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National Primary Drinking Water Regulations: Revisions to the Total Coliform Rule; Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 141 and 142

[EPA–HQ–OW–2008–0878; FRL–9166–8]

RIN 2040–AD94

National Primary Drinking Water Regulations: Revisions to the Total Coliform Rule

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule.

SUMMARY: The Environmental Protection Agency (EPA or the Agency) is proposing revisions to the 1989 Total Coliform Rule. The proposed Revised Total Coliform Rule offers a meaningful opportunity for greater public health protection beyond the current Total Coliform Rule. The proposed revisions require systems that have an indication of coliform contamination in the distribution system to assess the problem and take corrective action that may reduce cases of illnesses and deaths due to potential fecal contamination and waterborne pathogen exposure. This proposal also updates provisions in other rules that reference analytical methods and other requirements in the current TCR (*e.g.,* Public Notification and Ground Water Rules). These proposed revisions are in accordance with the Safe Drinking Water Act as amended, which requires EPA to review and revise, as appropriate, each national primary drinking water regulation promulgated under the Safe Drinking Water Act not less often than every six years. As with the current Total Coliform Rule, the proposed Revised Total Coliform Rule applies to all public water systems.

DATES: Comments must be received on or before September 13, 2010.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–OW–2008–0878, by one of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the on-line instructions for submitting comments.
- *Mail:* Water Docket, Environmental Protection Agency, Mailcode: 4101T, 1200 Pennsylvania Ave., NW., Washington, DC 20460, Attention Docket ID No. EPA–HQ–OW–2008–0878. In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503.
- *Hand Delivery:* EPA Docket Center, (EPA/DC) EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OW–2008–0878. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *http://www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *http://www.regulations.gov,* or e-mail. The *http://www.regulations.gov* Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through *http://www.regulations.gov,* your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket, visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Although listed in the index, some information is not publicly available, *i.e.,* CBI or other information whose disclosure is restricted by statue. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at the Water Docket, EPA Docket Center, EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Water Docket is (202) 566–2426.

FOR FURTHER INFORMATION CONTACT: Sean Conley, Standards and Risk Management Division, Office of Ground Water and Drinking Water (MC–4607M), Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone number: (202) 564–1781; e-mail address: *conley.sean@epa.gov*. For general information, contact the Safe Drinking Water Hotline, telephone number: (800) 426–4791. The Safe Drinking Water Hotline is open Monday through Friday, excluding legal holidays, from 10 a.m. to 4 p.m. Eastern time.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Regulated Categories and Entities

Entities potentially regulated by the proposed Revised Total Coliform Rule (RTCR) are all public water systems (PWSs). Regulated categories and entities include the following:

Category	Examples of regulated entities
Industry	Privately-owned community water systems (CWSs), transient non-community water systems (TNCWSs), and non-transient non-community water systems (NTNCWSs).
State, Tribal, and local governments.	Publicly-owned CWSs, TNCWSs, and NTNCWSs.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in the table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the definition of "public water system" in § 141.2 and the section entitled "Coverage" in § 141.3 in title 40 of the Code of Federal Regulations (CFR), and the applicability criteria in § 141.850(b) of this proposed rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. Copies of This Document and Other Related Information

This document is available for download at *http://www.epa.gov/safewater/disinfection/tcr/*. For other related information, see preceding discussion on docket.

Abbreviations Used in This Document

ADWR Airline Drinking Water Rule
AGI Acute Gastrointestinal Illness
AIDS Acquired Immune Deficiency Syndrome
AIP Agreement in Principle
AWWA American Water Works Association
ATP Alternative Test Procedure
AWOP Area Wide Optimization Program
BAT Best Available Technology
C Celsius
CA Corrective Action
CBI Confidential Business Information
CCR Consumer Confidence Report
CDC Centers for Disease Control and Prevention
CFR *Code of Federal Regulations*
COI Cost of Illness
CWS Community Water System
DBPs Disinfection Byproducts
DWC Drinking Water Committee
EA Economic Analysis
EC *E. coli*
EC–MUG EC Medium with MUG
EPA United States Environmental Protection Agency
ETV Environmental Technology Verification
FR *Federal Register*
GW Ground Water
GWR Ground Water Rule
GWS Ground Water System
GWUDI Ground Water Under the Direct Influence of Surface Water
HRRCA Health Risk Reduction and Cost Analysis
HUS Hemolytic Uremic Syndrome
ICR Information Collection Request
IESWTR Interim Enhanced Surface Water Treatment Rule
M Million
MCL Maximum Contaminant Level
MCLG Maximum Contaminant Level Goal
mg/L Milligrams per Liter
ml Milliliters
MOU Memorandum of Understanding
MRDL Maximum Residual Disinfectant Level
MUG 4-methylumbelliferyl-Beta-D-glucuronide
NCWS Non-community Water System
NDWAC National Drinking Water Advisory Council
NPDWR National Primary Drinking Water Regulation
NTNCWS Non-Transient Non-Community Water System
NTU Nephelometric Turbidity Unit
OMB Office of Management and Budget
PN Public Notification
PWS Public Water System
RFA Regulatory Flexibility Act
RICP Research and Information Collection Partnership
RTCR Revised Total Coliform Rule
SAB Science Advisory Board
SBA Small Business Administration
SDWA Safe Drinking Water Act
SDWIS Safe Drinking Water Information System
SDWIS/FED Safe Drinking Water Information System Federal Version
SOP Standard Operating Procedure
Stage 1 DBPR Stage 1 Disinfectants and Disinfection Byproducts Rule
Stage 2 DBPR Stage 2 Disinfectants and Disinfection Byproducts Rule
SW Surface Water
SWTR Surface Water Treatment Rule
TC Total Coliforms
TCR Total Coliform Rule
TCRDSAC Total Coliform Rule/Distribution System Advisory Committee
TNCWS Transient Non-Community Water System
T&C Technology and Cost
US United States
UV Ultraviolet Radiation
WRF Water Research Foundation

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II. Background

A. Statutory Authority

The Safe Drinking Water Act (SDWA) requires the EPA to review and revise, as appropriate, each existing national primary drinking water regulation (NPDWR) at least once every six years (SDWA section 1412(b)(9), 42 U.S.C. 300g–1(b)(9)). In 2003, EPA completed its review of the Total Coliform Rule (TCR) and 68 NPDWRs for chemicals that were promulgated prior to 1997 (USEPA 2003, 68 FR 42908, July 18, 2003). The purpose of the review was to identify new health risk assessments, changes in technology, and other factors that would provide a health-related or technological basis to support a regulatory revision that would maintain or improve public health protection. In the Six-Year Review 1 determination published in July 2003 (USEPA 2003, 68 FR 42908, July 18, 2003), EPA stated its intent to revise the 1989 TCR (also referred to as the "current TCR").

B. Total Coliform Rule Distribution System Advisory Committee (TCRDSAC)

In June 2007, EPA established the Total Coliform Rule/Distribution System Advisory Committee ("TCRDSAC" or "the advisory committee") in accordance with the provisions of the Federal Advisory Committee Act, 5 U.S.C. App.2, 9 (c), to provide recommendations to EPA on revisions to the 1989 TCR and on what information about distribution system issues is needed to better understand and address possible public health impacts from potential degradation of drinking water distribution systems (USEPA 2007a, 72 FR 35869, June 29, 2007). The decision to include a review of distribution system issues was made, in part, to address recommendations made by the Stage 2 Microbial and Disinfection Byproducts Federal Advisory Committee in December 2000 (USEPA 2000b, 65 FR 83015, December 29, 2000). The TCRDSAC used available information to analyze options for revisions to the TCR. The TCRDSAC also considered research and information needed to better understand and address public health risks from contamination of distribution systems.

The advisory committee consisted of representatives of EPA, State and local public health and regulatory agencies, consumer organizations, environmental organizations, local elected officials, Indian Tribes, and drinking water suppliers. A technical workgroup was also formed to provide the advisory committee with necessary technical support and analysis to facilitate the committee's discussions. The advisory committee met on 13 occasions between July 2007 and September 2008. All advisory committee members agreed to and signed the final Agreement in Principle (AIP) in September 2008. All of the recommendations of the advisory committee are found in the signed AIP. Pursuant to the AIP, EPA agreed to propose revisions to the TCR that, to the maximum extent consistent with EPA's legal obligations, have the same substance and effect as the elements of the AIP. Each party represented on the advisory committee agreed in the AIP not to take any action to inhibit the adoption and implementation of final rule(s) to the extent it and the corresponding preamble have the same substance and effect as the elements of the AIP. EPA also agreed in the AIP to develop a Research and Information Collection Partnership (RICP) to "inform and support the drinking water community in developing future national risk management decisions pertaining to drinking water distribution systems" by providing "a formal process for systematic planning, implementation, analysis, and communication of distribution system research and information collection" (USEPA 2008c). A discussion of the RICP can be found in section V of this preamble. The AIP and details about the advisory committee can be found at EPA's Web site at: *http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html.*

In addition to the outreach mentioned above, EPA agreed to engage in various future stakeholder meetings at least annually, to which all advisory committee members and the public at large would be invited. In April 2009, EPA held its first annual stakeholder meeting to provide draft proposed regulation updates and an opportunity for stakeholders to provide feedback on the development of the proposed RTCR.

C. Other Outreach Processes

In addition to consulting with the advisory committee, EPA engaged in several other activities as part of the Agency's outreach to stakeholders in developing the proposed RTCR. EPA held a technical workshop in Washington, DC, from January 30 to February 1, 2007, to discuss available information on the current TCR and available information regarding risks in distribution systems in support of revisions to the TCR. Other EPA outreach activities, namely the National Drinking Water Advisory Council consultation, Science Advisory Board consultation, and the Tribal consultation, are discussed in section VII of this preamble.

D. Public Health Concerns Addressed by the Proposed Revised Total Coliform Rule

1. Public Health Concerns, Fecal Contamination, and Waterborne Pathogens

The proposed RTCR aims to increase public health protection through the reduction of potential pathways of entry for fecal contamination into the distribution system. Since these potential pathways represent vulnerabilities in the distribution system whereby fecal contamination and/or waterborne pathogens, including bacteria, viruses and parasitic protozoa could possibly enter the system, the reduction of these pathways in general should lead to reduced exposure and associated risk from these contaminants. Fecal contamination and waterborne pathogens can cause a variety of illnesses, including acute gastrointestinal illness (AGI) with diarrhea, abdominal discomfort, nausea, vomiting, and other symptoms. Most AGI cases are of short duration and result in mild illness. Other more severe illnesses caused by waterborne pathogens include hemolytic uremic syndrome (HUS) (kidney failure), hepatitis, and bloody diarrhea (WHO 2004). Chronic disease such as irritable bowel syndrome, reduced kidney function, hypertension and reactive arthritis can result from infection by a waterborne agent (Clark *et al.* 2008).

When humans are exposed to and infected by waterborne enteric pathogens, the pathogens become capable of reproducing in the gastrointestinal tract. As a result, healthy humans shed pathogens in their feces for a period ranging from days to weeks. This shedding of pathogens often occurs in the absence of any signs of clinical illness. Regardless of whether a pathogen causes clinical illness in the

person who sheds it in his or her feces, the pathogen being shed may infect other people directly by person-to-person spread, contact with contaminated surfaces, and other means which are referred to as secondary spread. As a result, waterborne pathogens that are initially waterborne may subsequently infect other people through a variety of routes (WHO 2004). Sensitive subpopulations are at greater risk from waterborne disease than the general population (Gerba *et al.* 1996). For a discussion of sensitive subpopulations, see section VII.L of this preamble.

2. Indicators

Total coliforms are a group of closely related bacteria that, with a few exceptions, are not harmful to humans. Coliforms are abundant in the feces of warm-blooded animals, but can also be found in aquatic environments, in soil, and on vegetation. Coliform bacteria may be transported to surface water by run-off or to ground water by infiltration. Total coliforms are common in ambient water and may be injured by environmental stresses such as lack of nutrients, and water treatments such as chlorine disinfection, in a manner similar to most bacterial pathogens and many viral enteric pathogens (including fecal pathogens). EPA considers total coliforms to be a useful indicator that a potential pathway exists through which fecal contamination can enter the distribution system. The absence (versus the presence) of total coliforms in the distribution system indicates a reduced likelihood that fecal contamination and/or waterborne pathogens are occurring in the distribution system.

Under the current TCR, each total coliform-positive sample is assayed for either fecal coliforms or *E. coli.* Fecal coliform bacteria are a subgroup of total coliforms that traditionally have been associated with fecal contamination. Since the promulgation of the TCR, more information and understanding of the suitability of fecal coliform and *E. coli* as indicators have become available. Study has shown that the fecal coliform assay is imprecise and too often captures bacteria that do not originate in the human or mammal gut (Edberg *et al.* 2000). On the other hand, *E. coli* is a more restricted group of coliform bacteria that almost always originate in the human or animal gut (Edberg *et al.* 2000). Thus, *E. coli* is a better indicator of fecal contamination than fecal coliforms.

3. Occurrence of Fecal Contamination and Waterborne Pathogens

a. *Presence of fecal contamination.* Fecal contamination is a very general term that includes all of the organisms found in feces, both pathogenic and nonpathogenic. Fecal contamination can occur in drinking water both through use of contaminated source water as well as direct intrusion of fecal contamination into the drinking water distribution system. Lieberman *et al.* (1994) discuss the general association between fecal contamination and waterborne pathogens. Biofilms in distribution systems may harbor waterborne bacterial pathogens and accumulate enteric viruses and parasitic protozoa (Skraber *et al.* 2005; Helmi *et al.* 2008). Waterborne pathogens in biofilms may have entered the distribution system as fecal contamination from humans or animals.

Co-occurrence of indicators and waterborne pathogens is difficult to measure. The analytical methods approved by EPA to assay for *E. coli* are able to detect indicators of fecal contamination. They do not specifically identify most of the pathogenic *E. coli* strains. There are at least 700 recognized *E. coli* strains (Kaper *et al.* 2004). About 10 percent of recognized *E. coli* strains are pathogenic to humans (Feng 1995; Hussein 2007; Kaper *et al.* 2004). Pathogenic *E. coli* include *E. coli* O157:H7, which is the primary cause of hemolytic uremic syndrome (HUS) in the United States (Rangel *et al.* 2005). The U.S. Centers for Disease Control and Prevention (CDC) estimates that there are 73,000 cases of illness each year in the U.S. due to *E. coli* O157:H7 (Mead *et al.* 1999). The CDC estimates that about 15 percent of all reported *E. coli* O157:H7 cases are due to water contamination (Rangel *et al.* 2005). Active surveillance by CDC shows that 6.3 percent of *E. coli* O157:H7 cases progress to HUS (Griffin and Tauxe 1991; Gould *et al.* 2009) and about 12 percent of HUS cases result in death within four years (Garg *et al.* 2003). About 4 to 15 percent of cases are transmitted within households by secondary transmission (Parry and Salmon 1998).

Because EPA-approved standard methods for *E. coli* do not typically identify the presence of the pathogenic *E. coli* strains, an *E. coli*-positive monitoring result is an indicator of fecal contamination but is not necessarily a measure of waterborne pathogen occurrence. Specialized assays and methods are used to identify waterborne pathogens, including pathogenic *E. coli.*

One notable exception is the data reported by Cooley *et al.* (2007), which showed high concentrations of pathogenic *E. coli* strains in samples containing high concentrations of fecal indicator *E. coli.* These data are from streams and other poor quality surface waters surrounding California spinach fields associated with the 2006 *E. coli* O157:H7 foodborne outbreak. Data equivalent to these samples are not available from drinking water samples collected under the TCR.

Because *E. coli* is an indicator of fecal contamination (Edberg *et al.* 2000), and because of the general association between fecal contamination and waterborne pathogens (Lieberman *et al.* 1994; Lieberman *et al.* 2002), *E. coli* is a meaningful indicator for fecal contamination and the potential presence of associated pathogen occurrence.

b. *Waterborne disease outbreaks.* The CDC defines a waterborne disease outbreak as occurring when at least two persons (or one with amoebic meningoencephalitis) experience a similar illness after ingesting a specific drinking water (or after exposure to recreational water) contaminated with pathogens (or chemicals) (Kramer *et al.* 1996). The CDC maintains a database on waterborne disease outbreaks in the United States. The database is based upon responses to a voluntary and confidential survey form that is completed by State and local public health officials.

The National Research Council strongly suggests that the number of identified and reported outbreaks in the CDC database for surface and ground waters represents only a small percentage of actual number of waterborne disease outbreaks (NRC 1997; Bennett *et al.* 1987; Hopkins *et. al.* 1985 for Colorado data). Under-reporting occurs because most waterborne outbreaks in community water systems are not recognized until a sizable proportion of the population is ill (Perz *et al.* 1998; Craun 1996), perhaps 1 percent to 2 percent of the population (Craun 1996).

EPA drinking water regulations are designed to protect against endemic waterborne disease and to minimize waterborne outbreaks. In contrast to epidemic, endemic refers to the persistent low to moderate level or the usual ongoing occurrence of illness in a given population or geographic area (Craun *et al.* 2006).

III. Proposed Revised Total Coliform Rule

The proposed RTCR maintains and strengthens the objectives of the current

TCR and is consistent with the recommendations in the AIP. The objectives are: (1) To evaluate the effectiveness of treatment, (2) to determine the integrity of the distribution system, and (3) to signal the possible presence of fecal contamination. The proposed revision better addresses these objectives by requiring systems that may be vulnerable to fecal contamination (as indicated by their monitoring results) to do an assessment, to identify whether any sanitary defect(s) is (are) present, and to correct the defects. Therefore, the Agency anticipates greater public health protection under the proposed RTCR compared to the current TCR because of its more preventive approach to identifying and fixing problems that affect or may affect public health.

The following is an overview of the key provisions of the proposed RTCR:

• *MCLG and MCL for E. coli and coliform treatment technique for protection against potential fecal contamination.* The proposed RTCR establishes a maximum contaminant level goal (MCLG) and maximum contaminant level (MCL) for *E. coli.* It takes a preventive approach to protecting public health by establishing a coliform treatment technique for protection against potential fecal contamination. The treatment technique uses both total coliforms and *E. coli* monitoring results to start an evaluation process that, where necessary, will require the PWS to conduct follow-up corrective action that could prevent future incidences of contamination and exposure to fecal contamination and/or waterborne pathogens. See section III.A.2 of this preamble for a detailed discussion on the MCLG, MCL, and treatment technique requirements.

• *Monitoring.* As with the current TCR, PWSs will continue to monitor for total coliforms and *E. coli* according to a sample siting plan and schedule specific to the system.

Sample siting plans under the proposed RTCR must continue to be representative of the water throughout the distribution system. Under the proposed RTCR, systems have the flexibility to propose repeat sample locations that best verify and determine the extent of potential contamination of the distribution system rather than having to sample within five connections upstream and downstream of the total coliform-positive sample location. In lieu of proposing new repeat sample locations, the systems may stay with the default used under the current TCR of five connections upstream and downstream of the total coliform-positive sample location.

As with the current TCR, the proposed RTCR allows reduced monitoring for some small ground water systems. The proposed RTCR is expected to improve public health protection compared to the current TCR by requiring small ground water systems that are on or wish to conduct reduced monitoring to meet certain eligibility criteria. Examples of the criteria include a sanitary survey showing that the system is free of sanitary defects, a clean TCR compliance history for 12 months, and a recurring annual site visit by the State and/or a voluntary Level 2 assessment for systems on annual monitoring.

For small ground water systems, the proposed RTCR requires increased monitoring for high-risk systems that meet certain criteria such as unacceptable compliance history under the RTCR. The proposed RTCR specifies conditions under which systems will no longer be eligible for reduced monitoring and be required to return to routine monitoring or to monitor at an increased frequency.

The proposed RTCR requires systems on a quarterly or annual monitoring frequency (applicable only to ground water systems serving 1,000 or fewer people) to conduct additional routine monitoring the month following one or more total coliform-positive samples. Under the proposed RTCR, systems must collect at least three routine samples during the next month, unless the State waives the additional routine monitoring. This is a reduction in the required number of additional routine samples from the current TCR, which requires at least five routine samples in the month following a total coliform-positive sample for all systems serving 4,100 or fewer people.

The current TCR requires all systems serving 1,000 or fewer people to collect at least four repeat samples while PWSs serving 1,000 people or greater to collect three repeat samples. The proposed rule requires three repeat samples after a routine total coliform-positive sample, regardless of the system type and size.

See sections III.A.3 and III.A.4 of this preamble for detailed discussions of the routine monitoring and repeat sampling requirements of the proposed RTCR.

• *Seasonal systems.* The proposed RTCR establishes monitoring requirements for seasonal systems for the first time. Seasonal systems represent a special case in that the shutdown and start-up of these water systems present additional opportunities for contamination to enter or spread through the distribution system. Seasonal systems must demonstrate completion of a State-approved start-up procedure. In addition, they must designate the time period(s) for monitoring based on site-specific considerations (such as during periods of highest demand or highest vulnerability to contamination) in their State-approved sample siting plan. See section III.A.3 of this preamble for a detailed discussion of seasonal systems.

• *Assessment and corrective action.* As part of a treatment technique, all PWSs are required to assess their systems when monitoring results show that the system may be vulnerable to contamination. Systems must conduct a simple self-assessment (Level 1) or a more detailed assessment (Level 2) depending on the severity and frequency of contamination. The system is responsible for correcting any sanitary defect(s) found through either a Level 1 or Level 2 assessment. *See* section III.A.5 of this preamble for more discussion of the treatment technique requirement of the proposed RTCR.

• *Violations and public notification.* The proposed RTCR establishes an *E. coli* MCL violation, a treatment technique violation, a monitoring violation, and a reporting violation. Public notification is required for each type of violation, with the type of notification dependent on the degree of potential public health concern. This is consistent with EPA's current public notification requirements under 40 CFR part 141 subpart Q. The proposed RTCR also modifies the public notification and Consumer Confidence Report language to reflect the construct of the proposed rule. *See* sections III.A.6 and III.A.7 of this preamble for detailed discussions of violations and public notification under the proposed RTCR.

• *Transition to the RTCR.* The proposed RTCR allows all systems to transition to the new rule at their current TCR monitoring frequency, including systems on reduced monitoring under the current TCR. States will then evaluate the monitoring frequency during each sanitary survey conducted after the compliance effective date of the RTCR. This process reduces State burden by not requiring the State to determine appropriate monitoring frequency at the same time as when the State is trying to adopt primacy, develop policies, and train their own staff and the PWSs in the State.

The provisions of the proposed RTCR are contained in the new 40 CFR part 141 subpart Y, superseding 40 CFR 141.21 beginning three years following the publication of the final revised rule.

A. Proposed Rule Provisions and Rationale

1. Terms used in the proposed RTCR

a. *Provisions.* i. Clean compliance history. For the purposes of the proposed RTCR, EPA is proposing to define "clean compliance history" as a record of no maximum contaminant level (MCL) violations under 40 CFR 141.63; no monitoring violations under 40 CFR 141.21 or subpart Y; and no coliform treatment technique trigger exceedances or coliform treatment technique violations under subpart Y.

ii. Sanitary defect. EPA is proposing to define "sanitary defect" as a "defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure in a barrier that is already in place" (USEPA 2008c).

iii. Seasonal systems. EPA is proposing to define a seasonal system as a non-community water system that is operated in three or fewer calendar quarters per calendar year.

b. *EPA's rationale.* i. Clean compliance history. EPA is proposing a definition of "clean compliance history" because without a definition, the use of the phrase could result in multiple interpretations. Clean compliance history is one of the criteria a system must meet to be eligible for reduced monitoring. The advisory committee recommended this definition (USEPA 2008c, AIP p. 10).

ii. Sanitary defect. The advisory committee recommended the definition of sanitary defect. The proposed RTCR takes a more preventive approach to protect public health by establishing a framework for the assessment of public water systems to identify sanitary defects and to correct them as appropriate. The first part of the proposed definition of a "sanitary defect" focuses on problems in the distribution system that may provide a pathway for contaminants to enter the distribution system and its implication for potential exposure to both microbial and chemical contaminants. The second part of the definition also recognizes the importance of having barriers in place to prevent the entry of microbial contaminants into the distribution system. Indications of failure or imminent failure of these barriers are defects that require corrective action.

Sanitary defect is a term specific to the proposed RTCR assessment and corrective action provisions. Sanitary defects are not intended to be linked directly to "significant deficiencies" under the Interim Enhanced Surface Water Treatment Rule (IESWTR) (USEPA 1998b, 63 FR 69389, December 16, 1998) and Ground Water Rule (GWR) (USEPA 2006c, 71 FR 65574, November 8, 2006), although some problems could meet either definition. Nothing in this proposed rule is intended to limit the existing authorities of States under other regulations.

The following is a list of examples of sanitary defects and defects in the distribution system coliform monitoring practices (USEPA 2008c, AIP Appendix Y, p. 41).

Examples of sanitary defects:

- Cross connection and backflow issues such as a required backflow prevention device not in place or not operating properly; or an unprotected cross connection found.
- Operator issues such as failure to follow standard operating procedures (SOPs) that protect distribution system integrity and sanitary conditions.
- Distribution system issues such as inadequate inspection and maintenance of the distribution system; loss of distribution system integrity such as main breaks; failure to maintain adequate pressure; improper flushing operations; improper construction of new, replaced, or renovated lines; inadequate disinfection during and after repair/replacement activities; or inability to maintain required residual throughout the distribution system.
- Storage issues such as overflow, vents, hatches, and other penetrations not properly configured, screened, or sealed; inadequate maintenance of storage facilities; or inadequate disinfection during and after repair/replacement activities.
- Disinfection issues such as inability to maintain required residual throughout the distribution system.

iii. Seasonal systems. Seasonal systems fall under the broader category of non-community water systems (NCWS) and therefore are subject to provisions applicable to that category of systems. However, seasonal systems have unique characteristics and timetables that make them particularly susceptible to contamination. Seasonal systems represent a special case in that the shut down and start-up of the water system present opportunities for contamination to enter or spread through the distribution system. For example, loss of pressure after a system's shut down can lead to intrusion of contaminants. Microbial growth prior to start-up can result in biofilm formation, which can lead to the accumulation of contaminants. These systems are also more susceptible to contamination due to changes in the conditions of the source water (such as variable contaminant loading due to increased septic tank or septic field use), the seasonal nature of the demand, and the stress that the system experiences. As a result, the Agency is establishing a definition for seasonal systems and setting forth provisions that mitigate the risk associated with the unique characteristics of this type of system. The advisory committee recommended that such provisions pertain to seasonal systems. See section III.A.3 of this preamble for specific provisions that seasonal systems must meet.

c. *Request for comment.* EPA requests comment on the proposed definitions and whether they work within the construct of the proposed RTCR. Specifically, EPA requests comment on the proposed definition of seasonal systems. The advisory committee recommended that seasonal systems be identified and be subject to additional regulatory requirements because the shutdown and startup of the system presents opportunities for contaminants to enter or spread through the distribution system. These results are possible in any system that shuts down and does not maintain adequate pressure throughout the distribution system. The AIP describes a seasonal system as "one which operates less than four calendar quarters per year" (USEPA 2008c). EPA has interpreted this to mean that a seasonal system is one which is shut down for at least one full calendar quarter (*i.e.,* it operates in three or fewer calendar quarters). EPA requests comment on whether this proposed definition of "seasonal system" is adequate to address the concern that motivated the advisory committee's recommendation and is consistent with its intent. For example, a system that operated from March to October would operate in all four calendar quarters and would not be considered a seasonal system, but would be subject to the same possibility of distribution system intrusion as a seasonal system that operated April to November (*i.e.,* in only three calendar quarters). Should EPA modify the definition to address this issue? If so, how should the definition be modified? Should systems that close for some specified period (*e.g.,* 30 days, 60 days, 90 days) be subject to seasonal system requirements? What should that specified period be?

Systems that operate intermittently (*e.g.,* only on weekends or only when a camp is open) may also be subject to distribution system contamination due to lack of adequate pressure. Should this be addressed? If so, how should it be addressed—through regulation, guidance, or some other approach? Is

there a specific shutdown time that should be considered for intermittent systems in developing the approach and determining which systems should be included?

In addition to the public health benefits associated with these requirements, EPA is aware of the burden that States will have in determining which systems must comply and in tracking compliance. Therefore, EPA requests comment on ways to reduce State burden and facilitate implementation of seasonal system provisions.

2. MCLG and MCL for *E. coli,* and Coliform Treatment Technique

a. *Provisions.* The current TCR established a maximum contaminant level goal (MCLG) of zero for total coliforms (including fecal coliforms and *E. coli*) and an MCL for total coliforms. EPA is proposing in the RTCR to eliminate the MCLG for total coliforms (including fecal coliforms) and the MCL for total coliforms. Under the proposed RTCR, EPA establishes an MCLG of zero and an MCL for *E. coli* and a treatment technique for coliform. The proposed MCL for *E. coli* is based on the monitoring results for total coliforms and *E. coli.* A system is in compliance with the *E. coli* MCL unless any of the following conditions occur:

- A system has an *E. coli* positive repeat sample following a total coliform-positive routine sample; or
- A routine sample is *E. coli*-positive and one of its associated repeat samples is total coliform-positive; or
- A system fails to test for *E. coli* when any repeat sample tests positive for total coliforms; or
- A system fails to take all required repeat samples following a routine sample that is positive for *E. coli.*

The proposed MCL is similar to the criteria that define the conditions (if exceeded) when a Tier 1 acute MCL violation occurs under the current TCR but with two modifications. First, the proposed MCL excludes fecal coliforms. Second, the proposed MCL also includes an additional condition by which a system violates the MCL, namely failing to collect all repeat samples following an initial *E. coli*-positive sample. Although not explicitly stated, as a logical consequence of the second condition, a system also violates the MCL when an *E. coli*-positive routine sample is followed by an *E. coli*-positive repeat sample because *E. coli* are a subset of total coliforms. EPA is also proposing a coliform treatment technique, which uses total coliforms and *E. coli* as indicators of a possible breach in the distribution system that could lead to fecal contamination.

b. *EPA's rationale.* i. Inclusion of MCLG for *E. coli* and removal of MCLG for total coliforms (including fecal coliforms). EPA is proposing in the RTCR to include an MCLG of zero for *E. coli* and to remove the current MCLG of zero for total coliforms (including fecal coliforms). This is because *E. coli* is a more specific indicator of fecal contamination and potential harmful pathogens in drinking water than are total coliforms (including fecal coliforms). Many of the organisms detected by total coliform and fecal coliform methods are not of fecal origin and do not have any direct public health implication. *See* also the discussion of fecal coliforms in section III.A.9 of this preamble. New information has become available since promulgation of the current TCR in 1989 that indicates that measurement of fecal coliforms sometimes detects organisms that may not have any connection to fecal contamination (Edberg *et al.* 2000). An MCLG of zero for *E. coli* is more appropriate than an MCLG of zero for total coliforms (including fecal coliforms) since *E. coli* is a more specific indicator of the presence of fecal contamination.

