

**Kansas Public Water Supply
Survival Guide
for the
Phase II and Phase V Rules
(Asbestos, Nitrate, Inorganic, Volatile Organic, and
Synthetic Organic)**



Kansas Department of Health and Environment
Bureau of Water
Public Water Supply Section

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Disclaimer

This guidance document is provided by the State of Kansas as a “quick reference guide” to assist public water supply systems (PWS) in complying with requirements of the Phase II and Phase V Rules. The Phase II/V Rules are part of the National Primary Drinking Water Regulations of the federal Safe Drinking Water Act. These requirements have also been incorporated into Kansas Administrative Regulations (K.A.R.). This guidance provides a summary of the requirements which must be met. The applicable, full legal language of the Phase II/V Rules are contained in the K.A.R. in conjunction with the Code of Federal Regulation which Kansas has adopted by reference. These regulations can be viewed online at www.kdheks.gov/pws/ . Also available at this website are compliance sample collection guides.

This document is not a regulation and does not substitute for Kansas or EPA regulations. It cannot impose legally-binding requirements on the Kansas Department of Health and Environment, EPA or water suppliers. In some cases it may not apply to a particular water system based upon the water system’s unique circumstances. The State of Kansas and EPA retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate.

Applicable users for this survival guide include:

Water System Types: Community water systems (CWS) and non-transient, non-community water systems (NTNC), except that nitrate requirements also apply to transient, non-community water systems (NC).

Source Water Types: All source water types, which includes groundwater (GW), surface water (SW), and groundwater under the direct influence of surface water (GU).

Water System Sizes: All PWS having at least 10 service connections or serving 25 persons year round.

Questions regarding the information contained in this document, the Kansas Primary Drinking Water Regulations, or any other matters pertaining to drinking water and PWS in Kansas should be directed to:

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Additional information and e-mail addresses can be obtained by accessing KDHE’s web site at www.kdheks.gov/pws/ .

The Basics About the Phase II/V Rules

This section of the Phase II/V Rules Survival Guide addresses compliance with State and Federal regulations in broad terms. Following this section of basic information, this document addresses State and Federal regulations of contaminants in more detail according to a contaminant's specific category: Asbestos, Nitrate, Inorganics, Volatile Organics, or Synthetic Organics.

What are the Phase II/V Rules?

The Phase II requirements became effective on January 30, 1991 and the Phase V requirements became effective on July 17, 1992. These regulations established three important standards regarding monitoring of chemical contaminants in drinking water supplies: 1) set up regular and consistent monitoring frequencies for each contaminant; and 2) set up specific analytical laboratory methods approved by EPA for analyzing each contaminant.

These regulations also established five major categories of contaminants that are required to be monitored: Asbestos; Nitrate; Inorganics (IOC); Volatile Organics (VOC); and Synthetic Organics (SOC). All of these contaminants are harmful to human health, most being toxic and/or carcinogenic.

Although arsenic was not included in the original Phase II/V Rules, the Environmental Protection Agency (EPA) adopted a new rule regarding arsenic on January 22, 2001. It is included in this survival guide as an IOC.

EPA also adopted a new rule regarding disinfection by-products on December 16, 1998 and a new rule regarding radionuclides on December 7, 2000. Therefore, unique monitoring and compliance provisions for trihalomethanes and radionuclides are now covered separately in updated regulations; the Disinfection By-product Rule and the Radionuclides Rule. Survival guides for these rules and compliance sample collection guides for these contaminants can be viewed online at www.kdheks.gov/pws/.

Who is required to follow the Phase II/V Rules?

These regulations must be followed by all community water systems (CWS) and non-transient, non-community water systems (NTNC). Nitrate requirements also apply to transient, non-community water systems (NC).

What do I have to do?

If you are a CWS, an NTNC or an NC water system, you must collect compliance samples according to a monitoring schedule, and you must provide sample results to KDHE. Samples may be analyzed at any laboratories that are certified by Kansas to do the required analysis by EPA approved methods, including the Kansas Health and Environmental Laboratory (KHEL).

If a water system uses KHEL for their compliance monitoring, KHEL submits the results electronically to the KDHE, Bureau of Water, Public Water Supply Section on the water system's behalf. If a water system

uses a private laboratory for compliance monitoring, the system must make a complete copy of results reports and submit them to KDHE by the due date, which is generally no later than the 10th day of the month following the last month of the quarter in which the sample was collected (April 10th, July 10th, October 10th, and January 10th).

Where are compliance monitoring samples collected?

