

**Kansas Public Water Supply  
Survival Guide  
For Compliance With the  
Surface Water Treatment Rules**



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 surface water treatment rules known as: the Surface Water Treatment Rule (SWTR); the Interim Enhanced Surface Water Treatment Rule (IESWTR); the Long Term 1 Interim Enhanced Surface Water Treatment Rule (LT1); and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), as stated in the Code of Federal Regulations(CFR) 40 CFR 141.70; 40 CFR 141.170; 40 CFR 141.500; and 40 CFR 141.700 which can be found online at the Kansas Department of Health & Environment (KDHE), Public Water Supply Section website <http://www.kdheks.gov/pws> . The surface water treatment rules are part of the National Primary Drinking Water Regulations of the federal Safe Drinking Water Act which Kansas has adopted by reference into the Kansas Administrative Regulations (KAR). This guidance provides a summary of the requirements which must be met for compliance with all of the surface water treatment rules.

**This document is not a regulation and does not substitute for federal or Kansas regulations.** It cannot impose legally-binding requirements on the State of Kansas, Environmental Protection Agency (EPA) or water suppliers. In some cases it may not apply to a particular water system based upon the water system’s unique circumstances. KDHE 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:** All PWS types.

Community water systems (CWS)

Non-transient, Non-community water systems (NTNC)

Transient, Non-community water systems (NC)

**Source Water Types:** PWS that treat raw source water for drinking that is surface water (SW) and groundwater under the direct influence of surface water (GU).

**Water System Sizes:** All population sizes.

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:

Kansas Department of Health and Environment  
Bureau of Water, Public Water Supply Section  
1000 SW Jackson, Suite 420  
Topeka, Kansas 66612-1367  
Phone: (785) 296-5514  
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## Overview of the Surface Water Treatment Rules 1989-2006

The SWTR became law in June 1989. It affected all PWS that treat SW or GU. This rule addressed removal of microbial contaminants physically through filtration. It established the use of turbidity to measure filtration performance at the combined filter effluent (CFE). SWTR required sufficient treatment to reduce source water concentration of *Giardia lamblia* and viruses with disinfectant contact time (CT), with performance of CT calculations required along the path of a PWS treatment train.

The IESWTR became law in December 1998, affecting the PWS under the SWTR that served populations  $\geq$  10,000 people. The rule requires these PWS to meet improved filtration performance with lowered maximum turbidity standards, perform continuous monitoring of individual filter effluent (IFE) turbidity, and requires these systems complete disinfection profiles and benchmarks.

The LT1 became law in January 2002, affecting the PWS under the SWTR that served populations  $<$  10,000 people, requiring them to meet the same new standards as larger population PWS do under the IESWTR: lower maximum turbidity standards, continuous monitoring of IFE turbidity, and disinfection profiles and benchmarks.

The LT2 became law in January 2006, affecting all the PWS that fall under the SWTR. It specifically addresses *Cryptosporidium* (Crypto) which is commonly found in surface water. The LT2 requires source water monitoring and additional treatment for Crypto at SW/GU systems that show significant levels of Crypto in the source waters.

This document will first focus on what is required of PWS subject to the surface water treatment rules for monitoring, reporting, turbidity levels, and disinfection according to the first three implemented surface water treatment rules. Following that, this document will then focus on LT2 requirements.

# Surface Water Treatment Rules Compliance Monitoring, Levels, and Reporting

## Individual Filter Turbidity

### IFE Turbidity Monitoring

PWS with 3 or more individual filters must perform continuous IFE turbidity monitoring. This means that an IFE turbidity reading must be collected and recorded at least once every 15 minutes whenever an individual filter is in operation.

If a system has 2 or less individual filters, in lieu of continuous IFE turbidity monitoring, the PWS can perform continuous turbidity monitoring upon their CFE, wherein a turbidity reading from the CFE must be collected and recorded at least once every 15 minutes whenever the treatment plant is in operation.

