

Compilation of Quick Reference Guides

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Quick Reference Guides Included are:

Arsenic and Clarifications to Compliance and New Source Monitoring Rule: A Quick Reference Guide

Comprehensive Surface Water Treatment Rules Quick Reference Guide:

- ◆ Systems Using Conventional or Direct Filtration
- ◆ Systems Using Slow Sand, Diatomaceous Earth or Alternative Filtration
- ◆ Unfiltered Systems

Consumer Confidence Report Rule: A Quick Reference Guide

Filter Backwash Recycling Rule: A Quick Reference Guide

Ground Water Rule

- ◆ A Quick Reference Guide
- ◆ Compliance Monitoring: A Quick Reference Guide
- ◆ Sample Collection and Transport: A Quick Reference Guide
- ◆ Triggered and Representative Monitoring: A Quick Reference Guide

Interim Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Lead and Copper Rule: A Quick Reference Guide

Long Term 1 Enhanced Surface Water Treatment Rule: A Quick Reference Guide

The Public Notification Rule: A Quick Reference Guide

Radionuclides Rule: A Quick Reference Guide

Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rule:

- ◆ A Comprehensive Quick Reference Guide
- ◆ Laboratory Quick Reference Guide

The Standardized Monitoring Framework: A Quick Reference Guide

Total Coliform Rule: A Quick Reference Guide

Variances and Exemptions: A Quick Reference Guide

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 Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) - 40 CFR 141.700-141.722
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia lamblia</i> , and <i>Cryptosporidium</i> .
General Description	The Surface Water Treatment Rules: ► 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. ► Applies a treatment technique requirement for control of microbials.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Overview of Requirements

The purpose of this table is to show how the requirements for the IESWTR, FBRR, LT1ESWTR and LT2ESWTR build on the existing requirements established in the original SWTR.

APPLICABILITY: PWSs that use surface water or GWUDI (Subpart H systems) that practice conventional or direct filtration.		Final Rule Dates				
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002	LT2ESWTR 2006	FBRR 2001
Population Served	≥ 10,000	✓	✓		✓	✓
	< 10,000	✓	For sanitary survey provisions only	✓	✓	✓
Regulated Pathogens	99.99% (4-log) removal/inactivation of viruses	✓	Regulated under SWTR	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	Regulated under SWTR
	99% (2-log) removal of <i>Cryptosporidium</i>		✓	✓	Additional treatment may be required	Regulated under IESWTR and LT1ESWTR
Residual Disinfection Requirements	Entrance to distribution system (≥ 0.2 mg/L)	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR	
	Detectable in the distribution system	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR	
Source Water Monitoring Requirements and Bin Classification	Monitoring to calculate <i>Cryptosporidium</i> and determine appropriate bin classification for each plant required to monitor				✓	
Turbidity Performance Standards	Combined Filter Effluent	✓	✓	✓	Regulated under SWTR, IESWTR and LT1ESWTR	
	Individual Filter Effluent		✓	✓	Regulated under IESWTR and LT1ESWTR	
Disinfection Profiling and 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	Regulated under IESWTR	
Finished Reservoirs/ Water Storage Facilities	All new facilities constructed must be covered		✓	✓	Regulated under LT1ESWTR	
	Uncovered facilities must be covered or discharge treated				✓	
Operated by Qualified Personnel as Specified by State		✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR

** Community water system (CWS), Noncommunity water system (NCWS)

Turbidity

Compliance with turbidity provisions is measured at the Combined Filter Effluent (CFE) and Individual Filter Effluent (IFE). 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 hours CFE readings. **IFE** performance is measured in systems using conventional or direct filtration. The performance of each individual filter is critical to controlling pathogen breakthrough.

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. Subpart H systems using the Treatment Performance Toolbox option under the LT2ESWTR must meet the more stringent CFE and IFE turbidity monitoring levels in order to receive additional *Cryptosporidium* log credit.

Turbidity: Monitoring and Reporting Requirements				
Turbidity Type and Reporting Requirements (Reports due by the 10th day of the following month the system serves water to the public.)	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 percentile limit	At least every 4 hours*	≤ 0.5 NTU	≤ 0.3 NTU	≤ 0.3 NTU
CFE Maximum Value Report date and time of any CFE measurement that exceeds CFE maximum limit	At least every 4 hours*	5 NTU Contact state within 24 hours	1 NTU Contact state within 24 hours	1 NTU 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. 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 fewer than 500 people.

IFE Turbidity: 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 end of first 4 hours of continuous filter operation after backwash/offline:	Produce filter profile within 7 days (if unknown cause).	<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 unknown cause).	<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.	Date filter 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 Comprehensive Performance Evaluation (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.	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 had to begin complying with these requirements beginning January 1, 2005.

Filter Backwash Recycling Rule

The FBRR applies to Subpart H systems that 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. By June 8, 2004, systems were required to 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 and collect recycle flow information and retain on file. Any system making capital improvements to modify the recycle return location was given until June 8, 2006, to complete the improvements. All new systems must abide by these requirements.

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.

Subpart H systems using chlorine dioxide, ozone, or ultraviolet (UV) disinfection may achieve additional *Cryptosporidium* log credit by using the Inactivation Toolbox option under the LT2ESWTR. Systems must also comply with the maximum residual disinfectant level (MRDL) and maximum contaminant level (MCL) requirements specified in the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) and Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).

Residual Disinfectant Monitoring and Reporting Requirements			
Location	Concentration	Monitoring Frequency	Reporting (Reports due 10th 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 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.

LT2ESWTR Source Water Monitoring and Bin Classification

Bin concentration is calculated by averaging individual sample results from 1 or more years of monitoring (specific procedures vary by frequency and duration of monitoring).

A combined distribution system (CDS) is an interconnected distribution system consisting of the distribution systems of the wholesale system and of the consecutive systems that receive finished water from that wholesale system. Under the LT2ESWTR, wholesale systems in a CDS must comply with the LT2ESWTR based on the population of the largest system in their CDS.

EPA has established four schedule categories based on system size to simplify the discussion of the LT2ESWTR monitoring requirements. Schedule 1 applies to systems that serve 100,000 or more people or in a CDS that largest system serves 100,000 people. Schedule 2 applies to systems that serve 50,000 to 99,999 people or in a CDS that largest system serves 50,000 to 99,999 people. Schedule 3 applies to systems that serve 10,000 and 49,999 people or in a CDS that largest system serves 10,000 and 49,999 people. Schedule 4 applies to systems that serve less than 10,000 people.

Source water monitoring requirements are as follows:

- ▶ Large systems (≥ 10,000 people served) must sample for *Cryptosporidium*, *E.coli* and turbidity at least monthly for 2 years.
- ▶ Small systems (< 10,000 people served) must initially sample for *E.coli* at least once every 2 weeks for 1 year. *Cryptosporidium* monitoring is only required if *E. coli* levels are above certain levels based on the water source type.
- ▶ All systems must begin a second round of monitoring 6 years after initial bin classification.

Bin Classification and Additional Treatment Requirements			
Bin	Cryptosporidium Bin Concentration	Additional Treatment Requirements*	
		Conventional Filtration	Direct Filtration
Bin 1	Less than .075 oocysts/ L **	No additional treatment	No additional treatment
Bin 2	.075 oocysts/L or higher, but less than 1.0 oocysts/L	1-log treatment***	1.5-log treatment***
Bin 3	1.0 oocysts or higher, but less than 3.0 oocysts/L	2-log treatment***	2.5-log treatment***
Bin 4	3.0 oocysts or higher	2.5 log treatment***	3-log treatment***

* Requirements in addition to those met in full compliance with SWTR, IESWTR, and LT1ESWTR

** Or Subpart H systems not required to monitor for *Cryptosporidium*

*** Removal or inactivation

Microbial Toolbox: Inactivation Options, Credits and Criteria

The Microbial Toolbox provides a list of the tools that systems can use, and receive treatment credits for, in order to meet additional treatment requirements of LT2ESWTR. The toolbox provides systems with the flexibility to use any combination of applicable treatment options as long as the systems are in compliance with design, operational, and performance criteria which are not detailed in this document. The toolbox options and credits available for Subpart H systems are divided into five categories:

- ▶ Source protection and management: watershed control program (0.5-log), alternative source/intake management (no prescribed credit).
- ▶ Prefiltration: presedimentation basin with coagulation (0.5-log), two-stage lime softening (0.5-log), bank filtration (0.5- or 1-log).
- ▶ Treatment performance: combined filter performance (0.5-log), individual filter performance (0.5-log), demonstration of performance (log credit variable).
- ▶ Additional filtration: bag and cartridge filters individual (up to 2-log), bag and cartridge filters in series (up to 2.5-log), membrane filtration (log credit variable), second stage filtration (0.5-log), slow sand filters (2.5- to 3-log).
- ▶ Inactivation: chlorine dioxide (log credit variable), ozone (log credit variable), UV (log credit variable).

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			
The purpose of disinfection profiling and benchmarking is to allow systems and states to assess whether a change in disinfection practices reduces microbial protection. Systems must develop a disinfection profile that reflects <i>Giardia lamblia</i> and viruses inactivation, 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	LT2ESWTR
Affected Systems:	Community water systems (CWS), nontransient noncommunity water systems (NTNCWS), and transient noncommunity water systems (TNCWS) $\geq 10,000$.	CWS and NTNCWS $< 10,000$ only.	Any CWS, NTNCWS or TNCWS that proposes to make a significant change in disinfection practice*.
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 < 500 people. 	<ul style="list-style-type: none"> ▶ Upon completion of initial round of source water monitoring, AND ▶ 12 consecutive months prior to making the proposed change.
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.	At least weekly inactivation of <i>Giardia lamblia</i> and viruses, for at least 1 year. May use data collected for profile under IESWTR or LT1ESWTR.
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 4 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.	<ul style="list-style-type: none"> ▶ The system has an existing disinfection profile for both <i>Giardia lamblia</i> and viruses, and has neither made a significant change to its treatment practices nor changed sources since the profile was developed; OR, ▶ The system has at least 1 year of existing data that can be used to complete a disinfection profile, and has neither made a significant change to its treatment practice nor changed sources since the data were collected.
Disinfection Benchmark Must be Calculated If:	<ul style="list-style-type: none"> ▶ Systems required to develop a disinfection profile and are considering making a significant changes in disinfection practice*. ▶ 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.	Complete disinfection profile and benchmark for viruses and <i>Giardia lamblia</i> .

*A significant change in disinfection practice is defined as (1) change in the point of disinfection, (2) change to the type of disinfectant, (3) change to the disinfection process, or (4) any other modification designated by the state.

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 Filter Backwash Recycling Rule (FBRR) 40 CFR 141.76 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) - 40 CFR 141.500-141.571 Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) - 40 CFR 141.700-141.722
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia lamblia</i> , and <i>Cryptosporidium</i> .
General Description	The Surface Water Treatment Rules: ► 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. ► Applies a treatment technique requirement for control of microbials.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Overview of Requirements

The purpose of this table is to show how the requirements for the IESWTR, LT1ESWTR and LT2ESWTR build on the existing requirements established in the original SWTR.

APPLICABILITY: PWSs that use surface water or GWUDI (Subpart H systems) that practice slow sand, diatomaceous earth or alternative filtration.		Final Rule Dates			
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002	LT2ESWTR 2006
Population Served	≥ 10,000	✓	✓		✓
	< 10,000	✓	For sanitary survey provisions only	✓	✓
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>		✓	✓	Additional treatment may be required
Residual Disinfection Requirements	Entrance to distribution system (≥ 0.2 mg/L)	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Detectable in the distribution system	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
Source Water Monitoring Requirements and Bin Classification	Monitoring to calculate <i>Cryptosporidium</i> and determine appropriate bin classification for each plant required to monitor				✓
Turbidity Performance Standards	Combined Filter Effluent - Slow Sand and Diatomaceous Earth	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Combined Filter Effluent - Alternative	✓	✓	✓	Regulated under SWTR, IESWTR and LT1ESWTR
Disinfection Profiling and 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	Regulated under IESWTR
Finished Reservoirs/ Water Storage Facilities	All new facilities constructed must be covered		✓	✓	Regulated under LT1ESWTR
	Uncovered facilities must be covered or discharge treated				✓
Operated by Qualified Personnel as Specified by State		✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR

** Community water system (CWS), Noncommunity water system (NCWS)

Turbidity

Turbidity is measured as Combined Filter Effluent (CFE) for slow sand, diatomaceous earth, and alternative filtration. The CFE 95th percentile 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 lamblia* and 4-log virus removal and/or inactivation. The IESWTR and LT1ESWTR also require alternative filtration technologies to demonstrate 2-log *Cryptosporidium* removal. Subpart H systems using the Treatment Performance Toolbox option under the LT2ESWTR must meet the more stringent CFE turbidity monitoring levels in order to receive additional *Cryptosporidium* log credit.

Turbidity: Monitoring and Reporting Requirements					
Turbidity Type and Reporting Requirements (Reports due by the 10th day of the following month the system serves water to the public.)		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*	Established by state	Established by state	Established by state (not to exceed 1 NTU)
	CFE Max	At least every 4 hours*	Established by state	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 ≤ designated 95th percentile turbidity limits	Number and percent ≤ designated 95th percentile turbidity limits	Number and percent ≤ designated 95th 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.

Subpart H systems using chlorine dioxide, ozone, or ultraviolet (UV) disinfection may achieve additional *Cryptosporidium* log credit by using the Microbial Toolbox option under the LT2ESWTR. Systems must also comply with the maximum residual disinfectant level (MRDL) and maximum contaminant level (MCL) requirements specified in the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) and Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).

Residual Disinfectant Monitoring and Reporting Requirements

Location	Concentration	Monitoring Frequency	Reporting (Reports due 10th 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 $\leq 3,300$ 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.

LT2ESWTR Source Water Monitoring and Bin Classification

Bin concentration is calculated by averaging individual sample results from 1 or more years of monitoring (specific procedures vary by frequency and duration of monitoring).

A combined distribution system (CDS) is an interconnected distribution system consisting of the distribution systems of the wholesale system and of the consecutive systems that receive finished water from that wholesale system. Under the LT2ESWTR, wholesale systems in a CDS must comply with the LT2ESWTR based on the population of the largest system in their CDS.

EPA has established four schedule categories based on system size to simplify the discussion of the LT2ESWTR monitoring requirements. Schedule 1 applies to systems that serve 100,000 or more people or in a CDS that largest system serves 100,000 people. Schedule 2 applies to systems that serve 50,000 to 99,999 people or in a CDS that largest system serves 50,000 to 99,999 people. Schedule 3 applies to systems that serve 10,000 and 49,999 people or in a CDS that largest system serves 10,000 and 49,999 people. Schedule 4 applies to systems that serve less than 10,000 people.

Source water monitoring requirements are as follows:

- ▶ Large systems ($\geq 10,000$ people served) must sample for *Cryptosporidium*, *E.coli* and turbidity at least monthly for 2 years.
- ▶ Small systems ($< 10,000$ people served) must initially sample for *E.coli* at least once every 2 weeks for 1 year. *Cryptosporidium* monitoring is only required if *E. coli* levels are above certain levels based on the water source type.
- ▶ All systems must begin a second round of monitoring 6 years after initial bin classification.

Bin Classification and Additional Treatment Requirements

Bin	Cryptosporidium Bin Concentration	Additional Treatment Requirements*	
		Slow Sand or Diatomaceous Earth Filtration	Alternative Filtration Technologies
Bin 1	less than .075 oocysts/ L **	No additional treatment	No additional treatment
Bin 2	.075 oocysts/L or higher, but less than 1.0 oocysts/L	1-log treatment***	As determined by state: Total must be at least 4-log***
Bin 3	1.0 oocysts or higher, but less than 3.0 oocysts/L	2-log treatment***	As determined by state: Total must be at least 5-log***
Bin 4	3.0 oocysts or higher	2.5 log treatment***	As determined by state: Total must be at least 5.5-log***

*Requirements in addition to those met in full compliance with SWTR, IESWTR, and LT1ESWTR

** Or Subpart H systems not required to monitor for *Cryptosporidium*

***Removal and/or inactivation

Microbial Toolbox: Inactivation Options, Credits and Criteria

The Microbial Toolbox provides a list of the tools that systems can use, and receive treatment credits for, in order to meet additional treatment requirements of LT2ESWTR. The toolbox provides systems with the flexibility to use any combination of applicable treatment options as long as the systems are in compliance with design, operational, and performance criteria which are not detailed in this document. The toolbox options and credits available for systems that use slow sand, diatomaceous earth or alternative filtration are divided into five categories:

- ▶ Source protection and management: watershed control program (0.5-log), alternative source/intake management (no prescribed credit)
- ▶ Prefiltration: presedimentation basin with coagulation (0.5-log), two-stage lime softening (0.5-log), bank filtration (0.5- or 1-log)
- ▶ Treatment performance: demonstration of performance (log credit variable)
- ▶ Additional filtration: bag and cartridge filters individual (up to 2-log), bag and cartridge filters in series (up to 2.5-log), membrane filtration (log credit variable), second stage filtration (0.5-log), slow sand filters (2.5- to 3-log)
- ▶ Inactivation: chlorine dioxide (log credit variable), ozone (log credit variable), UV (log credit variable)

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

The purpose of disinfection profiling and benchmarking is to allow systems and states to assess whether a change in disinfection practices reduces microbial protection. Systems must develop a disinfection profile that reflects *Giardia lamblia* and viruses inactivation, 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	LT2ESWTR
Affected Systems:	Community water systems (CWS), nontransient noncommunity water systems (NTNCWS), and transient noncommunity water systems (TNCWS) $\geq 10,000$.	CWS and NTNCWS systems <10,000 only.	Any CWS, NTNCWS, TNCWS that proposes to make a significant change in disinfection practice*.
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 < 500 people. 	<ul style="list-style-type: none"> ▶ Upon completion of initial round of source water monitoring, AND ▶ 12 consecutive months prior to making the proposed change.
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.	At least weekly inactivation of <i>Giardia lamblia</i> and viruses, for at least 1 year. May use data collected for profile under IESWTR or LT1ESWTR.
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 4 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.	<ul style="list-style-type: none"> ▶ The system has an existing disinfection profile for both <i>Giardia lamblia</i> and viruses, and has neither made a significant change to its treatment practices nor changed sources since the profile was developed; OR, ▶ The system has at least 1 year of existing data that can be used to complete a disinfection profile and has neither made a significant change to its treatment practices nor changed sources since the data were collected.
Disinfection Benchmark Must be Calculated If:	<ul style="list-style-type: none"> ▶ Systems required to develop a disinfection profile and are considering making a significant changes in disinfection practice*. ▶ 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.	Complete a disinfection profile and benchmark for viruses and <i>Giardia lamblia</i> .

*A significant change in disinfection practice is defined as (1) change in the point of disinfection, (2) change to the type of disinfectant, (3) change to the disinfection process, or (4) any other modification designated by the state.

Comprehensive Surface Water Treatment Rules

Quick Reference Guide: Unfiltered Systems

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 Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) - 40 CFR 141.700-141.722
Purpose	Improve public health protection through the control of microbial contaminants, particularly viruses, <i>Giardia lamblia</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 unfiltered systems to perform surface water monitoring and meet site specific conditions for controls of microbials.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Overview of Requirements

The purpose of this table is to show how the requirements for the IESWTR, LT1ESWTR and LT2ESWTR build on the existing requirements established in the original SWTR.

APPLICABILITY: PWSs that use surface water or GWUDI (Subpart H systems) that do not provide filtration.		Final Rule Dates			
		SWTR 1989	IESWTR 1998	LT1ESWTR 2002	LT2ESWTR 2006
Population Served	≥ 10,000	✓	✓		✓
	< 10,000	✓	For sanitary survey provisions only	✓	✓
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> (through watershed control)		✓	✓	Regulated under IESWTR and LT1ESWTR
	99% (2-log) inactivation of <i>Cryptosporidium</i> for systems reporting ≤ 0.01 oocysts/L; 99.9% (3-log) inactivation of <i>Cryptosporidium</i> for systems reporting > 0.01 oocysts/L.				✓
Treatment Requirements	Entrance to distribution system (≥ 0.2 mg/L)	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Detectable in the distribution system	✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR
	Must use a minimum of two disinfectants to meet the <i>Cryptosporidium</i> , <i>Giardia lamblia</i> , and virus inactivation requirements.				✓
Source Water Monitoring Requirements	Monitoring of <i>Cryptosporidium</i> to calculate arithmetic mean of sample concentrations and determine additional treatment requirements				✓
Unfiltered System Requirements	Avoidance Criteria	✓	✓	✓	Regulated under SWTR, IESWTR and LT1ESWTR
Disinfection Profiling and 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	Regulated under IESWTR
Finished Reservoirs/ Water Storage Facilities	All new facilities constructed must be covered		✓	✓	Regulated under IESWTR and LT1ESWTR
	Uncovered finished water facilities must be covered or discharge treated				✓
Operated by Qualified Personnel as Specified by State		✓	Regulated under SWTR	Regulated under SWTR	Regulated under SWTR

**Community water system (CWS), Noncommunity water system (NCWS)

Filtration Avoidance Criteria

Since December 30, 1991, systems must meet source water quality and site specific conditions to remain unfiltered. If any of the following criteria to avoid filtration are not met, systems must install filtration treatment within 18 months of the failure. The following table outlines the avoidance criteria established by the SWTR and later enhanced by the IESWTR and LT1ESWTR.

