



Bio-Aquatic Testing, Inc.



TCEQ TNi Accredited

**Little Rock Water Reclamation Authority
Adams Field Reclamation Facility
OUTFALL 001**

Chronic Biomonitoring Report

86906

Ceriodaphnia dubia
Pimephales promelas

May 23, 2023

Approved by: Johnny Reed

Bio-Aquatic Testing, Inc. ♦ 2501 Mayes Rd. Ste. 100 ♦ Carrollton, Texas ♦ 75006

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***HAND-WRITTEN RAW DATA TABLES ARE AVAILABLE UPON REQUEST**

BIO-AQUATIC TESTING, INC.

2501 Mayes Road, Suite 100
Carrollton, Texas 75006
Tel: (972) 242-7750
Fax: (972) 242-7749

TOXICITY TEST REPORT - Chronic

Client: Little Rock Water Reclamation Authority	Sample:	001
Facility: Adams Field Reclamation Facility	Laboratory Number:	86906
Permit No. AR0021806	Date:	May 23, 2023

Ceriodaphnia dubia survival and reproduction test was invalid because the True Control (TCO) did not meet the minimum test-acceptability criteria. The *Pimephales promelas* survival and growth test was invalid because the True Control (TCO) did not meet the minimum test-acceptability criteria. A retest has been scheduled. The retest and all future tests under the current permit will be done using synthetic water as dilution water.

SAMPLE COLLECTION: Composite effluent samples from Little Rock Water Reclamation Authority, Adams Field Reclamation Facility, were received on May 22, 2023, May 25, 2023, and May 27, 2023. Effluent samples were collected from Outfall 001 by facility personnel.

The effluent samples were analyzed for total residual chlorine using the Hanna Ion Specific Meter #711 and contained <0.10 mg/L, <0.10 mg/L, and <0.10 mg/L, respectively. Effluent and laboratory dilution water pH, temperature, and dissolved oxygen data were collected daily.

TEST PROCEDURES: EPA METHOD: 1002
Ceriodaphnia dubia The seven-day (three brood) Chronic *Ceriodaphnia dubia* survival and reproduction test was initiated at 13:02 hours on May 23, 2023. Five effluent concentrations of 9%, 12%, 16%, 21% and 28% were prepared using receiving water (Arkansas River) as dilution water. The test was set up with 30mL plastic cups containing 15mL of test solution or control dilution water. Each effluent concentration or control dilution water included ten replicate cups with one organism in each cup. The control was conducted concurrently with the test. Test organisms were less than 24-hour old laboratory cultured neonates. Neonates were introduced into the test solutions using a blocking design. The test was renewed daily with newly prepared solutions. Food consisting of a half-milliliter suspension of the green algae, *Selenastrum capricornutum*, and YTC was added to the test solutions each day. The test proceeded for seven days or until 60% of the females in the control had three broods. Data on survival and number of young produced per female were collected daily. The test ended at 11:25 hours on May 31, 2023. Survival and reproduction data were statistically (p=0.05) analyzed according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL:

Ceriodaphnia dubia

Fisher's Exact test on *Ceriodaphnia dubia* survival test data demonstrated a statistically significant differences between the Performance Control (PCON) and the 28% effluent concentration tested. The True Control (TCON) was invalid because it did not meet the minimum test-acceptability criteria.

LOEC: 28% Effluent (when compared to the PCON)

NOEC: 21% Effluent (when compared to the PCON)

REPRODUCTION:

Ceriodaphnia dubia

The *Ceriodaphnia dubia* reproduction data were normally distributed at the alpha level of 0.01 (13.277) using the Chi-square test for normality. Reproduction data were shown not to be homogeneous using Bartlett's test at the alpha level of 0.01 (15.09) without data transformations. Using ANOVA and Dunnett's Test (with Bonferroni adjustment as appropriate for Sub-Lethality), *Ceriodaphnia dubia* reproduction data demonstrated no statistically significant differences between the Performance Control (PCON) and any of the remaining effluent concentrations tested. The True Control (TCON) was invalid because it did not meet the minimum test-acceptability criteria.

LOEC: 28% Effluent (when compared to the PCON)

NOEC: 21% Effluent (when compared to the PCON)

TEST PROCEDURES:

Pimephales promelas

EPA METHOD: 1000

The seven-day Chronic *Pimephales promelas* survival and growth test was initiated at 17:10 hours on May 23, 2023. Five effluent concentrations of 9%, 12%, 16%, 21% and 28% were prepared using receiving water (Arkansas River) as dilution water. The test was set up with 450mL plastic cups containing 250mL of test solution as test chambers. Each concentration consisted of five replicate chambers containing eight organisms each, giving a total of 40 (forty) per treatment. The control test was conducted concurrently with the test. Test organisms were laboratory-cultured *Pimephales promelas* larvae less than 24-hours old. The number of surviving larvae and water quality parameters in the old test solutions were recorded after each 24-hour period. The test was renewed daily with fresh solutions. Surviving larvae in each test chamber were fed freshly hatched brine shrimp two times per day. The test proceeded for seven days.

At the end of the test, all organisms were sacrificed, dried, and weighed. Data on surviving organisms and water quality were collected. The test ended at 17:04 hours on May 30, 2023. Survival and growth (weight) were statistically ($p=0.05$) analyzed according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL:

Pimephales promelas

The non-parametric Steel's Many-One Rank test performed on *Pimephales promelas* survival data demonstrated no statistically significant differences between the Performance Control (PCON) and all of the effluent concentrations tested. The True Control (TCON) was invalid because it did not meet the minimum test-acceptability criteria.

LOEC: 9% Effluent (when compared to the PCON)

NOEC: 0% Effluent (when compared to the PCON)

GROWTH:

Pimephales promelas

No statistical analysis was run due to excessive mortality.

LOEC: 9% Effluent (when compared to the PCON)

NOEC: 0% Effluent (when compared to the PCON)

BIO-AQUATIC TESTING, INC.

TOXICITY TEST

Chronic

Ceriodaphnia dubia

Client: Little Rock Water Reclamation Adams Field Reclamation Facility

Lab ID: 86906

Permit Number: ADEQ AR0021806

Test Temperature (oC): 25 ± 1

Sample Type: Composite

Photo Period: 16 Hours Light, 8 Hours Dark

Outfall Name: 001

Begin Date: 5/23/2023

Receiving Water Name: Arkansas River

End Date: 5/31/2023

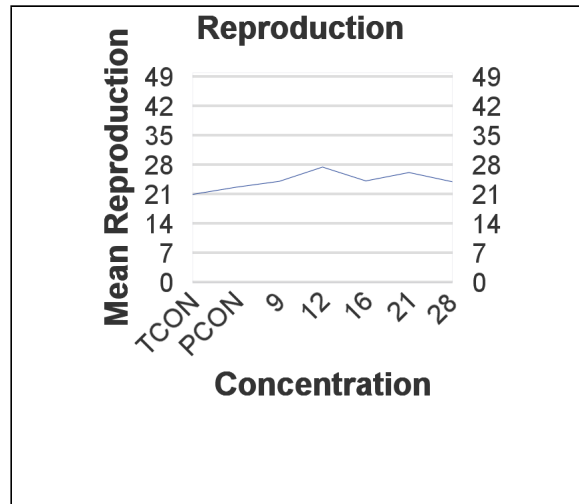
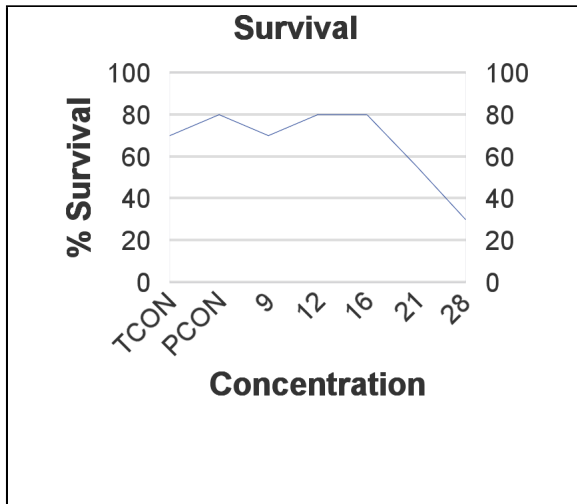
Test Start Time: 13:02

Test End Time: 11:25

SURVIVAL AND REPRODUCTION TABLE

Replicate	TCON	PCON	9%	12%	16%	21%	28%	
1	D- 0	18	29	30	24	E	D- 26	
2	20	21	18	34	24	D- 19	D- 14	
3	18	D- 0	24	36	34	D- 0	D- 18	
4	32	28	30	32	D- 0	28	26	
5	22	D- 0	D- 18	3	14	25	D- 17	
6	23	21	24	32	D- 16	35	D- 15	
7	9	15	D- 28	17	18	25	30	
8	D- 21	28	D- 4	D- 3	13	D- 20	D- 7	
9	23	29	23	36	37	D- 23	D- 21	
10	D- 2	22	21	D- 21	30	18	16	
Surv. Mean	21	22.7	24.1	27.5	24.2	26.2	24	
C.V%	32.7	22.5	17.5	42.2	37	23.4	30	
Total Mean	17.0	18.2	21.9	24.4	21.0	21.4	19.0	?
Var	47.333	26.214	17.809	134.857	80.214	37.7	52	
stddev	6.879	5.119	4.22	11.612	8.956	6.14	7.211	
Max	32	29	30	36	37	35	30	
Min	9	15	18	3	13	18	16	

Concentration Response Relationships



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Survival and Reproduction

TCON

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	D	A	A	A	5	A	A	3	A	A
5/27	D	3	A	4	A	4	7	A	7	D2
5/28	D	4	2	1	A	4	A	1	A	D
5/29	D	13	16	11	15	A	A	17	16	D
	0	20	18	16	20	8	7	21	23	2
5/30	D	A	A	A	A	13	2	D	A	D
	0	20	18	16	20	21	9	21	23	2
5/31	D	A	A	16	2	2	A	D	A	D
	0	20	18	32	22	23	9	21	23	2

Mean:	21.00	Coefficient of variation:	32.70
Var.	47.333	Max	32
Std.Dev.	6.879	Min	9

PCON

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	5	4	A	2	D	A	A	A	A	A
5/27	A	A	D	A	D	4	A	1	A	A
5/28	4	A	D	11	D	6	A	A	4	5
5/29	9	7	D	15	D	11	15	17	13	A
	18	11	0	28	0	21	15	18	17	5
5/30	A	A	D	A	D	A	A	A	12	17
	18	11	0	28	0	21	15	18	29	22
5/31	A	10	D	A	D	A	A	10	A	A
	18	21	0	28	0	21	15	28	29	22

Mean:	22.7	Coefficient of variation:	22.50
Var.	26.214	Max	29
Std.Dev.	5.119	Min	15

