	A	Α
01/18/14	\$ O \$	第0章	340年	<b>100</b>	<b>3.0</b> 2	X0.5	20两	<b>20</b> 5	0.	第01
	2	3	2	2	4	3	2	2	2	2
01/19/14	2.5	蒙3湯	1.2	恶2路	44	/#3 <sup>77</sup>	2.	2.7	2.9	擊2
	7	7	8	6	7	8	7	7	9	7
01/20/14	1/9	表10张	<b>\$10</b> £	378	朝鴻		<b>7.9</b> %	3 9 A		39.
	13	12	12	11	12	12	13	13	12	12
01/21/14	*229	22	7,22,	第199	₹£23°5	23	於22章	<b>22</b> 5	23	321
		x#Y	oung	21.9			C.V.	5.479	6	
		x% S	urvival	100%			C.V.	0.009	6	

				32% E	ffluent					
Date	Kep	Rep 2	Rep 31	Rep 4₹	rRep 5∗i			Rep 8		Re 10
	Α	Α	Α	Α	Α	A	Ā	Α	Α	Α
01/15/14	¥0*	数0吨	<b>#</b> 0#	101	02	数0急	<b>₩</b> 0\$	910	超0岁	100
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/16/14	WO A	0.0	₩0#	<b>₩</b> 0%	第02	0.0	类0代	数0级	数0数	養0
	Α	Α	Α	Α	Α	Α	Α	Α	Α	4
01/17/14	後0章	<b>40</b> 0	≱0×	9	0.8	¥ 0 ¥	長0月	<b>30</b> 2	第0歲	<b>9.0</b>
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/18/14	3.0	器0点	器 0 数	<b>20</b> 0 48	0	24.0	<b>₹0</b>	403	類 0 盤	₫0
	3	2	3	3	4	2	2	3	2	_2
01/19/14	33	12.5	133条	黨3漢	*4	3.2%	22	235	更2款	_
	10	8	8	7	9	9	6	8	8	9
01/20/14	#13 <sub>%</sub>	2102	發用達	[10]	3131	到時	3.8	和理	\$10.	_
	13	14	14	12	12	13	13	12	13	12
01/21/14	<b>%26</b> %	7240	<b>#25</b>	£22 j	£25	24	第21億	23	23	2.
		x# Y	oung	23.6			C.V.	6.38%	6	
		x% S	urvival	100%			C.V.	0.00%	6	

				42% E	ffluent					
n a Date		Rep 2	Rep 33	Rep 241	Kep:	Rep 6	Rep 7-	Rep 48	Rep ≯9	Rep 7-10
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/15/14	<b>₹0</b> ¥	(0)的	第0部	李0沙	30点	5.0	<b>30%</b>	0.4	*0.7	第0次
	Α	Α	Α	Α	Α	A	Α	Α	Α	Α
01/16/14	<b>≵0</b> \$	<b>20</b> 0	深0酸	₩0%	第0点	是0周	90美	液0多	章0歳	0.5
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/17/14	¥0\$	<b>30</b> 0	線0基	320A	20₫	160%	<b>0</b> 0	3. Or.	204	0.
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/18/14	70%	201	30)	2000	<b>202</b>	0.5	<b>於0</b> 問	305	物の統	<b>9</b> 0
	4	3	2	2	3	2	3	4	2	3
01/19/14	44	生3点	120	至2家	6.3	J-2	12/31	374章	2.2	:∴3,
	7	9	9	8	8	7	9	8	8	8
01/20/14	到接	£12₹	翻痕	(£10)	<b>深明</b>	美9装	<b>612</b> 5	深12	5/10	素則
	14	13	13	12	12	15	12	13	13	13
01/21/14	25%	浅25盏	¥24%	223	#23F	124	24	約25%	i₀23∄	824
		x # Y	oung	23.9			C.V.	4.169	6	
		x% Si	urvival	100%			C.V.	0.00%	6	

				56% E						
Date	Rep.	Rep In2	e Sep	Rep.	Rep 5	Ep 164		Kep	A	E O
ASS AS A SECTION OF	A	Α	Α	Α	Α	Α	Α	Α	Α	Α
01/15/14	20	30月	¥0.9	40年	<b>\$0</b> %	\$0£	<b>0</b> 0	#0	(10 g	<b>%</b> 0
	Α	Α	Α	Α	Α	Α	Α	A	A	A
01/16/14	模可認	# <b>0</b> K	¥0.2	漆0%	€40 <i>#</i>	2000	<b>₩0.</b> ₽	数0億	60年	€0
	Α	Α	À	Α	Α	Α	Α	Α	Α	^
01/17/14	7.0	数0法	<b>60</b> 0	10分	数の容	JOF	員0億	数0章	於0歲	* 0
	Α	Α	Α	A	Α	Α	A	Α	Α	Α
01/18/14	0.5	2000	**0家	<b>₩0</b> .	河0河	图0建	或00数	录0文	数0.6	20
	3	2	4	3	3	2	4	2	3	2
01/19/14	33/2	2.2	4.	33	332	5.2件	<b>344</b> %	第2页	第3月	<u>.</u> 2
	8	8_	6	6	7	7	9	9	9	10
01/20/14	<b>A138</b>	禁10%	210	9.	级[0]	₹9	513.	多數	數12章	_
	13	14	12	12	12	14	14	13	14	12
01/21/14	24	24	第22图	學213	¥22±	<b>323</b>	27	<b>建24</b> 案	*26 g	3 24
		x#Y0	oung	23.7			C.V.	7.72%	6	
		x% Si	urvival	100%			C.V.	0.00%	6	

where: A = Alive 5 = Alive, 5 young

D = Dead D5 = 5 Young, Female died A alive today
4 total young to date

5 alive, 5 young today
12 total young to date

City of Mena WWTF

Lab ID# 21912

Test Date: January 14, 2014

75% Effluent												
Date		Rep 124	Hep 3	Kep 4°		Rep 46	Rep 7	Rep	Rep 9	Кер 10		
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α		
01/15/14	<b>30%</b>	€07	0	0.5	F.0*	0.1	Ora	¥,0%	#0⊈	<b>0</b> .		
	Α	Α	Α	Α	Α	Α	A	Α	Α	Α		
01/16/14	<b>70</b> 2	0	第0年	0,4	0	₩0%	1800	<b>302</b>	0.	.≱0≱		
	Α	Α	Α	A	Α	Α	Α	Α	Α	Α		
01/17/14	20%	20%	<b>0</b> 00	於03	[0]	總0數	4.08	* 0 ×	<b>60</b> %	0.2		
	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α		
01/18/14	÷0.1	数0级	1-04	r=0:1	70	第0部	0.1	数0岁	第0部	<b>30</b>		
	3	3	2	2	3	4	3	3	2	4		
01/19/14	33	為3	.23	¥;2%	339	247	13	<b>通3</b> 数	2*4	44		
	7	8	9	9	6	6	8	8	8	7		
01/20/14	210%		810	<b>8408</b>	至9世	图10%	製作的	到46	2.10x			
	13	14	12	13	12	14	14	13	12	12		
01/21/14	表23点	製25章	237	424	210	, 24,	25	24	22	1,23		
		x#Y	oung	23.4			C.V.	5.419	6			
		x% Si	urvival	100%	•		C.V.	0.00%	6			

