

Comprehensive Surface Water Treatment Rules Quick Reference Guide: Systems Using Conventional or Direct Filtration

Overview of the Rules

Title	Surface Water Treatment Rule (SWTR) - 40 CFR 141.70-141.75 Interim Enhanced Surface Water Treatment Rule (IESWTR) - 40 CFR 141.170-141.175 Filter Backwash Recycling Rule (FBRR) - 40 CFR 141.76 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) - 40 CFR 141.500-141.571
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia</i> , and <i>Cryptosporidium</i> .
General Description	The Surface Water Treatment Rules : <ul style="list-style-type: none"> ▶ Applies to all public water systems (PWSs) using surface water or ground water under the direct influence of surface water (GWUDI), otherwise known as "Subpart H systems." ▶ Requires all Subpart H systems to disinfect. ▶ Requires Subpart H systems to filter unless specific filter avoidance criteria are met. ▶ Requires individual filter monitoring and establishes combined filter effluent (CFE) limits. ▶ Applies a treatment technique requirement for control of microbials.

Overview of Requirements

The purpose of this table is show how the requirements for the IESWTR and LT1ESWTR build on the existing requirements established in the original SWTR.

APPLICABILITY: PWSs that use surface water or ground water under the direct influence of surface water (Subpart H) that practice conventional or direct filtration.		Final Rule Dates			
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002	FBRR 2001
Population Served	≥10,000	✓	✓		✓
	< 10,000	✓	N/A (except for sanitary survey provisions)	✓	✓
Regulated Pathogens	99.99% (4-log) removal/inactivation of viruses	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	99.9% (3-log) removal/inactivation of <i>Giardia lamblia</i>	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	99% (2-log) removal of <i>Cryptosporidium</i>		✓	✓	Regulated under IESWTR & LT1ESWTR
Residual Disinfectant Requirements	Entrance to distribution system (≥0.2 mg/L)	✓	Regulated under SWTR	Regulated under SWTR	
	Detectable in the distribution system	✓	Regulated under SWTR	Regulated under SWTR	
Turbidity Performance Standards	Combined Filter Effluent	✓	✓	✓	
	Individual Filter Effluent		✓	✓	
Disinfection Profiling & Benchmarking	Systems must profile inactivation levels and generate benchmark, if required		✓	✓	
Sanitary Surveys (state requirement)	CWS: Every 3 years NCWS: Every 5 years		✓	Regulated under IESWTR	
Covered Finished Reservoirs/Water Storage Facilities (new construction only)			✓	✓	
Operated by Qualified Personnel as Specified by State		✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR

(CWS) Community Water System (NCWS) Non-community Water System

Turbidity

There are two ways turbidity is measured: **Combined Filter Effluent (CFE)** and **Individual Filter Effluent (IFE)**.

Turbidity: Monitoring and Reporting Requirements				
Turbidity Reporting Requirements <i>(Reports due by the 10th day of the following month the system serves water to the public.)</i>	Monitoring/Recording Frequency	SWTR As of June 29, 1993	IESWTR ≥ 10,000 people As of January 1, 2002	LT1ESWTR < 10,000 people As of January 1, 2005
CFE 95% Value Report total number of CFE measurements and number and percentage of CFE measurements ≤ 95 th % limit.	At least every 4 hours*	≤ 0.5 NTU	≤ 0.3 NTU	≤ 0.3 NTU
CFE Maximum Value Report date and value of any CFE measurement that exceeded CFE maximum limit.	At least every 4 hours*	5 NTU	1 NTU Contact state within 24 hours	1 NTU Contact state within 24 hours
		Contact state within 24 hours		
IFE Monitoring Report IFE monitoring conducted and any follow-up actions.	Monitor continuously every 15 minutes	None	Monitor—exceedances require follow-up action	Monitor—exceedances require follow-up action. Systems with 2 or fewer filters may monitor CFE continuously in lieu of IFE.

*Monitoring frequency may be reduced by the state to once per day for systems serving 500 or fewer people.

