

CITY OF ROGERS
OUTFALL 001

Chronic Biomonitoring Report
Permit Number NPDES AR0043397
AFIN 04-00155

Ceriodaphnia dubia
Pimephales promelas

February 4, 2020

Reviewed by:



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TOXICITY TEST REPORT - CHRONIC

Client	City of Rogers	Laboratory I.D.	31090
Permit No.	NPDES AR0043397	Begin Date	February 4, 2020
Sample.....	Outfall 001		

Results: **Pass** *Ceriodaphnia dubia* survival and reproduction and *Pimephales promelas* survival and growth at the critical concentration (82% effluent).

SAMPLE COLLECTION

Composite effluent samples from City of Rogers were delivered by Federal Express courier to Huthur & Associates on February 4, February 6, and February 8, 2020. Effluent samples were collected and composited from Outfall 001 using an automatic sampler by facility personnel. Two toxicity tests were requested: a seven-day *Ceriodaphnia dubia* survival and reproduction test (EPA Method 1002.0), and a seven-day *Pimephales promelas* larval survival and growth test (EPA Method 1000.0). Test organisms, procedures and quality assurance requirements were in accordance with the EPA manual, "*Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*" (EPA-821-R-02-013).

The effluent samples were analyzed for total residual chlorine (Standard Methods, 23rd 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 1615 hours, February 4, 2020. Five concentrations were prepared (26%, 35%, 46%, 62% and 82% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (Osage 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 ten 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 1615 hours, February 11, 2020. 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: 82% Effluent

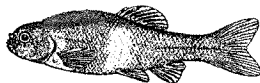
REPRODUCTION
Ceriodaphnia dubia

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: 82% Effluent

PMSD: 10.2%

TEST SETUP
Pimephales promelas



The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1600 hours, February 4, 2020. Five concentrations were prepared (26%, 35%, 46%, 62% and 82% effluent) utilizing distilled, deionized laboratory water reconstituted to match the hardness, alkalinity and pH of the receiving stream (Osage Creek). The test was conducted in 300 mL distilled water rinsed plastic beakers containing 250 mL of solution (eight organisms 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 beakers 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 1600 hours, February 11, 2020. 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: 82% 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: 7.6%**
NOEC: 82% Effluent

SUMMARY

There were no statistically significant differences between the control and the critical low flow concentration (82% 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 AR0043397 for City of Rogers, Outfall 001 **passed** for this testing period.

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

CLIENT	City of Rogers	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0043397	DATE COLLECTED	02/03/20 02/05/20 02/07/20
LAB ID #	31090	DATE RECEIVED	02/04/20 02/06/20 02/08/20
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	02/04/20 1615
TEST ORGANISM	<i>Ceriodaphnia dubia</i>	END DATE/TIME	02/11/20 1615
ORGANISM AGE	< 24-Hours	TEST TEMPERATURE (°C)	25 ± 1
ORGANISM SOURCE	In House	PHOTO PERIOD	16-hr. Light 8-hr. Dark
RECEIVING WATER	Osage Creek	LIGHT INTENSITY	50-100 ft. cndl.
DILUTION WATER	Laboratory	TECHNICIAN	T. 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
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/08/20	5	2	2	4	3	5	4	3	3	2
	5	2	2	4	3	5	4	3	3	2
02/09/20	8	6	6	8	9	10	7	9	8	6
	13	8	8	12	12	15	11	12	11	8
02/10/20	A	A	A	A	A	A	A	A	A	A
	13	8	8	12	12	15	11	12	11	8
02/11/20	12	13	13	14	13	12	12	13	12	14
	25	21	21	26	25	27	23	25	23	22
x # Young		23.8				C.V.		8.81%		
x%Survival		100%				C.V.		0.00%		

26%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/08/20	5	3	3	4	2	2	5	3	3	3
	5	3	3	4	2	2	5	3	3	3
02/09/20	9	8	7	8	7	9	8	10	6	6
	14	11	10	12	9	11	13	13	9	9
02/10/20	A	A	A	A	A	A	A	A	A	A
	14	11	10	12	9	11	13	13	9	9
02/11/20	13	12	14	14	14	12	13	12	12	13
	27	23	24	26	23	23	26	25	21	22
x # Young		24.0				C.V.		8.10%		
x%Survival		100%				C.V.		0.00%		

35%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/08/20	4	3	2	5	3	2	4	2	2	5
	4	3	2	5	3	2	4	2	2	5
02/09/20	11	10	6	9	10	6	8	7	7	7
	15	13	8	14	13	8	12	9	9	12
02/10/20	A	A	A	A	A	A	A	A	A	A
	15	13	8	14	13	8	12	9	9	12
02/11/20	12	14	14	12	14	13	14	12	12	14
	27	27	22	26	27	21	26	21	21	26
x # Young		24.4				C.V.		11.30%		
x%Survival		100%				C.V.		0.00%		

46%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/08/20	3	5	4	2	2	2	4	5	4	3
	3	5	4	2	2	2	4	5	4	3
02/09/20	8	9	10	6	11	7	8	11	6	8
	11	14	14	8	13	9	12	16	10	11
02/10/20	A	A	A	A	A	A	A	A	A	A
	11	14	14	8	13	9	12	16	10	11
02/11/20	12	13	14	12	12	13	13	13	14	13
	23	27	28	20	25	22	25	29	24	24
x # Young		24.7				C.V.		11.14%		
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

Rogers

Lab ID# 31090

Test Date: February 4, 2020

62%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
	3	2	2	4	5	5	4	3	3	4
02/08/20	3	2	2	4	5	5	4	3	3	4
	10	10	6	9	11	7	7	10	8	6
02/09/20	13	12	8	13	16	12	11	13	11	10
	A	A	A	A	A	A	A	A	A	A
02/10/20	13	12	8	13	16	12	11	13	11	10
	13	14	13	14	14	13	12	14	13	13
02/11/20	26	26	21	27	30	25	23	27	24	23
<p>x # Young 25.2 C.V. 10.21%</p> <p>x%Survival 100% C.V. 0.00%</p>										