Regulations specify, with the exception of asbestos monitoring, that all water samples for compliance with these regulations must be collected at the point-of-entry (POE). The POE collection site is located at a point after which the water has received all treatment (finished water) and before it enters the distribution system. This location should have a metal ID tag installed by KDHE staff with a number identifying it as a POE site.

In regards to asbestos monitoring, only CWS and NTNC that use asbestos-cement pipe in their distribution system are required to monitor for asbestos. Asbestos compliance samples must be collected at distribution tap sites that are served by asbestos-cement pipe.

How do I know what my water system’s monitoring schedule is?

The Phase II/V monitoring schedules of a PWS will mostly depend upon how the PWS is categorized under the Phase II/V Rules. There are three main criteria that will affect the monitoring schedule of a PWS: type of water system; population served; and type of source water used.

Type of Water System

The drinking water regulations categorize water systems by the type of population that make up its consumers, as shown in Table 1.

Types of Public Water Supply Systems

Community (CWS)	Serves the same resident consumers every day. Examples are cities, mobile home parks, rural water districts, and subdivisions
Non-transient, Non-community (NTNC)	Serves the same non-resident consumers every day. Examples are schools, day care facilities, industrial or manufacturing facilities.
Transient, Non-community (NC)	Serves different, non-resident consumers every day. Examples are motels, public parks, truck-stops, and campgrounds.

Table 1. Definitions of PWS Types

A CWS has at least 10 service connections used by year-round residents or regularly serves 25 year-round residents. An NTNC serves a non-resident population where the consumers are constant, or about the same every day, such as a manufacturing plant. An NC serves a non-resident population and the population is constantly changing every day, such as a well at a roadside rest-stop area.

Population Served

Drinking water regulations also categorize water systems by the size of the population served, as shown in Table 2. Under the Phase II/V Rules, systems that serve a population greater than 3,300 are categorized as large, and those that serve a population less than or equal to 3,300 are categorized as small.

Large and Small PWS Under Phase II/V Rules

Large	A water system that serves a population > 3,300.
Small	A water system that serves a population <= 3,300.

Table 2. Large and small PWS defined for compliance with the Phase II/V Rules

Type of Source Water Used

As shown in Table 3, water systems are also categorized by the type of source water used: groundwater (GW); surface water (SW); and groundwater under the influence of surface water (GU).

Please note that for water systems using GU source water, the more stringent requirements which typically apply to SW apply also to GU. GU sources are considered SW for the purposes of determining applicability of and compliance with drinking water regulations.

Types of Source Water Used by PWS

Groundwater (GW)	This term applies to water sources from aquifers., also known as “well water.”
Surface Water (SW)	This term applies to water sources that are open/exposed to the atmosphere and are subject to surface runoff, such as lakes, rivers, and reservoirs.
Groundwater Under the Influence of Surface Water (GU)	This term applies to shallow wells (less than 50 feet in depth) or springs which draw water from groundwater closely associated with surface water sources. GU are considered as surface water for the purposes of determining applicability of and compliance with federal and Kansas Administrative Regulations

Table 3. Definitions of Types of Source Water Used by PWS

Table 4 shows the general framework, or starting base, of monitoring frequencies for the different contaminants included in the Phase II/V Rules according to a PWS's three criteria: type of PWS; population size; and source water type.

Basic Monitoring Frequencies for Kansas PWS

1/YR = once per year

1/3YR = once every three years

Contaminant	Community Water Systems (CWS)	
	GW source	SW/GU source
Asbestos (if system has asbestos-cement pipe in distribution system)	1/9Y, all population sizes	1/9Y, all population sizes
Nitrate	1/YR, all population sizes	1/YR, all population sizes
IOC	1/3Y, all population sizes	1/YR, all population sizes
VOC	1/3Y, all population sizes	1/3Y, all population sizes
SOC	1/3Y, all population sizes	1/YR for large systems 1/3Y for small systems
Contaminant	Non-transient, Non-community Systems (NTNC)	
	GW source	SW/GU source
Asbestos (if system has asbestos-cement pipe in distribution system)	1/9Y, all population sizes	1/9Y, all population sizes
Nitrate	1/YR, all population sizes	1/YR, all population sizes
IOC	1/3Y, all population sizes	1/YR, all population sizes
VOC	1/3Y, all population sizes	1/3Y, all population sizes
SOC	1/3Y, all population sizes	1/YR for large systems 1/3Y for small systems
Contaminant	Transient, Non-community Systems (NC)	
	GW source	SW/GU source
Asbestos	Not Required	Not Required
Nitrate	1/YR, all population sizes	1/YR, all population sizes
IOC	Not Required	Not Required
VOC	Not Required	Not Required
SOC	Not Required	Not Required

Table 4. Basic monitoring framework for PWS in Kansas

When is quarterly monitoring required?