Replaken aken akeplaken keplaken akeplaken akeplaken													
Date 4.	<u>#</u> 18	21	3 7	4.	5.5	61	7.	<b>3.8</b> %	9.				
	Α	Α	Α	Α	Α	Α	Α	Α	Α	A			
01/15/14	数0数	*0#	<b>.</b> 0	<b>₽0</b> %	208	<b>X0</b> C	<b>30</b> %	美0%	60周	₽0			
	Α	Α	Α	Α	Ā	Α	Α	Α	Α	F			
01/16/14	30%	¥05	0	<b>※</b> 0档	<b>0.0</b>	ž 0.	後0周	<b>30</b> 0	60%	300			
	Α	Α	Α	Α	Α	Α	Α	Α	Α				
01/17/14	10	<b>%</b> 0.1	<b>2</b> 0₽	0	<b>0</b> 0	<b>303</b>	線0套	域0数	<b>0</b> 08	激(			
	Α	Α	A	Α	Α	Α	Α	Α	A				
01/18/14	<b>£0</b> 4	EQ#	第0点	0.	¥\$0¥	40分	第0第	<b>20</b> 0	将0%	Ŧ(			
	4	4	2	3	2	3	4	3	2	3			
01/19/14	44E	#47	2	-31	計2階	253章	<b>324</b> 0	3.3	2.	数			
	9	6	7	8	7	10	7	9	9				
01/20/14	413	7103	有9数	图16	94	§133	學演	124	数付款	劉			
	14	13	13	12	14	12	13	13	12	1			
01/21/14	127	23	22	<b>⊮23</b> §	23	25	v 241	<b>\$25</b>	1,23	¥2			
		x#Yo	oung	24.0			C.V.	6.21%	6				
		x% St	urvival	100%	1		C.V.	0.00%	6				

where:	A = Alive	ex 1:	ex 2:	
***********	5 = Alive, 5 young	A alive today	5 alive, 5 young today	
	D = Dead	4 total young to date	12 total young to date	
	D5 = 5 Voung Female died		<del> </del>	

City of Mena WWTF

Lab ID# 21912

Test Date: January 14, 2014

#### WET CHEMISTRY MEASUREMENTS

7000	i i	Temp	Samp.		E.	pH or S	olution			Analyst
Date :			No.	_CON	³ <sup>1</sup> 32%.	142% : <u>.</u>	56%;	75‰.	100%	
01/14/14	Start	25.0	1	8.81	8.16	7.72	7.54	7.38	7.15	STC
(401/15/14	- 24-AL	u 24.0		7.63	.7.58 <b>4</b> ,	7522	3.77.40 S	2.46	7.36	GZK.
01/15/14	Renew	24.0	1	7.70	7.54	7.45	7.41	7.29	7.15	GZK
02/01/16/04	48 Hr.	24.4		1 -8.32	· 7.70# "	7,755	7.46	<i>\$-7,</i> 40 <u>₹</u> 1	7:34°	· See 1
01/16/14	Renew	24.1	2	7.78	7.61	7.47	7.26	7.25	7.24	SCC
701/17/14	1772 Mil.	240.	27.1	. 7.65	7,54	# : 7:35	7,32	7/22	7,20⊭	SCC
01/17/14	Renew	24.0	2	8.56	7.86	7.56	7.36	7.29	7.24	SCC.
01/18/14	26 Hr 5	, 24/0	2 2	8.24	8.14	7.86	7.76 🏄	7:42	-734	edscc #
01/18/14	Renew	24.0	2	8.11	7.87	7.57	7.43	7.32	7.24	SCC
-01/19/14.3	120thf.	24.2	P . 2.	7.84	77.76	7.70	7.664	*7-59*	7-7:30	**STC#
01/19/14	Renew	24.0	2	7.58	7.45	7.33	7.23	7.12	7.02	STC
101/20/14	144世。	24.0	27.1	7.84	7776 r	-7.68	17.59 £	7.53	7,494	Tristc.
01/20/14	Renew	25.0	3	7.70	7.52	7.44	7.31	7.15	7.05	STC
01/21/14	4168.Hr. #	4440°,	3,44	7.747	7.65	, √47:60.	<i>-₁9</i> /54 /	√9:49i ≯ 1.5 ×	7.423	GZK 1

	Time	Temps	Samp	Property and		ĐỐ (mg/L)	of Solution	7.5.37.1		Analyst
	4		No.	JCON /	32%	. 42%	≱ 56% <sub>6</sub>	75%	400%	
01/14/14	Start	25.0	1	7.90	8.37	7.63	8.23	8.40	8.65	STC
01/15/14+	24 Htt. 2	24.0	Single	8:0974	7.77h. i	7:58	= 37:82) ×	÷-7°86Å	7.21	. ≎GZK
01/15/14	Renew	24.0	1	7.53	7.90	7.87	8.23	8.21	8.65	GZK
_01/16/14_4	48 Hi ◆	244	F, Sig. 7	4.8.53	8.07	8,28	8:074	8.16	√) \$8:01· *#	rg sce:i⁄n
01/16/14	Renew	24.1	2	8.16	8.10	8.48	8.13	8.29	8.71	scc
401/17/14.1	7,72 Hr. J	4 24 0	22.		, 48.33	8.32	8 41	8:45%	<b>4</b> 8.66 €	SCC
01/17/14	Renew	24.0	2	8.13	8.55	8.31	8.56	8.38	8.71	SCC
#401/18/44a_/	396 Hr.	+ 24:0s	Z 21-3	8.19.	+ 8·34 ···	8.47	8:56	F 8 632 +	. 18:84#*s	***SCC*_
01/18/14	Renew	24.0	2	8.45	8.50	8.52	8.60	8.59	8.71	SCC
(*,01/19/44.*	120E-1	24.2	254	8:80.24	8 20	8.08	8:08	3,8:02	7.98	STC:
01/19/14	Renew	24.0	2	8.24	8.02	8.56	8.31	8.32	8.23	STC
01/20/14	144)Цт	24.0	2	7×8×50	↓ 8.10° ;	17.76a	-, 7.73°	7/91 <sub>17</sub> 4	7.57	re STCP
01/20/14	Renew	25.0	3	8.56	7.83	8.25	7.86	7.85	8.70	STC
7.01/21/14	71688Hr.	24:0	[473.7]	7.44	5.7:37	7,44	7.525	7.46	7.72%	GZK