IFE and CFE turbidity monitoring records must be kept by the PWS for at least 3 years.

If a PWS experiences equipment failure and cannot collect or record continuous turbidity readings, then the PWS is allowed to collect and record manually the turbidity readings at least once every 4 hours until the equipment is repaired. The PWS must call KDHE and notify them of the equipment failure, and the PWS has up to 5 days for repair or replacement of equipment unless KDHE specifically grants an extension of time.

### IFE Turbidity Levels

The following IFE turbidity levels collected from water that is served into the distribution system must be reported in a monthly report.

1. Report if collection and recording of continuous IFE turbidity monitoring was performed.
2. The date, time, and filter number of any individual filter that had IFE turbidity levels greater than 1.0 NTU in two consecutive measurements collected 15 minutes apart.
3. The date, time, and filter number of any individual filter that had IFE turbidity levels greater than 0.5 NTU in two consecutive measurements collected 15 minutes apart after having been online after 4 hours.
4. The date, time, and filter number of any individual filter that had IFE turbidity levels greater than 1.0 NTU in two consecutive measurements collected 15 minutes apart occurring in 3 consecutive months.
5. The date, time, and filter number of any individual filter that had IFE turbidity levels greater than 2.0 NTU in two consecutive measurements collected 15 minutes apart occurring in 2 consecutive months.

If any of the above listed scenarios #2 - #5 of IFE turbidity levels occur, a system is required to conduct a comprehensive performance evaluation (CPE) within 30 days. If the PWS can readily determine the cause of the IFE turbidity levels without a CPE, then in lieu of a CPE the PWS must include on their monthly report the cause, the remedy, and when the remedy was/will be implemented.

### **IFE Turbidity Reporting**

KDHE has a specific form on which PWS must report their monthly IFE turbidity data. It is part of a comprehensive summary form titled “Monthly Turbidity-Disinfection-CT Report.” For IFE turbidity, near the bottom of the form there are check boxes to indicate if high IFE turbidity scenarios occurred, and a PWS can provide additional information in the Comments space or attach additional pages to the report. The report form is due to KDHE by the 10<sup>th</sup> day of each following month.

## **Combined Filter Turbidity**

### **CFE Turbidity Monitoring**

If a PWS has 2 or less individual filters, in lieu of continuous IFE turbidity monitoring, the PWS can perform continuous turbidity monitoring upon their combined filter effluent (CFE), wherein a turbidity reading from the CFE must be collected and recorded at least once every 15 minutes whenever the treatment plant is in operation. PWS with 3 or more individual filters must perform continuous IFE turbidity monitoring.

If a PWS experiences equipment failure and cannot collect or record continuous turbidity readings, then the PWS is allowed to collect and record manually the turbidity readings at least once every 4 hours until the equipment is repaired. The PWS must call KDHE and notify them of the equipment failure, and the PWS has up to 5 days for repair or replacement of equipment unless KDHE specifically grants an extension of time.

If a PWS has 3 or more individual filters, a CFE turbidity level must be collected and recorded at least once every 4 hours when a treatment plant is operating.

All CFE and IFE turbidity monitoring records must be kept by the PWS for at least 3 years.

If a PWS experiences a CFE turbidity level greater than 1.0 NTU for water that was served into the distribution system, they are required to contact KDHE within 24 hours.

### **CFE Turbidity Levels**

The following CFE turbidity levels collected from water served into the distribution system must be reported in a monthly report.

1. The number of CFE turbidity level readings that were collected each day.
2. The maximum CFE turbidity level that was collected for each day.
3. The number of CFE turbidity level readings that exceeded 0.3 NTU ( $\geq 0.35$  NTU) each day
4. If any CFE turbidity level readings exceeded 1 NTU, report how many readings exceeded 1 NTU for each day.
5. The percentage of CFE turbidity level readings during the month that were less than or equal to 0.3 NTU ( $< 0.35$  NTU).

