EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
	TN0078255	Scotts Creek WWTP	

Form 2A NPDES | **EPA**

U.S. Environmental Protection Agency
Application for NPDES Permit to Discharge Wastewater
NEW AND EXISTING PUBLICLY OWNED TREATMENT WORKS

SECTION 1. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS (40 CFR 122.21(j)(1) and (9))

Facility Information

1.1 Facility name
Scotts Creek Wastewater Treatment Plant

Mailing address (street or P.O. box)
10001 US Hwy 70

City or town	State	ZIP code
Lakeland	TN	38002

Contact name (first and last)	Title	Phone number	Email address
Shane Horn	City Manager	8675405	shorn@lakelandtn.org

Location address (street, route number, or other specific identifier) ☐ Same as mailing address
9708 Old Brownsville Rd

City or town	State	ZIP code
Lakeland	TN	38002

1.2 Is this application for a facility that has yet to commence discharge?
☐ Yes ➔ See instructions on data submission requirements for new dischargers. ☑ No

Applicant Information

1.3 Is applicant different from entity listed under Item 1.1 above?
☑ Yes ☐ No ➔ SKIP to Item 1.4.

Applicant name
City of Lakeland

Applicant address (street or P.O. box)
10001 US Hwy 70

City or town	State	ZIP code
Lakeland	TN	38002

Contact name (first and last)	Title	Phone number	Email address
Shane Horn	City Manager	8675405	shorn@lakelandtn.org

1.4 Is the applicant the facility's owner, operator, or both? (Check only one response.)
☐ Owner ☐ Operator ☑ Both

1.5 To which entity should the NPDES permitting authority send correspondence? (Check only one response.)
☐ Facility ☐ Applicant ☑ Facility and applicant (they are one and the same)

Existing Environmental Permits

1.6 Indicate below any existing environmental permits. (Check all that apply and print or type the corresponding permit number for each.)

Existing Environmental Permits

☑ NPDES (discharges to surface water) TN0078255	☐ RCRA (hazardous waste)	☐ UIC (underground injection control)
☐ PSD (air emissions)	☐ Nonattainment program (CAA)	☐ NESHAPs (CAA)
☐ Ocean dumping (MPRSA)	☐ Dredge or fill (CWA Section 404)	☐ Other (specify)

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19
	TN0078255	Scotts Creek WWTP	OMB No. 2040-0004

Collection System and Population Served

1.7 Provide the collection system information requested below for the treatment works.

Municipality Served	Population Served	Collection System Type (indicate percentage)	Ownership Status
City of Lakeland	8053	100 % separate sanitary sewer ___ % combined storm and sanitary sewer ☐ Unknown	☑ Own ☑ Maintain ☐ Own ☐ Maintain ☐ Own ☐ Maintain
		___ % separate sanitary sewer ___ % combined storm and sanitary sewer ☐ Unknown	☐ Own ☐ Maintain ☐ Own ☐ Maintain ☐ Own ☐ Maintain
		___ % separate sanitary sewer ___ % combined storm and sanitary sewer ☐ Unknown	☐ Own ☐ Maintain ☐ Own ☐ Maintain ☐ Own ☐ Maintain
		___ % separate sanitary sewer ___ % combined storm and sanitary sewer ☐ Unknown	☐ Own ☐ Maintain ☐ Own ☐ Maintain ☐ Own ☐ Maintain
Total Population Served	8053		

	Separate Sanitary Sewer System	Combined Storm and Sanitary Sewer
Total percentage of each type of sewer line (in miles)	100 %	%

Indian Country

1.8 Is the treatment works located in Indian Country?

☐ Yes ☑ No

1.9 Does the facility discharge to a receiving water that flows through Indian Country?

☐ Yes ☑ No

Design and Actual Flow Rates

1.10 Provide design *and* actual flow rates in the designated spaces.

Design Flow Rate
4.5 mgd

Annual Average Flow Rates (Actual)		
Two Years Ago	**Last Year**	**This Year**
.631 mgd	.622 mgd	.677 mgd

Maximum Daily Flow Rates (Actual)		
Two Years Ago	**Last Year**	**This Year**
1.201 mgd	1.521 mgd	.954 mgd

Discharge Points by Type

1.11 Provide the total number of effluent discharge points to waters of the United States by type.

Total Number of Effluent Discharge Points by Type				
Treated Effluent	**Untreated Effluent**	**Combined Sewer Overflows**	**Bypasses**	**Constructed Emergency Overflows**
1	0	0	0	0

Outfalls and Other Discharge or Disposal Methods

Outfalls Other Than to Waters of the United States

1.12 Does the POTW discharge wastewater to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the United States?

☐ Yes ☑ No ➔ SKIP to Item 1.14.

1.13 Provide the location of each surface impoundment and associated discharge information in the table below.

Surface Impoundment Location and Discharge Data

Location	Average Daily Volume Discharged to Surface Impoundment	Continuous or Intermittent (check one)
	gpd	☐ Continuous ☐ Intermittent
	gpd	☐ Continuous ☐ Intermittent
	gpd	☐ Continuous ☐ Intermittent

1.14 Is wastewater applied to land?

☐ Yes ☑ No ➔ SKIP to Item 1.16.

1.15 Provide the land application site and discharge data requested below.

Land Application Site and Discharge Data

Location	Size	Average Daily Volume Applied	Continuous or Intermittent (check one)
	acres	gpd	☐ Continuous ☐ Intermittent
	acres	gpd	☐ Continuous ☐ Intermittent
	acres	gpd	☐ Continuous ☐ Intermittent

1.16 Is effluent transported to another facility for treatment prior to discharge?

☐ Yes ☑ No ➔ SKIP to Item 1.21.

1.17 Describe the means by which the effluent is transported (e.g., tank truck, pipe).

1.18 Is the effluent transported by a party other than the applicant?

☐ Yes ☑ No ➔ SKIP to Item 1.20.

1.19 Provide information on the transporter below.

Transporter Data

Entity name	Mailing address (street or P.O. box)	
City or town	State	ZIP code
Contact name (first and last)	Title	
Phone number	Email address	

Outfalls and Other Discharge or Disposal Methods Continued

1.20 In the table below, indicate the name, address, contact information, NPDES number, and average daily flow rate of the receiving facility.

Receiving Facility Data

Facility name	Mailing address (street or P.O. box)	
City or town	State	ZIP code
Contact name (first and last)	Title	
Phone number	Email address	
NPDES number of receiving facility (if any) ☐ None	Average daily flow rate mgd	

1.21 Is the wastewater disposed of in a manner other than those already mentioned in Items 1.14 through 1.21 that do not have outlets to waters of the United States (e.g., underground percolation, underground injection)?

☐ Yes ☑ No ➔ SKIP to Item 1.23.

1.22 Provide information in the table below on these other disposal methods.

Information on Other Disposal Methods

Disposal Method Description	Location of Disposal Site	Size of Disposal Site	Annual Average Daily Discharge Volume	Continuous or Intermittent (check one)
		acres	gpd	☐ Continuous ☐ Intermittent
		acres	gpd	☐ Continuous ☐ Intermittent
		acres	gpd	☐ Continuous ☐ Intermittent

Variance Requests

1.23 Do you intend to request or renew one or more of the variances authorized at 40 CFR 122.21(n)? (Check all that apply. Consult with your NPDES permitting authority to determine what information needs to be submitted and when.)

☐ Discharges into marine waters (CWA Section 301(h))

☐ Water quality related effluent limitation (CWA Section 302(b)(2))

☑ Not applicable

Contractor Information

1.24 Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor?

☐ Yes ☑ No ➔ SKIP to Section 2.

1.25 Provide location and contact information for each contractor in addition to a description of the contractor's operational and maintenance responsibilities.

Contractor Information

	Contractor 1	Contractor 2	Contractor 3
Contractor name (company name)			
Mailing address (street or P.O. box)			
City, state, and ZIP code			
Contact name (first and last)			
Phone number			
Email address			
Operational and maintenance responsibilities of contractor			

SECTION 2. ADDITIONAL INFORMATION (40 CFR 122.21(j)(1) and (2))

Design Flow

Outfalls to Waters of the United States

2.1 Does the treatment works have a design flow greater than or equal to 0.1 mgd?

☑ Yes ☐ No ➔ SKIP to Section 3.

Inflow and Infiltration

2.2 Provide the treatment works' current average daily volume of inflow and infiltration.

Average Daily Volume of Inflow and Infiltration
40,000 gpd

Indicate the steps the facility is taking to minimize inflow and infiltration.

CCTV Inspections of collection lines, CIPP lining, Manhole Lining, Monitoring pump station run times, Visual Inspection during large rain events

Topographic Map

2.3 Have you attached a topographic map to this application that contains all the required information? (See instructions for specific requirements.)

☑ Yes ☐ No

Flow Diagram

2.4 Have you attached a process flow diagram or schematic to this application that contains all the required information? (See instructions for specific requirements.)

☑ Yes ☐ No

Scheduled Improvements and Schedules of Implementation

2.5 Are improvements to the facility scheduled?

☐ Yes ☑ No ➔ SKIP to Section 3.

Briefly list and describe the scheduled improvements.

1.

2.

3.

4.

2.6 Provide scheduled or actual dates of completion for improvements.

Scheduled or Actual Dates of Completion for Improvements

Scheduled Improvement (from above)	Affected Outfalls (list outfall number)	Begin Construction (MM/DD/YYYY)	End Construction (MM/DD/YYYY)	Begin Discharge (MM/DD/YYYY)	Attainment of Operational Level (MM/DD/YYYY)
1.					
2.					
3.					
4.					

2.7 Have appropriate permits/clearances concerning other federal/state requirements been obtained? Briefly explain your response.

☐ Yes ☐ No ☑ None required or applicable

Explanation:

EPA Identification Number	NPDES Permit Number	Facility Name	Form Approved 03/05/19 OMB No. 2040-0004
	TN0078255	Scotts Creek WWTP	

SECTION 3. INFORMATION ON EFFLUENT DISCHARGES (40 CFR 122.21(j)(3) to (5))

Description of Outfalls

3.1 Provide the following information for each outfall. (Attach additional sheets if you have more than three outfalls.)

	Outfall Number 1	Outfall Number ____	Outfall Number ____
State	TN		
County	Shelby		
City or town	Lakeland		
Distance from shore	12 ft.	ft.	ft.
Depth below surface	1 ft.	ft.	ft.
Average daily flow rate	0.677 mgd	mgd	mgd
Latitude	35° 16′ 56″ N	° ′ ″	° ′ ″
Longitude	89° 44′ 27″ W	° ′ ″	° ′ ″

Seasonal or Periodic Discharge Data

3.2 Do any of the outfalls described under Item 3.1 have seasonal or periodic discharges?

☐ Yes ☑ No ➔ SKIP to Item 3.4.

3.3 If so, provide the following information for each applicable outfall.

	Outfall Number ____	Outfall Number ____	Outfall Number ____
Number of times per year discharge occurs			
Average duration of each discharge (specify units)			
Average flow of each discharge	mgd	mgd	mgd
Months in which discharge occurs			

Diffuser Type

3.4 Are any of the outfalls listed under Item 3.1 equipped with a diffuser?

☐ Yes ☑ No ➔ SKIP to Item 3.6.

3.5 Briefly describe the diffuser type at each applicable outfall.

	Outfall Number ____	Outfall Number ____	Outfall Number ____

Waters of the U.S.

3.6 Does the treatment works discharge or plan to discharge wastewater to waters of the United States from one or more discharge points?

☑ Yes ☐ No ➔ SKIP to Section 6.

Receiving Water Description

3.7 Provide the receiving water and related information (if known) for each outfall.

	Outfall Number [1] ____	Outfall Number ____	Outfall Number ____
Receiving water name	Loosahatchie River		
Name of watershed, river, or stream system	Loosahatchie		
U.S. Soil Conservation Service 14-digit watershed code			
Name of state management/river basin	Chickasaw Basin Authority		
U.S. Geological Survey 8-digit hydrologic cataloging unit code	07030275		
Critical low flow (acute)	49.8 cfs	cfs	cfs
Critical low flow (chronic)	cfs	cfs	cfs
Total hardness at critical low flow	mg/L of $CaCO_3$	mg/L of $CaCO_3$	mg/L of $CaCO_3$

Treatment Description

3.8 Provide the following information describing the treatment provided for discharges from each outfall.

	Outfall Number [1] ____	Outfall Number ____	Outfall Number ____
Highest Level of Treatment (check all that apply per outfall)	☑ Primary ☐ Equivalent to secondary ☑ Secondary ☐ Advanced ☐ Other (specify) ____	☐ Primary ☐ Equivalent to secondary ☐ Secondary ☐ Advanced ☐ Other (specify) ____	☐ Primary ☐ Equivalent to secondary ☐ Secondary ☐ Advanced ☐ Other (specify) ____
Design Removal Rates by Outfall			
BOD_5 or $CBOD_5$	85 %	%	%
TSS	85 %	%	%
Phosphorus	☑ Not applicable %	☐ Not applicable %	☐ Not applicable %
Nitrogen	☑ Not applicable %	☐ Not applicable %	☐ Not applicable %
Other (specify) ____	☑ Not applicable %	☐ Not applicable %	☐ Not applicable %

Treatment Description Continued

3.9 Describe the type of disinfection used for the effluent from each outfall in the table below. If disinfection varies by season, describe below.

	Outfall Number 1	Outfall Number ____	Outfall Number ____
Disinfection type	Ultraviolet		
Seasons used	All		
Dechlorination used?	☑ Not applicable ☐ Yes ☐ No	☐ Not applicable ☐ Yes ☐ No	☐ Not applicable ☐ Yes ☐ No

Effluent Testing Data

3.10 Have you completed monitoring for all Table A parameters and attached the results to the application package?
☑ Yes ☐ No

3.11 Have you conducted any WET tests during the 4.5 years prior to the date of the application on any of the facility's discharges or on any receiving water near the discharge points?
☑ Yes ☐ No ➔ SKIP to Item 3.13.

3.12 Indicate the number of acute and chronic WET tests conducted since the last permit reissuance of the facility's discharges by outfall number or of the receiving water near the discharge points.

	Outfall Number 1		Outfall Number ____		Outfall Number ____	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Number of tests of discharge water	12	11				
Number of tests of receiving water	0	0				

3.13 Does the treatment works have a design flow greater than or equal to 0.1 mgd?
☑ Yes ☐ No ➔ SKIP to Item 3.16.

3.14 Does the POTW use chlorine for disinfection, use chlorine elsewhere in the treatment process, or otherwise have reasonable potential to discharge chlorine in its effluent?
☐ Yes ➔ Complete Table B, including chlorine. ☑ No ➔ Complete Table B, omitting chlorine.

3.15 Have you completed monitoring for all applicable Table B pollutants and attached the results to this application package?
☑ Yes ☐ No

3.16 Does one or more of the following conditions apply?

- The facility has a design flow greater than or equal to 1 mgd.
- The POTW has an approved pretreatment program or is required to develop such a program.
- The NPDES permitting authority has informed the POTW that it must sample for the parameters in Table C, must sample other additional parameters (Table D), or submit the results of WET tests for acute or chronic toxicity for each of its discharge outfalls (Table E).

☑ Yes ➔ Complete Tables C, D, and E as applicable. ☐ No ➔ SKIP to Section 4.

3.17 Have you completed monitoring for all applicable Table C pollutants and attached the results to this application package?
☑ Yes ☐ No

3.18 Have you completed monitoring for all applicable Table D pollutants required by your NPDES permitting authority and attached the results to this application package?
☐ Yes ☑ No additional sampling required by NPDES permitting authority.

Effluent Testing Data Continued

3.19 Has the POTW conducted either (1) minimum of four quarterly WET tests for one year preceding this permit application or (2) at least four annual WET tests in the past 4.5 years?

☑ Yes ☐ No ➔ Complete tests and Table E and SKIP to Item 3.26.

3.20 Have you previously submitted the results of the above tests to your NPDES permitting authority?

☑ Yes ☐ No ➔ Provide results in Table E and SKIP to Item 3.26.

3.21 Indicate the dates the data were submitted to your NPDES permitting authority and provide a summary of the results.

Date(s) Submitted (MM/DD/YYYY)	Summary of Results
03/08/2022	Every WET test passed. Pace Analytical did not test chronic on the 3/20 test.

3.22 Regardless of how you provided your WET testing data to the NPDES permitting authority, did any of the tests result in toxicity?

☐ Yes ☑ No ➔ SKIP to Item 3.26.

3.23 Describe the cause(s) of the toxicity:

3.24 Has the treatment works conducted a toxicity reduction evaluation?

☐ Yes ☑ No ➔ SKIP to Item 3.26.

3.25 Provide details of any toxicity reduction evaluations conducted.

3.26 Have you completed Table E for all applicable outfalls and attached the results to the application package?

☑ Yes ☐ Not applicable because previously submitted information to the NPDES permitting authority.

SECTION 4. INDUSTRIAL DISCHARGES AND HAZARDOUS WASTES (40 CFR 122.21(j)(6) and (7))

Industrial Discharges and Hazardous Wastes

4.1 Does the POTW receive discharges from SIUs or NSCIUs?

☐ Yes ☑ No ➔ SKIP to Item 4.7.

4.2 Indicate the number of SIUs and NSCIUs that discharge to the POTW.

Number of SIUs	Number of NSCIUs

4.3 Does the POTW have an approved pretreatment program?

☐ Yes ☐ No

4.4 Have you submitted either of the following to the NPDES permitting authority that contains information substantially identical to that required in Table F: (1) a pretreatment program annual report submitted within one year of the application or (2) a pretreatment program?

☐ Yes ☐ No ➔ SKIP to Item 4.6.

4.5 Identify the title and date of the annual report or pretreatment program referenced in Item 4.4. SKIP to Item 4.7.

4.6 Have you completed and attached Table F to this application package?

☐ Yes ☐ No

Industrial Discharges and Hazardous Wastes Continued

4.7 Does the POTW receive, or has it been notified that it will receive, by truck, rail, or dedicated pipe, any wastes that are regulated as RCRA hazardous wastes pursuant to 40 CFR 261?

☐ Yes ☑ No ➔ SKIP to Item 4.9.

4.8 If yes, provide the following information:

Hazardous Waste Number	Waste Transport Method (check all that apply)	Annual Amount of Waste Received	Units
	☐ Truck ☐ Rail ☐ Dedicated pipe ☐ Other (specify) _____		
	☐ Truck ☐ Rail ☐ Dedicated pipe ☐ Other (specify) _____		
	☐ Truck ☐ Rail ☐ Dedicated pipe ☐ Other (specify) _____		

4.9 Does the POTW receive, or has it been notified that it will receive, wastewaters that originate from remedial activities, including those undertaken pursuant to CERCLA and Sections 3004(7) or 3008(h) of RCRA?

☐ Yes ☑ No ➔ SKIP to Section 5.

4.10 Does the POTW receive (or expect to receive) less than 15 kilograms per month of non-acute hazardous wastes as specified in 40 CFR 261.30(d) and 261.33(e)?

☐ Yes ➔ SKIP to Section 5. ☐ No

4.11 Have you reported the following information in an attachment to this application: identification and description of the site(s) or facility(ies) at which the wastewater originates; the identities of the wastewater's hazardous constituents; and the extent of treatment, if any, the wastewater receives or will receive before entering the POTW?

☐ Yes ☐ No

SECTION 5. COMBINED SEWER OVERFLOWS (40 CFR 122.21(j)(8))

CSO Map and Diagram

5.1 Does the treatment works have a combined sewer system?

☐ Yes ☑ No ➔ SKIP to Section 6.

5.2 Have you attached a CSO system map to this application? (See instructions for map requirements.)

☐ Yes ☐ No

5.3 Have you attached a CSO system diagram to this application? (See instructions for diagram requirements.)

☐ Yes ☐ No

CSO Outfall Description

5.4 For each CSO outfall, provide the following information. (Attach additional sheets as necessary.)

	CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____
City or town			
State and ZIP code			
County			
Latitude	° ′ ″	° ′ ″	° ′ ″
Longitude	° ′ ″	° ′ ″	° ′ ″
Distance from shore	ft.	ft.	ft.
Depth below surface	ft.	ft.	ft.

CSO Monitoring

5.5 Did the POTW monitor any of the following items in the past year for its CSO outfalls?

	CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____
Rainfall	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
CSO flow volume	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
CSO pollutant concentrations	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Receiving water quality	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
CSO frequency	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Number of storm events	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

CSO Events in Past Year

5.6 Provide the following information for each of your CSO outfalls.

	CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____
Number of CSO events in the past year	events	events	events
Average duration per event	hours ☐ Actual or ☐ Estimated	hours ☐ Actual or ☐ Estimated	hours ☐ Actual or ☐ Estimated
Average volume per event	million gallons ☐ Actual or ☐ Estimated	million gallons ☐ Actual or ☐ Estimated	million gallons ☐ Actual or ☐ Estimated
Minimum rainfall causing a CSO event in last year	inches of rainfall ☐ Actual or ☐ Estimated	inches of rainfall ☐ Actual or ☐ Estimated	inches of rainfall ☐ Actual or ☐ Estimated

CSO Receiving Waters

5.7 Provide the information in the table below for each of your CSO outfalls.

	CSO Outfall Number ___	CSO Outfall Number ___	CSO Outfall Number ___
Receiving water name			
Name of watershed/ stream system			
U.S. Soil Conservation Service 14-digit watershed code (if known)	☐ Unknown	☐ Unknown	☐ Unknown
Name of state management/river basin			
U.S. Geological Survey 8-Digit Hydrologic Unit Code (if known)	☐ Unknown	☐ Unknown	☐ Unknown
Description of known water quality impacts on receiving stream by CSO (see instructions for examples)			

SECTION 6. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement

6.1 In Column 1 below, mark the sections of Form 2A that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.

Column 1	Column 2	
☑ Section 1: Basic Application Information for All Applicants	☐ w/ variance request(s)	☐ w/ additional attachments
☑ Section 2: Additional Information	☑ w/ topographic map ☐ w/ additional attachments	☑ w/ process flow diagram
☑ Section 3: Information on Effluent Discharges	☑ w/ Table A ☑ w/ Table B ☑ w/ Table C	☐ w/ Table D ☐ w/ Table E ☑ w/ additional attachments
☑ Section 4: Industrial Discharges and Hazardous Wastes	☐ w/ SIU and NSCIU attachments ☐ w/ additional attachments	☐ w/ Table F
☑ Section 5: Combined Sewer Overflows	☐ w/ CSO map ☐ w/ CSO system diagram	☐ w/ additional attachments
☑ Section 6: Checklist and Certification Statement	☐ w/ attachments	

6.2 **Certification Statement**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (print or type first and last name)	Official title
Shane Horn	City Manager
Signature	**Date signed**
	March 14, 2022

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE A. EFFLUENT PARAMETERS FOR ALL POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Biochemical oxygen demand ☐ BOD_5 or ☑ $CBOD_5$ (report one)	12	mg/L	5.29	mg/L	156	5210B-2016	5 mg/L ☐ ML ☑ MDL
Fecal coliform	2419	MPN	17.02	MPN	156	9223b	1 MPN ☐ ML ☑ MDL
Design flow rate	1.521	mgd	.631	mgd	1095		
pH (minimum)	6.75	S.U.					
pH (maximum)	7.53	S.U.					
Temperature (winter)	24.7	C	19.27	C	260		
Temperature (summer)	26.7	C	23.08	C	260		
Total suspended solids (TSS)	30	mg/L	8.22	mg/L	156	2540d	0.0 mg/L ☐ ML ☑ MDL

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

This page intentionally left blank.

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE B. EFFLUENT PARAMETERS FOR ALL POTWS WITH A FLOW EQUAL TO OR GREATER THAN 0.1 MGD

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Ammonia (as N)	15.8	mg/L	2.23	mg/L	156	Hach Method10205	.0162 mg/L ☐ ML ☑ MDL
Chlorine (total residual, TRC)[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A ☐ ML ☐ MDL
Dissolved oxygen	8.9	mg/L	7.46	mg/L	780	4500-0 H	.05 mg/L ☐ ML ☑ MDL
Nitrate/nitrite	2.33	mg/L	.903	mg/L	36	EPA-300	.100 mg/L ☐ ML ☑ MDL
Kjeldahl nitrogen	14.1	mg/L	2.4	mg/L	36	4500NORGD-2013	1.00 mg/L ☐ ML ☑ MDL
Oil and grease	<1.7	mg/L	<1.7	mg/L	2	1664b	1.7 mg/L ☐ ML ☑ MDL
Phosphorus	3.75	mg/L	2.1	mg/L	36	Hach Method 10210	.0093 mg/L ☐ ML ☑ MDL
Total dissolved solids	183	mg/L	171	mg/L	2	2540C-2011	54.3 mg/L ☐ ML ☑ MDL

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

[2] Facilities that do not use chlorine for disinfection, do not use chlorine elsewhere in the treatment process, and have no reasonable potential to discharge chlorine in their effluent are not required to report data for chlorine.

This page intentionally left blank.

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Metals, Cyanide, and Total Phenols							
Hardness (as $CaCO_3$)	58.7	mg/L	56.9	mg/L	2	EPA-200.7	.1 mg/L ☐ ML ☑ MDL
Antimony, total recoverable	<0.0100	mg/L	<0.0100	mg/L	2	EPA-200.7	.01 mg/L ☐ ML ☑ MDL
Arsenic, total recoverable	<0.0100	mg/L	<0.0100	mg/L	2	EPA-200.7	.01 mg/L ☐ ML ☑ MDL
Beryllium, total recoverable	<0.0010	mg/L	<0.0010	mg/L	2	EPA-200.7	.001 mg/L ☐ ML ☑ MDL
Cadmium, total recoverable	<0.0020	mg/L	<0.0020	mg/L	2	EPA-200.7	.002 mg/L ☐ ML ☑ MDL
Chromium, total recoverable	<0.0050	mg/L	<0.0050	mg/L	2	EPA-200.7	.005 mg/L ☐ ML ☑ MDL
Copper, total recoverable	.0089	mg/L	.0076	mg/L	2	EPA-200.7	.005 mg/L ☐ ML ☑ MDL
Lead, total recoverable	<0.0060	mg/L	<0.0060	mg/L	2	EPA-200.7	.006 mg/L ☐ ML ☑ MDL
Mercury, total recoverable	<0.0020	mg/L	<0.0020	mg/L	2	EPA245.1	.002 mg/L ☐ ML ☑ MDL
Nickel, total recoverable	.0070	mg/L	.0060	mg/L	2	EPA-200.7	.005 mg/L ☐ ML ☑ MDL
Selenium, total recoverable	<0.0100	mg/L	<0.0100	mg/L	2	EPA-200.7	.01 mg/L ☐ ML ☑ MDL
Silver, total recoverable	<0.0050	mg/L	<0.0050	mg/L	2	EPA-200.7	.005 mg/L ☐ ML ☑ MDL
Thallium, total recoverable	<0.0200	mg/L	<0.0200	mg/L	2	EPA-200.7	.02 mg/L ☐ ML ☑ MDL
Zinc, total recoverable	.0468	mg/L	.0399	mg/L	2	EPA-200.7	.02 mg/L ☐ ML ☑ MDL
Cyanide	<0.0050	mg/L	<0.0050	mg/L	2	4500CNE-2011	.005 mg/L ☐ ML ☑ MDL
Total phenolic compounds	<0.0050	mg/L	<0.0050	mg/L	2	420.1	.005 mg/L ☐ ML ☑ MDL
Volatile Organic Compounds							
Acrolein	<20.0	ug/L	<20.0	ug/L	2	624.1	20.0 ug/L ☐ ML ☑ MDL
Acrylonitrile	<20.0	ug/L	<20.0	ug/L	2	624.1	20.0 ug/L ☐ ML ☑ MDL
Benzene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Bromoform	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Carbon tetrachloride	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Chlorobenzene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Chlorodibromomethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Chloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
2-chloroethylvinyl ether	<5.00	ug/L	<5.00	ug/L	2	624.1	5.00 ug/L ☐ ML ☑ MDL
Chloroform	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Dichlorobromomethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,1-dichloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,2-dichloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
trans-1,2-dichloroethylene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,1-dichloroethylene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,2-dichloropropane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,3-dichloropropylene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Ethylbenzene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Methyl bromide	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Methyl chloride	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Methylene chloride	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,1,2,2-tetrachloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Tetrachloroethylene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Toluene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,1,1-trichloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
1,1,2-trichloroethane	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Trichloroethylene	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Vinyl chloride	<1.00	ug/L	<1.00	ug/L	2	624.1	1.00 ug/L ☐ ML ☑ MDL
Acid-Extractable Compounds							
p-chloro-m-cresol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2-chlorophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2,4-dichlorophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2,4-dimethylphenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
4,6-dinitro-o-cresol	<10.0	ug/L	<10.0	ug/L	2	625.1	10.0 ug/L ☐ ML ☑ MDL
2,4-dinitrophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2-nitrophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
4-nitrophenol	<10.0	ug/L	<10.0	ug/L	2	625.1	10.0 ug/L ☐ ML ☑ MDL
Pentachlorophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Phenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2,4,6-trichlorophenol	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Base-Neutral Compounds							
Acenaphthene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Acenaphthylene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Anthracene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Benzidine	<20.0	ug/L	<20.0	ug/L	2	625.1	20.0 ug/L ☐ ML ☑ MDL
Benzo(a)anthracene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Benzo(a)pyrene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
3,4-benzofluoranthene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Benzo(ghi)perylene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Benzo(k)fluoranthene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Bis (2-chloroethoxy) methane	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Bis (2-chloroethyl) ether	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Bis (2-chloroisopropyl) ether	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Bis (2-ethylhexyl) phthalate	<10.0	ug/L	<10.0	ug/L	2	625.1	10.0 ug/L ☐ ML ☑ MDL
4-bromophenyl phenyl ether	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Butyl benzyl phthalate	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2-chloronaphthalene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
4-chlorophenyl phenyl ether	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Chrysene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
di-n-butyl phthalate	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
di-n-octyl phthalate	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Dibenzo(a,h)anthracene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
1,2-dichlorobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
1,3-dichlorobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
1,4-dichlorobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
3,3-dichlorobenzidine	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Diethyl phthalate	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Dimethyl phthalate	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2,4-dinitrotoluene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
2,6-dinitrotoluene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
1,2-diphenylhydrazine	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Fluoranthene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Fluorene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Hexachlorobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Hexachlorobutadiene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Hexachlorocyclo-pentadiene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Hexachloroethane	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Indeno(1,2,3-cd)pyrene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Isophorone	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
Naphthalene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Nitrobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
N-nitrosodi-n-propylamine	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
N-nitrosodimethylamine	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL
N-nitrosodiphenylamine	<10.0	ug/L	<10.0	ug/L	2	625.1	10.0 ug/L ☐ ML ☑ MDL
Phenanthrene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
Pyrene	<2.00	ug/L	<2.00	ug/L	2	625.1	2.00 ug/L ☐ ML ☑ MDL
1,2,4-trichlorobenzene	<5.00	ug/L	<5.00	ug/L	2	625.1	5.00 ug/L ☐ ML ☑ MDL

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR Chapter I, Subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

This page intentionally left blank.

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	

Form Approved 03/05/19
OMB No. 2040-0004

TABLE D. ADDITIONAL POLLUTANTS AS REQUIRED BY NPDES PERMITTING AUTHORITY

Pollutant (list)	Maximum Daily Discharge		Average Daily Discharge			Analytical Method[1]	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
☑ No additional sampling is required by NPDES permitting authority.							
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL
							☐ ML ☐ MDL

[1] Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

This page intentionally left blank.

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number ____	Test Number ____	Test Number ____
Test Information			
Test species			
Age at initiation of test			
Outfall number			
Date sample collected			
Date test started			
Duration			
Toxicity Test Methods			
Test method number			
Manual title			
Edition number and year of publication			
Page number(s)			
Sample Type			
Check one:	☐ Grab ☐ 24-hour composite	☐ Grab ☐ 24-hour composite	☐ Grab ☐ 24-hour composite
Sample Location			
Check one:	☐ Before Disinfection ☐ After Disinfection ☐ After Dechlorination	☐ Before Disinfection ☐ After Disinfection ☐ After Dechlorination	☐ Before disinfection ☐ After disinfection ☐ After dechlorination
Point in Treatment Process			
Describe the point in the treatment process at which the sample was collected for each test.			
Toxicity Type			
Indicate for each test whether the test was performed to asses acute or chronic toxicity, or both. (Check one response.)	☐ Acute ☐ Chronic ☐ Both	☐ Acute ☐ Chronic ☐ Both	☐ Acute ☐ Chronic ☐ Both

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number ____	Test Number ____	Test Number ____
Test Type			
Indicate the type of test performed. (Check one response.)	☐ Static ☐ Static-renewal ☐ Flow-through	☐ Static ☐ Static-renewal ☐ Flow-through	☐ Static ☐ Static-renewal ☐ Flow-through
Source of Dilution Water			
Indicate the source of dilution water. (Check one response.)	☐ Laboratory water ☐ Receiving water	☐ Laboratory water ☐ Receiving water	☐ Laboratory water ☐ Receiving water
If laboratory water, specify type.			
If receiving water, specify source.			
Type of Dilution Water			
Indicate the type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.	☐ Fresh water ☐ Salt water (specify)	☐ Fresh water ☐ Salt water (specify)	☐ Fresh water ☐ Salt water (specify)
Percentage Effluent Used			
Specify the percentage effluent used for all concentrations in the test series.			
Parameters Tested			
Check the parameters tested.	☐ pH ☐ Salinity ☐ Temperature ☐ Ammonia ☐ Dissolved oxygen	☐ pH ☐ Salinity ☐ Temperature ☐ Ammonia ☐ Dissolved oxygen	☐ pH ☐ Salinity ☐ Temperature ☐ Ammonia ☐ Dissolved oxygen
Acute Test Results			
Percent survival in 100% effluent	%	%	%
LC_{50}			
95% confidence interval	%	%	%
Control percent survival	%	%	%

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
	TN0078255	Scotts Creek WWTP	1

Form Approved 03/05/19
OMB No. 2040-0004

TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number ____		Test Number ____		Test Number ____	
Acute Test Results Continued						
Other (describe)						
Chronic Test Results						
NOEC	%		%		%	
IC_{25}	%		%		%	
Control percent survival	%		%		%	
Other (describe)						
Quality Control/Quality Assurance						
Is reference toxicant data available?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Was reference toxicant test within acceptable bounds?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
What date was reference toxicant test run (MM/DD/YYYY)?						
Other (describe)						

This page intentionally left blank.

EPA Identification Number	NPDES Permit Number	Facility Name
	TN0078255	Scotts Creek WWTP

TABLE F. INDUSTRIAL DISCHARGE INFORMATION

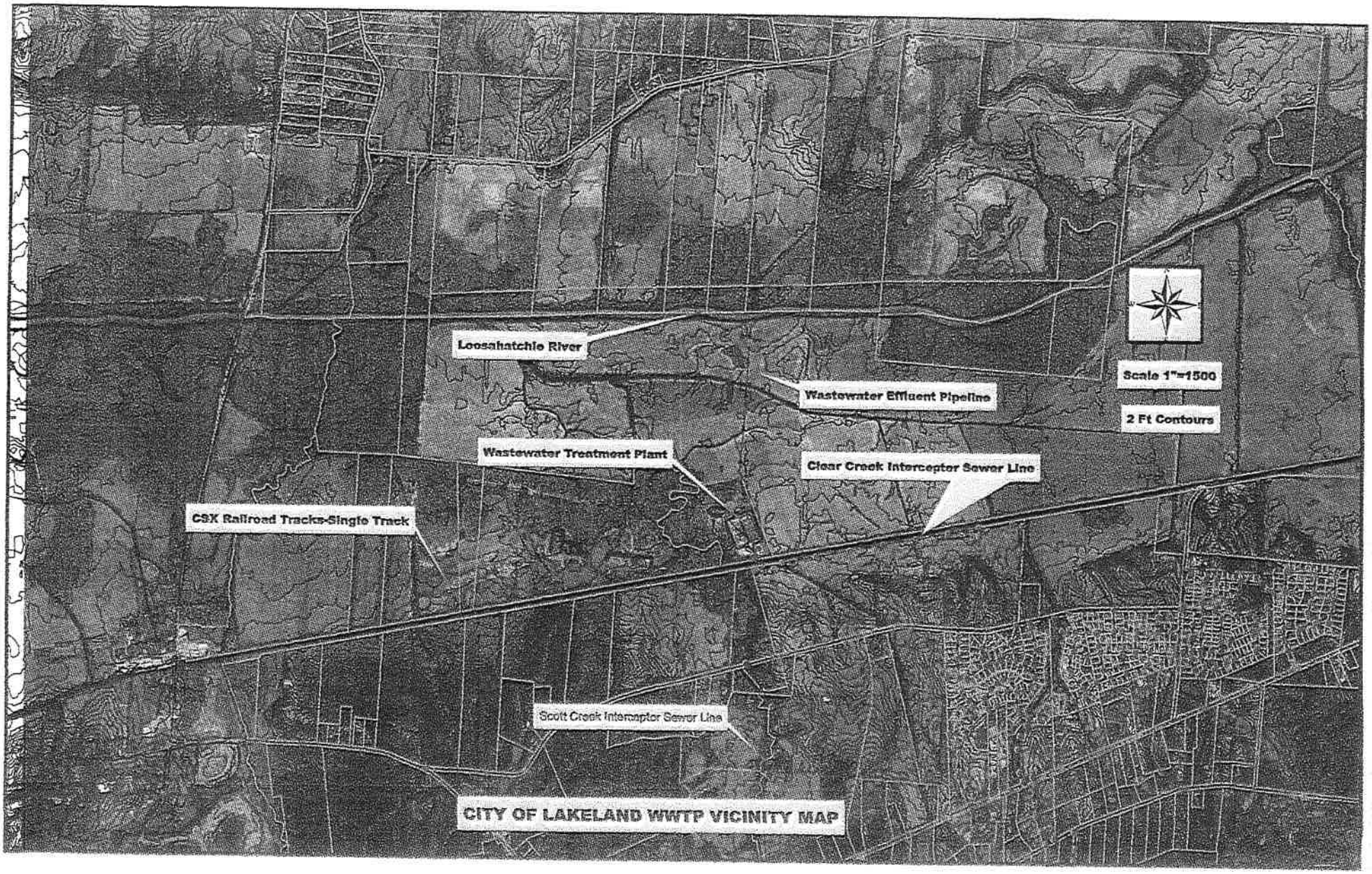
Response space is provided for three SIUs. Copy the table to report information for additional SIUs.

	SIU ___	SIU ___	SIU ___
Name of SIU			
Mailing address (street or P.O. box)			
City, state, and ZIP code			
Description of all industrial processes that affect or contribute to the discharge.			
List the principal products and raw materials that affect or contribute to the SIU's discharge.			
Indicate the average daily volume of wastewater discharged by the SIU.	gpd	gpd	gpd
How much of the average daily volume is attributable to process flow?	gpd	gpd	gpd
How much of the average daily volume is attributable to non-process flow?	gpd	gpd	gpd
Is the SIU subject to local limits?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Is the SIU subject to categorical standards?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

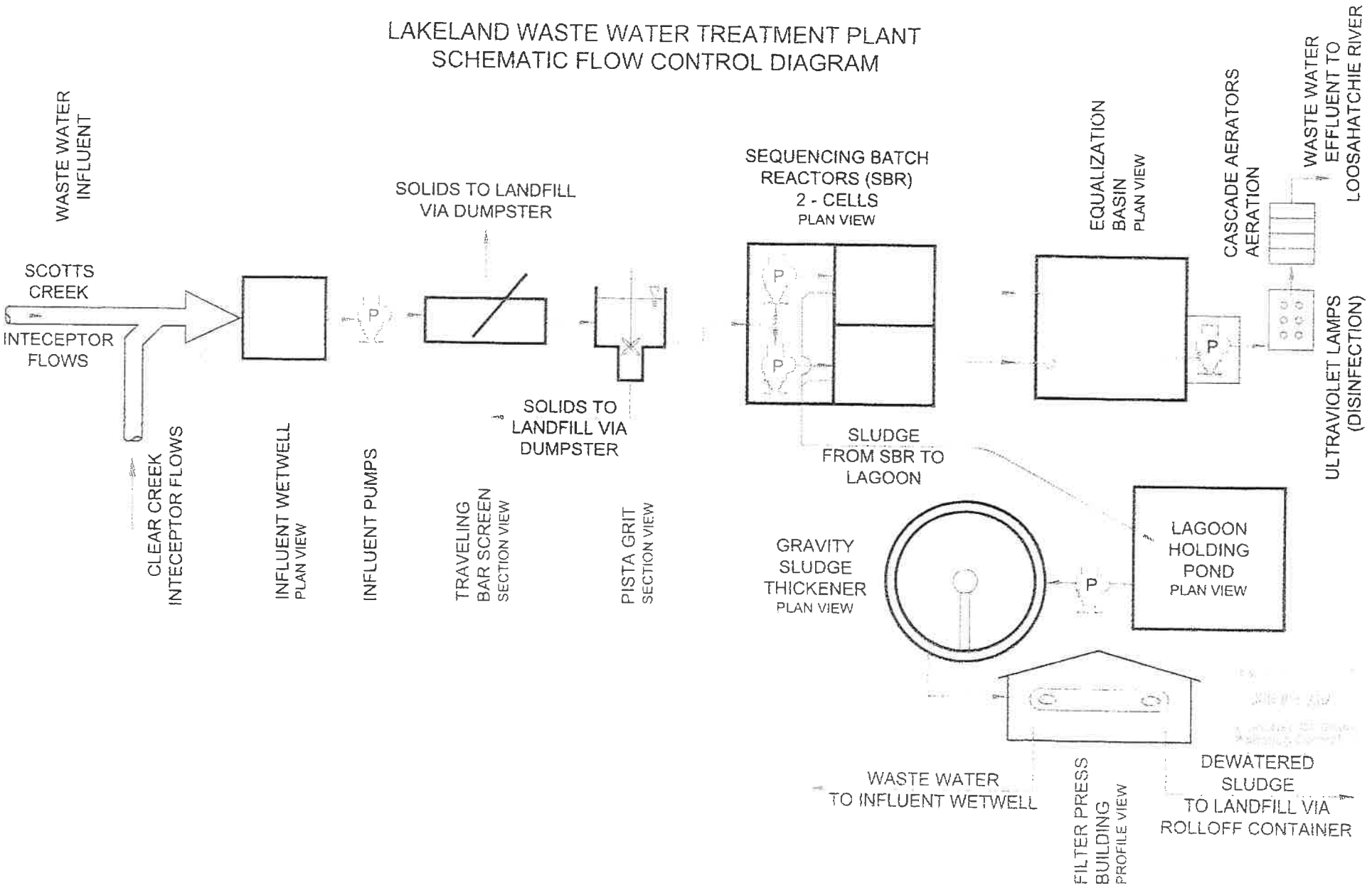
TABLE F. INDUSTRIAL DISCHARGE INFORMATION

Response space is provided for three SIUs. Copy the table to report information for additional SIUs.

	SIU ___	SIU ___	SIU ___
Under what categories and subcategories is the SIU subject?			
Has the POTW experienced problems (e.g., upsets, pass-through interferences) in the past 4.5 years that are attributable to the SIU?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If yes, describe.			