City of Mena WWTF

Lab ID# 21912

Test Date: January 14, 2014

### INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp:	pH <sub>1</sub> :-	DO/	Hardness mg/L-CaC03	#Alkalinity mg/L CaCO3	@onduct umhos/cm	Resid Cl2	Dechlor(mL) Na2S2O3 mg/L	Analyst
201/14/14	1	7.15	8.65	20	24	142	< 0.01	N/A	TN
#01/16/14#	2	7.24	8.71	24	26	163	< 0.01	N/A	TN
01/20/14	3	7.05	8.70	20	28	167	< 0.01	N/A	TN
401/14/14/2	Con	8.81	7.90	40	30	182	-	-	TN

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

Huther and Associates, Inc. Begin Date: January 14, 2014

Lab I.D.# 21912

## CERIODAPHNIA DUBIA STATISTICAL ANALYSES Reproduction

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	<u>N</u>	Min	Max	Mean
1	Control	10	19.000	23.000	21.900
2	32% Effluent	10	21.000	26.000	23.600
3	42% Effluent	10	22.000	25.000	23.900
4	56% Effluent	10	21.000	27.000	23.700
5	75% Effluent	10	21.000	25.000	23.400
6	100% Effluent	10	22.000	27.000	24.000

Summary Statistics on Transformed Data Table 2 of 2

Grp	<b>Identification</b>	Variance	Sd	Sem	C.V.%
1	Control	1.433	1.197	0.379	5.47
2	32% Effluent	2.267	1.506	0.476	6.38
3	42% Effluent	0.989	0.994	0.314	4.16
4	56% Effluent	3.344	1.829	0.578	7.72
5	75% Effluent	1.600	1.265	0.400	5.41
6	100% Effluent	2.222	1.491	0.471	6.21

Chi-Square Test For Normality: Actual And Expected Frequencies

<u>Interval</u>	<u>&lt; -1.5</u>	-1.5 to -0.5	-0.5 to 0.5	> 0.5  to  1.5	<u>&gt;1.5</u>
Expected	4.020	14.520	22.920	14.520	4.020
Observed	4	13	26	14	3

Calculated Chi-Square goodness of fit test statistic = 0.8505 Table Chi-Square value (alpha = 0.01) = 13.277

Data Pass normality test. Continue analysis.

Bartlett's	Test	For	Homoger	neity	of	Vai	iance
MAI LAULE O							

Calculated B1 statistic = 3.82

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	29.883	5.977	3.025
Within (Error)	54	106.700	1.976	
Total	59	136.583		

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

			Mean		
		<b>Transformed</b>	Calculated In		
Grp	Identification	Mean	<b>Original Units</b>	T Stat	Sig
1	Control	21.900	21.900		
2	32% Effluent	23.600	23.600	-2.704	
3	42% Effluent	23.900	23.900	-3.181	
4	56% Effluent	23.700	23.700	-2.863	
•	75% Effluent	23.400	23.400	-2.386	
2	100% Effluent	24.000	24.000	-3.341	
0	100% Ellinem	27.000			

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, DF=40,5)

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

C	Identification	Num of Reps	Minimum Sig Diff (In Orig. Units)	<u>% of</u> Control	Difference from Control
<u>Grp</u>	Control	10	(===		
Ţ	00		1 450		-1.700
2	32% Effluent	10	1.452	6.6	
3	42% Effluent	10	1.452	6.6	-2.000
4	56% Effluent	10	1.452	6.6	-1.800
5	75% Effluent	10	1.452	6.6	-1.500
3	, , , , ,			6.6	-2.100
6	100% Effluent	10	1.452	0.0	-2.100

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

CLIENT City of Mena WWTF.	SAMPLE TYPE 24 Hour Composite 24 Composite 2
NPDES # AR0036692	DATE COLLECTED #01/13/14 01/13/13 01/14/14
LAB ID # 21912	DATE RECEIVED 01/14/14/201/16/14 01/20/14
TEST TYPE Pay Chronic Control of the	BEGIN DATE/TIME
TEST ORGANISM Peimephales prometas	END DATE/TIME #01/21/14 1590
ORGANISM AGE	TEST TEMPERATURE (°C) 25 生物
ORGANISM SOURCE In House	PHOTO PERIOD 16-fin Light 8-fin Dark
RECEIVING WATER Junnamed tributary of Prairie Cleek	LIGHT INTENSITY 50 100 in a cidl
DILUTION WATER Laboratory Adjusted	TECHNICIAN M'Horner

### SURVIVAL SUMMARY

	Gana 62 3 30 4 01/45/14 Co. 3 4 6 2		0	1/16/1	4		og \$50 01/17/14	01/18/14			4		24 2 (-01/A9/A2/		
Conc.	A B C D TEN	Α	В	С	D	Е	M FOR ECT DE E	Α	В	С	D	Е	A BE G DE		
Con	88 88 88 989	8	8	8	8	8	85 48 3.84 184 88	8	8	8	8	8	88 88 88 284 284		
32%	8 28 484 682 682	8	8	8	8	8	284 #81 <b>284</b> #84 #84	8	8	8	8	8	88 89 89 78 484		
42%	182 386 182 48	8	8	8	8	8	8 8 8 8 8 8	8	8	8	8	8	<b>88 88 98 38 48</b> 488		
56%	88 88 88 88 88	8_	8	8	8	8	8 181 88 88 88	8	8	8	8	8	88 88 88 488		
75%	887 286 487 288 388	8	8	8	8	8	8 8 58 58	8	8	8	8	8	F89 F80 F8 58 483		
100%	287 287 88 2481 782	8	8	8	8	8	82 8 88 286 88	8	8	8	8	8	[28] [38] [38] [38] [38]		

	301/20/14		0	1/21/1	4		x %	C.V. %
Conc.	PAN PBY FC ADE SER	Α	В	С	D	E	Survival	C. V. 70
Con	8 8 8 8 8 8	8	8	8	8	8	100.0	0.00
32%	8 48 88 88 88	8	8	8	8	8	100.0	0.00
42%	88 28 48 28 28 28 28 28 28 28 28 28 28 28 28 28	8	8	8	8	8	100.0	0.00
56%	8 8 8 78 78 8	8	8	8	8	8	100.0	0.00
75%	8 8 8 48 8	8	8	8	8	8	100.0	0.00
100%	187 84 38 78 484	8	8	8	8	8	100.0	0.00