Filtration Avoidance Criteria			
		Requirement	Frequency
Source Water Quality Conditions	Microbial Quality	Monitor fecal coliform or total coliform density in representative samples of source water immediately prior to the first point of disinfection application: <ul style="list-style-type: none"> ► Fecal coliform density concentrations must be $\leq 20/100$ mL; OR ► Total coliform density concentrations must be $\leq 100/100$ mL. Sample results must satisfy the criteria listed above in at least 90% of the measurements from previous 6 months.	<ul style="list-style-type: none"> ► 1 to 5 samples per week depending on system size, AND ► Every day the turbidity of the source water exceeds 1 NTU
	Turbidity	Prior to the first point of disinfection application, turbidity levels cannot exceed 5 NTU.	Performed on representative grab samples of source water every 4 hours (or more frequently)
Site Specific Conditions	Systems must:	Calculate total inactivation ratio daily and provide 3-log <i>Giardia lamblia</i> and 4-log virus inactivation daily (except any one day each month) in 11 of 12 previous months (on an ongoing basis).	Take daily measurements before or at the first customer at each residual disinfectant concentration sampling point: <ul style="list-style-type: none"> ► Temperature ► pH (if chlorine used) ► Disinfectant contact time (at peak hourly flow) ► Residual disinfectant concentration measurements (at peak hourly flow)
	System must comply with:	<ul style="list-style-type: none"> ► MCL for total coliforms in 11 of 12 previous months (as per Total Coliform Rule) ► Stage 1 Disinfectants and Disinfection Byproducts Rule requirements. 	
	Systems must have:	<ul style="list-style-type: none"> ► Adequate entry point residual disinfectant concentration (see disinfection requirements). ► Detectable residual disinfectant concentration in the distribution system (see disinfection requirements). ► Redundant disinfection components or automatic shut-off whenever residual disinfectant concentration < 0.2 mg/L. ► A watershed control program minimizing potential for contamination by <i>Giardia lamblia</i> cysts and viruses in source water; IESWTR and LT1ESWTR update this requirement by adding <i>Cryptosporidium</i> control measures. ► An annual on-site inspection by state or approved third party with reported findings. ► Not been identified as a source of a waterborne disease outbreak. 	

Disinfection

Disinfection must be sufficient to ensure that the total treatment process 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.

Subpart H systems using chlorine dioxide, ozone, or ultraviolet (UV) disinfection must achieve additional *Cryptosporidium* log credit by using the Microbial Toolbox option under the LT2ESWTR. Systems must also comply with the maximum residual disinfectant level (MRDL) and maximum contaminant levels (MCL) requirements specified in the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) and the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR).

Residual Disinfectant Monitoring and Reporting Requirements			
Location	Concentration	Monitoring Frequency	Reporting (Reports due 10th 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.

LT2ESWTR Source Water Monitoring and Treatment Requirements

Each PWS must determine the arithmetic mean of all *Cryptosporidium* samples collected during monitoring.

A combined distribution system (CDS) is an interconnected distribution system consisting of the distribution systems of the wholesale system and of the consecutive systems that receive finished water from that wholesale system. Under the LT2ESWTR, wholesale systems in a CDS must comply with the LT2ESWTR based on the population of the largest system in their CDS.

EPA has established four schedule categories based on system size to simplify the discussion of the LT2ESWTR monitoring requirements. Schedule 1 applies to systems that serve 100,000 or more people or in a CDS that largest system serves 100,000 people. Schedule 2 applies to systems that serve 50,000 to 99,999 people or in a CDS that largest system serves 50,000 to 99,999 people. Schedule 3 applies to systems that serve 10,000 and 49,999 people or in a CDS that largest system serves 10,000 and 49,999 people. Schedule 4 applies to systems that serve less than 10,000 people.

Source water monitoring requirements are as follows:

- ▶ Schedule 1-3 systems must sample for *Cryptosporidium* at least monthly for 2 years.
- ▶ Schedule 4 systems must sample for *Cryptosporidium* at a frequency of either (a) at least 2 times per month for 1 year or (b) 1 time per month for 2 years.
- ▶ All systems must begin a second round of monitoring no later than 6 years after determining initial *Cryptosporidium* level.

Treatment Requirements		
If Arithmetic Mean <i>Cryptosporidium</i> Level is:	System Must Provide Treatment to:*	Disinfectant System Must Use:
≤ 0.01 oocysts/L	2-log <i>Cryptosporidium</i> inactivation	<ul style="list-style-type: none">▶ At least 2 disinfectants to provide 4-log virus, 3-log <i>Giardia lamblia</i> and 2- or 3-log <i>Cryptosporidium</i> inactivation.▶ Each disinfectant must achieve by itself the total inactivation required for one of these target pathogens
> 0.01 oocysts/L or if PWS chooses not to monitor for <i>Cryptosporidium</i>	3-log <i>Cryptosporidium</i> inactivation	

* Inactivation credit for treatment with chlorine dioxide, ozone or UV light.

Microbial Toolbox: Inactivation Options, Credits and Criteria

The Microbial Toolbox provides a list of the tools that systems can use, and receive treatment credits for, in order to meet additional treatment requirements of LT2ESWTR. The toolbox provides systems with the flexibility to use any combination of applicable treatment options as long as the systems are in compliance with design, operational, and performance criteria which are not detailed in this document. Unfiltered systems must use one of the following inactivation/disinfection tools to receive the corresponding credits:

- ▶ Chlorine dioxide: log credit received is based on measured CT in relation to the CT table.
- ▶ Ozone: log credit received is based on measured CT in relation to the CT table.
- ▶ UV: log credit received is based on validated UV dose in relation to the UV dose table; reactor validation testing is required to establish UV dose and associated operating conditions.

System Reporting Requirements

System Reporting Requirements	
Report to State:	What to Report:
Within 10 days after the end of the month:	<ul style="list-style-type: none">▶ Source water quality information (microbial quality and turbidity measurements).▶ In addition to the disinfection information above, systems must report the daily residual disinfectant concentration(s) and disinfectant contact time(s) used for calculating the CT value(s).
Within 10 days after the end of the first month following the month when the source water monitoring sample(s) were collected:	<ul style="list-style-type: none">▶ Results from the required source water monitoring.
By October 10 each year:	<ul style="list-style-type: none">▶ Report compliance with all watershed control program requirements.▶ Submit report on the on-site inspection, unless that state conducted the inspection, in which case the state must provide the system with a copy of the report.
Within 24 hours:	<ul style="list-style-type: none">▶ Turbidity exceedances of 5 NTU and waterborne disease outbreaks.
ASAP but no later than the end of the next business day:	<ul style="list-style-type: none">▶ Instance where the residual disinfectant level entering the distribution system was < 0.2mg/L.
Based on system's LT2ESWTR schedule*:	<ul style="list-style-type: none">▶ Sampling schedules and monitoring results for source water monitoring▶ Certain data elements of <i>Cryptosporidium</i>, <i>E. coli</i> and turbidity analyses.

*See each of the four LT2ESWTR by schedule QRGs available online at <http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/compliance.cfm> for additional details.

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			
The purpose of disinfection profiling and benchmarking is to allow systems and states to assess whether a change in disinfection practices reduces microbial protection. Systems must develop a disinfection profile that reflects <i>Giardia lamblia</i> and viruses inactivation, 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	LT2ESWTR
Affected Systems:	Community water systems (CWS), nontransient noncommunity water systems (NTNCWS), and transient noncommunity water systems (TNCWS) serving $\geq 10,000$.	CWS and NTNCWS serving $< 10,000$ only.	Any CWS, NTNCWS, or TNCWS that proposes to make a significant change in disinfection practice*.
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 < 500 people. 	<ul style="list-style-type: none"> ▶ Upon completion of initial round of source water monitoring, AND ▶ 12 consecutive months prior to making the proposed change.
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.	At least weekly inactivation of <i>Giardia lamblia</i> and viruses, for at least 1 year. May use data collected for profile under IESWTR and LT1SWTR.
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 4 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.	<ul style="list-style-type: none"> ▶ The system has an existing disinfection profile for both <i>Giardia lamblia</i> and viruses, and has neither made a change in disinfection practices nor changed sources since the profile was developed; OR, ▶ The system has at least 1 year of existing data that can be used to complete a disinfection profile, and has neither made a significant change to its treatment practice nor changed sources since the data were collected.
Disinfection Benchmark Must be Calculated If:	<ul style="list-style-type: none"> ▶ Systems required to develop a disinfection profile and are considering making a significant changes in disinfection practice*. ▶ 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.	Complete a disinfection profile and benchmark for viruses and <i>Giardia lamblia</i> .

*A significant change in disinfection practice is defined as (1) change in the point of disinfection, (2) change to the type of disinfectant, (3) change to the disinfection process, or (4) any other modification designated by the state.

Ground Water Rule Triggered and Representative Monitoring: A Quick Reference Guide

Overview of the Rule

Title*	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Purpose of Triggered Source Water Monitoring

- ▶ The purpose of triggered source water monitoring is to evaluate whether the presence of total coliform in the distribution system is due to fecal contamination in the ground water source.
- ▶ This type of source water monitoring is triggered by routine total coliform monitoring required by the Total Coliform Rule (TCR) (40 CFR 141.21).
 - Since TCR monitoring is conducted regularly, triggered source water monitoring can occur at any time and thus provides an ongoing evaluation of ground water sources.

Triggered Source Water Monitoring Requirements

Systems Required to Conduct Triggered Source Water Monitoring

GWSs are subject to triggered source water monitoring if they:	<ul style="list-style-type: none"> ▶ Do not provide, and conduct compliance monitoring for, at least 4-log treatment of viruses (through inactivation and/or removal). <ul style="list-style-type: none"> ■ This includes systems that decide to discontinue 4-log treatment. ▶ Do not purchase 100% of their water (and therefore have a source at which to sample).
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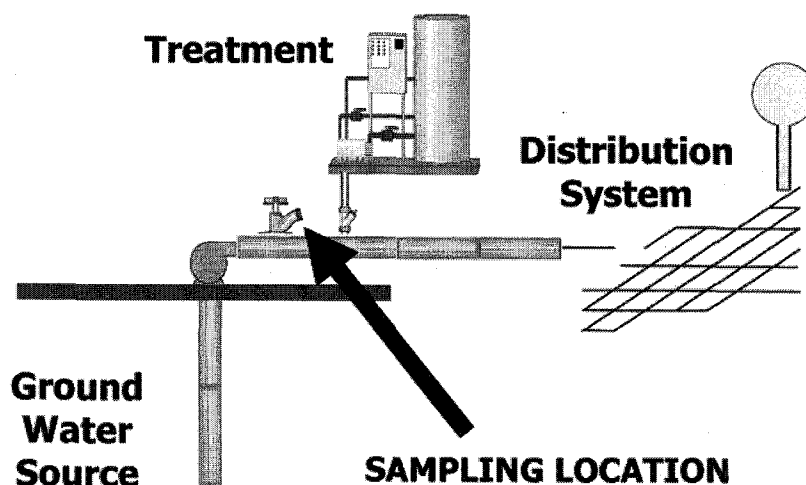
Situations Leading to Triggered Source Water Monitoring

GWSs must conduct triggered source water monitoring when:	<ul style="list-style-type: none"> ▶ The system is notified of a total coliform-positive routine sample collected in compliance with the TCR unless: <ul style="list-style-type: none"> ■ The total coliform sample is invalidated by the State. ■ The State allows an exception to the GWR triggered source water monitoring requirements. <p>OR</p> <ul style="list-style-type: none"> ▶ The system is a wholesale system and is notified by one of its consecutive systems that the consecutive system had a total coliform-positive sample during TCR monitoring.
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Collecting and Analyzing Triggered Source Water Monitoring Samples

When triggered source water monitoring is required, GWSs must:	<ul style="list-style-type: none"> ▶ Collect at least one ground water source sample from each source in use at the time the total coliform-positive sample was collected. <ul style="list-style-type: none"> ■ Samples must be collected within 24 hours of being notified of the total coliform-positive sample (unless the 24-hour limit is extended by the State). ■ Sample must be taken before treatment or at a State-approved location after treatment (see the diagram on the next page). ▶ Ensure all samples are analyzed for the presence of a fecal indicator (e.g., <i>E. coli</i>, enterococci, or coliphage) using an approved GWR method. ▶ If a fecal indicator-positive source sample is invalidated by the State, the GWS must collect another source water sample within 24 hours of being notified by the State of the sample invalidation and analyze for the same fecal indicator using an approved method. See the "Analytical Methods Approved for the Ground Water Rule" at http://water.epa.gov/scitech/drinkingwater/labcert/analyticalmethods.cfm.
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- The diagram below represents an appropriate sampling location for triggered source water monitoring. GWSs should have a sample tap at each source that enables triggered source water monitoring.



Additional Sampling

- If the initial triggered source water sample is fecal indicator-positive, and the State does not require corrective action in response, GWSs must conduct additional source water monitoring.
 - GWSs must collect five additional source water samples (from the source(s) that contained the original fecal indicator-positive samples) within 24 hours of being notified of the fecal indicator-positive sample.
 - The additional samples must be tested for a fecal indicator using an approved GWR method.
- If any one of the five additional samples is fecal indicator-positive, the system must take corrective action.
- If any additional sample is found to be fecal indicator-positive but is subsequently invalidated by the State, the GWS must resample for the same fecal indicator within 24 hours of being notified of the invalidation.

Note: If the GWS is a wholesale system, it must notify all consecutive systems served by a source of any fecal indicator-positive samples from that source within 24 hours of being notified of the sample result.

Sampling at Representative Sources and Triggered Source Water Monitoring Plans

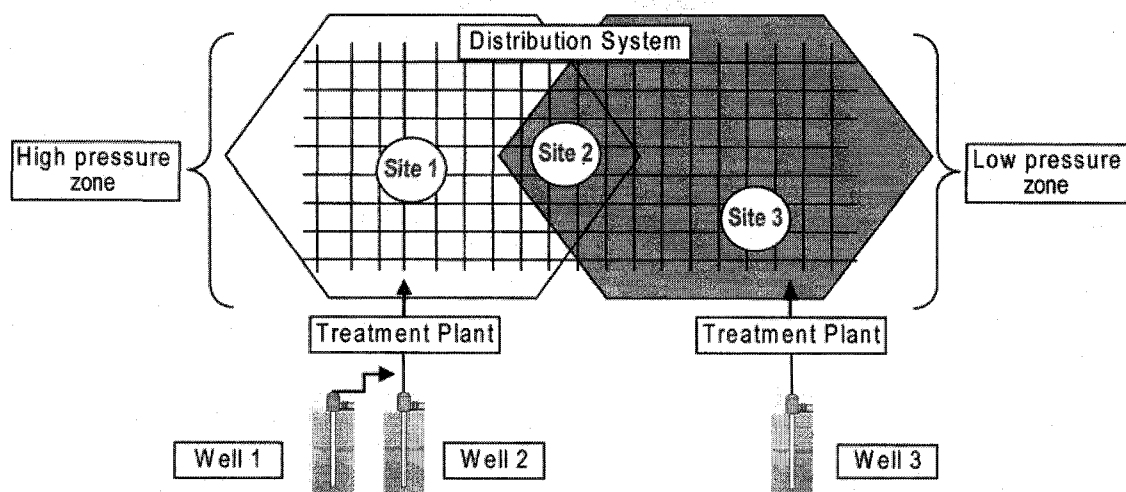
Representative Source Sampling

- If a GWS has multiple sources, the State may allow the GWS to conduct representative source sampling.
- Representative source water sampling allows systems to collect samples from the sources that represent (serve) the TCR monitoring site rather than from all sources. These representative ground water sources must be approved by the State.
- Systems must still:
 - Sample within 24 hours of total coliform-positive sample.
 - Analyze using an approved GWR method.

Triggered Source Water Monitoring Plan

- If the State allows representative site sampling, the State may require the GWS to submit a triggered source water monitoring plan for approval before the GWS starts conducting representative source sampling.
 - A triggered source water monitoring plan may include:
 - A map of the water system (including location of ground water sources, location of pressure zones, and location of storage facilities),
 - A written explanation of how the GWS knows which source feeds which section of the distribution system, and
 - Seasonal or intermittent ground water sources and when they are used.
 - Regardless of whether or not the State requires a plan to be submitted, all representative source sampling locations must be approved by the State.

- The diagram below provides an example of a system schematic that could be used to determine representative sources and develop a triggered source water monitoring plan, based on where in the distribution system the total coliform-positive sample is found. If approved by the State, the system could sample sources 1 and 2 after a total coliform-positive at Site 1 since Site 1 is in the zone served by those sources. A total coliform-positive at Site 2 would require source sampling from all sources since this area is served by all sources.



Variations in Requirements Based on System Size

GWSs Serving Fewer than 1,000 Persons

- GWSs that serve fewer than 1,000 persons may be able to meet TCR repeat monitoring requirements and GWR triggered source water monitoring requirements together if the State allows:
- Repeat TCR monitoring at the source
AND
 - *E. coli* to be used as a fecal indicator under the GWR.
- If the State allows this situation, then the GWS can use a TCR repeat sample collected at the source to meet the triggered source water monitoring requirement of the GWR. The fourth TCR repeat sample is collected at the source. Upstream and downstream samples and a sample at the TCR site are still needed to meet TCR requirements.
- Labs must use an approved GWR method to test for *E. coli*.

Note: If the TCR repeat sample collected at the source is TCR-positive but *E. coli* is not found, the GWR does not require further action but the system is in violation of the TCR MCL.

Consecutive Systems and Wholesale Systems

Consecutive Systems	<p>► Consecutive systems that purchase 100% of their water (and therefore do not have a source from which to sample) must:</p> <ul style="list-style-type: none"> ■ Notify their wholesale system within 24 hours of receiving notice of a total coliform-positive sample taken under the TCR. ■ Upon hearing from the wholesale system of a fecal indicator-positive source water sample (either initial triggered samples or additional samples), notify the public within 24 hours. <p>► Consecutive systems that purchase only some of their water must:</p> <ul style="list-style-type: none"> ■ Notify their wholesale system within 24 hours of receiving notice of a total coliform-positive sample taken under the TCR. ■ Collect GWR triggered source water monitoring samples and additional samples as required. ■ Upon receipt of notification from the laboratory about a fecal indicator-positive source water sample at the system's source(s) take corrective action, if required, and notify the public within 24 hours. ■ Upon receipt of notification from the wholesale system of a fecal indicator-positive sample (either initial triggered samples or additional samples) at the wholesale system's source(s), notify the public within 24 hours.
Wholesale Systems	<p>► Wholesale systems that are notified by a consecutive system of a total coliform-positive sample must:</p> <ul style="list-style-type: none"> ■ Within 24 hours of being notified, collect at least one ground water source sample from each source in use (unless representative sampling is allowed) when the total coliform-positive sample was collected. ■ Notify the public and ALL consecutive systems served by the source within 24 hours of learning that a source water sample is fecal-indicator positive.

Invalidation of Fecal Indicator-Positive Samples

- ▶ The State can invalidate a fecal indicator-positive triggered source water sample if:
 - The system provides the State with written notice from the laboratory that improper sample analysis occurred or
 - The State determines there is substantial evidence that the sample does not reflect source water quality.
 - The State must document in writing there is substantial evidence that the fecal indicator-positive ground water source sample is not related to source water quality.
- ▶ If any sample is found to be fecal indicator-positive and is subsequently invalidated by the State, the GWS must resample for the same indicator within 24 hours of being notified of the invalidation.

Exceptions to the Triggered Source Water Monitoring Requirements

Extension of the 24-hour collection limit

- ▶ The State may extend the 24-hour limit for collecting source water samples on a case-by-case basis if the State determines the system cannot collect the ground water source water sample within 24 hours due to circumstances beyond its control.
- ▶ In the case of an extension, the State must specify how much time the system has to collect the sample.

Total Coliform-Positive Sample Is The Result of Distribution System Conditions

- ▶ A GWS is not required to conduct triggered source water monitoring under one of the following circumstances:
 - The State determines and documents in writing that the total coliform-positive TCR sample is caused by a distribution system deficiency.
 - The GWS determines the total coliform-positive TCR sample was collected at a location that meets State criteria for distribution conditions that will cause total coliform-positive samples and notifies the State within 30 days.

Notification Requirements

If a GWS receives notice of a fecal indicator-positive source water sample collected under the GWR, the system must:	<ul style="list-style-type: none">▶ Consult with the State within 24 hours.▶ Notify the public within 24 hours.<ul style="list-style-type: none">■ Tier 1 Public Notification.▶ If the system is a community GWS, they must provide Special Notice of the fecal indicator-positive sample in their CCR.
If a GWS fails to conduct required triggered or additional monitoring, the system must:	<ul style="list-style-type: none">▶ Notify the public within 12 months.<ul style="list-style-type: none">■ Tier 3 Public Notification.▶ Community GWSs may be able to use their CCR.
Wholesale and consecutive systems are subject to:	<ul style="list-style-type: none">▶ The same notification requirements outlined above, in addition to the requirements to notify the wholesale or consecutive systems.

Critical Deadlines for Triggered Source Water Monitoring for Drinking Water Systems

November 30, 2009	New ground water sources put in place after this date must conduct triggered source water monitoring if the GWS does not provide 4-log virus treatment and conduct compliance monitoring and the GWS is notified that a sample collected for the TCR is total coliform-positive.
December 1, 2009	GWSs must conduct triggered source water monitoring if the GWS does not provide 4-log virus treatment and conduct compliance monitoring and the GWS is notified that a sample collected for the TCR is total coliform-positive.

Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide

Overview of the Rules

Titles*	<ul style="list-style-type: none"> ▶ Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) 63 FR 69390, December 16, 1998, Vol. 63, No. 241 ▶ Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) 71 FR 388, January 4, 2006, Vol. 71, No. 2
Purpose	Improve public health protection by reducing exposure to disinfection byproducts. Some disinfectants and disinfection byproducts (DBPs) have been shown to cause cancer and reproductive effects in lab animals and suggested bladder cancer and reproductive effects in humans.
General Description	<p>The DBPRs require public water systems (PWSs) to:</p> <ul style="list-style-type: none"> ▶ Comply with established maximum contaminant levels (MCLs) and operational evaluation levels (OELs) for DBPs, and maximum residual disinfection levels (MRDLs) for disinfectant residuals. ▶ Conduct an initial evaluation of their distribution system. <p>In addition, PWSs using conventional filtration are required to remove specific percentages of organic material that may react to form DBPs through the implementation of a treatment technique.</p>
Utilities Covered	The DBPRs apply to all sizes of community water systems (CWSs) and nontransient noncommunity water systems (NTNCWSs) that add a disinfectant other than ultraviolet (UV) light or deliver disinfected water, and transient noncommunity water systems (TNCWSs) that add chlorine dioxide.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Overview of Requirements

This table shows how the requirements for the Stage 2 DBPR build on the existing requirements established in the Stage 1 DBPR. For more information on changes in monitoring requirements, see Table 1.

		Stage 1 DBPR	Stage 2 DBPR	For More Info:
Coverage	All CWSs and NTNCWSs that add disinfectant other than UV light and TNCWSs that treat with chlorine dioxide.	✓	✓	
	Consecutive systems that deliver water treated with a disinfectant other than UV light.		✓	
TTHM & HAA5 MCL Compliance	MCL compliance is calculated using the running annual average (RAA) of all samples from all monitoring locations across the system.	✓		See Table 3 and Table 4.
	MCL compliance is calculated using the locational RAA (LRAA) for each monitoring location in the distribution system.		✓	
Regulated Contaminants & Disinfectants	Contaminants			See Table 2.
	Total Trihalomethanes (TTHM)	✓	✓	
	5 Haloacetic Acids (HAA5)	✓	✓	
	Bromate	✓	Regulated under Stage 1 DBPR ¹	
	Chlorite	✓	Regulated under Stage 1 DBPR	
	Disinfectants			
	Chlorine/chloramines	✓	Regulated under Stage 1 DBPR	
	Chlorine dioxide	✓	Regulated under Stage 1 DBPR	
Operational Evaluation	If an operational evaluation level (OEL) is exceeded, systems must evaluate practices and identify DBP mitigation actions.		✓	See Table 5.

1. A new analytical method for bromate was approved with the Stage 2 DBPR.

Table 1. Changes in Monitoring Requirements

			Stage 1 DBPR	Stage 2 DBPR
TTHM/ HAA5 Routine Monitoring	Number of Samples		Based on source water type, population, and number of treatment plants or wells.	Based on source water type and population.
	Sample Locations		At location of maximum residence time. ¹	Based on Initial Distribution System Evaluation (IDSE) requirements. ²
	Compliance Calculation		RAA must not exceed the MCL for TTHM or HAA5.	LRAA must not exceed the MCL for TTHM or HAA5.
Reduced Monitoring	Eligibility	TTHM/HAA5	All systems need TTHM RAA ≤ 0.040 mg/L and HAA5 ≤ 0.030 mg/L. Subpart H systems also need source water TOC RAA at location prior to treatment ≤ 4.0 mg/L. ^{3,4} The Stage 2 DBPR left eligibility unchanged but specifies that Subpart H systems must take source water TOC samples every 30 days. Subpart H systems on reduced monitoring must take source water TOC samples every 90 days to qualify for reduced monitoring.	
		Bromate ⁵	Source water bromide RAA < 0.05 mg/L. With the Stage 2 DBPR specified entry point to distribution system bromate RAA ≤ 0.0025 mg/L.	

¹Subpart H systems serving $\geq 10,000$ must have at least 25 percent of samples at the location of maximum residence time; the remaining samples must be representative of average residence time.

²All systems are required to satisfy their IDSE requirement by July 10, 2010.

³Subpart H systems are water systems that use surface water or ground water under the direct influence of surface water (GWUDI).

⁴Ground water systems serving $< 10,000$ must meet these RAA for 2 years; can also qualify for reduced monitoring if the TTHM RAA is ≤ 0.020 mg/L and a HAA5 RAA ≤ 0.015 mg/L for 1 year.

⁵A new analytical method for bromate was established with the Stage 2 DBPR.

Table 2. Regulated Contaminants and Disinfectants

Regulated Contaminants	Stage 1 DBPR		Stage 2 DBPR	
	MCL (mg/L)	MCLG (mg/L)	MCL (mg/L)	MCLG (mg/L)
TTHM	0.080		Unchanged ²	
Chloroform		-		0.07
Bromodichloromethane		Zero		Unchanged ²
Dibromochloromethane		0.06		Unchanged ²
Bromoform		Zero		Unchanged ²
HAA5	0.060		Unchanged ²	
Monochloroacetic acid		-		0.07
Dichloroacetic acid		Zero		Unchanged ²
Trichloroacetic acid		0.3		0.2
Bromoacetic acid		-		-
Dibromoacetic acid		-		-
Bromate (plants that use ozone) ¹	0.010	Zero	Unchanged ²	Unchanged ²
Chlorite (plants that use chlorine dioxide)	1.0	0.8	Unchanged ²	Unchanged ²
Regulated Disinfectants	MRDL ³ (mg/L)	MRDLG ³ (mg/L)	MRDL (mg/L)	MRDLG (mg/L)
Chlorine	4.0 as Cl ₂	4	Unchanged ²	Unchanged ²
Chloramines	4.0 as Cl ₂	4	Unchanged ²	Unchanged ²
Chlorine dioxide	0.8	0.8	Unchanged ²	Unchanged ²

¹A new analytical method for bromate was established with the Stage 2 DBPR.

²Stage 2 DBPR did not revise the MCL or MRDL for this contaminant/disinfectant.

³Stage 1 DBPR included MRDLs and MRDLGs for disinfectants, which are similar to MCLs and MCLGs.

Table 3. Compliance Determination

	Stage 1 DBPR	Stage 2 DBPR
TTHM/HAA5	RAA	LRAA
Bromate ¹	RAA	Unchanged ²
Chlorite	Daily/follow-up monitoring	Unchanged ²
Chlorine dioxide	Daily/follow-up monitoring	Unchanged ²
Chlorine/chloramines	RAA	Unchanged ²
DBP precursors (TOC sample set)*	Monthly for TOC and alkalinity	Every 30 days for TOC and alkalinity
¹ A new analytical method for bromate was established with the Stage 2 DBPR.		
² Stage 2 DBPR did not change the compliance requirements for this contaminant/disinfectant.		
*TOC sample set is comprised of source water alkalinity, source water TOC, and treated TOC.		

Table 4. Compliance with MCLs and MRDLs (Routine Monitoring)

Contaminant/ Disinfectant	Coverage		Stage 1 DBPR		Stage 2 DBPR	
	Source Water	Population	Monitoring Frequency	Total Distribution System Monitoring Locations	Monitoring Frequency ¹	Total Distribution System Monitoring Locations
TTHM/HAA5	Subpart H	< 500	Per year ²	1 per treatment plant	Per year ²	2
		500 - 3,300	Per quarter	1 per treatment plant	Per quarter	2
		3,301 - 9,999		4 per treatment plant		4
		10,000 - 49,000				8
		50,000 - 249,999				12
		250,000 - 999,999				16
		1,000,000 - 4,999,999				20
		≥ 5,000,000				
	Ground water	< 500	Per year ²	1 per treatment plant	Per year ²	2
		500 - 9,999	Per quarter		Per quarter	4
		10,000 - 99,999				6
		100,000 - 499,999				8
		≥ 500,000				
	Bromate ³	Systems that use ozone as a disinfectant		Monthly	1 at entry point to distribution system	Unchanged ⁴
Chlorite	Systems that use chlorine dioxide as a disinfectant		Daily (at entrance to distribution system); monthly (in distribution system)	1 at entry point to distribution system; 3 in distribution system	Unchanged ⁴	
Chlorine dioxide	Systems that use chlorine dioxide as a disinfectant		Daily	1 at entry point to distribution system	Unchanged ⁴	
Chlorine/ Chloramines	All systems		Same location and frequency as Total Coliform Rule (TCR) sampling		Unchanged ⁴	
DBP precursors (TOC sample set)*	Systems that use conventional filtration		Monthly	1 per source water source	Unchanged ⁴	

¹All systems must monitor during the month of highest DBP concentrations. Systems on quarterly monitoring, except Subpart H systems serving 500 - 3,300, must take dual sample sets every 90 days at each monitoring location. Systems on annual monitoring and Subpart H systems serving 500 - 3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. If monitoring annually, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and in the same month.

²Ground water systems serving < 10,000 and Subpart H systems serving < 500 must increase monitoring to quarterly if an MCL is exceeded.

³A new analytical method for bromate was established with the Stage 2 DBPR.

⁴Stage 2 DBPR did not revise the monitoring frequency or location requirements for this contaminant/disinfectant.

*TOC sample set is comprised of source water alkalinity, source water TOC, and treated TOC.

Table 5. Operational Evaluation Levels (OELs)

Applies to:	All systems subject to Stage 2 DBPR monitoring requirements that conduct compliance monitoring and collect samples quarterly.
Purpose of establishing OELs:	To reduce peaks in DBP levels and exposure to high DBP levels.
OEL calculations:	<ul style="list-style-type: none"> ▶ Calculated for both TTHMs and HAA5s at each monitoring location using Stage 2 DBPR compliance monitoring results. ▶ OEL is determined by the sum of the two previous quarter's TTHM or HAA5 result plus twice the current quarter's TTHM or HAA5 result at that location, divided by four. ▶ $OEL = (Q1 + Q2 + 2Q3) / 4$
OELs are exceeded:	During any quarter in which the OEL is greater than the TTHM or HAA5 MCL.
If an OEL is exceeded, a system must:	<ul style="list-style-type: none"> ▶ Conduct an operational evaluation. ▶ Submit a written report of the evaluation to the state no later than 90 days after being notified of the analytical results that caused the exceedance(s). ▶ Keep a copy of the operational evaluation report and make it publically available upon request.
The operational evaluation must include:	<ul style="list-style-type: none"> ▶ An examination of the treatment and distribution systems' operational practices that may contribute to TTHM and HAA5 formation. ▶ Steps to minimize future exceedances.
OEL requirements take effect:	When the system begins compliance monitoring for the Stage 2 DBPR.

Table 6. Standard Monitoring Compliance Dates

If You are a System Serving:	Schedule ¹	Begin LRAA TTHM & HAA5 Monitoring By:
At least 100,000 people or part of a combined distribution system (CDS) serving at least 100,000 people.	1	April 1, 2012
50,000 to 99,999 people or part of a CDS serving 50,000 to 99,999 people.	2	October 1, 2012
10,000 to 49,999 people or part of a CDS serving 10,000 to 49,999 people.	3	October 1, 2013
Less than 10,000 people or part of a CDS serving less than 10,000 people.	4	October 1, 2013 ²

¹Your schedule is determined by the largest system in your CDS.

²Systems not conducting *Cryptosporidium* monitoring under Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) must begin LRAA TTHM/HAA5 monitoring by this date. Systems conducting *Cryptosporidium* monitoring under LT2ESWTR must begin LRAA TTHM/HAA5 monitoring by October 1, 2014.

Table 7. TOC Removal

Subpart H systems that use conventional filtration treatment are required to remove specific percentages of organic materials, measured as total organic carbon (TOC), that may react with disinfectants to form DBPs. Removal must be achieved through a treatment technique (enhanced coagulation or enhanced softening) unless a system meets alternative criteria. Systems practicing softening must meet TOC removal requirements for source water alkalinity greater than 120 mg/L CaCO₃.

Source Water TOC (mg/L)	Source Water Alkalinity, mg/L as CaCO ₃		
	0 - 60	> 60 to 120	> 120
> 2.0 to 4.0	35.0%	25.0%	15.0%
> 4.0 to 8.0	45.0%	35.0%	25.0%
> 8.0	50.0%	40.0%	30.0%

For additional information on the DBPRs:

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your state drinking water representative.

The Standardized Monitoring Framework: A Quick Reference Guide

Overview of the Framework

Title*	The Standardized Monitoring Framework (SMF), promulgated in the Phase II Rule on January 30, 1991 (56 FR 3526).
Purpose	To standardize, simplify, and consolidate monitoring requirements across contaminant groups. The SMF increases public health protection by simplifying monitoring plans and synchronizing monitoring schedules leading to increased compliance with monitoring requirements.
General Description	The SMF reduces the variability within monitoring requirements for chemical and radiological contaminants across system sizes and types.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Additional Requirements

The SMF outlined on these pages summarizes existing systems' ongoing federal monitoring requirements only. Primacy agencies have the flexibility to issue waivers, with EPA approval, which take into account regional and state specific characteristics and concerns. To determine exact monitoring requirements, the SMF must be used in conjunction with any EPA approved waiver and additional requirements as determined by the primacy agency.

New water systems may have different and additional requirements as determined by the primacy agency.

SMF Benefits

Implementation of the SMF results in . . .

- ▶ Increased public health protection through monitoring consistency.
- ▶ A reduction in the complexity of water quality monitoring from a technical and managerial perspective for both primacy agencies and water systems.
- ▶ Equalizing of resource expenditures for monitoring and vulnerability assessments.
- ▶ Increased water system compliance with monitoring requirements.

Regulated Contaminants

Inorganic Contaminants (IOCs)	Fifteen (15) (Nitrate, Nitrite, total Nitrate/ Nitrite, and Asbestos are exceptions to SMF)
Synthetic Organic Contaminants (SOCs) & Volatile Organic Contaminants (VOCs)	Fifty-One (51)
Radionuclides	Four (4)

Utilities Covered

All PWSs	Nitrate Nitrite
CWSs	IOCs SOCs VOCs Radionuclides
NTNCWSs	IOCs SOCs VOCs

For additional information:

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink> or contact your primacy agency's drinking water representatives.

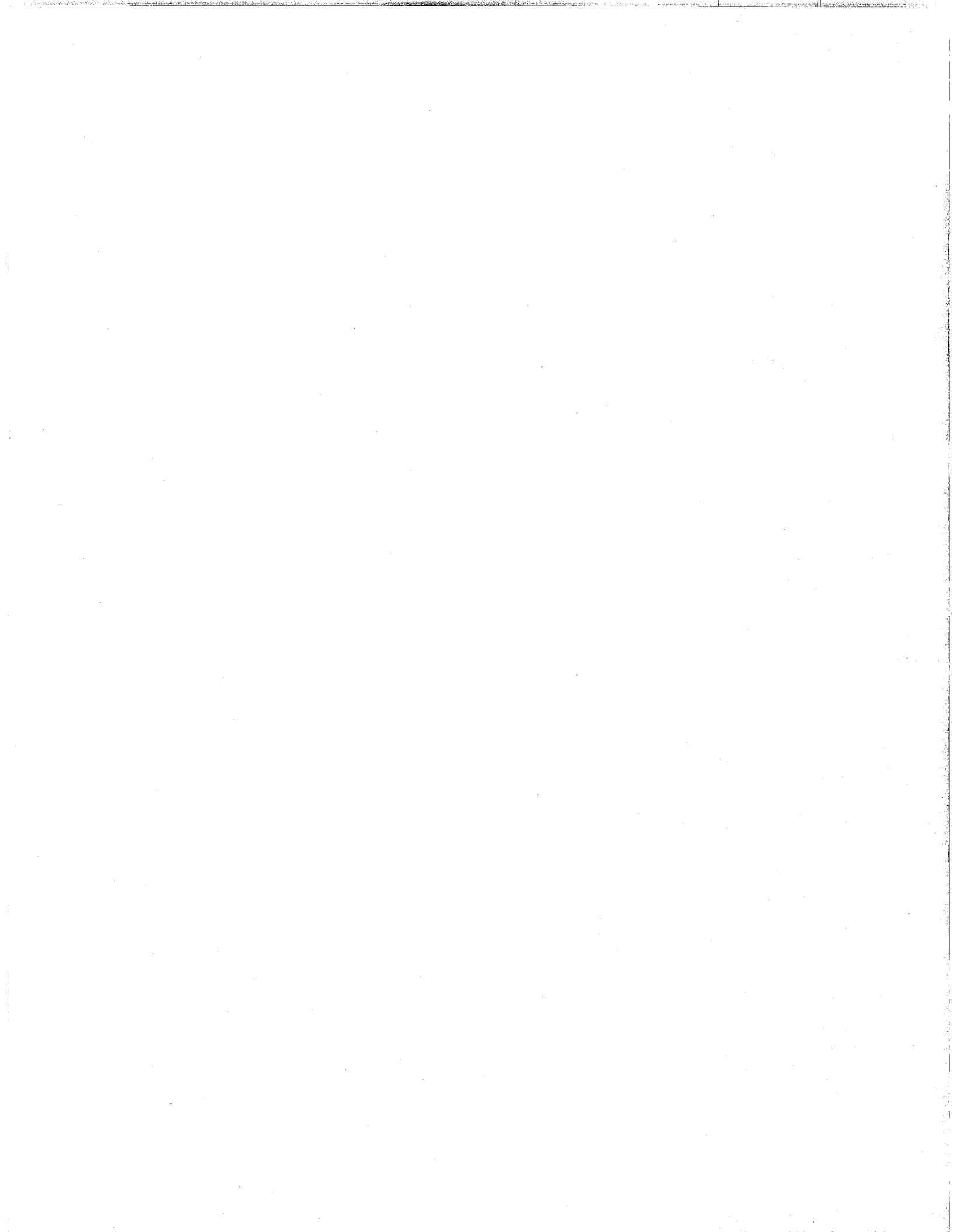
See 40 CFR 141.23 regarding IOCs; 40 CFR 141.24 regarding VOCs and SOCs; and 40 CFR 141.26 regarding Radionuclides.

Contaminant Type	Second Cycle										Third Cycle								
	1 st Period			2 nd Period			3 rd Period			1 st Period			2 nd Period			3 rd Period			
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Inorganic Contaminants (IOCs) ¹	Groundwater (Below Trigger Level)																		
	Waiver ²																		
	No Waiver																		
	Surface Water (Below Trigger Level)																		
	Waiver ²																		
Synthetic Organic Contaminants (SOCs)	Groundwater and Surface Water (Above Trigger Level) ³																		
	Reliably and Consistently ≤ MCL for Groundwater Systems																		
	Reliably and Consistently ≤ MCL for Surface Water Systems																		
	> MCL or Not Reliably and Consistently ≤ MCL																		
	Population > 3,300 (Below Trigger Level)																		
Volatile Organic Contaminants (VOCs)	Waiver																		
	< Detect and No Waiver																		
	Population < 3,300 (Below Trigger Level)																		
	Waiver																		
	< Detect and No Waiver																		
Inorganic Contaminants (IOCs) ¹	Above Trigger Level																		
	Reliably and Consistently ≤ MCL ⁴																		
	≥ Detect or Not Reliably and Consistently ≤ MCL																		
	Groundwater (Below Trigger Level)																		
	< Detect, Vulnerability Assessment, and Waiver ⁵																		
Synthetic Organic Contaminants (SOCs)	No Waiver ⁶																		
	Surface Water (Below Trigger Level)																		
	< Detect, Vulnerability Assessment, and Waiver ⁷																		
	No Waiver ⁸																		
	Above Trigger Level																		
Volatile Organic Contaminants (VOCs)	Reliably and Consistently < MCL ⁴																		
	≥ Detect or Not Reliably and Consistently ≤ MCL																		

STANDARDIZED MONITORING FRAMEWORK

	Second Cycle												Third Cycle		
	1 st Period				2 nd Period				3 rd Period				1 st Period		
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Nitrate	CWSs & NTNCWSs														
	≥ 1/2 MCL	****	****	****	****	****	****	****	****	****	****	****	****	****	****
	Groundwater Reliably and Consistently < MCL ⁹	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Surface Water with 4 Quarters of Results < 1/2 MCL ⁹	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitrite	TNCWSs														
	Standard Monitoring	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	< 1/2 MCL	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	Reliably and Consistently < MCL ⁹	****	****	****	****	****	****	****	****	****	****	****	****	****	****
Radio-nuclides	≥ 1/2 MCL or not Reliably and Consistently < MCL	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	< Detection Level	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	≥ Detection Level but ≤ 1/2 MCL	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	> 1/2 MCL but ≤ MCL	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Asbestos	> MCL	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	Waiver	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	No Waiver, Reliably and Consistently ≤ MCL, or vulnerable to asbestos contamination ¹⁰	02	03	04	05	06	07	08	09	10	11	12	13	14	15
	> MCL	02	03	04	05	06	07	08	09	10	11	12	13	14	15

Legend	* = 1 sample at each entry point to distribution system (EPTDS).	Until January 22, 2006 the maximum contaminant level (MCL) for arsenic is 50 µg/L; on January 23, 2006 the MCL for arsenic becomes 10 µg/L.
	** = 2 quarterly samples at each EPTDS. Samples must be taken during 1 calendar year during each 3-year compliance period.	Based on 3 rounds of monitoring at each EPTDS with all analytical results below the MCL. Waivers are not permitted under the current arsenic requirements, however systems are eligible for arsenic waivers after January 23, 2006.
	**** = 4 quarterly samples at each EPTDS within time frame designated by the primacy agency.	A system with a sampling point result above the MCL must collect quarterly samples, at that sampling point, until the system is determined by the primacy agency to be reliably and consistently below the MCL.
	X = No sampling required unless required by the primacy agency.	Samples must be taken during the quarter which previously resulted in the highest analytical result. Systems can apply for a waiver after 3 consecutive annual sampling results are below the detection limit.
	# = Systems must monitor at a frequency specified by the primacy agency.	Groundwater systems must update their vulnerability assessments during the time the waiver is effective. Primacy agencies must re-confirm that the system is non-vulnerable within 3 years of the initial determination or the system must return to annual sampling.
	! = When allowed by the primacy agency, data collected between June 2000 and December 6, 2003 may be grandfathered to satisfy the initial monitoring requirements due in 2004 for gross alpha, radium 226/228, and uranium.	If all monitoring results during initial quarterly monitoring are less than the detection limit, the primacy agency can allow a system to take 1 sample during each compliance period. Systems are also eligible for a waiver.
		Primacy agencies must determine that a surface water system is non-vulnerable based on a vulnerability assessment during each compliance period or the system must return to annual sampling.
		If all monitoring results during initial quarterly monitoring are less than the detection limit, the system can take annual samples. Systems are also eligible for a waiver.
		Samples must be taken during the quarter which previously resulted in the highest analytical result.
		Systems are required to monitor for asbestos during the first 3-year compliance period of each 9-year compliance cycle. A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe must take 1 sample at a tap served by that pipe. A system vulnerable to asbestos contamination at the source must sample at each EPTDS.



