

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

Chronic Biomonitoring Report
for
March 2020

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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 facility 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

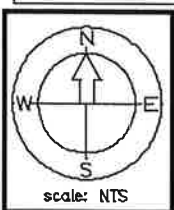
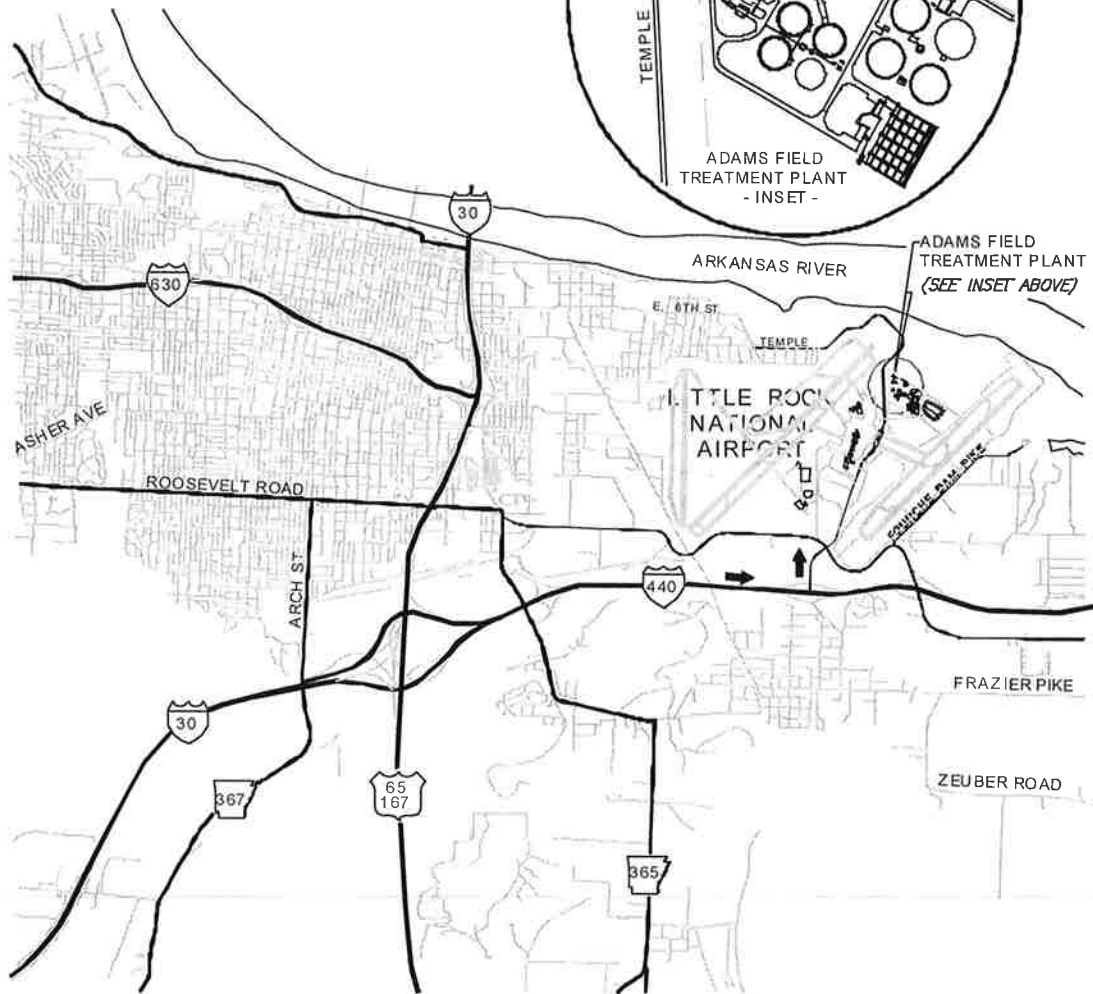
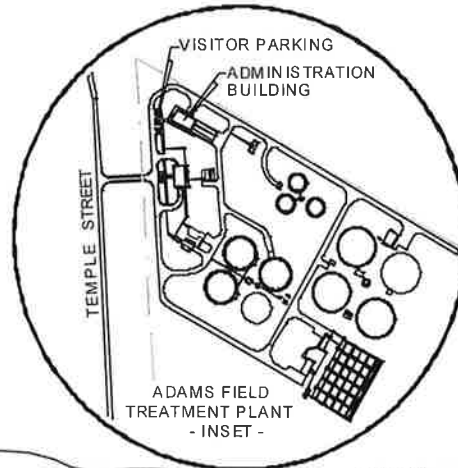
Arkansas River

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

Huther and Associates, 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.



PREPARED BY EVANGELINE O'NEAL
 SR. DRAFTER, LRNU TECH SVCS
 DATE: 06 JUNE 2000

D:\S\DFT\1-SUPERVISOR\LRNU
 \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

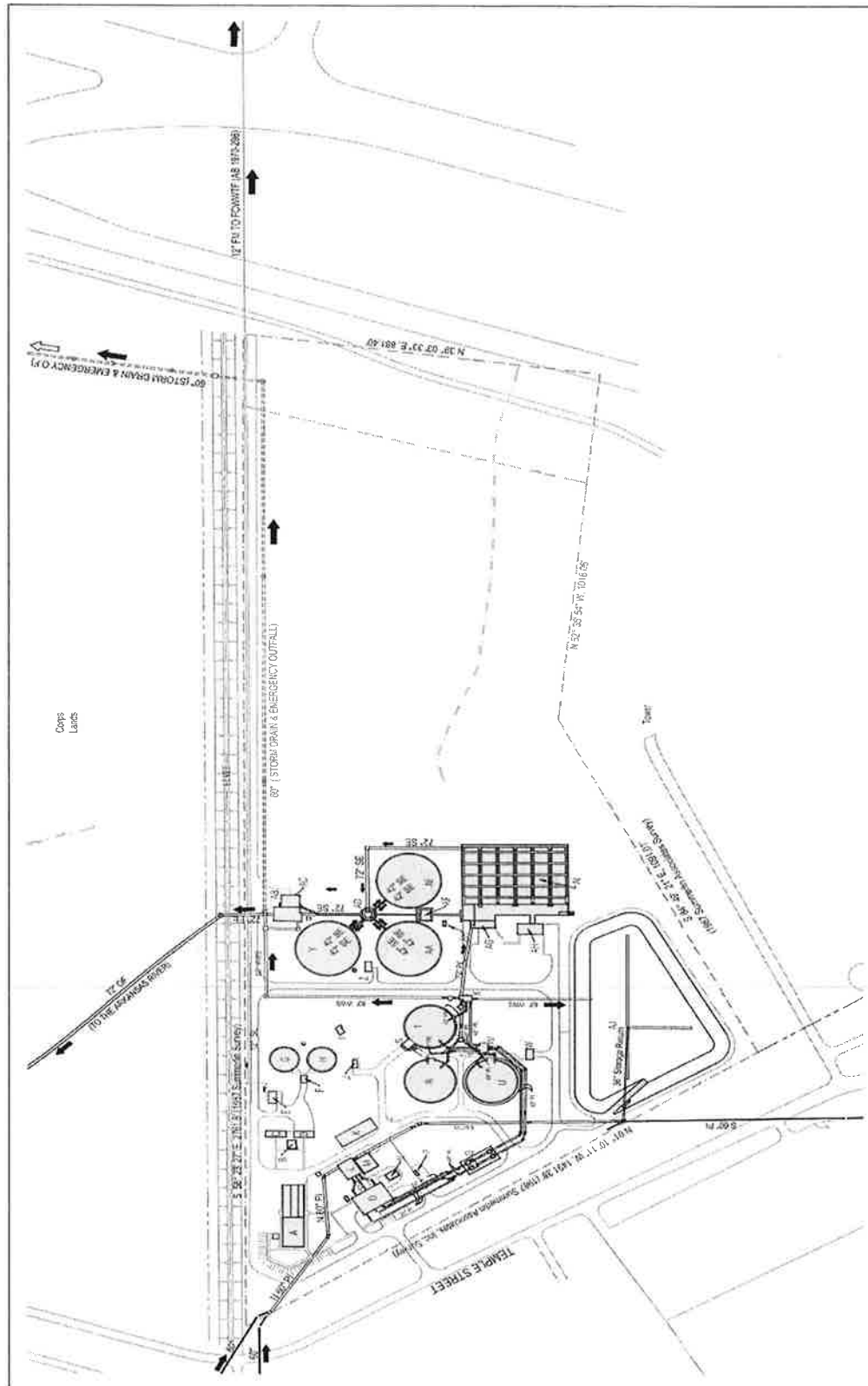
7. Volume of Waste Flow

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

<u>Date</u>	<u>Flow, MGD</u>
03/15/20 – 03/16/20	35.68
03/17/20 – 03/18/20	35.67
03/19/20 – 03/20/20	36.03

8. Design Flow of Treatment Facility at Time of Sampling

36 MGD



Little Rock Wastewater
 ADAMS FIELD WASTEWATER TREATMENT FACILITY
 SITE PLAN
 & FLOW SCHEMATIC

1801 Temple Street Little Rock, AR 72202
 NW Quarter, Section 8, Township 4 North, Range 11 West
 Plan Center - UTM: 20114F4W7F Site Plan - FLOW SCHEMATIC.dwg
 Prepared by: Evangelina O'Mega LEW
 Update: 12/26/2016
 Filename: 20114F4W7F SITE PLAN - FLOW SCHEMATIC.dwg

0' 100' 200'

Prepared by: Evangelina O'Mega LEW
 Update: 12/26/2016
 Filename: 20114F4W7F SITE PLAN - FLOW SCHEMATIC.dwg

PIPING LEGEND

FE	FINAL EFFLUENT
FB	FORCE MAIN
OF	OUTFALL
PE	PRIMARY EFFLUENT
PI	PRIMARY INFILTRANT
PAS	RETURN ACTIVATED SLUDGE
SD	STORM DRAIN
SE	SECONDARY EFFLUENT
SL	SLUDGE LINE
MS	WASTE ACTIVATED SLUDGE
WWS	WET WEATHER BUILDING
WWS	WET WEATHER STORAGE

STRUCTURE LEGEND

A	ADMINISTRATION BLDG
B	DRAIN PIT
C	GREASE HOLDING TANK
D	SEPTAGE RECEIVING TANK
E	SLUDGE TRANSFER P/S
F	STORAGE BUILDING
G	THICKENER #1
H	THICKENER #2
I	THICKENER OVERFLOW JUNCTION
J	PRIN TREATMENT ELECT BLDG
K	SPLITTER
L	SCREENING CHAMBER
M	PREL TREATMENT BLDG
N	MAIN ELECT BUILDING
O	MAIN P/S
P	MAIN GENERATOR
Q	VALVE VAULT
R	PRIM CLARIFIER #1
S	PRIM SLUDGE P/S
T	PRIM CLARIFIER #3
U	PRIM CLARIFIER #2
V	PRIM INFILTRANT FLOW SPLITTER BOX
W	STORAGE BUILDING
X	PRIM EFFLUENT JUNCTION BOX
Y	PRIM CLARIFIER #1
Z	WAKEUP WATER P/S
AA	FINAL CLARIFIER #2
AB	PAA INTERMITTENT FEED ROOM
AC	U7 DISINFECTION BASIN FACILITY
AD	COAGSON BOX
AE	FINAL CLARIFIER #3
AF	RETURN ACTIVATED SLUDGE P/S
AG	MIXING CHAMBER
AH	SLOWER BLDG
AI	AERATION BASIN
AJ	EDUCALIZATION BASIN
AK	SECONDARY GENERATOR