### MEAN DRY WEIGHT PER REP

o % Enluent	Rep As	Rep B	Rep <sub>i</sub> C 4	Rep.D	Representation	*** (x####	% CV%
Con	0.4190	0.4820	0.4670	0.4920	0.4210	0.4562	7.50
32%	0.4680	0.4250	0.5040	0.4490	0.5030	0.4698	7.31
y +42%	0.4360	0.4720	0.5060	0.4780	0.4290	0.4642	6.84
456% AV	0.4680	0.4690	0.4150	0.5020	0.5030	0.4714	7.60
3.75%	0.4960	0.4240	0.5030	0.4860	0.4250	0.4668	8.37
100%	0.4750	0.5030	0.4940	0.4160	0.4900	0.4756	7.32

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

City of Mena WWTF

Lab ID# 21912

Test Date: January 14, 2014

#### WET CHEMISTRY MEASUREMENTS

ALC: NO.		e y v	Samp.			pH of S	olution	#** ( <b>*</b>		Analyst
Manager A	TELLIC .	lemp	No.	Ç@N⊾″	÷ 32%;;*	42%	56%	175%/PE	100%	21371
01/14/14	Start	25.0	1	8.81	8.16	7.72	7.54	7.38	7.15	STC
. 201/15/14:	. :24 Hr.	24.0/**		7/42	(* 9137 <u>)</u>	7.31	7.26	''ς, <i>3</i> ε20Γ''ς	7:10	€ ĞZK.
01/15/14	Renew	24.0	1	7.70	7.54	7.45	7.41	7.29	7.15	GZK
01/16/14	748(Hr.	24.3 °		7.46	7:41	7.38	7/34	7.29	7.22,	* SCE
01/16/14	Renew	24.1	2	7.78	7.61	7.47	7.26	7.25	7.24	SCC
01/17/14	72 Hr	24.1.7	2.24	7•84.7	7:65,	7.54	第7:49:: :	+- 7:40° =	¶:33°∾	sec.*
01/17/14	Renew	24.0	2	8.56	7.86	7.56	7.36	7.29	7.24	SCC
01/18/44	596 Fb:	24.0	572	47778.	7.61	7,54	7.44.	7,41 p	(7:32 <sup>3)</sup>	* \$66 *4
01/18/14	Renew	24.0	2	8.11	7.87	7.57	7.43	7.32	7.24	SCC
01/19/14	*120 Hr.**	24.2	1.2	1.57k (*	, 7.5 <sup>3</sup> 47 <sup>3</sup>	7:48	2-7:47ex;;	7/36	\$7.28±i	STEAR
01/19/14	Renew	24.0	2	7.58	7.45	7.33	7.23	7.12	7.02	STC
4,01/20/14	344 Hr.	-24.0°c	2.7	7,7/41 <sup>1,7</sup>	7.42	7:39	1.7636;z.	*7.27	7:10	STG#1
01/20/14	Renew	25.0	3	8.56	7.83	8.25	7.86	7.85	7.05	STC
5/01/21/14/4	(-168/Hr)	ريو.2 <u>4!</u> 0. ۽	34.3	7.40	. 7.43	7:39	7,33	7.30	720	STC is

74 A	r 4		Samp.	W. T		DO (mg/L)	of Solution	APIS		Analyst
Albate */	arome:	Temps.	i No.	ÇON	32%	42%*:	56%	75%	- 4100%學	200
01/14/14	Start	25.0	1	7.90	8.37	7.63	8.23	8.40	8.65	STC
01/15/14	24 (8)	24.0	y Albert	7 8 49	8:49	<sup>1</sup> 8.44	8.46.	* 8.36 <b>.</b> 1	aj 8 23 🗀	GZK**
01/15/14	Renew	24.0	1	7.53	7.90	7.87	8.23	8.21	8.65	GZK
2.01/16/14	1.48/Hi	24:3	1.12	8.39)	8.10	. 8.15 <sub>4</sub>	8.28	- 18.36r	: 8,20° ±	#:#ISEG, 11
01/16/14	Renew	24.1	2	8.16	8.10	8.48	8.13	8.29	8.71	SCC
01/47/44	1972 Hr. 7	7 24°1	2 -		8.27	8 10 .	8:16	€ 18.10v°	# 7-90/°	SCC
01/17/14	Renew	24.0	2	8.13	8.55	8.31	8.56	8.38	8.71	SCC
201/48/145	- 96 <b>:H</b> i	24.0	(2 %)	-8:29 <b>L</b> s.	8.43	4 8.38 A	** .8.19 <sup>**</sup> *.	ты 8.84) <sup>т</sup> .	8.58	:::'SCC
01/18/14	Renew	24.0	2	8.45	8.50	8.52	8.60	8.59	8.71	SCC
901/19/14	1201Hr.	24.2	22	8:24%	8.23	7-87	.,8:01.₩	8.31, 5	7.52*-	STC.
01/19/14	Renew	24.0	2	8.24	8.02	8.56	8.31	8.32	8.23	STC
01/20/147	1144/96	124(0	2.22	791	8:36	7.8.29	<b>v</b> 8.12	7.84	7:56.9	STC-
01/20/14	Renew	25.0	3	8.56	7.83	8.25	7.86	7.85	8.70	STC
01/21/4	168 Hr. 7	24.0			7.79	71:78	777	248 1677	7.80	PASTIC 44

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

City of Mena WWTF

Lab ID# 21912

Test Date: January 14, 2014

### INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp.	pH	DO.	Hardnéss mg/L CaC03	Alkalimity mg/L CaCO3	Conduct umhos/cm	Resid: CI2	Dechlor(mlb) Na2S2O3 mg/L	Analysu
01/14/14	1	7.15	8.65	20	24	142	< 0.01	N/A	TN
501/16/14 <sup>25</sup>	2	7.24	8.71	24	26	163	< 0.01	N/A	TN
701/20/14%	3	7.05	8.70	20	28	167	< 0.01	N/A	TN
301/14/14	Con	8.81	7.90	40	30	182			

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

Huther and Associates, Inc. Begin Date: January 14, 2014

Lab I.D.# 21912

### PIMEPHALES PROMELAS STATISTICAL ANALYSES Growth

	Summary Statistic	cs on Tra	nsformed Da	ta Table 1	of 2	Shapiro - Wilk's Test For Normality
Grp	Identification	<u>N</u>	Min	Max	Mean	D = 0.030
1	Control	5	$\overline{0.419}$	0.492	0.456	
2	32% Effluent	5	0.425	0.504	0.470	W = 0.898
3	42% Effluent	5	0.429	0.506	0.464	
4	56% Effluent	5	0.415	0.503	0.471	Critical W (P = $0.05$ ) (n = $30$ ) = $0.927$
5	75% Effluent	5	0.424	0.503	0.467	Critical W (P = $0.01$ ) (n = $30$ ) = $0.900$
6	100% Effluent	5	0.416	0.503	0.476	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 Statistic	cs on Tra	nsformed Da	ata Table 2	of 2	Steel's Many-One Rank Test - Ho:Control < Treatment

