Little Rock Water Reclamation Authority
NPDES Permit No.: AR 0021806
AFIN Number 60-00409

Chronic Biomonitoring Report
for
June 2023

TABLE OF CONTENTS

SECTION I
INTRODUCTION

1. Permit Number

   The NPDES permit number for the Adams Field Water Reclamation Facility is AR0021806. This facility is a publicly owned treatment works operated by Little Rock Water Reclamation Authority.

2. Toxicity Testing Requirements of Permit

   Quarterly Whole Effluent Toxicity monitoring for two test species. They are:

   - Chronic static renewal 7-day survival and reproduction test using *Ceriodaphnia dubia* (Method 1002.0).

   - Chronic static renewal 7-day larval survival and growth test using fathead minnows (*Pimephales promelas*) (Method 1000.0).

3. Plant Location

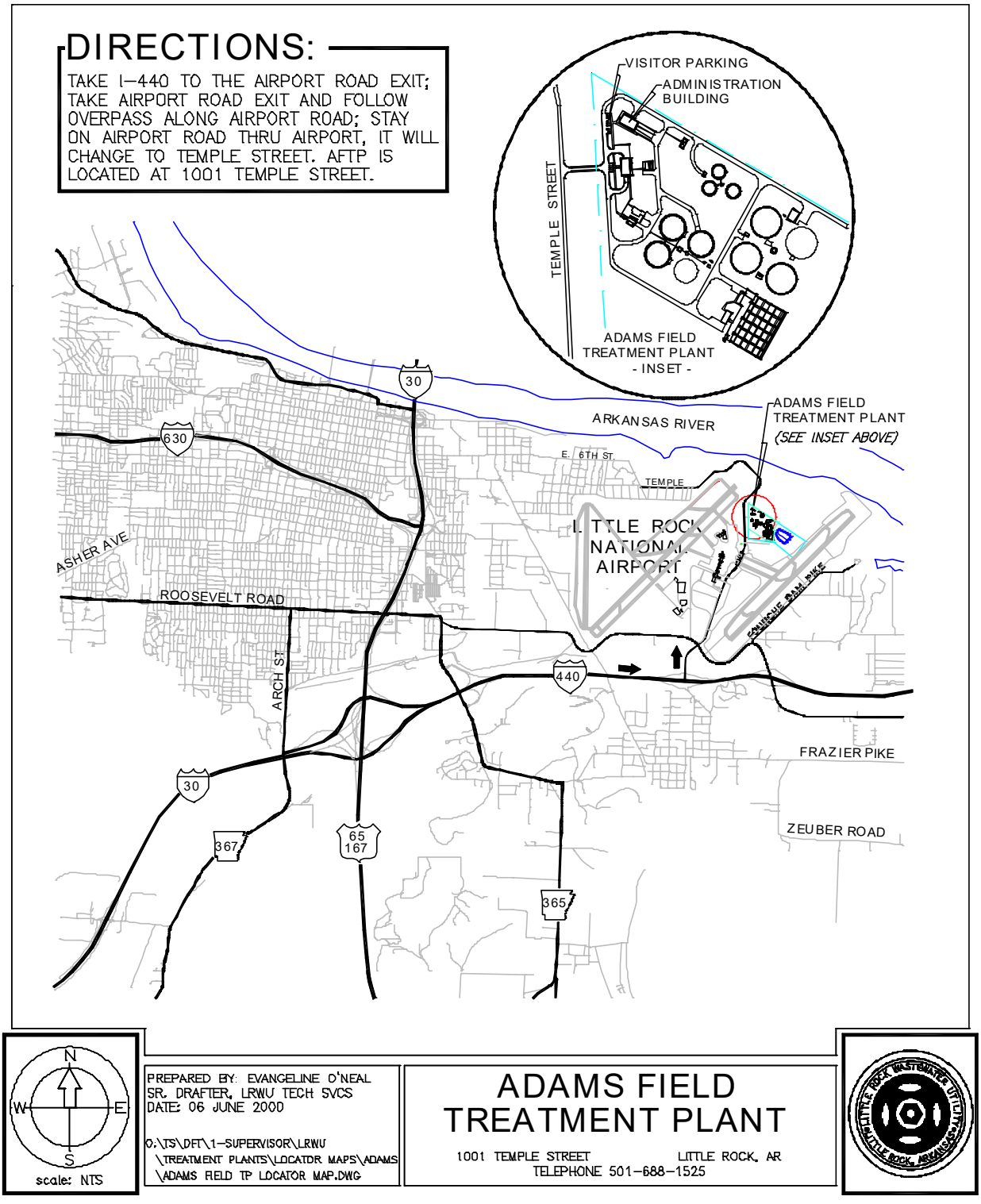
   The Adams plant is located at 1001 Temple Street in Little Rock which is on the southwest side of the Arkansas River just east of Little Rock's Adams Field Municipal Airport. (See page 2 for vicinity map location.)

4. Name of Receiving Water Body

   Arkansas River

5. Contract Laboratory (If the Tests are Performed Under Contract)

   Bio-Aquatic Testing, Inc.
   1156 North Bonnie Brae
   Denton, Texas 76201
   Telephone: (940)387-1025


DIRECTIONS:
TAKE I-440 TO THE AIRPORT ROAD EXIT; TAKE AIRPORT ROAD EXIT AND FOLLOW OVERPASS ALONG AIRPORT ROAD; STAY ON AIRPORT ROAD THRU AIRPORT, IT WILL CHANGE TO TEMPLE STREET. AFTP IS LOCATED AT 1001 TEMPLE STREET.
VISITOR PARKING
ADMINISTRATION BUILDING
TEMPLE STREET
ADAMS FIELD TREATMENT PLANT - INSET -
ADAMS FIELD TREATMENT PLANT (SEE INSET ABOVE)
ARKANSAS RIVER
E. 6TH ST.
TEMPLE
LITTLE ROCK NATIONAL AIRPORT
ASHER AVE
ROOSEVELT ROAD
ARCH ST
30
630
440
65
167
367
365
FRAZIER PIKE
ZEUBER ROAD
N
W
E
S
scale: NTS
PREPARED BY: EVANGELINE O'NEAL
SR. DRAFTER, LRWU TECH SVCS
DATE: 06 JUNE 2000
O:\TS\DFT\1-SUPERVISOR\LRWU \TREATMENT PLANTS\LOCATOR MAPS\ADAMS \ADAMS FIELD TP LOCATOR MAP.DWG
ADAMS FIELD TREATMENT PLANT
1001 TEMPLE STREET LITTLE ROCK, AR
TELEPHONE 501-688-1525

SECTION II
PLANT OPERATIONS

1. Product(s)

   Treated effluent from a publicly owned treatment works that receives municipal sewage.

2. Raw Materials

   Raw sewage sources are mainly domestic from household waste, pretreated industrial waste with some contributions from commercial sources.

3. Operating Schedule

   The Water Reclamation Facility receives and subsequently discharges flow at a continuous rate. The Water Reclamation Facility is staffed twenty-four hours a day by one operator or shift supervisor. During the day shift, Monday - Friday, one extra relief crew is on duty as well as the Plant Superintendent.

4. Description of Waste Treatment

   Preliminary Treatment. All incoming municipal sewage enters a screen chamber with 3/8 inch openings for screening followed by flow measurement.

   Primary Treatment. All Flow from the preliminary treatment units is treated in the primary clarifiers. Primary Treatment includes grit and scum removal which returns to the preliminary treatment building for disposal.

   Secondary Treatments. The treatment works has a complete-mix activated sludge process for secondary treatment.

   Disinfection. The final effluent is UV disinfected prior to discharge to the Arkansas River.

   Solids Handling and Disposal. The main sources of solids are: 1) primary sludge, and 2) waste activated sludge. The waste activated and primary sludges are transferred to the Fourche Creek Water Reclamation Facility. All sludges are processed in gravity sludge thickeners or a gravity belt thickener prior to transfer to anaerobic digesters. The digested sludge is pumped to biosolids, storage lagoons and ultimately disposed of through approved land application methods.

5. Schematic of Waste Treatment

   See page 5 for plant schematics.

6. Retention Time (If Applicable)

Retention times at design flow:

Primary Treatment .....2 hours
Activated Sludge Process .....6 hours
A.S.P. Final Tanks.....2 hours
UV Disinfection .....Instantaneous
PAA Supplemental Disinfection ..... 7.2 min

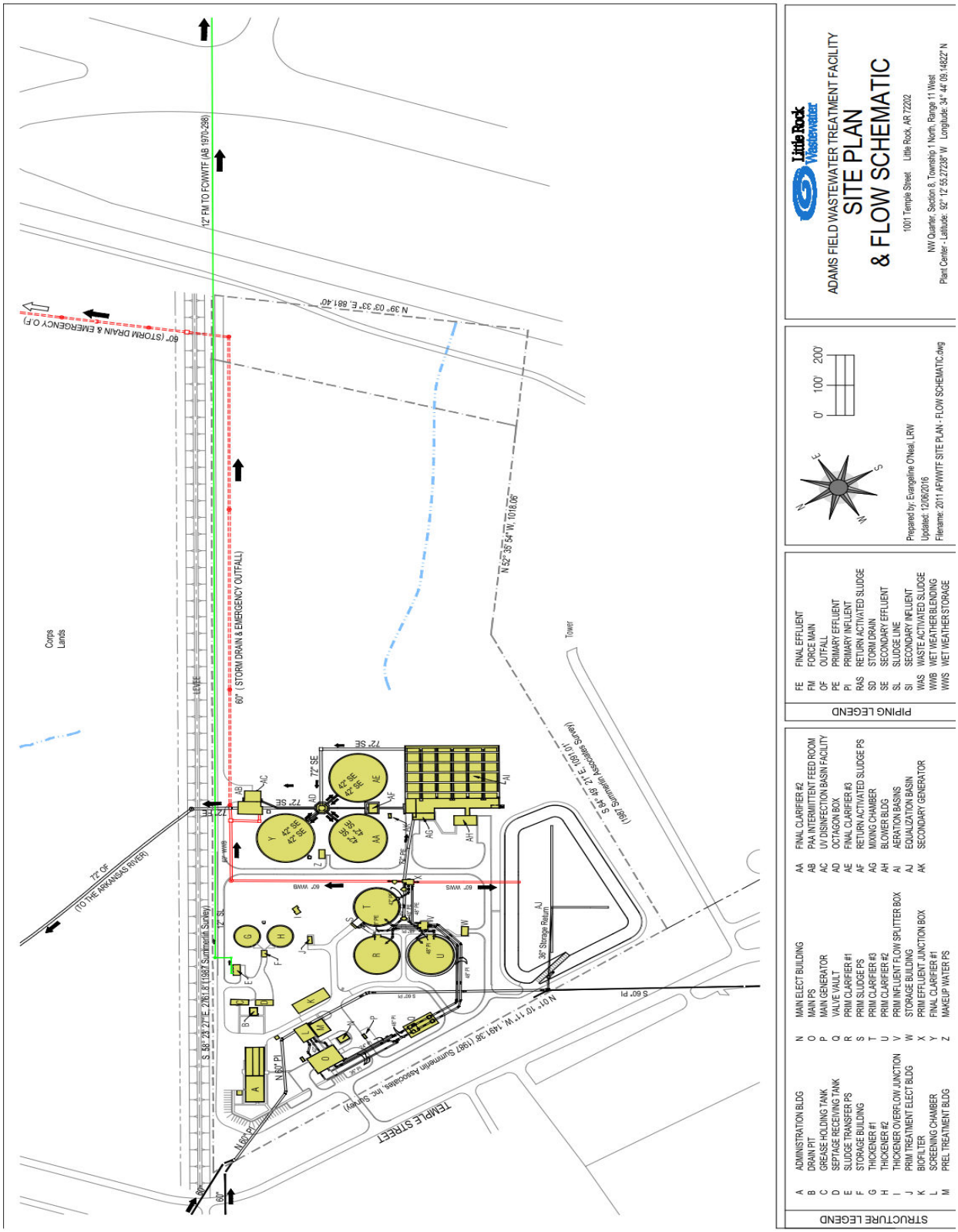
7. Volume of Waste Flow

The Adams Field Plant's effluent flows during the biomonitoring sampling event were:

Date	Flow, MGD
06/18/23 – 06/19/23	25.34
06/20/23 – 06/21/23	18.64
06/22/23 – 06/23/23	18.65

8. Design Flow of Treatment Facility at Time of Sampling

36 MGD


Little Rock Wastewater
ADAMS FIELD WASTEWATER TREATMENT FACILITY
SITE PLAN
& FLOW SCHEMATIC
1001 Temple Street Little Rock, AR 72202
NW Quarter, Section 8, Township 1 North, Range 11 West
Plant Center - Latitude: 92° 12' 55.27238" W Longitude: 34° 44' 09.14822" N
0' 100' 200'
Prepared by: Evangeline O'Neal, LRW
Updated: 12/06/2016
Filename: 2011 AFWWTF SITE PLAN - FLOW SCHEMATIC.dwg
PIPING LEGEND
FE FINAL EFFLUENT
FM FORCE MAIN
OF OUTFALL
PE PRIMARY EFFLUENT
PI PRIMARY INFLUENT
RAS RETURN ACTIVATED SLUDGE
SD STORM DRAIN
SE SECONDARY EFFLUENT
SL SLUDGE LINE
SI SECONDARY INFLUENT
WAS WASTE ACTIVATED SLUDGE
WWB WET WEATHER BLENDING
WWS WET WEATHER STORAGE
STRUCTURE LEGEND
A ADMINISTRATION BLDG
B DRAIN PIT
C GREASE HOLDING TANK
D SEPTAGE RECEIVING TANK
E SLUDGE TRANSFER PS
F STORAGE BUILDING
G THICKENER #1
H THICKENER #2
I THICKENER OVERFLOW JUNCTION
J PRIM TREATMENT ELECT BLDG
K BIOFILTER
L SCREENING CHAMBER
M PREL TREATMENT BLDG
N MAIN ELECT BUILDING
O MAIN PS
P MAIN GENERATOR
Q VALVE VAULT
R PRIM CLARIFIER #1
S PRIM SLUDGE PS
T PRIM CLARIFIER #3
U PRIM CLARIFIER #2
V PRIM INFLUENT FLOW SPLITTER BOX
W STORAGE BUILDING
X PRIM EFFLUENT JUNCTION BOX
Y FINAL CLARIFIER #1
Z MAKEUP WATER PS
AA FINAL CLARIFIER #2
AB PAA INTERMITTENT FEED ROOM
AC UV DISINFECTION BASIN FACILITY
AD OCTAGON BOX
AE FINAL CLARIFIER #3
AF RETURN ACTIVATED SLUDGE PS
AG MIXING CHAMBER
AH BLOWER BLDG
AI AERATION BASINS
AJ EQUALIZATION BASIN
AK SECONDARY GENERATOR
12" FM TO FCWWTF (AB 1970-298)
60" (STORM DRAIN & EMERGENCY O.F.)
60" (STORM DRAIN & EMERGENCY OUTFALL)
N 39° 03' 33" E, 881.40'
N 52° 35' 54" W, 1016.06'
Corps Lands
Levee
Tower
72" OF (TO THE ARKANSAS RIVER)
S 58° 28' 27" E, 276.18' (1987 Summerlin Survey)
12" SL
12" SE
72" SE
60" WWB
60" WWS
S 64° 49' 21" E, (1987 Summerlin Associates Survey)
36" Storage Return
AJ
S 60° Pl
N 60° Pl
N 0° 10' 11" W, 1491.38' (1987 Summerlin Associates, Inc. Survey)
TEMPLE STREET
60"

SECTION III
SOURCE OF EFFLUENT, RECEIVING WATER, AND DILUTION WATER

1. Plant Effluent Samples

(Special Samples Collected for Biomonitoring)

A. Sampling Point: Adams Field - Plant Effluent
Outfall 001: Latitude: 34° 44' 05"N; Longitude 92° 12'46"W

(See page 2 for a vicinity map that shows the sampling locations.)