Total coliforms (including fecal coliforms) do not in and of themselves pose a public health risk, but they may indicate the presence of a pathway by which fecal contamination can occur. Therefore, the removal of the MCLG for total coliforms (including fecal coliforms) would prevent possible public confusion as a result of attributing greater public health significance to the presence of total coliforms than is warranted. EPA believes that the removal of the MCLG for total coliforms, along with the other proposed changes discussed in the succeeding paragraphs, leads to a rule that is more protective of public health, and is less confusing to the public. The proposed MCLG of zero for *E. coli* and the removal of the MCLG for total coliforms (including fecal coliforms) are also consistent with the recommendation made by the advisory committee in the AIP.

ii. Inclusion of MCL for *E. coli* and removal of MCLs for total coliforms and fecal coliforms. EPA is proposing to include in the RTCR an MCL for *E. coli* because approved analytical methods continue to be available to measure the presence of *E. coli* in water samples, *i.e.,* the presence of *E. coli* is technologically feasible to ascertain. Violation of the proposed MCL for *E. coli* signifies fecal contamination occurrence and a possible high risk of exposure to pathogens. EPA is proposing to eliminate the MCLs for total coliforms and fecal coliforms because under the proposal there is no longer an MCLG for either total coliforms or fecal coliforms, for the reasons explained earlier. The proposed MCL for *E. coli* is consistent with the recommendation made by the advisory committee in the AIP.

iii. Coliform treatment technique. The 1996 SDWA amendments authorize EPA to promulgate a treatment technique in lieu of an MCL if EPA determines that "it is not economically or technologically feasible to ascertain the level of the contaminant" (SDWA 1412(b)(7)(A)). While it is technologically feasible to ascertain levels of *E. coli* (*i.e.,* analytical methods continue to be available to measure the presence of *E. coli* in water samples), because of the intermittent nature of fecal contamination, it is not economically feasible to ascertain the level of *E. coli* occurrence below which the water may be deemed safe. This is because it is not economically feasible to monitor *E. coli* with sufficient frequency to ensure such safety.

Because total coliform bacteria are part of the soil ecosystem, positive samples are indicators of fecal contaminant entry into drinking water via a pathway from the soil. EPA is proposing a coliform treatment technique, supplemental to directly measuring *E. coli,* to provide additional protection against fecal contamination. Under the proposed coliform treatment technique, as specified in the AIP, total coliform-positive samples, in the absence of *E. coli,* are still indicators of an *E. coli* or other fecal contaminant pathway.

A PWS that exceeds a specified frequency of total coliform occurrence must conduct a Level 1 or Level 2 assessment to determine if any sanitary defect(s) exist(s) and, if found, to correct the defect(s). In addition, under the proposed treatment technique requirements, a PWS that incurs an *E. coli* MCL violation must conduct a Level 2 assessment and take remedial action if any sanitary defects are found. *See* section III.A.5 of this preamble for a full discussion of conditions that trigger and define Level 1 and Level 2 assessments.

The treatment technique requirements as proposed enhance public health protection beyond the *E. coli* MCL for the following reasons:

- The assessment and corrective action provisions of the treatment technique when the MCL for *E. coli* is exceeded require PWSs to investigate the potential causes of the fecal contamination and require timely remedial action if any sanitary defects

are found. Under the current TCR, there are no requirements for investigation and corrective action after an MCL exceedance. Without such a find-and-fix provision, the pathway for contamination may not be identified and eliminated as sampling alone may not be adequate to identify intermittent sources of fecal contamination. The assessment and corrective action provisions of the proposed rule increase the likelihood of finding and correcting any sanitary defect and reduce the chance of recurrence of fecal contamination in the future.

• Using total coliforms in addition to *E. coli* as an indicator to prompt assessment and corrective action increases the sensitivity for identifying potential pathways for contamination. As discussed in section II.D.2 of this preamble, the presence of total coliforms indicates the potential existence of a pathway through which fecal contamination could follow. The absence (versus the presence) of total coliforms in the distribution system indicates a reduced likelihood that fecal contamination and/or waterborne pathogens are occurring in the distribution system. Analyses from EPA's 2005 Six-Year Review 2 data (USEPA 2006b; USEPA 2010e) (*see* section VI.B of this preamble for details on the Six-Year Review 2 data) and from the proposed RTCR Economic Analysis (EA) occurrence modeling show that total coliform presence in drinking water is approximately 20 to 40 times higher than *E. coli* occurrence in drinking water (*see* chapter 4 of the Proposed RTCR EA (USEPA 2010a)). Similarly, under the current TCR, non-acute MCL (also referred to as monthly MCL) violations (informed by total coliform occurrence) occur roughly 10 times more often than acute MCL violations (informed by total coliform and *E. coli* occurrence, essentially equivalent to the occurrence that triggers an *E. coli* MCL violation under this proposed rule). Thus, including monitoring of total coliforms, as well as *E. coli,* as part of a treatment technique to indicate when systems must find and fix any sanitary defects, substantially increases the likelihood of identifying such defects.

• The proposed treatment technique was supported by the advisory committee and is consistent with the recommendations in the AIP. *See* AIP, pages 6–7.

c. *Request for comment.* EPA requests comment on its proposal to eliminate the MCLG and MCL provisions for total coliforms and fecal coliforms and to include an MCLG and MCL for *E. coli* and coliform treatment technique provisions based on monitoring for total coliforms and *E. coli.* EPA also requests comment on its proposed definition of the *E. coli* MCL.

3. Monitoring

a. *Provisions.* As with the current TCR, the proposed RTCR requires all PWSs to collect and test samples for total coliforms and *E. coli* according to a sample siting plan and schedule specific to the system. Under the proposed RTCR, all PWSs are still required to take repeat samples within 24 hours of learning of any routine monitoring sample that is total coliform-positive. PWSs must comply with the repeat monitoring requirements and *E. coli* analytical requirement, discussed in detail in section III.A.4 of this preamble. All samples taken for proposed RTCR compliance (routine and repeat) may occur at a customer's premises, dedicated sampling station, or other designated compliance sampling location.

Under the proposed RTCR, system sample siting plans must include routine and repeat sample sites and any sampling points necessary to meet the Ground Water Rule (GWR) requirements. The sample siting plan is subject to State review and revision. The PWS may propose repeat monitoring locations that are expected to be representative of a pathway for contamination into the distribution system (for example, near a storage tank). Instead of identifying set repeat sampling locations (*i.e.,* within five service connections upstream and downstream of the original sampling location that tested total coliform-positive), systems may elect to specify criteria for selecting their repeat sampling locations on a situational basis in a standard operating procedure (SOP), which is part of the sample siting plan. Upon State review, the PWS must demonstrate to the State's satisfaction that the sample siting plan remains representative of the water quality in the distribution system. The State may modify the SOP as needed. To address access issues, small systems must specify in their sampling plans where the two additional samples will be taken. The State may determine that monitoring at the entry point to the distribution system (especially for undisinfected ground water systems) is effective to differentiate between potential source water and distribution problems.

Under the proposed RTCR, PWSs may take more than the minimum required number of routine samples and include the results in calculating whether the total coliform treatment technique trigger for conducting an assessment has been exceeded only if the samples are taken in accordance with the sample siting plan and are representative of water throughout the distribution system (*see* sections III.A.3 and III.A.5 of this preamble).

EPA is not proposing to make substantive changes to the current TCR requirements for (1) special purpose samples, and (2) invalidation of total coliform samples. EPA is proposing a minor modification to the provision for special purpose samples by changing "total coliform MCL" to "coliform treatment technique trigger."

The following are the proposed monitoring requirements for different categories of systems.

i. Ground water NCWSs serving ≤ 1,000 people. *(a). Routine monitoring.* The proposed RTCR requires ground water NCWS serving 1,000 or fewer people to routinely monitor each quarter for total coliforms and *E. coli.* Seasonal systems under this category must routinely monitor every month (seasonal systems are discussed later in this section).

(b). *Transition to the RTCR.* The proposed RTCR requires all ground water NCWSs serving 1,000 or fewer people, including seasonal systems, to continue with their TCR monitoring schedules as of the compliance date of the RTCR, unless or until any of the conditions for increased monitoring discussed later on in this section are triggered on or after the compliance date or unless otherwise directed by the State, including through the special monitoring evaluation conducted under a sanitary survey. In addition, systems on annual monitoring, including seasonal systems, must have an initial annual site visit by the State within one year of the compliance date (or an annual voluntary Level 2 assessment by a party approved by the State) and an annual site visit each year thereafter to remain on annual monitoring.

This rule proposes that after the compliance date of the final RTCR, during each sanitary survey the State (which would be either EPA or a State that has received primacy for this rule) must perform a special monitoring evaluation to review the status of the water system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule and modify the monitoring schedule as necessary. States must evaluate system factors such as the pertinent water quality and compliance history, the establishment and maintenance of contamination barriers, and other appropriate protections and validate the appropriateness of the

water system's existing monitoring schedule and modify as necessary. For seasonal systems on quarterly or annual monitoring, this evaluation must also include review of the approved sample siting plan which designates the time period(s) for monitoring based on site-specific considerations (such as during periods of highest demand or highest vulnerability to contamination). The system must collect compliance samples during these time periods.

(c). *Reduced monitoring.* The State has the discretion to reduce the monitoring frequency for well-operated ground water NCWSs from the quarterly routine monitoring to no less than annual monitoring, if the water system can demonstrate that it meets the criteria for reduced monitoring provided in this section.

To be eligible to qualify for and remain on annual monitoring after the compliance date, a ground water NCWS serving 1,000 or fewer people must meet all of the following criteria:

- The most recent sanitary survey shows the system is free of sanitary defects, has a protected water source and meets approved construction standards;
- The system must have a clean compliance history (no MCL violations or monitoring violations under the current TCR and/or proposed RTCR, no Level 1 or Level 2 trigger exceedances or treatment technique violations under the proposed RTCR) for a minimum of 12 months. (For a more detailed discussion on Level 1 and Level 2 triggers, *see* section III.A.5 of this preamble); and
- An initial site visit by the State within the last 12 months to qualify for reduced annual monitoring, and recurring annually to stay on reduced annual monitoring; and correction of all identified sanitary defects. A voluntary Level 2 assessment by a party approved by the State may be substituted for the State annual site visit in any given year.

(d). *Increased monitoring.* Ground water NCWS serving 1,000 or fewer people on quarterly or annual monitoring that experience any of the following events must begin monthly monitoring the month following the event:

- The system triggers a Level 2 assessment or two Level 1 assessments in a rolling 12 month period;
- The system has an *E. coli* MCL violation;
- The system has a coliform treatment technique violation (for example, if the system fails to conduct a Level 1 assessment or correct for sanitary defects if required to do so); or
- The system on quarterly monitoring has two monitoring violations in a rolling 12-month period or system on annual monitoring has one monitoring violation.

The system must continue monthly monitoring until the requirements in this section for returning to quarterly or annual monitoring are met.

(e). *Requirements for returning to quarterly monitoring.* To be eligible to return to quarterly monitoring, ground water NCWSs serving 1,000 or fewer people must meet all of the following criteria:

- Within the last 12 months, the system must have a completed sanitary survey or a site visit by the State or a voluntary Level 2 assessment by a party approved by the State. The system is free of sanitary defects, and has a protected water source; and
- The system has a clean compliance history (no *E. coli* MCL violations, Level 1 or 2 triggers, coliform treatment technique violations or monitoring violations) for a minimum of 12 months.

(f). *Requirements for returning to reduced annual monitoring.* To be eligible to return to reduced annual monitoring after being placed on increased monitoring, the system must meet the criteria to return to routine quarterly monitoring plus the following criteria:

- An annual site visit (recurring) by the State and correction of all identified sanitary defects. An annual voluntary Level 2 assessment may be substituted for the State annual site visit in any given year; and
- The system must have in place or adopt one or more additional enhancements to the water system barriers to contamination as approved by the State. These measures could include but are not limited to the following:

—Cross connection control, as approved by the State;
—An operator certified by an appropriate State certification program, which may include regular visits by a circuit rider;
—Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State; and
—Maintenance of at least a 4-log inactivation or removal of viruses each day of the month based on daily monitoring as specified in the GWR (with allowance for a 4-hour exception).
—Other equivalent enhancements to water system barriers as approved by the State.

(g). *Seasonal systems.* The proposed rule requires all seasonal systems to demonstrate completion of a State-approved start-up procedure on and after the compliance date of the final RTCR. Seasonal systems may continue with their TCR monitoring frequency after the compliance date of the final RTCR unless or until any of the conditions for increased monitoring discussed previously are triggered on or after the compliance date or as directed by the State. Under the proposed RTCR, seasonal systems are required to take routine samples monthly.

To be eligible for reduced monitoring after the compliance date, seasonal systems must meet the following criteria:

- The system must have an approved sample siting plan that designates the time period for monitoring based on site-specific considerations (*e.g.,* during periods of highest demand or highest vulnerability to contamination). The system must collect compliance samples during this time period; and
- To be eligible for reduced quarterly monitoring, the system must also meet all the reduced monitoring criteria discussed in section III.A.3.a.i.(e) of this preamble, *Requirements for returning to quarterly monitoring.*
- To be eligible for reduced annual monitoring, the system must also meet all the reduced monitoring criteria discussed in section III.A.3.a.i.(f) of this preamble, *Requirements for returning to reduced annual monitoring.*

(h). *Additional routine monitoring.* All systems collecting samples on a quarterly or annual frequency must conduct additional routine monitoring following a single total coliform-positive sample (with or without a Level 1 trigger event). The additional routine monitoring consists of three samples in the month following the total coliform-positive sample at routine monitoring locations identified in the sample siting plan. This is a change from the current TCR additional routine monitoring requirement of taking a total of five samples the month following a total coliform-positive sample for systems that take four or fewer samples per month. In this proposal, consistent with the current TCR, the State may waive the additional routine monitoring requirement if:

- The State, or an agent approved by the State, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action

is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.

• The State has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

All additional routine samples are included in determining compliance with the MCL and coliform treatment technique requirements.

ii. Ground water CWSs serving ≤ 1,000 people. *(a). Routine monitoring.* The proposed RTCR requires ground water CWSs serving 1,000 or fewer people to routinely monitor each month for total coliforms and *E. coli.*

The State may reduce the monitoring frequency for ground water CWS from the monthly routine monitoring to quarterly reduced monitoring if the water system can demonstrate that it meets the criteria for reduced monitoring provided later in this section

(b). *Transition to the RTCR.* All ground water CWSs serving 1,000 or fewer people continue with their current TCR monitoring schedules unless or until any of the increased monitoring requirements in this section occur or as directed by the State.

After the compliance date of the final RTCR, the State must determine whether the system is on an appropriate monitoring schedule by performing a special monitoring evaluation during each sanitary survey to review the status of the PWS, including the distribution system. The State must evaluate system factors such as the pertinent water quality and compliance history, the establishment and maintenance of barriers to contamination, and other appropriate protections to validate the water system's existing monitoring schedule or require more frequent monitoring.

(c). *Reduced monitoring.* The State has the flexibility to reduce the monitoring frequency for well-operated ground water CWS from the monthly routine monitoring to no less than quarterly monitoring if the water system can demonstrate that it meets the criteria for reduced monitoring provided in this section.

To be eligible for quarterly reduced monitoring, ground water CWSs serving 1,000 or fewer people on monthly monitoring after the compliance date must be in compliance with State-certified operator provisions and meet each of the following criteria:

• The most recent sanitary survey shows the system is free of sanitary defects (or has an approved plan and schedule to correct them), has a protected water source, and meets approved construction standards;

• The system must have a clean compliance history (no MCL violations or monitoring violations under the current TCR and/or proposed RTCR, no Level 1 or Level 2 trigger exceedances or treatment technique violations under the proposed RTCR) for a minimum of 12 months; and

• The system must meet at least one of the following criteria:

—An annual site visit by the State or a voluntary Level 2 assessment by a party approved by the State or meeting criteria established by the State and correction of all identified sanitary defects (or an approved plan and schedule to correct them), or

—A cross connection control program, as approved by the State, or

—The system must maintain continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State, or

—The system must maintain at least a 4-log inactivation or removal of viruses each day of the month based on daily monitoring as specified in the GWR (with allowance for a 4-hour exception) (USEPA 2006c, 71 FR 65574, November 8, 2006); or

—Other equivalent enhancements to water systems as approved by the State.

(d). *Return to routine monitoring requirements.* When a system on quarterly monitoring experiences any of the following events the system must begin monthly monitoring:

• System triggers a Level 2 assessment or two Level 1 assessments in a rolling 12 month period;

• System has an *E. coli* MCL violation;

• System has a coliform treatment technique violation (*e.g.,* fails to conduct a Level 1 or Level 2 assessment or to correct for a sanitary defect if required to do so); or

• System has two routine monitoring violations in a rolling 12-month period.

The system must continue monthly monitoring until all the reduced monitoring requirements discussed previously in this section are met. A system that loses its certified operator must also return to monthly monitoring the month following the loss.

(e). *Additional routine monitoring.* All systems collecting samples on a quarterly frequency must conduct additional routine monitoring following a single total coliform-positive sample (with or without a Level 1 trigger event). The additional routine monitoring consists of three samples in the month following the total coliform-positive sample at routine monitoring locations identified in the sample siting plan. The current TCR additional routine monitoring requirements consist of taking a total of five samples the month following a total coliform-positive sample for systems that take four or fewer samples per month. In this proposal, consistent with the current TCR, the State may waive the additional routine monitoring requirement if:

• The State, or an agent approved by the State, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.

• The State has determined why the sample was total coliform-positive and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what

action the system has taken and/or will take to correct this problem.

The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

All additional routine samples are included in determining compliance with the MCL and the coliform treatment technique requirements.

iii. Subpart H systems of this part serving ≤ 1,000 people. The monitoring requirements for subpart H systems of this part (PWSs supplied by surface water source or ground water source under the direct influence of surface water (GWUDI)) serving 1,000 or fewer people remain the same as under the current rule (*see* § 141.856). These systems are not eligible for reduced monitoring. In addition, the proposed rule requires all seasonal systems, on and after the compliance date of the final RTCR, to demonstrate completion of a State-approved start-up procedure.

iv. PWSs serving > 1,000 people. The monitoring requirements for PWSs serving more than 1,000 people remain the same as under the current TCR (*see* § 141.857), with the exception of the applicable revisions to the repeat sampling locations provided in § 141.858 and additional routine monitoring provisions. Systems on monthly monitoring are not required to take additional routine samples the month following a total coliform-positive sample. These systems are not eligible for reduced monitoring. In addition, the proposed rule requires all seasonal systems, on and after the compliance date of the final RTCR, to demonstrate completion of a State-approved start-up procedure.

b. *EPA's rationale.* i. Sampling sites and monitoring plans. Consistent with current practice, the proposed RTCR requires systems to develop a sample siting plan that is representative of the water throughout the distribution system. EPA is proposing to maintain the provision from the current TCR that indicates that sample siting plans are subject to State review and revision. The advisory committee recommended that States review and revise sample siting plans consistent with current practice and that the State develops and implements a process to ensure the adequacy of sample siting plans including a periodic review. The advisory committee also recommended that specific elements be included in the sampling plans such as the routine and repeat sample sites and sampling locations necessary to meet the requirements of the GWR. Alternative repeat monitoring locations (*e.g.,* at storage tanks and entry points to the distribution system) are subject to State approval. The system must demonstrate to the State's satisfaction that these alternative monitoring locations are representative of the water quality in the distribution system.

By allowing systems to specify criteria for selecting their repeat sampling locations in their SOP instead of setting fixed repeat sampling locations, systems can provide a more flexible and more protective response. The system can focus the repeat samples at locations that will best verify and determine the extent of potential contamination of the distribution system based on specific situations. In addition, EPA is proposing to require State approval if a ground water system serving 1,000 or fewer people wants to use a single sample to meet both the repeat monitoring requirements of the RTCR and the source water monitoring requirements of the GWR (*see* section III.A.4 of this preamble for further discussion of this topic).

EPA is proposing to allow the use of dedicated sampling locations for the following reasons:

- To reduce potential contamination of the taps. Utilities will have more control to prevent contamination of the tap by preventing its use by unauthorized persons and allowing no routine use of the tap except for sampling;
- To facilitate access to sampling taps. Currently systems may be constrained by where they sample, *e.g.,* only at public buildings or in certain individual customer's houses.
- To improve sampling representation of the distribution system. Allowing dedicated sample taps in areas where systems have not been able to gain access will facilitate better sampling representation of the distribution system.

ii. Ground water PWSs serving ≤ 1,000 people. *(a). Routine monitoring.* The advisory committee recommended that ground water NCWSs serving 1,000 or fewer people remain under a routine quarterly monitoring as provided in the current TCR. They believed that in conjunction with the assessment and corrective action requirements, public health protection would be maintained or improved without increasing sampling costs over current TCR requirements. The advisory committee also recognized that current sampling costs are not insignificant for small systems, and wanted to recognize the good performance of systems by allowing them to be able to continue to qualify for reduced monitoring, but under the more specific and rigorous criteria described previously. To continue to provide adequate health protection, systems on reduced monitoring must adhere to criteria that ensure that barriers are in place and are effective. Furthermore, systems with problems that may indicate poor system integrity, maintenance, or operations, or systems that fail to monitor, are triggered into monthly monitoring. This approach leverages the limited resources of these small ground water NCWSs and of States, so that systems with minimal problems can minimize their costs and States can focus their resources on systems needing the greatest attention, such as systems with problems or vulnerabilities.

The advisory committee thought it best to continue with existing routine monthly monitoring requirements for ground water CWSs serving 1,000 or fewer people in order to maintain the current levels of effort to identify potential problems. Since sanitary surveys are required under the GWR and these surveys provide substantial diagnostic value and corrective action response for problems identified, specifying higher routine monitoring frequency for these systems was not deemed necessary. These systems may also qualify for reduced monitoring if they meet certain criteria.

(b). *Transition to the RTCR.* The advisory committee was concerned about the ability of the States and systems to adopt the new regulations and to make all the determinations that may be necessary to determine the appropriate monitoring frequency within three years of rule promulgation. Requiring significant changes in monitoring frequencies in a short period (*i.e.,* without a transition period) could overwhelm State resources. The advisory committee recommended phasing in the requirements and using the sanitary survey process to facilitate a successful transition and implementation. The advisory committee, therefore, recommended that these systems continue with their current monitoring frequency during a transition period and that the State review the monitoring frequency to determine whether it is appropriate during each sanitary survey (USEPA 2008c, AIP p.9). This gives the systems the opportunity to address operation

and maintenance issues to maintain existing monitoring frequency or qualify for reduced monitoring. Systems on reduced TCR monitoring stay on reduced monitoring during the transition period if they continue to meet the reduced monitoring criteria. During the special monitoring evaluation conducted as part of the periodic sanitary survey, the State will determine whether the individual systems are on the proper monitoring schedule.

(c) *Reduced monitoring.* The reduced monitoring requirements are intended to recognize that well-operated systems may be less vulnerable to contamination. Therefore, certain conditions are specified under which reduced monitoring could be allowed. These include a clean compliance history for a minimum of 12 months, and an annual visit from the State for systems taking one sample per year and correction of all identified sanitary defects. Ground water NCWSs serving 1,000 or fewer people, with a routine quarterly monitoring frequency, could qualify for reduced annual monitoring, while ground water CWSs serving 1,000 or fewer people, with a routine monthly monitoring frequency, could qualify for reduced quarterly monitoring.

For NCWSs on annual monitoring, the advisory committee believed that requiring a system to have an annual site visit or a Level 2 assessment provides at least an equivalent level of diagnosis of problems and vulnerabilities that might exist as compared to quarterly monitoring without an annual site visit. Several States have elected to conduct annual site visits while also doing annual monitoring for some NCWSs.

(d) *Increased monitoring requirements for NCWSs.* The advisory committee wanted to recognize that if certain vulnerabilities are identified in a system, the system should be required to conduct more frequent monitoring to identify and correct its problems and better protect public health. Other than sanitary surveys or other site visits, monitoring is the primary means to identify pathways for potential contamination. If the system is deemed more vulnerable to such pathways, as indicated by the increased monitoring criteria, it must conduct more monitoring.

(e) *Requirements for returning to routine monitoring and reduced monitoring.* The advisory committee believed that systems that address or correct vulnerabilities as indicated by a clean compliance history should be allowed to return to routine monitoring, and subsequently to reduced monitoring (for NCWS). This provision allows for reduced monitoring costs.

(f) *Seasonal systems.* The advisory committee recognized that seasonal systems have unique characteristics that make them more susceptible to contamination. These systems do not maintain pressure while not in operation, which can result in the intrusion of contaminants. During the time when a seasonal system is not in operation, septic tank drain fields or other pollution sources may accumulate that could affect the conditions or quality of the source water (especially for intermittent contaminants) that infrequent monitoring may not be able to capture. If monitoring is done only at the start-up, there may not be enough time for the system to reach equilibrium (*i.e.,* there might not be enough time to recognize if microorganisms from a septic tank moved to the wellhead in seasonally operated systems). Therefore, the proposed rule requires seasonal systems to monitor routinely at a monthly frequency. Seasonal systems can qualify for reduced monitoring if they meet certain criteria. For a seasonal system to be allowed to monitor at a reduced frequency, the proposed rule requires the system to have an approved sample siting plan that designates the time period for monitoring and takes into consideration site-specific conditions. A system on a reduced monitoring schedule (less than monthly) must collect samples when there is the greatest chance that contamination could be identified and, due to the variability in water demands, when systems could be most challenged.

(g) *Additional routine monitoring.* EPA is proposing to retain the requirement of taking additional routine samples the month following a total coliform-positive sample for systems on quarterly or annual monitoring. The advisory committee recognized both the benefits and the limitations of additional routine monitoring. Additional routine samples are meant to enhance the diagnostic ability and supplement the infrequent routine monitoring of systems on quarterly or annual monitoring. Without the provision of additional monitoring, systems on annual or quarterly monitoring with a total coliform-positive sample would not take any samples the following month. The advisory committee believed that additional samples collected the following month are appropriate to help recognize the problem if it still persists.

For systems required to take the additional routine samples the following month (*i.e.,* systems on quarterly or annual monitoring), the proposed RTCR changes the requirement from taking a total of five routine samples to a requirement of just three routine samples. The advisory committee recognized that it is appropriate to drop from five to three samples the following month to reduce monitoring costs while still maintaining a substantial likelihood of identifying a problem if a problem persists. EPA recognizes that a reduction in the number of samples taken could also mean a reduction in the number of positive samples found. However, the reduction in the number of additional routine samples in conjunction with the new assessment and corrective action provisions of the proposed RTCR (discussed in section III.A.5 of this preamble) leads to a rule that is ultimately more protective of public health (*i.e.,* more *E. coli MCL* violations being prevented) and improvement in water quality (*i.e.,* decrease in the total coliform and *E. coli*-positive hit rates observed as shown by the Proposed RTCR EA occurrence modeling results). *See* chapter 6 of the Proposed RTCR EA (USEPA 2010a) for more details.

For systems taking at least one sample monthly, the advisory committee recommended no additional routine samples for these systems for the following reason. Taking no additional routine samples the following month substantially reduces monitoring costs. The assessment and corrective action provisions will give systems the ability to identify and prevent the occurrence of problems. EA modeling results show that although there is a decrease in the number of *E. coli* MCL violations found with the decrease in the number of additional routine samples taken (*i.e.,* going from five samples to one during the month following a total coliform-positive), the assessment and corrective action provisions lead to more *E. coli* MCL violations being prevented compared to the current TCR (*see* Exhibit 6–7 of the Proposed RTCR EA (USEPA 2010a) for more details).

In addition, whenever a total coliform-positive occurs during routine sampling, there is also a requirement to conduct repeat sampling to determine the extent of contamination or if potential pathways to contamination persist. For small systems serving 1,000 or fewer people on monthly monitoring, if a repeat sample is total coliform-positive, at least a Level 1 assessment will be triggered. If a sanitary defect(s) is (are) found, the system is required to correct the sanitary defect(s).

For systems on monthly monitoring, the assessment and corrective action provisions and the repeat sampling provisions mitigate the need for

additional routine sampling for the following month.

iii. Subpart H systems of this part serving ≤ 1,000 people. EPA is not proposing to change the routine monitoring requirements for systems using surface water or GWUDI serving 1,000 or fewer people, which include not allowing reduced monitoring for these systems. Since systems using surface water or ground water under the influence of surface water tend to have much higher levels of contaminants in their source water, and in general have more complex operations than ground water systems, it is appropriate to allow reduced routine monitoring for ground water systems but not for subpart H systems of this part. The advisory committee recommended that no reduced routine monitoring provisions be allowed for subpart H systems of this part serving 1,000 or fewer people.

iv. Public water systems serving > 1,000 people. EPA is proposing to eliminate the additional routine samples the month following a total coliform-positive sample for PWSs serving between 1,000 and 4,100 people for the same reasons discussed previously for small ground water systems monitoring monthly. PWSs serving more than 1,000 people are currently required to routinely monitor monthly (one to four samples per month depending on size) and continue to do so under the proposed RTCR.

c. *Request for comment.* EPA requests comment on the proposed monitoring requirements for PWSs. Specifically, EPA requests comment on the following questions: Are there other issues that EPA should consider in its approach to help systems transition to the RTCR? Should EPA develop guidance that would help States identify seasonal systems and implement the RTCR requirements (*e.g.,* suggestions for start up procedures and identifying vulnerable time periods)? What start-up procedures or other provisions regarding seasonal systems would be appropriate for inclusion in such guidance? EPA also requests comment on whether seasonal systems should be required to comply with State-directed shut down procedures (in addition to start-up procedures).

EPA requests comment on the following additional questions: Should daily measurement of chlorine residual count toward the maximum residual disinfectant level (MRDL) monitoring and be one of the criteria for reduced monitoring? Should NTNCWSs be required to comply with the CWS requirements (as they are in other rules such as DBP rules) since NTNCWSs serve the same people over time and include populations that may be at greater risk (*e.g.,* schools, hospitals, nursing homes)? Will the reduced, routine, and increased monitoring requirements for NCWSs shift the fixed State resources from CWS oversight to NCWS oversight in those States with large numbers of NCWSs? If so, what might be done to limit the impact? Should EPA develop guidance on how to develop a sample siting plan? Should sample siting plans require State approval?

EPA and the advisory committee did not identify any specific issues regarding consecutive systems in the proposed RTCR. EPA requests comment on whether there are such issues and how they should be addressed in the RTCR.