Variances and Exemptions: A Quick Reference Guide

Overview of the Rule

Overview of the Rule		
Title*	Variances and Exemptions Rule, 63 FR 43834-43851, August 14, 1998	
	General and Small System Variances	Exemptions
Purpose	Variances allow eligible systems to provide drinking water that does not comply with a National Primary Drinking Water Regulation (NPDWR) on the condition that the system installs a certain technology and the quality of the drinking water is still protective of public health.	Exemptions allow eligible systems additional time to build capacity in order to achieve and maintain regulatory compliance with newly promulgated NPDWRs, while continuing to provide acceptable levels of public health protection.
General	There are two types of variances: 1. General variances are intended for systems that are not able to comply with a NPDWR due to their source water quality. 2. Small system variances are intended for systems serving 3,300 persons or fewer that cannot afford to comply with a NPDWR (but may be allowed for systems serving up to 10,000 persons).	Exemptions do not release a water system from complying with NPDWRs; rather, they allow water systems additional time to comply with NPDWRs.
Compliance Date	General variances require compliance as expeditiously as practicable and in accordance with a compliance schedule determined by the State. Small system variances require compliance within 3 years (with a possible 2-year extension period).	Systems must achieve compliance as expeditiously as practicable and in accordance with the schedule determined by the State. In addition: <ul style="list-style-type: none"> Initial exemptions cannot exceed 3 years. Systems serving < 3,301 persons may be eligible for one or more additional 2-year extension periods (not to exceed 6 years).
Contaminants Excluded	<ul style="list-style-type: none"> General variances may generally not be granted for the maximum contaminant level (MCL) for total coliforms or any of the treatment technique (TT) requirements of Subpart H of 40 CFR 141. Exemptions from the MCL for total coliforms may generally not be granted. Small system variances may not be granted for NPDWRs promulgated prior to 1986 or MCLs, indicators, and TTs for microbial contaminants. 	<ul style="list-style-type: none"> Exemptions from the MCL for total coliforms may generally not be granted.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Utilities Covered

All public water systems	<p>Exclusions:</p> <ul style="list-style-type: none"> Systems that have received a small system variance are not eligible for an exemption. Small system variances may not be granted for NPDWRs that do not list a small system variance technology (SSVT). Systems that have received an exemption are generally not eligible for a variance.
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Definitions

State	For purposes of this document, "State" is used to refer to the primacy agency.
Best Available Technology (BAT)	The BAT, TT, or other means identified by EPA for use in complying with a NPDWR.
Small System Variance Technology (SSVT)	A treatment technology identified by EPA specifically for use by a small public water system that will achieve the maximum reduction or inactivation efficiency that is affordable considering the size of the system and the quality of its source water, while adequately protecting public health.
Small System Compliance Technology (SSCT)	A treatment technology that is affordable by small systems and allows systems to achieve compliance with the requirements of a NPDWR.

For additional information:

- Call the Safe Drinking Water Hotline at 1-800-426-4791.
- Visit the EPA Web site at <http://water.epa.gov/drink>.
- Contact your State's drinking water representatives.

Rule-Related Activities and Responsibilities

Systems		States
General and Small System Variances	<ul style="list-style-type: none"> May apply for, if eligible and unable to meet the NPDWR. Work with the State to hold a public hearing on the proposed variance. Meet all compliance criteria, including schedule set by the State, once the variance is approved. Must provide public notice within 1 year after the system begins operating under the variance. 	<ul style="list-style-type: none"> Review the system's application to determine whether the system meets all eligibility criteria. Before issuing a variance, determine a schedule for compliance and implementation. Work with the system to hold a public hearing on the variance and notify EPA of all variances.
Additional Activities for Small System Variances	<ul style="list-style-type: none"> May apply for only if EPA has identified an SSVT for the rule. Work with the State to provide notice of the proposed variance to all persons served by the system. 	<ul style="list-style-type: none"> Determine whether the system is financially and technically able to install and operate an EPA-approved SSVT. Work with the system to provide notice of the proposed variance to all persons served by the system and EPA. Review all small system variances every 5 years.
Exemptions	<ul style="list-style-type: none"> May apply for, if eligible and unable to meet the NPDWR. Work with the State to hold a public hearing on the proposed exemption. Upon approval, must meet all compliance criteria and comply with the NPDWR within 3 years. (Note: systems serving <3,301 persons may be eligible for an extension). Systems must provide public notice within 1 year after the system begins operating under the exemption. 	<ul style="list-style-type: none"> Review the system's application to determine whether the system meets all eligibility criteria. Before issuing an exemption, determine a schedule for compliance and implementation. Work with the system to hold a public hearing on the exemption and notify EPA of all exemptions.

General Variances

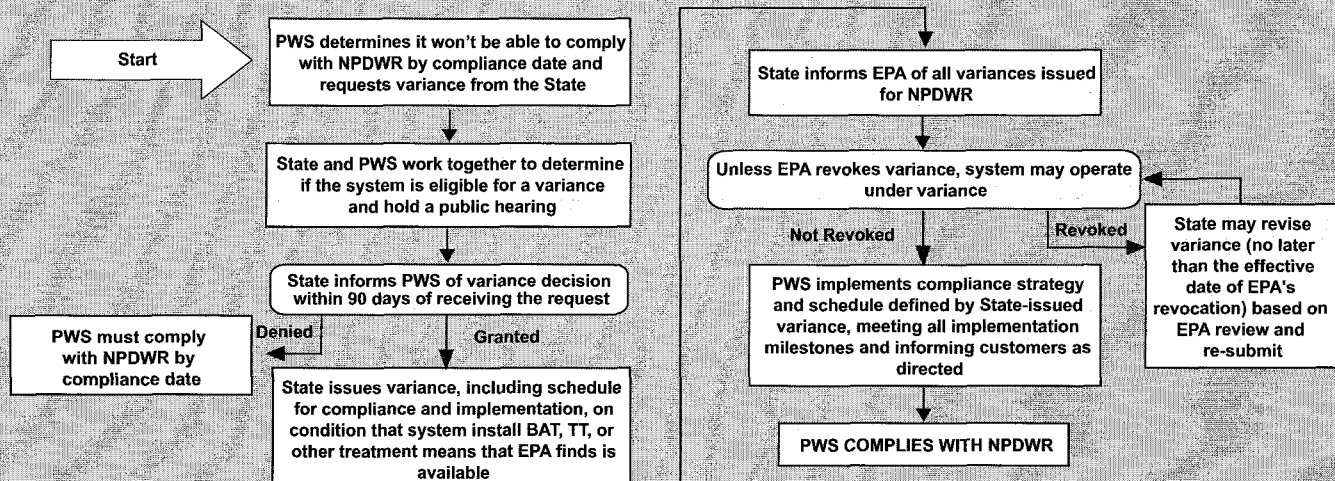
Eligibility Requirements

No Alternative Water Source	Using raw water sources that are reasonably available, the system is unable to meet MCLs (SDWA §1415(a)(1)(A) and 40 CFR 142.40(a)(1)).
Does Not Pose an URTH	The State must determine that the granting of the variance will not pose an unreasonable risk to health (URTH) (SDWA §1415(a)(1)(A) and 40 CFR 142.40(a)(2)).

Compliance Requirements

Compliance Date	Systems must comply with the NPDWR as soon as practicable and in accordance with a compliance schedule determined by the State (SDWA §1415(a)(1)(A) and 40 CFR 142.41(c)(4)).
Technology Improvements	The system must install and operate the BAT, TT, or other means found available by EPA as expeditiously as possible (SDWA §1415(a)(1)(A) and 40 CFR 142.42(c)).
Public Hearing	Before a variance may take effect, the State must provide notice and opportunity for a public hearing on the variance and schedule (SDWA §1415(a)(1)(A) and 40 CFR 142.44).
Public Notification	Systems must provide public notice within 1 year after the system begins operating under a variance and repeat the notice annually for the duration of the variance (40 CFR 141.204(b)(1)).

Example Application Process: General Variances



Small System Variances

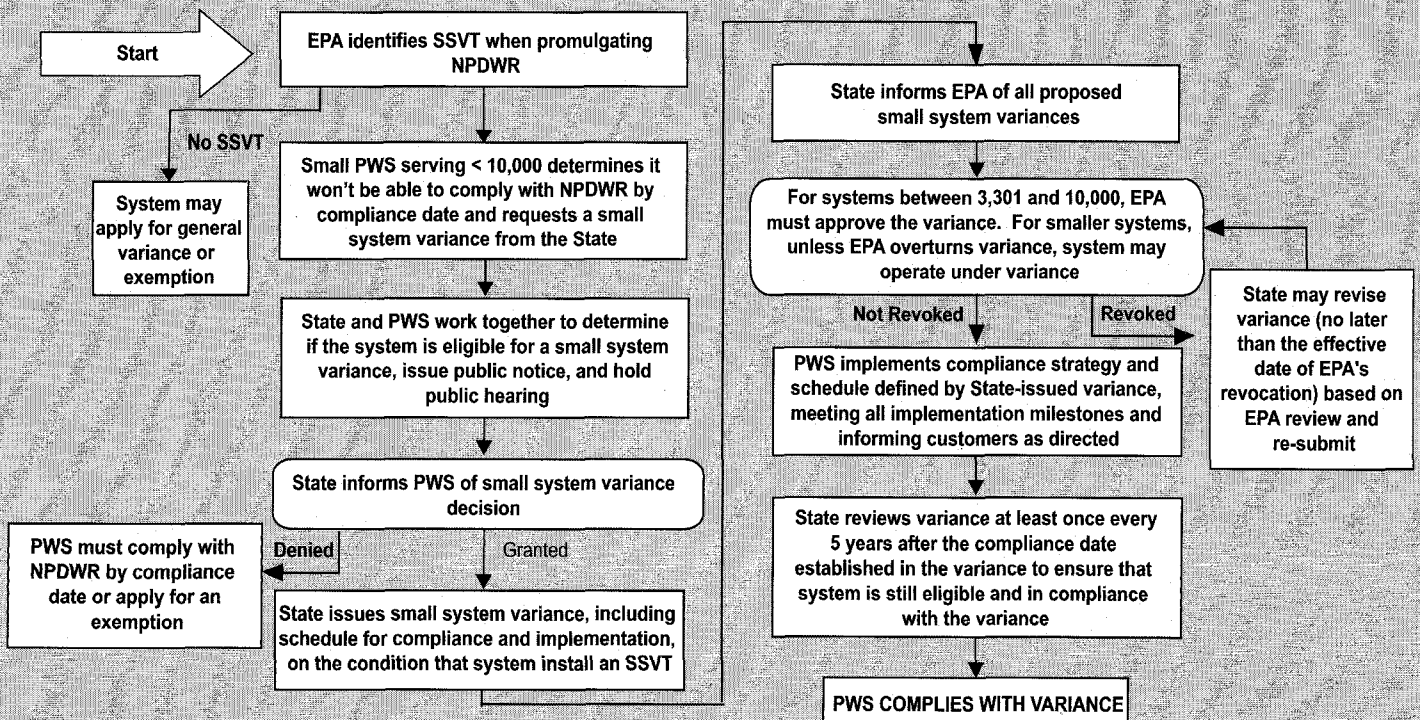
Eligibility Requirements

System Size	Generally available for systems serving < 3,301 persons and, with the approval of EPA, systems serving >3,300 persons but <10,000 persons (SDWA §1415(e)(1)(A)&(B) and 40 CFR 142.303(a)&(b)).
SSVT	Systems must install, operate, and maintain in accordance with guidance or regulations issued by the EPA Administrator, a TT or other means that EPA has identified as a variance technology that is applicable to the size and source water quality conditions of the system (SDWA §1415(e)(2)(A)&(B) and 40 CFR 142.307(b)).
Affordability	In accordance with the affordability criteria established by the State, the system cannot afford to comply with the NPDWR for which a small system variance is sought, including compliance through (SDWA §1415(e)(3) and 40 CFR 142.306(b)(2)): <ul style="list-style-type: none"> • Treatment • Alternate source of water supply • Restructuring or consolidation changes • Financial assistance
Ensure Adequate Protection of Human Health	The terms of the small system variance must ensure adequate protection of human health given source water quality, removal efficiencies, and the expected useful life of the SSVT (SDWA §1415(e)(3)(B) and 40 CFR 142.306(b)(5)).

Compliance Requirements

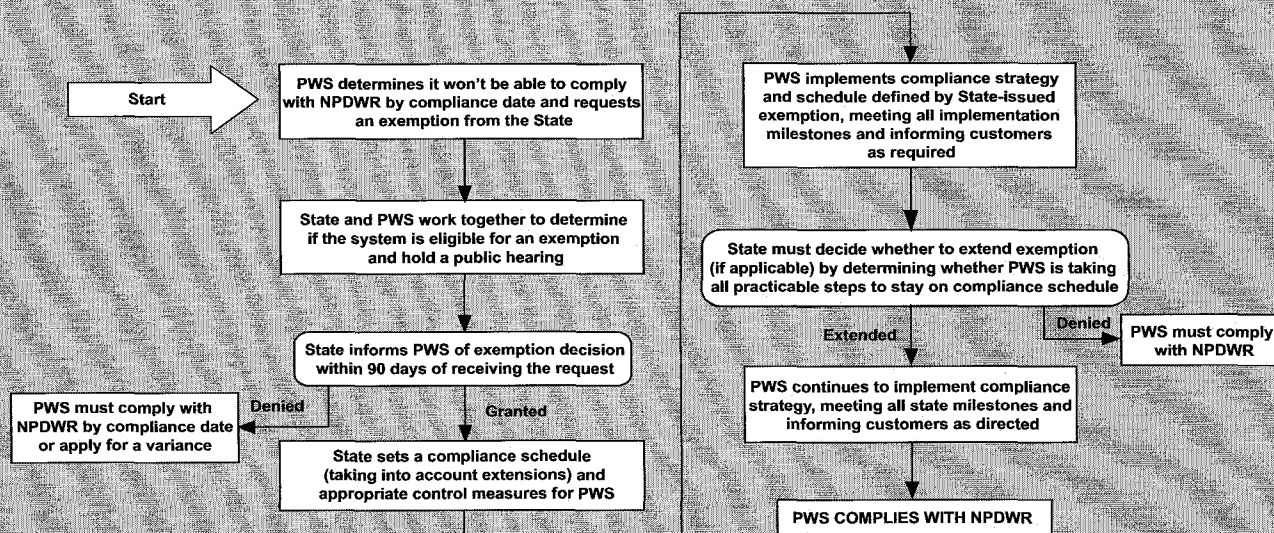
Compliance Date	Systems must comply with the terms of the small system variance within 3 years, unless the State allows up to an additional 2 years to make capital improvements. The State must review each variance at least once every 5 years to determine whether the system remains eligible (SDWA §1415(e)(4)&(5) and 40 CFR 142.307(c)(4)&(d)).
Technology Improvements	Systems must install an SSVT no later than 3 years (with a possible 2-year extension period) after the issuance of the variance and must be financially and technically capable of installing, operating, and maintaining the SSVT (40 CFR 142.306(b)(3)&(4)).
Public Hearing	Before a small system variance may take effect, the State must work with the system to provide public notice to everyone served by the system. Public notice must be issued 15 days before the proposed effective date and 30 days prior to a public meeting (40 CFR 142.308(a)).
Public Notification	Systems must provide public notice within 1 year after the system begins operating under a variance and repeat the notice annually for the duration of the small system variance (40 CFR 141.204(b)(1)).

Example Application Process: Small System Variances



Exemptions	
Eligibility Requirements	
No Alternative Water Source	The system is unable to comply with the NPDWR due to compelling factors (which may include economic factors) or to implement measures to develop an alternative source of water supply to achieve compliance (SDWA §1416(a)(1) and 40 CFR 142.50(a)(1)).
Does Not Pose An URTH	The State must make a determination that the exemption will not pose an URTH and may require interim compliance measures (SDWA §1416(a)(3) and 40 CFR 142.50(a)(3)).
System Operation	Systems must have begun operation prior to the effective date of the NPDWR, however, this requirement may be waived if the system does not have an alternative source of water supply (SDWA §1416(a)(2) and 40 CFR 142.50(a)(2)).
Management or Restructuring Changes	The system cannot reasonably make management or restructuring changes that would result in compliance or improved quality of the drinking water (SDWA §1416(a)(4) and 40 CFR 142.50(a)(4)).
Unable to Achieve Compliance	<p>No exemption shall be granted unless (SDWA §1416(b)(2)(B) and 40 CFR 142.50(b)(1),(2)&(3)):</p> <ul style="list-style-type: none"> • Capital improvements are unable to be completed before the NPDWR effective date -or- • A system that needs financial assistance has entered into an agreement to obtain that assistance -or- • The system has entered into an enforceable agreement to become part of a regional public water system; and the system is taking all appropriate steps to meet the standard.
Compliance Requirements	
Duration	<p>Systems must achieve compliance with the MCL as expeditiously as practicable and in accordance with a compliance schedule determined by the State, but no longer than 3 years from the date of issuance (SDWA §1416(b)(2)(A) and 40 CFR 142.56).</p> <p>Systems serving <3,301 persons may be eligible for an additional one or more 2-year periods, but the total duration of the exemption extensions may not exceed 6 years (SDWA §1416(b)(2)(C) and 40 CFR 142.56).</p>
Public Hearing	Before an exemption can take effect, the State must provide notice and opportunity for a public hearing on the exemption schedule (SDWA §1416(b)(1)(B) and 40 CFR 142.54(a)).
Public Notification	Systems must provide public notice within 1 year after the system begins operating under an exemption and must repeat the notice annually for the duration of the exemption (40 CFR 141.204(b)(1)).

Example Application Process: Exemptions



The Public Notification Rule: A Quick Reference Guide

Overview of the Rule

Title*	Public Notification (PN) Rule, 65 FR 25982, May 4, 2000.
Purpose	To notify the public of drinking water violations or situations that may pose a risk to public health.
General Description	The PN Rule requires all public water systems (PWSs) to notify their consumers any time a PWS violates a national primary drinking water regulation or has a situation posing a risk to public health. Notices must be provided to persons served (not just billing customers).
Utilities Covered	All PWSs.
Timing and Distribution	Notices must be sent within 24 hours, 30 days, or one year depending on the tier to which the violation is assigned. The clock for notification starts when the PWS learns of the violation.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Tier 1 (Immediate Notice, Within 24 Hours)

Tier 1 PN is required to be issued as soon as practical but no later than 24 hours after the PWS learns of the violation or situation including:

- ▶ Distribution system sample violation when fecal coliform or *E. coli* are present; failure to test for fecal coliform or *E. coli* after initial total coliform distribution system sample tests positive.
- ▶ Nitrate, nitrite, or total nitrate and nitrite maximum contaminant level (MCL) violation; failure to take confirmation sample.
- ▶ Special notice for noncommunity water systems (NCWSs) with nitrate exceedances between 10 mg/L and 20 mg/L, where system is allowed to exceed 10 mg/L by primacy agency.
- ▶ Chlorine dioxide maximum residual disinfectant level (MRDL) violation when one or more of the samples taken in the distribution system exceeds the MRDL on the day after a chlorine dioxide measurement taken at the entrance to the distribution system exceeds the MRDL, or when required samples are not taken in the distribution system.
- ▶ Exceedance of maximum allowable turbidity level, if elevated to a Tier 1 notice by primacy agency.
- ▶ Waterborne disease outbreak or other waterborne emergency.
- ▶ Detection of *E. coli*, enterococci, or coliphage in a ground water source sample.
- ▶ Other violations or situations determined by the primacy agency.

Tier 2 (Notice as Soon as Practical, Within 30 Days)

Tier 2 PN is required to be issued as soon as practical or within 30 days. Repeat notice every 3 months until violation or situation is resolved.

- ▶ All MCL, MRDL, and treatment technique violations, except where Tier 1 notice is required.
- ▶ Monitoring violations, if elevated to Tier 2 notice by primacy agency.
- ▶ Failure to comply with variance and exemption conditions.
- ▶ For ground water systems providing 4-log treatment and conducting Ground Water Rule (GWR) compliance monitoring, failure to maintain required treatment for more than 4 hours.
- ▶ Failure to take any required corrective action or be in compliance with a corrective action plan for a fecal indicator-positive ground water source sample.
- ▶ Failure to take any required corrective action or be in compliance with a corrective action plan for a significant deficiency under the GWR.
- ▶ Special public notice for repeated failure to conduct monitoring for *Cryptosporidium*.

Turbidity consultation is required when a PWS has a treatment technique violation resulting from a single exceedance of the maximum allowable turbidity limit or an MCL violation resulting from an exceedance of the 2-day turbidity limit. The PWS must consult their primacy agency within 24 hours. Primacy agencies will then determine whether a Tier 1 PN is necessary. If consultation does not occur within 24 hours, violations are automatically elevated to require Tier 1 PN.

Tier 3 (Annual Notice)

Tier 3 PN is required to be issued within 12 months and repeated annually for unresolved violations.