B. Collection Dates and Times:

1st sample	Setup	06/18/23 @ 0900
	Takeoff	06/19/23 @ 0700

2nd sample	Setup	06/20/23 @ 0900
	Takeoff	06/21/23 @ 0700

3rd sample	Setup	06/22/23 @ 0900
	Takeoff	06/23/23 @ 0700

C. Sample Collection Method: 24 Hour Flow-Proportioned Composite (12/24HFC)

D. Physical and Chemical Data

(Additional data in the appendices)

E. Mean Daily Discharge on Sample Collection Date

Date	Flow, MGD
06/18/23 – 06/19/23	25.34
06/20/23 – 06/21/23	18.64
06/22/23 – 06/23/23	18.65

F. Lapsed Time from Sample Collection to Delivery and Sample Temperature when received by Contract Laboratory

Sample 1: Relinquished 06/19/23 @ 0826 - Shipped via courier
Received 06/20/23 @ 0828 - Temperature upon arrival was 3.6°C
Sample 2: Relinquished 06/21/23 @ 0849 - Shipped via courier
Received 06/21/23 @ 1416 - Temperature upon arrival was 3.2°C
Sample 3: Relinquished 06/23/23 @ 0834 - Shipped via courier
Received 06/23/23 @ 1429 - Temperature upon arrival was 3.6°C

2. Plant Effluent Samples

(Regular NPDES Part I Monitoring)

A. Sampling Point: Adams Field - Plant Effluent

B. Collection Dates and Times:

The 24-hour flow composite time period begins at 8:00 a.m. daily on the date listed below as "Flow Date". Sample aliquots are collected every 2.0 hrs with the last aliquot collected at 6:00 a.m. of the next day.

C. Sample Collection Method: 24 Hour Flow Proportioned Composite (12/24HFC)

The sample aliquots are collected automatically and flow proportioned manually at the end of the sampling period. The volume of each sample aliquot used to prepare the composite sample is calculated based upon the instantaneous flow at the time the sample aliquot is collected.

D. Physical and Chemical Data

Adams Field Final Effluent Weekly Values

June 2023

Date	126 SPD - NPDES Plant Effluent Flow MGD	2096 LD-TSS Final Eff mg/L	2031 LD-BOD5 Final Eff mg/L	2007 LD-CBOD5 Final Eff mg/L	2081 LD-pH Final Eff S.U.	2069 LD-PAA Final Eff mg/L	2066 LD-FCB Final Eff (IDEXX) MPN/100m	2155 LD-NH3-N Final Eff mg/L	2200 LD-Phosphorus Final Eff (Grab) mg/L	2181 LD-NO2+NO3-N Final Eff (Grab) (V2167+V2178) mg/L	2068 LD-UV Transmittance %
Sun, Jun 18	25.34										
Mon, Jun 19	18.10	<2.5			6.67		5	4.02			70.00
Tue, Jun 20	18.64	<2.5			7.44		5	6.83			65.30
Wed, Jun 21	17.29	<2.5		1.96				4.96			
Thu, Jun 22	18.65										
Fri, Jun 23	16.61										
Sat, Jun 24	14.84										
Minimum					6.67						65.30
Maximum					7.44						70.00
Average	18.50	<2.5		1.96			5	5.27			

COMMENTS: The Adams Field CBOD values for the flow dates 6/19 and 6/20/23 were invalidated due to SOP requirements.

3. Receiving Water Samples

A. Source

Synthetic laboratory water prepared by contract laboratory. Approval letter from Arkansas Department of Energy and Environment – Division of Environmental Quality attached in Appendix A, Item C.

B. Collection Dates and Times

Distilled, deionized laboratory water was reconstituted by Bio-Aquatic Testing, Inc. to match the receiving stream's hardness, alkalinity, and pH for use as the test control and effluent dilutions.

C. Pretreatment

The city tap water is purified using the following treatment before being used in the preparation of synthetic laboratory water.

1. Distillation
2. Deionization

D. Physical and Chemical Characteristics

This data is included in Bio-Aquatic Testing, Inc.'s Analytical Report attached as Appendix C.

4. Dilution Water Samples

A. Source

Synthetic laboratory water prepared by contract laboratory

B. Collection Dates and Times

Distilled, deionized laboratory water was reconstituted by Bio-Aquatic Testing, Inc. to match the receiving stream's hardness, alkalinity, and pH for use as the test control and effluent dilutions.

C. Pretreatment

The city tap water is purified using the following treatment before being used in the preparation of synthetic laboratory water.

3. Distillation
4. Deionization

D. Physical and Chemical Characteristics

This data is included in Bio-Aquatic Testing, Inc.'s Analytical Report attached as Appendix C.

SECTION IV
TEST METHODS

Part A - *Pimephales promelas*

1. Toxicity Test Method Used (Title, Number, Source)

7-Day Chronic Toxicity Test, Static Renewal, with *Pimephales promelas*, EPA Method 1000.0, (EPA-821-R-02-013)

2. Endpoint(s) of Test

Larval Survival and Growth

3. Deviation(s) from Reference Method, if any, and the Reason(s)

None

4. Date and Time Test Started

June 20, 2023 @ 1551

5. Date and Time Test Terminated

June 27, 2023 @ 1551

6. Type and Volume of Test Chambers

   450 mL plastic cups

7. Volume of Solution Used Per Chamber

   250 mL solution/chamber

8. Number of Organisms Per Test Chamber

   8 organisms/chamber

9. Number of Replicate Test Chambers Per Concentration

   5 test chambers/concentration

10. Acclimation of Test Organisms (Temperature Mean and Range)

    The test organisms are cultured in-house by Bio-Aquatic Testing, Inc. and originated from a minimum of three in-house spawning.

11. Test Temperature (Mean and Range)

    25° ± 1°C

12. Specify if Aeration was Needed

    None

13. Feeding Frequency, and Amount and Type of Food

    Larvae in each test chamber were fed freshly hatched brine shrimp two times per day.

Part B - *Ceriodaphnia dubia*

1. Toxicity Test Method Used (Title, Number, Source)

   7-Day Chronic Toxicity Test, Static Renewal, with *Ceriodaphnia d*ubia, EPA Method 1002.0, (EPA-821-R-02-013)

2. Endpoint(s) of Test

   Survival and Reproduction

3. Deviation(s) from Reference Method, if any, and the Reason(s)

None

4. Date and Time Test Started

   June 20, 2023 @ 1144

5. Date and Time Test Terminated

   June 28, 203 @ 1045

6. Type and Volume of Test Chambers

   30 mL plastic cups

7. Volume of Solution Used Per Chamber

   15 mL solution/chamber

8. Number of Organisms Per Test Chamber

   1 Organism/chamber

9. Number of Replicate Test Chambers Per Concentration

   10 replicate cups/concentration

10. Acclimation of Test Organisms (Temperature Mean and Range)

    The test organisms were cultured in-house by Bio-Aquatic Testing, Inc.

11. Test Temperature (Mean and Range)

    25° ± 1°C

12. Specify if Aeration was Needed

    None

13. Feeding Frequency, and Amount and Type of Food

    Daily feeding consisted of 0.5 mL *Selenastrum capricornutum* and YTC per test chamber.

SECTION V
TEST ORGANISMS

Part A: Fathead Minnow (*Pimephales promelas*)

1. Scientific Name

   Pimephales promelas

2. Age

   Less than 24 hours old at test initiation and originated from a minimum of three in-house spawning

3. Life Stage

   Larval stage

4. Mean Length and Weight (Where Applicable)

Test Concentration (% Effluent)	Average Fish Weight, mg
Synthetic Water Control	0.506
9%	0.458
12%	0.505
16%	0.444
21%	0.518
28%	0.510

5. Source

   Bio-Aquatic Testing, Inc. culture their own *Pimephales promelas*. The larvae originated from a minimum of three in-house spawning.

6. Diseases and Treatment (Where Applicable)

   N/A

Part B: Water Flea (*Ceriodaphnia dubia*)

1. Scientific Name

   Ceriodaphnia dubia

2. Age

   Less than 24 hours old at test initiation and within eight hours of the same age at test initiation.

3. Life Stage

   Neonate

4. Mean Length and Weight (Where Applicable)

   N/A

5. Source

   Bio-Aquatic Testing, Inc. cultures their own *Ceriodaphnia dubia*

6. Diseases and Treatment (Where Applicable)

   N/A

SECTION VI
QUALITY ASSURANCE

The QA information supplied by Bio-Aquatic Testing, Inc. is contained in Appendix B.

SECTION VII
RESULTS

A summary of the whole effluent toxicity test results are listed below. Bio-Aquatic Testing, Inc.'s complete report can be found in the appendix C.

Part A: *Pimephales promelas* (Fathead minnow) Results

The Adams Field's effluent showed no statistically significant differences between the control and any effluent dilutions. The "No Observable Effects Concentration" (NOEC) for survival and growth was 28%. The coefficient of variation for the blank was 18.8% for growth and 11.8% for survival. The coefficient of variation for the critical dilution was 9.8% for growth and 0.00% for survival. The Percent Minimum Significant Difference (PMSD) was 19.2 %.

Part B: *Ceriodaphnia dubia* Results

The Adams Field's effluent showed no statistically significant differences between the control and any effluent dilutions. The "No Observable Effects Concentration" (NOEC) for survival and reproduction was 28%. The coefficient of variation for the blank was 18.1% for reproduction. The coefficient of variation for the critical dilution was 25.4% for reproduction. The Percent Minimum Significant Difference (PMSD) was 30.7%.

Table Summary of Test Data as Reported for Discharge Monitoring Report	
7-Day Static Renewal Sub-Lethal Effects - Pass/Fail	
TGP3B – *Ceriodaphnia. dubia* – Reproduction	Pass (0)
TGP6C – *Pimephales promelas* – Growth	Pass (0)
7-Day Static Renewal Lethal Effects - Pass/Fail	
TLP3B – *Ceriodaphnia. dubia* - Survival	Pass (0)
TLP6C – *Pimephales promelas* – Survival	Pass (0)
7-Day Static Renewal Toxic Lethal - No Observable Effects Concentration	
TOP3B – *Ceriodaphnia dubia* Survival NOEC	28%
TOP6C – *Pimephales promelas* Survival NOEC	28%
7-Day Static Renewal Toxic Sub-Lethal - No Observable Effects Concentration	
TPP3B – *Ceriodaphnia dubia* – Reproduction NOEC	28%
TPP6C – *Pimephales promelas* – Growth NOEC	28%
Coefficient of Variation (CV)	
TQP3B – *Ceriodaphnia dubia* Reproduction	25.4%
TQP6C – *Pimephales promelas* Growth	18.8%

Part C: Conclusions and Recommendations

The NPDES Permit Chronic WET testing requirements were met with this passing test.

APPENDIX A

ADEQ FORMS

1. **Outfall 001 DMR Reporting**
2. **ADEE-DEQ Approval Letter for use of Synthetic Water as Receiving Water**

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 Composites were collected:	FROM:	6/18/2023 @09:00	TO:	6/19/2023@ 07:00
	FROM:	6/20/2023 @09:00	TO:	6/21/2023@ 07:00
	FROM:	6/22/2023 @09:00	TO:	6/23/2023@ 07:00

Test Initiation: Time: 11:44 Date: 6/20/2023

Dilution Water Used: [ ] Receiving Water [X] Synthetic Dilution Water

NUMBER OF YOUNG PRODUCED PER ADULT AT TEST TERMINATION

	EFFLUENT CONCENTRATION (%)					
REPLICATE	0%	9 %	12 %	16 %	21 %	28 %
A	19	25	29	23	43	23
B	33	M	17	24	36	41
C	34	18	26	24	D- 18	32
D	31	31	22	29	42	24
E	D- 24	D- 15	D- 0	33	23	41
F	24	38	36	26	34	25
G	29	17	29	23	41	32
H	25	29	28	36	23	21
I	31	34	26	30	23	45
J	24	24	30	32	31	38
Surv. MEAN	27.7	27.0	27.0	28.0	32.8	32.2
Total MEAN	27.4	25.7	24.3	28.0	31.4	32.2
CV % [1]	18.1	27.4	19.6	16.6	25.4	27
PMSD	Acceptable Range 47 or Less					30.7 %

[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

	EFFLUENT CONCENTRATION (%)					
TIme of Reading	0%	9 %	12 %	16 %	21 %	28 %
24 HOURS	100	100	100	100	100	100
48 HOURS	100	100	90	100	100	100
7-DAY	90	90	90	100	90	100

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 _____X_____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 _____X_____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 = _____28_____ % Effluent **(Parameter TOP3B)**

b. NOEL Reproduction = _____28_____ % Effluent **(Parameter TPP3B)**

Q* refers to a value that is not calculable

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 (= 25.4).

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 (= 10).