Each contaminant has a result trigger level wherein if a compliance monitoring sample shows a result above that trigger level, then quarterly monitoring of that contaminant will be required. The exception is Nitrate; if the trigger level of 10 mg/L is met, rather than exceeded, then quarterly monitoring will be required.

What are the trigger levels that result in a quarterly monitoring requirement?

Tables 5, 6, and 7 show the names of the contaminants for which Kansas PWS are required to monitor that have enforceable MCL, along with the trigger level of results that would require quarterly monitoring of that particular contaminant.

Inorganic (IOC)	
Trigger Levels for IOC Are the Same As An IOC's MCL	
Analyte Name	Maximum Contaminant Level (MCL) (mg/L unless otherwise noted)
Antimony	0.006
Arsenic	0.010
Asbestos	7 million fibers/Liter
Barium	2
Beryllium	4
Cadmium	5
Chromium	0.1
Fluoride	4.0
Mercury	0.002
Nitrate	10 mg/L for CWS and 20 mg/L for NTNC and NC
Selenium	0.050
Thallium	2

Table 5. IOC contaminant trigger levels for quarterly monitoring and contaminant MCLs

Volatile Organic (VOC) Trigger Levels and MCLs		
Analyte Name	Trigger Level (mg/L)	Maximum Contaminant Level (MCL) (mg/L)
1,1,1-Trichloroethane	0.0005	0.2
1,1,2-Trichloroethane	0.0005	0.005
1,1-Dichloroethylene	0.0005	0.007
1,2,4-Trichlorobenzene	0.0005	0.07
1,2-Dichlorobenzene (O-Dichlorobenzene)	0.0006	0.6
1,2-Dichloroethane	0.0005	5
1,2-Dichloropropane	0.0005	5
1,4-Dichlorobenzene (P-Dichlorobenzene)	0.0005	0.075
Benzene	0.0005	5
Chlorobenzene (Monochlorobenzene)	0.0005	0.1
Cis 1,2-Dichloroethylene	0.0005	0.07
Dichloromethane (Methylene Chloride)	0.0005	5
Ethylbenzene	0.0007	0.7
*Ethylene Dibromide (EDB)	0.00001	0.00005
Styrene	0.0005	0.1
Tetrachloroethylene	0.0005	5
Tetrachloromethane (Carbon Tetrachloride)	0.0005	5
Toluene	0.001	1
Trans 1,2-Dichloroethylene	0.0005	0.1
Trichloroethylene	0.0005	5
Vinyl Chloride	0.0005	0.002
Xylene	0.010	10

*EDB is classified as an SOC, but at KHEL is monitored along with VOC under Method 524.3.

Table 6. VOC contaminant trigger levels for quarterly monitoring and their MCLs

Synthetic Organic (SOC) aka pesticides Trigger Levels and MCLs		
Analyte Name	Trigger Level (mg/L)	Maximum Contaminant Level (MCL) (mg/L)
Alachlor (Lasso)	0.0002	0.002
Atrazine	0.0003	0.003
BHC-Gamma (Lindane)	0.00002	0.0002
Chlordane	0.0002	0.002
Endrin	0.00001	0.002
**Ethylene Dibromide	0.00001	0.00005
Heptachlor	0.00004	0.00004
Heptachlor Epoxide	0.00002	0.00002
Hexachlorobenzene	0.0001	0.001
Methoxychlor	0.004	0.04
Polychlorinated Biphenyls (PCB)	0.0001	0.0005
Simazine	0.0004	0.004
Toxaphene	0.001	0.003
Alachlor (Lasso)	0.0002	0.002

**EDB is an SOC, but at KHEL is monitored along with VOC under Method 524.3.

Table 7. SOC contaminant trigger levels for quarterly monitoring and their MCLs

The following sections of this Phase II/V Rules Survival Guide addresses compliance with State and Federal drinking water regulations in more detail according to the specific type of contaminant: **Asbestos, Nitrate, Inorganic, Volatile Organic, and Synthetic Organic.**

Asbestos

Background Information

Inhalation of asbestos fibers has been shown to produce lung tumors in laboratory animals and in humans. Ingestion of asbestos fibers which are greater than 10 micrometers in length has been shown to cause benign tumors in laboratory animals. Generally, asbestos enters drinking water from either contact with natural mineral deposits or asbestos-cement pipes used in water distribution systems. There is no naturally occurring asbestos present in rock or mineral formations in Kansas. The MCL for asbestos is seven million fibers per liter (7 MFL).