### **CFE Turbidity Reporting**

KDHE has a specific form on which PWS must report their monthly CFE turbidity data. It is part of a comprehensive form titled “Monthly Turbidity-Disinfection-CT Report.” If #3 or #4 of the above listed scenarios of CFE turbidity levels occur, and the PWS can readily determine the cause of those CFE turbidity levels, the PWS should include on their monthly report the cause, the remedy, and when the remedy was/will be implemented. A PWS can provide additional information in the Comments space or attach additional pages to the report. The report form is due to KDHE by the 10<sup>th</sup> day of each following month.

## Disinfectant Residual Levels Leaving the Treatment Plant

### Disinfectant Monitoring

The required number of daily disinfectant residual level readings collected from water leaving the treatment plant and served into the distribution system is dependent upon the PWS population served.

Population Served	Minimum Daily Disinfectant Readings Required
$\leq 500$	1
501 – 1,000	2
1,001 – 2,500	3
2,501 – 3,300	4
$> 3,300$	Continuous

The drinking water regulations do not state that the number of disinfectant readings required is dependent upon the number of hours a treatment plant operates. Therefore, for PWS serving populations  $\leq 3,300$ , the PWS must collect the daily minimum required number of readings whether the treatment plant operates for 1 hour or 24 hours, and the collection of the readings should be spaced at regular time intervals.

If a PWS experiences a disinfectant residual level reading collected from water leaving the treatment plant and served into the distribution system with a level  $< 0.2$  mg/L, the PWS must collect a disinfectant level reading at least once every 4 hours until the level is again  $\geq 0.2$  mg/L. If the level is  $< 0.2$  mg/L for more than 4 hours, a treatment technique violation has been incurred and the PWS must contact KDHE within 24 hours.

If a PWS that is required to perform continuous disinfectant level monitoring experiences equipment failure and cannot collect or record continuous readings, then the PWS is allowed to collect and record manually the disinfectant residual level readings at least once every 4 hours until the equipment is repaired. The PWS must call KDHE and notify them of the equipment failure, and the PWS has up to 5 days for repair or replacement of equipment unless KDHE specifically grants an extension of time.

All monitoring records of the disinfectant residual level readings collected from water leaving the treatment plant must be kept by the PWS for at least 3 years.

### Disinfectant Levels

The following must be reported in a monthly report for disinfectant residual level readings collected from water leaving the treatment plant and served into the distribution system.

1. The number of disinfectant level readings that were collected each day.
2. The minimum disinfectant level reading that was collected for each day.
3. If any of the disinfectant residual levels leaving the treatment plant and served into the distribution system was  $< 0.2$  mg/L (free chlorine or total chlorine).
  - a. If yes, state the time the level dropped to  $< 0.2$  mg/L, and the time the level was again  $\geq 0.2$  mg/L.



### **Disinfectant Reporting**

KDHE has a specific form on which PWS must report their disinfectant residual level readings collected from water leaving the treatment plant and served into the distribution system. It is part of a comprehensive form titled “Monthly Turbidity-Disinfection-CT Report.” If #3 of the above listed scenarios occurs, and the PWS can readily determine the cause of those disinfectant levels, the PWS should include on their monthly report the cause, the remedy, and when the remedy was/will be implemented. A PWS can provide additional information in the Comments space or attach additional pages to the report. The report form is due to KDHE by the 10<sup>th</sup> day of each following month.

## **Disinfectant Residual Levels in the Distribution System**

### **Disinfectant Monitoring**

All Kansas PWS are required to collect a minimum of 1 disinfectant residual level reading from the distribution system for each day the PWS serves water. The disinfectant residual level readings collected from the distribution system should be collected from various sampling sites within the distribution system during the month, and from various distances from the treatment plant's point-of-entry into the distribution system. PWS that treat SW/GU must include information from these daily readings on their monthly report titled, "Monthly Turbidity-Disinfection-CT Report."

