

October 26, 2021

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

RE: Project: 4TH QTR WET
Pace Project No.: 60382801

Dear Tony Brown:

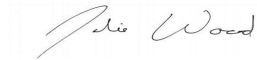
Enclosed are the analytical results for sample(s) received by the laboratory between October 12, 2021 and October 18, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where 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,



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

Enclosures



REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 4TH QTR WET

Pace Project No.: 60382801

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 #: 2000302021-3

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

Pace Analytical Services Southeast Kansas

808 West McKay, Frontenac, KS 66763

Arkansas Certification #: 18-016-0

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10426

Louisiana Certification #: 03055

Oklahoma Certification #: 9935

Texas Certification #: T104704407

Utah Certification #: KS00021

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SAMPLE SUMMARY

Project: 4TH QTR WET

Pace Project No.: 60382801

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60382801001	CITY OF SILOAM SPRINGS	Water	10/11/21 09:00	10/12/21 08:00
60382801002	CITY OF SILOAM SPRINGS WASTEWA	Water	10/11/21 09:00	10/12/21 18:10
60382801003	649833	Water	10/13/21 09:13	10/14/21 19:15
60382801004	649830	Water	10/15/21 09:00	10/18/21 18:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 4TH QTR WET

Pace Project No.: 60382801

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60382801001	CITY OF SILOAM SPRINGS	EPA 821/R-02/013	MEB	1	PASI-SE
60382801002	CITY OF SILOAM SPRINGS WASTEWA	EPA 200.8	JGP	12	PASI-K
60382801003	649833	EPA 200.8	JGP	12	PASI-K
60382801004	649830	EPA 200.8	JGP	12	PASI-K

PASI-K = Pace Analytical Services - Kansas City

PASI-SE = Pace Analytical Services - SE Kansas

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ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60382801

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: CITY OF SILOAM SPRINGS Lab ID: 60382801001 Collected: 10/11/21 09:00 Received: 10/12/21 08:00 Matrix: Water								
Chronic Toxicity	Analytical Method: EPA 821/R-02/013 Pace Analytical Services - SE Kansas							
Toxicity, Chronic	Complete		1.0	1		10/12/21 10:50		

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ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60382801

Sample: CITY OF SILOAM SPRINGS WASTEWA **Lab ID:** 60382801002 Collected: 10/11/21 09:00 Received: 10/12/21 18:10 Matrix: Water

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 Analytical Services - Kansas City						
Antimony	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-36-0	
Arsenic	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-38-2	
Beryllium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 07:58	7440-41-7	
Cadmium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 07:58	7440-43-9	
Chromium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-47-3	
Copper	1.3	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-50-8	
Lead	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7439-92-1	
Nickel	1.9	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-02-0	
Selenium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7782-49-2	
Silver	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 07:58	7440-22-4	
Thallium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 07:58	7440-28-0	
Zinc	35.2	ug/L	10.0	1	10/20/21 13:32	10/25/21 07:58	7440-66-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60382801

Sample: 649833	Lab ID: 60382801003	Collected: 10/13/21 09:13	Received: 10/14/21 19:15	Matrix: Water				
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 Analytical Services - Kansas City

Antimony	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-36-0	
Arsenic	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-38-2	
Beryllium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:15	7440-41-7	
Cadmium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:15	7440-43-9	
Chromium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-47-3	
Copper	1.3	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-50-8	
Lead	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7439-92-1	
Nickel	1.9	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-02-0	
Selenium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7782-49-2	
Silver	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:15	7440-22-4	
Thallium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:15	7440-28-0	
Zinc	31.7	ug/L	10.0	1	10/20/21 13:32	10/25/21 08:15	7440-66-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 4TH QTR WET

Pace Project No.: 60382801

Sample: 649830 **Lab ID: 60382801004** Collected: 10/15/21 09:00 Received: 10/18/21 18:00 Matrix: Water

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 Analytical Services - Kansas City						
Antimony	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-36-0	
Arsenic	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-38-2	
Beryllium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:20	7440-41-7	
Cadmium	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:20	7440-43-9	
Chromium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-47-3	
Copper	1.2	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-50-8	
Lead	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7439-92-1	
Nickel	1.2	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-02-0	
Selenium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7782-49-2	
Silver	ND	ug/L	0.50	1	10/20/21 13:32	10/25/21 08:20	7440-22-4	
Thallium	ND	ug/L	1.0	1	10/20/21 13:32	10/25/21 08:20	7440-28-0	
Zinc	14.5	ug/L	10.0	1	10/20/21 13:32	10/25/21 08:20	7440-66-6	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 4TH QTR WET
Pace Project No.: 60382801

QC Batch: 750764 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60382801002, 60382801003, 60382801004

METHOD BLANK: 3006164 Matrix: Water

Associated Lab Samples: 60382801002, 60382801003, 60382801004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	1.0	10/25/21 07:52	
Arsenic	ug/L	ND	1.0	10/25/21 07:52	
Beryllium	ug/L	ND	0.50	10/25/21 07:52	
Cadmium	ug/L	ND	0.50	10/25/21 07:52	
Chromium	ug/L	ND	1.0	10/25/21 07:52	
Copper	ug/L	ND	1.0	10/25/21 07:52	
Lead	ug/L	ND	1.0	10/25/21 07:52	
Nickel	ug/L	ND	1.0	10/25/21 07:52	
Selenium	ug/L	ND	1.0	10/25/21 07:52	
Silver	ug/L	ND	0.50	10/25/21 07:52	
Thallium	ug/L	ND	1.0	10/25/21 07:52	
Zinc	ug/L	ND	10.0	10/25/21 07:52	

LABORATORY CONTROL SAMPLE: 3006165

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	38.4	96	85-115	
Arsenic	ug/L	40	40.0	100	85-115	
Beryllium	ug/L	40	39.8	99	85-115	
Cadmium	ug/L	40	39.8	99	85-115	
Chromium	ug/L	40	39.1	98	85-115	
Copper	ug/L	40	42.5	106	85-115	
Lead	ug/L	40	36.4	91	85-115	
Nickel	ug/L	40	40.3	101	85-115	
Selenium	ug/L	40	39.5	99	85-115	
Silver	ug/L	20	19.0	95	85-115	
Thallium	ug/L	40	35.7	89	85-115	
Zinc	ug/L	100	104	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3006166 3006167

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		60382801002	Result	Spike Conc.	Spike Conc.							Result
Antimony	ug/L	ND	40	40	40.0	39.3	99	97	70-130	2	20	
Arsenic	ug/L	ND	40	40	41.1	40.9	102	102	70-130	0	20	
Beryllium	ug/L	ND	40	40	40.3	40.8	101	102	70-130	1	20	
Cadmium	ug/L	ND	40	40	38.7	38.6	97	96	70-130	0	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.

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QUALITY CONTROL DATA

Project: 4TH QTR WET

Pace Project No.: 60382801

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3006166 3006167												
Parameter	Units	MS		MSD		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60382801002 Result	Spike Conc.	Spike Conc.	MS Result							
Chromium	ug/L	ND	40	40	39.2	38.9	97	97	70-130	1	20	
Copper	ug/L	1.3	40	40	39.3	39.3	95	95	70-130	0	20	
Lead	ug/L	ND	40	40	38.7	38.3	96	95	70-130	1	20	
Nickel	ug/L	1.9	40	40	39.7	39.3	94	94	70-130	1	20	
Selenium	ug/L	ND	40	40	38.4	38.2	95	95	70-130	0	20	
Silver	ug/L	ND	20	20	17.9	17.9	89	89	70-130	0	20	
Thallium	ug/L	ND	40	40	37.7	37.4	94	94	70-130	1	20	
Zinc	ug/L	35.2	100	100	130	130	95	95	70-130	0	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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QUALIFIERS

Project: 4TH QTR WET

Pace Project No.: 60382801

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 4TH QTR WET

Pace Project No.: 60382801

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60382801001	CITY OF SILOAM SPRINGS	EPA 821/R-02/013	750989		
60382801002	CITY OF SILOAM SPRINGS	EPA 200.8	750764	EPA 200.8	750910
60382801003	WASTEWA 649833	EPA 200.8	750764	EPA 200.8	750910
60382801004	649830	EPA 200.8	750764	EPA 200.8	750910

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60382801



Client Name: Silgum springs

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-296 Type of Ice: WT Blue None

Cooler Temperature (°C): As-read 2.9 Corr. Factor -0.7 Corrected 2.6

Date and initials of person examining contents:

10/19/21

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO) LOT# <u>603173</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/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)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State: _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A
Required Client Information:
 Company: City of Siloam Springs
 Address: 975 Anderson Avenue
 Siloam Springs, AR
 Email To: abrown@silosamsprings.com
 Phone: 479-228-2000
 Requested Due Date/TAT: _____

Section B
Required Project Information
 Report To: Tony Brown
 Copy To: abrown@silosamsprings.com
 Purchase Order No.: _____
 Project Name: 4th QTR WET
 Project Number: _____

Section C
Invoice Information:
 Attention: _____
 Company Name: _____
 Address: _____
 Place Order Reference: _____
 Place Project Manager: Nolie Wood
 Place Profile #: 10809

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER
 Site Location: _____ STATE: AR

ITEM #	Valid Matrix Codes <small>DRINKING WATER: DW WASTE WATER: WW PRODUCT SOLID: P SLURRY: SL WASTE: WP AIR: AS OTHER: OT TISSUE: TS</small>	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE <small>(see valid codes to left)</small>	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives <small>H₂SO₄ HNO₃ HCl NaOH Na₂S₂O₈ Methanol Other</small>	Y/N	Requested Analysis Filtered (Y/N)
		COMPOSITE START	COMPOSITE END/GRAB							
1	City of Siloam Springs Wastewater Plant	10/14/21	10:00	C	WW		1			
2	1049 B30	10/15/21	9:00	C	WW		1			
3		10/15/21	9:00	C	WW		1			
4										
5										
6										
7										
8										
9										
10										
11										
12										

ADDITIONAL COMMENTS
 *samples have a 24 hour hold time!
 *return samples to the Frontier Lab on 100!
 TCA = 0.03 mg/L

RELINQUISHED BY / AFFILIATION
 DATE: 10/15/21
 TIME: 9:21
 Signature: Tony Brown

ACCEPTED BY / AFFILIATION
 DATE: 10/15/21
 TIME: 12:50
 Signature: Tony Brown

SAMPLE CONDITIONS
 Received on: 10/15/21
 Temp in °C: 2.6
 Cooled (Y/N): Y
 Custody Sealed (Y/N): Y
 Samples Intact (Y/N): Y

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Tony Brown
 SIGNATURE of SAMPLER: *Tony Brown*
 DATE Signed (MM/DD/YY): 10/15/21



Sample Condition Upon Receipt

Leg 3

Client Name: Siloam Springs

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-243 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 3.0 Corr. Factor -1.1 Corrected 1.9

Date and initials of person examining contents:

TS 10/15/12, 1250

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

REFERENCE #60382801

**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
1-479-228-2000

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

October 21, 2021

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SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (*Pimephales promelas*), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (*Ceriodaphnia dubia*), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the City of Siloam Springs effluent discharge from October 11, 2021 to October 15, 2021. All the test methods followed are as listed in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms."

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

In minnow section of testing, it was observed that the effluent had no significant effect on the survival of the larvae at the 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 12.5.

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 15.2.

The chronic toxicity exhibited by the fathead minnows and the *Ceriodaphnia* treated by the effluent sampled from October 11 to October 15 from the City of Siloam Springs effluent discharge, is acceptable as described in EPA 821-R-02-013.

INTRODUCTION

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

TEST MATERIAL

City of Siloam Springs personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 10-12-21. Subsequent samples followed by delivery on 10-14-21, and on 10-16-21. All samples were stored at $\leq 6^{\circ}$ Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in EPA 821-R-02-013.