4. Repeat Samples

a. *Provisions.* Under the proposed RTCR, all systems must take at least three repeat samples for each routine total coliform-positive sample. This is a change from the current TCR requirements where systems serving 1,000 or fewer people must collect at least four repeat samples while the rest of the systems must collect three repeat samples. EPA is not changing the following provisions: The 24-hour limit within which the system must collect the repeat samples; the authority of the State to extend this limit on a case-by-case basis; and the non-waiver by the State of the requirement for a system to collect repeat samples.

In addition to taking repeat samples, systems must test each routine total coliform-positive sample for *E. coli.* They must also test any repeat total coliform-positive sample for *E. coli.* As with the current TCR, if *E. coli* is present, the system must notify the State the same day it learns of the positive result or by the end of the next business day at the latest. The proposed rule is not changing the provision that a State has the discretion to allow the system to forgo *E. coli* testing in cases where the system assumes that the total coliform-positive sample is *E. coli*-positive. If the State allows a system to forgo *E. coli* testing, the system must still notify the State and comply with the *E. coli* MCL requirements specified in § 141.858.

As with the current TCR, the system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken. Unless different locations are specified in its sample siting plan, the system must also collect at least one repeat sample at a tap within five service connections upstream, and at least one repeat sample at a tap within five service connections downstream of the original sampling site. The State may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site if the total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system. The system may also propose alternative repeat monitoring locations in its sample siting plan as discussed in this section.

Under the proposed rule, ground water systems (GWSs) required to conduct triggered source monitoring under the GWR must take ground water source samples in addition to the repeat samples. However, a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the repeat monitoring requirements of the proposed RTCR and the source water monitoring requirements of the GWR, but only if the State approves the use of a single sample to meet both rule requirements (*i.e.,* a dual purpose sample) and the use of *E. coli* as a fecal indicator for source water monitoring. If the sample is *E. coli*-positive, the system violates the *E. coli* MCL under the proposed RTCR and must also comply with the GWR requirements following a fecal indictor-positive sample. These provisions are consistent with the GWR.

If a system with a limited number of monitoring locations (such as a system with only one service connection or a campground with only one tap) takes more than one repeat sample at the triggered source water monitoring location, the system may reduce the number of additional source water samples by the number of repeat samples taken at that location that were not *E. coli*-positive. For example, if a system takes two dual purpose samples and one is *E. coli*-positive and the other is *E. coli*-negative, the system has an *E. coli* MCL violation under the proposed RTCR and is required to take four additional source water samples, rather than five, under the GWR (*see* 40 CFR 141.402(a)(3)). If the system takes more than one of these repeat samples at the triggered source water monitoring location and has more than one repeat sample that is *E. coli*-positive, then the system would have both an *E. coli* MCL violation under the proposed RTCR and a second fecal indicator-positive source sample under the GWR. The system would then need to also comply with the treatment technique requirements under 40 CFR 141.403.

Under the proposed rule, the system must collect all repeat samples on the same day consistent with current TCR requirements. The State may allow

systems with a single service connection to collect the required set of repeat samples over a three-day period or to collect a larger volume repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 300 ml.

The proposed RTCR is not changing the requirement that systems collect an additional set of repeat samples for each total coliform-positive repeat sample. As with the original set of repeat samples, the system must collect the additional repeat samples within 24 hours of being notified of the positive result, unless the State extends the time limit. The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the coliform treatment technique trigger has been exceeded and notifies the State. After a trigger (*see* section III.A.5 of this preamble) is reached, the system is required to conduct only one round of repeat monitoring after each total coliform-positive or *E. coli*-positive routine sample. If a trigger is reached as a result of a repeat sample being total coliform- or *E. coli*-positive, no further repeat monitoring related to that sample is necessary.

The proposed RTCR is also not changing the current TCR provision that a subsequent routine sample, which is within five service connections of the initial routine sample and is collected after an initial routine sample but before the system learns the initial routine sample is total coliform-positive, may count as a repeat sample instead.

Results of all routine and repeat samples not invalidated by the State must be used to determine whether the coliform treatment technique trigger has been exceeded (*see* section III.A.5 of this preamble for a discussion of the coliform treatment technique triggers).

b. *EPA's rationale.* i. Why EPA is maintaining a provision for repeat sampling. As with the current TCR, the proposed RTCR requires systems to take repeat samples after a total coliform-positive sample. EPA believes that sampling immediately after an initial positive sample (*i.e.,* conducting repeat sampling) increases the likelihood of identifying the source and/or nature of the possible contamination. Analysis conducted by EPA indicated that once a total coliform-positive is found, there is a much greater likelihood of finding another total coliform-positive within a short period of time of the initial finding (*see* Exhibit III–1). Repeat sampling (when total coliform-positive) can indicate a current pathway for potential external contamination into the distribution system.

EPA used the Six-Year Review 2 (USEPA 2010e) data to support statistical modeling which produced estimates of average occurrence of routine total coliform-positive samples and repeat total coliform-positive samples and to characterize how occurrence varies from system to system. EPA's occurrence model assumes that, among similar systems, the positive rate for total coliforms in routine samples varies as a beta random variable. EPA used the Six-Year Review 2 data (USEPA 2010e) to estimate the parameters for the distribution of occurrences of routine and repeat total coliform-positive samples.

Exhibit III–1 shows the relative probability of finding a total coliform-positive result from routine samples versus from repeat samples for 27 basic subsets of systems. The table combines regular routine and additional routine samples since no distinction was available for the Six-Year Review 2 data set (USEPA 2010e). The relative probability is defined as the ratio of the probability of getting a total coliform-positive result from a repeat sample to the probability of getting a total coliform-positive result from a routine sample.

EXHIBIT III–1—RELATIVE PROBABILITY OF TOTAL COLIFORM-POSITIVE SAMPLES IN ROUTINE COMPARED TO REPEAT SAMPLES

System type [1]	Average pRTTC [2] (percent)	Average pRPTC [3] (percent)	Ratio pRPTC/pRTTC
TNCWS undisinfected GW:			
< 101	4.8	28	5.9
101–1,000	4.8	25	5.2
1,001–4,100	2.5	17	6.9
NTNCWS undisinfected GW:			
< 101	3.7	26	7.0
101–1,000	2.7	26	9.6
1,001–4,100	2.7	26	9.6
CWS undisinfected GW:			
< 101	3.1	19	6.0
101–1,000	2.7	19	7.1
1,001–4,100	2.7	13	4.9
TNCWS disinfected GW:			
< 101	2.3	14	6.2
101–1,000	2.3	14	6.2
1,001–4,100	2.3	14	6.2
NTNCWS disinfected GW:			
< 101	1.6	11	6.7
101–1,000	1.1	11	9.4
1,001–4,100	1.1	11	9.4
CWS disinfected GW:			
< 101	1.6	9.4	5.9
101–1,000	1.2	9.4	7.6
1,001–4,100	0.78	5.2	6.7
TNCWS SW:			
< 101	2.3	14	6.2
101–1,000	2.3	14	6.2
1,001–4,100	2.3	14	6.2
NTNCWS SW:			
< 101	1.6	11	6.7

EXHIBIT III–1—RELATIVE PROBABILITY OF TOTAL COLIFORM-POSITIVE SAMPLES IN ROUTINE COMPARED TO REPEAT SAMPLES—Continued

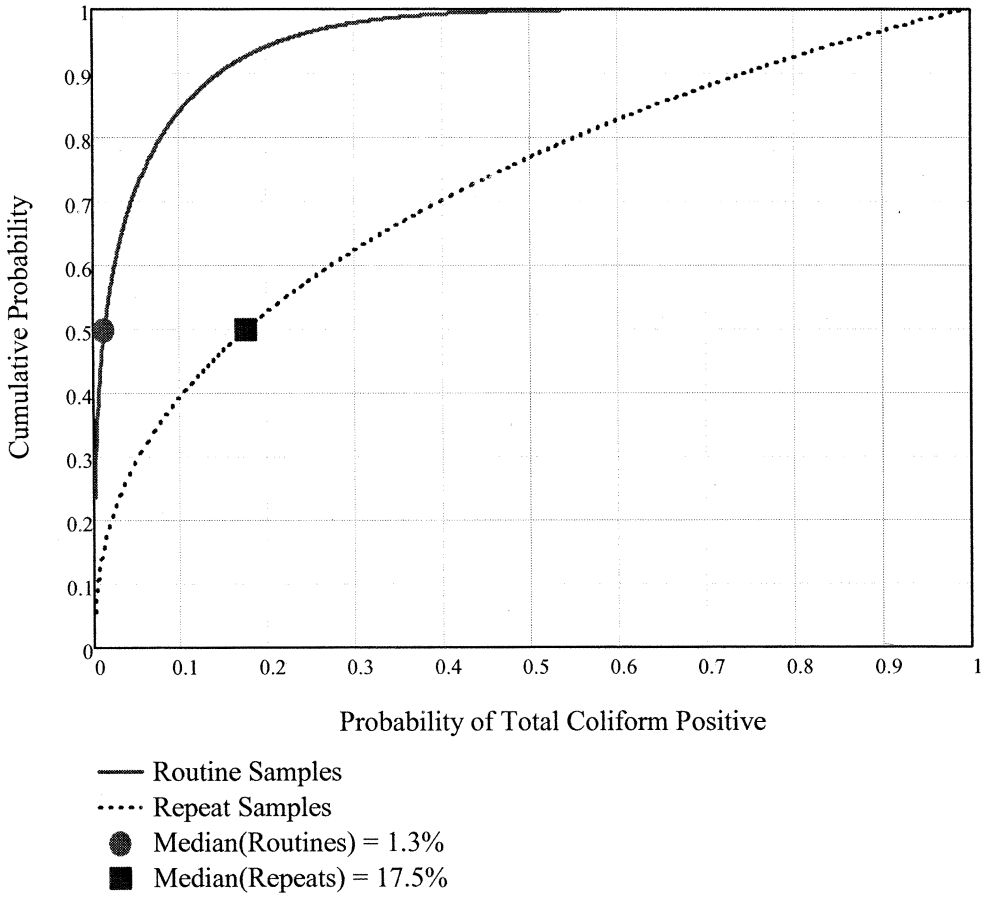
System type [1]	Average pRTTC [2] (percent)	Average pRPTC [3] (percent)	Ratio pRPTC/ pRTTC
101–1,000	1.1	11	9.4
1,001–4,100	1.1	11	9.4
CWS SW:			
< 101	1.5	6.5	4.3
101–1,000	0.95	6.5	6.8
1,001–4,100	0.59	3.4	5.8

[1] The following acronyms are used: (1) TNCWS Transient Non-Community Water System; (2) NTNCWS Non-Transient Non-Community Water System; (3) CWS Community Water System; (4) GW Ground Water; (5) SW Surface Water.
[2] Average probability of a total coliform-positive from a routine total coliform sample.
[3] Average probability of a total coliform-positive from a repeat total coliform sample.

Exhibit III–1 shows that for any type and size of system, regardless of source water and disinfection practice, repeat total coliform samples (triggered by positive routine samples) are much more likely to be positive than are routine samples. For small (serving 100 or fewer people) CWSs that provide undisinfected ground water, the average repeat total coliform-positive rate (19 percent) is about six times as great as the average routine total coliform-positive rate (3.1 percent) for these systems. The ratio of repeat to routine total coliform-positive rates is greater for some sets of systems and smaller for others, but a ratio of at least six to one is common. Similar ratios of repeat to routine monitoring total coliform-positive rates were found for disinfected systems (ground water and surface water systems).

Exhibit III–2 shows maximum likelihood distributions for the positive rates in routine and repeat samples of small TNCWSs (serving 100 people or fewer) serving undisinfected ground water. The vertical axis shows cumulative probability, which is the fraction of systems having at most the corresponding horizontal axis value. Corresponding to 0.5 on the vertical axis is the median probability of a total coliform-positive. For example, for half of the systems, the probability of getting a total coliform-positive is 1.3 percent (*i.e.,* 0.013 probability of total coliform-positive on horizontal axis) for routine samples. This is the median probability of total coliform-positive in routine samples. For repeat samples, the median probability of a positive is 17.5 percent (*i.e.,* 0.175 probability of total coliform-positive on horizontal axis), which is about 13 times greater than that of the routine samples.

Exhibit III-2 Maximum Likelihood Distribution for TNCWS Serving Undisinfected GW to <101 People



ii. Frequency of repeat samples. The advisory committee recommended that the current TCR requirement for systems serving more than 1,000 people to take three repeat samples subsequent to a routine total coliform-positive be retained. The advisory committee recommended that systems serving 1,000 or fewer people also be required to take three repeat samples rather than the four required under the current TCR. This view is supported by analysis of repeat sample records from the Six-Year Review 2 data (USEPA 2010e).

Repeat sampling helps utility operators to better understand the extent and duration of potential pathways of contamination into the distribution system. The Six-Year Review 2 data (USEPA 2010e) show that the average percentage of samples that are positive among repeat samples is much higher than that of routine samples, demonstrating that when operators are required to take a second look at their systems following the positive routine sample, they find, on average, a higher rate of coliform presence than during routine sampling. In other words, the high repeat total coliform-positive rate indicates the persistence of total coliforms at such locations in the distribution system.

Further analysis of the data shows that for all PWSs serving 1,000 or fewer people, two or more of the repeat samples are positive in 75 percent of those instances in which there are any positive repeat samples, as shown in Exhibit III–3. For those 75 percent of instances, reducing the number of repeat samples from four to three would have no effect on the number of systems that would be triggered to conduct an assessment of the system under the proposed RTCR. In these cases, at least one of the remaining repeat samples would still be total coliform-positive, and only one positive repeat sample is required to trigger an assessment.

The data show that one repeat sample is positive in 25 percent of the instances in which any of the four repeat samples is positive. For these instances, EPA estimates that if only three repeat samples had been taken instead of four, three out of four (or 75 percent) of these positive samples would still have been encountered.

EXHIBIT III–3—PERCENTAGE OF INSTANCES WITH 1 OR >1 POSITIVE REPEAT SAMPLES AMONG THOSE INSTANCES IN WHICH ≥1 REPEAT SAMPLES IS POSITIVE

System category	Number of positive repeat samples	
	1	> 1
Undisinfected GWSs Serving ≤1000	23%	77%
All PWSs Serving ≤1000	25	75

Note: Based on the analysis of Six-Year Review 2 dataset (USEPA 2010e) (described in chapter 4 of the Proposed RTCR EA (USEPA 2010a)). The total number of instances of positive repeat samples for undisinfected GWSs ≤1000 is 2953, while all PWSs ≤1000 have 3537 positive repeat samples.
Source: Proposed RTCR EA Appendix H (USEPA 2010a).

When both of the two situations in which at least one repeat sample is positive (either one positive repeat sample or more than one positive repeat sample) are considered together, it is possible to estimate the overall effect of reducing the number of repeats from four to three, as presented in Exhibit III–4. The estimates in the table indicate that if the number of required repeats were reduced from four to three, there would still be almost as many (approximately 94 percent) situations leading to an assessment being triggered for the system.

EXHIBIT III–4—ESTIMATED EFFECTS OF REDUCING NUMBER OF REQUIRED REPEAT SAMPLES FOR PWSS SERVING >1000 FROM 4 TO 3

	Percentage of events [1] with exactly 1 total coliform-positive (TC+) repeat sample	Estimated percentage of events that would still have 1 TC+ if 1 out of 4 repeat samples were not taken	Percentage of events [1] with >1 TC+ repeat sample	Estimated overall percentage of events that would still have ≥1 TC+ repeat sample if 1 out of 4 repeat samples were not taken
	A	B = A*0.75	C	D = B+C
Undisinfected GWSs Serving ≤1000	23%	18%	77%	94.2%
All PWSs Serving ≤1000	25%	19%	75%	93.8%

[1] Based on the analysis of the Six-Year Review 2 dataset (USEPA 2010e) (described in chapter 4 of the Proposed RTCR EA (USEPA 2010a)). The total number of events for undisinfected GWSs ≤1000 is 2953, while all PWSs ≤1000 have 3537 events.
Source: Proposed RTCR EA Appendix H (USEPA 2010a).

Although dropping the required number of repeat samples from four to three means that some fraction of triggers may be missed, the other provisions of the proposed RTCR compensate for that change and, taken as a whole, the provisions of the proposed RTCR provide for greater protection of public health. One such provision includes enhanced consequences for monitoring violations. For example, systems that do not take all of their repeat samples under the proposed RTCR are triggered to conduct a Level 1 assessment. This permits an increase in public health protection over the current TCR because PWSs are required to assess their systems when monitoring results show that the PWS may be vulnerable to contamination (indicated by exceeding the trigger). Moreover, because of the substantial cost of this potential consequence, systems would be more likely to take all of their required repeat samples in the first place.

It is important to point out that the majority of systems in this category are ground water systems treating to less than 4-log inactivation for viruses (*see* Exhibit 4.1 of the Proposed RTCR EA (USEPA 2010a)). Because of the triggered source monitoring provision under the GWR, these systems are required to collect a fecal indicator sample from the source water following a total coliform-positive sample in the distribution system in addition to the repeat samples. Under the existing GWR and TCR, systems taking four repeat samples are permitted to take the fourth repeat sample at the source water if they measure for *E. coli* as the fecal indicator and if they have State approval. Under the proposed RTCR, systems would continue to take this source water sample to comply with the GWR in addition to the required repeat samples in the distribution system to comply with the TCR. A positive sample at the source that is not also considered a repeat sample would not trigger an assessment under the proposed RTCR, but it would provide diagnostic value to the system in addition to triggering additional requirements under the GWR (*i.e.,* corrective action or five additional source water fecal indicator samples).

As under the existing GWR and current TCR, with State approval, ground water systems serving 1,000 or fewer people may use the sample taken at the location required for triggered source monitoring to also count toward the repeat monitoring requirements of the proposed RTCR. In this case, the State must also approve the use of *E. coli* as the fecal indicator under the GWR, and the system would comply with both GWR and the proposed RTCR when a total coliform-positive or *E. coli*-positive sample occurs. The advisory committee recommended this flexibility to reduce the burden on small ground water systems that in most cases will have a very limited distribution system and only one source, consistent with the GWR.

iii. Location of repeat samples. The advisory committee believed that

requiring repeat samples to be taken within five service connections up and downstream of the original total coliform-positive location can be difficult for systems to implement within the required 24 hours for a repeat sample because of issues such as access to the site. Therefore, the advisory committee recommended that systems be allowed to develop standard operating procedures (SOPs) as part of their sample siting plan to identify alternative monitoring sites and facilitate the identification of the source and extent of any problem. EPA is not requiring prior State approval for this provision since there is no reduction in monitoring and the SOP is expected to be used only by larger systems with the technical resources to justify alternative monitoring sites.

The advisory committee also recommended that ground water systems have the flexibility to propose repeat sampling locations that differentiate potential source water and distribution system contamination (*e.g.,* by sampling at entry points to the distribution system). *See* section III.A.3 of this preamble for additional discussion on this topic. Consistent with its understanding of the intent of the TCRDSAC, EPA has proposed that systems be allowed to exercise this flexibility only with prior State approval. State approval is required because this constitutes a reduction in monitoring (no separate triggered source water samples). EPA believes that this reduction in monitoring is appropriate only if the State determines that the dual purpose sample provides public health protection equivalent to that provided by separate repeat and source water samples. EPA believes that many ground water systems serving 1,000 or fewer people, such as systems with extensive distribution systems, will not be able to show that this reduction in monitoring (*i.e.,* a loss of repeat sample that is near the total coliform-positive routine sample site, but not near the source water sample site) will provide public health protection equivalent to separate samples. EPA believes that systems with limited or no distribution systems are the best candidate for approval.

c. *Request for comment.* EPA requests comment on the foregoing proposed repeat sampling requirements. Specifically, EPA requests comment on the proposal to allow samples taken at the ground water source to serve both as a triggered source sample under the GWR and as one of the repeat samples under the proposed RTCR. EPA is also requesting comment on whether systems should be allowed to use a dual purpose sample simply by including that in the sample siting plan, without prior State approval. Also, should systems using repeat monitoring sites more than five connections upstream or downstream from the routine total coliform-positive site be required to get prior State approval?

5. Treatment Technique Requirements

a. *Provisions.* i. Coliform treatment technique triggers. The non-acute MCL violation for total coliforms under the current TCR is effectively replaced by a coliform treatment technique involving monitoring for total coliforms under the proposed RTCR. Under the proposed treatment technique framework, the presence of total coliforms is used as an indicator of a potential pathway of contamination into the distribution system. As discussed in section III.A.2 of this preamble, the proposed RTCR eliminates the associated MCLG and MCL for total coliforms. The proposed revision specifies two levels of treatment technique triggers, Level 1 and Level 2, and their corresponding levels of response. Whether systems are required to conduct either a Level 1 or Level 2 assessment is based on the degree of potential pathway for contamination. The proposed rule further lays out an additional trigger for a Level 1 assessment and defines Level 2 triggers that require a more in-depth examination of the system and its monitoring and operational practices.

The system has exceeded the trigger immediately once any of the following conditions have been met:

Level 1 treatment technique triggers:

- For systems taking 40 or more samples per month, the PWS exceeds 5.0 percent total coliform-positive samples for the month; or
- For systems taking fewer than 40 samples per month, the PWS has two or more total coliform-positive samples in the same month; or
- The PWS fails to take every required repeat sample after any single routine total coliform-positive sample.

Level 2 treatment technique triggers:

- The PWS has an *E. coli* MCL violation (*see* section III.A.6 of this preamble for description of what constitutes an *E. coli* MCL violation); or
- The PWS has a second Level 1 treatment technique trigger within a rolling 12-month period, unless the first Level 1 treatment technique trigger was based on exceeding the allowable number of total coliform-positive samples, the State has determined a likely reason for the total coliform-positive samples that caused the initial Level 1 treatment technique trigger, and the State establishes that the system has fully corrected the problem.
- For PWSs with approved reduced annual monitoring, a Level 1 treatment technique trigger in two consecutive years.

ii. Assessment. EPA is proposing an assessment process in the RTCR to strengthen public health protection. Under the current TCR, a system is not required to perform an assessment following a monthly/non-acute MCL violation or an acute MCL violation. In contrast, the proposed RTCR requires systems to conduct assessments following the triggers specified above.

EPA is proposing two levels of assessment based on the associated treatment technique trigger: Level 1 assessment for a Level 1 treatment technique trigger and Level 2 assessment for a Level 2 treatment technique trigger. At a minimum, both Level 1 and 2 assessments must include review and identification of the following elements:

- Inadequacies in sample sites, sampling protocol, and sample processing,
- Atypical events that may affect distributed water quality or indicate that distributed water quality was impaired,
- Changes in distribution system maintenance and operation that may affect distributed water quality, including water storage,
- Source and treatment considerations that bear on distributed water quality, where appropriate, and
- Existing water quality monitoring data.

EPA expects that States will tailor specific assessment elements to the size and type of the system and that each public water system in turn will tailor its assessment activities based on the characteristics of its distribution system.

Level 1 assessment:

A Level 1 assessment must be conducted when a PWS exceeds one or more of the Level 1 treatment technique triggers specified above. Under the proposed rule, this self-assessment shall consist of a basic examination of the source water, treatment, distribution system and relevant operational practices. The PWS might look at conditions that could have occurred prior to and caused the total coliform-positive sample. Example conditions include treatment process interruptions, loss of pressure, maintenance and operation activities, recent operational changes, etc. In addition, the PWS might check the conditions of the following elements: sample sites, distribution system, storage tanks, source water, etc.

The PWS must complete the Level 1 assessment as soon as practical after

notification of its monitoring results or failure to take repeat samples. The PWS must submit the completed assessment form to the State for review within 30 days after determination that the PWS has exceeded the trigger. Failure to submit the completed assessment form within 30 days is a reporting violation. If the State determines that the assessment is insufficient, the State will consult with the PWS. If necessary after consultation, the PWS must submit a revised assessment to the State on an agreed upon schedule not to exceed 30 days from the date of the initial consultation.

The completed assessment form must include assessments conducted, all sanitary defects identified (or a statement that no sanitary defects were identified), corrective actions completed, and a timetable for any corrective actions not already completed. Upon completion and submission of the assessment form by the PWS to the State, the State shall determine if the system has identified the likely cause(s) for the Level 1 treatment technique trigger and establish whether the system has corrected the problem(s).

Level 2 assessment:

A Level 2 assessment must be conducted when a PWS exceeds one or more of the Level 2 treatment technique triggers specified previously.

A Level 2 assessment is a more comprehensive examination of the system, its monitoring and operational practices than the Level 1 assessment. The level of effort and resources committed to undertaking a Level 2 assessment will be commensurate with the more comprehensive investigation and review of available information, and engage additional parties and expertise relative to the Level 1 assessment (*see* Appendix X of the AIP) (USEPA 2008c). Level 2 assessments must be conducted by a party approved by the State: The State itself, a third party, or the PWS where the system has staff or management with the required certification or qualifications specified by the State. If the PWS or a third party conducts the Level 2 assessment, the PWS or third party must follow the State requirements for conducting the Level 2 assessment.

The PWS must complete the Level 2 assessment as soon as practical after notification that the PWS has exceeded a Level 2 treatment technique trigger. The PWS must submit the completed assessment form to the State for review within 30 days after determination that the PWS has exceeded the trigger. Failure to submit the completed assessment form after the PWS properly conducts the assessment is a reporting violation. The State may direct expedited action or additional actions such as in the case of an *E. coli* MCL violation. If the State determines that the assessment is insufficient, the State will consult with the PWS. If necessary after consultation, the PWS must submit a revised assessment to the State on an agreed upon schedule not to exceed 30 days from the date of the initial consultation.

The completed assessment form must include assessments conducted, all sanitary defects (or a statement that no sanitary defects were identified), corrective actions completed, and a timetable for any corrective actions not already completed. Upon completion and submission of the assessment form by the PWS to the State, the State shall determine if the system has identified the likely cause(s) for the Level 2 treatment technique trigger and, if so, establish that the system has corrected the problem(s).

iii. Corrective action. The current TCR does not require systems that have MCL violations to perform corrective actions. Under this proposal, EPA is requiring PWSs to correct sanitary defects found through either a Level 1 or Level 2 assessment. Ideally, systems will be able to correct any sanitary defects found in the assessment within 30 days and report that correction on the assessment form. When the correction of sanitary defects is not completed by the time the PWS submits the completed assessment form to the State, the PWS must complete the corrective action(s) on a schedule determined by the State. This schedule may be developed in consultation with the PWS. The schedule must include when the corrective action will be completed and any necessary milestones and temporary public health protection measures. The PWS must notify the State when each scheduled corrective action is completed.

At any time during the assessment or corrective action phase, either the PWS or the State may request a consultation with the other entity to discuss and determine the appropriate actions to be taken. The system may consult with the State on all relevant steps that the system is considering to complete the corrective action, including the method of accomplishment, an appropriate timeframe, and other relevant information.

E. coli detection in the distribution system indicates a public health hazard and can result in an *E. coli* MCL violation. Under the proposed rule, when an *E. coli* MCL violation has occurred, the system must complete a Level 2 assessment and corrective action must be implemented as soon as practical. The Agency encourages systems to promptly find the source of *E. coli* and fix the problem before the completed assessment form is due to the State.

b. *EPA's rationale.* i. Coliform treatment technique. The advisory committee indicated that the conditions leading to a monthly/non-acute MCL under the current TCR should trigger an assessment under the RTCR for several reasons. First, the advisory committee recognized that presence of total coliform indicates the potential presence of a pathway for contamination from external sources such as source water or through a loss of distribution system integrity. The change to a coliform treatment technique construct that uses total coliforms as an indicator of distribution system integrity places the emphasis on systems to take more preventive actions to address problems. These actions would better protect public health than the additional monitoring with no corrective action that is required under the current TCR. To address the high and constant number of PWSs with violations over the years under the current TCR, the proposed changes would be more protective by requiring systems to correct deficiencies associated with the non-acute MCL (*see* Exhibit VI.1 in section VI.C.1 of this preamble). Second, the advisory committee indicated that the public notice associated with non-acute violations is confusing because the presence of total coliforms is not necessarily an indication of a potential public health threat; however, it is an indicator of a potential pathway for fecal contamination to enter into the distribution system. Under the treatment technique requirement, the presence of total coliforms (at the level equivalent to a non-acute violation) indicates a need to assess whether a problem exists. When a system fails to conduct the assessment, the system will then incur a violation and be required to issue public notification. If the system does conduct the assessment and satisfies the requirements of the treatment technique (including corrective action when a sanitary defect is identified), no public notification is required. Third, the occurrence of total coliforms in the context of the coliform treatment technique requirement continues to inform and further the original objectives of the TCR: to evaluate the effectiveness of treatment, determine the integrity of the distribution system, and signal the

possible presence of fecal contamination. Finally, total coliform presence indicates the potential presence of a pathway for contaminants from external sources such as source water or through a loss of distribution system integrity.

ii. Assessment. The proposed rule requires assessments to ensure that specific action is taken to identify whether potential pathways of contamination into the distribution system exist. The advisory committee indicated that assessments are significant actions that protect public health. Under the current rule, when a system has a non-acute MCL violation and if any subsequent sampling did not detect total coliform, the problem may persist due to the intermittent nature of total coliform and remain unaddressed. However, the absence of total coliform-positive samples subsequent to an initial positive finding is not a reliable indicator that a contamination pathway no longer exists. In contrast, the proposed revisions would ensure that systems examine and assess the cause of the total coliform occurrence (that is equivalent to the current non-acute MCL level) and take any corrective action if necessary.

Under the proposed rule, the system will also be required to conduct an assessment if it fails to conduct repeat monitoring following an initial total coliform-positive sample result. As discussed in section III.A.4 of this preamble, repeat monitoring is critical in identifying the extent, source, and characteristics of fecal contamination in a timely manner. Since the revised rule proposes to eliminate additional routine monitoring for systems that monitor at least monthly and decrease the number of additional routine monitoring and repeat monitoring samples for the smallest systems, the need to conduct repeat monitoring is more crucial than ever in providing immediate and useful information needed to protect public health. The cost for collecting and analyzing a repeat sample would be considerably less than the cost for conducting a Level 1 assessment. EPA expects that systems will want to ensure that assessments are conducted only when potential problems may exist rather than for failure to take repeat samples.

The proposed rule specifies two different levels of assessments—Level 1 and Level 2—to recognize that a higher level of effort to diagnose a problem applies to situations of greater potential of public health concern such as repeated Level 1 triggers or an *E. coli* MCL violation. Level 2 assessments are conducted by a party approved by the State, which may be the PWS where it has staff or management with the certification or qualifications as determined by the State. The Level 2 assessments may also be conducted by the State or a third party approved by the State.

