

February 23, 2021

Tony Brown City of Siloam Springs 975 Anderson Avenue Siloam Springs, AR 72761

RE: Project: 4TH QTR WET Pace Project No.: 60360977

Dear Tony Brown:

Enclosed are the analytical results for sample(s) received by the laboratory between February 09, 2021 and February 16, 2021. 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 Kansas City
- Pace Analytical Services SE Kansas

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

Sincerely,

This Wood

Nolie Wood nolie.wood@pacelabs.com 1(913)563-1401 Project Manager

Enclosures





Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

CERTIFICATIONS

Project: 4TH QTR WET

Pace Project No.: 60360977

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Inorganic Drinking Water Certification #: 10090 Arkansas Drinking Water Arkansas Certification #: 20-020-0 Arkansas Drinking Water Illinois Certification #: 200030 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055 Nevada Certification #: KS000212020-2 Oklahoma Certification #: 9205/9935 Florida: Cert E871149 SEKS WET Texas Certification #: T104704407-19-12 Utah Certification #: KS000212019-9 Illinois Certification #: 004592 Kansas Field Laboratory Accreditation: # E-92587 Missouri SEKS Micro Certification: 10070

Louisiana Certification #: 03055 Oklahoma Certification #: 9935 Texas Certification #: T104704407 Utah Certification #: KS00021

Pace Analytical Services Southeast Kansas

808 West McKay, Frontenac, KS 66763 Arkansas Certification #: 18-016-0 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10426



SAMPLE SUMMARY

Project:4TH QTR WETPace Project No.:60360977

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60360977001	WASTEWATER PLANT	Water	02/08/21 09:00	02/09/21 08:00
60360977002	METALS	Water	02/10/21 09:00	02/16/21 18:50



SAMPLE ANALYTE COUNT

Project:4TH QTR WETPace Project No.:60360977

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60360977001	WASTEWATER PLANT	EPA 821/R-02/013	MEB	1	PASI-SE
60360977002	METALS	EPA 200.8	JGP	12	PASI-K

PASI-K = Pace Analytical Services - Kansas City PASI-SE = Pace Analytical Services - SE Kansas



ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60360977

Sample: WASTEWATER PLANT	Lab ID: 60	360977001	Collected: 02/08/2	21 09:00	Received: 0	02/09/21 08:00	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical Me Pace Analytic	ethod: EPA 82 cal Services -	21/R-02/013 SE Kansas					
Toxicity, Chronic	Complete		1.0	1		02/09/21 11:0	0	



ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60360977

Sample: METALS	Lab ID: 60360977002		Collected: 02/10/2	1 09:00	Received: 02	/16/21 18:50 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical M	ethod: EPA 20	0.8 Preparation Met	hod: EP	A 200.8			
	Pace Analyti	ical Services -	Kansas City					
Antimony	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-36-0	
Arsenic	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-38-2	
Beryllium	ND	ug/L	0.50	1	02/18/21 09:16	02/22/21 14:17	7440-41-7	
Cadmium	ND	ug/L	0.50	1	02/18/21 09:16	02/19/21 13:42	7440-43-9	
Chromium	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-47-3	
Copper	2.2	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-50-8	
Lead	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7439-92-1	
Nickel	3.6	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-02-0	
Selenium	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7782-49-2	
Silver	ND	ug/L	0.50	1	02/18/21 09:16	02/19/21 13:42	7440-22-4	
Thallium	ND	ug/L	1.0	1	02/18/21 09:16	02/19/21 13:42	7440-28-0	
Zinc	51.2	ug/L	10.0	1	02/18/21 09:16	02/19/21 13:42	7440-66-6	



QUALITY CONTROL DATA

Project: 4TH QTR WET

Pace Project No.:	60360977
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QC Batch:	704767	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
		Laboratory:	Pace Analytical Services - Kansas City
Associated Lab Samp	bles: 60360977002		

Matrix: Water

METHOD BLANK: 2838941

Associated Lab Samples: 60360977002

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	ug/L		1.0	02/19/21 13:34	
Arsenic	ug/L	ND	1.0	02/19/21 13:34	
Beryllium	ug/L	ND	0.50	02/22/21 14:09	
Cadmium	ug/L	ND	0.50	02/19/21 13:34	
Chromium	ug/L	ND	1.0	02/19/21 13:34	
Copper	ug/L	ND	1.0	02/19/21 13:34	
Lead	ug/L	ND	1.0	02/19/21 13:34	
Nickel	ug/L	ND	1.0	02/19/21 13:34	
Selenium	ug/L	ND	1.0	02/19/21 13:34	
Silver	ug/L	ND	0.50	02/19/21 13:34	
Thallium	ug/L	ND	1.0	02/19/21 13:34	
Zinc	ug/L	ND	10.0	02/19/21 13:34	

LABORATORY CONTROL SAMPLE: 2838942

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	ug/L	40	38.3	96	85-115	
Arsenic	ug/L	40	40.9	102	85-115	
Beryllium	ug/L	40	39.5	99	85-115	
Cadmium	ug/L	40	40.1	100	85-115	
Chromium	ug/L	40	39.0	98	85-115	
Copper	ug/L	40	40.1	100	85-115	
Lead	ug/L	40	39.1	98	85-115	
Nickel	ug/L	40	39.6	99	85-115	
Selenium	ug/L	40	40.9	102	85-115	
Silver	ug/L	20	18.4	92	85-115	
Thallium	ug/L	40	37.9	95	85-115	
Zinc	ug/L	100	97.5	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2838943					2838944							
			MS	MSD								
		60360977002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	ug/L	ND	40	40	37.7	38.4	94	95	70-130	2	20	
Arsenic	ug/L	ND	40	40	41.2	42.0	102	105	70-130	2	20	
Beryllium	ug/L	ND	40	40	38.0	38.5	95	96	70-130	1	20	
Cadmium	ug/L	ND	40	40	38.1	39.0	95	97	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, LLC.



QUALITY CONTROL DATA

Project: 4TH QTR WET Pace Project No.: 60360977

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2838943					2838944							
			MS	MSD								
		60360977002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chromium	ug/L	 ND	40	40	36.6	37.4	91	93	70-130	2	20	
Copper	ug/L	2.2	40	40	40.6	41.2	96	97	70-130	2	20	
Lead	ug/L	ND	40	40	40.1	40.9	99	101	70-130	2	20	
Nickel	ug/L	3.6	40	40	41.9	42.5	96	97	70-130	1	20	
Selenium	ug/L	ND	40	40	38.3	39.3	95	97	70-130	3	20	
Silver	ug/L	ND	20	20	17.5	19.6	86	97	70-130	12	20	
Thallium	ug/L	ND	40	40	37.9	39.0	95	97	70-130	3	20	
Zinc	ug/L	51.2	100	100	142	145	91	93	70-130	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



QUALIFIERS

Project: 4TH QTR WET

Pace Project No.: 60360977

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.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 4TH QTR WET Pace Project No.: 60360977

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60360977001	WASTEWATER PLANT	EPA 821/R-02/013	704855		
60360977002	METALS	EPA 200.8	704767	EPA 200.8	704851



Sample Condition Upon Receipt

Client Name: <u>Siloam springs</u> Courier: FedEx UPS VIA Clay Pl Tracking #:	EX □ Shippir	ECI ng Lab	I □ pel Used	Pace □ Xroads □ Client □ Other □ d? Yes □ No □
Custody Seal on Cooler/Box Present: Yes Z No I Packing Material: Bubble Wrap I Bubble Bags I Thermometer Used: T-298 Type of I	Seals i I ce: Ve	Foi Foi Bli	:Yes⊉ am⊡ ueNo	I No □ None □ Other □ ne
Cooler Temperature (°C): As-read <u>2-7</u> Corr. Facto	r0-	2	Correct	ted 2.1 Date and initials of person examining contents:
Temperature should be above freezing to 6°C	_			P2/16/21
Chain of Custody present:	Z Yes	□No	□n/A	e note U
Chain of Custody relinquished:	Yes	ΠNο	□n/a	
Samples arrived within holding time:	AYes	⊡No	□n/a	
Short Hold Time analyses (<72hr):	Yes		□n/A	
Rush Turn Around Time requested:	TYes	Z No	□n/a	
Sufficient volume:	Ø∕Yes	□No	⊡n/a	
Correct containers used:	Z Yes	No	□n/a	
Pace containers used	Yes	ΠNo	□n/a	
Containers intect:	Aves.			
Unpresented 5035A / TV1005/1006 soils fraten in 49bra2				
Filtered volume received for dissolved tests?				
Sample labels match COC: Date / time / ID / analyses	Yes	No	∐N/A	
Samples contain multiple phases? Matrix: WT	□ Yes	No	□n/a	
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	Yes	□No	□n/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:				
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes			
Trip Blank present	□Yes	□No		
Headspace in VOA vials (>6mm):	□Yes			
Samples from USDA Regulated Area State	□Yes			
Additional labels attached to 5035A / TX1005 viols in the field?				
Client Notification/ Resolution: Copy COC to Copy COC	Client?	Y /	N	Field Data Required? Y / N
Person Contacted: Date/Tir	ne:	_		

Project Manager Review:

Date:

WO#:60360977

60360977

company: City of Siloam Springs Re deress: 975 Anderson Avenue co Siloam Springs, AR mail To: abrown@siloamsprings.com Re thome: 470,078,0000 Re	tequired Project Information:	Section C	Passe 1 of 2
ddress. 975 Anderson Avenue Co Siloam Springs, AR mail To: <u>abrown@siloamsprings.com</u> Ri hone: 470.778.7000 [Fax	report To: Tony Brown	Attention:	
mail To: abrowin@siloamsprings.com Prove 470.228.2000 Internet to the providence of	opy To: abrown@siloamsprings.com	Company Name:	DEGIII ATODV ACENOV
mail To: abrown@siloamsprings.com Pu hone: 470-224.2000 Fax		Address:	
Hone A79-228-2000 Fac	urchase Order No.:	Pace Quite Reference:	C UST F RORA
10-550-5000	roject Name: 4th QTR WET	Pace Project Notie Wood	Sta location
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		Requested	Analysis Filtered (Y/N)
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Right

CHRONIC TOXICITY TEST FOR City of Siloam Springs

PERMIT # AR0020273 AFIN # 04-00106

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

City of Siloam Springs Attn: Tony Brown 975 Anderson Avenue Siloam Springs, AR 1-479-228-0934

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

February 18, 2021

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SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (<u>Pimephales promelas</u>), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (<u>Ceriodaphnia dubia</u>), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the City of Siloam Springs effluent discharge from February 8, 2021 to February 12, 2021. All the test methods followed are as listed in <u>EPA 821-R-02-013</u>, "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-Karber 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 100% 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 100% for survival. No significant reduction in growth was observed in the 100% effluent concentration. The Toxic Units is <1. The IC25 is >100. The NOEC for growth in effluent was determined to be 100%. The PMSD was 14.1.

In Cladoceran section of testing, it was observed that the effluent had significant effect on the survival of the organisms in the 42, 56, 75, and 100% 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 32% for survival. Significant reduction in reproduction was observed in the 32, 42, 56, 75, and 100% effluent concentrations. The Toxic Units is 3.11. The IC25 is 32.17. The NOEC for reproduction in effluent was determined to be <32%. The PMSD was 16.5.

The chronic toxicity exhibited by the fathead minnows and the <u>Ceriodaphnia</u> treated by the effluent sampled from February 8 to February 12 from the City of Siloam Springs effluent discharge, is not acceptable as described in <u>EPA 821-R-02-013</u>.

INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the City of Siloam Springs effluent discharge. Chronic toxicity was measured using the <u>Pimephales promelas</u> at larval for survival and growth test and the <u>Ceriodaphnia dubia</u> survival and reproduction test described in <u>EPA 821-R-02-013</u>, "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

City of Siloam Springs personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 2-09-21. Subsequent samples followed by delivery on 2-11-21, and on 2-13-21. All samples were stored at \leq 6° Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in <u>EPA 821-R-02-013</u>.

TEST METHODS

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

The <u>Pimephales</u> and <u>Ceriodaphnia</u> tests were initiated on 2-09-21 and carried out until 2-16-21. 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 <u>Ceriodaphnia</u> 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: City of Siloam Springs Effluent discharge.

