

Comprehensive Surface Water Treatment Rules Quick Reference Guide: Systems Using Slow Sand, Diatomaceous Earth, or Alternative 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 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 <u>all</u> Subpart H systems to disinfect. ▶ Requires Subpart H systems to filter unless specific filter avoidance criteria are met. ▶ 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 slow sand, diatomaceous earth or alternative filtration.		Final Rule Dates		
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002
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
	99.9% (3-log) removal/inactivation of <i>Giardia lamblia</i>	✓	Regulated under SWTR	Regulated under SWTR
	99% (2-log) removal of <i>Cryptosporidium</i>		✓	✓
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 - Slow Sand and Diatomaceous Earth	✓	Regulated under SWTR	Regulated under SWTR
	Combined Filter Effluent - Alternative	✓	✓	✓
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

(CWS) Community Water System

(NCWS) Non-community Water System

Turbidity

Turbidity is measured as Combined Filter Effluent (CFE) for slow sand, diatomaceous earth, and alternative filtration. The CFE 95th % value and CFE maximum value for slow sand and diatomaceous earth were not lowered in the IESWTR and LT1ESWTR since these filtration technologies are assumed to provide 2-log *Cryptosporidium* removal with the turbidity limits established by SWTR. Alternative filtration technologies (defined as filtration technologies other than conventional, direct, slow sand, or diatomaceous earth) must demonstrate to the state that filtration and/or disinfection achieve 3-log *Giardia* and 4-log virus removal and/or inactivation. The IESWTR and LT1ESWTR also require alternative filtration technologies to demonstrate 2-log *Cryptosporidium* removal.

Turbidity: Monitoring and Reporting Requirements					
Turbidity Type and 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
Slow Sand & Diatomaceous Earth	CFE 95%	At least every 4 hours*	≤1 NTU	Regulated under SWTR	Regulated under SWTR
	CFE Max	At least every 4 hours*	5 NTU	Regulated under SWTR	Regulated under SWTR
Alternative ▶ Membranes ▶ Cartridges ▶ Other	CFE 95%	At least every 4 hours*	≤1 NTU	Established by state	Established by state (not to exceed 1 NTU)
	CFE Max	At least every 4 hours*	5 NTU	Established by state	Established by state (not to exceed 5 NTU)

*Monitoring frequency may be reduced by the state to once per day for systems using slow sand or alternative filtration. Monitoring frequency may be reduced by the state to once per day for systems serving 500 or fewer people regardless of type of filtration used.

CFE Turbidity: Reporting Requirements			
Report to State:	SWTR Measurements	IESWTR Measurements	LT1ESWTR Measurements**
Within 10 days after the end of the month:	Total number of monthly measurements	Total number of monthly measurements	Total number of monthly measurements
	Number and percent less than or equal to designated 95 th percentile turbidity limits	Number and percent less than or equal to designated 95 th percentile turbidity limits	Number and percent less than or equal to designated 95 th percentile turbidity limits
	Date and value exceeding 5 NTU	Date and value exceeding 5 NTU for slow sand and diatomaceous earth or maximum level set by state for alternative filtration	Date and value exceeding 5 NTU for slow sand and diatomaceous earth or maximum level set by state for alternative filtration
Within 24 hours:	Exceedances of 5 NTU for CFE	Exceedances of 5 NTU for slow sand and diatomaceous earth or maximum CFE level set by state for alternative filtration	Exceedances of 5 NTU for slow sand and diatomaceous earth or maximum CFE level set by state for alternative filtration

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

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, <u>and 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 <u>and</u> 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 <u>and</u> 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.