IFE Follow-Up and Reporting Requirements						
Condition	IESWTR (≥ 10,000)			LT1ESWTR (< 10,000) **		
	Action	Report	By	Action	Report	By
2 consecutive recordings >0.5 NTU taken 15 minutes apart at the end of the first 4 hours of continuous filter operation after backwash/offline:	Produce filter profile within 7 days (if cause not known)	<ul style="list-style-type: none"> ▶ Filter # ▶ Turbidity value ▶ Date ▶ Cause (if known) <u>or</u> report profile was produced 	10 th of the following month			
2 consecutive recordings > 1.0 NTU taken 15 minutes apart:	Produce filter profile within 7 days (if cause not known)	<ul style="list-style-type: none"> ▶ Filter # ▶ Turbidity value ▶ Date ▶ Cause (if known) <u>or</u> report profile was produced 	10 th of the following month		<ul style="list-style-type: none"> ▶ Filter # ▶ Turbidity value ▶ Date ▶ Cause (if known) 	10 th of the following month
2 consecutive recordings > 1.0 NTU taken 15 minutes apart at the same filter for 3 months in a row :	Conduct filter self-assessment within 14 days	<ul style="list-style-type: none"> ▶ Filter # ▶ Turbidity value ▶ Date ▶ Report filter self-assessment produced 	10 th of the following month	Conduct a filter self-assessment within 14 days. Systems with 2 filters that monitor CFE in lieu of IFE must do both filters.	<ul style="list-style-type: none"> ▶ Date filter self-assessment triggered & completed 	10 th of the following month (or within 14 days of filter self-assessment being triggered if triggered in last 4 days of the month)
2 consecutive recordings > 2.0 NTU taken 15 minutes apart at the same filter for 2 months in a row:	Arrange for CPE within 30 days & submit report within 90 days	<ul style="list-style-type: none"> ▶ Filter # ▶ Turbidity value ▶ Date 	10 th of the following month	Arrange for CPE within 60 days & submit CPE report within 120 days	<ul style="list-style-type: none"> ▶ Date CPE triggered 	10 th of the following month
		Submit CPE report	90 days after exceedance		Submit CPE report	120 days after exceedance

** Systems serving fewer than 10,000 people must begin complying with these requirements beginning January 1, 2005.

IFE performance is measured in systems using conventional or direct filtration. The performance of each individual filter is critical to controlling pathogen breakthrough. The **CFE** turbidity results may mask the performance of an individual filter since the individual filter may have a turbidity spike of a short duration not detected by 4 hour CFE readings.

The IESWTR and LT1ESWTR created more stringent CFE turbidity standards and established a new IFE turbidity monitoring requirement to address *Cryptosporidium*. These new turbidity standards assure conventional and direct filtration systems will be able to provide 2-log *Cryptosporidium* removal.

Disinfection

Disinfection must be sufficient to ensure that the total treatment process (disinfection plus filtration) of the system achieves at least:

- ▶ 99.9% (3-log) inactivation and/or removal of *Giardia lamblia*.
- ▶ 99.99% (4-log) inactivation and/or removal of viruses.

Cryptosporidium must be removed by filtration and no inactivation credits are currently given for disinfection. Systems must also comply with the maximum residual disinfectant level (MRDL) requirements specified in the Stage 1 Disinfectants/Disinfection Byproducts Rule (Stage 1 DBPR).

Residual Disinfectant Monitoring and Reporting Requirements			
Location	Concentration	Monitoring Frequency	Reporting (Reports due 10 th of the following month)
Entry to distribution system.	Residual disinfectant concentration cannot be < 0.2 mg/L for more than 4 hours.	Continuous, but states may allow systems serving 3,300 or fewer persons to take grab samples from 1 to 4 times per day, depending on system size.	Lowest daily value for each day, the date and duration when residual disinfectant was < 0.2 mg/L, and when state was notified of events where residual disinfectant was < 0.2 mg/L.
Distribution system - same location as total coliform sample location(s).	Residual disinfectant concentration cannot be undetectable in greater than 5% of samples in a month, for any 2 consecutive months. Heterotrophic plate count (HPC) ≤ 500/mL is deemed to have detectable residual disinfectant.	Same time as total coliform samples.	Number of residual disinfectant or HPC measurements taken in the month resulting in no more than 5% of the measurements as being undetectable in any 2 consecutive months.