To make more transparent what the Level 1 and Level 2 assessments entail and to facilitate consistent implementation among States, the proposed rule specifies minimum elements for these assessments. The advisory committee recommended that the minimum elements identified previously in this preamble be included in the Level 1 and Level 2 assessments to identify potential flaws in monitoring or specific pathways of contamination. Although the proposed RTCR specifies the same minimum elements for both the Level 1 and Level 2 assessments, the Level 2 assessment involves a more in-depth examination of these elements compared to a Level 1 assessment. Specific examples of how the Level 2 assessments are more in-depth than Level 1 assessments may be found in Appendix X of the AIP (USEPA 2008c).

EPA recognizes that not every assessment will identify a sanitary defect or find a reason or cause for the presence of total coliforms. If no sanitary defect is identified, the system must document that fact in the completed assessment form and provide supporting evidence for this conclusion. EPA expects that only systems that adhere to proper procedures and standards set by the State are eligible to arrive at this determination, and only after providing sufficient supporting evidence.

The advisory committee recommended that the Level 1 and Level 2 assessments be conducted as soon as practical after the PWS receives notice that the system has exceeded the treatment technique trigger. The advisory committee also recommended that systems submit the completed assessment forms to the State within 30 days after determination that the PWS has exceeded the trigger. The rationale for the 30-day interval is to allow sufficient time for problem identification and potential remediation of the problem in conjunction with the follow-up assessment, in most cases.

To help States and PWSs conduct assessments, EPA intends to develop a draft assessment and corrective action guidance manual and to make it available for public comment prior to promulgation of the final rule and to finalize the guidance manual after the rule is finalized.

iii. Corrective action. The advisory committee recognized that not every assessment will identify a sanitary defect. However, the advisory committee recommended that the RTCR require all sanitary defects be corrected by the system in a timely manner. The system, in consultation with the State as needed, identifies and determines the specific corrective action.

Under the proposed rule, the State may allow the PWS additional time to conduct the corrective action if needed. EPA recognizes that some systems may not be able to fix sanitary defects before submitting the completed assessment form within the 30-day interval due to the extent and cost of the corrective action. In such situations, EPA encourages the State and PWS to work together to determine the appropriate schedule for corrective actions (which may include additional or more detailed assessment or engineering studies) to be completed as soon as possible. The system must comply with the agreed upon schedule and notify the State when each scheduled corrective action is completed.

Either the PWS or the State may request consultation with the other party to determine the appropriate actions to be taken. EPA is not requiring this to be a mandatory consultation to provide ease of implementation for States. In many cases, consultation may not be necessary because the type of corrective action for the sanitary defect will be clear and can be fixed right away (for example, replacement of a missing screen).

c. *Request for comment.* EPA requests comment on the: (1) Proposed change from the non-acute MCL for total coliforms to a coliform treatment technique requirement that uses total coliforms as an indicator of a pathway of contamination; (2) proposed requirement for systems to conduct an assessment following a trigger condition; (3) proposed levels of assessment required; and (4) proposed requirement for systems to correct all sanitary defects found during an assessment. In addition, EPA requests comment on how to ensure that a Level 2 assessment is more comprehensive than a Level 1 assessment (*e.g.,* should a Level 2 assessment include additional elements such as asset management and capacity development?). Should EPA provide more detail, either in guidance or rule language, on the elements and differences between a Level 1 and Level 2 assessments? If in rule language, how should the rule language distinguish the two levels of assessments? Please provide examples. Additionally, should EPA provide additional guidance on how systems might address the situation where a Level 1 or Level 2 assessment

fails to identify any sanitary defects (*i.e.,* the trigger event remains unexplained). If so, what should such guidance say?

6. Violations

a. *Provisions.* EPA is proposing to modify the definition of the existing MCL violation, establish a treatment technique violation, and revise the monitoring and reporting violations. EPA is proposing that public notice be required for each type of violation (*see* section III.A.7 of this preamble for detail information on public notification).

i. *E. coli* MCL violation. A violation of the *E. coli* MCL occurs when:

- A routine sample is total coliform-positive and one of its associated repeat samples is *E. coli*-positive; or
- A routine sample is *E. coli*-positive and one of its associated repeat samples is total coliform-positive; or
- A system fails to take all required repeat samples following a routine sample that is positive for *E. coli;* or
- A system fails to test for *E. coli* when any repeat sample tests positive for total coliforms.

ii. Coliform treatment technique violation. A coliform treatment technique violation occurs when:

- A system fails to conduct a required assessment within 30 days of notification of the system exceeding the trigger (*see* section III.A.5 of this preamble for conditions under which monitoring results trigger a required assessment); or
- A system fails to correct any sanitary defect found through either a Level 1 or 2 assessment within 30 days (*see* also section III.A.6 of this preamble) or in accordance with State-derived schedule.

There would be no treatment technique violation associated solely with a system exceeding one or more action triggers (Level 1 or Level 2 triggers).

iii. Monitoring violation. Under the current TCR, a monitoring violation occurs when a system fails to comply with the total coliform monitoring requirements, including the sanitary survey requirement. Under the proposed RTCR, a monitoring violation occurs when a system fails to take every required routine or additional routine sample in a compliance period, or when it fails to test for *E. coli* following a routine sample that is total coliform-positive.

In addition, if a system on quarterly monitoring has a monitoring violation in two or more quarters, or if a system on annual monitoring misses its annual monitoring, it must begin monthly monitoring until it meets criteria for less frequent monitoring. *See* section III.A.3 of this preamble for a detailed discussion on monitoring frequency.

iv. Reporting violation. A reporting violation occurs when a system that properly conducts monitoring or an assessment fails to submit a monitoring report or a correctly completed assessment form by the required deadline. The PWS is responsible for reporting this information to the State regardless of any arrangement with a laboratory. A reporting violation also occurs when a system fails to notify the State following an *E. coli*-positive sample.

b. *EPA's rationale.* To define violations, the advisory committee built upon the principles underlying the current TCR violations and current TCR public notification and suggested changes to improve public health protection where they saw a specific need. This proposal specifies responses to different degrees of potential public health concern. As described in the next section on providing information and notification to the public, Tier 1, Tier 2, and Tier 3 public notices are required following violations corresponding to the severity of each violation type.

i. *E. coli* MCL violation. An *E. coli* MCL violation (which includes failure to take all required repeat samples following an *E. coli*-positive sample) creates concern of an immediate potential public health threat. For this reason, an *E. coli* MCL violation is considered an acute violation requiring immediate response by the system. Including an *E. coli* MCL violation condition for systems failing to collect all repeat samples following an initial *E. coli*-positive sample enhances public health protection by preventing a system from incurring only a monitoring violation when there is an indication of fecal contamination. As discussed previously in section II.D of this preamble, the presence of *E. coli* indicates a pathway of fecal contamination and should be taken seriously. Systems need to follow up with repeat samples to characterize the extent and source of such contamination. Failure to take the required repeat samples following an initial *E. coli*-positive sample is not protective of public health and is a serious violation.

ii. Coliform treatment technique violation. A coliform treatment technique violation occurs when a potential pathway of contamination in the distribution system is unexplored and/or uncorrected. Performing the Level 1 and 2 assessments and taking corrective action are essential aspects of compliance with the treatment technique. A system which neglects to perform the prescribed assessment or corrective action is in violation of the proposed RTCR's treatment technique requirements.

iii. Monitoring violation and reporting violation. Monitoring and reporting violations occur when a system fails to comply with the routine monitoring requirements or when a system fails to submit monitoring reports or completed assessment forms. EPA believes that monitoring violations and reporting violations need to be addressed so that a system is held accountable to take actions to reduce public health risk, including regular monitoring of water quality.

c. *Request for comment.* EPA requests comment on the proposed violation determinations.

7. Providing Notification and Information to the Public

a. *Provisions.* To correspond to the changes in the proposed revised rule, EPA is proposing some modifications to the public notice (PN) requirements contained in 40 CFR part 141 subpart Q. Tier 1 PN is required for an *E. coli* MCL violation. Tier 2 PN is required for a treatment technique violation for failure to conduct assessments or corrective actions. Tier 3 PN is required for a monitoring violation or a reporting violation.

In the current TCR, if a system has an acute MCL violation which is based on the presence of fecal coliforms or *E. coli,* or which is based on the system's failure to test for fecal coliforms or *E. coli* following a total coliform-positive repeat sample, the system is required to publish Tier 1 PN. Under the proposed RTCR, a system is required to publish Tier 1 PN when it has an *E. coli* MCL violation (*see* section III.A.6 of this preamble for what constitutes an *E. coli* MCL violation). In addition, the system will continue to be required to notify the State after learning of an *E. coli*-positive sample, as currently is required under the TCR. As mentioned earlier in section III.A.2 of this preamble, EPA is proposing to eliminate the MCL for fecal coliforms. Under the proposed rule, the standard health effects language, which is required to be included in all public notification actions, is modified to delete the reference to the fecal coliform MCL and fecal coliforms. The language for a non-acute violation under the current TCR is modified to apply to a violation of the assessments and corrective action requirements of the coliform treatment technique.

In the current TCR, a system is required to publish a Tier 2 PN when the system has a non-acute MCL violation, which is based on total

coliform presence. Under the proposed rule, a system is required to publish a Tier 2 PN if the system violates the coliform treatment technique requirements. Also, EPA is proposing to modify the standard health effects language for coliform to emphasize the assessment and corrective action requirements of the proposed rule.

In the current TCR, a system is required to publish a Tier 3 PN when the system has a monitoring or reporting violation. In the proposed rule, the Tier 3 PN requirements are changed to incorporate the recommendation in the AIP that monitoring violations be considered distinct from reporting violations under the proposed RTCR. Both types of violations require Tier 3 PN.

Consumer confidence report (CCR) requirements are also modified. Health effects language for the CCR, which is identical to the health effects language required for PN, is updated in the same way as described for PN. In addition, the proposed RTCR removes the CCR requirements that require the inclusion of total numbers of positive samples, or highest monthly percentage of positive samples for total coliforms as well as total number of positive samples for fecal coliforms. These provisions are replaced by requirements to include the number of Level 1 and Level 2 assessments required and completed, the corrective actions required and completed, and the total number of positive samples for *E. coli.* Unchanged and consistent with existing provisions under the current TCR, a CWS may provide Tier 3 PN using the annual CCR.

b. *EPA's rationale.* The proposed public notification requirements are consistent with the AIP language as well as with the tier system described in 40 CFR part 141 subpart Q. These changes are appropriate because some of the types of violations in the proposed RTCR are different from the current TCR. The standard health effects language for the public notification is also revised as appropriate given the changes to what constitutes a violation under the proposed RTCR.

The proposed Tier 1 PN requirement for an *E. coli MCL* violation is consistent with the current TCR. Tier 1 PN is required for NPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short term exposure. The existing Tier 1 PN requires public notice as soon as possible but no later than 24 hours after the system learns of the violation. Exposure to *E. coli* in drinking water can possibly result in serious, acute health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms and possible greater health risks for infants, young children, some of the elderly, and people with severely compromised immune systems.

Tier 2 PN is required for all NPDWR violations and situations with potential to have serious adverse effects on human health not requiring Tier 1 PN. The system must provide public notice as soon as practical, but no later than 30 days after the system learns of the violation. A treatment technique violation under the proposed RTCR meets these criteria because it is an indication that the public water system failed to conduct an assessment or complete corrective action following identification of sanitary defects. Identification of a sanitary defect indicates that a problem may exist in the distribution system that has potential to cause public health concern.

Tier 3 PN is required for all other NPDWR violations and situations not included in Tier 1 or Tier 2. The existing Tier 3 PN requires a system to provide public notice no later than one year after the system learns of the violation or situation or begins operating under a variance or exemption. Monitoring violations and reporting violations meet these criteria because, while they do represent a violation of the proposed RTCR, the risk to public health is not as clearly linked as those that are Tier 1 or 2. Therefore, EPA believes that a public notice given at least annually fulfills the public's right-to-know about these violations.

Consumer confidence report requirements are updated to reflect the advisory committee's recommendations that total coliforms be used as an indicator to start an evaluation process that, where necessary, will require the PWS to correct sanitary defects. EPA believes it is most appropriate to inform the public about actions taken, in the form of assessments and corrective actions, since failure to conduct these activities lead to treatment technique violations under the proposed RTCR. Because the proposed RTCR no longer includes the total coliform MCL but now includes a trigger, EPA believes that systems no longer need to report the number of total coliform-positive samples via the CCR, since that could cause confusion or inappropriate changes in behavior among consumers. In addition, the CCR requirements will also reflect the removal of fecal coliform provisions under the proposed RTCR.

c. *Request for comment.* EPA requests comment on whether the PN and CCR language revisions are consistent with the provisions of the proposed RTCR that reflect the use of total coliforms as an indicator within a coliform treatment technique. Since EPA is not aware of health effects resulting solely from exposure to total coliforms, the proposed RTCR eliminates the public notification requirement for detection of total coliforms, but provides for public notification upon detection of *E. coli,* and for violation of the coliform treatment technique. The Agency does request comment, however, on the loss of information to consumers resulting from elimination of public notification requirements following positive sample results for total coliforms. EPA also requests comment on whether the proposed RTCR should require special notice to the public of sanitary defects, in addition to the PN requirements, similar to the GWR special notice requirements. This would be consistent with current requirements for other regulations that limit pathogens in ground water systems. Under 40 CFR 141.403(a)(7)(i), a CWS must inform the public of the significant deficiency and/or fecal indicator-positive sample. The CWS must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source has been determined by the State to be corrected. Under 40 CFR 141.403(a)(7)(ii), an NCWS that receives notice from the State of a significant deficiency must inform the public of any significant deficiency that has not been corrected within 12 months of being notified by the State, or earlier if directed by the State. The NCWS must continue to inform the public annually until the significant deficiency is corrected.

8. Reporting and Recordkeeping Requirements for Systems

a. *Provisions.* i. Reporting. In addition to the existing general reporting requirements provided in 40 CFR 141.31, the proposed RTCR requires a PWS to:

- Notify the State no later than the end of the next business day after it learns of an *E. coli*-positive sample.
- Report to the State an *E. coli* MCL violation no later than the end of the next business day after learning of the violation. The PWS is also required to notify the public according to the provisions laid out in 40 CFR part 141 subpart Q.
- Report to the State a treatment technique violation no later than the end of the next business day after it learns of the violation. The PWS must also notify the public in accordance with 40 CFR part 141 subpart Q.

• Report to the State monitoring violations within ten days after the system discovers the violation, and notify the public in accordance with 40 CFR part 141 subpart Q.

• Notify the State when each scheduled corrective action is completed for corrections not completed by the time of the submission of the assessment form.

In addition, systems triggered into conducting an assessment are required to submit the completed assessment form within 30 days after determination that the coliform treatment technique trigger has been exceeded (*see* section III.A.3 of this preamble for additional discussion).

ii. Recordkeeping. EPA is proposing to maintain the current TCR requirements regarding retention of sample results and records of decisions related to monitoring schedules found in 40 CFR 141.33, including provisions that address the new requirements of the proposed RTCR pertaining to reduced and increased monitoring, treatment technique, etc. In addition, systems are required to maintain on file for State review the assessment form or other available summary documentation of the sanitary defects and corrective actions taken. Systems are required to maintain these documents for a period not less than five years after completion of the assessment or corrective action.

b. *EPA's rationale.* In the case of an *E. coli*-positive sample, the proposed RTCR maintains the current TCR requirement that systems must notify the State by the end of the day when they are notified of the *E. coli*-positive result or by the end of the next business day if the State office is already closed. The advisory committee believed that this requirement is important to maintain because of the potential for immediate public health risk associated with *E. coli* presence and the desire for States to consider quickly whether additional actions might be appropriate. The same rationale applies to *E. coli* MCL violations.

Since there are new requirements for conducting assessments and corrective actions, and new conditions for obtaining increased or reduced monitoring provisions, the proposed rule includes reporting and recordkeeping requirements to facilitate tracking of Level 1 and Level 2 triggers and compliance with treatment technique requirements. Systems are required to maintain these files no less than five years. Since systems have to maintain these files no shorter than the maximum period allowed between sanitary surveys (*i.e.,* five years; *see* 40 CFR 142.16(b)(3) and 40 CFR 142.16(o)(2)), States have the opportunity to look at and review these files during sanitary surveys and/or annual visits. The five year period is also consistent with the recordkeeping requirements for microbiological analyses under 40 CFR 141.33(a).

The timeframe by which reporting and recordkeeping are required under the proposed rule is consistent with EPA's practice regarding reporting and recordkeeping requirements in other regulations under SDWA.

c. *Request for comment.* EPA requests comment on whether the timeframe required for reporting and recordkeeping requirements are appropriate.

9. Analytical Methods

a. *AIP-related method issues.* i. Evaluation of currently-approved methods. The AIP contains several recommendations by the advisory committee regarding the analytical methods approved under the proposed RTCR. The advisory committee noted that the methods currently approved under the current TCR have varying sensitivities and specificities, and recommended that " * * * the Agency evaluate all currently approved coliform analytical methods to determine whether these methods continue to be appropriate for use in drinking water compliance monitoring" (USEPA 2008c, AIP p. 7).

In the twenty years since the current TCR was promulgated, many methods have been developed and approved for use. Most of the approved methods that are used to support the current TCR were evaluated under EPA's Alternate Test Procedure (ATP) process. Under this process, a proposed method is evaluated in comparison to a reference method. A favorable comparison serves as the basis for subsequent approval of the method for use in regulatory compliance monitoring.

The ATP evaluations are designed based on the ATP Microbiology Protocol (USEPA 2004), an EPA guidance document that outlines how the evaluation study should be conducted. In the years the ATP program has been in place, the ATP guidance document has been revised several times. As a result of different protocols being used over time, the current set of approved methods have not all been evaluated under identical conditions.

In addition to the concerns expressed by the advisory committee that the approved methods may not be equivalent to each other, EPA notes that there have been additional concerns with some of the methods currently approved. This includes allegations that some of the approved methods may have been modified since approval without EPA's knowledge. EPA is also aware of reports of varying performance of some enzyme-based methods (Oldstadt *et al.* 2007; Fricker *et al.* 2003). Lastly, EPA is aware of at least one circumstance where the manufacturer of an approved method placed a "product hold" and recall on the medium after the product was reported to be experiencing reduced recovery of *E. coli.*

For these reasons, EPA believes that additional information may be needed regarding the performance of the currently approved methods in order to justify their continued approval. Among the options, EPA is considering a complete, side-by-side method evaluation study, whereby all the methods are compared to each other under identical conditions, according to the same protocol.

EPA is considering an approach under which vendors of all currently approved methods would have the option of voluntarily participating in an independent, third-party laboratory evaluation through EPA's Environmental Technology Verification (ETV) Program. The goal of the ETV Program is to provide independent, objective, and credible performance data for commercial-ready environmental technologies. More information on this program is available on EPA's Web site at *www.epa.gov/etv/index.*

Under the ETV approach, EPA anticipates that participating vendors would generally fund the majority of the cost of their method evaluation. Based on the results of the ETV study, as documented in the verification report, EPA would judge the appropriateness of each analytical method and would determine which should continue to be approved for future monitoring. EPA would then make any changes to the analytical methods approved under the RTCR through later rulemaking.

If a vendor chooses not to participate in the ETV study, EPA would allow the vendor to propose, for EPA's consideration, an equivalent alternative approach for method evaluation. EPA will determine whether the proposed approach will provide an independent, effective, and credible evaluation. EPA emphasizes that any alternative approach would need to be equivalent in scope and rigor to the ETV program. As with the ETV study, EPA would use the results from an alternative study to judge the appropriateness of each analytical method and would determine which methods warrant approval for future monitoring under this regulation.

As described at EPA's April 2009 stakeholder meeting, the time required to plan and conduct a proper method evaluation, and to assess the results, is such that EPA does not expect to be able to complete this effort and to take action on the method evaluation in time for the results to be included in the final RTCR. Instead, and to the extent necessary, EPA would address the disapproval of any of the current methods, or restrictions on any methods, in independent regulatory actions.

ii. Review of ATP protocol. The AIP further recommends that EPA "engage stakeholders in a technical dialogue in its review of the Alternative Test Procedure (ATP) microbial protocol for TC/*E. coli* methods for drinking water to determine if the criteria for acceptance of methods are consistent with the intent and objectives of the TCR * * *" (USEPA 2008c, AIP p. 7). In response, EPA notes that the study plan developed for the re-evaluation of current methods (under an ETV or alternative approach) could serve as a starting point for discussions with stakeholders regarding the basis for evaluating new methods. The study plan could be used as a model for a revised ATP protocol; lessons learned from the re-evaluation could also inform EPA's future assessment of new methods.

iii. Approval of "24-hour" methods. The AIP also recommends that EPA "consider approving methods that allow the timely (*e.g.* on the order of 24 hours) analytical results for *E. coli* and TC and that provide relatively concurrent analyses, without significantly sacrificing accuracy, precision and specificity" (USEPA 2008c, AIP p. 7). EPA notes that many of the approved methods that may be used in compliance with the proposed rule can be completed in approximately 24 hours. However, the methods that detect lactose fermentation include a confirmation step that involves transfer of a presumptively positive culture into a more inhibitory confirmation medium which serves to ensure the initial positive was correct. As a result of this confirmatory step, lactose fermentation methods can take up to 96 hours to obtain a result. The enzyme based methods do not require this confirmation step, and their results can be obtained in a 24 to 48 hour time period.

EPA is aware of some concerns that methods with a 24 hour incubation time may not be able to detect as many coliform bacteria as methods with a 48 hour incubation period. Since many of the coliform bacteria found in a distribution system are injured or stressed due to disinfection practices, and since injured/stressed organisms may take longer to detect than 24 hours, this concern is of interest to EPA. As part of, or in addition to, the method evaluation previously described, EPA may therefore further investigate the impact of incubation time on the recovery of stressed/injured organisms in drinking water using approved media. At this time, EPA believes that it is premature to conclude that either enzyme-based or lactose-based methods are inherently preferable.

As discussed during the advisory committee meetings, the analysis time of the analytical methods is just one aspect in the overall amount of time it takes before a PWS obtains sample results from the laboratory and subsequently collects repeat samples. Factors that can impact how quickly the PWS receives notification of a positive result include whether the PWS uses an in-house laboratory or must ship the sample to a distant contract laboratory, and whether the sample results are reported via an electronic means or via traditional mail. In addition, the turnaround time for repeat sampling can be affected by such factors as the laboratory daily hours of operation. The current TCR specifies that repeat samples be collected within 24 hours, but States currently have the flexibility to extend this timeline. The current TCR does not contain provisions for how quickly the laboratory must notify the PWS when a positive result is obtained. This proposal does not change these provisions.

iv. Elimination of fecal coliforms under the proposed RTCR. The AIP also contains a recommendation that EPA remove all provisions related to fecal coliforms under the proposed RTCR. Consistent with this recommendation, and for the following reasons, EPA is proposing to eliminate all fecal coliform provisions in the RTCR.

First, the fecal coliform group can contain bacteria not associated with fecal contamination. *E. coli* is the most prominent member of the fecal coliform group. However, other coliform bacteria, such as thermotolerant strains of *Klebsiella spp.,* have been shown to occur in the fecal coliform group (Warren *et al.* 1978). These non-*E. coli* bacteria are often found in environmental sources (for example, soil, vegetation, water) and, therefore, are not exclusively associated with feces. Due to the presence of these non-fecal bacteria, the fecal coliform group may not always provide the public water system with meaningful data regarding the vulnerability of their distribution system to fecal contamination.

Secondly, when the current TCR was developed, there were few *E. coli* methods available. Many public water systems were familiar with and preferred to use the fecal coliform methods. However, since the current TCR was promulgated, many *E. coli* methods have been developed and approved for use. EPA believes that most systems nationwide currently test for *E. coli,* while few test for fecal coliform bacteria. Since the methods used to test for *E. coli* have approximately the same cost as those used to test for fecal coliform bacteria, this proposed change is not expected to create an additional burden on PWSs.

EPA is proposing to eliminate all analytical method provisions for fecal coliforms that are included in the current TCR. EPA proposes instead to allow testing only for *E. coli* following a total coliform-positive sample. This change will provide the water system with more meaningful information regarding potential fecal contamination of the distribution system.

The current TCR specifies a number of analytical methods that can be used for compliance sample analysis (in 40 CFR 141.21(f)). Since fecal coliform bacteria are not regulated contaminants under this proposed rule, the analytical methods for fecal coliforms are no longer applicable and are removed from the list of analytical methods. All other methods used for compliance with the current TCR are maintained for compliance sample analysis under the proposed RTCR.

v. Request for comment on AIP-related method issues. EPA is requesting comment on the following RTCR analytical method issues related to recommendations from the TCRDSAC in its AIP:

- The use of an ETV approach for a reevaluation of analytical methods.
- Whether the RTCR should include provisions to ensure a more expedited results notification process. The RTCR could, for example, include language requiring that PWSs arrange to be notified of a positive result by their laboratory within 24 hours.
- Whether the RTCR should require repeat samples be taken within 24 hours of a total coliform-positive with no (or limited) exceptions.

b. *Other method issues.* In addition to addressing the recommendations of the advisory committee, EPA is proposing some minor technical changes related to analytical methods. Many of these changes document practices that are already followed by PWSs and laboratories, and are consistent with the

Manual for the Certification of Laboratories Analyzing Drinking Water (referred to as the "Laboratory Certification Manual") (USEPA 2005), an EPA document that outlines method requirements and good laboratory practices for certified laboratories conducting drinking water compliance sample analyses.

Some of these changes were brought to the attention of EPA by EPA Regions and States involved in the implementation of the drinking water certification program. Other minor changes have been proposed to make the analytical methods section of this regulation easier to understand and implement. Each proposed change is described as follows with a discussion of the rationale for the change.

i. Holding time. The proposed RTCR continues to provide a 30-hour holding time limit for the samples collected in compliance with this regulation (40 CFR 141.21(f)(3)). However, EPA is proposing to change the definition for holding time from "the time from sample collection to initiation of analysis may not exceed 30 hours" to "the time from sample collection to initiation of test medium incubation may not exceed 30 hours."

ii. Dechlorinating agent for sample preservation of chlorinated water supplies. The proposed RTCR establishes the following provision: "If chlorinated water is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample." Dechlorination procedures are addressed in section 9060A.2 of *Standard Methods for the Examination of Water and Wastewater* (20th and 21st editions) (Clesceri *et al.* 1998; Eaton *et al.* 2005).

iii. Filtration funnels. EPA is proposing to add the following footnote to the analytical methods table (§ 141.852) under the revised rule:

All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of membrane filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series.

iv. Analytical methods table changes. EPA is proposing the following changes to the analytical methods table:

- The table is organized by methodology (*e.g.,* lactose-fermentation methods vs. enzyme-substrate methods).
- *E. coli* methods are included in the table.
- 18th and 19th editions of *Standard Methods for the Examination of Water and Wastewater* are no longer approved and have been removed.
- The references to Standard Methods 9221A and 9222A are removed.
- The reference to Standard Methods 9221B is changed to 9221B.1, B.2.
- The reference to Standard Methods 9221D is changed to 9221D.1, D.2.
- The table proposes to allow Standard Methods 9221D in the multiple tube format as described in Standard Methods 9221B.
- The citation for MI agar is changed to EPA Method 1604 for clarity and consistency.
- The table clarifies that Standard Methods 9221 F.1 and 9222 G.1*a* (1), (2) may be used for *E. coli* analysis.
- The table clarifies the correct formulation for EC–MUG broth, when used in conjunction with Standard Methods 9222G.1*a*(2), through the addition of the following footnote:

The following changes must be made to the EC broth with MUG (EC–MUG) formulation: Potassium dihydrogen phosphate, KH_2PO_4 must be 1.5g and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

- The table reflects the approval of a modified Colitag method for the simultaneous detection of *E. coli* and other total coliforms.

v. EPA's rationale for proposed changes related to other method issues.

(a). Holding time.

The current rule states "The time from sample collection to initiation of analysis may not exceed 30 hours" (40 CFR 141.21 (f)(3)). Since promulgation of the current TCR, some States and EPA Regions have commented that "initiation of analysis" may be interpreted several different ways, which can lead to the sample being held longer than the 30 hours intended by the rule. The proposed language more clearly defines the amount of time that the sample may be held and is consistent with section 6.4.1 of the *Manual for the Certification of Laboratories Analyzing Drinking Water* which states: "For the analysis of total coliform in drinking water, the time between sample collection and the placement of sample in the incubator must not exceed 30 hours."

EPA believes that changing the definition of holding time from "the time from sample collection to initiation of analysis" to "the time from sample collection to initiation of test medium incubation" may slightly decrease the amount of time a PWS has to get the sample to a laboratory. EPA does not believe that this change will significantly reduce the amount of time a water system has to get a sample to the laboratory, as most of the methods approved under this rule require 30 minutes or less to process and prepare the sample for the incubation step. Thus, the initial analytical steps should not constitute a large portion of the holding time as a whole. EPA recommends that PWSs that have difficulty meeting the holding time notify the laboratory that the samples are in transit and need to be given priority. The laboratory could begin analysis immediately upon sample arrival so that the samples could be placed in the incubator in time to meet the 30 hour holding time. EPA notes that a laboratory may have to make specific accommodations in their processes in order to properly analyze a sample received close to the end of the holding time. EPA believes that this is feasible with proper planning.

(b). *Dechlorinating agent for sample preservation of chlorinated water supplies.* Under this proposal, EPA would require that chlorinated water samples be collected in bottles that contain the dechlorinating agent sodium thiosulfate. This is consistent with section 3.15.4 of the Laboratory Certification Manual, which states "If chlorinated water is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample." Neutralization ceases the bactericidal action of the chlorine during sample transit, thus allowing a more accurate assessment of what the true microbial content of the water sample was at the time of sample collection. Implementation of this new requirement should be straightforward since PWSs need only ask the laboratory for pre-treated sample containers. EPA does not believe this provision will cause an increase in cost to PWSs, as the cost of the bottles with the sodium thiosulfate is essentially the same as the cost of the bottles without the sodium thiosulfate.

(c). *Filtration funnels.* Under this proposal, EPA is requiring that membrane filtration equipment be autoclaved before beginning a filtration series. This requirement is consistent with section 4.1.3 of the Laboratory Certification Manual, which states: "Membrane filter equipment must be autoclaved before the beginning of a filtration series."

Under the current TCR, not all of the approved membrane filtration methods require that a filtration series begin with membrane filtration units that have been sterilized by autoclave. Some of the approved methods allow the laboratory to use ultraviolet (UV)

radiation exposure in lieu of autoclaving to sterilize filtration units between filtration series. EPA does not believe that ultraviolet radiation is sufficient to properly sterilize the membrane filtration equipment. Additionally, EPA believes that when ultraviolet radiation is used, not all areas of the membrane filtration equipment are exposed, and therefore microorganisms may persist and contaminate other water samples and the laboratory. For these reasons, EPA is proposing to include a footnote to the analytical methods table in order to ensure proper sterilization.