All monitoring records of the disinfectant residual level readings collected from the distribution system must be kept by the PWS for at least 3 years.

### **Disinfectant Levels**

The following must be reported in a monthly report for disinfectant residual level readings collected from the distribution system.

1. The number of disinfectant level readings that were collected each day.
2. The minimum disinfectant level reading that was collected for each day.
3. If any of the disinfectant residual levels from the distribution system was  $< 0.2$  mg/L free chlorine or  $< 1.0$  mg/L total chlorine.
  - a. If yes, state how many samples during the month were  $< 0.2$  mg/L free chlorine or  $< 1.0$  mg/L total chlorine.

### **Disinfectant Reporting**

KDHE has a specific form on which PWS must report their disinfectant residual level readings collected from the distribution system. It is part of a comprehensive form titled "Monthly Turbidity-Disinfection-CT Report." If #3 of the above listed scenarios occurs, and the PWS can readily determine the cause of those disinfectant levels, the PWS should include on their monthly report the cause, the remedy, and when the remedy was/will be implemented. A PWS can provide additional information in the Comments space or attach additional pages to the report. The report form is due to KDHE by the 10<sup>th</sup> day of each following month.

## Contact Time Ratios

### Contact Time Calculations and Ratios

40 CFR 141.72(b)(1) and 40 CFR 141.170(a)(1), in summary, require that treatment of SW/GU by a PWS must be sufficient to ensure that the total treatment processes achieve at least 99.9 % (3-log) for Giardia, at least 99.99% (4-log) for viruses, and at least 99% (2-log) removal of *Cryptosporidium* in the treatment train. Performing daily CT calculations and determining if the ratio of the CT achieved to the CT required is  $\geq 1.00$  is the only way to know that the requirements of these regulations have been met.

A CT Helper is available on the KDHE, Public Water Supply Section website at <http://www.kdheks.gov/pws/engineeringpermits/cthelper.html> . The purpose of the CT Helper is to assist PWS operators in developing a working knowledge of how to determine CT credit, log inactivation, and total log removal and/or inactivation.

All records of the CT calculations and ratios must be kept by the PWS for at least 3 years.

### CT Ratio Reporting

KDHE has a specific form on which PWS report their daily CT ratios titled, “Monthly Turbidity-Disinfection-CT Report.” The form has a column for recording the CT ratio achieved for Giardia and the CT ratio achieved for viruses. If a PWS incurs a day wherein they do not achieve CT ratios of at least 1.00, the PWS should include on their monthly report the cause, the remedy, and when the remedy was/will be implemented. A PWS can provide additional information in the Comments space or attach additional pages to the report. The report form is due to KDHE by the 10th day of each following month.

## Monthly Turbidity-Disinfection-CT Report Form

The following 2 pages show the report form and instructions for filling out the report form. The report is due to KDHE the 10<sup>th</sup> day following the end of each month.

It can be mailed in:  
Public Water Supply Section, KDHE  
1000 SW Jackson, Suite 420  
Topeka, KS 66612

Faxed in:  
785-559-4258

Or submitted as a pdf email attachment to:  
Dianne Sands ([dianne.sands@ks.gov](mailto:dianne.sands@ks.gov) 785-368-8336)

The report must arrive to KDHE complete and correct. If not complete or correct, the PWS will be instructed to re-submit the report. An electronic report form is available that will automatically perform most of the needed calculations as the cells of the form are filled in.