9

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	5	A	A	A	2	3	A	D4	2	A
5/27	A	A	4	6	5	A	6	D	6	1
5/28	A	5	7	6	A	6	10	D	A	A
5/29	15	5	13	A	11	A	D12	D	15	5
	20	10	24	12	18	9	28	4	23	6
5/30	A	A	A	A	A	A	D	D	A	15
	20	10	24	12	18	9	28	4	23	21
5/31	9	8	A	18	D	15	D	D	A	A
	29	18	24	30	18	24	28	4	23	21

Mean:	24.1	Coefficient of variation:	17.50
Var.	17.809	Max	30
Std.Dev.	4.220	Min	18

12

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	5	5	A	A	3	A	2	3	A	3
5/27	A	A	8	6	A	7	7	A	5	A
5/28	A	12	A	A	A	9	A	A	A	16
5/29	12	17	11	A	A	16	A	D	15	A
	17	34	19	6	3	32	9	3	20	19
5/30	A	A	17	16	A	A	8	D	16	A
	17	34	36	22	3	32	17	3	36	19
5/31	13	A	A	10	A	A	A	D	A	D2
	30	34	36	32	3	32	17	3	36	21

Mean:	27.5	Coefficient of variation:	42.20
Var.	134.857	Max	36
Std.Dev.	11.612	Min	3

16

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	D	A	A	A	A	A	A
5/26	A	3	A	D	A	A	3	A	A	A
5/27	5	A	A	D	A	5	A	6	7	A
5/28	A	4	3	D	12	D11	A	1	A	A
5/29	16	17	16	D	A	D	14	3	16	17
	21	24	19	0	12	16	17	10	23	17
5/30	A	A	A	D	A	D	A	3	14	13
	21	24	19	0	12	16	17	13	37	30
5/31	3	A	15	D	2	D	1	A	A	A
	24	24	34	0	14	16	18	13	37	30

Mean:	24.2	Coefficient of variation:	37.00
Var.	80.214	Max	37
Std.Dev.	8.956	Min	13

21

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	3	A	A	6	4	5	4	3	2	A
5/27	E	4	D	6	A	A	6	A	6	4
5/28	E	15	D	A	6	A	A	A	A	A
5/29	E	D	D	16	15	14	15	17	15	9
		19	0	28	25	19	25	20	23	13
5/30	E	D	D	A	A	16	A	D	A	5
		19	0	28	25	35	25	20	23	18
5/31	E	D	D	A	A	A	A	D	D	A
		19	0	28	25	35	25	20	23	18

Mean:	26.2	Coefficient of variation:	23.4
Var.	37.700	Max	35
Std.Dev.	6.140	Min	18

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Survival and Reproduction

28

Date	1	2	3	4	5	6	7	8	9	10
5/24	A	A	A	A	A	A	A	A	A	A
5/25	A	A	A	A	A	A	A	A	A	A
5/26	5	4	A	4	A	4	7	3	4	4
5/27	6	6	8	A	7	A	6	D4	A	5
5/28	A	A	D10	6	1	A	A	D	A	A
5/29	A	A	D	16	D9	11	17	D	16	7
	11	10	18	26	17	15	30	7	20	16
5/30	D15	D4	D	A	D	D	A	D	D1	A
	26	14	18	26	17	15	30	7	21	16
5/31	D	D	D	A	D	D	A	D	D	A
	26	14	18	26	17	15	30	7	21	16

Mean:	24	Coefficient of variation:	30.00
Var.	52.000	Max	30
Std.Dev.	7.211	Min	16

Date	1	2	3	4	5	6	7	8	9	10
5/24										
5/25										
5/26										
5/27										
5/28										
5/29										
5/30										
5/31										

Mean:		Coefficient of variation:	
Var.		Max	
Std.Dev.		Min	

BIO-AQUATIC TESTING, INC.

Chronic CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION

Client: Little Rock Water - Adams Field Reclamation Lab ID: 86906 Culture No.: Bio051523C

TEST INSTRUCTIONS:

ORGANISMS ADDED: Date: 5-23-23 Time: 1302 Technician: 813

Photo Period 16hr Light/8hr dark

Dilution: TCON

RANDOMIZATION:
RS-10 1

DATE/TIME/TECHNICIAN	1	2	3	4	5	6	7	8	9	10
24Hr 5-24-23 MH 1130	A									A
48Hr 05-25-23 MV 1145	A									A
72Hr 05-26-23 MV 1605	D	A	A	A	5	A	A	3	A	A
96Hr 5-27-23 DF 1544		3	A	4	A	4	1/5	A	1/5	1/10
5 days 5-28-23 MH 1325		4	A ₂	A ₁	A	4	A	A ₁	A	1
6 days 05-29-23 MV 1350		13	16	11	15	A	A	17	16	
7 days 05-30-23 MV 1205		A	A	A	A	1/12	2/12	A	D	A
8 days 05-31-23 MV 1125		A	A	1/5	A _{1/2}	A _{1/2}	A			A

Dilution: PCON

	1	2	3	4	5	6	7	8	9	10
24Hr	A									A
48Hr	A			A	A*	A				A
72Hr	5	4	A	A	A	A	A	A	A	A
96Hr	A	A	D _{1/2}	A	1	4	A	1/1		A
5 days	4	A	1	11	1	6	A	A	4	5
6 days	9	7	1	15	1	11	15	17	13	A
7 days	A	A	1	A	1	A	A	A	12	7
8 days	10	10	10	10	10	7	A	1/9	A	A

* cerio pale and barely moving -mv

Code: Cells in numbered columns indicate daily survival and reproduction: "A" means adult alive and no young produced, a number means adult alive and that number of young produced, "D" followed by a zero means adult dead and no young produced, "D" followed by a number means adult dead and that number of young produced. "E" indicates toss out due to experimenter error. Lined through spaces preceded by a number or letter represent the same number. Lined spaces without a preceding number or letter indicate unused or not applicable spaces.

BIO-AQUATIC TESTING, INC.

Chronic	CERIODAPHNIA DUBIA	SURVIVAL AND REPRODUCTION
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Client: Little Rock Water - Adams Field Reclamation Lab ID: 86906 Culture No.: _____

TEST INSTRUCTIONS:

Dilution: 9 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A									A
48Hr	A									A
72Hr	5	A	A	A	A	3	A	A	A	A
96Hr	A	A	4	6	5	A	6	1	6	1/2 A
5 days	A	5	7	6	8	6	10			A A
6 days	15	5	13	A	3	A	D ₁₂			15 5
7 days	A	A	A	6	A	1/2 A	1			16 15
8 days	9	8	A	12	10	5	1			A A

**pale color that is barely moving - m*

Dilution: 12 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A									A
48Hr	A									A
72Hr	5	5	A	A	3	A	A	3	A	3
96Hr	A	6	1/2	6	A	7	7	A	5	A
5 days	7	6	A	A	A	9	A	A	A	16
6 days	5	17	11	A	A	16	15	15	15	A
7 days	A	A	17	16	A	A	8	16	A	A
8 days	13	10	A	10	A	14	A	1	A	10

Code: Cells in numbered columns indicate daily survival and reproduction: "A" means adult alive and no young produced, a number means adult alive and that number of young produced, "D" followed by a zero means adult dead and no young produced, "D" followed by a number means adult dead and that number of young produced. "E" indicates toss out due to experimenter error. Lined spaces preceded by a number or letter represent the same number or letter without a preceding number or letter indicate unused or not applicable spaces.

BIO-AQUATIC TESTING, INC.

Chronic

CERIODAPHNIA DUBIA

SURVIVAL AND REPRODUCTION

Client: Little Rock Water - Adams Field Reclamation Lab ID: 86906 Culture No.: _____

TEST INSTRUCTIONS:

Dilution: 16 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A									A
48Hr	A	A	A	A	A					A
72Hr	A	3	A	1	A	A	3	A	A	A
96Hr	5	A	A	1	2/6	5	A	6	2/5	A
5 days	A	4	3	1	4	D	A	A	A	A
6 days	16	17	16	1	A	14	3	16	17	
7 days	A	A	A	1	A	1	A	3	4	13
8 days	3	12	15	1	1/2	1	1/4	A	A	A

Dilution: 21 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A									A
48Hr	A									A
72Hr	3	A	A	6	4	5	4	3	A	A
96Hr	E	4	D	5	A	A	6	A	2/6	4
5 days	1	15	1	A	6	A	A	A	A	A
6 days	1	D	1	16	15	14	15	17	15	9
7 days	1	1	1	15	A	16	A	D	A	5
8 days	1	1	1	A	A	14	A	1	1/2	A

Code: Cells in numbered columns indicate daily survival and reproduction: "A" means adult alive and no young produced, a number means adult alive and that number of young produced, "D" followed by a zero means adult dead and no young produced, "D" followed by a number means adult dead and that number of young produced. "E" indicates toss out due to experimenter error. Lined through spaces preceded by a number or letter represent the same number. Lined spaces without a preceding number or letter indicate unused or not applicable spaces.

BIO-AQUATIC TESTING, INC.

Chronic	CERIODAPHNIA DUBIA	SURVIVAL AND REPRODUCTION
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Client: Little Rock Water - Adams Field Reclamation Lab ID: 86906 Culture No.: _____

TEST INSTRUCTIONS:

Test Temperatures

	0Hr	24Hr		48Hr		72Hr		96Hr		5 days		6 days		7 days
	new	old / new		old / new		old / new		old / new		old / new		old / new		old
TCON	0.2	25.6	25.1	25.2	25.0	25.1	25.3	25.6	25.1	25.4	25.3	25.2	25.3	25.1
PCON									25.6					
9									25.6					
12														
16														
21														
28														
TIME/DATE TECH	5-23-23 SPB 1302	5-24-23 MH 1130		05-25-23 MW 1145		05-26-23 MW 1605		5-27-23 PT 1514		5-28-23 MH 1325		05-29-23 MW 1350		05-30-23 MW 1205
IR GUN ID #	021	021		012		012		021		012		012		012

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

Chronic *Pimephales promelas*

Client: Little Rock Water Reclamation Adams Field Reclamation Facility

Lab ID: 86906

Permit Number: ADEQ AR0021806

Test Temperature (oC): 25 ± 1

Outfall Name: 001 **Sample Type:** Composite

Photo Period: 16 Hours Light
8 Hours Dark

Receiving Water Name: Arkansas River

Test Start Time:

Test End Time:

Begin Date: 5/23/2023

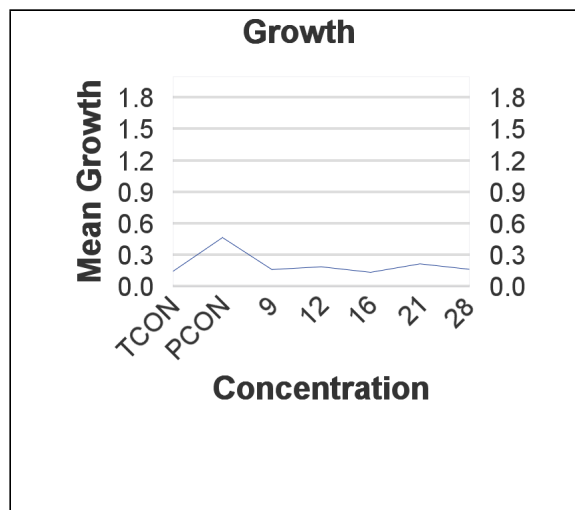
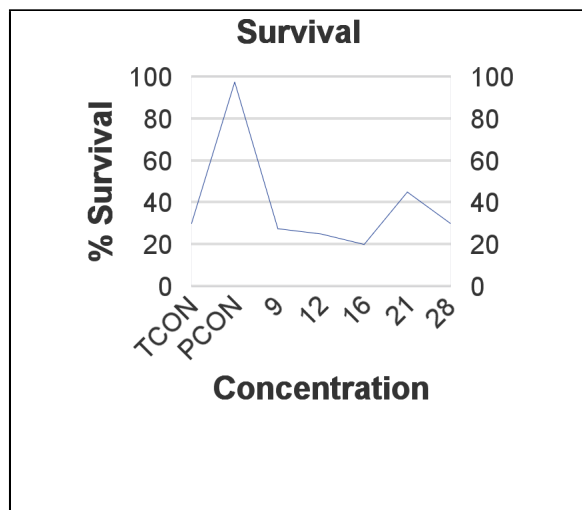
End Date: 5/30/2023

SURVIVAL

	Effluent Concentration	Number Of Alive								Avg% Surv.
		5/23	5/24	5/25	5/26	5/27	5/28	5/29	5/30	
TCON	A	8	8	7	3	3	3	2	2	30.0%
	B	8	8	8	7	3	3	3	3	
	C	8	8	8	4	2	2	2	2	
	D	8	8	8	6	2	2	2	2	
	E	8	8	7	6	4	3	3	3	
PCON	A	8	8	8	8	8	8	8	8	97.5%
	B	8	8	8	8	8	8	8	8	
	C	8	8	8	8	8	8	8	8	
	D	8	8	8	8	8	8	8	8	
	E	8	8	8	7	7	7	7	7	
9	A	8	8	8	5	2	1	1	1	27.5%
	B	8	8	8	6	2	2	1	1	
	C	8	8	8	5	3	3	3	2	
	D	8	8	8	6	4	3	2	2	
	E	8	8	8	8	6	5	5	5	
12	A	8	8	8	4	3	3	2	2	25.0%
	B	8	8	8	7	4	4	3	2	
	C	8	8	8	7	5	5	3	2	
	D	8	8	8	7	3	2	2	2	
	E	8	8	8	5	3	2	2	2	

Effluent Concentration	Number Of Alive								Avg% Surv.	
	5/23	5/24	5/25	5/26	5/27	5/28	5/29	5/30		
16	A	8	8	8	2	1	0	0	0	20.0%
	B	8	8	8	5	4	4	4	4	
	C	8	8	8	5	3	3	3	2	
	D	8	8	8	6	1	1	1	1	
	E	8	8	8	5	1	1	1	1	
21	A	8	8	8	6	4	4	4	4	45.0%
	B	8	8	8	6	6	6	6	6	
	C	8	8	8	6	4	3	3	3	
	D	8	8	8	4	3	3	3	3	
	E	8	8	8	7	5	3	2	2	
28	A	8	8	8	6	4	4	4	4	30.0%
	B	8	8	8	6	2	1	1	1	
	C	8	8	8	4	3	3	2	2	
	D	8	8	8	4	2	2	2	2	
	E	8	8	8	4	4	4	4	3	

Concentration Response Relationships



BIO-AQUATIC TESTING, INC.

Chronic Pimephales promelas SURVIVAL

Lab ID: 86906

Client: Little Rock Water Reclamation

Facility: Adams Field Reclamation Facility

Outfall: 001

Sample Type: Composite

TEST INSTRUCTIONS:

[Empty box for test instructions]

Culture No.: P0-23-142B

Photo Period: 16hr light, 8hr dark

RANDOMIZATION:

RS-5 1

	Dilution: TCON					PCON					9					12						
	DATE/TIME/TECHNICIAN	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
0Hr	5-23-23 1710 JC	8					8					8					8					
24Hr	5/24/23 1253 ZC	8					8					8					8					
48Hr	5-25-23 821320	7	8	8	8	7	8					8					8					
72Hr	5-26-23 02920	3 ₄	7 ₁	4 ₄	6 ₂	6 ₁	8				7	5 ₃	6 ₂	5 ₃	6 ₂	8	4 ₄	7 ₁	7 ₁	7 ₁	5 ₃	
96Hr	5-27-23 1041 JZ	3	3 ₄	2 ₂	2 ₄	4 ₂	8				7	2 ₃	2 ₄	3 ₂	4 ₂	6 ₂	3 ₁	4 ₃	5 ₂	3 ₄	3 ₂	
5 days	5/28/23 1702 AR	3	3	2	2	3 ₁	8				7	1 ₁	2	3	3 ₁	5 ₁	3	4	5	2 ₁	2 ₁	
6 days	5/29/23 1042 AR	2 ₁	3	2	2	3	8				7	1	1	3	2	5	2 ₁	3 ₁	3 ₂	2	2	
7 days	5-30-23 1704 SC	2	3	2	2	3	8				7	1	1	2	2	5	2	2	2	2	2	

	Dilution: 16					21					28											
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
0Hr	8					8					8											
24Hr	8					8					8											
48Hr	8					8					8											
72Hr	2 ₆	5 ₃	5 ₃	6 ₂	5 ₃	6 ₂	6 ₂	6 ₂	4 ₄	7 ₁	6 ₂	6 ₂	4 ₄	4 ₄	4 ₄							
96Hr	1 ₁	4 ₁	3 ₂	1 ₅	1 ₂	4 ₂	6 ₄	4 ₂	3 ₁	5 ₂	4 ₂	2 ₄	3 ₁	2 ₂	4							
5 days	9	4	3	1	1	4	6	3 ₁	3	3 ₂	4	1	3	2	4							
6 days	1	4	3	1	1	4	6	3	3	2 ₁	4	1	2	2	4							
7 days	1	4	2 ₁	1	1	4	6	3	3	2	4	1	2	2	3 ₁							

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable s;

BIO-AQUATIC TESTING, INC.

Chronic

Pimephales promelas SURVIVAL

Lab ID: 86906

Client: Little Rock Water Reclamation

Facility: Adams Field Reclamation Facility

Outfall: 001

Sample Type: Composite

TEST INSTRUCTIONS:

Test Temperatures

	0Hr	24Hr		48Hr		72Hr		96Hr		5 days		6 days		7 days
	new	old / new	old / new	old / new	old / new	old / new	old / new	old / new	old / new	old / new	old / new	old / new	old	
TCON	24.9	25.1	25.1	25.2	25.1	25.2	25.1	25.2	25.2	25.0	24.6	25.7	24.3	24.7
PCON	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/
12	/	/	/	/	/	/	/	/	/	/	/	/	/	/
16	/	/	/	/	/	/	/	/	/	/	/	/	/	/
21	/	/	/	/	/	/	/	/	/	/	/	/	/	/
28	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	/	/	/	/	/	/	/	/	/	/	/	/	/	/
TIME/DATE TECH	1710 JC 5-23-23	5124/23 1253/22	5-25-23 1370	5-26-23 920	5-27-23 JC 1040	5/28/23 1402 AR	5/29/23 1640 AR	6-30-23 1704 JC						
IR GUN ID #	020	020	020	020	020	024	024	020						

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

Chronic *Pimephales promelas*

Client: Little Rock Water Reclamation Adams Field Reclamation Facility

Lab ID: 86906

Permit Number: AR0021806

Sample Type: Composite

Outfall Name: 001

Receiving Water Name: Arkansas River

True Control

Performance Control

9

12

	ON	SN	Wt.	Avg.	SN Avg.
A	8	2	0.451	0.056	0.226
B	8	3	1.491	0.186	0.497
C	8	2	1.578	0.197	0.789
D	8	2	0.770	0.096	0.385
E	8	3	1.492	0.187	0.497

	ON	Wt.	Avg.
A	8	3.077	0.385
B	8	4.035	0.504
C	8	4.082	0.510
D	8	3.687	0.461
E	8	3.746	0.468

	ON	Wt.	Avg.
A	8	0.977	0.122
B	8	0.824	0.103
C	8	1.242	0.155
D	8	1.179	0.147
E	8	2.202	0.275

	ON	Wt.	Avg.
A	8	1.309	0.164
B	8	1.077	0.135
C	8	1.728	0.216
D	8	1.573	0.197
E	8	1.780	0.223

Mean	C.V. %
0.145	44.3

Mean	C.V. %
0.466	10.8

Mean	C.V. %
0.161	41.9

Mean	C.V. %
0.187	19.8

SN Mean	SN C.V. %
0.479	43.0

16

21

28

	ON	Wt.	Avg.
A	8	0	0.000
B	8	2.324	0.291
C	8	1.611	0.201
D	8	0.687	0.086
E	8	0.739	0.092

	ON	Wt.	Avg.
A	8	2.416	0.302
B	8	1.906	0.238
C	8	1.125	0.141
D	8	1.554	0.194
E	8	1.589	0.199

	ON	Wt.	Avg.
A	8	1.801	0.225
B	8	0.854	0.107
C	8	1.107	0.138
D	8	1.308	0.164
E	8	1.449	0.181

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %
0.134	84.3

Mean	C.V. %
0.215	27.9

Mean	C.V. %
0.163	27.4

Mean	C.V. %

Note: ON stands for original number per replicate, while SN refers to the number surviving after test completion.

BIO-AQUATIC TESTING, INC. TOXICITY TEST

Chronic

Pimephales promelas

Lab ID: **86906**

Client: Little Rock Water Reclamation - Adams Field Reclamation Facility

Balance: Radweg BAL-007

Begin Date: 5/23/2023

End Date: 5/30/2023

Organism: Pimephales promelas

Analyst:

Date/Time placed in Oven: 05/30/23 | 1815

Weigh Date: 06/03/23

Date/Time removed from Oven: 05/31/23 | 1800

TCON

	Qty.	Wt.
A	2	0.451
B	3	1.491
C	2	1.578
D	2	0.770
E	3	1.492

PCON

	Qty.	Wt.
A	8	3.077
B	1	4.035
C	1	4.082
D	1	3.687
E	7	3.746

9 %

	Qty.	Wt.
A	1 8	0.70977
B	1	0.824
C	2	1.242
D	2	1.179
E	25	2.202

12 %

	Qty.	Wt.
A	2	1.309
B	2	1.077
C	2	1.728
D	2	1.573
E	2	1.780

16 %

	Qty.	Wt.
A	∅	∅
B	4	2.324
C	2	1.611
D	1	0.687
E	1	0.739

21 %

	Qty.	Wt.
A	4	2.414
B	4	1.906
C	3	1.125
D	3	1.554
E	2	1.589

28 %

	Qty.	Wt.
A	4	1.801
B	1	0.854
C	2	1.107
D	2	1.308
E	3	1.449

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Qty. Wt.

	Qty.	Wt.
A		
B		
C		
D		
E		

Lined through spaces preceded by a number represent the same number. Lined spaces without a preceding number indicate unused or not applicable spaces.

APPENDIX A

STATISTICS SUMMARY

Both the lethal and sub-lethal endpoints were statistically calculated according to their respective EPA guidelines. The Chronic Freshwater organisms were calculated according to EPA-821-R-02-013, October 2002 Fourth Edition. The Chronic Marine and Estuarine organisms were calculated according to EPA-821-R-02-014, October 2002 Third Edition. The Acute Freshwater and Marine organisms were calculated according to EPA-821-R-02-012, October 2002 Fifth Edition. The fertilization organisms were calculated according to EPA-600-R-95-136 or EPA-600-R-12-022, dependent upon the species. Listed below are the basic principles of these guidelines. If you would like a copy of the raw statistical calculations for your test then please contact us.

The chronic and acute *Pimephales promelas* and *Menidia beryllina* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts (parametric). If the data fails Shapiro Wilks Test or Bartlett's Test then Steels Many One Test (non-parametric) is used. The chronic *Pimephales promelas* and *Menidia beryllina* growth data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Shipiro Wilks Test and Bartlett's Test then Steels Many One Test is used. Point estimation may also be used.

The chronic *Mysidopsis bahia* survival data is analyzed using Chi-square test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test or Bartlett's Test then Steels Many One Test is used. *Mysidopsis bahia* growth data is analyzed using Chi-square test and Bartlett's Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test and Bartlett's Test then Steels Many One Test is used. Point estimation may also be used.

The acute *Mysidopsis bahia* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shipiro Wilks Test or Bartlett's Test then Steels Many One Test is used. Point estimation may also be used.

The chronic *Ceriodaphnia dubia* survival data are analyzed using the Fisher's Exact Test. The chronic *Ceriodaphnia dubia* reproduction and are analyzed using the Chi-square test and Bartlett Test. If the data passes one of these tests then the data is run through ANOVA and Dunnetts. If the data fails Chi-square test and Bartlett's Test then Steels Many One Test is used. Point estimation may also be used.

The acute *Daphnia pulex* and *Ceriodaphnia dubia* survival data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test or Bartlett's Test then Steels Many One Test is used. Point estimation may also be used.

The fertilization data is analyzed using Shapiro Wilks Test and Bartlett's Test. If the data passes both tests then the data is run through ANOVA and Dunnetts. If the data fails Shapiro Wilks Test or Bartlett's Test then Steels Many One Test is used. Point estimation or TST methodology may also be used.

FISHER'S EXACT TEST

```

=====
                                NUMBER OF
                                -----
IDENTIFICATION                ALIVE    DEAD    TOTAL ANIMALS
-----
CONTROL                        8      2      10
      9                        7      3      10
-----
TOTAL                          15     5      20
=====

```

CRITICAL FISHER'S VALUE (10,10,8) (p=0.05) IS 3. b VALUE IS 7.
 Since b is greater than 3 there is no significant difference
 between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

```

=====
                                NUMBER OF
                                -----
IDENTIFICATION                ALIVE    DEAD    TOTAL ANIMALS
-----
CONTROL                        8      2      10
      12                       8      2      10
-----
TOTAL                          16     4      20
=====

```

CRITICAL FISHER'S VALUE (10,10,8) (p=0.05) IS 3. b VALUE IS 8.
 Since b is greater than 3 there is no significant difference
 between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

```

=====
                                NUMBER OF

```

IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	8	2	10
16	8	2	10
TOTAL	16	4	20

CRITICAL FISHER'S VALUE (10,10,8) (p=0.05) IS 3. b VALUE IS 8.
 Since b is greater than 3 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

NUMBER OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	8	2	10
21	6	4	10
TOTAL	14	6	20

CRITICAL FISHER'S VALUE (10,10,8) (p=0.05) IS 3. b VALUE IS 6.
 Since b is greater than 3 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

NUMBER OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS

CONTROL	8	2	10
28	3	7	10

TOTAL	11	9	20
=====			

CRITICAL FISHER'S VALUE (10,10,8) (p=0.05) IS 3. b VALUE IS 3.
 Since b is less than or equal to 3 there is a significant difference
 between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHER'S EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	2	
1	9	10	3	
2	12	10	2	
3	16	10	2	
4	21	10	4	
5	28	10	7	*

CERIO REPRO
 File: 86906.cdr Transform: NO TRANSFORMATION

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	3.283	11.858	18.718	11.858	3.283
OBSERVED	7	5	21	16	0

Calculated Chi-Square goodness of fit test statistic = 13.1827
 Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

CERIO REPRO

File: 86906.cdr Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 2.76

Bartlett's test using average degrees of freedom
Calculated B2 statistic = 2.71
Based on average replicate size of 8.80

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.
Data PASS B2 homogeneity test at 0.01 level. Continue analysis.

CERIO REPRO
File: 86906.cdr Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	4	150.600	37.650	0.360
Within (Error)	44	4597.522	104.489	
Total	48	4748.122		

Critical F value = 2.61 (0.05,4,40)
Since F < Critical F FAIL TO REJECT Ho: All equal

CERIO REPRO
File: 86906.cdr Transform: NO TRANSFORMATION

BONFERRONI t-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	pcon	19.000	19.000		
2	9	21.900	21.900	-0.634	

3	12	24.400	24.400	-1.181
4	16	21.000	21.000	-0.438
5	21	21.444	21.444	-0.520

 Bonferroni t table value = 2.33 (1 Tailed Value, P=0.05, df=40,4)

CERIO REPRO
 File: 86906.cdr Transform: NO TRANSFORMATION

BONFERRONI t-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	pcon	10			
2		9	10.646	56.0	-2.900
3		12	10.646	56.0	-5.400
4		16	10.646	56.0	-2.000
5		21	10.938	57.6	-2.444

FATHEAD SURVIVAL
 File: 86906.PPS Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 35.200

W = 0.889

Critical W (P = 0.05) (n = 30) = 0.927

Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

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

FATHEAD SURVIVAL
 File: 86906.PPS Transform: NO TRANSFORMATION

Hartley's test for homogeneity of variance

Bartlett's test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

FATHEAD SURVIVAL

File: 86906.PPS

Transform: NO TRANSFORMATION

STEEL'S MANY-ONE RANK TEST

-

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	PCON	7.800				
2	9	2.200	15.00	16.00	5.00	*
3	12	2.000	15.00	16.00	5.00	*
4	16	1.600	15.00	16.00	5.00	*
5	21	3.600	15.00	16.00	5.00	*
6	28	2.400	15.00	16.00	5.00	*

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

Bio-Aquatic Testing, Inc.

FRESH WATER TEST SETUP FORM

Client: Little Rock Water Reclamation Authority

Permit AR0021806

Facility: Adams Field Reclamation Facility

Lab Number 86906

Outfall Name: 001

Number of samples 3

Dilution Water: Receiving Stream

Receiving Water Name: Arkansas River

Dechlorinate Sample: _____

Sx #	Rcvd Date	Rcvd Time	Sampling Dates		Sampling Times	
			Begin Date	End Date	Start	End
1	05/22/23	14:46	05/21/23	05/22/23	09:00	07:00
2	05/25/23	09:15	05/23/23	05/24/23	09:00	07:00
3	05/27/23	08:35	05/25/23	05/26/23	09:00	07:00

Type of Test(s)	
<u>Ceriodaphnia dubia</u>	<u>Chronic</u>
<u>Pimephales promelas</u>	<u>Chronic</u>

Dilution Water		
Sample #	Hardness	Alkalinity
	As mg/L CaCO ₃	as mg/L CaCO ₃
1	79	83
2	61	90
3	105	86

Start Sx # 1 Date: 5/23/2023
 Renew Sx # 1 Date: 5/24/2023
 Renew Sx # 2 Date: 5/25/2023
 Renew Sx # 2 Date: 5/26/2023
 Renew Sx # 3 Date: 5/27/2023
 Renew Sx # 3 Date: 5/28/2023
 Renew Sx # 3 Date: 5/29/2023

Test Start Date: 5/23/2023 Test End Date: 5/30/2023

Ceriodaphnia dubia Test Set Up: 10 Reps & 1 Organisms per Rep

Pimephales Test Set Up: 5 Reps & 8 Organism per Rep

Concentrations: 9 12 16 21 28 %

Test Chemistry on these dilutions: 9 12 16 21 28

Samples received by: Express Delivery UPS Next Day via Air Cargo DHL
 Federal Express the Client Bio-Aquatic personnel

Other: _____

BIO-AQUATIC TESTING, INC.

Hardness, Alkalinity, Residual Chlorine, Specific Conductivity, and Salinity Analysis Data

Client: Little Rock Water Reclamation

Lab ID: 86906

Facility: Adams Field Reclamation Facility

Outfall: 001

Dilution Water(s): Receiving Stream

Test Date: May 23, 2023

EFFLUENT PARAMETERS

Effluent Sample #	Received		Residual Cl ₂ (mg/L)	DeChlor (ml/L) ¹	Ammonia (mg/L)	Analyst Initials	Temp. Received
	Date	Time					
1	5/22/23	14:46	<0.10	N/A	9.2	JR	3.9
2	5/25/23	09:15	<0.10	N/A	<0.25	DF	4.2
3	5/27/23	08:35	<0.10	N/A	10.8	JP	3.8

¹**Dechlorination Reagent:** 0.025 N Sodium Thiosulfate

Effluent Sample #	pH	DO (mg/L)	Hardness (mg/L CaCO ₃)	Alkalinity (mg/L CaCO ₃)	Conductivity (umhos/cm)	Analyst Initials
1	7.1	8.8	62	76	265	JR
2	7.2	9.0	70	61	350	DF
3	7.3	7.8	185	92	564	JP

DAILY RENEWAL CONDUCTIVITY**

Date	Sample #	Values are at Highest Dilution		Analyst	
		Specific Conductivity as umhos/cm	Salinity (ppt)		
5/23	TCON	223	0.1	GS	
5/24	TCON	207	0.1	AF/IC	
5/25	TCON	325	0.2	JR/MM	
5/26	TCON	291	0.2	CG/M	
5/27	TCON	377	0.2	CG	
5/28	TCON	357	0.2	CG	
5/29	TCON	351	0.2	GS	
5/23	OUTFALL*	1	246	0.2	GS
5/24	OUTFALL*	1	257	0.2	AF/IC
5/25	OUTFALL*	2	334	0.2	JR/MM
5/26	OUTFALL*	2	299	0.2	CG/M
5/27	OUTFALL*	3	361	0.2	CG
5/28	OUTFALL*	3	362	0.2	CG
5/29	OUTFALL*	3	360	0.2	GS

**Conductivity is taken on the highest remaining effluent concentration used for test renewal, not necessarily 100%

Analysis Methods: Chlorine: Hanna Colorimeter #HI711, Ammonia: Hanna Colorimeter #HI733, Hardness: Hanna Photometer #HI96735, Alkalinity: Hanna Colorimeter #HI775, pH, DO, Conductivity: Thermo Versa Star Benchtop Meter

BIO-AQUATIC TESTING, INC.

pH, Dissolved Oxygen

Chronic

Ceriodaphnia dubia

Client: Little Rock Water Reclamation

Lab ID: 86906

Facility: Adams Field Reclamation Facility

Dilution Water(s): Receiving Stream

Outfall: 001

Test Begin Date: May 23, 2023

NR indicates that the test is non-renewal.

					Concentration							
ANALYST	DATE	TIME	SX#	UNIT	TCON	9	12	16	21	28		
GS	5/23	Start	1	pH	7.6	7.7	7.6	7.6	7.6	7.6		
		25 ± 1		DO (mg/L)	8.3	8.4	8.4	8.4	8.5	8.5		
AF/IC	5/24	24 Hr	1	pH	7.8	7.7	7.6	7.6	7.6	7.6		
		25 ± 1		DO (mg/L)	7.9	7.8	7.8	7.8	7.6	7.6		
		Renew	1	pH	7.5	7.7	7.7	7.7	7.7	7.6		
				DO (mg/L)	7.7	7.7	7.7	7.8	7.8	7.9		
JR/MM	5/25	48 Hr	1	pH	7.5	7.5	7.6	7.6	7.5	7.6		
		25 ± 1		DO (mg/L)	7.6	7.4	7.4	7.4	7.4	7.4		
		Renew	2	pH	7.6	7.7	7.7	7.7	7.7	7.7		
				DO (mg/L)	7.7	7.9	7.9	8.1	8.1	8.1		
CG/MM	5/26	72 Hr	2	pH	7.2	7.7	7.7	7.7	7.7	7.7		
		25 ± 1		DO (mg/L)	7.8	7.6	7.6	7.6	7.6	7.7		
		Renew	2	pH	7.9	7.9	7.9	7.9	7.9	7.9		
				DO (mg/L)	8.0	8.1	8.1	8.1	8.2	8.2		
CG	5/27	96 Hr	2	pH	8.0	7.9	7.9	7.8	7.8	7.8		
		25 ± 1		DO (mg/L)	7.9	7.8	7.8	7.8	7.8	7.8		
		Renew	3	pH	7.9	7.9	7.9	7.8	7.8	7.8		
				DO (mg/L)	8.1	8.1	8.1	8.3	8.3	8.4		
CG	5/28	120 Hr	3	pH	8.1	8.0	8.0	7.9	7.9	7.9		
		25 ± 1		DO (mg/L)	8.3	8.2	8.2	8.1	8.1	8.1		
		Renew	3	pH	8.0	7.9	7.9	7.8	7.8	7.6		
				DO (mg/L)	8.3	8.2	8.2	8.1	8.1	8.1		
CG/GS	5/29	144 Hr	3	pH	7.8	7.8	7.8	7.8	7.8	7.7		
		25 ± 1		DO (mg/L)	8.1	8.0	8.0	7.5	7.5	7.5		
		Renew	3	pH	7.9	7.9	7.9	7.8	7.8	7.7		
				DO (mg/L)	8.1	8.2	8.2	8.5	8.5	8.5		
GS	5/30	168 Hr	3	pH	7.7	7.7	7.7	7.7	7.7	7.8		
		25 ± 1		DO (mg/L)	8.4	8.4	8.4	8.3	8.2	8.1		

BIO-AQUATIC TESTING, INC.

pH, Dissolved Oxygen

Chronic

Pimephales promelas

Client: Little Rock Water Reclamation

Lab Number: 86906

Facility: Adams Field Reclamation Facility Dilution Water(s): Receiving Stream

Outfall: 001

Test Begin Date: May 23, 2023

NR indicates that the test is non-renewal.

ANALYST	DATE	TIME	SX#	UNIT	Concentration							
					TCON	9	12	16	21	28		
GS	5/23	Start	1	pH	7.6	7.7	7.6	7.6	7.6	7.6		
		25 ± 1		DO (mg/L)	8.3	8.4	8.4	8.4	8.5	8.5		
		24 Hr		1	pH	7.5	7.5	7.5	7.5	7.5	7.5	
25 ± 1	DO (mg/L)	7.5	7.4		7.4	7.4	7.4	7.5				
Renew	1	pH	7.5		7.7	7.7	7.7	7.7	7.6			
				DO (mg/L)	7.7	7.7	7.7	7.8	7.8	7.9		
JR/MM	5/25	48 Hr	1	pH	7.6	7.5	7.5	7.4	7.4	7.4		
		25 ± 1		DO (mg/L)	7.8	7.6	7.3	7.1	7.0	6.9		
		Renew		2	pH	7.6	7.7	7.7	7.7	7.7	7.7	
				DO (mg/L)	7.7	7.9	7.9	8.1	8.1	8.1		
CG/MM	5/26	72 Hr	2	pH	8.2	8.1	8.0	7.9	7.9	7.9		
		25 ± 1		DO (mg/L)	7.8	7.7	7.7	7.5	7.4	7.3		
		Renew		2	pH	7.9	7.9	7.9	7.9	7.9	7.9	
				DO (mg/L)	8.0	8.1	8.1	8.1	8.2	8.2		
CG	5/27	96 Hr	2	pH	7.8	7.8	7.8	7.8	7.8	7.7		
		25 ± 1		DO (mg/L)	8.0	7.9	7.9	7.8	7.8	7.7		
		Renew		3	pH	7.9	7.9	7.9	7.8	7.8	7.8	
				DO (mg/L)	8.1	8.1	8.1	8.3	8.3	8.4		
CG	5/28	120 Hr	3	pH	7.9	7.8	7.8	7.7	7.7	7.6		
		25 ± 1		DO (mg/L)	7.6	7.5	7.5	7.4	7.3	7.3		
		Renew		3	pH	8.0	7.9	7.9	7.8	7.8	7.6	
				DO (mg/L)	8.3	8.2	8.2	8.1	8.1	8.1		
CG/GS	5/29	144 Hr	3	pH	8.1	8.0	7.9	7.9	7.9	7.9		
		25 ± 1		DO (mg/L)	8.1	8.1	8.0	8.0	8.0	8.0		
		Renew		3	pH	7.9	7.9	7.9	7.8	7.8	7.7	
				DO (mg/L)	8.1	8.2	8.2	8.5	8.5	8.5		
GS	5/30	168 Hr	3	pH	7.8	7.8	7.8	7.8	7.7	7.7		
		25 ± 1		DO (mg/L)	8.2	8.2	8.1	8.1	7.9	7.9		

Appendix B

Ceriodaphnia dubia

BIO-AQUATIC TESTING, INC.

Carrollton, TX

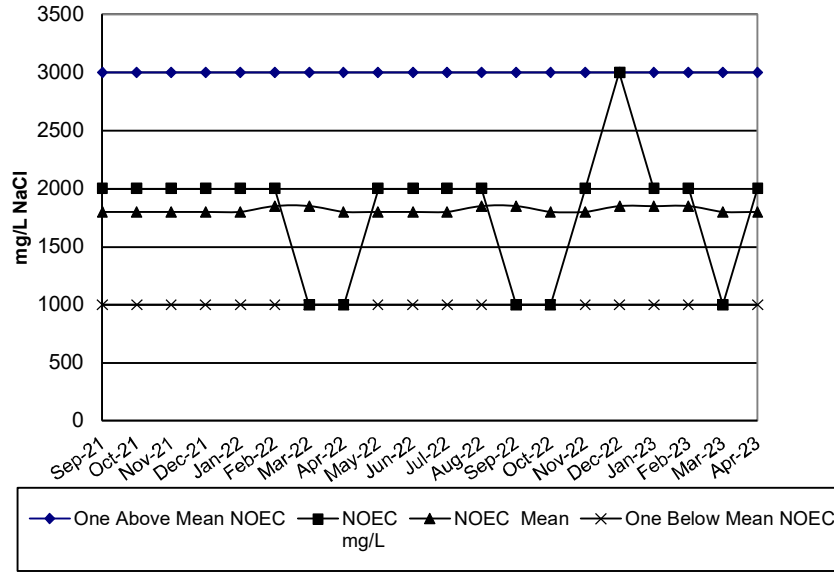
REFERENCE TOXICANTS

Bio-Aquatic Testing conducts reference toxicant testing monthly for organisms cultured in-house. For studies requiring purchased organisms, reference toxicant testing is performed simultaneously. Reference toxicant testing validates data and measures organism consistency. Only reagent grade chemicals are used of the following choices: sodium laurel sulfate (SLS), copper sulfate, copper chloride, potassium chloride, and sodium chloride. Organism responses are tracked with control charts for each reference toxicant/organism combination. The data are examined for sensitivity trends and to determine if results are within EPA described limits.

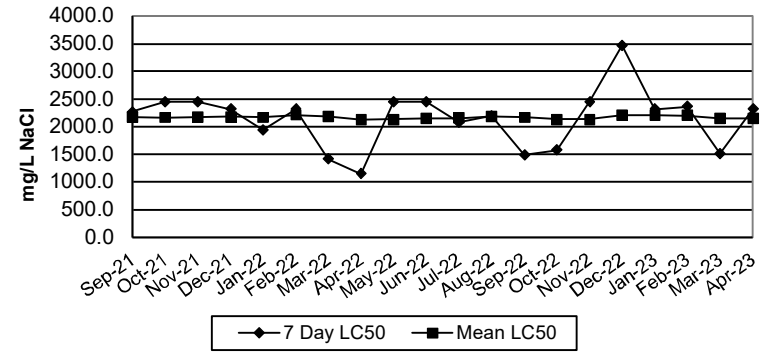
CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Freshwater						
CHEMICAL:	Sodium Chloride						
DURATION:	3-Brood Chronic						
TEST NUMBER:	338						
PROJECT NUMBER:	86827						
START DATE:	4/25/2023						
START TIME:	16:15						
TOTAL NUMBER EXPOSED:	10 organisms per concentration						
CONCENTRATIONS (mg/L):	CON	250	500	1000	2000	3000	4000
NUMBER DEAD PER CONCENTRATION:	0	0	0	0	1	10	10
TEST METHODS:	As listed in EPA-821-R-02-013						
STATISTICAL METHODS:	SURVIVAL: Fisher's Exact Test REPRODUCTION: ANOVA-Dunnetts						
NOEC FOR SURVIVAL:	2000	mg/L					
LOEC FOR SURVIVAL:	3000	mg/L					
NOEC FOR REPRODUCTION:	500	mg/L					
LOEC FOR REPRODUCTION:	1000	mg/L					
PMSD:	20.6						

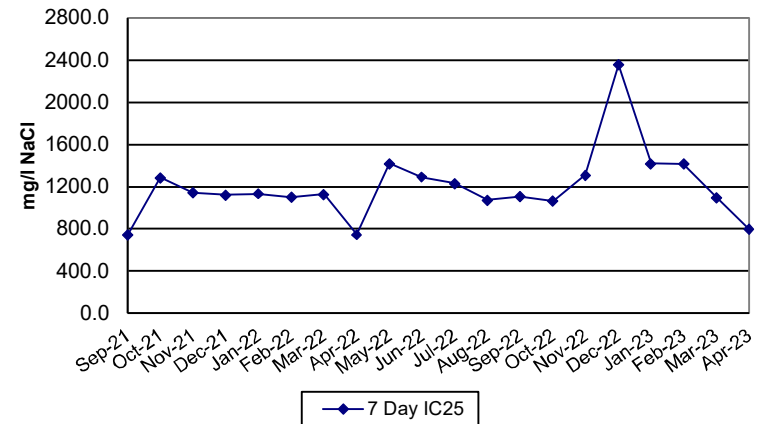
Ceriodaphnia Chronic Survival Control Chart



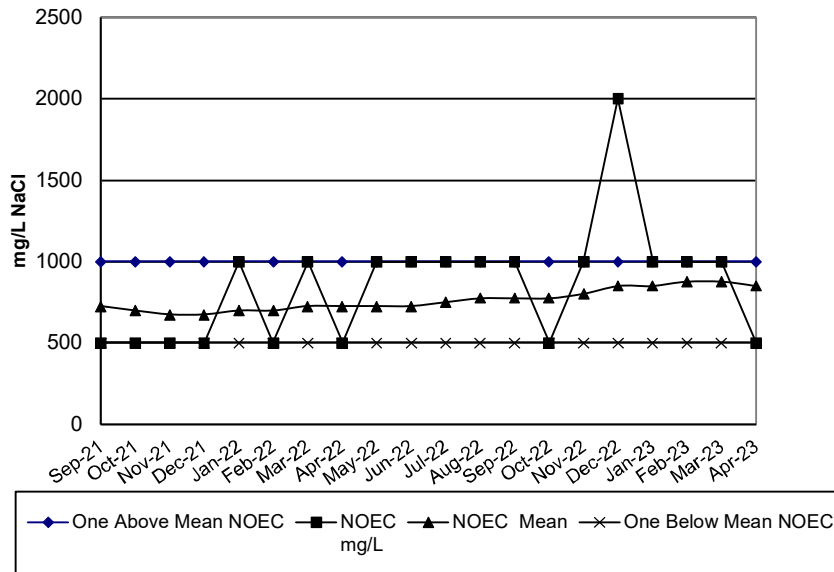
Ceriodaphnia 7-Day LC50



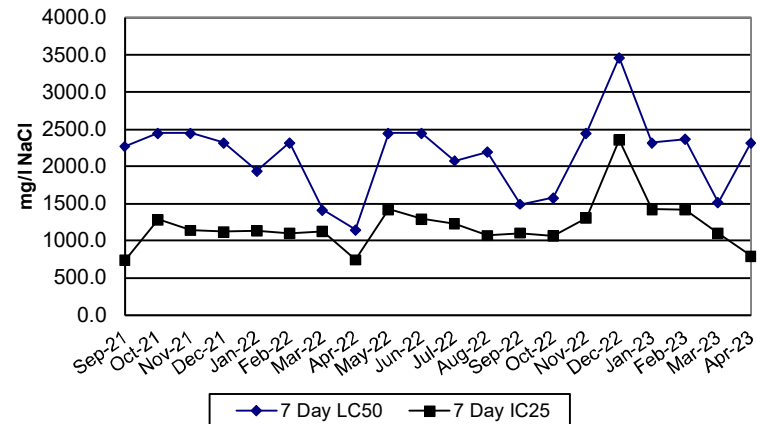
Ceriodaphnia 7-Day IC25



Ceriodaphnia Chronic Reproduction Control Chart



Ceriodaphnia 7-Day LC50 & IC25



Appendix B

Pimephales promelas

BIO-AQUATIC TESTING, INC.

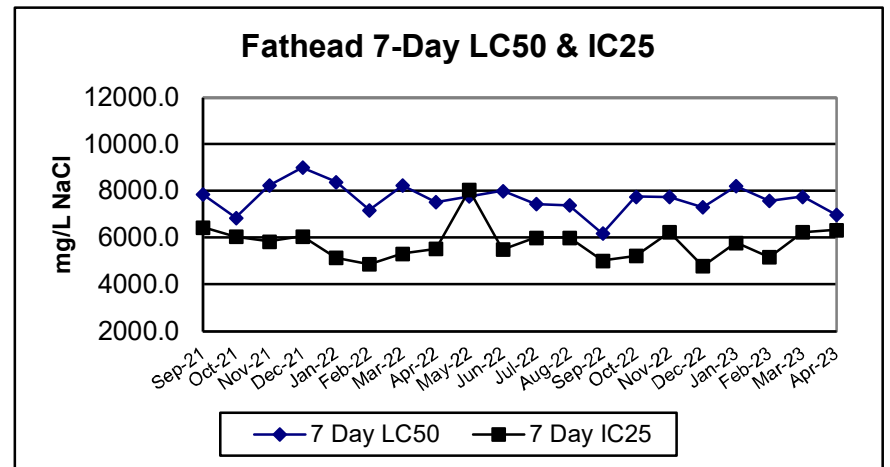
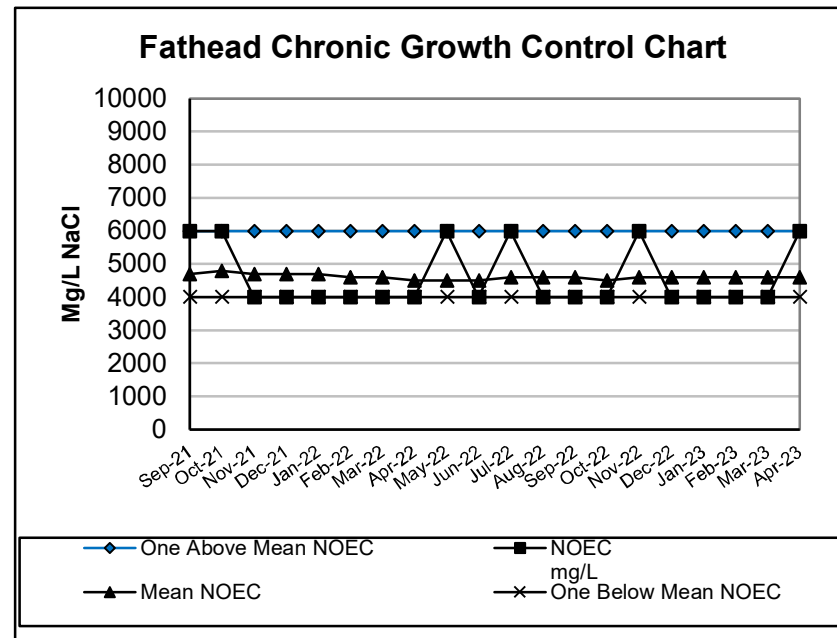
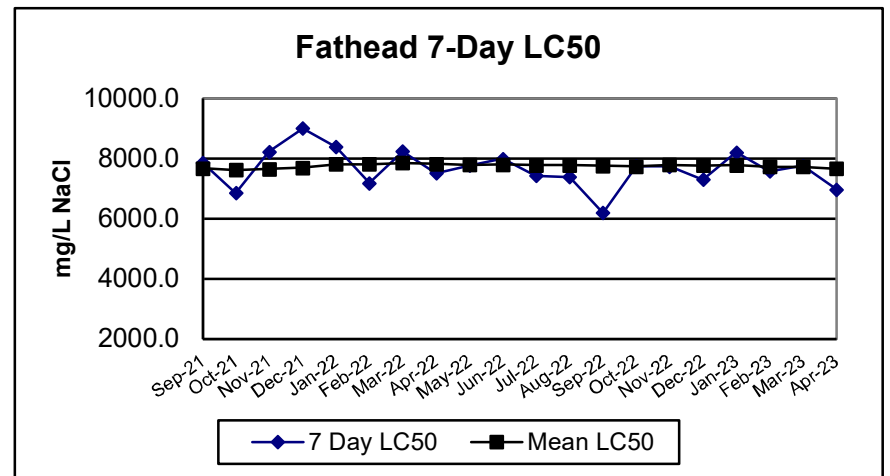
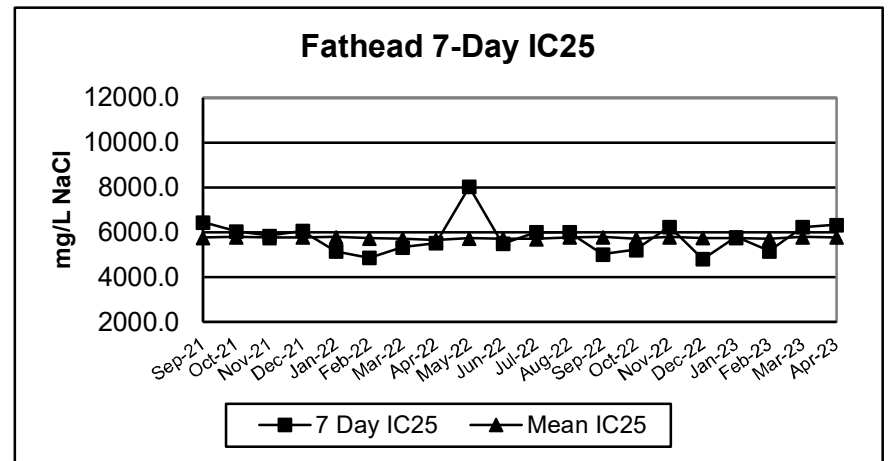
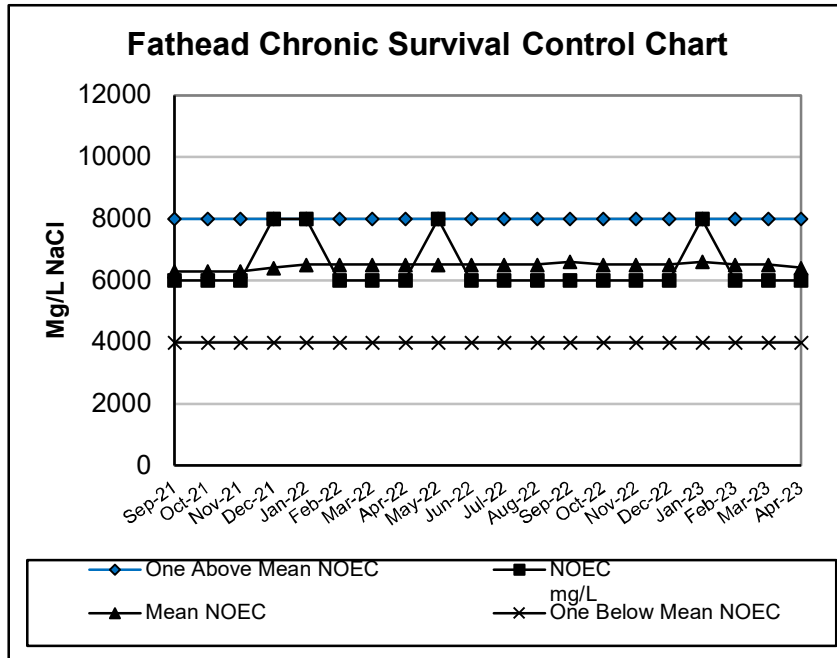
Carrollton, TX

REFERENCE TOXICANTS

Bio-Aquatic Testing conducts reference toxicant testing monthly for organisms cultured in-house. For studies requiring purchased organisms, reference toxicant testing is performed simultaneously. Reference toxicant testing validates data and measures organism consistency. Only reagent grade chemicals are used of the following choices: sodium laurel sulfate (SLS), copper sulfate, copper chloride, potassium chloride, and sodium chloride. Organism responses are tracked with control charts for each reference toxicant/organism combination. The data are examined for sensitivity trends and to determine if results are within EPA described limits.

CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Freshwater
CHEMICAL:	Sodium Chloride
DURATION:	7 Days
TEST NUMBER:	378
PROJECT NUMBER:	86825
START DATE:	4/26/2023
START TIME:	17:25
TOTAL NUMBER EXPOSED:	40 organisms per concentration
CONCENTRATIONS (mg/L):	CON 2000 4000 6000 8000 10000 12000
NUMBER DEAD PER CONCENTRATION:	3 0 0 7 31 40 40
TEST METHODS:	As listed in EPA-821-R-02-013
STATISTICAL METHODS:	SURVIVAL: Steel's Many-One Rank Test GROWTH: ANOVA-Dunnetts w/Bonf. Adj.
NOEC FOR SURVIVAL:	6000 mg/L
LOEC FOR SURVIVAL:	8000 mg/L
NOEC FOR GROWTH:	6000 mg/L
LOEC FOR GROWTH:	8000 mg/L
PMSD:	25.6



APPENDIX C

LITERATURE REFERENCES

- U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To Freshwater Organisms (Fifth Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-012.
- U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents and Receiving Water To Marine And Estuarine Organisms (Third Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-014.
- U.S.E.P.A., 2002. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To Freshwater Organisms (Fourth Edition) U.S. Environmental Protection Agency, Office of Water, Washington D.C., EPA-821-R-02-013.
- U.S.E.P.A., 2012. Tropical Collector Urchin, *Tripneustes gratilla* (First Edition) U.S. Environmental Protection Agency, Office of Research and Development and Region 9, EPA-600-R-12-022.
- U.S.E.P.A., 1995. Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Water To West Coast Marine and Estuarine Organisms (First Edition) U.S. Environmental Protection Agency, EPA-600-R-95-136.
- U.S.E.P.A., 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document, U.S. Environmental Protection Agency, Office of Wastewater, Washington D.C., EPA-833-R-10-004.
- U.S.E.P.A., 1991. Technical Support Document For Water Quality-Based Toxics Control, U.S. Environmental Protection Agency, EPA-505-2-90-001.
- Zarr, Jerrold, H., 1984. Biostatistical Analysis, (Second Edition). Prentice-Hall, Inc., Englewood Cliffs, N.J.

CHAIN-OF-CUSTODY SHEETS

Appendix D

HUTHER & ASSOCIATES
 2501 MAYES RD., STE. 100
 CARROLLTON, TX 75006
 PH: 972-242-7750 FAX: 972-242-7749

CHAIN OF CUSTODY Huther Only, No Sample Left **Lab Id:** 86906
 Please Fill Out C-O-C by Completing Sections A, B, & C. **P.O. No.:** _____

A.1 Check Sample # For Chronic and 48 Hour Acute Tests: _____ First, _____ Second, or _____ Third.

Check the type of test(s) required, if different from the Scheduled Test(s) in "A":

<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour
C. dubia (water flea)	D. pulex (water flea)	D. magna (water flea)	P. promelas (minnow)	M. bahia (shrimp)	M. beryllina (minnow)	Selenastrum (green algae)			

Notes: 2nd Qtr

SENT TO HUTHER & ASSOC. BY ARKANSAS BEST COURIERS

Client: Little Rock Water Reclamation Authority

Facility: Adams Field Reclamation Facility

Permit No: AR0021806 **Outfall:** 001

Client Contact: JARED EVANOV

Client Phone: 501-490-5401

A. SCHEDULED TEST(S):

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

To Ship the 1st Sample on: 5/22/2023

Dilution Series: 9 12 16 21 28

Include Semi-annual 24hr Acute Test? No

Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rec. Stream S = Sediment	Sample Date		Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
		From	To			
005-009 1 AF FINAL EFF	E	5-21-23	5-22-23	0700	C J. BULLOCK: J. BRETT VANDIVER	1
082-004 2 UPSTREAM SAMPLE AT OUTFALL	RS	5-19-23	N/A	N/A	G J. BULLOCK: J. BRETT VANDIVER	1
3						

Relinquished By:	Date	Time	Received By:		Date	Time
			Signature	Signature		
J. Bulluck	5-22-23	7:10	J. Bulluck	5-22-23	1446	

Huther Sample Login				Effluent Parameters:				Receiving Stream Parameters:			
Date/Time: 5-23-23 1446	Tech: J. Bulluck	IR Gun#: 002	IR Gun#: 002	Temp: 3.9 (C)	pH: 7.1	Hd: 62 mg/l	Hd: 62 mg/l	Temp: 3.9 (C)	pH: 4.3	Hd: 79 mg/l	Hd: 79 mg/l
				Cl ₂ : 40.1 mg/l	DO: 8.8 mg/l	Alk: 70 mg/l	Alk: 70 mg/l	Cl ₂ : 40.1 mg/l	DO: 9.4 mg/l	Alk: 83 mg/l	Alk: 83 mg/l
				NH3: 9.2 mg/l	Int. Salinity/Conductivity: 265 ppt/us	Adj. Sal: ppt	Adj. Sal: ppt	NH3: 40.25 mg/l	Int. Salinity/Conductivity: 184 ppt/us	Adj. Sal: ppt	Adj. Sal: ppt
				Condition: color-metric 1.2	Other: color-metric 1.2			Condition: good	Other: good		

HUTHER & ASSOCIATES
 2501 MAYES RD., STE. 100
 CARROLLTON, TX 75006
 PH: 972-242-7750 FAX: 972-242-7749

CHAIN OF CUSTODY

Huther Only: No Sample Left
 Lab Id : **86906**
 Please Fill Out C-O-C by Completing Sections A, B, & C. **P.O. No:**

A.1 Check Sample # For Chronic and 48 Hour Acute Tests : _____ First, _____ Second, or _____ Third.
 Check the type of test(s) required, if different from the Scheduled Test(s) in "A":

Client: Little Rock Water Reclamation Authority
 Facility: Adams Field Reclamation Facility
 Permit No: AR0021806 Outfall: 001
 Client Contact: JARED EVANOV
 Client Phone: 501-490-5401

<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour
---	--	--	---	--	--	--	--	--

A. SCHEDULED TEST(S):

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

To Ship the 1st Sample on: 5/22/2023

Dilution Series: 9 12 16 21 28

Include Semi-annual 24hr Acute Test? No

Notes: 2nd Qtr
 SHIPPED BY ARKANSAS BEST COURIER

B.

Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rec. Stream S = Sediment	Sample Date		Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
		From	To			
005-010 1 AFFINALEFF.	E	5-23-23	5-24-23	C	J. BULL - J. BRETT VANDIVER	1
080-005 2 RIVER SAMPLE UPSTREAM OF OUTFALL	RS	N/A	N/A	G	J. BULL - J. BRETT VANDIVER	1

C.

Relinquished By:	Date	Time	Received By:	Date	Time

Huther Sample Login

Date/Time: 5-24-23 Tech: [Signature] IR Gun# [Signature]

Dilution Water: Receiving Stream Synthetic Lab

Dechlor.: Yes No

Effluent Parameters:				Receiving Stream Parameters:			
Temp:	77.2	pH:	7.2	Temp:	85	pH:	7.9
Cl ₂ :	0.0	DO:	9.0	Cl ₂ :	0.0	DO:	8.5
NH ₃ Ammonia:	0.05	Int. Salinity/Conductivity:	250	NH ₃ Ammonia:	0.02	Int. Salinity/Conductivity:	91
Condition:	[Signature]	Hd:	70	Condition:	[Signature]	Hd:	60
		Alk:	61			Alk:	90
		Adj. Sal:				Adj. Sal:	

HUTHER & ASSOCIATES
 2501 MAYES RD., STE. 100
 CARROLLTON, TX 75006
 PH: 972-242-7750 FAX: 972-242-7749

CHAIN OF CUSTODY

Huther Only
 No Sample Left

Lab Id :

86906

Please Fill Out C-O-C by Completing Sections A, B, & C. P.O. No.:

Client: Little Rock Water Reclamation Authority
Facility: Adams Field Reclamation Facility
Permit No: AR0021806 **Outfall:** 001
Client Contact: JARED EVANOV
Client Phone: 501-490-5401

A.1 Check Sample # For Chronic and 48 Hour Acute Tests : ___ First, ___ Second, or ___ Third.