- ▶ All monitoring or testing procedure violations, unless primacy agency elevates to Tier 2, including failure to conduct benchmarking and profiling (surface water systems) and failure to develop a monitoring plan (disinfecting systems).
- ▶ Operating under a variance and exemption.
- ▶ Special public notice for availability of unregulated contaminant monitoring results.
- ▶ Special public notice for fluoride secondary maximum contaminant level (SMCL) exceedance.

For additional information
on the PN Rule

Call the Safe Drinking
Water Hotline at 1-800-
426-4791; visit the EPA
Web site at <http://water.epa.gov/drink>; or contact
your state or local primacy
agency's drinking water
representative. Log onto
the PNWriter Web site to
use EPA's templates at
www.PNWriter.com

Ten Required Elements of a Public Notice

Unless otherwise specified in the regulations,* each notice must contain:

1. Description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s).
2. When the violation or situation occurred (i.e., date the sample was collected or was supposed to be collected).
3. Any potential adverse health effects from drinking the water and standard language regarding the violation or situation. (For MCL, MRDL, treatment technique violations, or violations of the conditions of a variance or exemption, use health effects language from Appendix B of the PN Rule. For monitoring and testing procedure violations, use the standard monitoring language below.)
4. The population at risk, including subpopulations that may be particularly vulnerable if exposed to the contaminant in their drinking water.
5. Whether alternate water supplies should be used.
6. Actions consumers should take, including when they should seek medical help, if known.
7. What the PWS is doing to correct the violation or situation.
8. When the PWS expects to return to compliance or resolve the situation.
9. The name, business address, and phone number or those of a designee of the PWS as a source of additional information concerning the notice.
10. A statement (see standard distribution language below) encouraging notice recipients to distribute the notice to others, where applicable.

* These elements do not apply to notices for fluoride SMCL exceedances, availability of unregulated contaminant monitoring data, and operation under a variance or exemption. Content requirements for these notices are specified in the PN Rule.

Standard Language:

Standard Monitoring Language: We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During [period] we [did not monitor or test/did not complete all monitoring or testing] for [contaminant(s)], and therefore cannot be sure of the quality of the drinking water during that time.

Standard Distribution Language: Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Multilingual Requirements

- ▶ Where the PWS serves a large proportion of non-English speakers, the PWS must provide information in the appropriate language(s) on the importance of the notice or on how to get assistance or a translated copy.

Presentation and Distribution

- ▶ The Tier 1 PN must be issued via radio, TV, hand delivery, posting, or other method specified by the primacy agency to reach all persons served. PWSs must also initiate consultation with the primacy agency within 24 hours. Primacy agency may establish additional requirements during consultation.
- ▶ The Tier 2 and Tier 3 PNs must be issued by Community Water Systems (CWSs) via mail or direct delivery and by NCWSs via posting, direct delivery, or mail. Primacy agencies may permit alternate methods. All PWSs must use additional delivery methods reasonably calculated to reach other consumers not notified by the first method.*
- ▶ Notices for individual violations can be combined into an annual notice (including the Consumer Confidence Report [CCR], if PN requirements can still be met).
- ▶ Each PN:
 - ▶ Must be displayed in a conspicuous way.
 - ▶ Must not include overly technical language or very small print.
 - ▶ Must not be formatted in a way that defeats the purpose of the notice.
 - ▶ Must not include language that nullifies the purpose of the notice.
- ▶ If the notice is posted, it must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved.

*PWSs should check with their primacy agency to determine the most appropriate delivery methods.

Notices to New Customers

- ▶ All new billing units and customers must be notified of ongoing violations or situations requiring PN.

Reporting and Recordkeeping

- ▶ PWSs have 10 days to send a certification of compliance and a copy of the completed notice to the primacy agency.
- ▶ PWS and primacy agency must keep notices on file for 3 years.

The Required Elements of a Public Notice

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Tests Showed Presence of Coliform Bacteria

The Jonesville Water System routinely monitors for coliform bacteria. During the month of July, 7 percent of our samples tested positive. The standard is that no more than 5 percent of samples may test positive.

What should I do?

- **You do not need to boil your water or take other corrective actions.** However, if you have specific health concerns, consult your doctor.
- You do not need to use an alternate (e.g., bottled) water supply.
- People with severely compromised immune systems, infants, pregnant women, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

What does this mean?

This is not an emergency. If it had been, you would have been notified immediately. Coliform bacteria are generally not harmful themselves. *Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.*

Usually, coliforms are a sign that there could be a problem with the system's treatment or distribution system (pipes). Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or *E. coli*, are present. We did not find any of these bacteria in our subsequent testing.

What was done?

We took additional samples for coliform bacteria which all came back negative. As an added precaution, we chlorinated and flushed the pipes in the distribution system to make sure bacteria were eliminated. This situation is now resolved.

For more information, or to learn more about protecting your drinking water please contact John Jones at (502) 555-1212.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This is being sent by the Jonesville Water System.

State Water System ID#1234567. Date Distributed: 8/8/09

2. When the violation occurred →

6. Actions consumers should take →

3. Potential adverse health effects →

7. What is being done to correct the violation or situation →

10. Required distribution language →

← 1. Description of the violation

← 5. Should alternate water supplies be used

← 4. The population at risk

← 8. When the system expects to return to compliance

← 9. Phone number for more information

Ground Water Rule Sample Collection and Transport: A Quick Reference Guide

Overview of the Rule

Title*	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and address source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

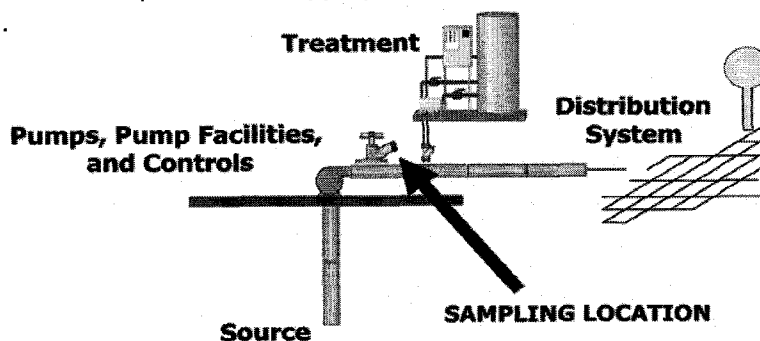
*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

GWR Situations Requiring Sample Collection and Transport

- ▶ The GWR requires that systems that do not provide 4-log treatment of viruses for all their ground water sources collect at least one source water sample after detection of total coliform in a routine Total Coliform Rule (TCR) (40 CFR 141.21) sample. These triggered source samples must be collected from ground water sources in use at the time of the TC positive. Samples must be collected within 24 hours unless the State allows an extension and the State will specify how long the extension is. Samples must be analyzed for the presence of one of three fecal indicators, ***E. coli***, **enterococci**, or **coliphage**. See *Ground Water Rule Triggered and Representative Monitoring: A Quick Reference Guide* (EPA 815-F-08-004) for more information.
- ▶ If a fecal indicator is found to be present in a triggered source sample and the State does not require corrective action, the GWR requires systems to collect five additional source water samples and analyze the samples for the presence of one of the three fecal indicators.
- ▶ Assessment source water monitoring may be required by the State for systems with sources that may be at risk for fecal contamination. Systems must meet State requirements for the number of samples collected and the analyses (*E. coli*, enterococci, coliphage) conducted.

Sampling Location

- ▶ For both triggered source water monitoring and assessment source water monitoring, samples must be collected at the ground water source **before treatment**, unless another location is approved by the State.
- ▶ GWSs should install a sample tap at each source to enable source water monitoring.
- ▶ The diagram below represents an appropriate sampling location for source water monitoring.



Sample Collection

Sample Containers

- ▶ Samples should be collected in sterile, plastic or glass containers with a leak-proof lid.
- ▶ The GWR requires GWSs conducting source water monitoring to analyze at least a **100-mL sample volume**.
 - However, EPA recommends that the GWS collect and ship more than 100-mL of sample to ensure that a minimum of 100 mL is available for analysis (see below).
- ▶ The sample containers should be large enough to allow at least **1-inch of headspace** to facilitate mixing of the sample by shaking prior to analysis.
- ▶ Sample volume and container size recommendations for samples of various types are provided below.

<i>E. coli</i> and Enterococci Samples	<ul style="list-style-type: none"> ▶ Sample volume: At least 120 mL of sample should be collected to ensure sufficient volume for sample analysis is available in the event of spillage at the laboratory. ▶ Container Size: The capacity of sample containers should allow at least a 1-inch headspace to facilitate mixing of the sample by shaking prior to analysis.
Coliphage Samples	<ul style="list-style-type: none"> ▶ Sample volume: If Method 1601 is used for coliphage sample analyses, either 100-mL or 1-L sample volumes may be analyzed (Method 1602 only accommodates 100-mL volumes). <ul style="list-style-type: none"> ■ While the minimum sample volume requirement for the GWR is 100 mL, systems may wish to collect and analyze a 1-L sample volume to increase the sensitivity of the Method 1601 analysis. ■ For all coliphage analyses, the GWS should collect 2.5 times more of the sample than necessary (i.e., 250 mL for 100 mL samples and 2.5 L for 1 L samples) to allow for sample re-analysis, if necessary.* ▶ Container size: The capacity of sample containers should allow at least a 1-inch headspace to facilitate mixing of the sample by shaking prior to analysis. <p>* Alternatively, samples for male-specific and somatic coliphage analyses can be collected in separate containers.</p>

Collection Procedures

Gloves and hand washing	<ul style="list-style-type: none"> ▶ When collecting samples from a ground water source, individuals should wash their hands before collecting samples and if possible wear gloves (latex, etc.).
Records	<ul style="list-style-type: none"> ▶ All samples taken should be recorded in an on-site sample log book or on a sample collection form if it is to be sent to a laboratory for analysis. Sample log books and sample collection forms should contain the following information: <ul style="list-style-type: none"> ■ Name of system (e.g., Public Water System Identification number) ■ Sample site location ■ Sample type (assessment, triggered) ■ Sampler's name ■ Sample number ■ Date of sample collection ■ Time of sample collection ■ Analysis requested
Water tap and service line	<ul style="list-style-type: none"> ▶ Water taps used for sampling should be free of aerators, bubblers, strainers, hose attachments, mixing type faucets, and purification devices. The flow of water out of the tap should be adjusted so the water will not splash out when the sample is collected. The tap should be cleaned and flushed. ▶ The service line should be cleared before sampling by maintaining a steady water flow for at least two minutes (or until the water changes temperature).
Collecting samples	<ul style="list-style-type: none"> ▶ Using aseptic technique (i.e., sanitize tap, do not touch the inside of the sample container), the individual taking the sample should fill the sample containers, leaving at least 1-inch of headspace.
Cap and label the container	<ul style="list-style-type: none"> ▶ Immediately following sample collection, the sampler should tighten the sample container lid. ▶ The system name, sampler's name, sample number, sample type, date and time of sample collection, sample location, and analysis requested should be recorded on the sample container. ▶ IMPORTANT: If the sample will not be shipped off-site for analysis immediately, the sample should be placed upright in a refrigerator to maintain the sample at a temperature of $< 8^{\circ}\text{C}$ prior to shipment. If a refrigerator is unavailable, the sample should be insulated in some other manner to keep it cool.

Sample Collection

Sample Containers

Packaging

- ▶ If the samples will be analyzed at a laboratory that is off-site, the water system should contact the laboratory as soon as possible (preferably prior to sampling) so that the laboratory can be prepared with the appropriate media.
- ▶ As soon as the sample has been collected, labeled and capped, the sample should be packaged in a shipping cooler or foam box that is used exclusively for this purpose.
 - The cooler should be double lined with plastic (i.e., with trash bags) and contain ice (wet ice in ziplock bags, gel packs, or blue ice). The GWR recommends keeping samples below **10°C**.
- ▶ The signed and dated sample collection form should be included with the sample.
- ▶ The lid of the cooler should be securely sealed and the joints of the container should be sealed with duct tape.
- ▶ If the package is being shipped, a copy of the airbill or shipping record should be kept by the ground water system.
- ▶ Packages should be sent priority overnight so that the arrangements for transport and shipping-time from collection to analysis does not exceed **30 hours** as required by the GWR.

Chain-of-Custody

- ▶ Sample collectors and laboratories should follow applicable State regulations pertaining to chain-of-custody procedures, since it is necessary to have an accurate written record to trace the possession and handling of samples from collection through reporting.
 - This procedure includes:
 - Field records of sample collection (sample collection form),
 - Label or standardized tag on the sample container(s),
 - Package sent to lab with chain-of-custody record form, pertinent field records, and analysis request form.
 - The procedure used by the water system and the laboratory should be documented.
 - **Every person** who takes custody of the sample should fill in the appropriate section of the chain-of-custody record.
 - See EPA's *Manual for the Certification of Laboratories Analyzing Drinking Water: Criteria and Procedures Quality Assurance (Fifth Edition)* for more information.

Arsenic and Clarifications to Compliance and New Source Monitoring Rule: A Quick Reference Guide

Overview of the Rule

Title*	Arsenic and Clarifications to Compliance and New Source Monitoring Rule 66 FR 6976 (January 22, 2001)
Purpose	To improve public health by reducing exposure to arsenic in drinking water.
General Description	Changes the arsenic MCL from 50 µg/L to 10 µg/L; Sets arsenic MCLG at 0; Requires new systems and new drinking water sources to demonstrate compliance as specified by the State; Clarifies the procedures for determining compliance with the MCLs for IOCs, SOC, and VOCs.
Utilities	All community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) must comply with the arsenic requirements. EPA estimates that 3,024 CWSs and 1,080 NTNCWSs will have to install treatment to comply with the revised MCL.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Benefits

Implementation of the Arsenic Rule will result in . . .

- Avoidance of 16 to 26 non-fatal bladder and lung cancers per year.
- Avoidance of 21 to 30 fatal bladder and lung cancers per year.
- Reduction in the frequency of non-carcinogenic diseases.

Critical Deadlines and Requirements

Consumer Confidence Report Requirements**

Report Due	Report Requirements
July 1, 2002 and beyond	For reports covering calendar years 2001 and beyond, systems that detect arsenic between 5 µg/L and 10 µg/L must include an educational statement in the CCRs.
July 1, 2002 - July 1, 2006	For reports covering calendar years 2001 to 2005, systems that detect arsenic between 10 µg/L and 50 µg/L must include a health effects statement in their CCRs.
July 1, 2007 and beyond	For reports covering calendar year 2006 and beyond, systems that are in violation of the arsenic MLC (10 µg/L) must include a health effects statement in their CCRs.

For Drinking Water Systems

Jan. 22, 2004	All <i>NEW</i> systems/sources must collect initial monitoring samples for all IOCs, SOC, and VOCs within a period and frequency determined by the State.
Jan. 1, 2005	When allowed by the State, systems may grandfather data collected after this date.
Jan. 23, 2006	The new arsenic MCL of 10 µg/L becomes effective. All systems must begin monitoring or when allowed by the State, submit data that meets grandfathering requirements.
Dec. 31, 2006	Surface water systems must complete initial monitoring or have a State approved waiver.
Dec. 31, 2007	Ground water systems must complete initial monitoring or have a State approved waiver.

For States

Spring 2002	EPA meets and works with States to explain new rule and requirements and to support adoption and implementation activities.
Jan. 22, 2003	State primacy revision applications due.
Jan. 22, 2005	State primacy revision applications due from States that received 2-year extensions.

**For required educational and health effect statements, please see 40 CFR 141.154.



Compliance Determination (IOCs , VOCs , and SOCs)

1. Calculate compliance based on a running annual average at each sampling point.
2. Systems will not be in violation until 1 year of quarterly samples have been collected (unless fewer samples would cause the running annual average to be exceeded.)
3. If a system does not collect all required samples, compliance will be based on the running annual average of the samples collected.

Monitoring and Reporting Requirements for Total Arsenic⁽¹⁾

Monitoring

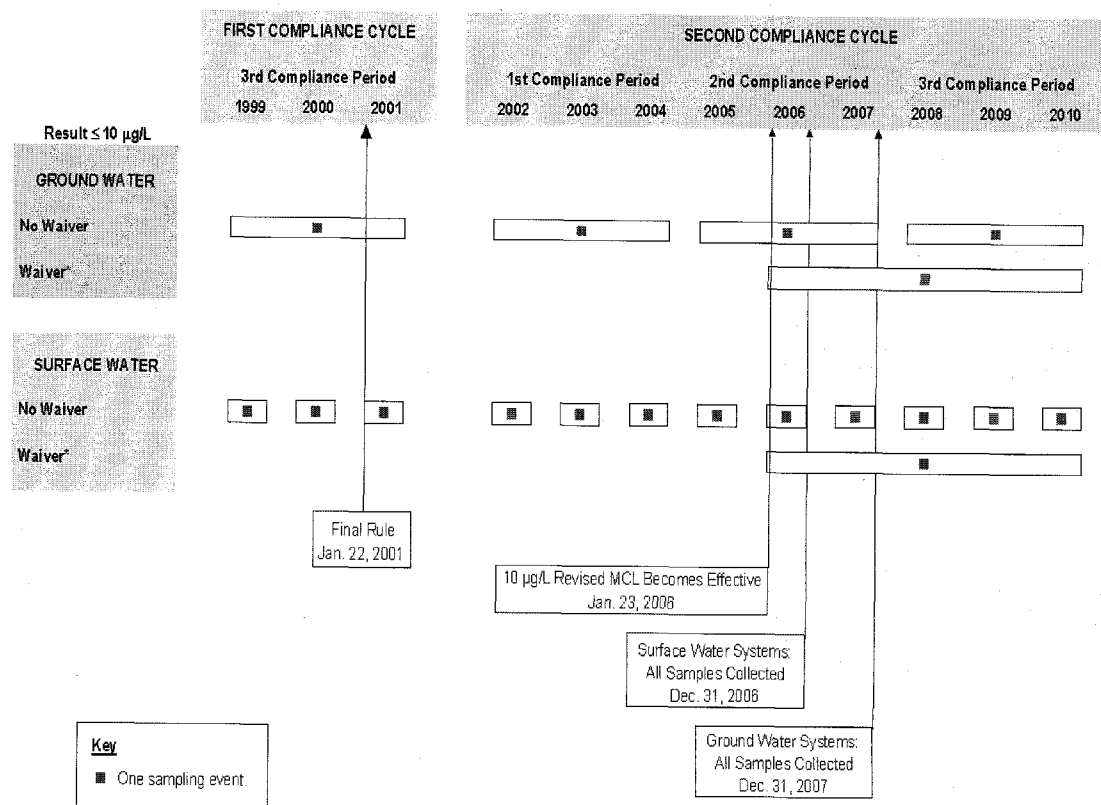
One sample after the effective date of the MCL (January 23, 2006). Surface water systems must take annual samples. Ground water systems must take one sample during the 2005-2007 compliance period. If the monitoring result is less than the MCL ground water systems must collect one sample every 3 years and surface water systems must continue to collect annual samples.

Increased Monitoring

A system with a sampling point result above the MCL must collect quarterly samples at that sampling point, until the system is reliably and consistently below the MCL.

⁽¹⁾All samples must be collected at each entry point to the distribution system, unless otherwise specified by the State.

Applicability of Standardized Monitoring Framework to Arsenic



*States may issue 9 year monitoring waivers under the January 22, 2001 final arsenic rule. To be eligible for a waiver, surface water systems must have monitored annually for at least 3 years. Ground water systems must conduct a minimum of 3 rounds of monitoring with detection limits below $10 \mu\text{g/L}$.

For additional information on the Arsenic Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at <http://water.epa.gov/drink>; or contact your State drinking water representative.

Consumer Confidence Report Rule: A Quick Reference Guide

Overview of the Rule

Title*	Consumer Confidence Report (CCR) Rule, 63 FR 44511, August 19, 1998, Vol. 63, No. 160
Purpose	Improve public health protection by providing educational material to allow consumers to make educated decisions regarding any potential health risks pertaining to the quality, treatment, and management of their drinking water supply.
General Description	The CCR Rule requires all community water systems to prepare and distribute a brief annual water quality report summarizing information regarding source water, detected contaminants, compliance, and educational information.
Utilities Covered	Community water systems (CWSs), all size categories.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Related Benefits

Implementation of the CCR Rule will result in . . .	<ul style="list-style-type: none"> ► Increased consumer knowledge of drinking water sources, quality, susceptibility to contamination, treatment, and drinking water supply management. ► Increased awareness of consumers to potential health risks so they may make informed decisions to reduce those risks, including taking steps toward protecting their water supply. ► Increased dialogue between drinking water utilities and consumers to increase understanding of the value of drinking water and water supply services and to facilitate consumer participation in decisions that affect public health.
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Annual Requirements

CWSs must prepare and distribute a CCR to all billing units or service connections.	<ul style="list-style-type: none"> ► <i>April 1</i> - Deadline for CWS that sells water to another CWS to deliver the information necessary for the buyer CWS to prepare their CCR (requirement outlined in 40 CFR 141.152). ► <i>July 1</i> - Deadline for annual distribution of CCR to customers and state or local primary agency for report covering January 1 - December 31 of previous calendar year. ► <i>October 1</i> - (or 90 days after distribution of CCR to customers, whichever is first) Deadline for annual submission of proof of distribution to state or local primary agency. ► A CWS serving 100,000 or more persons must also post its current year's report on a publicly accessible site on the Internet. Many systems choose to post their reports at the following EPA Web site http://safewater.tetratech-ffx.com/ccr/index.cfm. ► All CWSs must make copies of the report available on request.
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Multilingual Requirements

- CWSs that have a large proportion of non-English speaking residents must include information in the appropriate language(s) expressing the importance of the CCR, or a phone number or address where residents may contact the CWS to obtain a translated copy of the CCR or assistance in the appropriate language.
- The state or EPA will make the determination of which CWSs need to include this information.