The Kansas Geological Survey has determined that there are no naturally occurring deposits of asbestos in Kansas. It is also known that asbestos fibers do not readily migrate through GW. Therefore, all Kansas water systems are exempted from asbestos monitoring at their POEs. The only systems that are susceptible to contamination from asbestos in Kansas are those that utilize asbestos-cement pipe in their distribution lines.

Water systems without asbestos-cement pipe in their distribution systems are not required to conduct asbestos monitoring.

Compliance Monitoring for Asbestos

Systems using asbestos-cement pipes in their distribution systems are required to monitor for asbestos at least once every nine years. The monitoring sample must be collected within the first three years of the nine-year compliance cycle defined by EPA. Table 8 shows the structure of the past, present, and future nine-year compliance cycles.

Nine-Year Compliance Cycles Are Made Up of Three-year Compliance Periods

1/9Y = once every nine years

FIRST COMPLIANCE CYCLE: 1993 - 2001		
1 st Compliance Period	January 1, 1993 to December 31, 1995	1/9Y asbestos sample due
2 nd Compliance Period	January 1, 1996 to December 31, 1998	
3 rd Compliance Period	January 1, 1999 to December 31, 2001	
SECOND COMPLIANCE CYCLE: 2002 - 2010		
1 st Compliance Period	January 1, 2002 to December 31, 2004	1/9Y asbestos sample due
2 nd Compliance Period	January 1, 2005 to December 31, 2007	
3 rd Compliance Period	January 1, 2008 to December 31, 2010	
THIRD COMPLIANCE CYCLE: 2011 - 2019		
1 st Compliance Period	January 1, 2011 to December 31, 2013	1/9Y asbestos samples due
2 nd Compliance Period	January 1, 2014 to December 31, 2016	
3 rd Compliance Period	January 1, 2017 to December 31, 2019	
FOURTH COMPLIANCE CYCLE: 2020 - 2028		
1 st Compliance Period	January 1, 2020 to December 31, 2022	1/9Y asbestos samples due
2 nd Compliance Period	January 1, 2023 to December 31, 2025	
3 rd Compliance Period	January 1, 2026 to December 31, 2028	

Table 8. Three-year Compliance Periods Within Nine-year Compliance Cycles

Samples must be collected from distribution tap sites in areas of the water system that are served by asbestos-cement pipe.

KHEL does not do analytical work for asbestos. Therefore, any water system required to monitor for asbestos must contract with a Kansas certified private laboratory for their asbestos compliance monitoring.

When the Asbestos Trigger Level is Exceeded

The trigger level for increasing the frequency of asbestos monitoring is 7 MFL; same as the asbestos MCL. Any system with asbestos results above 7 MFL will monitor quarterly until KDHE determines the results to be reliably and consistently below the MCL.

When an Asbestos Monitoring Schedule Can Be Reduced to Less Than Quarterly

A water system must have at least four consecutive quarters of monitoring results showing asbestos at levels less than the MCL to be eligible for KDHE to determine that levels are reliably and consistently below the MCL. After KDHE determines that the system is reliably and consistently below the MCL, it can be reduced to 1/YR monitoring. If the system shows results below the MCL for three consecutive years, it can be reduced to a 1/9Y monitoring schedule, and will not be required to monitor again until the first three years of the next nine-year compliance cycle.

When a Water System Incurs an Asbestos Violation

There are two types of asbestos violations; a Failure to Monitor Violation and an MCL Exceedance Violation.

If a water system fails to monitor for asbestos when required, it will incur a Failure to Monitor Violation and will be required to distribute a level Tier 3 public notice within one calendar year.

An Asbestos MCL Exceedance Violation is incurred when the running annual average (RAA) of a water system's quarterly samples is greater than 7 MFL. The water system would be required to distribute a level Tier 2 public notice within thirty days.

Nitrate

Background Information

Nitrate is a naturally occurring compound found in the environment. Nitrogen from decaying plant and animal matter may find its way into groundwater by leaching through soil, and/or by percolation caused by precipitation and surface water. Two significant causes of nitrate contamination of ground water are fertilization of agricultural and urban land with ammonium nitrate and runoff from livestock operations which contains nitrogen-laden animal wastes.

