APPENDIX F

Public Water Supply

2022 Kansas Public Water Supply
Harmful Algal Bloom
Seasonal Monitoring Program Guide

The Kansas Public Water System (PWS) Harmful Algal Bloom (HAB) Seasonal Monitoring Program is a voluntary participation program for Water Supply Systems, which provides consistent proactive monitoring for potential toxins through the HAB bloom season. It is intended to provide water systems with important information, so that treatment processes can be modified, or other measures taken to assure safe drinking water is provided to their customers. Early detection will also allow for timely notification to customers should an event occur.

This Guide provides guidelines on Harmful Algal bloom (HAB) monitoring and sampling periods and protocols, identifies acceptable analytical methods, and identifies cyanotoxin levels that will be used to make advisory decisions and consistent monitoring protocol for public water systems.

Human Health Effects of Cyanotoxins

Adverse health outcomes from exposure to cyanotoxins may range from a mild skin rash to serious illness or death. Acute illnesses caused by exposure to cyanotoxins have been reported, and after short-term exposures, microcystin and cylindrospermopsin could cause liver and kidney damage. The table below summarizes the health effects caused by the most common toxin producing cyanobacteria. The below table is taken from the EPA Health and Ecological Effects website at: https://www.epa.gov/cyanohabs/health-effects-cyanotoxins

Cyanotoxins	Acute Health Effects in Humans	Most common cyanobacteria producing toxin
Microcystin-LR	Abdominal pain, Headache, Sore throat, Vomiting and nausea, Dry	*Microcystis*, *Anabaena***, *Nodularia*, *Planktothrix*, *Fischerella*, *Nostoc, Oscillatoria*, and *Gloeotrichia*

Cyanotoxins	Acute Health Effects in Humans	Most common cyanobacteria producing toxin
	cough, Diarrhea, Blistering around the mouth, and Pneumonia	
Cylindrospermopsin	Fever, Headache, Vomiting, Bloody diarrhea	*Raphidiopsis (formerly Cylindrospermopsis) raciborskii, Aphanizomenon flos-aquae, Aphanizomenon gracile, Aphanizomenon ovalisporum, Umezakia natans, Anabaena bergii***, Anabaena lapponica, Anabaena planctonica***, *Lyngbya wollei, Rhaphidiopsis curvata,* and *Rhaphidiopsis mediterranea*
Anatoxin-a group	Tingling, burning, numbness, drowsiness, incoherent speech, salivation, respiratory paralysis leading to death*	*Chrysosporum (Aphanizomenon) ovalisporum, Cuspidothrix, Raphidiopsis (formerly Cylindrospermopsis), Cylindrospermum, Dolichospermum, Microcystis, Oscillatoria, Planktothrix, Phormidium, Anabaena flos-aquae***, *A. lemmermannii,*** *Raphidiopsis mediterranea* (strain of *Cylindrospermopsis raciborskii),* *Tychonema* and *Woronichinia*

Cyanotoxins	Acute Health Effects in Humans	Most common cyanobacteria producing toxin
Saxitoxin	In severe poisoning, illness typically progresses rapidly and may include gastrointestinal (nausea, vomiting) and neurological (cranial nerve dysfunction, a floating sensation, headache, muscle weakness, parasthesias and vertigo) signs and symptoms. Respiratory failure and death can occur from paralysis	*Marine dinoflagellates, cyanobacteria in the genera Anabaena**, Aphanizomenon, Planktothrix, Cylindrospermopsis, Lyngbya and Scytonema (Smith et al., 2012; Wiese et al., 2012).*

* Symptoms observed in animals.

**Note: most planktonic *Anabaena* have now been placed into the genus *Dolichospermum*

Numerical Cyanotoxin Thresholds for Drinking Water Health Advisories

In 2015, EPA developed Health Advisories (HA) for the two cyanobacterial toxins. These thresholds will be used to determine when a public health advisory will be issued for a detection of cyanotoxins in finished drinking water. These HAs are not regulations and should not be construed as legally enforceable federal standards. HAs may change as new information becomes available.