Small Water System Flexibility

- With the permission of the governor of a state (or designee), or where the tribe has primacy, in lieu of mailing, systems serving fewer than 10,000 persons may publish their CCR in a local newspaper.**
- With the permission of the governor of a state (or designee), or where the tribe has primacy, in lieu of a mailing and/or publication, systems serving 500 or fewer persons may provide a notice stating the CCR is available upon request.**

**Questions regarding whether the necessary permission has been granted should be addressed to the appropriate state or primacy agency.

Eight Content Requirements of a CCR

- ▶ **Item 1: Water System Information** – Name/phone number of a contact person; information on public participation opportunities.
- ▶ **Item 2: Source(s) of Water.**
- ▶ **Item 3: Definitions** – Maximum Contaminant Level (MCL); MCL Goal (MCLG); Treatment Technique (TT); Action Level (AL); Maximum Residual Disinfectant Level (MRDL); MRDL Goal (MRDLG).
- ▶ **Item 4: Detected Contaminants** – A table summarizing reported concentrations and relevant MCLs and MCLGs or MRDLs and MRDLGs; known source of detected contaminants; health effects language.
- ▶ **Item 5: Information on Monitoring for *Cryptosporidium*, Radon, and Other Contaminants** (if detected).
- ▶ **Item 6: Compliance with Other Drinking Water Regulations** (any violations and Ground Water Rule [GWR] special notices).
- ▶ **Item 7: Variances and Exemptions** (if applicable).
- ▶ **Item 8: Required Educational Information** – Explanation of contaminants in drinking water and bottled water; information to vulnerable populations about *Cryptosporidium*; statements on nitrate, arsenic, and lead.

Optional Information

CWSs are not limited to providing only the required information in their CCR. CWSs may want to include:

- ▶ An explanation (or include a diagram of) the CWSs treatment processes.
- ▶ Source water protection efforts and/or water conservation tips.
- ▶ Costs of making the water safe to drink.
- ▶ A statement from the mayor or general manager.
- ▶ **Information to educate customers about:** Taste and odor issues, affiliations with programs such as the Partnership for Safe Water, opportunities for public participation, etc.

Communication Tips

- ▶ Provide a consistent message. Be as simple, truthful, and straightforward as possible. Avoid acronyms, initials, and jargon.
- ▶ Provide links to useful information resources.
- ▶ Limit wordiness – write short sentences and keep your paragraphs short.
- ▶ Assume that consumers will only read the top half of the notice or what can be read in 10 seconds.
- ▶ Display important elements in bold and/or large type in the top half of the notice.
- ▶ Do not make your text size too small.
- ▶ Give a draft of your CCR to relatives or friends who are not drinking water experts and ask them if it makes sense. Ask customers for their comments when you publish the CCR.
- ▶ Use graphics, photographs, maps, and drawings to illustrate your message. Do not distract from your main message with graphics and/or pictures that do not complement your message.
- ▶ Consider printing the CCR on recycled paper and taking other steps to make the CCR “environmentally friendly.” If you hope to get your customers involved in protecting or conserving water, set a good example for them to follow.
- ▶ Use the CCR as an opportunity to tell your customers about all of the things that you are doing well.

Reporting and Recordkeeping

- ▶ CWSs must:
 - ▶ Mail or directly deliver a copy of the CCR to each of their customers by July 1 annually.
 - ▶ Make a good faith effort to get CCRs to non-bill-paying consumers, using means recommended by the state.
 - ▶ Send a copy to the director of the state drinking water program and any other state agency that the state drinking water program director identifies when you mail it to customers.
 - ▶ Submit to the state a certification, within 3 months of mailing, that the CWS distributed the CCR, and that its information is correct and consistent with the compliance monitoring data previously submitted to the state.
 - ▶ Post their CCRs on the Internet (if the CWSs serve 100,000 or more people).
- ▶ CWSs may also want to send copies to state and local health departments, as well as local TV and radio stations and newspapers.

For additional information on the CCR Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at <http://water.epa.gov/drink>; or contact your state or local primacy agency's drinking water representative. Log onto the CCRiWriter Web site to use EPA's template at www.CCRiWriter.com.

Filter Backwash Recycling Rule: A Quick Reference Guide

Overview of the Rule

Title*	Filter Backwash Recycling Rule (FBRR) 66 FR 31086, June 8, 2001, Vol. 66, No. 111
Purpose	Improve public health protection by assessing and changing, where needed, recycle practices for improved contaminant control, particularly microbial contaminants.
General Description	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.
Utilities Covered	Applies to public water systems 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.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Benefits

Implementation of the FBRR will result in . . .	<ul style="list-style-type: none"> ▶ Reduction in risk of illness from microbial pathogens in drinking water, particularly <i>Cryptosporidium</i>.
Estimated impacts of the FBRR include . . .	<ul style="list-style-type: none"> ▶ FBRR will apply to an estimated 4,650 systems serving 35 million Americans. ▶ Fewer than 400 systems are expected to require capital improvements. ▶ Annualized capital costs incurred by public water systems associated with recycle modifications are estimated to be \$5.8 million. ▶ Mean annual cost per household is estimated to be less than \$1.70 for 99 percent of the affected households and between \$1.70 and \$100 for the remaining one percent of affected households.

Conventional and Direct Filtration

- ▶ Conventional filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal. Conventional filtration is the most common type of filtration.
- ▶ Direct filtration, as defined in 40 CFR 141.2, is a series of processes including coagulation and filtration, but excluding sedimentation, and resulting in substantial particulate removal. Typically, direct filtration can be used only with high-quality raw water that has low levels of turbidity and suspended solids.

Recycle Flows

- ▶ Spent Filter Backwash Water - A stream containing particles that are dislodged from filter media when water is forced back through a filter (backwashed) to clean the filter.
- ▶ Thickener Supernatant - A stream containing the decant from a sedimentation basin, clarifier or other unit that is used to treat water, solids, or semi-solids from the primary treatment processes.
- ▶ Liquids From Dewatering Processes - A stream containing liquids generated from a unit used to concentrate solids for disposal.

Critical Deadlines and Requirements

For Drinking Water Systems

December 8, 2003	Submit recycle notification to the state.
June 8, 2004	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 recycle location). Collect recycle flow information and retain on file.
June 8, 2006	Complete all capital improvements associated with relocating recycle return location (if necessary).
For States	
June 8, 2003	States submit FBRR primacy revision application to EPA (triggers interim primacy).
June 8, 2005	Primacy extension deadline - all states with an extension must submit primacy revision applications to EPA.

What does a recycle notification include?

- ▶ Plant schematic showing origin of recycle flows, how recycle flows are conveyed, and return location of recycle flows.
- ▶ Typical recycle flows (gpm), highest observed plant flow experienced in the previous year (gpm), and design flow for the treatment plant (gpm).
- ▶ State-approved plant operating capacity (if applicable).

What recycle flow information does a system need to collect and retain on file?

- ▶ Copy of recycle notification and information submitted to the state.
- ▶ List of all recycle flows and frequency with which they are returned.
- ▶ Average and maximum backwash flow rates through filters, and average and maximum duration of filter backwash process (in minutes).
- ▶ Typical filter run length and written summary of how filter run length is determined.
- ▶ Type of treatment provided for recycle flows.
- ▶ Data on the physical dimension of the equalization and/or treatment units, typical and maximum hydraulic loading rates, types of treatment chemicals used, average dose, frequency of use, and frequency at which solids are removed, if applicable.

For additional information on the FBRR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your state drinking water representative.

Ground Water Rule: A Quick Reference Guide

Overview of the Rule

Title*	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Public Health Benefits

Implementation of the GWR will result in . . .	<ul style="list-style-type: none"> ▶ Targeted protection for over 70 million people served by ground water sources that are either not disinfected or receive less than 4-log treatment. ▶ Avoidance of 42,000 viral illnesses and 1 related death annually.
Estimated impacts of the GWR include . . .	<ul style="list-style-type: none"> ▶ The annualized present value of the GWR is \$19.7 million, with a 90-percent confidence interval of \$6.5 to \$45.4 million. ▶ Mean annual cost per household is estimated to be less than \$1.00 for approximately 96 percent of affected households.

Critical Deadlines and Requirements

For Drinking Water Systems

November 30, 2009	New ground water sources put in place after this date must meet triggered source water monitoring requirements or conduct compliance monitoring.
December 1, 2009	By this date, GWSs conducting compliance monitoring because they provide at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer, must have notified the state and must begin compliance monitoring. The written notification to the state must include engineering, operational, and other information the state requests.
December 1, 2009	GWSs must conduct triggered source water monitoring if the GWS does not provide at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer and the GWS is notified that a sample collected for the Total Coliform Rule (TCR) is total coliform-positive.
December 1, 2009	GWSs for which the state has identified a significant deficiency and GWSs at which at least one of the five additional ground water source samples (or at state discretion, after the initial source sample or an assessment source sample) has tested positive for fecal contamination must comply with the treatment technique requirements.

For States

August 8, 2008	States are encouraged to submit final primacy applications or extension requests to EPA.
November 8, 2008	Final primacy revision applications for GWR must be submitted to the EPA regional administrator, unless state is granted an extension.
August 8, 2010	States with approved extension agreements are encouraged to submit final primacy applications to EPA.
November 8, 2010	Final primacy applications must be submitted to the EPA regional administrator for states with a full 2 year extension.
December 31, 2012	States must complete initial sanitary survey cycle for all community GWSs except those that meet performance criteria.
December 31, 2014	States must complete initial sanitary survey cycle for all noncommunity GWSs and all community GWSs that meet performance criteria.

Analytical Methods for Source Water Monitoring

Fecal Indicator	Methodology	Method Citation
<i>E. coli</i>	Colilert Colisure Membrane Filter Method with MI Agar m-ColiBlue24 Test E*Colite Test EC-MUG NA-MUG	9223 B. 9223 B. EPA Method 1604. 9221 F. 9222 G.
Enterococci	Multiple-Tube Technique Membrane Filter Technique Membrane Filter Technique Enterolert	9230 B. 9230 C. EPA Method 1600.
Coliphage	Two-Step Enrichment Presence-Absence Procedure Single Agar Layer Procedure	EPA Method 1601. EPA Method 1602.

**Footnotes regarding methods can be found in 40 CFR 141.402

Major Provisions

Compliance Monitoring

Treatment Technique Compliance Monitoring

- ▶ In order not to be subject to triggered source water monitoring, a GWS can notify the state that it provides at least 4-log treatment of viruses using virus inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal before or at the first customer. The GWS must then begin compliance monitoring designed to show the effectiveness of their treatment processes.
- ▶ GWSs that use chemical disinfection and serve more than 3,300 people must continuously monitor their disinfectant concentration. GWSs must maintain the minimum disinfectant residual concentration determined by the state.
- ▶ GWSs that use chemical disinfection and serve 3,300 people or fewer must take daily grab samples or meet the continuous monitoring requirements described above for GWSs serving more than 3,300 people.
- ▶ GWSs using membrane filtration for 4-log treatment of viruses must monitor the membrane filtration process according to state-specified monitoring requirements.
- ▶ GWSs may use alternative treatment technologies (e.g., ultraviolet radiation [UV]) approved by the state. GWSs must monitor the alternative treatment according to state-specified monitoring requirements, and must operate the alternative treatment according to compliance requirements established by the state.

Source Water Monitoring

Triggered Source Water Monitoring

- ▶ GWSs that do not conduct compliance monitoring and are notified of a total coliform-positive routine sample collected in compliance with the TCR (40 CFR 141.21) must conduct triggered source water monitoring.
- ▶ GWSs must collect at least one ground water source sample from each source in use at the time the total coliform-positive sample was collected. The triggered source water sample must be analyzed for the presence of a fecal indicator as specified in the rule.
- ▶ If the triggered source water sample is fecal indicator-positive, the GWS must either take corrective action, as directed by the state, or if corrective action is not required by the state and the sample is not invalidated by the state, the GWS must conduct additional source water sampling.
- ▶ States may waive the triggered source water monitoring requirement if the state determines and documents, in writing, that the total coliform-positive routine sample is the result of a documented distribution system deficiency.
- ▶ States may develop criteria for distribution system conditions that cause total coliform positive samples. A GWS can document to the state that it met the state criteria within 30 days of the total coliform-positive sample and be exempt from collecting triggered source water sample(s).
- ▶ States may invalidate a fecal indicator-positive ground water source sample under specific conditions. If a fecal indicator-positive source sample is invalidated, the GWS must collect another source water sample within 24 hours of being notified by the state of its invalidation decision.

Additional Source Water Sampling

- ▶ If the state does not require corrective action in response to a fecal indicator-positive triggered source water sample, the GWS must collect five additional source water samples (from the same source) within 24 hours of being notified of the fecal indicator-positive sample.

Assessment Source Water Monitoring

- ▶ States have the opportunity to target higher risk GWSs for additional testing. States independently can determine on a case by case basis whether monitoring is necessary and when corrective action needs to be taken.

Treatment Technique Requirements

GWSs with Significant Deficiencies or Source Water Fecal Contamination

- ▶ GWSs must take corrective action if a significant deficiency is identified, or if the initial source sample or a GWR assessment monitoring source sample (if required by the state) or one of the five additional ground water source samples tests positive for fecal contamination. The GWS must implement at least one of the following corrective actions:
 - ▶ Correct all significant deficiencies.
 - ▶ Provide an alternate source of water.
 - ▶ Eliminate the source of contamination.
 - ▶ Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

New Sources

New Ground Water Sources

- ▶ New sources which come on line after November 30, 2009 are required either to conduct triggered source water monitoring as required by the GWR, or provide at least 4-log inactivation, removal or a state-approved combination of these technologies and conduct compliance monitoring within 30 days of the source being put in service.

Sanitary Surveys

All Ground Water Systems

- ▶ States are required to conduct sanitary surveys of all GWSs in order to identify significant deficiencies, including deficiencies which may make a system susceptible to microbial contamination.
- ▶ Following the initial sanitary survey, states must conduct sanitary surveys every 3 years for most CWSs and every 5 years for NCWSs and CWSs that provide at least 4-log treatment of viruses or have outstanding performance records, as determined by the state.

For additional information on the GWR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your state drinking water representative.

Ground Water Rule Compliance Monitoring: A Quick Reference Guide

Overview of the Rule

Title*	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and address source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

* This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Purpose of Compliance Monitoring

- Compliance monitoring ensures that GWSs that provide at least 4-log treatment of viruses using chemical disinfection, membrane filtration, or a State-approved alternative treatment technology are consistently and effectively achieving this level of treatment.

When is Compliance Monitoring Required?

- GWSs that provide at least 4-log treatment of viruses **as a corrective action** must conduct compliance monitoring.
- GWSs that provide at least **4-log treatment of viruses** at or before the first customer using chemical disinfection, membrane filtration, or a State-approved alternative treatment technology and do not conduct GWR triggered source water monitoring must **notify their State in writing** that they provide treatment and begin compliance monitoring.
- The compliance dates for systems that provide 4-log treatment in lieu of GWR triggered source water monitoring are as follows:
 - GWSs with **existing ground water sources** must notify the State by **December 1, 2009**, that they provide at least 4-log treatment of viruses and begin compliance monitoring.
 - GWSs with **new ground water sources** placed into service **after November 30, 2009**, must notify the State that they provide at least 4-log treatment of viruses and begin compliance monitoring within 30 days.

What are the Compliance Monitoring Requirements for Chemical Disinfection?

GWSs Serving 3,300 or Fewer

- GWSs using chemical disinfection and serving 3,300 or fewer persons must monitor for the **residual disinfectant concentration** and meet the **State specified** minimum concentration at or before the first customer.
- GWSs must monitor on a **daily** basis and collect a grab sample during the hour of peak flow or at another time specified by the State.
 - If any daily grab sample is less than the minimum disinfectant residual concentration, the system must take follow-up samples **every four hours** until the residual meets or exceeds the State-specified minimum concentration.
 - These systems also have the option to monitor **continuously**.
 - If the GWS monitors continuously, the system must meet the monitoring requirements for GWSs serving greater than 3,300 persons (see below).
- GWSs must monitor at a State-approved location.

GWSs Serving Greater than 3,300 Persons

- ▶ GWSs using chemical disinfection and serving greater than 3,300 persons that conduct compliance monitoring must monitor for the **residual disinfectant concentration** and meet the **State specified** minimum concentration at or before the first customer.
 - GWSs of this size must monitor **continuously** and record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public.
- ▶ GWSs must monitor at a State-approved location.

Failure of Continuous Monitoring Equipment

- ▶ In the event of equipment failure for continuous monitoring, provisions are available for all GWSs serving greater than 3,300 persons and GWSs serving 3,300 persons or fewer who opt to monitor continuously.
 - If there is a failure in continuous monitoring equipment, the ground water system must **conduct grab sampling every four hours** until the continuous monitoring equipment is returned to service.
 - The system must resume continuous residual disinfectant monitoring **within 14 days**.

What are the Compliance Monitoring Requirements for Membrane Filtration?

- ▶ GWSs that use membrane filtration systems to achieve 4-log virus treatment to meet GWR requirements must:
 - Operate the process in accordance with State-specified compliance requirements.
 - Monitor the membrane filtration process in accordance with all State-specified monitoring requirements.
 - Verify that the integrity of the membrane is intact.
- ▶ The **frequency** and **location** of samples for systems conducting membrane filtration will be determined by the State.

What are the Compliance Monitoring Requirements for Alternative Treatment?

- ▶ GWSs that use alternative treatment systems to achieve 4-log virus treatment to meet GWR requirements must:
 - Operate the process in accordance with State-specified compliance requirements.
 - Monitor the process in accordance with State-specified monitoring requirements.

Compliance Monitoring and Validation Testing for Ultraviolet (UV) Disinfection

- ▶ GWSs using UV disinfection as an alternative technology to meet GWR requirements should:
 - Monitor for UV intensity, as measured by a UV sensor, flow rate and UV lamp status and any additional State-specified parameters.
 - Verify the calibration of UV sensors, and recalibrate in accordance with a State-approved protocol, at least monthly.
- ▶ UV reactors should undergo validation testing to determine the operating conditions under which the reactor delivers the UV dose corresponding to the virus log removal credit received. See "Ultraviolet Disinfection Guidance for the Final Long Term 2 Enhanced Surface Water Treatment Rule" (http://www.epa.gov/ogwdw/disinfection/lt2/pdfs/guide_lt2_uvguidance.pdf) for more information.

Summary

- ▶ The following table summarizes the compliance monitoring requirements for systems providing 4-log virus treatment in lieu of triggered source water monitoring or as a corrective action under the GWR.

System Type	Monitor For	Frequency	Sample Location
GWSs serving $\leq 3,300$ using chemical disinfection	Residual disinfectant concentration (must meet State minimum)	Daily or continuous	State-approved location(s)
GWSs serving $> 3,300$ using chemical disinfection		Continuous only	
GWSs using membrane filtration	Membrane filtration process effectiveness	Consult State for specific information	
GWSs using State-approved alternative treatment	Alternative treatment effectiveness		

- ▶ If operation according to the criteria or requirements for compliance monitoring (minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, alternative treatment operating criteria, etc.) is not restored **within four hours**, a GWS must **notify the State as soon as possible**.
- ▶ For all GWSs conducting compliance monitoring, failure to conduct required compliance monitoring (Sec. 141.403(b)) requires a **Tier 3 public notice**.
- ▶ If any GWS wishes to **discontinue** 4-log treatment of viruses before or at the first customer, the GWS then becomes subject to the **GWR triggered source water monitoring requirements**.
 - See "Ground Water Rule Factsheet: Monitoring Requirements" and "Ground Water Rule Triggered and Representative Monitoring: A Quick Reference Guide" for more information.

Radionuclides Rule: A Quick Reference Guide

Overview of the Rule

Title*	Radionuclides Rule 66 FR 76708 December 7, 2000 Vol. 65, No. 236
Purpose	Reducing the exposure to radionuclides in drinking water will reduce the risk of cancer. This rule will also improve public health protection by reducing exposure to all radionuclides.
General Description	The rule retains the existing MCLs for combined radium-226 and radium-228, gross alpha particle radioactivity, and beta particle and photon activity. The rule regulates uranium for the first time.
Utilities Covered	Community water systems, all size categories.
*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.	

Public Health Benefits

Implementation of the Radionuclides Rule will result in . . .	Reduced uranium exposure for 620,000 persons, protection from toxic kidney effects of uranium, and a reduced risk of cancer.
Estimated impacts of the Radionuclides Rule include . . .	Annual compliance costs of \$81 million. Only 795 systems will have to install treatment.

Regulated Contaminants

Regulated Radionuclide	MCL	MCLG
Beta/photon emitters**	4mrem/yr	0
Gross alpha particle	15 pCi/L	0
Combined radium-226/228	5 pCi/L	0
Uranium	30µg/L	0
**A total of 168 individual beta particle and photon emitters may be used to calculate compliance with the MCL.		

Critical Deadlines & Requirements

For Drinking Water Systems

June 2000 - December 8, 2003	When allowed by the State, data collected between these dates may be eligible for use as grandfathered data (excluding beta particle and photon emitters).
December 8, 2003	Systems begin initial monitoring under State-specified monitoring plan unless the State permits use of grandfathered data.
December 31, 2007	All systems must complete initial monitoring.

For States

December 2000 - December 2003	States work with systems to establish monitoring schedules.
December 8, 2000	States should begin to update vulnerability assessments for beta photon and particle emitters and notify systems of monitoring requirements.
Spring 2001	EPA meets and works with States to explain new rules and requirements and to initiate adoption and implementation activities.
December 8, 2002	State submits primacy revision application to EPA. (EPA approves within 90 days.)