Loosahatchie River
Wastewater Effluent Pipeline
Wastewater Treatment Plant
Clear Creek Interceptor Sewer Line
CSX Railroad Tracks-Single Track
Scott Creek Interceptor Sewer Line
Scale 1"=1500
2 Ft Contours
CITY OF LAKELAND WWTP VICINITY MAP

LAKELAND WASTE WATER TREATMENT PLANT
SCHEMATIC FLOW CONTROL DIAGRAM



ANALYTICAL REPORT

March 14, 2021

Cp
Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

City of Lakeland

Sample Delivery Group:	L1321598
Samples Received:	03/02/2021
Project Number:	
Description:	Lakeland Biomonitoring
Site:	TN0078255
Report To:	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By: Justin Carr

Justin Carr
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

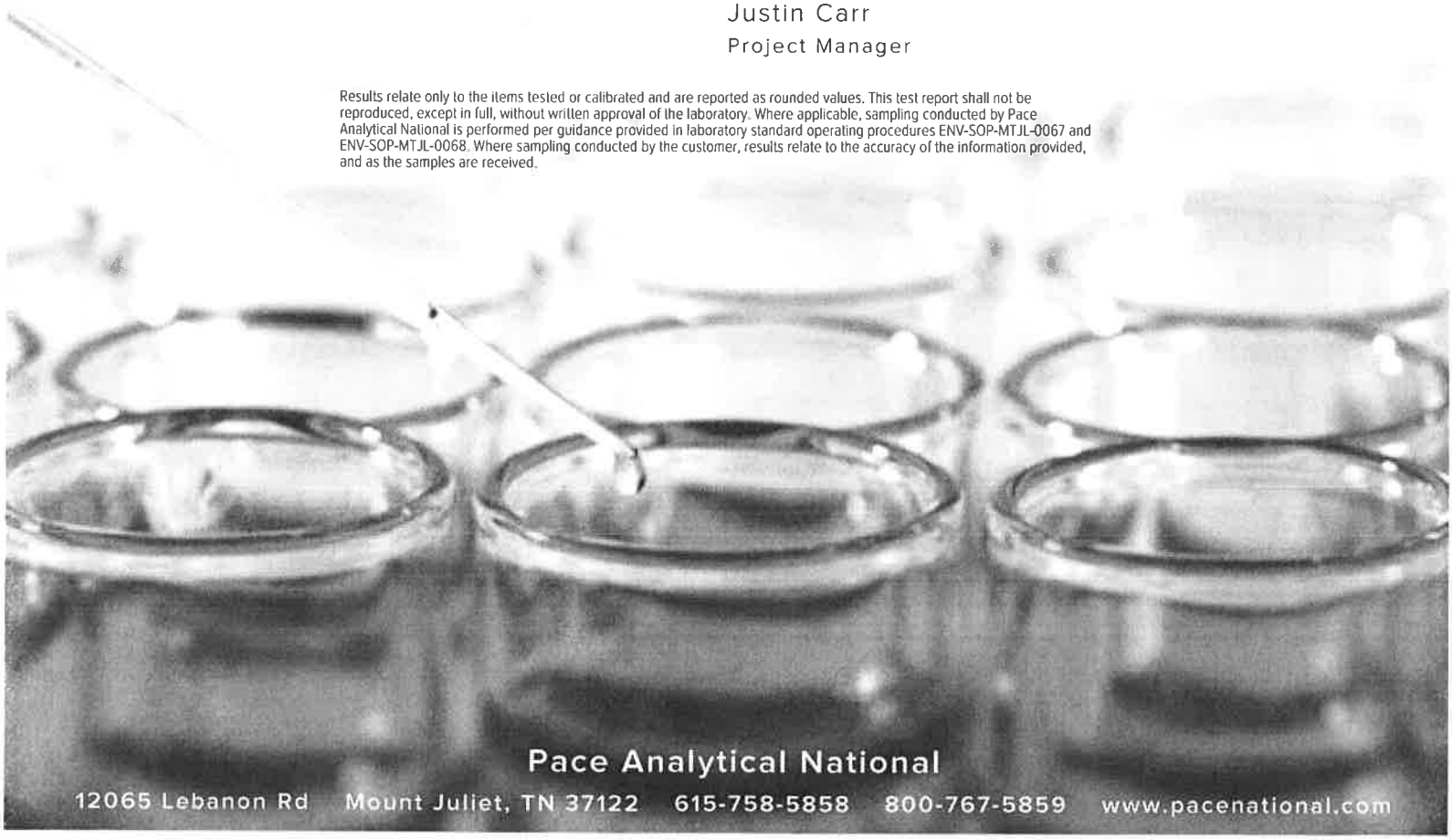


TABLE OF CONTENTS

SAMPLE SUMMARY

SAMPLE 1 L1321598-01 WW

Collected by: Chris Hatcher
Collected date/time: 03/01/21 08:00
Received date/time: 03/02/21 10:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1629385	1	03/02/21 14:57	03/02/21 14:57	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1629385	1	03/02/21 14:30	03/02/21 14:30	CM	Mt. Juliet, TN
Calculated Results	WG1629851	1	03/09/21 20:22	03/09/21 20:22	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1633179	2	03/12/21 16:30	03/12/21 16:30	LRP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1629851	1	03/09/21 00:02	03/09/21 20:22	CCE	Mt. Juliet, TN

SAMPLE 2 L1321598-02 WW

Collected by: Chris Hatcher
Collected date/time: 03/03/21 08:15
Received date/time: 03/04/21 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1629851	1	03/09/21 20:25	03/09/21 20:25	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1633179	2	03/12/21 16:56	03/12/21 16:56	LRP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1629851	1	03/09/21 00:02	03/09/21 20:25	CCE	Mt. Juliet, TN

SAMPLE 3 L1321598-03 WW

Collected by: Chris Hatcher
Collected date/time: 03/05/21 08:15
Received date/time: 03/06/21 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1629854	1	03/09/21 23:29	03/09/21 23:29	EL	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1633179	2	03/12/21 17:09	03/12/21 17:09	LRP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1629854	1	03/09/21 01:11	03/09/21 23:29	EL	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Justin Carr
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA/600/4-89/001).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	6.82	su
Temperature (on-site)	16.5	

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - Minnow	>43.2 (PASS)		03/02/2021 14:57	WG1629385

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - C. dubia	>43.2 (PASS)		03/02/2021 14:30	WG1629385

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	54.0		2.50	1	03/09/2021 20:22	WG1629851

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	64.2	B	40.0	2	03/12/2021 16:30	WG1633179

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	15.3		1.00	1	03/09/2021 20:22	WG1629851
Magnesium	3.88		1.00	1	03/09/2021 20:22	WG1629851

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	6.87	su
Temperature (on-site)	16.3	

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	59.5		2.50	1	03/09/2021 20:25	WG1629851

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	56.0	B	40.0	2	03/12/2021 16:56	WG1633179

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	17.4		1.00	1	03/09/2021 20:25	WG1629851
Magnesium	3.87		1.00	1	03/09/2021 20:25	WG1629851

SAMPLE 3

Collected date/time: 03/05/21 08:15

SAMPLE RESULTS - 03

L1321598

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	58.5		2.50	1	03/09/2021 23:29	WG1629854

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	70.0	B	40.0	2	03/12/2021 17:09	WG1633179

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	17.0		1.00	1	03/09/2021 23:29	WG1629854
Magnesium	3.87		1.00	1	03/09/2021 23:29	WG1629854

QUALITY CONTROL SUMMARY

L1321598-01,02,03

Method Blank (MB)

(MB) R3630269-2 03/12/21 16:14

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	13.3	J	9.80	20.0

L1321491-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1321491-02 03/12/21 16:54 • (DUP) R3630269-4 03/12/21 16:55

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	168	169	1	0.593		20

L1321617-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1321617-02 03/12/21 17:01 • (DUP) R3630269-5 03/12/21 17:10

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	87.1	80.4	1	8.00		20

Laboratory Control Sample (LCS)

(LCS) R3630269-3 03/12/21 16:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	196	98.0	90.0-110	

WG1629851

Metals (ICP) by Method 200.7

QUALITY CONTROL SUMMARY

L1321598-01,02

Method Blank (MB)

(MB) R3629077-1 03/09/21 19:28

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3629077-2 03/09/21 19:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	20.0	21.1	106	85.0-115	
Magnesium	20.0	20.6	103	85.0-115	

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3629077-4 03/09/21 19:38 • (MSD) R3629077-5 03/09/21 19:41

Analyte	Spike Amount mg/l	Original Result	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	20.0		77.8	78.4	98.0	101	1	70.0-130	V	V	0.705	20
Magnesium	20.0		32.6	33.0	99.2	101	1	70.0-130			1.18	20

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3629077-6 03/09/21 19:46 • (MSD) R3629077-7 03/09/21 19:49

Analyte	Spike Amount mg/l	Original Result	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	20.0		117	114	97.1	82.1	1	70.0-130	V	V	2.20	20
Magnesium	20.0		23.2	22.9	99.3	97.8	1	70.0-130			1.45	20

QUALITY CONTROL SUMMARY

L1321598-03

Method Blank (MB)

(MB) R3629042-1 03/09/21 22:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3629042-2 03/09/21 22:56

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	9.60	96.0	85.0-115	
Magnesium	10.0	9.56	95.6	85.0-115	

L1323353-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1323353-01 03/09/21 22:59 • (MS) R3629042-4 03/09/21 23:04 • (MSD) R3629042-5 03/09/21 23:07

Analyte	Spike Amount mg/l	Orig nal Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	19.6	31.9	32.0	123	124	1	70.0-130			0.375	20
Magnesium	10.0	4.03	14.3	14.2	102	102	1	70.0-130			0.254	20

L1323353-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1323353-03 03/09/21 23:10 • (MS) R3629042-6 03/09/21 23:12 • (MSD) R3629042-7 03/09/21 23:15

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	21.1	31.7	32.0	106	109	1	70.0-130			1.11	20
Magnesium	10.0	4.24	14.1	14.2	98.9	99.5	1	70.0-130			0.478	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland, TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
Chris Hatcher

Site/Facility ID #
TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Quote #

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3 (NV)
SAMPLE 1		WW				3	X	X	X
Sample 1	Comp	WW		3-1-21	8:00Am		X		
Sample 2	Comp	WW		3-1-21	8:00Am			X	
Sample 3	Comp	WW		3-1-21	8:00Am				X

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Road Mt Juliet, TN 37122
Phone: 615-758-5858 Toll Free: 800-767-5859
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1321598
J075

Acctnum: **LAKE02**
Template: **T144780**
Prelogin: **P828127**
PM: **807 - Justin Carr**
PB: **U 2/19/21**

Shipped Via: **FedEX Ground**

Remarks | Sample # (lab only)

SAMPLE 1 -01

* Matrix:
SS - Soil **AIR** - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #1 - Collect a 24hr composite sample from Sunday-Monday (2/28-3/1). Ship sample overnight to arrive at lab on Tuesday 3/2/2021.

pH 6.82 Temp 16.5
Flow _____ Other 8.13 mg/L

Samples returned via:
__ UPS ✓ FedEx __ Courier _____

Tracking # 951757616694

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: ✓ Y N
Bottles arrive intact: ✓ Y N
Correct bottles used: ✓ Y N
Sufficient volume sent: ✓ Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: ✓ Y N
RAD Screen <0.5 mR/hr: ✓ Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Christopher Hatcher	3-1-21	8:20Am	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			Patricia Mulcare

Trip Blank Received: Yes (No) HCL / MeoH TBR
N/A

Temp: 1.5-2=3 °C Bottles Received: 3

Date: 3-2-21 Time: 1000

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Road Mt Juliet, TN 37122
Phone: 615-758-5858 Alt: 800-767-5859
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Company Name/Address: **City of Lakeland**
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland, TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Chris Hatcher

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature): [signature]

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y X

SDG # L1321598
J169

Acctnum: LAKE02
Template: T144781
Prelogin: P826570
PM: 807 - Justin Carr
PB: 2/4/21 MB
Shipped Via: FedEX Ground

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 2		WW				3	X	X	X		-01
Sample 1	comp	WW		3-3-21	8:15		X				
Sample 2	comp	WW		3-3-21	8:15			X			
Sample 3	comp	WW		3-3-21	8:15				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ________

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (2/16 - 2/17). Ship sample overnight to arrive at lab on Thursday 2/18/2021.

pH 6.87 Temp 16.3
Flow ______ Other ______

Samples returned via: __ UPS ✓ FedEx __ Courier ________

Tracking # 9517 5758 5084

Sample Receipt Checklist
COC Seal Present/Intact: __NP ✓Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: ✓Y __N
RAD Screen <0.5 mR/hr: ✓Y __N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)		
[signature]	3-3-21	8:25h		Trip Blank Received: Yes / (No) HCL / MeOH TBR	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 9.7=5 °C Bottles Received: 3	If preservation required by Login: Date/Time
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Patricia Michael	Date: 3-4-21 Time: 0915	Hold: Condition: NCF / (OK)

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: **Spencer Smalley**

Email To: **ssmalley@lakelandtn.org**

Project Description: **Lakeland Biomonitoring**

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project # **LAKE02-BIOMON**

Collected by (print): Chris Hatcher

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Site/Facility ID # **TN0078255**

P.O. #

Quote #

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		-03
Sample 1	Comp	WW		3-5-21	8:15		X				
Sample 2	Comp	WW		3-5-21	8:15			X			
Sample 3	Comp	WW		3-5-21	8:15				X		

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Road Mt Juliet, TN 37122
Phone: 615-758-5858 Alt: 800-767-5859
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1321598
J015

Acctnum: **LAKE02**
Template: **T144783**
Prelogin: **P826571**
PM: **807 - Justin Carr**
PB: 2/4/21 MW

Shipped Via: **FedEX Ground**

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #3 - Collect a 24hr composite sample from Thurs-Fri (2/18-2/19). Ship sample overnight to arrive at lab on Saturday 2/20/2021. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 6.96 Temp 16.5

Flow _____ Other 8.16 3/L

Samples returned via: __ UPS X FedEx __ Courier _____

Tracking # 9517 5758 5095

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR	
	3-5-21	8:30am			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.3 °C Bottles Received: 3	If preservation required by Login: Date/Time
				1613=8	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 3-6-21 Time: 1010	Hold: Condition: NCF / OK
			Patricia Michael		

Pace Analytical

ANALYTICAL REPORT

July 09, 2021

Cp Tc Ss Cn Sr Qc Gl Al Sc

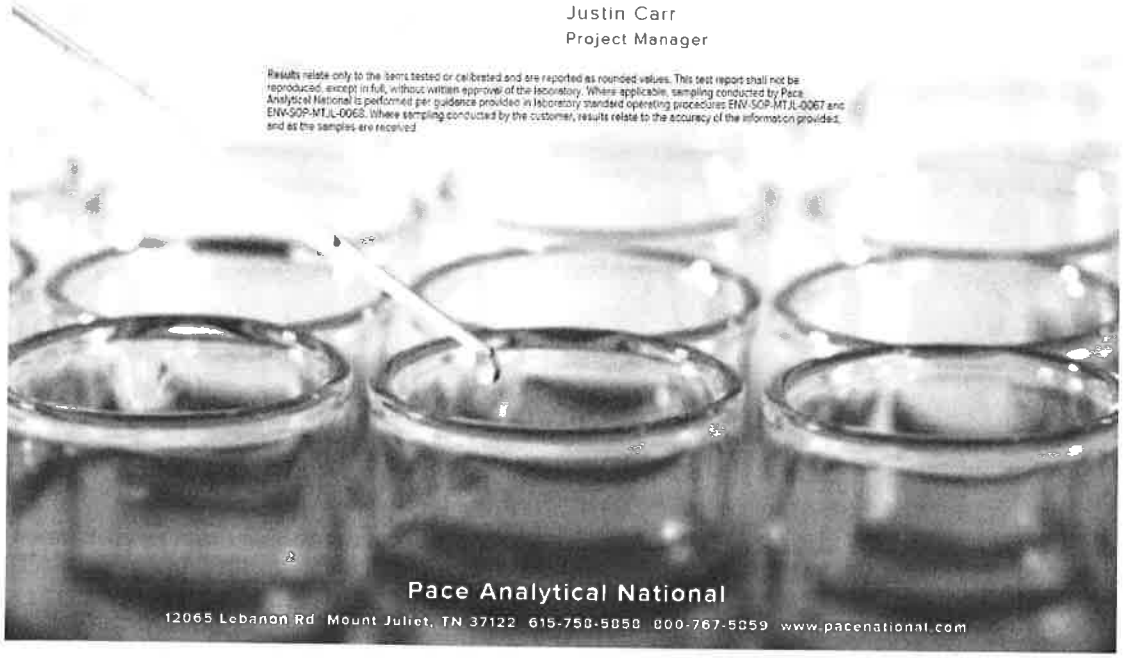
City of Lakeland

Sample Delivery Group:	L1369021
Samples Received	06/22/2021
Project Number	
Description	Lakeland Biomonitoring
Site:	TN0078255
Report To	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By

Justin Carr
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
City of Lakeland		L1369021	07/09/21 09:58	1 of 15

TABLE OF CONTENTS

SAMPLE SUMMARY

SAMPLE 1 L1369021-01 WW

Collected by: John Hunter
Collected date/time: 06/21/21 07:20
Received date/time: 06/22/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1693270	1	06/22/21 12:15	06/22/21 12:15	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1693270	1	06/22/21 13:09	06/22/21 13:09	CM	Mt. Juliet, TN
Calculated Results	WG1699136	1	07/08/21 21:42	07/08/21 21:42	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1698547	2	07/01/21 14:54	07/01/21 14:54	JER	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1699136	1	07/08/21 09:54	07/08/21 21:42	CCE	Mt. Juliet, TN

SAMPLE 2 L1369021-02 WW

Collected by: John Hunter
Collected date/time: 06/23/21 07:30
Received date/time: 06/24/21 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1699136	1	07/08/21 22:30	07/08/21 22:30	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1698548	5	07/01/21 17:54	07/01/21 17:54	JER	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1699136	1	07/08/21 09:54	07/08/21 22:30	CCE	Mt. Juliet, TN

SAMPLE 3 L1369021-03 WW

Collected by: John Hunter
Collected date/time: 06/25/21 08:00
Received date/time: 06/26/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1699136	1	07/08/21 22:33	07/08/21 22:33	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1698548	5	07/01/21 17:55	07/01/21 17:55	JER	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1699136	1	07/08/21 09:54	07/08/21 22:33	CCE	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Justin Carr
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA/600/4-89/001).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

SAMPLE 1
Collected date/time: 06/21/21 07:20

SAMPLE RESULTS - 01
L1369021

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis date / time	Batch
IC25 - Minnow	>43.2 (PASS)		06/22/2021 12:15	WG1693270

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis date / time	Batch
IC25 - C. dubia	>43.2 (PASS)		06/22/2021 13:09	WG1693270

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hardness (calculated) as CaCO3	50.6		2.50	1	07/09/2021 21:42	WG1699136

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
ALK	71.4		40.0	2	07/01/2021 14:54	WG1698547

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Calcium	14.6		1.00	1	07/08/2021 21:42	WG1699136
Magnesium	3.46		1.00	1	07/08/2021 21:42	WG1699136

SAMPLE 2
Collected date/time: 06/23/21 07:30

SAMPLE RESULTS - 02
L1369021

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	47.5		2.50	1	07/08/2021 22:30	WG1699136

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	ND		100	5	07/01/2021 17:54	WG1698548

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	13.6		1.00	1	07/08/2021 22:30	WG1699136
Magnesium	3.28		1.00	1	07/08/2021 22:30	WG1699136

SAMPLE 3
Collected date/time: 06/25/21 08:00

SAMPLE RESULTS - 03
L1369021

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hardness (calculated) as CaCO3	49.1		2.50	1	07/08/2021 22:33	WG1699136

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
ALK	ND		100	5	07/01/2021 17:55	WG1698548

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Calcium	13.9		1.00	1	07/08/2021 22:33	WG1699136
Magnesium	3.50		1.00	1	07/08/2021 22:33	WG1699136

WG1698547
Wet Chemistry by Method 310.2

QUALITY CONTROL SUMMARY
L1369021-01

Method Blank (MB)

(MB) R3674669-1 07/01/21 14:50

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		9.50	20.0

L1369025-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1369025-01 07/01/21 14:56 • (DUP) R3674669-3 07/01/21 14:57

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	126	127	1	0.791		20

L1369573-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1369573-01 07/01/21 15:55 • (DUP) R3674669-4 07/01/21 15:56

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	1190	1190	20	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3674669-2 07/01/21 14:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec %	Rec Limits %	LCS Qualifier
ALK	200	204	102	90.0-110	

WG1698548
Wet Chemistry by Method 310.2

QUALITY CONTROL SUMMARY
L1369021-02,03

Method Blank (MB)

(MB) R3674710-1 07/01/21 17:42

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
ALK	U		9.80	20.0

L1368967-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1368967-02 07/01/21 17:46 • (DUP) R3674710-4 07/01/21 17:47

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
ALK	131	136	5	3.76		20

Laboratory Control Sample (LCS)

(LCS) R3674710-2 07/01/21 17:43

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
ALK	200	204	102	90-110	

WG1699136
Metals (ICP) by Method 200.7

QUALITY CONTROL SUMMARY
L1369021-01,02,03

Method Blank (MB)

(MB) R3677334-1 07/08/21 21:27

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	0.0477	J	0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3677334-2 07/08/21 21:29

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	9.95	99.5	85.0-115	
Magnesium	10.0	9.89	98.9	85.0-115	

L1367263-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1367263-01 07/08/21 21:32 • (MS) R3677334-4 07/08/21 21:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Calcium	10.0	46.6	59.2	126	1	70.0-130	
Magnesium	10.0	10.7	21.1	104	1	70.0-130	

L1369021-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1369021-01 07/08/21 21:42 • (MS) R3677334-6 07/08/21 21:45 • (MSD) R3677334-7 07/08/21 21:47

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	14.6	25.5	25.3	109	107	1	70.0-130			0.787	20
Calcium	10.0	14.6	25.5	58.0	109	435	1	70.0-130		J3 J5	77.9	20
Magnesium	10.0	3.46	13.6	13.6	101	101	1	70.0-130			0.0521	20
Magnesium	10.0	3.46	13.6	20.8	101	173	1	70.0-130		J3 J5	41.8	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preperation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Caroline	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address: **City of Lakeland**
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley
Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring
City/State Collected:
Please Circle: PT MT CT ET

Phone: 901-870-1803
Client Project #
Lab Project #: LAKE02-BIOMON

Collected by (print): John Hunter
Site/Facility ID #: TN0078255
P.O. #

Collected by (signature): [signature]
Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #
Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1369021
C090
Acctnum: LAKE02
Template: T144780
Prelogin: P854574
PM: 807 - Justin Carr
PB: [initials] 6/15/21
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3								Remarks	Sample # (lab only)
SAMPLE 1		WW				3	X	X	X									-01
Sample 1	Comp			6-21-21	7:20am		X											
Sample 2	Comp			↓	↓			X										
Sample 3	Comp								X									

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ______

Remarks: **Sample #1 - Collect a 24hr composite sample from Sunday-Monday (6/20-6/21). Ship sample overnight to arrive at lab on Tuesday 6/22/2021.**

pH 7.09 Temp 24.5°C
Flow ______ Other ______

Samples returned via: __ UPS __ FedEx __ Courier ______
Tracking # 5163 7698 7870

Sample Receipt Checklist
COC Seal Present/Intact: _NP Y _N
COC Signed/Accurate: Y _N
Bottles arrive intact: Y _N
Correct bottles used: Y _N
Sufficient volume sent: Y _N
If Applicable
VOA Zero Headspace: _Y _N
Preservation Correct/Checked: Y _N
RAD Screen <0.5 mR/hr: Y _N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	
[signature]	6-21-21	8:10am		Trip Blank Received: Yes / No HCL / MeoH TBR
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.7 °C 1.3+.0=1.3 Bottles Received: 3
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) [signature]	Date: 6/22/21 Time: 0900

If preservation required by Login: Date/Time
Hold:
Condition: NCF / OK

Company Name/Address: **City of Lakeland**
10001 HWY 70
Lakeland, TN 38002

Billing Information: Spencer Smalley, 10001 HWY 70, Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley
Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring
City/State Collected: Lakeland TN
Please Circle: PT MT CT ET

Phone: 901-870-1803
Client Project #
Lab Project #: LAKE02-BIOMON

Collected by (print): John Hunter
Site/Facility ID #: TN0078255
P.O. #

Collected by (signature): Jim Hunt
Rush? (Lab MUST Be Notified): ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day
Quote #
Date Results Needed

Immediately Packed on Ice N ___ Y ✓

Analysis / Container / Preservative: ALKBIO 125mlHDPE-NoPres; Biomonitoring 1 Gal-HDPE-NoPres; HARDMETALS 250mlHDPE-HNO3

Chain of Custody Page ___ of ___

Pace Analytical®

SDG # L1369021 C194
Acctnum: LAKE02
Template: T144781
Prelogin: P854575
PM: 807 - Justin Carr
PB: [illegible] 6/15/21
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 2		WW				3	X	X	X		-02
Sample 1	Comp			6-23-21	7:30		X				
Sample 2	↓			↓	↓			X			
Sample 3	↓			↓	↓				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ______

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (6/22 - 6/23). Ship sample overnight to arrive at lab on Thursday 6/24/2021.

pH 7.18 Temp 23.3
Flow ___ Other ___

Samples returned via: __ UPS __ FedEx __ Courier ______
Tracking # 5163 7698 7907

Sample Receipt Checklist
COC Seal Present/Intact: NP _Y _N
COC Signed/Accurate: ✓Y _N
Bottles arrive intact: ✓Y _N
Correct bottles used: ✓Y _N
Sufficient volume sent: ✓Y _N
If Applicable
VOA Zero Headspace: _Y _N
Preservation Correct/Checked: ✓Y _N
RAD Screen <0.5 mR/hr: ✓Y _N

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	
Jim Hunt	6-23-21	8:00		Trip Blank Received: Yes / No HCL / MeoH TBR
				Temp: °C 2.7+.3=3.0 Bottles Received: 5
			Received for lab by: (Signature) [signature]	Date: 6/24/21 Time: 0830

If preservation required by Login: Date/Time
Hold:
Condition: NCF / OK

Company Name/Address: **City of Lakeland**, 10001 HWY 70, Lakeland, TN 38002

Billing Information: Spencer Smalley, 10001 HWY 70, Lakeland, TN 38002

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland, TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): John Hinote

Collected by (signature):

Immediately Packed on Ice: N ___ Y ✓

Site/Facility ID #: TN0078255

P.O. #

Quote #

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3
SAMPLE 3		WW				3	X	X	X
Sample 1	Comp			6-24-21	8:00		X		
Sample 2	↓			↓	↓			X	
Sample 3									X

Chain of Custody Page ___ of ___

Pace Analytical

SDG # 134902

K004

Acctnum: LAKE02
Template: T144783
Prelogin: P854576
PM: 807 - Justin Carr
PB: 06 6/15/21
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

-03

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks: Sample #3 - Collect a 24hr composite sample from Thurs-Fri (6/24-6/25). Ship sample overnight to arrive at lab on Saturday 6/26/2021. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.12 Temp 24.1 Flow ___ Other ___

Samples returned via: ___ UPS ___ FedEx ___ Courier ___

Tracking # 5163 7698 7940

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR	Sample Receipt Checklist
	6-25-21	8:30 am			
Relinquished by: (Signature)	Date:	Time	Received by: (Signature)	Temp: 0.5 °C Bottles Received: 3	If preservation required by Login: Date/Time
Relinquished by: (Signature)	Date	Time:	Received for lab by: (Signature)	Date: 6/26/21 Time: 0930	Hold: Condition: NCF / (OK)

CITY OF
LAKELAND
TENNESSEE

E. Coli

Standard Method 9223 B 21ST Edition

Sample Date/Time:	6.1.21 / 6:30	Sample Location:	EFF
Date / Time In:	" / 6:55	Date / Time Out:	6.2.21 / 7:20
MPN:	1.0	Blank:	
Sampled By:	BW	Analyzed By:	BW

Sample Date/Time:	6-2-21 / 640	Sample Location:	EFF
Date / Time In:	6-2-21 / 650	Date / Time Out:	6-3-21 / 7:20
MPN:	2.0	Blank:	
Sampled By:	BW	Analyzed By:	SS

Sample Date/Time:	6-7-21 / 815	Sample Location:	~~EFF~~ EFF
Date / Time In:	6-7-21 / 830	Date / Time Out:	6-8-21 / 8:35
MPN:	< 1.0	Blank:	
Sampled By:	BW	Analyzed By:	SS

Sample Date/Time:	6-8-21 / 935	Sample Location:	EFF
Date / Time In:	6-8-21 / 945	Date / Time Out:	6-9-21 / 9:50
MPN:	1.0	Blank:	
Sampled By:	BW	Analyzed By:	SS

Sample Date/Time:	6-9-21 / 850	Sample Location:	EFF
Date / Time In:	6-9-21 / 9:00	Date / Time Out:	6-10-21 / 9:15
MPN:	< 1.0	Blank:	
Sampled By:	BW	Analyzed By:	SS

Sample Date/Time:	6-14-21 / 7:45	Sample Location:	EFF
Date / Time In:	6-14-21 / 8:10	Date / Time Out:	6-15-21 / 9:15
MPN:	< 1.0	Blank:	
Sampled By:	BW	Analyzed By:	SS

CITY OF
LAKELAND
TENNESSEE

E. Coli

Standard Method 9223 B 21ST Edition

Sample Date/Time:	6-15-21/700	Sample Location:	EFF
Date / Time In:	6-15-21/705	Date / Time Out:	6-16-21 / 805
MPN:	1.0	Blank:	
Sampled By:	BW	Analyzed By:	BW

Sample Date/Time:	6-16-21 845	Sample Location:	EFF
Date / Time In:	6-16-21 855	Date / Time Out:	6-17-21 / 930
MPN:	3.1	Blank:	
Sampled By:	BW	Analyzed By:	BW

Sample Date/Time:	6-21-21 7:20	Sample Location:	EFF
Date / Time In:	" 8:25	Date / Time Out:	6-22-21 / 8:40
MPN:	< 1.0	Blank:	
Sampled By:	CH	Analyzed By:	BW

Sample Date/Time:	6-22-21 / 730	Sample Location:	EFF
Date / Time In:	6-22-21 / 805	Date / Time Out:	6-23-21 / 830
MPN:	1.0	Blank:	
Sampled By:	BW	Analyzed By:	BW

Sample Date/Time:	6-23-21 / 730	Sample Location:	EFF
Date / Time In:	6-23-21 / 740	Date / Time Out:	6-24-21 / 9:00
MPN:	1.0	Blank:	
Sampled By:	BW	Analyzed By:	BW

Sample Date/Time:	6/28 7:30	Sample Location:	EFF
Date / Time In:	6/28 7:55	Date / Time Out:	6/29 8:00
MPN:	< 1.0	Blank:	
Sampled By:	SS	Analyzed By:	SS

CITY OF
LAKELAND
TENNESSEE

E. Coli

Standard Method 9223 B 21ST Edition

Sample Date/Time:	6/29 7:40	Sample Location:	EFF
Date / Time In:	6/29 7:50	Date / Time Out:	6/30 / 755
MPN:	1.0	Blank:	
Sampled By:	SS	Analyzed By:	WAW

Sample Date/Time:	6-30/745	Sample Location:	EFF
Date / Time In:	6-30/800	Date / Time Out:	7-1/8:05
MPN:	3.1	Blank:	
Sampled By:	WAW	Analyzed By:	SS

Sample Date/Time:		Sample Location:	
Date / Time In:		Date / Time Out:	
MPN:		Blank:	
Sampled By:		Analyzed By:	

Sample Date/Time:		Sample Location:	
Date / Time In:		Date / Time Out:	
MPN:		Blank:	
Sampled By:		Analyzed By:	

Sample Date/Time:		Sample Location:	
Date / Time In:		Date / Time Out:	
MPN:		Blank:	
Sampled By:		Analyzed By:	

Sample Date/Time:		Sample Location:	
Date / Time In:		Date / Time Out:	
MPN:		Blank:	
Sampled By:		Analyzed By:	

ANALYTICAL REPORT

October 14, 2021

City of Lakeland

Sample Delivery Group:	L1409783
Samples Received:	09/28/2021
Project Number:	
Description:	Lakeland Biomonitoring
Site:	TN0078255
Report To:	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By: Cassandra Foster

Cassandra Foster
Project Manager

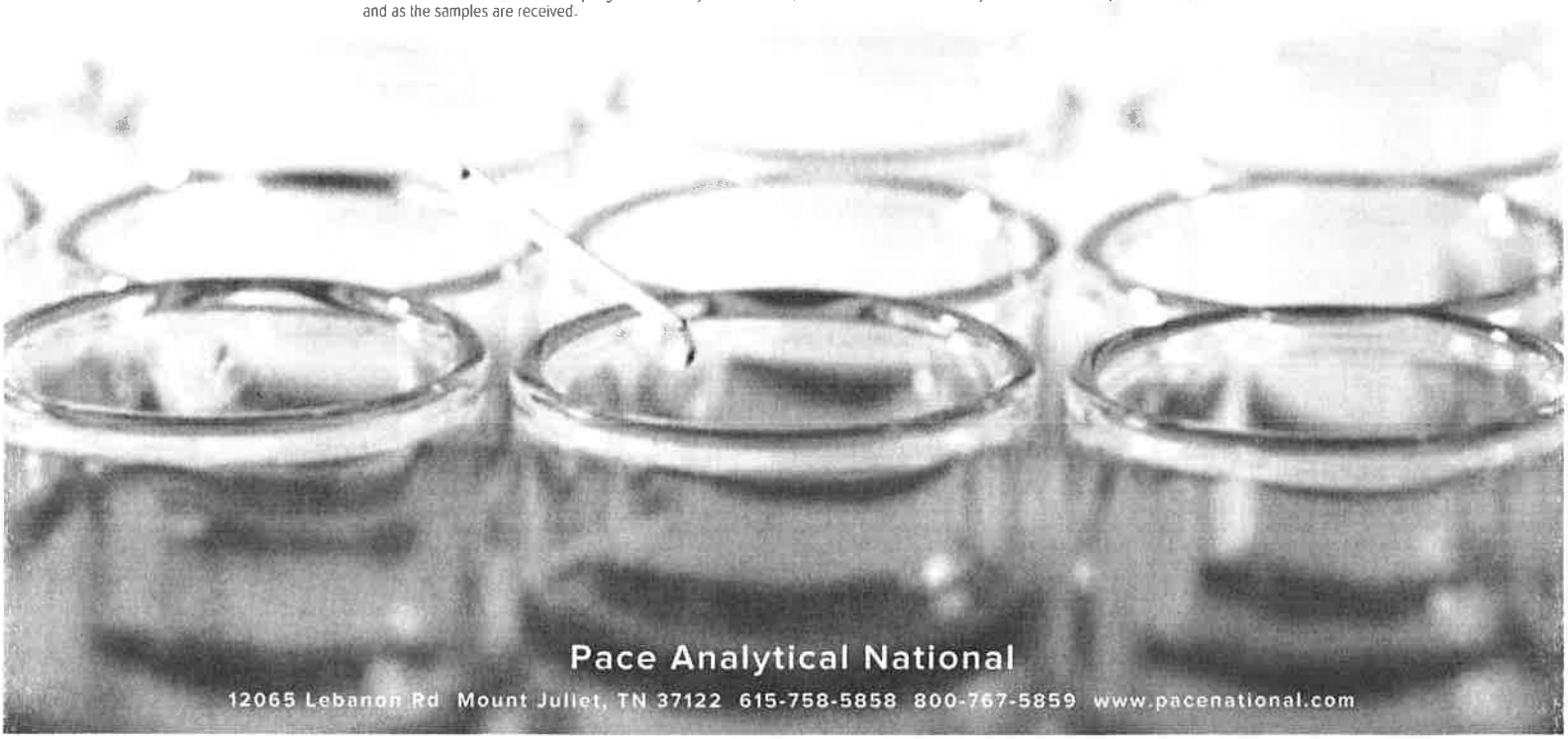


TABLE OF CONTENTS

SAMPLE SUMMARY

SAMPLE 1 L1409783-01 WW

Collected by: John Hunter
Collected date/time: 09/27/21 11:10
Received date/time: 09/28/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1747931	1	09/28/21 12:11	09/28/21 12:11	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1747931	1	09/28/21 11:55	09/28/21 11:55	CM	Mt. Juliet, TN
Calculated Results	WG1751263	1	10/09/21 04:51	10/09/21 04:51	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1752132	1	10/06/21 01:16	10/06/21 01:16	SDL	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1751263	1	10/05/21 19:17	10/09/21 04:51	CCE	Mt. Juliet, TN

SAMPLE 2 L1409783-02 WW

Collected by: John Hunter
Collected date/time: 09/29/21 00:00
Received date/time: 09/30/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1751263	1	10/09/21 04:54	10/09/21 04:54	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1752132	1	10/06/21 01:18	10/06/21 01:18	SDL	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1751263	1	10/05/21 19:17	10/09/21 04:54	CCE	Mt. Juliet, TN

SAMPLE 3 L1409783-03 WW

Collected by: John Hunter
Collected date/time: 10/01/21 07:05
Received date/time: 10/02/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1753639	1	10/13/21 22:50	10/13/21 22:50	CCE	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1752132	1	10/06/21 01:19	10/06/21 01:19	SDL	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1753639	1	10/10/21 08:55	10/13/21 22:50	CCE	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Cassandra Foster

Cassandra Foster
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA/600/4-89/001).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7	su
Temperature (on-site)	25.5	

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - Minnow	>43.2 (PASS)		09/28/2021 12:11	WG1747931

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - C. dubia	43.2 (PASS)		09/28/2021 11:55	WG1747931

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	48.6		2.50	1	10/09/2021 04:51	WG1751263

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	58.6		20.0	1	10/06/2021 01:16	WG1752132

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	13.7		1.00	1	10/09/2021 04:51	WG1751263
Magnesium	3.51		1.00	1	10/09/2021 04:51	WG1751263

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7.02	su
Temperature (on-site)	24.8	

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hardness (calculated) as CaCO3	48.1		2.50	1	10/09/2021 04:54	WG1751263

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
ALK	64.9		20.0	1	10/06/2021 01:18	WG1752132

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Calcium	13.6		1.00	1	10/09/2021 04:54	WG1751263
Magnesium	3.40		1.00	1	10/09/2021 04:54	WG1751263

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7.03	su
Temperature (on-site)	24.3	

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	45.3		2.50	1	10/13/2021 22:50	WG1753639

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	57.9		20.0	1	10/06/2021 01:19	WG1752132

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	13.2		1.00	1	10/13/2021 22:50	WG1753639
Magnesium	3.00		1.00	1	10/13/2021 22:50	WG1753639

QUALITY CONTROL SUMMARY

L1409783-01,02,03

Method Blank (MB)

(MB) R3712829-1 10/06/21 01:14

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		9.80	20.0

L1409783-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1409783-01 10/06/21 01:16 • (DUP) R3712829-3 10/06/21 01:17

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	58.6	58.2	1	0.685		20

L1410664-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1410664-05 10/06/21 02:02 • (DUP) R3712829-4 10/06/21 02:03

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	203	202	1	0.494		20

Laboratory Control Sample (LCS)

(LCS) R3712829-2 10/06/21 01:15

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	190	95.0	90.0-110	

QUALITY CONTROL SUMMARY

L1409783-01,02

Method Blank (MB)

(MB) R3714283-1 10/09/21 04:15

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3714283-2 10/09/21 04:18

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	10.2	102	85.0-115	
Magnesium	10.0	10.4	104	85.0-115	

L1407674-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1407674-01 10/09/21 04:20 • (MS) R3714283-4 10/09/21 04:26 • (MSD) R3714283-5 10/09/21 04:29

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	47.7	58.3	57.2	105	94.6	1	70.0-130			1.85	20
Magnesium	10.0	15.2	25.2	24.8	100	95.6	1	70.0-130			1.74	20

L1409665-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1409665-02 10/09/21 04:31 • (MS) R3714283-6 10/09/21 04:34 • (MSD) R3714283-7 10/09/21 04:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	68.2	83.6	80.3	155	122	1	70.0-130	V		4.03	20
Magnesium	10.0	8.04	18.9	18.4	109	103	1	70.0-130			2.99	20

QUALITY CONTROL SUMMARY

L1409783-03

Method Blank (MB)

(MB) R3716180-1 10/13/21 22:45

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3716180-2 10/13/21 22:48

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	9.86	98.6	85.0-115	
Magnesium	10.0	9.74	97.4	85.0-115	

L1409783-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1409783-03 10/13/21 22:50 • (MS) R3716180-4 10/13/21 22:56 • (MSD) R3716180-5 10/13/21 22:59

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	13.2	24.4	23.7	112	106	1	70.0-130			2.57	20
Magnesium	10.0	3.00	13.0	12.7	100	97.2	1	70.0-130			2.31	20

L1412187-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1412187-01 10/13/21 23:02 • (MS) R3716180-6 10/13/21 23:04 • (MSD) R3716180-7 10/13/21 23:07

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	26.5	35.9	36.1	93.9	96.7	1	70.0-130			0.785	20
Magnesium	10.0	5.75	15.6	15.6	98.1	98.8	1	70.0-130			0.420	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
V	The sample concentration is too high to evaluate accurate spike recoveries.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
John Hinter

Site/Facility ID #
TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1469783
J178
T

Acctnum: **LAKE02**
Template: **T144780**
Prelogin: **P874244**
PM: **807 - Justin Carr**
PB: 9-16-2021 GM
Shipped Via: **FedEx Ground**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 1		WW				3	X	X	X		-01
Sample 1	Comp	↓		9-27-21	11:10		X				
Sample 2	Comp			↓	↓			X			
Sample 3	Comp	✓							X		

* Matrix:
SS - Soil **AIR** - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #1 - Collect a 24hr composite sample from Sunday-Monday (9/26-9/27). Ship sample overnight to arrive at lab on Tuesday 9/28/2021.

pH 7.00 Temp 29.5

Flow _____ Other _____

Samples returned via: ___ UPS ___ FedEx ✓ Courier _____

Tracking # 5318 9044 7951

Sample Receipt Checklist

COC Seal Present/Intact:	NP	✓ Y ___ N
COC Signed/Accurate:		✓ Y ___ N
Bottles arrive intact:		✓ Y ___ N
Correct bottles used:		✓ Y ___ N
Sufficient volume sent:		✓ Y ___ N
If Applicable		
VOA Zero Headspace:		___ Y ___ N
Preservation Correct/Checked:		✓ Y ___ N
RAD Screen <0.5 mR/hr:		✓ Y ___ N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR	If preservation required by Login: Date/Time
	9-27-21	12:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp 0.2+0 °C Bottles Received: 3	
				0.4+.1=0.5	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9/28/21 Time: 930	Hold: / Condition: NCF / OK
			T. Robertson		

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
John Hunter

Site/Facility ID #
TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 2		WW				3	X	X	X		02
Sample 1	Comp	↓		9-29-21			X				
Sample 2	↓	↓		↓				X			
Sample 3	↓	↓		↓					X		

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # 1409785

Tab D128

Acctnum: **LAKE02**

Template: **T144781**

Prelogin: **P874247**

PM: **807 - Justin Carr**

PB: 9-16-2021 GM

Shipped Via: **FedEX Ground**

* Matrix:
SS - Soil AIR - Air **F** - Filter
GW - Groundwater **B** - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #2 - Collect a 24hr composite sample from Tues-Wed (9/28-9/29). Ship sample overnight to arrive at lab on Thursday 9/30/2021.

pH 7.02 Temp 24.8

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 5318 9944 7981

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
John Hunter	9-29-21	7:50 am		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.4+0=1.4 °C Bottles Received: 3
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9/30/21 Time: 0900
			Barbara Robinson	Hold: Condition: NCF / OK

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Analysis / Container / Preservation

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at http://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

SDG # T G005

Collected by (print):
John Hunter

Site/Facility ID #
TN0078255

P.O. #

Acctnum: **LAKE02**

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Template: **T144783**

Prelogin: **P874249**

PM: **807 - Justin Carr**

PB: 9-10-2021

Immediately Packed on Ice N ___ Y ___

Shipped Via: **FedEX Ground**

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		
Sample 1	Comp	↓		10-1-21	7:05		X				
Sample 2	↓	↓		↓	↓			X			
Sample 3	↓	↓		↓	↓				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ___

Remarks:Sample #3 - Collect a 24hr composite sample from Thurs-Fri (9/30-10/1). Ship sample overnight to arrive at lab on Saturday 10/2/2021. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.03 Temp 24.3

Flow ___ Other ___

Samples returned via:
__ UPS ✓ FedEx __ Courier ___

Tracking # 531899448028

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		✓Y N
Bottles arrive intact:		✓Y N
Correct bottles used:		✓Y N
Sufficient volume sent:		✓Y N
If Applicable		
VOA Zero Headspace:		✓Y N
Preservation Correct/Checked:		✓Y N
RAD Screen <0.5 mR/hr:		✓Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR
	10-1-21	7:05		DBOR
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.0+0=2.0 °C Bottles Received: 3
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 10/2/21 Time: 9:30
				Hold: Condition: NCF / OK

ANALYTICAL REPORT

December 22, 2021

City of Lakeland

Sample Delivery Group:	L1435911
Samples Received:	11/30/2021
Project Number:	
Description:	Lakeland Biomonitoring
Site:	TN0078255
Report To:	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By: Cassandra Foster

Cassandra Foster
Project Manager

TABLE OF CONTENTS

SAMPLE SUMMARY

SAMPLE 1 L1435911-01 WW

Collected by: John Hunter | Collected date/time: 11/29/21 07:00 | Received date/time: 11/30/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1783186	1	11/30/21 12:15	11/30/21 12:15	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1783186	1	11/30/21 11:45	11/30/21 11:45	CM	Mt. Juliet, TN
Calculated Results	WG1790648	1	12/21/21 09:29	12/21/21 09:29	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1787240	1	12/11/21 12:44	12/11/21 12:44	KEG	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1790648	1	12/18/21 15:42	12/21/21 09:29	KMG	Mt. Juliet, TN

SAMPLE 2 L1435911-02 WW

Collected by: John Hunter | Collected date/time: 12/01/21 07:00 | Received date/time: 12/02/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1790648	1	12/21/21 09:32	12/21/21 09:32	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1787240	1	12/11/21 12:45	12/11/21 12:45	KEG	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1790648	1	12/18/21 15:42	12/21/21 09:32	KMG	Mt. Juliet, TN

SAMPLE 3 L1435911-03 WW

Collected by: John Hunter | Collected date/time: 12/03/21 06:45 | Received date/time: 12/04/21 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1790648	1	12/21/21 09:40	12/21/21 09:40	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1789666	2	12/16/21 10:45	12/16/21 10:45	JER	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1790648	1	12/18/21 15:42	12/21/21 09:40	KMG	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Cassandra Foster

Cassandra Foster
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA-821-R-02-013 October 2002, Fourth Edition).

Acute Test Methods are described in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms"(EPA-821-R-02-012 October 2002, Fifth Edition).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7.1	su
Temperature (on-site)	20.1	

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - Minnow	>43.2 (PASS)		11/30/2021 12:15	WG1783186

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - C. dubia	>43.2 (PASS)		11/30/2021 11:45	WG1783186

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	47.7		2.50	1	12/21/2021 09:29	WG1790648

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	ND		20.0	1	12/11/2021 12:44	WG1787240

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	13.1		1.00	1	12/21/2021 09:29	WG1790648
Magnesium	3.60		1.00	1	12/21/2021 09:29	WG1790648

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7.1	su
Temperature (on-site)	20.4	

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	44.8		2.50	1	12/21/2021 09:32	WG1790648

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	ND		20.0	1	12/11/2021 12:45	WG1787240

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	12.6		1.00	1	12/21/2021 09:32	WG1790648
Magnesium	3.20		1.00	1	12/21/2021 09:32	WG1790648

Additional Information - Results for field analyses are not accredited to ISO 17025

Analyte	Result	Units
pH (On Site)	7.03	su
Temperature (on-site)	20.2	

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	47.1		2.50	1	12/21/2021 09:40	WG1790648

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	75.4		40.0	2	12/16/2021 10:45	WG1789666

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	13.4		1.00	1	12/21/2021 09:40	WG1790648
Magnesium	3.32		1.00	1	12/21/2021 09:40	WG1790648

WG1787240

Wet Chemistry by Method 310.2

QUALITY CONTROL SUMMARY

L1435911-01,02

Method Blank (MB)

(MB) R3739927-2 12/11/21 12:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		9.80	20.0

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3739927-4 12/11/21 12:32

Analyte	Original Result	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK		119	1	0.844		20

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3739927-5 12/11/21 12:51

Analyte	Original Result	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK		48.8	1	2.70		20

Laboratory Control Sample (LCS)

(LCS) R3739927-3 12/11/21 12:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	202	101	90.0-110	

WG1789666

Wet Chemistry by Method 310.2

QUALITY CONTROL SUMMARY

L1435911-03

Method Blank (MB)

(MB) R3741365-1 12/16/21 10:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		9.80	20.0

L1437268-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1437268-01 12/16/21 10:52 • (DUP) R3741365-3 12/16/21 10:53

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	60.8	61.4	1	0.982		20

L1439092-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1439092-01 12/16/21 11:05 • (DUP) R3741365-4 12/16/21 11:06

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	49.3	48.6	1	1.43		20

Laboratory Control Sample (LCS)

(LCS) R3741365-2 12/16/21 10:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	191	95.5	90.0-110	

WG1790648

Metals (ICP) by Method 200.7

QUALITY CONTROL SUMMARY

L1435911-01,02,03

Method Blank (MB)

(MB) R3743333-1 12/21/21 08:33

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3743333-2 12/21/21 08:35

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	9.54	95.4	85.0-115	
Magnesium	10.0	9.53	95.3	85.0-115	

L1435767-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1435767-01 12/21/21 08:38 • (MS) R3743333-4 12/21/21 08:44 • (MSD) R3743333-5 12/21/21 08:46

Analyte	Spike Amount mg/l	Origina Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	51.5	59.6	59.4	81.0	78.5	1	70.0-130			0.413	20
Magnesium	10.0	5.44	14.5	14.6	90.2	91.4	1	70.0-130			0.768	20

L1436917-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1436917-03 12/21/21 08:49 • (MS) R3743333-6 12/21/21 08:52 • (MSD) R3743333-7 12/21/21 08:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	30.4	40.5	41.2	101	108	1	70.0-130			1.58	20
Magnesium	10.0	ND	10.2	10.4	92.9	94.9	1	70.0-130			1.97	20

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
John Hunter

Site/Facility ID #
TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	<2								Remarks	Sample # (lab only)
SAMPLE 1		WW				3	X	X	X										-01
Sample 1	Comp	WW		11-29-21	7:00		X												
Sample 2	↓	↓		↓	↓			X											
Sample 3	↓	↓		↓	↓				X										↓

Chain of Custody Page ___ of ___

Pace Analytical

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1435911
F058

Acctnum: **LAKE02**
Template: **T144780**
Prelogin: **P888896**
PM: **807 - Justin Carr**
PB: CD 11/20/21
Shipped Via: **FedEX Ground**

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #1 - Collect a 24hr composite sample from Sunday-Monday (11/28-11/29). Ship sample overnight to arrive at lab on Tuesday 11/30/2021.

pH 7.10 Temp 20.1

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 5433 8386 0075

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
John Hunter	11-29-21	7:00 am	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: BA ALC 0.7+0=0.7 Bottles Received: 3

Date: 11/30/21 Time: 0930

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: **ssmalley@lakelandtn.org**

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT (CT) ET

Phone: **901-870-1803**

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
John Hunter

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Site/Facility ID #
TN0078255

P.O. #

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3								
SAMPLE 2	Comp	WW		12-1-21	7:00 am	3	X	X	X								-02
Sample 1	↓	↓		↓	↓		X										
Sample 2								X									
Sample 3									X								

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://www.pacelabs.com/terms-of-service-terms.pdf

SDG # L1435911
C226

Table

Acctnum: **LAKE02**
Template: **T144781**
Prelogin: **P888897**
PM: **807 - Justin Carr**
PB: CK 11/20/21

Shipped Via: **FedEX Ground**

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #2 - Collect a 24hr composite sample from Tues-Wed (11/30-12/1). Ship sample overnight to arrive at lab on Thursday 12/2/2021.

pH 7.10 Temp 20.4

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 5433 8386 0101

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
John Hunter	12-1-21	8:00 am		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.7+0=1.7 Bottles Received: 3
				If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 12/2/21 Time: 900
				Hold: Condition: NCF / OK

Company Name/Address:
City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to:
Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description:
Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT (CT) ET

Phone: 901-870-1803

Client Project #

Lab Project #
LAKE02-BIOMON

Collected by (print):
John Hunter

Site/Facility ID #
TN0078255

P.O. #

Collected by (signature):
John Hunter

Immediately
Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3							Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X								-03
Sample 1	Comp	WW		12/3/21	6:45		X										
Sample 2	↓	↓		↓	↓			X									
Sample 3	↓	↓		↓	↓				X								

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1435911

Table F196

Acctnum: LAKE02

Template: T144783

Prelogin: P888899

PM: 807 - Justin Carr

PB: CR 11/29/21

Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #3 - Collect a 24hr composite sample from Thurs-Fri (12/2-12/3). Ship sample overnight to arrive at lab on Saturday 12/4/2021. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.03 Temp 20.2

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 543383860145

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

	Date:	Time:		
Relinquished by : (Signature) John Hunter	12/3/21	6:45	Received by: (Signature)	Trip Blank Received: Yes / (No) HCL / MeoH TBR
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 10.2-1.6 °C Bottles Received: 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 12-4-21 Time: 0900

If preservation required by Login: Date/Time

Hold:

Condition: NCF / (OK)

CHRONIC TOXICITY BIOASSAY REPORT

CITY OF LAKELAND

PACE JOB #: 7320456

CLIENT SAMPLE ID: LAKELAND BIOMONITORING

TEST ORGANISM: PIMEPHALES PROMELAS

NPDES PERMIT #: TN0078255

Pace Analytical received 1 sample on 03-03-20, 03-05-20 and 03-07-20 for the analyses presented in the following report

CHRONIC TOXICITY

BIOASSAY REPORT

Pace Job #: 7320456

Conducted For:

City of Lakeland
10001 Hwy 70
Lakeland TN 38002

Conducted By:

Pace Analytical
225 Industrial Park Road
P O Box 286
Beaver WV 25813

Pace Analytical Services
225 Industrial Park Road
P O Box 286
Beaver WV 25813
TEL: (304) 255-2500
Website: www.pacelabs.com

Executive Summary

City of Lakeland submitted samples for a chronic Whole Effluent Toxicity (WET) test to be conducted. The client sample ID was Lakeland Biomonitoring and the Pace job number was 7320456. The NPDES permit number was TN0078255. The samples were collected on 03-02-20, 03-04-20 and 03-06-20. The chronic toxicity test was initiated on 03-03-20 and utilized *Pimephales promelas* as the test species.

The survival test results for the *Pimephales promelas* were as follows: The Lethal Concentration to 50% of the test organisms (LC50) was calculated to be >43.2% effluent. The concentration which produced no observable effect (NOEC) was the 43.2% concentration. The lowest test concentration to produce a negative observable effect (LOEC) was >43.2% test concentration. This data corresponds to a Toxicity Unit-chronic (TUc) for survival of <2.31. In essence, the effluent was non-toxic in regards to the survival of the *Pimephales promelas*.

Regarding growth outcomes, the test concentration which produced no observable effect (NOEC) was the 43.2% concentration and the lowest test concentration to produce a negative observable effect (LOEC) was the >43.2% test concentration. The concentration which would inhibit 25% of the growth of the test organism (IC25) was calculated to be >43.2% effluent. This data corresponds to a Toxicity Unit-chronic (TUc) for growth of <2.31. In essence, this effluent was non-toxic in regards to the growth of the *Pimephales promelas*.

An item of interest that occurred in the growth portion of the test was the Percent Minimum Significant Difference (PMSD) was 10.32 which is out of the 12-30 recommended range indicating very slight differences in the growth of the test organisms.

Please feel free to contact myself, or Ed J. Kirk, Bioassay Lab Director, should you have any comments or questions, or if we can be of any further assistance. We truly appreciate your business!