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	03/15/20 @ 12:00 PM
	Takeoff	03/16/20 @ 10:00 AM

2nd sample	Setup	03/17/20 @ 12:00 PM
	Takeoff	03/18/20 @ 10:00 AM

3rd sample	Setup	03/19/20 @ 12:00 PM
	Takeoff	03/20/20 @ 10:00 AM

- 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

<u>Date</u>	<u>Flow, MGD</u>
03/15/20 – 08/16/20	35.68
03/17/20 – 08/18/20	35.67
03/19/20 – 08/20/20	36.03

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

- Sample 1: Relinquished 03/16/20 @ 2:04 PM - Shipped Greyhound Bus
Received 03/17/20 @ 11:00 AM - Temperature upon arrival was 3.2°C
- Sample 2: Relinquished 03/18/20 @ 2:07 PM - Shipped Greyhound Bus
Received 03/19/20 @ 9:20 AM - Temperature upon arrival was 4.2°C
- Sample 3: Relinquished 03/20/20 @ 1:51 PM - Shipped Greyhound Bus
Received 03/21/20 @ 10:00 AM - Temperature upon arrival was 4.9°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

Date	Day	Adams Field Final Effluent Weekly Values											
		Flow MGD	TSS mg/L	BOD ₅ mg/L	CBOD ₅ mg/L	pH S.U.	PAA (Meter) Residual, mg/L	FCB MPN/100 mL	NH ₃ -N mg/L	Phosphorus mg/L	NO ₃ +NO ₂ -N mg/L	PAA Feed (Yes)	UVT %
03/15/20	Sun.	35.68											
03/16/20	Mon.	35.17	20.4	16.85		6.81	0.73	654				Yes	71.91
03/17/20	Tue.	35.67	20.6	17.89		6.84	0.64	602				Yes	72.81
03/18/20	Wed.	36.90	26.5	17.85			0.51	2247				Yes	65.27
03/19/20	Thu.	36.03											
03/20/20	Fri.	35.74											
03/21/20	Sat.	32.67											
7-Day Ave.		35.41	22.5	17.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Geo. Ave.		N/A	N/A	N/A	N/A	N/A	N/A	960	N/A	N/A	N/A	N/A	N/A
Maximum		N/A	N/A	N/A	N/A	6.84	0.73	N/A	N/A	N/A	N/A	N/A	72.81
Minimum		N/A	N/A	N/A	N/A	6.81	N/A	N/A	N/A	N/A	N/A	N/A	65.27

Comments:
 1. Interim CBOD/NH₃-N monitoring is required May-October and BOD monitoring is required January-December; Interim ends December 31, 2020. The monitoring frequency for PAA of two/week applies only when PAA is being used for disinfection.
 2. As per NPDES permit requirements, NO₃+NO₂-N is only required once per quarter; this testing was last performed for flow date 02/04/20, and the phosphorus monitoring is required once per month; this testing was last performed for flow date 02/04/20.
 3. An additional PAA (requested by OPS during WET sampling event) was collected on 03/18/20, and is being included for the instantaneous maximum, reported on the DMR.

3. Receiving Water Samples

- A. Source - Arkansas River – Upstream of the Adams Field Final Effluent Outfall
Latitude: 34° 47' 27"N; Longitude 92° 21' 31"W
- B. Sample Collection Method - Grab Sample
- C. Collection Dates and Times

1st sample	Grab	03/16/20 @ 9:41 AM
2nd sample	Grab	03/18/20 @ 9:33 AM
3rd sample	Grab	03/20/20 @ 10:44 AM

D. Streamflow (at time of sampling)

03/16/20	147,000 cfs
03/18/20	141,000 cfs
03/20/20	195,000 cfs

E. Lapsed time from sample collection to delivery

- Sample 1: Relinquished 03/16/20 @ 2:04 PM - Shipped Greyhound Bus
 Received 03/17/20 @ 11:00 AM - Temperature upon arrival was 3.2°C
- Sample 2: Relinquished 03/18/20 @ 2:07 PM - Shipped Greyhound Bus
 Received 03/19/20 @ 9:20 AM - Temperature upon arrival was 4.2°C
- Sample 3: Relinquished 03/20/20 @ 1:51 PM - Shipped Greyhound Bus
 Received 03/21/20 @ 10:00 AM - Temperature upon arrival was 4.9°C

F. Physical and Chemical Data – Field Measurements

Parameter Description	1st sample	2 nd sample	3rd sample
Date Collected	03/16/20	03/18/20	03/20/20
TDS, mg/L	328.7	276.0	298.0
pH, S.U.	7.83	7.48	7.50
Dissolved Oxygen, mg/L	10.90	10.17	10.16
Temperature, °C	11.7	12.0	13.6
TRC, mg/L	0.12	0.08	0.16

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 Huther and Associates, 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 Huther and Associates, 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
March 17, 2020 @ 15:30
5. Date and Time Test Terminated
March 24, 2020 @ 15:30
6. Type and Volume of Test Chambers
300 mL distilled water rinsed plastic beakers
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 Huther and Associates, 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 <24 hour old *Artemia* (brine shrimp) three times per day.

Part B - *Ceriodaphnia dubia*

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

7-Day Chronic Toxicity Test, Static Renewal, with *Ceriodaphnia dubia*, 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

March 17, 2020 @ 16:00

5. Date and Time Test Terminated

March 24, 2019 @ 16:00

6. Type and Volume of Test Chambers

25 mL distilled water rinsed plastic beakers

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 Huther and Associates, Inc., 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 cerophyll 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
AR River Control	0.4442
9%	0.4580
12%	0.4622
16%	0.4650
21%	0.4640
28%	0.4582

5. Source

Huther and Associates, 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

Huther and Associates, Inc. cultures their own *Ceriodaphnia dubia*

6. Diseases and Treatment (Where Applicable)

N/A

**SECTION VI
QUALITY ASSURANCE**

The QA information supplied by Huther and Associates, Inc. is contained in Appendix B.

**SECTION VII
 RESULTS**

A summary of the whole effluent toxicity test results are listed below. Huther and Associates, 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 5.07% for growth and 0.00% for survival. The coefficient of variation for the critical dilution was 4.85% for growth and 0.00% for survival. The Percent Minimum Significant Difference (PMSD) was 7.7 %.

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 9.62% for reproduction and 0.00% for survival. The coefficient of variation for the critical dilution was 10.38% for reproduction and 0.00% for survival. The Percent Minimum Significant Difference (PMSD) was 9.8%.

Table Summary of Test Data as Reported for Discharge Monitoring Report	
7-Day Static Renewal Sub-Lethal Effects - Pass/Fail	
TGP3B – <i>Ceriodaphnia dubia</i> – Reproduction	Pass (0)
TGP6C – <i>Pimephales promelas</i> – Growth	Pass (0)
7-Day Static Renewal Lethal Effects - Pass/Fail	
TLP3B – <i>Ceriodaphnia dubia</i> - Survival	Pass (0)
TLP6C – <i>Pimephales promelas</i> – Survival	Pass (0)
7-Day Static Renewal Toxic Lethal - No Observable Effects Concentration	
TOP3B – <i>Ceriodaphnia dubia</i> Survival NOEC	28%
TOP6C – <i>Pimephales promelas</i> Survival NOEC	28%
7-Day Static Renewal Toxic Sub-Lethal - No Observable Effects Concentration	
TPP3B – <i>Ceriodaphnia dubia</i> – Reproduction NOEC	28%
TPP6C – <i>Pimephales promelas</i> – Growth NOEC	28%
Coefficient of Variation (CV)	
TQP3B – <i>Ceriodaphnia dubia</i> Reproduction	10.38%
TQP6C – <i>Pimephales promelas</i> Growth	5.07%

APPENDIX A
ADEQ FORMS



LITTLE ROCK WATER RECLAMATION AUTHORITY
ADAMS FIELD WATER RECLAMATION FACILITY
PERMIT NO. NPDES AR0021806
OUTFALL 001
TEST DATE: 03/17/20
FOR NET DMR

I. Ceriodaphnia dubia

Table with 2 columns: Test Description and Response. Rows include survival and reproduction tests for Ceriodaphnia dubia with responses like 0, 28%, and 10.38%.

II. Pimephales promelas

Table with 2 columns: Test Description and Response. Rows include survival and growth tests for Pimephales promelas with responses like 0, 28%, and 5.07%.

Ceriodaphnia dubia

Table with 2 columns: Retest Number and Response. Rows show retest numbers 22415, 22416, 51443 and their corresponding response of 9.

Pimephales promelas

Table with 2 columns: Retest Number and Response. Rows show retest numbers 22418, 22419, 51444 and their corresponding response of 9.

In comment box at bottom left: 9 = No retests required.

APPENDIX B

HUTHER AND ASSOCIATES, INC.

QUALITY ASSURANCE REPORT



CHRONIC REFERENCE TOXICANT TEST RESULTS

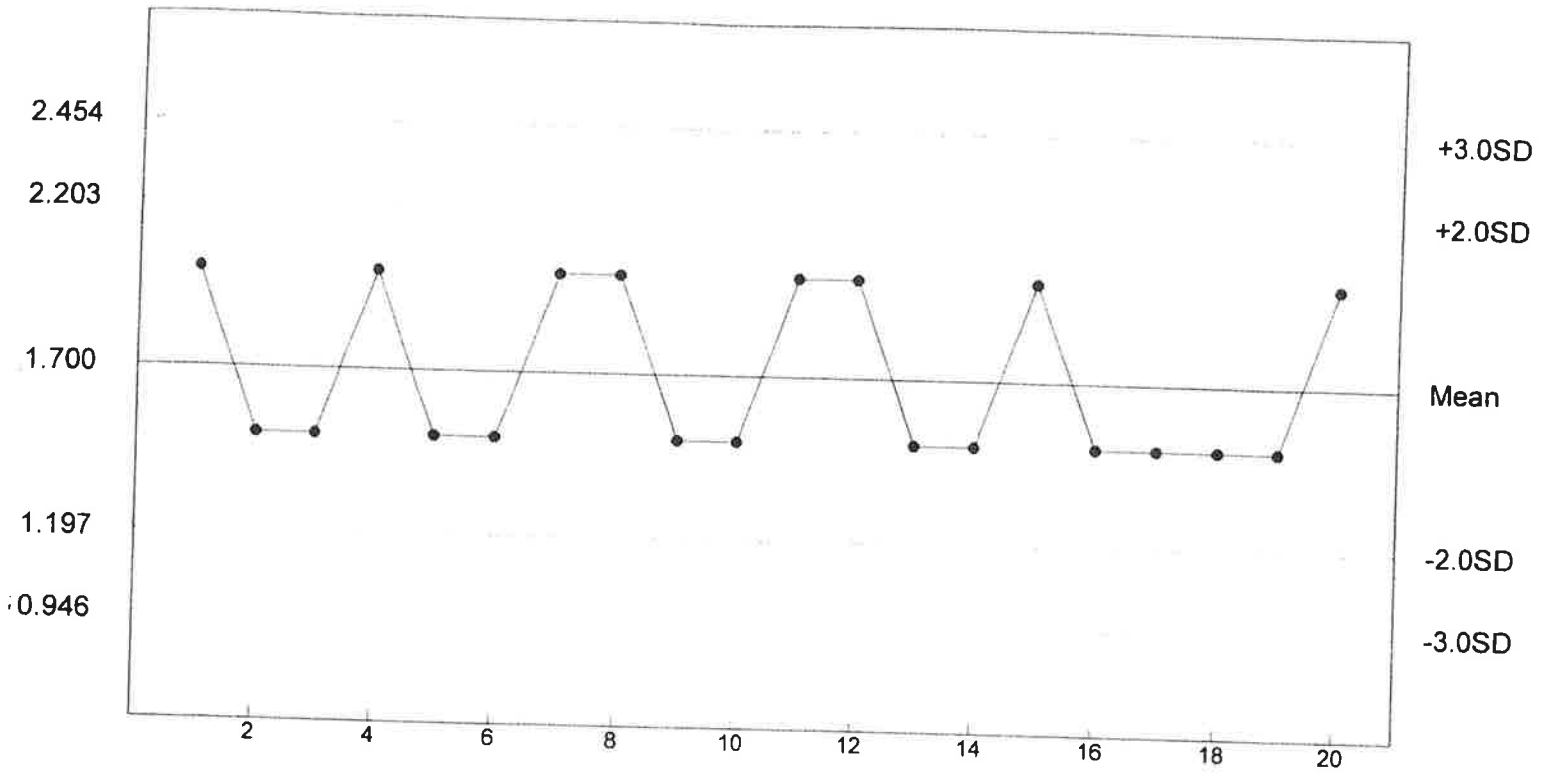
SPECIES: *Ceriodaphnia dubia*
CHEMICAL: Sodium Chloride
DURATION: 7-Days
TEST NUMBER: 3
TEST DATE: 03/04/20 - 03/11/20
1645 Hrs - 1645 Hrs
STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	0
2.0	10	3
2.5	10	10
3.0	10	10
4.0	10	10