Monitoring Requirements

Gross Alpha, Combined Radium-226/228, and Uranium (1)

Beta Particle and Photon Radioactivity (1)

Initial Monitoring

Four consecutive quarters of monitoring.

No monitoring required for most CWSs.

Vulnerable CWSs (2) must sample for:

- Gross beta: quarterly samples.
- Tritium and Strontium-90: annual samples.

Reduced Monitoring

If the average of the initial monitoring results for each contaminant is below the detection limit: One sample every 9 years.

If the average of the initial monitoring results for each contaminant is greater than or equal to the detection limit, but less than or equal to one-half the MCL: One sample every 6 years.

If the average of the initial monitoring results for each contaminant is greater than one-half the MCL, but less than or equal to the MCL: One sample every 3 years.

If the running annual average of the gross beta particle activity minus the naturally occurring potassium-40 activity is less than or equal to 50 pCi/L: One sample every 3 years.

Increased Monitoring

A system with an entry point result above the MCL must return to quarterly sampling until 4 consecutive quarterly samples are below the MCL.

If gross beta particle activity minus the naturally occurring potassium-40 activity exceeds 50 pCi/L, the system must:

- Speciate as required by the State.
- Sample at the initial monitoring frequency.

(1) All samples must be collected at each entry point to the distribution system.

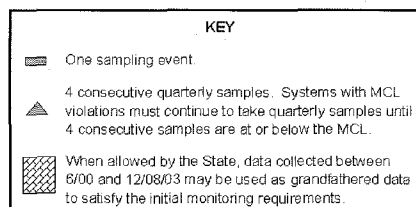
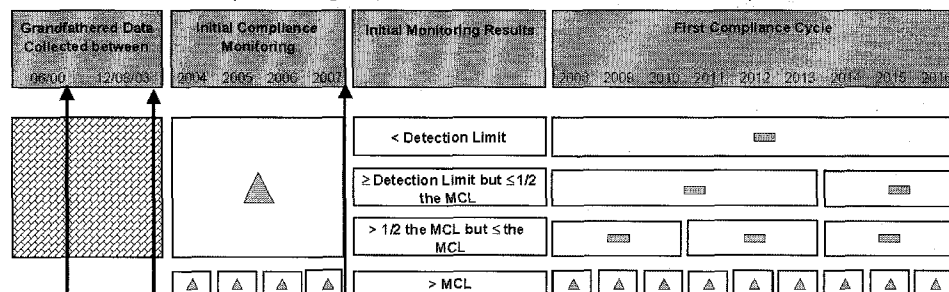
(2) The rule also contains requirements for CWSs using waters contaminated by effluents from nuclear facilities.

Grandfathering of Data

When allowed by the State, data collected between June, 2000 and December 8, 2003 may be used to satisfy the initial monitoring requirements if samples have been collected from:

- Each entry point to the distribution system (EPTDS).
- The distribution system, provided the system has a single EPTDS.
- The distribution system, provided the State makes a written justification explaining why the sample is representative of all EPTDS.

Applicability of the Standardized Monitoring Framework to Radionuclides (Excluding the Beta Particle and Photon Emitters)



For additional information on the Radionuclides Rule

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at <http://water.epa.gov/drink>

Stage 1 and Stage 2 Disinfectants and Disinfection Byproduct Rules: Laboratory Quick Reference Guide

Overview of the Rules

Title*	<p>Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) 63 FR 69390, December 16, 1998, Vol. 63, No. 241</p> <p>Revisions to the Interim Enhanced Surface Water Treatment Rule (IESWTR), the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR), and Revisions to State Primacy Requirements to Implement the Safe Drinking Water Act (SDWA) Amendments 66 FR 3770, January 16, 2001, Vol. 66, No. 29</p> <p>Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) 71 FR 388, January 4, 2006, Vol. 71, No. 2</p>
Purpose	Improve public health protection by reducing exposure to disinfection byproducts. Some disinfectants and disinfection byproducts (DBPs) have been shown to cause cancer and reproductive effects in lab animals and are suspected to cause bladder cancer and reproductive effects in humans.
General Description	The Stage 1 DBPR is the first of a staged set of rules that will reduce the allowable levels of DBPs in drinking water. The new rule establishes seven new standards and a treatment technique of enhanced coagulation or enhanced softening to further reduce DBP exposure. The rule is designed to limit capital investments and avoid major shifts in disinfection technologies until additional information is available on the occurrence and health effects of DBPs. The Stage 2 DBPR bases total trihalomethanes (TTHM) and haloacetic acids (HAA5) compliance on a locational running annual average (LRAA) calculated at each monitoring location.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Critical Deadlines and Requirements

January 1, 2002**	Surface water systems and ground water systems under the direct influence of surface water (GWUDI) serving $\geq 10,000$ people must comply with the Stage 1 DBPR requirements.
January 1, 2004**	Surface water systems and GWUDI serving $< 10,000$, and all ground water systems must comply with the Stage 1 DBPR requirements.
April 1, 2009	Systems that use ozone must qualify for reduced monitoring using a Bromate running annual average (RAA) of less than or equal to 0.0025 mg/L. Systems can no longer qualify for reduced monitoring using source water Bromide monitoring.

**This is the compliance date for TTHM/HAA5 running annual average (RAA) under Stage 1 DBPR. For compliance dates under Stage 2 DBPR see the Quick Reference Guides for the rule.

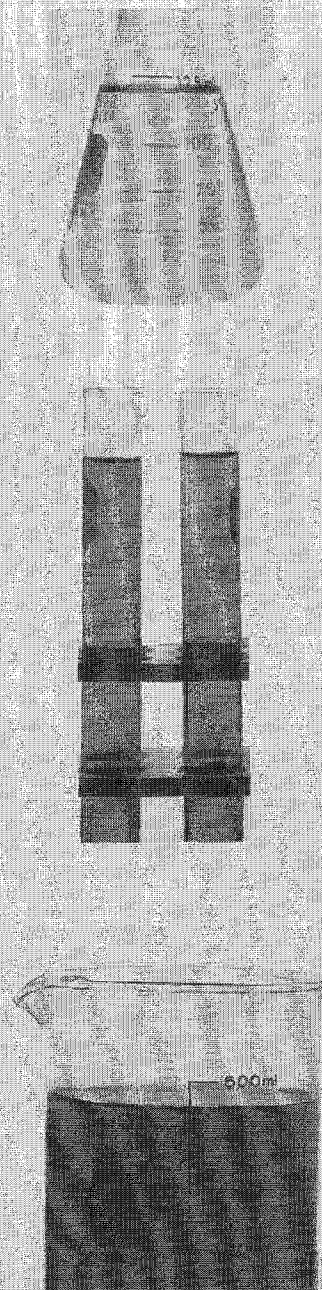
Routine Monitoring Requirements

Regulated Contaminants/Disinfectants	Requirement
TTHM/HAA5	Under the Stage 1 DBPR the monitoring frequency is based on the system's source water type, number of persons served, and number of plants. Under Stage 2 DBPR, the monitoring frequency is based on the system's source water type and number of persons served. Systems may be required to monitor quarterly or yearly depending on system size.
Bromate	Systems that disinfect their water using ozone must monitor for bromate monthly at the entrance to the distribution system.
Chlorite	Systems that disinfect their water using chlorine dioxide must monitor for chlorite daily at the entrance to the distribution system and monthly in the distribution system.
Chlorine/Chloramines	All systems must monitor for chlorine/chloramines at the same location and with the same frequency as Total Coliform Rule sampling.
Chlorine dioxide	Systems that disinfect their water using chlorine dioxide must monitor for chlorine dioxide daily at the entrance to the distribution system.
DBP precursors (TOC/Alkalinity/SUVA)	Systems that use conventional filtration systems must monitor monthly for total organic carbon and alkalinity or the specific ultraviolet absorbance (SUVA) alternative.

Laboratory Considerations

Obtain certification (or state approval) to perform new analyses.
 Become familiar with new monitoring requirements.
 Prepare for increased number of samples (e.g., storage, supplies, staff).
 Schedule to accommodate large number of samples, holding times, and demands on instrumentation.

The table on the reverse is a brief summary of available methods. The entire list of methods may be found in 40 CFR 141, Subpart C.



For additional information on the Stage 1 or Stage 2 DBPR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at <http://water.epa.gov/drink>; or contact your state or local primacy agency's drinking water representative.

Routine Monitoring Requirements

Regulated Contaminants/Disinfectants	MCL (mg/L)	MRDL (mg/L)	Analytical Method(s)	Preservation/Quenching Agent	Holding Time Sample/Extract	Sample Container Size & Type
TTHM* (Sum of: Chloroform, Bromodichloromethane, Dibromochloromethane, Bromoform)	0.080		EPA 502.2	Ascorbic acid or sodium thiosulfate. Adjust to pH <2 with HCl (dechlorinate before adding acid).	14 days at 4°C	40 - 120 mL glass w/Teflon-lined septum
			EPA 524.2	Ascorbic acid (if gases are included); otherwise, sodium thiosulfate. Adjust to pH <2 with HCl (dechlorinate before adding acid).	48 hours at ≤ 10°C, then 14 days at ≤ 6°C	40 - 60 mL glass w/Teflon-lined septum
			EPA 524.3	If only TTHM analysis: sodium thiosulfate. If all VOCs included: use maleic acid/ascorbic acid.	Samples: 14 days at 4°C. Extracts: 14 days at < -10°C	60 mL glass w/Teflon-lined septum
			EPA 551.1	If only TTHM analysis: ammonium chloride. If full target list: sodium sulfite.	Samples: 28 days at 4°C away from light. Extracts: 48 hours at ≤ 4°C	> 100 mL amber glass w/Teflon-lined septum
HAAs* (Sum of: Monochloroacetic acid, Dichloroacetic acid, Trichloroacetic acid, Monobromoacetic acid, Dibromoacetic acid)	0.060		EPA 552.1	Ammonium chloride	Samples: 14 days at 4°C away from light. Extracts: 7 days at 4°C, or 14 days at ≤ -10°C	> 50 mL amber glass w/Teflon-lined septum
			EPA 552.2	Ammonium chloride	Samples: 14 days at ≤ 6°C away from light. Extracts: 21 days (MTBE extracts) or 28 days (TAME extracts) at ≤ -10°C	> 50 mL amber glass w/Teflon-lined septum
			EPA 552.3	Ammonium chloride	48 hours at ≤ 10°C, then 14 days at ≤ 6°C	40 mL amber glass w/Teflon-lined septum
			EPA 557	Ammonium chloride	Samples: 14 days at 4°C. Extracts: 21 days at -11°C	40 - 60 mL glass vial w/Teflon-lined septum
			SM 625.1B	Ammonium chloride	28 days	> 30 mL plastic or glass
			EPA 300.1; ASTM D 6581-00, 08 A, B	Ethylendiamine	28 days at < 6°C	> 30 mL opaque plastic or glass
Bromate *	0.010		EPA 317.0, Rev. 2.0; EPA 326.0 ²	Ethylendiamine	28 days	> 30 mL plastic or glass
			EPA 321.8 ²	Ethylendiamine	28 days ≤ 6°C	> 20 mL plastic or glass
			EPA 302.0	Ethylendiamine	48 hours at ≤ 10°C, then 14 days at ≤ 6°C	> 40 mL amber glass w/Teflon-lined septum
			EPA 557	Ammonium chloride	Immediately	> 500 mL plastic or glass
Chlorite* (Daily at entrance to distribution system)	1.0		SM 4500-ClO ₂ E	None	Immediately; samples can be held up to 4 hours at ≤ 10°C	Spurge in 100+ mL beaker. Transfer to 16 mL amber glass vial
			EPA 327.0, Rev. 1.1	Remove 1 mL sample from vial and replace with 1 mL citric acid/glycine buffer.	14 days < 4°C	> 30 mL opaque glass or plastic
			EPA 300.0, Rev. 2.1; EPA 300.1; ASTM D 6581-00, 08 A, B	Ethylendiamine	14 days < 6°C	> 30 mL opaque glass or plastic
			EPA 317.0, Rev. 2.0; EPA 326.0	Ethylendiamine	14 days < 4°C	> 30 mL opaque glass or plastic
Chlorite* (Monthly in distribution system)	1.0		EPA 300.0, Rev. 2.1; EPA 300.1; ASTM D 6581-00, 08 A, B	Ethylendiamine	14 days < 6°C	> 30 mL opaque glass or plastic
			EPA 317.0, Rev. 2.0; EPA 326.0	Ethylendiamine	14 days < 6°C	> 30 mL opaque glass or plastic
			Free - SM 4500-Cl D, F, G, H; EPA 334.0; ASTM D 1253-08	None	Immediately	> 500 mL amber glass
			Total - SM 4500-Cl D, E, F, G, I; EPA 334.0; ASTM D 1253-08 ChloroSense (Free & Total)	None	Immediately	> 100 mL amber glass
Chlorine *	4.0 as Cl ₂		D99-003 (Free)	None	Immediately	> 500 mL amber glass
			Total - SM 4500-Cl D, E, F, G, I; ASTM D 1253-08; EPA 334.0; ChloroSense (Total)	None	Immediately	> 500 mL amber glass
			Combined - SM 4500-Cl D, F, G; ASTM D 1253-08	None	Immediately	> 500 mL amber glass
			SM 4500-ClO ₂ D, E	Remove 1 mL sample from vial and replace with 1 mL citric acid/glycine buffer.	Immediately; samples can be held up to 4 hours at ≤ 10°C	16 mL amber glass vial
Chlorine Dioxide *	0.8 as ClO ₂		EPA 327.0, Rev. 1.1	None	Immediately	> 500 mL plastic or glass
pH *			EPA 150.1; 150.2; SM 4500-H+ B; or ASTM D 1293-95, 99	Acidify TOC samples to pH < 2. Filter DOC sample through 0.45 µm pore diameter filter as soon as possible after collection (≤ 48 hours) and then acidify same as TOC.	28 days stored at 4°C and protected from light	> 100 mL amber glass w/Teflon-lined septum
DBP Precursors* (TOC/Alkalinity/SUVA)	Treatment Technique: Enhanced coagulation/enhanced softening to improve removal of DBP precursors for surface water systems using conventional filtration treatment or line softening		SM 5310 B, C, D; EPA 415.3 for TOC or DOC portion of SUVA	Filter through 0.45 µm pore diameter filter as soon as possible after collection (≤ 48 hours).	≤ 48 hours stored at 4°C and protected from light	> 100 mL amber glass w/Teflon-lined septum
			SM 5910 B; EPA 415.3 for UV ₂₅₄ portion of SUVA	None	14 days stored at 4°C and protected from light	> 200 mL plastic or glass
			ASTM D 1067-92 02 B; SM 2320 B; I-1030-65 for alkalinity	None		

1 - Note the sample volumes specified in this table are estimates. The actual sample container volumes should be specified by the laboratory(s) performing the analyses.
 2 - Starting April 1, 2009, systems must use one of these methods to qualify for reduced bromate monitoring.
 * - Indicates the analysis must be performed by a party approved by the state.
 + - Indicates the laboratory must be certified to analyze the sample.

Interim Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Overview of the Rule

Title*	Interim Enhanced Surface Water Treatment Rule (IESWTR) 63 FR 69478 - 69521, December 16, 1998, Vol. 63, No. 241 Revisions to the Interim Enhanced Surface Water Treatment Rule (IESWTR), the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR), and Revisions to State Primacy Requirements to Implement the Safe Drinking Water Act (SDWA) Amendments 66 FR 3770, January 16, 2001, Vol 66, No. 29
Purpose	Improve public health control of microbial contaminants, particularly <i>Cryptosporidium</i> . Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 Disinfectants and Disinfection Byproducts Rule.
General Description	Builds upon treatment technique approach and requirements of the 1989 Surface Water Treatment Rule. Relies on existing technologies currently in use at water treatment plants.
Utilities Covered	Sanitary survey requirements apply to all public water systems using surface water or ground water under the direct influence of surface water, regardless of size. All remaining requirements apply to public water systems that use surface water or ground water under the direct influence of surface water and serve 10,000 or more people.

*This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

Major Provisions

Regulated Contaminants

<i>Cryptosporidium</i>	<ul style="list-style-type: none"> ▶ Maximum contaminant level goal (MCLG) of zero. ▶ 99 percent (2-log) physical removal for systems that filter. ▶ Include in watershed control program for unfiltered systems.
Turbidity Performance Standards	Conventional and direct filtration combined filter effluent: <ul style="list-style-type: none"> ▶ ≤ 0.3 nephelometric turbidity units (NTU) in at least 95 percent of measurements taken each month. ▶ Maximum level of 1 NTU.

Turbidity Monitoring Requirements (Conventional and Direct Filtration)

Combined Filter Effluent	▶ Performed every 4 hours to ensure compliance with turbidity performance standards.
Individual Filter Effluent	▶ Performed continuously (every 15 minutes) to assist treatment plant operators in understanding and assessing filter performance.

Additional Requirements

- ▶ Disinfection profiling and benchmarking.
- ▶ Construction of new uncovered finished water storage facilities prohibited.
- ▶ Sanitary surveys, conducted by the state, for all surface water and ground water under the direct influence of surface water systems regardless of size (every 3 years for community water systems and every 5 years for noncommunity water systems).



Profiling and Benchmarking

Public water systems must evaluate impacts on microbial risk before changing disinfection practices to ensure adequate protection is maintained. The three major steps are:

- ▶ Determine if a public water system needs to profile based on TTHM and HAA5 levels (applicability monitoring)
- ▶ Develop a disinfection profile that reflects daily *Giardia lamblia* inactivation for at least a year (systems using ozone or chloramines must also calculate inactivation of viruses)
- ▶ Calculate a disinfection benchmark (lowest monthly inactivation) based on the profile and consult with the state prior to making a significant change to disinfection practices

Critical Deadlines and Requirements

For Drinking Water Systems

February 16, 1999	Construction of uncovered finished water reservoirs is prohibited.
March 1999	Public water systems lacking ICR or other occurrence data begin 4 quarters of applicability monitoring for TTHM and HAA5 to determine if disinfection profiling is necessary.
April 16, 1999	Systems that have 4 consecutive quarters of HAA5 occurrence data that meet the TTHM monitoring requirements must submit data to the state to determine if disinfection profiling is necessary.
December 31, 1999	Public water systems with ICR data must submit it to states to determine if disinfection profiling is necessary.
April 1, 2000	Public water systems must begin developing a disinfection profile if their annual average (based on 4 quarters of data) for TTHM is greater than or equal to 0.064 mg/L or HAA5 is greater than or equal to 0.048 mg/L.
March 31, 2001	Disinfection profile must be complete.
January 1, 2002	Surface water systems or ground water under the direct influence of surface water systems serving 10,000 or more people must comply with all IESWTR provisions (e.g., turbidity standards, individual filter monitoring).

For States

December 16, 2000	States submit IESWTR primacy revision applications to EPA (triggers interim primacy).
January 2002	States begin first round of sanitary surveys.
December 16, 2002	Primacy extension deadline - all states with an extension must submit primacy revision applications to EPA.
December 2004	States must complete first round of sanitary surveys for community water systems.
December 2006	States must complete first round of sanitary surveys for noncommunity water systems.

Public Health Benefits

Implementation of the IESWTR will result in . . .	<ul style="list-style-type: none">▶ Increased protection against gastrointestinal illnesses from <i>Cryptosporidium</i> and other pathogens through improvements in filtration.▶ Reduced likelihood of endemic illness from <i>Cryptosporidium</i> by 110,000 to 463,000 cases annually.▶ Reduced likelihood of outbreaks of cryptosporidiosis.
Estimated impacts of the IESWTR include . . .	<ul style="list-style-type: none">▶ National total annualized cost: \$307 million▶ 92 percent of households will incur an increase of less than \$1 per month.▶ Less than 1 percent of households will incur an increase of more than \$5 per month (about \$8 per month).

For additional information on the IESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your State drinking water representative.

Additional material is available at <http://water.epa.gov/lawsregs/rulesregs/sdwa/ieswtr/>.

Lead and Copper Rule: A Quick Reference Guide

Overview of the Rule

Title ¹	Lead and Copper Rule (LCR) ² , 56 FR 26460 - 26564, June 7, 1991
Purpose	Protect public health by minimizing lead (Pb) and copper (Cu) levels in drinking water, primarily by reducing water corrosivity. Pb and Cu enter drinking water mainly from corrosion of Pb and Cu containing plumbing materials.
General Description	Establishes action level (AL) of 0.015 mg/L for Pb and 1.3 mg/L for Cu based on 90 th percentile level of tap water samples. An AL exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment (CCT), source water monitoring/treatment, public education, and lead service line replacement (LSLR).
Utilities Covered	All community water systems (CWSs) and non-transient non-community water systems (NTNCWSs) are subject to the LCR requirements.

Public Health Benefits

Implementation of the LCR has resulted in	<ul style="list-style-type: none"> ▶ Reduction in risk of exposure to Pb that can cause damage to brain, red blood cells, and kidneys, especially for young children and pregnant women. ▶ Reduction in risk of exposure to Cu that can cause stomach and intestinal distress, liver or kidney damage, and complications of Wilson's disease in genetically predisposed people.
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Major Monitoring Provisions

Lead and Copper Tap

Applicability	▶ All CWSs and NTNCWSs.
Standard	<ul style="list-style-type: none"> ▶ CWSs and NTNCWSs must collect first-draw samples at taps in homes/buildings that are at high risk of Pb/Cu contamination as identified in 40 CFR 141.86(a). ▶ Number of samples is based on system size (see Table 1). ▶ Systems must conduct monitoring every 6 months unless they qualify for reduced monitoring.
Reduced	▶ See Table 1 for sample number and Table 2 for criteria.