Table 1 (Sheet 3 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

		Date/Time		Date/Time
Dates and times Composites were collected:	FROM:	6/18/2023 @ 09:00	TO:	6/19/2023 @ 07:00
	FROM:	6/20/2023 @ 09:00	TO:	6/21/2023 @ 07:00
	FROM:	6/22/2023 @ 09:00	TO:	6/23/2023 @ 07:00

Test Initiation: Time: 15:51 Date: 6/20/2023

Dilution Water Used: [ ] Receiving Water [X] Synthetic Dilution Water

DATA TABLE FOR GROWTH OF *Pimephales promelas*

Effluent Concentration	Average Dry Weight in milligrams (mg) per replicate					Mean Dry Weight (mg)	CV % [1]
	A	B	C	D	E		
0%	0.677	0.467	0.466	0.465	0.458	0.506	18.8
9 %	0.519	0.365	0.527	0.429	0.451	0.458	14.7
12 %	0.569	0.443	0.575	0.460	0.477	0.505	12.4
16 %	0.494	0.433	0.357	0.474	0.464	0.444	12.1
21 %	0.465	0.580	0.473	0.558	0.514	0.518	9.8
28 %	0.557	0.515	0.551	0.497	0.429	0.510	10.1
PMSD	Acceptable Range 30 or Less					19.2 %	

DATA TABLE FOR SURVIVAL OF *Pimephales promelas*

Effluent Concentration	Percent Survival per replicate					Average % Survival			CV % [1]
	A	B	C	D	E	24 Hours	48 Hours	7-Day	
0%	100	75	100	100	100	100	95	95	11.8
9 %	100	87.5	100	100	100	100	100	97.5	5.7
12 %	100	100	100	100	100	100	100	100	0.0
16 %	100	100	87.5	100	87.5	100	97.5	95	7.2
21 %	100	100	100	100	100	100	100	100	0.0
28 %	100	100	100	100	100	100	100	100	0.0

[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 _____X_____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 _____X_____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 = _____28_____ % Effluent **(Parameter TOP6C)**

b. NOELGrowth = _____28_____ % Effluent **(Parameter TPP6C)**

Q* refers to a value that is not calculable

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 (= 18.8).

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 (= 0).

July 13, 2023

Jared Evanov
Little Rock Water Reclamation Authority
9500 Birdwood Dr.
Little Rock, AR 72206

RE: Control and dilution water for Whole Effluent Toxicity (WET) Testing
NPDES Permit No.: AR0040177 Outfall: 001 AFIN: 60-01021
NPDES Permit No.: AR0021806 Outfall: 001 AFIN: 60-00409

Mr. Evanov:

The Division has reviewed requirements for acceptability of receiving water for use as dilution water. According to Chapter 6 of EPA Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing, "the receiving water should support adequate performance of the test organisms with respect to survival, growth, reproduction, or other responses that may be measured in the test," i.e., "the 100% receiving water concentration used as a dilution water control should consistently meet test acceptability criteria for control responses."

The receiving water (Arkansas River) control in the AR0021806 May 2023 *P. promelas* test failed to meet the following test acceptance criteria:

- "The toxicity test control (0% effluent) must have survival equal to or greater than 80%." (NPDES Permit No. AR0021806 Part II.10.C.i.a.)
    - Mean *P. promelas* survival in the AR0021806 May 2023 test was 30%.

- "The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater." (NPDES Permit No. AR0021806 Part II.10.C.i.d.)
    - The mean dry weight of surviving Fathead minnow was 0.145 mg in the AR0021806 May 2023 test.

- "The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the reproduction test; the growth and survival endpoints of the Fathead minnow test." (NPDES Permit No. AR0021806 Part II.10.C.i.e.)
    - The coefficient of variation was 44.3% in the AR0021806 May 2023 receiving water control for *P. promelas* growth.

EPA method guidance states that when receiving water is inappropriate for use as dilution water, synthetic water should be used. The Division approves use of synthetic dilution water that approximates the chemical characteristics of the receiving water (Arkansas River) for future WET tests.

For the remainder of the permit term, synthetic dilution water may be used for WET tests (both organisms) for NPDES Permit No.: AR0021806, Outfall 001.

For the remainder of the permit term, synthetic dilution water may be used for WET tests (both organisms) for NPDES Permit No.: AR0040177, Outfall 001.

Please contact me if you have any questions.

Sincerely,

Mary Barnett
Ecologist Coordinator

ECC: Mary Barnett, OWQ Planning
Kristen Graham, OWQ Enforcement

APPENDIX B

Bio-Aquatic Testing, Inc.

Quality Assurance Report

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.

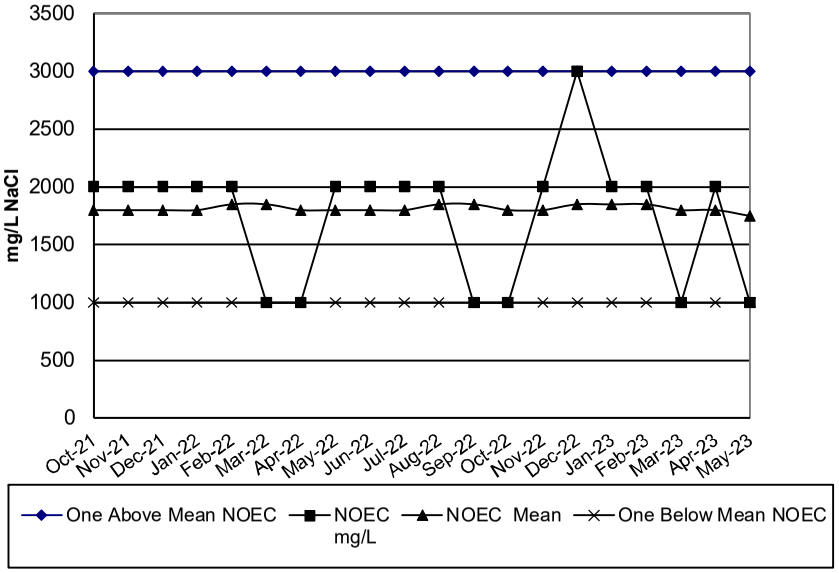
CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Freshwater						
CHEMICAL:	Sodium Chloride						
DURATION:	3-Brood Chronic						
TEST NUMBER:	339						
PROJECT NUMBER:	87493 DOC						
START DATE:	5/30/2023						
START TIME:	14:40						
TOTAL NUMBER EXPOSED:	10 organisms per concentration						
CONCENTRATIONS (mg/L):	CON	250	500	1000	2000	3000	4000
NUMBER DEAD PER CONCENTRATION:	1	0	1	4	9	10	10
TEST METHODS:	As listed in EPA-821-R-02-013						
STATISTICAL METHODS:	SURVIVAL: Fisher's Exact Test REPRODUCTION: ANOVA-Dunnetts w/Bonf. Adj.						

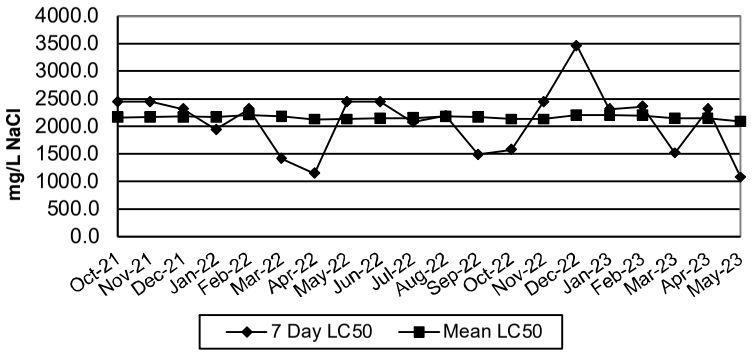
NOEC FOR SURVIVAL:	1000	mg/L
LOEC FOR SURVIVAL:	2000	mg/L
NOEC FOR REPRODUCTION:	500	mg/L
LOEC FOR REPRODUCTION:	1000	mg/L

PMSD: 42.2

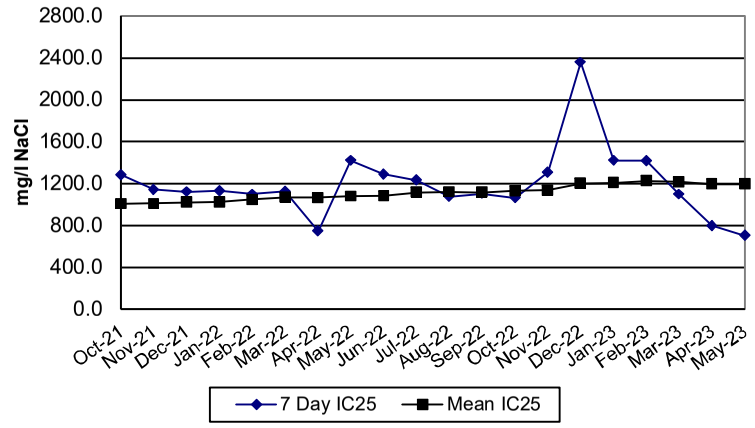
Ceriodaphnia Chronic Survival Control Chart



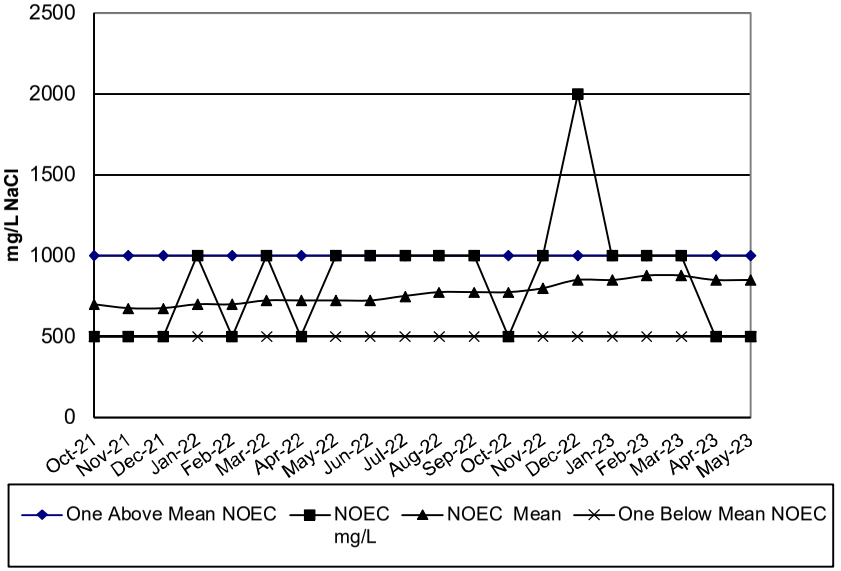
Ceriodaphnia 7-Day LC50



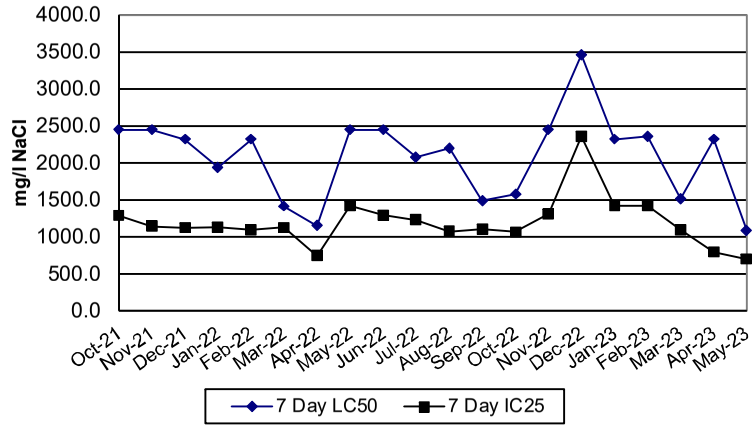
Ceriodaphnia 7-Day IC25



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.

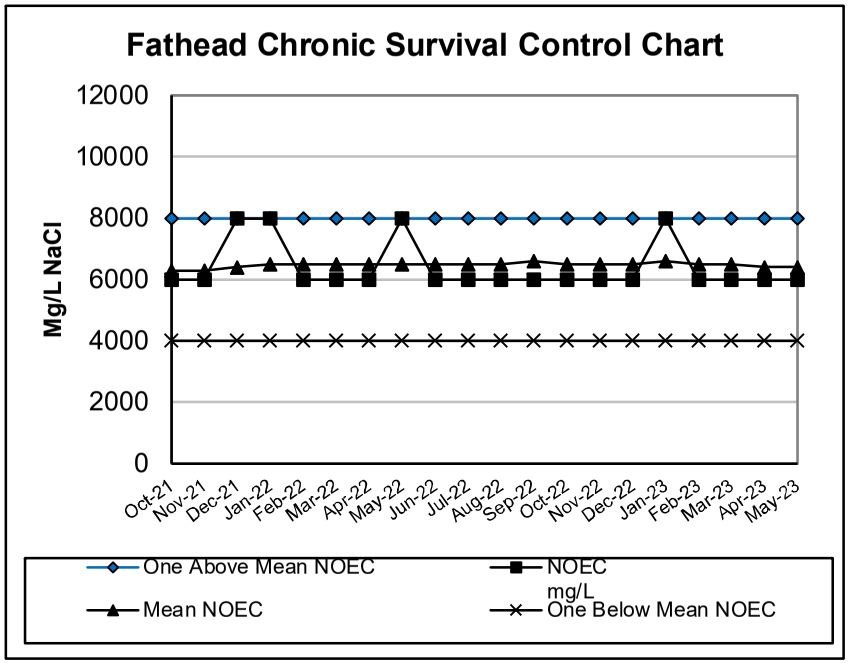
CHRONIC REFERENCE TOXICANT TEST RESULTS

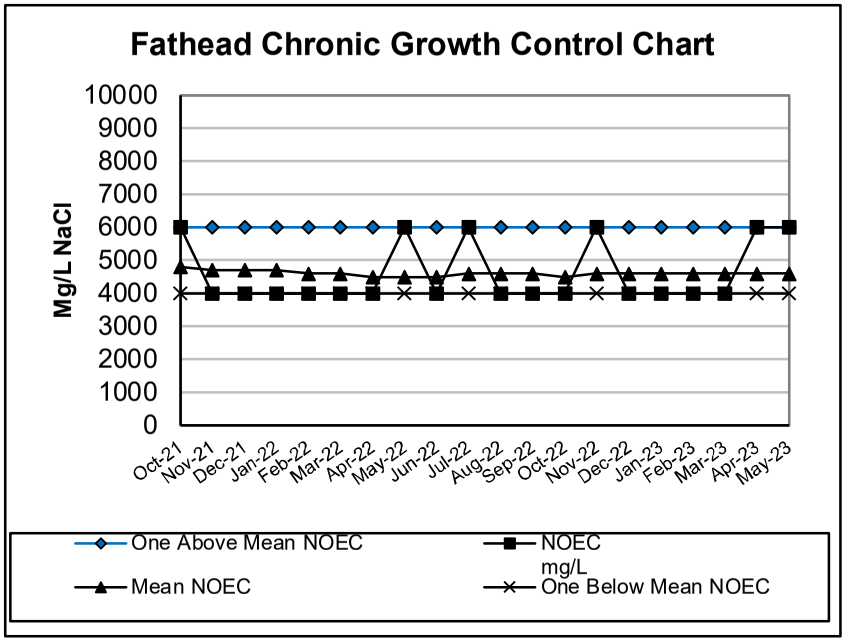
DILUTION WATER:	Standard Synthetic Freshwater
CHEMICAL:	Sodium Chloride
DURATION:	7 Days
TEST NUMBER:	379
PROJECT NUMBER:	87483 DOC
START DATE:	5/30/2023
START TIME:	15:20
TOTAL NUMBER EXPOSED:	40 organisms per concentration

