

APPENDIX F

Public Water Supply

2020 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 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 customers. Early detection also allows 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/nutrient-policy-data/health-and-ecological-effects-with-Saxitoxin-information-added-from-the-World-Health-Organization-\(WHO\)](https://www.epa.gov/nutrient-policy-data/health-and-ecological-effects-with-Saxitoxin-information-added-from-the-World-Health-Organization-(WHO)).

Cyanotoxins	Acute Health Effects in Humans	Most common cyanobacteria producing toxin
Microcystin-LR	Abdominal pain, Headache, Sore throat, Vomiting and nausea, Dry cough, Diarrhea, Blistering around the mouth, and Pneumonia	<i>Microcystis</i> , <i>Anabaena</i> ** [†] , <i>Nodularia</i> , <i>Planktothrix</i> , <i>Fischerella</i> , <i>Nostoc</i> , <i>Oscillatoria</i> , and <i>Gloeotrichia</i>

Cyanotoxins	Acute Health Effects in Humans	Most common cyanobacteria producing toxin
Cylindrospermopsin	Fever, Headache, Vomiting, Bloody diarrhea	<i>Cylindrospermopsis raciborskii</i> , <i>Aphanizomenon flos-aquae</i> , <i>Aphanizomenon gracile</i> , <i>Aphanizomenon ovalisporum</i> , <i>Umezakia natans</i> , <i>Anabaena bergii</i> **, <i>Anabaena lapponica</i> , <i>Anabaena planctonica</i> **, <i>Lyngbya wollei</i> , <i>Rhaphidiopsis curvata</i> , and <i>Rhaphidiopsis mediterranea</i>
Anatoxin-a group	Tingling, burning, numbness, drowsiness, incoherent speech, salivation, respiratory paralysis leading to death*	<i>Chrysochloris (Aphanizomenon) ovalisporum</i> , <i>Cuspidothrix</i> , <i>Cylindrospermopsis</i> , <i>Cylindrospermum</i> , <i>Dolichospermum</i> , <i>Microcystis</i> , <i>Oscillatoria</i> , <i>Planktothrix</i> , <i>Phormidium</i> , <i>Anabaena flos-aquae</i> **, <i>A. lemmermannii</i> **, <i>Raphidiopsis mediterranea</i> (strain of <i>Cylindrospermopsis raciborskii</i>), <i>Tychonema</i> and <i>Woronichinia</i>
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	<i>Marine dinoflagellates</i> , cyanobacteria in the genera <i>Anabaena</i> **, <i>Aphanizomenon</i> , <i>Planktothrix</i> , <i>Cylindrospermopsis</i> , <i>Lyngbya</i> and <i>Scytonema</i> (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 drinking water Health Advisories (HA) for 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/nutrient-policy-data/guidelines-and-recommendations>

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

1. Monitoring Season will run from May through October 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. The KDHE PWS Section 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 be 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

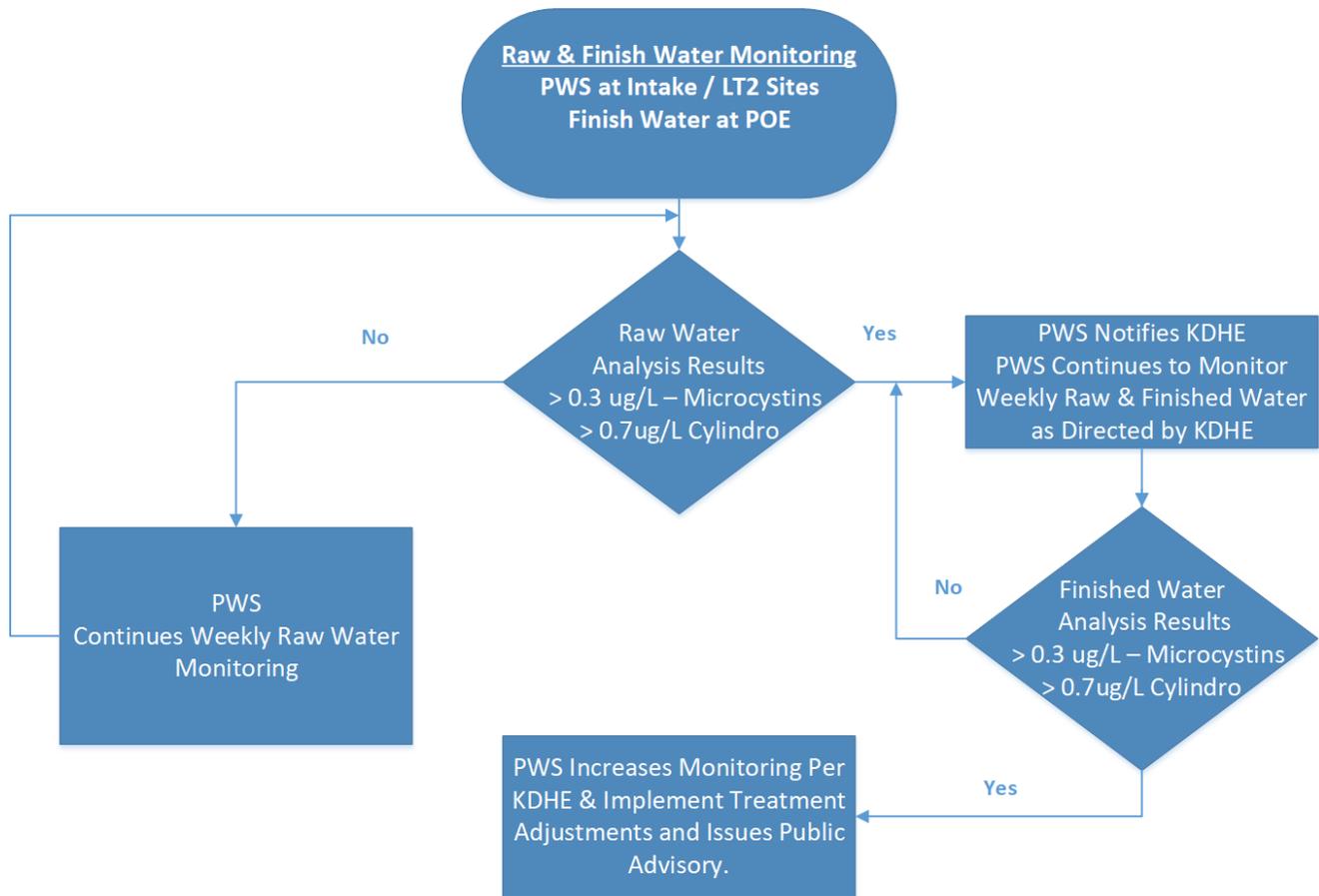
After Hours or Weekend/ Holidays contact (24/7):