Excessive amounts of nitrate ingestion by infants can cause a life-threatening condition called methemoglobinemia, also known as “blue-baby syndrome.” To safeguard infants from this condition, federal and Kansas regulations set a nitrate MCL of 10 mg/L for CWS and 20 mg/L for NTNC and NC.

Compliance Monitoring for Nitrate

CWS, NTNC, and NC water systems that obtain water from their own GW, SW, or GU sources are required to monitor each active POE annually for nitrate.

When the Nitrate Trigger Level is Met

The trigger level for increased monitoring for nitrate is 10 mg/L. Any POE with nitrate results equal to or greater than 10 mg/L is required to monitor quarterly. Any water system that has a POE for which they are required to collect quarterly monitoring samples for nitrate must continue to do so until KDHE determines the POE’s results to be reliably and consistently below the MCL.

When a Nitrate Monitoring Schedule Can Be Reduced to Less Than Quarterly

A water system must have at least four consecutive quarters of monitoring results showing nitrate at levels less than 10 mg/L to be eligible for KDHE to determine that levels are reliably and consistently below 10 mg/L. After KDHE determines that the results of a water system’s POE are reliably and consistently below 10 mg/L, it can be reduced to 1/YR monitoring.

When a Water System Incurs a Nitrate Violation

There are two types of nitrate violations; a Failure to Monitor Violation and an MCL Exceedance Violation.

If a water system fails to monitor for nitrate when required, it will incur a Failure to Monitor Violation and will be required to distribute a level Tier 2 public notice within thirty days.

A Nitrate MCL Exceedance Violation is incurred when a single compliance sample is greater than the MCL. The water system would be required to distribute a level Tier 1 public notice within 24 hours. The nitrate MCL is 10 mg/L for CWS, and 20 mg/L for NTNC and NC.

A Tier 1 public notice is required for NTNC and NC with nitrate results greater than 10 mg/L, but no violation is incurred unless the nitrate level exceeds 20 mg/L. Nitrate levels above 10 mg/L, but not to exceed 20 mg/L, may be allowed for NTNC and NC water systems so long as the water supplier satisfactorily demonstrates the following four criteria: 1) the water will not be available to children under 6 months of age; 2) the non-community water system is meeting the public notification requirement; 3) state and local public health authorities are notified of nitrate levels that exceed 10 mg/L; and 4) no adverse health effects shall result.

Inorganic (IOC), Special Public Notice Required if Fluoride Exceeds 2.0 mg/L, and Quarterly Fluoride Monitoring for PWS That Fluoridate

Background Information

IOC consist of substances that do not have any carbon in their composition. Two major classes of IOC are metals and non-metals. Most of these IOC occur naturally in the environment and are soluble in water. Because of their high solubility factor, IOC are potentially significant contaminants of drinking water. However, not all IOC originate from mineral deposits. Industrial activities such as metal finishing, textile manufacturing, mining operations, electroplating, and manufacturing of fertilizers, paints, and glass also generate these contaminants.

Some IOC contaminants are toxic to humans at certain levels. For example, IOC such as cadmium, chromium, and selenium can cause damage to the kidneys, liver, and nervous and circulatory systems at high levels. Barium has been associated with high blood pressure and mercury has been shown to damage kidneys. Antimony, beryllium, cyanide, nickel, and thallium have been shown to damage the brain, lungs, kidneys, heart, spleen, and liver.

Compliance Monitoring for IOC

CWS and NTNC water systems that obtain water from their own water sources will monitor each active POE for IOC. POEs using SW/GU sources will monitor IOC annually. POEs using GW sources will monitor IOC once every three years.

Federal regulations 40 CFR Part 141.62 require monitoring for specific IOC. Kansas regulation K.A.R. 28-15a-23 requires monitoring for additional IOC. Table 9 and Table 10 show the list of IOC for Federal inorganic monitoring and the list of IOC for Kansas additional inorganic monitoring.

Federal Required IOC	
Trigger Levels for IOC Are the Same As An IOC's MCL	
IOC Name	Maximum Contaminant Level (MCL) (mg/L)
Antimony	0.006
Arsenic	0.010
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	1
Fluoride	4.0
Mercury	0.002

Table 9. Federal Inorganic List.

Additional IOC Required by Kansas Regulations	
IOC Name	Secondary MCL (mg/L)
Alkalinity as CaCO ₃	300
Calcium	200
Chloride	250
Iron	0.3
Magnesium	150
Manganese	0.05
pH	6.5 pH
Potassium	100
Silica	50
Sodium	100
Specific conductivity	1500 umho/cm
Sulfate	250
Total dissolved solids	500
Total hardness	400
Total phosphorus	5

Table 10. Kansas Additional IOC and Secondary MCL.