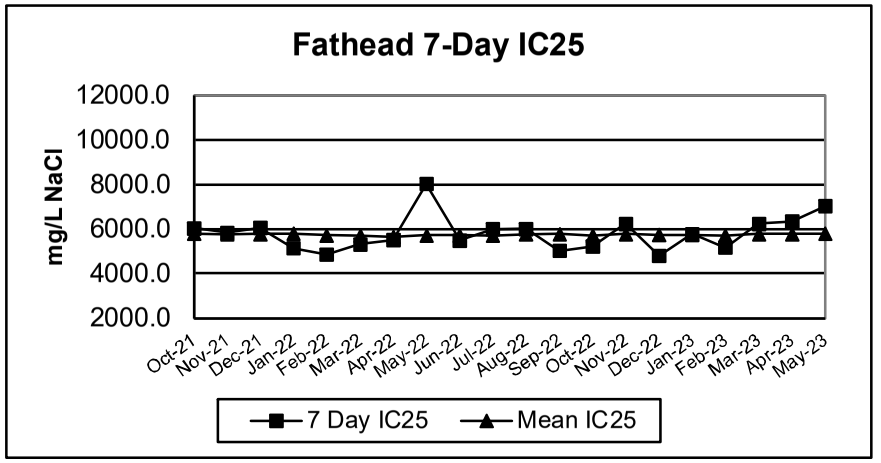
CONCENTRATIONS (mg/L):	CON	2000	4000	6000	8000	10000	12000
NUMBER DEAD PER CONCENTRATION:	0	2	2	3	13	40	40

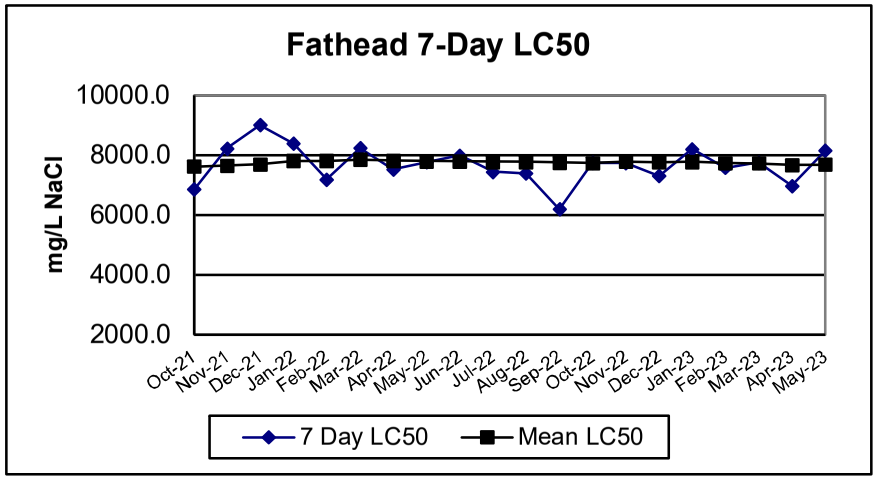
TEST METHODS:	As listed in EPA-821-R-02-013	
STATISTICAL METHODS:	SURVIVAL: Steel's Many-One Rank Test GROWTH: ANOVA-Dunnetts	
NOEC FOR SURVIVAL:	6000	mg/L
LOEC FOR SURVIVAL:	8000	mg/L
NOEC FOR GROWTH:	6000	mg/L
LOEC FOR GROWTH:	8000	mg/L

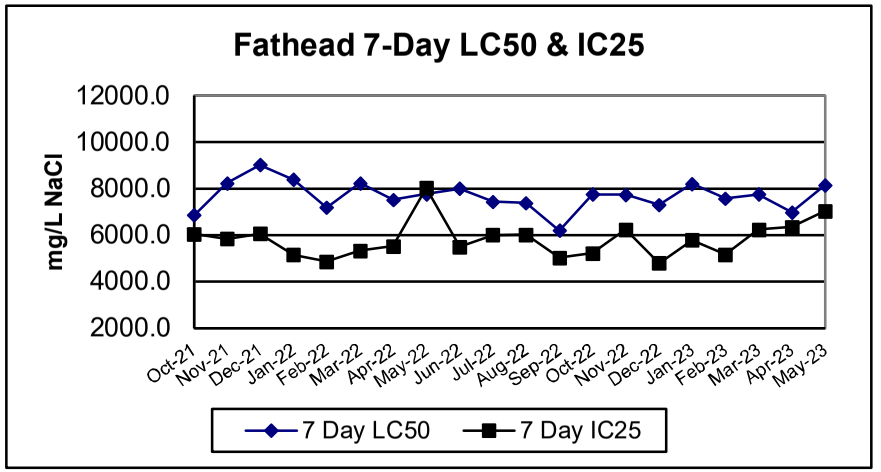
PMSD: 16.3


Fathead Chronic Survival Control Chart
Mg/L NaCl
12000
10000
8000
6000
4000
2000
0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
One Above Mean NOEC
NOEC
Mean NOEC
One Below Mean NOEC
mg/L


Fathead Chronic Growth Control Chart
Mg/L NaCl
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
One Above Mean NOEC
NOEC
Mean NOEC
One Below Mean NOEC
mg/L


Fathead 7-Day IC25
mg/L NaCl
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day IC25
Mean IC25


Fathead 7-Day LC50
mg/L NaCl
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day LC50
Mean LC50


Fathead 7-Day LC50 & IC25
mg/L NaCl
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day LC50
7 Day IC25

APPENDIX C

BIO-AQUATIC TESTING, INC.'S REPORT

June 2023

Bio-Aquatic Testing, Inc.

TCEQ TNI Accredited

Little Rock Water Reclamation Authority
Adams Field Reclamation Facility
OUTFALL 001

Chronic Biomonitoring Report

87589

Ceriodaphnia dubia
Pimephales promelas

June 20, 2023

Approved by: Joshua 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
Facility: Adams Field Reclamation Facility
Permit No. AR0021806

Sample: 001
Laboratory Number: 87589
Date: June 20, 2023

Ceriodaphnia dubia **passed** survival and reproduction testing requirements. *Pimephales promelas* **passed** survival and growth testing requirements.

SAMPLE COLLECTION:

Composite effluent samples from Little Rock Water Reclamation Authority, Adams Field Reclamation Facility, were received on June 20, 2023, June 21, 2023, and June 23, 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 11:44 hours on June 20, 2023. Five effluent concentrations of 9%, 12%, 16%, 21% and 28% were prepared using synthetic water 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 10:45 hours on June 28, 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 no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)
NOEC: 28% Effluent

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 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) on *Ceriodaphnia dubia* reproduction data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)
NOEC: 28% Effluent

TEST PROCEDURES:

EPA METHOD: 1000

Pimephales promelas

The seven-day Chronic *Pimephales promelas* survival and growth test was initiated at 15:51 hours on June 20, 2023. Five effluent concentrations of 9%, 12%, 16%, 21% and 28% were prepared using synthetic water 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 12:17 hours on June 27, 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 control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)
NOEC: 28% Effluent

GROWTH:

Pimephales promelas

The *Pimephales promelas* growth data were normally distributed at the alpha level of 0.01 (0.900) using Shapiro Wilk's test for normality. Growth data were shown 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 on *Pimephales promelas* growth data demonstrated no statistically significant differences between the control and any of the effluent concentrations tested.

LOEC: Not Calculable (Q)
NOEC: 28% Effluent

BIO-AQUATIC TESTING, INC.

TOXICITY TEST

Chronic ***Ceriodaphnia dubia***

Client: Little Rock Water Reclamation Adams Field Reclamation Facility

Lab ID: 87589

Permit Number: ADEQ AR0021806

Test Temperature (oC): 25 ± 1

Sample Type: Composite

Photo Period: 16 hours light, 8 hours dark

Outfall Name: 001

Dilution Water: synthetic

Receiving Water Name: Arkansas River

Begin Date: 6/20/2023

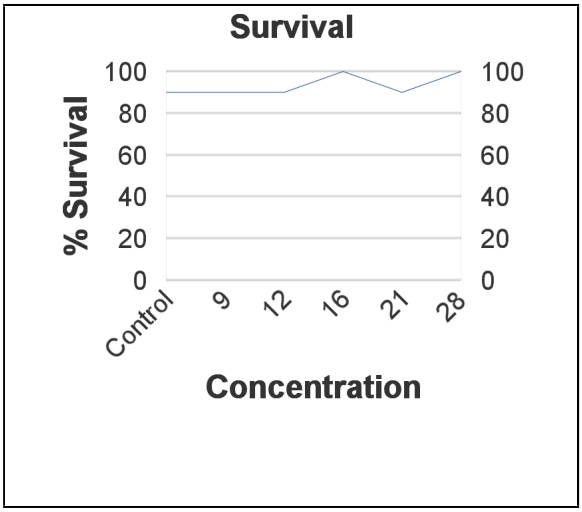
End Date: 6/28/2023

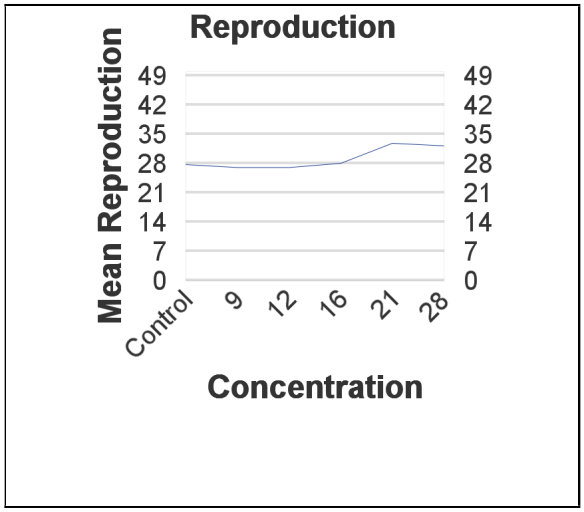
Test Start Time: 11:44 **Test End Time:** 10:45

SURVIVAL AND REPRODUCTION TABLE

FEMALE #	Control	9	%	12	%	16	%	21	%	28	%
1	19	25		29		23		43		23	
2	33	M		17		24		36		41	
3	34	18		26		24		D- 18		32	
4	31	31		22		29		42		24	
5	D- 24	D- 15		D- 0		33		23		41	
6	24	38		36		26		34		25	
7	29	17		29		23		41		32	
8	25	29		28		36		23		21	
9	31	34		26		30		23		45	
10	24	24		30		32		31		38	
Surv.Mean	27.7	27.0		27.0		28.0		32.8		32.2	
C.V%	18.1	27.4		19.6		16.6		25.4		27	
Total Mean	27.4	25.7		24.3		28.0		31.4		32.2	
Var	25.194	54.857		28.25		21.777		69.861		75.733	
Std.Dev.	5.019	7.406		5.315		4.666		8.358		8.702	
Max	34	38		36		36		43		45	
Min	19	17		17		23		23		21	

Concentration Response Relationships





BIO-AQUATIC TESTING, INC.

Survival and Reproduction

Control

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	A	A	A	A	A	A
6/23	A	4	6	1	A	A	A	A	A	A
6/24	11	A	A	A	A	7	A	9	5	12
6/25	A	14	A	17	13	A	A	14	13	1
6/26	A	15	12	A	D11	A	15	A	13	A
	11	33	18	18	24	7	15	23	31	13
6/27	8	A	A	13	D	7	14	A	A	11
	19	33	18	31	24	14	29	23	31	24
6/28	A	A	16	A	D	10	A	2	A	A
	19	33	34	31	24	24	29	25	31	24

Mean: 27.70 **CV%** 18.10
Var. 25.19 **Max** 34
Std.Dev. 5.02 **Min** 19

9

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	A	A	A	A	A	A
6/23	A	A	4	6	4	A	5	2	A	A
6/24	11	A	A	9	A	7	A	9	10	12
6/25	2	A	A	A	A	A	4	A	16	A
6/26	A	A	A	A	D11	15	A	A	A	12
	13	0	4	15	15	22	9	11	26	24
6/27	12	A	A	16	D	16	A	18	8	A
	25	0	4	31	15	38	9	29	34	24
6/28	A	M	14	A	D	A	8	A	A	A
	25	0	18	31	15	38	17	29	34	24

Mean: 27.00 **CV%** 27.40
Var. 54.86 **Max** 38
Std.Dev. 7.41 **Min** 17

12

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	D	A	A	A	A	A
6/23	A	A	A	A	D	A	A	A	A	A
6/24	5	A	A	11	D	A	A	9	10	11
6/25	6	A	2	A	D	4	13	4	A	5
6/26	A	5	6	11	D	14	A	A	1	14
	11	5	8	22	0	18	13	13	11	30
6/27	18	A	A	A	D	A	A	15	15	A
	29	5	8	22	0	18	13	28	26	30
6/28	A	12	18	A	D	18	16	A	A	A
	29	17	26	22	0	36	29	28	26	30

Mean: 27.00 **CV%** 19.60
Var. 28.25 **Max** 36
Std.Dev. 5.32 **Min** 17

16

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	A	A	A	A	A	A
6/23	3	4	5	A	2	7	3	A	A	A
6/24	10	A	A	2	A	A	A	9	11	9
6/25	10	A	A	A	A	2	A	11	A	9
6/26	A	10	19	15	12	A	11	1	19	A
	23	14	24	17	14	9	14	21	30	18
6/27	A	A	A	12	A	17	A	15	A	14
	23	14	24	29	14	26	14	36	30	32
6/28	A	10	A	A	19	A	9	A	A	A
	23	24	24	29	33	26	23	36	30	32

Mean: 28.00 **CV%** 16.60
Var. 21.78 **Max** 36
Std.Dev. 4.67 **Min** 23

21

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	A	A	A	A	A	A
6/23	3	6	4	4	4	A	A	A	3	1
6/24	11	A	A	8	A	10	9	4	9	10
6/25	12	14	9	11	A	12	7	A	A	9
6/26	1	A	5	6	1	6	8	5	A	A
	27	20	18	29	5	28	24	9	12	20
6/27	16	A	D	13	13	A	17	14	11	11
	43	20	18	42	18	28	41	23	23	31
6/28	A	16	D	A	5	6	A	A	A	A
	43	36	18	42	23	34	41	23	23	31

Mean: 32.80 **CV%** 25.40
Var. 69.86 **Max** 43
Std.Dev. 8.36 **Min** 23

28

Date	1	2	3	4	5	6	7	8	9	10
6/21	A	A	A	A	A	A	A	A	A	A
6/22	A	A	A	A	A	A	A	A	A	A
6/23	A	A	A	A	A	A	A	A	A	A
6/24	A	A	3	A	10	A	10	9	9	12
6/25	8	10	7	9	6	A	4	5	7	9
6/26	5	15	13	5	15	12	5	1	11	A
	13	25	23	14	31	12	19	15	27	21
6/27	A	A	A	A	A	A	A	6	18	17
	13	25	23	14	31	12	19	21	45	38
6/28	10	16	9	10	10	13	13	A	A	A
	23	41	32	24	41	25	32	21	45	38

Mean: 32.20 **CV%** 27.00
Var. 75.73 **Max** 45
Std.Dev. 8.70 **Min** 21

BIO-AQUATIC TESTING, INC.