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/ground-water-and-drinking-water/cyanotoxins-drinking-water>

PWS-KDHE Voluntary HAB Monitoring Program Flow Diagram



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 finish 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>

Ohio EPA HAB Website

<https://epa.ohio.gov/ddagw/HAB>

Environmental Chain of Custody Form

Department of Health
 AND ENVIRONMENT
 DIVISION OF ENVIRONMENTAL SERVICES

Client: _____ Location Name: _____
 Profile: _____ Collector: _____
 Location Code: _____ Event Desc: _____

Additional Report Recipients

To	To
Address	Address

Known Hazards
 Flammable
 Radiological
 Poison
 Other

#	Sample ID, Description	Matrix	Collection		Sample Comments	Analytes				Total number of containers	Field Test Results		
			Date	Time									
1													
2													
3													
4													
5													
6													
7													
8													

Transfers	Released By	Date/Time	Received By	Date/Time	Sample Condition		Receipt
1					Received on ice	Samples Intact	Temperature: _____
2					Y	N	
3					Y	N	

Front of form

Environmental Chain of Custody Form KE1

- **Client:** Please pick one of the following – BER Remedial Section, BER Storage Tanks Section, BER Assessment & Restoration Section, BER Surface Mining Section, BOW-Geology, BOW-Industrial Programs, BOW-Livestock Management, BOW-Technical Services, BOW-Watershed Management Section, BOW-Watershed Planning, NW District Office, NE District Office, NC District Office, SW District Office, SE District Office, SC District Office, BWM-Hazardous Waste Programs, BWM-Solid Waste Programs
- **Profile:** Please pick one of the following, which corresponds to client chosen above – State Cooperative Program, USDA Program, Voluntary Cleanup Program, EUC Program, Site Assessment Program, State Water Plan Program, Brownfields Program, Special Projects, Public Water Supply Unit, Monitoring Unit, LUST Unit, Remedial Unit, Federal Facilities, Spill Response Program, Dry Cleaning Program, Superfund Program, General ARS, NRD Program, Abandoned Mine Land Program, Active Mining Program, General Programs, Underground Brine Injection, Pre-treatment Programs, Livestock Special Projects, Livestock Ground Water Projects, Waste Effluent, Waste Influent, Chlorinated PWS, Distribution Systems, Point of Entry, Test Source, Supply Source, Private, Sanitary Program, Effluent Monitoring, Non-point pollution Monitoring, Pollution Investigations, Stream Chemistry, Stream Probabilistic, Lakes Monitoring WRAPS, TMDL, Biology Monitoring
- **Location Code:** Please include project code (e.g. C5-123-1234) as desired on final Report of Analysis. There is a 20-character limit.
- **Location Name:** Please include location name desired on final Report of Analysis
- **Collector:** Please include collector name desired on final Report of Analysis.
- Event Desc:** Leave blank.
- Additional Report Recipients:** Please include names and email addresses of additional report recipients desired.
- **Sample ID:** Please include unique sample identifier for each sample.
- **Matrix:** Please pick one of the following for each sample – DW-Drinking Water; W-Water; WW-Waste Water; SO-Soil; SL-Solid; or SD-Sediment
- **Actual Collection Date/Time:** Please include actual collection date and time (military format) for each sample.
- **Analytes:** Please pick from the following analyses available in the KHEL Environmental Test Catalog – AF Alpb/Bet, AF Gamma, PWS Met, S 8080Pest, S 8260 VOC, S Bromide, S Gamma, S ICP Met, S Mercury, S Nitrate, S RCRA Met, S TCLP Met, S TKN, W 608Pest, W 8080Pest, W 8260 VOC, W Alph/Bet, W BOD, W Bromide, W COD, W Conduct, W DO, W Gamma, W Hardness, W ICP Met, W Mercury, W Mineral, W Nitrate, W Nutrient, W RCRA Met, W RCRAHg, W Ra226, W Ra228, W Strontiu, W TCLP Met, W TDS, W TKN, W TOC, W TSS, W Tritium, W Turbid, W Uranium
- ** REQUIRED data for sample submission; all other fields are optional.**