**MONTHLY TURBIDITY - DISINFECTION - CT**

**SUMMARY REPORT FOR THE MONTH & YEAR OF:**



PWS NAME/FACILITY: \_\_\_\_\_  
 ACCOUNT/PWS ID No.: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 CITY & ZIP CODE: \_\_\_\_\_

MAIL TO:  
 KDHE - Bureau of Water  
 Public Water Supply Section  
 1000 SW Jackson St.; Suite 420  
 Topeka, KS 66612-1367

DATE	(A) Minimum Residual in Distribution System			(B) Minimum Residual Leaving the Plant			(C) Maximum Combined Filter Effluent (CFE) Turbidity Reading For Each Day	(D) Total Number of CFE Turbidity Readings Taken Each Day	(E) Number of CFE Turbidity Readings Greater than 0.3 NTU (≥0.35)	(F) Disinfectant Contact Time Ratio GIA / VIR		Bact Samples Collected <input checked="" type="checkbox"/>
	Minimum Daily Residual (mg/L)	Disinfectant Type (Combined or Free)	# of Residual Readings Taken	Minimum Daily Residual (mg/L)	Disinfectant Type (Combined or Free)	# of Residual Readings Taken						
1												
2												
3												
4												
5												
6												
7												
8												
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30												
31												
TOTALS												

**Percent (%) of NTU Readings Which are in Compliance:**

COMMENTS:

- Please check box if disinfectant residual leaving the plant was < 0.2 mg/L. (attach required data with this report)
- Please check box if the Individual Filter Effluent (IFE) was monitored and recorded every 15 minutes as required.
- Please check box if any IFE exceeded 1.0 NTU in two consecutive readings taken 15 minutes apart. (attach required data with this report)
- Please check box if any IFE exceeded .5 NTU in two consecutive readings taken 15 minutes apart after being online at least 4 hours.

Prepared By: \_\_\_\_\_

Date Form Completed: \_\_\_\_\_

*Signature on this form certifies all information above is accurate and complete to the best of the signer's knowledge.*

## Descriptions of values that should be entered on the Monthly Turbidity and Disinfection Report

- **Column (A), Minimum Residual in Distribution System, Minimum Daily Residual:** This is where you write the lowest Minimum Daily Residual that occurred during each day of the month. In the total box at the bottom of this column is where you write the lowest Minimum Daily Residual that occurred during the whole month.
- **Column (A), Minimum Residual in Distribution System, # of Residual Readings Taken:** This is where you write the total number of readings taken during each day of the month. In the total box at the bottom of this column is where you write the total number of readings taken during the whole month.
- **Column (B), Minimum Residual Leaving the Plant, Minimum Daily Residual:** This is where you write the lowest Minimum Daily Residual that occurred each day of the month. In the total box at the bottom of this column is where you write the lowest Minimum Daily Residual that occurred during the whole month.
- **Column (B), Minimum Residual Leaving the Plant, # of Residual Readings Taken:** This is where you write the total number of readings taken each day of the month. In the total box at the bottom of this column is where you write the total number of readings taken during the whole month.
- **Column (C), Maximum CFE Turbidity Reading For Each Day:** This is where you write the highest CFE Turbidity Reading that occurred each day of the month. In the total box at the bottom of this column is where you write the maximum CFE Turbidity Reading that occurred during the whole month.
- **Column (D), Total Number of CFE Turbidity Readings Taken Each Day:** This is where you write the total number of readings taken each day of the month. In the total box at the bottom of this column is where you write the total number of readings taken during the whole month.
- **Column (E), Number of CFE Turbidity Readings Greater Than 0.3 NTU:** This is where you write the number of readings that were greater than 0.3 NTU (if a reading is  $\geq 0.35$  NTU, it rounds to 0.4 NTU) that occurred each day of the month. If none occurred, please write "0". In the total box at the bottom of this column is where you write the total number of readings taken during the whole month that exceeded 0.3 NTU.
- **Column (F), Disinfectant Contact Time Ratio:** This column is divided into spaces for Giardia and Virus. Whichever CT ratio you are recording, please record it in the proper space according to whether it is a CT ratio for Giardia or Virus.
- **Percent (%) of NTU Readings Which Are in Compliance:** this value is computed by:  
  
(total box from (D)) – (total box from (E)) / (total box from (D))
- **Indicator check box for IFE continuous monitoring and recording:** This is near the bottom of the page. Continuous monitoring and recording is defined as at least once every 15 minutes for both the monitoring and the recording aspect. If for any reason continuous monitoring and recording was not performed during the month, then do not check the box and put comments explaining the situation in the **Comment** section.