Chronic **CERIODAPHNIA DUBIA** **SURVIVAL AND REPRODUCTION**

Client: **Little Rock Water - Adams Field Reclamation** Lab ID: **87589** Culture No.: Bio 061223-A

TEST INSTRUCTIONS:

ORGANISMS ADDED: Date: 6-20-23 Time: 11:44 Technician: Cody CG

Photo Period 16hr Light/8hr dark

RANDOMIZATION: SC-10 15

Dilution: Control

	DATE/TIME/ TECHNICIAN	1	2	3	4	5	6	7	8	9	10
24Hr	6-21-23 MH 1230	A	—	—	—	—	—	—	—	—	A
48Hr	6-22-23 SM 911	A	—	—	—	—	—	—	—	—	A
72Hr	6-23-23 1104 CG	A	4	6	1	A	—	—	—	—	A
96Hr	6-24-23 MW 1351	1	A	A	10	A	7	A	9	5	12
5 days	6-25-23 CG 1242	A	3/12	5	7	13	A	A	14	13	1
6 days	6-26-23 MH 1050	A	15	7	A	D_{11}	A	15	A	13	A
7 days	6-27-23 MW 1002	8	A	A	13	1	7	14	A	20	11
8 days	6-28-23 SM 1045	A	7	16	A	1	10	A	3/A	A	A

Dilution: 9 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A	—	—	—	—	—	—	—	—	A
48Hr	A	—	—	—	—	—	—	—	—	A
72Hr	A	A	4	6	4	2	5	2	A	A
96Hr	1	A	A	9	A	5	A	9	10	12
5 days	2	A	—	—	—	A	4	A	16	3
6 days	A	—	A	4	D_{11}	15	A	—	A	9
7 days	12	A	A	12	1	16	A	18	8	13
8 days	A	A	14	A	1	A	18	A	A	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.

Page 1

BIO-AQUATIC TESTING, INC.

Chronic CERIODAPHNIA DUBIA SURVIVAL AND REPRODUCTION

Client: **Little Rock Water - Adams Field Reclamation** Lab ID: **87589** Culture No.:

TEST INSTRUCTIONS:

Dilution: 12 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A	—	—	—	—	—	—	—	—	A
48Hr	A	A	A	A	D	A	—	—	—	A
72Hr	A	—	—	A		A	—	—	—	A
96Hr	5	A	A	11		A	A	9	10	11
5 days	6	12	9/A	4		1/3	13	4	A	5
6 days	A	A,	6	7		14	A	A	A,	14
7 days	18	A	A	12		A	A	15	16	3
8 days	A	12	18	A		2/16	16	A	A	16

Dilution: 16 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A	—	—	—	—	—	—	—	—	A
48Hr	A	—	—	—	—	—	—	—	—	A
72Hr	3	4	5	A	2	7	3	A	—	A
96Hr	10	A	A	A	A	A	A	9	11	9
5 days	9	3	A	A	4	2/A	3	11	6	8
6 days	A,	7	19	15	8	A	8	A,	13	A,
7 days	12	A	A	12	A	17	A	15	10	14
8 days	A	10	A	A	2/17	A	1/8	A	A	13

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

Client: **Little Rock Water - Adams Field Reclamation** Lab ID: **87589** Culture No.:

TEST INSTRUCTIONS:

Dilution: 21 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A	—	—	—	—	—	—	—	—	A
48Hr	A	—	—	—	—	—	—	—	—	A
72Hr	3	6	4	4	4	A	A	A	3	1
96Hr	11	A	A	8	A	10	9	4	9	10
5 days	12	14	9	11	A	12	7	A	A	9
6 days	A,	A	5	6	A,	6	8	5	A	A
7 days	16	A	D	13	13	A	17	14	11	11
8 days	A	16	1	A	5	5	A	A	A	A

Dilution: 28 %

	1	2	3	4	5	6	7	8	9	10
24Hr	A	—	—	—	—	—	—	—	—	A
48Hr	A	—	—	—	—	—	—	—	—	A
72Hr	A	—	—	—	—	—	—	—	—	A
96Hr	A	A	3	A	10	A	10	9	9	12
5 days	8	10	7	9	6	A	4	5	7	9
6 days	5	15	13	5	15	12	5	A,	11	A
7 days	A	A	A	A	A	A	A	6	18	17
8 days	10	16	9	10	10	13	13	A	A	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**

Client: **Little Rock Water - Adams Field Reclamation** Lab ID: **87589** 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
Control	25.1	25.6	25.7	25.2	25.0	25.3	25.3	25.2	25.0	25.7	26	25.6	25.3	25.3
9														
12														
16														
21														
28														
TIME/DATE TECH	1144 6-20-23 CG	6-21-23 MH	1230	6-22-23 SB	911	6-23-23 CG	1113	6-24-23 MW	1351	6-25-23 CG	1252	6-26-23 MH	1050	6-27-23 MW 1002
IR GUN ID #	012	021		021		021		012		012		021		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:** 87589

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: 15:51 Test End Time: 12:17

Begin Date: 6/20/2023

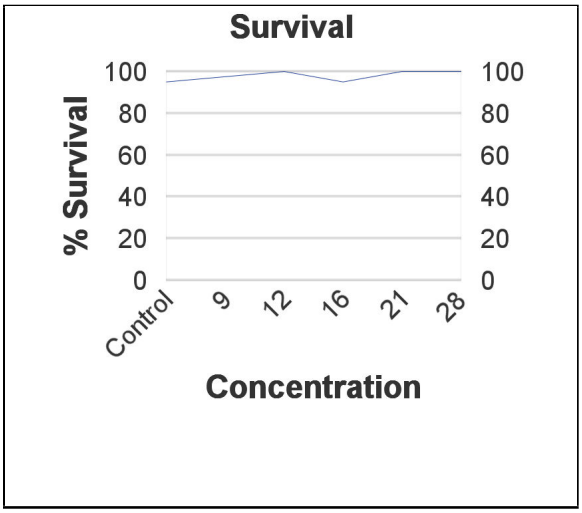
End Date: 6/27/2023

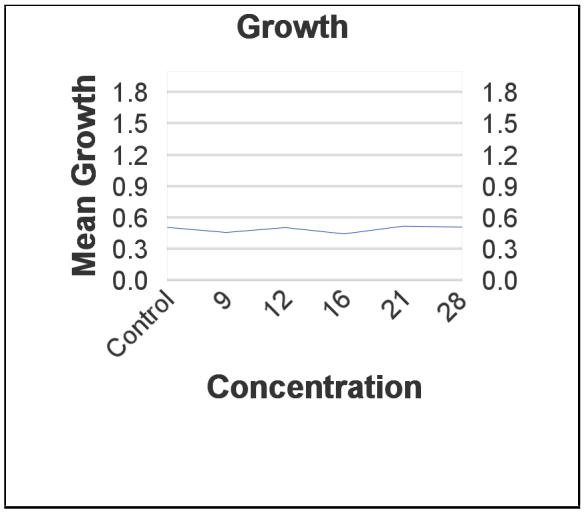
SURVIVAL

Effluent Concentration		Number Of Alive 6/20	6/21	6/22	6/23	6/24	6/25	6/26	6/27	Avg% Surv.
Control	A	8	8	8	8	8	8	8	8	95.0%
	B	8	8	6	6	6	6	6	6	
	C	8	8	8	8	8	8	8	8	
	D	8	8	8	8	8	8	8	8	
	E	8	8	8	8	8	8	8	8	
9	A	8	8	8	8	8	8	8	8	97.5%
	B	8	8	8	8	8	8	8	7	
	C	8	8	8	8	8	8	8	8	
	D	8	8	8	8	8	8	8	8	
	E	8	8	8	8	8	8	8	8	
12	A	8	8	8	8	8	8	8	8	100.0%
	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	8	8	8	8	8	
16	A	8	8	8	8	8	8	8	8	95.0%
	B	8	8	8	8	8	8	8	8	
	C	8	8	8	8	8	8	8	7	
	D	8	8	8	8	8	8	8	8	
	E	8	8	7	7	7	7	7	7	

Effluent Concentration		Number Of Alive 6/20	6/21	6/22	6/23	6/24	6/25	6/26	6/27	Avg% Surv.
21	A	8	8	8	8	8	8	8	8	100.0%
	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	8	8	8	8	8	
28	A	8	8	8	8	8	8	8	8	100.0%
	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	8	8	8	8	8	
	A									
	B									
	C									
	D									
	E									

Concentration Response Relationships





BIO-AQUATIC TESTING, INC.

Chronic Pimephales promelas SURVIVAL Lab ID: **87589**

Client: **Little Rock Water Reclamation** Facility **Adams Field Reclamation Facility** Outfall: 001

Sample Type: Composite

TEST INSTRUCTIONS:

Culture No. : PO-23-170B Photo Period: 16hr light, 8hr dark **RANDOMIZATION:** SC-5 1

Dilution: Control 9 12 16

	DATE/TIME/ TECHNICIAN	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
0Hr	06/20/23 1551 LC	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
24Hr	06/21/23 846 LC	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
48Hr	6/22/23 0918 AR	8	6	8	—	—	8	—	—	—	—	8	—	—	—	—	8	—	—	—	7
72Hr	6/23/23 0808 AR	8	6	8	—	—	8	—	—	—	—	8	—	—	—	—	8	—	—	—	7
96Hr	6/24/23 1122 AR	8	6	8	—	—	8	—	—	—	—	8	—	—	—	—	8	—	—	—	7
5 days	6-25 0920 AR	8	6	8	—	—	8	—	—	—	—	8	—	—	—	—	8	—	—	—	7
6 days	6-26 1035 AR	8	6	8	—	—	8	—	—	—	—	8	—	—	—	—	8	—	—	—	7
7 days	6-27-23 1217 AR	8	6	8	—	—	8	7	8	—	—	8	—	—	—	—	8	8	7	8	7

Dilution: 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	8	8	8	8	8	8	8										
24Hr	8	8	8	8	8	8	8	8	8	8										
48Hr	8	—	—	—	—	8	—	—	—	—										
72Hr	8	—	—	—	—	8	—	—	—	—										
96Hr	8	—	—	—	—	8	—	—	—	—										
5 days	8	—	—	—	—	8	—	—	—	—										
6 days	8	—	—	—	—	8	—	—	—	—										
7 days	8	—	—	—	—	8	—	—	—	—										

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BIO-AQUATIC TESTING, INC.

Chronic Pimephales promelas SURVIVAL Lab ID: **87589**

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
Control	24.1	24.1	24.1	25.2	24.1	25.1	24.7	25.1	24.8	25.3	25.2	24.6	24.3	24.0
9														
12														
16														
21														
28														
TIME/DATE TECH	06/20/23 1331 LC	06/21/23 851 LC		6-22-23 0928 AR		6-23-23 0808 AR		1122 1230 6-24 TS 6/24 TS		0920 1414 6-25 TS 6/25 TS		1010 6509 6-26 TS 6/26 TS		6-27-23 1217 AR
IR GUN ID #	020	020		024		020		024		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.