Sincerely,

Michael Lester

Michael Lester
Bioassay Lab Manager
Pace Analytical

PACE ANALYTICAL

SAMPLE INFORMATION

Client: City of Lakeland

Address: 10001 Hwy 70
Lakeland TN 38002

Pace Job #: 7320456

Pace Sample ID #: 7320456-001

Client Sample ID #: Lakeland Biomonitoring

NPDES Permit #: TN0078255

Sample Type: Composite

Collected To: **Date:** 03-02-20
Date: 03-04-20
Date: 03-06-20

Bioassay Tests Performed: 7-Day Fathead minnow (*Pimephales promelas*) larval survival and growth test Method 1000.0.

Test Procedure: EPA Methods Manual 821-R-02-013; October 2002
ENV-SOP-BEAV-CHRONIC-REV.01

Measured Effects: Death and/or reduced growth in *Pimephales promelas*.

Dilution Water Used: Moderately Hard Synthetic Fresh Water

Test Beginning: **Date:** 03-03-20 **Time:** 1200

Test Ending: **Date:** 03-10-20 **Time:** 1225

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001 CLIENT NAME: City of Lakeland
CLIENT SAMPLE ID: Lakeland Biomonitoring NPDES PERMIT #: TN0078255

TEST INFORMATION

Type of Test Chambers Used:
Pimephales promelas - Disposable 400 milliliter polyethylene tripour beakers.

Number of Replicate Test Chambers per Treatment:
Pimephales promelas - 4

Volume of Test Solution Used per Chamber:
Pimephales promelas - 250 milliliters

Number of Organisms per Test Chamber:
Pimephales promelas - 10

Location Where Tests Were Conducted: Walk-in Environmental Chamber

Photoperiod: 16 Hrs. Light / 8 Hrs. Dark

Environmental Chamber Temperature Range: 24.0 – 26.0°C

Filtration: Filtered through a 60 micron screen

Test Organisms Used and Age: *Pimephales promelas* Age: < 24 Hrs.

Feeding During Test: *Pimephales promelas* 0.15 g brine shrimp twice daily

Source of Test Organisms: Aquatic BioSystems

Diseases/Treatments: None

Standard Reference Toxicant Used and Source:
NaCl, 99.6% J.T.Baker, Inc., Philipsburg, N.J.

Date of Most Recent Reference Toxicant Test: 03-10-20

Reference Toxicant Test Results: *Pimephales promelas* = Acceptable

Dilution Water Used: Moderately Hard Synthetic Fresh Water

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

TEST RESULTS

Pimephales promelas

Survival Data:		Statistical Test Method:	Data Qualifier:
LC50	>43.2	None Needed	
NOEC	43.2	Steel's Many One Rank	
LOEC	>43.2	Steel's Many One Rank	
TUC	<2.31		

Growth Data:		Statistical Test Method:	Data Qualifier:
NOEC	43.2	Dunnett's	
LOEC	>43.2	Dunnett's	
IC25	>43.2	Linear Interpolation	
TUC	<2.31		
PMSD	10.32		

Key:
LC50 - Lethal Concentration to 50% of population at 48 hours
NOEC - No Observable Effect Concentration
LOEC - Lowest Observable Effect Concentration
TUC - Toxicity Units Chronic
IC25 - 25% Inhibition Concentration
PMSD - Percent Minimum Significant Difference

Qualifiers:
P - Initial pH falls outside the range of 6.0 - 9.0
H - 36 Hour Hold Time Exceeded
T - Initial Temperature exceeded 0 - 6° Range

APPROVED: Michael Lester
Michael Lester
Bioassay Lab Manager

DATE: 03-23-20

PACE ANALYTICAL

SURVIVAL DATA FOR FATHEAD MINNOW LARVAL SURVIVAL AND GROWTH TEST.

Client: City of Lakeland
Pace Sample ID: 7320456-001
Client Sample ID: Lakeland Biomonitoring
Randomization Template #: 1

NPDES Permit #: TN0078255
Test Dates: 03-03-20/03-10-20
Analysts: ML/DL/EP/KE/SO/TG

Test	Day	1	2	3	4	5	6	7	
Concentration	Replicate	Number of Survivors							Remarks
MHSFW* Control	A	10	10	10	10	10	10	10	
MHSFW* Control	B	10	10	10	10	10	10	10	
MHSFW* Control	C	10	10	10	10	10	10	10	
MHSFW* Control	D	10	10	10	10	10	9	9	
2.7 %	A	10	10	10	10	10	10	10	
2.7 %	B	10	10	10	10	10	10	10	
2.7 %	C	10	10	10	10	10	10	10	
2.7 %	D	10	10	10	10	10	10	10	
5.4 %	A	10	10	10	10	10	10	10	
5.4 %	B	10	10	10	10	10	10	10	
5.4 %	C	10	10	10	10	10	10	10	
5.4 %	D	10	10	10	10	10	10	10	
10.8 %	A	10	10	10	10	10	10	10	
10.8 %	B	10	10	10	10	10	10	10	
10.8 %	C	10	10	10	10	10	10	10	
10.8 %	D	10	10	10	10	10	10	10	
21.6 %	A	10	10	10	10	10	10	9	
21.6 %	B	10	10	10	10	10	10	10	
21.6 %	C	10	10	10	10	10	10	10	
21.6 %	D	10	10	10	10	10	10	10	
43.2 %	A	10	10	10	10	10	10	10	
43.2 %	B	10	10	10	10	10	10	10	
43.2 %	C	10	10	10	10	10	10	10	
43.2 %	D	10	10	10	10	10	10	10	

*Moderately Hard Synthetic Fresh Water

PACE ANALYTICAL

WEIGHT AND SURVIVAL DATA FOR FATHEAD MINNOW LARVAL SURVIVAL AND GROWTH TEST

Client: City of Lakeland
Pace Sample ID#: 7320456-001
Client Sample ID: Lakeland Biomonitoring
Test Dates: 03-03-20/03-10-20
Weighing Date: 03-11-20
NPDES Permit #: TN0078255
Drying Time and Temperature: 24 Hrs at 60°C
Drying Start Date and Time: 03-10-20/1400
Drying Stop Date and Time: 03-11-20/1410

Test Concentration	Replicate	A Weight of Boat (g)	B Dry Weight foil & larvae (g)	B-A Total Dry Weight of larvae (g)	C Number of larvae	(B-A)/C Mean dry weight of larvae (mg)	% Survival per test Concentration	Average Weight per test Concentration (mg)
Control	A	1.26930	1.27423	0.00493	10	0.493	97.5 %	0.51625
	B	1.27366	1.27899	0.00533	10	0.533		
	C	1.27251	1.27763	0.00512	10	0.512		
	D	1.27588	1.28115	0.00527	10	0.527		
2.7 %	A	1.28413	1.28881	0.00468	10	0.468	100.0 %	0.48625
	B	1.26537	1.27029	0.00492	10	0.492		
	C	1.26814	1.27320	0.00506	10	0.506		
	D	1.27340	1.27819	0.00479	10	0.479		
5.4 %	A	1.27608	1.28122	0.00514	10	0.514	100.0 %	0.48800
	B	1.26617	1.27132	0.00515	10	0.515		
	C	1.26886	1.27359	0.00473	10	0.473		
	D	1.26608	1.27058	0.00450	10	0.450		
10.8 %	A	1.27450	1.27966	0.00516	10	0.516	100.0 %	0.48500
	B	1.27382	1.27897	0.00515	10	0.515		
	C	1.27720	1.28162	0.00442	10	0.442		
	D	1.26980	1.27447	0.00467	10	0.467		
21.6 %	A	1.27805	1.28233	0.00428	10	0.428	97.5 %	0.48275
	B	1.27358	1.27838	0.00480	10	0.480		
	C	1.27680	1.28227	0.00547	10	0.547		
	D	1.27144	1.27620	0.00476	10	0.476		
43.2 %	A	1.27064	1.27549	0.00485	10	0.485	100.0 %	0.49675
	B	1.26520	1.27000	0.00480	10	0.480		
	C	1.26820	1.27350	0.00530	10	0.530		
	D	1.27343	1.27835	0.00492	10	0.492		
	Analyst	EP	EK	ML	ML	ML		

PACE ANALYTICAL

CHEMICAL AND PHYSICAL DATA FORM FOR FATHEAD MINNOW (*PIMEPHALES PROMELAS*) LARVAL SURVIVAL AND GROWTH TEST.

Client: City of Lakeland
Pace Sample ID#: 7320456-001
Client Sample ID: Lakeland Biomonitoring

NPDES Permit #: TN0078255
Test Beginning Date and Time: 03-03-20/1200
Test Ending Date and Time: 03-10-20/1225
Analysts: ML/DL/EP/KE/SO/TG

Moderately Hard Synthetic Fresh Water Control								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.5	22.4	21.8	22.9	23.0	24.8	
DO Initial	7.8	7.7	7.8	7.8	8.0	8.0	8.1	
DO Final	7.1	5.5	6.8	6.7	6.8	6.7	6.2	
pH Initial	7.93	7.93	7.95	7.92	8.04	7.92	8.00	
pH Final	7.70	7.55	7.68	7.61	7.60	7.70	7.63	
Conductivity (us)	331	338	322	332	335	334	342	
Chlorine (mg/l)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Alkalinity (mg/l)	63.0	54.4	62.1	62.1	62.1	63.9	64.4	
Hardness (mg/l)	98.8	86.7	92.8	92.8	92.8	98.2	100	
Time	1200	1155	1230	1210	1200	1115	1225	
Initials	SO/EK	EK/TG	TG/KE	KE/TG	TG/SO	SO/TG	TG/TG	

2.7 % Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.1	22.8	22.6	22.0	23.0	23.4	25.2	
DO Initial	7.8	8.1	8.0	7.9	8.1	8.1	8.2	
DO Final	5.6	5.8	6.7	6.5	6.4	6.5	5.9	
pH Initial	7.97	8.00	7.95	7.92	8.05	7.91	7.99	
pH Final	7.49	7.52	7.63	7.56	7.52	7.62	7.57	
Conductivity (us)	336	338	322	333	336	336	340	

5.4 % Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.8	22.5	21.9	23.2	23.4	25.3	
DO Initial	7.9	8.0	8.0	8.0	8.1	8.1	8.2	
DO Final	5.3	6.1	6.8	6.5	6.3	6.5	5.9	
pH Initial	7.94	8.04	7.89	7.89	8.02	7.89	7.98	
pH Final	7.46	7.58	7.65	7.56	7.55	7.63	7.60	
Conductivity (us)	328	345	324	334	338	328	338	

PACE ANALYTICAL

CHEMICAL AND PHYSICAL DATA FORM FOR FATHEAD MINNOW (*PIMEPHALES PROMELAS*) LARVAL SURVIVAL AND GROWTH TEST.

Client: City of Lakeland
Pace Sample ID#: 7320456-001
Client Sample ID: Lakeland Biomonitoring

NPDES Permit #: TN0078255
Test Beginning Date and Time: 03-03-20/1200
Test Ending Date and Time: 03-10-20/1225
Analysts: ML/DL/EP/KE/SO/TG

10.8 % Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.8	22.7	21.9	23.1	23.2	25.2	
DO Initial	7.8	7.9	8.0	8.0	8.1	8.2	8.2	
DO Final	5.6	6.1	6.7	6.6	6.4	6.5	5.9	
pH Initial	7.93	7.96	7.89	7.89	8.04	7.90	8.00	
pH Final	7.51	7.59	7.63	7.58	7.57	7.64	7.59	
Conductivity (us)	337	360	329	334	337	334	340	

21.6 % Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.9	22.6	21.7	23.2	23.4	25.2	
DO Initial	7.8	8.1	8.0	8.1	8.1	8.1	8.1	
DO Final	5.8	6.1	6.7	6.6	6.4	6.4	5.8	
pH Initial	7.89	7.98	7.83	7.87	8.03	7.90	7.99	
pH Final	7.56	7.60	7.66	7.59	7.57	7.63	7.60	
Conductivity (us)	342	380	333	341	335	342	344	

43.2 % Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.8	22.4	21.8	23.2	23.3	25.2	
DO Initial	7.6	7.6	7.9	8.0	8.0	8.1	8.0	
DO Final	5.7	6.0	6.6	6.6	6.3	6.4	5.6	
pH Initial	7.79	7.94	7.74	7.83	8.03	7.90	8.02	
pH Final	7.53	7.60	7.65	7.62	7.58	7.62	7.61	
Conductivity (us)	352	341	336	346	345	348	353	
Chlorine (mg/l)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Alkalinity (mg/l)	74.8		71.1		68.7			
Hardncss (mg/l)	60.6		58.2		61.7			
Time	1200	1155	1230	1210	1200	1155	1225	
Initials	SO/EK	EK/TG	TG/KE	KE/TG	TG/SO	SO/TG	TG/TG	

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 1

Chronic Cumulative Data Summary Sheet

Test Date	Vertebrate	Invertebrate	LC50	NOEC	LOEC	IC25	TUC
03-10-20*	X		>43.2	43.2	>43.2	>43.2	<2.31

Note: *Results are submitted with this report.

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 2

Summary of Test Conditions

Test Start: 03-03-20 **Time:** 1200

Test End: 03-10-20 **Time:** 1225

Test Type: 7 Day Fathead Minnow Larval Survival and Growth Test

Test organisms: Pimephales promelas **Age:** <24 Hours

Test chamber size: 400 ml **Volume:** 250 ml

Diluent: Moderately Hard Synthetic Fresh Water

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 2 (CONTINUED)

Range of Values Measured During Test

	Parameter		Effluent	Diluent
1.	**Chlorine (mg/l)**	**initial**	0.00	0.00
		adjusted	NA	NA
2.	**pH**	**initial**	7.53 – 8.03	7.55 – 8.04
		adjusted	NA	NA
3.	**Alkalinity (mg/l as CACO3)**		68.7 – 74.8	54.4 – 64.4
4.	**Hardness (mg/l as CACO3)**		58.2 – 61.7	86.7 – 100
5.	**Conductivity (umhos/cm)**		336 – 353	322 – 342
6.	**D.O. (mg/l)**		5.6 – 8.1	5.5 – 8.1
7.	**Methods used for adjustment**			
		Chlorine	NA	
		pH	NA	

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 2 (CONTINUED)

Test Results Chronic

1. **Test Acceptability**

Control survival %	97.5 %
Average weight control organisms	0.51625

2. **Methods of statistical analyses** — Shapiro Wilks, Bartlett's, Dunnett's, Steel's Many One Rank and Linear Interpolation

3. **Statistical Results Pimephales promelas**

LC50	>43.2		
Survival NOEC	43.2	**LOEC**	>43.2
Growth NOEC	43.2	**LOEC**	>43.2
TUC	<2.31	**IC25**	>43.2
PMSD	10.32		
Normal Distribution	Survival No	Growth Yes	
Homogeneous Variance	Survival No	Growth Yes	

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001 CLIENT NAME: City of Lakeland
CLIENT SAMPLE ID: Lakeland Biomonitoring NPDES PERMIT #: TN0078255

ATTACHMENT 3

Toxicity Test Conditions and Results

Sample Description

Sample Collected From: **Date:** 03-02-20 **Time:**
Date: 03-04-20 **Time:**
Date: 03-06-20 **Time:**

Sample Type: Composite
Collector: Chris Hatcher **Affiliation:** City of Lakeland
Delivery: Shipped

Test Conditions

Type: 7 Day Fathead Minnow Larval Survival and Growth
Start Date: 03-03-20 **Time:** 1200
End Date: 03-10-20 **Time:** 1225
Organism: Pimephales promelas **Age:** <24 Hours
Chamber size: 400 ml **Volume:** 250 ml
Concentrations: Control, 2.7%, 5.4%, 10.8%, 21.6% and 43.2%
Number Replicates: 4
Organisms Per Replicate: 10
Feeding Prior to Test: Brine Shrimp twice daily
Feeding During Test: 0.15 g Brine Shrimp twice daily
Photo Period: 16 hrs. light / 8 hrs. darkness

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 3 (CONTINUED)

Equipment

pH meter Oakton pH 700 Series

DO meter HACH HQ40d

Conductivity meter Hanna Edge

Temperature meter Oakton pH 700 Series

Chlorine Test Hanna HI96781

Comments:

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring

CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 4

Effluent Use Sheet

Test Organism: Pimephales promelas

Sample Collection				**Sample Use**		
Date		Time				
From	To	From	To	Date	Time	Test Day
	03-02-20			03-03-20	1200	1
				03-04-20	1155	2
	03-04-20			03-05-20	1230	3
				03-06-20	1210	4
	03-06-20			03-07-20	1200	5
				03-08-20	1115	6
				03-09-20	1225	7

PACE ANALYTICAL

PACE SAMPLE ID: 7320456-001
CLIENT SAMPLE ID: Lakeland Biomonitoring
CLIENT NAME: City of Lakeland
NPDES PERMIT #: TN0078255

ATTACHMENT 5

Chronic Reftox Data

Pimephales promelas

Date: 03-10-20

Survival		Statistical Test
LC50	4.47 ppt	Probit
NOEC	1.715 ppt	Steel's Many One Rank
LOEC	2.45 ppt	Steel's Many One Rank

Growth		Statistical Test
NOEC	1.715 ppt	Dunnett's
LOEC	2.45 ppt	Dunnett's
IC25	2.24 ppt	Linear Interpolation
PMSD	17.48	

Key:
LC50 - Lethal Concentration to 50% of population at test termination
NOEC - No Observable Effect Concentration
LOEC - Lowest Observable Effect Concentration
IC25 - 25% Inhibition Concentration
PMSD - Percent Minimum Significant Difference

Note: Sodium Chloride was used as the reference toxicant. NaCl, 99.6% J.T.Baker, Inc., Philipsburg NJ

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	3/3/2020 12:00	Test ID:	7320456pp	Sample ID:	Biomonitoring
End Date:	3/10/2020 12:25	Lab ID:	PACE-WV01040	Sample Type:	DMR-Discharge Monitoring Report
Sample Date:	3/2/2020	Protocol:	EPAFW02-EPA/821/R-02-01	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4
Hard Synthetic	1.0000	1.0000	1.0000	0.9000
2.7	1.0000	1.0000	1.0000	1.0000
5.4	1.0000	1.0000	1.0000	1.0000
10.8	1.0000	1.0000	1.0000	1.0000
21.6	0.9000	1.0000	1.0000	1.0000
43.2	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Hard Synthetic	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4		
2.7	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	20.00	10.00
5.4	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	20.00	10.00
10.8	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	20.00	10.00
21.6	0.9750	1.0000	1.3713	1.2490	1.4120	5.942	4	18.00	10.00
43.2	1.0000	1.0256	1.4120	1.4120	1.4120	0.000	4	20.00	10.00

Auxiliary Tests				Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)				0.61382	0.916	-2.1359	5.27706
Equality of variance cannot be confirmed							
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**			
Steel's Many-One Rank Test	43.2	>43.2		2.31481			
Treatments vs MHSF-Moderately Hard Synthetic							

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	3/3/2020 12:00	Test ID:	7320456pp	Sample ID:	Biomonitoring
End Date:	3/10/2020 12:25	Lab ID:	PACE-WV01040	Sample Type:	DMR-Discharge Monitoring Report
Sample Date:	3/2/2020	Protocol:	EPAFW02-EPA/821/R-02-013	Test Species:	PP-Pimephales promelas
Comments:					

Conc-%	1	2	3	4
y Hard Synthetic	0.000493	0.000533	0.000512	0.000527
2.700000	0.000468	0.000492	0.000506	0.000479
5.400000	0.000514	0.000515	0.000473	0.000450
10.800000	0.000516	0.000515	0.000442	0.000467
21.600000	0.000428	0.000480	0.000547	0.000476
43.200000	0.000485	0.000480	0.000530	0.000492

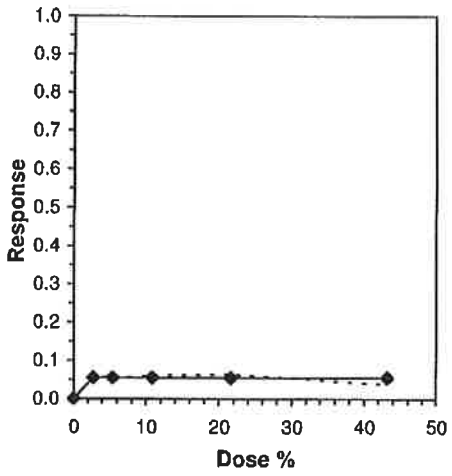
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
y Hard Synthetic	0.000516	1.000000	0.000516	0.000493	0.000533	3.456	4				0.0005	1.0000
2.700000	0.000486	0.941889	0.000486	0.000468	0.000506	3.377	4	1.357	2.410	0.0001	0.0005	0.9448
5.400000	0.000488	0.945278	0.000488	0.000450	0.000515	6.560	4	1.278	2.410	0.0001	0.0005	0.9448
10.800000	0.000485	0.939467	0.000485	0.000442	0.000516	7.561	4	1.413	2.410	0.0001	0.0005	0.9448
21.600000	0.000483	0.935109	0.000483	0.000428	0.000547	10.133	4	1.515	2.410	0.0001	0.0005	0.9448
43.200000	0.000497	0.962228	0.000497	0.000480	0.000530	4.571	4	0.882	2.410	0.0001	0.0005	0.9448

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)					0.978596		0.916		0.17103	0.074443
Bartlett's Test indicates equal variances (p = 0.45)					4.752086		15.08627			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	43.2	>43.2		2.314815	5.33E-05	0.103211	6.34E-10	9.78E-10	0.666113	5, 18
Treatments vs MHSF-Moderately Hard Synthetic										

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05*	2.4454			
IC10	>43.2			
IC15	>43.2			
IC20	>43.2			
IC25	>43.2			
IC40	>43.2			
IC50	>43.2			

* Indicates IC estimate less than the lowest concentration



City of Lakeland
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected:

Please Circle: PT MT CT ET

Phone: 901-870-1803
Fax:

Client Project #

Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatcher

Collected by (signature):

Site/Facility ID # TN0078255

P.O. #

Quote #

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3								
SAMPLE 1		WW				3	X	X	X								
Sample 1	comp	ww		3-2-20			X										
Sample 2	Comp	ww		3-2-20				X									
Sample 3	comp	ww		3-2-20					X								

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG #

Table #

Acctnum: LAKE02
Template: T144780
Prelogin: P751807
PM: 510 - Liana M Dranes
PB SG 01/25/20

Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #1 - Collect a 24hr composite sample from Sunday-Monday (2/2-2/3). Ship sample overnight to arrive at lab on Tuesday 2/4/2020.

pH 7.04 Temp 17.8
Flow _____ Other D.O. 7.79 mg/L

Samples returned via: ___UPS ___FedEx ___Courier _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD Screen <0.5 mR/hr: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
	2-2-20	11:00am			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	
			Kelli Enderson 02-03-20		
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: Condition: NCF / OK

cl- 1.3°C

City of Lakeland
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley
Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring
City/State Collected: Lakeland / TN
Please Circle: PT MT CT ET

Phone: 901-870-1803
Fax:
Client Project #
Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatcher
Collected by (signature):
Site/Facility ID # TN0078255
P.O. #
Quote #

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3
SAMPLE 2		WW				3	X	X	X
Sample 1	comp	ww		3-4-20	9:00am		X		
Sample 2	comp	ww		3-4-20	9:00am			X	
Sample 3	comp	ww		3-4-20	9:00am				X

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG #
Table #
Acctnum: LAKE02
Template: T144781
Prelogin: P751808
PM: 510 - Liana M Dranes
PB: CSG 01/25/20
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (2/4-2/5). Ship sample overnight to arrive at lab on Thursday 2/6/2020.

pH 7.12 Temp 17.2°
Flow ___ D.O. ~~Other~~ 8.29

Samples returned via: __ UPS __ FedEx __ Courier _____
Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD Screen <0.5 mR/hr: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
	3-4-20	10:00am	3-5-20 1112		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:	Hold: / Condition: NCF / OK

13 Ice 88 0.9°C

#3

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland / TN

Please Circle: PT MT CT ET

Phone: 901-870-1803
Fax:

Client Project #

Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatcher

Site/Facility ID # TN0078255

P.O. #

Collected by (signature): [signature]

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y X

SDG #
Table #
Acctnum: LAKE02
Template: T144783
Prelogin: P751810
PM: 510 - Liana M Dranes
PB: CSC 01/25/20
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		
Sample 1	comp	ww		3-6-20	7:35Am		X				
Sample 2	comp	ww		3-6-20	7:35Am			X			
Sample 3	comp	ww		3-6-20	7:35Am				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ___

Remarks: Sample #3 - Collect a 24hr composite sample from Thurs-Fri (2/6-2/7). Ship sample overnight to arrive at lab on Saturday 2/7/2020. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.23 Temp 16.1°
Flow ___ Cl₂ 0.25

Samples returned via: __ UPS __ FedEx __ Courier ___

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: __NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N
RAD Screen <0.5 mR/hr: __Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
[signature]	3-6-20	8:40Am	[signature] 030720 1025	

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C	Bottles Received:
				0.6	75im 87

If preservation required by Login: Date/Time

Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	Hold:	Condition: NCF / OK

TOXICITY TEST DATA SHEET

INITIAL READINGS

Pace Job # 7320452

Client Name City of Lakeland

Client Sample ID

Sample Type Composite

Date Received 03-03-2020

Sampling From		Sampling To	
Date	Time	Date	Time

Dissolved Oxygen 5.6

pH 6.88

Conductivity 380

Temperature 1.3°C

Chlorine HANNA HI 96781 Reagent Lot # 0.00 707A

Chlorine HACH Model CN66/66F/66T Reagent Lot #

Appearance Yellow cloudy

Odor None

Shipment Method

Sample Storage During Shipment Cooler with Ice

Sample Storage Upon Arrival D.O WC#1

Date 03-03-20 Time 1057 Initials KE

TOXICITY TEST DATA SHEET

INITIAL READINGS

Pace Job # 732052

Client Name Lakeland

Client Sample ID

Sample Type Comp

Date Received 03-05-2020

	Sampling From		Sampling To	
Date	0304-2020	Time 0900	Date	Time

Dissolved Oxygen 6.0

pH 6.92

Conductivity 360

Temperature 0.9°

Chlorine HANNA HI 96781 Reagent Lot # TO7A 0.00

Chlorine HACH Model CN66/66F/66T Reagent Lot #

Appearance Clear

Odor none

Shipment Method

Sample Storage During Shipment cooler on ice

Sample Storage Upon Arrival Bio WC #1

Date 03-05-2020 Time 1120 Initials JH

#3

TOXICITY TEST DATA SHEET

INITIAL READINGS

Pace Job # 7320456

Client Name City of Lakeland

Client Sample ID Sample 3

Sample Type Composite

Date Received 03-07-2020

	Sampling From		Sampling To	
Date		Time	03-06-2020	Time 0735

Dissolved Oxygen 7.3

pH 6.63

Conductivity 356

Temperature 0.6

Chlorine HANNA HI 96781 Reagent Lot # TOTA 000

Chlorine HACH Model CN66/66F/66T Reagent Lot # —

Appearance Slightly Cloudy

Odor None

Shipment Method Shipped

Sample Storage During Shipment on Ice & Cold

Sample Storage Upon Arrival Broken

Date 03-07-2020 Time 1100 Initials a

PACE ANALYTICAL

SURVIVAL DATA FOR FATHEAD MINNOW LARVAL SURVIVAL AND GROWTH TEST.

Client: Lakeland
Pace Sample ID: 7320456-001
Client Sample ID: 0.0 mon. turing
Randomization Template #: 1

NPDES Permit #: TN0078255
Test Dates: 03-03-20/03-10-20
Analysts:

Test Concentration	Day / Replicate	1	2	3	4	5	6	7	Remarks
		Number of Survivors							
MHSFW* Control	A	10	10	10	10	10	10	10	
MHSFW* Control	B	10	10	10	10	10	10	10	
MHSFW* Control	C	10	10	10	10	10	10	10	
MHSFW* Control	D	10	10	10	10	10	9	9	
2.7	A	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	
5.4	A	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	
10.8	A	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	
21.6	A	10	10	10	10	10	10	9	
	B	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	
43.2	A	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	
	A								
	B								
	C								
	D	JM/ER	JM/ME		JM	SO	JH	EP	

*Moderately Hard Synthetic Fresh Water

PACE ANALYTICAL

WEIGHT AND SURVIVAL DATA FOR FATHEAD MINNOW LARVAL SURVIVAL AND GROWTH TEST

Client: LaKeland
Pace Sample ID#: 7320456001
Client Sample ID: ~~LaKeland~~ TSSKE 03-20 Biomonitoring

Test Dates: 03-03-20 | 03-10-20 **Drying Time and Temperature:** 24 Hrs at 60°C
Weighing Date: 03-11-20 **Drying Start Date and Time:** 03-10-20 1400
NPDES Permit #: TN0078255 **Drying Stop Date and Time:** 03-11-20 1410

Test Concentration	Replicate	A Weight of Boat (g)	B Dry Weight foil & larvae (g)	B-A Total Dry Weight of larvae (g)	C Number of larvae	(B-A)/C Mean dry weight of larvae (mg)	% Survival per test Concentration	Average Weight per test Concentration (mg)
Control 1.28115 EK	A	1.26930	1.27423	0.00493	10	0.493	97.5	0.51625
	B	1.27306	1.27899	0.00533	10	0.533		
	C	1.27251	1.27763	0.00512	10	0.512		
	D	1.27588	~~1.28178~~	0.00527	10	0.527		
2.7	A	1.28413	1.28881	0.00468	10	0.468	100.0	0.48625
	B	1.26537	1.27029	0.00492	10	0.492		
	C	1.26814	1.27320	0.00506	10	0.506		
	D	1.27340	1.27819	0.00479	10	0.479		
5.4	A	1.27608	1.28122	0.00514	10	0.514	100.0	0.48800
	B	1.26617	1.27132	0.00515	10	0.515		
	C	1.26886	1.27359	0.00473	10	0.473		
	D	1.26608	1.27058	0.00450	10	0.450		
10.8	A	1.27450	1.27966	0.00516	10	0.511	100.0	0.48500
	B	1.27382	1.27897	0.00515	10	0.515		
	C	1.27720	1.28162	0.00442	10	0.442		
	D	1.26980	1.27447	0.00467	10	0.467		
21.6	A	1.27805	1.28233	0.00428	10	0.428	97.5	0.48275
	B	1.27358	1.27838	0.00480	10	0.480		
	C	1.27680	1.28227	0.00547	10	0.547		
	D	1.27144	1.27620	0.00476	10	0.476		
43.2 27343	A	1.27064	1.27549	0.00485	10	0.485	100.0	0.49675
	B	1.26520	1.27000	0.00480	10	0.480		
	C	1.26820	1.27350	0.00530	10	0.530		
	D	~~1.27064~~	1.27835	0.00492	10	0.492		
Analyst:	* ~~EP~~	EP	EK					

*EE EP 03-10-2020

PACE ANALYTICAL

CHEMICAL AND PHYSICAL DATA FORM FOR FATHEAD MINNOW (*PIMEPHALES PROMELAS*) LARVAL SURVIVAL AND GROWTH TEST.

Client: Lakeland
Pace Sample ID#: 73204572-001
Client Sample ID: Biomonitoring

NPDES Permit #: TN0078255
Test Beginning Date and Time: 03-03-20 1200
Test Ending Date and Time: 03-10-20 1225
Analysts:

MHSFW* Control								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.5	22.4	~~22.3~~ 21.8	22.9	23.0	24.8	
DO Initial	7.8	7.7	7.8	7.8	8.0	8.0	8.1	
DO Final	7.1	5.5	6.8	~~7.8~~ 6.7	6.8	6.7	6.2	
pH Initial	7.93	7.93	7.95	7.92	8.04	7.92	8.00	
pH Final	7.70	7.55	7.68	~~7.47~~ 7.76	7.60	7.70	7.63	
Conductivity (us)	331	338	322	332	335	334	342	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	
Alkalinity (mg/l)	63.0	54.4	62.1	62.1	62.1	63.5	64.4	
Hardness (mg/l)	98.4	86.7	92.8	92.4	92.8	98.2	100	
Time	1200	1157	1230	1210	1200	1115	1225	
Initials	JD / EK	EK/JA	JA/KE	KC/KE JA	JA/JD	JD/JA	JA/JA	

*Moderately Hard Synthetic Fresh Water

2.7 Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.1	22.8	22.6	~~21.9~~ 22.0	23.0	23.4	25.2	
DO Initial	7.8	8.1	8.0	7.9	8.1	8.1	8.2	
DO Final	5.6	5.8	6.7	~~8.0~~ 6.5	6.4	6.5	5.9	
pH Initial	7.97	8.00	7.95	7.92	8.05	7.91	7.99	
pH Final	7.49	7.52	7.63	~~8.14~~ 7.56	7.52	7.62	7.57	
Conductivity (us)	336	338	322	333	336	336	340	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	

5.4 Concentration								
Day	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Remarks**
Temperature (°C)	24.0	22.8	22.5	~~22.5~~ 21.9	23.2	23.4	25.3	
DO Initial	7.9	8.0	8.0	8.0	8.1	8.1	8.2	
DO Final	5.3	6.1	6.8	~~8.0~~ 6.5	6.3	6.5	5.9	
pH Initial	7.94	8.04	7.89	7.89	8.02	7.89	7.98	
pH Final	7.46	7.58	7.65	~~7.19~~ 7.54	7.55	7.63	7.60	
Conductivity (us)	328	345	324	334	338	328	338	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	

PACE ANALYTICAL

CHEMICAL AND PHYSICAL DATA FORM FOR FATHEAD MINNOW (*PIMEPHALES PROMELAS*) LARVAL SURVIVAL AND GROWTH TEST.

Client: Lakeland
Pace Sample ID#: 73204556-001
Client Sample ID: Bio monitoring

NPDES Permit #: TN0078255
Test Beginning Date and Time: 03-03-20 1200
Test Ending Date and Time: 03-10-20 1225
Analysts:

10.8 Concentration								
Day	1	2	3	4	5	6	7	Remarks
Temperature (°C)	24.0	22.8	22.7	~~22.4~~ 21.9	23.1	23.2	25.2	
DO Initial	7.8	7.9	8.0	8.0	8.1	8.2	8.2	
DO Final	5.6	6.1	6.7	~~8.0~~ 6.6	6.4	6.5	5.9	[illegible] 03-07-2020
pH Initial	7.93	7.96	7.89	7.89	8.04	7.90	8.00	
pH Final	7.51	7.59	7.63	~~8.20~~ 7.58	7.57	7.64	7.59	
Conductivity (us)	337	360	329	334	337	334	340	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	

21.6 Concentration								
Day	1	2	3	4	5	6	7	Remarks
Temperature (°C)	24.0	22.9	22.6	~~22.4~~ 21.7	23.2	23.4	25.2	
DO Initial	7.8	8.1	8.0	8.1	8.1	8.1	8.1	
DO Final	5.8	6.1	6.7	~~8.1~~ 6.6	6.4	6.4	5.8	
pH Initial	7.89	7.98	7.83	7.87	8.03	7.90	7.99	
pH Final	7.56	7.60	7.66	~~8.15~~ 7.59	7.57	7.63	7.60	
Conductivity (us)	342	380	333	341	335	342	344	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	

43.2 Concentration								
Day	1	2	3	4	5	6	7	Remarks
Temperature (°C)	24.0	22.8	22.4	~~23.1~~ 21.8	23.2	23.3	25.2	
DO Initial	7.6	7.6	7.9	8.0	8.0	8.1	8.0	
DO Final	5.7	6.0	6.6	~~8.1~~ 6.6	6.3	6.4	5.6	
pH Initial	7.79	7.94	7.74	7.83	8.03	7.90	8.02	
pH Final	7.53	7.60	7.65	~~8.15~~ 7.6	7.58	7.62	7.61	
Conductivity (us)	352	341	336	346	345	348	353	
Chlorine (mg/l)	ND	ND	ND	ND	ND	ND	ND	
Alkalinity (mg/l)	74.8		71.1		68.7			
Hardness (mg/l)	66.6		58.2		61.7			
Time	1200	1155	1230	1210	1200	1115	1225	
Initials	SO/ EK	[illegible]	JA/KE	KE/KE	[illegible]/SO	SO/[illegible]	[illegible]	

Page 2 of 2

Pace_Bioassay_Chronic_PP_Readings_2018_V1

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(800) 767-5859
www.envsci.com

May 31, 2020

Spencer Smalley
Lakeland STP
10001 HWY 70
Lakeland, TN 38002

Biomonitoring Results
Pace National Identification #: L1217306-01,-02,-03

Attached are the results for toxicity test performed: May 12-19, 2020

A summary of the findings is presented below:

Test Species	***Ceriodaphnia dubia***	***Pimephales promelas***
EPA Method No.	EPA Method 1002.0	EPA Method 1000.0
Test Concentrations	2.7%, 5.4%, 10.8%, 21.6%, 43.2%	2.7%, 5.4%, 10.8%, 21.6%, 43.2%
Permit Limit	43.2%	43.2%
Test Endpoint	IC25	IC25
Test Result	**> 43.2%**	**> 43.2%**
	effluent successfully meets permit requirements for Ceriodaphnia dubia	effluent successfully meets permit requirements for fathead minnow
Next Test Date	**Week of August 16, 2020**	
Comments	**Lakeland STP**	

If you have any questions or comments concerning the enclosed report, please do not hesitate to contact us.

Pace Analytical®
National Center for Testing & Innovation

Aquatic Biology Lab
(615) 758-5858 ext. 7549
(615) 758-5858 ext. 7544

Pace Analytical®
National Center for Testing & Innovation

Acute or Chronic? Chronic
Screen or Definitive? Definitive
Test Date: May 12-19, 2020
Lab Identification #: L1217306-01,-02,-03

TOXICITY TEST REPORT SHEET

1). Facility/Discharger	Lakeland STP
2). Contact Person	Spencer Smalley
phone (facility)	901.870.1803
email 1	ssmalley@lakelandtn.org
3). Permit # or Project ID	TN0078255
4). Report Address	10001 HWY 70 Lakeland, TN 38002
5). Receiving Stream	Loosahatchie River at mile 24.1
6). Laboratory Name	Pace National
7). Laboratory Contact (phone)	Shain W. Schmitt, Sr. Aquatic Biologist 615.773.7549
8). Outfall(s) Tested	Final Effluent

9). Test Species	#1 *Ceriodaphnia dubia*	#2 *Pimephales promelas*
10). Species Age	#1 Neonates, <24-hr	#2 24-36 hours old
11). Test Conditions (Static or Static-Renewal?)	#1 Static-Renewal	#2 Static-Renewal

12). Dilution Water Type (synthetic, receiving stream)	Moderately Hard SDW
13). Aeration? (Before/During Test)	none
14). Dechlorination?	none
15). Original Chlorine Level	<0.2mg/L, <0.2mg/L, <0.2mg/L
16). Report prepared by	Clarissa Moore, Biologist

signature of person performing initial review	6-16-2020 (date)
Brandon Etheridge (name (typed or printed))	Sr. Biologist (title)
signature of person performing final review	6-17-2020 (date)
Shain W. Schmitt (name (typed or printed))	Sr. Aquatic Biologist (title)

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1217306-01,-02,-03
Test Date: May 12-19, 2020

SAMPLING SUMMARY

Sample	Sample Type Grab or Composite	Volume Collected	Sample Collection Begin (MM/DD/Time)	Sample Collection End (MM/DD/Time)	Flow Rate (at collection)	Sample Temperature (when received at lab)
1	composite	1 gallon		5/11/2020 @ 8:25		0.5 deg C
2	composite	1 gallon		5/13/2020 @ 8:15		1.3 deg C
3	composite	1 gallon		5/15/2020 @ 8:10		1.7 deg C

Comments:

TEST PERFORMANCE

Species #1

***Ceriodaphnia dubia* (water flea)**
5/12/2020 @ 13:31 to 5/18/2020 @ 12:02

Species Age
< 24 hrs old, within 8 hrs of the same age

Organism Source
Pace National, in-house cultures

Acclimation Procedure
cultured in Moderately Hard SDW at 25 deg C

Test Duration
3-Brood

Feeding Regime
0.15 *mL* YCT and 0.15 *mL* algal suspension, daily, upon renewal

Type of Test Chamber
polystyrene cup

Volume of Test Chamber
30 *mL*

Volume of Solution Used Per Test Chamber
20 *mL*

Number of Test Organisms Per Test Chamber
one (1)

Number of Replicates Per Treatment
ten (10)

Species #2

***Pimephales promelas* (fathead minnow)**
5/12/2020 @ 13:49 to5/19/2020 @ 9:55

Species Age	Hatch Date	Pace National Lot #
24-36 hours old	5/11/2020	051120HD

Organism Source
Aquatic Bio Systems - Fort Collins, CO

Acclimation Procedure
acclimated in 20% DMW at 25 deg C for about 2 hrs

Test Duration
7-Day

Feeding Regime
0.15 *mL* - 0.2 *mL* newly hatched brine shrimp nauplii, twice daily

Type of Test Chamber
polypropylene beaker

Volume of Test Chamber
500 *mL*

Volume of Solution Used Per Test Chamber
250 *mL*

Number of Test Organisms Per Test Chamber
ten (10)

Number of Replicates Per Treatment
four (4)

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1217306-01,-02,-03
Test Date: May 12-19, 2020

ADDITIONAL TOXICITY TEST INFORMATION

Copies of all bench sheets and statistical calculations and printouts obtained during the test are attached in the Appendix. Electronically entered data is entered in real time and digitaly tracked to ensure traceability.

Methods/Instrumentation used in chemical analysis:

Dissolved Oxygen: YSI 5000 DO Meter/Probe (serial #01L0435)
pH: Beckman 390pH/Temp/mV/ISE Meter
Conductivity: Thermo Orion Model 150A+
pH/RDO/Conductivity: Thermo Scientific Orion VersaStar (serial #V 02105)
Water Bath: Lindberg/Blue, Model WB1140A-1 (serial #S01M-580360-SM)
Temperature: Thermometers calibrated to NIST certified thermometer
Alkalinity: Lachat
Hardness: Lachat
Total Residual Chlorine: Hach Pocket Colorimeter, Model #DR300 (serial #19110A002361)
Environmental Chambers: 25 degrees C + 1.0 degree - Thermo-Kool
Environmental Chambers (for Colorado tests): 20 degrees C $\pm$ 1.0 degree - Thermo Scientific Model 3759
Light Quality: Ambient Lab Illumination
Light Intensity: 50-100 ft-c - VWR Traceable Dual-Range Light Meter- Model 62344-944 (S/N 200000293)
Photoperiod: 16 hours light, 8 hours dark
Drying: Overnight at greater than 60 degrees Celsius in a Fisher Scientific Isotemp Oven, Model 655F
Mean Dry Weight: Determined using Mettler Toledo Balance, AT261 Delta Range
Reference Weights (Set #1): Class 1, TREOMNER, Inc., serial number 85035
Reference Weights (Set #2): Class 1, TREOMNER, Inc., serial number 67812
EPA Acute Manual Edition and Date: EPA-821-02-012 October 2002, Fifth Edition
EPA Chronic Manual Edition and Date: EPA-821-R-02-013 October 2002, Fourth Edition

This method is performed only by Assistant Biologists, Biologists, and Senior Biologists that have experience with aquatic toxicity testing. Laboratory Technicians, Chemists, and any other laboratory personnel that are not experienced with toxicity testing will not handle test organisms during a toxicity evaluation. Lab Techs, Chemists, and others may assist (under supervision) with the gathering of data during the evaluation (pH, DO, conductivity, alkalinity, hardness, etc.), but will not be allowed to do any work with the test organisms themselves. The following analysts have met Technical Training Qualifications and their initials (in parenthesis) can be found on the bench sheets in this report: **Brandon Etheridge (BE); Shaln W. Schmitt (SWS); Adam Macomber (AM); Kristen Corson (KC); Emily Novick (EN); Cody Medley (CM); Clarissa Moore (CGM); Nadiar Yakob (NY); Joel Soto (JSV); Rachel Conradi (RC); Jessica Davis (JOD);**

Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA Methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate (etc) and the justification for such manipulations or deviations. Attach additional pages as needed.

<no deviations to report>

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1217306-01,-02,-03
Test Date: May 12-19, 2020

Toxicity Test Results

Results of a *Ceriodaphnia* (Genus) *dubia* (Species) 3-Brood, Survival & Reproduction Test (Type/Duration)

Conducted 5/12/2020 to 5/18/2020 Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								# of Young	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	100	100	100	100	100	100		321	32.1
2.7% Effluent	100	100	100	100	100	100	100		372	37.2
5.4% Effluent	100	100	100	100	100	100	100		307	30.7
10.8% Effluent	100	100	100	100	100	100	100		410	41.0
21.6% Effluent	100	100	100	100	100	90	90		324	32.4
43.2% Effluent	100	100	100	100	100	100	100		406	40.6

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival > 43.2% reproduction

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Coefficient of Variance (CV%): 41.2%

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 35.9%

$$PMSD = \frac{\text{Minimum Significant Difference X 100}}{\text{Control Mean (reproduction)}}$$

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (47 for *Ceriodaphnia*), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Ceriodaphnia dubia (water flea) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or reproduction of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the *Ceriodaphnia* test. Permittee successfully meets *Ceriodaphnia* requirements for the period.

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1217306-01,-02,-03
Test Date: May 12-19, 2020

Toxicity Test Results

Results of a *Pimephales* (Genus) *promelas* (Species) 7-day, Survival & Growth Test (Type/Duration)

Conducted 5/12/2020 to 5/19/2020 Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								Dry Weight (mg)	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	100	100	100	100	100	100	100	1.9010	0.4753
2.7% Effluent	100	100	100	100	100	100	100	100	1.9940	0.4985
5.4% Effluent	100	97.5	97.5	97.5	97.5	97.5	97.5	97.5	1.9750	0.4938
10.8% Effluent	100	100	100	100	100	100	100	100	1.9540	0.4885
21.6% Effluent	100	100	100	100	100	100	100	100	2.1160	0.5290
43.2% Effluent	100	100	100	100	100	100	100	100	2.0040	0.5010

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival > 43.2% growth

Coefficient of Variance (CV%): 7.9%

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 21.6%

$$PMSD = \frac{\text{Minimum Significant Difference X 100}}{\text{Control Mean (growth)}}$$

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (30 for fathead minnow), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Pimephales promelas (fathead minnow) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or growth of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the fathead minnow test. Permittee successfully meets fathead minnow requirements for the period.