## **Long Term 2 Enhanced Surface Water Treatment Rule (LT2)**

The LT2 Rule specifically addresses *Cryptosporidium* (Crypto) which is commonly found in surface water. This rule requires that all PWS treating SW/GU must monitor their source water to ascertain the character of the source water regarding Crypto. The LT2 Rule requires that PWS with source water shown to contain an average concentration of Crypto  $\geq 0.075$  oocysts/Liter must provide additional logs of Crypto treatment in their treatment train processes using one or more options listed in the EPA Microbial Toolbox list. Some PWS may already have one or more of the toolbox options in place, but if required, will need to properly report its successful usage each month. Other PWS with Crypto concentration  $\geq 0.075$  oocysts/L in their source water may have to install and implement new treatment train processes.

### **LT2 Source Water Monitoring**

PWS that treat SW/GU must conduct two rounds of source water monitoring. Each round of source water monitoring is conducted for a limited number of months, either 12 months or 24 months. The 2<sup>nd</sup> round begins 6 years after the last sample of the 1<sup>st</sup> round.

Source water monitoring samples must be collected from appropriate sample collection sites as set forth in 40 CFR 141.701. The samples must be of raw source water, collected prior to any treatment. For PWS that recycle their filter backwash, the samples must be collected prior to the addition of any filter backwash.

PWS are required to submit a source water monitoring plan for approval to KDHE along with a map or schematic that shows the position of the sample collection location in relation to the source water, the treatment processes, and the filter backwash recycle if employed by the PWS. The plan also needs to list which Kansas certified laboratory the PWS will be using and the schedule of collection dates.

### **LT2 Source Water Monitoring Results Determine a PWS's Bin**

Results of the source water monitoring samples are used to calculate the average Crypto concentration, which is then used to determine what bin a PWS is assigned. Table 1 shows a range of oocysts/L concentrations along with the corresponding bin class assigned, and how many additional logs of Crypto treatment a PWS in each bin must provide each month.

Oocysts/L Concentrations, Bin Classification, Additional Crypto Treatment Required					
Crypto Concentration	Bin Class	PWS Filtration Method			
		Conventional	Direct	Slow Sand	Diatomaceous Earth
< 0.075 oocysts/L	Bin 1	No additional treatment	No additional treatment	No additional treatment	No additional treatment
0.075 - < 1.0 oocysts/L	Bin 2	1-log additional treatment	1.5-log additional treatment	1-log additional treatment	Total Crypto removal is 4- log
≥ 1.0 - < 3.0 oocysts/L	Bin 3	2-log additional treatment	2.5-log additional treatment	2-log additional treatment	Total Crypto removal is 5- log
≥ 3.0 oocysts/L	Bin 4	2.5-log additional treatment	3-log additional treatment	2.5-log additional treatment	Total Crypto removal is 5.5- log

Table 1. Range of oocysts/L concentrations along with the corresponding bin class assigned, and how many additional logs of Crypto treatment a PWS in each bin must provide each month.

At the time this document was written, no Kansas PWS were assigned a bin class above Bin 2.

### LT2 Source Water Monitoring Reporting and Record Keeping

PWS are required to submit complete copies of laboratory results of source water monitoring samples to KDHE. By the 10<sup>th</sup> day of each month, PWS should submit complete copies of the results of any source water samples in their possession that have not already been submitted to KDHE.

Drinking water regulations require PWS to keep LT2 source water monitoring plans and results records for at least 3 years after the PWS's bin class has been determined for that round of source water monitoring. KDHE recommends keeping all LT2 round 1 and round 2 source water monitoring plans and results records for at least 3 years until after the 2<sup>nd</sup> round of source water monitoring is completed.