**C.V.%** Grp Identification Sd <u>Sem</u> Variance 0.034 0.015 7.50 Control 0.001 32% Effluent 0.001 0.034 0.015 7.31 42% Effluent 0.001 0.032 0.014 6.84 56% Effluent 0.0010.036 0.016 7.60 75% Effluent 0.002 0.039 0.017 8.37 100% Effluent 0.001 0.035 0.016 7.32

Grp	<u>Identification</u>	Transformed Mean	Rank Sum	<u>Crit.</u> Value	<u>Df</u>	<u>Sig</u>
1	Control	0.456				
2	32% Effluent	0.470	32.00	16.00	5.00	
3	42% Effluent	0.464	30.00	16.00	5.00	
4	56% Effluent	0.471	31.00	16.00	5.00	
5	75% Effluent	0.467	33.00	16.00	5.00	
6	100% Effluent	0.476	32.00	16.00	5.00	

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

APPENDIX A RAW DATA

### 7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION DAILY RAW DATA TABLE PAGE \_\_\_OF \_\_\_\_\_\_

_ CLIENT	Mena	 _		
OUTFALL	001			

START DATE/TIME

END DATE/TIME

-LAB ID#		21	19/	12

						(	<u>01</u>	<u> </u>				
, Date	Repl	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
17	A	14	A	A	A	4	A	4	4	Α	7,	१८००
" <u>1/5</u>											76	1300
$\lfloor \mathcal{V}_{\cdot} \rfloor$	A	A	A	<b>A</b>	A	A	A	A	$A_{-}$	$A_{-}$	NL	1495
/ / b					_	A	<u> </u>	7	<del>                                     </del>	<u> </u>	/V C	1113
1/2		A	A	A	1	/\	1	$\Delta$	21	А	NL	1340
	1 a	A	4	4	4	A	4	4	4	4	110	10 10
1/8			//_	7	//		-	7.7	·/-		MH	1340
1	2	3	2	2	4	3	2	2	2	2	7.17	
1/9											MH	0945
TV.	2	2	8	6	7	8	2	7	9	2	26	1030
1/20					-			_			26	1036
/_	13	12	17	1	7	12	13	13	17	12	26	1500
21	22	<u> 22</u>	22	117	<u> </u>	<u> 23</u>	122	22	23	d	00	1,500

$$\bar{x}$$
 # Young w/o Dead =  $21.9$  CV% =  $5.47$ 

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

 $\bar{x}$  % Survival =

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

100.0 CV%= 0.00

Date Rep1 Rep2 Rep3 Rep4 Rep5 Rep6 Rep7 Rep8 Rep9 Rep10 Analyst Time  V/S A A A A A A A A A A A A A A A A A A A							3	<u> </u>					·
V <sub>15</sub> A A A A A A A A A A A A A A A A A A A	Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
Y <sub>16</sub> A A A A A A A A A A A A A A A A A A A	1/1	A		A			A	A				76	1500
16 NL 1945 17 A A A A A A A A A A A A A A A A A A A		<u> </u>	Δ	A	Λ	Λ	A		A	A	Δ	Co	1500
1/17 A A A A A A A A A A A A A A A A A A A	16	7	$\Delta$		_	$\triangle$	<u> </u>	1	71		_/3	NL	1445
1/18 A A A A A A A A A A MM 1349 1/19 3 2 3 3 4 2 2 3 2 2 MM 0945 1/20 10 8 8 7 9 9 6 8 8 9 76 WSO 1/1 13 MM 12 12 13 13 12 13 12 76 1500	1/	A	Λ	A	A	Λ	A	A	A	A	А		1-7/1
1/18 3 2 3 3 4 2 2 3 2 2 MM 0945 1/19 10 8 8 7 9 9 6 8 8 9 76 1000 1/20 13 14 14 12 12 13 13 12 13 12 76 1500	17		<b>_</b>	- 7			7				7	NC	1590
1/9 3 2 3 3 4 2 2 3 2 2 MM 0945 1/20 10 8 8 7 9 9 6 8 8 9 76 WSO 1/ 13 M M 12 12 13 13 12 13 12 7 6 1500	Via	A	1	#	4	A	1	1	#	A	1	MH	1340
1/19 10 8 8 7 9 9 6 8 8 9 76 100 100 100 100 100 100 100 100 100 10	//8		2	3	3	4	2	2	3	2	2		<u>.</u>
1/ 13 M 14 12 12 13 13 12 13 12 76 1880	1/19											MH	0945
1/ 13 14 14 12 12 13 13 12 13 12 76 150	1/22	10	8	ક્ર	7	9	G	6	8	8	4	7/	- معددا
7. 1-4-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	120		<u> </u>	<u> </u>	<u> </u>	ļ		_	<u> </u>		1.	10	1030
21 12/024/25/2225/24/21/25/25/25	1/2	13	14	14	12	17	13	13	13	13		26	1500
	21	alo	124	25	2	<u> </u>	124	191	23	25	123		7500

 $\bar{x}$  # Young w/o Dead = 23.6 CV% = 6.38

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

 $\bar{x}$  % Survival = /00.0 CV% = 0.00

Date	Repl	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/15	A	A	A	A	A	A	Ą	A	A	A	26	1200
16	A	A	A	A.	A	A	A	Λ	A	Α	NL	1445
1/2	A	A	A	Α	A	A	A	A	A	A	NL	1340
1/8	A	A	A	A	4	A	Ą	4	A	A	MH	1340
1/9	4	3	2	2	3	2	3	4	2	3	MH	0945
/20	7	9	9	8	ક્ર	7	৭	8	8	8	26	1030
1/21	14	13	13	12	12	15	12	13	13	13	26	1200
	<u>x</u> #	Youn	g w/c	o Dea	<u> </u>	23	<u>5</u> ,9	7	CV%	= 4	.16	

 $\bar{x}$  % Survival = //0.0 CV% = 0.00

42

						_						
Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
1/	A	A	A	A	A	A	A	A	A	A		1200
115							<u></u>				26	1300
V.	A	A	A	A	A	A	A	1	A	A		_ دربیہ
1/6	Ľ.	L.	·			L.,					NL	1445
1/	A	A	1	1	1	A	1	A	1	A	NI	340
17						L_,		ļ,			NC	<u> </u>
1/	H	A	A	1	1	4	1	1	1	1	AALL	3
1/18		Ĺ		Ľ_	<u> </u>		<u> </u>				MH	1346
1/.	3	2	4	3	3	2	4	2	2	2	MIL	MOUZ
7/9		<u> </u>	<u> </u>					<u></u>			117	0773
4	४	8	6	6	12	7	9	9	9	10	26	1030
120			<u> </u>		<u> </u>	_	<b> </b>	<u> </u>	ļ			1,00
1/	13	14	12	12	12	14	14	13	14	12	26	1000
<b>少</b> い	24	24	122	21	22	123	27	24	126	124	20	130
	<u>'</u>											