Cyanotoxin	Drinking Water Health Advisory (10-day)	Drinking Water Health Advisory (10-day)
	Bottle-fed infants and pre-school children	School-age children and adults

Microcystins	0.3 µg/L	1.6 µg/L
Cylindrospermopsin	0.7 µg/L	3 µg/L
Anatoxin-A	*	*
Saxitoxin	*	*

**A few States have determined their own guidance/action levels for Anatoxin-A and Saxitoxin. However, Kansas will continue to follow EPA's Guidance. From:*

https://www.epa.gov/cyanohabs/epa-drinking-water-health-advisories-cyanotoxins

Kansas PWS Proposed Monitoring Plan – (Surface Water Sources Only)

1. Monitoring Season will run from May 1 through October 31 of each year.
2. PWS will conduct initial microcystins monitoring for both raw and finished water during May of each year.
3. If no microcystins are detected, the PWS would begin weekly monitoring of raw water at water intake only (i.e. the same location as LT2 Samples are collected or water intake structure)
4. If microcystins are detected in the raw water, Contact KDHE PWS-Section immediately (contact information listed below). PWS will then collect a paired raw and finished water microcystins samples within 24 hours of receiving the positive results and complete analysis within five days.
5. Depending on the microcystins levels detected, KDHE may instruct PWS to continue weekly monitoring or request increased testing of raw and/or finished water. Modifications to water treatment process may be recommended to remove toxins.
6. PWS will continue with weekly paired raw and finished water microcystins monitoring until results are below the HA for at least two consecutive weeks or as recommended by KDHE.
7. PWS will subsidize the cost for monitoring. The current estimated cost for laboratory analysis is approximately $100.00 per sample. The cost to your PWS system will be no more than $25.00 per sample. This cost may be lower depending upon the number of participating PWS systems.
8. PWS systems that choose not to participate in the voluntary routine monitoring program will still be eligible to use Kansas Health and Environmental Laboratories (KHEL) for special samples if a HAB occurs in their source water, however there may delays in sample collection due to sample bottle scheduling and shipping and the cost is estimated at $75.00 per sample.

KDHE PWS HAB Contact Information

Questions regarding KDHE monitoring for public water supplies or to report possible Hazardous Algal Bloom or positive test results contact:

During Normal Business Hours (8:00 to 5:00pm, M-F):

Robert Gavin, Ph. 785-296-0643, rob.gavin@ks.gov

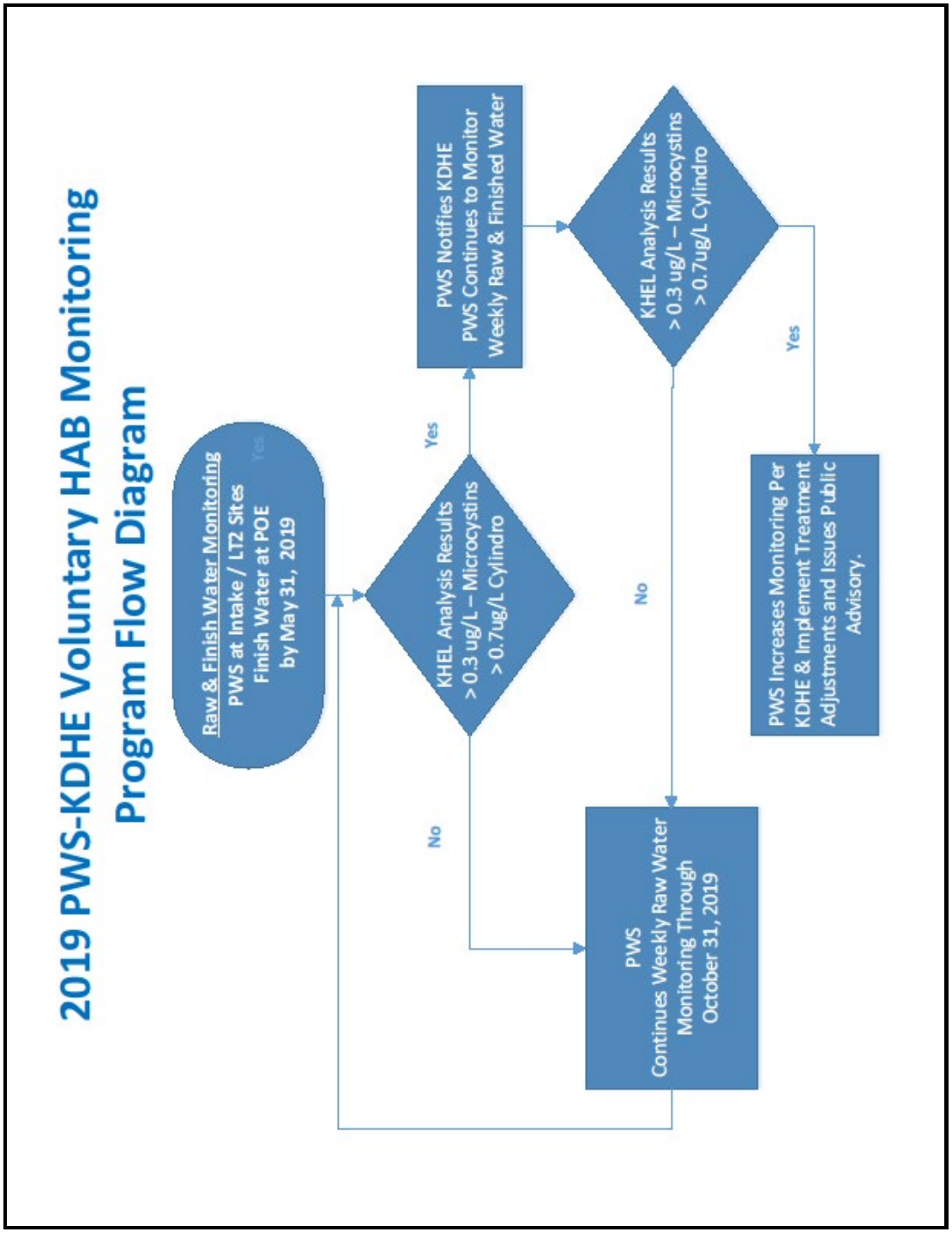
Amelia Springer, Ph. 785-296-5523, amelia.springer@ks.gov

