Total Coliform Rule Within a Safe Drinking Water Act Context

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September 18-19, 2007

This Meeting's Presentations

Objectives

Provisions

Total Coliform Rule Within A Safe Drinking Water Act Context

System compliance

Improvement

Research

Overview

- Provide an overview of SDWA legislative framework for drinking water regulations
- Describe some of the regulatory approaches available under SDWA and how they have been used in the other applications
- Summary of TCR
- Convey how other SDWA rules relate to the TCR objectives

Background

- SDWA provides the framework for regulating contaminants that pose a public concern when present in drinking water
- That framework consists of determining:
  - Whether a contaminant that is likely to occur in drinking water poses a risk to public health
  - What level of removal can be achieved with available technology
  - Setting either an enforceable limit or a required practice to assure cost-effective control of the contaminant

Six-Year Review

- 1996 SDWA Amendments established six year "review and revise, as appropriate" schedule for NPDW regulations
- Revisions shall "maintain, or provide for greater, protection of the health of persons"
- In 2003 EPA found that it was appropriate to review and potentially revise the TCR

Regulation of Public Water Systems

- EPA regulates contaminants that the Administrator determines:
  - May have an adverse effect on the health of persons,
  - Are known to occur or there is a substantial likelihood of occurrence with a frequency and at levels of public health concern, and
  - Are determined to present a meaningful opportunity for health risk reduction if regulated
- Regulation may take the form of a
  - Primary standard (MCL or Treatment Technique)
  - Secondary standard
- Setting level includes consideration of costs and benefits

MCL/MCLG

MCLG	MCL
EPA must set an MCLG for every primary drinking water standard	When information is adequate, EPA sets an MCL
Level at which no known or anticipated adverse human health effects occur, with an adequate margin of safety	Maximum permissible level of a contaminant in water delivered to users, generally set as close as is feasible to the MCLG
Health goals and not enforceable values	Compliance can be based on a single sample result or an average of samples
Not needed for non-contaminant parameters (e.g., turbidity)	Feasibility determined based best available technology (BAT) or other means of achieving compliance within cost constraints

MCL Determination

- Key information includes
  - A contaminant with an adverse health effect that is likely to occur in PWSs at a frequency and level of public health concern
  - Analytical methods to determine if the contaminant is present at a level of public health concern and if treatment is effective

Treatment Technique (TT)

- When it is not economically or technologically feasible (due to analytical cost or sensitivity) to determine the level of a contaminant, EPA can develop a different type of regulation called a treatment technique
- Key information to develop a treatment technique
  - Operational measures that achieve desired levels of control for the target contaminant and prevent know or anticipated adverse public health effects to the extent feasible
  - Design conditions/monitoring parameters that serve as an enforceable indicator that operational measures in place (e.g., turbidity, chlorine residual) are controlling the contaminant

Triggers

- As part of both MCL and TT rules, systems are required to conduct evaluations or make changes based on operational/compliance monitoring
  - Evaluation can be triggered without a violation
  - Failure to monitor, conduct evaluation, or make changes is violation

Trigger Examples

Rule	Trigger	Follow-Up Action
Stage 2 DBPR (effective 2012) - Operational evaluations	Based on TTHM/HAA5 compliance monitoring	Operational evaluation
IESWTR and LT1ESWTR - Turbidity	Combined filter effluent and individual filter monitoring	Filter profile, self assessment, comprehensive performance evaluation
Lead and Copper Rule	Action levels & water quality parameters	Corrosion control, public education

What is the Current Framework for Drinking Water Regulation?

- 1974 SDWA resulted in EPA turning USPHS standards for total coliforms into 1975 Interim Standards
  - Indicator of fecal contamination of the public water supply
- 1986 SDWA Amendments
  - Established schedule and deadline for contaminants to be regulated, including total coliforms

1989 Total Coliform Rule Objectives

- To evaluate the effectiveness of treatment,
- To determine the integrity of the distribution system, and
- To signal the possible presence of fecal contamination

How do other rules address these objectives?

TCR Requirements

- TCR (1989) set MCLG and MCL for coliforms
  - Total coliforms, fecal coliforms, E. coli

- TCR set minimum numbers of samples to be collected each month

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.

Sanitary Surveys are also an Element of the TCR

- A primacy requirement in 1975 SDWA
  - States must have a sanitary survey program
- 1989 TCR incorporated sanitary surveys to take advantage of the information / contact available through program in setting monitoring requirements
  - Only applies to systems ≤ 4,100 population served

"Sanitary survey means an onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water." 40 CFR 141.2

Current TCR Monitoring Framework Provides Flexibility by System Type

- Reduced monitoring at small systems linked to sanitary survey (sanitary survey replaces monitoring)

System Type	Population Served	Sanitary Survey	TCR Samples
CWS	≤ 4,100	No	5 samples / month
CWS – Groundwater	≤ 1,000	Yes	1 sample / quarter
CWS / NCWS	1,000 – 4,100	Yes	2 – 4 samples /month
NCWS - Groundwater	≤ 1,000	Yes (no sanitary defects)	1 sample / year