APPENDIX

Lakeland STP

NPDES #: TN0078255

Test Date: May 12-19, 2020

Lab ID #: L1217306 -01,-02,-03

Comments

Control #4

Tue 5/12/20

Initials	pH	Con.	DO	Time	Analyst
Control	7.8	251.6	9.2	16:25:40	RC
Dup. Control	7.8	251.5	9.2	16:26:04	RC
2.7	7.8	258.6	9.1	16:26:29	RC
Dup. 2.7	7.8	258.6	9.1	16:27:00	RC
5.4	7.8	262.6	9.1	16:27:27	RC
Dup. 5.4	7.8	262.7	9.1	16:28:06	RC
10.8(PL)	7.8	271.1	9.1	16:29:40	RC
Dup. 10.8(PL)	7.8	271.1	9.1	16:30:02	RC
21.6	7.7	281.4	9.1	16:30:56	RC
Dup. 21.6	7.7	282.4	9.1	16:31:17	RC
43.2	7.6	309	9.1	16:31:58	RC
Dup. 43.2	7.6	309	9	16:32:19	RC

Wed 5/13/20

Initials	pH	Con.	DO	Time	Analyst
Control	7.8	276.7	9	16:27:25	JSV
2.7	7.9	272.6	9.1	16:27:55	JSV
5.4	7.9	275.3	9	16:28:19	JSV
10.8(PL)	7.8	284.3	9	16:28:43	JSV
21.6	7.8	295.9	9	16:29:11	JSV
43.2	7.7	320	9	16:29:34	JSV

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8	8.7	13:42:02	RC	7.9	8.6	9:28:18	RC
Dup. Control	8	8.8	13:42:49	RC	7.9	8.6	9:28:38	RC
2.7	7.9	8.8	13:43:15	RC	7.8	8.5	9:29:20	RC
Dup. 2.7	8	8.8	13:43:47	RC	7.8	8.5	9:29:51	RC
5.4	8	8.7	13:44:32	RC	7.9	8.5	9:30:52	RC
Dup. 5.4	8	8.7	13:44:49	RC	7.8	8.6	9:31:29	RC
10.8(PL)	7.9	8.7	13:45:19	RC	7.9	8.6	9:31:51	RC
Dup. 10.8(PL)	8	8.7	13:45:36	RC	7.9	8.6	9:32:14	RC
21.6	7.9	8.8	13:46:17	RC	7.8	8.6	9:32:44	RC
Dup. 21.6	7.9	8.7	13:46:38	RC	7.8	8.5	9:33:06	RC
43.2	7.9	8.7	13:47:10	RC	7.8	8.4	9:33:35	RC
Dup. 43.2	8	8.6	13:47:37	RC	7.8	8.4	9:34:00	RC

Thu 5/14/20

Initials	pH	Con.	DO	Time	Analyst
Control	7.2	269.3	9.1	13:34:43	KC
2.7	7.8	267.5	9.2	13:35:58	KC
5.4	7.8	269.6	9.2	13:36:17	KC
10.8(PL)	7.8	276.5	9.2	13:36:36	KC
21.6	7.7	286.6	8.9	13:37:03	KC
43.2	7.5	309	8.7	13:37:33	KC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	9.4	12:57:26	KC	7.2	7.7	8:29:45	EN
2.7	8	8.9	12:58:20	KC	7.6	7.8	8:30:45	EN
5.4	7.9	8.8	12:58:46	KC	7.7	7.7	8:31:10	EN
10.8(PL)	8	8.7	12:59:35	KC	7.7	7.7	8:31:34	EN
21.6	7.9	8.7	12:59:45	KC	7.7	7.7	8:31:55	EN
43.2	8	8.6	13:00:05	KC	7.7	7.7	8:32:26	EN

Fri 5/15/20

Initials	pH	Con.	DO	Time	Analyst
Control	8.2	262.3	8.7	14:02:53	KC
2.7	8.1	272.1	8.9	14:05:35	KC
5.4	8.1	276	8.9	14:05:56	KC
10.8(PL)	8.1	285.9	8.9	14:06:17	KC
21.6	8	296.6	8.9	14:07:08	KC
43.2	7.9	317	8.9	14:07:49	KC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.2	8.8	13:18:11	KC	8.1	8.1	8:59:36	KC
2.7	8.1	8.8	13:18:50	KC	7.6	7.9	9:00:38	KC
5.4	8.1	8.7	13:19:25	KC	7.9	7.5	9:01:35	KC
10.8(PL)	8.1	8.6	13:20:14	KC	7.9	7.7	9:01:56	KC
21.6	8.2	8.6	13:20:51	KC	7.9	7.7	9:02:18	KC
43.2	8.2	8.7	13:21:13	KC	7.9	7.6	9:02:35	KC

Lakeland STP

NPDES #: TN0078255 **Test Date:** May 12-19, 2020

Sat 5/16/20

Initials	pH	Con.	DO	Time	Analyst
Control	8.2	253.3	8.6	14:41:33	KC
2.7	8.2	272.7	8.4	14:41:55	KC
5.4	8.2	281.2	8.5	14:42:23	KC
10.8(PL)	8.1	284.2	8.6	14:42:49	KC
21.6	7.8	302	9.1	14:43:44	KC
43.2	7.6	316	8.6	14:44:18	KC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.4	8.8	15:18:16	KC	7.9	8.1	8:27:31	KC
2.7	8.3	8.9	15:19:15	KC	8	7.9	8:28:04	KC
5.4	8.3	8.8	15:19:34	KC	8	8	8:28:32	KC
10.8(PL)	8.3	8.8	15:20:38	KC	8.1	8	8:28:57	KC
21.6	8.3	8.8	15:22:27	KC	8	8.2	8:29:23	KC
43.2	8.4	8.9	15:22:56	KC	8	7.9	8:29:42	KC

Sun 5/17/20

Initials	pH	Con.	DO	Time	Analyst
Control	8.1	270.5	8.9	10:43:01	EN
2.7	8	277	8.8	10:43:28	EN
5.4	8	280.8	8.8	10:43:49	EN
10.8(PL)	7.9	285.8	8.7	10:44:10	EN
21.6	7.8	294.9	8.7	10:44:41	EN
43.2	7.6	315	8.6	10:45:12	EN

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.5	12:16:20	EN	7.9	8.4	8:11:35	EN
2.7	8.1	8.7	12:19:06	EN	7.8	8	8:12:08	EN
5.4	8	8.6	12:19:33	EN	7.8	8	8:12:30	EN
10.8(PL)	8	8.7	12:19:51	EN	7.8	7.8	8:13:04	EN
21.6	8	8.7	12:20:08	EN	7.8	7.7	8:13:43	EN
43.2	8	8.7	12:20:25	EN	7.8	7.6	8:14:14	EN

Mon 5/18/20

Initials	pH	Con.	DO	Time	Analyst
Control	8	268.7	8.6	11:46:58	RC
2.7	8	278	8.7	11:48:38	RC
5.4	8	281.1	8.7	11:49:06	RC
10.8(PL)	8	286	8.7	11:49:41	RC
21.6	7.9	297.8	8.7	11:50:03	RC
43.2	7.7	317	8.7	11:50:43	RC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	7.5	8.4	14:29:56	RC	7.9	8.1	10:53:09	RC
2.7	8	8.6	14:31:08	RC	7.9	8.3	10:54:02	RC
5.4	8	8.5	14:48:10	RC	7.9	8.2	10:56:09	RC
10.8(PL)	8	8.7	14:49:02	RC	7.9	8.4	10:56:30	RC
21.6	8.1	8.7	14:50:18	RC	7.9	8.4	10:57:04	RC
43.2	8.1	8.6	14:51:50	RC	8	8.5	10:57:23	RC

Tue 5/19/20

Initials	pH	Con.	DO	Time	Analyst
Control					
2.7					
5.4					0
10.8(PL)					0
21.6					0
43.2					0

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control					7.7	8.1	8:54:08	KC
2.7					7.7	7.8	8:54:28	KC
5.4				0	7.7	7.7	8:54:52	KC
10.8(PL)				0	7.7	7.5	8:55:21	KC
21.6				0	7.8	7.3	8:55:44	KC
43.2				0	7.8	7.4	8:56:07	KC

Initials

	pH		Con		DO	
	range	mean	range	mean	range	mean
Control	7.2-8.2	7.9	251.5-276.7	263.0	8.6-9.2	8.9
2.7	7.8-8.2	8.0	258.6-278	269.6	8.4-9.2	8.9
5.4	7.8-8.2	8.0	262.6-281.2	273.7	8.5-9.2	8.9
10.8(PL)	7.8-8.1	7.9	271.1-286	280.6	8.6-9.2	8.9
21.6	7.7-8	7.8	282.4-302	292.3	8.7-9.1	8.9
43.2	7.5-7.9	7.7	309-320	314.0	8.6-9.1	8.8

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH		DO		pH		DO	
	range	mean	range	mean	range	mean	range	mean
Control	7.5-8.4	8.0	8.4-9.4	8.8	6.1-7.9	7.6	7.7-8.6	8.2
2.7	7.9-8.3	8.1	8.6-8.9	8.8	7.6-8	7.8	7.8-8.5	8.1
5.4	7.9-8.3	8.0	8.5-8.8	8.7	7.7-8	7.8	7.5-8.6	8.0
10.8(PL)	7.9-8.3	8.0	8.6-8.8	8.7	7.7-8.1	7.9	7.5-8.6	8.0
21.6	7.9-8.3	8.0	8.6-8.8	8.7	7.7-8	7.8	7.3-8.6	8.0
43.2	7.9-8.4	8.1	8.6-8.9	8.7	7.7-8	7.9	7.4-8.5	7.9

Lakeland STP

NPDES # TN0078255 **Test Date:** May 12-19, 2020

Lab ID #: L1217306 -01,-02,-03

Control #4

L# of Control		Alkalinity (mg/L)	Hardness (mg/L)	Carboy
L1217462-03	Tue 5/12/20	47.4	62.3	S 5-11
L1218638-03	Thu 5/14/20	52.2	61.8	S 5-13
L1219534-03	Sat 5/16/20	48.6	65.8	S 5-15

Control Alkalinity (mg/L)			
range:	47.4-52.2	mean:	49.4
Control Hardness (mg/L)			
range:	61.8-65.8	mean:	63.3

100% Effluent	Alkalinity (mg/L)	Hardness (mg/L)
Tue 5/12/20	76.2	57.2
Thu 5/14/20	63.6	56.4
Sat 5/16/20	75.2	56.6

Effluent Alkalinity (mg/L)			
range:	63.6-76.2	mean:	71.7
Effluent Hardness (mg/L)			
range:	56.4-57.2	mean:	56.7

	Total Res. Cl_2 (mg/L)	Analyst
Tue 5/12/20	<0.2	JOD
Thu 5/14/20	<0.2	JOD
Sat 5/16/20	<0.2	JOD

Temperature *Pimephales promelas* (°C)

	Tue 5/12/20	Wed 5/13/20	Thu 5/14/20	Fri 5/15/20	Sat 5/16/20	Sun 5/17/20	Mon 5/18/20	Tue 5/19/20
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	JOD	JOD	JOD	JOD	JOD	NY	NY	JOD
Control	25.0°C	25.0°C	25.1°C	25.2°C	25.1°C	24.9°C	24.9°C	25.2°C
2.7	25.0°C	25.0°C	25.2°C	25.3°C	25.2°C	24.9°C	24.8°C	25.2°C
5.4	24.9°C	25.0°C	25.2°C	25.3°C	25.2°C	25.0°C	24.8°C	25.2°C
10.8(PL)	24.9°C	24.9°C	25.2°C	25.2°C	25.2°C	24.9°C	24.8°C	25.0°C
21.6	24.8°C	24.9°C	25.2°C	25.2°C	25.2°C	24.8°C	24.9°C	25.2°C
43.2	24.9°C	24.9°C	25.2°C	25.3°C	25.1°C	24.8°C	24.8°C	25.1°C

Measurement taken in test chambers

Temperature *Ceriodaphnia dubia* (°C)

	Tue 5/12/20	Wed 5/13/20	Thu 5/14/20	Fri 5/15/20	Sat 5/16/20	Sun 5/17/20	Mon 5/18/20	Tue 5/19/20
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	JOD	JOD	JOD	JOD	JOD	NY	NY	
Test	24.5°C	25.0°C	25.4°C	25.7°C	25.7°C	24.8°C	24.8°C	

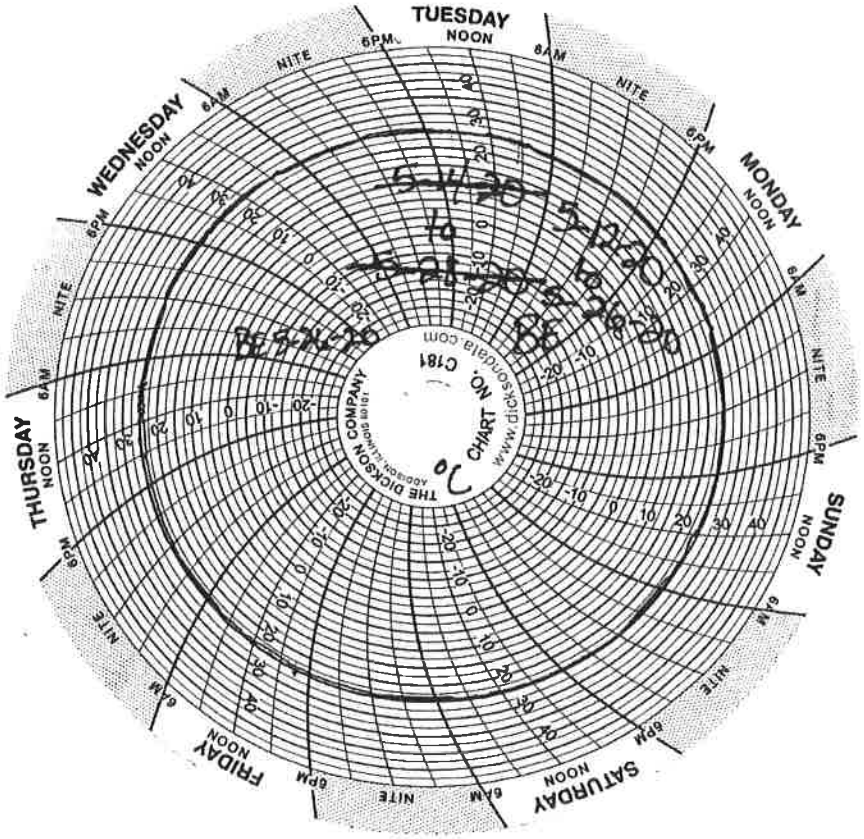
Thermometer serial number: 24400035

Lakeland STP

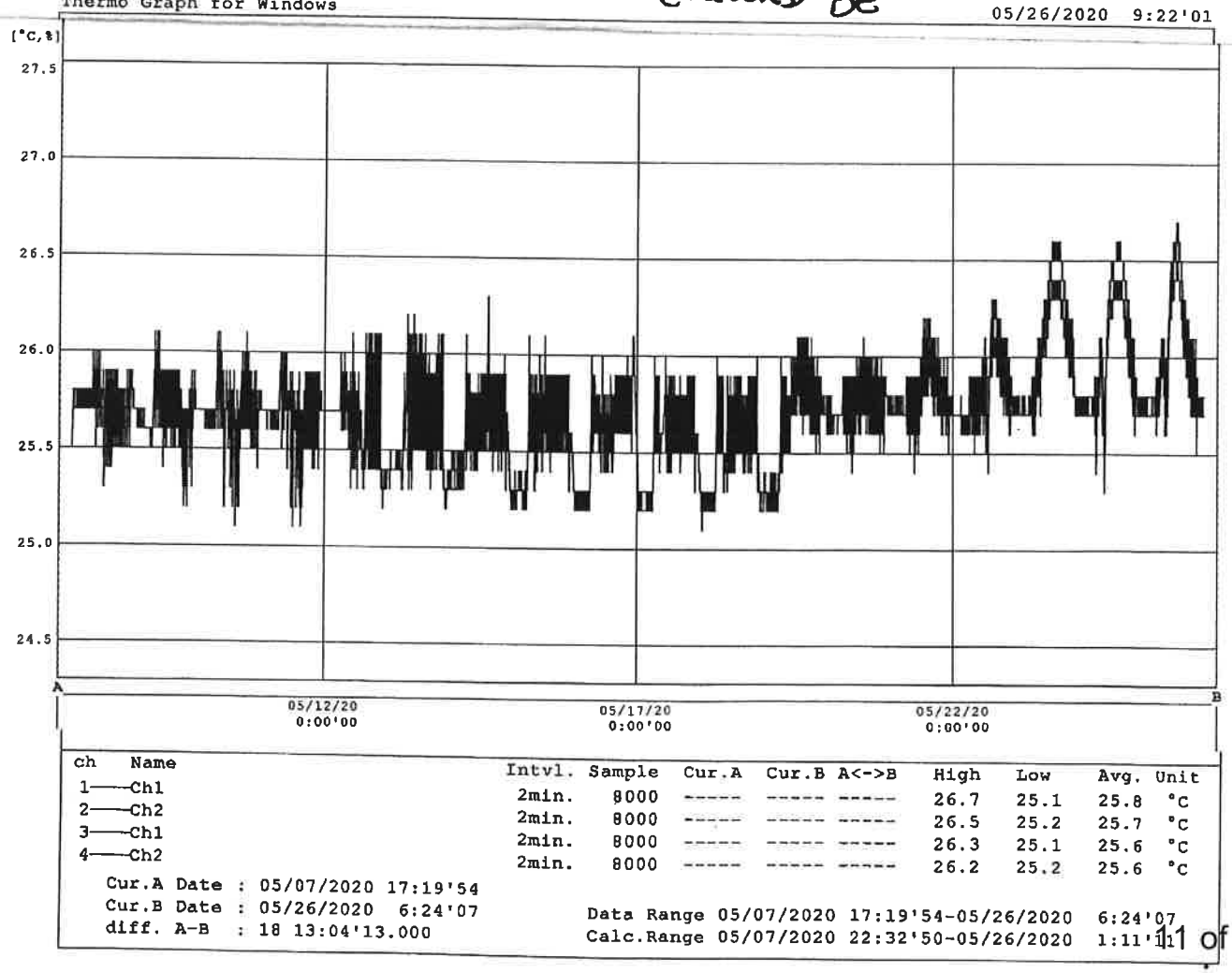
Chart Devices Used in
Thermo-Kool Walk-in Incubator:

Dickson (small chart)

[redacted]



Week of 05-12-20 to 05-26-20 (2 weeks) BE



ch	Name
1	Ch1
2	Ch2
3	Ch1
4	Ch2

Cur.A Date : 05/07/2020 17:19'54
Cur.B Date : 05/26/2020 6:24'07
diff. A-B : 18 13:04'13.000

Intvl.	Sample	Cur.A	Cur.B	A<->B	High	Low	Avg.	Unit
2min.	8000	-----	-----	-----	26.7	25.1	25.8	°C
2min.	8000	-----	-----	-----	26.5	25.2	25.7	°C
2min.	8000	-----	-----	-----	26.3	25.1	25.6	°C
2min.	8000	-----	-----	-----	26.2	25.2	25.6	°C

Data Range 05/07/2020 17:19'54-05/26/2020 6:24'07
Calc.Range 05/07/2020 22:32'50-05/26/2020 1:11'11

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1217306-01,-02,-03
Test Date: May 12-19, 2020

NOTATIONS USED BY ANALYSTS DURING TOXICITY EVALUATIONS

Ceriodaphnia dubia (water flea)

#	numbers on the Reproduction bench sheets (chronic) indicate the number of live young produced
@	if number is circled, this indicates movement of daphnid has become impaired either by actual algal growth on the organisms, or has become entrapped in substances found in the effluent sample, or has been covered in stalked cilia
ME	(molted embryo) often a stressed or poor condition female will abort all or some of a brood in response to a toxin, insufficient nutrition, or just an inability to sustain a certain level of reproduction
P	(pale) this is a noticeable reduction in coloration compared to that which is normal for the individual's age
SS	(small size) this observation is made in comparison to other individuals of the same brood or age group and generally represents a difference of at least 2X size difference
ES	(erratic swimming) this represents a locomotor behavior typified by unsustained swimming with the daphnid periodically "resting" on the bottom of the test vessel; this condition is often observed prior to a daphnid becoming totally immotile
I	(immotility) this denotes a total lack of motility; daphnid is on the bottom of the test vessel and is confirmed as living; daphnids are frequently dead within a short time
LIT	(lost in transfer) organism was lost during transfer process; stats are adjusted to represent this dilution as having one less organism
NL	(not loaded) organism was not loaded at test intiation; stats are adjusted to represent this dilution having one less organism
NT	(not transferred) organism was not present at the time of the next transfer; stats are adjusted to represent this dilution having one less organism loaded at the initiation of testing
X	(dead) dead daphnid is on bottom of test vessel and is confirmed dead by observation of no appendage movement and no visible heartbeat

Pimephales promelas (fathead minnow)

#	numbers indicate the number of live organisms remaining
BS	(bent spine) fish appear to have a curved spine
LR	(loss of reflex) fish are alive, but slow to react to gentle prodding
NL	(not loaded) organism was not loaded at test initiation; stats are adjusted to represent this dilution having one less organism
TS	(top swimmers) fish appear to congregate only at the surface of the test solution (sometimes attributed to low dissolved oxygen levels)
SS	(small size) this observation is made in comparison to other individuals of the same age group and generally represents a difference of at least 2X size difference

L #: L1217306 -01,-02,-03

Date(s) and Time(s) of Neonate Harvest:	From	14:05	on	5/11/2020	to	16:01	on	5/11/2020		
Neonates were Harvested from the Following Tray(s):	050520T1	050520T2	050520T2	050520T2	050520T2	050520T2	050520T2	050520T2	050520T2	050520T2	Template Name:
Neonates were Harvested from the Following Cups:	E3	J2	A6	I2	B4	C4	D1	D3	D4	D5	OMICRON

Control Water Carboy Used →

Description of Sample Being Analyzed Below: **CONTROL 4 Lakeland STP** **TN0078255**

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 1	B: 3	C: 7	D: 4	E: 5	F: 2	G: 7	H: 3	I: 6	J: 1		
S 5-11 Tue 5/12/20	13:31	JOD	initiation	0	0	0	0	0	0	0	0	0	0	0	10
S 5-12 Wed 5/13/20	12:02	AM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
S 5-13 Thu 5/14/20	12:20	EN	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
S 5-14 Fri 5/15/20	11:27	CM	72 hrs	0	0	6	3	5	6	6	6	6	3	41	10
S 5-15 Sat 5/16/20	13:52	JSV	96 hrs	0	0	0	0	0	11	0	0	0	0	11	10
S 5-16 Sun 5/17/20	9:56	CGM	120 hrs	0	6	14	15	12	0	15	14	14	14	104	10
Mon 5/18/20	12:02	CGM	144 hrs	0	12	21	17	22	16	20	20	20	17	165	10
Tue 5/19/20			168 hrs											0	
Wed 5/20/20			192 hrs											0	
Total # of Young Produced:				0	18	41	35	39	33	41	40	40	34	Total Offspring at Renewal: 321	Total Young Produced: 321

C. dubia Cup Batch/Lot: 20D24364 Algae Lot: 050520 YCT Lot: 050520ABS

Test Acceptability Criteria:

Survival ≥ 80%?		≥ 15 neonates/female?		≥ 60% 3rd brood?		Control Valid?	
YES	NO	YES	NO	YES	NO	YES	NO
X		X		X		X	

Description of Sample Being Analyzed Below: **2.7 Lakeland STP** **TN0078255**

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 3	B: 6	C: 1	D: 5	E: 3	F: 7	G: 4	H: 2	I: 7	J: 6		
Tue 5/12/20	13:31	JOD	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 5/13/20	12:05	AM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 5/14/20	12:25	EN	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 5/15/20	11:39	CM	72 hrs	5	1	6	6	2	4	4	5	4	5	42	10
Sat 5/16/20	13:56	JSV	96 hrs	0	0	14	0	8	0	0	0	0	0	22	10
Sun 5/17/20	10:02	CGM	120 hrs	5	18	0	12	18	14	15	11	14	13	120	10
Mon 5/18/20	12:06	CGM	144 hrs	0	26	27	21	[17]	22	24	22	25	21	188	10
Tue 5/19/20			168 hrs											0	
Wed 5/20/20			192 hrs											0	
Total # of Young Produced:				10	45	47	39	28	40	43	38	43	39	Total Offspring at Renewal: 372	Total Young Produced: 372

Comments:

[ ] Fourth brood observed. Not included in calculations.

L #: L1217306 -01,-02,-03

Description of Sample Being Analyzed Below:				5.4			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 4	B: 1	C: 3	D: 6	E: 4	F: 5	G: 3	H: 6	I: 1	J: 2			
Tue 5/12/20	13:31	JOD	initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 5/13/20	12:07	AM	24 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Thu 5/14/20	12:27	EN	48 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Fri 5/15/20	11:44	CM	72 hrs	0	4	4	0	4	5	5	5	3	3		33	10
Sat 5/16/20	14:00	JSV	96 hrs	0 P	0	8	0	0	0	0	0	12	0		20	10
Sun 5/17/20	10:07	CGM	120 hrs	0	11	12	12	11	10	14	14	0	12		96	10
Mon 5/18/20	12:09	CGM	144 hrs	0	16	[21]	21	23	20	19	21	19	19		158	10
Tue 5/19/20			168 hrs												0	
Wed 5/20/20			192 hrs												0	
Total # of Young Produced:				0	31	24	33	38	35	38	40	34	34		Total Offspring at Renewal	Total Young Produced
															307	307

Description of Sample Being Analyzed Below:				10.8(PL)			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 5	B: 7	C: 5	D: 3	E: 7	F: 3	G: 5	H: 1	I: 4	J: 7			
Tue 5/12/20	13:31	JOD	initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 5/13/20	12:10	AM	24 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Thu 5/14/20	12:29	EN	48 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Fri 5/15/20	11:49	CM	72 hrs	0	4	7	5	5	5	3	5	5	0		39	10
Sat 5/16/20	14:10	JSV	96 hrs	6	0	0	0	0	0	0	0	0	5		11	10
Sun 5/17/20	10:12	CGM	120 hrs	10	13	16	16	15	16	15	11	14	14		140	10
Mon 5/18/20	12:12	CGM	144 hrs	19	23	23	22	24	23	27	22	17	20		220	10
Tue 5/19/20			168 hrs												0	
Wed 5/20/20			192 hrs												0	
Total # of Young Produced:				35	40	46	43	44	44	45	38	36	39		Total Offspring at Renewal	Total Young Produced
															410	410

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

[ ] Fourth brood observed. Not included in calculations.

L #: L1217306 -01,-02,-03

Description of Sample Being Analyzed Below:				21.6			Lakeland STP							TN0078255	
Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 6	B: 2	C: 4	D: 2	E: 2	F: 1	G: 6	H: 4	I: 5	J: 3		
Tue 5/12/20	13:31	JOD	Initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 5/13/20	12:12	AM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 5/14/20	12:31	EN	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 5/15/20	11:53	CM	72 hrs	0	5	4	5	6	4	7	4	4	3	42	10
Sat 5/16/20	14:13	JSV	96 hrs	0	0 P	14	0	0	9	0	0	0	0	23	10
Sun 5/17/20	10:16	CGM	120 hrs	5	0 X	0	13	14	0	15	11	14	10	82	9
Mon 5/18/20	12:15	CGM	144 hrs	4	-	23	22	23	11	23	25	23	23	177	9
Tue 5/19/20			168 hrs		-									0	
Wed 5/20/20			192 hrs		-									0	
Total # of Young Produced:				9	5	41	40	43	24	45	40	41	36	Total Offspring at Renewal	Total Young Produced
														324	324

Description of Sample Being Analyzed Below:				43.2			Lakeland STP							TN0078255	
Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 7	B: 4	C: 2	D: 7	E: 1	F: 6	G: 2	H: 5	I: 2	J: 4		
Tue 5/12/20	13:31	JOD	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 5/13/20	12:14	AM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 5/14/20	12:34	EN	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 5/15/20	11:58	CM	72 hrs	0	4	4	0	5	4	4	4	7	0	32	10
Sat 5/16/20	14:16	JSV	96 hrs	7	0	0	7	13	0	1 *	0	0	4	32	10
Sun 5/17/20	10:20	CGM	120 hrs	0	18	16	12	0	13	16	13	16	15	119	10
Mon 5/18/20	12:28	CGM	144 hrs	7	27	29	21	23	25	25	22	24	20	223	10
Tue 5/19/20			168 hrs											0	
Wed 5/20/20			192 hrs											0	
Total # of Young Produced:				14	49	49	40	41	42	46	39	47	39	Total Offspring at Renewal	Total Young Produced
														406	406

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

*Continuation of previous brood- CGM 5/20/2020

Ceriodaphnia 7-d Survival and Reproduction Test — Pace National

Batch ID:	02-3520-8207	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Clarissa Moore		
Start Date:	12 May-20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	18 May-20	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24

Sample ID:	17-5678-3689	**Code:**	68B66449	**Project:**	
Sample Date:	11 May-20 08:25	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	12 May-20 08:45	**CAS (PC):**		**Station:**	
Sample Age:	16h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1217306 -01,-02,-03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
19-3931-8550	Reproduction	Dunnett Multiple Comparison Test		43.2	>43.2	n/a	2.315	35.9%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
10-8700-1678	7d Survival Rate	Linear Interpolation (ICPIN)	✓	LC5	43.2	14.4	n/a	2.315	1
			✓	LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
20-9012-3890	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>43.2	n/a	n/a	<2.315	1
			✓	IC10	>43.2	n/a	n/a	<2.315	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
10-8700-1678	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
19-3931-8550	Reproduction	Control Resp	32.1	15	>>	Yes	Passes Criteria
20-9012-3890	Reproduction	Control Resp	32.1	15	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.7		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
5.4		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
10.8		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
21.6		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
43.2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	32.1	22.64	41.56	0	41	4.181	13.22	41.18%	0.00%
2.7		10	37.2	29.42	44.98	10	47	3.438	10.87	29.22%	-15.89%
5.4		10	30.7	22.35	39.05	0	40	3.691	11.67	38.02%	4.36%
10.8		10	41	38.2	43.8	35	46	1.238	3.916	9.55%	-27.73%
21.6		10	32.4	21.96	42.84	5	45	4.614	14.59	45.04%	-0.93%
43.2		10	40.6	33.34	47.86	14	49	3.208	10.15	24.99%	-26.48%

Ceriodaphnia 7-d Survival and Reproduction Test — **Pace National**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2.7		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5.4		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.8		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
21.6		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
43.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	0	18	41	35	39	33	41	40	40	34
2.7		10	45	47	39	28	40	43	38	43	39
5.4		0	31	24	33	38	35	38	40	34	34
10.8		35	40	46	43	44	44	45	38	36	39
21.6		9	5	41	40	43	24	45	40	41	36
43.2		14	49	49	40	41	42	46	39	47	39

TOXICITY TEST DATA SHEET - *Pimephales promelas* (fathead minnow) 7-Day Survival & Weight Data

Lakeland STP

Test Date: May 12-19, 2020

NPDES #: TN0078255

NUMBER OF SURVIVORS

Sample Distribution		Sample #1 Tues/Wed		Sample #2 Thurs/Fri		Sample #3 Sat/Sun/Mon			
Day of the Week and Date		Tue 5/12/20	Wed 5/13/20	Thu 5/14/20	Fri 5/15/20	Sat 5/16/20	Sun 5/17/20	Mon 5/18/20	Tue 5/19/20
Effluent Conc. In%	ID of Rep.	0 hours	24 hours	48 hours	72 hours	96 hours	120 hours	144 hours	168 hours
Control 4	A: 1	10	10	10	10	10	10	10	10
	B: 3	10	10	10	10	10	10	10	10
	C: 1	10	10	10	10	10	10	10	10
	D: 1	10	10	10	10	10	10	10	10
2.7	A: 2	10	10	10	10	10	10	10	10
	B: 2	10	10	10	10	10	10	10	10
	C: 2	10	10	10	10	10	10	10	10
	D: 5	10	10	10	10	10	10	10	10
5.4	A: 3	10	10	10	10	10	10	10	10
	B: 1	10	10	10	10	10	10	10	10
	C: 3	10	10	10	10	10	10	10	10 (1 SS)
	D: 3	10	9	9	9	9	9	9	9
10.8(PL)	A: 4	10	10	10	10	10	10	10	10
	B: 4	10	10	10	10	10	10	10	10
	C: 5	10	10	10	10	10	10	10	10
	D: 4	10	10	10	10	10	10	10	10
21.6	A: 5	10	10	10	10	10	10	10	10
	B: 5	10	10	10	10	10	10	10	10
	C: 4	10	10	10	10	10	10	10	10
	D: 2	10	10	10	10	10	10	10	10
43.2	A: 6	10	10	10	10	10	10	10	10
	B: 6	10	10	10	10	10	10	10	10
	C: 6	10	10	10	10	10	10	10	10
	D: 6	10	10	10	10	10	10	10	10
Initials of Analyst Checking Survival		CM	AM	EN	KC	KC	RC	NY	JOD
Time that Minnows were Examined:		13:49	11:48	12:06	11:10	13:55	10:56	10:33	9:55
Carboy used to dilute sample:		S 5-11	S 5-12	S 5-13	S 5-14	S 5-15	S 5-16	S 5-17	

Fish Cup Batch/Lot: 5001C47503 **Brine Shrimp Lot:** 8313223

COMMENTS: Minnows used in this test are from ESC Lot# 051120HD Minnows were hatched on 5/11/2020

WEIGHT DATA for SURVIVING MINNOWS

		Weight Empty Boat (mg)	Boat w/ Fish (mg)	Weight of Larvae (mg)	Mean Weight of Larvae (mg)	Total of Mean	Mean per Concentration
Control	A	1222.08	1226.3	4.22	0.422	1.9010	0.4753
	B	1249.35	1254.38	5.03	0.503		
	C	1245.35	1250.36	5.01	0.501		
	D	1233.64	1238.39	4.75	0.475		
2.7	A	1245.63	1250.74	5.11	0.511	1.9940	0.4985
	B	1238.9	1243.87	4.97	0.497		
	C	1228.97	1234.04	5.07	0.507		
	D	1228.43	1233.22	4.79	0.479		
5.4	A	1227.24	1232.12	4.88	0.488	1.9750	0.4938
	B	1232.59	1237.61	5.02	0.502		
	C	1242.56	1247.49	4.93	0.493		
	D	1240.01	1244.93	4.92	0.492		
10.8(PL)	A	1243.05	1247.7	4.65	0.465	1.9540	0.4885
	B	1237.22	1242.23	5.01	0.501		
	C	1240.03	1244.87	4.84	0.484		
	D	1236.94	1241.98	5.04	0.504		
21.6	A	1236.18	1240.72	4.54	0.454	2.1160	0.5290
	B	1226	1231.77	5.77	0.577		
	C	1232.62	1238.09	5.47	0.547		
	D	1235.66	1241.04	5.38	0.538		
43.2	A	1243.09	1248.17	5.08	0.508	2.0040	0.5010
	B	1215.75	1221.35	5.6	0.56		
	C	1237.43	1241.74	4.31	0.431		
	D	1233.75	1238.8	5.05	0.505		
Analyst:		BE	KC				

Date & Time Put in Oven	Date & Time Removed
5/19/20 @ 9:56	5-20-20@12:24

Oven Temp:	74°C	Oven Temp:	73°C
Analyst:	JOD	Analyst:	KC

Survival ≥ 80%?

YES	NO
X	

≥ 0.25mg Average Weight in Surviving Controls?

YES	NO
X	

Control Valid?

YES	NO
X	

Login #: L1217306 -01,-02,-03

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — Pace National

Batch ID:	00-8721-8732	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Jessica Davis
Start Date:	12 May-20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	19 May-20	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** <36

Sample ID:	21-0936-1765	**Code:**	7DBA4E65	**Project:**	
Sample Date:	11 May-20 08:25	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	12 May-20 08:45	**CAS (PC):**		**Station:**	
Sample Age:	16h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1217306-01,-02, -03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
11-1508-2071	Mean Dry Biomass-mg	Dunnett T3 Multiple Comparison Test		43.2	>43.2	n/a	2.315	21.6%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
04-8612-2899	7d Survival Rate	Linear Interpolation (ICPIN)	✓	LC5	>43.2	n/a	n/a	<2.315	1
			✓	LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
06-4480-1822	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓	IC5	>43.2	n/a	n/a	<2.315	1
			✓	IC10	>43.2	n/a	n/a	<2.315	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
04-8612-2899	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
06-4480-1822	Mean Dry Biomass-mg	Control Resp	0.4753	0.25	>>	Yes	Passes Criteria
11-1508-2071	Mean Dry Biomass-mg	Control Resp	0.4753	0.25	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
2.7		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
5.4		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	2.50%
10.8		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
21.6		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
43.2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.4753	0.4152	0.5353	0.422	0.503	0.01886	0.03772	7.94%	0.00%
2.7		4	0.4985	0.4758	0.5212	0.479	0.511	0.007138	0.01428	2.86%	-4.89%
5.4		4	0.4937	0.4843	0.5032	0.488	0.502	0.002955	0.00591	1.20%	-3.89%
10.8		4	0.4885	0.4599	0.5171	0.465	0.504	0.008989	0.01798	3.68%	-2.79%
21.6		4	0.529	0.4451	0.6129	0.454	0.577	0.02636	0.05271	9.96%	-11.31%
43.2		4	0.501	0.4166	0.5854	0.431	0.56	0.02653	0.05306	10.59%	-5.42%

Fathead Minnow 7-d Larval Survival and Growth Test — Pace National

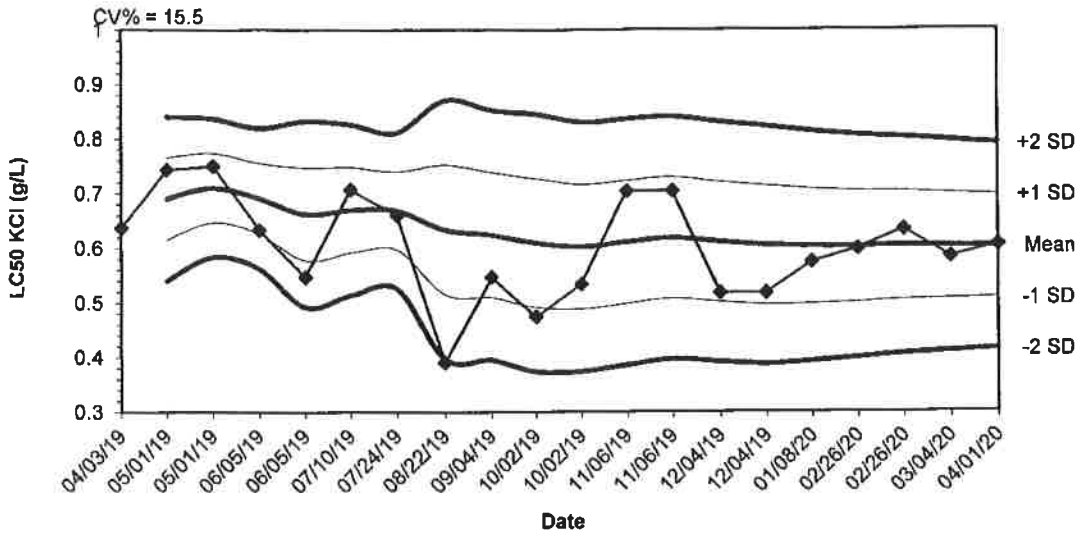
7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
2.7		1.0000	1.0000	1.0000	1.0000
5.4		1.0000	1.0000	1.0000	0.9000
10.8		1.0000	1.0000	1.0000	1.0000
21.6		1.0000	1.0000	1.0000	1.0000
43.2		1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.422	0.503	0.501	0.475
2.7		0.511	0.497	0.507	0.479
5.4		0.488	0.502	0.493	0.492
10.8		0.465	0.501	0.484	0.504
21.6		0.454	0.577	0.547	0.538
43.2		0.508	0.56	0.431	0.505

Control Chart April 2020 Acute C. dubia Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
04/03/19	0.6373					
05/01/19	0.7436	0.6905	0.6153	0.5401	0.7656	0.8408
05/01/19	0.7500	0.7103	0.6470	0.5837	0.7736	0.8369
06/05/19	0.6338	0.6912	0.6269	0.5626	0.7555	0.8198
06/05/19	0.5477	0.6625	0.5775	0.4926	0.7474	0.8324
07/10/19	0.7071	0.6699	0.5918	0.5136	0.7481	0.8262
07/24/19	0.6598	0.6685	0.5970	0.5256	0.7399	0.8113
08/22/19	0.3912	0.6338	0.5156	0.3973	0.7521	0.8703
09/04/19	0.5477	0.6242	0.5100	0.3957	0.7385	0.8528
10/02/19	0.4743	0.6093	0.4915	0.3738	0.7270	0.8447
10/02/19	0.5339	0.6024	0.4884	0.3745	0.7164	0.8303
11/06/19	0.7040	0.6109	0.4983	0.3858	0.7234	0.8360
11/06/19	0.7040	0.6180	0.5072	0.3964	0.7288	0.8396
12/04/19	0.5176	0.6109	0.5011	0.3913	0.7207	0.8304
12/04/19	0.5176	0.6046	0.4961	0.3876	0.7131	0.8217
01/08/20	0.5743	0.6027	0.4976	0.3925	0.7078	0.8129
02/26/20	0.5982	0.6025	0.5007	0.3989	0.7042	0.8060
02/26/20	0.6338	0.6042	0.5052	0.4062	0.7032	0.8022
03/04/20	0.5833	0.6031	0.5068	0.4104	0.6995	0.7958
04/01/20	0.6052	0.6032	0.5095	0.4157	0.6970	0.7908

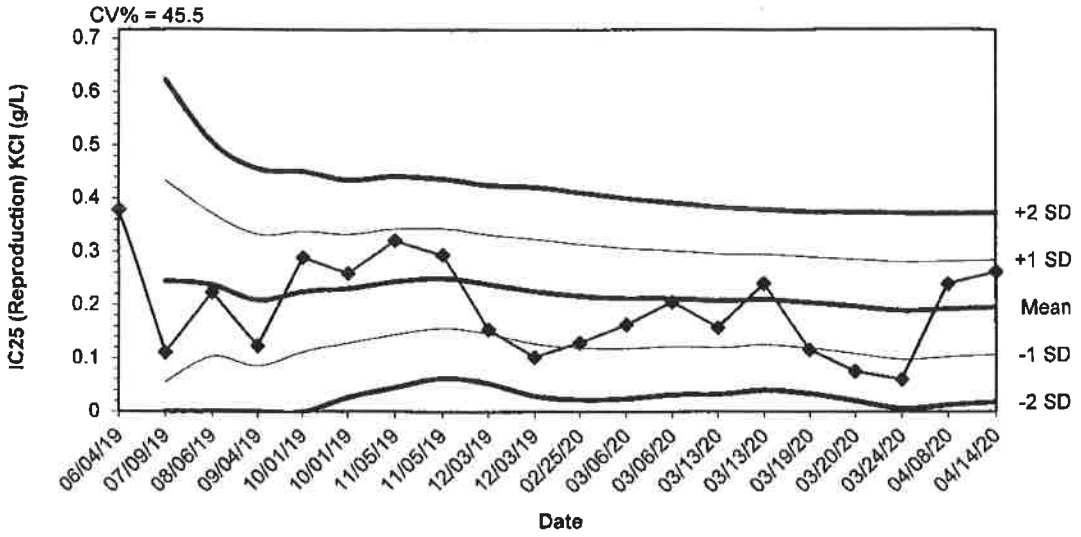
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

April 2020
Reference Toxicant Test

Control Chart April 2020 Chronic C. dubia Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
06/04/19	0.3784					
07/09/19	0.1108	0.2446	0.0554	0.0000	0.4338	0.6230
08/06/19	0.2238	0.2377	0.1033	0.0000	0.3720	0.5063
09/04/19	0.1233	0.2091	0.0854	0.0000	0.3328	0.4565
10/01/19	0.2894	0.2251	0.1122	0.0000	0.3381	0.4511
10/01/19	0.2591	0.2308	0.1288	0.0268	0.3328	0.4348
11/05/19	0.3212	0.2437	0.1445	0.0453	0.3429	0.4421
11/05/19	0.2937	0.2500	0.1564	0.0629	0.3435	0.4370
12/03/19	0.1541	0.2393	0.1462	0.0531	0.3324	0.4256
12/03/19	0.1025	0.2256	0.1277	0.0299	0.3235	0.4214
02/25/20	0.1297	0.2169	0.1196	0.0224	0.3142	0.4114
03/06/20	0.1630	0.2124	0.1184	0.0244	0.3064	0.4005
03/06/20	0.2053	0.2119	0.1218	0.0318	0.3019	0.3920
03/13/20	0.1581	0.2080	0.1203	0.0326	0.2957	0.3834
03/13/20	0.2402	0.2102	0.1253	0.0403	0.2951	0.3800
03/19/20	0.1159	0.2043	0.1189	0.0336	0.2896	0.3750
03/20/20	0.0750	0.1967	0.1083	0.0199	0.2851	0.3735
03/24/20	0.0601	0.1891	0.0975	0.0059	0.2807	0.3723
04/08/20	0.2393	0.1917	0.1020	0.0122	0.2815	0.3713
04/14/20	0.2615	0.1952	0.1065	0.0177	0.2840	0.3727

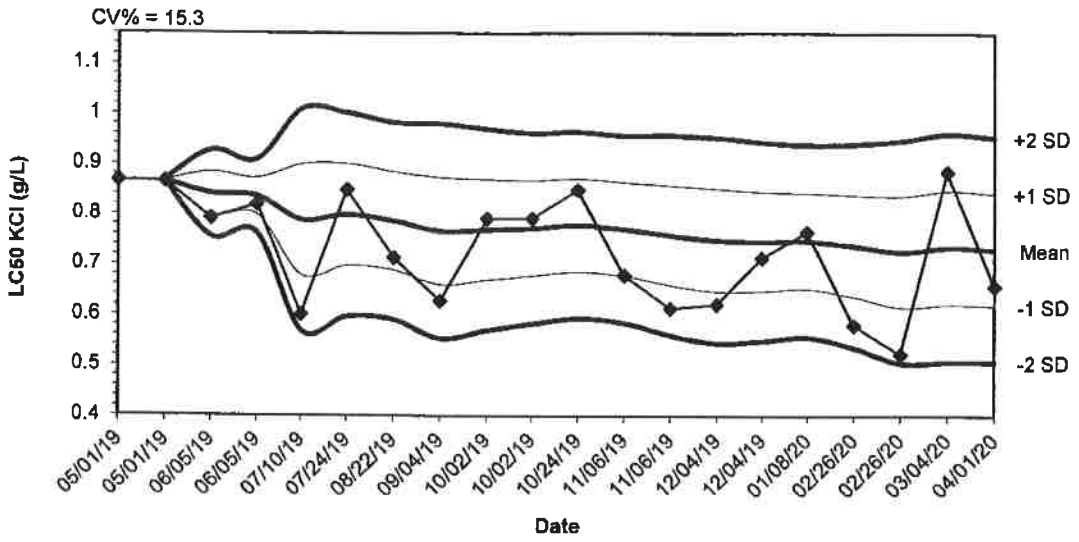
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

April 2020
Reference Toxicant Test

Control Chart April 2020 Acute Minnow Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/01/19	0.8667					
05/01/19	0.8647	0.8657	0.8643	0.8629	0.8671	0.8685
06/05/19	0.7917	0.8410	0.7983	0.7556	0.8838	0.9265
06/05/19	0.8196	0.8357	0.7992	0.7627	0.8722	0.9087
07/10/19	0.6000	0.7885	0.6785	0.5685	0.8986	1.0086
07/24/19	0.8485	0.7985	0.6971	0.5957	0.9000	1.0014
08/22/19	0.7135	0.7864	0.6884	0.5904	0.8844	0.9824
09/04/19	0.6273	0.7665	0.6597	0.5530	0.8733	0.9800
10/02/19	0.7917	0.7693	0.6691	0.5689	0.8695	0.9697
10/02/19	0.7917	0.7715	0.6768	0.5821	0.8663	0.9610
10/24/19	0.8485	0.7785	0.6857	0.5929	0.8714	0.9642
11/06/19	0.6783	0.7702	0.6771	0.5839	0.8633	0.9564
11/06/19	0.6127	0.7581	0.6588	0.5595	0.8573	0.9566
12/04/19	0.6212	0.7483	0.6461	0.5440	0.8504	0.9526
12/04/19	0.7135	0.7460	0.6471	0.5483	0.8448	0.9437
01/08/20	0.7647	0.7471	0.6515	0.5559	0.8428	0.9384
02/26/20	0.5796	0.7373	0.6362	0.5351	0.8384	0.9395
02/26/20	0.5223	0.7253	0.6149	0.5045	0.8357	0.9461
03/04/20	0.8842	0.7337	0.6204	0.5071	0.8470	0.9603
04/01/20	0.6573	0.7299	0.6183	0.5067	0.8415	0.9531

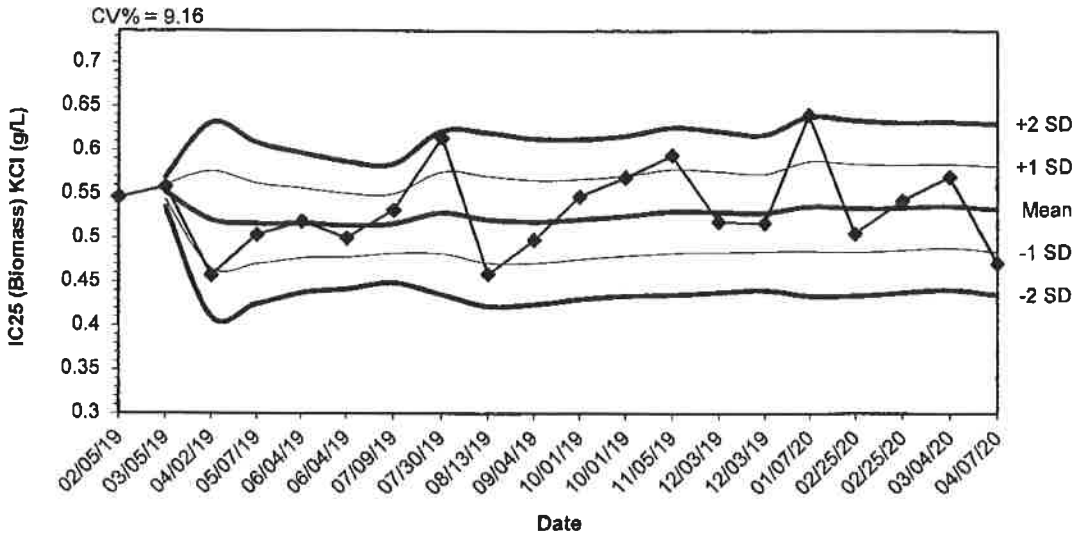
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

April 2020
Reference Toxicant Test

Control Chart April 2020 Chronic Minnow Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
02/05/19	0.5462					
03/05/19	0.5583	0.5523	0.5437	0.5351	0.5608	0.5694
04/02/19	0.4570	0.5205	0.4652	0.4099	0.5758	0.6311
05/07/19	0.5036	0.5163	0.4703	0.4244	0.5622	0.6082
06/04/19	0.5190	0.5168	0.4770	0.4372	0.5566	0.5965
06/04/19	0.4995	0.5139	0.4776	0.4413	0.5502	0.5866
07/09/19	0.5320	0.5165	0.4827	0.4488	0.5504	0.5842
07/30/19	0.6140	0.5287	0.4821	0.4355	0.5753	0.6219
08/13/19	0.4587	0.5209	0.4715	0.4221	0.5703	0.6198
09/04/19	0.4981	0.5186	0.4715	0.4243	0.5658	0.6129
10/01/19	0.5472	0.5212	0.4757	0.4301	0.5668	0.6123
10/01/19	0.5691	0.5252	0.4796	0.4341	0.5708	0.6164
11/05/19	0.5942	0.5305	0.4829	0.4352	0.5782	0.6258
12/03/19	0.5185	0.5297	0.4838	0.4379	0.5756	0.6215
12/03/19	0.5172	0.5288	0.4845	0.4402	0.5732	0.6175
01/07/20	0.6398	0.5358	0.4847	0.4337	0.5868	0.6378
02/25/20	0.5051	0.5340	0.4840	0.4340	0.5839	0.6339
02/25/20	0.5425	0.5344	0.4859	0.4374	0.5830	0.6315
03/04/20	0.5696	0.5363	0.4885	0.4406	0.5841	0.6320
04/07/20	0.4709	0.5330	0.4842	0.4354	0.5818	0.6306

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

April 2020
Reference Toxicant Test

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected:

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Spencer Smalley

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y /

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3							
SAMPLE 1	Comp	WW		5-11-25	8:25	3	X	X	X							-01

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG L1217306
A105
Tat

Acctnum: LAKE02
Template: T144780
Prelogin: P769622
PM: 510 - Liana M Dranes
PB: CS 4/24/2020
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #1 - Collect a 24hr composite sample from Sunday-Monday (5/10-5/11). Ship sample overnight to arrive at lab on Tuesday 5/12/2020.