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

Reference Tox Sodium Chloride g/L

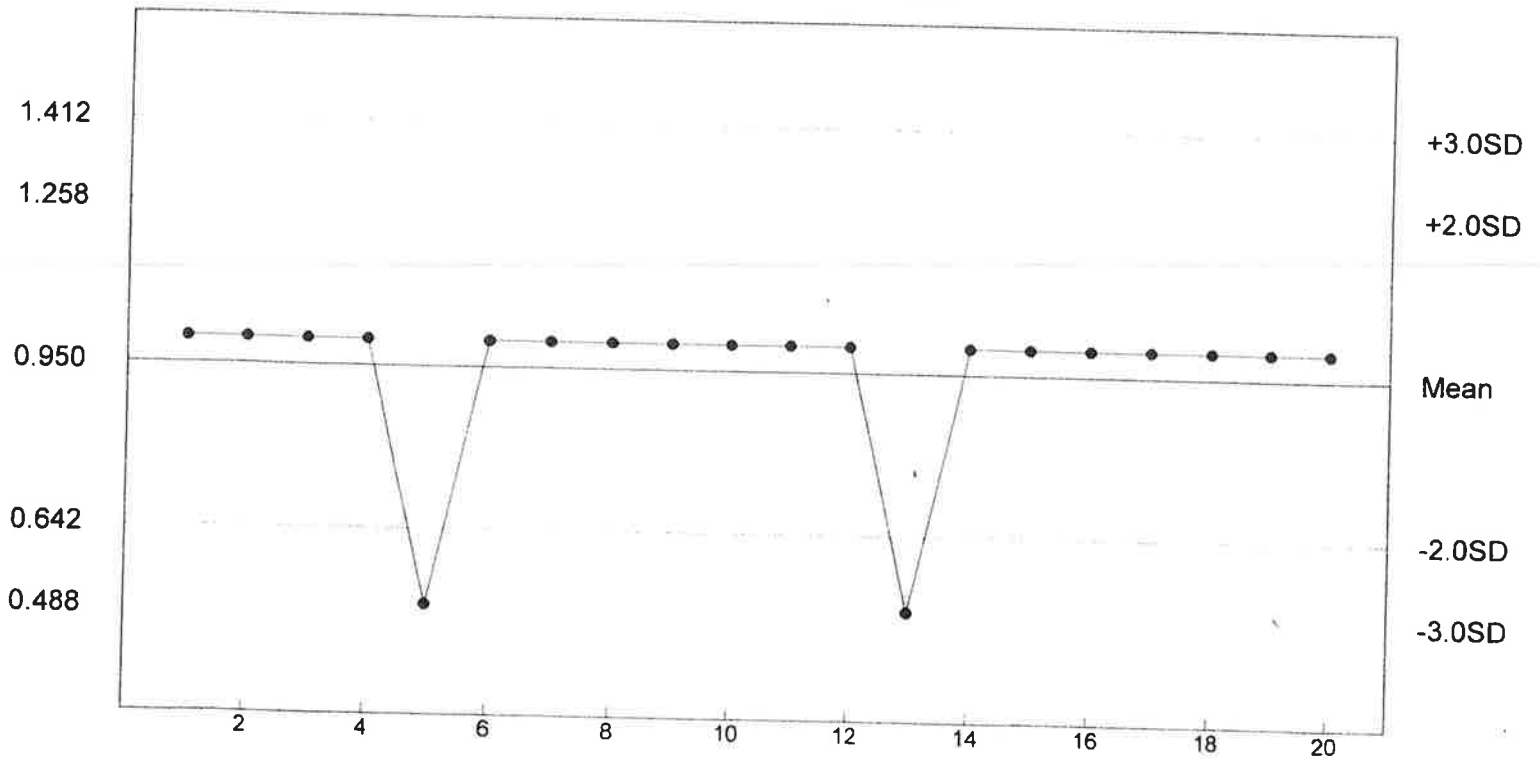
C. dubia Survival - NOEC



n= 20 Mean= 1.700 SD= 0.251 CV= 14.78% Min= 1.500 Max= 2.000

Reference Tox Sodium Chloride g/L

C. dubia Reproduction - NOEC



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



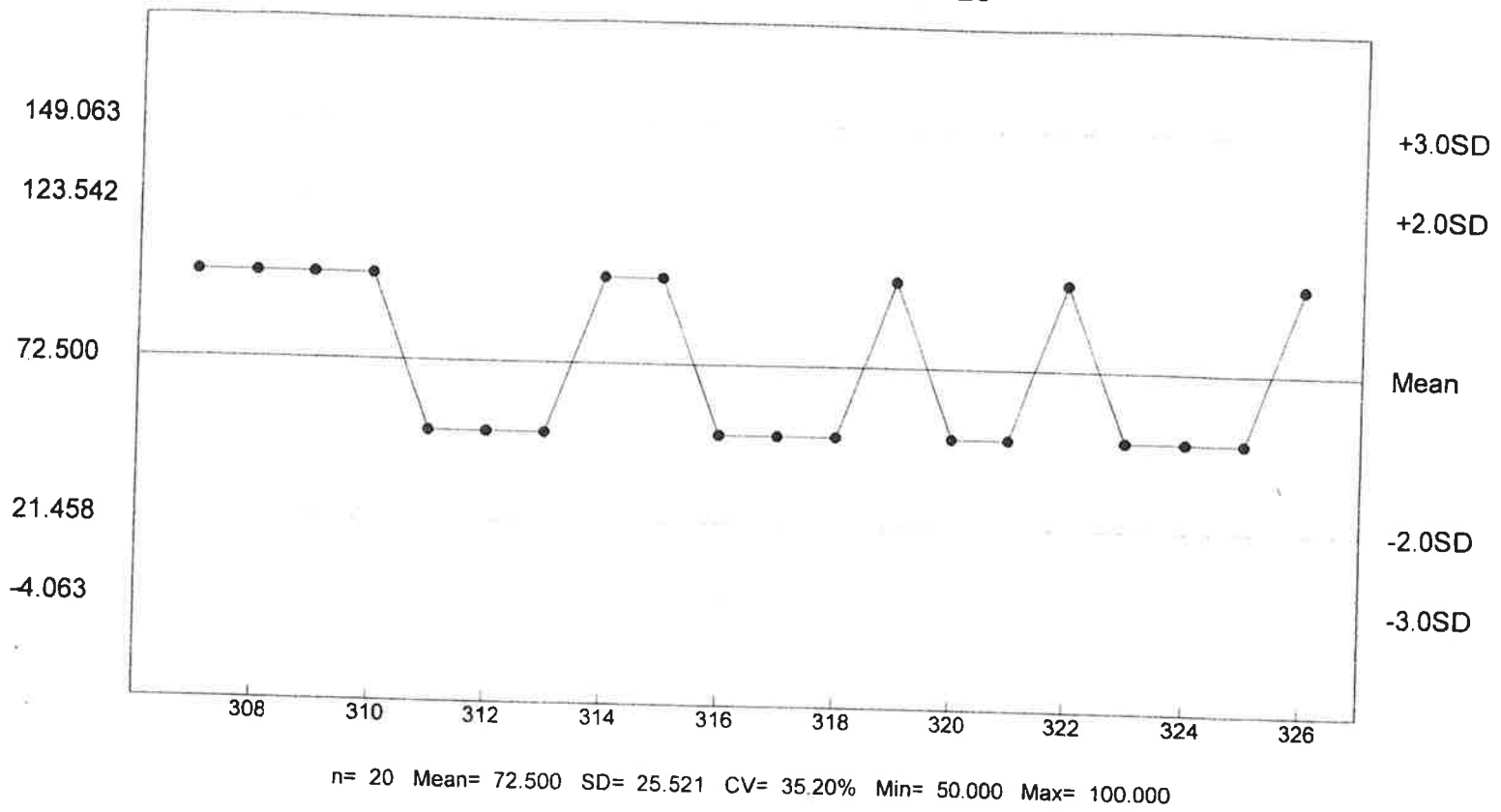
CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: *Pimephales promelas*
 CHEMICAL: Copper Nitrate
 DURATION: 7-Days
 TEST NUMBER: 3
 TEST DATE: 03/04/20 - 03/11/20
 1630 Hrs - 1630 Hrs
 STATISTICAL METHOD: Dunnetts/Steels