Some of the Secondary MCLs of the IOC on the Kansas additional IOC list were set by EPA. The Secondary MCLs are levels of the individual contaminant that may cause cosmetic effects (such as skin or tooth discoloration), aesthetic effects (such as taste, odor, or color), or maintenance problems for water treatment equipment in drinking water, but have not been found to cause adverse health effects. Kansas requires the collection of monitoring samples for the additional IOC, but does not enforce the Secondary MCLs set by EPA. Generally, the additional IOC contaminants that Kansas regulations require PWS to monitor will not be increased to quarterly monitoring.

When a Regulated IOC Trigger Level Is Exceeded

The trigger level for increasing the monitoring frequency of a Federal Required individual IOC is the same as that IOC's MCL. If a sample from an active POE shows that an IOC result exceeds the trigger level, then quarterly monitoring will be required for that particular IOC. Any POE with results of an IOC above the MCL will monitor quarterly until KDHE determines the results to be reliably and consistently below the MCL.

When a Regulated IOC Monitoring Schedule Can Be Reduced to Less Than Quarterly

A POE must have a least four consecutive quarters of monitoring results showing the individual IOC at levels less than the MCL to be eligible for KDHE to determine that the levels are reliably and consistently below the MCL. After KDHE determines that the POE is reliably and consistently below the MCL, it can be reduced to 1/YR monitoring. If a POE is serving only groundwater, then if results show levels below the MCL for three consecutive years, it can be reduced to a 1/3Y monitoring schedule.

When a Water System Incurs an IOC Violation

There are two types of IOC violations; a Failure to Monitor Violation and an MCL Exceedance Violation.

If a water system fails to monitor for IOC when required, it will incur a Failure to Monitor Violation and will be required to distribute a level Tier 3 public notice within one calendar year.

An MCL Exceedance Violation is incurred when the running annual average (RAA) of a water system's quarterly samples is greater than the MCL of an individual IOC. The water system would be required to distribute a level Tier 2 public notice within thirty days.

Public Notice Required When Fluoride Results Show Levels Above 2.0 mg/L

At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/L) of fluoride may develop cosmetic discoloration of their permanent teeth (dental fluorosis). Dental fluorosis in its moderate or severe forms may result in a brown staining and or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. If any of the monitoring results of a CWS or NTNC show fluoride levels less than or equal to the MCL of 4.0 mg/L, but higher than 2.0 mg/L, the water system is required to distribute level Tier 3 public notice within one calendar year because of the potential for this cosmetic dental problem.

Quarterly Fluoride Monitoring Required for PWS That Fluoridate

Kansas requires quarterly monitoring of fluoride for any CWS or NTNC that uses fluoridation treatment.

On January 7, 2011, the EPA and the US Health and Human Services Agency (HHS) adjusted their recommended levels of fluoride in drinking water from a previous range of 0.7 mg/L to 1.2 mg/L to a set optimal level of 0.7mg/L. KDHE recommends that Kansas water systems that fluoridate their water aim for the target level of 0.7 mg/L, as suggested by EPA and HHS.

Volatile Organic (VOC)

Background Information

Volatile Organic chemicals (VOC) are commonly called organic solvents. These compounds can be identified by their distinct aromatic smell, and most VOC are flammable and toxic to varying degrees. They are potentially significant pollution and health hazards. These compounds are generally found as constituents of many degreasers, industrial cleaners, stain removers, paints, paint thinners, varnishes, lacquers, dry cleaning chemicals, press chemicals, and petroleum products.

Ethylene Dibromide (EDB)

Ethylene Dibromide is classified as a Synthetic Organic (SOC), but at KHEL is monitored along with VOC under Method 524.3. EDB is mainly used in anti-knock gasoline mixtures, and can enter the environment during the use, storage, and transport of leaded gasoline

Compliance Monitoring for VOC

CWS and NTNC water systems that obtain water from their own water sources will monitor each active POE for VOC.

When a VOC Trigger Level Is Exceeded

The trigger levels for increasing the monitoring frequency of an individual VOC is listed in Table 6 (Table 6 also appears earlier in this document). If a sample from an active POE shows that a VOC result exceeds the trigger level, then quarterly monitoring will be required for that particular VOC. Any POE with results of a VOC above the trigger level will monitor quarterly until KDHE determines the results to be reliably and consistently below that individual VOC's MCL.