Disinfection Profiling and Benchmarking Requirements

A **disinfection profile** is the graphical representation of a system's microbial inactivation over 12 consecutive months.

A **disinfection benchmark** is the lowest monthly average microbial inactivation value. The disinfection benchmark is used as a baseline of inactivation when considering changes in the disinfection process.

Disinfection Profiling and Benchmarking Requirements Under IESWTR & LT1ESWTR		
The purpose of disinfection profiling and benchmarking is to allow systems and states to assess whether a change in disinfection practices creates a microbial risk. Systems should develop a disinfection profile that reflects <i>Giardia lamblia</i> inactivation (systems using ozone or chloramines must also calculate inactivation of viruses), calculate a benchmark (lowest monthly inactivation) based on the profile, and consult with the state prior to making a significant change to disinfection practices.		
REQUIREMENT	IESWTR	LT1ESWTR
AFFECTED SYSTEMS:	Community, non-transient non-community, and <u>transient</u> systems.	Community and non-transient non-community systems only.
BEGIN PROFILING BY:	April 1, 2000	<ul style="list-style-type: none"> ▶ July 1, 2003 for systems serving 500-9,999 people. ▶ January 1, 2004 for systems serving fewer than 500 people.
FREQUENCY & DURATION:	Daily monitoring for 12 consecutive calendar months to determine the total logs of <i>Giardia lamblia</i> inactivation (and viruses, if necessary) for each day in operation.	Weekly inactivation of <i>Giardia lamblia</i> (and viruses, if necessary), on the same calendar day each week over 12 consecutive months.
STATES MAY WAIVE DISINFECTION PROFILING REQUIREMENTS IF:	TTHM annual average <0.064 mg/L and HAA5 annual average <0.048 mg/L: <ul style="list-style-type: none"> ▶ Collected during the same period. ▶ Annual average is arithmetic average of the quarterly averages of four consecutive quarters of monitoring. ▶ At least 25% of samples at the maximum residence time in the distribution system. ▶ Remaining 75% of samples at representative locations in the distribution system. 	One TTHM sample <0.064 mg/L and one HAA5 sample <0.048 mg/L: <ul style="list-style-type: none"> ▶ Collected during the month of warmest water temperature; AND ▶ At the maximum residence time in the distribution system. Samples must have been collected after January 1, 1998.
DISINFECTION BENCHMARK MUST BE CALCULATED IF:	Systems required to develop a disinfection profile and are considering any of the following: <ul style="list-style-type: none"> ▶ Changes to the point of disinfection. ▶ Changes to the disinfectant(s) used. ▶ Changes to the disinfection process. ▶ Any other modification identified by the state. Systems must consult the state prior to making any modifications to disinfection practices.	Same as IESWTR, and systems must obtain state approval prior to making any modifications to disinfection practices.

Filter Backwash Recycling Rule

The FBRR applies to PWSs that use surface water or ground water under the direct influence of surface water, practice conventional or direct filtration, and recycle spent filter backwash, thickener supernatant, or liquids from dewatering processes. The FBRR requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state. The FBRR was developed to improve public health protection by assessing and changing, where needed, recycle practices for improved contaminant control, particularly microbial contaminants. Systems were required to submit recycle notification to the state by December 8, 2003.

Filter Backwash Critical Deadlines and Requirements	
June 8, 2004	<ul style="list-style-type: none"> ▶ Return recycle flows through the processes of a system's existing conventional or direct filtration system or an alternate recycle location approved by the state (a 2-year extension is available for systems making capital improvements to modify the recycle return location). ▶ Collect recycle flow information and retain on file.
June 8, 2006	Complete all capital improvements associated with relocating recycle return location (if necessary).