Sanitary Surveys are Elements of Several Rules

Characteristics	TCR	IESWTR	GWR
Applicability	Any system taking < 5 TC samples/ mo (≤ 4100)	Systems using SW or GWUDI	Systems using GW
Frequency	Every 5 yrs (10 yrs for NCWS w/ protected, disinfected GW	CWS – 3 yrs (5 yrs if outstanding) NCWS – 5 yrs	CWS – 3 yrs (5 yrs if outstanding) NCWS – 5 yrs
Requirements	Not specified	8 specified elements	8 specified elements
Effective Date	In effect	In effect	CWS – by 2012 NCWS – by 2014

Required Sanitary Survey Elements

- Sanitary surveys under IESWTR and GWR must address the following eight elements:
  - Source
  - Treatment
  - Distribution system
  - Finished water storage
  - Pumps, pump facilities, and controls
  - Monitoring, reporting, and data verification
  - System management and operation
  - Operator compliance with State requirements
- States must have authority to require systems to correct significant deficiencies
- Not required to evaluate inapplicable elements

SDWA Rules Related to TCR

Microbial Rules	Disinfection By-Product Rules
1989 Surface Water Treatment Rule (SWTR)	1979 Total Trihalomethane (TTHM) Rule
1998 Interim Enhanced SWTR	1998 Stage 1 Disinfection Byproducts Rule
2006 Long-Term 2 Enhanced SWTR	2006 Stage 2 Disinfection Byproducts Rule
2006 Groundwater Rule (GWR)	

These requirements continue to balance potential microbial and disinfection byproduct risks

SDWA Rules (Microbial) and the TCR

- Surface Water Treatment Rule (SWTR) (1989)
  - Set source water treatment technique requirements for *Giardia* and viruses for surface water systems
  - Compliance through combination of removal and inactivation, demonstrated by treatment process monitoring results
  - Requires maintenance of detectable residual in distribution system
  - Also applies to ground water under direct influence of surface water
  - SWTR replaced turbidity monitoring and performance requirements of the 1975 Interim Standards

- Use of disinfectants in treatment and in the distribution system can affect coliform levels and improve TCR compliance

SDWA Rules (Microbial) and the TCR

- Interim Enhanced SWTR (1998)
  - Primacy requirement for State sanitary surveys for surface water systems.
  - Specify sanitary survey frequency and scope; scope includes distribution systems
  - States have authority to require correction of significant deficiencies
- Long-Term 2 Enhanced SWTR (2006)
  - Requires additional treatment at treatment plants that have high levels of Cryptosporidium in their source water
  - Requires systems to cover, replace, or treat the effluent from any remaining open finished water storage facilities

SDWA Rules (Microbial) and the TCR

- Ground Water Rule (2006)
  - More than 147,000 PWSs must comply with GWR
    - Many are small, non-community water systems (≈ 74,000 NCWS serving less than 100 persons)
    - Frequently NCWS are simply a well and an associated structure
  - TCR TC+ monitoring result may trigger source water monitoring for fecal indicators (e.g., coliphage, *E. coli*)
    - Positive fecal indicator at the ground water source results may trigger requirement for corrective action
  - State sanitary surveys are required
    - Same frequency and scope as IESWTR
    - Systems must address significant deficiencies through corrective action

SDWA Rules (DBP) and the TCR

- Total Trihalomethane (TTHM) Rule (1979)
  - Set MCL for disinfection byproducts (total trihalomethanes)
  - Required monitoring and compliance for community water systems serving ≥10,000 and using disinfection
  - Community water systems serving < 10,000 using disinfection not subject to the TTHM standard
    - Not included due to concerns about their ability to balance DBP compliance with microbial risk

SDWA Rules (DBP) and the TCR

- Stage 1 Disinfection Byproducts Rule (1998)
  - Added HAA5 MCL and lowered TTHM MCL
  - Potential impact to systems disinfecting for TCR compliance
  - Some PWSs changing to chloramines for Stage 1 compliance - improved distribution residual
- Stage 2 Disinfection Byproducts Rule (2006)
  - Requires DBP MCL compliance at each monitoring location (LRAA)
  - Potentially an additional impact to systems disinfecting for TCR compliance
- Use of disinfectants in treatment and the distribution system can reduce coliform levels and improve TCR compliance, but poorly controlled use may lead to DBP compliance problems

How are 1989 TCR Objectives Addressed?

OBJECTIVE	PROVISIONS	RULE
Evaluate the effectiveness of treatment	Coliform monitoring* *Treatment process monitoring* *Sanitary surveys*	TCR *SWTRs, GWR* *IESWTR, GWR*
Determine the integrity of the distribution system	Coliform monitoring* *Disinfectant residual monitoring* *Sanitary surveys*	TCR *SWTR, DBPRs* *IESWTR, GWR*
Indicate possible fecal contamination	TC+ sample analysis for *E. coli* / fecal coliform *Groundwater source sampling* *Sanitary surveys*	TCR *GWR* *IESWTR, GWR*

* For small systems, sanitary surveys can replace some TC monitoring.