Date Sampled	No. 1: 2-8-21	9:00
	No. 2: 2-10-21	9:00
	No. 3: 2-12-21	9:00
Test Initiated: 11:00 Test End: 11:30	Date: 2-9-21 Date: 2-16-21	

RESULTS

Ceriodaphnia dubia	Results	
TLP3B	1	
TGP3B	1	
ТОРЗВ	42	
ТРРЗВ	<32	
ТДРЗВ	SYN 13.02 CD N/A	
Pimephales promelas	Results	
TLP6C	0	
TGP6C	0	
TOP6C	100	
TPP6C	100	
TQP6C	9.66	

Dilution Water used: Moderately Hard Synthetic Water

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL (Pimephales promelas)

DATA TABLE FOR GROWTH OF PATHEAD MINNOWS							
Effluent Concentration	Average Dry Weight in Milligrams in Replicate Chambers				Mean Dry Weight	CV% *	
(70)	A	В	C	D	E	(mg)	
Control 0%	0.327	0.386	0.429	0.392	0.401	0.387	9.66
Dilution 1 32%	0.337	0.396	0.448	0.405	0.401	0.397	9.97
Dilution 2 42%	0.384	0.410	0.372	0.311	0.374	0.370	9.83
Dilution 3 56%	0.400	0.429	0.373	0.315	0.402	0.384	11.27
Dilution 4 75%	0.413	0.357	0.413	0.366	0.398	0.389	6.78
Dilution 5 100%	0.351	0.406	0.362	0.365	0.432	0.383	8.96

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

* Coefficient of Variation = Standard Deviation X 100 / Mean

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					% Percent Survival in Replicate Mean Percent Survival Chambers			CV %
	A	В	С	D	E	24hr	48hr	7 day	
Control 0%	100	100	87.5	100	100	100	100	97.5	4.79
Dilution 1 32%	100	100	100	100	100	100	100	100	0.00
Dilution 2 42%	100	100	100	87.5	100	100	100	97.5	4.79
Dilution 3 56%	100	100	100	87.5	100	100	100	97.5	4.79
Dilution 4 75%	100	100	100	100	100	100	100	100	0.00
Dilution 5 100%	87.5	100	100	100	100	100	100	97.5	4.79

Permittee: City of Siloam Springs Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR <u>CERIODAPHNIA</u> YOUNG PRODUCTION

Replicate	Control	Dilution 1	Dilution 2	Dilution 3	Dilution 4	Dilution 5
	0%	32%	42%	56%	75%	100%
1	15	13	16	0	0	0
2	17	17	11	0	0	0
3	18	9	13	0	0	0
4	14	12	0	0	0	0
5	21	20	11	0	0	0
6	19	9	4	0	0	0
7	19	14	0	0	0	0
8	16	13	9	0	0	0
9	20	15	12	0	0	0
10	20	13	14	0	0	0
Mean	17.9	13.5	9.0	0.0	0.0	0.0
SD	2.331	3.342	5.715	0.0	0.0	0.0
CV %	13.02	24.75	63.51	N/A	N/A	N/A

CERIODAPHNIA MEAN PERCENT SURVIVAL

11		Per	cent Effluent	t (%)		
Time Elapsed	Control 0%	Dilution 1 32%	Dilution 2 42%	Dilution 3 56%	Dilution 4 75%	Dilution 5 100%
24 hrs	100	100	100	100	100	100
48 hrs	100	100	100	100	100	100
7-day	100	100	80	0	0	0
SD	0.000	0.000	0.422	0.0	0.0	0.0
CV %	0.00	0.00	52.70	N/A	N/A	N/A

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
16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 32%, 42%, 56%, 75%, 100%
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
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%, 32%, 42%, 56%, 75%, 100%
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%.

BIOMONITORING CHRONIC TOXICITY REPORT FATHEAD MINNOW (<u>Pimephales promelas</u>) CHEMICAL PARAMETERS CHART

Permittee: City of Siloam Springs Effluent discharge.

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

TABLE 2 (SECTION 2)INITIAL WATER QUALITYEFFLUENT CONCENTRATION

	Control	100%
PH	7.6	7.4
D.O.	8.5	8.3
Temp	25.0	25.0
Alk	64	82
Hard	98	168
Cond	315	727
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 (%)	РН	D.O. (mg/l)	Temperature (C)
0% Control	7.6	6.9	24.9
32% Effluent	7.6	6.9	24.7
42% Effluent	7.6	6.9	24.7
56% Effluent	7.6	6.9	24.7
75% Effluent	7.6	6.9	24.7
100% Effluent	7.6	6.9	24.7

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.6	6.9	24.5
32% Effluent	7.6	6.9	24.7
42% Effluent	7.6	6.9	24.7
56% Effluent	7.6	6.8	24.7
75% Effluent	7.6	6.8	24.7
100% Effluent	7.6	6.8	24.7

FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	100%
рН	7.6	8.0
D.O.	7.1	6.9
Temp	24.7	25.3
Alk	62	80
Hard	94	170
Cond	374	829

* 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 <u>Pimephales promelas</u> control survival rate was 97.5. The mean dry weight (growth) of the <u>Pimephales promelas</u> was determined at 0.387 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 17.13. The <u>Ceriodaphnia</u> dubia survival rates were 100 in the control. The <u>Ceriodaphnia</u> in the control produced an average of 17.9 young over the seven-day exposure period. Percent CV values for <u>Ceriodaphnia</u> dubia control survival and reproduction was 0.00 and 13.02. Control data met or exceeded all criteria set out by <u>EPA 8100-R-02-013</u> for test acceptance.

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: 2/9/21 11:00 End: 2/16/21 10:30

Reference Toxica	ant (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	33	11	4		
6 g/l	40	40	36	24		
4 g/l	40	40	40	39		
2 g/l	40	40	40	40		

IC25 (5.00 g/l Sodium Chloride)

Survival NOEC: 4.0 g/l

Reference Toxicant	(NaCl)	Ceriodaphni	a Dubia	
Concentration of Toxicant		Avg. # of Live Org	anisms/replicate	
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	8	3	0
2.0 g/l	10	10	10	2
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 (1.14 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By:

Timothy Harrell, Technical Director

60360977 Siloam Springs FATHEAD SURVIVAL File: 6360977A 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 _____ 11.4607.2602.0102600 EXPECTED 2.010 7.260 OBSERVED 4 0 Calculated Chi-Square goodness of fit test statistic = 36.9480 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. 60360977 Siloam Springs FATHEAD SURVIVAL File: 6360977A Transform: ARC SINE(SQUARE ROOT(Y)) Shapiro - Wilk's test for normality D = 0.043W = 0.596Critical 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.

603609	77	Siloam	Springs	FATHEAD	SURVI	eval			
File:	636	50977A	Tı	cansform:	ARC	SINE	(SQUARE	ROOT (Y))