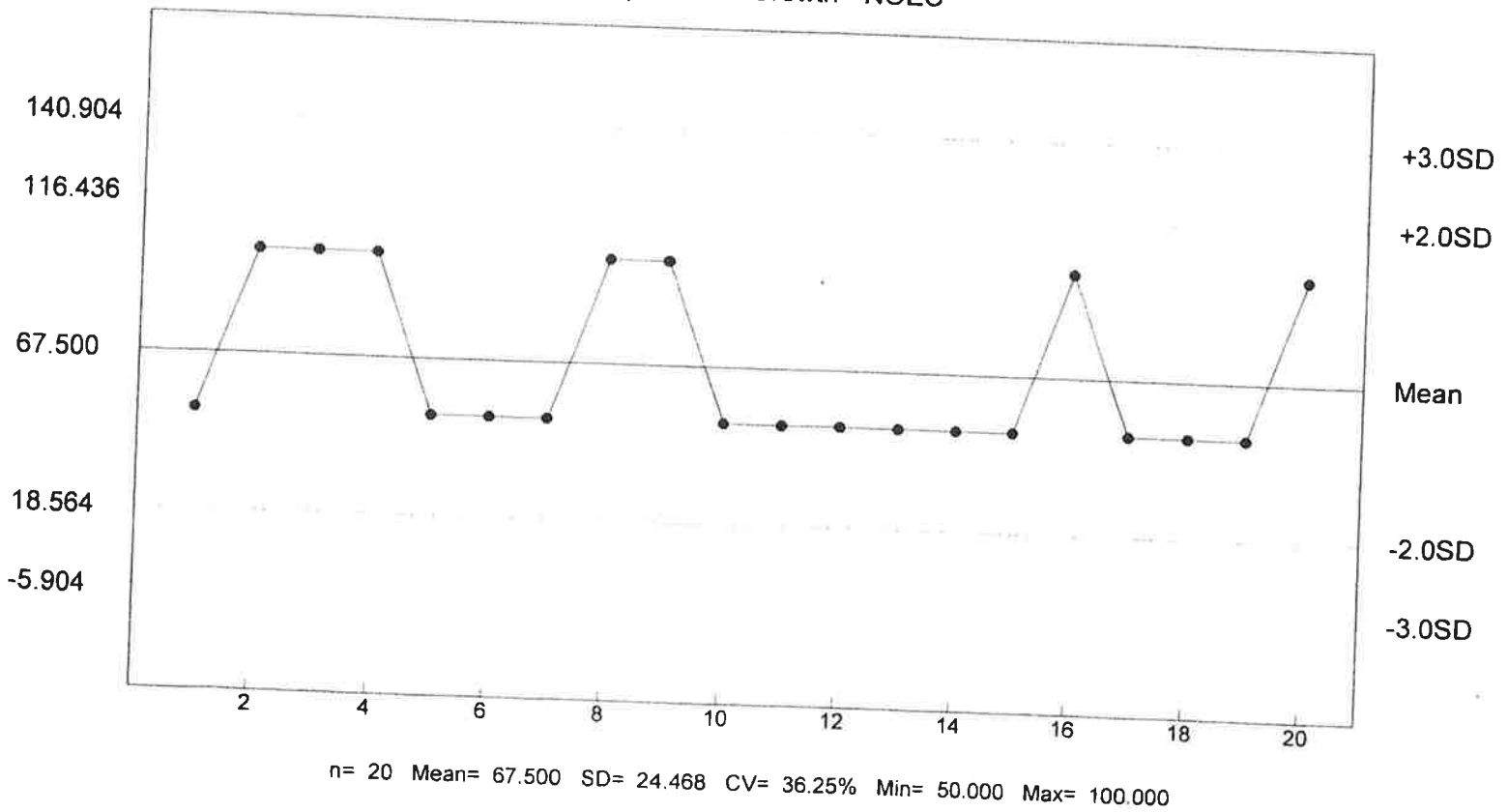
CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	0
50	40	0
100	40	0
200	40	33
400	40	40
800	40	40

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

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



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



APPENDIX C

HUTHER AND ASSOCIATES, INC.'S REPORT

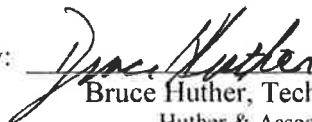
**LITTLE ROCK WATER RECLAMATION AUTHORITY
ADAMS FIELD WATER RECLAMATION FACILITY
OUTFALL 001**

Chronic Biomonitoring Report
Permit Number NPDES AR0021806
AFIN 60-00409

Ceriodaphnia dubia
Pimephales promelas

March 17, 2020

Reviewed by:



Bruce Huther, Technical Director
Huther & Associates, Inc.
1156 North Bonnie Brae
Denton, Texas 76201
(940) 387-1025, Fax: (940) 387-1036

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TOXICITY TEST REPORT - CHRONIC

Client ...Little Rock Water Reclamation Authority
Facility ..Adams Field Water Reclamation Facility
Permit No. NPDES AR0021806

Sample Outfall 001
Laboratory I.D. 31262
Begin Date March 17, 2020

Results: Pass Ceriodaphnia dubia survival and reproduction and Pimephales promelas survival and growth at the critical low flow concentration (21% effluent).

SAMPLE COLLECTION

Composite effluent samples from Little Rock Water Reclamation Authority, Adams Field Water Reclamation Facility were delivered by Greyhound Package Express courier to Huthur & Associates on March 17, March 19, and March 21, 2020. Effluent samples were collected from Outfall 001 using an automatic sampler and were manually composited by facility personnel. Two toxicity tests were requested: a seven-day Ceriodaphnia dubia survival and reproduction test (EPA Method 1002.0), and a seven-day Pimephales promelas larval survival and growth test (EPA Method 1000.0). Test organisms, procedures and quality assurance requirements were in accordance with the EPA manual, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

The effluent and receiving water samples were analyzed for total residual chlorine (Standard Methods, 23rd Edition, 4500-Cl D) and contained <0.01 mg/L, <0.01 mg/L, and <0.01 mg/L, respectively. Effluent and receiving dilution water hardness, alkalinity, conductivity, pH, and dissolved oxygen data were collected and recorded.

TEST SETUP Ceriodaphnia dubia



The seven-day Ceriodaphnia dubia survival and reproduction test was initiated at 1600 hours, March 17, 2020. Five concentrations were prepared (9%, 12%, 16%, 21%, and 28% effluent) utilizing receiving water (Arkansas River) as dilution water. The test was conducted in 25 mL distilled water rinsed plastic beakers containing 15 mL of solution (one organism per beaker, ten beakers per concentration). C. dubia neonates were less than 24-hours-old and within eight hours of the same age at test initiation. Neonates were placed in beakers following a randomized block test design. Fresh solutions were prepared and renewed daily. Daily feeding consisted of 0.5 mL Selenastrum capricornutum and cerophyll per test chamber. The test proceeded for seven days during which survival, reproduction and water quality data were collected daily.

A true control of ten replicate beakers containing one neonate each in receiving water was conducted concurrently with the test. There was 100% survival in the true control. In addition, a performance control of ten replicate beakers containing one neonate each in synthetic laboratory water was conducted concurrently with the test. The purpose of the performance control was to assess the health of the test organisms and to identify receiving water toxicity. The performance control data was not used in the statistical analysis of the test data. There was 100% survival in the performance control. The test ended at 1600 hours, March 24, 2020. Survival and reproduction data were statistically analyzed ($p = 0.05$) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL***Ceriodaphnia dubia***

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

LOEC: Not Applicable

NOEC: 28% Effluent

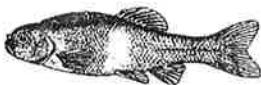
REPRODUCTION***Ceriodaphnia dubia***

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

LOEC: Not Applicable

NOEC: 28% Effluent

PMSD: 9.8%

TEST SETUP***Pimephales promelas***

The seven-day *Pimephales promelas* larval survival and growth test was initiated at 1530 hours, March 17, 2020. Five concentrations were prepared (9%, 12%, 16%, 21%, and 28% effluent) utilizing receiving water (Arkansas River) as dilution water. The test was conducted in 300 mL distilled water rinsed plastic beakers containing 250 mL of solution (eight organisms per beaker, five beakers per concentration). *P. promelas* larvae were less than 24-hours-old at test initiation and originated from a minimum of three in-house spawnings. Fresh solutions were prepared and renewed daily. Larvae in each test chamber were fed <24-hour-old *Artemia* (brine shrimp) three times per day. The test proceeded for seven days during which survival and water quality data were collected daily.

A true control of five replicate beakers of eight larvae each in receiving water was conducted currently with the test. There was 100% survival in the true control. In addition, a performance control of five replicate beakers of eight larvae each in synthetic laboratory water was conducted concurrently with the test. The purpose of the performance control was to assess the health of the test larvae and to identify receiving water toxicity. The performance control data was not used in the statistical analysis of the test data. There was 100% survival in the performance control. At the end of the test, all larvae were sacrificed, dried, and weighed. The test ended at 1530 hours, March 24, 2020. Survival and growth (weight) data were statistically analyzed ($p = 0.05$) according to EPA procedures to determine the Lowest Observable Effect Concentration (LOEC) and the No Observable Effect Concentration (NOEC).

SURVIVAL
Pimephales promelas

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

LOEC: Not Applicable
NOEC: 28% Effluent

GROWTH
Pimephales promelas

P. promelas growth data were normally distributed at the 0.01 alpha level (0.900) using Shapiro Wilk's test for normality. Growth data were homogeneous using Bartlett's test at the 0.01 alpha level (15.09) without data transformations. Therefore, a parametric test was performed on the homogeneous data. Dunnett's test on *P. promelas* growth data demonstrated that there were no statistically significant differences between the control and any of the effluent concentrations.

LOEC: Not Applicable **PMSD: 7.7%**
NOEC: 28% Effluent

SUMMARY

There were no statistically significant differences between the control and the critical low flow concentration (21% effluent) for *C. dubia* survival and reproduction and *P. promelas* survival and growth. Based on biomonitoring requirements for Outfall 001 contained in Permit Number NPDES AR0021806 for Little Rock Water Reclamation Authority, Adams Field Water Reclamation Facility, Outfall 001 **passed** for this testing period.

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

CLIENT Little Rock WRA, Adams Field WRF
NPDES # AR0021806
LAB ID # 31262
TEST TYPE 7 Day Chronic
TEST ORGANISM *Ceriodaphnia dubia*
ORGANISM AGE < 24-Hours
ORGANISM SOURCE In House
RECEIVING WATER Arkansas River
DILUTION WATER Arkansas River

SAMPLE TYPE 24 Hour Composite
DATE COLLECTED 03/16/20 03/18/20 03/20/20
DATE RECEIVED 03/17/20 03/19/20 03/21/20
BEGIN DATE/TIME 03/17/20 1600
END DATE/TIME 03/24/20 1600
TEST TEMPERATURE (°C) 25 ± 1
PHOTO PERIOD 16-hr. Light 8-hr. Dark
LIGHT INTENSITY 50-100 ft. cndI
TECHNICIAN M. Horner

SURVIVAL & REPRODUCTION SUMMARY

Performance Control										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	3	3	4	4	2	5	2	5	3	3
03/22/20	3	3	4	4	2	5	2	5	3	3
	6	8	9	A	6	A	9	10	A	8
03/23/20	9	11	13	4	8	5	11	15	3	11
	A	A	A	10	A	9	A	A	7	A
03/24/20	9	11	13	14	8	14	11	15	10	11
	12	14	12	14	13	12	12	12	13	12
03/24/20	21	25	25	28	21	26	23	27	23	23
x # Young 24.2 C.V. 9.89% x%Survival 100% C.V. 0.00%										

True Control										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	4	2	3	3	5	3	2	2	2	5
03/22/20	4	2	3	3	5	3	2	2	2	5
	11	A	8	10	A	6	9	6	A	A
03/23/20	15	2	11	13	5	9	11	8	2	5
	A	8	A	A	9	A	A	A	7	7
03/24/20	15	10	11	13	14	9	11	8	9	12
	12	12	13	13	13	13	14	12	14	12
03/24/20	27	22	24	26	27	22	25	20	23	24
x # Young 24.0 C.V. 9.62% x%Survival 100% C.V. 0.00%										

9%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	3	3	2	3	3	5	5	5	4	2
03/22/20	3	3	2	3	3	5	5	5	4	2
	A	A	7	8	6	6	9	A	A	A
03/23/20	3	3	9	11	9	11	14	5	4	2
	9	8	A	A	A	A	A	7	8	8
03/24/20	12	11	9	11	9	11	14	12	12	10
	14	14	12	13	14	13	13	14	12	14
03/24/20	26	25	21	24	23	24	27	26	24	24
x # Young 24.4 C.V. 7.02% x%Survival 100% C.V. 0.00%										

12%Effluent										
Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	4	5	2	5	2	2	3	2	4	4
03/22/20	4	5	2	5	2	2	3	2	4	4
	A	A	A	11	A	A	10	11	7	9
03/23/20	4	5	2	16	2	2	13	13	11	13
	9	10	8	A	7	6	A	A	A	A
03/24/20	13	15	10	16	9	8	13	13	11	13
	12	12	13	14	13	13	13	13	13	14
03/24/20	25	27	23	30	22	21	26	26	24	27
x # Young 25.1 C.V. 10.70% x%Survival 100% C.V. 0.00%										

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

ex 1:

A
4

 alive today
total young to date

ex 2:

5
12

 alive, 5 young today
total young to date

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

Little Rock, Adams Field

Lab ID# 31262

Test Date: March 17, 2020

16% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	4	2	4	5	4	5	2	4	3	4
	4	2	4	5	4	5	2	4	3	4
03/22/20	7	8	7	A	7	A	6	A	8	A
	11	10	11	5	11	5	8	4	11	4
03/23/20	A	A	A	10	A	9	A	7	A	7
	11	10	11	15	11	14	8	11	11	11
03/24/20	13	14	12	14	13	14	14	14	14	12
	24	24	23	29	24	28	22	25	25	23
x # Young 24.7 C.V. 8.96% x%Survival 100% C.V. 0.00%										

21% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	5	5	2	3	3	2	3	2	4	3
	5	5	2	3	3	2	3	2	4	3
03/22/20	A	10	A	9	11	11	9	A	A	9
	5	15	2	12	14	13	12	2	4	12
03/23/20	10	A	6	A	A	A	6	10	A	A
	15	15	8	12	14	13	12	8	14	12
03/24/20	13	13	13	12	13	14	13	13	13	13
	28	28	21	24	27	27	25	21	27	25
x # Young 25.3 C.V. 10.38% x%Survival 100% C.V. 0.00%										

28% Effluent

Date	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
03/18/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/19/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/20/20	A	A	A	A	A	A	A	A	A	A
	0	0	0	0	0	0	0	0	0	0
03/21/20	2	5	4	5	3	2	5	2	2	4
	2	5	4	5	3	2	5	2	2	4
03/22/20	10	A	A	A	10	A	6	7	9	9
	12	5	4	5	13	2	11	9	11	13
03/23/20	A	7	9	9	A	8	A	A	A	A
	12	12	13	14	13	10	11	9	11	13
03/24/20	12	13	14	14	13	14	14	12	13	13
	24	25	27	28	26	24	25	21	24	26
x # Young 25.0 C.V. 7.77% x%Survival 100% C.V. 0.00%										

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

ex 1:

A
4

 alive today
 total young to date

ex 2:

5
12

 alive, 5 young today
 total young to date

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

Little Rock, Adams Field

Lab ID# 31262

Test Date: March 17, 2020

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp. No.	pH of Solution							Analyst
				PCON	TCON	9%	12%	16%	21%	28%	
03/17/20	Start	25.0	1	8.17	8.11	8.04	7.98	7.94	7.88	7.81	SD
03/18/20	24 Hr.	24.3	1	8.14	8.18	8.18	8.17	8.15	8.13	8.12	LM
03/18/20	Renew	24.2	1	8.77	8.61	8.55	9.50	8.49	8.40	8.40	LM
03/19/20	48 Hr.	24.6	1	8.30	8.24	8.18	8.14	8.13	8.10	8.08	SD
03/19/20	Renew	25.0	2	8.14	8.09	8.02	7.93	7.87	7.82	7.78	SD
03/20/20	72 Hr.	24.4	2	8.22	8.06	7.88	7.82	7.79	7.70	7.64	LM
03/20/20	Renew	24.3	2	8.09	8.01	7.87	7.79	7.76	7.70	7.64	LM
03/21/20	96 Hr.	24.0	2	8.28	8.15	8.06	8.04	8.03	8.00	8.02	XX
03/21/20	Renew	25.0	3	7.96	7.92	7.84	7.77	7.70	7.67	7.58	SD
03/22/20	120 Hr.	24.3	3	8.03	7.86	7.72	7.67	7.67	7.58	7.54	LM
03/22/20	Renew	24.3	3	8.02	7.83	7.70	7.56	7.59	7.41	7.36	LM
03/23/20	144 Hr.	24.4	3	8.17	7.97	7.71	7.65	7.64	7.50	7.45	LM
03/23/20	Renew	24.3	3	8.11	7.87	7.62	7.52	7.53	7.44	7.31	LM
03/24/20	168 Hr.	24.5	3	8.18	8.11	8.10	8.09	8.08	8.07	8.07	SD

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution							Analyst
				PCON	TCON	9%	12%	16%	21%	28%	
03/17/20	Start	25.0	1	8.15	8.15	8.15	8.09	7.99	7.85	8.10	SD
03/18/20	24 Hr.	24.3	1	7.45	7.28	8.23	8.60	8.35	8.28	8.33	LM
03/18/20	Renew	24.2	1	7.66	8.60	8.45	7.53	7.22	7.98	8.49	LM
03/19/20	48 Hr.	24.6	1	7.98	7.99	8.00	8.24	8.17	7.89	8.00	SD
03/19/20	Renew	25.0	2	7.81	8.63	8.59	8.63	7.69	8.55	8.43	SD
03/20/20	72 Hr.	24.4	2	8.15	8.08	8.06	8.05	7.99	8.04	7.11	LM
03/20/20	Renew	24.3	2	8.09	7.60	7.63	8.11	8.12	8.12	8.07	LM
03/21/20	96 Hr.	24.0	2	8.02	8.04	7.87	7.70	8.65	7.20	7.16	XX
03/21/20	Renew	25.0	3	8.65	7.71	7.66	7.71	7.82	7.82	7.73	SD
03/22/20	120 Hr.	24.3	3	7.66	7.36	7.51	7.58	8.59	8.38	7.68	LM
03/22/20	Renew	24.3	3	7.83	7.71	7.73	7.82	7.82	7.79	7.12	LM
03/23/20	144 Hr.	24.4	3	7.80	8.60	8.59	7.32	8.65	7.74	7.65	LM
03/23/20	Renew	24.3	3	8.50	8.61	8.65	8.62	7.80	7.44	8.10	LM
03/24/20	168 Hr.	24.5	3	8.04	8.45	8.14	8.09	8.18	8.25	8.18	SD

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

Little Rock, Adams Field

Lab ID# 31262

Test Date: March 17, 2020

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
03/17/20	1	7.74	8.43	60	44	216	<0.01	N/A	SD
03/19/20	2	7.70	8.24	56	54	268	<0.01	N/A	SD
03/21/20	3	7.74	7.55	64	54	252	<0.01	N/A	SD

INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
03/17/20	RS1	8.11	8.15	140	100	644	<0.01	N/A	SD
03/19/20	RS2	8.09	8.63	108	86	480	<0.01	N/A	SD
03/21/20	RS3	7.92	7.71	124	88	525	<0.01	N/A	SD

¹ Measurements taken in 100% solution.

CERIODAPHNIA DUBIA STATISTICAL ANALYSES
 Reproduction

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	10	20.000	27.000	24.000
2	9% Effluent	10	21.000	27.000	24.400
3	12% Effluent	10	21.000	30.000	25.100
4	16% Effluent	10	22.000	29.000	24.700
5	21% Effluent	10	21.000	28.000	25.300
6	28% Effluent	10	21.000	28.000	25.000

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V.%
1	Control	5.333	2.309	0.730	9.62
2	9% Effluent	2.933	1.713	0.542	7.02
3	12% Effluent	7.211	2.685	0.849	10.70
4	16% Effluent	4.900	2.214	0.700	8.96
5	21% Effluent	6.900	2.627	0.831	10.38
6	28% Effluent	3.778	1.944	0.615	7.77

Chi-Square Test For Normality: Actual And Expected Frequencies

Interval	< -1.5	-1.5 to -0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
Expected	4.020	14.520	22.920	14.520	4.020
Observed	6	11	23	16	4

Calculated Chi-Square goodness of fit test statistic = 1.9798
 Table Chi-Square value (alpha = 0.01) = 13.277

Data **Pass** normality test. Continue analysis.

Bartlett's Test For Homogeneity of Variance

Calculated B1 statistic = 2.49

Table Chi-square value = 15.09 (alpha = 0.01, DF = 5)
 Table Chi-square value = 11.07 (alpha = 0.05, DF = 5)

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

ANOVA Table

SOURCE	DF	SS	MS	F
Between	5	11.750	2.350	0.454
Within (Error)	54	279.500	5.176	
Total	59	291.250		

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

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

Grp	Identification	Transformed	Mean	T Stat	Sig
		Mean	Calculated In Original Units		
1	Control	24.000	24.000		
2	9% Effluent	24.400	24.400	-0.393	
3	12% Effluent	25.100	25.100	-1.081	
4	16% Effluent	24.700	24.700	-0.688	
5	21% Effluent	25.300	25.300	-1.278	
6	28% Effluent	25.000	25.000	-0.983	

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

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

Grp	Identification	Num of Reps	Minimum Sig	% of	Difference
			Diff (In Orig. Units)	Control	from Control
1	Control	10			
2	9% Effluent	10	2.350	9.8	-0.400
3	12% Effluent	10	2.350	9.8	-1.100
4	16% Effluent	10	2.350	9.8	-0.700
5	21% Effluent	10	2.350	9.8	-1.300
6	28% Effluent	10	2.350	9.8	-1.000

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

CLIENT	Little Rock WRA, Adams Field WRF	SAMPLE TYPE	24 Hour Composite
NPDES #	AR0021806	DATE COLLECTED	03/16/20 03/18/20 03/20/20
LAB ID #	31262	DATE RECEIVED	03/17/20 03/19/20 03/21/20
TEST TYPE	7 Day Chronic	BEGIN DATE/TIME	03/17/20 1530
TEST ORGANISM	<i>Pimephales promelas</i>	END DATE/TIME	03/24/20 1530
ORGANISM AGE	< 24-Hours	TEST TEMPERATURE (°C)	25 ± 1
ORGANISM SOURCE	In House	PHOTO PERIOD	16-hr Light 8-hr. Dark
RECEIVING WATER	Arkansas River	LIGHT INTENSITY	50-100 ft. cndl
DILUTION WATER	Arkansas River	TECHNICIAN	J. Castillo

SURVIVAL SUMMARY

Conc.	03/18/20					03/19/20					03/20/20					03/21/20					03/22/20									
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E					
PCON	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
TCON	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
12%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
16%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
21%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
28%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Conc.	03/23/20					03/24/20					x% Survival	C.V. %
	A	B	C	D	E	A	B	C	D	E		
PCON	8	8	8	8	8	8	8	8	8	8	100.0	0.00
TCON	8	8	8	8	8	8	8	8	8	8	100.0	0.00
9%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
12%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
16%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
21%	8	8	8	8	8	8	8	8	8	8	100.0	0.00
28%	8	8	8	8	8	8	8	8	8	8	100.0	0.00

MEAN DRY WEIGHT PER REP

% Effluent	Rep A	Rep B	Rep C	Rep D	Rep E	x	C.V. %
PCON	0.4650	0.4870	0.4290	0.4630	0.4770	0.4642	4.73
TCON	0.4820	0.4240	0.4340	0.4350	0.4460	0.4442	5.07
9%	0.4290	0.4760	0.4850	0.4610	0.4390	0.4580	5.19
12%	0.4640	0.4850	0.4240	0.4730	0.4650	0.4622	4.97
16%	0.4490	0.4670	0.4800	0.4790	0.4500	0.4650	3.24
21%	0.4860	0.4270	0.4650	0.4770	0.4650	0.4640	4.85
28%	0.4900	0.4350	0.4570	0.4260	0.4830	0.4582	6.18