Cathy Tucker-Vogel, Ph. 785-368-7130, cathy.tucker-vogel@ks.gov

After Hours or Weekends/Holidays contact (24/7):

KDHE Spill Hotline, 785-296-1679

For additional information related to cyanotoxins management for public water supply systems please refer to the following Environmental Protection Agency Website: https://www.epa.gov/cyanohabs



Public Notification Procedure

Public notification for total microcystins will be conducted in accordance with the provisions contained in this section. Should an exceedance of the 2015 EPA Health Advisory occur in the finished water or distribution system samples, Contact KDHE PWS-Section immediately. KDHE will assist the PWS to issue an immediate Tier 1 public Advisory (24-hour notification) informing all customers of the situation. If requested, a public notice template may be provided by KDHE containing the appropriate health effects language and use restrictions.

The geographic area under public notification may be limited based on distribution sample results and provisions described in the system's written contingency plan. Distribution sampling results may also be a consideration when modifying use restrictions or lifting the advisory.

Contingency Planning

KDHE encourages public water systems to work with KDHE, their local emergency management agency, and local health departments to develop a coordinated response to cyanotoxin detections in finished water above EPA designated health advisory Levels. A detailed response protocol should be included in the contingency plans of those PWSs using surface water sources susceptible to a harmful algal bloom.

Items the water system should address in their contingency plan include a communication strategy, including 24-hour emergency contacts, identification of critical users/possible susceptible populations, and considerations for water restrictions or connections to a backup water system. KDHE can provide additional guidance if requested.