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 1790 3020 8418

Sample Receipt Checklist
COC Seal Present/Intact: __NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR	If preservation required by Login: Date/Time
Spencer Smalley	5/11/20	9:00am			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.3 °C Bottles Received: 3+2=5 3	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) Sandy Yosef	Date: 5/12/20 Time: 8:45	Hold: Condition: NCF / OK

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: **Spencer Smalley**

Email To: ssmalley@lakelandtn.org

Project Description: **Lakeland Biomonitoring**

City/State Collected:

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Spencer Smalley

Site/Facility ID #: **TN0078255**

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3	V2								Remarks	Sample # (lab only)
SAMPLE 2	Comp	WW		5-13-20	8:15	3	X	X	X										-02
	"																		

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1217306
A222

Acctnum: LAKE02
Template: T144781
Prelogin: P769623
PM: 510 - Liana M Dranes
PB: CR 4/24/2020
Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #2 - Collect a 24hr composite sample from Tues-Wed (5/12-5/13). Ship sample overnight to arrive at lab on Thursday 5/14/2020.

pH _____ Temp _____

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 1Z AD 302 08 44 10

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

	Date:	Time:		
Relinquished by: (Signature)	5-13-20	9:00	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeOH TBR
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.5+.2=1.3 °C Bottles Received: 3
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Sandy Yossef	Date: 5/14/20 Time: 8:45

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: **Spencer Smalley**

Email To: **ssmalley@lakelandtn.org**

Project Description: **Lakeland Biomonitoring**

City/State Collected:

Please Circle: PT MT CT ET

Phone: **901-870-1803**

Client Project #

Lab Project # **LAKE02-BIOMON**

Collected by (print): Spencer Smalley

Site/Facility ID # **TN0078255**

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3								
SAMPLE 3	Comp	WW		5-15-20	8:10	3	X	X	X								-03

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1217306

Table A102

Acctnum: LAKE02
Template: T144783
Prelogin: P769624
PM: 510 - Liana M Dranes
PB: 4/24/2020
Shipped Via: FedEx Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #3 - Collect a 24hr composite sample from Thurs-Fri (5/14-5/15). Ship sample overnight to arrive at lab on Saturday 5/16/2020. **SATURDAY Delivery Shipping Labels Must Be Used**

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 179030208451

Sample Receipt Checklist
COC Seal Present/Intact: __NP Y __N
COC Signed/Accurate: Y __N
Bottles arrive intact: Y __N
Correct bottles used: Y __N
Sufficient volume sent: Y __N
If Applicable
VOA Zero Headspace: Y __N
Preservation Correct/Checked: Y __N
RAD Screen <0.5 mR/hr: Y __N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	
Spencer Smalley	5-15-20	9:00			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.3 °C Bottles Received: 1.4+.3=1.7 3	If preservation required by Login: Date/Time
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 5/16/20 Time: 9100	Hold: Condition: NCF / OK
			Sandy Yosset		

27 of 27

Pace Analytical®
National Center for Testing & Innovation

12065 LEBANON RD.
MT. JULIET, TN 37122
(800) 767-5859
WWW.ENVSCI.COM

December 21, 2020

Spencer Smalley
Lakeland STP
10001 HWY 70
Lakeland, TN 38002

Biomonitoring Results
Pace National Identification #: L1251455-01,-02,-03

Attached are the results for toxicity test performed: August 18-24, 2020

A summary of the findings is presented below:

Test Species	*Ceriodaphnia dubia*	*Pimephales promelas*
EPA Method No.	EPA Method 1002.0	EPA Method 1000.0
Test Concentrations	2.7%, 5.4%, 10.8%, 21.6%, 43.2%	2.7%, 5.4%, 10.8%, 21.6%, 43.2%
Permit Limit	43.2%	43.2%
Test Endpoint	IC25	IC25
Test Result	**> 43.2%**	**> 43.2%**
	effluent successfully meets permit requirements for Ceriodaphnia dubia	effluent successfully meets permit requirements for fathead minnow
Next Test Date	**Feburary 14, 2021**	
Comments	**Lakeland STP**	

If you have any questions or comments concerning the enclosed report, please do not hesitate to contact us.

Pace Analytical®
National Center for Testing & Innovation

Aquatic Biology Lab
(615) 758-5858 ext. 7549
(615) 758-5858 ext. 7544

Pace Analytical®
National Center for Testing & Innovation

Acute or Chronic? Chronic
Screen or Definitive? Definitive
Test Date: August 18-24, 2020
Lab Identification #: L1251455-01,-02,-03

TOXICITY TEST REPORT SHEET

1). Facility/Discharger	Lakeland STP	
2). Contact Person phone (facility) email 1	Spencer Smalley 901.870.1803 ssmalley@lakelandtn.org	
3). Permit # or Project ID	TN0078255	4). Report Address 10001 HWY 70 Lakeland, TN 38002
5). Receiving Stream	Loosahatchie River at mile 24.1	
6). Laboratory Name	Pace National	
7). Laboratory Contact (phone)	Shain W. Schmitt, Sr. Aquatic Biologist 615.773.7549	
8). Outfall(s) Tested	Final Effluent	

9). Test Species	#1 *Ceriodaphnia dubia*	#2 *Pimephales promelas*
10). Species Age	#1 Neonates, <24-hr	#2 24-36 hours old
11). Test Conditions (Static or Static-Renewal?)	#1 Static-Renewal	#2 Static-Renewal

12). Dilution Water Type (synthetic, receiving stream)	Moderately Hard SDW
13). Aeration? (Before/During Test)	none
14). Dechlorination?	none
15). Original Chlorine Level	<0.2mg/L, <0.2mg/L, <0.2mg/L
16). Report prepared by	Clarissa Moore, Biologist

Brandon Etheridge — signature of person performing final review
12-21-2020 — date
Brandon Etheridge — name (typed or printed)
Sr. Biologist — title

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1251455-01,-02,-03
Test Date: August 18-24, 2020

SAMPLING SUMMARY

Sample	Sample Type Grab or Composite	Volume Collected	Sample Collection Begin (MM/DD/Time)	Sample Collection End (MM/DD/Time)	Flow Rate (at collection)	Sample Temperature (when received at lab)
1	composite	1 gallon		8/17/2020 @ 9:00		0.4 deg C
2	composite	1 gallon		8/19/2020 @ 7:30		0.7 deg C
3	composite	1 gallon		8/21/2020 @ 7:45		1.0 deg C

Comments:

TEST PERFORMANCE

Species #1

***Ceriodaphnia dubia* (water flea)**
8/18/2020 @ 15:09 to 8/24/2020 @ 11:32

Species Age
< 24 hrs old, within 8 hrs of the same age

Organism Source
Pace National, in-house cultures

Acclimation Procedure
cultured in Moderately Hard SDW at 25 deg C

Test Duration
3-Brood

Feeding Regime
0.15 *mL* YCT and 0.15 *mL* algal suspension, daily, upon renewal

Type of Test Chamber
polystyrene cup

Volume of Test Chamber
30 *mL*

Volume of Solution Used Per Test Chamber
20 *mL*

Number of Test Organisms Per Test Chamber
one (1)

Number of Replicates Per Treatment
ten (10)

Species #2

***Pimephales promelas* (fathead minnow)**
8/18/2020 @ 14:43 to 8/25/2020 @ 11:04

Species Age	Hatch Date	Pace National Lot #
24-36 hours old	8/17/2020	081720HD

Organism Source
Aquatic Bio Systems - Fort Collins, CO

Acclimation Procedure
acclimated in 20% DMW at 25 deg C for about 2 hrs

Test Duration
7-Day

Feeding Regime
0.15 *mL* - 0.2 *mL* newly hatched brine shrimp nauplii, twice daily

Type of Test Chamber
polypropylene beaker

Volume of Test Chamber
500 *mL*

Volume of Solution Used Per Test Chamber
250 *mL*

Number of Test Organisms Per Test Chamber
ten (10)

Number of Replicates Per Treatment
four (4)

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1251455-01,-02,-03
Test Date: August 18-24, 2020

ADDITIONAL TOXICITY TEST INFORMATION

Copies of all bench sheets and statistical calculations and printouts obtained during the test are attached in the Appendix. Electronically entered data is entered in real time and digitaly tracked to ensure traceability.

Methods/Instrumentation used in chemical analysis:

Dissolved Oxygen: YSI 5000 DO Meter/Probe (serial #01L0435)
pH: Beckman 390pH/Temp/mV/ISE Meter
Conductivity: Thermo Orion Model 150A+
pH/RDO/Conductivity: Thermo Scientific Orion VersaStar (serial #V 02105)
Water Bath: Lindberg/Blue, Model WB1140A-1 (serial #S01M-580360-SM)
Temperature: Thermometers calibrated to NIST certified thermometer
Alkalinity: Lachat
Hardness: Lachat
Total Residual Chlorine: Hach Pocket Colorimeter, Model #DR300 (serial #19110A002361)
Environmental Chambers: 25 degrees C + 1.0 degree - Thermo-Kool
Environmental Chambers (for Colorado tests): 20 degrees C $\pm$ 1.0 degree - Thermo Scientific Model 3759
Light Quality: Ambient Lab Illumination
Light Intensity: 50-100 ft-c - VWR Traceable Dual-Range Light Meter- Model 62344-944 (S/N 200000293)
Photoperiod: 16 hours light, 8 hours dark
Drying: Overnight at greater than 60 degrees Celsius in a Fisher Scientific Isotemp Oven, Model 655F
Mean Dry Weight: Determined using Mettler Toledo Balance, AT261 Delta Range
Reference Weights (Set #1): Class 1, TREOMNER, Inc., serial number 85035
Reference Weights (Set #2): Class 1, TREOMNER, Inc., serial number 67812
EPA Acute Manual Edition and Date: EPA-821-02-012 October 2002, Fifth Edition
EPA Chronic Manual Edition and Date: EPA-821-R-02-013 October 2002, Fourth Edition

This method is performed only by Assistant Biologists, Biologists, and Senior Biologists that have experience with aquatic toxicity testing. Laboratory Technicians, Chemists, and any other laboratory personnel that are not experienced with toxicity testing will not handle test organisms during a toxicity evaluation. Lab Techs, Chemists, and others may assist (under supervision) with the gathering of data during the evaluation (pH, DO, conductivity, alkalinity, hardness, etc.), but will not be allowed to do any work with the test organisms themselves. The following analysts have met Technical Training Qualifications and their initials (in parenthesis) can be found on the bench sheets in this report: **Brandon Etheridge (BE); Shain W. Schmitt (SWS); Adam Macomber (AM); Kristen Corson (KC); Emily Novick (EN); Makayla Graham (MJG); Cody Medley (CM); Clarissa Moore (CGM); Nadlar Yakob (NY); Joel Soto (JSV); Rachel Conradi (RC); Jessica Davis (JOD);**

Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA Methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate (etc) and the justification for such manipulations or deviations. Attach additional pages as needed.

*Daphnid "Replicate D" was removed as an outlier throught the data set due to inconsistent responses unrepresentative of the general trend.

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1251455-01,-02,-03
Test Date: August 18-24, 2020

Toxicity Test Results

Results of a | *Ceriodaphnia* (Genus) | *dubia* (Species) | 3-Brood, Survival & Reproduction Test (Type/Duration)

Conducted | 8/18/2020 | to | 8/24/2020 | Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								# of Young	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100*	100*	100*	100*	100*	88.9*	88.9		268*	29.8*
2.7% Effluent	100*	100*	100*	100*	100*	100*	100*		293*	32.6*
5.4% Effluent	100*	100*	100*	100*	100*	100*	100*		307*	34.1*
10.8% Effluent	100*	88.9*	88.9*	88.9*	88.9*	88.9*	88.9*		286*	31.8*
21.6% Effluent	100*	100*	100*	100*	100*	100*	100*		293*	32.6*
43.2% Effluent	100*	100*	100*	100*	88.9*	88.9*	88.9*		282*	31.3*

*Daphnid "Replicate D" was removed as an outlier throught the data set due to inconsistent responses unrepresentative of the general trend.

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival | > 43.2% reproduction

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Coefficient of Variance (CV%): 30.4%

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 39.5%

$$PMSD = \frac{\text{Minimum Significant Difference X 100}}{\text{Control Mean (reproduction)}}$$

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (47 for *Ceriodaphnia*), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Ceriodaphnia dubia (water flea) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or reproduction of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the *Ceriodaphnia* test. Permittee successfully meets *Ceriodaphnia* requirements for the period.

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1251455-01,-02,-03
Test Date: August 18-24, 2020

Toxicity Test Results

Results of a *Pimephales* (Genus) *promelas* (Species) 7-day, Survival & Growth Test (Type/Duration)

Conducted 8/18/2020 to 8/24/2020 Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								Dry Weight (mg)	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	97.5	97.5	97.5	97.5	97.5	97.5	97.5	2.8870	0.7218
2.7% Effluent	100	100	97.5	97.5	97.5	97.5	97.5	97.5	2.7280	0.6820
5.4% Effluent	100	100	100	100	100	100	100	100	2.8750	0.7188
10.8% Effluent	100	95	95	95	95	95	95	95	2.8430	0.7107
21.6% Effluent	100	100	100	100	100	100	100	100	2.8270	0.7068
43.2% Effluent	100	100	100	100	100	100	100	100	2.8490	0.7123

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival; > 43.2% growth

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Coefficient of Variance (CV%): 9.4%

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 14.9%

PMSD = Minimum Significant Difference X 100 / Control Mean (growth)

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (30 for fathead minnow), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Pimephales promelas (fathead minnow) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or growth of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the fathead minnow test. Permittee successfully meets fathead minnow requirements for the period.

APPENDIX

Lakeland STP

NPDES #: TN0078255

Test Date: August 18-25, 2020

Lab ID #: L1251455 -01,-02,-03

Comments

Control # 2

Tue 8/18/20

Initials	pH	Con.	DO	Time	Analyst
Control	8	304.9	8.9	17:17:52	RC
Dup. Control	8	310	8.9	17:18:10	RC
2.7	8	309.9	8.9	17:18:33	RC
Dup. 2.7	8	314.5	9	17:18:51	RC
5.4	8	313.2	9	17:19:12	RC
Dup. 5.4	8	313.3	9	17:19:29	RC
10.8(PL)	8	315.3	9	17:19:53	RC
Dup. 10.8(PL)	8	322	9	17:20:13	RC
21.6	7.9	316.8	9	17:20:34	RC
Dup. 21.6	7.9	324.6	9	17:20:50	RC
43.2	7.8	323.3	9	17:21:13	RC
Dup. 43.2	7.8	323.4	9	17:21:31	RC

Wed 8/19/20

Initials	pH	Con.	DO	Time	Analyst
Control	8	308.4	9	16:51:56	KC
2.7	8	311.7	9	16:52:26	KC
5.4	8	313.5	9	16:52:45	KC
10.8(PL)	8	317.9	9	16:53:11	KC
21.6	7.9	323	9	16:53:34	KC
43.2	7.8	328.3	9	16:54:01	KC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8	8.8	15:01:31	KC	7.9	8	9:25:43	RC
Dup. Control	8	8.9	15:02:03	KC	7.9	8.1	9:26:01	RC
2.7	8.1	8.9	15:02:47	KC	7.9	8.1	9:26:23	RC
Dup. 2.7	8	9	15:03:15	KC	7.9	8.2	9:26:41	RC
5.4	8.1	9	15:03:55	KC	7.9	8.2	9:27:01	RC
Dup. 5.4	8	9	15:04:40	KC	7.9	8.1	9:27:34	RC
10.8(PL)	8.1	9	15:05:07	KC	7.9	8.1	9:27:54	RC
Dup. 10.8(PL)	8	9.1	15:05:38	KC	7.9	8.1	9:28:25	RC
21.6	8.1	9.1	15:05:59	KC	7.9	8.1	9:28:55	RC
Dup. 21.6	8	9.1	15:06:24	KC	7.9	8.2	9:29:14	RC
43.2	8.1	9.1	15:06:47	KC	7.8	8.1	9:29:43	RC
Dup. 43.2	8	9.1	15:07:12	KC	7.8	8.1	9:30:13	RC

Thu 8/20/20

Initials	pH	Con.	DO	Time	Analyst
Control	8	317.8	8.6	14:55:09	JOD
2.7	8	324.7	8.5	14:55:32	JOD
5.4	8	325.7	8.5	14:56:02	JOD
10.8(PL)	7.9	332	8.5	14:56:22	JOD
21.6	7.8	337.5	8.5	14:56:51	JOD
43.2	7.7	343.7	8.4	14:57:18	JOD

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.7	15:44:44	JOD	7.9	8.6	8:54:06	KC
2.7	8.1	8.7	15:45:11	JOD	7.9	8.4	8:54:32	KC
5.4	8.1	8.7	15:45:36	JOD	7.8	8.3	8:54:52	KC
10.8(PL)	8.1	8.7	15:46:03	JOD	7.8	8.1	8:55:16	KC
21.6	8	8.8	15:46:44	JOD	7.9	8.1	8:55:39	KC
43.2	8.1	8.7	15:47:07	JOD	7.8	8	8:56:00	KC

Fri 8/21/20

Initials	pH	Con.	DO	Time	Analyst
Control	7.7	475.9	8.2	15:07:28	JSV
2.7	8.1	351.3	8.2	15:08:01	JSV
5.4	8.1	353.1	8.4	15:08:24	JSV
10.8(PL)	8	353.5	8.4	15:08:49	JSV
21.6	8	357.7	8.5	15:09:14	JSV
43.2	7.9	361.7	8.6	15:09:38	JSV

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.5	12:57:31	KC	7.8	7.6	8:27:54	JOD
2.7	8.1	8.5	12:58:03	KC	7.8	7.7	8:28:19	JOD
5.4	8.1	8.5	12:58:34	KC	7.8	7.7	8:28:41	JOD
10.8(PL)	8.1	8.6	12:59:00	KC	7.8	7.6	8:28:59	JOD
21.6	8.1	8.6	12:59:26	KC	7.8	7.5	8:29:18	JOD
43.2	8.1	8.6	12:59:59	KC	7.8	7.5	8:29:36	JOD

Lakeland STP

NPDES #: TN0078255 **Test Date:** August 18-25, 2020

Sat 8/22/20

Initials	pH	Con.	DO	Time	Analyst
Control	8.2	328.6	8.3	14:45:38	KC
2.7	8.2	338.2	8.3	14:46:00	KC
5.4	8.1	340.1	8.4	14:46:23	KC
10.8(PL)	8.1	344.6	8.5	14:46:46	KC
21.6	8	352.8	8.5	14:47:10	KC
43.2	7.8	359.3	8.5	14:47:34	KC

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	7.9	14:13:11	KC	7.8	7.2	8:20:31	JOD
2.7	8.2	8.1	14:13:30	KC	7.7	7.2	8:20:54	JOD
5.4	8.1	8.3	14:13:48	KC	7.7	7	8:21:13	JOD
10.8(PL)	8.1	8.3	14:14:06	KC	7.8	7	8:21:43	JOD
21.6	8.1	8.3	14:14:25	KC	7.7	7	8:22:05	JOD
43.2	8.1	8.3	14:14:49	KC	7.7	7	8:22:29	JOD

Sun 8/23/20

Initials	pH	Con.	DO	Time	Analyst
Control	8	324.3	8.5	10:53:02	EN
2.7	8.1	335.7	8.5	10:53:20	EN
5.4	8	337.2	8.5	10:54:02	EN
10.8(PL)	8	342.6	8.6	10:54:21	EN
21.6	7.9	345.2	8.6	10:54:51	EN
43.2	7.7	351.4	8.5	10:55:18	EN

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8	8.6	12:20:42	EN	7.9	8.3	9:46:17	EN
2.7	8.1	8.6	12:21:46	EN	7.8	8.2	9:46:38	EN
5.4	8.1	8.7	12:22:05	EN	7.8	8.2	9:46:57	EN
10.8(PL)	8.1	8.7	12:22:40	EN	7.9	8.1	9:47:20	EN
21.6	8	8.6	12:23:20	EN	7.9	8.3	9:47:39	EN
43.2	8	8.6	12:23:49	EN	7.9	8.4	9:48:31	EN

Mon 8/24/20

Initials	pH	Con.	DO	Time	Analyst
Control	8.2	351.6	8.9	13:30:27	BE
2.7	8.2	359.4	8.9	13:30:49	BE
5.4	8.1	357.9	8.9	13:31:11	BE
10.8(PL)	8.1	358.9	8.8	13:40:40	BE
21.6	8	355.4	8.8	13:41:04	BE
43.2	7.9	339.3	8.8	13:41:34	BE

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.4	14:27:19	BE	7.7	7.7	9:05:21	BE
2.7	8.2	8.6	14:27:50	BE	7.9	7.7	9:05:46	BE
5.4	8.1	8.8	14:28:09	BE	7.9	7.8	9:06:04	BE
10.8(PL)	8.2	8.9	14:28:31	BE	7.9	7.9	9:06:24	BE
21.6	8.1	9	14:28:57	BE	7.9	7.9	9:06:41	BE
43.2	8.1	9.1	14:29:17	BE	7.9	7.9	9:06:59	BE

Tue 8/25/20

Initials	pH	Con.	DO	Time	Analyst
Control					
2.7					
5.4					0
10.8(PL)					0
21.6					0
43.2					0

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control					7.7	7.2	8:50:14	KC
2.7					7.7	6.9	8:50:37	KC
5.4				0	7.8	6.8	8:50:57	KC
10.8(PL)				0	7.8	7	8:51:39	KC
21.6				0	7.7	7	9:00:43	KC
43.2				0	7.9	7.3	9:01:26	KC

Initials

	pH		Con		DO	
	range	mean	range	mean	range	mean
Control	7.7-8.2	8.0	304.9-475.9	340.2	8.2-9	8.7
2.7	8-8.2	8.1	309.9-359.4	330.7	8.2-9	8.7
5.4	8-8.1	8.0	313.2-357.9	331.8	8.4-9	8.7
10.8(PL)	7.9-8.1	8.0	315.3-358.9	335.9	8.4-9	8.7
21.6	7.8-8	7.9	316.8-357.7	339.1	8.5-9	8.7
43.2	7.7-7.9	7.8	323.3-361.7	341.3	8.4-9	8.7

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH		DO		pH		DO	
	range	mean	range	mean	range	mean	range	mean
Control	8-8.1	8.1	7.9-8.9	8.5	7.7-7.9	7.8	7.2-8.6	7.8
2.7	8-8.2	8.1	8.1-9	8.6	7.7-7.9	7.8	6.9-8.4	7.8
5.4	8-8.1	8.1	8.3-9	8.7	7.7-7.9	7.8	6.8-8.3	7.8
10.8(PL)	8-8.2	8.1	8.3-9.1	8.8	7.8-7.9	7.9	7-8.1	7.7
21.6	8-8.1	8.1	8.3-9.1	8.8	7.7-7.9	7.8	7-8.3	7.8
43.2	8-8.1	8.1	8.3-9.1	8.8	7.7-7.9	7.8	7-8.4	7.8

Lakeland STP

NPDES # TN0078255 **Test Date:** August 18-25, 2020

Lab ID #: L1251455 -01,-02,-03

Control #2

L# of Control		Alkalinity (mg/L)	Hardness (mg/L)	Carboy
L1251684-01	Tue 8/18/20	59.2	89.6	I 8-17
L1251684-01	Thu 8/20/20	59.2	89.6	I 8-17
L1253774-01	Sat 8/22/20	43.5	93.6	I 8-21

Control Alkalinity (mg/L)			
range:	43.5-59.2	mean:	54.0
Control Hardness (mg/L)			
range:	89.6-93.6	mean:	90.9

100% Effluent	Alkalinity (mg/L)	Hardness (mg/L)
Tue 8/18/20	70.5	47
Thu 8/20/20	70.1	44.9
Sat 8/22/20	68.5	45.9

Effluent Alkalinity (mg/L)			
range:	68.5-70.5	mean:	69.7
Effluent Hardness (mg/L)			
range:	44.9-47	mean:	45.9

	Total Res. Cl_2 (mg/L)	Analyst
Tue 8/18/20	<0.2	JSV
Thu 8/20/20	<0.2	KC
Sat 8/22/20	<0.2	JOD

Temperature *Pimephales promelas* (°C)

	Tue 8/18/20	Wed 8/19/20	Thu 8/20/20	Fri 8/21/20	Sat 8/22/20	Sun 8/23/20	Mon 8/24/20	Tue 8/25/20
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	JSV	JOD	JOD	KC	KC	NY	NY	NY
Control	25.0°C	25.0°C	25.2°C	25.1°C	25.2°C	25.1°C	25.2°C	25.1°C
2.7	25.0°C	25.0°C	25.3°C	25.2°C	25.2°C	25.0°C	25.1°C	25.3°C
5.4	25.0°C	25.1°C	25.2°C	25.2°C	25.2°C	25.1°C	25.1°C	25.2°C
10.8(PL)	25.0°C	25.1°C	25.2°C	25.2°C	25.1°C	25.1°C	25.3°C	25.1°C
21.6	24.9°C	25.2°C	25.3°C	25.2°C	25.1°C	25.0°C	25.2°C	25.2°C
43.2	24.8°C	25.2°C	25.2°C	25.3°C	25.2°C	25.1°C	25.2°C	25.1°C

Measurement taken in test chambers

Temperature *Ceriodaphnia dubia* (°C)

	Tue 8/18/20	Wed 8/19/20	Thu 8/20/20	Fri 8/21/20	Sat 8/22/20	Sun 8/23/20	Mon 8/24/20	Tue 8/25/20
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	JSV	JOD	JOD	KC	KC	NY	NY	
Test	24.7°C	24.9°C	25.8°C	25.6°C	25.0°C	25.1°C	25.1°C	

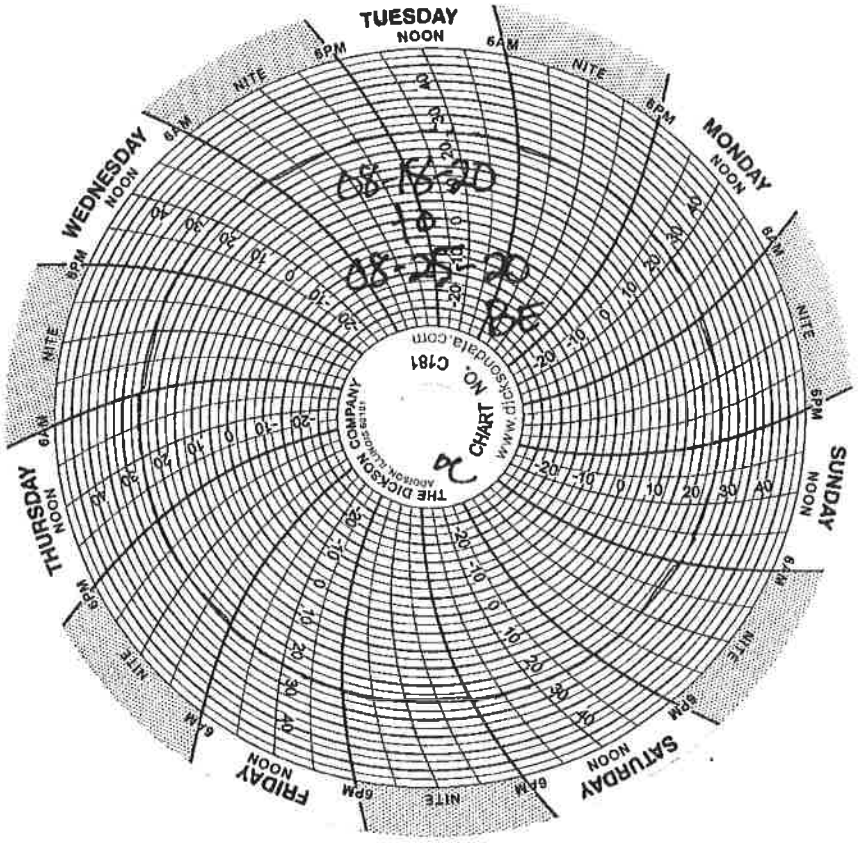
Thermometer serial number: 18050064

Lakeland STP

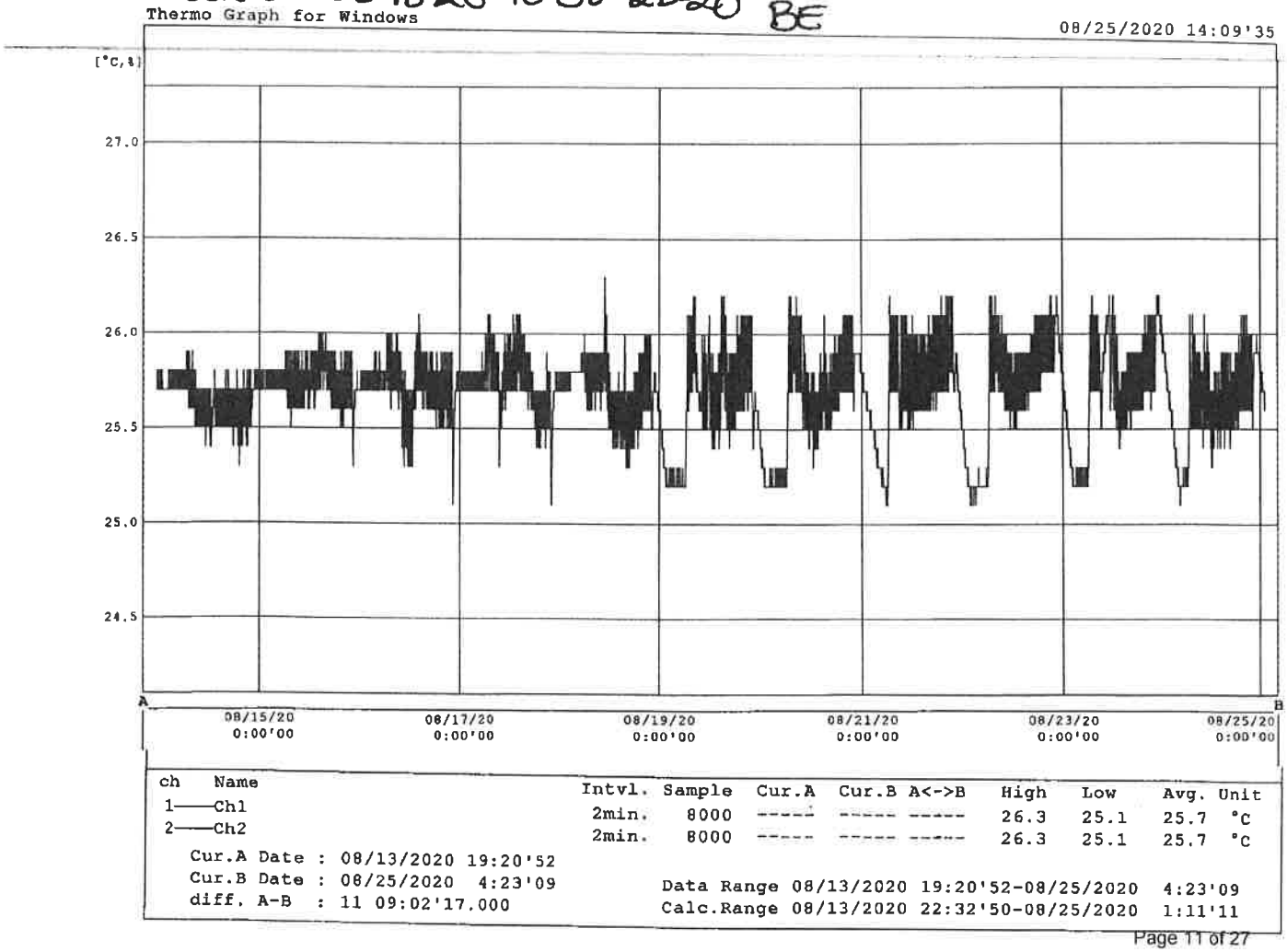
Chart Devices Used in
Thermo-Kool Walk-In Incubator:

Dickson (small chart)

[redacted]



Week of 08-18-20 to 08-25-20 BE



ch	Name	Intvl.	Sample	Cur.A	Cur.B	A<->B	High	Low	Avg.	Unit
1	Ch1	2min.	8000	-----	-----	-----	26.3	25.1	25.7	°C
2	Ch2	2min.	8000	-----	-----	-----	26.3	25.1	25.7	°C

Cur.A Date : 08/13/2020 19:20'52
Cur.B Date : 08/25/2020 4:23'09
diff. A-B : 11 09:02'17.000

Data Range 08/13/2020 19:20'52-08/25/2020 4:23'09
Calc.Range 08/13/2020 22:32'50-08/25/2020 1:11'11

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1251455-01,-02,-03
Test Date: August 18-24, 2020

NOTATIONS USED BY ANALYSTS DURING TOXICITY EVALUATIONS

Ceriodaphnia dubia (water flea)

#	numbers on the Reproduction bench sheets (chronic) indicate the number of live young produced
@	if number is circled, this indicates movement of daphnid has become impaired either by actual algal growth on the organisms, or has become entrapped in substances found in the effluent sample, or has been covered in stalked cilia
ME	(molted embryo) often a stressed or poor condition female will abort all or some of a brood in response to a toxin, insufficient nutrition, or just an inability to sustain a certain level of reproduction
P	(pale) this is a noticeable reduction in coloration compared to that which is normal for the individual's age
SS	(small size) this observation is made in comparison to other individuals of the same brood or age group and generally represents a difference of at least 2X size difference
ES	(erratic swimming) this represents a locomotor behavior typified by unsustained swimming with the daphnid periodically "resting" on the bottom of the test vessel; this condition is often observed prior to a daphnid becoming totally immotile
I	(immotility) this denotes a total lack of motility; daphnid is on the bottom of the test vessel and is confirmed as living; daphnids are frequently dead within a short time
LIT	(lost in transfer) organism was lost during transfer process; stats are adjusted to represent this dilution as having one less organism
NL	(not loaded) organism was not loaded at test intiation; stats are adjusted to represent this dilution having one less organism
NT	(not transferred) organism was not present at the time of the next transfer; stats are adjusted to represent this dilution having one less organism loaded at the initiation of testing
X	(dead) dead daphnid is on bottom of test vessel and is confirmed dead by observation of no appendage movement and no visible heartbeat

Pimephales promelas (fathead minnow)

#	numbers indicate the number of live organisms remaining
BS	(bent spine) fish appear to have a curved spine
LR	(loss of reflex) fish are alive, but slow to react to gentle prodding
NL	(not loaded) organism was not loaded at test initiation; stats are adjusted to represent this dilution having one less organism
TS	(top swimmers) fish appear to congregate only at the surface of the test solution (sometimes attributed to low dissolved oxygen levels)
SS	(small size) this observation is made in comparison to other individuals of the same age group and generally represents a difference of at least 2X size difference

L #: L1251455 -01,-02,-03

Date(s) and Time(s) of Neonate Harvest:	From	16:50	on	8/17/2020	to	23:18	on	8/17/2020		
Neonates were Harvested from the Following Tray(s):	081120AD2	081120AD2	081120AD2	081120AD2	081120AD2	081120T1	081120T1	081120T2	081720XA1	081120AD1	Template Name:
Neonates were Harvested from the Following Cups:	C7	D3	G2	G5	G6	G1	H3	I5	J2	F4	CHICKADEE

Control Water Carboy Used

Description of Sample Being Analyzed Below: **CONTROL 2 Lakeland STP** **TN0078255**

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 1	B: 7	C: 4	D: 5	E: 6	F: 7	G: 2	H: 2	I: 1	J: 6		
18-17 Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
18-17 Wed 8/19/20	11:31	CM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
18-17 Thu 8/20/20	13:08	RC	48 hrs	0	0	0	0 X	0	0	0	0	0	0	0	9
18-20 Fri 8/21/20	10:34	JOD	72 hrs	6	4	4	-	0	0	0	0	0	0	14	9
18-21 Sat 8/22/20	12:54	JSV	96 hrs	0	6	5	-	6	5	7	7	8	4	48	9
18-21 Sun 8/23/20	10:14	RC	120 hrs	14 X	10	13	-	14	16	14	15	13	11	120	8
Mon 8/24/20	11:32	RC	144 hrs	-	[15]	[21]	-	17	18	19	17	0	15	86	8
Tue 8/25/20			168 hrs	-			-							0	
Wed 8/26/20			192 hrs	-			-							0	
Total # of Young Produced:				20	20	22	0	37	39	40	39	21	30	Total Offspring at Renewal: 268	Total Young Produced: 268

C. dubia Cup Batch/Lot: 20H05980 Algae Lot: 080420 YCT Lot: 070720

Test Acceptability Criteria:

Survival ≥ 80%?		≥ 15 neonates/female?		≥ 60% 3rd brood?		Control Valid?	
YES	NO	YES	NO	YES	NO	YES	NO
X		X		X		X	

Description of Sample Being Analyzed Below: **2.7 Lakeland STP** **TN0078255**

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 3	B: 6	C: 1	D: 2	E: 1	F: 1	G: 5	H: 7	I: 5	J: 4		
Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 8/19/20	11:35	CM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 8/20/20	13:10	RC	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 8/21/20	10:36	JOD	72 hrs	7	6	5	0	6	0	0	0	0	5	29	10
Sat 8/22/20	12:57	JSV	96 hrs	10	0	0	[5]	0	5	7	7	0	0	29	10
Sun 8/23/20	10:18	RC	120 hrs	0	10	11	[12]	12	14	8 ME	15	11	15	96	10
Mon 8/24/20	11:35	RC	144 hrs	20	11	16	[16]	19	18	18	18	0	19	139	10
Tue 8/25/20			168 hrs											0	
Wed 8/26/20			192 hrs											0	
Total # of Young Produced:				37	27	32	0	37	37	33	40	11	39	Total Offspring at Renewal: 293	Total Young Produced: 293

Comments:

[ ] FOURTH BROOD OBSERVED. NOT INCLUDED IN CALCULATIONS. JOD 8/26/2020 *REPLICATE 'D' WAS REMOVED AS AN OUTLIER THROUGHOUT THE DATA SET DUE TO INCONSISTENT RESPONSES UNREPRESENTATIVE OF THE GENERAL TREND. -JOD 8/26/2020

L #: L1251455 -01,-02,-03

Description of Sample Being Analyzed Below:				5.4			Lakeland STP							TN0078255	
Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 4	B: 4	C: 5	D: 3	E: 7	F: 6	G: 3	H: 3	I: 2	J: 1		
Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 8/19/20	11:47	CM	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 8/20/20	13:12	RC	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 8/21/20	10:39	JOD	72 hrs	0	0	5	0	7	0	0	0	0	0	12	10
Sat 8/22/20	13:00	JSV	96 hrs	6	6	0	[5]	0	6	7	7	7	6	45	10
Sun 8/23/20	10:22	RC	120 hrs	13	11	12	[11]	12	15	16	3 ME	14	11	107	10
Mon 8/24/20	11:39	RC	144 hrs	16	16	21	[18]	18	20	19	14	0	19	143	10
Tue 8/25/20			168 hrs											0	
Wed 8/26/20			192 hrs											0	
Total # of Young Produced:				35	33	38	0	37	41	42	24	21	36	Total Offspring at Renewal	Total Young Produced
														307	307

Description of Sample Being Analyzed Below:				10.8(PL)			Lakeland STP							TN0078255	
Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 5	B: 2	C: 2	D: 6	E: 3	F: 3	G: 6	H: 6	I: 7	J: 2		
Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 8/19/20	11:50	CM	24 hrs	0	0	0	0 X	0	0	0	0	0	0 X	0	8
Thu 8/20/20	13:14	RC	48 hrs	0	0	0	0 -	0	0	0	0	0	0 -	0	8
Fri 8/21/20	10:41	JOD	72 hrs	5	0	5	-	0	0	0	0	0	-	10	8
Sat 8/22/20	13:04	JSV	96 hrs	0	5	0	-	6	6	7	7	6	-	37	8
Sun 8/23/20	10:25	RC	120 hrs	11	13	13	-	11	14	17	14	8	-	101	8
Mon 8/24/20	11:41	RC	144 hrs	17	16	21	-	19	17	17	18	13	-	138	8
Tue 8/25/20			168 hrs				-						-	0	
Wed 8/26/20			192 hrs				-						-	0	
Total # of Young Produced:				33	34	39	0	36	37	41	39	27	0	Total Offspring at Renewal	Total Young Produced
														286	286

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

*REPLICATE 'D' WAS REMOVED AS AN OUTLIER THROUGHOUT THE DATA SET DUE TO INCONSISTENT RESPONSES UNREPRESENTATIVE OF THE GENERAL TREND. -JOD 8/26/2020

L #: L1251455 -01,-02,-03

Description of Sample Being Analyzed Below:				21.6			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 6	B: 3	C: 7	D: 7	E: 4	F: 2	G: 1	H: 1	I: 6	J: 5			
Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 8/19/20	11:57	CM	24 hrs	0	0	0	0 X	0	0	0	0	0	0		0	9
Thu 8/20/20	13:16	RC	48 hrs	0	0	0	0 -	0	0	0	0	0	0		0	9
Fri 8/21/20	10:43	JOD	72 hrs	6	0	0	-	0	0	0	0	0	0		6	9
Sat 8/22/20	13:06	JSV	96 hrs	0	6	6	-	8	0	7	8	8	6		49	9
Sun 8/23/20	10:28	RC	120 hrs	13	11	14	-	12	0	15	2 ME	14	13		94	9
Mon 8/24/20	11:44	RC	144 hrs	19	19	22	-	20	0	19	15	11	19		144	9
Tue 8/25/20			168 hrs				-								0	
Wed 8/26/20			192 hrs				-								0	
Total # of Young Produced:				38	36	42	0	40	0	41	25	33	38		Total Offspring at Renewal	Total Young Produced
															293	293

Description of Sample Being Analyzed Below:				43.2			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 7	B: 1	C: 3	D: 4	E: 5	F: 5	G: 7	H: 5	I: 4	J: 3			
Tue 8/18/20	15:09	CGM	initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 8/19/20	12:03	CM	24 hrs	0	0	0	0 X	0	0	0	0	0	0		0	9
Thu 8/20/20	13:18	RC	48 hrs	0	0	0	0 -	0	0	0	0	0	0		0	9
Fri 8/21/20	10:45	JOD	72 hrs	4	6	5	-	0	0	0	0	0	0		15	9
Sat 8/22/20	13:10	JSV	96 hrs	0	0	0	-	8	7	5	8	6 X	0		34	8
Sun 8/23/20	10:32	RC	120 hrs	11	13	10	-	13	14	11	15	-	0 ME		87	8
Mon 8/24/20	11:46	RC	144 hrs	16	22	18	-	20	19	15	20	-	16		146	8
Tue 8/25/20			168 hrs				-					-			0	
Wed 8/26/20			192 hrs				-					-			0	
Total # of Young Produced:				31	41	33	0	41	40	31	43	6	16		Total Offspring at Renewal	Total Young Produced
															282	282

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

*REPLICATE 'D' WAS REMOVED AS AN OUTLIER THROUGHOUT THE DATA SET DUE TO INCONSISTENT RESPONSES UNREPRESENTATIVE OF THE GENERAL TREND. -JOD 8/26/2020

Ceriodaphnia 7-d Survival and Reproduction Test — Pace National

Batch ID:	07-6309-4354	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jessica Davis		
Start Date:	18 Aug-20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	24 Aug-20	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	6d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24

Sample ID:	16-3569-2715	**Code:**	617EB0AB	**Project:**	
Sample Date:	17 Aug-20 09:00	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	18 Aug-20 09:30	**CAS (PC):**		**Station:**	
Sample Age:	15h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1251455-01,-02,-03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
13-9133-9950	Reproduction	Dunnett Multiple Comparison Test		43.2	>43.2	n/a	2.315	39.5%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
03-4597-8484	7d Survival Rate	Linear Interpolation (ICPIN)	✓	LC5	33.12	7.406	n/a	3.019	1
			✓	LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
08-0010-4148	Reproduction	Linear Interpolation (ICPIN)		IC5	>43.2	n/a	n/a	<2.315	1
			✓	IC10	>43.2	n/a	n/a	<2.315	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
03-4597-8484	7d Survival Rate	Control Resp	0.8889	0.8	>>	Yes	Passes Criteria
08-0010-4148	Reproduction	Control Resp	29.78	15	>>	Yes	Passes Criteria
13-9133-9950	Reproduction	Control Resp	29.78	15	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	0.00%
2.7		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-12.50%
5.4		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-12.50%
10.8		9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	0.00%
21.6		9	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-12.50%
43.2		9	0.8889	0.6327	1.0000	0.0000	1.0000	0.1111	0.3333	37.50%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	9	29.78	22.82	36.74	20	40	3.017	9.052	30.40%	0.00%
2.7		9	32.56	25.62	39.5	11	40	3.01	9.029	27.73%	-9.33%
5.4		9	34.11	28.59	39.63	21	42	2.395	7.184	21.06%	-14.55%
10.8		9	31.78	22.08	41.48	0	41	4.206	12.62	39.70%	-6.72%
21.6		9	32.56	22.37	42.74	0	42	4.416	13.25	40.70%	-9.33%
43.2		9	31.33	21.62	41.05	6	43	4.213	12.64	40.34%	-5.22%

Ceriodaphnia 7-d Survival and Reproduction Test — Pace National

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
2.7		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
5.4		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
10.8		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	
21.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
43.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	20	20	22	37	39	40	39	21	30	
2.7		37	27	32	37	37	33	40	11	39	
5.4		35	33	38	37	41	42	24	21	36	
10.8		33	34	39	36	37	41	39	27	0	
21.6		38	36	42	40	0	41	25	33	38	
43.2		31	41	33	41	40	31	43	6	16	

TOXICITY TEST DATA SHEET - *Pimephales promelas* (fathead minnow) 7-Day Survival & Weight Data

Lakeland STP

Test Date: August 18-25, 2020

NPDES #: TN0078255

NUMBER OF SURVIVORS

Sample Distribution		Sample #1 Tues/Wed		Sample #2 Thurs/Fri		Sample #3 Sat/Sun/Mon			
Day of the Week and Date		Tue 8/18/20	Wed 8/19/20	Thu 8/20/20	Fri 8/21/20	Sat 8/22/20	Sun 8/23/20	Mon 8/24/20	Tue 8/25/20
Effluent Conc. In%	ID of Rep.	0 hours	24 hours	48 hours	72 hours	96 hours	120 hours	144 hours	168 hours
Control 2	A: 1	10	10	10	10	10	10	10	10
	B: 2	10	10	10	10	10	10	10	10
	C: 4	10	10	10	10	10	10	10	10
	D: 3	10	9	9	9	9	9	9	9
2.7	A: 2	10	10	9	9	9	9	9	9
	B: 1	10	10	10	10	10	10	10	10
	C: 5	10	10	10	10	10	10	10	10
	D: 2	10	10	10	10	10	10	10	10
5.4	A: 3	10	10	10	10	10	10	10	10
	B: 5	10	10	10	10	10	10	10	10
	C: 6	10	10	10	10	10	10	10	10
	D: 1	10	10	10	10	10	10	10	10
10.8(PL)	A: 4	10	10	10	10	10	10	10	10
	B: 3	10	10	10	10	10	10	10	10
	C: 1	10	10	10	10	10	10	10	10
	D: 6	10	8	8	8	8	8	8	8
21.6	A: 5	10	10	10	10	10	10	10	10
	B: 4	10	10	10	10	10	10	10	10
	C: 2	10	10	10	10	10	10	10	10 (1SS)
	D: 5	10	10	10	10	10	10	10	10 (1SS)
43.2	A: 6	10	10	10	10	10	10	10	10
	B: 8	10	10	10	10	10	10	10	10
	C: 3	10	10	10	10	10	10	10	10
	D: 4	10	10	10	10	10	10	10	10
Initials of Analyst Checking Survival		JSV	JOD	KC	KC	JSV	NY	NY	RC
Time that Minnows were Examined		14:43	11:02	13:05	10:27	12:48	10:07	10:57	11:04
Carboy used to dilute sample		I 8-17	I 8-17	I 8-17	I 8-20	I 8-21	I 8-21	I 8-23	

Fish Cup Batch/Lot: 700028379 **Brine Shrimp Lot:** 8313419

COMMENTS: Minnows used in this test are from ESC Lot# 081720HD Minnows were hatched on 8/17/2020

WEIGHT DATA for SURVIVING MINNOWS

		Weight Empty Boat (mg)	Boat w/ Fish (mg)	Weight of Larvae (mg)	Mean Weight of Larvae (mg)	Total of Mean	Mean per Concentration
Control	A	1256.74	1264.71	7.97	0.797	2.8870	0.7218
	B	1256.82	1264.41	7.59	0.759		
	C	1258.06	1264.55	6.49	0.649		
	D	1262.86	1269.68	6.82	0.682		
2.7	A	1264.17	1271.59	7.42	0.742	2.7280	0.6820
	B	1267.78	1274.34	6.56	0.656		
	C	1264.64	1271.75	7.11	0.711		
	D	1265.45	1271.64	6.19	0.619		
5.4	A	1262.49	1270.04	7.55	0.755	2.8750	0.7188
	B	1264.9	1272.26	7.36	0.736		
	C	1266.3	1273.06	6.76	0.676		
	D	1264.8	1271.88	7.08	0.708		
10.8(PL)	A	1259.97	1267.55	7.58	0.758	2.8430	0.7107
	B	1258.35	1266.09	7.74	0.774		
	C	1265.55	1273.09	7.54	0.754		
	D	1265.97	1271.54	5.57	0.557		
21.6	A	1255.3	1262.39	7.09	0.709	2.8270	0.7068
	B	1269.54	1276.18	6.64	0.664		
	C	1260.57	1268.15	7.58	0.758		
	D	1254.92	1261.88	6.96	0.696		
43.2	A	1260.15	1267.59	7.44	0.744	2.8490	0.7123
	B	1260.88	1268.49	7.61	0.761		
	C	1262.62	1269.69	7.07	0.707		
	D	1266.62	1272.99	6.37	0.637		
Analyst:		SWS	JOD				

Date & Time Put in Oven	Date & Time Removed
8-25-20 @ 11:05	8-26-20 @ 12:30

Oven Temp:	74°C	Oven Temp:	74°C
Analyst:	RC	Analyst:	JOD

Survival ≥ 80%?