EPA does, however, believe that ultraviolet light can be used to sanitize the filtration equipment between filtrations within a filtration series, as stated in section 4.1.4 of the Laboratory Certification Manual: "Ultraviolet light (254 nm) may be used to sanitize equipment (after initial autoclaving for sterilization), if all supplies are pre-sterilized. Ultraviolet light may be used to reduce bacterial carry-over between samples during a filtration series."

(d). *Analytical methods table.* In this proposal, EPA is identifying a number of changes to the analytical methods table for clarity and accuracy.

In the current TCR, the methods are listed by date approved and the *E. coli* methods are listed in a text format. In this proposal, the analytical methods table is organized by methodology (*e.g.,* lactose-fermentation methods vs. enzyme-substrate methods), and the *E. coli* methods are included in the table.

Standard Methods for the Examination of Water and Wastewater is a reference document designed to represent "the best current practice of American water analysts." Periodically, new editions are published in order to incorporate improvements in the methods contained within this manual. Thus, new editions of this publication contain more current and improved versions of the methods. Under the current TCR, four editions of this publication are approved, resulting in different, oftentimes outdated, versions of the same method being approved. Having multiple editions of this manual approved under this regulation also creates a burden for the laboratory certification officers who must understand the differences between the versions of the method for which the laboratory may be seeking certification. For these reasons, EPA is proposing to remove the 18th and 19th editions of *Standard Methods for the Examination of Water and Wastewater* for use in compliance sample analysis under the RTCR. EPA expects that the burden associated with this change will be minimal as most laboratories have already procured the newer editions or have arranged for access to the online publication.

In this proposed regulation, the reference to Standard Methods 9221A and 9222A are removed. These sections of the methods contain only introductory information, not any actual methodology. They do not represent methods approved for use under this regulation.

The references to Standard Methods 9221B and 9221D are modified in this proposed regulation. In the current TCR, the methods are referenced as 9221B and 9221D with footnote 5 denoting that the "completed phase" called for in the methods is not required. By more specifically citing Standard Methods 9221 B.1, B.2, and 9221 D.1, D.2 (which contain the applicable, required steps of these methods) EPA is able to eliminate the original footnote and improve clarity.

EPA is proposing to allow Standard Methods 9221D (Presence-Absence broth) to be used in a multiple tube format. This method has traditionally been used in a single bottle, allowing only the qualitative detection of total coliforms. However, there are published reports showing this method can be used in a multiple tube format for the quantitative detection of total coliforms (Rice *et al.* 1987; Rice *et al.* 1993). This medium would be used in the same manner that Lauryl Tryptose Broth (LTB) is described as being used in Standard Methods 9221B. Allowing the use of this method in a multiple tube format would allow PWSs that use this method to quantitate any total coliforms that may occur in the water sample.

EPA is proposing to change the citation for MI Agar. Under the current TCR, this method is cited as Standard Methods 9222, with a footnote citing the *Applied and Environmental Microbiology* article where the method was initially described. In this proposal, the method is now cited as EPA Method 1604, consistent with section 5.4.2.1.3 of the Laboratory Certification Manual. EPA Method 1604 is identical to the citation in the TCR and does not require the use of the original footnote. This change is also consistent with the citation of this method as listed in the Ground Water Rule (*see* 40 CFR 141.402).

The current TCR describes the use of "EC medium supplemented with 50 μg/mL of 4-methylumbelliferyl-Beta-D-glucuronide (MUG)" (*see* 40 CFR 141.21(f)(6)(i)). This proposal clarifies that this medium, included in both Standard Methods 9221F and Standard Methods 9222G.1*a*(2), is approved for use under this regulation. This is consistent with the Laboratory Certification Manual, particularly section 5.1.8, which describes both of these methods as approved for use in the detection of *E. coli* under this regulation.

Lastly, EPA is clarifying the formulation for EC broth with MUG (EC–MUG) given in Standard Methods 9222G.1*a*(2) to correct an error in the publication. The Standard Methods 9222G.1*a*(2) formulation calls for 0.1 g of 4-methylumbelliferyl-Beta-D-glucuronide, and 1.4g KH_2PO_4. This formulation differs from that given in Standard Methods 9221F.1, which calls for 0.05 g and 1.5 g, respectively. EPA believes that the correct formulation is given in Standard Methods 9221F and has confirmed this with Standard Methods committee members (Rice 2009). Accordingly, EPA has added a footnote to the 9222G.1*a*(2) stating the proper formulation.

EPA anticipates that these changes to the analytical methods table will not cause any additional burden to the PWSs.

vi. Request for comment regarding holding temperature. The current TCR states the following regarding sample shipment: "Systems are encouraged but not required to hold samples below 10 deg. C during transit." Other national primary drinking water regulations requiring microbial sampling require that the samples be shipped in cold conditions, and require the sample be maintained at a temperature of 10 degrees Celsius (C) or less. Maintaining the sample temperature below 10 degrees C serves to preserve the bacterial population by minimizing both bacterial cell death and cell multiplication, thus allowing for a more accurate representation of the microbial population in the sample at the time of sample collection. Also, *Standard Methods for Examination of Water and Wastewater,* 21st edition (Eaton *et al.* 2005) recommends that samples be shipped at less than 8 degrees C but not frozen.

In the years since the promulgation of the current TCR, EPA has heard concern that at times, samples collected under the TCR may reach high temperatures during transit to the laboratory due to the lack of a requirement to ship samples on ice. High temperatures that may be reached during transit could have a deleterious or prolific effect on the bacterial cells present in the samples such that the samples may no longer represent the microbial content of the water at the time of sample collection.

EPA recognizes that requiring the samples under the proposed RTCR to be held at 10 degrees C or less, but above

freezing, would result in an increased cost to the water systems (for shipping, supplies, etc.), but believes the extra burden may be warranted. EPA is seeking public comment on whether this passage should remain as is in the current TCR or whether the RTCR should require that the samples collected for compliance with this regulation be shipped in cold conditions, *i.e.,* requiring a temperature of 10 degrees C or less, but above freezing to be maintained for better sample preservation. EPA also welcomes comments and supporting data on what the acceptable temperature range should be when samples are in transit.

B. Proposed Compliance Date

Consistent with SDWA section 1412(b)(10), EPA proposes that the compliance date of the final RTCR be three years from the date on which the regulation is promulgated (*i.e.,* the publication date of the final rule in the **Federal Register**). PWSs must comply with the requirements of the rule by the compliance date.

EPA believes that capital improvements generally are not necessary to ensure compliance with the proposed RTCR. However, a State may allow individual systems up to two additional years to comply with the RTCR if the State determines that additional time is necessary for capital improvements, in accordance with SDWA section 1412(b)(10).

EPA requests comment on the proposed compliance date of the proposed RTCR.

C. Links to Other Drinking Water Rule Requirements

The proposed RTCR recognizes that existing NPDWRs contain linkages among monitoring requirements in different rules. The current residual disinfectant monitoring must be conducted at the same time and location at which TCR samples are taken, as provided for in the Surface Water Treatment Rule (SWTR) (USEPA 1989b, 54 FR 27486, June 29, 1989) and the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) (USEPA 1998a, 63 FR 69389, December 16, 1998). Under the GWR, TCR distribution system monitoring results determine whether a system is required to conduct source water monitoring. Under the SWTR, high measurements of turbidity in an unfiltered subpart H system of this part trigger additional total coliform samples. Sanitary survey provisions exist in surface water and ground water drinking water regulations. The proposed RTCR does not change the existing sanitary survey requirements except to add the special monitoring evaluation that States must conduct at systems serving 4,100 or fewer people. These evaluations do not increase the burden to conduct sanitary surveys because of the relatively simple nature of these systems and their monitoring requirements.

1. SWTR, Stage 1 and Stage 2 DBPRs, ADWR

After considering the possible linkages among the proposed RTCR and the SWTR, Stage 1 DBPR, Stage 2 DBPR (USEPA 2006e, 71 FR 388, January 4, 2006), and Airline Drinking Water Rule (ADWR) (USEPA 2009), EPA has concluded that the only necessary revision is to update the reference to the current TCR at 40 CFR 141.21, which is superseded by 40 CFR part 141 subpart Y beginning three years following publication of the final rule. EPA is also proposing several revisions to other NPDWRs, discussed below, that are not necessary but would facilitate implementation of all applicable NPDWRs.

2. GWR

As with the other drinking water rules mentioned above, EPA is proposing to update the references in the GWR to the current TCR at 40 CFR 141.21, which will be superseded by 40 CFR part 141 subpart Y.

3. Sanitary Surveys

Sanitary survey requirements are not included in the proposed RTCR. Under the current TCR, community water systems and non-community water systems that serve 4,100 or fewer people are required to conduct periodic sanitary surveys. Since the promulgation of the TCR in 1989, new sanitary survey requirements for surface water systems and ground water systems have been established for all system sizes and types under the Interim Enhanced Surface Water Treatment Rule (IESWTR) (USEPA 1998b, 63 FR 69477, December 16, 1998) (40 CFR 142.16(b)(3)), and the Ground Water Rule (GWR) (40 CFR 142.16(o)(2)(i)). Public water systems began implementing the IESWTR sanitary survey requirements in 2001. Therefore, for surface water systems, the current TCR sanitary survey requirements have phased out since that time. Implementation of the GWR sanitary survey requirements began in December 2009 for ground water systems. Therefore, for ground water systems, the GWR sanitary survey requirements will be in effect by the time the RTCR is finalized.

D. Best Available Technology (BAT)

1. Provisions

The proposed RTCR would maintain the provisions set forth in 40 CFR 141.63(d) (proposed to be in § 141.63(e)), regarding the best technology, treatment techniques, or other means available for achieving compliance with the MCL of either total coliforms or *E. coli.* EPA is proposing the following modifications:

- 40 CFR 141.63(d)(1) (proposed § 141.63(e)(1)) would be modified by replacing "coliforms" with "fecal contaminants."
- 40 CFR 141.63(d)(3) (proposed § 141.63(e)(3)) would be modified by including "cross connection control" in the list of proper maintenance practices for the distribution system.
- 40 CFR 141.63(d)(4) (proposed § 141.63(e)(4)) would be modified by including the subparts P, T, and W that describe filtration and/or disinfection of surface water, and subpart S for disinfection of ground water.

2. EPA's Rationale

a. *Change "coliform" to "fecal contaminants."* This change reflects the approach of the proposed RTCR that the presence of total coliforms does not necessarily have a direct public health implication. Instead, total coliform is used as an indicator of a potential pathway of contamination within a treatment technique requirement. For additional discussion on this topic, *see* section III.A.2 of this preamble.

b. *Inclusion of cross connection control.* EPA believes that adding cross connection control to the list of proper maintenance practices for distribution systems is appropriate because of the significant contribution of cross connections and backflow to waterborne disease outbreaks. From 1981 to 1998, the CDC documented 9, 734 detected and reported illnesses from 57 waterborne outbreaks related to cross connections (NRC 2006). From 1970 to 2001, approximately 12,000 illnesses resulted from 459 incidents of waterborne outbreaks from backflow events (NRC 2006).

c. *Addition of other relevant subparts of 141.* This change adds references to subparts that contain provisions for the other drinking water rules promulgated since 1989 when the TCR was promulgated (in particular, subpart P for the IESWTR, subpart S for the GWR, subpart T for the Long Term Enhanced Surface Water Treatment Rule (USEPA 2002, 67 FR 1812, January 14, 2002, and subpart W for the Long Term 2 Enhanced Surface Water Treatment Rule (USEPA 2006d, 71 FR 654, January 5,

2006)). These drinking water rules contain updated filtration and disinfection standards that were not part of the current TCR when it was promulgated in 1989.

3. Request for Comment

EPA requests comment on the modifications to the existing BATs and whether there is a need to add or otherwise update the list of BATs.

E. Variances and Exemptions

1. Provisions

EPA is proposing to not allow variances or exemptions to the *E. coli* MCL. EPA is also proposing to eliminate the variance provisions in 40 CFR 141.4(b) that allow systems to demonstrate to the State that the violation of the monthly/non-acute total coliform MCL is due to biofilm and not fecal or pathogenic contamination. This change will also result in a parallel change in 40 CFR 142.63(b).

2. EPA's Rationale

Under the proposed RTCR, *E. coli* is used as an indicator of fecal contamination that may contain waterborne pathogens. To the extent a variance or exemption would permit the continued presence of *E. coli,* the potential for pathogens to be present also would remain. EPA believes that water which exceeds the MCL for *E. coli* poses an unreasonable risk to public health. Therefore, EPA is not allowing any variances or exemptions to the *E. coli* MCL. This provision is consistent with the existing requirement, since the provision that allows variances applies only to the monthly/non-acute total coliform MCL violation and not to the acute violation associated with the presence of *E. coli.*

Under the current TCR, EPA allows variances to the MCL for total coliforms when a system has demonstrated to the State that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system (*i.e.,* biofilm) rather than fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system.

EPA is proposing to eliminate the variance in 40 CFR 141.4(b) because under the proposed RTCR, there would no longer be an MCL for total coliforms (*see* section III.A.2 of this preamble). The current TCR MCL for total coliforms was based on the presence or absence of total coliforms in a sample (*see* 40 CFR 141.63 for details). In the proposed RTCR, the presence of total coliforms at a certain level requires the system to comply with the coliform treatment technique requirements (*see* section III.A.5 of this preamble). The assessment and corrective action requirements under this proposed rule include the possibility of recognizing that the total coliform presence is associated with biofilm. EPA plans to include this information in a new assessment and corrective action guidance manual related to the RTCR.

3. Request for Comment

EPA requests comment on its proposal to allow no variance or exemption to the *E. coli* MCL and to eliminate the variance provisions associated with the monthly/non-acute total coliform MCL.

F. Request for Comment on Other Issues Related to the Proposed RTCR

1. Consistency Between the Proposed RTCR and the GWR

EPA requests comment on the need for general consistency between the proposed RTCR and the GWR. Please provide specific examples. For example, under the current TCR, States are required to keep records of their decision to either waive or extend the 24-hour limit for collecting samples (that is, for repeat samples following a total coliform-positive sample, or for follow-up samples after high levels of turbidity) (*see* 40 CFR 142.14(a)(5)(i)(A) and 142.14(a)(5)(ii)(D)). The proposed RTCR also requires States to keep records of decisions to either waive or extend the 24-hour limit for repeat samples following a total coliform-positive sample, for samples following invalidation, or for follow-up samples after high levels of turbidity (*see* §§ 142.14(a)(10)(i)(A) and 142.14(a)(10)(ii)(D) of the proposed RTCR). Under the GWR, there are no recordkeeping requirements for the decision to waive or extend the 24-hour limit. Instead, the GWR includes special primacy requirements to describe criteria the State will use to extend the 24-hour limit (*see* 40 CFR 142.16(o)(3)(i)). EPA requests comment on whether it is appropriate to have States describe their criteria for waiving or extending the 24-hour limit as a primacy condition, or instead have States keep records of decisions to waive and/or extend the 24-hour limit.

2. Storage Tank Inspection and Cleaning

EPA requests comment on the value and cost of periodic storage tank inspection and cleaning. There are instances of storage tanks being the source of waterborne disease outbreaks at PWSs. In December 1993, a *Salmonella typhimurium* outbreak in Gideon, Missouri resulted in over 600 people affected by diarrhea, 31 cases of laboratory-confirmed salmonellosis and seven deaths of nursing home residents who had exhibited diarrheal illness (four deaths were confirmed by culture). The larger of the two storage tanks had a breach in the roof hatch that allowed pigeon droppings to be carried into the tank and likely accumulated in the several inches of sediment. This contaminated sediment, more than likely, was pulled into the distribution system by a flushing program that drained the tank (Clark *et al.* 1996). *Salmonella typhimurium* was isolated from the sediment of one of the towers, and tap water tested positive for fecal coliforms (CDC 1996).

In March 2008, Alamosa, Colorado (with a population of about 9,000 people) experienced a waterborne disease outbreak associated with *Salmonella.* The report released by the Colorado Department of Public Health and Environment (Falco and Williams 2009) indicated that the outbreak resulted in 442 reported cases of illnesses, 122 of which were laboratory confirmed, and one fatality. The State epidemiologist estimated that a total of 1,300 people may have been ill. Two storage tanks in Alamosa had several inches of sediment and breaches; one tank had breaches large enough for birds and animals to enter. Some of the key factors that contributed to these two outbreaks include significant levels of sediment (several inches to feet) and the presence of breaches of the integrity of the storage tank.

Sediment accumulation occurs within storage facilities due to quiescent conditions which promote particle setting. Over time sediment continues to accumulate in a tank, even if the finished water is consistently treated to below 0.1 nephelometric turbidity unit (NTU). For surface water systems, it is not uncommon to have ¼ to ½ inch or more of sediment accumulate after two to three years (Kirmeyer *et al.* 1999). While there are no turbidity regulations for ground water systems (except for ground water under the direct influence of surface water (GWUDI)), the levels of turbidity can be significant in the water pumped from an aquifer. Sand particles, if allowed to accumulate, provide pore spaces that house diverse populations of biota (which may include pathogenic microorganisms) (Kirmeyer *et al.* 1999; van der Kooij 2003). Periodic high flows in the storage tank may scour, stir up, and suspend the sediment (along with entrapped bacteria and pathogens) and carry it into the distribution system, with greater accumulation of sediment

being a more significant concern. Other water quality problems associated with sediment accumulation include increased disinfectant demand and disinfection byproduct formation.

The storage tank's vulnerability to contamination increases when breaches of the storage tank allow insects, animals, and birds and their associated diseases to enter. Contamination from bird and other animal excrement can potentially transmit disease-causing organisms to the finished water. Waterfowl, for example, are known carriers of many different waterborne pathogens including *Vibrio cholerae* (Ogg *et al.* 1989).

Based on the potential public health implications associated with poorly maintained storage tanks (*e.g.,* as indicated by significant sediment accumulation and breaches), EPA is interested in receiving comments and supporting information regarding the state and condition of tanks that have been cleaned and inspected, costs of storage tank inspection and cleaning, and how public health can be better protected. EPA requests information on whether there are States that recommend or require periodic inspection and cleaning of storage tanks. If so, what are the requirements, the frequency of inspection and cleaning, and how successful are they? Are inspections and cleaning done by individual PWSs or by contractors?

3. States Under EPA Direct Implementation

EPA does not have the authorities provided to other primacy agencies under 40 CFR part 142 to use in implementing rules in direct implementation entities (*e.g.,* Tribal systems and Wyoming). To provide EPA the flexibility of other primacy agencies to modify monitoring requirements as necessary to protect public health (*e.g.,* to require more stringent monitoring or to develop criteria such as those that primacy States develop under the special primacy conditions requirement in 40 CFR 142.16) and facilitate implementation of this rule. EPA is requesting comment on whether the Agency should have the same authorities specified in subpart Y, as States have in 40 CFR 142.16, for PWSs for which the Agency has direct implementation responsibilities. EPA is requesting comment on whether this authority should be added to subpart Y specifically.

G. Limitations to the Public Comment on the Proposed RTCR

The proposed revisions to other drinking water regulations (SWTR, Stage 1 DBPR, Stage 2 DBPR, and ADWR) are made solely to update the reference to the current TCR at 40 CFR 141.21, which will be superseded by 40 CFR part 141 subpart Y beginning three years following publication of the final rule. This proposed rule would not change any substantive requirements of those rules and EPA is not soliciting public comments on those rules other than their proposed revised references to the current TCR or any other references to the current TCR that EPA may need to revise.

IV. State Implementation

The proposed RTCR provides States with flexibility to implement the requirements of the rule in a manner that maximizes the efficiency of the rule for the States and water systems while increasing the effectiveness of the rule to protect public health. While the proposed rule provides some reduction in monitoring relative to the current TCR, overall, the proposed rule is more stringent and better protects public health. As a result, States must adopt these revisions, when final, or adopt or maintain more stringent requirements, in order to maintain primacy. This section describes the regulations and other procedures and policies States must adopt in order to obtain primacy to implement the RTCR, if finalized as proposed today.

SDWA section 1413 establishes requirements that States or eligible Indian Tribes must meet to assume and maintain primary enforcement responsibility (primacy) for its PWSs. These requirements include:

- Adopting drinking water regulations that are no less stringent than Federal drinking water regulations;
- Adopting and implementing adequate procedures for enforcement;
- Keeping records and making reports available on activities that EPA requires by regulation;
- Issuing variances and exemptions (if allowed by the State), under conditions no less stringent than allowed under SDWA; and
- Adopting and being capable of implementing an adequate plan for the provisions of safe drinking water under emergency situations.

States may adopt more stringent requirements (*e.g.,* requiring all systems to conduct routine monthly monitoring). Many States have used this authority in the past to improve public health protection and/or simplify implementation.

Section 1413(a)(1) of SDWA provides two years (plus up to two more years if the Administrator approves) after promulgation of the final RTCR for the State to adopt corresponding drinking water regulations in order to obtain primacy for the final RTCR. To implement the final RTCR, States would be required to adopt or maintain requirements that are at least as stringent as the following revisions to 41 CFR part 141:

- Section 141.4—Variances and exemptions (if allowed by the State).
- Section 141.21—Coliform sampling.
- Section 141.52—Maximum contaminant level goals for microbiological contaminants.
- Section 141.63—Maximum contaminant levels (MCLs) for microbiological contaminants.
- Section 141.74—Analytical and monitoring requirements.
- Section 141.132—Monitoring requirements.
- Subpart 141.153—Content of the reports.
- Subpart 141.202—Tier 1 Public Notice—Form, manner, and frequency of notice.
- Subpart 141.203—Tier 2 Public Notice—Form, manner, and frequency of notice.
- Subpart 141.204—Tier 3 Public Notice—Form, manner, and frequency of notice.
- Subpart O—Consumer Confidence Reports, Appendix A, Regulated Contaminants.
- Subpart Q—Public Notification of Drinking Water Violations, Appendix A, NPDWR Violations and Other Situations.
- Subpart Q—Public Notification of Drinking Water Violations, Appendix B, NPDWR Violations and Other Situations.
- Subpart Y—Revised Total Coliform Rule.

EPA's regulation at 40 CFR part 142 sets out the specific program implementation requirements for States to obtain primacy for the public water supply supervision program as authorized under SDWA section 1413. In addition to adopting basic primacy requirements specified in 40 CFR part 142, States may be required to adopt special primacy provisions pertaining to specific regulations where implementation of the rule involves activities beyond general primacy provisions. States must include these regulation-specific provisions in their application for approval of their program revision. States must continue to meet all other conditions of primacy for all other rules in 40 CFR part 142. Primacy requirements for the proposed RTCR are described below.

The advisory committee recognized that this rule will require more tracking to ensure effective implementation.

Therefore, EPA plans to release an upgrade to SDWIS/State and SDWIS/FED (the State and Federal versions of the Safe Drinking Water Information System, respectively) within 18 months of final rule promulgation to accommodate monitoring data, tracking, compliance determinations and reporting of all rule related requirements, as appropriate.

A. State Special Primacy Requirements

To ensure that a State program includes all the elements necessary for an effective and enforceable program under the proposed RTCR, a State primacy application must include a description of how the State will perform the following:

• Sample Siting Plans—States must describe the frequency and process used to review and revise sample siting plans in accordance with 40 CFR 141, subpart Y to determine adequacy.

• Reduced Monitoring Criteria—The primacy application must indicate whether the State will adopt the reduced monitoring provisions of subpart Y. If the State adopts the reduced monitoring provisions, it must describe the specific types or categories of water systems that will be covered by reduced monitoring and whether the State will use all or a reduced set of the optional criteria. For each of the reduced monitoring criteria, both mandatory and optional, the State must describe how the criteria will be evaluated to determine when systems qualify.

• Assessments and Corrective Actions—States must describe their process to implement the new assessment and corrective action phase of the rule. The description must include examples of sanitary defects, examples of assessment forms or formats, and methods that systems may use to consult with the State on appropriate corrective actions.

• Invalidation of routine and repeat samples collected under subpart Y—States must describe their criteria and process to invalidate total coliform-positive and *E. coli*-positive samples under subpart Y. This includes criteria to determine if a sample was improperly processed by the laboratory, reflects a domestic or other non-distribution system plumbing problem or reflects circumstances or condition that does not reflect water quality in the distribution system.

• Approval of individuals allowed to conduct subpart Y Level 2 assessments—States must describe their criteria and process for approval of individuals allowed to conduct subpart Y Level 2 assessments.

• Special monitoring evaluation—States must describe how they will perform special monitoring evaluations during sanitary surveys for ground water systems serving 1,000 or fewer people to determine whether systems are on an appropriate monitoring schedule.

• Seasonal systems—States must describe how they will identify seasonal systems, how they will determine when systems on less than monthly monitoring must monitor, and what will be the seasonal system start-up provisions.

• Additional criteria for reduced monitoring—States must describe how they will require systems on reduced monitoring to demonstrate:

—Continuous disinfection entering the distribution system and a residual in the distribution system;

—Cross connection control;

—Other enhancements to water system barriers; and

—Procedures for seasonal systems to start up operations at the beginning of each season.

B. State Recordkeeping Requirements

The current regulations in 40 CFR 142.14 require States with primacy to keep records, including: Analytical results to determine compliance with MCLs, MRDLs, and treatment technique requirements; PWS inventories; State approvals; enforcement actions; and the issuance of variances and exemptions. The proposed RTCR requires States to keep additional records, including all supporting information and an explanation of the technical basis for each decision as follows. Records of the following decisions or activities must be retained for five years, consistent with recordkeeping requirements for existing regulations:

• Any decision to waive the 24-hour time limit for collecting repeat samples after a total coliform-positive routine sample, or to extend the 24-hour limit for collection of samples following invalidation, or for an unfiltered subpart H system of this part to collect a total coliform sample following a turbidity measurement exceeding 1 NTU.

• Any decision to allow a system to waive the requirement for three routine samples the month following a total coliform-positive sample. The record of the waiver decision must contain all the items listed in §§ 141.854(j) and 141.855(f) of the proposed RTCR.

• Any decision to invalidate a total coliform-positive sample. If the State decides to invalidate a total coliform-positive sample as provided in § 141.853(c)(1) of the proposed RTCR, the record of the decision must contain all the items listed in that paragraph.

• Completed and approved 40 CFR part 141 subpart Y assessments, including reports from the system that corrective action has been completed.

States must retain records of each of the following decisions in such a manner so that each system's current status may be determined at any time:

• Any decision to reduce the total coliform monitoring frequency for a community water system serving 1,000 or fewer people to less than once per month, as provided in § 141.855(d) of the proposed RTCR; and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

• Any decision to reduce the total coliform monitoring frequency for a non-community water system using only ground water and serving 1,000 or fewer people to less than once per quarter, as provided in § 141.854(e) of the proposed RTCR, and what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

• Any decision to reduce the total coliform monitoring frequency for a non-community water system using only ground water and serving more than 1,000 persons during any month the system serves 1,000 or fewer people, as provided in § 141.857(d) of the proposed RTCR. A copy of the reduced monitoring frequency must be provided to the system.

• Any decision to waive the 24-hour limit for taking a total coliform sample for a public water system that uses surface water, or ground water under the direct influence of surface water, and that does not practice filtration in accordance with part 141, subparts H, P, T, and W, and that measures a source water turbidity level exceeding 1 NTU near the first service connection.

• Any decision to allow a public water system to forgo *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is *E. coli*- positive.

C. State Reporting Requirements

EPA currently requires at 40 CFR 142.15 that States report to EPA information such as violations, variance and exemption status, and enforcement actions. The proposed RTCR requires States to develop and maintain a list of public water systems that the State is allowing to monitor less frequently than once per month for community water systems or less frequently than once per quarter for non-community water

systems, including the compliance date (the date that reduced monitoring was approved) of the reduced monitoring requirement for each system.

D. Interim Primacy

On April 28, 1998, EPA amended its State primacy regulations at 40 CFR 142.12 to incorporate the new process identified in the 1996 SDWA Amendments for granting primary enforcement authority to States while their applications to modify their primacy programs are under review (USEPA 1998c, 63 FR 23361, April 28, 1998). The new process grants interim primary enforcement authority for a new or revised regulation during the period in which EPA is making a determination with regard to primacy for that new or revised regulation. This interim enforcement authority begins on the date of the primacy application submission or the effective date of the new or revised State regulation, whichever is later, and ends when EPA makes a final determination. However, this interim primacy authority is only available to a State that has primacy (including interim primacy) for every existing NPDWR in effect when the new regulation is promulgated.

As a result, States that have primacy (including interim primacy) for every existing NPDWR already in effect may obtain interim primacy for the RTCR, beginning on the date that the State submits the application for this rule to EPA, or the effective date of its revised regulations, whichever is later. A State that wishes to obtain interim primacy for future NPDWRs must obtain primacy for this rule.

E. Request for Comment

EPA requests comment on the adequacy of the proposed RTCR requirements for State implementation, including but not limited to State special primacy requirements and State reporting and recordkeeping requirements. Specifically, EPA requests comment on whether there are any requirements that should be added to assure proper State oversight, or any that can be removed without detriment to implementation of the rule.

V. Distribution System Research and Information Collection Activities

A. Research and Information Collection Partnership

The advisory committee recommended that a Research and Information Collection Partnership (RICP) be formed to inform and support the drinking water community in developing future national risk management decisions pertaining to drinking water distribution systems. The advisory committee recommended seven priority areas for research and information collection. These seven priority areas are: (1) Cross-connection and backflow of contaminated water; (2) contamination due to storage facility design, operation, or maintenance; (3) contamination due to main installation, repair, or rehabilitation practices; (4) contaminant intrusion due to pressure conditions and physical gaps in distribution system infrastructure; (5) significance and control of biofilm and microbial growth; (6) nitrification issues that lead to public health effects; and (7) accumulation and release of contaminants from distribution system scales and sediments (USEPA 2008c, AIP p. 30).

In January 2009, EPA and the Water Research Foundation (WRF or the Foundation) signed a memorandum of understanding (MOU) to form the RICP in response to recommendations from the advisory committee contained in the AIP (USEPA and WRF 2009). The MOU conveys the partners' agreement to collaborate and identify, define, prioritize, coordinate, and communicate critical decision-relevant distribution system research and information collection needs of the drinking water community. The RICP is directed by a steering committee comprised of nine members: Three members from EPA, three members from water utilities, and three additional members representing the public health, environmental advocate, and State regulator perspectives.

The partners are developing a distribution system research and information collection agenda that focuses on characterizing and reducing public health risks. The identified priority information and research will allow better understanding and management of potential public health risks from drinking water distribution systems. *See http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions_tcrdsac.html* for further information on this effort.