 $\bar{x}$  # Young w/o Dead = 23.7 CV% = 7.72

x # Young w/Dead =

 $\bar{x}$  % Survival = /OO. O CV% = O

### 7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION DAILY RAW DATA TABLE

PAGE 2 OF 2

Mena 1-14-14 NL 1500 START DATE/TIME \_ CLIENT END DATE/TIME 1-21-14 26 1500 **OUTFALL** LAB ID# 100

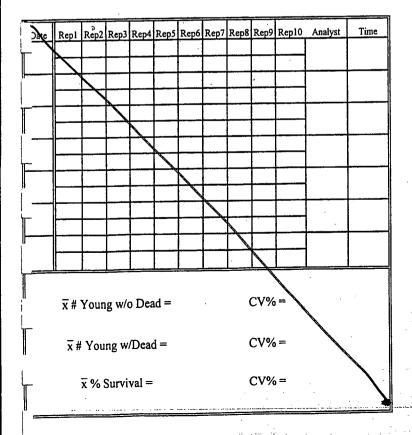
2010	Penl	Pan2	Den3	Rend	Rens	Ren6	Ren7	Rep8	Ren9	Rep10	Analyst	Time
V	4	A	A	A	A	Ā	A	Ą	Α	A	76	1500
1/5	A	A	A	A	A	A	A	A	A	A		,,,
7/6	A	1	1	Δ	A	A	4	A	A	A	NL	1445
11			A	/\			7			1	NL	1340
1/18	A	A	A	1	4	A	4	17	#	7	MH	1340
la	3	3	2	2	3	4	3	3	2	4	МН	0945
	7	8	9	9	6	6	ક	8	૪	7		1030
1/20	12	111	11	13	15	14	14	13	12	12	26	
21	23	25	23	24	ai	24	25	24	23	23	26	1500

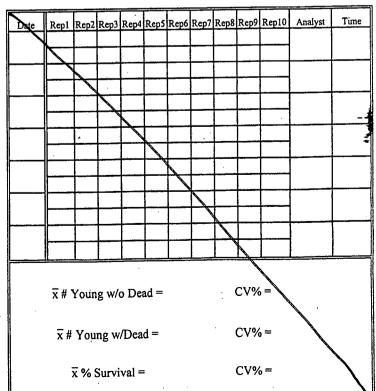
$$\bar{x}$$
 # Young w/o Dead = 23.4 CV% = 5.4/

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

$$\bar{x}$$
 % Survival =  $/00.0$  CV% =  $0.00$ 

_													
	Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
	1/15	A	A	1	A	<u> </u>	A	4	A	4	A	20	LSoc
	416	A	A	A	A	A	A	A	A	A	A	NL	1445
	Y	Λ	A	Λ	A	A	A	А	A	A	A		1340
	// <sub>1</sub>	A	#	A	A	A	A	A	A	14	A	MH	134G
	1/2	4	4	2	3	2	3	4	3	- 2	3	MH	0945
	/19 V	9	G	7	8	7	10	7	9	9	8		_
	120			_				-		,	1,7	76	1030
	1/21	14	23	33	12 23	23	12 25	13 24	25		14	25	150
		x # `	Youn	g w/o	Dea	ad =	24	10	) (	CV%	s= (	521	
	x # Young w/Dead =									CV%	, <del>-</del>	·	
			₹% S	Survi	val =	. /	160	.0		CV%	<sub>6</sub> =	0.60	





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

CLIENT/FACILITY	<u>Mena</u>	DATE/TIME STARTED	1-14-14	76	1530
OUTFALL#		DATE/TIME ENDED	01-21-14	SK	1530
ORGANISM ID#	ppo-14-013				

Conc.	А	В	С	D	E	A	В	С	מ	E	A	В	С	D	E	A	В	С	D	E	A	В	С	D	E
Con	8	8	8	8	8	8	8	8	8	8	8	8	જિ	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	છ	8	8	8	8	8	8	8	8	8	8	8	8
42	8	8	8	8	8	8	જ	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
56	8	8	8	8	2	8	8	8	8	8	8	8	8	8	P	8	8	8	8	8	8	8	8	8	8
75	8	8	8	8	8	8	g	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	δ	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
				ļ																					
												:													
Initials Date/Time	Initials Date/Time 1-15-14 MH 1530 61-136-14 11K 0820				1-1	<u> 7-14</u>	N	_ 0	905	1-1	18-1	4 M	H 0	950	01-1	9-14	( )	4(C	<b>%</b>						

Conc.	А	В	С	D	Е	A	В	С	D	E	Mean Survival	: C.V.%
Can	8	8	8	ક	8	8	8	8	8	8	100.0	0.00
32	૪	8	B	Q	8	.8	8	8	8	8	100.0	0.00
42	8	8	8	8	ક	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	B	8	8	8	100.0	0.00
100	ξ	8	8	8	8	8	8	8	8	8	100.0	0.00
					<u> </u>							
Initials Date/Time	1-20	1-14	70	08	315	01-2	1-14	2k	15	530		

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

Client	Mina	Date/Time Start	1/14/14	1530
Project#	21912	Date/Time End	1/21/14	1530

% Effluent.	Rep A	Rep B	Rep C	Rep D	Rep E, ∠	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	CV%	Analyst
Cor	.4190	14820	14670	.4920	14210	.4562	7.50	BH
32	·4680	14250	15040	17490	.5030	14698	7.31	1
42	14360	14720	15060	.4780	17290	,4642	6.84	
56	· 4680	.4690	.4150	.5020	·1030	,4714	7.60	
75	.4960	14240	.5030	.4860	14250	.4668	8.37	
100	14750	15030	14940	.4160	14900	,4756	7.32	V

Client / Facility	Mena	
Lab ID Number	21912	·
Outfall Number	001	
Test Date	1-14-14	

#### INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	ı. Hq	DO:	Hardness mg/L CaC03 !	Alkalinity: mg/L CaCO3 1	Conduct. umhos/cm	Resid:Cl2 mg/L!	Dechlor(mL) Na2S2O3 mg/L 1	Analyst
1/14	1	7.15	જ. <i>હ</i> 5	20	24	142	20.01	Na	TI
1/16	a	7.24	8.71	24	He	163			
1/20	3	7.05	8.70	20	28	167			
/14	CON	881	7.90	40	30	185			

#### INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER

- Date	Samp. No.	рĤ	DO	Hardness :: mg/I_CaC03 !	Alkalinity mg/L CaCO3	Conduct. umbos/cm '/-	Resid Cl2 mg/L	Dechlor(mls) Na2S2O3 mg/L	Analyst
	$\bigg)\bigg]$								

Notes:

APPENDIX B
REFERENCE TOXICANTS

### CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: Ceriodaphnia dubia

CHEMICAL: Sodium Chloride

DURATION: 7-Days

TEST NUMBER: 01

TEST DATE/TIME: 01/03/14 - 01/10/14

1530 Hrs - 1530 Hrs

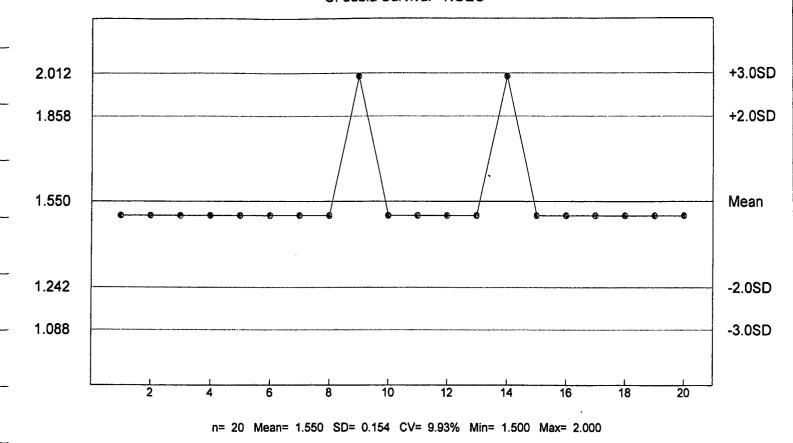
STATISTICAL METHOD: Fishers, Dunnetts/Steels

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

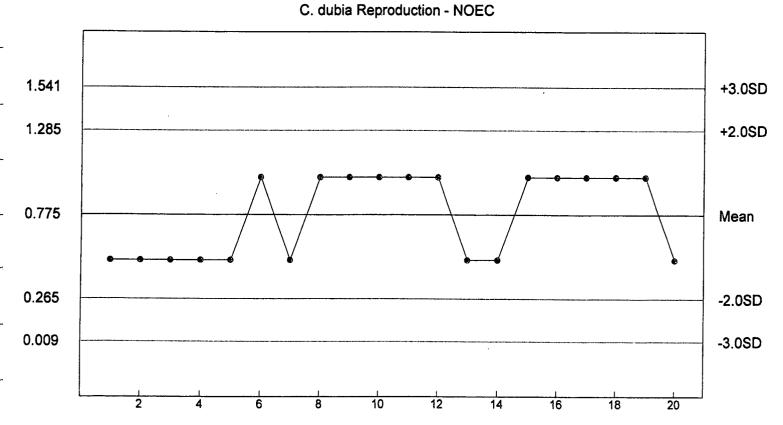
LOEC FOR	NOEC FOR	LOEC FOR	NOEC FOR REPRODUCTION
SURVIVAL	SURVIVAL	REPRODUCTION	
2.0 g/L	1.5 g/L	1.0 g/L	0.5 g/L

### Reference Tox Sodium Chloride g/L

#### C. dubia Survival - NOEC



### Reference Tox Sodium Cloride g/L



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

### CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES:

Pimephales promelas

CHEMICAL:

Copper Nitrate

**DURATION:** 

7-Days

TEST NUMBER:

01

TEST DATE/TIME:

01/06/13 - 01/13/14

1005 Hrs - 1005 Hrs

STATISTICAL METHOD:

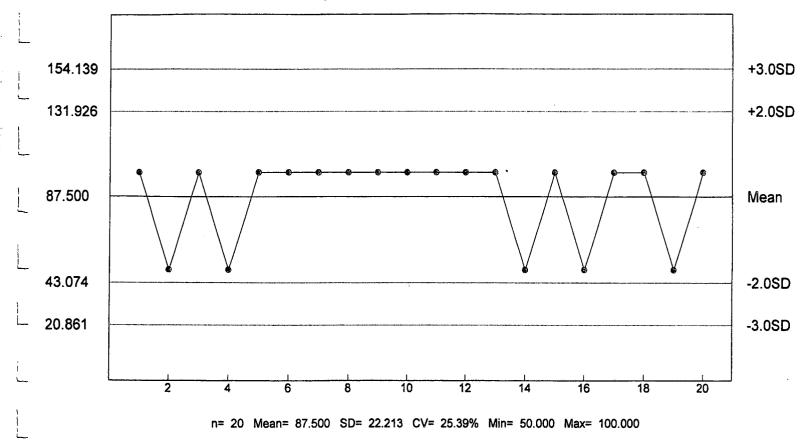
Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	0
50	40	0
100	40	7
200	40	26
400	40	40
800	40	. 40