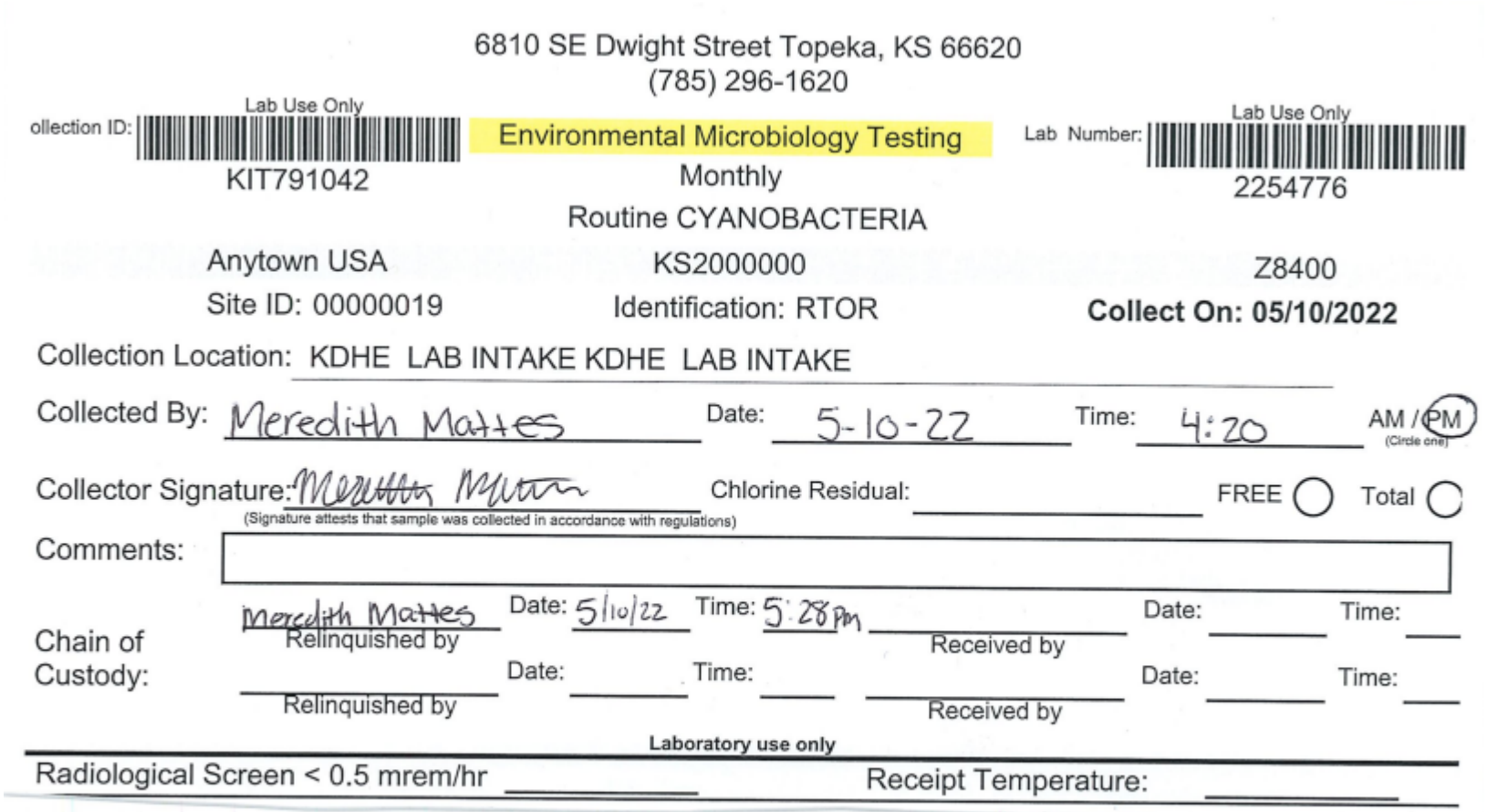
Helpful Links for PWS

Managing Cyanotoxins in Public Drinking Water Systems
https://www.epa.gov/ground-water-and-drinking-water/managing-cyanotoxins-public-drinking-water-systems

Drinking Water Cyanotoxin Risk Communication Toolbox
https://www.epa.gov/ground-water-and-drinking-water/drinking-water-cyanotoxin-risk-communication-toolbox

Cyanotoxin tools -Management Plan Template
https://www.epa.gov/ground-water-and-drinking-water/what-cyanotoxin-tools-are-available-public-water-systems

KDHE HAB Website
https://www.kdhe.ks.gov/777/Harmful-Algal-Bloom



6810 SE Dwight Street Topeka, KS 66620
(785) 296-1620

Lab Use Only
ollection ID: KIT791042

Environmental Microbiology Testing
Monthly
Routine CYANOBACTERIA

Lab Use Only
Lab Number: 2254776

Anytown USA | KS2000000 | Z8400
Site ID: 00000019 | Identification: RTOR | **Collect On: 05/10/2022**

Collection Location: KDHE LAB INTAKE KDHE LAB INTAKE

Collected By: Meredith Mattes Date: 5-10-22 Time: 4:20 AM / PM (Circle one)

Collector Signature: Meredith Mattes (Signature attests that sample was collected in accordance with regulations) Chlorine Residual: FREE ◯ Total ◯

Comments:

Chain of Custody:
Meredith Mattes Relinquished by Date: 5/10/22 Time: 5:28 pm — Received by Date: Time:
Relinquished by Date: Time: — Received by Date: Time:

Laboratory use only

Radiological Screen < 0.5 mrem/hr Receipt Temperature:

Example of Laboratory Algae Submission/Chain of Custody form – completed