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

Little Rock, Adams Field

Lab ID# 31262

Test Date: March 17, 2020

WET CHEMISTRY MEASUREMENTS

Date	Time	Temp	Samp. No.	pH of Solution						Analyst	
				PCON	TCON	9%	12%	16%	21%		28%
03/17/20	Start	25.0	1	8.17	8.11	8.04	7.98	7.94	7.88	7.81	SD
03/18/20	24 Hr.	24.6	1	7.73	7.63	7.66	7.63	7.65	7.64	7.54	LM
03/18/20	Renew	24.2	1	8.77	8.61	8.55	9.50	8.49	8.40	8.40	LM
03/19/20	48 Hr.	24.7	1	7.83	7.79	7.79	7.80	7.78	7.77	7.76	SD
03/19/20	Renew	25.0	2	8.14	8.09	8.02	7.93	7.87	7.82	7.78	SD
03/20/20	72 Hr.	24.5	2	8.02	7.91	7.90	7.90	7.86	7.80	7.73	LM
03/20/20	Renew	24.3	2	8.09	8.01	7.87	7.79	7.76	7.70	7.64	LM
03/21/20	96 Hr.	24.0	2	7.62	7.64	7.65	7.69	7.71	7.68	7.63	SD
03/21/20	Renew	25.0	3	7.96	7.92	7.84	7.77	7.70	7.67	7.58	SD
03/22/20	120 Hr.	24.2	3	7.72	7.72	7.71	7.66	7.67	7.71	7.73	LM
03/22/20	Renew	24.2	3	8.02	7.83	7.70	7.56	7.59	7.41	7.36	LM
03/23/20	144 Hr.	24.4	3	7.69	7.59	7.54	7.57	7.52	7.50	7.49	LM
03/23/20	Renew	24.3	3	8.11	7.87	7.62	7.52	7.53	7.44	7.31	LM
03/24/20	168 Hr.	24.5	3	7.66	7.61	7.60	7.62	7.55	7.52	7.51	SD

Date	Time	Temp	Samp. No.	DO (mg/L) of Solution						Analyst	
				PCON	TCON	9%	12%	16%	21%		28%
03/17/20	Start	25.0	1	8.15	8.15	8.15	8.09	7.99	7.85	8.10	SD
03/18/20	24 Hr.	24.6	1	7.78	8.37	7.84	7.85	7.86	7.82	7.72	LM
03/18/20	Renew	24.2	1	7.66	8.60	8.45	7.53	7.22	7.98	8.49	LM
03/19/20	48 Hr.	24.7	1	7.93	8.60	8.62	8.64	8.57	8.57	8.59	SD
03/19/20	Renew	25.0	2	7.81	8.63	8.59	8.63	7.69	8.55	8.43	SD
03/20/20	72 Hr.	24.5	2	7.91	7.97	7.97	8.00	7.86	7.49	7.93	LM
03/20/20	Renew	24.3	2	8.09	7.60	7.63	8.11	8.12	8.12	8.07	LM
03/21/20	96 Hr.	24.0	2	8.00	8.03	7.99	7.98	7.79	7.83	7.67	SD
03/21/20	Renew	25.0	3	8.65	7.71	7.66	7.71	7.82	7.82	7.73	SD
03/22/20	120 Hr.	24.2	3	8.50	7.79	7.67	7.85	7.88	7.88	7.75	LM
03/22/20	Renew	24.2	3	7.83	7.71	7.73	7.82	7.82	7.79	7.12	LM
03/23/20	144 Hr.	24.4	3	7.76	7.72	7.72	8.65	7.74	7.78	7.70	LM
03/23/20	Renew	24.3	3	8.50	8.61	8.65	8.62	7.80	7.44	8.10	LM
03/24/20	168 Hr.	24.5	3	8.54	8.54	8.10	8.29	8.34	8.05	8.33	SD

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

Little Rock, Adams Field

Lab ID# 31262

Test Date: March 17, 2020

INITIAL CHEMISTRY MEASUREMENTS @ 100% EFFLUENT

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
03/17/20	1	7.74	8.43	60	44	216	<0.01	N/A	SD
03/19/20	2	7.70	8.24	56	54	268	<0.01	N/A	SD
03/21/20	3	7.74	7.55	64	54	252	<0.01	N/A	SD

INITIAL CHEMISTRY MEASUREMENTS @ RECEIVING WATER

Date	Samp. No.	pH ¹	DO ¹	Hardness mg/L CaCO ₃ ¹	Alkalinity mg/L CaCO ₃ ¹	Conduct. μS/cm ¹	Resid.Cl ₂ mg/L ¹	Dechlor(mL) Na ₂ S ₂ O ₃ mg/L ¹	Analyst
03/17/20	RS1	8.11	8.15	140	100	644	<0.01	N/A	SD
03/19/20	RS2	8.09	8.63	108	86	480	<0.01	N/A	SD
03/21/20	RS3	7.92	7.71	124	88	525	<0.01	N/A	SD

¹ Measurements taken in 100% solution.

PIMEPHALES PROMELAS STATISTICAL ANALYSES
 Growth

Summary Statistics on Transformed Data Table 1 of 2

Grp	Identification	N	Min	Max	Mean
1	Control	5	0.424	0.482	0.444
2	9% Effluent	5	0.429	0.485	0.458
3	12% Effluent	5	0.424	0.485	0.462
4	16% Effluent	5	0.449	0.480	0.465
5	21% Effluent	5	0.427	0.486	0.464
6	28% Effluent	5	0.426	0.490	0.458

Summary Statistics on Transformed Data Table 2 of 2

Grp	Identification	Variance	Sd	Sem	C.V. %
1	Control	0.001	0.023	0.010	5.07
2	9% Effluent	0.001	0.024	0.011	5.19
3	12% Effluent	0.001	0.023	0.010	4.97
4	16% Effluent	0.000	0.015	0.007	3.24
5	21% Effluent	0.001	0.022	0.010	4.85
6	28% Effluent	0.001	0.028	0.013	6.18

Shapiro - Wilk's Test For Normality

D = 0.013

W = 0.967

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

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

Data **Pass** normality test at P=0.01 level. Continue analysis.

Bartlett's Test For Homogeneity of Variance

Calculated B1 statistic = 1.38

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.

ANOVA Table

SOURCE	DF	SS	MS	F
Between	5	0.001	0.000	0.557
Within (Error)	24	0.013	0.001	
Total	29	0.014		

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

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

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

Grp	Identification	Transformed	Mean	T Stat	Sig
		Mean	Calculated In Original Units		
1	Control	0.444	0.444		
2	9% Effluent	0.458	0.458	-0.955	
3	12% Effluent	0.462	0.462	-1.245	
4	16% Effluent	0.465	0.465	-1.439	
5	21% Effluent	0.464	0.464	-1.370	
6	28% Effluent	0.458	0.458	-0.969	

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

No statistically significant difference

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

Grp	Identification	Num of Reps	Minimum Sig	% of	Difference
			Diff (In Orig. Units)	Control	from Control
1	Control	5			
2	9% Effluent	5	0.034	7.7	-0.014
3	12% Effluent	5	0.034	7.7	-0.018
4	16% Effluent	5	0.034	7.7	-0.021
5	21% Effluent	5	0.034	7.7	-0.020
6	28% Effluent	5	0.034	7.7	-0.014

**APPENDIX A
RAW DATA**

7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

PAGE 1 OF 2

CLIENT Little Rock - Adams Field

START DATE/TIME 3-17-20 MH 1600

OUTFALL 001

END DATE/TIME 3-24-20 MH 1600

LAB ID # 31262

Pcon

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	3	3	4	4	2	5	2	5	3	3	MH	1530
3/22	6	8	9	A	6	A	9	10	A	8	MH	1200
3/23	A	A	A	10	A	9	A	A	7	A	TG	0845
3/24	12	14	12	14	13	12	12	12	13	12	MH	1600
	21	25	25	28	21	26	23	27	23	23		

\bar{x} # Young w/o Dead = 24.2 CV% = 9.89

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

\bar{x} % Survival = 100 CV% = 0.00

Tcon

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	4	2	3	3	5	3	2	2	2	5	MH	1530
3/22	11	A	8	10	A	6	9	6	A	A	MH	1200
3/23	A	8	A	A	9	A	A	A	7	7	TG	0845
3/24	12	12	13	13	13	13	14	12	14	12	MH	1600
	27	22	24	26	27	22	25	20	23	24		

\bar{x} # Young w/o Dead = 24.0 CV% = 9.62

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

\bar{x} % Survival = 100 CV% = 0.00

9

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	3	3	2	3	3	5	5	5	4	2	MH	1530
3/22	A	A	7	8	6	6	9	A	A	A	MH	1200
3/23	9	8	A	A	A	A	A	7	8	8	TG	0845
3/24	14	14	12	13	14	13	13	14	12	14	MH	1600
	26	25	21	24	23	24	27	26	24	24		

\bar{x} # Young w/o Dead = 24.4 CV% = 7.02

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

\bar{x} % Survival = 100 CV% = 0.00

12

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	4	5	2	5	2	2	3	2	4	4	MH	1530
3/22	A	A	A	11	A	A	10	11	7	9	MH	1200
3/23	9	10	8	A	7	6	A	A	A	A	TG	0845
3/24	12	12	13	14	13	13	13	13	13	14	MH	1600
	25	27	23	30	22	21	26	26	24	27		

\bar{x} # Young w/o Dead = 25.1 CV% = 10.70

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

\bar{x} % Survival = 100 CV% = 0.00

7-DAY CERIODAPHNIA DUBIA SURVIVAL & REPRODUCTION

DAILY RAW DATA TABLE

CLIENT Little Rock-Adams Field
 OUTFALL 001
 LAB ID # 31262

START DATE/TIME 3-17-20 MH 1600
 END DATE/TIME 3-24-20 MH 1600

16

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	4	2	4	5	4	5	2	4	3	4	MH	1530
3/22	7	8	7	A	7	A	6	A	8	A	MH	1200
3/23	A	A	A	10	A	9	A	7	A	7	TG	0845
3/24	13	14	12	14	13	14	14	14	12	12	MH	1600

\bar{x} # Young w/o Dead = 24.7 CV% = 8.96

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

\bar{x} % Survival = 100 CV% = 0.00

21

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	5	5	2	3	3	2	3	2	4	3	MH	1530
3/22	A	10	A	9	11	11	9	A	A	9	MH	1200
3/23	10	A	6	A	A	A	A	6	10	A	TG	0845
3/24	13	13	13	12	13	14	13	13	13	13	MH	1600

\bar{x} # Young w/o Dead = 25.3 CV% = 10.38

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

\bar{x} % Survival = 100 CV% = 0.00

28

Date	Rep1	Rep2	Rep3	Rep4	Rep5	Rep6	Rep7	Rep8	Rep9	Rep10	Analyst	Time
3/18	A	A	A	A	A	A	A	A	A	A	MH	1600
3/19	A	A	A	A	A	A	A	A	A	A	MH	1415
3/20	A	A	A	A	A	A	A	A	A	A	TG	1230
3/21	2	5	4	5	3	2	5	2	2	4	MH	1530
3/22	10	A	A	A	10	A	6	7	9	9	MH	1200
3/23	A	7	9	9	A	8	A	A	A	A	TG	0845
3/24	12	13	14	14	13	14	14	12	13	13	MH	1600