	SUMMARY	STATISTICS	ON TRANSFO	RMED DATA	TABLE 1 of	2		
~~~~								
GRP	IDENTIFICATION	N	MIN	MAX 	MEAN			
1	CONTROL	5	0.991	1.107	1.084			
2	32%	; 5	1.107	1.107	1,107			
3	428	r 5	0.991	1.107	1.084			
4	56%	5	0.991	1.107	1.084			
5	75%	; 5	1.107	1.107	1.107			
6	100%	r 5	0.991	1.107	1.084			
6036 File	60360977 Siloam Springs FATHEAD SURVIVAL File: 6360977A Transform: ARC SINE(SQUARE ROOT(Y))							
GRP	IDENTIFICATION	I VARI	ANCE	SD	SEM	C.V. %		
1	CONTROI		0.003	0.052	0.023	4.79		
2	32%	5	0.000	0.000	0.000	0.00		
3	428	Ś	0.003	0.052	0.023	4.79		
4	568	5	0.003	0.052	0.023	4.79		
5	758	Ś	0.000	0.000	0.000	0.00		
6	100%	5	0.003	0.052	0.023	4.79		

60360977 Siloam Springs FATHEAD SURVIVAL File: 6360977A Transform: ARC SINE(SQUARE ROOT(Y))

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		ANOVA TABLE		
SOURCE	DF	SS	MS	F
Between	5	0.004	0.001	0.400
Within (Error)	24	0.043	0.002	
Total	29	0.047		
Critical F val Since F < Cri	ue = 2.6 tical F F	2 (0.05,5,24) AIL TO REJECT HO: All	l equal	

_____

60360977 Siloam Springs FATHEAD SURVIVAL File: 6360977A Transform: ARC SINE(SQUARE ROOT(Y))

	DUNNETT'S TEST -	TABLE 1 OF 2	Ho:	Control<	Freatment	
GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCU ORIGINAI	JLATED IN L UNITS	T STAT	SIG
1 2 3 4 5 6	CONTROL 32% 42% 56% 75% 100%	1.084 1.107 1.084 1.084 1.107 1.084	0.5 0.8 0.7 0.8 0.7	780 300 780 780 300 780	-0.866 0.000 0.000 -0.866 0.000	
Dunne	tt table value = 2.36	(1 Tailed V	alue, P=0.05	5, df=24	,5)	
60360 File:	977 Siloam Springs FAT 6360977A Trans	HEAD SURVIVAL form: ARC SINE(S	QUARE ROOT(	Y))		
	DUNNETT'S TEST -	TABLE 2 OF 2	Но	:Control<	Treatment	
GROUP 1 2 3	IDENTIFICATION CONTROL 32% 42%	NUM OF Minimu REPS (IN OR 5 5 5 5	um Sig Diff 2IG. UNITS) 0.054 0.054	% of CONTROL  7.0 7.0	DIFFEREN FROM CON 	CE TROL 20 00
4 5 6	56% 75% 100%	5 5 5	0.054 0.054 0.054	7.0 7.0 7.0	0.0 -0.0 0.0	00 20 00 

60360977 Siloam Springs FATHEAD GROWTH File: 6360977B Transform: NO TRANSFORMATION Shapiro - Wilk's test for normality D = 0.032W = 0.939 Critical W (P = 0.05) (n = 30) = 0.927Critical W (P = 0.01) (n = 30) = 0.900_____ _____ Data PASS normality test at P=0.01 level. Continue analysis. 60360977 Siloam Springs FATHEAD GROWTH Transform: NO TRANSFORMATION File: 6360977B Bartlett's test for homogeneity of variance Calculated B1 statistic = 0.94 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.

#### 60360977 Siloam Springs FATHEAD GROWTH File: 63609778 Transform: NO TRANSFORMATION

# SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
		E		0 129	 0 387
2	CONTROL 328	5	0.327	0.448	0.397
3	42%	5	0.311	0.410	0.370
4	56%	5	0.315	0.429	0.384
5	75%	5	0.357	0.413	0.389
6	100%	5	0.351	0.432	0.383

#### 60360977 Siloam Springs FATHEAD GROWTH File: 63609778 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	9.66
2	32%	0.002	0.040	0.018	9.97
3	42%	0.001	0.036	0.016	9.83
4	56%	0.002	0.043	0.019	11.27
5	75%	0.001	0.026	0.012	6.78
6	100%	0.001	0.034	0.015	8.96

#### 60360977 Siloam Springs FATHEAD GROWTH File: 63609778 Transform: NO TRANSFORMATION

		ANOVA TABLE		
SOURCE	DF	SS	MS	F
Between	5	0.002	0.000	0.299
Within (Error)	24	0.032	0.001	
Total	29	0.034		
Critical F val Since F < Cri	ue = 2.62 tical F FAI	(0.05,5,24) LL TO REJECT HO: All	equal	

60360977 Siloam Springs FATHEAD GROWTH File: 6360977B Transform: NO TRANSFORMATION _____

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

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULAI ORIGINAL UN	ED IN ITS T STAT	SIG
1	CONTROL	0.387	0.387		
2	32%	0.397	0.397	-0.449	
3	42%	0.370	0.370	0.726	
4	56%	0.384	0.384	0.138	
5	75%	0.389	0.389	-0.104	
6	100%	0.383	0.383	0.164	
Dunnett	table value = $2.36$	(1 Tailed	Value, P=0.05,	df=24,5)	

# 60360977 Siloam Springs FATHEAD GROWTH File: 6360977B Transform: NO TRANSFORMATION

	DUNNETT'S TEST -	TABLE 2 O	PF 2 Ho	:Control<	Treatment
GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	5			
2	32%	5	0.055	14.1	-0.010
3	42%	5	0.055	14.1	0.017
4	56%	5	0.055	14.1	0.003
5	75%	5	0.055	14.1	-0.002
6	100%	5	0.055	14.1	0.004

#### FISHER'S EXACT TEST

		NUMB	ER OF
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
32%	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.

FJ	SHER'S EXACT	TEST	
		======================================	EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
42%	8	2	10
TOTAL	18	2	20

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

#### FISHER'S EXACT TEST

		NUMBE	R OF
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
56%	0	10	10

TOTAL	10	10	20
CRITICAL FISHER'S VALUE (1 Since b is less than or eq between CONTROL and TREATM	======================================	) IS 6. s a signif: level.	b VALUE IS 0. icant difference
	FISHER'S EXACT	TEST	
		======================================	======================================
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
75%	0	10	10
TOTAL	10	10	20
CRITICAL FISHER'S VALUE (1 Since b is less than or eq between CONTROL and TREATM	0,10,10) (p=0.05 ual to 6 there 5 ENT at the 0.05	5) IS 6. Is a signif level.	b VALUE IS 0. icant difference
	TOUTDIG FYACT	ਧਾਜ਼ਤਧਾ	
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
			10
CONTROL	10	0	IU
100%	0	10	10
TOTAL	10	10	20
CRITICAL FISHER'S VALUE (1 Since b is less than or ec between CONTROL and TREATM	L0,10,10) (p=0.0 qual to 6 there 4ENT at the 0.05	5) IS 6. is a signif level.	b VALUE IS 0. Eicant difference

SUMMARY OF FISHER'S EXACT TESTS

NUMBER SIG

Page 33 of 46

NUMBER

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	32%	10	0	
2	42%	10	2	
3	56%	10	10	*
4	75%	10	10	*
5	100%	10	10	*

60360977 Siloam Springs CERIODAPHNIA DUBIA SURVIVA File: 6360977D 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	32%	10	1.000	1.000	1.000
3	42%	10	0.000	1.000	0.800
4	56%	10	0.000	0.000	0.000
5	75%	10	0.000	0.000	0.000
6	100%	10	0.000	0.000	0.000

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# 60360977 Siloam Springs CERIODAPHNIA DUBIA SURVIVA File: 6360977D Transform: NO TRANSFORM

# SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

-	-	-	=	$\sim$	-	-	-	-	-	-	-	-	-	 -	-	-

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	328	0.000	0.000	0.000	0.00
2	42%	0.178	0.422	0.133	52.70
4	56%	0.000	0.000	0.000	N/A
5	75%	0.000	0.000	0.000	N/A
6	100%	0.000	0.000	0.000	N/A

# 60360977 Siloam Springs CERIODAPHNIA DUBIA SURVIVA File: 6360977D Transform: NO TRANSFORM

SOURCE	DF	SS	MS	F
Between	5	13.333	2.667	90.000
Within (Error)	54	1.600	0.030	
Total	59	14.933		
Critical F val Since F > Cri	ue = 2.45 tical F REJ	(0.05,5,40) TECT Ho: All equal		

60360977 Siloam Springs CERIODAPHNIA DUBIA SURVIVA File: 6360977D Transform: NO TRANSFORM _____

 DUNNETT'S TEST
 TABLE 1 OF 2
 Ho:Control<Treatment</th>

아이지가 아이지 않					
		TRANSFORMED	MEAN CALCULATED IN		
GROUP	IDENTIFICATION	MEAN	ORIGINAL UNITS	T STAT	SIG
1	CONTROL	1.000	1.000		
2	32%	1,000	1.000	0.000	
3	42%	0.800	0.800	2.598	*
4	56%	0.000	0.000	12.990	*
5	75%	0.000	0.000	12.990	*
6	100%	0.000	0.000	12.990	*
Dunnett	table value = 2.31	(1 Tailed V	alue, P=0.05, df=40,	5)	
6036097 File: 6	7 Siloam Springs CERI 360977D Transf	ODAPHNIA DUBIA orm: NO TRANSFO	SURVIVA DRM		
_			U. Control .		

	DUNNETT'S TEST -	TABLE 2 OF 2Ho		:Control <treatment< th=""></treatment<>	
GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	10			
2	32%	10	0.178	17.8	0.000
3	42%	10	0.178	17.8	0.200
4	56%	10	0.178	17.8	1.000
5	75%	10	0.178	17.8	1.000
6	100%	10	0.178	17.8	1.000
60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E 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 8 43 1 OBSERVED 3 5 Calculated Chi-Square goodness of fit test statistic = 29.2889 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. 60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E Transform: NO TRANSFORMATION Hartley's test for homogeneity of variance Bartlett's test for homogeneity of variance _____ These two tests can not be performed because at least one group has zero variance. Data FAIL to meet homogeneity of variance assumption. Additional transformations are useless. _____

### 60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E Transform: NO TRANSFORMATION

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### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	14.000	21.000	17.900
2	32%	10	9.000	20.000	13,500
3	42%	10	0.000	16.000	9.000
4	56%	10	0.000	0.000	0.000
5	75%	10	0.000	0.000	0.000
6	100%	10	0.000	0.000	0.000

### 60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E Transform: NO TRANSFORMATION

### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %	
1	CONTROL	5.433	2.331	0.737	13.02	
2	32%	11.167	3.342	1.057	24.75	
3	42%	32.667	5.715	1.807	63.51	
4	56%	0.000	0.000	0.000	N/A	
5	75%	0.000	0.000	0.000	N/A	
6	100%	0.000	0.000	0.000	N/A	
2222						

60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E Transform: NO TRANSFORMATION

		ANOVA TABLE		
SOURCE	DF	SS	MS	F
Between	5	3116.333	623.267	75.905
Within (Error)	54	443.400	8.211	
Total	59	3559.733		

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

60360977 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6360977E Transform: NO TRANSFORMATION ____

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

		TRANSFORMED	) MEAN CALC	דיים אד מידים דוו		
GROUP	IDENTIFICATION	MEAN	ORIGINA	L UNITS	T STAT	SIG
1	CONTROL	17.900		900		(7)(7)(7)
2	32%	13.500	13.	500	3.433	*
3	42%	9.000	9.	000	6.945	*
4	56%	0.000	Ο.	000	13.968	*
5	75%	0.000	0.	000	13.968	*
6	100%	0.000	Ο.	000	13.968	*
603609	977 Siloam Springs CERI	ODAPHNIA DUBI	A REPRODU			
File:	6360977E Transf	orm: NO TRANS	FORMATION			
	DUNNETT'S TEST - I	ABLE 2 OF 2	Но	:Control<	Treatment	
GROUP	IDENTIFICATION	NUM OF Mini REPS (IN	.mum Sig Diff ORIG. UNITS)	% of CONTROL	DIFFEREN FROM CON	CE TROL
1	CONTROL	10				
2	32%	10	2.960	16.5	4.4	00
3	42%	10	2.960	16.5	8.9	00
4	56%	10	2.960	16.5	17.9	00
5	75%	10	2.960	16.5 16 5	17 9	
0	TOOS	ΤU	2.960	10.5	±/.9	00

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Conc. I	D	1	2	3	4	5	6
Conc. T	ested	0	32	42	56	75	100
Respons Respons Respons	e 1 e 2 e 3	15 17 18	13 17 9	16 11 13	0 0 0	0 0 0	0 0 0
Respons Respons Respons Respons Respons	e 4 e 5 e 6 e 7 e 8	14 21 19 19 16	12 20 9 14 13	0 11 4 0 9		0 0 0 0	0 0 0 0
Respons Respons	e 9 e 10	20 20	15 13	12 14	0 0	0 0	0 0
*** Inh Toxican Test St Test Sp Test Du DATA FI	ibition Con t/Effluent art Date: 2 ecies: Dub: ration: LE:	ncentrati : Siloam 2/9/21 ia 7	on Percenta Springs Test Ending Day	age Estimate g Date: 2/16	***		
Conc. ID	Number Replicate:	Conce s	ntration	Response Means	St De	ed. ev. Res	Pooled sponse Means
1 2 3 4 5 6	10 10 10 10 10 10	1	0.000 32.000 42.000 56.000 75.000 00.000	$   \begin{array}{r}     17.900 \\     13.500 \\     9.000 \\     0.000 \\     0.000 \\     0.000 \\     0.000 \\     0.000 \\   \end{array} $	2 3 5 0 0 0 0	.331 .342 .715 .000 .000 .000	17.900 13.500 9.000 0.000 0.000 0.000
The Lin	lear Interp	olation E	stimate:	32.1667	Entered	d P Value	e: 25
Number The Boc Origina Resampl	of Resampl otstrap Est al Confiden ing time i	ings: 8 imates Me ce Limits n Seconds	0 an: 31.29 : Lower: : 0.00	52 Standard 23.8710 Random See	Deviat: Upper: ed: -958	ion: 37.0 3843814	3.9021 926

Conc. ID		1	2	3	4		5	6
Conc. Tes	sted	0	32	42	56		75	100
Response Response Response Response Response	1 2 3 4 5	.327 .386 .429 .392 .401	.337 .396 .448 .405 .401	.384 .410 .372 .311 .374	.400 .429 .373 .315 .402		413 357 413 366 398	.351 .406 .362 .365 .432