Check the type of test(s) required, if different from the Scheduled Test(s) in "A":

<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input checked="" type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour	<input type="checkbox"/> Chronic <input type="checkbox"/> 96 Hour <input type="checkbox"/> 48 Hour <input type="checkbox"/> 24 Hour
---	--	---	--	--	--	--	--

A. SCHEDULED TEST(S):

To Ship the 1st Sample on: 5/22/2023

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

Dilution Series: 9 12 16 21 28

Include Semi-annual 24hr Acute Test? No

Notes: 2nd Qtr

SHIPPED BY ARKANSAS BEST COURIER

Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rac. Stream S = Sediment	Sample Date		Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
		From	To			
005-011 1 AFFINAL EFF.	E	5-25-23	5-26-23	C	J. BARKER J. BRETT VANDIVER	1
080-005 2 RIVER SAMPLE UPSTREAM OF OUTFALL	RS	5-23-23	N/A	G	J. BARKER J. BRETT VANDIVER	1

Relinquished By:	Date	Time	Received By:	Date	Time

Huther Sample Login			Effluent Parameters:			Receiving Stream Parameters:		
Date/Time: 5/27/23 0840	Tech: JB	IR Gun#: 802	Temp: 3.8	pH: 7.3	Hd: 185	Temp: 3.7	pH: 7.8	Hd: 105
			Cl ₂ : <0.1	DO: 7.8	Alk: 92	Cl ₂ : <0.1	DO: 9.7	Alk: 86
			NH ₃ : 10.8	Int. Salinity/Conductivity: 504	Adj. Sal: ppt	NH ₃ : <0.25	Int. Salinity/Conductivity: 335	Adj. Sal: ppt
			Condition: colorimetric	Other: NH ₃		Condition: good	Other:	

REGULATORY AGENCY TABLES

Appendix E

Table 1 (Sheet 1 of 4)
BIOMONITORING REPORT

Ceriodaphnia dubia SURVIVAL AND REPRODUCTION TEST

Permittee: Little Rock Water Reclamation - Adams Field Reclamation Facility
 Permit No.: AR0021806
 Outfall No.: 001

		Date/Time		Date/Time
Dates and times	FROM:	<u>5/21/2023 @09:00</u>	TO:	<u>5/22/2023@ 07:00</u>
Composites were collected:	FROM:	<u>5/23/2023 @09:00</u>	TO:	<u>5/24/2023@ 07:00</u>
	FROM:	<u>5/25/2023 @09:00</u>	TO:	<u>5/26/2023@ 07:00</u>

Ceriodaphnia dubia survival and reproduction test was invalid because the True Control (TCON) did not meet the minimum test-acceptability criteria. The *Pimephales promelas* survival and growth test was invalid because the True Control (TCON) did not meet the minimum test-acceptability criteria. A retest has been scheduled. The retest and all future tests under the current permit will be done using synthetic water as dilution water.

Test Initiation: Time: 13:02 Date: 5/23/2023

Dilution Water Used: Receiving Water Synthetic Dilution Water

NUMBER OF YOUNG PRODUCED PER ADULT AT TEST TERMINATION

REPLICATE	EFFLUENT CONCENTRATION (%)						
	TCON	PCON	9 %	12 %	16 %	21 %	28 %
A	D- 0	18	29	30	24	E	D- 26
B	20	21	18	34	24	D- 19	D- 14
C	18	D- 0	24	36	34	D- 0	D- 18
D	32	28	30	32	D- 0	28	26
E	22	D- 0	D- 18	3	14	25	D- 17
F	23	21	24	32	D- 16	35	D- 15
G	9	15	D- 28	17	18	25	30
H	D- 21	28	D- 4	D- 3	13	D- 20	D- 7
I	23	29	23	36	37	D- 23	D- 21
J	D- 2	22	21	D- 21	30	18	16
Surv. MEAN	21.0	22.7	24.1	27.5	24.2	26.2	24.0
Total MEAN	17.0	18.2	21.9	24.4	21.0	21.4	19.0
CV % ¹	32.7	22.5	17.5	42.2	37	23.4	30
PMSD	Acceptable Range 47 or Less					57.6 %	

¹ Coefficient of Variation = (standard deviation/mean) x 100 Calculations are based on young of the surviving females. Males are designated (M), and dead females are designated (D) along with the number of neonates released prior to death.

Table 1 (Sheet 2 of 4)
BIOMONITORING REPORT

Ceriodaphnia dubia SURVIVAL AND REPRODUCTION TEST

Permittee: Little Rock Water Reclamation - Adams Field Reclamation Facility
 Permit No.: AR0021806
 Outfall No.: 001

PERCENT SURVIVAL

Time of Reading	EFFLUENT CONCENTRATION (%)						
	TCON	PCON	9 %	12 %	16 %	21 %	28 %
24 HOURS	100	100	100	100	100	100	100
48 HOURS	100	100	100	100	90	100	100
7-DAY	70	80	70	80	80.0	?	30

1. DUNNETT'S PROCEDURE OR STEEL'S MANY-ONE RANK TEST (with Bonferroni adjustment as appropriate for Sub-Lethality)

Is the mean number of young produced per adult significantly different ($p=0.05$) than the number of young per adult in the control for the low flow or critical dilution?

CRITICAL DILUTION (21 %): _____ YES _____ NO

If you report NO, enter a '0' on the DMR form for Parameter TGP3B, other wise enter a '1'. This parameter is also referred to as the 7-DAY Ceriodaphnia Sub-Lethal Pass/Fail.

2. FISHER'S EXACT TEST (as appropriate for Lethality)

Is the mean survival at test end significantly different ($p=0.05$) than the control's survival for the low flow or critical dilution?

CRITICAL DILUTION (21 %): _____ YES _____ NO

If you report NO, enter a '0' on the DMR form for Parameter TLP3B, other wise enter a '1'. This parameter is also referred to as the 7-DAY Ceriodaphnia Lethal Pass/Fail.

3. Enter the percent effluent corresponding to each NOEC/LOEC below:

a. NOEL Survival = 21** % Effluent (**Parameter TOP3B**)

b. NOEL Reproduction = 28** % Effluent (**Parameter TPP3B**)

Q* refers to a value that is not calculable

**The NOECs above are based on statistical analysis using the Performance Control (PCON) and are for informational purposes only. The True Control (TCON) was invalid because it did not meet the minimum test-acceptability criteria.

4. If you are required to report Parameter No. **TQP3B**, report the percent coefficient of variation value that is the highest between the control and the critical dilution (21 %), found in the reproduction table above for *Ceriodaphnia dubia* (= 23.4).

5. If you are required to report Parameter No. **TJP3B**, report the percent mortality in the critical dilution at the completion of the test for the *Ceriodaphnia dubia* (= Q*).

BIOMONITORING REPORT

Pimephales promelas SURVIVAL AND GROWTH TESTPermittee: Little Rock Water Reclamation - Adams Field Reclamation FacilityPermit No.: AR0021806Outfall No.: 001

	Date/Time	Date/Time
Dates and times	FROM: <u>5/21/2023 @09:00</u>	TO: <u>5/22/2023@ 07:00</u>
Composites were collected:	FROM: <u>5/23/2023 @09:00</u>	TO: <u>5/24/2023@ 07:00</u>
	FROM: <u>5/25/2023 @09:00</u>	TO: <u>5/26/2023@ 07:00</u>

Ceriodaphnia dubia survival and reproduction test was invalid because the True Control (TCON) did not meet the minimum test-acceptability criteria. The *Pimephales promelas* survival and growth test was invalid because the True Control (TCON) did not meet the minimum test-acceptability criteria. A retest has been scheduled. The retest and all future tests under the current permit will be done using synthetic water as dilution

Test Initiation: Time: 17:10 Date: 5/23/2023Dilution Water Used: Receiving Water Synthetic Dilution Water

DATA TABLE FOR GROWTH OF *Pimephales promelas*
Average Dry Weight in milligrams (mg) per replicate

Effluent Concentration	A	B	C	D	E	Mean Dry Weight (mg)	CV % ¹
TCON	0.056	0.186	0.197	0.096	0.187	0.145	44.3
PCON	0.385	0.504	0.510	0.461	0.468	0.466	10.8
9 %	0.122	0.103	0.155	0.147	0.275	0.161	41.9
12 %	0.164	0.135	0.216	0.197	0.223	0.187	19.8
16 %	0.000	0.291	0.201	0.086	0.092	0.134	84.3
21 %	0.302	0.238	0.141	0.194	0.199	0.215	27.9
28 %	0.225	0.107	0.138	0.164	0.181	0.163	27.4
PMSD	Acceptable Range 30 or Less					Q* %	

DATA TABLE FOR SURVIVAL OF *Pimephales promelas*
Percent Survival per replicate

Effluent Concentration	A	B	C	D	E	Average % Survival			CV % ¹
						24 Hours	48 Hours	7-Day	
TCON	25	37.5	25	25	37.5	100	95	30	22.8
PCON	100	100	100	100	87.5	100	100	97.5	5.7
9 %	12.5	12.5	25	25	62.5	100	100	27.5	74.7
12 %	25	25	25	25	25	100	100	25	0.0
16 %	0	50	25	12.5	12.5	100	100	20	94.8
21 %	50	75	37.5	37.5	25	100	100	45	42.1
28 %	50	12.5	25	25	37.5	100	100	30	47.5

¹ Coefficient of Variation = (standard deviation/mean) x 100)

? = cannot be calculated due to 100% mortality or lab exception

Table 1 (Sheet 4 of 4)
BIOMONITORING REPORT

Pimephales promelas SURVIVAL AND GROWTH TEST

Permittee: Little Rock Water Reclamation - Adams Field Reclamation Facility

Permit No.: AR0021806

Outfall No.: 001

1. DUNNETT'S PROCEDURE OR STEEL'S MANY-ONE RANK TEST
(with Bonferroni adjustment as appropriate for Sub-Lethality)

Is the mean dry weight at 7 days significantly different ($p=0.05$) than the control's mean dry weight for the low flow or critical dilution?

CRITICAL DILUTION (21 %): _____ YES _____ NO

*If you report NO, enter a '0' on the DMR form for Parameter **TGP6C**, other wise enter a '1'. This parameter is also referred to as the 7-DAY Pimephales Sub-Lethal Pass/Fail.*

2. DUNNETT'S PROCEDURE OR STEEL'S MANY-ONE RANK TEST (as appropriate for Lethality)

Is the mean survival at 7 days significantly different ($p=0.05$) than the control's survival for low flow or critical dilution?

CRITICAL DILUTION (21 %): _____ YES _____ NO

*If you report NO, enter a '0' on the DMR form for Parameter **TLP6C**, other wise enter a '1'. This parameter is also referred to as the 7-DAY Pimephales Lethal Pass/Fail.*

3. Enter the percent effluent corresponding to each NOEC/LOEC below:

a. NOEL Survival = _____ **Q**** % Effluent (**Parameter TOP6C**)

b. NOEL Growth = _____ **Q**** % Effluent (**Parameter TPP6C**)

Q* refers to a value that is not calculable

****The NOECs above are based on statistical analysis using the Performance Control (PCON) and are for informational purposes only. The True Control (TCON) was invalid because it did not meet the minimum test-acceptability criteria.

4. If you are required to report Parameter No. **TQP6C**, report the percent coefficient of variation value that is the highest between the control and the critical dilution, (21 %), found in the growth table above for *Pimephales promelas* (=27.9).

5. If you are required to report Parameter No. **TJP6C**, report the percent mortality in the critical dilution at the completion of the test for the *Pimephales promelas* (= 55).