YES	NO
X	

≥ 0.25mg Average Weight in Surviving Controls?

YES	NO
X	

Control Valid?

YES	NO
X	

Login #: L1251455 -01,-02,-03

Fathead Minnow 7-d Larval Survival and Growth Test — Pace National

Batch ID:	04-3744-7303	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Jessica Davis
Start Date:	18 Aug-20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-20	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** <36

Sample ID:	03-1242-4485	**Code:**	129F3825	**Project:**	
Sample Date:	17 Aug-20 09:00	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	18 Aug-20 09:30	**CAS (PC):**		**Station:**	
Sample Age:	15h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1251455-01,-02,-03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
15-1496-8835	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test		43.2	>43.2	n/a	2.315	14.9%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
08-5560-4492	7d Survival Rate	Linear Interpolation (ICPIN)	✓	LC5	>43.2	n/a	n/a	<2.315	1
			✓	LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
13-2137-3573	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓	IC5	>43.2	n/a	n/a	<2.315	1
			✓	IC10	>43.2	n/a	n/a	<2.315	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
08-5560-4492	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Criteria
13-2137-3573	Mean Dry Biomass-mg	Control Resp	0.7218	0.25	>>	Yes	Passes Criteria
15-1496-8835	Mean Dry Biomass-mg	Control Resp	0.7218	0.25	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
2.7		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
5.4		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
10.8		4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	2.56%
21.6		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
43.2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.7218	0.6134	0.8302	0.649	0.797	0.03406	0.06812	9.44%	0.00%
2.7		4	0.682	0.5944	0.7696	0.619	0.742	0.02751	0.05503	8.07%	5.51%
5.4		4	0.7187	0.664	0.7735	0.676	0.755	0.01721	0.03442	4.79%	0.42%
10.8		4	0.7108	0.5471	0.8744	0.557	0.774	0.05143	0.1029	14.47%	1.52%
21.6		4	0.7068	0.6446	0.7689	0.664	0.758	0.01953	0.03905	5.53%	2.08%
43.2		4	0.7122	0.6247	0.7998	0.637	0.761	0.0275	0.055	7.72%	1.32%

Fathead Minnow 7-d Larval Survival and Growth Test — **Pace National**

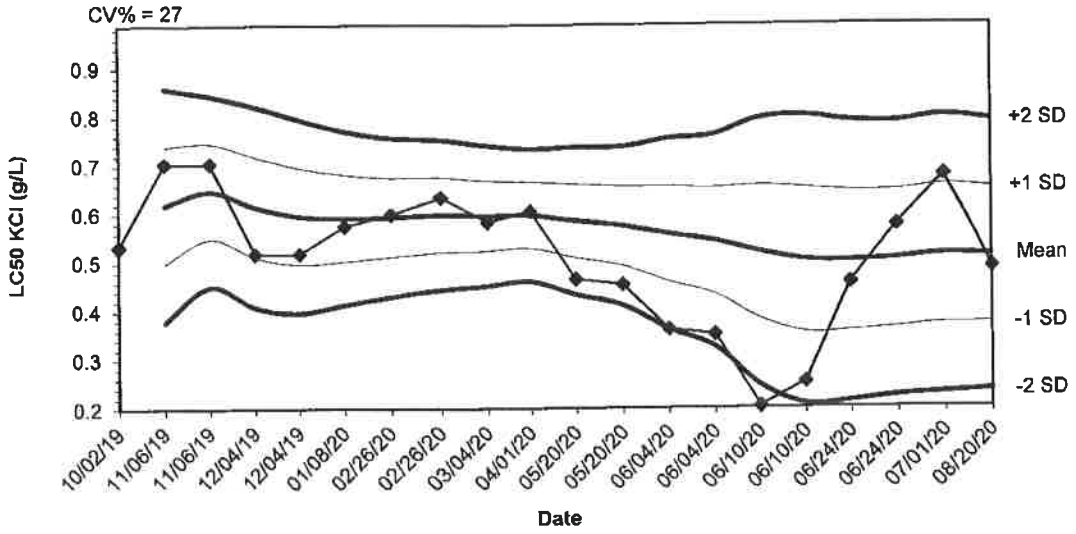
7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	0.9000
2.7		0.9000	1.0000	1.0000	1.0000
5.4		1.0000	1.0000	1.0000	1.0000
10.8		1.0000	1.0000	1.0000	0.8000
21.6		1.0000	1.0000	1.0000	1.0000
43.2		1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.797	0.759	0.649	0.682
2.7		0.742	0.656	0.711	0.619
5.4		0.755	0.736	0.676	0.708
10.8		0.758	0.774	0.754	0.557
21.6		0.709	0.664	0.758	0.696
43.2		0.744	0.761	0.707	0.637

Control Chart for August 2020 Acute C. dubia Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
10/02/19	0.5339					
11/06/19	0.7040	0.6190	0.4987	0.3784	0.7392	0.8595
11/06/19	0.7040	0.6473	0.5491	0.4509	0.7455	0.8437
12/04/19	0.5176	0.6149	0.5117	0.4086	0.7180	0.8211
12/04/19	0.5176	0.5954	0.4961	0.3967	0.6948	0.7941
01/08/20	0.5743	0.5919	0.5026	0.4134	0.6812	0.7704
02/26/20	0.5982	0.5928	0.5113	0.4297	0.6743	0.7559
02/26/20	0.6338	0.5979	0.5211	0.4442	0.6748	0.7516
03/04/20	0.5833	0.5963	0.5242	0.4522	0.6684	0.7404
04/01/20	0.6052	0.5972	0.5292	0.4612	0.6652	0.7332
05/20/20	0.4654	0.5852	0.5094	0.4337	0.6610	0.7367
05/20/20	0.4544	0.5743	0.4928	0.4113	0.6558	0.7373
06/04/20	0.3618	0.5580	0.4602	0.3624	0.6558	0.7536
06/04/20	0.3514	0.5432	0.4342	0.3252	0.6522	0.7612
06/10/20	0.2031	0.5205	0.3836	0.2467	0.6574	0.7943
06/10/20	0.2532	0.5038	0.3556	0.2075	0.6520	0.8002
06/24/20	0.4564	0.5010	0.3571	0.2132	0.6450	0.7889
06/24/20	0.5743	0.5051	0.3644	0.2237	0.6458	0.7865
07/01/20	0.6760	0.5141	0.3719	0.2296	0.6563	0.7986
08/20/20	0.4868	0.5127	0.3741	0.2356	0.6513	0.7899

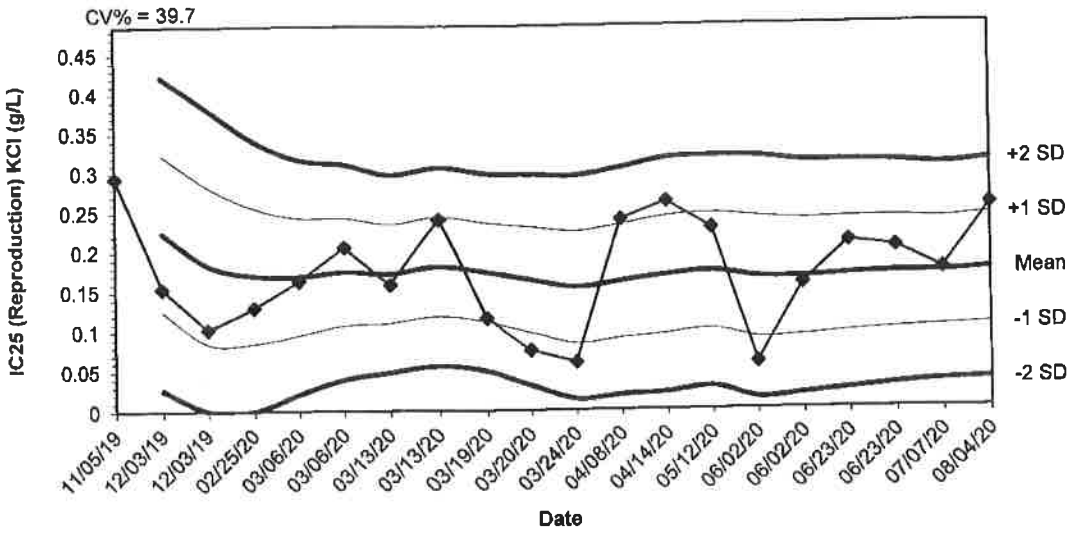
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

August 2020
Reference Toxicant Test

Control Chart for August 2020 Chronic C. dubia Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/05/19	0.2937					
12/03/19	0.1541	0.2239	0.1252	0.0265	0.3226	0.4213
12/03/19	0.1025	0.1834	0.0845	0.0000	0.2824	0.3813
02/25/20	0.1297	0.1700	0.0849	0.0000	0.2551	0.3402
03/06/20	0.1630	0.1686	0.0948	0.0210	0.2424	0.3162
03/06/20	0.2053	0.1747	0.1070	0.0394	0.2424	0.3101
03/13/20	0.1581	0.1723	0.1103	0.0482	0.2344	0.2965
03/13/20	0.2402	0.1808	0.1185	0.0562	0.2431	0.3054
03/19/20	0.1159	0.1736	0.1115	0.0493	0.2358	0.2979
03/20/20	0.0750	0.1638	0.0974	0.0310	0.2301	0.2965
03/24/20	0.0601	0.1543	0.0840	0.0137	0.2246	0.2949
04/08/20	0.2393	0.1614	0.0900	0.0186	0.2328	0.3042
04/14/20	0.2615	0.1691	0.0953	0.0216	0.2429	0.3166
05/12/20	0.2275	0.1733	0.1007	0.0281	0.2458	0.3184
06/02/20	0.0589	0.1657	0.0897	0.0138	0.2416	0.3175
06/02/20	0.1573	0.1651	0.0918	0.0184	0.2385	0.3119
06/23/20	0.2093	0.1677	0.0959	0.0241	0.2396	0.3114
06/23/20	0.2019	0.1696	0.0995	0.0293	0.2398	0.3099
07/07/20	0.1733	0.1698	0.1016	0.0335	0.2380	0.3062
08/04/20	0.2552	0.1741	0.1050	0.0360	0.2431	0.3122

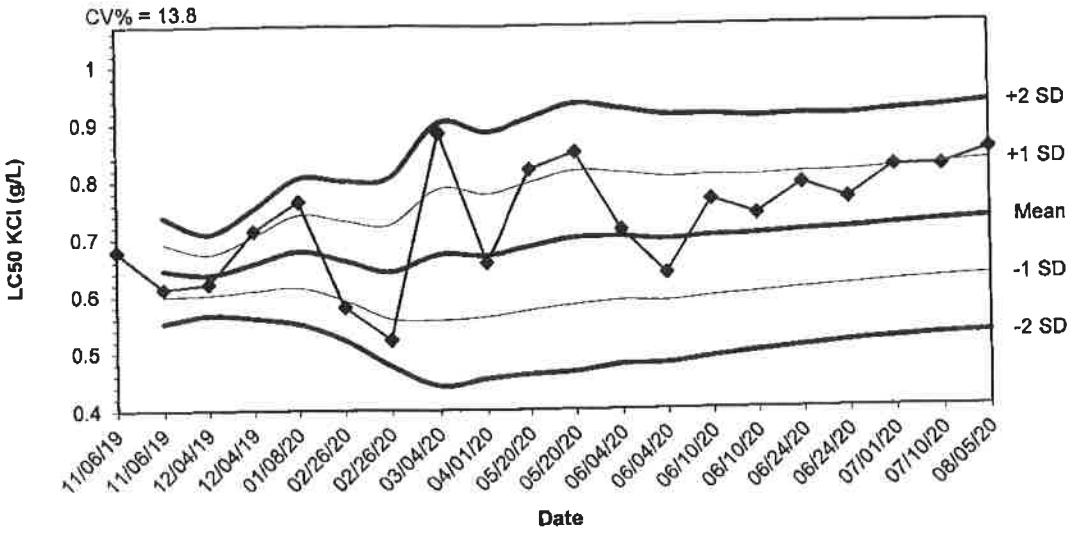
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

August 2020
Reference Toxicant Test

Control Chart for August 2020 Acute Minnow Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
11/06/19	0.6783					
11/06/19	0.6127	0.6455	0.5991	0.5527	0.6919	0.7383
12/04/19	0.6212	0.6374	0.6017	0.5661	0.6731	0.7087
12/04/19	0.7135	0.6564	0.6085	0.5606	0.7043	0.7523
01/08/20	0.7647	0.6781	0.6143	0.5505	0.7419	0.8056
02/26/20	0.5796	0.6617	0.5919	0.5221	0.7315	0.8012
02/26/20	0.5223	0.6418	0.5591	0.4764	0.7244	0.8071
03/04/20	0.8842	0.6721	0.5572	0.4422	0.7870	0.9019
04/01/20	0.6573	0.6704	0.5628	0.4552	0.7780	0.8856
05/20/20	0.8196	0.6853	0.5735	0.4616	0.7972	0.9091
05/20/20	0.8485	0.7002	0.5832	0.4662	0.8172	0.9341
06/04/20	0.7135	0.7013	0.5897	0.4781	0.8129	0.9245
06/04/20	0.6367	0.6963	0.5880	0.4796	0.8047	0.9130
06/10/20	0.7647	0.7012	0.5955	0.4898	0.8069	0.9126
06/10/20	0.7387	0.7037	0.6014	0.4991	0.8060	0.9083
06/24/20	0.7917	0.7092	0.6079	0.5067	0.8105	0.9117
06/24/20	0.7647	0.7125	0.6135	0.5146	0.8114	0.9104
07/01/20	0.8196	0.7184	0.6191	0.5199	0.8177	0.9170
07/10/20	0.8196	0.7237	0.6245	0.5253	0.8230	0.9222
08/05/20	0.8485	0.7300	0.6295	0.5289	0.8305	0.9310

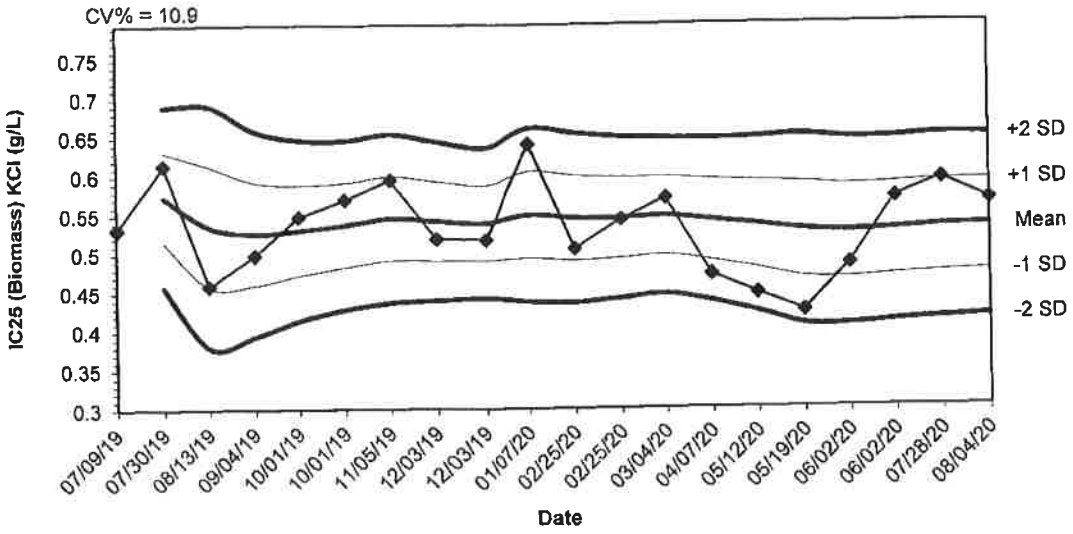
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

August 2020
Reference Toxicant Test

Control Chart for August 2020 Chronic Minnow Reference Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/09/19	0.5320					
07/30/19	0.6140	0.5730	0.5150	0.4570	0.6310	0.6890
08/13/19	0.4587	0.5349	0.4572	0.3795	0.6126	0.6903
09/04/19	0.4981	0.5257	0.4597	0.3936	0.5917	0.6578
10/01/19	0.5472	0.5300	0.4720	0.4140	0.5880	0.6460
10/01/19	0.5691	0.5365	0.4822	0.4280	0.5908	0.6451
11/05/19	0.5942	0.5448	0.4906	0.4365	0.5989	0.6530
12/03/19	0.5185	0.5415	0.4905	0.4395	0.5924	0.6434
12/03/19	0.5172	0.5388	0.4904	0.4421	0.5871	0.6355
01/07/20	0.6398	0.5489	0.4932	0.4375	0.6046	0.6602
02/25/20	0.5051	0.5449	0.4905	0.4360	0.5993	0.6538
02/25/20	0.5425	0.5447	0.4928	0.4409	0.5966	0.6485
03/04/20	0.5696	0.5466	0.4964	0.4463	0.5968	0.6470
04/07/20	0.4709	0.5412	0.4889	0.4366	0.5935	0.6458
05/12/20	0.4465	0.5349	0.4789	0.4229	0.5909	0.6469
05/19/20	0.4236	0.5279	0.4671	0.4063	0.5888	0.6496
06/02/20	0.4836	0.5253	0.4654	0.4056	0.5852	0.6451
06/02/20	0.5680	0.5277	0.4687	0.4098	0.5867	0.6456
07/28/20	0.5919	0.5311	0.4719	0.4128	0.5902	0.6494
08/04/20	0.5650	0.5328	0.4747	0.4166	0.5909	0.6489

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

August 2020
Reference Toxicant Test

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Report to: Spencer Smalley

Project Description: Lakeland Biomonitoring

Phone: 901-870-1803

Collected by (print): Chris Hatcher

Collected by (signature): Chris Hatcher

Immediately Packed on Ice: N ___ Y X

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Email To: ssmalley@lakelandtn.org

City/State Collected: Lakeland

Please Circle: PT MT CT ET

Client Project #

Site/Facility ID #: TN0078255

Lab Project #: LAKE02-BIOMON

P.O. #

Quote #

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3
SAMPLE 1		WW				3	X	X	X
Sample 1	comp	WW		8-17-20	9:00		X		
Sample 2	Comp	WW		8-17-20	9:00			X	
Sample 3	Comp	WW		8-17-20	9:00				X

Chain of Custody Page ___ of ___

Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1251455

B014

Table #

Acctnum: LAKE02
Template: T144780
Prelogin: P787199
PM: 807 - Justin Carr
PB: JC 8/5/2020
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

-01

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #1 - Collect a 24hr composite sample from Sunday-Monday (8/16-8/17). Ship sample overnight to arrive at lab on Tuesday 8/18/2020.

pH 7.01 Temp 25.6° Flow ___ Other 7.20 0.0

Samples returned via: UPS FedEx Courier

Tracking # 1822 0811 8461

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Christopher Hatcher	8-17-20	9:20am	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No HCL / MeoH TBR

Temp °C 7.3 7.4 Bottles Received: 3

Date: 8/18/2 Time: 930

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland /TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Chris Hatch

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

D121

Table # L125455

Acctnum: LAKE02

Template: T144781

Prelogin: P787200

PM: 807 - Justin Carr

PB: CB 8/5/2020

Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 2		WW				3	X	X	X		-02
Sample 1	Comp	WW		8-19-20	7:30		X				
Sample 2	Comp	WW		8-19-20	7:30			X			
Sample 3	Comp	WW		8-19-20	7:30				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (8/18-8/19). Ship sample overnight to arrive at lab on Thursday 8/20/2020.

pH 7.84 Temp 24.5

Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 192208118491

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

	Date:	Time:		
Relinquished by: (Signature)	8-19-20	5:00pm	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 0.8-1.0 °C Bottles Received: 3
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8-20-20 Time: 0915

If preservation required by Login: Date/Time

Hold:

Condition: NCF OK

City of Lakeland
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley
Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring
City/State Collected: Lakeland/TN
Please Circle: PT MT CT ET

Phone: 901-870-1803
Client Project #
Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatcher
Site/Facility ID # TN0078255
P.O. #

Collected by (signature):
Rush? (Lab MUST Be Notified) Quote #
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed

Immediately Packed on Ice N ___ Y X

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 125455
C212

Acctnum: LAKE02
Template: T144783
Prelogin: P787201
PM: 807 - Justin Carr
PB: CR 8/5/2020
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		-03
Sample 1	Comp	WW		8-21-20	7:45a		X				
Sample 2	Comp	WW		8-21-20	7:45a			X			
Sample 3	Comp	WW		8-21-20	7:45a				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #3 - Collect a 24hr composite sample from Thurs-Fri (8/20-8/21). Ship sample overnight to arrive at lab on Saturday 8/22/2020. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.01 Temp 24.5
Flow _____ Other 7.50

Samples returned via: __UPS __FedEx __Courier _____
Tracking # 1922 0811 8531

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / NO HCL / MeoH TBR
	8-21-20	8:15a		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp °C Bottles Received:
				1.2=1.0 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
				8/22/20 9:00

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 18, 2020

Cp
Tc
Ss
Cn
Sr
Qc
Gl
Al
Sc

City of Lakeland

Sample Delivery Group:	L1293674
Samples Received:	12/08/2020
Project Number:	
Description:	Lakeland Biomonitoring
Site:	TN0078255
Report To:	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By:

Jason Romer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

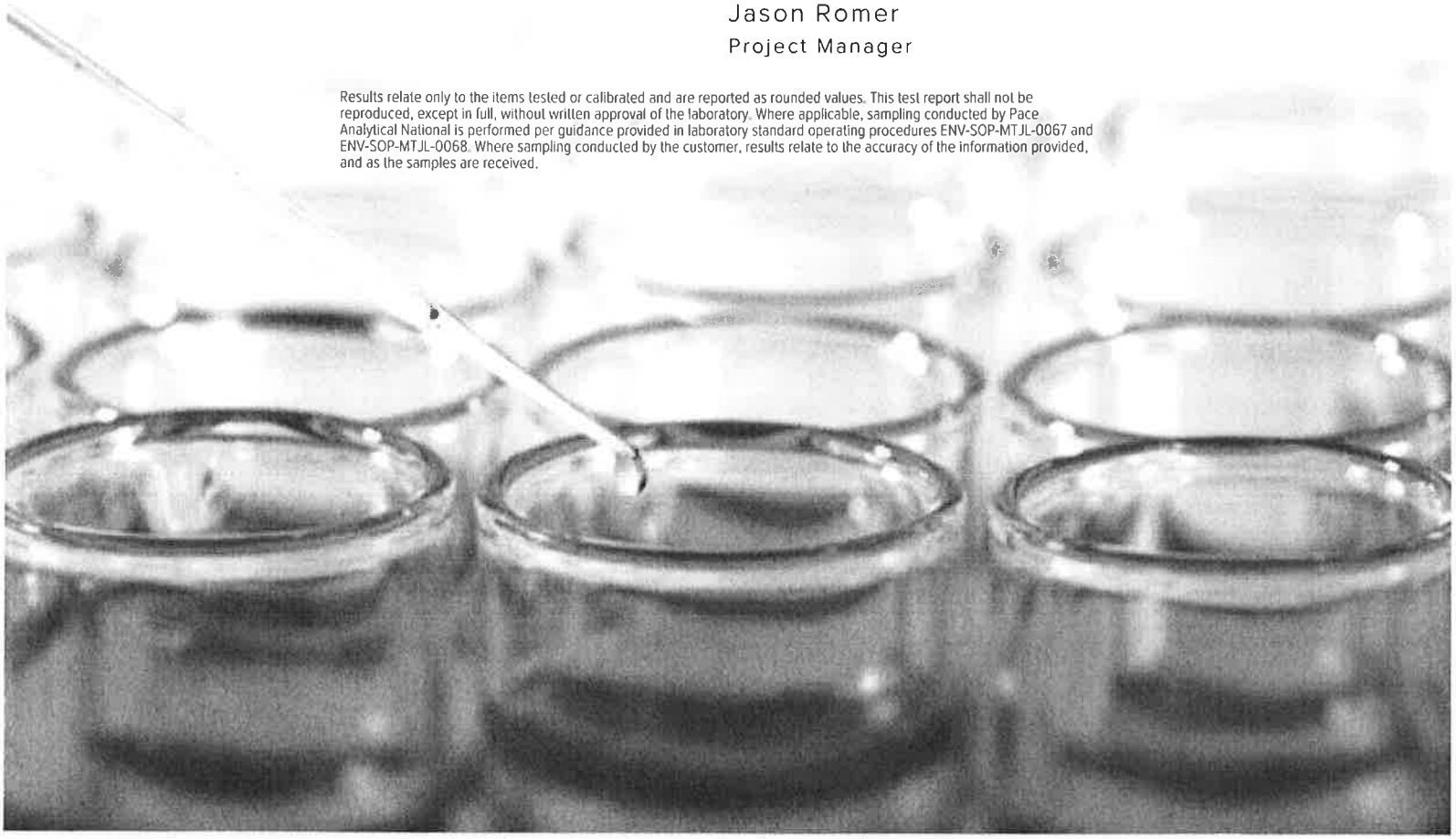


TABLE OF CONTENTS

SAMPLE 1 L1293674-01 WW

Collected by: Chris Hatcher | Collected date/time: 12/07/20 09:50 | Received date/time: 12/08/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1588903	1	12/08/20 13:52	12/08/20 13:52	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1588903	1	12/08/20 14:08	12/08/20 14:08	CM	Mt. Juliet, TN
Calculated Results	WG1591242	1	12/16/20 05:24	12/16/20 05:24	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1593044	5	12/17/20 11:48	12/17/20 11:48	MSP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1591242	1	12/14/20 07:28	12/16/20 05:24	KMG	Mt. Juliet, TN

SAMPLE 2 L1293674-02 WW

Collected by: Chris Hatcher | Collected date/time: 12/09/20 09:45 | Received date/time: 12/10/20 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1591925	1	12/17/20 07:52	12/17/20 07:52	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1593044	5	12/17/20 11:49	12/17/20 11:49	MSP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1591925	1	12/15/20 08:31	12/17/20 07:52	KMG	Mt. Juliet, TN

SAMPLE 3 L1293674-03 WW

Collected by: John Hunter | Collected date/time: 12/11/20 07:20 | Received date/time: 12/12/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1591925	1	12/17/20 07:55	12/17/20 07:55	KMG	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1593044	5	12/17/20 11:50	12/17/20 11:50	MSP	Mt. Juliet, TN
Metals (ICP) by Method 200.7	WG1591925	1	12/15/20 08:31	12/17/20 07:55	KMG	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA/600/4-89/001).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - Minnow	>43.2 (PASS)		12/08/2020 13:52	WG1588903

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - C. dubia	>43.2 (PASS)		12/08/2020 14:08	WG1588903

Calculated Results

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (calculated) as CaCO3	44.6		2.50	1	12/16/2020 05:24	WG1591242

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	ND		100	5	12/17/2020 11:48	WG1593044

Metals (ICP) by Method 200.7

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Calcium	12.9		1.00	1	12/16/2020 05:24	WG1591242
Magnesium	3.03		1.00	1	12/16/2020 05:24	WG1591242

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	48.1		2.50	1	12/17/2020 07:52	WG1591925

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	ND		100	5	12/17/2020 11:49	WG1593044

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	13.8		1.00	1	12/17/2020 07:52	WG1591925
Magnesium	3.34		1.00	1	12/17/2020 07:52	WG1591925

Calculated Results

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hardness (calculated) as CaCO3	49.2		2.50	1	12/17/2020 07:55	WG1591925

Wet Chemistry by Method 310.2

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
ALK	ND		100	5	12/17/2020 11:50	WG1593044

Metals (ICP) by Method 200.7

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Calcium	14.0		1.00	1	12/17/2020 07:55	WG1591925
Magnesium	3.47		1.00	1	12/17/2020 07:55	WG1591925

Method Blank (MB)

(MB) R3604576-1 12/17/20 11:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		9.80	20.0

Laboratory Control Sample (LCS)

(LCS) R3604576-3 12/17/20 11:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	201	101	90.0-110	

Method Blank (MB)

(MB) R3604006-1 12/16/20 04:29

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3604006-2 12/16/20 04:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	9.30	93.0	85.0-115	
Magnesium	10.0	9.35	93.5	85.0-115	

Method Blank (MB)

(MB) R3604660-1 12/17/20 07:19

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Calcium	U		0.0473	1.00
Magnesium	U		0.115	1.00

Laboratory Control Sample (LCS)

(LCS) R3604660-2 12/17/20 07:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Calcium	10.0	10.0	100	85.0-115	
Magnesium	10.0	10.4	104	85.0-115	

L1293567-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1293567-03 12/17/20 07:24 • (MS) R3604660-4 12/17/20 07:30 • (MSD) R3604660-5 12/17/20 07:32

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	25.5	36.9	37.6	114	121	1	70.0-130			1.90	20
Magnesium	10.0	11.1	21.5	21.9	104	108	1	70.0-130			2.09	20

L1296407-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1296407-01 12/17/20 07:35 • (MS) R3604660-6 12/17/20 07:37 • (MSD) R3604660-7 12/17/20 07:39

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Calcium	10.0	39.9	49.8	51.5	98.6	116	1	70.0-130			3.38	20
Magnesium	10.0	6.41	16.3	16.9	99.1	105	1	70.0-130			3.50	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana [1]	LA180010	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation
12065 Lebanon Rd, Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project # LAKE02-BIOMON

SDG # J008 12-93674

Acctnum: LAKE02
Template: T144780
Prelogin: P809021
PM: 807 - Justin Carr
PB: 11/16/20 KB
Shipped Via: FedEX Ground

Collected by (print): chris Hatcher

Site/Facility ID # TN0078255

P.O. #

Collected by (signature): Chris Hatcher

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y X

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 1		WW				3	X	X	X		-01
sample 1	comp	ww		12-7-20	9:50am		X				
Sample 2	Comp	ww		12-7-20	9:50am			X			
Sample 3	comp	ww		12-7-20	9:50am				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ________

Remarks: Sample #1 - Collect a 24hr composite sample from Sunday-Monday (11/15-11/16). Ship sample overnight to arrive at lab on Tuesday 11/17/2020.

pH 6.93 Temp 17.8
Flow ____ Other 7.52

Samples returned via: __ UPS __ FedEx __ Courier ________

Tracking # 4348 1601 1273

Sample Receipt Checklist
COC Seal Present/Intact: _NP Y _N
COC Signed/Accurate: Y _N
Bottles arrive intact: Y _N
Correct bottles used: Y _N
Sufficient volume sent: Y _N
If Applicable
VOA Zero Headspace: _Y _N
Preservation Correct/Checked: Y _N
RAD Screen <0.5 mR/hr: _Y _N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeOH TBR
Chris Hatcher	12-7-20	10:00am		

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.0=4 °C	Bottles Received: 3	If preservation required by Login: Date/Time

Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	Hold:	Condition: NCF / OK
			K. Holden	12/8/20	9:00		

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): John Hunter

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y ✓

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3								
SAMPLE 2		WW				3	X	X	X								-02
Sample 1	✓	WW		12-9-20	9:45		X										
Sample 2	✓	WW		↓	↓			X									
Sample 3	✓	WW		↓	↓				X								

Analysis / Container / Preservative: 2

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1293674

Table E160

Acctnum: LAKE02
Template: T144781
Prelogin: P809024
PM: 807 - Justin Carr
PB: 11/20/20 KB
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (11/17-11/18). Ship sample overnight to arrive at lab on Thursday 11/19/2020.

pH 6.93 Temp 18.6

Flow _____ Other 7.93 mg/L

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 9818 6681 1300

Sample Receipt Checklist

COC Seal Present/Intact:	NP	Y N
COC Signed/Accurate:		Y N
Bottles arrive intact:		Y N
Correct bottles used:		Y N
Sufficient volume sent:		Y N
If Applicable		
VOA Zero Headspace:		Y N
Preservation Correct/Checked:		Y N
RAD Screen <0.5 mR/hr:		Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
[signature]	12-9-20	10:10am			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 0.3 °C Bottles Received: 3	
				12-11-20	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 12-10-20 Time: 9:45	Hold: Condition: NCF / OK

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected: Lakeland TN

Please Circle: PT MT CT ET

Phone: 901-870-1803

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): John Hunter

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature): John Hunter

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

No. of Cntrs

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARDMETALS 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		-03
Sample 1	Comp	WW		11-11-20	7:20		X				
Sample 2	↓	WW		↓	↓			X			
Sample 3	↓	WW		↓	↓				X		

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

D182

Table # U293674

Acctnum: LAKE02

Template: T144783

Prelogin: P809025

PM: 807 - Justin Carr

PB: 11/16/20 KB

Shipped Via: FedEx Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #3 - Collect a 24hr composite sample from Thurs-Fri (11/19-11/20). Ship sample overnight to arrive at lab on Saturday 11/21/2020. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 6.90 Temp 19.3

Flow _____ Other 7.40 mg/L

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking #

Sample Receipt Checklist

COC Seal Present/Intact:	NP Y N
COC Signed/Accurate:	Y N
Bottles arrive intact:	Y N
Correct bottles used:	Y N
Sufficient volume sent:	Y N
If Applicable	
VOA Zero Headspace:	Y N
Preservation Correct/Checked:	Y N
RAD Screen <0.5 mR/hr:	Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
John Hunter	12-11-20	8:30 am		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 1.5+2-1.7 °C Bottles Received: 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11/12 Time: 0900

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

05/01/2019

City of Lakeland
Mr. James Stimpson
10001 US Hwy 70
Lakeland, TN 38002

Ref: Analytical Testing
Report Number: 19-105-0190
Project Description: Bioassay Testing QTR 2

Dear Mr. James Stimpson:

The results of this WET (Whole Effluent Toxicity) test are acceptable according to test review criteria. There were no significant deficiencies found in sample handling, test performance, or reporting. The test results are within the limits established by your NPDES permit and were entered into the permittee's records in the database.

Results: *Ceriodaphnia dubia* IC25 > 43.2 %
Fathead minnow IC25 > 43.2 %

IC25 Permit Limit: 10.8%

EPA Methods: 1002.0 *Ceriodaphnia dubia* Survival and Reproduction
1000.0 *Pimephales promelas* Larval Survival and Growth

All statistical interpretations generated by CETIS - Comprehensive Environmental Toxicity Information System (v.1.9.1.4). CETIS created by Tidepool Scientific Software

Respectfully,

Blake Andres
Lab Supervisor

CETIS Test Evaluation Report

Test Code: 19-105-0190 cd | 04-3141-0640

Facility:	City of Lakeland	**Test Name:**	Ceriodaphnia 7-d Survival and Reproduction Test
Sample Site:		**Organism:**	Ceriodaphnia dubia (Water Flea)
Sample Code:	19-105-0190	**Protocol:**	EPA/821/R-02-013 (2002)
Sample Date:	15 Apr-19 08:10	**Start Date:**	16 Apr-19 12:36
Sample Age:	28h (1.6 °C)	**End Date:**	23 Apr-19 16:45
Project:	WET Quarterly Compliance Test (2Q)	**Duration:**	7d 4h **Organism Age:** <24

Permitee:	City of Lakeland TN	**Laboratory:**	Waypoint Analytical Tennessee , LLC.
Address:	10001 HWY 70 Lakeland, TN 38002	**Address:**	2790 Whitten Road Memphis, TN 38133
Contact:	Mr. James Stimpson	**Contact:**	Ms. Blake Andres, Lab Supervisor
Phone:	901-870-1382	**Phone:**	901-271-5200, 901-213-2440(fax)
Email:	jstimpson@lakelandtn.org	**Email:**	sandres@waypointanalytical.com

Comments:

Chronic Toxicity Evaluation

Endpoint	Criteria	Conc-%	IWC	Decision	Method
Reproduction	EC25	>43.2	10.8	Passes IWC	Linear Interpolation (ICPIN)

Test Acceptability Criteria

			TAC Limits			
Endpoint	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Acceptibility Criteria
Reproduction	Control Resp	29	15	>>	Yes	Passes Acceptibility Criteria
Reproduction	Control Resp	29	15	>>	Yes	Passes Acceptibility Criteria

Reproduction Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	29	24.71	33.29	2	40	3.697	11.69	40.31%	0.0%
2.7		10	31.8	26.36	37.24	3	52	4.688	14.82	46.61%	-9.66%
5.4		10	36.6	33.51	39.69	25	55	2.663	8.422	23.01%	-26.21%
10.8		10	35.8	31.33	40.27	6	49	3.849	12.17	34.00%	-23.45%
21.6		10	34.5	32.08	36.92	19	42	2.083	6.587	19.09%	-18.97%
43.2		10	31.5	28.02	34.98	10	42	2.997	9.478	30.09%	-8.62%

7d Survival Rate Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	0.9	0.784	1	0	1	0.1	0.3162	35.14%	0.0%
2.7		10	1	1	1	1	1	0	0	0.00%	-11.11%
5.4		10	1	1	1	1	1	0	0	0.00%	-11.11%
10.8		10	1	1	1	1	1	0	0	0.00%	-11.11%
21.6		10	1	1	1	1	1	0	0	0.00%	-11.11%
43.2		10	1	1	1	1	1	0	0	0.00%	-11.11%

Reproduction Data Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	L	10	29	2	40	3.697	11.69	40.31%	0.0%
2.7		10	31.8	3	52	4.688	14.82	46.61%	-9.66%
5.4		10	36.6	25	55	2.663	8.422	23.01%	-26.21%
10.8		10	35.8	6	49	3.849	12.17	34.00%	-23.45%
21.6		10	34.5	19	42	2.083	6.587	19.09%	-18.97%
43.2		10	31.5	10	42	2.997	9.478	30.09%	-8.62%

Ceriodaphnia 7-d Survival and Reproduction Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	16-8036-5622	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Ivey Elizabeth Wilkinson
Start Date:	16 Apr-19 12:36	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	23 Apr-19 16:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 4h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	21-2769-0644	**Code:**	19-105-0190	**Client:**	City of Lakeland TN
Sample Date:	15 Apr-19 08:10	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	15 Apr-19 10:00	**Source:**	City of Lakeland (TN0078255)		
Sample Age:	28h (1.6 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	19-105-0190	17 Apr-19 08:55	17 Apr-19 11:22	18 Apr-19 00:00	0.3
2	19-105-0190	19 Apr-19 08:45	19 Apr-19 10:00	20 Apr-19 00:00	1.6

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
06-2971-3708	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	43.2	> 43.2	n/a	2.315	n/a
04-8856-6159	Reproduction	Steel Many-One Rank Sum Test	43.2	> 43.2	n/a	2.315	38.4%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
20-0258-6938	Reproduction	Linear Interpolation (ICPIN)	IC25	>43.2	n/a	n/a	<2.315

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-2971-3708	7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Acceptibility Criteria
04-8856-6159	Reproduction	Control Resp	29	15	>>	Yes	Passes Acceptibility Criteria
20-0258-6938	Reproduction	Control Resp	29	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
2.7		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
5.4		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
10.8		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
21.6		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
43.2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	10	29	20.64	37.36	2	40	3.697	11.69	40.31%	0.00%
2.7		10	31.8	21.2	42.4	3	52	4.688	14.82	46.61%	-9.66%
5.4		10	36.6	30.58	42.62	25	55	2.663	8.422	23.01%	-26.21%
10.8		10	35.8	27.09	44.51	6	49	3.849	12.17	34.00%	-23.45%
21.6		10	34.5	29.79	39.21	19	42	2.083	6.587	19.09%	-18.97%
43.2		10	31.5	24.72	38.28	10	42	2.997	9.478	30.09%	-8.62%

Ceriodaphnia 7-d Survival and Reproduction Test — Waypoint Analytical Tennessee , LLC.

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
2.7		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5.4		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.8		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
21.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
43.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	34	37	35	21	30	39	20	32	2	40
2.7		52	41	31	3	45	37	11	32	30	36
5.4		55	36	33	25	39	40	27	32	38	41
10.8		40	46	39	34	38	44	6	34	49	28
21.6		32	39	41	36	35	42	19	30	36	35
43.2		30	41	39	42	30	26	10	28	31	38

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	L	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
2.7		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
5.4		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
10.8		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
21.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
43.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	16-8036-5622	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Ivey Elizabeth Wilkinson
Start Date:	16 Apr-19 12:36	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	23 Apr-19 16:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 4h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	21-2769-0644	**Code:**	19-105-0190	**Client:**	City of Lakeland TN
Sample Date:	15 Apr-19 08:10	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	15 Apr-19 10:00	**Source:**	City of Lakeland (TN0078255)		
Sample Age:	28h (1.6 °C)	**Station:**			

Ceriodaphnia 7-d Survival and Reproduction Test — **Waypoint Analytical Tennessee , LLC.**

Total Residual Chlorine-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	0	0	0	0	0	0	0
2.7								
5.4								
10.8								
21.6								
43.2		0	0	0	0	0	0	0

Conductivity-µS/cm

Conc-%	Code	1	2	3	4	5	6	7
0	L	160.1	168.3	162	160.2	161.1	158.7	164.1
2.7								
5.4								
10.8								
21.6								
43.2		378	389	384	387	368	366	373

Final Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.6	8.6	8.8	9.3	9	7.1	8.7
2.7		8.7	8.6	8.9	8.9	9	7.4	8.8
5.4		8.7	8.7	8.9	8.9	9	7.6	8.8
10.8		8.5	8.8	8.8	8.8	9	7.6	8.9
21.6		8.4	8.8	8.9	8.9	8.9	7.6	8.9
43.2		8.3	9	8.9	9	8.9	7.8	9

Initial Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.5	8.9	8.5	8.6	8.9	8.6	7.8
2.7		8.5	8.9	8.5	8.7	8.9	8.7	7.7
5.4		8.4	8.8	8.5	8.8	8.9	8.7	7.7
10.8		8.4	8.8	8.5	8.8	8.9	8.7	7.8
21.6		8.4	8.7	8.5	8.8	8.9	8.7	7.8
43.2		8.4	8.6	8.5	8.8	8.7	8.7	7.8

Final pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.7	7.4	7.7	7.9	7.8	7.5	7.5
2.7		7.7	7.5	7.7	8	7.9	7.5	7.5
5.4		7.7	7.4	7.7	8	7.8	7.5	7.5
10.8		7.6	7.4	7.7	8	7.8	7.5	7.5
21.6		7.5	7.4	7.6	7.9	7.8	7.5	7.5
43.2		7.5	7.3	7.6	7.9	7.8	7.5	7.4

Initial pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.6	7.8	7.5	7.8	7.8	7.7	7.5
2.7		7.6	7.7	7.5	7.7	7.8	7.7	7.5
5.4		7.6	7.6	7.4	7.7	7.8	7.7	7.5
10.8		7.6	7.6	7.3	7.6	7.7	7.7	7.4
21.6		7.4	7.4	7.3	7.5	7.5	7.5	7.3
43.2		7.3	7.2	7.1	7.2	7.3	7.4	7.1

Ceriodaphnia 7-d Survival and Reproduction Test — Waypoint Analytical Tennessee , LLC.

Final Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	25	25	25	25	25	25	25
2.7		25	25	25	25	25	25	25
5.4		25	25	25	25	25	25	25
10.8		25	25	25	25	25	25	25
21.6		25	25	25	25	25	25	25
43.2		25	25	25	25	25	25	25

Initial Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	25	25	25	25	25	25	25
2.7		25	25	25	25	25	25	25
5.4		25	25	25	25	25	25	25
10.8		25	25	25	25	25	25	25
21.6		25	25	25	25	25	25	25
43.2		25	25	25	25	25	25	25

CETIS Test Evaluation Report

Facility:	City of Lakeland	**Test Name:**	Fathead Minnow 7-d Larval Survival and Growth Test
Sample Site:		**Organism:**	Pimephales promelas (Fathead Minnow)
Sample Code:	19-105-0190	**Protocol:**	EPA/821/R-02-013 (2002)
Sample Date:	15 Apr-19 08:10	**Start Date:**	16 Apr-19 11:50
Sample Age:	28h (1.6 °C)	**End Date:**	23 Apr-19 12:47
Project:	WET Quarterly Compliance Test (2Q)	**Duration:**	7d 1h **Organism Age:** <24

Permitee:	City of Lakeland TN	**Laboratory:**	Waypoint Analytical Tennessee , LLC.
Address:	10001 HWY 70 Lakeland, TN 38002	**Address:**	2790 Whitten Road Memphis, TN 38133
Contact:	Mr. James Stimpson	**Contact:**	Ms. Blake Andres, Lab Supervisor
Phone:	901-870-1382	**Phone:**	901-271-5200, 901-213-2440(fax)
Email:	jstimpson@lakelandtn.org	**Email:**	sandres@waypointanalytical.com

Comments:

Chronic Toxicity Evaluation

Endpoint	Criteria	Conc-%	IWC	Decision	Method
Mean Dry Weight-mg	EC25	>43.2	10.8	Passes IWC	Linear Interpolation (ICPIN)

Test Acceptability Criteria

			TAC Limits			
Endpoint	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Acceptibility Criteria
Mean Dry Weight-mg	Control Resp	0.46	0.25	>>	Yes	Passes Acceptibility Criteria
Mean Dry Weight-mg	Control Resp	0.46	0.25	>>	Yes	Passes Acceptibility Criteria

Mean Dry Weight-mg Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	4	0.46	0.4156	0.5044	0.28	0.54	0.06055	0.1211	26.33%	0.0%
2.7		4	0.505	0.4859	0.5241	0.44	0.56	0.02598	0.05196	10.29%	-9.78%
5.4		4	0.5425	0.5315	0.5535	0.51	0.58	0.01493	0.02986	5.50%	-17.93%
10.8		4	0.5525	0.5308	0.5742	0.48	0.61	0.02955	0.05909	10.70%	-20.11%
21.6		4	0.575	0.5523	0.5977	0.52	0.66	0.03096	0.06191	10.77%	-25.0%
43.2		4	0.4125	0.3863	0.4387	0.31	0.47	0.03568	0.07136	17.30%	10.33%

7d Survival Rate Data Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	4	0.9	0.8266	0.9734	0.6	1	0.1	0.2	22.22%	0.0%
2.7		4	0.925	0.9067	0.9433	0.9	1	0.025	0.05	5.41%	-2.78%
5.4		4	0.925	0.8899	0.9601	0.8	1	0.04787	0.09574	10.35%	-2.78%
10.8		4	0.975	0.9567	0.9933	0.9	1	0.025	0.05	5.13%	-8.33%
21.6		4	0.925	0.8899	0.9601	0.8	1	0.04787	0.09574	10.35%	-2.78%
43.2		4	0.675	0.5994	0.7506	0.4	0.9	0.1031	0.2062	30.54%	25.0%

Mean Dry Weight-mg Data Summary — **Calculated Variate**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	4	0.46	0.28	0.54	0.06055	0.1211	26.33%	0.0%
2.7		4	0.505	0.44	0.56	0.02598	0.05196	10.29%	-9.78%
5.4		4	0.5425	0.51	0.58	0.01493	0.02986	5.50%	-17.93%
10.8		4	0.5525	0.48	0.61	0.02955	0.05909	10.70%	-20.11%
21.6		4	0.575	0.52	0.66	0.03096	0.06191	10.77%	-25.0%
43.2		4	0.4125	0.31	0.47	0.03568	0.07136	17.30%	10.33%

Fathead Minnow 7-d Larval Survival and Growth Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	17-6596-0924	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Ivey Elizabeth Wilkinson
Start Date:	16 Apr-19 11:50	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	23 Apr-19 12:47	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24
Sample ID:	21-2769-0644	**Code:**	19-105-0190	**Client:**	City of Lakeland TN
Sample Date:	15 Apr-19 08:10	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	15 Apr-19 10:00	**Source:**	City of Lakeland (TN0078255)		
Sample Age:	28h (1.6 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	19-105-0190	17 Apr-19 08:55	17 Apr-19 11:22	18 Apr-19 00:00	0.3
2	19-105-0190	19 Apr-19 08:45	19 Apr-19 10:00	20 Apr-19 00:00	1.6

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
02-6780-1821	7d Survival Rate	Dunnett Multiple Comparison Test	21.6	43.2	30.55	4.63	22.7%
00-7998-7201	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	43.2	> 43.2	n/a	2.315	26.5%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
20-3106-7729	Mean Dry Weight-mg	Linear Interpolation (ICPIN)	IC25	>43.2	n/a	n/a	<2.315

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
02-6780-1821	7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Acceptibility Criteria
00-7998-7201	Mean Dry Weight-mg	Control Resp	0.46	0.25	>>	Yes	Passes Acceptibility Criteria
20-3106-7729	Mean Dry Weight-mg	Control Resp	0.46	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	4	0.9000	0.5818	1.0000	0.6000	1.0000	0.1000	0.2000	22.22%	0.00%
2.7		4	0.9250	0.8454	1.0000	0.9000	1.0000	0.0250	0.0500	5.41%	-2.78%
5.4		4	0.9250	0.7727	1.0000	0.8000	1.0000	0.0479	0.0957	10.35%	-2.78%
10.8		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	-8.33%
21.6		4	0.9250	0.7727	1.0000	0.8000	1.0000	0.0479	0.0957	10.35%	-2.78%
43.2		4	0.6750	0.3470	1.0000	0.4000	0.9000	0.1031	0.2062	30.54%	25.00%

Mean Dry Weight-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	4	0.46	0.2673	0.6527	0.28	0.54	0.06055	0.1211	26.33%	0.00%
2.7		4	0.505	0.4223	0.5877	0.44	0.56	0.02598	0.05196	10.29%	-9.78%
5.4		4	0.5425	0.495	0.59	0.51	0.58	0.01493	0.02986	5.50%	-17.93%
10.8		4	0.5525	0.4585	0.6465	0.48	0.61	0.02955	0.05909	10.70%	-20.11%
21.6		4	0.575	0.4765	0.6735	0.52	0.66	0.03096	0.06191	10.77%	-25.00%
43.2		4	0.4125	0.299	0.526	0.31	0.47	0.03568	0.07136	17.30%	10.33%

Fathead Minnow 7-d Larval Survival and Growth Test
Waypoint Analytical Tennessee , LLC.