TEST METHODS

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

The Pimephales and Ceriodaphnia tests were initiated on 10-12-21 and carried out until 10-19-21. The Pimephales tests were conducted in 500 ml plastic jars with 250 ml of test solution. Ten larvae were placed in each of at least 5 replicates to make a total of 50 larvae per sample concentration. The Ceriodaphnia tests were carried out in 35ml vials containing 25 ml of test solution. One Neonate was placed in each of 10 replicates to make a total of 10 neonates per sample concentration.

TEST ORGANISMS

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

REFERENCE #60382801

TABLE 1

Permittee: City of Siloam Springs Effluent discharge.

Date Sampled	No. 1: 10-11-21	9:00
	No. 2: 10-13-21	9:13
	No. 3: 10-14-21	9:00

Test Initiated: 10:50
 Test End: 10:40

Date: 10-12-21
 Date: 10-19-21

RESULTS

Critical Dilution:	100%
Ceriodaphnia dubia	Results
TLP3B	0
TGP3B	0
TOP3B	100
TPP3B	100
TQP3B	15.87
Pimephales promelas	Results
TLP6C	0
TGP6C	0
TOP6C	100
TPP6C	100
TQP6C	9.44

Dilution Water used: Moderately Hard Synthetic Water

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

Effluent Concentration (%)	Average Dry Weight in Milligrams in Replicate Chambers					Mean Dry Weight (mg)	CV% *
	A	B	C	D	E		
Control 0%	0.471	0.462	0.578	0.479	0.510	0.500	9.44
Dilution 1 32%	0.492	0.497	0.459	0.427	0.506	0.476	6.87
Dilution 2 42%	0.490	0.581	0.468	0.420	0.488	0.489	11.94
Dilution 3 56%	0.505	0.510	0.493	0.544	0.516	0.514	3.70
Dilution 4 75%	0.533	0.451	0.510	0.602	0.614	0.529	9.96
Dilution 5 100%	0.561	0.589	0.541	0.523	0.536	0.550	4.68

* Coefficient of Variation = Standard Deviation X 100 / Mean

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E	24hr	48hr	7 day	
Control 0%	100	100	100	100	100	100	100	100	0.00
Dilution 1 32%	100	100	100	90	100	100	100	98	5.28
Dilution 2 42%	100	100	100	90	100	100	100	98	5.28
Dilution 3 56%	100	100	100	100	100	100	100	100	0.00
Dilution 4 75%	100	100	100	100	100	100	100	100	0.00
Dilution 5 100%	100	100	100	100	100	100	100	100	0.00

Permittee: City of Siloam Springs Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

Replicate	Control 0%	Dilution 1 32%	Dilution 2 42%	Dilution 3 56%	Dilution 4 75%	Dilution 5 100%
1	16	24	20	19	25	19
2	24	19	23	16	16	24
3	19	17	18	24	19	18
4	20	23	15	25	20	21
5	19	23	20	22	21	17
6	21	27	16	20	19	23
7	24	22	19	24	23	17
8	23	20	21	22	26	25
9	25	19	20	17	21	20
10	16	19	22	22	24	26
Mean	20.7	21.3	19.4	21.1	21.4	21.0
SD	3.268	3.020	2.503	3.035	3.098	3.333
CV %	15.79	14.18	12.90	14.38	14.48	15.87

CERIODAPHNIA MEAN PERCENT SURVIVAL

Time Elapsed	Percent Effluent (%)					
	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	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	10
11. No. replicates/concentration	5
12. No. larvae/concentration	50
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 (Pimephales promelas)
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 QUALITY
EFFLUENT CONCENTRATION**

	Control	100%
PH	7.6	7.5
D.O.	8.0	8.1
Temp	25.0	25.0
Alk	64	76
Hard	86	192
Cond	322	859
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

REFERENCE #60382801

TEST WATER QUALITY

24-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.7	7.1	24.7
32% Effluent	7.7	7.2	24.6
42% Effluent	7.7	7.3	24.6
56% Effluent	7.7	7.4	24.6
75% Effluent	7.7	7.5	24.6
100% Effluent	7.6	7.6	24.6