Volatile Organic (VOC) Trigger Levels and MCLs		
Analyte Name	Trigger Level (mg/L)	Maximum Contaminant Level (MCL) (mg/L)
1,1,1-Trichloroethane	0.0005	0.2
1,1,2-Trichloroethane	0.0005	0.005
1,1-Dichloroethylene	0.0005	0.007
1,2,4-Trichlorobenzene	0.0005	0.07
1,2-Dichlorobenzene (O-Dichlorobenzene)	0.0006	0.6
1,2-Dichloroethane	0.0005	5
1,2-Dichloropropane	0.0005	5
1,4-Dichlorobenzene (P-Dichlorobenzene)	0.0005	0.075
Benzene	0.0005	5
Chlorobenzene (Monochlorobenzene)	0.0005	0.1
Cis 1,2-Dichloroethylene	0.0005	0.07
Dichloromethane (Methylene Chloride)	0.0005	5
Ethylbenzene	0.0007	0.7
*Ethylene Dibromide (EDB)	0.00001	0.00005
Styrene	0.0005	0.1
Tetrachloroethylene	0.0005	5
Tetrachloromethane (Carbon Tetrachloride)	0.0005	5
Toluene	0.001	1
Trans 1,2-Dichloroethylene	0.0005	0.1
Trichloroethylene	0.0005	5
Vinyl Chloride	0.0005	0.002
Xylene	0.010	10

*EDB is classified as an SOC, but at KHEL is monitored along with VOC under Method 524.3.

Table 6. VOC contaminant trigger levels for quarterly monitoring and their MCLs

When a VOC Monitoring Schedule Can Be Reduced to Less Than Quarterly

A POE must have a least four consecutive quarters of monitoring results showing the individual VOC at levels less than the MCL to be eligible for KDHE to determine that the levels are reliably and consistently below the MCL. After KDHE determines that the POE is reliably and consistently below the MCL, it can be reduced to 1/YR monitoring. If POE results show levels of VOC at No Detect for three consecutive years, it can be reduced to a 1/3Y monitoring schedule.

When a Water System Incurs a VOC Violation or an EDB Violation

There are two types of VOC violations; a Failure to Monitor Violation and an MCL Exceedance Violation.

If a water system fails to monitor for VOC or EDB when required, it will incur a Failure to Monitor Violation and will be required to distribute a level Tier 3 public notice within one calendar year.

An MCL Exceedance Violation is incurred when the running annual average (RAA) of a water system's quarterly samples is greater than the MCL of an individual VOC or EDB. The water system would be required to distribute a level Tier 2 public notice within thirty days.

Synthetic Organic (SOC)

Background Information

SOC are man-made compounds, many of which are chlorinated and used as herbicides, pesticides, fungicides, and insecticides. They are also used in manufacturing processes. These SOC contaminants are known to be toxic to humans in certain concentrations and can cause damage to the nervous and circulatory systems. They have also been known to cause damage to the liver, kidneys, and gastrointestinal tract in laboratory animals.

Ethylene Dibromide (EDB)

Ethylene Dibromide is classified as a Synthetic Organic (SOC), but at KHEL is monitored along with VOC under Method 524.3. EDB is mainly used in anti-knock gasoline mixtures, and can enter the environment during the use, storage, and transport of leaded gasoline.

Compliance Monitoring for SOC

CWS and NTNC water systems that obtain water from their own water sources will monitor each active POE for SOC as shown in Table 11. SW/GU systems must collect their SOC samples during May or June. May and June are considered to be the time during which most SW/GU systems in Kansas are susceptible to contamination from run-off carrying pesticides applied to crops.

GW POEs may monitor for SOC using a triazine immunoassay (IA) screen. IA sample results are recorded as atrazine for compliance purposes. However, IA results are actually a measure of whether or not any compounds of the triazine family were detected in the sample. If an IA result is greater than 0.3 ug/L, a follow up sample is collected for a full SOC analysis so that it can be determined what compound was detected in the IA sample.

Basic SOC Monitoring Frequencies for Kansas PWS

1/YR = once per year

1/3YR = once every three years

Community Water Systems (CWS)		
	GW source (IA sample eligible)	SW/GU source
SOC Basic Monitoring Frequency	1/3Y, all population sizes	1/YR for large systems 1/3Y for small systems
Non-transient, Non-community Systems (NTNC)		
	GW source (IA sample eligible)	SW/GU source
SOC Basic Monitoring Frequency	1/3Y, all population sizes	1/YR for large systems 1/3Y for small systems

Table 11. Basic SOC monitoring framework for PWS in Kansas

SW and GU POEs of large water systems must monitor for SOC in May or June of each year. SW and GU POEs of small water systems must monitor for SOC once every three years, and must collect the SOC compliance monitoring samples in May or June. GW POEs of large and small water systems must monitor for SOC once every three years.