\bar{x} # Young w/o Dead = 25.0 CV% = 7.77

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

\bar{x} % Survival = 100 CV% = 0.00

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

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

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

\bar{x} % Survival = CV% =

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

CLIENT/FACILITY: Little Rock - Adams Field DATE/TIME STARTED: 3-17-20 JC 1530

OUTFALL #: 001 PROJECT #: 31262 DATE/TIME ENDED: 3-24-20 JC 1530

ORGANISM ID#: PRO-20-076

Cont.	3-18-20 JC 1530					3-19-20 JC 1355					3-20-20 55					3-21-20 JC 935					3-22-20 JC 950				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Pear	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Tear	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
12	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
16	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
21	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
28	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Cont.	3-23-20 TG 1500					3-24-20 JC 1530					C.V. %	
	A	B	C	D	E	A	B	C	D	E		
Pear	8	8	8	8	8	8	8	8	8	8	100.0	0.00
Tear	8	8	8	8	8	8	8	8	8	8	100.0	0.00
9	8	8	8	8	8	8	8	8	8	8	100.0	0.00
12	8	8	8	8	8	8	8	8	8	8	100.0	0.00
16	8	8	8	8	8	8	8	8	8	8	100.0	0.00
21	8	8	8	8	8	8	8	8	8	8	100.0	0.00
28	8	8	8	8	8	8	8	8	8	8	100.0	0.00

**APPENDIX B
REFERENCE TOXICANTS**

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: *Ceriodaphnia dubia*

CHEMICAL: Sodium Chloride

DURATION: 7-Days

TEST NUMBER: 3

TEST DATE: 03/04/20 - 03/11/20
1645 Hrs - 1645 Hrs

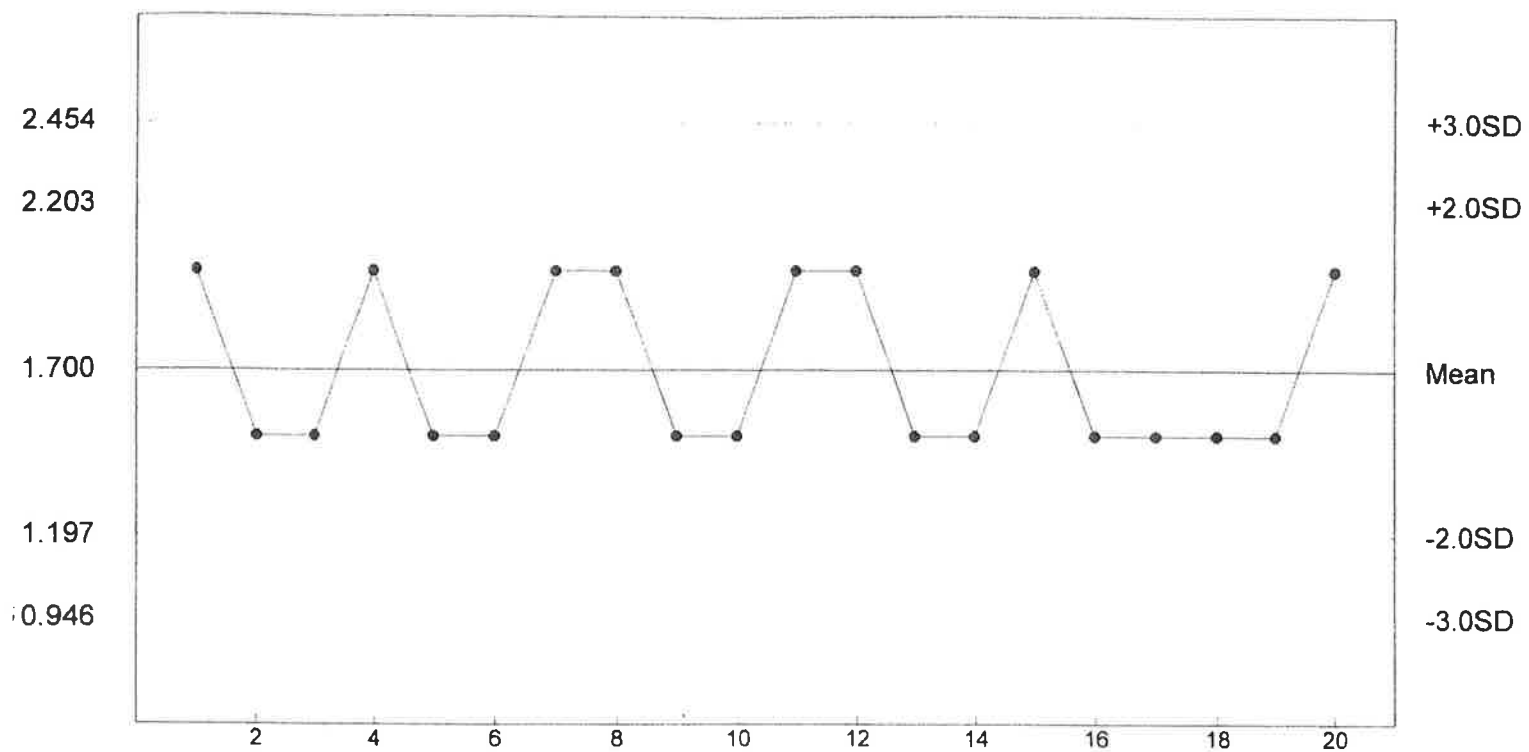
STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
0.5	10	0
1.0	10	0
1.5	10	0
2.0	10	3
2.5	10	10
3.0	10	10
4.0	10	10

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

Reference Tox Sodium Chloride g/L

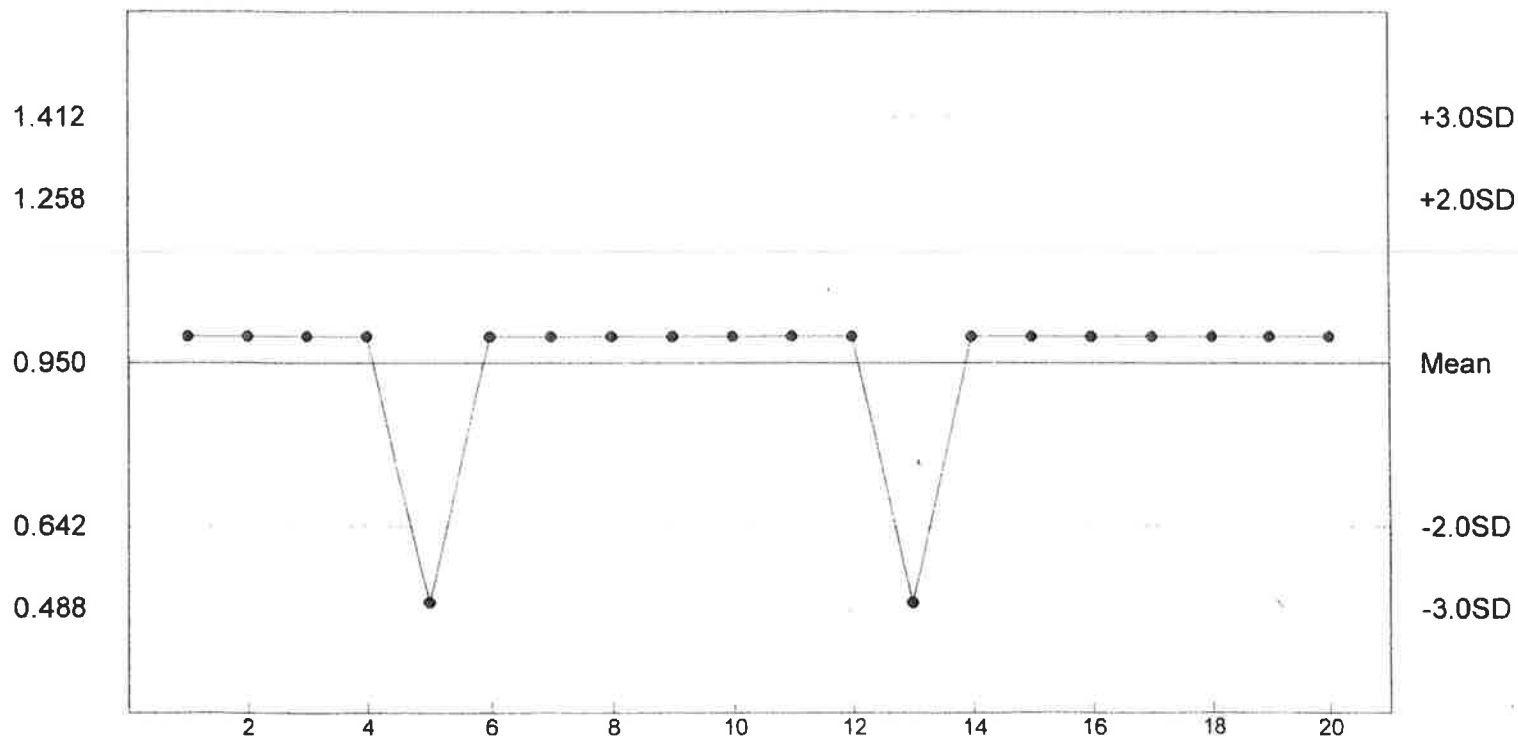
C. dubia Survival - NOEC



n= 20 Mean= 1.700 SD= 0.251 CV= 14.78% Min= 1.500 Max= 2.000

Reference Tox Sodium Chloride g/L

C. dubia Reproduction - NOEC



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

CHRONIC REFERENCE TOXICANT TEST RESULTS

SPECIES: *Pimephales promelas*

CHEMICAL: Copper Nitrate

DURATION: 7-Days

TEST NUMBER: 3

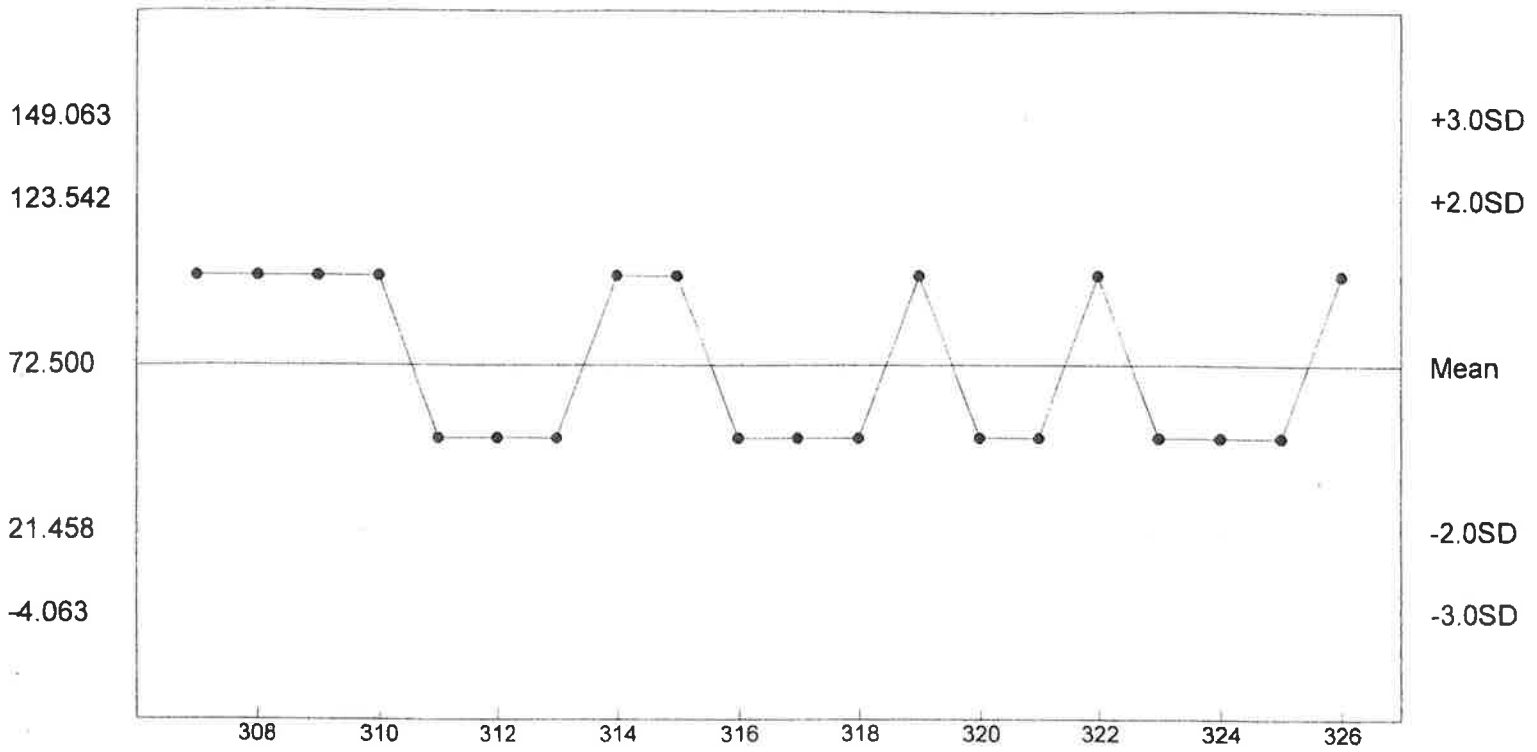
TEST DATE: 03/04/20 - 03/11/20
1630 Hrs - 1630 Hrs

STATISTICAL METHOD: Dunnetts/Steels

CONCENTRATION (ug/L)	NUMBER EXPOSED	NUMBER DEAD
12.5	40	0
25	40	0
50	40	0
100	40	0
200	40	33
400	40	40
800	40	40

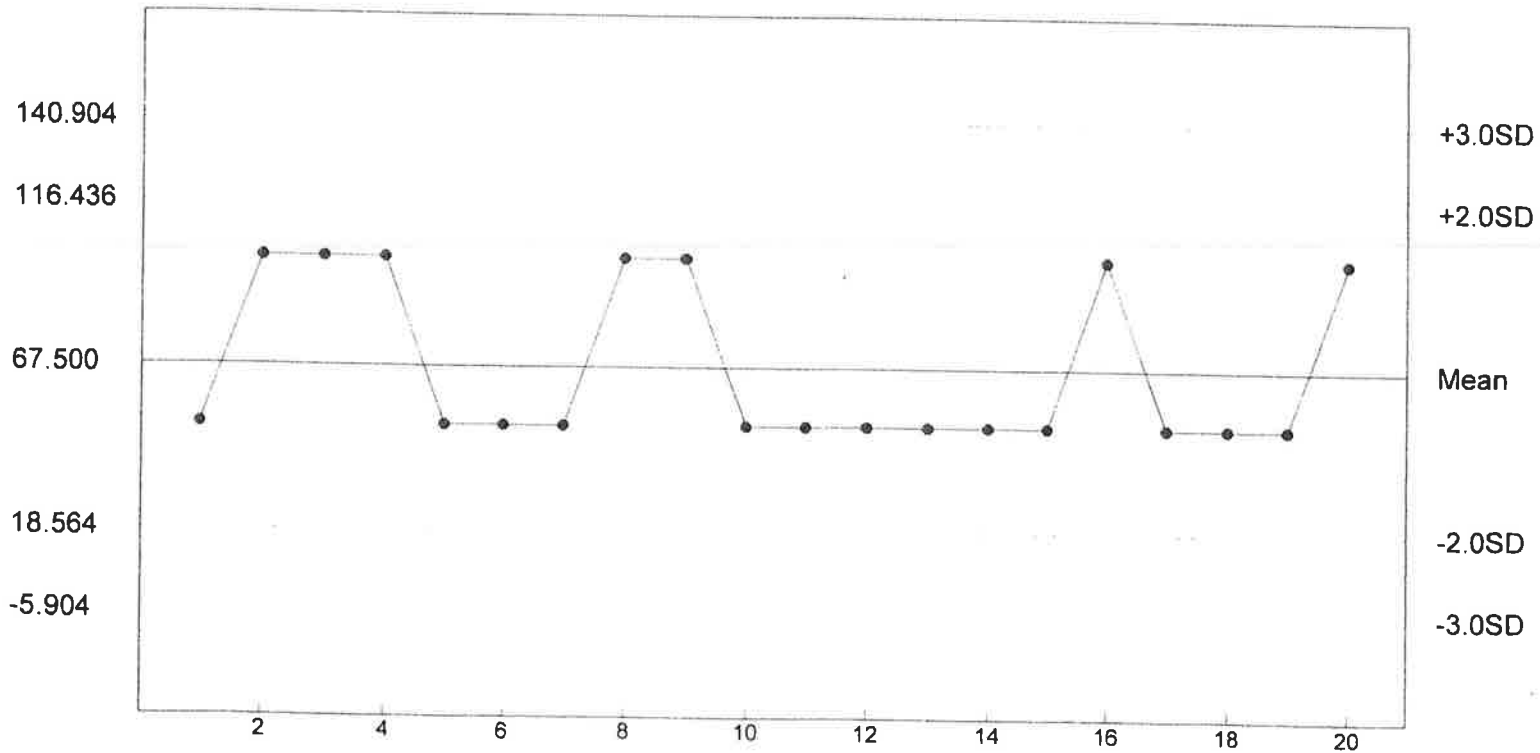
LOEC FOR SURVIVAL	NOEC FOR SURVIVAL	LOEC FOR GROWTH	NOEC FOR GROWTH
200 ug/L	100 ug/L	200 ug/L	100 ug/L

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



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

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



n= 20 Mean= 67.500 SD= 24.468 CV= 36.25% Min= 50.000 Max= 100.000

**APPENDIX C
CHAIN OF CUSTODY SHEETS**

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

CHAIN OF CUSTODY RECORD

PROJECT # 31262 PROJECT NAME Little Rock - Adams Field PERMIT# AR0021806

OUTFALL SAMPLES

24-Hr Flow Weighted Composite Other _____

OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	METHODS OF COLLECTION AND COMPOSITE			# OF CONTAINERS TO BE SHIPPED
					AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	
005-001 AF Final EFF	<i>Bradley</i>	3-15-20 12:00PM	3-16-20 10:00AM	12			X	1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H ₂ O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED
080-001 UP Stream AF out-Fall 34-823602, -92-395966	Dena Marcelli <i>Dena Marcelli</i>	3-16-2020	9:41am	1

TYPE OF TEST 7 Day C/F
 NAME OF RECEIVING WATER Arkansas River
 DILUTION WATER USED FOR THIS TEST RS
* Delivered to Greyhound for Shipment

RELINQUISHED BY: Dena Marcelli DATE: 3-16-20 TIME: * RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 METHOD OF SHIPMENT: Greyhound Pick Up _____ Client Delivered _____ Other _____

RECEIVED: Matt Turner DATE: 3-17-20 TIME: 1100 SAMPLE TEMP. @ RECEIPT: 3.2
JRI

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

CHAIN OF CUSTODY RECORD

PROJECT # 31262 PROJECT NAME Little Rock - Adams Field PERMIT# AR 0021806

OUTFALL SAMPLES

24-Hr Flow Weighted Composite Other

OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	METHODS OF COLLECTION AND COMPOSITE			# OF CONTAINERS TO BE SHIPPED
					AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	
005-002 AF FINAL EFF.	J. Burk	3-17-20 12:00pm	3-18-20 10:00am	12			X	1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'NG) H ₂ O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED
080-002 Above AR. River outfall 34.823602, 92.395.66	R. Scanlon	3-18-20	9:33am	1

TYPE OF TEST 7 Day C/F
 NAME OF RECEIVING WATER Arkansas River
 DILUTION WATER USED FOR THIS TEST RS
 * Delivered to Greyhound for Shipment

RELINQUISHED BY: Brodly Roberts DATE: 3-18-20 TIME: * RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 METHOD OF SHIPMENT: Greyhound Client Delivered _____ Other _____
 RECEIVED: [Signature] DATE: 3/19/20 TIME: 9:20 SAMPLE TEMP. @ RECEIPT. 42.1 R

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

CHAIN OF CUSTODY RECORD

PROJECT # 31262 PROJECT NAME Little Rock - Adams Field PERMIT# AR0021806

OUTFALL SAMPLES

24-Hr Flow Weighted Composite Other _____

OUTFALL NUMBER	PERSON TAKING SAMPLE	START DATE/TIME	END DATE/TIME	# OF PORTIONS COMPOSITED	METHODS OF COLLECTION AND COMPOSITE			# OF CONTAINERS TO BE SHIPPED
					AUTO COLL. AUTO COMP.	MANUAL COLL. MANUAL COMP.	AUTO COLL. MANUAL COMP.	
005-003 AF FINAL EFF.	J. B. Baker	3-19-2020 12:00pm	3-20-2020 10:00am	12			X	1

RECEIVING WATER SAMPLES

SAMPLE IDENTIFICATION (FOR REC'G) H ₂ O GRABS, GIVE NAME OF STREAM AND LOCATION	PERSON TAKING SAMPLE	DATE	TIME	# OF CONTAINERS TO BE SHIPPED
080-003 AF RIVER SAMPLE - AR RIVER ABOVE OUTFALL	Paul Scarborough	3-20-2020	Am	1

TYPE OF TEST 7 Day CIF
 NAME OF RECEIVING WATER Arkansas River
 DILUTION WATER USED FOR THIS TEST RS
 DELIVERED TO GREYHOUND FOR SHIPMENT.

RELINQUISHED BY: J. B. Baker DATE: 3-20-2020 TIME: 8 RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 RELINQUISHED BY: _____ DATE: _____ TIME: _____ RECEIVED BY AT THIS DATE/TIME _____
 METHOD OF SHIPMENT: Greyhound Pick Up _____ Client Delivered _____ Other _____

RECEIVED: Matt Turner DATE: 3-21-20 TIME: 1000 SAMPLE TEMP. @ RECEIPT: 49
 IRI

**LITTLE ROCK WATER RECLAMATION AUTHORITY
ADAMS FIELD WATER RECLAMATION FACILITY
PERMIT NO. NPDES AR0021806
OUTFALL 001
TEST DATE: 03/17/20
FOR NET DMR**

I. *Ceriodaphnia dubia*

	Response
a. If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TLP3B.	0
b. Report the NOEC value for survival, Parameter No. TOP3B.	28%
c. Report the NOEC value for reproduction, Parameter No. TPP3B.	28%
d. If the NOEC for reproduction is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TGP3B.	0
e. Report the higher coefficient of variation (critical dilution or control), Parameter No. TQP3B.	10.38%

II. *Pimephales promelas*

	Response
a. If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TLP6C.	0
b. Report the NOEC value for survival, Parameter No. TOP6C.	28%
c. Report the NOEC value for growth, Parameter No. TPP6C.	28%
d. If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a "1"; otherwise, enter a "0". Parameter No. TGP6C.	0
e. Report the highest coefficient of variation (critical dilution or control) Parameter No. TQP6C.	5.07%

Ceriodaphnia dubia

22415 Retest Number 1 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9
22416 Retest Number 2 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9
51443 Retest Number 3 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9

Pimephales promelas

22418 Retest Number 1 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9
22419 Retest Number 2 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9
51444 Retest Number 3 (<i>For 9: First column param. NODI pulldown menu, highlight "9"</i>)	9

In comment box at bottom left: 9 = No retests required.