*** Inhik Toxicant/ Test Star Test Spec Test Dura DATA FILE	oition Con /Effluent: rt Date: 2 cies: Fath ation: E:	centratic Siloam S /9/21 5 ead 7	on Percen Springs Test Endi: Day	tage Estima ng Date: 2/	te *** 16/21			
Conc. ID F	Number Replicates	Concer	ntration	Respons Means	e	Std. Dev.	Po Respor	ooled nse Means
1 2 3 4 5 6	5 5 5 5 5 5 5 5	3 4 5 1 1	0.000 32.000 42.000 56.000 75.000 00.000	0.38 0.39 0.37 0.38 0.38 0.38	7 7 0 4 9 3	0.037 0.040 0.036 0.043 0.026 0.034	0 . 0 . 0 . 0 . 0 . 0 .	.392 .392 .382 .382 .382 .382 .382

*** 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.

Pace Analytical	The Chain-of-	Custody is a LEGAL DOCU	UMENT. All relevant fie	ds must be complete	d accurately.				./
Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Inform	ation;				Page: 1	of	3
Company: City of Siloam Springs	Report To: Tony Brown	Attention:			<b></b>				5
Address. 975 Anderson Avenue	Copy To: abrown@siloamsprings.com	Company Nam	le:		REGULATOR	Y AGENCY			
Siloam Springs, AR		Address:			NPDES	L GROUN	JD WATER F	DRINKIN	3 WATER
Email To: abrown@siloamsprings.com	Purchase Order No.:	Pace Quote Reference:				L RCRA		- OTHER	- Like
Phone: 479-228-2000 Fax:	Project Name: 4th QTR WET	Pace Project Manager	Nolie Wood		Site Location		and the second se		
Requested Due Date/TAT:	Project Number	Pace Profile #:	10809		STATE:	AR			
				Requester	d Analysis Fitter	(NIA) pa			
Section D Valid Matrix Required Client Information MATRIX	(Cootes 2)		Preservatives	t N /A					
DAWKING WATE WATER WATER WATER WATE PRODUCT SMLSOUD	IS DW W T W W T W W W W W W W W W W W W W W	S DLLECTION		1s			(N/X)		1.17
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City of Siloam Springs Wastewate	Z 00 DATE TIME DATE 0 St Plant www C 277/21 10:00 02/08/21	11ME & H		2 × 1			<b>ਨੇ</b> ਮ	ace Project	Vo./ Lab I.D.
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9		_							
7 8									
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12									
ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE TIME	ACCEPTE	D BY / AFFILIATION	DATE	TIME	/S	AMPLE CONDIT	SNOL
"samples have a 24 hour hold time!	Town Brown)	2/8/21	17 Munt	AL-PACE	19/9/201	8:00	NOC	ア	5
return samples to the Frontenac Lab on ice!			0	*					-
Page	SAMPLER NAME AND PRINT Name of	SIGNATURE					O° ni ( N/Y)	(N/Y)	s Intact (N)
e 42 of 4	SIGNATURE 0	I SAMPLER: JOHN DIUMI	Banur	DATE Signed (MM/DD/YY):	2/8/2	_	qmeT ————————————————————————————————————	(boîzu)	Sample X)
16		5						[6]	

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"important Note: By signing this form you are accepting Pace's NET 30 day payment tarms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical

## CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Sectio.	n A A Clinest Informations	Section B	+ Infor	unation.					Section	C	i								Ľ	:eG		3		_
Compar	W City of Silvam Sorings	Report To: Tor	N Br	rown					Attention:							<b>-</b>			1			ŀ		
																							-	17
Addres	s: 975 Anderson Avenue	Copy To: abi	rown(	i@siloan	nsprings	S.com			Company	/ Name:						REG	ULATO	<b>3Y AGE</b>	NCY					-
	Siloam Springs, AR								Address:							0.	VPDES	GA		ATER	DRII	IKING W	ATER	-
Email T	o: abrown@siloamsprings.com	Purchase Order	No.:						Pace Quo Reference	e .							UST	L RC	RA		Г отн	КШ		
Phone:	479-228-2000 Fax	Project Name:	4th	h QTR W	/ET				Pace Proy. Manager,	Bect	olie V	poo,				Site	Location	L					and the second sec second second sec	10-16-15-1
Reque	sted Due Date/TAT:	Project Number							Pace Prof	ile #: 1(	9090					1	STATE.	12	AK					2 2 2 10
													П	R	equeste	I Analy	sis Filte	red (Y/	\$	· · · · · · · · · · · · · · · · · · ·	1. 1. 1. 1. 1. 1. 1. 1. 1. 1.			1.1.1
	Section D Valid Matrix C Required Client Information MATRIX	o left) CODE	(AM	1	8		a.			Ър	eserve	atives	-	1 N /A										10 m
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# W31	SAMPLE ID WIPE (A-Z, 0-9 / -) OTHER Sample IDs MUST BE UNIQUE TISSUE	್ಲೆ ಕ್ಷೆ ದಿ ಜ ಜ. 20DE (ತ್	SAMPLE TYPE (G=					П О ТА ЯМЭТ ЭЈЯМА2	# ОF СОИТАІИЕR3 Шрргезерлен	HNO ³ H ⁵ CO ⁴	HCI	Na2S2O3	Methanol Other	teaT sisylsnA <b>t</b>	eT TEW sinond					Residual Chlorine	ace Pro	ect NoJ	Lab I.D.	
-	City of Siloam Springs Wastewater I	Plant wv	0 2	2/9/2	10:	00 02/1	0/21 9:(	g	-			F	×	$\square$	×									
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12	ADDIFIONAL COMMENTS	- Re		UISHED B	IV / AFFIL	<b>IATION</b>		DATE	- III	1		ACCI	EPTED	BY / AFF	ILIATION	T	DATE	WIE	]		SAMPLE C	ONDITION	S	
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*return	samples to the Frontenac Lab on ice!										-	2 1		11				-	_					- T
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₽age					SAN	<b>APLER NA</b>	ME AND S	IGNATU	RE												(M)	(NZ	rtact	-
e 43						PRIN	I Name of S	AMPLER	: Tony B	rown										bevie	1/Y) a 	aler (Y	(N\Y)	
of 46						SIGN	ATURE of S	AMPLER	M	4 Bl	MAN			3 S	(TE Stgned M/DD/YY):		2/10	121	,oT	Rec		000	ime2	
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"important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to tale charges of 1.5% per month for any involces not paid within 30 days.

	2	
1	Pace Analytica	1"
/	www.pacelabs.com	

Client Name: Siloam Springs		
Courier: FedEx UPS VIA S Clav P		Pace 🗆 Xroads 🗆 Client 🗆 Other 🗆
Tracking #: Pace	e Shinning Label Usec	17 Yes 🗆 No <b>X</b>
Custody Seal on Cooler/Box Present: Yes X No	Seals intact: Yes X	
<b>Packing Material:</b> Bubble Wran $\square$ Bubble Bags	Foam	None X Other
Thermometer Used: T-111 Type of	Ice: Wet Blue Nor	
Cooler Temperature (°C): As read	or 6 Correct	Date and initials of person $\frac{1}{2}$
Temperature should be above freezing to $6^{\circ}$ C		ed or, - examining contents. ). 3 (kg)
Chain of Custody present:		
Chain of Custody relinquished:	tylYes ∐No ∐N/A	
Samples arrived within holding time:	∯Yes □No □N/A	
Short Hold Time analyses (<72hr):	XYes □No □N/A	
Rush Turn Around Time requested:	□Yes XNo □N/A	
Sufficient volume:	XYes □No □N/A	
Correct containers used:	XYes □No □N/A	
Pace containers used:	XYes □No □N/A	
Containers intact:	XYes □No □N/A	
Lippreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No XN/A	
Eiltered volume received for dissolved tests?	□Yes □No □x/A	
Sample abels match COC. Date / time / D / analyses		
Samples contain multiple phases? Watrix.		List sample IDs, volumes, lot #'s of preservative and the
(HNO ₂ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)		date/time added.
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		-
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)		
Trip Blank present:		
Headspace in VOA vials ( >6mm):	∐Yes ∐No XN/A	
Samples from USDA Regulated Area: State:	□Yes □No XN/A	
Additional labels attached to 5035A / TX1005 vials in the field	? □Yes □No Xx/A	
Client Notification/ Resolution: Copy COC to	o Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/	Гіте:	
Comments/ Resolution:		
Project Manager Review:	– Dat	.e:

Pace Analytical

## CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT, All relevant fields must be completed accurately.

Section /	A Oliset Information:	Section B Developed Information:	Section C	Page: .3 of
Company:	City of Siloam Snings	Report To: Tory Brown	Invoice information: Attention:	
-fineduloo		Notation 1 OILY DIOWIL	ALLER RIGH.	
Address:	975 Anderson Avenue	Copy To: abrown@siloamsprings.com	Company Name:	REGULATORY AGENCY
	Siloam Springs, AR		Address:	RINKING WATER C DRINKING WATER
Email To:	abrown@siloamsprings.com	Purchase Order No.:	Pace Quote Reference:	L UST L RCRA L OTHER
Phone:	479-228-2000 Fax	Project Name: 4th QTR WET	Pace Project Nolie Wood Manager.	Site Location
Requeste	ed Due Date/TAT:	Project Number.	Pace Profile #: 10809	STATE: AR
			Requested	i Analysis Fittered (V/N)
	Section D Valid Matrix C Required Client Information MATRIX	bodes € 0. cone 2 2 2 2 COLLECTED	Preservatives	
	DRINKING WATER WATER WASTE WASTE PRODUCT SOILSOLID	WT WT SILLE COMPOSITE COMPOSITE START START ENDOR		(N/A)
	SAMPLE ID WIPE (A.Z, 0-9 / -) OTHER Sampia IDs MUST BE UNIQUE TISSUE	자 다 (G=C 20DE (38 20DE (38	Temp at co utaliuers rved i fest i fest	) ənhold D
# MƏTI		DATRIX O MATRIX O MAR DAT TIME DAT	A SAMPLE T H2Co Unpresei H2Co NaCH H2Co NaCH NaCH NaCH NaCH NaCH NaCH NaCH NaCH	Residual Residual Rece Project No./ Lab I.D.
1	City of Siloam Springs Wastewater	Plant [ww/ c   2/11/21   10:00   02/12/21   5	00 1 1 X X X	
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2 3				
12				
	ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE TIME ACCEPTED BY / AFFILIATION	DATE TIME SAMPLE CONDITIONS
*samples	have a 24 hour hold time!	Tony Bows	11121 1218 Chiddleger price	3/13/3 800 1.2 14 14 14
Leium sei	imples to the Frontenac Lab on Ice!			
R	2X= 0.00			
Pa				
age 4		SAMPLEK NAME AND	IGNA LURE	اله در Seale on Seale on (۲/۱۷)
l5 of		SIGNATURE	AMPLER: JONY BYOWN	(Y)
46			(MM/DD/Y):	2/11/21   ⁻   ō ⁻   [∞]

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"important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any linvolces not paid within 30 days.



Sample Condition Upon Receipt

Client Name: <u>Stock Spirgs</u>	PEX 🗆 ECI 🗆	Pace □ Xroads □ Client∕□ Other □
Tracking #: Pac	e Shipping Label Usec	d? 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: <u>T-111</u> Type of	Ice: 🕢 Blue Nor	ne
Cooler Temperature (°C): As-read $1/2$ Corr. Fact	or6 Correct	ted $4 \rightarrow$ Date and initials of person examining contents; $2 \rightarrow$
Temperature should be above freezing to 6°C		2/13/21 800
Chain of Custody present:	XYes □No □N/A	- 1 7 -
Chain of Custody relinquished:	XQYes □No □N/A	
Samples arrived within helding time:		
Samples arrived within holding time.		
Short Hold Time analyses (<72hr):	XYes LINO LIN/A	
Rush Turn Around Time requested:	□Yes XNo □N/A	
Sufficient volume:	XYes □No □N/A	
Correct containers used:	XYes □No □N/A	
Pace containers used:	XYes No N/A	
Containers intact:	XYes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No XN/A	
Filtered volume received for dissolved tests?	□Yes □No □x/A	
Sample labels match COC: Date / time / ID / analyses	XYes □No □N/A	
Samples contain multiple phases? Matrix:	□Yes XNo □N/A	
Containers requiring pH preservation in compliance? (HNO₃, H₂SO₄, HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	□Yes □No XN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trin Blank present:	□Yes □No XN/A	
Headspace in VOA vials ( >6mm):	□Yes □No XN/A	
Samples from USDA Regulated Area: State:	□Yes □No XN/A	
Additional labels attached to 5035A / TX1005 vials in the field	? □Yes □No Xx/A	
Client Notification/ Resolution: Copy COC	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution:		
	+ 1	
Project Manager Review:	Dat	te:



Pace Analytical Services, LLC 9608 Loiret Blvd. Lenexa, KS 66219 (913)599-5665

March 30, 2021

Tony Brown City of Siloam Springs 975 Anderson Avenue Siloam Springs, AR 72761

RE: Project: 1ST QTR WET (RE-TEST) Pace Project No.: 60363755

Dear Tony Brown:

Enclosed are the analytical results for sample(s) received by the laboratory between March 16, 2021 and March 22, 2021. 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 Kansas City
- Pace Analytical Services SE Kansas

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

Sincerely,

This Wood

Nolie Wood nolie.wood@pacelabs.com 1(913)563-1401 Project Manager

Enclosures





### CERTIFICATIONS

Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

### **Pace Analytical Services Kansas**

9608 Loiret Boulevard, Lenexa, KS 66219 Missouri Inorganic Drinking Water Certification #: 10090 Arkansas Drinking Water Arkansas Certification #: 20-020-0 Arkansas Drinking Water Illinois Certification #: 200030 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10116 Louisiana Certification #: 03055

### Nevada Certification #: KS000212020-2 Oklahoma Certification #: 9205/9935 Florida: Cert E871149 SEKS WET Texas Certification #: T104704407-19-12 Utah Certification #: KS000212019-9 Illinois Certification #: 004592 Kansas Field Laboratory Accreditation: # E-92587 Missouri SEKS Micro Certification: 10070

Louisiana Certification #: 03055 Oklahoma Certification #: 9935 Texas Certification #: T104704407 Utah Certification #: KS00021

### Pace Analytical Services Southeast Kansas

808 West McKay, Frontenac, KS 66763 Arkansas Certification #: 18-016-0 Iowa Certification #: 118 Kansas/NELAP Certification #: E-10426



### SAMPLE SUMMARY

Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60363755001	SILOAM SPRINGS WASTEWATER	Water	03/15/21 09:00	03/16/21 08:00
60363755002	CITY OF SILOAM SPRINGS WASTEWA	Water	03/15/21 09:00	03/16/21 19:10
60363755003	201233	Water	03/17/21 09:00	03/18/21 19:00
60363755004	201232	Water	03/19/21 09:00	03/22/21 18:30



### SAMPLE ANALYTE COUNT

Project:1ST QTR WET (RE-TEST)Pace Project No.:60363755

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60363755001	SILOAM SPRINGS WASTEWATER PLAN	EPA 821/R-02/013	MEB	1	PASI-SE
60363755002	CITY OF SILOAM SPRINGS WASTEWA	EPA 200.8	JGP	12	PASI-K
60363755003	201233	EPA 200.8	JGP	12	PASI-K
60363755004	201232	EPA 200.8	JGP	12	PASI-K

PASI-K = Pace Analytical Services - Kansas City

PASI-SE = Pace Analytical Services - SE Kansas



Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

Sample: SILOAM SPRINGS WASTEWATER PLAN	Lab ID: 6	0363755001	Collected: 03/15/2	21 09:00	Received: 03	/16/21 08:00	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical M Pace Analyt							
Toxicity, Chronic	Complete		1.0	1		03/16/21 10:3	0	



### Project: 1ST QTR WET (RE-TEST)

### Pace Project No.: 60363755

Sample: CITY OF SILOAM SPRINGS WASTEWA	Lab ID: 6	0363755002	Collected: 03/15	5/21 09:0	0 Received: 03	/16/21 19:10 N	1atrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical M	lethod: EPA 20	0.8 Preparation M	ethod: E	PA 200.8			
	Pace Analy	tical Services -	Kansas City					
Antimony	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-36-0	
Arsenic	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-38-2	
Beryllium	ND	ug/L	0.50	) 1	03/24/21 14:57	03/27/21 14:01	7440-41-7	
Cadmium	ND	ug/L	0.50	) 1	03/24/21 14:57	03/27/21 14:01	7440-43-9	
Chromium	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-47-3	
Copper	1.6	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-50-8	
Lead	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7439-92-1	
Nickel	1.5	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-02-0	
Selenium	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7782-49-2	
Silver	ND	ug/L	0.50	) 1	03/24/21 14:57	03/27/21 14:01	7440-22-4	
Thallium	ND	ug/L	1.(	) 1	03/24/21 14:57	03/27/21 14:01	7440-28-0	
Zinc	34.7	ug/L	10.0	) 1	03/24/21 14:57	03/27/21 14:01	7440-66-6	



Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

Sample: 201233	Lab ID: 60363755003		Collected: 03/17/2	Collected: 03/17/21 09:00		/18/21 19:00 N	latrix: Water			
Parameters	Parameters Results Units		Report Limit	DF	Prepared	Analyzed	CAS No.	Qual		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
	Pace Analyti	ical Services -	Kansas City							
Antimony	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-36-0			
Arsenic	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-38-2			
Beryllium	ND	ug/L	0.50	1	03/24/21 14:57	03/29/21 11:56	7440-41-7			
Cadmium	ND	ug/L	0.50	1	03/24/21 14:57	03/29/21 11:56	7440-43-9			
Chromium	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-47-3			
Copper	1.8	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-50-8			
Lead	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7439-92-1			
Nickel	1.5	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-02-0			
Selenium	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7782-49-2			
Silver	ND	ug/L	0.50	1	03/24/21 14:57	03/29/21 11:56	7440-22-4			
Thallium	ND	ug/L	1.0	1	03/24/21 14:57	03/29/21 11:56	7440-28-0			
Zinc	37.1	ug/L	10.0	1	03/24/21 14:57	03/29/21 11:56	7440-66-6			



Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

Sample: 201232	Lab ID: 60363755004		Collected: 03/19/2	Collected: 03/19/21 09:00		/22/21 18:30 N	latrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical	Method: EPA 20	0.8 Preparation Me	thod: EP	A 200.8			
	Pace Anal	ytical Services -	Kansas City					
Antimony	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-36-0	
Arsenic	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-38-2	
Beryllium	NE	D ug/L	0.50	1	03/24/21 14:57	03/29/21 11:58	7440-41-7	
Cadmium	NE	D ug/L	0.50	1	03/24/21 14:57	03/29/21 11:58	7440-43-9	
Chromium	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-47-3	
Copper	1.4	4 ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-50-8	
Lead	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7439-92-1	
Nickel	1.3	3 ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-02-0	
Selenium	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7782-49-2	
Silver	NE	D ug/L	0.50	1	03/24/21 14:57	03/29/21 11:58	7440-22-4	
Thallium	NE	D ug/L	1.0	1	03/24/21 14:57	03/29/21 11:58	7440-28-0	
Zinc	30.1	1 ug/L	10.0	1	03/24/21 14:57	03/29/21 11:58	7440-66-6	



### **QUALITY CONTROL DATA**

Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

QC Batch:	710610	Analysis Method:	EPA 200.8
QC Batch Method:	EPA 200.8	Analysis Description:	200.8 MET
		Laboratory:	Pace Analytical Services - Kansas City
Associated Lab Samp	les: 60363755002, 60363755003, 60	363755004	

METHOD BLANK: 2860	214	Matrix:	Water		
Associated Lab Samples:	60363755002, 60363755003,	60363755004			
		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	1.0	03/27/21 13:45	
Arsenic	ug/L	ND	1.0	03/27/21 13:45	
Beryllium	ug/L	ND	0.50	03/27/21 13:45	
Cadmium	ug/L	ND	0.50	03/27/21 13:45	
Chromium	ug/L	ND	1.0	03/27/21 13:45	
Copper	ug/L	ND	1.0	03/27/21 13:45	
Lead	ug/L	ND	1.0	03/27/21 13:45	
Nickel	ug/L	ND	1.0	03/27/21 13:45	
Selenium	ug/L	ND	1.0	03/27/21 13:45	
Silver	ug/L	ND	0.50	03/27/21 13:45	
Thallium	ug/L	ND	1.0	03/27/21 13:45	
Zinc	ug/L	ND	10.0	03/27/21 13:45	

### LABORATORY CONTROL SAMPLE: 2860215

		Spike	LCS	LCS	% Rec	
Parameter	Units	Conc.	Result	% Rec	Limits	Qualifiers
Antimony	ug/L	40	40.1	100	85-115	
Arsenic	ug/L	40	41.2	103	85-115	
Beryllium	ug/L	40	38.9	97	85-115	
Cadmium	ug/L	40	41.7	104	85-115	
Chromium	ug/L	40	39.9	100	85-115	
Copper	ug/L	40	39.6	99	85-115	
Lead	ug/L	40	39.4	99	85-115	
Nickel	ug/L	40	38.7	97	85-115	
Selenium	ug/L	40	41.5	104	85-115	
Silver	ug/L	20	19.0	95	85-115	
Thallium	ug/L	40	39.3	98	85-115	
Zinc	ug/L	100	101	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2860216 2860217												
			MS	MSD					04 E			
		60363755002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Antimony	ug/L	ND	40	40	40.4	40.1	100	100	70-130	1	20	
Arsenic	ug/L	ND	40	40	40.9	40.7	102	101	70-130	1	20	
Beryllium	ug/L	ND	40	40	39.1	38.1	98	95	70-130	3	20	
Cadmium	ug/L	ND	40	40	38.2	37.9	95	95	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### **REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

MATRIX SPIKE & MATRIX SP	IKE DUPL	ICATE: 2860	216		2860217							
			MS	MSD								
		60363755002	Spike	Spike	MS	MSD	MS	MSD	% Rec		Max	
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	RPD	Qual
Chromium	ug/L	 ND	40	40	39.6	39.2	98	97	70-130	1	20	
Copper	ug/L	1.6	40	40	38.9	38.6	93	92	70-130	1	20	
Lead	ug/L	ND	40	40	37.9	37.4	94	93	70-130	1	20	
Nickel	ug/L	1.5	40	40	39.3	38.9	94	93	70-130	1	20	
Selenium	ug/L	ND	40	40	38.9	39.3	96	98	70-130	1	20	
Silver	ug/L	ND	20	20	16.9	16.9	85	85	70-130	0	20	
Thallium	ug/L	ND	40	40	38.0	37.6	95	94	70-130	1	20	
Zinc	ug/L	34.7	100	100	131	130	96	95	70-130	1	20	

MATRIX SPIKE SAMPLE: 2860218 60363755004 Spike MS MS % Rec % Rec Limits Qualifiers Parameter Units Result Conc. Result ND Antimony ug/L 40 42.1 105 70-130 ND 40 42.7 106 70-130 Arsenic ug/L Beryllium ND 40 40.8 102 70-130 ug/L ND 40 40.4 101 Cadmium ug/L 70-130 Chromium ND 40 41.0 101 ug/L 70-130 1.4 40 40.9 99 Copper ug/L 70-130 ND 40 41.0 102 70-130 Lead ug/L 1.3 Nickel ug/L 40 40.6 98 70-130 ND 40 99 Selenium ug/L 40.0 70-130 ND Silver ug/L 20 18.0 90 70-130 ND Thallium ug/L 40 40.9 102 70-130 30.1 Zinc 100 130 100 70-130 ug/L

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### **REPORT OF LABORATORY ANALYSIS**

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### QUALIFIERS

### Project: 1ST QTR WET (RE-TEST)

Pace Project No.: 60363755

### 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.



### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project:1ST QTR WET (RE-TEST)Pace Project No.:60363755

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60363755001	SILOAM SPRINGS WASTEWATER PLAN	EPA 821/R-02/013	710757		
60363755002	CITY OF SILOAM SPRINGS WASTEWA	EPA 200.8	710610	EPA 200.8	710638
60363755003 60363755004	201233 201232	EPA 200.8 EPA 200.8	710610 710610	EPA 200.8 EPA 200.8	710638 710638



Sample Condition Upon Receipt

### WO#:60363755

Client Name: Silvan springs		
Courier: FedEx UPS VIAC Clay 🗆	PEX 🗆 🛛 ECI 🗆	Pace 🗆 Xroads 🗆 Client 🗆 Other 🗆
Tracking #: Pa	ce Shipping Label Use	d? Yes 🗆 No 🖸
Custody Seal on Cooler/Box Present: Yes 🖉 No 🗆	Seals intact: Yes	No 🗆
Packing Material:         Bubble Wrap □         Bubble Bags	Foam D	Non Other
Thermometer Used: <u>T-298</u> Type of	of Ice: Wet Blue No	Date and initials of person
Cooler Temperature (°C): As-read <u>/ 6</u> Corr. Fac	tor <u>O·O</u> Correc	ted <u>/ 6</u> examining contents:
Temperature should be above freezing to 6°C		p~5/23/21
Chain of Custody present:	Yes No N/A	20 
Chain of Custody relinquished:		
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):	Tyes No N/A	
Rush Turn Around Time requested:		
Sufficient volume:	Yes No N/A	
Correct containers used:		
Pace containers used:		
Containers intact:	Yes No N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No ∠N/A	
Filtered volume received for dissolved tests?	□Yes □No ØN/A	
Sample labels match COC: Date / time / ID / analyses		
Samples contain multiple phases? Matrix:	Yes No N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide)	Yes No N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)		
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	Yes No	
Trip Blank present:	□Yes □No □N/A	
Headspace in VOA vials ( >6mm):	Yes No N/A	
Samples from USDA Regulated Area: State:		
Additional labels attached to 5035A / TX1005 vials in the field	I? □Yes □No DN/A	
Client Notification/ Resolution: Copy COC t	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution:		

Project Manager Review:

Date:

Face Analytical

# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section / Required (	A Client Information:	Section B Remitted Project Int	formation.	ż				Š	ction C										ſ	1	
Company:	City of Siloam Springs	Report To: Tony R	LOW D					AH0	oloe Info	mation:					Г			3	<b>b</b>	5	n
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	Siloam Springs, AR	1						Add	ress:						Z D	PDEA					CITE ON C
Email To:	abrown@siloamsprings.com	Purchase Order No.						Pac	e Quote						: = : L 						
Phone: 4	179-228-2000 Fax	Project Name: 15	st QTR	<b>WET</b>	(Re-Te	žť)		Pac	a Project	Note	e Woo	0			Site	ocation			And a second second	OLNER	
Requested	d Due Date/TAT:	Project Number:						Page	e Profile #	108	60				i T	STATE:	₹	R			
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F-ALL-Q-020rev.08, 12-Oct-2007

"important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Pace Analytical Sample Condition	ہ Upon Receipt	pre existing project
		60363755
Client Name: Siloan Springs		Pace  Xroads Client  Other
Tracking #:         Pa	ice Shipping Label Use	$\frac{1}{2} \text{ Yes } \square \text{ No } \mathbf{X}$
Custody Seal on Cooler/Box Present: Yes X No 🗆	Seals intact: Yes >	🕻 No 🗆
Packing Material:Bubble Wrap □Bubble BagsThermometer Used:T-111Type of	□ Foam □ of Ice:∭ Blue No	None X Other □ ne
Cooler Temperature (°C): As-read <u>4.2</u> Corr. Fac Temperature should be above freezing to 6°C	tor <u>6</u> Correc	ted <u>3.</u> (c) Date and initials of person examining contents: <u>8</u> 3, (2) (2) 8°
Chain of Custody present:	XYes □No □N/A	1.0,
Chain of Custody relinquished:	XYes □No □N/A	
Samples arrived within holding time:	Yes DNO DN/A	
Short Hold Time analyses (<72hr):	XYes □No □N/A	
Rush Turn Around Time requested:	□Yes XNo □N/A	
Sufficient volume:	XYes □No □N/A	
Correct containers used:	XYes □No □N/A	
Pace containers used:	XYes □No □N/A	
Containers intact:	XYes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No <b>X</b> N/A	
Filtered volume received for dissolved tests?	□Yes □No □x/A	
Sample labels match COC: Date / time / ID / analyses	XYes □No □N/A	
Samples contain multiple phases? Matrix:	□Yes XNo □N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	□Yes □No XN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No □Yes □No	
Trip Blank present:	□Yes □No XN/A	
Headspace in VOA vials ( >6mm):	□Yes □No XN/A	
Samples from USDA Regulated Area: State:	□Yes □No XN/A	
Additional labels attached to 5035A / TX1005 vials in the field	I? □Yes □No Xx/A	
Client Notification/ Resolution: Copy COC t	o Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/ Comments/ Resolution:	Time:	
Project Manager Review:	Date	:

### **REFERENCE #60363755**

### CHRONIC TOXICITY TEST FOR City of Siloam Springs

PERMIT # AR0020273 AFIN # 04-00106

### PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

City of Siloam Springs Attn: Tony Brown 975 Anderson Avenue Siloam Springs, AR 1-479-228-0934

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

March 24, 2021

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TEST METHODS	4
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APPENDIX B - CHAIN OF CUSTODY FORMS

### SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (<u>Pimephales promelas</u>), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (<u>Ceriodaphnia dubia</u>), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the City of Siloam Springs effluent discharge from March 15, 2020 to March 19, 2020. All the test methods followed are as listed in <u>EPA 821-R-02-013</u>, "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-Karber method. Statistical analysis is accomplished by following steps in <u>EPA 821-R-02-013</u>, 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 100% 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 100% for survival. No significant reduction in growth was observed in the 100% effluent concentration. The Toxic Units is <1. The IC25 is >100. The NOEC for growth in effluent was determined to be 100%. The PMSD was 13.0.

In Cladoceran section of testing, it was observed that the effluent had no significant effect on the survival of the organisms in the 100% 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 100% for survival. No significant reduction in reproduction was observed in the 100% effluent concentrations. The Toxic Units is <1. The IC25 is >100. The NOEC for reproduction in effluent was determined to be 100%. The PMSD was 17.7.

The chronic toxicity exhibited by the fathead minnows and the <u>Ceriodaphnia</u> treated by the effluent sampled from March 15 to March 19 from the City of Siloam Springs effluent discharge, is acceptable as described in <u>EPA 821-R-02-013</u>.

### INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the City of Siloam Springs effluent discharge. Chronic toxicity was measured using the <u>Pimephales promelas</u> at larval for survival and growth test and the <u>Ceriodaphnia dubia</u> survival and reproduction test described in <u>EPA 821-</u> <u>R-02-013</u>, "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

City of Siloam Springs personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 3-16-21. Subsequent samples followed by delivery on 3-18-21, and on 3-20-21. All samples were stored at  $\leq$  6° Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in <u>EPA 821-R-02-013</u>.

### TEST METHODS

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

The <u>Pimephales</u> and <u>Ceriodaphnia</u> tests were initiated on 3-16-21 and carried out until 3-23-21. 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 <u>Ceriodaphnia</u> 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.

### **REFERENCE #60363755**

### TABLE 1

Permittee: City of Siloam Springs Effluent discharge,

Date Sampled	No. 1:	3-15-21	9:00
	No. 2:	3-17-21	9:00
	No. 3:	3-19-21	9:00
Test Initiated: 10:30 Test End: 10:50	Date: 3-16- Date: 3-22-	21 21	

### RESULTS

Ceriodaphnia dubia	Results
TLP3B	0
TGP3B	0
ТОРЗВ	100
ТРРЗВ	100
TQP3B	14.78
Pimephales promelas	Results
TLP6C	0
TGP6C	0
TOP6C	100
TPP6C	100
TQP6C	12.46

### **REFERENCE #60363755**

Dilution Water used: Moderately Hard Synthetic Water

### FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL (<u>Pimephales promelas</u>)

	DATA	IADLE F	ON GROV		ATTICAD	IVIININOVVS	
Effluent Concentration	Averag	e Dry W Replica	eight in Mi ite Chamb	lligrams in ers		Mean Dry Weight	CV% *
(%)	A	В	С	D	E	(mg)	
Control 0%	0.374	0.417	0.490	0.411	0.501	0.439	12.46
Dilution 1 32%	0.455	0.486	0.441	0.488	0.421	0.458	6.32
Dilution 2 42%	0.464	0.462	0.404	0.480	0.474	0.457	6.66
Dilution 3 56%	0.410	0.44	0.412	0.449	0.489	0.441	7.33
Dilution 4 75%	0.384	0.505	0.484	0.478	0.456	0.461	10.11
Dilution 5 100%	0.417	0.400	0.418	0.436	0.472	0.429	6.39

### DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

* Coefficient of Variation = Standard Deviation X 100 / Mean

### FATHEAD MINNOW SURVIVAL

Conc. %	Pe	rcent S	urvival i Chambe	n Replica rs	ate	Mean	Percent S	Survival	CV %
	A	В	С	D	Е	24hr	48hr	7 day	
Control 0%	90	100	100	100	100	100	100	98	5.28
Dilution 1 32%	100	100	100	100	100	100	100	100	0.00
Dilution 2 42%	100	100	90	100	100	100	100	98	5.28
Dilution 3 56%	100	90	100	100	100	100	100	98	5.28
Dilution 4 75%	90	100	100	100	100	100	100	98	5.28
Dilution 5 100%	100	90	100	100	100	100	100	98	5.28

Permittee: City of Siloam Springs Effluent discharge.

### CERIODAPHNIA SURVIVAL AND REPRODUCTION

Replicate	Control	Dilution 1	Dilution 2	Dilution 3	Dilution 4	Dilution 5
	0%	32%	42%	56%	75%	100%
1	24	29	20	30	17	24
2	21	21	25	19	26	25
3	22	23	26	24	28	27
4	20	26	21	24	21	25
5	15	19	15	23	20	22
6	19	23	23	24	25	26
7	20	21	28	22	18	15
8	17	22	21	15	19	22
9	20	24	22	21	22	21
10	23	21	26	22	26	23
Mean	20.1	22.9	22.7	22.4	22.2	23.0
SD	2.685	2.885	3.773	3.864	3.824	3.399
CV %	13.36	12.60	16.62	17.25	17.22	14.78

### DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

### CERIODAPHNIA MEAN PERCENT SURVIVAL

		Perc	cent Effluent	: (%)		
Time	Control	Dilution 1	Dilution 2	Dilution 3	Dilution 4	Dilution 5
Elapsed	0%	32%	42%	56%	75%	100%
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	0.00	0.00

### 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
16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 32%, 42%, 56%, 75%, 100%
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
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%, 32%, 42%, 56%, 75%, 100%
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%.

### BIOMONITORING CHRONIC TOXICITY REPORT FATHEAD MINNOW (<u>Pimephales promelas</u>) CHEMICAL PARAMETERS CHART

Permittee: City of Siloam Springs Effluent discharge.

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

### TABLE 2 (SECTION 2)INITIAL WATER QUALITYEFFLUENT CONCENTRATION

	Control	100%
PH	7.6	7.5
D.O.	8.2	7.7
Temp	25.0	25.0
Alk	62	102
Hard	94	196
Cond	316	751
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	7.7	6.9	24.8
32% Effluent	7.7	6.9	25.3
42% Effluent	7.7	6.8	25.3
56% Effluent	7.7	6.8	25.3
75% Effluent	7.7	6.8	25.3
100% Effluent	7.7	6.8	25.3

### 48-Hour Water Quality Measurements

	1		
Effluent	PH	D.O.	Temperature
Concentration (%)		(mg/l)	(C)
0% Control	7.7	7.1	25.0
32% Effluent	7.7	7.1	25.0
42% Effluent	7.8	7.0	25.0
56% Effluent	7.8	6.9	25.0
75% Effluent	7.8	6.9	25.0
100% Effluent	7.8	6.9	25.0
# FINAL WATER QUALITY

# EFFLUENT CONCENTRATION

	Control	100%
рН	7.8	7.7
D.O.	7.2	6.8
Temp	25.1	24.9
Alk	60	108
Hard	96	192
Cond	357	864

* 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 <u>Pimephales promelas</u> control survival rate was 98. The mean dry weight (growth) of the <u>Pimephales promelas</u> was determined at 0.439 mg/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 5.28 and 12.46. The <u>Ceriodaphnia</u> dubia survival rates were 100 in the control. The <u>Ceriodaphnia</u> in the control produced an average of 20.1 young over the seven-day exposure period. Percent CV values for <u>Ceriodaphnia dubia</u> control survival and reproduction was 0.00 and 13.36. Control data met or exceeded all criteria set out by <u>EPA 8100-R-02-013</u> for test acceptance.

# **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: 3/16/21 11:30 End: 3/23/21 11:00

<b>Reference</b> Toxic	ant (NaCl)	<u>Pimephales</u>			
Concentration of Toxicant	ŀ	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days	
10 g/l	40	5	0	0	
8 g/l	40	16	12	4	
6 g/l	40	40	40	25	
4 g/l	40	40	40	39	
2 g/l	40	40	40	38	

IC25 (5.18 g/l Sodium Chloride)

# Survival NOEC: 4.0 g/l

Reference Toxica	ant (NaCl)	Ceriodaphi	nia Dubia	
Concentration	Avg. # of Live Organisms/replicate			
OFTOxicant	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	7	3	0
2.0 g/l	10	10	10	1
1.5 g/l	10	10	10	1
1.0 g/l	10	10	10	10
0.5 g/l	10	10	10	10

IC25 (1.15 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By:

Timothy Harrell, Technical Director

60363755 Siloam Springs FATHEAD SURVIVAL File: 6363755A 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 11.460 7.260 7.260 2.010 EXPECTED 2.010 0 25 0 OBSERVED 5 0 Calculated Chi-Square goodness of fit test statistic = 36.9753 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. 60363755 Siloam Springs FATHEAD SURVIVAL File: 6363755A Transform: ARC SINE(SQUARE ROOT(Y)) Shapiro - Wilk's test for normality _____ D = 0.106 W = 0.558Critical 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.

60363755 Siloam Springs FATHEAD SURVIVAL File: 6363755A Transform: ARC SINE(SQUARE ROOT(Y))							
	SUMMARY S	TATISTICS	ON TRANSF	ORMED DATA	TABLE 1 of	Ē 2	
GRP	IDENTIFICATION	 N	MIN	MAX	MEAN		
1 2 3 4 5	Control 32% 42% 56% 75%	5 5 5 5 5 5	1.249 1.412 1.249 1.249 1.249	1.412 1.412 1.412 1.412 1.412 1.412	1.379 1.412 1.379 1.379 1.379 1.379		
6	100%	5	1.249	1.412	1.379		
6036 File	3755 Siloam Spri : 6363755A SUMMARY S	ngs FATHE Transfo TATISTICS	AD SURVIVA rm: ARC SI ON TRANSF	L NE(SQUARE : ORMED DATA	ROOT(Y)) TABLE 2 of	E 2	
GRP	IDENTIFICATION	VARI.	ANCE	SD	SEM	C.V.	a)o
1 2 3 4 5 6	Control 32% 42% 56% 75% 100%		0.005 0.000 0.005 0.005 0.005 0.005	0.073 0.000 0.073 0.073 0.073 0.073 0.073	0.033 0.000 0.033 0.033 0.033 0.033	5.2 0.0 5.2 5.2 5.2 5.2 5.2	8 0 8 8 8 8 8
6036 File	3755 Siloam Spri : 6363755A	ngs FATHE. Transfo	AD SURVIVA rm: ARC SI ANOVA I	L NE (SQUARE ABLE	ROOT (Y) )		
SOUR	CE I	F	SS		MS		F
Betw	een	5	0.0	04	0.001		0.200
With	in (Error) 2	24	0.1	.06	0.004		
Tota	1 2	.9	0.1	.11			
Critical F value = 2.62 (0.05,5,24) Since F < Critical F FAIL TO REJECT Ho: All equal							

60363755 Siloam Springs FATHEAD SURVIVAL File: 6363755A Transform: ARC SINE(SQUARE ROOT(Y))

DUNNETT'S	TEST	-	TABLE	1	OF	2
				_	<u> </u>	_

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
				=	
1	Control	1.379	0.980		
2	32%	1.412	1.000	-0.775	
3	42%	1.379	0.980	0.000	
4	56%	1.379	0.980	0.000	
5	75%	1.379	0.980	0.000	
6	100%	1.379	0.980	0.000	
Dunnett	table value = 2.36	(1 Tailed V	alue, P=0.05, df=24	, 5)	

60363755 Siloam Springs FATHEAD SURVIVAL File: 6363755A Transform: ARC SINE(SQUARE ROOT(Y))

	DUNNETT'S TEST -	TABLE 2 O	F 2 Ho	:Control<	Treatment
GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	5			
2	328	5	0.046	4.7	-0.020
3	42%	5	0.046	4.7	0.000
4	56%	5	0.046	4.7	0.000
5	75%	5	0.046	4.7	0.000
6	100%	5	0.046	4.7	0.000

60363755 Siloam Springs FATHEAD GROWTH File: 6363755B Transform: NO TRANSFORMATION Shapiro - Wilk's test for normality D = 0.035 W = 0.981 Critical W (P = 0.05) (n = 30) = 0.927Critical W (P = 0.01) (n = 30) = 0.900 _____ Data PASS normality test at P=0.01 level. Continue analysis. 60363755 Siloam Springs FATHEAD GROWTH File: 6363755B Transform: NO TRANSFORMATION _____ Bartlett's test for homogeneity of variance Calculated B1 statistic = 3.17 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.

# 60363755 Siloam Springs FATHEAD GROWTH File: 63637558 Transform: NO TRANSFORMATION

#### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	Ν	MIN	MAX	MEAN
1	Control	5	0.374	0.501	0.439
2	32%	5	0.421	0.488	0.458
3	42%	5	0.404	0.480	0.457
4	56%	5	0.410	0.489	0.441
5	75%	5	0.384	0.505	0.461
6	100%	5	0.400	0.472	0.429

# 60363755 Siloam Springs FATHEAD GROWTH File: 6363755B Transform: NO TRANSFORMATION

#### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %	
	m=m+m+m+m+m+m+m+m+m+m+m+m+m+m+m+m+m+m+m					
1	Control	0.003	0.055	0.024	12.46	
2	32%	0.001	0.029	0.013	6.32	
3	42%	0.001	0.030	0.014	6.66	
4	56%	0.001	0.032	0.014	7.33	
5	75%	0.002	0.047	0.021	10.11	
6	100%	0.001	0.027	0.012	6.39	

# 60363755 Siloam Springs FATHEAD GROWTH File: 6363755B Transform: NO TRANSFORMATION

		ANOVA TABLE		
SOURCE	DF	SS	MS	F
Between	5	0.004	0.001	0.602
Within (Error)	24	0.035	0.001	
Total	29	0.039		
Critical F val Since F < Cri	ue = 2.62 tical F FA	(0.05,5,24) IL TO REJECT Ho: All	equal	

60363755 Siloam Springs FATHEAD GROWTH File: 63637558 Transform: NO TRANSFORMATION DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED I ORIGINAL UNITS	N T STAT	SIG
1	Control	0.439	0.439		
2	32%	0.458	0.458	-0.813	
3	428	0.457	0.457	-0.755	
4	56%	0.441	0.441	-0.091	
5	75%	0.461	0.461	-0.946	
6	100%	0.429	0.429	0.415	
Dunnett	t table value = $2.36$	(1 Tailed V	alue, P=0.05, df=2	4,5)	

# 60363755 Siloam Springs FATHEAD GROWTH File: 6363755B Transform: NO TRANSFORMATION

	DUNNETT'S TEST -	TABLE 2 C	F 2 Ho	:Control<	Treatment
GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
****					
1	Control	5			
2	32%	5	0.057	13.0	-0.020
3	42%	5	0.057	13.0	-0.018
4	56%	5	0.057	13.0	-0.002
5	75%	5	0.057	13.0	-0.023
6	100%	5	0.057	13.0	0.010

		NUMBE	R OF
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
32%	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.

F	ISHER'S EXACT	TEST	
			ER OF
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
42%	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	
		======================================	R OF
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
56%	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.						
FISH	ER'S EXACT	TEST				
		NUMBE:	R OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS			
CONTROL	10	0	10			
75%	10	0	1.0			
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.						
FISH	ER'S EXACT ========	TEST ============				
		NUMBE	R OF			
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS			
CONTROL	10	0	10			
100%	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

SUMMARI OF FISHER 5 EARCH TEBIS

NUMBER

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	32%	10	0	
2	428	10	0	
3	56%	10	0	
4	75%	10	0	
5	100%	10	0	

### 60363755 Siloam Springs CERIODAPHNIA DUBIA SURVIVA File: 6363755D Transform: NO TRANSFORM

# SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2 GRP IDENTIFICATION N MIN MAX MEAN CONTROL101.0001.0001.00032%101.0001.0001.00042%101.0001.0001.00056%101.0001.0001.00075%101.0001.0001.000100%101.0001.0001.000 1

______

60363755	Siloam	Springs	CERIODAPI	HNIA	DUBIA	SURVIVA	
File: 630	53755D	Tı	cansform:	NO	TRANSFO	ORM	

#### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

1         CONTROL         0.000         0.000         0.000         0.000           2         32%         0.000         0.000         0.000         0.000           3         42%         0.000         0.000         0.000         0.000           4         56%         0.000         0.000         0.000         0.000           5         75%         0.000         0.000         0.000         0.000           6         100%         0.000         0.000         0.000         0.000	GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
I       CONTROL       0.000       0.000       0.000       0.000         2       32%       0.000       0.000       0.000       0.000         3       42%       0.000       0.000       0.000       0.000         4       56%       0.000       0.000       0.000       0.000         5       75%       0.000       0.000       0.000       0.000         6       100%       0.000       0.000       0.000       0.000						
2       32%       0.000       0.000       0.000       0.000         3       42%       0.000       0.000       0.000       0.000         4       56%       0.000       0.000       0.000       0.000         5       75%       0.000       0.000       0.000       0.000         6       100%       0.000       0.000       0.000       0.000	Ť	CONTROL	0.000	0.000	0.000	0.00
3       42%       0.000       0.000       0.000       0.000         4       56%       0.000       0.000       0.000       0.000         5       75%       0.000       0.000       0.000       0.000         6       100%       0.000       0.000       0.000       0.000	2	328	0.000	0.000	0.000	0.00
4 $56\%$ $0.000$ $0.000$ $0.000$ $0.000$ 5 $75\%$ $0.000$ $0.000$ $0.000$ $0.000$ 6 $100\%$ $0.000$ $0.000$ $0.000$ $0.000$	3	428	0.000	0.000	0.000	0.00
5     75%     0.000     0.000     0.000     0.000       6     100%     0.000     0.000     0.000     0.000	4	56%	0.000	0.000	0.000	0.00
6  100%  0.000  0.000  0.000  0.000	5	75%	0.000	0.000	0.000	0.00
	6	100%	0.000	0.000	0.000	0.00

60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E 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 4 12 26 15 3 Calculated Chi-Square goodness of fit test statistic = 1.1260 Table Chi-Square value (alpha = 0.01) = 13.277 Data PASS normality test. Continue analysis. 60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION ______ Bartlett's test for homogeneity of variance Calculated B1 statistic = 2.00 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.

60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION

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# SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N 	MIN	MAX	MEAN
1	CONTROL	10	15.000	24.000	20.100
2	32%	10	19.000	29.000	22.900
3	42%	10	15.000	28.000	22.700
4	56%	10	15.000	30.000	22.400
5	75%	10	17.000	28.000	22.200
6	100%	10	15.000	27.000	23.000

### 60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION

#### SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	7.211	2.685	0.849	13.36
2	32%	8.322	2.885	0.912	12.60
3	42%	14.233	3.773	1.193	16.62
4	56%	14.933	3.864	1.222	17.25
5	75%	14.622	3.824	1.209	17.22
6	100%	11.556	3.399	1.075	14.78
in the state					

#### 60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION

ANOVA TABLE							
SOURCE	DF	SS	MS	F			
Between	5	58.283	11.657	0.987			
Within (Error)	54	637.900	11.813				
Total	59	696.183					
Critical F value = 2.45 (0.05,5,40) Since F < Critical F FAIL TO REJECT Ho: All equal							

60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION

		TRANSFORMED	MEAN CALCULATED IN		
GROUP	IDENTIFICATION	MEAN	ORIGINAL UNITS	T STAT	SIG
				m=m=m=m	
l	CONTROL	20.100	20.100		
2	32%	22.900	22.900	-1.822	
3	42%	22.700	22.700	-1.692	
4	56%	22.400	22.400	-1.496	
5	75%	22.200	22.200	-1.366	
6	100%	23.000	23.000	-1.887	
Dunnett	table value = 2.31	(1 Tailed V	alue, P=0.05, df=40,	5)	

# 60363755 Siloam Springs CERIODAPHNIA DUBIA REPRODU File: 6363755E Transform: NO TRANSFORMATION

	DUNNETT'S TEST -	TABLE 2 O	F 2 Ho	:Control<	Treatment
GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	10	2 551	17 7	-2 800
4	525 42%	10	3,551	17.7	-2.600
4	56%	10	3.551	17.7	-2.300
5	75%	10	3.551	17.7	-2.100
6	100%	10	3.551	17.7	-2.900

Conc. I	D	1	2	3	4		5	6
Conc. To	ested	0	32	42	56		75	100
Response Response Response Response Response *** Inh	e 1 e 2 e 3 e 4 e 5 ibition Con	.374 .417 .490 .411 .501	.455 .486 .441 .488 .421 on Percen	.464 .462 .404 .480 .474 tage Estima	.410 .444 .412 .449 .489		384 505 484 478 456	.417 .400 .418 .436 .472
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*** 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.

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*** 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.

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# CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

TCR: (.06) 3-15-21	4         5           5	1     City of Siloam Springs Wa       2	Section D Required Client Information SAMPLE ID (AZ 0-91,-) Sample IDS MUST BE UNIQUE 3 3 4 4 4 5 5 6 6 7 7 7 7 7 7 10 10 10 11 12 ADDITIONAL COMMENTS samples have a 24 hour hold time! TCR: (.04) 3-15-21	Section D Required Client Information     M       Sample IDs MUST BE UNIQUE     Information       1     City of Siloam Springs Wa       2     City of Siloam Springs Wa       3     3       4     City of Siloam Springs Wa       5     City of Siloam Springs Wa       1     City of Siloam Springs Wa       2     ADDITIONAL COMMENTS       3     City of Siloam Springs Wa       10     Information       11     Information       12     ADDITIONAL COMMENTS       Samples have a 24 hour hold time!       TCR: Call     S.F.21	Section D       Section D       Sample Clern Information       Sample IDs MUST BE UNIQUE       1     City of Siloarn Springs Wa       2     City of Siloarn Springs Wa       3     Sample IDS MUST BE UNIQUE       1     City of Siloarn Springs Wa       2     Sample IDS MUST BE UNIQUE       3     Sample IDS MUST BE UNIQUE       1     City of Siloarn Springs Wa       2     Sample IDS MUST BE UNIQUE       3     Sample IDS MUST BE UNIQUE       10     Sample IDS MUST BE UNIQUE       11     Sample IDS MUST BE UNIQUE       12     ADDITIONAL COMMENTS       samples have a 24 hour hold time!       return samples to the Frontienac Lab on losi	Phone: 479-228-2000 Fax: Required Due Date/TAT: Section D Section D Section D Section D Section D Section D Sample Clean Information (A-Z, 0-91,-) Sample IDS MUST BE UNIQUE 3 3 4 4 5 5 6 6 6 7 7 10 10 10 10 10 11 12 ADDITIONAL COMMENTS samples have a 24 hour hold time! TCR: (.04) 3-15-21	Section D Phone: 479-228-2000 Fax: Requested Due Date/TAT: Section D Required Client Information (A-Z. 0-91,-) Sample IDs MUST BE UNIQUE 1 1 1 1 1 1 1 1 1 1 1 1 1	Address:     975 Anderson Avenue       Silcam Springs, AR       Emeil To:     abrown@silcamsprings.con       Phone:     479-228-2000       Fax:       Required Due Date/TAT:       Section D       Required Clent Information       B       1       City of Silcam Springs Wa       2       3       4       1       City of Silcam Springs Wa       2       3       4       10       11       ADDITIONAL COMMENTS   Provide have a 24 hour hold time! TCR: (.ou) 3-15-21	Company:       City of Siloam Springs, AR         Address:       975 Anderson Avenue         Siloam Springs, AR         Email To:       abrown@siloamsprings, AR         Phone:       479-228-2000       Fax:         Phone:       479-228-2000       Fax:         Section D       Required Client Information       M         Section D       (A.Z. 0-01,-)       Ample IDS MUST BE UNIQUE       M         1       City of Siloam Springs Wa       5       A         2       Ample IDS MUST BE UNIQUE       M       M         1       City of Siloam Springs Wa       5       6         3       A       4       4       4         10       Ample IDS MUST BE UNIQUE       M       M         10       Ample IDS MUST BE UNIQUE       M       M         11       City of Siloam Springs Wa       5       6         11       Ample IDS MUST BE UNIQUE       M       M         12       Ample IDS MUST BE UNIQUE       M       M         12       Ample IDS MUST BE UNIQUE       M       M         12       Ample IDS MUST BE UNIQUE       M       M         13       Ample IDS MUST BE UNIQUE       M       M
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*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any involces not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007

F-ALL-Q-020rev.08, 12-Oct-2007

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	ra) 3-17-a1 0730	ss to the Frontenac Lab on icel	ave a 24 hour hold time!	ADDITIONAL COMMENTS								City of Siloam Springs Wastewat	SAMPLE ID (A-Z, 0-9 /) Sample IDs MUST BE UNIQUE	Section D Valid Matr Required Client Information MATRIX		sted Due Date/TAT:	479-228-2000 Fax	ro: abrown@siloamsprings.com	Siloam Springs, AR	s: 975 Anderson Avenue	ny: City of Siloam Springs	on A red Client Information:
	11	Tuller A	Town Rowald	RELINQUISHED							WW C 3/16	ter Plant ww c 3/16	및 했 금익첫록우우가찾록및 MATRIX CODE (see valid codes SAMPLE TYPE (G=GRAB C=C)	to left)		Project Number.	Project Name: 1st QTR	Purchase Order No :		Copy To: abrown@siloa	Report To: Tony Brown	Section B Required Project Information
SAMPLER NAME A PRINT Nami SIGNATURE		allen		BY / AFFILIATION							5/21 10:00 03/17/21	5/21 10:00 03/17/21	TE TIME DATE	COLLECTED			WET (Re-Test)			amsprings.com		
ND SIGNATURE of SAMPLER: T E of SAMPLER:		9	3/17/21	DATE							9:00	9:00	SAMPLE TEMP AT COLLECTION			0	9	317	Þ	0		= (0
Tony Brown		Print Cold	17.46 July market	TIME ACCEPTED B							1 X	1 X	# OF CONTAINERS Unpreserved H ₂ SO ₄ HNO ₃ HCI NaOH Na ₂ S ₂ O ₃ Methanol Other	Preservatives		ace Profile #. 10809	hanager: Nolie Wood	Pace Quote Reference:	Address:	Company Name:	Attention:	Section C nvoice Information:
DATE Signed (MM/DD/YY):		and have	in Anis.	Y AFFILIATION							×	×	Chronic WET Test Metals-Zn		Requested Ar					R		
3/17/21			S/10/2017	DATE TIME											nalysis Filtered (Y/N)	STATE:	Site Location	UST I RCRA	NPDES T GROU	EGULATORY AGENC		
Temp In °C Received on Ice (Y/N) Custody Sealed Cooler (Y/N)			M V V V	SAMPLE CONDITIONS							301273	Ph0694	Residual Chlorine (Y/N) Pace Project No.					A T OTHER	UND WATER T DRINKING WAT	Y		Page: 2 of 3

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CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Face Analytical

Pace Analytical Sample Condition U	pon Receipt	l
Client Name: Siloom Socioes		Renewal water
Courier: FedEx $\square$ UPS $\square$ VIA $\square$ Clay $\square$ E		
Tracking #: Pac	e Shipping Label Use	$d$ ? Yes $\Box$ No <b>X</b>
Custody Seal on Cooler/Box Present: Yes X No	Seals intact: Yes >	( No 🗆
Packing Material:Bubble WrapBubble BagsThermometer Used:T-111Type of	□ Foam □ I <b>ce: √</b> Blue No	None X Other
Cooler Temperature (°C): As-read 2. Corr. Facto	or <u>6</u> Correc	ted $1, 6$ Date and initials of person second examining contents: $153(16/2)$
Temperature should be above freezing to 6°C		
Chain of Custody present:	XYes □No □N/A	
Chain of Custody relinquished:	Yes No N/A	
Samples arrived within holding time:		
Short Hold Time analyses (<72hr):	XYes □No □N/A	
Rush Turn Around Time requested:	□Yes XNo □N/A	
Sufficient volume:	XYes □No □N/A	
Correct containers used:	XYes □No □N/A	
Pace containers used:	XYes □No □N/A	
Containers intact:	XYes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No XN/A	
Filtered volume received for dissolved tests?	□Yes □No □x/A	
Sample labels match COC: Date / time / ID / analyses	XYes □No □N/A	
Samples contain multiple phases? Matrix:	□Yes XNo □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 □No XN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	□Yes □No XN/A	
Headspace in VOA vials ( >6mm):	□Yes □No XN/A	
Samples from USDA Regulated Area: State:	□Yes □No XN/A	
Additional labels attached to 5035A / TX1005 vials in the field?	? □Yes □No Xx/A	
Client Notification/ Resolution: Copy COC to	Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/T	ime:	
Project Manager Review;	_ Dat	e:

F-ALL-Q-020rev.08, 12-Oct-2007

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CHAIN-OF-CUSTODY / Analytical Request Document The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.



# Sample Condition Upon Receipt

Client Name: Storm Score		
Courier: $EedEx \square UPS \square VIA \square Clay \square I$		Pace 🔲 Xroads 🗆 Client-7 Other 🗆
Tracking #		$\frac{1}{2} \operatorname{Yes} \square \operatorname{No} \mathbf{X}$
Custady Soal on Cooler/Pay Present: Ves X No D	Social integt: Ves X	
Packing Materials Bubble Wran Bubble Bags		
Thermometer Used: T-111 Type of		
		Date and initials of person
Cooler Temperature (°C): As-read <u>9</u> Corr. Fact	Correct	ed <u>S. Ce</u> <u>examining contents</u> : <u>Ep</u>
Temperature should be above freezing to 6°C		300/210-
Chain of Custody present:	XYes No N/A	
Chain of Custody relinquished:	XYes □No □N/A	
Samples arrived within holding time:	Yes No N/A	
Short Hold Time analyses (<72hr):	XYes □No □N/A	
Rush Turn Around Time requested:	□Yes XNo □N/A	
Sufficient volume:	XYes No N/A	
Correct containers used:	XYes □No □N/A	
Pace containers used:	XYes No N/A	
Containers intact:	XYes □No □N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	□Yes □No XN/A	
Filtered volume received for dissolved tests?	□Yes □No □x/A	
Sample labels match COC: Date / time / ID / analyses	Xyes □No □N/A	
Samples contain multiple phases? Matrix:	□Yes XNo □N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCI<2; NaOH>9 Sulfide, NaOH>10 Cyanide)	□Yes □No XN/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	□Yes □No	
Potassium iodide test strip turns blue/purple? (Preserve)	□Yes □No	
Trip Blank present:	□Yes □No XN/A	
Headspace in VOA vials ( >6mm):	□Yes □No XN/A	
Samples from USDA Regulated Area: State:	TYes No XN/A	
Additional labels attached to 5035A / TX1005 vials in the field	I? □Yes □No Xx/A	
Client Notification/ Resolution: Copy COC t	to Client? Y / N	Field Data Required? Y / N
Person Contacted: Date/	Time:	
Comments/ Resolution;		
Project Manager Review:	Dat	e:



# Memorandum

To: State Representative of the Arkansas Energy & Environment (DEQ),

Cc: Steve Gorszczyk, Public Works Director

From: Tony Brown, Wastewater Superintendent

Date: March 24, 2021

Re: 1st QTR WET TEST Results between February 09, 2021, and February 16, 2021

# Background:

Wastewater staff received the analytical results for sample(s) received by Pace Analytical laboratory between February 09, 2021, and February 16, 2021. In the summary of the report, we were told in error that we passed the chronic toxicity test per the EPA 821-R-02-013.

I received a phone call on February 10, 2021, from the Technical Director, Tim Harrell at Pace Analytical informing us that the Wednesday, February 10, 2021 sample was not getting the desired results. I requested Pace Analytical to run a Metals test to see if we could determine the root cause of the negative results. The first and third samples taken on Monday, February 8, 2021, and Friday, February 12, 2021, had no negative effects and had the desired results.

I requested Pace Analytical to send us the coolers and sample containers so we could rerun the 1st quarter WET test. We received the coolers and containers and scheduled the retest to run between February 15, 2021, and February 20, 2021. We are currently awaiting the results of that test, and I will attach the results to the original WET test submitted to the Net-DMR.

# **Root Cause Analysis:**

The Metals (EPA Method 200.8) test run by Pace Analytical provided information on the sample from Wednesday, February 10, 2021. Zinc was reported at 51.2 ug/L and Copper at 2.2 ug/L.

As a result of extremely cold temperatures between Tuesday, February 9, 2021, and Wednesday, February 10, 2021, and a subsequent unscheduled power outage, all process control equipment was offline with no power to operate the process control equipment. This included the backbone of the nutrient removal process, the centrifugal blowers which provide aeration. As a secondary benefit, the aeration system also provides a heat source for optimum biological activity. With that heat source removed and temperatures at -5°C, the autotrophic-nitrifying bacteria cease functioning. With no biological activity removing nutrients/metals this resulted in an environment not suitable for the survivability or reproduction of the Ceriodaphnia dubia.

It is my opinion that we failed the 1st quarter Chronic Whole Effluent Toxicity test due to multiple factors that were completely out of our control. The service interruption resulted in the Siloam Springs Wastewater Plant being shutdown. Extremely low temperatures caused the generator not to start, due to the gelling of the diesel fuel. At 32 degrees, the wax in the liquid form will crystallize and leave the fuel tank clouded. At 10-15 degrees, it will finally start to gel and clog the tank and fuel filters. This perfect storm combined a rare set of circumstances that drastically and negatively affected the outcome of the 1st quarter Chronic Whole Effluent Toxicity Test.

Respectfully,

Wastewater Superintendent (NPDES Permit: AR0020273)

# Attachments:

NET-DMR Pace Analytical 1st QTR WET (Results), Pace Analytical Metals (EPA 200.8)