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	L	0.6000	1.0000	1.0000	1.0000
2.7		0.9000	0.9000	1.0000	0.9000
5.4		1.0000	0.8000	1.0000	0.9000
10.8		1.0000	1.0000	0.9000	1.0000
21.6		0.8000	0.9000	1.0000	1.0000
43.2		0.7000	0.7000	0.4000	0.9000

Mean Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	L	0.28	0.52	0.54	0.5
2.7		0.56	0.53	0.49	0.44
5.4		0.58	0.51	0.53	0.55
10.8		0.61	0.53	0.48	0.59
21.6		0.54	0.52	0.58	0.66
43.2		0.45	0.42	0.31	0.47

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	L	6/10	10/10	10/10	10/10
2.7		9/10	9/10	10/10	9/10
5.4		10/10	8/10	10/10	9/10
10.8		10/10	10/10	9/10	10/10
21.6		8/10	9/10	10/10	10/10
43.2		7/10	7/10	4/10	9/10

Fathead Minnow 7-d Larval Survival and Growth Test — **Waypoint Analytical Tennessee , LLC.**

Batch ID:	17-6596-0924	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Ivey Elizabeth Wilkinson
Start Date:	16 Apr-19 11:50	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% DMW
Ending Date:	23 Apr-19 12:47	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24
Sample ID:	21-2769-0644	**Code:**	19-105-0190	**Client:**	City of Lakeland TN
Sample Date:	15 Apr-19 08:10	**Material:**	POTW Effluent	**Project:**	WET Quarterly Compliance Test (2Q)
Receipt Date:	15 Apr-19 10:00	**Source:**	City of Lakeland (TN0078255)		
Sample Age:	28h (1.6 °C)	**Station:**			

Fathead Minnow 7-d Larval Survival and Growth Test **Waypoint Analytical Tennessee , LLC.**

Total Residual Chlorine-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	0	0	0	0	0	0	0
2.7								
5.4								
10.8								
21.6								
43.2		0	0	0	0	0	0	0

Conductivity-µS/cm

Conc-%	Code	1	2	3	4	5	6	7
0	L	160.1	168.3	162	160.2	161.1	158.7	164.1
2.7								
5.4								
10.8								
21.6								
43.2		378	389	384	387	368	366	373

Final Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.3	8.4	7.9	8.2	7.3	7	8.1
2.7		7.9	7.9	7.8	8.2	7.4	7	7.9
5.4		7.7	8.2	7.6	8.1	7.4	6.9	8.1
10.8		7.4	8.2	7.7	8.1	7.4	6.8	8
21.6		7.1	7.9	7.6	8	7.4	6.7	7.9
43.2		6.8	7.9	7.6	8	7.3	6.6	7.7

Initial Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7
0	L	8.5	8.9	8.5	8.6	8.9	8.6	7.8
2.7		8.5	8.9	8.5	8.7	8.9	8.7	7.7
5.4		8.4	8.8	8.5	8.8	8.9	8.7	7.7
10.8		8.4	8.8	8.5	8.8	8.9	8.7	7.8
21.6		8.4	8.7	8.5	8.8	8.9	8.7	7.8
43.2		8.4	8.6	8.5	8.8	8.7	8.7	7.8

Final pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.4	7.3	7.2	7.3	7.3	7.2	7.2
2.7		7.4	7.2	7.2	7.3	7.3	7.2	7.2
5.4		7.3	7.2	7.2	7.3	7.3	7.2	7.2
10.8		7.3	7.2	7.1	7.3	7.3	7.2	7.1
21.6		7.2	7.2	7.1	7.2	7.3	7.1	7.1
43.2		7.1	7.1	7.1	7.1	7.2	7.1	7.1

Initial pH-Units

Conc-%	Code	1	2	3	4	5	6	7
0	L	7.6	7.8	7.5	7.8	7.8	7.7	7.5
2.7		7.6	7.7	7.5	7.7	7.8	7.7	7.5
5.4		7.6	7.6	7.4	7.7	7.8	7.7	7.5
10.8		7.6	7.6	7.3	7.6	7.7	7.7	7.4
21.6		7.4	7.4	7.3	7.5	7.5	7.5	7.3
43.2		7.3	7.2	7.1	7.2	7.3	7.4	7.1

Fathead Minnow 7-d Larval Survival and Growth Test

Waypoint Analytical Tennessee , LLC.

Final Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	25	25	25	25	25	25	25
2.7		25	25	25	25	25	25	25
5.4		25	25	25	25	25	25	25
10.8		25	25	25	25	25	25	25
21.6		25	25	25	25	25	25	25
43.2		25	25	25	25	25	25	25

Initial Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7
0	L	25	25	25	25	25	25	25
2.7		25	25	25	25	25	25	25
5.4		25	25	25	25	25	25	25
10.8		25	25	25	25	25	25	25
21.6		25	25	25	25	25	25	25
43.2		25	25	25	25	25	25	25

Waypoint Analytical, LLC.
2790 Whitten Road
Memphis, TN 38133

Additional Toxicity Test Information

1. Methods/Instrumentation used in chemical analysis:
   - Dissolved oxygen, DM 4: (SM 4500-O G-2011)
   - pH, PM 1: (SM 4500-H + B-2011)
   - Temperature, PM 1: (SM 2550 B-2011)
   - Conductivity, C 1: (SM 2510 B-2011)
   - Alkalinity: (SM 2320 B-2011)
   - Hardness: (EPA 200.7 / SM 2340 B-2011)
   - Total Residual Chlorine: (SM 4500-CL G-2011)
     - Reported value of "0" indicates result below detection limit of 0.02 mg/L
     - Reported value of "1" indicates result above detection limit of 0.02 mg/L
   - EPA Acute Manual Edition and Date: EPA-821-R-02-012, OCT 2002 (Fifth edition)
   - EPA Chronic Manual Edition and Date: EPA-821-R-02-013, OCT 2002 (Fourth edition)

2. Laboratory
   - Temperature: Average: 25 °C Range: 25± 1°C
     - Incubator ID: BIO Thermometer ID: 120554
   - Light Cycle: 16 hours light/ 8 hours dark
   - Light intensity: 50-100 foot-candles, average
   - Control Water: Dilute mineral water made with 20 % Perrier in Nanopure
   - Dilution Water: Laboratory control water
   - Pretreatment: none

3. Method 1002.0 Ceriodaphnia dubia Survival and Reproduction
   - Test chambers: 30 mL disposable plastic beakers
   - Volume per chamber: 15 mL
   - Number of organisms per chamber: 1
   - Number of replicates: 10
   - Food: Ceriodaphnia dubia are fed 0.15mL *Raphidocelis subcapitata* (Algae) and YTC solution daily.
   - Acclimation of organisms: In house cultures are raised at 25°C. Purchased organisms are allowed to reach 25°C prior to use.

4. Method 1000.0 *Pimephales promelas* (Fathead minnow) Larval Survival and Growth
   - Test chambers: 20 oz. Disposable plastic cups
   - Volume per chamber: 250 mL
   - Average number of organisms per chamber: 10
   - Number of replicates per concentration: 4
   - Food: Fathead minnows are fed 0.15 mL *Artemia* brine shrimp hatched in laboratory twice daily
   - Acclimation of organisms: Dilution water is added until organisms are contained in a culture media that consists of 80% dilution water. Organisms are allowed to reach 25°C prior to use.

5. Reference Toxicity
   - Reference toxicity tests are performed monthly on each method performed by the laboratory.
   - Potassium Chloride is used as the reference toxicity chemical for vertebrate species
   - Current chemical ID: CS 6150834
   - Sodium Chloride is used as the reference toxicity chemical for invertebrate species
   - Current chemical ID: CS6153103

6. Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate, etc. and the justification for such manipulations or deviations. Attach additional pages as needed.
   - None

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

04135
City of Lakeland
Mr. Spencer Smalley
10001 US Hwy 70
Lakeland , TN 38002

Project Information : Bioassay Testing

Report Date : 05/01/2019
Received : 04/15/2019

Report Number : **19-105-0190**

REPORT OF ANALYSIS

Lab No : **89188**
Sample ID : **Effluent Composite 4/16-17/19**

Matrix: **Aqueous**
Sampled: **4/17/2019 8:55**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**72**	mg/L	1	1	04/26/19 09:45	CJH	2320B-2011
Calcium	**20.9**	mg/L	0.500	1	04/27/19 09:12	KKM	EPA-200.7
Hardness as CaCO3(SM-2340B)	**70.2**	mg/L	0.100	1	04/27/19 09:12		EPA-200.7
Magnesium	**4.38**	mg/L	0.100	1	04/27/19 09:12	KKM	EPA-200.7

Qualifiers/ Definitions DF Dilution Factor MQL Method Quantitation Limit

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

04135
City of Lakeland
Mr. Spencer Smalley
10001 US Hwy 70
Lakeland , TN 38002

Project Information : Bioassay Testing

Report Date : 05/01/2019
Received : 04/15/2019

Report Number : **19-105-0190**

REPORT OF ANALYSIS

Lab No : **90191**
Sample ID : **Effluent Composite 4/18-19/19**

Matrix: **Aqueous**
Sampled: **4/19/2019 8:45**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**71**	mg/L	1	1	04/26/19 09:45	CJH	2320B-2011
Calcium	**21.5**	mg/L	0.500	1	04/27/19 09:32	KKM	EPA-200.7
Hardness as CaCO3(SM-2340B)	**72.2**	mg/L	0.100	1	04/27/19 09:32		EPA-200.7
Magnesium	**4.49**	mg/L	0.100	1	04/27/19 09:32	KKM	EPA-200.7

Qualifiers/ Definitions DF Dilution Factor MQL Method Quantitation Limit

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

04135
City of Lakeland
Mr. Spencer Smalley
10001 US Hwy 70
Lakeland , TN 38002

Project Information : Bioassay Testing

Report Date : 05/01/2019
Received : 04/15/2019

Report Number : **19-105-0190**

REPORT OF ANALYSIS

Lab No : **98923**
Sample ID : **Effluent Composite 4/14-15/19**

Matrix: **Aqueous**
Sampled: **4/15/2019 8:10**

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Method
Alkalinity (as CaCO3)	**65**	mg/L	1	1	04/26/19 09:45	CJH	2320B-2011
Calcium	**19.6**	mg/L	0.500	1	04/27/19 09:58	KKM	EPA-200.7
Hardness as CaCO3(SM-2340B)	**65.9**	mg/L	0.100	1	04/27/19 09:58		EPA-200.7
Magnesium	**4.11**	mg/L	0.100	1	04/27/19 09:58	KKM	EPA-200.7

Qualifiers/ Definitions DF Dilution Factor MQL Method Quantitation Limit

Waypoint ANALYTICAL

(1)

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

Kit ID:	0000109240
Initiated By:	Sydney Andres
Initiated Date:	1/4/2019
Project Comment	

CHAIN-OF-CUSTODY

19-105-0190
04135
04-15-2019
10:04:06
City of Lakeland
Bioassay Testing

Company Name	Company Number	Client Project Manager/Contact	Purchase Order Number
City of Lakeland	04135	City of Lakeland	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☐ UPS ☐ USPS ☐ Courier ☒ Client Drop Off Other
Kit QTR 2 A - Bioassay 04/14-15/2019			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Lakeland - Bioassay	(901) 867-5412		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
4/15	8:10	Composite 1 Outfall 001	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
|	|	Composite 1 Outfall 001	Aqueous	C	2	Plastic - Gallon	NONE	Bioassay FH/CD
|	|	Composite 1 Outfall 001	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	Hardness

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Spencer Smalley				
(Y)/N	Y/(N)		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date	Time
			[signature]	4/15 10:00			
(Blank)/Cooler Temp			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date	Time
1.6°C							
T450			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date	Time
					[signature]	4/15/19	1000

(2)

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

Kit ID:	**0000109241**
Initiated By:	***Sydney Andres***
Initiated Date:	**1/4/2019**
Project Comment	

CHAIN-OF-CUSTODY

19-105-0190
04135
04-15-2019
10:04:06
City of Lakeland
Bioassay Testing

Company Name	**Company Number**	**Client Project Manager/Contact**	**Purchase Order Number**
City of Lakeland	04135	City of Lakeland	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☐ UPS ☐ USPS ☐ Courier ☐ Client Drop Off Other
Kit QTR 2 B - Bioassay 04/16-17/2019			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Lakeland - Bioassay	(901) 867-5412		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
4-17-19	8:55	Composite 2 Outfall 001	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
"	"	Composite 2 Outfall 001	Aqueous	C	2	Plastic - Gallon	NONE	Bioassay FH/CD
"	"	Composite 2 Outfall 001	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	Hardness

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Chris Hester				
Y/N	Y/N		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
Blank/Cooler Temp				4-17-19 10:00			
THS 0.3°C			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time	
						4/17/19 1122	

Waypoint ANALYTICAL

2790 Whitten Road, Memphis, TN 38133
Main 901.213.2400 ° Fax 901.213.2440
www.waypointanalytical.com

3

Kit ID:	**0000109242**
Initiated By:	**Sydney Andres**
Initiated Date:	**1/4/2019**
Project Comment	

CHAIN-OF-CUSTOD

19-105-0190
04135
04-15-2019
10:04:06
City of Lakeland
Bioassay Testing

Company Name	Company Number	Client Project Manager/Contact	Purchase Order Number
City of Lakeland	04135	City of Lakeland	
Site Name	**Project Number**	☐ RUSH – Additional charges apply ☐ Special Detection Limits(s) Date Results Needed	**Method of Shipment** ☐ Fed Ex ☐ UPS ☐ USPS ☐ Courier ☒ Client Drop Off Other
Kit QTR 2 C - Bioassay 04/18-19/2019			
LIMS Project ID	**Project Manager Phone #**	**Project Manager Email**	**Site/Facility ID #**
Lakeland - Bioassay	(901) 867-5412		

Date	Time	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation	Analyses
4.19.19	9:45	Composite 3 Outfall 001	Aqueous	C	1	Plastic - Pint	NONE	Alkalinity
"	"	Composite 3 Outfall 001	Aqueous	C	3	Plastic - Gallon	NONE	Bioassay FH/CD
"	"	Composite 3 Outfall 001	Aqueous	C	1	Plastic - Pint	HNO3 - Nitric Acid	Hardness

For Laboratory Use Only			Sampled by (Name - Print)	Client Remarks/Comments			
Ice	Custody Seals	Lab Comments	Cade McMillan				
Y/N (Y)	Y/N (Y)		**Relinquished by: (SIGNATURE)**	**Date Time**	**Received by: (SIGNATURE)**	**Date Time**	
Blank/Cooler Temp			Cade McMillan	4.19.19			
TAS 1.6 (8.0)			**Relinquished by: (SIGNATURE)**	**Date Time**	**Received by: (SIGNATURE)**	**Date Time**	
			Relinquished by: (SIGNATURE)	**Date Time**	**Received by: (SIGNATURE)**	**Date Time**	
					4/19/19	1000	

Pace Analytical®
National Center for Testing & Innovation

12065 LEBANON RD.
MT. JULIET, TN 37122
(800) 767-5859
WWW.ENVSCI.COM

August 1, 2019

Spencer Smalley
Lakeland STP
10001 HWY 70
Lakeland, TN 38002

Biomonitoring Results
Pace National Identification #: L1118659-01,-02,-03

Attached are the results for toxicity test performed: July 16-22, 2019

A summary of the findings is presented below:

Test Species	*Ceriodaphnia dubia*	*Pimephales promelas*
EPA Method No.	EPA Method 1002.0	EPA Method 1000.0
Test Concentrations	2.7%, 5.4%, 10.8%, 21.6%, 43.2%	2.7%, 5.4%, 10.8%, 21.6%, 43.2%
Permit Limit	43.2%	43.2%
Test Endpoint	IC25	IC25
Test Result	**> 43.2%**	**> 43.2%**
	effluent successfully meets permit requirements for Ceriodaphnia dubia	effluent successfully meets permit requirements for fathead minnow
Next Test Date	**Week of October 13, 2019**	
Comments	***Cl2 reading missed for Sample #3. Analyst error.**	

If you have any questions or comments concerning the enclosed report, please do not hesitate to contact us.

Pace Analytical®
National Center for Testing & Innovation

Aquatic Biology Lab
(615) 758-5858 ext. 7549
(615) 758-5858 ext. 7544

Pace Analytical®
National Center for Testing & Innovation

Acute or Chronic? Chronic
Screen or Definitive? Definitive
Test Date: July 16-22, 2019
Lab Identification #: L1118659-01,-02,-03

TOXICITY TEST REPORT SHEET

1). Facility/Discharger	Lakeland STP	
2). Contact Person phone (facility) email 1	Spencer Smalley 901.870.1803 ssmalley@lakelandtn.org	
3). Permit # or Project ID	TN0078255	4). Report Address 10001 HWY 70 Lakeland, TN 38002
5). Receiving Stream	Loosahatchie River at mile 24.1	
6). Laboratory Name	Pace National	
7). Laboratory Contact (phone)	Shain W. Schmitt, Sr. Aquatic Biologist 615.773.7549	
8). Outfall(s) Tested	Final Effluent	

9). Test Species	#1 *Ceriodaphnia dubia*	#2 *Pimephales promelas*
10). Species Age	#1 Neonates, <24-hr	#2 24-36 hours old
11). Test Conditions (Static or Static-Renewal?)	#1 Static-Renewal	#2 Static-Renewal

12). Dilution Water Type (synthetic, receiving stream)	Moderately Hard SDW
13). Aeration? (Before/During Test)	none
14). Dechlorination?	none
15). Original Chlorine Level	<0.2mg/L, <0.2mg/L, *
16). Report prepared by	Clarissa Moore, Assistant Biologist

C Fernandes Monteiro — 9/17/19
signature of person performing initial review — date

Christabel Monteiro — Biology Manager
name (typed or printed) — title

SMS 9-13-19

Shain W. Schmitt — 9-13-19
signature of person performing final review — date

Shain W. Schmitt — Sr. Aquatic Biologist
name (typed or printed) — title

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1118659-01,-02,-03
Test Date: July 16-22, 2019

SAMPLING SUMMARY

Sample	Sample Type Grab or Composite	Volume Collected	Sample Collection Begin (MM/DD/Time)	Sample Collection End (MM/DD/Time)	Flow Rate (at collection)	Sample Temperature (when received at lab)
1	composite	1 gallon		7/15/2019 @ 10:30		2.9 deg C
2	composite	1 gallon		7/17/2019 @ 7:50		1.9 deg C
3	composite	1 gallon		7/19/2019 @ 8:15		3.7 deg C

Comments:

TEST PERFORMANCE

Species #1

***Ceriodaphnia dubia* (water flea)**
7/16/2019 @ 13:54 to 7/22/2019 @ 14:23

Species Age
< 24 hrs old, within 8 hrs of the same age

Organism Source
Pace National, in-house cultures

Acclimation Procedure
cultured in Moderately Hard SDW at 25 deg C

Test Duration
3-Brood

Feeding Regime
0.15 *mL* YCT and 0.15 *mL* algal suspension, daily, upon renewal

Type of Test Chamber
polystyrene cup

Volume of Test Chamber
30 *mL*

Volume of Solution Used Per Test Chamber
20 *mL*

Number of Test Organisms Per Test Chamber
one (1)

Number of Replicates Per Treatment
ten (10)

Species #2

***Pimephales promelas* (fathead minnow)**
7/16/2019 @ 13:49 to 7/23/2019 @ 12:49

Species Age	Hatch Date	Pace National Lot #
24-36 hours old	7/15/2019	071519HD

Organism Source
Aquatic Bio Systems - Fort Collins, CO

Acclimation Procedure
acclimated in 20% DMW at 25 deg C for about 2 hrs

Test Duration
7-Day

Feeding Regime
0.15 *mL* - 0.2 *mL* newly hatched brine shrimp nauplii, twice daily

Type of Test Chamber
polypropylene beaker

Volume of Test Chamber
500 *mL*

Volume of Solution Used Per Test Chamber
250 *mL*

Number of Test Organisms Per Test Chamber
ten (10)

Number of Replicates Per Treatment
four (4)

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1118659-01,-02,-03
Test Date: July 16-22, 2019

ADDITIONAL TOXICITY TEST INFORMATION

Copies of all bench sheets and statistical calculations and printouts obtained during the test are attached in the Appendix. Electronically entered data is entered in real time and digitaly tracked to ensure traceability.

Methods/Instrumentation used in chemical analysis:

Dissolved Oxygen: YSI 5000 DO Meter/Probe (serial #01L0435)
pH: Beckman 390pH/Temp/mV/ISE Meter
Conductivity: Thermo Orion Model 150A+
pH/RDO/Conductivity: Thermo Scientific Orion VersaStar (serial #V 02105)
Water Bath: Lindberg/Blue, Model WB1140A-1 (serial #S01M-580360-SM)
Temperature: Thermometers calibrated to NIST certified thermometer
Alkalinity: Lachat
Hardness: Lachat
Total Residual Chlorine: Hach Pocket Colorimeter, Model #46770-00 (serial #971000112186)
Environmental Chambers: 25 degrees C + 1.0 degree - Thermo-Kool
Environmental Chambers (for Colorado tests): 20 degrees C ± 1.0 degree - Thermo Scientific Model 3759
Light Quality: Ambient Lab Illumination
Light Intensity: 50-100 ft-c - VWR Traceable Dual-Range Light Meter- Model 62344-944 (S/N 181399747)
Photoperiod: 16 hours light, 8 hours dark
Drying: Overnight at greater than 60 degrees Celsius in a Fisher Scientific Isotemp Oven, Model 655F
Mean Dry Weight: Determined using Mettler Toledo Balance, AT261 Delta Range
Reference Weights (Set #1): Class 1, TREOMNER, Inc., serial number 85035
Reference Weights (Set #2): Class 1, TREOMNER, Inc., serial number 67812
EPA Acute Manual Edition and Date: EPA-821-02-012 October 2002, Fifth Edition
EPA Chronic Manual Edition and Date: EPA-821-R-02-013 October 2002, Fourth Edition

This method is performed only by Assistant Biologists, Biologists, and Senior Biologists that have experience with aquatic toxicity testing. Laboratory Technicians, Chemists, and any other laboratory personnel that are not experienced with toxicity testing will not handle test organisms during a toxicity evaluation. Lab Techs, Chemists, and others may assist (under supervision) with the gathering of data during the evaluation (pH, DO, conductivity, alkalinity, hardness, etc.), but will not be allowed to do any work with the test organisms themselves. The following analysts have met Technical Training Qualifications and their initials (in parenthesis) can be found on the bench sheets in this report: **Brandon Etheridge** (BE); **Shaln W. Schmitt (SWS); Adam Macomber (AM); Amy Eggleston (AME); Brittnie Boyd (BB); Mellssa Holwerda (MH); Cody Medley (CM); Joel Soto (JSV); Clarissa Moore (CGM); Nadiar Yakob (NY); Jessica Davis (JOD); Rachel Conradi (RC)**

Indicate below any other relevant information that may aid in the evaluation of this report. Include any deviations from EPA Methodology that were necessary for these tests as well as any sample manipulations which were performed, such as aeration, dechlorination with sodium thiosulfate (etc) and the justification for such manipulations or deviations. Attach additional pages as needed.

*Cl2 reading missed for Sample #3. Analyst error.

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1118659-01,-02,-03
Test Date: July 16-22, 2019

Toxicity Test Results

Results of a | *Ceriodaphnia* (Genus) | *dubia* (Species) | 3-Brood, Survival & Reproduction Test (Type/Duration)

Conducted | 7/16/2019 | to | 7/22/2019 | Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								# of Young	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	100	90	90	90	90	90		312	31.2
2.7% Effluent	100	100	100	100	100	100	100		330	33.0
5.4% Effluent	100	100	100	100	100	100	100		289	28.9
10.8% Effluent	100	100	100	100	100	100	100		347	34.7
21.6% Effluent	100	100	100	100	100	100	100		335	33.5
43.2% Effluent	100	100	100	100	100	100	100		316	31.6

Total Young was divided by 9 instead of 10 to arrive at the mean (per EPA Methods).

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival | > 43.2% reproduction

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Coefficient of Variance (CV%): 38.8%

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 26.9%

$$PMSD = \frac{\text{Minimum Significant Difference X 100}}{\text{Control Mean (reproduction)}}$$

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (47 for *Ceriodaphnia*), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Ceriodaphnia dubia (water flea) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or reproduction of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the *Ceriodaphnia* test. Permittee successfully meets *Ceriodaphnia* requirements for the period.

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1118659-01,-02,-03
Test Date: July 16-22, 2019

Toxicity Test Results

Results of a *Pimephales* (Genus) *promelas* (Species) 7-day, Survival & Growth Test (Type/Duration)

Conducted 7/16/2019 to 7/22/2019 Using Effluent from Outfall: Final Effluent

Test Solution	Percent Surviving (time intervals used - days)								Dry Weight (mg)	
	0	1	2	3	4	5	6	7	Total	Mean
Control	100	97.5	97.5	97.5	97.5	97.5	97.5	97.5	2.1830	0.5457
2.7% Effluent	100	100	100	100	100	100	100	100	1.8890	0.4723
5.4% Effluent	100	95	95	95	95	95	95	92.5	1.8580	0.4645
10.8% Effluent	100	100	100	100	100	100	100	100	1.8970	0.4743
21.6% Effluent	100	100	100	100	97.5	97.5	97.5	97.5	1.9910	0.4978
43.2% Effluent	100	100	100	100	97.5	97.5	97.5	95	1.8930	0.4733

Permit Limit: 43.2%

IC_{25} Value: > 43.2% survival > 43.2% growth

Confidence Limits
Upper Limit:
Lower Limit:

Confidence Limits
Upper Limit
Lower Limit

Coefficient of Variance (CV%): 18.1%

Statistical methods used to determine NOEC (if applicable):
NOEC not applicable for this evaluation

Percent Minimum Significant Difference: 18.4%

$$PMSD = \frac{\text{Minimum Significant Difference X 100}}{\text{Control Mean (growth)}}$$

The PMSD describes the variability that occurred within the test. If the PMSD value for a given test is less than or equal to the 90th PMSD (30 for fathead minnow), the test's variability measure is within the normal range expected for the test.

INTERPRETATION OF RESULTS

Pimephales promelas (fathead minnow) - No inhibition was demonstrated. Using Linear Interpolation Method, the IC25 (inhibition concentration causing a 25% reduction in survival or growth of the test organisms) was determined to be greater than (>) 43.2% effluent.

Results of the evaluation indicate there was no toxicity exhibited in the fathead minnow test. Permittee successfully meets fathead minnow requirements for the period.

APPENDIX

Lakeland STP

NPDES #: TN0078255 **Test Date:** July 16-23, 2019

Lab ID #: L1118659 -01,-02,-03

Comments: Control #8

Tue 7/16/19

Initials	pH	Con.	DO	Time	Analyst
Control	7.9	240.9	8.6	14:19:20	RC
Dup. Control	7.9	241.3	8.7	14:19:40	RC
2.7	7.9	247.9	8.7	14:20:24	RC
Dup. 2.7	7.9	247.5	8.7	14:21:23	RC
5.4	7.8	250.1	8.7	14:22:14	RC
Dup. 5.4	7.8	250.1	8.7	14:22:33	RC
10.8(PL)	7.7	255	8.7	14:23:28	RC
Dup. 10.8(PL)	7.7	255	8.7	14:24:02	RC
21.6	7.5	265.9	8.7	14:24:45	RC
Dup. 21.6	7.5	265.8	8.7	14:25:07	RC
43.2	7.3	286.6	8.7	14:25:51	RC
Dup. 43.2	7.3	286.6	8.7	14:26:11	RC

Wed 7/17/19

Initials	pH	Con.	DO	Time	Analyst
Control	8	258.9	8.9	13:14:14	BB
2.7	8	259.9	8.9	13:14:37	BB
5.4	7.9	262.5	8.8	13:15:00	BB
10.8(PL)	7.9	265.3	8.8	13:15:24	BB
21.6	7.8	275.1	8.8	13:15:50	BB
43.2	7.6	298.1	8.8	13:16:16	BB

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8	8.8	14:27:55	BB	7.8	8.4	8:17:08	BB
Dup. Control	8	8.8	14:28:18	BB	7.8	8.4	8:17:55	BB
2.7	8.1	8.9	14:29:02	BB	7.8	8.3	8:24:15	BB
Dup. 2.7	8.1	8.9	14:29:22	BB	7.8	8.2	8:24:35	BB
5.4	8.1	8.9	14:29:42	BB	7.7	8.1	8:25:14	BB
Dup. 5.4	8.1	8.9	14:30:01	BB	7.7	7.9	8:25:35	BB
10.8(PL)	8	8.9	14:30:24	BB	7.8	7.8	8:26:07	BB
Dup. 10.8(PL)	8	8.9	14:30:43	BB	7.8	7.8	8:26:28	BB
21.6	8	8.9	14:32:16	BB	7.8	7.8	8:26:52	BB
Dup. 21.6	8	8.9	14:32:45	BB	7.8	7.9	8:27:29	BB
43.2	8	8.8	14:33:49	BB	7.8	7.9	8:27:56	BB
Dup. 43.2	8	8.8	14:34:10	BB	7.8	8	8:28:15	BB

Thu 7/18/19

Initials	pH	Con.	DO	Time	Analyst
Control	8	254	8.6	14:49:05	JOD
2.7	8	257.6	8.7	14:49:45	JOD
5.4	7.9	261.5	8.8	14:50:06	JOD
10.8(PL)	7.9	268.7	8.8	14:50:43	JOD
21.6	7.8	283.2	8.7	14:51:12	JOD
43.2	7.6	312	8.7	14:51:35	JOD

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	7.8	8.1	13:03:14	JSV	7.7	7.5	8:36:16	RC
2.7	8	8.2	13:03:54	JSV	7.7	7.4	8:36:57	RC
5.4	8	8.5	13:04:19	JSV	7.8	7.6	8:37:26	RC
10.8(PL)	7.9	8.5	13:05:03	JSV	7.8	7.9	8:37:50	RC
21.6	8	8.3	13:05:29	JSV	7.7	7.8	8:38:43	RC
43.2	7.8	8	13:06:00	JSV	7.7	7.5	8:39:35	RC

Fri 7/19/19

Initials	pH	Con.	DO	Time	Analyst
Control	8.2	247.8	8.5	14:44:55	AME
2.7	8.1	255	8.5	14:45:17	AME
5.4	8.1	258.9	8.5	14:45:36	AME
10.8(PL)	8	266.7	8.5	14:45:58	AME
21.6	7.8	280.5	8.5	14:46:25	AME
43.2	7.6	311	8.5	14:46:47	AME

	Ceriodaphnia dubia				*Pimephales promelas*			
Finals	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.9	14:14:52	AME	8	8	8:40:33	JOD
2.7	8	8.6	14:15:10	AME	7.9	8.1	8:40:53	JOD
5.4	8	8.4	14:15:32	AME	7.9	8.2	8:41:13	JOD
10.8(PL)	8	8.4	14:15:52	AME	7.9	8.2	8:41:42	JOD
21.6	8	8.4	14:16:15	AME	7.8	8.1	8:42:05	JOD
43.2	8	8.4	14:16:33	AME	7.8	8.1	8:42:27	JOD

Lakeland STP

NPDES #: TN0078255 **Test Date:** July 16-23, 2019

Sat 7/20/19

Initials

	pH	Con.	DO	Time	Analyst
Control	8.2	263.6	8.9	15:16:02	JOD
2.7	8.1	269.6	8.8	15:16:26	JOD
5.4	8.1	275.1	8.8	15:16:47	JOD
10.8(PL)	8	284.4	8.7	15:17:16	JOD
21.6	7.9	305	8.7	15:17:45	JOD
43.2	7.7	339	8.7	15:18:12	JOD

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.2	8.7	14:50:49	JOD	7.8	7.8	8:39:30	JOD
2.7	8.1	8.8	14:51:09	JOD	7.8	7.9	8:40:36	JOD
5.4	8.1	8.7	14:51:29	JOD	7.8	8	8:41:35	JOD
10.8(PL)	8.2	8.7	14:51:54	JOD	7.9	8	8:42:13	JOD
21.6	8.1	8.7	14:52:15	JOD	7.8	8	8:42:40	JOD
43.2	8.1	8.6	14:52:40	JOD	7.9	8	8:43:44	JOD

Sun 7/21/19

Initials

	pH	Con.	DO	Time	Analyst
Control	8	245	8.6	14:12:11	RC
2.7	8	256.9	8.7	14:12:35	RC
5.4	8.1	262.8	8.7	14:12:59	RC
10.8(PL)	8	277.7	8.7	14:13:26	RC
21.6	7.9	298	8.7	14:13:58	RC
43.2	7.8	344	8.7	14:14:25	RC

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.3	9	14:38:20	RC	7.8	7.5	8:35:55	RC
2.7	8.2	9	14:38:44	RC	7.7	7.4	8:36:26	RC
5.4	8.2	9	14:39:10	RC	7.8	7.3	8:37:03	RC
10.8(PL)	8.2	9	14:39:30	RC	7.8	7.5	8:37:38	RC
21.6	8.2	9	14:39:57	RC	7.9	7.5	8:38:05	RC
43.2	8.2	9	14:40:24	RC	7.8	7.5	8:38:41	RC

Mon 7/22/19

Initials

	pH	Con.	DO	Time	Analyst
Control	8	238.1	8.8	11:51:17	RC
2.7	8	250	8.7	11:51:55	RC
5.4	8	255.2	8.6	11:52:37	RC
10.8(PL)	8	261.9	8.6	11:53:01	RC
21.6	7.9	290.9	8.6	11:53:44	RC
43.2	7.7	328	8.5	11:54:13	RC

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control	8.1	8.3	15:42:03	RC	7.8	7.6	8:46:06	RC
2.7	8.1	8.4	15:42:39	RC	7.8	7.6	8:46:33	RC
5.4	8.1	8.4	15:44:17	RC	7.7	7.5	8:46:54	RC
10.8(PL)	8.1	8.4	15:45:02	RC	7.7	7.4	8:47:17	RC
21.6	8.1	8.5	15:46:02	RC	7.8	7.4	8:47:43	RC
43.2	8.1	8.5	15:46:36	RC	7.8	7.4	8:48:10	RC

Tue 7/23/19

Initials

	pH	Con.	DO	Time	Analyst
Control					
2.7					
5.4					0
10.8(PL)					0
21.6					0
43.2					0

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH	DO	Time	Analyst	pH	DO	Time	Analyst
Control					7.8	7.6	8:33:38	JOD
2.7					7.8	7.6	8:34:03	JOD
5.4				0	7.8	7.7	8:34:28	JOD
10.8(PL)				0	7.8	7.7	8:34:54	JOD
21.6				0	7.8	7.7	8:35:19	JOD
43.2				0	7.8	7.7	8:35:43	JOD

Initials

	pH		Con		DO	
	range	mean	range	mean	range	mean
Control	7.9-8.2	8.0	238.1-263.6	248.7	8.5-8.9	8.7
2.7	7.9-8.1	8.0	247.5-269.6	255.6	8.5-8.9	8.7
5.4	7.8-8.1	8.0	250.1-275.1	259.5	8.5-8.8	8.7
10.8(PL)	7.7-8	7.9	255-284.4	266.8	8.5-8.8	8.7
21.6	7.5-7.9	7.8	265.8-305	283.1	8.5-8.8	8.7
43.2	7.3-7.8	7.6	286.6-344	313.2	8.5-8.8	8.7

Finals

	Ceriodaphnia dubia				*Pimephales promelas*			
	pH		DO		pH		DO	
	range	mean	range	mean	range	mean	range	mean
Control	7.8-8.3	8.1	8.1-9	8.7	7.7-8	7.8	7.5-8.4	7.9
2.7	8-8.2	8.1	8.2-9	8.7	7.7-7.9	7.8	7.4-8.3	7.8
5.4	8-8.2	8.1	8.4-9	8.7	7.7-7.9	7.8	7.3-8.2	7.8
10.8(PL)	7.9-8.2	8.1	8.4-9	8.7	7.7-7.9	7.8	7.4-8.2	7.8
21.6	8-8.2	8.1	8.3-9	8.7	7.7-7.9	7.8	7.4-8.1	7.8
43.2	7.8-8.2	8.0	8-9	8.6	7.7-7.9	7.8	7.4-8.1	7.8

Lakeland STP

NPDES # TN0078255 **Test Date:** July 16-23, 2019

Lab ID #: L1118659 -01,-02,-03

Control #8

L# of Control		Alkalinity (mg/L)	Hardness (mg/L)	Carboy
L1118618-02	Tue 7/16/19	44.2	55.2	B 7-15
L1119830-02	Thu 7/18/19	49.3	57.2	B 7-17
L1120754-01	Sat 7/20/19	*	68.9	B 7-19

Control Alkalinity (mg/L)			
range:	44.2-49.3	mean:	46.8
Control Hardness (mg/L)			
range:	55.2-68.9	mean:	60.4

100% Effluent	Alkalinity (mg/L)	Hardness (mg/L)
Tue 7/16/19	59.1	54.3
Thu 7/18/19	49.9	52.6
Sat 7/20/19	57.2	58.2

Effluent Alkalinity (mg/L)			
range:	49.9-59.1	mean:	55.4
Effluent Hardness (mg/L)			
range:	52.6-58.2	mean:	55.0

	Total Res. Cl_2 (mg/L)	Analyst
Tue 7/16/19	<0.2	AM
Thu 7/18/19	<0.2	JOD
Sat 7/20/19	**	**

*Data not recorded.

**Cl2 reading missed for Sample #3. Analyst error.

Temperature *Pimephales promelas* (°C)

	Tue 7/16/19	Wed 7/17/19	Thu 7/18/19	Fri 7/19/19	Sat 7/20/19	Sun 7/21/19	Mon 7/22/19	Tue 7/23/19
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	AM	NY	BB	JOD	JOD	NY	NY	NY
Control	24.9°C	24.5°C	24.2°C	24.5°C	24.6°C	24.3°C	24.9°C	24.5°C
2.7	25.0°C	24.0°C	24.3°C	24.6°C	24.6°C	24.5°C	24.9°C	24.4°C
5.4	25.2°C	2.0°C	24.4°C	24.7°C	24.7°C	24.5°C	24.9°C	24.5°C
10.8(PL)	25.5°C	24.3°C	24.4°C	24.7°C	24.7°C	24.4°C	25.0°C	24.6°C
21.6	25.6°C	24.3°C	24.4°C	24.7°C	24.7°C	24.4°C	25.0°C	24.6°C
43.2	25.6°C	24.2°C	24.4°C	24.7°C	24.7°C	24.5°C	25.0°C	24.5°C

Measurement taken in test chambers

Temperature *Ceriodaphnia dubia* (°C)

	Tue 7/16/19	Wed 7/17/19	Thu 7/18/19	Fri 7/19/19	Sat 7/20/19	Sun 7/21/19	Mon 7/22/19	Tue 7/23/19
	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:	Analyst:
	AM	NY	BB	JOD	JOD	NY	NY	
Test	24.2°C	24.5°C	24.5°C	24.7°C	24.6°C	24.3°C	24.9°C	

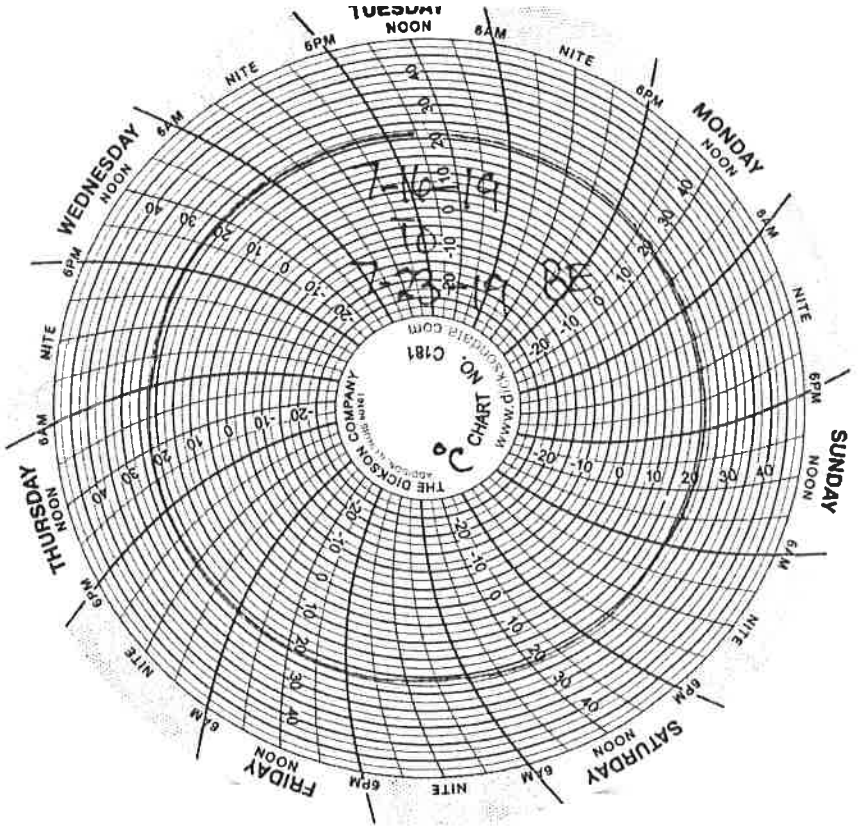
18050063

Lakeland STP

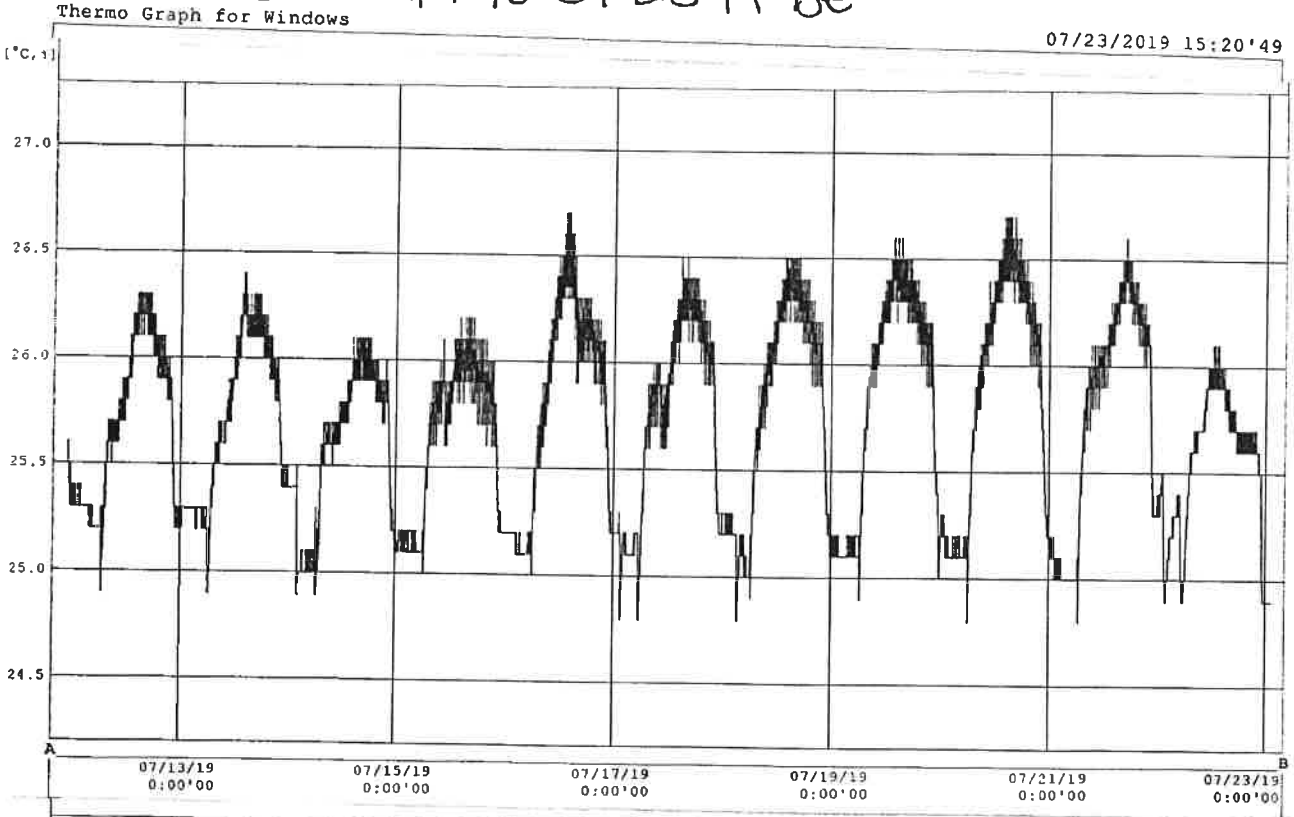
Chart Devices Used In
Thermo-Kool Walk-in Incubator:

Dickson (small chart)

[redacted]



Week of 07-16-19 to 07-23-19 BE



ch	Name	Intvl.	Sample	Cur.A	Cur.B	A<->B	High	Low	Avg.	Unit
1	Ch1	2min.	8000	-----	-----	-----	26.6	24.8	25.7	°C
2	Ch2	2min.	8000	-----	-----	-----	26.7	24.8	25.7	°C

Cur.A Date : 07/11/2019 19:20'52
Cur.B Date : 07/23/2019 4:23'09
diff. A-B : 11 09:02'17.000

Data Range 07/11/2019 19:20'52-07/23/2019 4:23'09
Calc.Range 07/11/2019 22:32'50-07/23/2019 1:11'11

Pace Analytical®
National Center for Testing & Innovation

Facility/Discharger: Lakeland STP
Lab Identification #: L1118659-01,-02,-03
Test Date: July 16-22, 2019

NOTATIONS USED BY ANALYSTS DURING TOXICITY EVALUATIONS

Ceriodaphnia dubia (water flea)

#	numbers on the Reproduction bench sheets (chronic) indicate the number of live young produced
@	if number is circled, this indicates movement of daphnid has become impaired either by actual algal growth on the organisms, or has become entrapped in substances found in the effluent sample, or has been covered in stalked cilia
ME	(molted embryo) often a stressed or poor condition female will abort all or some of a brood in response to a toxin, insufficient nutrition, or just an inability to sustain a certain level of reproduction
P	(pale) this is a noticeable reduction in coloration compared to that which is normal for the individual's age
SS	(small size) this observation is made in comparison to other individuals of the same brood or age group and generally represents a difference of at least 2X size difference
ES	(erratic swimming) this represents a locomotor behavior typified by unsustained swimming with the daphnid periodically "resting" on the bottom of the test vessel; this condition is often observed prior to a daphnid becoming totally immotile
I	(immotility) this denotes a total lack of motility; daphnid is on the bottom of the test vessel and is confirmed as living; daphnids are frequently dead within a short time
LIT	(lost in transfer) organism was lost during transfer process; stats are adjusted to represent this dilution as having one less organism
NL	(not loaded) organism was not loaded at test intiation; stats are adjusted to represent this dilution having one less organism
NT	(not transferred) organism was not present at the time of the next transfer; stats are adjusted to represent this dilution having one less organism loaded at the initiation of testing
X	(dead) dead daphnid is on bottom of test vessel and is confirmed dead by observation of no appendage movement and no visible heartbeat

Pimephales promelas (fathead minnow)

#	numbers indicate the number of live organisms remaining
BS	(bent spine) fish appear to have a curved spine
LR	(loss of reflex) fish are alive, but slow to react to gentle prodding
NL	(not loaded) organism was not loaded at test initiation; stats are adjusted to represent this dilution having one less organism
TS	(top swimmers) fish appear to congregate only at the surface of the test solution (sometimes attributed to low dissolved oxygen levels)
SS	(small size) this observation is made in comparison to other individuals of the same age group and generally represents a difference of at least 2X size difference

B L #: L1118659 -01,-02,-03

Date(s) and Time(s) of Neonate Harvest:	From	14:00	on	7/15/2019	to	17:02	on	7/15/2019		
Neonates were Harvested from the Following Tray(s):	071519XA2	071519XA2	071519XA2	071519XA2	071519XA2	071519XA2	071519XA2	071519XA2	071519XA2	Template Name:
Neonates were Harvested from the Following Cups:	A6	A7	C1	D3	E2	E3	F2	H5	I1	J7	GAMMA

Control Water Carboy Used

Description of Sample Being Analyzed Below: CONTROL 8 Lakeland STP TN0078255

	Set-up & Transfer Data: Date	Time	Analyst		Identification of Replicate A: 1	B: 5	C: 2	D: 1	E: 4	F: 6	G: 3	H: 5	I: 3	J: 7	# of Offspring at Renewal	# of Live Adults at Renewal
B 7-15	Tue 7/16/19	13:54	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
B 7-16	Wed 7/17/19	11:34	BB	24 hrs	0	0	0 X	0	0	0	0	0	0	0	0	9
B 7-17	Thu 7/18/19	11:55	BB	48 hrs	0	0	0 -	0	0	0	0	0	0	0	0	9
B 7-18	Fri 7/19/19	13:44	BB	72 hrs	4	0	-	0	6	0	5	0	0	0	15	9
B 7-19	Sat 7/20/19	13:16	NY	96 hrs	0	5	-	5	0	5	0	9	8	11	43	9
B 7-20	Sun 7/21/19	12:21	CGM	120 hrs	14	13	-	13	15	11	12	14	13	12	117	9
	Mon 7/22/19	14:23	BE	144 hrs	13	17	-	17	20	17	18	16	19	0	137	9
	Tue 7/23/19			168 hrs			-								0	
	Wed 7/24/19			192 hrs			-								0	
	Total # of Young Produced:				31	35	0	35	41	33	35	39	40	23	Total Offspring at Renewal: 312	Total Young Produced: 312