B. Distribution System Optimization Activities

As part of the AIP, the advisory committee encouraged "the development of national and regional distribution system optimization partnerships that focus on protecting the integrity of drinking water quality once it is delivered to the distribution system. The purpose of the partnerships should be to inform and inspire proactive systems to implement best management practices that emphasize protection of public health. These partnerships, comprised, for example, of representatives from utilities, communities, academia, and regulatory organizations could develop continuous improvement programs that encompass water distribution optimization principles and practices for system design, operations, and maintenance. These partnerships should foster continuous review of distribution system issues and should define excellence in distribution system operation in terms of processes, systems, procedures, as well as measures. The optimization partnerships should encourage voluntary program participation of all drinking water utilities regardless of system size" (USEPA 2008c, AIP p. 25).

EPA is aware of two distribution system optimization programs that are currently being developed. EPA and the Foundation are concurrently developing distribution system optimization programs that focus on protecting public health in the distribution system. Developmental activities to support these efforts are occurring through the EPA's National Area Wide Optimization Program (AWOP) and the Foundation's project #4109. While these programs are being developed independently with differing measures of performance, both are founded on the optimization principles of improving water systems, and go beyond the regulatory requirements, while using existing staff and facilities. These principles and practices are currently being used through the in-plant treatment optimization programs operated through AWOP and the American Water Works Association's (AWWA) Partnership for Safe Water (the Partnership). For more information on the Partnership for Safe Water, *see (http://www.awwa.org/Resources/PartnershipforSafeWater.cfm?ItemNumber=3787&navItemNumber=33969).*

The goal of EPA's optimization program is to protect public health by addressing both the technical and management issues that limit the water system's ability to meet water quality performance goals. EPA has started developing a distribution system optimization program, which is currently focused on improving water treatment plant finished water quality while maintaining disinfectant residual and minimizing disinfection byproduct formation in the distribution system. Future work may focus on other water quality parameters or issues of concern. An outcome of this effort will be the identification of the key technical and management skills, practices, and tools

that a water system should implement to achieve long-term distribution system optimization. Ultimately, participating AWOP States will be introduced to distribution system optimization methods developed by EPA. At this time, additional development activities are needed before a distribution system optimization program will be available for State implementation.

In 2007, the Foundation initiated project #4109 to identify a limited number of straightforward criteria that can be used by water utilities to measure distribution system optimization performance and to develop a self-assessment approach using standards of excellence. The results from this project will also be used to expand the Partnership for Safe Water Program treatment plant optimization program into distribution system optimization. The Foundation anticipates project #4109 to be completed by early 2010. With the results of project #4109, the Partnership anticipates finalizing a preliminary set of optimization goals and a model assessment process in calendar year 2010. Prior to finalizing the goals and assessment process, the Partnership will conduct trials at several volunteer utilities. The optimization goals and assessment process will be evaluated and refined based on those trials prior to consideration by the Partnership for adoption and implementation. AWWA anticipates that applications for the Partnership's Distribution System Optimization Program will be available in calendar year 2011.

C. Request for Comment

EPA requests comment about these distribution system optimization projects and information about or suggestions for other possible approaches to distribution system optimization.

VI. Economic Analysis (Health Risk Reduction and Cost Analysis)

This section summarizes the Health Risk Reduction and Cost Analysis (HRRCA) in support of the proposed RTCR as required by section 1412(b)(3)(C) of the SDWA. EPA has prepared the RTCR Economic Analysis (EA) (USEPA 2010a) to comply with this requirement. The EA document for the proposed RTCR is available in the docket and is also published on the government's Web site at *http://www.regulations.gov.*

The HRRCA consists of seven elements: (1) quantifiable and nonquantifiable health risk reduction benefits; (2) quantifiable and nonquantifiable health risk reduction benefits from reductions in co-occurring contaminants; (3) quantifiable and nonquantifiable costs that are likely to occur solely as a result of compliance; (4) incremental costs and benefits of rule options; (5) effects of the contaminant on the general population and sensitive subpopulations including infants, children, pregnant women, elderly, and individuals with a history of serious illness; (6) any increased health risks that may occur as a result of compliance, including risks associated with co-occurring contaminants; and (7) other relevant factors such as uncertainties in the analysis and factors with respect to the degree and nature of risk. *See* SDWA section 1412(b)(3)(C). A summary of these elements is provided in this section of the preamble, and a complete discussion can be found in the Proposed RTCR EA (USEPA 2010a).

The benefits described in this section are discussed qualitatively, and reductions in detection of total coliforms and *E. coli* and in Level 2 assessments are used to describe the benefits, as described later in this section. The costs discussed in this section are presented as annualized present values in 2007 dollars. Both benefit and cost measures are adjusted using social discounting. In social discounting, future values of a rule's or policy's effects are multiplied by discount factors. The discount factors reflect both the amount of time between the present and the point at which these events occur and the degree to which current consumption is more highly valued than future consumption (USEPA 2000c). This process allows comparison of cost and benefit streams that are variable over a given time period. EPA uses social discount rates of both three percent and seven percent to calculate present values from the stream of benefits and costs and also to annualize the present value estimates. Historically, the use of three percent is based on rates of return on relatively risk-free financial instruments, while seven percent is generally an estimate of before-tax rate of return to incremental private investment. For further information, *see* USEPA 2000c and OMB 1996.

In the Proposed RTCR EA (USEPA 2010a), EPA also presents the undiscounted stream of benefits and costs over the 25-year time frame (*i.e.,* the year-to-year realization of benefits and costs presented in constant terms).

The time frame used for both benefit and cost comparisons in this rule is 25 years. This time interval accounts for rule implementation activities occurring soon after promulgation (*e.g.,* States adopting the criteria of the regulation) and the time for different types of compliance actions (*e.g.,* assessments and corrective actions) to be realized up through the 25th year following rule promulgation.

EPA was unable to quantify health benefits for the proposed RTCR because there are insufficient data reporting the co-occurrence in a single sample of fecal indicator *E. coli* and pathogenic organisms. In addition, the available fecal indicator *E. coli* data from the Six-Year Review 2 dataset (USEPA 2010e) described in this preamble were limited to presence-absence data because the current TCR requires only the reporting of presence or absence of fecal indicator *E. coli* using EPA-approved standard methods. However, as discussed in chapter 6 of the Proposed RTCR EA (USEPA 2010a), even though health benefits could not be directly quantified, the potential benefits from the proposed RTCR include avoidance of a full range of health effects from the consumption of fecally contaminated drinking water, including the following: acute and chronic illness, endemic and epidemic disease, waterborne disease outbreaks, and death. Also, since fecal contamination may contain waterborne pathogens including bacteria, viruses, and parasitic protozoa, in general, a reduction in fecal contamination should reduce the risk from these other contaminants.

The net costs of the rule stem mostly from the new assessment and corrective action requirements as well as the revised monitoring provisions described earlier in this preamble.

This section of the preamble includes elements as follows: (A) Regulatory Options Considered, (B) Major Sources of Data and Information used in Supporting Analyses, (C) Occurrence and Predictive Modeling, (D) Baseline Profiles, (E) Anticipated Benefits of the Proposed RTCR, (F) Anticipated Costs of the Proposed RTCR, (G) Potential Impact of the Proposed RTCR on Households, (H) Incremental Costs and Benefits, (I) Benefits from Simultaneous Reduction of Co-occurring Contaminants, (J) Change in Risk from Other Contaminants, (K) Effects of Fecal Contamination and/or Waterborne Pathogens on the General Population and Sensitive Subpopulations, (L) Uncertainties in the Benefit and Cost Estimates for the Proposed RTCR, (M) Benefit Cost Determination for the Proposed RTCR, and (N) Request for Comment.

A. Regulatory Options Considered

EPA evaluated the following three regulatory options as part of this revised

rule proposal: (1) The current TCR option, (2) the AIP option, and (3) an Alternative option. EPA discusses the three regulatory options briefly in this preamble and in greater detail in chapter 3 of the Proposed RTCR EA (USEPA 2010a).

First, the current TCR option reflects EPA's understanding of how the current TCR (USEPA 1989a, 54 FR 27544, June 29, 1989) is currently being implemented. That is, the current TCR option is assumed to include "status quo" PWS and State implementation practices. Next, the AIP option is a revised TCR based on the recommendations of the advisory committee. The provisions of this proposed rule are based on the AIP option and are described in detail in section III of this preamble. Third, the Alternative option parallels the AIP in most ways but includes variations of some of the provisions that were discussed by the advisory committee before consensus was reached on the AIP.

The Alternative option differs from the AIP option in two ways. First, under the Alternative option, at the compliance date all PWSs are required to sample monthly for an initial period until they meet the eligibility criteria for reduced monitoring. EPA assumes that eligibility for reduced monitoring is determined during the next sanitary survey following the RTCR compliance date. This more stringent approach differs from the AIP option that allows PWSs to continue to monitor at their current frequencies (with an additional annual site visit or voluntary Level 2 assessment requirement for PWSs wishing to remain on annual monitoring) until they are triggered into an increased sampling frequency. Second, under the Alternative option, no PWSs are allowed to reduce monitoring to an annual basis. EPA defined the Alternative option this way and included it in the Proposed RTCR EA (USEPA 2010a) to assess the relative impacts of a more stringent rule and to better understand the balance between costs and public health protection.

To understand the relative impacts of the options, EPA gathered available data and information to develop and provide input into an occurrence and predictive model. EPA estimated both baseline conditions and changes to these conditions anticipated to occur over time as a result of these revised rule options. The analysis is described in more detail in the Proposed RTCR EA (USEPA 2010a).

B. Major Sources of Data and Information Used in Supporting Analyses

This section of the preamble briefly discusses the data sources that EPA used in its supporting analyses for the proposed RTCR. For a more detailed discussion, *see* chapter 4 of the Proposed RTCR EA (USEPA 2010a).

1. Safe Drinking Water Information System Federal Version Data

Safe Drinking Water Information System Federal Version (SDWIS/FED) is EPA's national regulatory compliance database for the drinking water program and is the main source of PWS inventory and violation data for the proposed RTCR baseline. SDWIS/FED contains information on each of the approximately 155,000 active PWSs as reported by primacy agencies, EPA Regions, and EPA headquarters personnel. SDWIS/FED includes records of MCL violations and monitoring and reporting (MR) violations (both routine and repeat and minor and major). It does not include sample results. It also contains information to characterize the US inventory of PWSs including system name and location, retail population served, source water type (ground water (GW), surface water (SW), or ground water under the direct influence of surface water (GWUDI)), disinfection status, and PWS type (community water system (CWS), transient non-community water system (TNCWS), and non-transient non-community water system (NTNCWS)).

To create the PWS and population baseline, EPA used the fourth quarter of SDWIS/FED 2007 (USEPA 2007b), which was the most current PWS inventory data available when EPA began developing the Proposed RTCR EA. These data represent all current, active PWSs and the population served by these systems.

EPA also used the MCL violation data from SDWIS/FED to validate model predictions for systems serving 4,100 or fewer people and to predict *E. coli* (acute)_–MCL violations (current TCR, AIP, and Alternative option), total coliform (non-acute or monthly) MCL violations (current TCR), and Level 1 and Level 2 assessment triggers (AIP and Alternative option) for systems serving more than 4,100 people.

2. Six-Year Review 2 Data

Through an Information Collection Request (USEPA 2006b), States voluntarily submitted electronically available TCR monitoring data (sample results) that were collected between January 1998 and December 2005. EPA requested the TCR monitoring results with the intent of conducting analyses and developing models to assess the potential impacts of changes to the current TCR. EPA received data from 46 States, Tribes, and territories. A Data Quality Report (USEPA 2010c) describes how TCR monitoring data were obtained, evaluated, and modified where necessary to make the database internally consistent and usable for analysis. Exhibit 2.1 in the Data Quality Report provides a complete list of States or territories that submitted data and a description of the use of these data.

In this EA, EPA included data from 37 primacy agencies (35 States and 2 Tribes). Records included data for:

- PWS information (system type, population served, source water type)
- Sample type (routine, repeat, special purpose)
- Analytical result
- Sampling location—entry point, distribution system and, for repeat samples, original location, downstream, upstream, and other
- Analytical method
- Disinfectant residual data collected at TCR monitoring sites

As discussed in greater detail in section 4.2.2.1 of the Proposed RTCR EA (USEPA 2010a), EPA used 2005 data exclusively in the analyses supporting the proposed RTCR because the 2005 data set was the most complete year of data among the Six-Year Review 2 data (USEPA 2010e). The 2005 data was also the most recent data available suggesting that it may be the most representative of present conditions.

The Six-Year Review 2 data (USEPA 2010e) also informed EPA's assumptions regarding the proportions of GWSs serving 1,000 or fewer people that sample monthly, quarterly, or annually.

3. Other Information Sources

Additional data and information sources included the Economic Analysis for the Ground Water Rule (GWR EA) (USEPA 2006a), the *Technology and Cost Document for the Proposed Revised Total Coliform Rule* (proposed RTCR T&C document) (USEPA 2010b), the U.S. Census data, and the knowledge and experience of stakeholders representing industry, States, small systems, and the public.

The GWR EA provided occurrence information on *E. coli* in the source water of ground water PWSs for modeling the triggered monitoring component of GWR and informed the assumptions on the distribution of corrective actions taken in response to the presence of *E. coli* in the source water. As discussed in section VI.C.1 of

this preamble, the model developed for this economic analysis considers the effect of GWR both before and during implementation of the proposed revised rule. The proposed RTCR T&C document included estimates of unit costs for the major components of the proposed RTCR including labor, monitoring, assessments, and corrective actions. U.S. Census data were used to estimate population per household and to characterize sensitive subpopulations. Lastly, knowledge and experience from stakeholders helped to inform the assumptions that were made for the analysis.

A more detailed discussion of these data sources and how EPA used them are included in the Proposed RTCR EA (USEPA 2010a).

C. Occurrence and Predictive Modeling

EPA used the data to develop an occurrence and predictive model for PWSs serving 4,100 or fewer people based primarily on the 2005 Six-Year Review 2 data (USEPA 2010e). The model predicts changes in total coliform and *E. coli* occurrence, Level 1 and Level 2 assessments (based on simulated monitoring results), corrective actions, and violations over time. EPA developed another, simpler, predictive model, for PWSs serving more than 4,100 people, that predicts Level 1 and Level 2 assessments (based on 2005 violation data from SDWIS/FED), corrective actions, and violations over time, but not total coliform and *E. coli* occurrence. EPA modeled systems serving more than 4,100 people separately because the Six-Year Review 2 data (USEPA 2010e) for larger PWSs were not as robust as the data for the smaller systems. In addition, while EPA is proposing new monitoring requirements for PWSs serving 4,100 people or fewer, proposed monitoring requirements for systems serving greater than 4,100 people remain essentially unchanged. This section briefly discusses the structures of each of the two models and how they used available data, information, and assumptions to make predictions over time resulting from the proposed regulatory options.

Chapter 5 of the Proposed RTCR EA (USEPA 2010a) includes a more detailed description of the occurrence and predictive model used for PWSs serving 4,100 or fewer people, and the other simpler predictive model used for PWSs serving greater than 4,100 people.

1. Model Used for Public Water Systems Serving 4,100 or Fewer People

The occurrence and predictive model used for PWSs serving 4,100 or fewer people has two components. The first component of the model characterized how the presence or positive rates of total coliform and *E. coli* detections vary across the population of small (serving 4,100 or fewer people) public water systems in the U.S. These rates vary by the type of sample (routine or repeat), by analyte (total coliforms or *E. coli*), and by system type (CWS, NCWS, or TNCWS) and size. The second component of the model used the total coliform and *E. coli* occurrence distributions to simulate a set of nationally-representative systems within the context of the three regulatory options (TCR, AIP, and Alternative) to predict changes in total coliform and *E. coli* occurrence, triggers, assessments, corrective actions over time, and violations.

The model assumed that the national occurrence of total coliforms and *E. coli* has reached a steady state in recent years under the current TCR. It assumed that cycles of normal deterioration and repair/replacement are occurring at the individual system level. However, the numbers of violations at the national level have remained relatively unchanged. This assumption is based on evaluation of SDWIS/FED violation data. Exhibit VI–1 presents the number of PWSs with TCR violations over the last several years which shows that national violation rates have remained relatively steady over the past several years. Revisions to the TCR affect this steady state, likely resulting in a reduction of the underlying occurrence and associated violations. However, before the RTCR goes into effect, GWR implementation begins which is also expected to affect the steady state.

Exhibit VI-1 Number of PWSs with Violations by System Type (2001 – 2007)

PWS Type	Year						
	2001	2002	2003	2004	2005	2006	2007
Acute MCL Violations							
CWS	143	144	185	171	151	171	171
NTNCWS	51	53	70	58	65	68	45
TNCWS	261	278	322	351	349	361	295
All	455	475	577	580	565	600	511
Non-Acute MCL Violations							
CWS	2,074	2,110	2,204	2,314	2,196	2,095	1,996
NTNCWS	601	679	725	750	753	735	655
TNCWS	2,707	2,934	3,036	3,132	3,039	3,244	3,209
All	5,382	5,723	5,965	6,196	5,988	6,074	5,860

Note: PWSs counts are of systems that had at least one violation during the year.
Source: SDWIS/FED annual data for period ending 3rd quarter 2001 – 2007. OH, US territories, Tribal PWS data excluded.

To estimate the effects that GWR implementation is expected to have on present steady state conditions, EPA used the occurrence and predictive model to simulate five years of implementation of the current TCR with the GWR, which became effective in December 2009. EPA assumed these five years to account for the approximately two years before the expected promulgation date of the final RTCR and an additional three years after that until the RTCR effective date. The assumptions made to account for the GWR are described in detail in the Proposed RTCR EA (USEPA 2010a) and summarized in Exhibit VI–2.

EXHIBIT VI–2—SUMMARY OF MAJOR ASSUMPTIONS FOR SIMULATING GWR IMPLEMENTATION

GWR provision	Modeling approach/ assumption
Triggered Monitoring: GWSs not providing 4-log treatment for viruses that have total coliform-positive samples under current TCR are required to take source water samples and test for fecal indicator. If the sample is positive, they must take an additional 5 source water samples (unless the State requires corrective action). If any of these is positive, they must conduct corrective action.	Current model used same probabilities used in GWR EA (USEPA 2006a) to predict whether source water samples will be *E. coli*-positive. GWSs required to conduct corrective action due to monitoring results will either install disinfection or implement a nondisinfecting corrective action as described in Proposed RTCR EA (USEPA 2010a). GWSs installing disinfection will draw from the probability distributions for total coliforms and *E. coli* for disinfected systems for the remainder of analysis. GWSs implementing a nondisinfecting corrective action will experience no positive samples for the remainder of the year plus two additional years and will experience a 75 [1] percent reduction in occurrence for five additional years.
Sanitary Surveys: GWR includes Federal sanitary survey requirements for all GWSs, and requires States to perform regular comprehensive sanitary surveys including eight critical elements.	Model did not explicitly simulate sanitary surveys or their results. Rather, it assumed that the new sanitary survey provisions will result in 10 percent [2] reduced occurrence of total coliforms universally for entire analysis.
Compliance Monitoring: GWSs that provide 4-log treatment for viruses must demonstrate that they are providing this level of treatment by conducting compliance monitoring..	Model did not explicitly simulate compliance monitoring. Rather, it assumed that the provision will result in 10 percent [3] reduced occurrence of total coliforms for those GWSs that are conducting compliance monitoring once assumed 4-log treatment for viruses begins

[1, 2, 3] Assumption reflects EPA best professional judgment.
Source: Proposed RTCR EA (USEPA 2010a) as informed by GWR EA (USEPA 2006a).

Actual reductions in occurrence that are expected to result from the implementation of GWR requirements may differ from what is presented here. However, based on assumptions used in this model, the analysis of how the AIP and Alternative option perform relative to each other are not affected.

In addition to capturing the effect of implementation of GWR requirements with the current TCR for a five-year period of analysis, the model captures an additional 25 years with the current TCR, the AIP option, and the Alternative option. Along with changes in total coliform and *E. coli* occurrence, the model predicts behavioral changes: The number of Level 1 and Level 2 assessments (and associated Level 1 or Level 2 corrective actions) to be performed, further resulting adjustments to occurrence, and changes in sampling regimens as systems qualify for reduced monitoring requirements. The assumptions used to simulate RTCR implementation are detailed in the Proposed RTCR EA (USEPA 2010a) and summarized in Exhibit VI–3.

EXHIBIT VI–3—SUMMARY OF MAJOR ASSUMPTIONS FOR SIMULATING PROPOSED RTCR IMPLEMENTATION

Proposed RTCR provision	Modeling approach/assumption
Level 1 Assessment	Model simulates sampling and sampling results and determines which PWSs will be triggered to conduct an assessment. Sanitary defects are found in 10 percent [1] of assessments (represents net increase over current TCR). All sanitary defects are corrected. Model selects from distribution of potential corrective actions as explained in chapter 7 of the Proposed RTCR EA (USEPA 2010a). PWSs implementing a corrective action as a result of a Level 1 assessment experience no positive samples for the remainder of the year plus one additional year and will experience 50 percent [2] reduction in occurrence for three additional years.
Level 2 Assessment	Model simulates sampling and sampling results and determines which PWSs will be triggered to conduct an assessment. Sanitary defects will be found in 10 percent [3] of assessments (represents net increase over current TCR). All sanitary defects are corrected. Model selects from distribution of potential corrective actions as explained in chapter 7 of the Proposed RTCR EA (USEPA 2010a). PWSs implementing a corrective action as a result of a Level 2 assessment will experience no positive samples for the remainder of the year plus two additional years and will experience 75 percent [4] reduction in occurrence for five additional years.

[1 3] Assumption based on conversation with State representatives with on-the-ground experience.
[2 4] Assumption reflects EPA best professional judgment.

Note: EPA recognizes that there is a large uncertainty with the assumptions. Sensitivity analyses showed that the fundamental conclusions of the economic analysis do not change over a wide range of assumptions tested.
Source: Proposed RTCR EA (USEPA 2010a).

EPA made different assumptions for the effectiveness of assessments and subsequent corrective actions to account for the differences between the two types of assessments. The Level 2 assessment is a more comprehensive investigation that may result in finding more substantial problems than what may be found during a Level 1 assessment, and for that reason the corrective actions that result from a Level 2 assessment were modeled to have bigger and longer lasting effects than those of the Level 1 assessments. EPA conducted sensitivity analyses around the key assumptions summarized in Exhibit VI–2 as discussed in section VI.L of this preamble.

2. Model Used for Public Water Systems Serving More Than 4,100 People

For systems serving more than 4,100 people, EPA estimated violation and trigger rates using SDWIS/FED because the Six-Year Review 2 data (USEPA 2010e) for PWSs serving more than 4,100 people were not as robust as the Six-Year Review 2 data (USEPA 2010e) for systems serving 4,100 or fewer people. EPA did not quantify changes in violation or trigger rates for systems serving more than 4,100 people among the current TCR, AIP, and Alternative options because of: (1) Limited Six-Year Review 2 data (USEPA 2010e) to characterize these systems, (2) the essentially unchanged monitoring requirements across options for these systems, and (3) the level of effort already occurring to implement the TCR.

D. Baseline Profiles

The estimate of baseline conditions that EPA developed provides a reference point for understanding net impacts of the proposed rule revisions.

Compliance with the GWR begins in December 2009, and the expected compliance date of the RTCR is approximately five years following commencement of the GWR implementation. The majority of PWSs are GWSs and these systems are expected to be affected by the GWR. Because GWR implementation prior to the effective date of RTCR is expected to cause changes to GWSs, the baseline conditions that EPA developed for GWSs account for the expected effects of the GWR.

For PWSs serving more than 4,100 people, EPA assumed that present conditions, as reflected in 2005 SDWIS/FED data, are an appropriate representation of the conditions that are likely to exist when the RTCR becomes effective. EPA assumed that a steady state exists at the national level.

The number of GW PWSs that disinfect is expected to change during implementation of the GWR before the expected rule compliance date of the proposed RTCR. Exhibit VI–4 shows the estimated baseline number of the GW PWSs at the proposed RTCR compliance date.

Exhibit VI-4 Estimated Baseline Number of GW Systems and Disinfection Status at compliance date (3 years post RTCR promulgation)

PWS Size	Number of GW PWSs (Post-GWR)					
	CWS		NTNCWS		TNCWS	
	Disinfecting	Non-Disinfecting	Disinfecting	Non-Disinfecting	Disinfecting	Non-Disinfecting
≤100	6,308	5,630	2,937	5,889	13,781	46,419
101 - 500	9,326	4,566	2,777	3,836	5,459	13,816
501-1,000	3,516	951	873	845	685	1,278
1,001-4,100	5,423	1,020	547	265	274	343
4,101-33,000	2,798	358	56	14	27	40
33,001-96,000	307	28	2	-	-	2
96,001-500,000	62	1	-	-	-	1
500,001-1 Million	4	-	-	-	-	1
> 1 Million	3	-	-	-	-	-
Total	**27,746**	**12,555**	**7,192**	**10,849**	**20,226**	**61,900**
Combined Total	**40,301**		**18,041**		**82,126**	

Source: Proposed RTCR Occurrence and Predictive Model Output as detailed in the Proposed RTCR EA (USEPA 2010a)

EPA estimated the numbers of GW PWSs that monitor monthly, quarterly, and annually under the current TCR based on an analysis of the Six-Year Review 2 data (USEPA 2010e) and individual State statutes conducted by EPA and the advisory committee Technical Work Group (TWG). Of the GW PWSs serving 1,000 or fewer people, EPA estimated that approximately 34,000 monitor monthly, 67,000 monitor quarterly, and 27,000 monitor annually. EPA assumed that the numbers of systems on monthly, quarterly, and annual monitoring remain unchanged at the rule effective date for either a continuation of the current TCR or for the AIP option. Under the Alternative option, all PWSs, regardless of size or type, start at monthly monitoring at the rule effective date.

The following two tables provide an overview of summary statistics relating to baseline water quality. Exhibit VI–5 shows the percentage of total coliform- and *E. coli*-positive samples based on PWS type and size. The percentages of samples that are total coliform-positive are generally higher in ground water

systems than in surface water systems; in smaller systems than in larger systems; and in NCWSs than in CWSs.

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Exhibit VI-5 Total Coliform and *E. coli* Percent Positive by System Size and Type

PWS Type	Source Water	Population Served	TC (# Samples)	TC (+ Samples)	TC (% Positive)	EC (# Samples) [1]	EC (+ Samples)	EC (% Positive)[2]
CWS	GW	≤100	93,105	2,479	2.66%	1,172	72	0.08%
		101 - 500	125,490	2,500	1.99%	1,639	61	0.05%
		501-1,000	48,265	736	1.52%	483	20	0.04%
		1,001-4,100	110,391	1,176	1.07%	732	21	0.02%
		4,101-33,000	183,721	877	0.48%	458	22	0.01%
		33,001-100,000	96,361	214	0.22%	44	2	0.00%
		>100,000	64,965	289	0.44%	34	1	0.00%
		Total GW	722,298	8,271	1.15%	4,562	199	0.03%
	SW	≤100	6,735	95	1.41%	64	6	0.09%
		101 - 500	19,716	227	1.15%	159	10	0.05%
		501-1,000	12,828	90	0.70%	70	7	0.05%
		1,001-4,100	55,310	314	0.57%	233	17	0.03%
		4,101-33,000	175,758	525	0.30%	399	41	0.02%
		33,001-100,000	112,894	157	0.14%	106	5	0.00%
		>100,000	112,143	235	0.21%	99	2	0.00%
		Total SW	495,384	1,643	0.33%	1,130	88	0.02%
	GW & SW	**Total CWS**	1,217,682	9,914	0.81%	5,692	287	0.02%
TNCWS	GW	≤100	163,730	7,820	4.78%	5,820	316	0.20%
		101 - 500	52,891	2,418	4.57%	1,869	99	0.19%
		501-1,000	6,952	299	4.30%	217	4	0.06%
		>1,000	7,062	143	2.02%	85	2	0.03%
		Total GW	230,635	10,680	4.63%	7,991	421	0.18%
	SW	≤100	6,723	150	2.23%	141	17	0.25%
		101 - 500	2,854	75	2.63%	69	13	0.46%
		501-1,000	523	19	3.63%	19	-	0.00%
		>1,000	988	6	0.61%	37	-	0.00%
		Total SW	11,088	250	2.25%	266	30	0.27%
	GW & SW	**Total TNCWS**	241,723	10,930	4.52%	8,257	451	0.19%
NTNCWS	GW	≤100	46,505	1,476	3.17%	1,061	34	0.07%
		101 - 500	33,084	893	2.70%	628	19	0.06%
		501-1,000	9,531	166	1.74%	103	2	0.02%
		>1,000	13,138	177	1.35%	103	5	0.04%
		Total GW	102,258	2,712	2.65%	1,895	60	0.06%
	SW	≤100	1,668	32	1.92%	30	4	0.24%
		101 - 500	2,304	9	0.39%	9	2	0.09%
		501-1,000	932	6	0.64%	5	-	0.00%
		>1,000	1,316	1	0.08%	1	-	0.00%
		Total SW	6,220	48	0.77%	45	6	0.10%
	GW & SW	**Total NTNCWS**	108,478	2,760	2.54%	1,940	66	0.06%

[1] Number of *E. coli* samples is the denominator of the *E. coli* percent positive calculation, and includes the number of total coliform
negative samples plus the number of total coliform-positive samples that were tested for *E. coli*.

[2] Percent *E. coli*-positive was calculated as (number of *E. coli*-positive samples)/(number of *E. coli* samples taken).

Source: Derived using Six-Year Review 2 Data (USEPA 2010e), which was filtered by including a State only if the State's PWSs as a group had submitted at least 50 percent of the expected sample-months of usable data. The Total Coliform Rule Compliance Monitoring Data Quality and Completion Report (USEPA 2010c) includes a detailed description of this data cleaning process.

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Exhibit VI–6 presents the number of acute and non-acute violations received by PWSs. The number of violations is also an indicator of baseline water quality prior to implementation of the proposed RTCR. As discussed in detail in chapter 5 of the Proposed RTCR EA (USEPA 2010a), EPA used these data to estimate the numbers of MCL violations and triggers for PWSs serving more than 4,100 people for the three options. Under the current TCR, larger systems incur a relatively small number of violations annually, while smaller systems incur the majority.

EXHIBIT VI–6—BASELINE NUMBER OF TCR VIOLATIONS BY SYSTEM SIZE AND TYPE (2005)

	GW PWSs			SW PWSs			All PWSs total
	Non-acute	Acute	Total	Non-acute	Acute	Total	
CWSs							
≤100	905	52	957	16	3	19	976
101–500	809	34	843	50	7	57	900
501–1,000	203	13	216	16	3	19	235
1,001–3,300	272	8	280	55	7	62	342
3,301–10,000	171	8	179	75	3	78	257
10,001–50,000	125	8	133	78	4	82	215
50,001–100,000	11	2	13	5	4	9	22
100,001–1 Million	1	1	2	3	1	4	6
>1 Million				1		1	1
Totals	2,497	126	2,623	299	32	331	2,954
NTNCWSs							
≤100	514	34	548	7	2	9	557
101–500	346	20	366	4		4	370
501–1,000	57	6	63	2		2	65
1,001–3,300	58	4	62				62
3,301–10,000	9	2	11	1		1	12
10,001–50,000	1		1				1
50,001–100,000							
100,001–1 Million							
>1 Million							
Totals	985	66	1,051	14	2	16	1,067
TNCWSs							
≤100	2,665	278	2,943	19	5	24	2,967
101–500	833	76	909	11	1	12	921
501–1,000	133	11	144	4		4	148
1,001–3,300	58	2	60	1		1	61
3,301–10,000	5		5	1		1	6
10,001–50,000							
50,001–100,000							
100,001–1 Million							
>1 Million							
Totals	3,694	367	4,061	36	6	42	4,103
Grand Total	7,176	559	7,735	349	40	389	8,124

Note: The proposed RTCR EA uses violations data for PWSs serving greater than 4,100 people to estimate triggers for these systems. Data for other system sizes is provided for reference.

Source: SDWIS/FED 2005 3rd quarter data. OH, U.S. territories, Tribal PWS data excluded. *See* the Proposed RTCR EA (USEPA 2010a) for additional details.

E. Anticipated Benefits of the Proposed RTCR

In promulgating the RTCR, EPA expects to further reduce the risk of contamination of public drinking water supplies from the current baseline risk under the current TCR. The options considered during development of this proposed rule and analyzed as part of the Proposed RTCR EA (USEPA 2010a) are designed to achieve this reduction while maintaining public health protection in a cost-effective manner.

This section examines the benefits in terms of trade-offs among compliance with the current TCR option, the AIP option, and the Alternative option. Because there are insufficient data reporting the co-occurrence in a single sample of fecal indicator *E. coli* and pathogenic organisms and because the available fecal indicator *E. coli* data from the Six-Year Review 2 dataset (USEPA 2010e) were limited to presence-absence data, EPA was unable to quantify health benefits for the proposed RTCR. EPA used several methods to qualitatively evaluate the benefits of the proposed RTCR options. The qualitative evaluation uses both the judgment of EPA as informed by the TCRDSAC deliberations as well as quantitative estimates of changes in total coliform occurrence and counts of systems implementing corrective actions. The evaluation characterizes, in relative terms, the reduction in risk for each regulatory scenario as compared to baseline conditions.

Since *E. coli* is an indicator of fecal contamination, EPA assumed that a decrease in *E. coli* occurrence in the distribution system would be associated with a decrease in fecal contamination in the distribution system. In general, this decrease in fecal contamination should reduce the potential risk to human health for PWS customers. Thus, any reduction in *E. coli* occurrence is considered a benefit of the proposed RTCR. Also, since fecal contamination may contain waterborne pathogens including bacteria, viruses, and parasitic protozoa, in general, a reduction in fecal contamination should also reduce the risk from these other contaminants.

As presented in Exhibit VI–5, the percentages of samples that are positive for total coliforms and *E. coli* are generally higher for PWSs serving 4,100 or fewer people than those serving more than 4,100 people. PWSs with higher total coliform and *E. coli* occurrence are more likely to be triggered into assessments and corrective action. As discussed previously, the assessments and corrective action lead to a decrease in total coliform and *E. coli* occurrence. Because the PWSs serving 4,100 or fewer people have a higher initial *E. coli* occurrence and are likely triggered into more assessments and corrective actions than larger PWSs, the increase in benefits for these small systems are likely more evident as compared to the larger systems. In particular, model results suggest that customers of small ground water TNCWSs serving 100 or fewer people, which constitute approximately 40 percent of PWSs, experience the most improvement in water quality under the proposed RTCR. That is, the occurrence of *E. coli* is predicted to decrease more for these systems than for other systems types.

1. Relative Risk Analysis

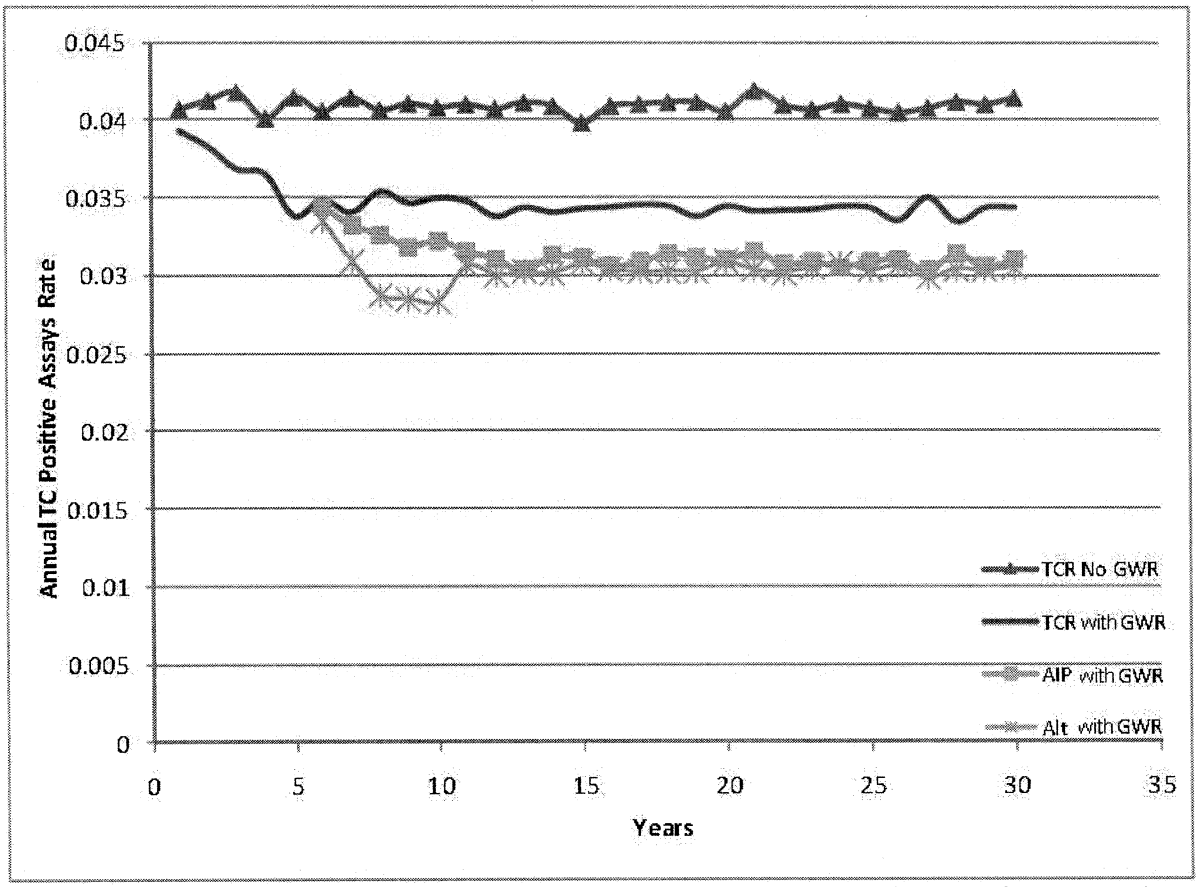
When revising an existing drinking water regulation, one of the main concerns is to ensure that backsliding on water quality and public health protection does not occur. SDWA requires that EPA at least maintain or improve public health protection for any rule revision. The proposed RTCR is more stringent that the current TCR with regard to protecting public health. The basis for this perspective is provided in this subsection and the following subsections (sections V*I.E.*1–3) of this preamble.

Risk reduction for the proposed RTCR is characterized by the activities performed that are presumed to reduce risk of exposing the public to contaminated water. These activities are considered under each rule component presented in Exhibit VI–8.

More frequent monitoring has the potential to decrease the risk of contamination in PWSs based on an enhanced ability to diagnose and mitigate system issues in a more timely fashion. Conversely, less frequent monitoring has the potential to increase risk. Real-time continuous sampling would mitigate the most risk possible based on sampling schedule; however, it would cost prohibitively more than the periodic sampling practiced under the current TCR and included in the AIP and the Alternative options. EPA's objective in proposing the sampling schedules included in the AIP and Alternative options was to find an appropriate balance between the factors of risk mitigation and cost management.

Under the AIP and Alternative options, the reduction in the number of repeat samples and additional routine samples for some PWSs has the potential to contribute to increased risk for PWS customers (*see* also sections III.A.3 and III.A.4 of this preamble for discussions on the repeat sample and additional routine sample provisions respectively). However, this increase in risk is expected to be more than offset by potential decreases in risk from increased routine monitoring (*see* section III.A.3 of this preamble) and the addition of the assessments and corrective action provisions (*see* section III.A.5 of this preamble) that find and fix problems indicated by monitoring. Exhibit VI–7 illustrates the predicted reduced frequency at which total coliforms occur subsequent to the implementation of the AIP and Alternative options. As discussed previously, the proposed RTCR uses total coliform occurrence as an indicator of potential pathways for possible contamination to enter the distribution system (*see* section III.A.2 of this preamble). Exhibit VI–7 illustrates the combined effects on total coliform occurrence resulting from changes in monitoring and the effects of assessments and corrective actions for the different rule options illustrated. The relative trends indicated in Exhibit VI–7 for transient non-community water systems also pertain to other PWS categories as illustrated in chapter 5 of the Proposed RTCR EA (USEPA 2010a). EPA chose to include the characterization for TNCWSs because they represent the system category of largest influence on the national impacts.

Exhibit VI-7 GW Transient Non-community Water System Total Coliform Occurrence



Source: Proposed RTCR occurrence model as described in the Proposed RTCR EA (USEPA 2010a).

The effect that the proposed changes to public notification requirements for monthly/non-acute MCL violations have on risk is difficult to predict. Some factors, such as reduction in available public information and possible PWS complacency, lead to a potential increase in risk and other factors, such as less confusion (PN more in line with potential health risks) and PWSs resources used more efficiently, lead to a potential decrease, as discussed in Exhibit VI–8. This change to PN is addressing a key concern expressed by various stakeholders in the advisory committee and during the Six-Year Review 1 comment solicitation process. By eliminating the requirement and replacing it with assessment and corrective action requirements, the Agency expects less public confusion, more effective use of resources, and increased transparency. Other proposed rule components are expected to have a negligible effect on risk. However, the overall effect of the proposed RTCR is expected to be a further reduction in risk from the current baseline risk under the current TCR. Chapter 6 of the Proposed RTCR EA (USEPA 2010a) presents a detailed discussion of the potential influence on health risk for each proposed rule component.

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Exhibit VI-8 Potential Changes in Risk under the AIP and Alternative Options Relative to the Current TCR

Proposed Rule Component	Factors Leading to a Potential Increase in Risk		Factors Leading to a Potential Decrease in Risk		Overall Predicted Change in Risk	
	AIP	Alternative	AIP	Alternative	AIP	Alternative
Implementation Activities	None	None	None	None	No change	No change
Routine Monitoring (Including Reduced Monitoring)	None	None	Increased stringency in requirements to qualify for reduced monitoring along with requirement to return to baseline monitoring upon loss of these criteria is expected to result in decreased risk (That is, fewer PWSs will qualify and therefore monitor more frequently than under the baseline for reduced monitoring)	PWSs all monitor monthly in the first few years of implementation of the RTCR, which is an increase in sampling frequency for systems that monitor quarterly or annually under the current TCR. After the first few years, systems may reduce to quarterly, but none may reduce to annual monitoring, creating a decrease in risk for systems on annual monitoring under the current TCR	Decrease	Decrease
Repeat Monitoring	Required repeat samples reduced from 4 to 3 for systems serving <1,000 people	Same as AIP option	None	None	Increase	Increase
Additional Routine Monitoring	Additional routine samples are no longer required for PWSs monitoring monthly. Ground water PWSs serving 1,000 or fewer people reduce additional routine samples from 5 to 3.	Same as AIP option	None	None	Increase	Increase
Annual Site Visits	None (only States currently performing annual site visits are expected to continue)	Based on discussions with stakeholders, States that currently conduct	None (only States currently performing annual site visits are expected to continue)	None	No change	Increase

		annual site visits under the current TCR may no longer have the resources to continue the site visits and conduct quarterly monitoring under the Alternative option				
Assessments	None	None	Mandatory assessments are a new requirement	Same as AIP option	Decrease	Decrease
Corrective Actions	None	None	Mandatory corrective actions are a new requirement	Same as AIP option	Decrease	Decrease
Public Notification – Monthly/Non-Acute MCL Violations	Reduction in available public information Possible PWS complacency	Same as AIP option	Less confusion (PN more in line with potential health risks) PWSs resources used more efficiently	Same as AIP option	Unknown	Unknown
Public Notification – Monitoring and Reporting Violations	None	None	Increased stringency of PNs motivates PWSs to conduct required sampling	Same as AIP option	Decrease	Decrease
Overall					Decrease	Decrease

Notes: Detailed discussion of the rationale for determinations of potential risk for each rule component is presented in chapter 6 (section 6.2) of the Proposed RTCR EA (USEPA 2010a). Implementation activities consist of administrative activities by PWSs and States to implement the rule. Assessment of potential changes in risk for monitoring components is an *overall* assessment. Potential changes (or static state) of risk for particular system sizes and types differ according to individual regulatory requirements and are discussed in section 6.2 of the Proposed RTCR EA. Chapter 3 of the Proposed RTCR EA provides a detailed description of the regulatory components for all three regulatory scenarios, and this preamble provides additional discussion of the TCRDSAC process and the rationale underlying the structure of the regulatory options considered.

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2. Changes in Violation Rates and Corrective Actions

The quantified portion of the benefits analysis focuses on several measures that contribute to the changes in risk expected under the proposed RTCR. Specifically, EPA modeled the predicted outcomes based on each regulatory option considered—baseline (current TCR), the AIP, and the Alternative option—in the form of estimates of non-acute violations for the current TCR and assessment triggers for the AIP and Alternative option; *E. coli* violations; and the number of corrective actions implemented under each option. This section of the preamble includes six graphs (Exhibit VI–9 through Exhibit VI–14) that help to illustrate these endpoints.

Evaluation of each of these endpoints informed EPA's understanding of potential changes to the underlying quality of drinking water. In particular, the number of corrective actions performed has a strong relationship to potential improvements in water quality and public health. For a given rate of total coliform and *E. coli* occurrence, an increase in the number of corrective actions implemented leads to improved water quality. However, a reduction in sampling likely leads to a reduction in total coliform and *E. coli* positives being found, which in turn likely leads to a reduction in assessments and corrective actions being implemented. The number of total coliform and *E. coli* positives that are prevented, missed, or found under each regulatory option considered in comparison to those predicted under the current TCR results in estimates of annual non-acute and acute violations (current TCR) and assessment triggers (AIP and Alternative options). Section 6.4 of the Proposed RTCR EA (USEPA 2010a) presents a step-wise sensitivity analysis of the competing effects of additional protective activity (*e.g.*, assessments and corrective actions) and decreased additional routine and repeat sampling of the regulatory alternatives compared to the current TCR. The results of this sensitivity analysis showed that for all categories of systems, more total coliform and *E. coli* positives are prevented than missed under both regulatory options.

For each of the graphs presented in Exhibit VI–9 through Exhibit VI–14, there are two main model drivers that affect the endpoints depicted: The total

number of samples taken over time (including routine, additional routine, and repeat samples) and the effect of corrective actions taken. When looking at the comparisons between the TCR with the AIP across all PWSs, the overall effect of the total numbers of samples taken is negligible because the total number of samples predicted to be taken throughout the period of analysis is almost the same (approximately 82 million samples) under both the TCR and AIP. For the Alternative option, the analysis predicts that approximately 87 million total samples are taken over the period of analysis. Exhibit VI–18 of this preamble presents estimated total numbers of samples taken over the 25-year period of analysis. Based on the relationships of total samples taken among the TCR, AIP, and Alternative options, the best way to interpret the graphs presented in this section is in a step-wise manner.

The first comparison that should be made is between the current TCR and AIP options. Because similar total numbers of samples are taken under each option, the major effect seen in the graphs can be isolated to the effects that implementation of corrective actions has on underlying occurrence and how that occurrence influences the endpoint in question (assessments, *E. coli* MCL violations, and corrective actions). In each graph, this is depicted by a marked reduction in the endpoint under the AIP option compared to the current TCR option and is a reflection of overall better water quality. The second comparison can then be made of the Alternative option against the AIP option. In each graph, the predicted results (assessments, *E. coli* MCL violations, and corrective actions) for the Alternative option are above those for the AIP option and represent an additional benefit over the AIP option. This additional benefit is primarily a function of the additional diagnostic abilities gained through increased monitoring under the Alternative option, and is especially prominent in the early years of the analysis when all systems are required to monitor at least monthly.

More detailed descriptions of each endpoint considered in terms of the evaluation process described previously are provided in this section as they apply to the individual graphs in Exhibit VI–9 through VI–14. Each of the graphs shown in this section is presented first in nondiscounted terms, and then based on a discount rate of three percent to reflect the reduced valuation of potential benefits over time, consistent with the presentation of costs in the section that follows. Graphs of benefits discounted using seven percent discounted rates are presented in Appendix B of the Proposed RTCR EA (USEPA 2010a).

Exhibit VI–9 shows the effect (on average across all PWSs) of the AIP and the Alternative options on the annual number of non-acute violations (TCR) and assessment triggers (AIP and Alternative options) over time. The estimated reduction of annual assessment triggers (from the current TCR estimates of non-acute violations) by approximately 1,000 events under the AIP option is a reflection of the improved water quality expected under the AIP option. A similar but smaller reduction in non-acute violations (Level 1 triggers) from the current TCR is seen under the Alternative option. The larger initial estimate of assessment triggers followed by a higher steady state number for the Alternative option than seen under the AIP option reflects the diagnostic abilities provided by increased sampling under the Alternative option. The additional triggers identified by increased sampling under the Alternative option translate into greater potential benefits than under the AIP option.

Exhibit VI–10 shows the effect (on average across all PWSs) of the AIP and the Alternative option with respect to *E. coli* violations found over the 25-year period of analysis in comparison to the current TCR. The overall reduction in annual *E. coli* violations under the AIP option of more than 100 events is a measure that should correlate more closely with expected benefits (that is, reductions in adverse health outcomes) than non-acute events (as presented in Exhibit VI–9) because *E. coli* violations are a direct result of measurement of fecal contamination in water. A similar but smaller reduction is seen under the Alternative option after steady state is achieved. This is the result of two off-setting effects. The "true" number of steady state violations under the Alternative option is lower because there is a greater likelihood that violations will be found and fixed. However, the additional monitoring leads to a higher percentage of violations being detected. This second effect outweighs the first, so that the total number of detected violations in the steady state is higher than for the AIP, even though the underlying "true" number of violations is lower. This lower number of "true" violations means that the Alternative option is more protective of public health, even though more violations are detected.

Exhibit VI–11 presents estimates over the 25-year period of analysis of the increase in corrective actions (on average across all PWSs) attributable to the regulatory options considered. Performance of these additional corrective actions is expected to result in the most direct benefits under the proposed RTCR. Because only the incremental numbers of corrective actions estimated under the AIP and Alternative options were modeled, the reference point for comparison to the current TCR is the base (zero) line in the graph. The Proposed RTCR EA (USEPA 2010a) assumes that corrective actions are already being performed under the current TCR. Baseline corrective actions are taken into account by assuming only a modest incremental increase of 10 percent in implementation of effective corrective actions under both regulatory options considered.

Exhibit VI–11 indicates that more corrective actions are implemented under the Alternative option than under the AIP option. This is driven, again, by the increased diagnostic power of more sampling and reflects additional potential benefits beyond those gained under the AIP option.

Taken together, Exhibit VI–9 through Exhibit VI–11 indicate that the modeled endpoints for the AIP and Alternative options predict positive benefits in comparison to the current TCR; in particular, the Alternative option captures more benefits than the AIP option. Similar to the patterns seen in Exhibits VI–9 through VI–11, for each of the discounted endpoints presented over time in Exhibits VI–12 though VI–14, the graphs show that (on average across all PWSs) the Alternative option provides more benefit than the AIP, and both provide more benefit than the current TCR. These outcomes are consistent with the qualitative assessment of the benefits summarized in section VI.E.1.

The major difference between the AIP option and Alternative option is the increased monitoring that is required under the Alternative option. The increased diagnostic ability of the extra samples taken under the Alternative option is seen in the large difference in the endpoint counts through the first several years in Exhibit VI–9 through Exhibit VI–14. Absent this effect, the Alternative option essentially mirrors the AIP option in the exhibits. Even though the predicted results (assessments, *E. coli* MCL violations, and corrective actions) under the Alternative option are greater than the current TCR at first, the trend is due to initially finding more problems through monitoring. The increased monitoring during the first several years under the Alternative option results in a frontloading of benefits at the beginning

of the implementation period. The benefits, however, tend to even out over time between the AIP and Alternative option as eligible systems qualify for less intense (quarterly) monitoring under the Alternative option. However, the Alternative option leads to a greater number of assessments, *E. coli* MCL violations, and corrective actions than the AIP option because all PWSs are required to sample no less than quarterly under the Alternative option while under the AIP option qualifying PWSs are permitted to sample at a minimum of once per year (more monitoring has the potential for more triggered assessments, corrective actions, and/or violations than less monitoring).

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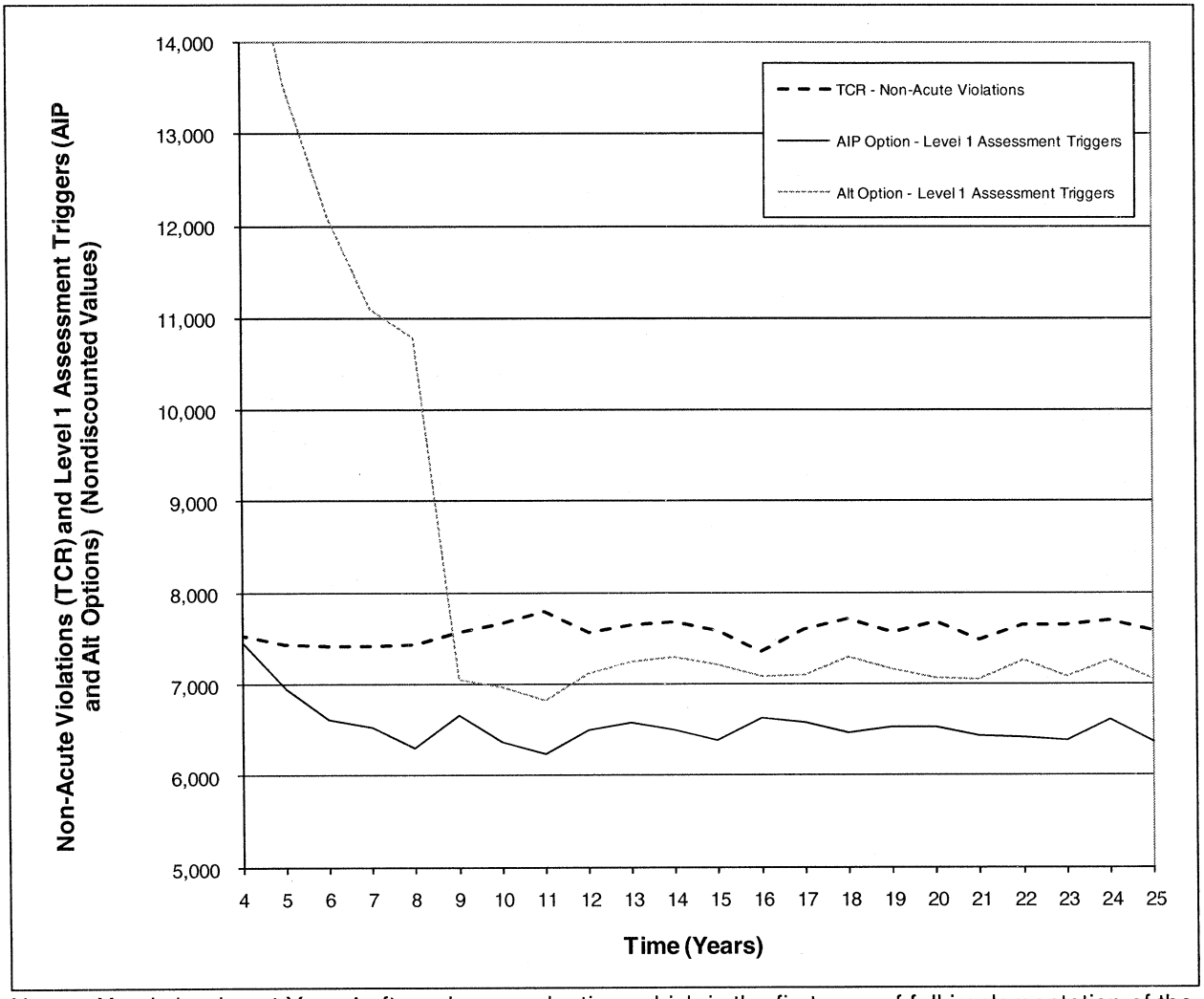
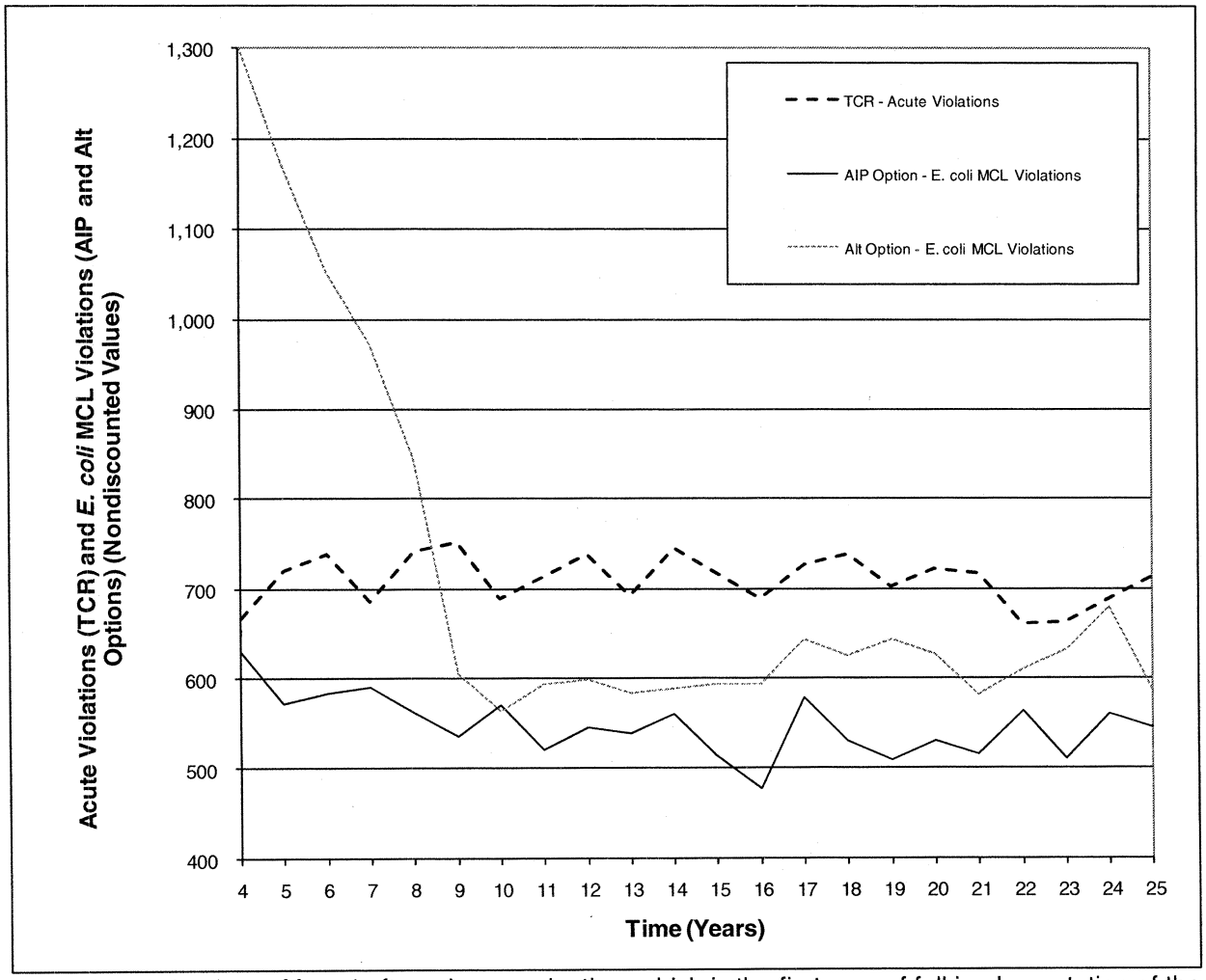
Exhibit VI-9 Estimates of Non-Acute Violations (TCR) and Level 1 Assessment Triggers (AIP and Alternative Option)



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of non-acute violations (TCR) and Level 1 assessment triggers (AIP and Alternative option) as predicted by the model reach a steady state beginning in approximately Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. Estimates represent the annual number of assessment triggers found by each option and the non-acute violations found under the TCR.
Source: Proposed RTCR occurrence model output.