When an SOC Trigger Level Is Exceeded

The trigger levels for increasing the monitoring frequency of an individual SOC is listed in Table 7 (Table 7 also appears earlier in this document). If a sample from a POE shows that an SOC result exceeds the trigger level, then quarterly monitoring will be required for that particular SOC. Any POE with results of an SOC above the trigger level will monitor quarterly until KDHE determines the results to be reliably and consistently below that individual SOC's MCL.

Synthetic Organic (SOC) aka pesticides Trigger Levels and MCLs		
Analyte Name	Trigger Level (mg/L)	Maximum Contaminant Level (MCL) (mg/L)
Alachlor (Lasso)	0.0002	0.002
Atrazine	0.0003	0.003
BHC-Gamma (Lindane)	0.00002	0.0002
Chlordane	0.0002	0.002
Endrin	0.00001	0.002
**Ethylene Dibromide	0.00001	0.00005
Heptachlor	0.00004	0.00004
Heptachlor Epoxide	0.00002	0.00002
Hexachlorobenzene	0.0001	0.001
Methoxychlor	0.004	0.04
Polychlorinated Biphenyls (PCB)	0.0001	0.0005
Simazine	0.0004	0.004
Toxaphene	0.001	0.003
Alachlor (Lasso)	0.0002	0.002

**EDB is an SOC, but at KHEL is monitored along with VOC under Method 524.3.

Table 7. SOC contaminant trigger levels for quarterly monitoring and their MCLs

If a POE is on quarterly monitoring for SOC, then their Second Quarter monitoring sample must be collected during May or June.

What if a GW POE sample shows a detect > 0.3 ug/L with the IA screen?

If a sample shows a detect greater than 0.3 ug/L with the IA screen, then the water system will need to collect a follow-up sample which will be analyzed using Method 507/508 to determine what SOC was detected in the IA. If results of the follow-up sample show that an SOC result exceeds the trigger level, then quarterly monitoring will be required for that particular SOC. Any POE with results of an SOC above the trigger level will monitor quarterly until KDHE determines the results to be reliably and consistently below that individual SOC's MCL.

When an SOC Monitoring Schedule Can Be Reduced to Less Than Quarterly

A POE must have a least four consecutive quarters of monitoring results showing the individual SOC at levels less than the MCL to be eligible for KDHE to determine that the levels are reliably and consistently below the MCL. After KDHE determines that the POE is reliably and consistently below the MCL, it can be reduced to 1/YR monitoring.

SW and GU POEs of large water systems can only be reduced to 1/YR monitoring. SW and GU POEs of small water systems can be reduced to 1/3Y monitoring if results show No Detect for three consecutive

years. GW POEs of large and small water systems can be reduced to 1/3Y monitoring, and can return to using the IA screen, if results show No Detect for three consecutive years.

When a Water System Incurs an SOC Violation

There are two types of SOC violations; a Failure to Monitor Violation and an MCL Exceedance Violation.

If a water system fails to monitor for SOC when required, it will incur a Failure to Monitor Violation and will be required to distribute a level Tier 3 public notice within one calendar year.

An MCL Exceedance Violation is incurred when the running annual average (RAA) of a water system's quarterly samples is greater than the MCL of an individual SOC. The water system would be required to distribute a level Tier 2 public notice within thirty days.

Acronym Glossary

BOW	=	Bureau of Water
CWS	=	Community Water System
EDB	=	Ethylene Dibromide
EPA	=	Environmental Protection Agency
GU	=	Groundwater Under the Direct Influence of Surface Water
GW	=	Groundwater
IOC	=	Inorganic Chemicals/Compounds
K.A.R.	=	Kansas Administrative Regulations
KDHE	=	Kansas Department of Health and Environment
KHEL	=	Kansas Health and Environmental Laboratory
MCL	=	Maximum Contaminant Level
MFL	=	Million Fibers per Liter (measure of asbestos in drinking water)
NC	=	Transient, Non-community
NTNC	=	Non-transient, Non-community
POE	=	Point-of-Entry (to a PWS distribution system)
PWS	=	Public Water Supply Systems
RAA	=	Running Annual Average
SOC	=	Synthetic Organic Chemicals/Compounds
SW	=	Surface Water/Groundwater Under the Influence of Surface Water
VOC	=	Volatile Organic Chemicals/Compounds