C. dubia Cup Batch/Lot: ESC41712 Algae Lot: 071619 YCT Lot: 061119

Test Acceptability Criteria:

Survival ≥ 80%? YES	NO	≥ 15 neonates/female? YES	NO	≥ 60% 3rd brood? YES	NO	Control Valid? YES	NO
X		X		X		X	

Description of Sample Being Analyzed Below: 2.7 Lakeland STP TN0078255

Set-up & Transfer Data: Date	Time	Analyst		Identification of Replicate A: 3	B: 1	C: 4	D: 7	E: 1	F: 2	G: 6	H: 3	I: 5	J: 6	# of Offspring at Renewal	# of Live Adults at Renewal
Tue 7/16/19	13:54	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 7/17/19	11:36	BB	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 7/18/19	11:56	BB	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 7/19/19	13:48	BB	72 hrs	5	0	0	0	4	0	0	0	0	0	9	10
Sat 7/20/19	13:19	NY	96 hrs	0	8	3	9	0	5	9	6	7	8	55	10
Sun 7/21/19	12:26	CGM	120 hrs	13	7	5	13	11	12	11	14	13	12	111	10
Mon 7/22/19	14:26	BE	144 hrs	14	14	20	14	16	15	18	13	16	15	155	10
Tue 7/23/19			168 hrs											0	
Wed 7/24/19			192 hrs											0	
Total # of Young Produced:				32	29	28	36	31	32	38	33	36	35	Total Offspring at Renewal: 330	Total Young Produced: 330

Comments:

L #: L1118659 -01,-02,-03

Description of Sample Being Analyzed Below:				5.4			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 4	B: 6	C: 1	D: 5	E: 3	F: 7	G: 2	H: 4	I: 6	J: 1			
Tue 7/16/19	13:54	CGM	Initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 7/17/19	11:38	BB	24 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Thu 7/18/19	12:00	BB	48 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Fri 7/19/19	13:51	BB	72 hrs	5	0	0	0	8	0	0	0	0	0		13	10
Sat 7/20/19	13:21	NY	96 hrs	0	8	7	5	0	6	7	0	8	0		41	10
Sun 7/21/19	12:30	CGM	120 hrs	12	10	5	13	15	10	11	13	12	0		101	10
Mon 7/22/19	14:31	BE	144 hrs	15	15	14	13	17	15	18	14	13	0	ME	134	10
Tue 7/23/19			168 hrs												0	
Wed 7/24/19			192 hrs												0	
Total # of Young Produced:				32	33	26	31	40	31	36	27	33	0		Total Offspring at Renewal	Total Young Produced
															289	289

Description of Sample Being Analyzed Below:				10.8(PL)			Lakeland STP								TN0078255	
Set-up & Transfer Data				Identification of Replicate											# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 5	B: 3	C: 7	D: 6	E: 2	F: 4	G: 7	H: 1	I: 2	J: 5			
Tue 7/16/19	13:54	CGM	initiation	0	0	0	0	0	0	0	0	0	0		0	10
Wed 7/17/19	11:40	BB	24 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Thu 7/18/19	12:02	BB	48 hrs	0	0	0	0	0	0	0	0	0	0		0	10
Fri 7/19/19	13:55	BB	72 hrs	7	3	0	0	0	0	0	0	0	0		10	10
Sat 7/20/19	13:23	NY	96 hrs	0	0	4	9	8	6	8	8	9	9		61	10
Sun 7/21/19	12:38	CGM	120 hrs	12	12	10	15	12	12	14	13	15	10		125	10
Mon 7/22/19	14:34	BE	144 hrs	17	14	14	15	13	15	15	17	17	14		151	10
Tue 7/23/19			168 hrs												0	
Wed 7/24/19			192 hrs												0	
Total # of Young Produced:				36	29	28	39	33	33	37	38	41	33		Total Offspring at Renewal	Total Young Produced
															347	347

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

L #: L1118659 -01,-02,-03

Description of Sample Being Analyzed Below: 21.6 Lakeland STP TN0078255

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 6	B: 2	C: 5	D: 3	E: 7	F: 5	G: 4	H: 6	I: 1	J: 2		
Tue 7/16/19	13:54	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 7/17/19	11:42	BB	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 7/18/19	12:04	BB	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 7/19/19	13:58	BB	72 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Sat 7/20/19	13:25	NY	96 hrs	8	0	10	8	8	5	10	8	8	8	73	10
Sun 7/21/19	12:45	CGM	120 hrs	13	14	7	14	11	9	11	13	12	13	117	10
Mon 7/22/19	14:36	BE	144 hrs	17	17	16	17	12	13	12	13	14	14	145	10
Tue 7/23/19			168 hrs											0	
Wed 7/24/19			192 hrs											0	
Total # of Young Produced:				38	31	33	39	31	27	33	34	34	35	Total Offspring at Renewal: 335	Total Young Produced: 335

Description of Sample Being Analyzed Below: 43.2 Lakeland STP TN0078255

Set-up & Transfer Data				Identification of Replicate										# of Offspring at Renewal	# of Live Adults at Renewal
Date	Time	Analyst		A: 7	B: 4	C: 6	D: 2	E: 5	F: 3	G: 1	H: 7	I: 4	J: 3		
Tue 7/16/19	13:54	CGM	initiation	0	0	0	0	0	0	0	0	0	0	0	10
Wed 7/17/19	11:44	BB	24 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Thu 7/18/19	12:06	BB	48 hrs	0	0	0	0	0	0	0	0	0	0	0	10
Fri 7/19/19	14:00	BB	72 hrs	0	6	0	0	4	0	3	6	0	0	19	10
Sat 7/20/19	13:28	NY	96 hrs	8	0	8	7	0	6	0	0	7	8	44	10
Sun 7/21/19	12:52	CGM	120 hrs	16	13	5	14	13	13	13	13	11	8	119	10
Mon 7/22/19	14:38	BE	144 hrs	18	19	0	18	17	17	17	18	10	0	134	10
Tue 7/23/19			168 hrs											0	
Wed 7/24/19			192 hrs											0	
Total # of Young Produced:				42	38	13	39	34	36	33	37	28	16	Total Offspring at Renewal: 316	Total Young Produced: 316

"X" = indicates dead daphnid; death is confirmed by observation (no appendage movement and no visible heartbeat)

Comments:

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — Pace National

Batch ID:	06-4188-3630	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Clarissa Moore
Start Date:	16 Jul-19	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	22 Jul-19	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	6d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample ID:	03-4202-5943	**Code:**	1462E6D7	**Project:**	
Sample Date:	15 Jul-19 10:30	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	16 Jul-19 08:45	**CAS (PC):**		**Station:**	
Sample Age:	14h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1118659 -01,-02,-03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
00-6482-2605	Reproduction	Dunnett Multiple Comparison Test		43.2	>43.2	n/a	2.315	26.9%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
01-4257-0648	7d Survival Rate	Linear Interpolation (ICPIN)	✓	LC5	>43.2	n/a	n/a	<2.315	1
			✓	LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
06-4671-5729	Reproduction	Linear Interpolation (ICPIN)	✓	IC5	>43.2	n/a	n/a	<2.315	1
			✓	IC10	>43.2	n/a	n/a	<2.315	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
01-4257-0648	7d Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Criteria
00-6482-2605	Reproduction	Control Resp	31.2	15	>>	Yes	Passes Criteria
06-4671-5729	Reproduction	Control Resp	31.2	15	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	0.00%
2.7		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
5.4		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
10.8		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
21.6		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%
43.2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-11.11%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	10	31.2	22.53	39.87	0	41	3.832	12.12	38.84%	0.00%
2.7		10	33	30.69	35.31	28	38	1.022	3.232	9.79%	-5.77%
5.4		10	28.9	21.09	36.71	0	40	3.453	10.92	37.78%	7.37%
10.8		10	34.7	31.66	37.74	28	41	1.342	4.244	12.23%	-11.22%
21.6		10	33.5	31.02	35.98	27	39	1.098	3.472	10.36%	-7.37%
43.2		10	31.6	24.6	38.6	13	42	3.096	9.789	30.98%	-1.28%

Ceriodaphnia 7-d Survival and Reproduction Test — Pace National

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2.7		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5.4		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.8		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
21.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
43.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	31	35	0	35	41	33	35	39	40	23
2.7		32	29	28	36	31	32	38	33	36	35
5.4		32	33	26	31	40	31	36	27	33	0
10.8		36	29	28	39	33	33	37	38	41	33
21.6		38	31	33	39	31	27	33	34	34	35
43.2		42	38	13	39	34	36	33	37	28	16

TOXICITY TEST DATA SHEET - *Pimephales promelas* (fathead minnow) 7-Day Survival & Weight Data

Lakeland STP

Test Date: July 16-23, 2019

NPDES #: TN0078255

NUMBER OF SURVIVORS

Sample Distribution		Sample #1 Tues/Wed		Sample #2 Thurs/Fri		Sample #3 Sat/Sun/Mon			
Day of the Week and Date		Tue 7/16/19	Wed 7/17/19	Thu 7/18/19	Fri 7/19/19	Sat 7/20/19	Sun 7/21/19	Mon 7/22/19	Tue 7/23/19
Effluent Conc. In%	ID of Rep.	0 hours	24 hours	48 hours	72 hours	96 hours	120 hours	144 hours	168 hours
Control #8	A: 1	10	10	10	10	10	10	10	10
	B: 6	10	10	10	10	10	10	10	10 (1 SS)
	C: 3	10	10	10	10	10	10	10	10
	D: 1	10	9	9	9	9	9	9	9 (1 SS)
2.7	A: 2	10	10	10	10	10	10	10	10 (1 SS)
	B: 5	10	10	10	10	10	10	10	10
	C: 5	10	10	10	10	10	10	10	10 (1 SS)
	D: 3	10	10	10	10	10	10	10	10 (2 SS)
5.4	A: 3	10	10	10	10	10	10	10	9
	B: 4	10	9	9	9	9	9	9	9 (2 SS)
	C: 1	10	10	10	10	10	10	10	10
	D: 2	10	9	9	9	9	9	9	9 (1 SS)
10.8(PL)	A: 4	10	10	10	10	10	10	10	10 (1 SS)
	B: 3	10	10	10	10	10	10	10	10
	C: 6	10	10	10	10	10	10	10	10
	D: 6	10	10	10	10	10	10	10	10
21.6	A: 5	10	10	10	10	9	9	9	9
	B: 2	10	10	10	10	10	10	10	10
	C: 2	10	10	10	10	10	10	10	10 (1 SS)
	D: 4	10	10	10	10	10	10	10	10
43.2	A: 6	10	10	10	10	9	9	9	8
	B: 1	10	10	10	10	10	10	10	10 (2 SS)
	C: 4	10	10	10	10	10	10	10	10 (1 SS)
	D: 5	10	10	10	10	10	10	10	10 (2 SS)
Initials of Analyst Checking Survival		AM	RC/JSV	JOD/BB	AME	JOD/NY	NY	NY	JOD/BB
Time that Minnows were Examined:		13:49	11:33	11:59	13:50	13:30	12:00	11:18	12:49
Carboy used to dilute sample:		B 7-15	B 7-16	B 7-17	B 7-18	B 7-19	B 7-20	B 7-21	

Fish Cup Batch/Lot: 5000X82944

Brine Shrimp Lot: 8313223

071519HD Minnows were hatched on 7/15/2019

COMMENTS: Minnows used in this test are from ESC Lot#

WEIGHT DATA for SURVIVING MINNOWS

		Weight Empty Boat (mg)	Boat w/ Fish (mg)	Weight of Larvae (mg)	Mean Weight of Larvae (mg)	Total of Mean	Mean per Concentration
Control	A	1317.37	1324.21	6.84	0.684	2.1830	0.5457
	B	1317.83	1323.28	5.45	0.545		
	C	1315.66	1320.6	4.94	0.494		
	D	1316.46	1321.06	4.6	0.46		
2.7	A	1305.08	1310.12	5.04	0.504	1.8890	0.4723
	B	1316.58	1321.49	4.91	0.491		
	C	1327.62	1332.7	5.08	0.508		
	D	1310.27	1314.13	3.86	0.386		
5.4	A	1318.28	1323.63	5.35	0.535	1.8580	0.4645
	B	1320.56	1325.47	4.91	0.491		
	C	1319.24	1323.86	4.62	0.462		
	D	1300.52	1304.22	3.7	0.37		
10.8(PL)	A	1306.23	1311.21	4.98	0.498	1.8970	0.4743
	B	1328.36	1332.87	4.51	0.451		
	C	1324.91	1329.91	5	0.5		
	D	1316.28	1320.76	4.48	0.448		
21.6	A	1314.05	1318.84	4.79	0.479	1.9910	0.4978
	B	1325.69	1330.43	4.74	0.474		
	C	1315.99	1321.42	5.43	0.543		
	D	1310.86	1315.81	4.95	0.495		
43.2	A	1313.46	1318.55	5.09	0.509	1.8930	0.4733
	B	1310.53	1314.97	4.44	0.444		
	C	1301.02	1305.99	4.97	0.497		
	D	1324.52	1328.95	4.43	0.443		
Analyst:		JOD	CGM				

Date & Time Put in Oven	Date & Time Removed
7-23-19 @ 12:55	7-25-19 @ 9:57

Oven Temp:	74°C	Oven Temp:	73°C
Analyst:	JOD	Analyst:	CGM

Survival ≥ 80%?

YES	NO
X	

≥ 0.25mg Average Weight in Surviving Controls?

YES	NO
X	

Control Valid?

YES	NO
X	

Login #: L1118659 -01,-02,-03

CETIS Summary Report

Pace National

Fathead Minnow 7-d Larval Survival and Growth Test

Batch ID:	08-9790-0705	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Clarissa Moore
Start Date:	16 Jul-19	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	23 Jul-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CO **Age:** <36

Sample ID:	05-7297-7925	**Code:**	2226F305	**Project:**	
Sample Date:	15 Jul-19 10:30	**Material:**	POTW Effluent	**Source:**	
Receipt Date:	16 Jul-19 08:45	**CAS (PC):**		**Station:**	
Sample Age:	14h	**Client:**	Lakeland STP		

Comments:
Lakeland STP (TN0078255) L1118659 -01,-02,-03

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	TU	PMSD	S
09-3134-6579	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test		43.2	>43.2	n/a	2.315	18.4%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
02-2422-8650	7d Survival Rate	Linear Interpolation (ICPIN)		LC5	>43.2	n/a	n/a	<2.315	1
				LC10	>43.2	n/a	n/a	<2.315	
			✓	LC15	>43.2	n/a	n/a	<2.315	
			✓	LC20	>43.2	n/a	n/a	<2.315	
			✓	LC25	>43.2	n/a	n/a	<2.315	
			✓	LC40	>43.2	n/a	n/a	<2.315	
			✓	LC50	>43.2	n/a	n/a	<2.315	
08-1880-6131	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓	IC5	1.075	0.2561	n/a	93.06	1
			✓	IC10	2.149	0.5121	n/a	46.53	
			✓	IC15	>43.2	n/a	n/a	<2.315	
			✓	IC20	>43.2	n/a	n/a	<2.315	
			✓	IC25	>43.2	n/a	n/a	<2.315	
			✓	IC40	>43.2	n/a	n/a	<2.315	
			✓	IC50	>43.2	n/a	n/a	<2.315	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
02-2422-8650	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Criteria
08-1880-6131	Mean Dry Biomass-mg	Control Resp	0.5458	0.25	>>	Yes	Passes Criteria
09-3134-6579	Mean Dry Biomass-mg	Control Resp	0.5458	0.25	>>	Yes	Passes Criteria

7d Survival Rate Summary

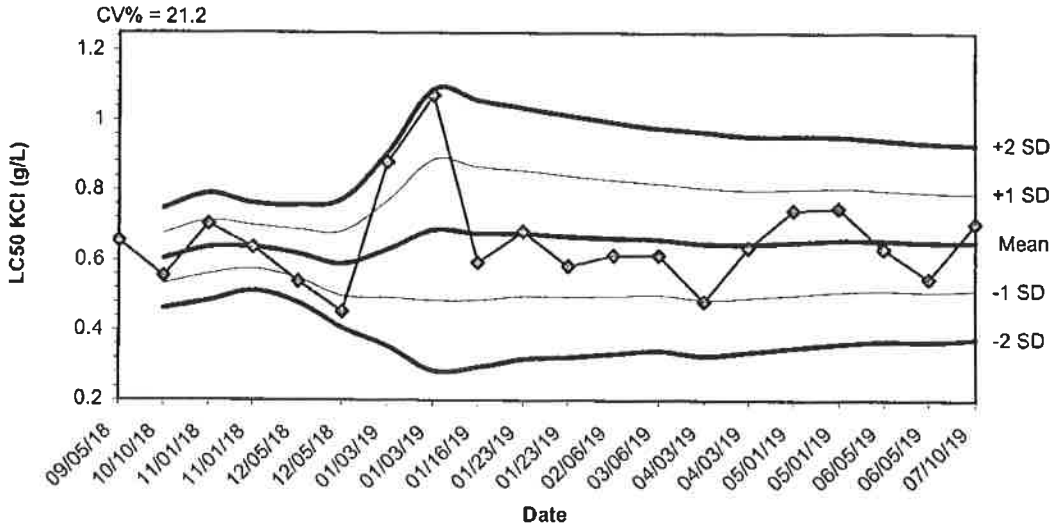
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
2.7		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
5.4		4	0.9250	0.8454	1.0000	0.9000	1.0000	0.0250	0.0500	5.41%	5.13%
10.8		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.56%
21.6		4	0.9750	0.8954	1.0000	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
43.2		4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	2.56%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.5458	0.3889	0.7026	0.46	0.684	0.04928	0.09856	18.06%	0.00%
2.7		4	0.4723	0.38	0.5645	0.386	0.508	0.02898	0.05796	12.27%	13.47%
5.4		4	0.4645	0.3535	0.5755	0.37	0.535	0.03489	0.06978	15.02%	14.89%
10.8		4	0.4742	0.4287	0.5198	0.448	0.5	0.01431	0.02862	6.03%	13.10%
21.6		4	0.4978	0.4477	0.5478	0.474	0.543	0.01573	0.03147	6.32%	8.79%
43.2		4	0.4732	0.418	0.5285	0.443	0.509	0.01735	0.03471	7.33%	13.29%

Fathead Minnow 7-d Larval Survival and Growth Test						Pace National
7d Survival Rate Detail						
Conc-%	**Code**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	
0	D	1.0000	1.0000	1.0000	0.9000	
2.7		1.0000	1.0000	1.0000	1.0000	
5.4		0.9000	0.9000	1.0000	0.9000	
10.8		1.0000	1.0000	1.0000	1.0000	
21.6		0.9000	1.0000	1.0000	1.0000	
43.2		0.8000	1.0000	1.0000	1.0000	
Mean Dry Biomass-mg Detail						
Conc-%	**Code**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	
0	D	0.684	0.545	0.494	0.46	
2.7		0.504	0.491	0.508	0.386	
5.4		0.535	0.491	0.462	0.37	
10.8		0.498	0.451	0.5	0.448	
21.6		0.479	0.474	0.543	0.495	
43.2		0.509	0.444	0.497	0.443	

Control Chart for July 2019 Acute C. dubia Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
09/05/18	0.6547					
10/10/18	0.5535	0.6041	0.5325	0.4610	0.6757	0.7472
11/01/18	0.7040	0.6374	0.5607	0.4839	0.7141	0.7909
11/01/18	0.6373	0.6374	0.5747	0.5121	0.7000	0.7627
12/05/18	0.5391	0.6177	0.5479	0.4781	0.6875	0.7574
12/05/18	0.4531	0.5903	0.4985	0.4068	0.6820	0.7738
01/03/19	0.8801	0.6317	0.4938	0.3559	0.7696	0.9075
01/03/19	1.0710	0.6866	0.4855	0.2845	0.8877	1.0887
01/16/19	0.5946	0.6764	0.4858	0.2953	0.8669	1.0575
01/23/19	0.6830	0.6770	0.4974	0.3177	0.8567	1.0364
01/23/19	0.5840	0.6686	0.4958	0.3231	0.8413	1.0141
02/06/19	0.6156	0.6642	0.4988	0.3334	0.8296	0.9950
03/06/19	0.6156	0.6604	0.5015	0.3426	0.8194	0.9783
04/03/19	0.4830	0.6478	0.4879	0.3280	0.8077	0.9675
04/03/19	0.6373	0.6471	0.4930	0.3389	0.8012	0.9553
05/01/19	0.7436	0.6531	0.5023	0.3515	0.8039	0.9547
05/01/19	0.7500	0.6588	0.5109	0.3630	0.8067	0.9546
06/05/19	0.6338	0.6574	0.5138	0.3702	0.8010	0.9446
06/05/19	0.5477	0.6516	0.5098	0.3680	0.7935	0.9353
07/10/19	0.7071	0.6544	0.5158	0.3772	0.7930	0.9316

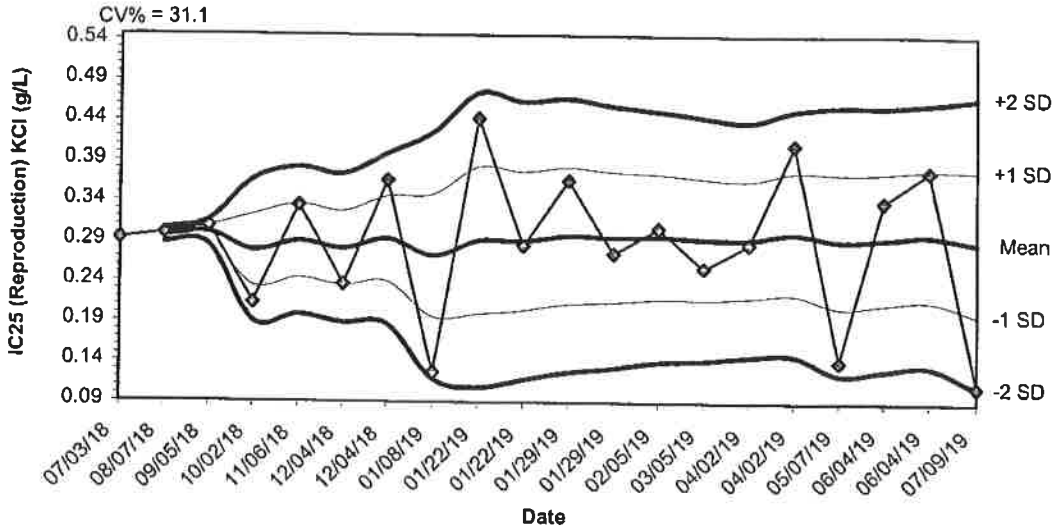
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

July 2019
Reference Toxicant Test

Control Chart for July 2019 Chronic C. dubia Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
07/03/18	0.2935					
08/07/18	0.2994	0.2965	0.2923	0.2881	0.3006	0.3048
09/05/18	0.3091	0.3007	0.2928	0.2849	0.3085	0.3164
10/02/18	0.2133	0.2788	0.2347	0.1905	0.3230	0.3671
11/06/18	0.3355	0.2902	0.2443	0.1984	0.3360	0.3819
12/04/18	0.2369	0.2813	0.2348	0.1884	0.3277	0.3742
12/04/18	0.3662	0.2934	0.2402	0.1871	0.3466	0.3998
01/08/19	0.1269	0.2726	0.1959	0.1191	0.3493	0.4261
01/22/19	0.4433	0.2916	0.2000	0.1084	0.3832	0.4748
01/22/19	0.2852	0.2909	0.2045	0.1182	0.3773	0.4637
01/29/19	0.3669	0.2978	0.2127	0.1277	0.3829	0.4680
01/29/19	0.2759	0.2960	0.2146	0.1332	0.3774	0.4588
02/05/19	0.3074	0.2969	0.2189	0.1409	0.3749	0.4528
03/05/19	0.2578	0.2941	0.2184	0.1428	0.3697	0.4454
04/02/19	0.2880	0.2937	0.2208	0.1479	0.3666	0.4395
04/02/19	0.4115	0.3011	0.2247	0.1484	0.3774	0.4537
05/07/19	0.1409	0.2916	0.2081	0.1246	0.3751	0.4586
06/04/19	0.3408	0.2944	0.2125	0.1307	0.3762	0.4580
06/04/19	0.3784	0.2988	0.2169	0.1351	0.3806	0.4625
07/09/19	0.1108	0.2894	0.1993	0.1093	0.3794	0.4695

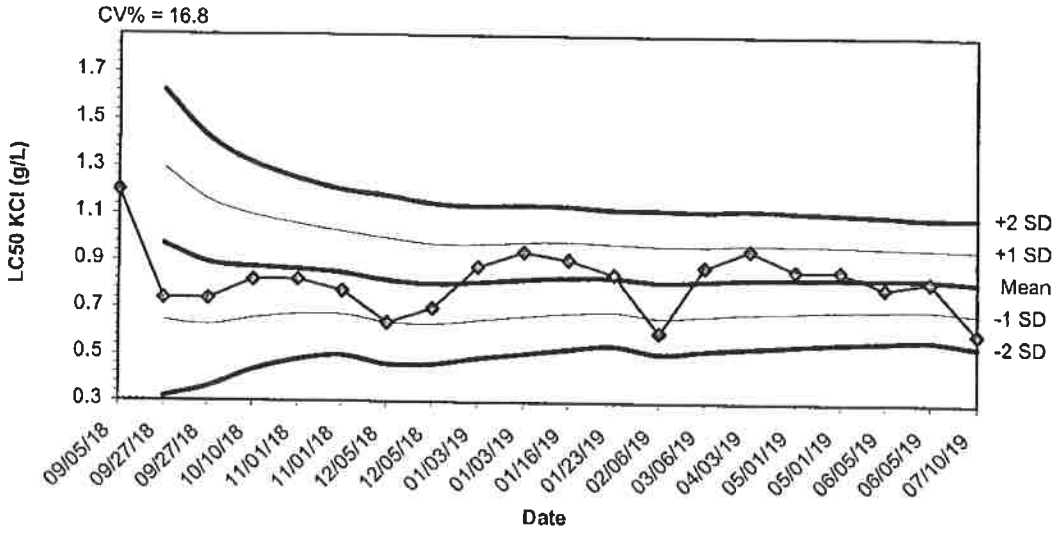
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

July 2019
Reference Toxicant Test

Control Chart for July 2019 Acute Minnow Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
09/05/18	1.2000					
09/27/18	0.7387	0.9694	0.6432	0.3170	1.2955	1.6217
09/27/18	0.7387	0.8925	0.6261	0.3598	1.1588	1.4251
10/10/18	0.8196	0.8743	0.6538	0.4333	1.0947	1.3152
11/01/18	0.8196	0.8633	0.6708	0.4783	1.0558	1.2483
11/01/18	0.7715	0.8480	0.6718	0.4956	1.0242	1.2005
12/05/18	0.6375	0.8179	0.6385	0.4590	0.9974	1.1769
12/05/18	0.7000	0.8032	0.6319	0.4606	0.9745	1.1458
01/03/19	0.8785	0.8116	0.6494	0.4872	0.9738	1.1360
01/03/19	0.9415	0.8246	0.6662	0.5079	0.9829	1.1412
01/16/19	0.9094	0.8323	0.6799	0.5275	0.9847	1.1370
01/23/19	0.8485	0.8336	0.6883	0.5429	0.9790	1.1244
02/06/19	0.6000	0.8157	0.6621	0.5086	0.9692	1.1227
03/06/19	0.8801	0.8203	0.6718	0.5233	0.9688	1.1173
04/03/19	0.9524	0.8291	0.6820	0.5348	0.9762	1.1233
05/01/19	0.8667	0.8314	0.6890	0.5466	0.9739	1.1163
05/01/19	0.8647	0.8334	0.6952	0.5571	0.9715	1.1097
06/05/19	0.7917	0.8311	0.6967	0.5623	0.9654	1.0998
06/05/19	0.8196	0.8305	0.6998	0.5692	0.9611	1.0917
07/10/19	0.6000	0.8189	0.6818	0.5446	0.9561	1.0933

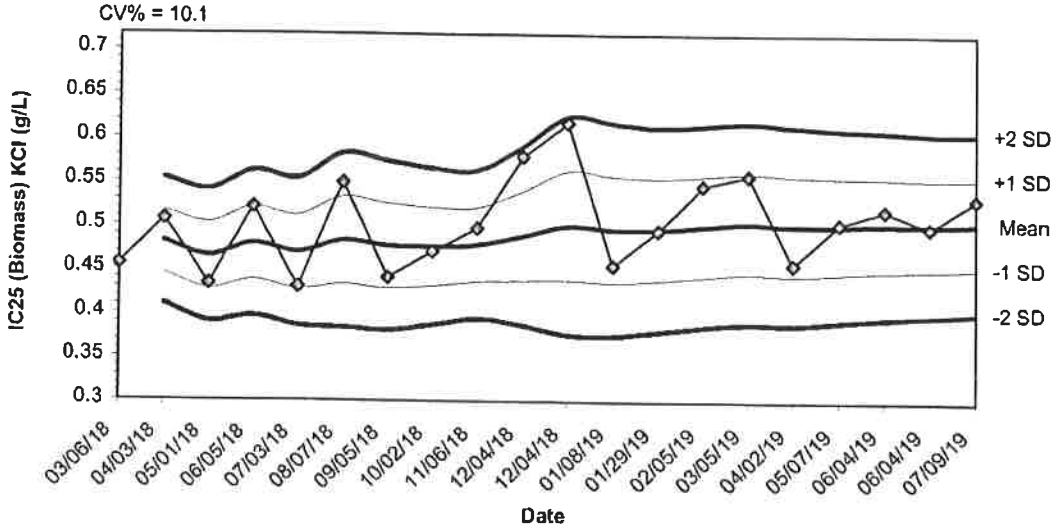
Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

July 2019
Reference Toxicant Test

Control Chart for July 2019 Chronic Minnow Refrence Toxicant



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
03/06/18	0.4562					
04/03/18	0.5069	0.4816	0.4457	0.4098	0.5174	0.5533
05/01/18	0.4335	0.4655	0.4280	0.3904	0.5031	0.5407
06/05/18	0.5210	0.4794	0.4380	0.3967	0.5208	0.5621
07/03/18	0.4300	0.4695	0.4274	0.3854	0.5116	0.5537
08/07/18	0.5491	0.4828	0.4331	0.3833	0.5325	0.5822
09/05/18	0.4410	0.4768	0.4288	0.3807	0.5249	0.5729
10/02/18	0.4705	0.4760	0.4315	0.3869	0.5206	0.5651
11/06/18	0.4976	0.4784	0.4361	0.3938	0.5207	0.5630
12/04/18	0.5790	0.4885	0.4375	0.3865	0.5395	0.5905
12/04/18	0.6174	0.5002	0.4381	0.3761	0.5623	0.6243
01/08/19	0.4553	0.4965	0.4359	0.3753	0.5570	0.6176
01/29/19	0.4956	0.4964	0.4384	0.3804	0.5544	0.6124
02/05/19	0.5462	0.5000	0.4427	0.3854	0.5572	0.6145
03/05/19	0.5583	0.5038	0.4466	0.3894	0.5611	0.6183
04/02/19	0.4570	0.5009	0.4444	0.3879	0.5574	0.6139
05/07/19	0.5036	0.5011	0.4463	0.3916	0.5558	0.6105
06/04/19	0.5190	0.5021	0.4488	0.3956	0.5553	0.6086
06/04/19	0.4995	0.5019	0.4502	0.3984	0.5537	0.6055
07/09/19	0.5320	0.5034	0.4526	0.4018	0.5543	0.6051

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mt. Juliet, TN 37122

(615) 773-7549
(615) 758-5859 Fax

July 2019
Reference Toxicant Test

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected:

Phone: 901-870-1803
Fax:

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Chris Hatcher

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3								
SAMPLE 1		WW				3	X	X	X								.01
Sample 1	Comp	ww		7-15-19	10:30		X										
Sample 2	Comp	ww		7-15-19	10:30			X									
Sample 3	Comp	ww		7-15-19	10:30				X								

Analysis / Container / Preservative

Chain of Custody Page: ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800 767 5859
Fax: 615-758-5859

L# L1118689
A127

Acctnum: LAKE02
Template: T144780
Prelogin: P716776
TSR: 510 - Liana M Dranes
PB: 7-17-19

Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #1 - Collect a 24hr composite sample from Sunday-Monday (7/14-7/15). Ship sample overnight to arrive at lab on Tuesday 7/16/2019.

pH 7.04 Temp 25.4° Flow_____ Other_____

Samples returned via:
__ UPS ✓ FedEx __ Courier _____

Tracking # 1082 5988 102

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR
Christopher Hatcher	7-15-19	10:45AM		Ø
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.1°F °C Bottles Received: 2.8+.1=2.9 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 7-16-19 Time: 8:45

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected:

Phone: 901-870-1803
Fax:

Client Project #

Lab Project #: LAKE02-BIOMON

Collected by (print): Chris Hatcher

Site/Facility ID #: TN0078255

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N ___ Y X

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No of Cntrs	ALK610 125mlHDPE NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3								Remarks	Sample # (lab only)
SAMPLE 2		WW				3	X	X	X									02
Sample 1	Comp	WW		7-17-19	7:50am		X											
Sample 2	Comp	WW		7-17-19	"			X										
Sample 3	Comp	WW		7-17-19	"				X									

Chain of Custody Page ___ of ___

Pace Analytical
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 111965
H005

Acctnum: LAKE02
Template: T144781
Prelogin: P716777
TSR: 510 - Llana M Dranes
PB: 7-17

Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks: Sample #2 - Collect a 24hr composite sample from Tues-Wed (7/14-7/15). Ship sample overnight to arrive at lab on Thursday 7/16/2019.

pH 7.10 Temp 25.5°

Flow _____ Other _____

Samples returned via: ___ UPS ___ FedEx ___ Courier _____

Tracking # 1Z82 5988 1073

Sample Receipt Checklist
COC Seal Present/Intact: Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

RAD SCREEN: <0.5 mR/hr

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Trip Blank Received: Yes (No) HCL / MeoH TBR
	7-17-19	12:20pm		

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 4.3&6 °C 2.1-2=1.9	Bottles Received: 3	If preservation required by Login: Date/Time
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 7-18-19	Time: 8:45	Hold: Condition: NCF

City of Lakeland
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

Report to: Spencer Smalley
Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring
City/State Collected:

Phone: 901-870-1803
Fax:
Client Project #
Lab Project #: LAKE02-BIOMON

Collected by (print): Chris Hetcher
Site/Facility ID #: TN0078255
P.O. #

Collected by (signature):
Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Quote #
Date Results Needed

Immediately Packed on Ice N ___ Y X

L# 1118659
D112
Acctnum: LAKE02
Template: T144783
Prelogin: P716778
TSR: 510 - Liana M Dranes
PB: 7-1 ...
Shipped Via: FedEX Ground

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3	Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X		-03
Sample 1	Comp	ww		7-19-19	8:15 Am	1	X				
Sample 2	Comp	ww		7-19-19	8:15 Am	1		X			
Sample 3	Comp	ww		7-14-19	8:15 Am	1			X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other ______

Remarks: Sample #3 - Collect a 24hr composite sample from Thurs-Fri (7/16-7/17). Ship sample overnight to arrive at lab on Saturday 7/18/2019. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 6.99 Temp 25.4°
Flow ______ Other ______

Samples returned via: __ UPS __ FedEx __ Courier ______
Tracking # FedEx 1083 5958 1121

Sample Receipt Checklist
COC Seal Present/Intact: _NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD SCREEN: <0.5 mR/hr

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Christopher [signature]	7-17-19	9:15 Am		
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 38.1-3 °C Bottles Received: 3
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) [signature]	Date: 7/20/19 Time: 8:45

If preservation required by Login: Date/Time
Hold:
Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 02, 2019

City of Lakeland

Sample Delivery Group:	L1162222
Samples Received:	11/19/2019
Project Number:	
Description:	Lakeland Biomonitoring
Site:	TN0078255
Report To:	Spencer Smalley 10001 HWY 70 Lakeland, TN 38002

Entire Report Reviewed By: Liana M. Dranes

Liana M Dranes
Project Manager

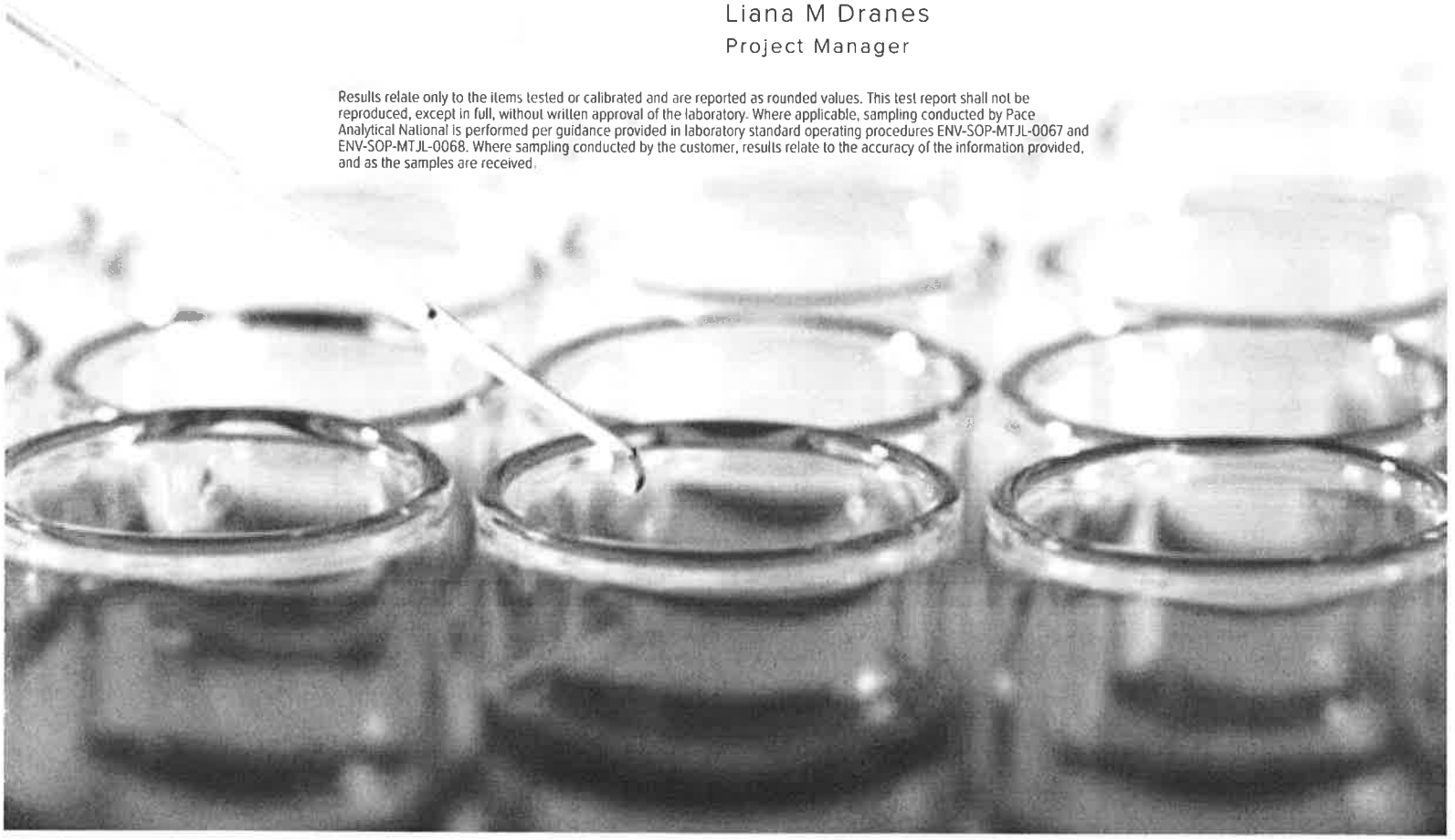


TABLE OF CONTENTS

ONE LAB. NATIONWIDE

SAMPLE SUMMARY

SAMPLE 1 L1162222-01 WW

Collected by: Chris Hatcher | Collected date/time: 11/18/19 08:05 | Received date/time: 11/19/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Aquatic Toxicity by Method 1000.0	WG1384142	1	11/19/19 13:37	11/19/19 13:37	CM	Mt. Juliet, TN
Aquatic Toxicity by Method 1002.0	WG1384142	1	11/19/19 13:08	11/19/19 13:08	CM	Mt. Juliet, TN
Wet Chemistry by Method 130.1	WG1385291	1	11/24/19 07:10	11/27/19 13:06	JER	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1386176	1	11/27/19 23:06	11/27/19 23:06	JER	Mt. Juliet, TN

SAMPLE 2 L1162222-02 WW

Collected by: Chris Hatcher | Collected date/time: 11/20/19 07:35 | Received date/time: 11/21/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1385291	1	11/24/19 07:10	11/27/19 13:07	JER	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1386176	1	11/27/19 23:07	11/27/19 23:07	JER	Mt. Juliet, TN

SAMPLE 3 L1162222-03 WW

Collected by: Chris Hatcher | Collected date/time: 11/22/19 07:45 | Received date/time: 11/23/19 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 130.1	WG1385296	1	11/26/19 07:07	11/27/19 16:34	JER	Mt. Juliet, TN
Wet Chemistry by Method 310.2	WG1386176	1	11/27/19 23:08	11/27/19 23:08	JER	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Liana M. Dranes

Liana M Dranes
Project Manager

Project Narrative

Please review all information in this report for accuracy and completeness. Contact our office within ten days if there are any questions.

Chronic Test Methods are described in "Short Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Freshwater Organisms" (EPA/600/4-89/001).

The Biomonitoring results in this report are only a summary of the tests performed. A detailed report will follow. The detailed report (not this summary sheet) must be submitted to the appropriate regulatory agency.

Additional Information

Analyte	Result	Units
pH (On Site)	7.09	su
Temperature (on-site)	18	

Aquatic Toxicity by Method 1000.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - Minnow	>43.2 (PASS)		11/19/2019 13:37	WG1384142

Aquatic Toxicity by Method 1002.0

Analyte	Result	Qualifier	Analysis	Batch
	%		date / time	
IC25 - C. dubia	>43.2 (PASS)		11/19/2019 13:08	WG1384142

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	51.5	B	30.0	1	11/27/2019 13:06	WG1385291

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	64.0		20.0	1	11/27/2019 23:06	WG1386176

Additional Information

Analyte	Result	Units
pH (On Site)	7.01	su
Temperature (on-site)	19	
Dissolved Oxygen (on-site)	7.29	mg/l

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
Hardness (colorimetric) as CaCO3	40.8	B	30.0	1	11/27/2019 13:07	WG1385291

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
	mg/l		mg/l			
ALK	65.6		20.0	1	11/27/2019 23:07	WG1386176

Additional Information

Analyte	Result	Units
pH (On Site)	7.01	su
Temperature (on-site)	20	

Wet Chemistry by Method 130.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Hardness (colorimetric) as CaCO3	50.1	B	30.0	1	11/27/2019 16:34	WG1385296

Wet Chemistry by Method 310.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
ALK	64.1		20.0	1	11/27/2019 23:08	WG1386176

Method Blank (MB)

(MB) R3477105-1 11/27/19 12:49

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	11.5	J	1.43	30.0

L1162098-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1162098-01 11/27/19 12:54 • (DUP) R3477105-5 11/27/19 12:55

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	114	97.4	1	15.7		20

L1162104-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1162104-02 11/27/19 12:59 • (DUP) R3477105-6 11/27/19 13:00

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	137	125	1	9.16		20

Laboratory Control Sample (LCS)

(LCS) R3477105-2 11/27/19 12:50

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	94.7	94.7	85.0-115	

L1162084-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1162084-02 11/27/19 12:51 • (MS) R3477105-3 11/27/19 12:51 • (MSD) R3477105-4 11/27/19 12:52

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	190	240	241	50.0	51.0	1	80.0-120	E J6	E J6	0.416	20

Method Blank (MB)

(MB) R3477113-1 11/27/19 16:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hardness (colorimetric) as CaCO3	12.6	J	1.43	30.0

L1162222-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1162222-03 11/27/19 16:34 • (DUP) R3477113-3 11/27/19 16:35

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	50.1	45.1	1	10.5		20

L1163520-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1163520-04 11/27/19 16:42 • (DUP) R3477113-6 11/27/19 16:43

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Hardness (colorimetric) as CaCO3	102	97.7	1	4.31		20

Laboratory Control Sample (LCS)

(LCS) R3477113-2 11/27/19 16:32

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hardness (colorimetric) as CaCO3	100	93.3	93.3	85.0-115	

L1163520-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1163520-02 11/27/19 16:37 • (MS) R3477113-4 11/27/19 16:37 • (MSD) R3477113-5 11/27/19 16:38

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Hardness (colorimetric) as CaCO3	100	121	198	201	77.0	80.0	1	80.0-120	J6	E	1.50	20

Method Blank (MB)

(MB) R3477165-1 11/27/19 22:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
ALK	U		6.30	20.0

L1162222-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1162222-03 11/27/19 23:08 • (DUP) R3477165-3 11/27/19 23:09

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
ALK	64.1	64.8	1	1.09		20

Laboratory Control Sample (LCS)

(LCS) R3477165-2 11/27/19 22:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
ALK	200	208	104	85.0-115	

Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: **Lakeland Biomonitoring**

City/State Collected:

Please Circle: PT MT CT ET

Phone: 901-870-1803
Fax:

Client Project #

Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatcher

Site/Facility ID # TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3									
									27									
SAMPLE 1		WW				3	X	X	X									
Sample 1	Comp	WW		11-18-19	8:05AM		X											-01
Sample 2	Comp	WW		11-18-19	8:05AM			X										
Sample 3	Comp	WW		11-18-19	8:05AM				X									

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #1 - Collect a 24hr composite sample from Sunday-Monday (11/17-11/18). Ship sample overnight to arrive at lab on Tuesday 11/19/2019.

pH 7.09 Temp 18.0°
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 1319 2020 5720

Relinquished by : (Signature) — Date: 11-18-19 — Time: 12:00pm — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received for lab by: (Signature) Carol Kemp — Date: 11/19/19 — Time: 8:45

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 4.6+1=4.7 °C — Bottles Received: 3

If preservation required by Login: Date/Time

Hold: — Condition: NCF / OK

Sample Receipt Checklist
COC Seal Present/Intact: X NP Y N
COC Signed/Accurate: X Y N
Bottles arrive intact: X Y N
Correct bottles used: X Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: X Y N

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # 162222
G011

Acctnum: LAKE02
Template: T144780
Prelogin: P740278
PM: 510 - Llana M Dranes
PB: JB 11-11-19
Shipped Via: FedEX Ground

Remarks | Sample # (lab only)

City of Lakeland

10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Report to: **Spencer Smalley**

Email To: ssmalley@lakelandtn.org

Project Description: **Lakeland Biomonitoring**

City/State Collected:

Please Circle: PT MT CT ET

Phone: **901-870-1803**
Fax:

Client Project #

Lab Project # **LAKE02-BIOMON**

Collected by (print): Chris Hatcher

Site/Facility ID # **TN0078255**

P.O. #

Collected by (signature): [signature]

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately Packed on Ice N___ Y X

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3	Remarks	Sample # (lab only)
Pres Chk									<2		
SAMPLE 2		**WW**				**3**	**X**	**X**	**X**		
Sample 1	Comp	ww		11-20-19	7:35am		X				-02
Sample 2	Comp	ww		11-20-19	7:35am			X			
Sample 3	Comp	ww		11-20-19	7:35am				X		

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other______

Remarks:Sample #2 - Collect a 24hr composite sample from Tues-Wed (11/19-11/20). Ship sample overnight to arrive at lab on Thursday 11/21/2019.

pH 7.01 Temp 19.0
Flow ______ Other DO 7.79 mg/L

Samples returned via:
__ UPS __ FedEx __ Courier ______

Tracking # 132120205252

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	
[signature]	11-20-19	8:45 Am		Trip Blank Received: Yes / No; HCL / MeoH; TBR
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 0.7+1=0.8 °C; Bottles Received: 3
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) [signature]	Date: 11/21/19 Time: 8:30

Chain of Custody Page ___ of ___

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1162222

D045

Acctnum: LAKE02

Template: T144781

Prelogin: P740279

PM: 510 - Liana M Dranes

PB: JB 11-11-19

Shipped Via: **FedEX Ground**

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

City of Lakeland
10001 HWY 70
Lakeland, TN 38002

Billing Information:
Spencer Smalley
10001 HWY 70
Lakeland, TN 38002

Pres Chk

Report to: Spencer Smalley

Email To: ssmalley@lakelandtn.org

Project Description: Lakeland Biomonitoring

City/State Collected:

Please Circle: PT MT CT ET

Phone: 901-870-1803
Fax:

Client Project #

Lab Project # LAKE02-BIOMON

Collected by (print): Chris Hatch

Site/Facility ID # TN0078255

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	ALKBIO 125mlHDPE-NoPres	Biomonitoring 1 Gal-HDPE-NoPres	HARD 250mlHDPE-HNO3									Remarks	Sample # (lab only)
SAMPLE 3		WW				3	X	X	X										-03
Sample 1	Comp	ww		11-22-19	7:45am		X												
Sample 2	Comp	ww		11-22-19	7:45am			X											
Sample 3	Comp	ww		11-22-19	7:45am				X										

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1162222

Tab D137

Acctnum: LAKE02
Template: T144783
Prelogin: P740280
PM: 510 - Liana M Dranes
PB: JB 11-11-19
Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:Sample #3 - Collect a 24hr composite sample from Thurs-Fri (11/21-11/22). Ship sample overnight to arrive at lab on Saturday 11/23/2019. **SATURDAY Delivery Shipping Labels Must Be Used**

pH 7.01 Temp 20.0°
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 132920205296

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Chris Hatch	11-22-19	9:30am	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No HCl / MeoH TBR

Temp: .2 -.1=.1 Bottles Received: 3

Date: 11/23/19 Time: 9:00

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK