

May 04, 2020

Brad Stewart
Springdale Water Utilities
2910 Silent Grove Road
Springdale, AR 72762

RE: Project: WET TEST
Pace Project No.: 60334832

Dear Brad Stewart:

Enclosed are the analytical results for sample(s) received by the laboratory on April 21, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - SE Kansas

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jeffrey Shopper
jeff.shopper@pacelabs.com
1(913)563-1408
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: WET TEST

Pace Project No.: 60334832

Pace Analytical Services Southeast Kansas

808 West McKay, Frontenac, KS 66763

Arkansas Certification #: 18-016-0

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10426

Louisiana Certification #: 03055

Oklahoma Certification #: 9935

Texas Certification #: T104704407

Utah Certification #: KS00021

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: WET TEST
Pace Project No.: 60334832

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60334832001	SWWTF EFFLUENT	Water	04/20/20 08:00	04/21/20 08:00

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SAMPLE ANALYTE COUNT

Project: WET TEST
Pace Project No.: 60334832

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60334832001	SWWTF EFFLUENT	EPA 821/R-02/013	TDH	1	PASI-SE

PASI-SE = Pace Analytical Services - SE Kansas

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ANALYTICAL RESULTS

Project: WET TEST

Pace Project No.: 60334832

Sample: SWWTF EFFLUENT		Lab ID: 60334832001	Collected: 04/20/20 08:00	Received: 04/21/20 08:00	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity								
Analytical Method: EPA 821/R-02/013								
Pace Analytical Services - SE Kansas								
Toxicity, Chronic	Complete		1.0	1		04/21/20 10:45		

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QUALIFIERS

Project: WET TEST

Pace Project No.: 60334832

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WET TEST

Pace Project No.: 60334832

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60334832001	SWWTF EFFLUENT	EPA 821/R-02/013	652170		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60334832
Barcode with number 60334832

Client Name: Springdale

Courier: FedEx [] UPS [] WA [X] Clay [] PEX [] ECI [] Pace [] Xroads [] Client [] Other []

Tracking #: Pace Shipping Label Used? Yes [] No [X]

Custody Seal on Cooler/Box Present: Yes [X] No [] Seals intact: Yes [X] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [X] Other []

Thermometer Used: T-111 Type of Ice: Wet [] Blue [] None []

Cooler Temperature (°C): As-read 3.8 Corr. Factor -1.0 Corrected 2.8

Date and initials of person examining contents: MB 4/21/20 0800

Temperature should be above freezing to 6°C

Table with 2 columns: Question/Field and Answer (Yes/No/N/A). Rows include Chain of Custody present, Samples arrived within holding time, Short Hold Time analyses, etc.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Jeffrey Shopper Date:



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

MATRIX Drinking Water Waste Water Product Soil/Solid Oil Wipe All Other Tissue		CODE DW WW P SL OL WIP AR OT TS	
SAMPLE ID One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique			
MATRIX CODE (see valid codes to left) SAMPLE TYPE (G=GRAB C=COMP) COLLECTED START DATE TIME END DATE TIME SAMPLE TEMP AT COLLECTION # OF CONTAINERS Unpreserved H2SO4 HNO3 HCl NaOH Na2S2O3 Methanol Other Analyzes Test Y/N Chronic Wet Test Requested Analysis Filtered (Y/N)			

ITEM #	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	Received on	Ice (Y/N)	Custody Sealed (Y/N)	Cooler (Y/N)	Samples Intact (Y/N)
1	W	04/20/20	0800	Jeff Shopper	4/21/20	0800	2.8					
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: Travis Piatkowski SIGNATURE of SAMPLER: <i>Travis Piatkowski</i> DATE Signed: 04/20/20	
--	--

REFERENCE #60334832

**CHRONIC TOXICITY TEST FOR
Springdale Water Utilities**

PERMIT # AR 0022063
AFIN # 72-00003

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

Springdale Water Utilities
Brad Stewart
2910 Silent Grove Road
Springdale, AR 72762
479-756-3657

PREPARED BY:
Pace Analytical Services, Inc.
808 West McKay
Frontenac, KS 66763
1-620-235-0003

April 30, 2020

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SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (*Pimephales promelas*), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (*Ceriodaphnia dubia*), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the Springdale Water Utilities effluent discharge from April 20, 2020 to April 24, 2020. All the test methods followed are as listed in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms."

Statistically significant ($p < 0.05$) mortality is determined by Dunnet's procedure using average percent survival of each test concentration versus the average survival of the controls. If significant mortality occurs, median lethal concentrations are calculated using effluent concentrations and their corresponding percent mortality data. The 95% confidence intervals are calculated where appropriate by the Spearman-Kärber method. Statistical analysis is accomplished by following steps in EPA 821-R-02-013, February 2002 and by use of Toxstat version 3.4.

In minnow section of testing, it was observed that the effluent had no significant effect on the survival of the larvae at the 97% concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 97% for survival. No significant reduction in growth was observed in the 97% effluent concentration. The Toxic Units is < 1.03 . The IC₂₅ is > 97 . The NOEC for growth in effluent was determined to be 97%. The PMSD was 16.0. The COV is 10.12

In Cladoceran section of testing, it was observed that the effluent had no significant effect on the survival of the organisms in the 97% effluent concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 97% for survival. No significant reduction in reproduction was observed in the 97% effluent concentrations. The Toxic Units is < 1.03 . The IC₂₅ is > 97 . The NOEC for reproduction in effluent was determined to be 97%. The PMSD was 14.8. The COV is 22.04.

The chronic toxicity exhibited by the fathead minnows and the *Ceriodaphnia* treated by the effluent sampled from April 20 to April 24 from the Springdale Water Utilities effluent discharge, is acceptable as described in EPA 821-R-02-013.

INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the Springdale Water Utilities effluent discharge. Chronic toxicity was measured using the Pimephales promelas at larval for survival and growth test and the Ceriodaphnia dubia survival and reproduction test described in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." The raw data of the study is stored at Pace Analytical Services, INC. 808 West McKay, Frontenac, KS 66763.

TEST MATERIAL

Springdale Water Utilities personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 4-21-20. Subsequent samples followed by delivery on 4-23-20 and on 4-25-20. All samples were stored at $\leq 6^{\circ}$ Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in EPA 821-R-02-013.

TEST METHODS

Pace used EPA test method 1000.0 for conducting the Fathead Minnow, Pimephales promelas, Larval Survival and Growth Test. EPA test method 1002.0 was used for conducting the Cladoceran, Ceriodaphnia dubia, Survival and Reproduction Test. The tests were conducted to estimate the NOEC, and LOEC for survival, growth, and reproduction of these test species.

The Pimephales and Ceriodaphnia tests were initiated on 4-21-20 and carried out until 4-28-20. The Pimephales tests were conducted in 500 ml plastic jars with 250 ml of test solution. Eight larvae were placed in each of at least 5 replicates to make a total of 40 larvae per sample concentration. The Ceriodaphnia tests were carried out in 35ml vials containing 25 ml of test solution. One Neonate was placed in each of 10 replicates to make a total of 10 neonates per sample concentration.

TEST ORGANISMS

The organisms used in these tests were cultured at Pace under controlled temperature and photoperiod conditions and/or were purchased from an external supplier. Pace maintains records of all culture techniques used in producing organisms.

TABLE 1

Permittee: Springdale Water Utilities Effluent discharge.

Date Sampled	No. 1: 4-20-20	8:00
	No. 2: 4-22-20	8:00
	No. 3: 4-24-20	8:00
Test Initiated: 10:45	Date: 4-21-20	

RESULTS

Ceriodaphnia dubia	Results
TLP3B	0
TGP3B	0
TOP3B	97
TPP3B	97
TQP3B	22.04
Pimephales promelas	Results
TLP6C	0
TGP6C	0
TOP6C	97
TPP6C	97
TQP6C	10.12

Dilution Water used: Moderately Hard Synthetic Water

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(*Pimephales promelas*)

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

Effluent Concentration (%)	Average Dry Weight in Milligrams in Replicate Chambers					Mean Dry Weight (mg)	CV% *
	A	B	C	D	E		
Control 0%	0.382	0.417	0.359	0.396	0.320	0.375	9.92
Dilution 1 31%	0.405	0.341	0.389	0.356	0.396	0.377	7.29
Dilution 2 41%	0.389	0.281	0.319	0.384	0.432	0.361	16.69
Dilution 3 55%	0.360	0.347	0.412	0.318	0.409	0.369	11.01
Dilution 4 73%	0.398	0.369	0.346	0.376	0.422	0.382	7.58
Dilution 5 97%	0.338	0.343	0.426	0.405	0.384	0.379	10.12

* Coefficient of Variation = Standard Deviation X 100 / Mean

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E	24hr	48hr	7 day	
Control 0%	100	100	100	100	87.5	100	100	97.5	4.79
Dilution 1 31%	100	87.5	100	100	100	100	100	97.5	4.79
Dilution 2 41%	100	75	100	100	100	100	100	95	9.30
Dilution 3 55%	100	100	100	87.5	100	100	100	97.5	4.79
Dilution 4 73%	100	100	87.5	100	100	100	100	97.5	4.79
Dilution 5 97%	87.5	100	100	100	100	100	100	97.5	4.79

REFERENCE #60334832

Permittee: Springdale Water Utilities Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

Replicate	Control 0%	Dilution 1 31%	Dilution 2 41%	Dilution 3 55%	Dilution 4 73%	Dilution 5 97%
1	20	25	20	19	23	25
2	22	21	18	18	25	24
3	23	21	16	25	22	24
4	26	25	21	17	27	17
5	20	17	24	21	17	13
6	25	22	16	17	28	25
7	22	17	24	18	20	17
8	22	26	24	19	23	16
9	25	21	21	21	17	23
10	23	24	23	24	23	25
Mean	22.8	21.9	20.7	19.9	22.0	20.9
SD	2.044	3.178	3.164	2.807	3.197	4.606
CV %	8.96	14.51	15.29	14.10	14.53	22.04

CERIODAPHNIA MEAN PERCENT SURVIVAL

Time Elapsed	Percent Effluent (%)					
	Control 0%	Dilution 1 31%	Dilution 2 41%	Dilution 3 55%	Dilution 4 73%	Dilution 5 97%
24 hrs	100	100	100	100	100	100
48 hrs	100	100	100	100	100	100
7-day	100	100	100	100	100	100
SD	0.000	0.000	0.000	0.000	0.000	0.000
CV %	0.00	0.00	0.00	0.00	0.000	0.000

TABLE 2
SUMMARY OF TEST CONDITIONS FOR THE FATHEAD MINNOW
(Pimephales promelas) LARVAL SURVIVAL AND GROWTH TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	500 ml
7. Test solution volume	250 ml
8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	8
11. No. replicates/concentration	5
12. No. larvae/concentration	40
13. Feeding regime	Feed 0.15 g newly hatched brine shrimp nauplii two times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None

TABLE 2 (CONT.)

16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 31%, 41%, 55%, 73%, 97%
18. Test duration	7 days
19. Endpoints	Survival and growth
20. Test acceptability	80% or greater survival in the controls, Average dry weight in controls >0.25 mg, Coefficient of variation in the control must not exceed 40%.

**TABLE 2 (CONT.)
SUMMARY OF TEST CONDITIONS FOR THE CLADOCERAN
(Ceriodaphnia dubia) SURVIVAL AND REPRODUCTION TEST**

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	30 ml
7. Test solution volume	25 ml

TABLE 2 (CONT.)

8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	1
11. No. replicates/concentration	10
12. No. larvae/concentration	10
13. Feeding regime	Feed 0.1 ml YCT and 0.1 ml of Algae daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None
16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 31%, 41%, 55%, 73%, 97%
18. Test duration	Until 60% or more surviving control females have three broods or a maximum of 8 days.
19. Endpoints	Survival and Reproduction
20. Test acceptability	80% or greater survival in the controls, Average reproduction rate of 15 young / adult. Coefficient of variation in the control must not exceed 40%.

TABLE 2 (SECTION 2)

BIOMONITORING CHRONIC TOXICITY REPORT
 FATHEAD MINNOW (Pimephales promelas)
 CHEMICAL PARAMETERS CHART

Permittee: Springdale Water Utilities Effluent discharge.

ANALYSTS: Pace Analytical Services, Inc.
 Timothy Harrell
 Mike Bollin
 Ethan Castagno

TABLE 2 (SECTION 2)
 INITIAL WATER QUALITY
 EFFLUENT CONCENTRATION

	Control	100%
PH	7.44	7.71
D.O.	8.30	9.40
Temp	25.0	25.0
Alk	62	98
Hard	90	132
Cond	330	712
Chlorine	<0.1	<0.1

- * D.O. is reported as mg/L
- Alkalinity is reported as mg/L CaCO₃
- Hardness is reported as mg/L CaCO₃
- Conductance is reported as umhos
- Ammonia is reported as mg/L
- Chlorine is reported as mg/L

TEST WATER QUALITY

24-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.56	7.30	25.2
31% Effluent	7.68	7.10	25.2
41% Effluent	7.74	7.10	25.2
55% Effluent	7.86	7.00	25.2
73% Effluent	7.89	6.90	25.2
97% Effluent	7.92	6.70	25.2

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.55	7.20	25.1
31% Effluent	7.64	7.20	25.2
41% Effluent	7.70	7.10	25.2
55% Effluent	7.82	7.10	25.2
73% Effluent	7.85	7.00	25.2
97% Effluent	7.87	7.00	25.2

FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	97%
pH	7.66	7.86
D.O.	7.00	7.00
Temp	25.1	25.0
Alk	64	100
Hard	94	126
Cond	378	844

- * D.O. is reported as mg/L
- Alkalinity is reported as mg/L CaCO₃
- Hardness is reported as mg/L CaCO₃
- Conductance is reported as umhos

TEST VALIDITY

The Pimephales promelas control survival rate was 97.5. The mean dry weight (growth) of the Pimephales promelas was determined at 0.375 mg/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 4.79 and 9.92. The Ceriodaphnia dubia survival rates were 100 in the control. The Ceriodaphnia in the control produced an average of 22.8 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 0.00 and 8.96. Control data met or exceeded all criteria set out by EPA 8100-R-02-013 for test acceptance.

REFERENCE #60334832

REFERENCE TOXICANTS

The absence of significant control mortality during this test indicated the health of the organisms and indicated that any significant mortality in the test concentrations was not due to contaminants or variations in testing conditions.

Reference toxicity testing is routinely performed by staff members in our biomonitoring - bioassay laboratory.

Start: 4/14/20 14:40 End: 4/21/20 14:00

Reference Toxicant (NaCl) Pimephales promelas

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
10 g/l	40	4	0	0
8 g/l	40	36	26	3
6 g/l	40	40	36	25
4 g/l	40	40	40	39
2 g/l	40	40	40	40

IC25 (5.12 g/l Sodium Chloride)

Survival NOEC: 4.0 g/l

Reference Toxicant (NaCl) Ceriodaphnia Dubia

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	6	2	0
2.0 g/l	10	10	9	1
1.5 g/l	10	10	10	10
1.0 g/l	10	10	10	10
0.5 g/l	10	10	10	10

IC25 (1.21 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By:


Timothy Harrell, Technical Director

60334832 Springdale FATHEAD SURVIVAL
File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

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	2.010	7.260	11.460	7.260	2.010
OBSERVED	6	0	24	0	0

Calculated Chi-Square goodness of fit test statistic = 38.1722
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

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

60334832 Springdale FATHEAD SURVIVAL
File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.093

W = 0.612

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.