LOEC FOR	NOEC FOR	LOEC FOR	NOEC FOR
SURVIVAL	SURVIVAL	GROWTH	GROWTH
200 ug/L	1 <b>00 ug/L</b>	100 ug/L	50 ug/L

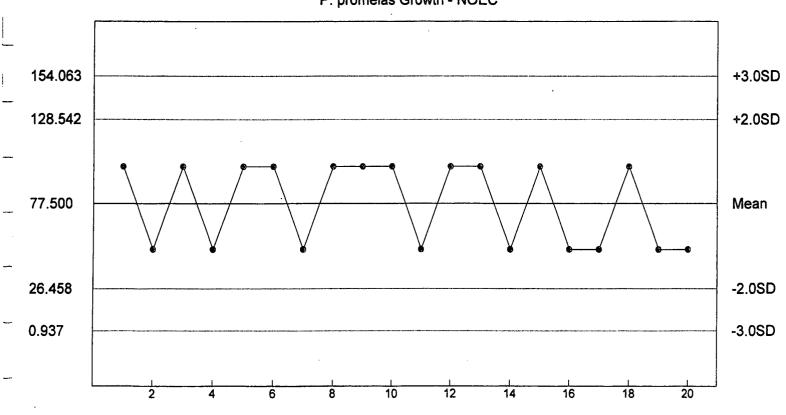
### Reference Tox Copper Nitrate ug/L

### P. promelas Chronic Survival - NOEC



### Reference Tox Copper Nitrate ug/L

### P. promelas Growth - NOEC



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

APPENDIX C
CHAIN OF CUSTODY SHEETS

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

### CHAIN OF CUSTODY RECORD

(940) 387-1025 •	FAX (940) 387-1036	)								
PROJECT #	21912	PROJECT	NAME	Ma	na			PERMIT#	NPDES A	100361692
		24-I	Ir Flow Weighted		FALL SA	MPLES Other				
OUTFALL	PERSON FAKING	STARE: 4 S.C.	END	e #OFP	ORTIONS OSITED &	AUTOGOLE	SOF COLLECTIO	OFF. AU	TO CODE	#OF CONTAINERS
OO (	FeFF	DATE/TIME SE 12JAN20 1200	DATE FIME W 133AN 191 1200			AUTO COMP	MANUALE)		NUAL COMP.	STOBESHIPPED 24
		RECEIVING V	WATER SAMI	PLES			•			
SAMPLE IDENT HO GRABS: GIV LOCATION	IFICATION (FOR REC TENAME OF STREAM	NG) PERSON I AND) SAMPLE		DATE	TIME	#OF CONTAINERS			ME OF LINEY	_
							DII	LUTION WATER FOR THIS		<u>ab</u>
RELINQUISHED B	v. Jeff		DATE:	13 JAN	14 TIME: 1	400 RECEIV	ED BY AT THIS DAT	13 14 TE/TIME	tanzok 400 of	KUPS Fice Store-M
RELINQUISHED B	Y:		DATE:	· · · · · · · · · · · · · · · · · · ·	TIME:	RECEIV	ED BY AT THIS DAT	TE/TIME		
RELINQUISHED B		d	DATE: Pick Up			RECEIV	YED BY AT THIS DAT	TE/TIME	LPS .	
RECEIVED:	Luy FRIC		1ST PAGE -		E: 01-14	TIME:	1037	SAMPLE TEM	P. @ RECEIPT	

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

A STATE OF THE PARTY OF THE PAR

### **CHAIN OF CUSTODY RECORD**

(940) 387-1025	• FAX (940) 387-1036							
PROJECT #	21912	PROJECT N	<b>АМЕ</b>	lina		PERN	MIT# MPDES	SAR0036692
				OUTFALL SA	MPLES			
		24-Hr	Flow Weighted		Other			
			J	•				_
						COLLECTIONAND C		
OUTFALL NUMBER 4 2	PERSON TAKING SAMPLEU SE	START DATE/TIME	END DATE/TIME	#OF PORTIONS COMPOSITED	AUTO GOLL AUTO GOMP	MANUAL COEL: MANUAL COMP	AUTO COEL: MANUAL COMP.	#OF CONTAINERS GTOBESHIPPED
001	Teff	1437112014	1200 1200	24	X			
		1,200	1.200					
		RECEIVING W	ATER SAMP	LES		•	_	•
SAMPLE IDEN	ITIFICATION (FOR REC IVE NAME OF STREAM	NG) PERSONITAL		DATE	#OF CONTAINERS TO BE SHIPPED	TY	PE OF TEST	day GF
©LOCATION S					per substitution of the second	RECEIV	NAME OF UNO	and tributar
						DILUTION W	VATER USED	lab
	<del></del>					FOI	R THIS TEST	
							152	M2014/1345
RELINQUISHED	BY: Teffet	tanjur	DATE: 12	STANIY <sub>TIME:</sub>	1345 RECEIVED	BY AT THIS DATE/TIME _	UPS OFFices	M2014/1345 Store Meva)
RELINQUISHED	BY:		DATE:	TIME:	RECEIVED	BY AT THIS DATE/TIME _		
RELINQUISHED	ВУ:		DATE:	TIME:	RECEIVED	BY AT THIS DATE/TIME _	11.05	
METHOD OF SH	IPMENT: Greyhoun	d	Pick Up		Client Delivered	Other	WID	- 9°
RECEIVED:	Duy THE		1ST PAGE - I	DATE: 01-16	TIME: O	<del></del>	темр. @ RECEIPT.	0.9°c

IMITATION & ACCOUNTED **HUTHER & ASSOCIATES** 1156 NORTH BONNIE BRAE STREET

DENTON, TX	76201 5 • FAX (940) 387-1036		CHAI	IN OF CUSTO	DY RECORD			
PROJECT #_	21912	PROJECT N.	AME	Mena		PERM	MT# NPDES	AR0036692
		24-Hr	Flow Weighted (	OUTFALL SA	MPLES Other			
					A MERHODS OF	Chamber The Person of the South State of the South	the transfer of the same and th	
OUTFALL NUMBER	PERSON TAKING SAMPLE	STARTA DATE/TIME	END DATE/TIME	#OFFORTIONS COMPOSITED	AUTO COLL AUTO COMP.	MANUAL COLL MANUAL COMP.	AUTO COLL MANUAL COMP	#OF CONTAINERS TO BE SHIPPED
001	Feff	16JAN2014 1200	17JXH2014/ 1200		X			and the second of the second o
	. ;	RECEIVING W	ATER SAMP	LES				
SAMPLE IDE H <sub>I</sub> O GRABS, LOCATION	NTIFICATION (EOR-REC' GIVE NAME OF STREAM	NG) PERSONITAL AND SAMPLE	ONG:	DATE TIME	#OF CONTAINERS TELEO BE SHIPPED		PE OF TEST NAME OF ING WATER	day CIF med tributar
						DILUTION W FOR	VATER USED R THIS TEST	ab
RELINQUISHE	D BY: Jeff 7	antin	DATE: 17	JANI4 <sub>TIME:</sub> 1	445 RECEIVED BY	Y AT THIS DATE/TIME [	7J2N14/1445	UPS Office Store-Me
RELINQUISHE			DATE:	TIME:		Y AT THIS DATE/TIME _		
METHOD OF SI		d	Pick Up		Client Delivered	Other	UPS	
RECEIVED:	Land D.	inger	467.0465	DATE: <u>/-2</u>	7-14 TIME: 69	320sample	темр. @ RECEIPT.	-1.2°

environmental toxicologists, biologists, and consultants

### CITY OF MENA WWTF NPDES PERMIT NO. AR0036692 AFIN 57-00042 BIOMONITORING REPORTING TEST DATE: 01/14/2014

Ceriodaphnia dubia	Response
A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TLP3B	0
B. Report the NOEC value for survival. Parameter TOP3B	100%
C. Report the NOEC value for reproduction. Parameter TPP3B	100%
D. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TGP3B	0
E. Report the higher (critical dilution or control) Coefficient of Variation (CV%),  Parameter TQP3B	6.21%
Report Parameter No. 22414 (lowest NOEC value) for Ceriodaphnia dubia.	100%
Pimephales promelas	Response
Pimephales promelas  A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TLP6C	Response 0
A. If the NOEC for survival is less than the critical dilution, enter a "1";	-
A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TLP6C	0
A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TLP6C  B. Report the NOEC value for survival. Parameter TOP6C	0
<ul> <li>A. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter TLP6C</li> <li>B. Report the NOEC value for survival. Parameter TOP6C</li> <li>C. Report the NOEC value for reproduction. Parameter TPP6C</li> <li>D. If the NOEC for reproduction is less than the critical dilution, enter a "1";</li> </ul>	0 100% 100%

Ph: (940) 387-1025 Fax: (940) 387-1036

Mena WUTP -323 POIK 53 MENA AR 71953



ADEQ NODES BIO MONTH ShorE DR 5301 NONTH ShorE DR NOTH LATTLE ROCK AR, 12118-5317