### PWS With a Bin Class ≥ 2 Must Choose Microbial Toolbox Option(s) to Comply With Additional Required Crypto Treatment

PWS with a bin class greater than Bin 1 will have a deadline by which they must begin providing the additional required treatment for Crypto. To comply with providing additional Crypto treatment requirements, PWS must choose treatment(s) from one or more of the 16 available Microbial Toolbox options. The following page lists the Microbial Toolbox options with brief descriptions.



<b>Toolbox Option</b>	<b><i>Cryptosporidium</i> Treatment Credit (with design and implementation criteria)</b>
1) Watershed control program	<b>0.5-log credit</b> for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Specific criteria can be found in 40 CFR 141.716(a)
2) Alternative source/intake management	<b>No prescribed credit.</b> Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria can be found in 40 CFR 141.716(b)
3) Presedimentation basin with coagulation	<b>0.5-log credit</b> during any month that Presedimentation basins achieve a monthly mean reduction of 0.5 log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria can be found in 40 CFR 141.717(a)
4) Two-stage lime softening	<b>0.5-log credit</b> for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria can be found in CFR 40 141.717(b)
5) Bank filtration	<b>0.5-log credit</b> for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria can be found in CFR 40 141.717(c)
6) Combined filter performance	<b>0.5-log credit</b> for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria can be found in 40 CFR 141.718(a)
7) Individual filter performance	<b>0.5-log credit</b> (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria can be found in 40 CFR 141.718(b)
8) Demonstration of performance	<b>Credit awarded</b> to unit process or treatment train <b>based on a demonstration</b> to the State with a State-approved protocol. Specific criteria can be found in 40 CFR 141.718 (c)
9) Bag or cartridge filters (individual filters)	<b>Up to 2-log credit based on the removal efficiency</b> demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria can be found in 40 CFR 141.719(a)
10) Bag or cartridge filters (in series)	<b>Up to 2.5-log credit based on the removal efficiency</b> demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria can be found in 40 CFR 141.719(a)
11) Membrane filtration	<b>Log credit equivalent to removal efficiency</b> demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria can be found in 40 CFR 141.719(b)
12) Second stage filtration	<b>0.5-log credit</b> for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria can be found in 40 CFR 141.719(c)
13) Slow sand filters	<b>2.5-log credit</b> as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria can be found in 40 CFR 141.719(d)
14) Chlorine dioxide	<b>Log credit based on measured CT</b> in relation to CT table. Specific criteria can be found in 40 CFR 141.720(b)
15) Ozone	<b>Log credit based on measured CT</b> in relation to CT table. Specific criteria can be found in 40 CFR 141.720(b)
16) UV	<b>Log credit based on validated UV dose</b> in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria can be found in 40 CFR 141.720(d)

Should a PWS plan to make any new installations to comply with the requirement to provide additional Crypto treatment, they should be aware that according to K.A.R. 28-15-16, all plans for the future use of a source of supply, treatment, construction of new wells, water treatment plants, pumping stations, finished water storage facilities and distribution facilities including water line extensions used in connection with the public water supply system must be approved by KDHE in our Topeka office prior to construction. A permit application must be submitted and approved by KDHE for any such improvements, except that while waterlines less than one mile in length do not require a permit application to accompany the submittal documents.

If/when concluded that a PWS will be utilizing a specific Microbial Toolbox option to comply with the LT2 Rule requirement for additional log of Crypto treatment, they will be provided with the correct monthly reporting form(s) they would be required to submit. Monthly report forms are due to KDHE by the 10th day of each following month.

### **Monthly Reporting That Additional Crypto Treatment Was Provided**

All additional Crypto Treatment monitoring records must be kept by the PWS for at least 3 years. States are allowed to approve PWS to certify operation within required parameters for treatment credit rather than submitting to the State data from daily operations. KDHE will take advantage of this allowance. An example of this type of reporting is the report titled, “Monthly Turbidity-Disinfection-CT Report.”