82%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
02/05/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/06/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
02/07/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
	4	3	5	4	3	2	2	4	5	3
02/08/20	4	3	5	4	3	2	2	4	5	3
	11	10	7	8	9	7	7	10	6	11
02/09/20	15	13	12	12	12	9	9	14	11	14
	A	A	A	A	A	A	A	A	A	A
02/10/20	15	13	12	12	12	9	9	14	11	14
	13	12	14	13	14	13	14	12	13	12
02/11/20	28	25	26	25	26	22	23	26	24	26
<p>x # Young 25.1 C.V. 6.89%</p> <p>x%Survival 100% C.V. 0.00%</p>										

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

ex 1:

A
4

 alive today
total young to date

ex 2:

5
12

 alive, 5 young today
total young to date

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

Rogers

Lab ID# 31090

Test Date: February 4, 2020

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	26%	35%	46%	62%	82%	
02/04/20	Start	25.0	1	8.01	7.97	7.94	7.88	7.68	7.65	SD
02/05/20	24 Hr.	24.0	1	8.07	8.03	8.01	8.02	8.01	8.05	LM
02/05/20	Renew	24.1	1	8.08	8.17	8.15	7.98	7.96	7.78	LM
02/06/20	48 Hr.	24.1	1	8.25	8.13	8.15	8.12	8.06	7.97	SD
02/06/20	Renew	25.0	2	8.13	8.08	7.91	7.87	7.79	7.70	SD
02/07/20	72 Hr.	24.0	2	8.16	8.10	8.07	8.01	7.96	7.88	LM
02/07/20	Renew	24.0	2	8.34	8.59	8.54	8.36	8.25	7.96	LM
02/08/20	96 Hr.	24.0	2	8.29	8.22	8.18	8.08	8.03	8.02	SD
02/08/20	Renew	25.0	3	8.15	8.10	8.02	7.89	7.80	7.67	SD
02/09/20	120 Hr.	24.1	3	8.39	8.21	8.12	7.93	7.82	7.67	LM
02/09/20	Renew	24.3	3	8.25	8.53	8.52	8.24	8.12	7.83	LM
02/10/20	144 Hr.	24.2	3	8.20	8.19	8.15	8.06	8.00	7.95	LM
02/10/20	Renew	24.2	3	8.30	8.44	8.43	8.22	8.25	7.78	LM
02/11/20	168 Hr.	24.0	3	8.32	8.27	8.26	8.23	8.23	8.25	SD

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	26%	35%	46%	62%	82%	
02/04/20	Start	25.0	1	7.95	7.78	7.73	7.80	8.56	8.53	SD
02/05/20	24 Hr.	24.0	1	7.88	7.91	7.91	7.90	7.88	7.82	LM
02/05/20	Renew	24.1	1	7.93	7.97	7.92	7.93	7.88	8.38	LM
02/06/20	48 Hr.	24.1	1	7.77	7.81	7.81	7.75	7.75	8.62	SD
02/06/20	Renew	25.0	2	7.00	7.44	7.15	7.61	7.78	7.70	SD
02/07/20	72 Hr.	24.0	2	8.10	7.94	7.47	8.14	8.04	8.07	LM
02/07/20	Renew	24.0	2	8.05	8.03	8.60	8.45	8.06	8.65	LM
02/08/20	96 Hr.	24.0	2	7.81	7.84	7.80	7.76	7.75	7.74	SD
02/08/20	Renew	25.0	3	7.78	8.59	8.58	8.60	8.58	8.50	SD
02/09/20	120 Hr.	24.1	3	7.93	8.34	7.93	8.11	7.98	7.97	LM
02/09/20	Renew	24.3	3	8.62	8.65	8.51	8.53	8.45	8.02	LM
02/10/20	144 Hr.	24.2	3	8.10	8.12	8.10	8.08	7.96	7.98	LM
02/10/20	Renew	24.2	3	7.68	8.51	7.98	7.69	7.70	8.59	LM
02/11/20	168 Hr.	24.0	3	7.16	8.27	7.93	8.16	7.94	8.35	SD

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

Rogers

Lab ID# 31090

Test Date: February 4, 2020

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
02/04/20	1	7.53	6.81	136	104	664	<0.01	N/A	SD
02/06/20	2	7.23	7.73	116	102	591	<0.01	N/A	SD
02/08/20	3	7.36	7.70	116	102	614	<0.01	N/A	SD
02/04/20	CON	8.01	7.95	124	72	409	-	-	JS

¹ 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	23.800
2	26% Effluent	10	21.000	27.000	24.000
3	35% Effluent	10	21.000	27.000	24.400
4	46% Effluent	10	20.000	29.000	24.700
5	62% Effluent	10	21.000	30.000	25.200
6	82% Effluent	10	22.000	28.000	25.100

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	4.400	2.098	0.663	8.81
2	26% Effluent	3.778	1.944	0.615	8.10
3	35% Effluent	7.600	2.757	0.872	11.30
4	46% Effluent	7.567	2.751	0.870	11.14
5	62% Effluent	6.622	2.573	0.814	10.21
6	82% Effluent	2.989	1.729	0.547	6.89

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	17	13	21	5

Calculated Chi-Square goodness of fit test statistic = 7.8480
 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 = 3.21

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	16.333	3.267	0.595
Within (Error)	54	296.600	5.493	
Total	59	312.933		

Critical F value = 2.45 (0.05,5,40)
 Since F < Critical F Fail to Reject Ho: All equal

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

Grp	Identification	Mean		T Stat	Sig
		Transformed Mean	Calculated In Original Units		
1	Control	23.800	23.800		
2	26% Effluent	24.000	24.000	-0.191	
3	35% Effluent	24.400	24.400	-0.572	
4	46% Effluent	24.700	24.700	-0.859	
5	62% Effluent	25.200	25.200	-1.336	
6	82% Effluent	25.100	25.100	-1.240	

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

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

Grp	Identification	Num of Reps	Minimum	Sig	Difference from Control
			Diff (In Orig. Units)	% of Control	
1	Control	10			
2	26% Effluent	10	2.421	10.2	-0.200
3	35% Effluent	10	2.421	10.2	-0.600
4	46% Effluent	10	2.421	10.2	-0.900
5	62% Effluent	10	2.421	10.2	-1.400
6	82% Effluent	10	2.421	10.2	-1.300

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

CLIENT	City of Rogers	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0043397	DATE COLLECTED	02/03/20 02/05/20 02/07/20
LAB ID #	31090	DATE RECEIVED	02/04/20 02/06/20 02/08/20
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	02/04/20 1600
TEST ORGANISM	<i>Pimephales promelas</i>	END DATE/TIME	02/11/20 1600
ORGANISM AGE	< 24-Hours	TEST TEMPERATURE (°C)	25 ± 1
ORGANISM SOURCE	In House	PHOTO PERIOD	16-hr. Light 8-hr. Dark
RECEIVING WATER	Osage Creek	LIGHT INTENSITY	50-100 ft. cndl.
DILUTION WATER	Laboratory	TECHNICIAN	J. Castillo

SURVIVAL SUMMARY

Conc.	02/05/20					02/06/20					02/07/20					02/08/20					02/09/20				
	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
26%	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
35%	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
46%	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
62%	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
82%	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.	02/10/20					02/11/20					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
26%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
35%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
46%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
62%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
82%	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	0.4710	0.4250	0.4300	0.4510	0.4230	0.4400	4.68
26%	0.4410	0.4680	0.4250	0.4710	0.4650	0.4540	4.43
35%	0.4720	0.4290	0.4680	0.4770	0.4510	0.4594	4.27
46%	0.4800	0.4530	0.4720	0.4210	0.4630	0.4578	5.00
62%	0.4440	0.4790	0.4150	0.4820	0.4650	0.4570	6.10
82%	0.4670	0.4830	0.4430	0.4260	0.4580	0.4554	4.81

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

Rogers

Lab ID# 31090

Test Date: February 4, 2020

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp. No.	pH of Solution						Analyst
				CON	26%	35%	46%	62%	82%	
02/04/20	Start	25.0	1	8.01	7.97	7.94	7.88	7.68	7.65	SD
02/05/20	24 Hr.	24.0	1	7.66	7.70	7.65	7.62	7.69	7.57	LM
02/05/20	Renew	24.1	1	8.08	8.17	8.15	7.98	7.96	7.78	LM
02/06/20	48 Hr.	24.3	1	7.81	7.72	7.71	7.72	7.71	7.72	SD
02/06/20	Renew	25.0	2	8.13	8.08	7.91	7.87	7.79	7.70	SD
02/07/20	72 Hr.	24.0	2	7.47	7.61	7.62	7.64	7.71	7.68	LM
02/07/20	Renew	24.0	2	8.34	8.59	8.54	8.36	8.25	7.96	LM
02/08/20	96 Hr.	24.0	2	7.51	7.57	7.65	7.65	7.70	7.63	SD
02/08/20	Renew	25.0	3	8.15	8.10	8.02	7.89	7.80	7.67	SD
02/09/20	120 Hr.	24.4	3	7.32	7.62	7.62	7.61	7.64	7.70	LM
02/09/20	Renew	24.3	3	8.25	8.53	8.52	8.24	8.12	7.83	LM
02/10/20	144 Hr.	24.2	3	7.73	7.84	7.81	7.72	7.68	7.70	LM
02/10/20	Renew	24.2	3	8.30	8.44	8.43	8.22	8.25	7.78	LM
02/11/20	168 Hr.	24.1	3	8.22	8.24	8.22	8.17	8.15	8.14	SD

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst
				CON	26%	35%	46%	62%	82%	
02/04/20	Start	25.0	1	7.95	7.78	7.73	7.80	8.56	8.53	SD
02/05/20	24 Hr.	24.0	1	7.63	7.95	7.60	7.62	7.98	7.15	LM
02/05/20	Renew	24.1	1	7.93	7.97	7.92	7.93	7.88	8.38	LM
02/06/20	48 Hr.	24.3	1	7.71	7.52	8.35	8.59	7.72	8.57	SD
02/06/20	Renew	25.0	2	7.00	7.44	7.15	7.61	7.78	7.70	SD
02/07/20	72 Hr.	24.0	2	8.58	7.74	7.86	7.64	8.63	7.69	LM
02/07/20	Renew	24.0	2	8.05	8.03	8.60	8.45	8.06	8.65	LM
02/08/20	96 Hr.	24.0	2	7.75	8.42	8.37	7.67	8.56	8.48	SD
02/08/20	Renew	25.0	3	7.78	8.59	8.58	8.60	8.58	8.50	SD
02/09/20	120 Hr.	24.4	3	8.63	7.72	7.76	7.77	7.67	7.76	LM
02/09/20	Renew	24.3	3	8.62	8.65	8.51	8.53	8.45	8.02	LM
02/10/20	144 Hr.	24.2	3	7.81	7.85	7.80	7.83	7.68	7.83	LM
02/10/20	Renew	24.2	3	7.68	8.51	7.98	7.69	7.70	8.59	LM
02/11/20	168 Hr.	24.1	3	7.71	8.57	8.62	7.69	8.26	8.56	SD

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

Rogers

Lab ID# 31090

Test Date: February 4, 2020

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
02/04/20	1	7.53	6.81	136	104	664	<0.01	N/A	SD
02/06/20	2	7.23	7.73	116	102	591	<0.01	N/A	SD
02/08/20	3	7.36	7.70	116	102	614	<0.01	N/A	SD
02/04/20	CON	8.01	7.95	124	72	409	-	-	JS

¹ 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	0.423	0.471	0.440
2	26% Effluent	5	0.425	0.471	0.454
3	35% Effluent	5	0.429	0.477	0.459
4	46% Effluent	5	0.421	0.480	0.458
5	62% Effluent	5	0.415	0.482	0.457
6	82% Effluent	5	0.426	0.483	0.455

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	0.000	0.021	0.009	4.68
2	26% Effluent	0.000	0.020	0.009	4.43
3	35% Effluent	0.000	0.020	0.009	4.27
4	46% Effluent	0.001	0.023	0.010	5.00
5	62% Effluent	0.001	0.028	0.012	6.10
6	82% Effluent	0.000	0.022	0.010	4.81

Shapiro - Wilk's Test For Normality

D = 0.012

W = 0.941

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 = 0.66

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	0.001	0.000	0.502
Within (Error)	24	0.012	0.000	
Total	29	0.013		

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

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

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

Grp	Identification	Mean		T Stat	Sig
		Transformed Mean	Calculated In Original Units		
1	Control	0.440	0.440		
2	26% Effluent	0.454	0.454	-0.991	
3	35% Effluent	0.459	0.459	-1.373	
4	46% Effluent	0.458	0.458	-1.260	
5	62% Effluent	0.457	0.457	-1.203	
6	82% Effluent	0.455	0.455	-1.090	

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

No statistically significant difference

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

Grp	Identification	Num of Reps	Minimum	Sig	Difference from Control
			Diff (In Orig. Units)	% of Control	
1	Control	5			
2	26% Effluent	5	0.033	7.6	-0.014
3	35% Effluent	5	0.033	7.6	-0.019
4	46% Effluent	5	0.033	7.6	-0.018
5	62% Effluent	5	0.033	7.6	-0.017
6	82% Effluent	5	0.033	7.6	-0.015

**APPENDIX A
RAW DATA**

7-DAY CERIODAPHНИЯ DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

PAGE 1 OF 2

CLIENT Rogers

START DATE/TIME 2-4-20 TG 1615

OUTFALL 001

END DATE/TIME 2-11-20 MH 1615

LAB ID # 31090

30

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	5	2	2	4	3	5	4	3	3	2	TG	1615
2/9	8	6	6	8	9	10	7	9	8	6	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	12	13	13	14	13	12	12	13	12	14	MH	1615
	25	21	21	26	25	27	23	25	23	22		

\bar{x} # Young w/o Dead = 23.8 CV% = 8.81

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

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

26

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	5	3	3	4	2	2	5	3	3	3	TG	1615
2/9	9	8	7	8	7	9	8	10	6	6	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	13	12	14	14	14	12	13	12	12	13	MH	1615
	27	23	24	26	23	23	26	25	21	22		

\bar{x} # Young w/o Dead = 24.0 CV% = 8.10

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

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

35

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	4	3	2	5	3	2	4	2	2	5	TG	1615
2/9	11	10	6	9	10	6	8	7	7	7	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	12	14	14	12	14	13	14	12	12	14	MH	1615
	27	27	22	26	27	21	26	21	21	26		

\bar{x} # Young w/o Dead = 24.4 CV% = 11.30

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

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

46

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	3	5	4	2	2	2	4	5	4	3	TG	1615
2/9	8	9	10	6	11	7	8	11	6	8	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	12	13	14	12	12	13	13	13	14	13	MH	1615
	23	27	28	20	25	22	25	29	24	24		

\bar{x} # Young w/o Dead = 24.7 CV% = 11.14

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

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

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

CLIENT Rogers
OUTFALL 001
LAB ID # 31090

START DATE/TIME 2-4-20 TG 1615
END DATE/TIME 2-11-20 MH 1615

62

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	3	2	2	4	5	5	4	3	3	4	TG	1615
2/9	10	10	6	9	11	7	7	10	8	6	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	13	14	13	14	14	13	12	14	13	13	MH	1615
	26	26	21	27	30	25	23	27	24	23		

\bar{x} # Young w/o Dead = 25.2 CV% = 10.21

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

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

82

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
2/5	A	A	A	A	A	A	A	A	A	A	TG	1615
2/6	A	A	A	A	A	A	A	A	A	A	MH	1515
2/7	A	A	A	A	A	A	A	A	A	A	MH	1400
2/8	4	3	5	4	3	2	2	4	5	3	TG	1615
2/9	11	10	7	8	9	7	7	10	6	11	TG	1245
2/10	A	A	A	A	A	A	A	A	A	A	MH	1415
2/11	13	12	14	13	14	13	14	12	13	12	MH	1615
	28	25	26	25	26	22	23	26	24	26		

\bar{x} # Young w/o Dead = 25.1 CV% = 6.89

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

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

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

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

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

\bar{x} % Survival = CV% =

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

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

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

\bar{x} % Survival = CV% =

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

CLIENT/FACILITY Rogers DATE/TIME STARTED 2-4-20 JK 1600
 OUTFALL # 001 PROJECT # 31090 DATE/TIME ENDED 2-11-20 TG 1600
 ORGANISM ID# PP0-20-034

Contc.	2-5-20 MH 1600					2-6-20 JK 1400					2-7-20 MH 0910					2-8-20 JK 935					2-9-20 JK 1025									
	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					
10A	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
26	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
35	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
40	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
62	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
82	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																														

Contc.	2-10-20 MH 0900					2-11-20 TG 1600					Mean Survival	C.V. %
	A	B	C	D	E	A	B	C	D	E		
10A	8	8	8	8	8	8	8	8	8	8	100.0	0.00
26	8	8	8	8	8	8	8	8	8	8	100.0	0.00
35	8	8	8	8	8	8	8	8	8	8	100.0	0.00
40	8	8	8	8	8	8	8	8	8	8	100.0	0.00
62	8	8	8	8	8	8	8	8	8	8	100.0	0.00
82	8	8	8	8	8	8	8	8	8	8	100.0	0.00
Initials Date/Time												

Client / Facility Rogers
 Lab ID Number 31090
 Outfall Number 001
 Test Date 2-4-20

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH	DO	Hardness mg/L CaCO ₃	Alkalinity mg/L CaCO ₃	Conduct. umhos/cm	Resid. Cl ₂ mg/L	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L	Analyst
2-4-20	1	7.53	6.81	136	104	664	<0.01	N/A	SD
2-6-20	2	7.23	7.73	116	102	591	<0.01	N/A	SD
2-8-20	3	7.36	7.70	116	102	614	<0.01	N/A	SD
2-4-20	Con	8.01	7.95	124	72	409	-	-	JS

INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER

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

Notes:

APPENDIX B
REFERENCE TOXICANTS

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: *Ceriodaphnia dubia*

CHEMICAL: Sodium Chloride

DURATION: 7-Days

TEST NUMBER: 2

TEST DATE: 02/05/20 - 02/12/20
1630 Hrs - 1630 Hrs

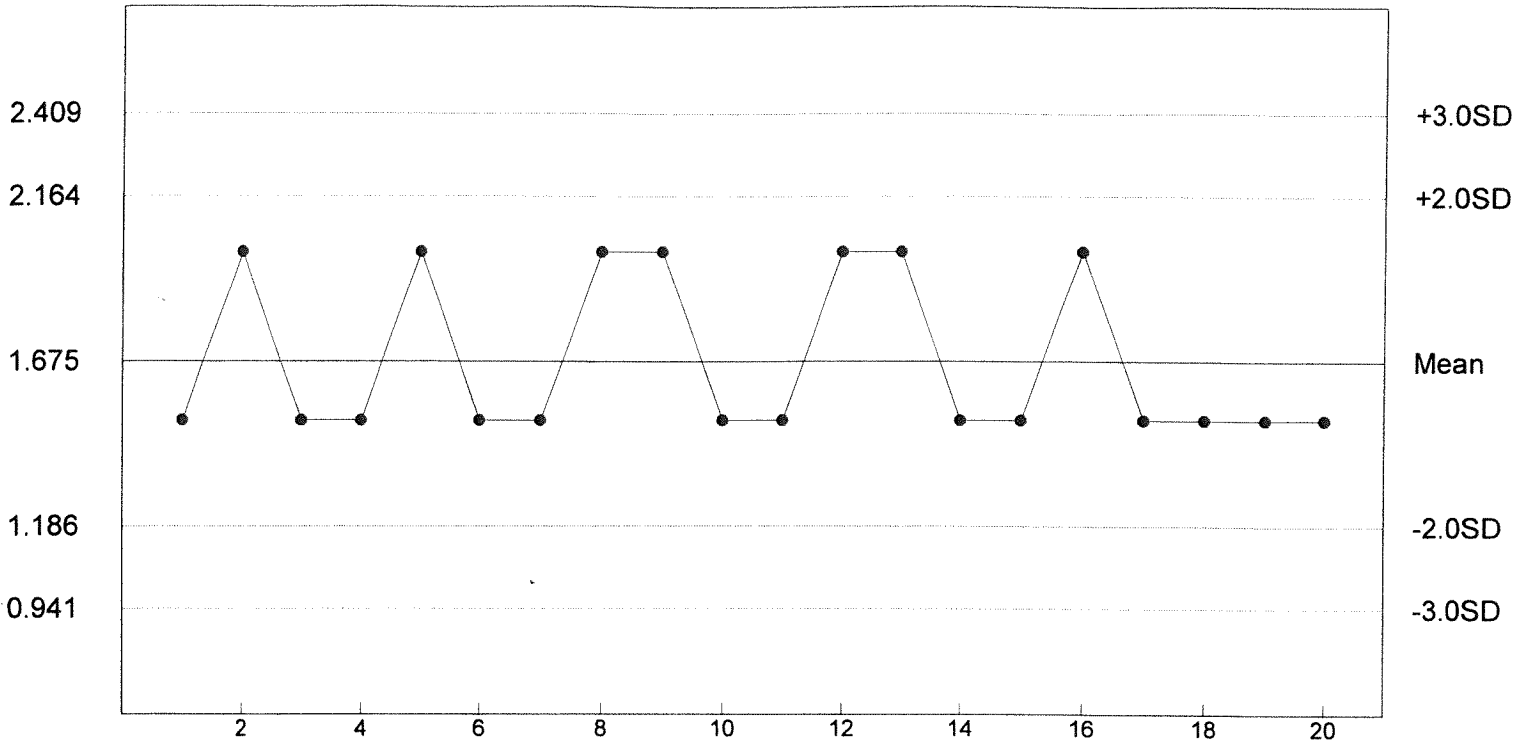
STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	2
2.0	10	5
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	1.5 g/L	1.0 g/L

Reference Tox Sodium Chloride g/L

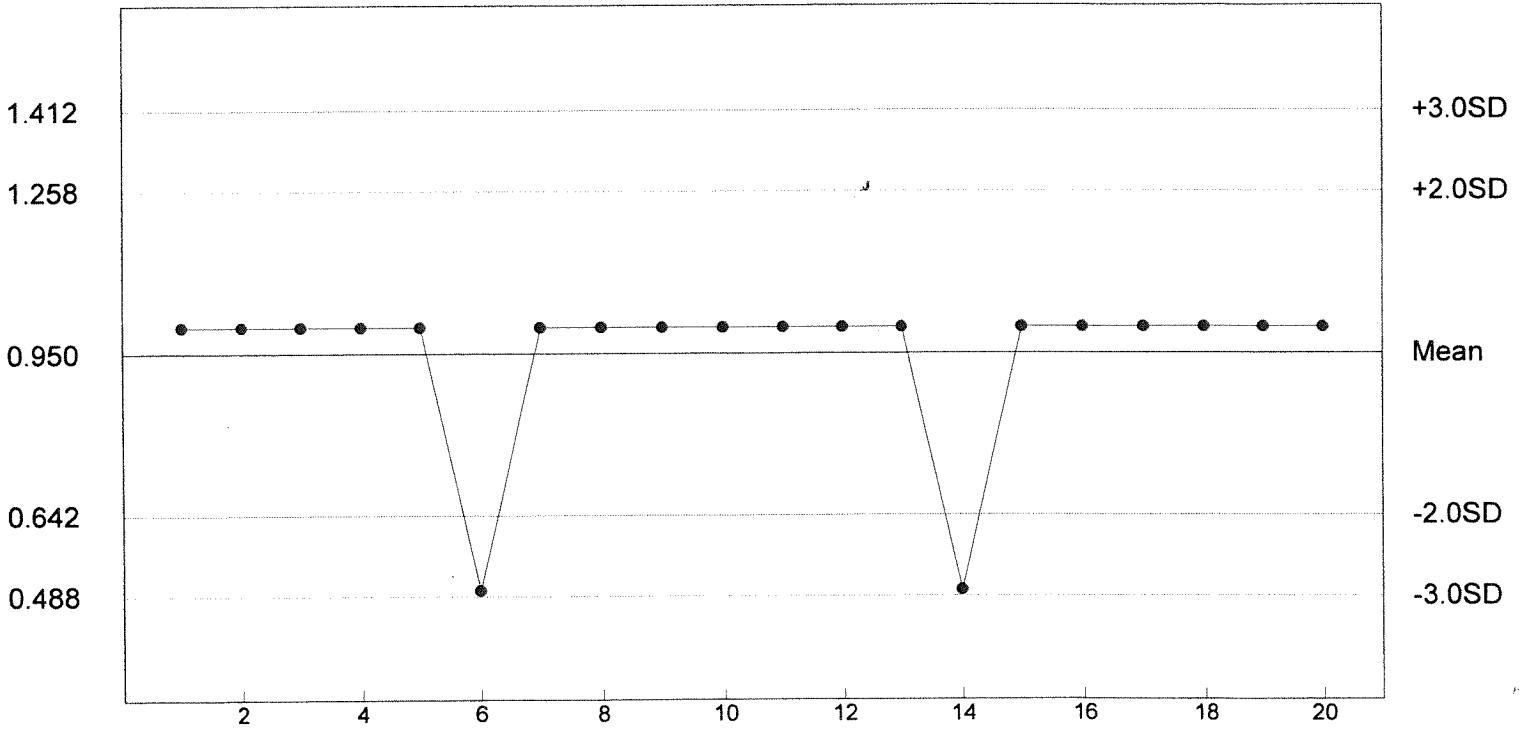
C. dubia Survival - NOEC



n= 20 Mean= 1.675 SD= 0.245 CV= 14.61% Min= 1.500 Max= 2.000

Reference Tox Sodium Chloride g/L

C. dubia Reproduction - NOEC



n= 20 Mean= 0.950 SD= 0.154 CV= 16.20% Min= 0.500 Max= 1.000

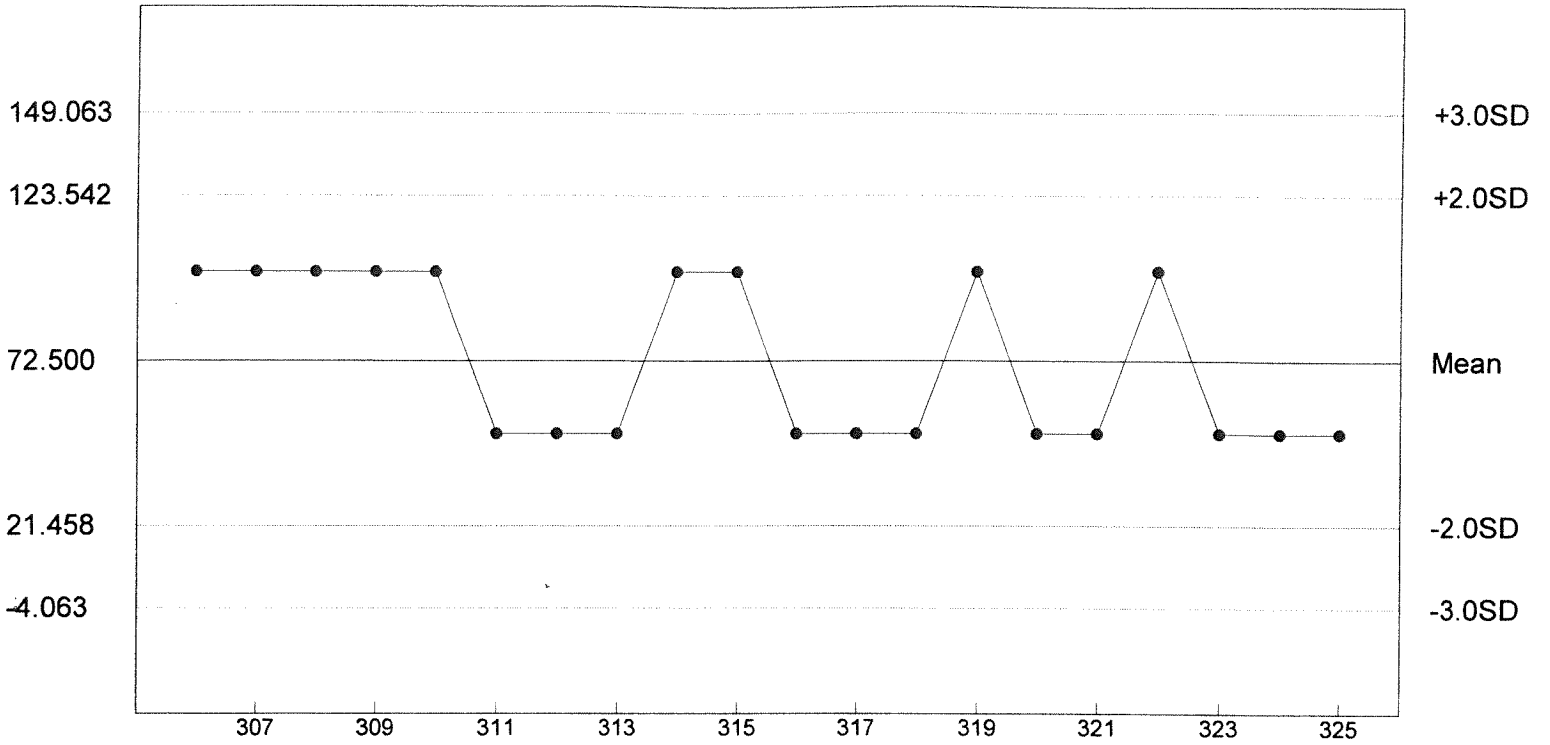
CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: *Pimephales promelas*
 CHEMICAL: Copper Nitrate
 DURATION: 7-Days
 TEST NUMBER: 2
 TEST DATE: 02/05/20 - 02/12/20
 1130 Hrs - 1130 Hrs
 STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	0
50	40	0
100	40	10
200	40	14
400	40	40
800	40	40

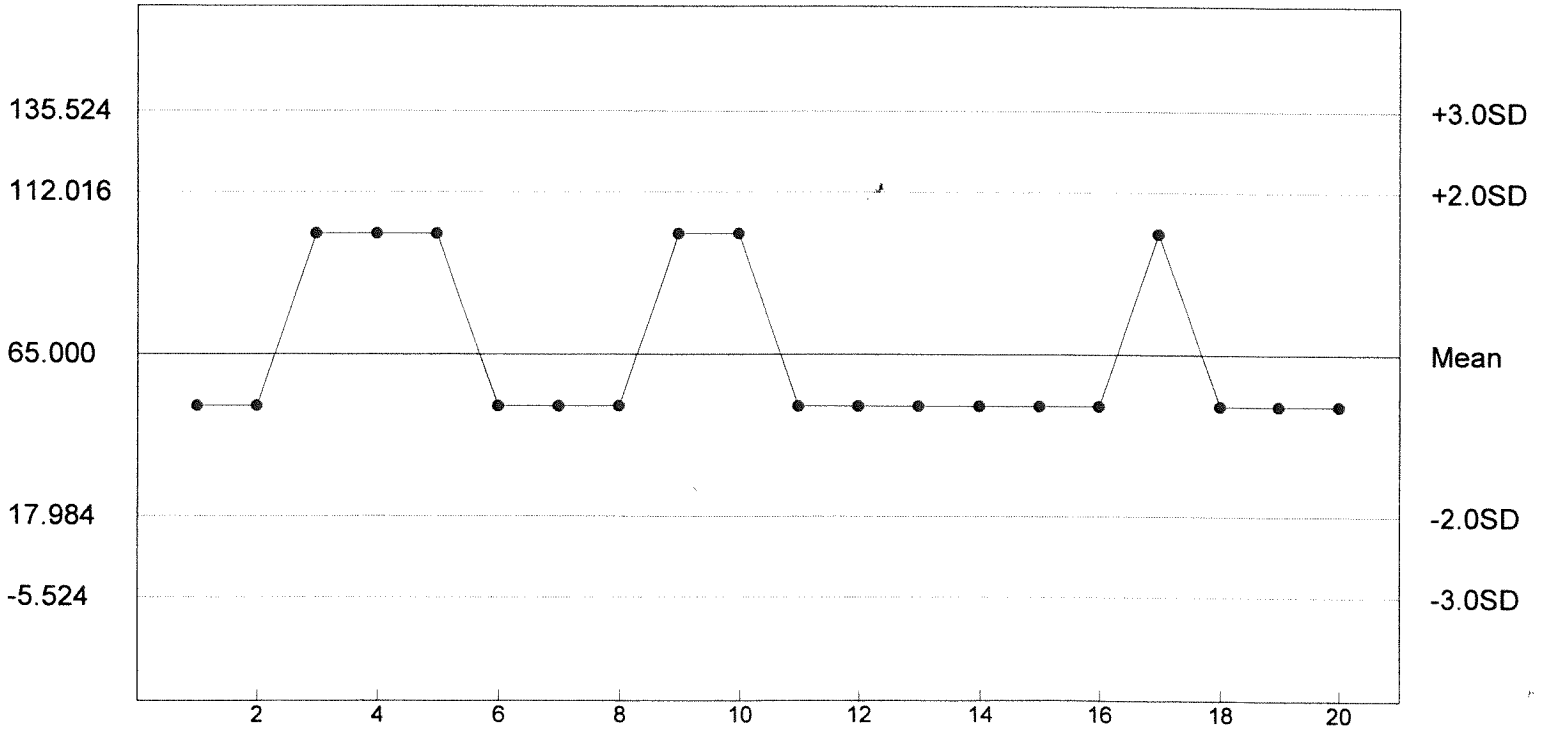
LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR GROWTH	NOEC FOR GROWTH
100 ug/L	50 ug/L	100 ug/L	50 ug/L

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



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

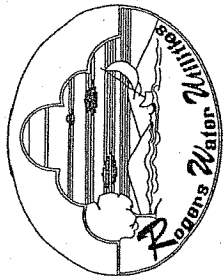
Reference Tox Copper Nitrate ug/L
P. promelas Growth - NOEC



n= 20 Mean= 65.000 SD= 23.508 CV= 36.17% Min= 50.000 Max= 100.000

APPENDIX C
CHAIN OF CUSTODY SHEETS

31090



ROGERS POLLUTION CONTROL FACILITY
CHAIN OF CUSTODY

ANALYSES

SAMPLE DESCRIPTION	SAMPLE ID	COLLECTION		CONTAINER	TYPE	METH	TEMP °C	TSS	COD	NH3	NO2 & NO3	TP	PO4	O&G	CNLS	PHENOLS	METALS	WETO	TTO
		DATE	TIME																
Effluent	31090	On: 2-2-2020 Off: 2-3-2020	0830 0830	P	C	A	2.3												
Influent		On: 2-2-2020 Off: 2-3-2020	0836 0836	P	C	A	2.4											X	
		On: Off:																	
		On: Off:																	
		On: Off:																	

Received by: Daniel C. Date: 2-3-2020 Time: 0850

Relinquished by: Daniel C. Date: 2-3-2020 Time: 0850

Received by: Matt Horner Date: 2-4-20 Time: 0850

Relinquished by: Matt Horner Date: 2-4-20 Time: 0850

SAMPLER(S):

On: Daniel C. Off: Daniel C.

35 IRI FedEX

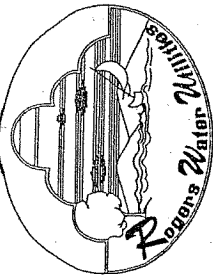
* Metals: Ag, As, Be, Cd, Cr, Cu, Mo, Ni, Pb, Sb, Se, Ti, Zn (preserved with HNO₃)

* WET: Whole Effluent Toxicity (Biomonitoring).

* TTO Scan: Table II - Organic Toxic Pollutants as defined by 40 CFR 122 appendix D. (Volatiles, Acid Compounds, Base / Neutral, Pesticides)

* NH₃-N, TN, TP and O&G preserved with H₂SO₄ * CN preserved with NaOH * PHENOL preserved with CuSO₄ + Phos Acid

#31090



ROGERS POLLUTION CONTROL FACILITY
CHAIN OF CUSTODY

ANALYSES

SAMPLE DESCRIPTION	SAMPLE ID	COLLECTION		CONTAINER		TYPE C/G	METH A/M	TEMP °C	T S S	C B O D 5	N O H 3	N O 2 & N O 3	T N P	P O 4	P O & C N	P H E N O L	M E T A L S	T T O	W E T	
		DATE	TIME	L	G/P															
Effluent	31090	On: 2-4-20	0830	Full 12	P	C	A	4.2												X
Influent		On: 2-4-20	0836	13	P	C	A	3.1												
		On:																	
		Off: 2-5-20	0836																	
		On:																	
		Off:																	

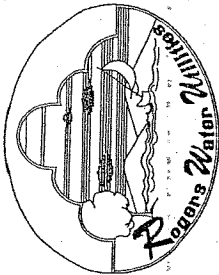
Relinquished by: Daniel C. Received by: Daniel C. Date: 2-5-20

Relinquished by: Daniel C. Received by: Matt Turner Date: 2-6-20

COMMENTS: Did not miss sample
FedEx 1.6°C IRI
SAMPLER(S): On: Daniel C. Off: Daniel C.

* Metals: Ag, As, Be, Cd, Cr, Cu, Mo, Ni, Pb, Sb, Se, Ti, Zn (preserved with HNO₃)
 * WET: Whole Effluent Toxicity (Biomonitoring)
 * TTO Scan: Table II - Organic Toxic Pollutants as defined by 40 CFR 122 appendix D. (Volatiles, Acid Compounds, Base / Neutral, Pesticides)
 * NH₃-N, TN, TP and O&C preserved with H₂SO₄ * CN preserved with NaOH * PHENOL preserved with CuSO₄ + Phos Acid

① MW 2-6-20



**ROGERS POLLUTION CONTROL FACILITY
CHAIN OF CUSTODY**

ANALYSES

SAMPLE DESCRIPTION	SAMPLE ID	COLLECTION		CONTAINER		TYPE C/G	METH A/M	TEMP °C	TS	SOD	CNH3	NO2 & NO3	TN	TP	PO4	O&G	CN	PHENOLS	METALS	WETT	TTO	
		DATE	TIME	L	G/P																	
Effluent		On: 2-6-20	0830	F11	P	C	A	3.8														
		Off: 2-7-20	0830																			
Influent		On: 2-6-20	0836	15	P	C	A	3.5														
		Off: 2-7-20	0836																			
		On:																				
		Off:																				
		On:																				
		Off:																				

Relinquished by: Daniel C. Received by: Daniel C. Date: 2-7-20 Time: 945

Relinquished by: [Signature] Received by: [Signature] Date: 2-8-20 Time: 945

COMMENTS: EFF missed 4 samples

Fedex FR1:326

SAMPLER(S):

On: Daniel C. Off: Daniel C.

Metals: Ag, As, Be, Cd, Cr, Cu, Mo, Ni, Pb, Sb, Se, Ti, Zn (preserved with HNO₃)

WET: Whole Effluent Toxicity (Biomonitoring).

TTO Scan: Table II - Organic Toxic Pollutants as defined by 40 CFR 122 appendix D. (Volatiles, Acid Compounds, Base / Neutral, Pesticides)

NH₃-N, TN, TP and O&G preserved with H₂SO₄ * CN preserved with NaOH * PHENOL preserved with CuSO₄ + Phos Acid

**CITY OF ROGERS
 NPDES PERMIT NO. AR0043397
 AFIN NUMBER: 04-00155
 BIOMONITORING REPORTING
 TEST DATE: 02/04/20**

I. *Ceriodaphnia dubia*

Response

(A) If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TLP3B.	0
(B) Report the NOEC value for survival, Parameter No. TOP3B.	82%
(C) Report the NOEC value for reproduction, Parameter No. TPP3B.	82%
(D) If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TGP3B.	0
(E) Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B.	8.81%

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) Report the NOEC value for survival, Parameter No. TOP6C.	82%
(C) Report the NOEC value for growth, Parameter No. TPP6C.	82%
(D) If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TGP6C.	0
(E) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C.	4.81%

22414 - 10	82%
22414 - PO	82%