60334832 Springdale FATHEAD SURVIVAL
 File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	0.991	1.107	1.084
2	31%	5	0.991	1.107	1.084
3	41%	5	0.886	1.107	1.063
4	55%	5	0.991	1.107	1.084
5	73%	5	0.991	1.107	1.084
6	97%	5	0.991	1.107	1.084

60334832 Springdale FATHEAD SURVIVAL
 File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.003	0.052	0.023	4.79
2	31%	0.003	0.052	0.023	4.79
3	41%	0.010	0.099	0.044	9.30
4	55%	0.003	0.052	0.023	4.79
5	73%	0.003	0.052	0.023	4.79
6	97%	0.003	0.052	0.023	4.79

60334832 Springdale FATHEAD SURVIVAL
 File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.002	0.000	0.095
Within (Error)	24	0.093	0.004	
Total	29	0.095		

Critical F value = 2.62 (0.05,5,24)
 Since $F < \text{Critical } F$ FAIL TO REJECT H_0 : All equal

60334832 Springdale FATHEAD SURVIVAL
 File: 6334832A Transform: ARC SINE(SQUARE ROOT(Y))

DUNNETT'S TEST - TABLE 1 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	1.084	0.780		
2	31%	1.084	0.780	0.000	
3	41%	1.063	0.760	0.534	
4	55%	1.084	0.780	0.000	
5	73%	1.084	0.780	0.000	
6	97%	1.084	0.780	0.000	

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

60334832 Springdale FATHEAD SURVIVAL

File: 6334832A

Transform: ARC SINE(SQUARE ROOT(Y))

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	31%	5	0.081	10.4	0.000
3	41%	5	0.081	10.4	0.020
4	55%	5	0.081	10.4	0.000
5	73%	5	0.081	10.4	0.000
6	97%	5	0.081	10.4	0.000

6033483 Springdale FATHEAD GROWTH
File: 6334832B Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.039

W = 0.972

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.

6033483 Springdale FATHEAD GROWTH
File: 6334832B Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance

Calculated B1 statistic = 3.12

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.

6033483 Springdale FATHEAD GROWTH
 File: 6334832B Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	0.320	0.417	0.375
2	31%	5	0.341	0.405	0.377
3	41%	5	0.281	0.432	0.361
4	55%	5	0.318	0.412	0.369
5	73%	5	0.346	0.422	0.382
6	97%	5	0.338	0.426	0.379

6033483 Springdale FATHEAD GROWTH
 File: 6334832B Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.001	0.037	0.017	9.92
2	31%	0.001	0.028	0.012	7.29
3	41%	0.004	0.060	0.027	16.69
4	55%	0.002	0.041	0.018	11.01
5	73%	0.001	0.029	0.013	7.58
6	97%	0.001	0.038	0.017	10.12

6033483 Springdale FATHEAD GROWTH
 File: 6334832B Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.001	0.000	0.184
Within (Error)	24	0.039	0.002	
Total	29	0.040		

Critical F value = 2.62 (0.05,5,24)
 Since $F < \text{Critical } F$ FAIL TO REJECT H_0 : All equal

6033483 Springdale FATHEAD GROWTH
 File: 6334832B 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	0.375	0.375		
2	31%	0.377	0.377	-0.102	
3	41%	0.361	0.361	0.542	
4	55%	0.369	0.369	0.220	
5	73%	0.382	0.382	-0.290	
6	97%	0.379	0.379	-0.173	

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

6033483 Springdale FATHEAD GROWTH

File: 6334832B

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	31%	5	0.060	16.0	-0.003
3	41%	5	0.060	16.0	0.014
4	55%	5	0.060	16.0	0.006
5	73%	5	0.060	16.0	-0.007
6	97%	5	0.060	16.0	-0.004

FISHER'S EXACT TEST

=====			
NUMBER OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS

CONTROL	10	0	10
31%	10	0	10

TOTAL	20	0	20
=====			

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

FISHER'S EXACT TEST

=====			
NUMBER OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS

CONTROL	10	0	10
41%	10	0	10

TOTAL	20	0	20
=====			

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

FISHER'S EXACT TEST

=====			
NUMBER OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS

CONTROL	10	0	10
55%	10	0	10

TOTAL 20 0 20

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

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
73%	10	0	10
TOTAL	20	0	20

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

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
97%	10	0	10
TOTAL	20	0	20

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

SUMMARY OF FISHER'S EXACT TESTS

NUMBER	NUMBER	SIG
--------	--------	-----

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	31%	10	0	
2	41%	10	0	
3	55%	10	0	
4	73%	10	0	
5	97%	10	0	

60334832 Springdale CERIODAPHNIA DUBIA SURVIVA
File: 6334832D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	1.000	1.000	1.000
2	31%	10	1.000	1.000	1.000
3	41%	10	1.000	1.000	1.000
4	55%	10	1.000	1.000	1.000
5	73%	10	1.000	1.000	1.000
6	97%	10	1.000	1.000	1.000

60334832 Springdale CERIODAPHNIA DUBIA SURVIVA
File: 6334832D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	31%	0.000	0.000	0.000	0.00
3	41%	0.000	0.000	0.000	0.00
4	55%	0.000	0.000	0.000	0.00
5	73%	0.000	0.000	0.000	0.00
6	97%	0.000	0.000	0.000	0.00

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
File: 6334832E 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	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	13	22	17	3

Calculated Chi-Square goodness of fit test statistic = 1.1173
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
File: 6334832E Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 5.83

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.

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
 File: 6334832E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	20.000	26.000	22.800
2	31%	10	17.000	26.000	21.900
3	41%	10	16.000	24.000	20.700
4	55%	10	17.000	25.000	19.900
5	73%	10	17.000	27.000	22.000
6	97%	10	13.000	25.000	20.900

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
 File: 6334832E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	4.178	2.044	0.646	8.96
2	31%	10.100	3.178	1.005	14.51
3	41%	10.011	3.164	1.001	15.29
4	55%	7.878	2.807	0.888	14.10
5	73%	10.222	3.197	1.011	14.53
6	97%	21.211	4.606	1.456	22.04

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
 File: 6334832E Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	55.533	11.107	1.048
Within (Error)	54	572.400	10.600	
Total	59	627.933		

Critical F value = 2.45 (0.05,5,40)
 Since $F < \text{Critical } F$ FAIL TO REJECT H_0 : All equal

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU
 File: 6334832E 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	22.800	22.800		
2	31%	21.900	21.900	0.618	
3	41%	20.700	20.700	1.442	
4	55%	19.900	19.900	1.992	
5	73%	22.000	22.000	0.549	
6	97%	20.900	20.900	1.305	

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

60334832 Sprindale CERIODAPHNIA DUBIA REPRODU

File: 6334832E

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	10			
2	31%	10	3.363	14.8	0.900
3	41%	10	3.363	14.8	2.100
4	55%	10	3.363	14.8	2.900
5	73%	10	3.363	14.8	0.800
6	97%	10	3.363	14.8	1.900

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	31	41	55	73	97
Response 1	20	25	20	19	23	25
Response 2	22	21	18	18	25	24
Response 3	23	21	16	25	22	24
Response 4	26	25	21	17	27	17
Response 5	20	17	24	21	17	13
Response 6	25	22	16	17	28	25
Response 7	22	17	24	18	20	17
Response 8	22	26	24	19	23	16
Response 9	25	21	21	21	17	23
Response 10	23	24	23	24	23	25

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: Springdale

Test Start Date: 4/21/20 Test Ending Date: 4/28/20

Test Species: Dubia

Test Duration: 7 Day

DATA FILE:

Conc. ID	Number Replicates	Concentration	Response Means	Std. Dev.	Pooled Response Means
1	10	0.000	22.800	2.044	22.800
2	10	31.000	21.900	3.178	21.900
3	10	41.000	20.700	3.164	21.033
4	10	55.000	19.900	2.807	21.033
5	10	73.000	22.500	3.719	21.033
6	10	97.000	20.900	4.606	20.900

*** No Linear Interpolation Estimate can be calculated from the input data since none of the (possibly pooled) group response means were less than 75% of the control response mean.