### **Monthly Reporting Example**

So far, the most commonly used Microbial Toolbox options by Kansas PWS are options #6 Combined Filter Performance and #7 Individual Filter Performance. A report form was developed for monthly reporting of these parameters along with reporting other surface water treatment rule requirements titled, “Crypto Additional Treatment: Monthly Turbidity-Disinfection-CT Report,” and it is shown on the following page. Crypto Additional Treatment monthly reporting forms have also been developed for options #3 Presedimentation Basin with Coagulation, and # 15 Ozone.

**CRYPTO ADDITIONAL TREATMENT: MONTHLY TURBIDITY - DISINFECTION - CT**

**SUMMARY REPORT FOR THE MONTH & YEAR OF:** \_\_\_\_\_

<b>PWS NAME/FACILITY:</b> _____	<b>MAIL TO:</b> _____
<b>ACCOUNT/PWS ID No.:</b> _____	KDHE - Bureau of Water Public Water Supply Section 1000 SW Jackson St.; Suite 420 Topeka, KS 66612-1367
<b>ADDRESS:</b> _____	
<b>CITY &amp; ZIP CODE:</b> _____	
Email: <a href="mailto:dianne.sands@ks.gov">dianne.sands@ks.gov</a> Fax: (785) 559-4258	

DATE	(A) Minimum Residual in Distribution System			(B) Minimum Residual Leaving the Plant			(C) Maximum Combined Filter Effluent (CFE) Turbidity Reading For Each Day	(D) Total Number of CFE Turbidity Readings Taken Each Day	(E) Number of CFE Turbidity Readings Greater than 0.15 NTU	(F) Disinfectant Contact Time Ratio GIA / VIR	Bact Samples Collected <input checked="" type="checkbox"/>
	Minimum Daily Residual (mg/L)	Disinfectant Type (Combined or Free)	# of Residual Readings Taken	Minimum Daily Residual (mg/L)	Disinfectant Type (Combined or Free)	# of Residual Readings Taken					
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
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30											
31											
TOTALS											

**Percent (%) of NTU Readings Which are in Compliance:** \_\_\_\_\_

**COMMENTS:** \_\_\_\_\_

- Please check box if disinfectant residual leaving the plant was < 0.2 mg/L (free or combined chlorine). (attach required data with this report)
- Please check box if the Individual Filter Effluent (IFE) was monitored and recorded every 15 minutes as required.
- Please check box if 95% of all IFE readings collected during the month were <= 0.15 NTU.
- Please check box if any IFE exceeded 0.34 NTU in two consecutive readings taken 15 minutes apart. (attach required data with this report)

**Prepared By:** \_\_\_\_\_

**Date Form Completed:** \_\_\_\_\_

*Signature on this form certifies all information above is accurate and complete to the best of the signer's knowledge.*

# Appendix A

## Glossary of Acronyms

CFE	Combined Filter Effluent
CFR	code of Federal Regulations
CPE	Comprehensive Performance Evaluation
CT	Contact Time
CWS	Community Water Systems
EPA	Environmental Protection Agency
GU	Groundwater Under the Influence of Surface Water
IESWTR	Interim Enhanced Surface Water Treatment Rule of 1998
IFE	Individual Filter Effluent
KAR	Kansas Administrative Regulations
KDHE	Kansas Department of Health & Environment
LT1	Long Term 1 Enhanced Surface Water Treatment Rule of 2002
LT2	Long Term 2 Enhanced Surface Water Treatment Rule of 2006
MG/L	Milligrams per Liter, or Parts Per Million
NC	Transient, Non-community Water Systems
NTNC	Non-transient, Non-community Water Systems
NTU	Nephelometric Turbidity Unit
oocysts/L	Oocysts per Liter
PWS	Public Water Supply System
SW	Surface Water
SWTR	Surface Water Treatment Rule of 1989