2nd Organism **BIO-AQUATIC TESTING, INC.** **TOXICITY TEST**

Chronic *Pimephales promelas*

Client: Little Rock Water Reclamation Adams Field Reclamation Facility **Lab ID: 87589**

Permit Number: AR0021806

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

Receiving Water Name: Arkansas River

Synthetic

	ON	SN	Wt.	Avg.	SN Avg.
A	8	8	5.413	0.677	0.677
B	8	6	3.737	0.467	0.623
C	8	8	3.724	0.466	0.466
D	8	8	3.719	0.465	0.465
E	8	8	3.662	0.458	0.458

Mean	C.V. %
0.506	18.8

SN Mean	SN C.V. %
0.538	19.4

9

	ON	Wt.	Avg.
A	8	4.150	0.519
B	8	2.917	0.365
C	8	4.218	0.527
D	8	3.433	0.429
E	8	3.605	0.451

Mean	C.V. %
0.458	14.7

12

	ON	Wt.	Avg.
A	8	4.549	0.569
B	8	3.544	0.443
C	8	4.597	0.575
D	8	3.680	0.460
E	8	3.813	0.477

Mean	C.V. %
0.505	12.4

16

	ON	Wt.	Avg.
A	8	3.948	0.494
B	8	3.460	0.433
C	8	2.854	0.357
D	8	3.793	0.474
E	8	3.715	0.464

Mean	C.V. %
0.444	12.1

21

	ON	Wt.	Avg.
A	8	3.718	0.465
B	8	4.642	0.580
C	8	3.785	0.473
D	8	4.467	0.558
E	8	4.109	0.514

Mean	C.V. %
0.518	9.8

28

	ON	Wt.	Avg.
A	8	4.452	0.557
B	8	4.117	0.515
C	8	4.408	0.551
D	8	3.977	0.497
E	8	3.435	0.429

Mean	C.V. %
0.510	10.1

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

Mean	C.V. %

	ON	Wt.	Avg.
A			
B			
C			
D			
E			

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: **87589**

Client: Little Rock Water Reclamation - Adams Field Reclamation Facility Balance: Radwag BAL-007

Begin Date: 6/20/2023 End Date: 6/27/2023 Organism: Pimephales promelas

Analyst: [signature] Date/Time placed in Oven: 06/27/23 1353

Weigh Date: 06/30/23 Date/Time removed from Oven: 06/28/23 1353

Control

	Qty.	Wt.
A	8	5.413
B	6	3.737
C	8	3.724
D		3.719
E		3.662

9 %

	Qty.	Wt.
A	8	4.150
B	7	2.917
C	8	4.218
D		3.433
E		3.605

12 %

	Qty.	Wt.
A	8	4.549
B		3.544
C		4.597
D		3.680
E		3.813

16 %

	Qty.	Wt.
A	8	3.948
B	8	3.460
C	7	2.854
D	8	3.793
E	7	3.715

21 %

	Qty.	Wt.
A	8	3.718
B		4.642
C		3.785
D		4.467
E		4.109

28 %

	Qty.	Wt.
A	8	4.452
B		4.117
C		4.408
D		3.977
E		3.435

	Qty.	Wt.
A		
B		
C		
D		
E		

	Qty.	Wt.
A		
B		
C		
D		
E		

	Qty.	Wt.
A		
B		
C		
D		
E		

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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.

cerio repro
File: 87589.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	3.953	14.278	22.538	14.278	3.953
OBSERVED	2	19	18	18	2

Calculated Chi-Square goodness of fit test statistic = 5.3754
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

cerio repro
File: 87589.cdr Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 8.06

Bartlett's test using average degrees of freedom
Calculated B2 statistic = 7.91
Based on average replicate size of 8.83

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

cerio repro
File: 87589.cdr Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	479.059	95.812	1.565

Within (Error)	53	3244.500	61.217
Total	58	3723.559	

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho: All equal

cerio repro
File: 87589.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	control	27.400	27.400		
2	9	25.667	25.667	0.482	
3	12	24.300	24.300	0.886	
4	16	28.000	28.000	-0.171	
5	21	31.400	31.400	-1.143	
6	28	32.200	32.200	-1.372	

Bonferroni t table value = 2.40 (1 Tailed Value, P=0.05, df=50,5)

cerio repro
File: 87589.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	control	10			
2	9	9	8.640	31.5	1.733
3	12	10	8.409	30.7	3.100
4	16	10	8.409	30.7	-0.600
5	21	10	8.409	30.7	-4.000
6	28	10	8.409	30.7	-4.800

fathead survival
File: 87589.pps Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 4.800

W = 0.655

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: 87589.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: 87589.pps Transform: NO TRANSFORMATION

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	control	7.600				
2	9	7.800	28.00	16.00	5.00	
3	12	8.000	30.00	16.00	5.00	
4	16	7.800	28.00	16.00	5.00	
5	21	8.000	30.00	16.00	5.00	

6	28	8.000	30.00	16.00	5.00

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

fathead growth
File: 87589.ppg Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.102

W = 0.945

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.

fathead growth
File: 87589.ppg Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 2.38

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.

fathead growth
File: 87589.ppg Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.024	0.005	1.115
Within (Error)	24	0.102	0.004	

```
---------------------------------------------------------------------------
Total              29              0.126
---------------------------------------------------------------------------

  Critical F value =   2.62  (0.05,5,24)
  Since  F < Critical F  FAIL TO REJECT  Ho: All equal
```

fathead growth
File: 87589.ppg Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	0.507	0.507		
2	9	0.458	0.458	1.171	
3	12	0.505	0.505	0.044	
4	16	0.444	0.444	1.505	
5	21	0.518	0.518	-0.276	
6	28	0.510	0.510	-0.077	

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

fathead growth
File: 87589.ppg Transform: NO TRANSFORMATION

DUNNETT'S 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	control	5			
2	9	5	0.098	19.2	0.048
3	12	5	0.098	19.2	0.002
4	16	5	0.098	19.2	0.062
5	21	5	0.098	19.2	-0.011
6	28	5	0.098	19.2	-0.003

BIO-AQUATIC TESTING, INC.

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

Client: Little Rock Water Reclamation **Lab ID:** 87589

Facility: Adams Field Reclamation Facility **Outfall:** 001

Dilution Water(s): Synthetic Lab **Test Date:** June 20, 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	6/20/23	08:28	<0.10	N/A	6.8	DT	3.6
2	6/21/23	14:16	<0.10	N/A	13.2	DT	3.2
3	6/23/23	14:29	<0.10	N/A	9.7	DT	3.2

[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	6.7	8.8	36	49	281	DT
2	7.1	8.6	62	63	302	DT
3	6.7	8.6	51	60	310	DT

DAILY RENEWAL CONDUCTIVITY**

Date		Sample #	Values are at Highest Dilution		Analyst
			Specific Conductivity as umhos/cm	Salinity (ppt)	
6/20	Lab H2O		364	0.2	TM
6/21	Lab H2O		369	0.2	MM/T
6/22	Lab H2O		382	0.2	LC
6/23	Lab H2O		376	0.2	MM/C
6/24	Lab H2O		390	0.2	TM/CG
6/25	Lab H2O		431	0.2	JC/SG
6/26	Lab H2O		405	0.2	LC
6/20	OUTFALL*	1	346	0.2	TM
6/21	OUTFALL*	1	339	0.2	MM/T
6/22	OUTFALL*	2	336	0.2	LC
6/23	OUTFALL*	2	340	0.2	MM/C
6/24	OUTFALL*	3	366	0.2	TM/CG
6/25	OUTFALL*	3	402	0.2	JC/SG
6/26	OUTFALL*	3	380	0.2	LC

**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:** 87589

Facility: Adams Field Reclamation Facility **Dilution Water(s):** Synthetic Lab

Outfall: 001 **Test Begin Date:** June 20, 2023

NR indicates that the test is non-renewal.

					Concentration							
ANALYST	DATE	TIME	SX#	UNIT	Control	9	12	16	21	28		
TM	6/20	Start	1	pH	7.6	7.7	7.7	7.6	7.6	7.5		
		25 ± 1		DO (mg/L)	8.5	8.2	8.2	8.0	8.0	8.0		
MM/TM	6/21	24 Hr	1	pH	7.6	7.6	7.6	7.6	7.6	7.5		
		25 ± 1		DO (mg/L)	7.5	7.6	7.6	7.7	7.7	7.7		
		Renew	1	pH	7.7	7.7	7.7	7.6	7.6	7.5		
				DO (mg/L)	8.3	8.2	8.2	8.2	8.2	8.1		
LC	6/22	48 Hr	1	pH	7.6	7.8	7.6	7.6	7.9	7.6		
		25 ± 1		DO (mg/L)	8.2	8.3	8.2	8.1	8.1	8.3		
		Renew	2	pH	7.9	7.6	8.2	7.5	7.8	7.9		
				DO (mg/L)	8.2	8.3	8.4	8.1	8.2	8.3		
MM/CG	6/23	72 Hr	2	pH	7.8	7.8	7.8	7.7	7.7	7.7		
		25 ± 1		DO (mg/L)	7.6	7.7	7.7	7.7	7.7	7.7		
		Renew	2	pH	7.8	7.8	7.8	7.7	7.7	7.6		
				DO (mg/L)	7.8	7.8	8.0	8.2	8.2	8.3		
TM/CG	6/24	96 Hr	2	pH	7.9	7.9	7.9	7.8	7.8	7.7		
		25 ± 1		DO (mg/L)	7.7	7.8	7.8	7.8	7.8	7.8		
		Renew	3	pH	7.8	7.8	7.8	7.6	7.6	7.5		
				DO (mg/L)	8.1	8.2	8.2	8.4	8.4	8.5		
JC/SG	6/25	120 Hr	3	pH	7.7	7.7	7.7	7.8	7.8	7.7		
		25 ± 1		DO (mg/L)	8.4	8.4	8.4	8.4	8.4	8.3		
		Renew	3	pH	7.4	7.5	7.5	7.6	7.6	7.7		
				DO (mg/L)	7.9	8.1	8.1	8.1	8.1	8.0		
CG	6/26	144 Hr	3	pH	7.8	7.8	7.8	7.7	7.7	7.7		
		25 ± 1		DO (mg/L)	7.7	7.7	7.7	7.8	7.8	7.8		
		Renew	3	pH	7.6	7.7	7.7	7.7	7.7	7.7		
				DO (mg/L)	8.1	8.0	8.0	8.1	8.1	8.2		
LC	6/27	168 Hr	3	pH	7.4	7.6	7.4	7.4	7.5	7.6		
		25 ± 1		DO (mg/L)	8.3	8.3	8.2	8.2	8.3	8.2		

BIO-AQUATIC TESTING, INC.

pH, Dissolved Oxygen

Chronic **Pimephales promelas**

Client: Little Rock Water Reclamation **Lab Number:** 87589

Facility: Adams Field Reclamation Facility **Dilution Water(s):** Synthetic Lab

Outfall: 001 **Test Begin Date:** June 20, 2023

NR indicates that the test is non-renewal.

ANALYST	DATE	TIME	SX#	UNIT	Concentration							
					Control	9	12	16	21	28		
TM	6/20	Start	1	pH	7.6	7.7	7.7	7.6	7.6	7.5		
		25 ± 1		DO (mg/L)	8.5	8.2	8.2	8.0	8.0	8.0		
MM/TM	6/21	24 Hr	1	pH	7.7	7.7	7.7	7.6	7.6	7.6		
		25 ± 1		DO (mg/L)	8.3	8.4	8.4	8.4	8.4	8.3		
		Renew	1	pH	7.7	7.7	7.7	7.6	7.6	7.5		
				DO (mg/L)	8.3	8.2	8.2	8.2	8.2	8.1		
LC	6/22	48 Hr	1	pH	7.7	7.7	7.7	7.6	7.6	7.7		
		25 ± 1		DO (mg/L)	8.0	8.3	8.2	8.3	8.3	8.1		
		Renew	2	pH	7.9	7.6	8.2	7.5	7.8	7.9		
				DO (mg/L)	8.2	8.3	8.4	8.1	8.2	8.3		
MM/CG	6/23	72 Hr	2	pH	7.5	7.5	7.5	7.5	7.5	7.5		
		25 ± 1		DO (mg/L)	8.0	7.8	7.8	7.7	7.7	7.6		
		Renew	2	pH	7.8	7.8	7.8	7.7	7.7	7.6		
				DO (mg/L)	7.8	7.8	8.0	8.2	8.2	8.3		
TM/CG	6/24	96 Hr	2	pH	7.4	7.4	7.4	7.4	7.4	7.3		
		25 ± 1		DO (mg/L)	7.5	7.0	7.0	6.7	6.7	6.5		
		Renew	3	pH	7.8	7.8	7.8	7.6	7.6	7.5		
				DO (mg/L)	8.1	8.2	8.2	8.4	8.4	8.5		
JC/SG	6/25	120 Hr	3	pH	7.3	7.4	7.4	7.4	7.4	7.5		
		25 ± 1		DO (mg/L)	7.4	7.4	7.4	7.3	7.3	7.3		
		Renew	3	pH	7.4	7.5	7.5	7.6	7.6	7.7		
				DO (mg/L)	7.9	8.1	8.1	8.1	8.1	8.0		
CG	6/26	144 Hr	3	pH	7.8	7.8	7.8	7.7	7.7	7.7		
		25 ± 1		DO (mg/L)	7.1	7.2	7.2	7.4	7.4	7.4		
		Renew	3	pH	7.6	7.7	7.7	7.7	7.7	7.7		
				DO (mg/L)	8.1	8.0	8.0	8.1	8.1	8.2		
LC	6/27	168 Hr	3	pH	7.8	7.8	7.8	7.7	7.7	7.8		
		25 ± 1		DO (mg/L)	8.1	8.0	8.0	7.9	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.

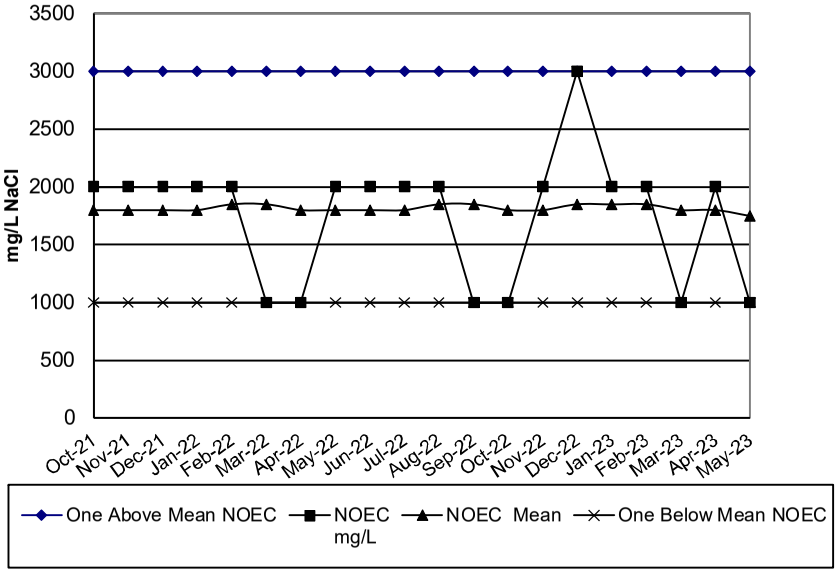
CHRONIC REFERENCE TOXICANT TEST RESULTS

DILUTION WATER:	Standard Synthetic Freshwater						
CHEMICAL:	Sodium Chloride						
DURATION:	3-Brood Chronic						
TEST NUMBER:	339						
PROJECT NUMBER:	87493 DOC						
START DATE:	5/30/2023						
START TIME:	14:40						
TOTAL NUMBER EXPOSED:	10 organisms per concentration						
CONCENTRATIONS (mg/L):	CON	250	500	1000	2000	3000	4000
NUMBER DEAD PER CONCENTRATION:	1	0	1	4	9	10	10
TEST METHODS:	As listed in EPA-821-R-02-013						
STATISTICAL METHODS:	SURVIVAL: Fisher's Exact Test REPRODUCTION: ANOVA-Dunnetts w/Bonf. Adj.						