Water Quality Parameter (WQP)

Applicability	<ul style="list-style-type: none"> ▶ Systems serving > 50,000 people. ▶ Systems serving ≤ 50,000 during monitoring periods in which either AL is exceeded.
Standard	<ul style="list-style-type: none"> ▶ WQP samples at taps are collected every 6 months. ▶ WQPs at entry points to distribution system (EPTDS) are collected every 6 months prior to CCT installation, then every 2 weeks.
Reduced	▶ See Table 1 for sample number and page 2 for criteria. Does not apply to EPTDS WQP monitoring.

Table 1: Lead and Copper Tap and WQP Tap Monitoring

Size Category	System Size	Number of Pb/Cu Tap Sample Sites ³		Number of WQP Tap Sample Sites ⁴	
		Standard	Reduced	Standard	Reduced
Large	> 100K	100	50	25	10
	50,001 - 100K	60	30	10	7
Medium	10,001 - 50K	60	30	10	7
	3,301 - 10K	40	20	3	3
Small	501 - 3,300	20	10	2	2
	101 - 500	10	5	1	1
	≤ 100	5	5	1	1

³ With written State approval, PWSs can collect < 5 samples if all taps used for human consumption are sampled.

⁴ Two WQP tap samples are collected at each sampling site.

Table 2: Criteria for Reduced Pb/Cu Tap Monitoring

Annual	<ol style="list-style-type: none"> 1. PWS serves ≤ 50,000 people and is ≤ both ALs for 2 consecutive 6-month monitoring periods; or 2. Any PWS that meets optimal WQPs (OWQPs) and is ≤ Pb AL for 2 consecutive 6-month monitoring periods.
Triennial	<ol style="list-style-type: none"> 1. PWS serves ≤ 50,000 people and is ≤ both ALs for 3 consecutive years of monitoring; or 2. Any PWS that meets OWQP specifications and is ≤ Pb AL for 3 consecutive years of monitoring; or 3. Any PWS with 90th percentile Pb and Cu levels ≤ 0.005 mg/L and ≤ 0.65 mg/L, respectively, for 2 consecutive 6-month monitoring periods (i.e., accelerated reduced Pb/Cu tap monitoring).
Every 9 years	PWS serves ≤ 3,300 people and meets monitoring waiver criteria found at 40 CFR 141.86(g).

Lead Consumer Notice

Within 30 days of learning the results, all systems must provide individual Pb tap results to people who receive water from sites that were sampled, regardless of whether the results exceed the Pb AL, as required by 40 CFR 141.85(d).

Consumer Confidence Report (CCR)

All CWSs, irrespective of their lead levels, must provide an educational statement about lead in drinking water in their CCRs as required by 40 CFR 141.154. Must be in 2008 CCR (due July 1, 2009) if EPA is Primacy Agency, State adopts the rule by reference automatically, or adopts during 2008. Otherwise, this statement is required in the 2009 CCR (due July 1, 2010).

¹ This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

² The June 1991 LCR was revised with the following Technical Amendments: 56 FR 32112, July 15, 1991; 57 FR 28785, June 29, 1992; 59 FR 33860, June 30, 1994.

It was subsequently revised by: the LCR Minor Revisions, 65 FR 1950, January 12, 2000, and the LCR Short-Term Revisions, 72 FR 57782, October 10, 2007.

Treatment Technique and Sampling Requirements if the AL is Exceeded⁵

⁵ Based on 90th percentile level. Multiply number of valid samples by 0.9 (e.g., 10 samples x 0.9 = 9; thus, use 9th highest Pb and Cu test result to compare to AL). For 5 samples, average 4th and 5th highest results. For < 5 samples, use highest result.

Water Quality Parameter (WQP)

Applicability	Refer to page 1.
Parameters	<ul style="list-style-type: none"> pH, alkalinity, calcium (<i>initial only, unless calcium carbonate stabilization is used</i>), conductivity (<i>initial monitoring only</i>), orthophosphate (<i>if inhibitor is phosphate-based</i>); silica (<i>if inhibitor is silicate-based</i>), and temperature (<i>initial monitoring only</i>).
Frequency	<ul style="list-style-type: none"> Systems installing CCT, must conduct follow-up monitoring for 2 consecutive 6-month periods. WQP tap monitoring is conducted every 6 months, EPTDS monitoring increases to every 2 weeks. After follow-up monitoring, State sets OWQP specifications that define optimal CCT.
Reduced Tap Monitoring	<ul style="list-style-type: none"> Collect reduced number of sampling sites (see Table 1) if meet OWQPs for 2 consecutive 6-month periods. Collect reduced number of sampling sites at reduced frequency if meet OWQPs for: <ul style="list-style-type: none"> 6 consecutive 6-month monitoring periods can monitor annually; 3 consecutive years of annual monitoring can monitor triennially.

Public Education (PE)

Applicability	Systems that exceed the Pb AL (<i>not required if only the Cu AL is exceeded</i>).
Purpose	Educates consumers about lead health effects, sources, and steps to minimize exposure.
Delivery Method	<ul style="list-style-type: none"> CWSs: deliver materials to bill-paying customers and post lead information on water bills, work in concert with local health agencies to reach at-risk populations (children, pregnant woman), deliver to other organizations serving "at-risk" populations, provide press releases, include new outreach activities from list in 40 CFR 141.85(a)(2)(vi), and post to Web site (CWSs serving > 100,000 only). NTNCWSs: posting and distribution to all consumers (can be electronic with State permission). Can apply to CWSs such as hospitals and prisons where population cannot make improvements.
Timing	<ul style="list-style-type: none"> Within 60 days <i>after end of monitoring period</i> in which Pb AL was exceeded if not already delivering PE.⁶ Repeat annually except: water bill inserts - quarterly; press releases - 2x/year, and Web posting - continuous. Can discontinue whenever ≤ Pb AL but must recommence if subsequently exceed Pb AL.

⁶State may allow extension in some situations. Also, State may require approval of message content prior to delivery.

Source Water Monitoring and Source Water Treatment (SOWT)

Applicability	Systems that exceed Pb or Cu AL.
Purpose	Determine contribution from source water to total tap water Pb and Cu levels and need for SOWT.
Timing	<ul style="list-style-type: none"> One set of samples at each EPTDS is due within 6 months of first AL exceedance. System has 24 months to install any required SOWT. State sets maximum permissible levels (MPLs) for Pb and Cu in source water based on initial and follow-up source water monitoring.
Standard	Ground water PWSs monitor once during 3-year compliance periods; surface water PWSs monitor annually.
Reduced	Monitor every 9 years if MPLs are not exceeded during 3 consecutive compliance periods for ground water PWSs or 3 consecutive years for surface water PWSs.

Corrosion Control Treatment (CCT)

Applicability	<ul style="list-style-type: none"> All large systems except those meeting requirements of 40 CFR 141.81(b)(2) or (b)(3). Medium and small systems that exceed either AL; may stop CCT steps if ≤ both ALs for 2 consecutive 6-month periods but must recommence CCT if subsequently exceed either AL.
Study	<ul style="list-style-type: none"> All large systems except as noted above. If State requires study for small or medium systems, it must be completed within 18 months.
Treatment	<ul style="list-style-type: none"> Once State determines type of CCT to be installed, PWS has 24 months to install. Systems installing CCT must conduct 2 consecutive 6 months of follow-up tap and WQP monitoring.
OWQPs	After follow-up Pb/Cu tap and WQP monitoring, State sets OWQPs. Refer to WQP section above.

Lead Service Line Replacement (LSLR)

Applicability	<ul style="list-style-type: none"> Systems that continue to exceed the Pb AL after installing CCT and/or SOWT. Can discontinue LSLR whenever ≤ Pb AL in tap samples for 2 consecutive 6-month monitoring periods; must recommence if subsequently exceed.
Monitoring	<ul style="list-style-type: none"> Optional: Sample from LSL to determine if line must be replaced. If all samples are ≤ 0.015 mg/L, line is considered "replaced through testing"; must reconsider these lines if Pb AL is subsequently exceeded. Required: Sample from any LSLs not completely replaced to determine impact on Pb levels.
Replacement	<ul style="list-style-type: none"> Must replace at least 7% of LSLs annually; State can require accelerated schedule. If only portion of LSL is replaced, PWS must: <ul style="list-style-type: none"> Notify customers at least 45 days prior to replacement about potential for increased Pb levels. Collect samples within 72 hours of replacement and provide results within 3 days of receipt.

For additional information on the LCR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA Web site at <http://water.epa.gov/drink>; or contact your State drinking water representative.

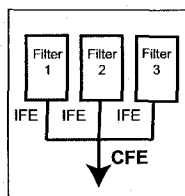
Long Term 1 Enhanced Surface Water Treatment Rule: A Quick Reference Guide

Overview of the Rule

Title ¹	Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) 67 FR 1812, January 14, 2002, Vol. 67, No. 9
Purpose	Improve public health protection through the control of microbial contaminants, particularly <i>Cryptosporidium</i> . Prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 Disinfectants and Disinfection Byproducts Rule.
General Description	Builds upon the requirements of the 1989 Surface Water Treatment Rule (SWTR). Smaller system counterpart of the Interim Enhanced Surface Water Treatment Rule (IESWTR).
Utilities Covered	Public water systems that use surface water or ground water under the direct influence of surface water (GWUDI) and serve fewer than 10,000 people.

Major Provisions

Control of <i>Cryptosporidium</i>	<ul style="list-style-type: none"> ▶ The maximum contaminant level goal (MCLG) is set at zero. ▶ Filtered systems must physically remove 99% (2-log) of <i>Cryptosporidium</i>. ▶ Unfiltered systems must update their watershed control programs to minimize the potential for contamination by <i>Cryptosporidium</i> oocysts. ▶ <i>Cryptosporidium</i> is included as an indicator of GWUDI.
Combined Filter Effluent (CFE) Turbidity Performance Standards	<p>Specific CFE turbidity requirements depend on the type of filtration used by the system.</p> <p><u>Conventional and direct filtration:</u></p> <ul style="list-style-type: none"> ▶ ≤ 0.3 nephelometric turbidity units (NTU) in at least 95% of measurements taken each month. ▶ Maximum level of turbidity: 1 NTU. <p><u>Slow sand and diatomaceous earth (DE) filtration:</u></p> <ul style="list-style-type: none"> ▶ Continue to meet CFE turbidity limits specified in the SWTR: <ul style="list-style-type: none"> • 1 NTU in at least 95% of measurements taken each month. • Maximum level of turbidity: 5 NTU. <p><u>Alternative technologies (other than conventional, direct, slow sand, or DE):</u></p> <ul style="list-style-type: none"> ▶ Turbidity levels are established by the State based on filter demonstration data submitted by the system. <ul style="list-style-type: none"> • State-set limits must not exceed 1 NTU (in at least 95% of measurements) or 5 NTU (maximum).



For additional information on the LT1ESWTR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your State drinking water representative.

¹ This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

² This frequency may be reduced by the State to once per day for systems using slow sand/alternative filtration or for systems serving 500 persons or fewer regardless of the type of filtration used.

Turbidity Monitoring Requirements

Combined Filter Effluent	<ul style="list-style-type: none"> ▶ Performed at least every 4 hours to ensure compliance with CFE turbidity performance standards.²
Individual Filter Effluent (IFE) (for systems using conventional and direct filtration only)	<p><i>Since the CFE may meet regulatory requirements even though one filter is producing high turbidity water, the IFE is measured to assist conventional and direct filtration treatment plant operators in understanding and assessing individual filter performance.</i></p> <ul style="list-style-type: none"> ▶ Performed continuously (recorded at least every 15 minutes). ▶ Systems with two or fewer filters may conduct continuous monitoring of CFE turbidity in place of individual filter effluent turbidity monitoring. ▶ Certain follow-up actions are required if the IFE turbidity (or CFE for systems with two filters) exceeds 1.0 NTU in 2 consecutive readings or more (i.e., additional reporting, filter self-assessments, and/or comprehensive performance evaluations (CPEs)).

Disinfection Profiling and Benchmarking Requirements

Community and non-transient non-community public water systems must evaluate impacts on microbial risk before changing disinfection practices to ensure adequate microbial protection is maintained. This is accomplished through a process called disinfection profiling and benchmarking.

What are the disinfection profiling and benchmarking requirements?

- ▶ Systems must develop a disinfection profile, which is a graphical compilation of weekly inactivation of *Giardia lamblia*, taken on the same calendar day each week over 12 consecutive months. (Systems using chloramines, ozone, or chlorine dioxide for primary disinfection must also calculate inactivation of viruses). Results must be available for review by the State during sanitary surveys.
- ▶ A State may deem a profile unnecessary if the system has sample data collected after January 1, 1988-during the month of warmest water temperature and at maximum residence time in the distribution system-indicating TTHM levels are below 0.064 mg/L and HAA5 levels are below 0.048 mg/L.
- ▶ Prior to making a significant change to disinfection practices, systems required to develop a profile must calculate a disinfection benchmark and consult with the State. The benchmark is the calculation of the lowest monthly average of inactivation based on the disinfection profile.

Additional Requirements

- ▶ Construction of new uncovered finished water reservoirs is prohibited.

Critical Deadlines and Requirements

For Drinking Water Systems

March 15, 2002	Construction of uncovered finished reservoirs is prohibited.
July 1, 2003	No later than this date, systems serving between 500-9,999 persons must report to the State: <ul style="list-style-type: none">▶ Results of optional monitoring which show levels of TTHM < 0.064 mg/L <u>and</u> HAA5 < 0.048 mg/L, OR▶ System has started profiling.
January 1, 2004	No later than this date, systems serving fewer than 500 persons must report to the State: <ul style="list-style-type: none">▶ Results of optional monitoring which show levels of TTHM < 0.064 mg/L <u>and</u> HAA5 < 0.048 mg/L, OR▶ System has started profiling.
June 30, 2004	Systems serving between 500 and 9,999 persons must complete their disinfection profile unless the State has determined it is unnecessary.
December 31, 2004	Systems serving fewer than 500 persons must complete their disinfection profile unless the State has determined it is unnecessary.
January 14, 2005	Surface water systems or GWUDI systems serving fewer than 10,000 people must comply with the applicable LT1ESWTR provisions (e.g., turbidity standards, individual filter monitoring, <i>Cryptosporidium</i> removal requirements, updated watershed control requirements for unfiltered systems).

For States

January 2002	As per the IESWTR, States begin first round of sanitary surveys (at least every 3 years for community water systems and every 5 years for non-community water systems).
October 14, 2003	States are encouraged to submit final primacy applications to EPA.
January 14, 2004	Final primacy applications must be submitted to EPA unless granted an extension.
December 2004	States must complete first round of sanitary surveys for community water systems (as per the IESWTR).
January 14, 2006	Final primacy revision applications from States with approved 2-year extension agreements must be submitted to EPA.
December 2006	States must complete first round of sanitary surveys for non-community water systems (as per the IESWTR).

Public Health Benefits

Implementation of the LT1ESWTR will result in ...	<ul style="list-style-type: none">▶ Increased protection against gastrointestinal illnesses from <i>Cryptosporidium</i> and other pathogens through improvements in filtration.▶ Reduced likelihood of endemic illness from <i>Cryptosporidium</i> by an estimated 12,000 to 41,000 cases annually.▶ Reduced likelihood of outbreaks of cryptosporidiosis.
Estimated impacts of the LT1ESWTR include ...	<ul style="list-style-type: none">▶ National total annualized cost: \$39.5 million.▶ 90% of affected households will incur an increase of less than \$1.25 per month.▶ One percent of affected households are likely to incur an increase of more than \$10 per month.

Total Coliform Rule: A Quick Reference Guide

Overview of the Rule

Title ¹	Total Coliform Rule (TCR) 54 FR 27544-27568, June 29, 1989, Vol. 54, No. 124 ²
Purpose	Improve public health protection by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and <i>Escherichia coli</i> (<i>E. coli</i>).
General Description	Establishes a maximum contaminant level (MCL) based on the presence or absence of total coliforms, modifies monitoring requirements including testing for fecal coliforms or <i>E. coli</i> , requires use of a sample siting plan, and also requires sanitary surveys for systems collecting fewer than five samples per month.
Utilities Covered	The TCR applies to all public water systems.

Public Health Benefits

Implementation of the TCR has resulted in . . .	► Reduction in risk of illness from disease causing organisms associated with sewage or animal wastes. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and associated headaches and fatigue.
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What are the Major Provisions?

ROUTINE Sampling Requirements

- Total coliform samples must be collected at sites which are representative of water quality throughout the distribution system according to a written sample siting plan subject to state review and revision
- Samples must be collected at regular time intervals throughout the month except groundwater systems serving 4,900 persons or fewer may collect them on the same day.
- Monthly sampling requirements are based on population served (see table on next page for the minimum sampling frequency).
- A reduced monitoring frequency may be available for systems serving 1,000 persons or fewer and using only ground water if a sanitary survey within the past 5 years shows the system is free of sanitary defects (the frequency may be no less than 1 sample/quarter for community and 1 sample/year for non-community systems).
- Each total coliform-positive routine sample must be tested for the presence of fecal coliforms or *E. coli*.
- If any routine sample is total coliform-positive, repeat samples are required.

REPEAT Sampling Requirements

- Within 24 hours of learning of a total coliform-positive ROUTINE sample result, at least 3 REPEAT samples must be collected and analyzed for total coliforms:
 - One REPEAT sample must be collected from the same tap as the original sample.
 - One REPEAT sample must be collected within five service connections upstream.
 - One REPEAT sample must be collected within five service connections downstream.
 - Systems that collect 1 ROUTINE sample per month or fewer must collect a 4th REPEAT sample.
- If any REPEAT sample is total coliform-positive:
 - The system must analyze that total coliform-positive culture for fecal coliforms or *E. coli*.
 - The system must collect another set of REPEAT samples, as before, unless the MCL has been violated and the system has notified the state.

Additional ROUTINE Sample Requirements

- A positive ROUTINE or REPEAT total coliform result requires a minimum of five ROUTINE samples be collected the following month the system provides water to the public unless waived by the state.

¹ This document provides a summary of federal drinking water requirements; to ensure full compliance, please consult the federal regulations at 40 CFR 141 and any approved state requirements.

² The June 1989 Rule was revised as follows: Corrections and Technical Amendments, 6/19/90 and Partial Stay of Certain Provisions (Variance Criteria) 56 FR1556-1557, Vol 56, No 10.

Note: The TCR is currently undergoing the 6 year review process and may be subject to change.

Public Water System ROUTINE Monitoring Frequencies

Population	Minimum Samples/ Month	Population	Minimum Samples/ Month	Population	Minimum Samples/ Month
25-1,000*	1	21,501-25,000	25	450,001-600,000	210
1,001-2,500	2	25,001-33,000	30	600,001-780,000	240
2,501-3,300	3	33,001-41,000	40	780,001-970,000	270
3,301-4,100	4	41,001-50,000	50	970,001-1,230,000	300
4,101-4,900	5	50,001-59,000	60	1,230,001-1,520,000	330
4,901-5,800	6	59,001-70,000	70	1,520,001-1,850,000	360
5,801-6,700	7	70,001-83,000	80	1,850,001-2,270,000	390
6,701-7,600	8	83,001-96,000	90	2,270,001-3,020,000	420
7,601-8,500	9	96,001-130,000	100	3,020,001-3,960,000	450
8,501-12,900	10	130,001-220,000	120	≥ 3,960,001	480
12,901-17,200	15	220,001-320,000	150		
17,201-21,500	20	320,001-450,000	180		

*Includes PWSs which have at least 15 service connections, but serve <25 people.

What are the Other Provisions?

Systems collecting fewer than 5 ROUTINE samples per month . . .

Must have a sanitary survey every 5 years (or every 10 years if it is a non-community water system using protected and disinfected ground water).**

Systems using surface water or ground water under the direct influence of surface water (GWUDI) and meeting filtration avoidance criteria . . .

Must collect and have analyzed one coliform sample each day the turbidity of the source water exceeds 1 NTU. This sample must be collected from a tap near the first service connection.

** As per the IESWTR, states must conduct sanitary surveys for community surface water and GWUDI systems in this category every 3 years (unless reduced by the state based on outstanding performance).

How is Compliance Determined?

- ▶ Compliance is based on the presence or absence of total coliforms.
- ▶ Compliance is determined each calendar month the system serves water to the public (or each calendar month that sampling occurs for systems on reduced monitoring).
- ▶ The results of ROUTINE and REPEAT samples are used to calculate compliance.

A Monthly MCL Violation is Triggered if:

A system collecting fewer than 40 samples per month . . .

Has greater than 1 ROUTINE/REPEAT sample per month which is total coliform-positive.

A system collecting at least 40 samples per month . . .

Has greater than 5.0 percent of the ROUTINE/REPEAT samples in a month total coliform-positive.

An Acute MCL Violation is Triggered if:

Any public water system . . .

Has any fecal coliform- or *E. coli*-positive REPEAT sample or has a fecal coliform- or *E. coli*-positive ROUTINE sample followed by a total coliform-positive REPEAT sample.

What are the Public Notification and Reporting Requirements?

For a Monthly MCL Violation

- ▶ The violation must be reported to the state no later than the end of the next business day after the system learns of the violation.
- ▶ The public must be notified within 30 days after the system learns of the violation.

For an Acute MCL Violation

- ▶ The violation must be reported to the state no later than the end of the next business day after the system learns of the violation.
- ▶ The public must be notified within 24 hours after the system learns of the violation.

Systems with ROUTINE or REPEAT samples that are fecal coliform- or *E. coli*-positive . . .

Must notify the state by the end of the day they are notified of the result or by the end of the next business day if the state office is already closed.

For additional information on the TCR

Call the Safe Drinking Water Hotline at 1-800-426-4791; visit the EPA web site at <http://water.epa.gov/drink>; or contact your state drinking water representative.