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	31	41	55	73	97
Response 1	.382	.405	.389	.360	.398	.338
Response 2	.417	.341	.281	.347	.369	.343
Response 3	.359	.389	.319	.412	.346	.426
Response 4	.396	.356	.384	.318	.376	.405
Response 5	.320	.396	.432	.409	.422	.384

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: Springdale

Test Start Date: 4/21/20 Test Ending Date: 4/28/20

Test Species: Fathead

Test Duration: 7 Day

DATA FILE:

Conc. ID	Number Replicates	Concentration	Response Means	Std. Dev.	Pooled Response Means
1	5	0.000	0.375	0.037	0.376
2	5	31.000	0.377	0.028	0.376
3	5	41.000	0.361	0.060	0.373
4	5	55.000	0.369	0.041	0.373
5	5	73.000	0.382	0.029	0.373
6	5	97.000	0.379	0.038	0.373

*** No Linear Interpolation Estimate can be calculated from the input data since none of the (possibly pooled) group response means were less than 75% of the control response mean.

Sample Condition Upon Receipt

Client Name: Springdale
 Courier: FedEx UPS MAE Clay PEX ECI Pace Xroads Client Other

Tracking #: _____
 Custody Seal on Cooler/Box Present: Yes No
 Seals intact: Yes No
 Packing Material: Bubble Wrap Bubble Bags Foam None Other
 Thermometer Used: T-111
 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 2.0 Corr. Factor -1.0 Corrected 1.0
 Temperature should be above freezing to 6°C

Date and initials of person examining contents:
Pro 4/23/20
0800

Chain of Custody present:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Chain of Custody relinquished:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Samples arrived within holding time:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Short Hold Time analyses (<22hr):	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Rush Turn Around Time requested:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Sufficient volume:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Correct containers used:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Pace containers used:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Containers intact:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Filtered volume received for dissolved tests?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X/A
Sample labels match COC: Date / time / ID / analyses	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Samples contain multiple phases? Matrix:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Cyanide water sample checks:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Lead acetate strip turns dark? (Record only)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Potassium iodide test strip turns blue/purple? (Preserve)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Trip Blank present:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Headspace in VOA vials (>6mm):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Samples from USDA Regulated Area: State:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Additional labels attached to 5035A / TX1005 vials in the field?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X/A

Client Notification/ Resolution: _____
 Copy COC to Client? Y / N
 Field Data Required? Y / N
 Person Contacted: _____
 Date/Time: _____
 Comments/ Resolution: _____

Project Manager Review: _____
 Date: _____

Sample Condition Upon Receipt

Client Name: Springdale Courier: FedEx UPS Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-111 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 1.0 Corr. Factor -1.0 Corrected 2.0

Date and initials of person examining contents: MS 800 4/25/20

Temperature should be above freezing to 6°C

Chain of Custody present	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Chain of Custody relinquished	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Samples arrived within holding time:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Short Hold Time analyses (<72hr):	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Rush Turn Around Time requested:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Sufficient volume:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Correct containers used:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Pace containers used:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Containers intact:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Filtered volume received for dissolved tests?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X/A
Sample labels match COC: Date / time / ID / analyses	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Samples contain multiple phases? Matrix:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2, NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Cyanide water sample checks:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Lead acetate strip turns dark? (Record only)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Potassium iodide test strip turns blue/purple? (Preserve)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Trip Blank present:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Headspace in VOA vials (>6mm):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Samples from USDA Regulated Area: State:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Additional labels attached to 5035A / TX1005 vials in the field?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> X/A

List sample IDs, volumes, lot #'s of preservative and the date/time added.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____