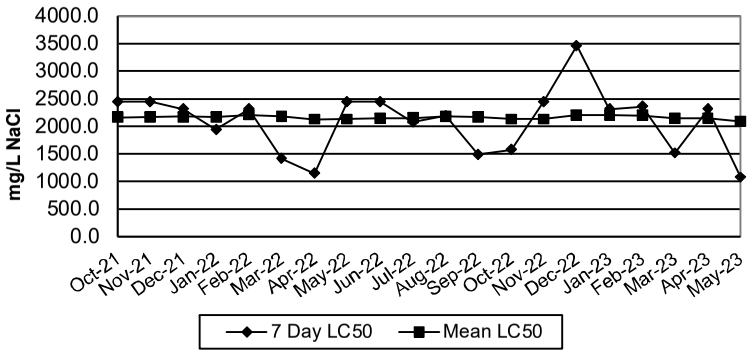
NOEC FOR SURVIVAL:	1000	mg/L
LOEC FOR SURVIVAL:	2000	mg/L
NOEC FOR REPRODUCTION:	500	mg/L
LOEC FOR REPRODUCTION:	1000	mg/L

PMSD: 42.2

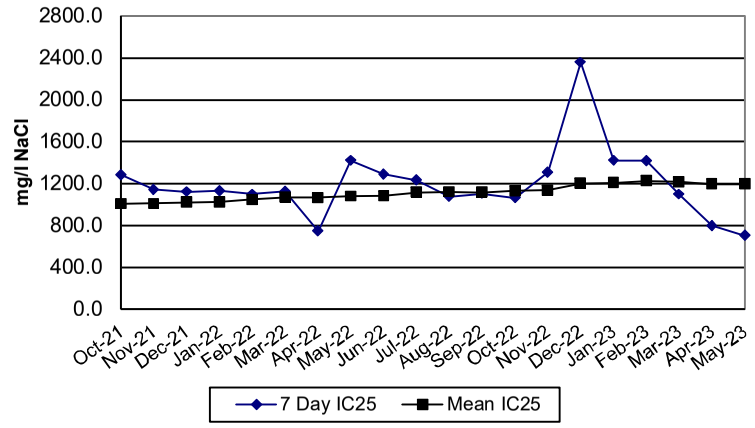
Ceriodaphnia Chronic Survival Control Chart



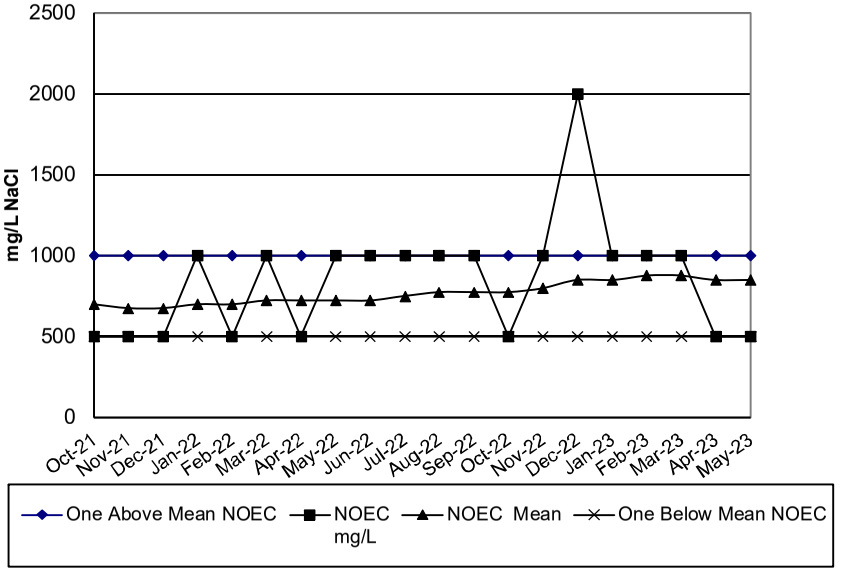
Ceriodaphnia 7-Day LC50



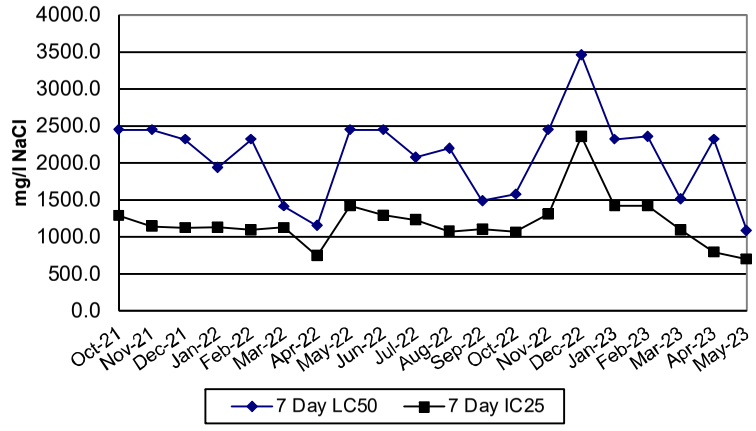
Ceriodaphnia 7-Day IC25



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.

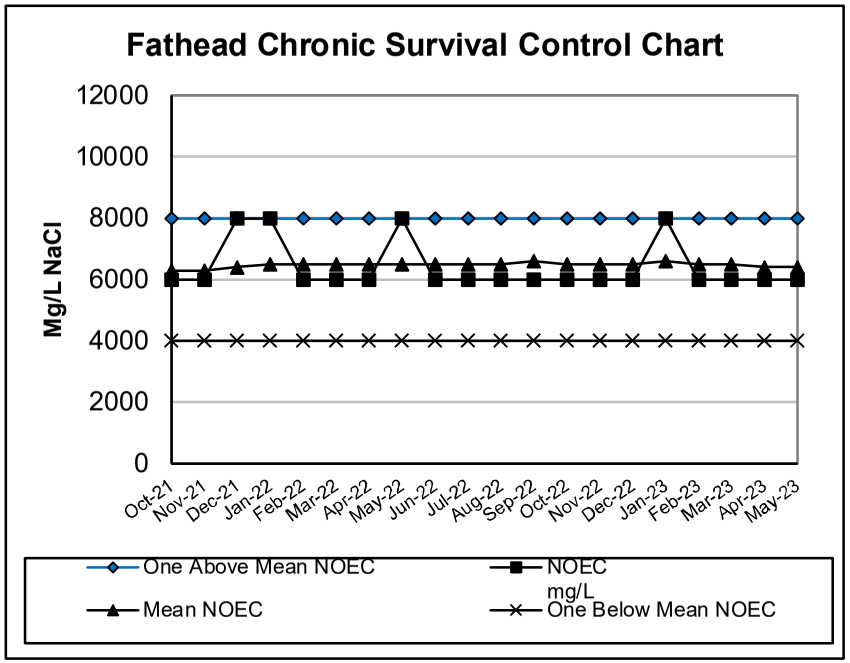
CHRONIC REFERENCE TOXICANT TEST RESULTS

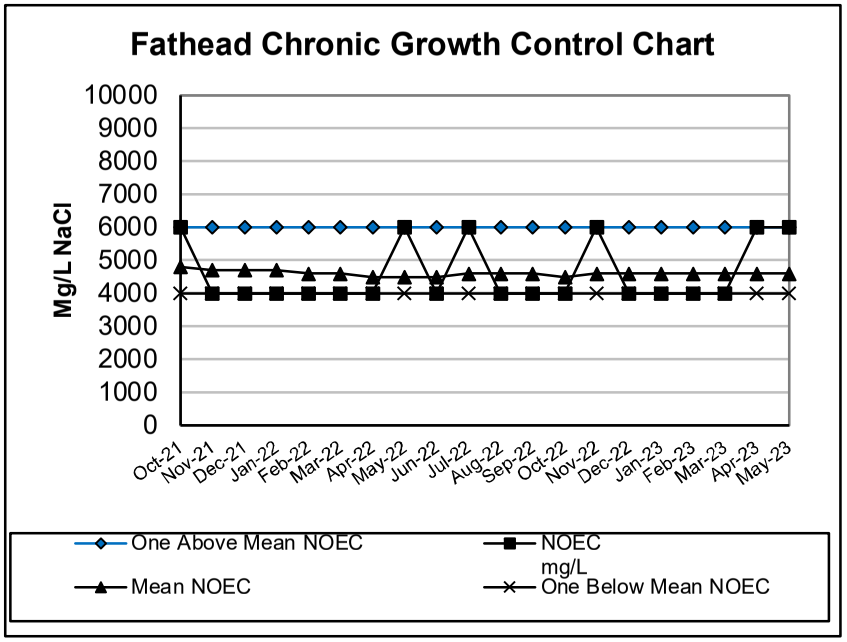
DILUTION WATER:	Standard Synthetic Freshwater
CHEMICAL:	Sodium Chloride
DURATION:	7 Days
TEST NUMBER:	379
PROJECT NUMBER:	87483 DOC
START DATE:	5/30/2023
START TIME:	15:20
TOTAL NUMBER EXPOSED:	40 organisms per concentration

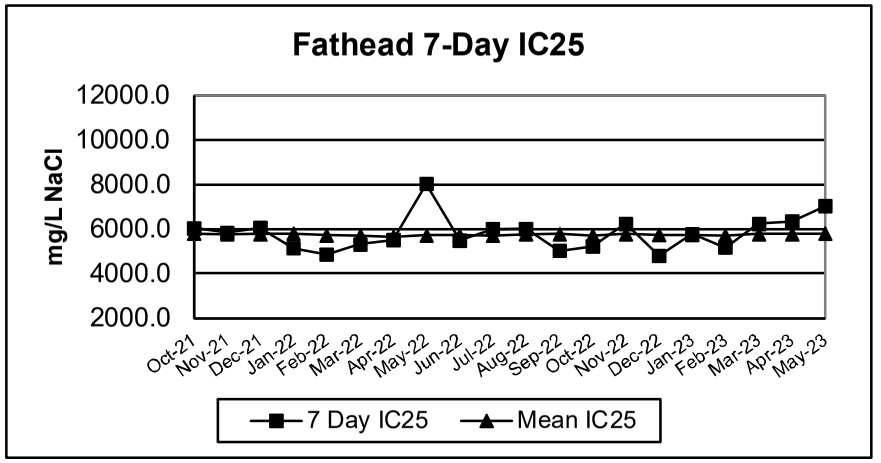
CONCENTRATIONS (mg/L):	CON	2000	4000	6000	8000	10000	12000
NUMBER DEAD PER CONCENTRATION:	0	2	2	3	13	40	40

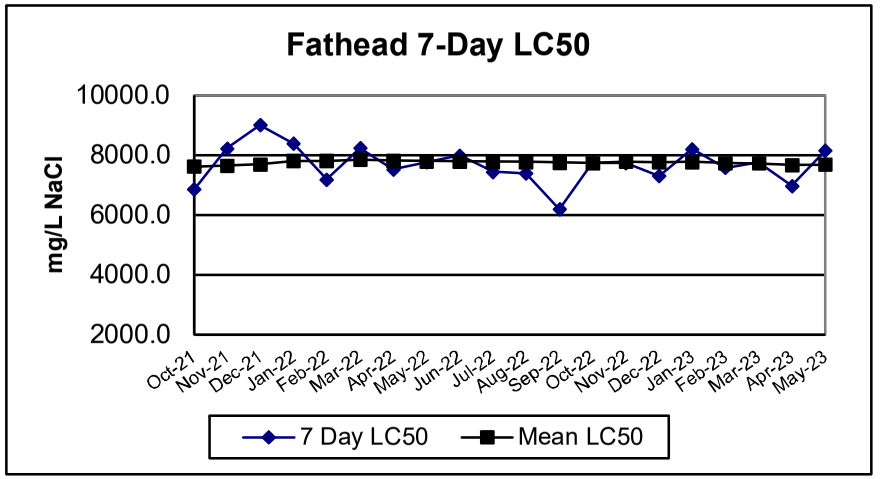
TEST METHODS:	As listed in EPA-821-R-02-013	
STATISTICAL METHODS:	SURVIVAL: Steel's Many-One Rank Test GROWTH: ANOVA-Dunnetts	
NOEC FOR SURVIVAL:	6000	mg/L
LOEC FOR SURVIVAL:	8000	mg/L
NOEC FOR GROWTH:	6000	mg/L
LOEC FOR GROWTH:	8000	mg/L

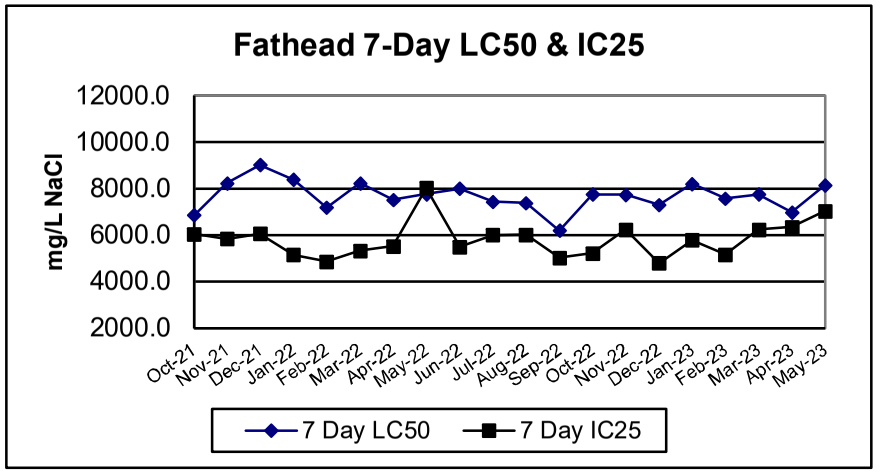
PMSD: 16.3


Fathead Chronic Survival Control Chart
Mg/L NaCl
12000
10000
8000
6000
4000
2000
0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
One Above Mean NOEC
NOEC
Mean NOEC
One Below Mean NOEC
mg/L


Fathead Chronic Growth Control Chart
Mg/L NaCl
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
One Above Mean NOEC
NOEC
Mean NOEC
One Below Mean NOEC
mg/L


Fathead 7-Day IC25
mg/L NaCl
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day IC25
Mean IC25


Fathead 7-Day LC50
mg/L NaCl
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day LC50
Mean LC50


Fathead 7-Day LC50 & IC25
mg/L NaCl
12000.0
10000.0
8000.0
6000.0
4000.0
2000.0
Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23
7 Day LC50
7 Day IC25

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.