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.6	7.1	24.6
32% Effluent	7.6	7.1	24.7
42% Effluent	7.6	7.1	24.7
56% Effluent	7.7	7.2	24.7
75% Effluent	7.7	7.2	24.7
100% Effluent	7.8	7.3	24.7

FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	100%
pH	7.6	7.9
D.O.	7.0	7.0
Temp	25.0	25.0
Alk	62	78
Hard	94	186
Cond	383	911

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

TEST VALIDITY

The Pimephales promelas control survival rate was 100. The mean dry weight (growth) of the Pimephales promelas was determined at 0.500 g/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 0.00 and 9.44. The Ceriodaphnia dubia survival rates were 100 in the control. The Ceriodaphnia in the control produced an average of 20.7 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 0.00 and 15.79. Control data met or exceeded all criteria set out by EPA 821-R-02-013 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: 9/14/21 11:30 End: 9/21/21 12:10
 Reference Toxicant (NaCl) Pimephales promelas

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
10 g/l	40	7	1	0
8 g/l	40	35	14	4
6 g/l	40	40	36	26
4 g/l	40	40	40	40
2 g/l	40	40	40	39

IC25 (5.15 g/l Sodium Chloride)


Survival NOEC: 4.0 g/l

Reference Toxicant (NaCl) Ceriodaphnia Dubia

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	8	3	0
2.0 g/l	10	10	9	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 (1.24 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By: 
 Timothy Harrell, Technical Director

60382801 Siloam Springs FATHEAD SURVIVAL
File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	2.010	7.260	11.460	7.260	2.010
OBSERVED	2	0	28	0	0

Calculated Chi-Square goodness of fit test statistic = 40.4019
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.

60382801 Siloam Springs FATHEAD SURVIVAL
File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.042

W = 0.547

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

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

Data FAIL normality test. Try another transformation.

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

60382801 Siloam Springs FATHEAD SURVIVAL
 File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	1.412	1.412	1.412
2	32%	5	1.249	1.412	1.379
3	42%	5	1.249	1.412	1.379
4	56%	5	1.412	1.412	1.412
5	75%	5	1.412	1.412	1.412
6	100%	5	1.412	1.412	1.412

60382801 Siloam Springs FATHEAD SURVIVAL
 File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	32%	0.005	0.073	0.033	5.28
3	42%	0.005	0.073	0.033	5.28
4	56%	0.000	0.000	0.000	0.00
5	75%	0.000	0.000	0.000	0.00
6	100%	0.000	0.000	0.000	0.00

60382801 Siloam Springs FATHEAD SURVIVAL
 File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.007	0.001	0.800
Within (Error)	24	0.042	0.002	
Total	29	0.050		

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

60382801 Siloam Springs FATHEAD SURVIVAL
 File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	1.412	1.000		
2	32%	1.379	0.980	1.225	
3	42%	1.379	0.980	1.225	
4	56%	1.412	1.000	0.000	
5	75%	1.412	1.000	0.000	
6	100%	1.412	1.000	0.000	

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

60382801 Siloam Springs FATHEAD SURVIVAL

File: 6382801A Transform: ARC SINE(SQUARE ROOT(Y))

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	5			
2	32%	5	0.023	2.3	0.020
3	42%	5	0.023	2.3	0.020
4	56%	5	0.023	2.3	0.000
5	75%	5	0.023	2.3	0.000
6	100%	5	0.023	2.3	0.000

60382801 Siloam Springs FATHEAD GROWTH
File: 6382801B Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.042

W = 0.973

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

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

Data PASS normality test at P=0.01 level. Continue analysis.

60382801 Siloam Springs FATHEAD GROWTH
File: 6382801B Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance

Calculated B1 statistic = 6.12

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)

Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60382801 Siloam Springs FATHEAD GROWTH
 File: 6382801B Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	0.462	0.578	0.500
2	32%	5	0.427	0.506	0.476
3	42%	5	0.420	0.581	0.489
4	56%	5	0.493	0.544	0.514
5	75%	5	0.451	0.589	0.529
6	100%	5	0.523	0.589	0.550

60382801 Siloam Springs FATHEAD GROWTH
 File: 6382801B Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.002	0.047	0.021	9.44
2	32%	0.001	0.033	0.015	6.87
3	42%	0.003	0.058	0.026	11.94
4	56%	0.000	0.019	0.008	3.70
5	75%	0.003	0.053	0.024	9.96
6	100%	0.001	0.026	0.012	4.68

60382801 Siloam Springs FATHEAD GROWTH
 File: 6382801B Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.018	0.004	2.074
Within (Error)	24	0.042	0.002	
Total	29	0.060		

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

60382801 Siloam Springs FATHEAD GROWTH
 File: 6382801B Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.500	0.500		
2	32%	0.476	0.476	0.899	
3	42%	0.489	0.489	0.400	
4	56%	0.514	0.514	-0.514	
5	75%	0.529	0.529	-1.088	
6	100%	0.550	0.550	-1.889	

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

60382801 Siloam Springs FATHEAD GROWTH
 File: 6382801B Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	5			
2	32%	5	0.062	12.5	0.024
3	42%	5	0.062	12.5	0.011
4	56%	5	0.062	12.5	-0.014
5	75%	5	0.062	12.5	-0.029
6	100%	5	0.062	12.5	-0.050

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	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.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	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

IDENTIFICATION	NUMBER OF		
	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.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
75%	10	0	10
TOTAL	20	0	20

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

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF		
	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
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

NUMBER NUMBER SIG

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

60382801 Siloam Springs CERIODAPHNIA DUBIA SUR
File: 6382801D 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	1.000	1.000	1.000
4	56%	10	1.000	1.000	1.000
5	75%	10	1.000	1.000	1.000
6	100%	10	1.000	1.000	1.000

60382801 Siloam Springs CERIODAPHNIA DUBIA SUR
File: 6382801D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	32%	0.000	0.000	0.000	0.00
3	42%	0.000	0.000	0.000	0.00
4	56%	0.000	0.000	0.000	0.00
5	75%	0.000	0.000	0.000	0.00
6	100%	0.000	0.000	0.000	0.00

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
File: 6382801E 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	3	18	17	21	1

Calculated Chi-Square goodness of fit test statistic = 7.7826
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
File: 6382801E Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 0.83

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

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
 File: 6382801E Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	16.000	25.000	20.700
2	32%	10	17.000	27.000	21.300
3	42%	10	15.000	23.000	19.400
4	56%	10	16.000	25.000	21.100
5	75%	10	16.000	26.000	21.400
6	100%	10	17.000	26.000	21.000

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
 File: 6382801E Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	10.678	3.268	1.033	15.79
2	32%	9.122	3.020	0.955	14.18
3	42%	6.267	2.503	0.792	12.90
4	56%	9.211	3.035	0.960	14.38
5	75%	9.600	3.098	0.980	14.48
6	100%	11.111	3.333	1.054	15.87

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
 File: 6382801E Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	27.083	5.417	0.580
Within (Error)	54	503.900	9.331	
Total	59	530.983		

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

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
 File: 6382801E Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	20.700	20.700		
2	32%	21.300	21.300	-0.439	
3	42%	19.400	19.400	0.952	
4	56%	21.100	21.100	-0.293	
5	75%	21.400	21.400	-0.512	
6	100%	21.000	21.000	-0.220	

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

60382801 Siloam Springs CERIODAPHNIA DUBIA REP
 File: 6382801E Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2

Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	10			
2	32%	10	3.156	15.2	-0.600
3	42%	10	3.156	15.2	1.300
4	56%	10	3.156	15.2	-0.400
5	75%	10	3.156	15.2	-0.700
6	100%	10	3.156	15.2	-0.300

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	32	42	56	75	100
Response 1	.471	.492	.490	.505	.533	.561
Response 2	.462	.497	.581	.510	.451	.589
Response 3	.578	.459	.468	.493	.510	.541
Response 4	.479	.427	.420	.544	.602	.523
Response 5	.510	.506	.488	.516	.614	.536

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: 60382801 Siloam Springs

Test Start Date: 10/12/21 Test Ending Date: 10/19/21

Test Species: Fathead

Test Duration: 7 days

DATA FILE:

Conc. ID	Number Replicates	Concentration %	Response Means	Std. Dev.	Pooled Response Means
1	5	0.000	0.500	0.047	0.512
2	5	32.000	0.476	0.033	0.512
3	5	42.000	0.489	0.058	0.512
4	5	56.000	0.514	0.019	0.512
5	5	75.000	0.542	0.067	0.512
6	5	100.000	0.550	0.026	0.512

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

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	32	42	56	75	100
Response 1	16	24	20	19	25	19
Response 2	24	19	23	16	16	24
Response 3	19	17	18	24	19	18
Response 4	20	23	15	25	20	21
Response 5	19	23	20	22	21	17
Response 6	21	27	16	20	19	23
Response 7	24	22	19	24	23	17
Response 8	23	20	21	22	26	25
Response 9	25	19	20	17	21	20
Response 10	16	19	22	22	24	26

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: 60382801 Siloam Springs

Test Start Date: 10/12/21 Test Ending Date: 10/19/21

Test Species: C. dubia

Test Duration: 7 days

DATA FILE:

Conc. ID	Number Replicates	Concentration %	Response Means	Std. Dev.	Pooled Response Means
1	10	0.000	20.700	3.268	21.000
2	10	32.000	21.300	3.020	21.000
3	10	42.000	19.400	2.503	20.725
4	10	56.000	21.100	3.035	20.725
5	10	75.000	21.400	3.098	20.725
6	10	100.000	21.000	3.333	20.725

*** 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.

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	City of Siloam Springs	Report To:	Tony Brown	Attention:	
Address:	975 Anderson Avenue	Copy To:	abrown@silosamsprings.com	Company Name:	
	Siloam Springs, AR	Purchase Order No.:		Address:	
Email To:	abrown@silosamsprings.com	Project Name:	4th QTR WET	Pace Quote Reference:	
Phone:	479-228-2000	Project Number:		Pace Project Manager:	Nollie Wood
Requested Due Date/TAT:				Pace Profile #:	10809

Page: 1 of 3

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Site Location: _____ STATE: AR

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WATER WT WASTE WATER WW PRODUCT P SOIL/SOLID SL OIL OL WIPE WP AIR AR OTHER OT TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Analysis Test† Chronic WET Test Metals-Zn	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				DATE	TIME							
1	City of Siloam Springs Wastewater Plant	WW C	C	10/10/21	10:00	10/11/21	9:00					60382801
2		WW C	C	10/10/21	10:00	10/11/21	9:00	X	X			60382801
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

ADDITIONAL COMMENTS

*samples have a 24 hour hold time!

*return samples to the Frontenac Lab on ice!

GLB = 0.10 TCA

RELINQUISHED BY / AFFILIATION

DATE: 10/11/21 TIME: 9:16

[Signature]

ACCEPTED BY / AFFILIATION

DATE: 10/12/21 TIME: 16:00

[Signature]

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Tony Brown

SIGNATURE of SAMPLER: *[Signature]*

DATE Signed (MM/DD/YYYY): 10/11/21

Temp in °C

Received on Ice (Y/N)

Custody Sealed (Y/N)

Cooler (Y/N)

Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: City of Siloam Springs		Report To: Tony Brown		Attention:	
Address: 975 Anderson Avenue		Copy To: abrown@siloamsprings.com		Company Name:	
Siloam Springs, AR		Purchase Order No.:		Address:	
Email To: abrown@siloamsprings.com		Project Name: 4th QTR WET		Pace Guide:	
Phone: 479-228-2000		Project Number:		References:	
Requested Due Date/TAT:				Pace Project Manager: Nollie Wood	
				Pace Profile #: 10809	
				REGULATORY AGENCY	
				<input checked="" type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER	
				Site Location	
				STATE: AR	

ITEM #	Section D Required Client Information	Valid Matrix Codes	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives	Analysis Test (Y/N)	Chronic WET Test Metals-Zn	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB								
1	City of Siloam Springs Wastewater Plant	WW C	10/12/21	10:00	10/13/21	9:13	1	Unpreserved	H ₂ SO ₄	X		
2	<i>649833</i>	WW C	10/12/21	10:00	10/13/21	9:13	1			X		
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
samples have a 24 hour hold time	<i>Tony Brown</i>	10/13/21	9:22	<i>Tony Brown</i>	10/14/21	8:00	Y Y Y
return samples to the Frontmanac Lab on ice!	<i>Tony Brown</i>	10/14/21	16:00				
<i>Site: (0.04) TCR</i>							

Temp in °C		Received on Ice (Y/N)	Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: Tony Brown
 SIGNATURE of SAMPLER: *Tony Brown*

DATE Signed (MM/DD/YYYY): 10/13/21



Sample Condition Upon Receipt

Client Name: Siloam Springs

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-243 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 4.2 Corr. Factor -1.1 Corrected 3.1

Date and initials of person examining contents:

BP 10/14/21
800

Temperature should be above freezing to 6°C

Chain of Custody present: Yes No N/A

Chain of Custody relinquished: Yes No N/A

Samples arrived within holding time: Yes No N/A

Short Hold Time analyses (<72hr): Yes No N/A

Rush Turn Around Time requested: Yes No N/A

Sufficient volume: Yes No N/A

Correct containers used: Yes No N/A

Pace containers used: Yes No N/A

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 N/A

Sample labels match COC: Date / time / ID / analyses Yes No N/A

Samples contain multiple phases? Matrix: Yes No N/A

Containers requiring pH preservation in compliance? Yes No N/A

(HNO₃, H₂SO₄, HCl<2; NaOH>9, Sulfide, NaOH>10 Cyanide)
(Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)

Cyanide water sample checks: Yes No

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: Yes No N/A

Additional labels attached to 5035A / TX1005 vials in the field? Yes No N/A

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____



CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	City of Siloam Springs	Report To:	Tony Brown	Attention:	
Address:	975 Anderson Avenue	Copy To:	abrown@siloomsprings.com	Company Name:	
Email To:	abrown@siloomsprings.com	Purchase Order No.:		Address:	
Phone:	479-228-2000	Project Name:	4th QTR WET	Pace Quote Reference:	
		Project Number:		Pace Project Manager:	Nolie Wood
				Pace Profile #:	10809

ITEM #	Valid Matrix Codes MATRIX CODE DRINKING WATER DW WASTE WATER WT WASTE WATER PRODUCT WW SOIL/SOLID P OIL SL WIP AR AIR OT OTHER TS TISSUE	Matrix Code (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Analysis Test Y/N	Chronic WET Test Y/N	Metals-Zn Y/N	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB								
1		WW	C	10/14/21	10/15/21	9:00	1		X				
2		WW	C	10/14/21	10/15/21	9:00	1		X				
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
*samples have a 24 hour hold time *return samples to the Frontenac Lab on ice! TCA = 0.03 mg/L		10/15/21	9:21	Tuffay Jones	10/16/21	1250.19	Y Y Y
SAMPLER NAME AND SIGNATURE							
PRINT Name of SAMPLER: Tony Brown							
SIGNATURE of SAMPLER: <i>Tony Brown</i>							
DATE Signed (MM/DD/YY): 10/15/21							
Temp in °C							
Received on Ice (Y/N)							
Custody Sealed (Y/N)							
Cooler (Y/N)							
Samples Intact (Y/N)							

*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.

Sample Condition Upon Receipt

Legs

Client Name: Silom Springs

Courier: FedEx UPS VIAL Clay PEX ECI Pace Xroads Client Other

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-243

Cooler Temperature (°C): As-read 3.0 Corr. Factor -1.1 Corrected 1.9

TS 10/16/12 50

Temperature should be above freezing to 6°C

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

Client Notification/Resolution: Copy COC to Client? Y / N

Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ Date: _____