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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.

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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

Report Date: 07/12/2023 Revision 0

33 of 41

Bio-Aquatic Lab ID: 87589

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 : 87589

Please Review & Complete Sections A, B, C, & D.

Sample No: 87589 – ____

Revision 2 Effective Date 9/25/2017

Check Sample No. : ____ First, ____ Second, or ____ Third.

P.O. No:

Client: Little Rock Water Reclamation Authority

Facility: Adams Field Reclamation Facility

Permit No: AR0021806

Outfall: 001

Client Contact: REBECCA BURKMAN

Client Phone: 501-490-5401

A. REVIEW SCHEDULED TEST(s):

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

Concentration: 9 12 16 21 28

(For TX) Setup separate 24hr Acute Test? No

To Ship the 1st Sample on: 6/19/2023

B. Use area below to make changes, if the Scheduled Test(s) in "A" are incorrect:

Freshwater Species					Saltwater Species	
C. dubia (water flea)	*D. pulex (water flea)*	*D. magna (water flea)*	*P. promelas (minnow)*	*Selenastrum (green algae)*	*M. beryllina (minnow)*	*Mysidopsis (shrimp)*
☒Chronic	☐Chronic	☐Chronic	☒Chronic	☐96 Hour	☐Chronic	☐Chronic
☐96 Hour	☐96 Hour	☐96 Hour	☐96 Hour	☐48 Hour	☐96 Hour	☐96 Hour
☐48 Hour	☐48 Hour	☐48 Hour	☐48 Hour	☐24 Hour	☐48 Hour	☐48 Hour
☐24 Hour	☐24 Hour	☐24 Hour	☐24 Hour		☐24 Hour	☐24 Hour

Notes: 2nd Qtr -Using Lab Water, due to RS Invalid on 5/23/23

C.

	Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rec. Stream S = Sediment	Sample Date From	Sample Date To	Sample Time (military) From	Sample Time (military) To	Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
1	005-012	E	6/18/23	6/19/23	0900	0700	C	B Daley Brian Dadey	1
2									
3									

D.

	Relinquished By:	Date	Time	Received By:	Date	Time
1	Brian Dadey	6/19/23		DT	6-20-23	0828
2						
3						

Huther Sample Login

HA sample personnel: ● Yes ● No

Dechlorinate Sample: ○ Yes ○ No

Dilution Water: ○ Receiving Stream ◉ Synthetic Lab

Date: 6.20.23 Time: 0828 By: DT Temperature: 3.6 (C) IR#: 002

Chlorine: <0.1 mg/l Ammonia: 6.8 mg/l Int. Sal\Cond: 281 ppt/uS Adj. Salinity ppt

pH: 6.7 Hardness: 36 mg/l Other Colormetric

DO: 8.8 mg/l Alkalinity: 49 mg/l Condition: 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 : 87589

Please Review & Complete Sections A, B, C, & D.

Sample No: 87589 – ____

Revision 2 Effective Date 9/25/2017

Check Sample No. : ____ First, ____ Second, or ____ Third.

P.O. No:

Client: Little Rock Water Reclamation Authority

Facility: Adams Field Reclamation Facility

Permit No: AR0021806

Outfall: 001

Client Contact: REBECCA BURKMAN

Client Phone: 501-490-5401

A. REVIEW SCHEDULED TEST(s):

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

Concentration: 9 12 16 21 28

To Ship the 1st Sample on: 6/19/2023

(For TX) Setup separate 24hr Acute Test? No

B. Use area below to make changes, if the Scheduled Test(s) in "A" are incorrect:

Freshwater Species					Saltwater Species	
C. dubia (water flea)	*D. pulex (water flea)*	*D. magna (water flea)*	*P. promelas (minnow)*	*Selenastrum (green algae)*	*M. beryllina (minnow)*	*Mysidopsis (shrimp)*
☒Chronic ☐96 Hour ☐48 Hour ☐24 Hour	☐Chronic ☐96 Hour ☐48 Hour ☐24 Hour	☐Chronic ☐96 Hour ☐48 Hour ☐24 Hour	☐Chronic ☐96 Hour ☐48 Hour ☐24 Hour	☐96 Hour ☐48 Hour ☐24 Hour	☐Chronic ☐96 Hour ☐48 Hour ☐24 Hour	☐Chronic ☐96 Hour ☐48 Hour ☐24 Hour

Notes: 2nd Qtr -Using Lab Water, due to RS Invalid on 5/23/23

*SHIPPED BY ARKANSAS BEST COURIER

C.

	Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rec. Stream S = Sediment	Sample Date From	Sample Date To	Sample Time (military) From	Sample Time (military) To	Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
1	005-013 AF Final Eff	E	7-20-23	7-21-23	9:00AM	7:00AM	C	Red Scarborough Red Scarborough	1
2									
3									

D.

	Relinquished By:	Date	Time	Received By:	Date	Time
1	Red Scarborough	6-21-23	*	DT	6.21.23	1416
2						
3						

Huther Sample Login

HA sample personnel: ● Yes ● No

Dechlorinate Sample: ○ Yes ○ No

Dilution Water: ○ Receiving Stream ◉ Synthetic Lab

Date: 6.21.23 Time: 1416 By: DT Temperature: 3.2 (C) IR#: 002

Chlorine: <0.1 ~~mg/l~~ Ammonia: 13.2 mg/l Int. Sal\Cond: 302 ppt/uS Adj. Salinity ppt

pH: 7.1 Hardness: 62 mg/l Other Colorless

DO: 8.6 mg/l Alkalinity: 63 mg/l Condition: good

Report Date: 07/12/2023 Revision 0

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BIO-Aquatic Lab ID: 87589

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 : 87589

Please Review & Complete Sections A, B, C, & D.

Sample No: 87589 - ____

Revision 2 Effective Date 9/25/2017

Check Sample No. : ____ First, ____ Second, or ____ Third.

P.O. No:

Client: Little Rock Water Reclamation Authority

Facility: Adams Field Reclamation Facility

Permit No: AR0021806

Outfall: 001

Client Contact: REBECCA BURKMAN

Client Phone: 501-490-5401

A. REVIEW SCHEDULED TEST(s):

Chronic	Ceriodaphnia dubia
Chronic	Pimephales promelas

Concentration: 9 12 16 21 28

(For TX) Setup separate 24hr Acute Test? No

To Ship the 1st Sample on: 6/19/2023

B. Use area below to make changes, if the Scheduled Test(s) in "A" are incorrect:

Freshwater Species					Saltwater Species	
C. dubia (water flea)	*D. pulex* (water flea)	*D. magna* (water flea)	*P. promelas* (minnow)	*Selenastrum* (green algae)	*M. beryllina* (minnow)	*Mysidopsis* (shrimp)
☒Chronic	☐Chronic	☐Chronic	☒Chronic	☐96 Hour	☐Chronic	☐Chronic
☐96 Hour	☐96 Hour	☐96 Hour	☐96 Hour	☐48 Hour	☐96 Hour	☐96 Hour
☐48 Hour	☐48 Hour	☐48 Hour	☐48 Hour	☐24 Hour	☐48 Hour	☐48 Hour
☐24 Hour	☐24 Hour	☐24 Hour	☐24 Hour		☐24 Hour	☐24 Hour

Notes: 2nd Qtr -Using Lab Water, due to RS Invalid on 5/23/23

C.

	Sample ID or Location: (Outfall No. or Name)	Sample Type: E = Effluent RS = Rec. Stream S = Sediment	Sample Date From	Sample Date To	Sample Time (military) From	Sample Time (military) To	Grab or Composite	Sampled By: (Sign and Print Name)	Number Of Containers Shipped
1	005-04 AF-Final EFF	E	6/22/23	6/23/23	0900	0700	C	Brian Daley	1
2									
3									

D.

	Relinquished By:	Date	Time	Received By:	Date	Time
1	Brian Daley	6/23/23	0816	DT	6.23.23	1429
2						
3						

Huther Sample Login

HA sample personnel: ● Yes ○ No

Dechlorinate Sample: ○ Yes ○ No

Dilution Water: ○ Receiving Stream ◉ Synthetic Lab

Date: 6-23-23 Time: 1429 By: DT Temperature: 3.6 (C) IR#: 002

Chlorine: ~~Lot~~ Lot DT mg/l Ammonia: 9.7 mg/l Int. Sal\Cond: 310 ppt/uS Adj. Salinity ppt

pH: 6.7 Hardness: 5.1 mg/l Other Colornetrk

DO: 8.6 mg/l Alkalinity: 60 mg/l Condition: Good

REGULATORY AGENCY TABLES

Appendix E

Bio-Aquatic Testing, Inc.

FRESH WATER TEST SETUP FORM

Client: Little Rock Water Reclamation Authority Permit AR0021806

Facility: Adams Field Reclamation Facility Lab Number 87589

Outfall Name: 001 Number of samples 3

Dilution Water: Synthetic Lab

Receiving Water Name: Arkansas River

Dechlorinate Sample: _____

Sx #	Rcvd Date	Rcvd Time	Sampling Dates		Sampling Times	
			Begin Date	End Date	Start	End
1	06/20/23	08:28	06/18/23	06/19/23	09:00	07:00
2	06/21/23	14:16	06/20/23	06/21/23	09:00	07:00
3	06/23/23	14:29	06/22/23	06/23/23	09:00	07:00

Type of Test(s)

Ceriodaphnia dubia	Chronic
Pimephales promelas	Chronic

Dilution Water

Sample #	Hardness As mg/L $CaCO_3$	Alkalinity as mg/L $CaCO_3$
1	130	54
2	130	54
3	130	49

Start Sx #	1	Date:	6/20/2023
Renew Sx #	1	Date:	6/21/2023
Renew Sx #	2	Date:	6/22/2023
Renew Sx #	2	Date:	6/23/2023
Renew Sx #	3	Date:	6/24/2023
Renew Sx #	3	Date:	6/25/2023
Renew Sx #	3	Date:	6/26/2023

Test Start Date: 6/20/2023 Test End Date: 6/27/2023

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: _____

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 Composites were collected:	FROM:	6/18/2023 @09:00	TO:	6/19/2023@ 07:00
	FROM:	6/20/2023 @09:00	TO:	6/21/2023@ 07:00
	FROM:	6/22/2023 @09:00	TO:	6/23/2023@ 07:00

Test Initiation: Time: 11:44 Date: 6/20/2023

Dilution Water Used: [ ] Receiving Water [X] Synthetic Dilution Water

NUMBER OF YOUNG PRODUCED PER ADULT AT TEST TERMINATION

	EFFLUENT CONCENTRATION (%)					
REPLICATE	0%	9 %	12 %	16 %	21 %	28 %
A	19	25	29	23	43	23
B	33	M	17	24	36	41
C	34	18	26	24	D- 18	32
D	31	31	22	29	42	24
E	D- 24	D- 15	D- 0	33	23	41
F	24	38	36	26	34	25
G	29	17	29	23	41	32
H	25	29	28	36	23	21
I	31	34	26	30	23	45
J	24	24	30	32	31	38
Surv. MEAN	27.7	27.0	27.0	28.0	32.8	32.2
Total MEAN	27.4	25.7	24.3	28.0	31.4	32.2
CV % [1]	18.1	27.4	19.6	16.6	25.4	27
PMSD	Acceptable Range 47 or Less					30.7 %

[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

	EFFLUENT CONCENTRATION (%)					
TIme of Reading	0%	9 %	12 %	16 %	21 %	28 %
24 HOURS	100	100	100	100	100	100
48 HOURS	100	100	90	100	100	100
7-DAY	90	90	90	100	90	100

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 _____X_____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 _____X_____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 = _____28_____ % Effluent **(Parameter TOP3B)**

b. NOEL Reproduction = _____28_____ % Effluent **(Parameter TPP3B)**

Q* refers to a value that is not calculable

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 (= 25.4).

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 (= 10).

Table 1 (Sheet 3 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

		Date/Time		Date/Time
Dates and times Composites were collected:	FROM:	6/18/2023 @ 09:00	TO:	6/19/2023 @ 07:00
	FROM:	6/20/2023 @ 09:00	TO:	6/21/2023 @ 07:00
	FROM:	6/22/2023 @ 09:00	TO:	6/23/2023 @ 07:00

Test Initiation: Time: 15:51 Date: 6/20/2023

Dilution Water Used: [ ] Receiving Water [X] Synthetic Dilution Water

DATA TABLE FOR GROWTH OF *Pimephales promelas*

Effluent Concentration	Average Dry Weight in milligrams (mg) per replicate					Mean Dry Weight (mg)	CV % [1]
	A	B	C	D	E		
0%	0.677	0.467	0.466	0.465	0.458	0.506	18.8
9 %	0.519	0.365	0.527	0.429	0.451	0.458	14.7
12 %	0.569	0.443	0.575	0.460	0.477	0.505	12.4
16 %	0.494	0.433	0.357	0.474	0.464	0.444	12.1
21 %	0.465	0.580	0.473	0.558	0.514	0.518	9.8
28 %	0.557	0.515	0.551	0.497	0.429	0.510	10.1
PMSD	Acceptable Range 30 or Less					19.2 %	

DATA TABLE FOR SURVIVAL OF *Pimephales promelas*

Effluent Concentration	Percent Survival per replicate					Average % Survival			CV % [1]
	A	B	C	D	E	24 Hours	48 Hours	7-Day	
0%	100	75	100	100	100	100	95	95	11.8
9 %	100	87.5	100	100	100	100	100	97.5	5.7
12 %	100	100	100	100	100	100	100	100	0.0
16 %	100	100	87.5	100	87.5	100	97.5	95	7.2
21 %	100	100	100	100	100	100	100	100	0.0
28 %	100	100	100	100	100	100	100	100	0.0

[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 _____X_____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 _____X_____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 = _____28_____ % Effluent **(Parameter TOP6C)**

b. NOELGrowth = _____28_____ % Effluent **(Parameter TPP6C)**

Q* refers to a value that is not calculable

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 (= 18.8).

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 (= 0).