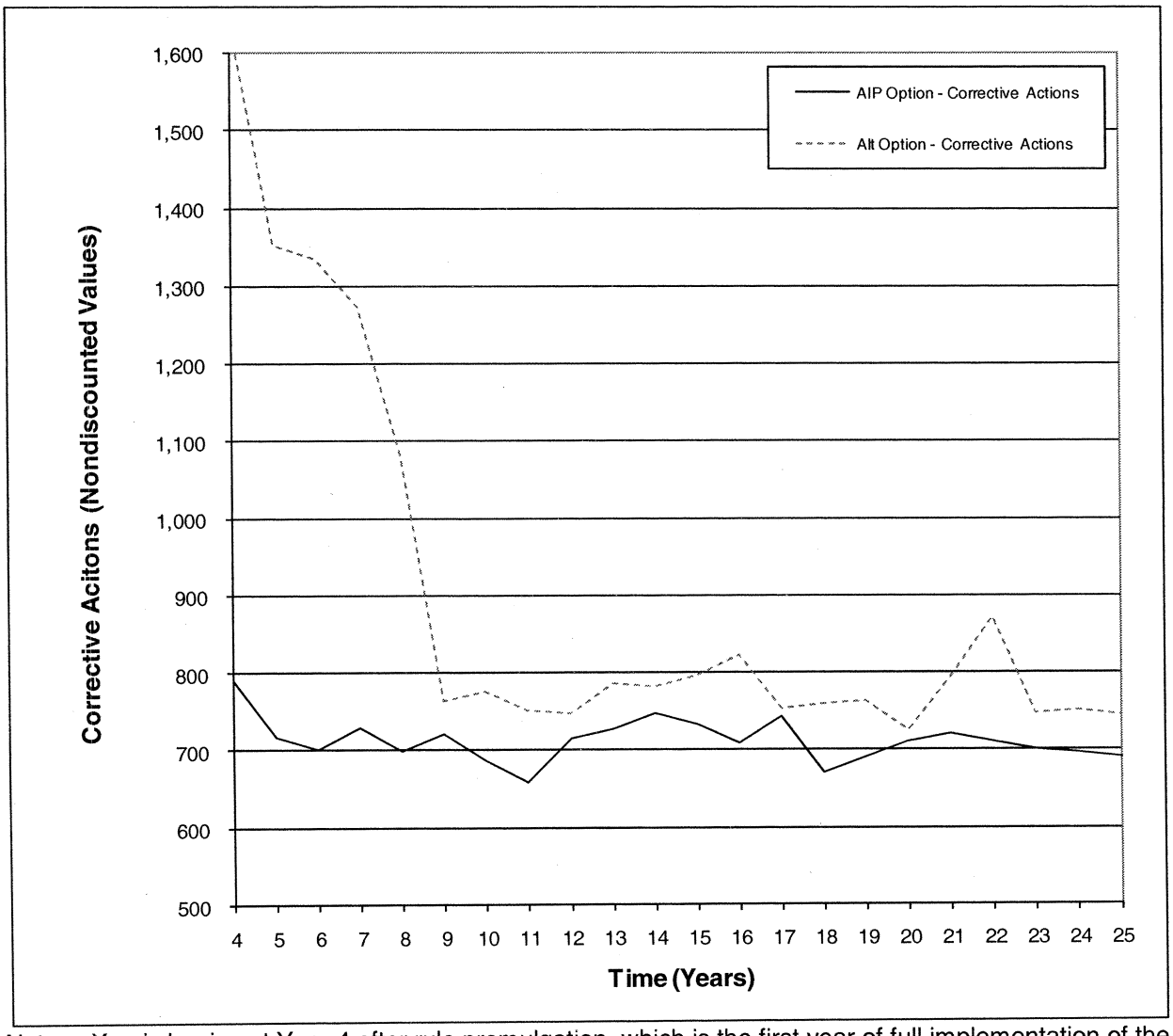
Exhibit VI-10 Estimates of Acute Violations (TCR) and *E. coli* MCL Violations (AIP and Alternative Options)



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of acute violations (TCR) and *E. coli* MCL violations (AIP and Alternative option) as predicted by the model reach steady state in approximately Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. Estimates represent the annual number of acute violations found by each option and the TCR.

Source: Proposed RTCR occurrence model output.

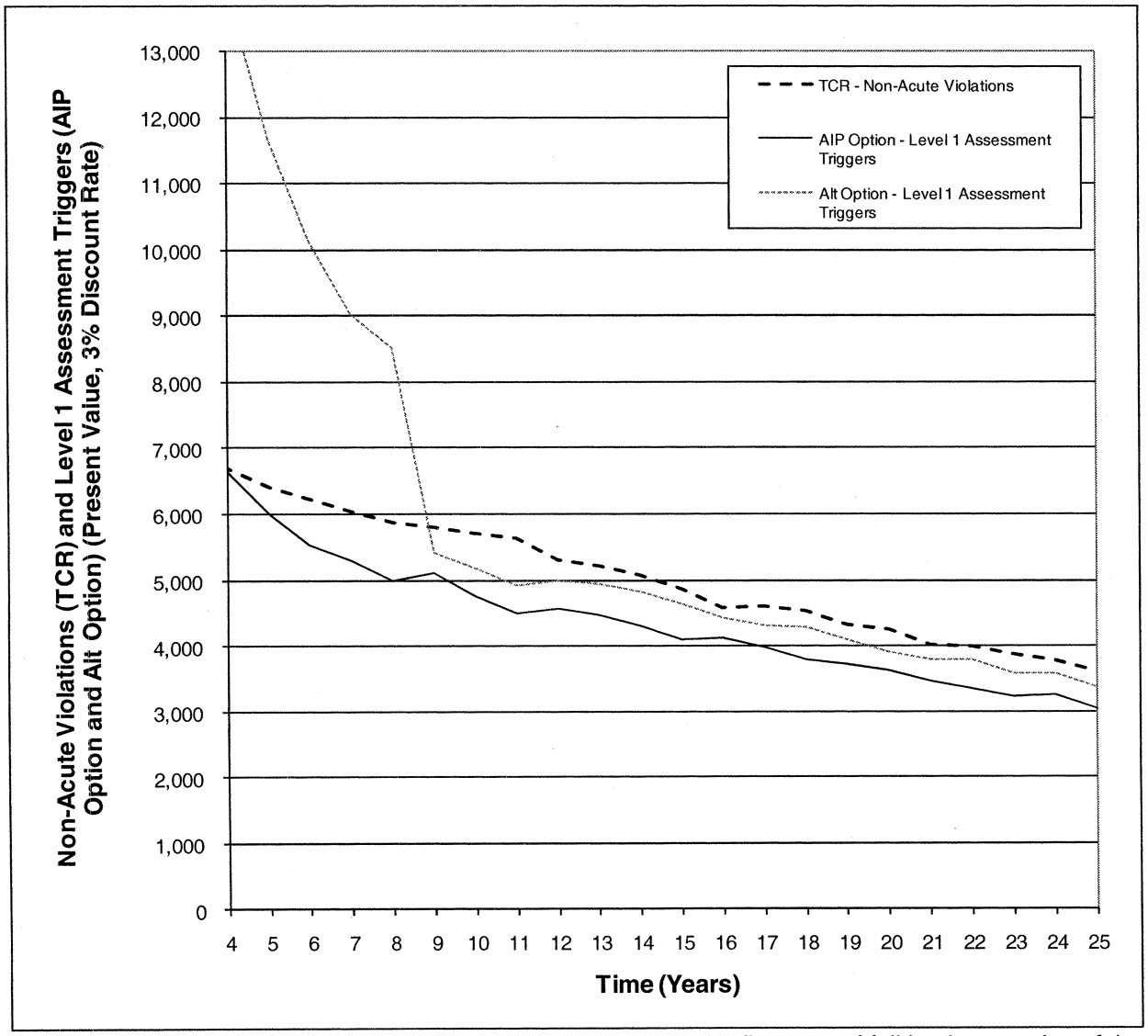
Exhibit VI-11 Estimates of Corrective Actions



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of corrective actions as predicted by the model reach a steady state beginning approximately in Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. All corrective actions performed are in addition to activity under the current TCR, which does not require corrective actions. Therefore the current TCR is not included in this graph.

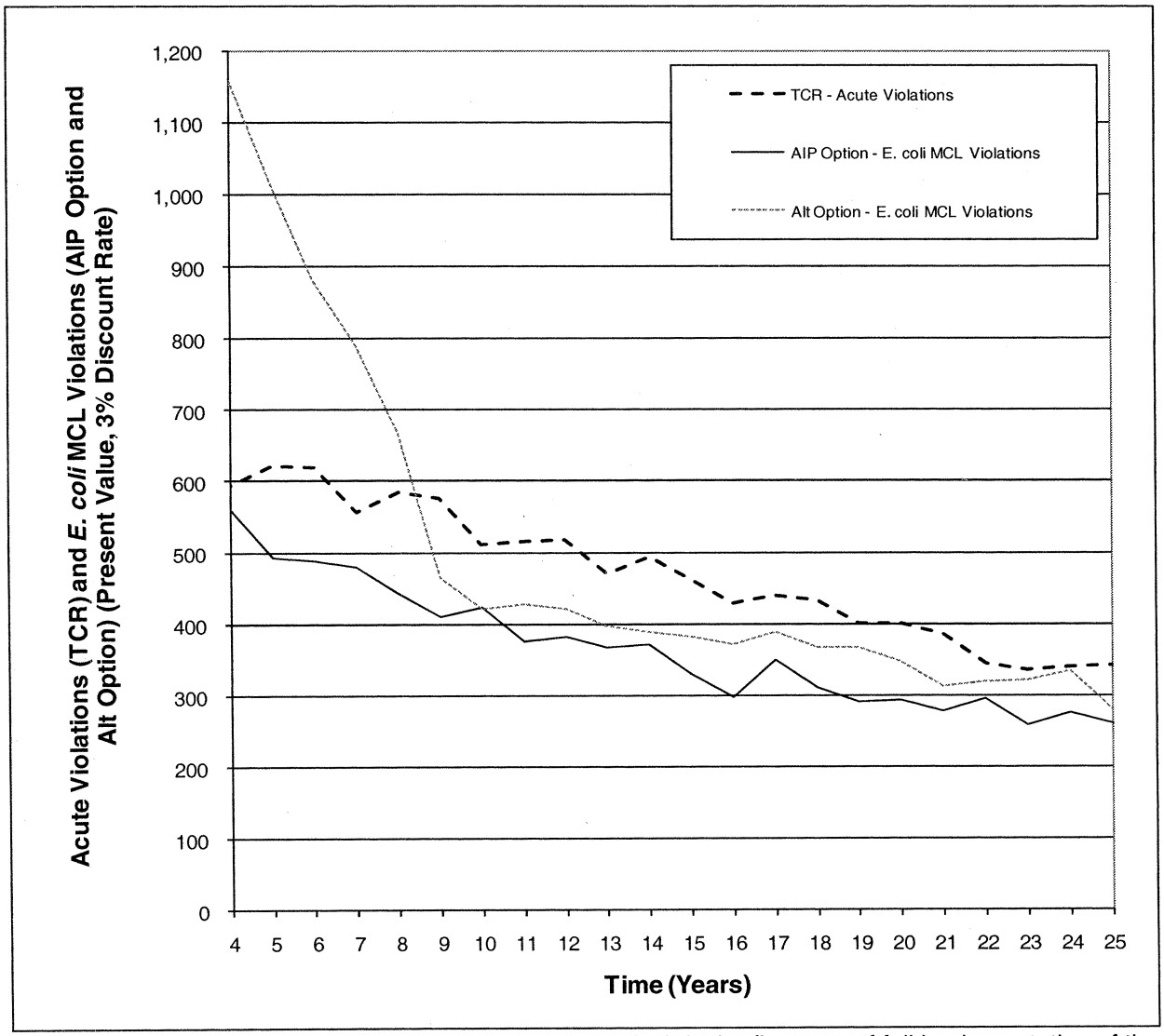
Source: Proposed RTCR occurrence model output.

Exhibit VI-12 Discounted Estimates of Non-Acute Violations (TCR) and Level 1 Assessment Triggers (AIP and Alternative Options) (three percent discount rate)



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of non-acute violations (TCR) and Level 1 assessment triggers (AIP and Alternative option) as predicted by the model reach a steady state beginning in approximately Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. Estimates represent the annual number of assessment triggers found by each option and the non-acute violations found under the TCR.
Source: Proposed RTCR occurrence model output.

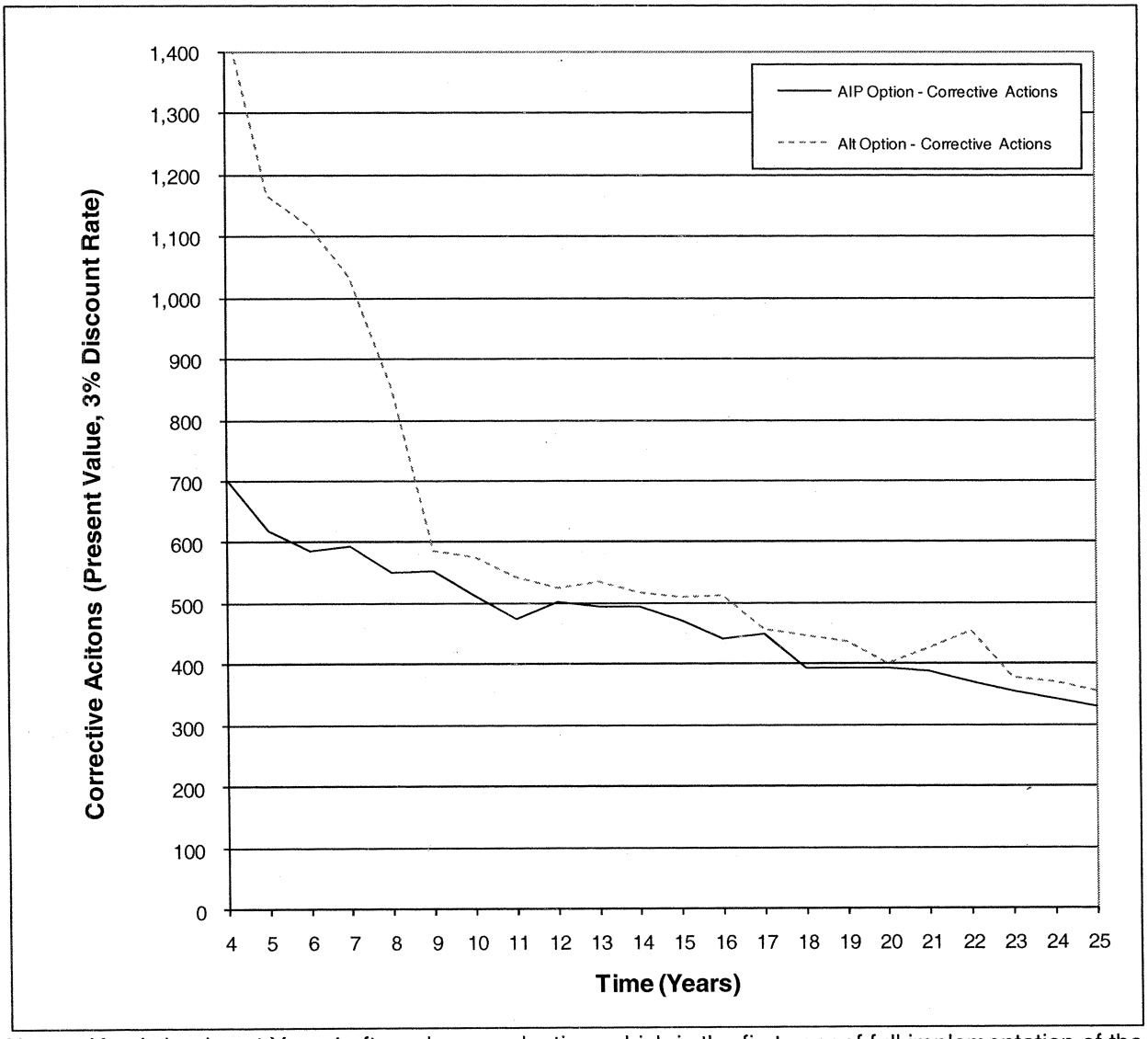
Exhibit VI-13 Discounted Estimates of Acute Violations (TCR) and *E. coli* Violations (AIP and Alternative Options) (three percent discount rate)



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of acute violations (TCR) and *E. coli* MCL violations (AIP and Alternative option) as predicted by the model reach steady state in approximately Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. Estimates represent the annual number of acute violations found by each option and the TCR.

Source: Proposed RTCR occurrence model output.

Exhibit VI-14 Discounted Estimates of Corrective Actions (three percent discount rate)



Notes: X-axis begins at Year 4 after rule promulgation, which is the first year of full implementation of the proposed RTCR (AIP option) or Alternative option. The annual rates of corrective actions as predicted by the model reach a steady state beginning in approximately Year 9, by which time PWSs that are expected to meet the criteria for reduced monitoring begin reduced monitoring, and the distribution of PWSs the monitor monthly, quarterly, and annually is assumed to remain relatively constant. All corrective actions performed are in addition to activity under the current TCR, which does not require corrective actions. Therefore the current TCR is not included in this graph.
Source: Proposed RTCR occurrence model output.

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3. Nonquantifiable Benefits

a. *Potential decreased incidence of endemic illness from fecal contamination, waterborne pathogens, and associated outbreaks.* As discussed in section VI of this preamble and chapter 2 of the Proposed RTCR EA (USEPA 2010a), benefits from the proposed RTCR may include avoidance of a full range of health effects from the consumption of fecally contaminated drinking water, including the following: Acute and chronic illness, endemic and epidemic disease, waterborne disease outbreaks, and death. EPA recognizes that the EPA-approved standard methods available for *E. coli* do not typically identify the presence of the pathogenic *E. coli* strains, such as *E. coli* O157:H7. Thus, *E. coli* occurrence, as used in this EA, serves as an indication of fecal contamination but not necessarily pathogenic contamination. *See* also discussion in sections III.A.2 and III.A.9 of this preamble.

EPA was unable to quantify the cases of morbidity or mortality avoided because there are insufficient data reporting the co-occurrence of fecal indicator *E. coli* and pathogenic organisms in a single water sample, and because the available fecal indicator *E. coli* data from the Six-Year Review 2 dataset (USEPA 2010e) were limited to presence-absence data. Instead, EPA estimated changes in total coliform and fecal indicator *E. coli* occurrence (for systems serving 4,100 or fewer people) and changes in number of corrective actions (for systems serving greater than 4,100 people) as measures of reduced risk. As discussed previously, the assessments and corrective actions required under the RTCR will help lead to a decrease in total coliform and *E. coli* occurrence in drinking water. Since fecal contamination can contain waterborne pathogens including bacteria, viruses, and parasitic protozoa, in general, a reduction in fecal contamination should also reduce the potential risk from these other contaminants and the associated primary and secondary endemic disease burden, both acute and chronic.

b. *Other nonquantifiable benefits.* Other nonquantified benefits may include those associated with increased knowledge regarding system operation, accelerated maintenance and repair, avoided costs of outbreaks, and reductions in averting behavior.

By requiring PWSs to conduct assessments that meet minimum elements focused on identifying sanitary defects in response to triggers for total coliform- or *E. coli*-positive samples, the proposed RTCR increases the likelihood that PWS operators, in particular those of systems triggered to conduct assessments and corrective action, will develop further understanding of system operations and improve and practice preventive maintenance compared to the current TCR, which does not require PWSs to perform assessments and corrective action.

Another non-quantified benefit is that systems may choose corrective actions that also address other drinking water contaminants. For example, correcting for a pathway of potential contamination into the distribution system can possibly also mitigate a variety of other potential contaminants. Due to the lack of data available on the effect of corrective action on contamination entering through distribution system pathways, EPA has not quantified such potential benefits.

Some systems may *see* additional nonquantified benefits associated with the acceleration of their capital replacement fund investments in response to early identification of impending problems with large capital components. Although such capital investment will eventually occur anyway, earlier investment may ensure that problems are addressed in a preventive manner and may preclude some decrease in protection that might have occurred otherwise. At the very least, the increased operator awareness is expected to reduce the occurrence of unplanned capital expenditures in any given year. However, because of the difficulty of projecting when capital replacements would occur, EPA has not costed this acceleration of capital replacement, so there would also be a nonquantified cost of making such investments sooner.

Another major non-health benefit is the avoided costs associated with outbreak response. Outbreaks can be very costly for both the PWS and the community in which they occur. Avoided outbreak response costs include such costs as issuing public health warnings, boiling drinking water and providing alternative supplies, remediation and repair, and testing and laboratory costs. Reduced total coliform occurrence resulting from the proposed RTCR may also lead to a reduction of costs associated with boil-water orders, which some States require following non-acute violations under the current TCR. Taken together, these expenses can be quite significant. For example, an analysis of the economic impacts of a waterborne disease outbreak in Walkerton, Ontario (population 5,000) estimated the economic impact, excluding medically related costs, to be over $45.9 million in 2007 Canadian dollars (approximately 42.8 million 2007 US dollars) (Livernois 2002). The author of the study believed that this was a conservative estimate.

In addition, the proposed RTCR may also reduce uncertainty regarding drinking water safety, which may lead to reduced costs for averting behaviors. Averting behaviors include the use of bottled water and point-of-use devices. This benefit also includes the reductions in time spent on averting behavior such as the time spent obtaining alternative water supplies.

F. Anticipated Costs of the Proposed RTCR

To understand the net impacts of the proposed RTCR on public water systems and States in terms of costs, EPA first used available data, information, and best professional judgment to characterize how PWSs and States are currently implementing the current TCR, and to estimate cost relative to a baseline of no RTCR. Then, EPA considered the net change in costs that results from implementing the AIP or Alternative options as compared to the costs of continuing with the current TCR. The objective was to present the net change in costs resulting from revisions to the current TCR rather than absolute totals. More detailed information on cost estimates is provided in the sections that follow and a complete discussion can be found in chapter 7 of the Proposed RTCR EA (USEPA 2010a). A detailed discussion of the proposed revisions is located in section III of this preamble.

1. Total Annualized Present Value Costs

To compare cost of compliance activities for the three regulatory scenarios, the year or years in which all costs are expended are determined and the costs are then calculated as a net present value. For the purposes of this EA, one-time and yearly costs were projected over a 25-year time period to allow comparison with other drinking water regulations using the same analysis period. For this analysis, the net present values of costs in 2007 dollars are calculated using discount rates of three percent and seven percent. These present value costs are then annualized over the 25-year period using the two discount rates.

Exhibit VI–15 summarizes the comparison of total and net change in annualized present value of the AIP and Alternative options relative to the current TCR baseline. A continuation of the current TCR will result in no net change in costs. The net change in mean annualized present value national costs of the AIP option is estimated to be

approximately $14 million (M) using either a three percent or seven percent discount rate. The net change in mean annualized present value national costs for the Alternative option are estimated to be approximately $27M using a three percent discount rate and $30M using a seven percent discount rate.

Under the AIP option, public water systems are estimated to incur greater than 90 percent of the proposed revised rule's net annualized present value costs. States are expected to incur the remaining costs.

Exhibit VI–16 presents the comparison of total and net change in annualized present value costs by rule component. The table shows that routine monitoring and corrective action costs are the most significant contributors to the net increase in costs for PWSs under both the AIP and Alternative options. For States, revising sampling plans contribute most to the cost increase. For both PWSs and States, a net decrease in costs associated with PN requirements helps to offset the total net cost increase.

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Exhibit VI-15 Comparison of Total and Net Change from Current TCR in Annualized Present Value Costs ($Millions, 2007$)

	PWSs	State	Total	PWSs	State	Total
	3% Discount Rate			7% Discount Rate		
TCR – Baseline [1]	$ 185	$ 0.9	$ 186	$ 178	$ 0.9	$ 179
AIP – Baseline + Incremental [2]	$ 199	$ 1.1	$ 200	$ 191	$ 1.3	$ 192
AIP - Net Change	$ 14	$ 0.1	$ 14	$ 13	$ 0.4	$ 14
AIP - Percent Change	7%	16%	7%	7%	48%	8%
Alternative option – Baseline + Incremental [2]	$ 212	$ 1.2	$ 213	$ 207	$ 1.5	$ 209
Alternative option - Net Change	$ 27	$ 0.3	$ 27	$ 29	$ 0.6	$ 30
Alternative option - Percent Change	15%	32%	15%	16%	67%	17%

Note: Detail may not add due to independent rounding.

Source: Proposed RTCR EA (USEPA 2010a).

[1] Does not quantify all TCR components.

[2] For components not quantified for the TCR, the AIP and Alternative option totals include only an estimate of the net increase for those same rule components (*e.g.*, corrective action costs).

Exhibit VI-16 Comparison of Total and Net Change in Annualized Present Value Costs by Rule Component ($Millions, 2007$)

	PWSs	State	Total	PWSs	State	Total
	3% Discount Rate			7% Discount Rate		
	Rule Implementation					
TCR - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Total	$ 2.77	$ 0.18	$ 2.95	$ 4.00	$ 0.26	$ 4.26
AIP - Net Change	$ 2.77	$ 0.18	$ 2.95	$ 4.00	$ 0.26	$ 4.26
Alternative Option - Total	$ 2.77	$ 0.18	$ 2.95	$ 4.00	$ 0.26	$ 4.26
Alternative Option - Net Change	$ 2.77	$ 0.18	$ 2.95	$ 4.00	$ 0.26	$ 4.26
	Revising Sampling Plans					
TCR - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Total	$ 0.59	$ 0.42	$ 1.01	$ 0.84	$ 0.59	$ 1.42
AIP - Net Change	$ 0.59	$ 0.42	$ 1.01	$ 0.84	$ 0.59	$ 1.42
Alternative Option - Total	$ 0.59	$ 0.42	$ 1.01	$ 0.84	$ 0.59	$ 1.42
Alternative Option - Net Change	$ 0.59	$ 0.42	$ 1.01	$ 0.84	$ 0.59	$ 1.42
	Routine Monitoring					
TCR - Total	$ 170.59	$ -	$ 170.59	$ 163.94	$ -	$ 163.94
AIP - Total	$ 174.71	$ -	$ 174.71	$ 167.74	$ -	$ 167.74
AIP - Net Change	$ 4.12	$ -	$ 4.12	$ 3.80	$ -	$ 3.80
Alternative Option - Total	$ 186.34	$ -	$ 186.34	$ 181.49	$ -	$ 181.49
Alternative Option - Net Change	$ 15.75	$ -	$ 15.75	$ 17.56	$ -	$ 17.56
	Additional Routine Monitoring					
TCR - Total	$ 3.87	$ -	$ 3.87	$ 3.72	$ -	$ 3.72
AIP - Total	$ 1.12	$ -	$ 1.12	$ 1.09	$ -	$ 1.09
AIP - Net Change	$ (2.75)	$ -	$ (2.75)	$ (2.63)	$ -	$ (2.63)
Alternative Option - Total	$ 0.68	$ -	$ 0.68	$ 0.58	$ -	$ 0.58
Alternative Option - Net Change	$ (3.18)	$ -	$ (3.18)	$ (3.14)	$ -	$ (3.14)
	Repeat Monitoring					
TCR - Total	$ 5.11	$ -	$ 5.11	$ 4.91	$ -	$ 4.91
AIP - Total	$ 4.82	$ -	$ 4.82	$ 4.64	$ -	$ 4.64
AIP - Net Change	$ (0.29)	$ -	$ (0.29)	$ (0.27)	$ -	$ (0.27)
Alternative Option - Total	$ 5.50	$ -	$ 5.50	$ 5.45	$ -	$ 5.45
Alternative Option - Net Change	$ 0.39	$ -	$ 0.39	$ 0.54	$ -	$ 0.54
	Site Inspections					
TCR - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Net Change	$ -	$ -	$ -	$ -	$ -	$ -
Alternative Option - Total	$ -	$ -	$ -	$ -	$ -	$ -
Alternative Option - Net Change	$ -	$ -	$ -	$ -	$ -	$ -
	Level 1 Assessment					
TCR - Total	$ 1.13	$ 0.21	$ 1.34	$ 1.08	$ 0.21	$ 1.29
AIP - Total	$ 1.63	$ 0.20	$ 1.84	$ 1.57	$ 0.20	$ 1.77
AIP - Net Change	$ 0.50	$ (0.01)	$ 0.49	$ 0.49	$ (0.01)	$ 0.48
Alternative Option - Total	$ 1.73	$ 0.23	$ 1.95	$ 1.69	$ 0.22	$ 1.91
Alternative Option - Net Change	$ 0.60	$ 0.01	$ 0.61	$ 0.60	$ 0.02	$ 0.62
	Level 2 Assessment					
TCR - Total	$ 0.70	$ 0.26	$ 0.96	$ 0.68	$ 0.25	$ 0.93
AIP - Total	$ 0.90	$ 0.19	$ 1.09	$ 0.88	$ 0.18	$ 1.06
AIP - Net Change	$ 0.20	$ (0.07)	$ 0.12	$ 0.20	$ (0.07)	$ 0.13
Alternative Option - Total	$ 1.23	$ 0.28	$ 1.51	$ 1.27	$ 0.30	$ 1.57
Alternative Option - Net Change	$ 0.52	$ 0.02	$ 0.55	$ 0.60	$ 0.05	$ 0.65
	Corrective Actions based on Level 1 Assessments					
TCR - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Total	$ 9.17	$ 0.01	$ 9.18	$ 7.77	$ 0.01	$ 7.77
AIP - Net Change	$ 9.17	$ 0.01	$ 9.18	$ 7.77	$ 0.01	$ 7.77
Alternative Option - Total	$ 9.39	$ 0.01	$ 9.40	$ 8.01	$ 0.01	$ 8.02
Alternative Option - Net Change	$ 9.39	$ 0.01	$ 9.40	$ 8.01	$ 0.01	$ 8.02
	Corrective Actions based on Level 2 Assessments					
TCR - Total	$ -	$ -	$ -	$ -	$ -	$ -
AIP - Total	$ 2.72	$ 0.00	$ 2.72	$ 2.41	$ 0.00	$ 2.41
AIP - Net Change	$ 2.72	$ 0.00	$ 2.72	$ 2.41	$ 0.00	$ 2.41
Alternative Option - Total	$ 3.53	$ 0.01	$ 3.53	$ 3.36	$ 0.01	$ 3.37
Alternative Option - Net Change	$ 3.53	$ 0.01	$ 3.53	$ 3.36	$ 0.01	$ 3.37
	Public Notification					
TCR - Total	$ 3.75	$ 0.44	$ 4.19	$ 3.60	$ 0.42	$ 4.03
AIP - Total	$ 0.26	$ 0.06	$ 0.33	$ 0.26	$ 0.06	$ 0.32
AIP - Net Change	$ (3.49)	$ (0.38)	$ (3.87)	$ (3.35)	$ (0.36)	$ (3.71)
Alternative Option - Total	$ 0.34	$ 0.08	$ 0.42	$ 0.35	$ 0.08	$ 0.43
Alternative Option - Net Change	$ (3.41)	$ (0.36)	$ (3.77)	$ (3.26)	$ (0.34)	$ (3.60)

Note: Assumes a certain level of assessment activity already occurs under the current TCR, as discussed in chapter 7 of the Proposed RTCR EA (USEPA 2010a).

Source: Proposed RTCR EA (USEPA 2010a).

Not all TCR components are quantified. For components not quantified for the TCR, the AIP and Alternative option totals include only an estimate of the net increase for those same rule components (*e.g.*, corrective action costs).

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2. PWS Costs

Like the current TCR, the proposed RTCR applies to all PWSs. Exhibit VI–17 presents the total and net change in annualized costs to PWSs by size and type for the three regulatory options. No net change in costs will result from a continuation of the current TCR. Among PWSs serving 4,100 or fewer people, looking at the three percent discount rate, the largest increase in aggregate net costs is incurred by the TNCWSs serving 100 or fewer people under either the AIP ($5.1M) or Alternative option ($13.4M) because of the large number of systems. On a per system basis, this translates to a net annualized present value increase of approximately $83 per system under the AIP and $217 per system under the Alternative option for the TNCWSs serving 100 or fewer people. As described in section VII.C of this preamble, none of the small TNCWSs are estimated to have costs that are greater than or equal to three percent of their revenue.

The total net change in national annualized present value costs for all PWSs serving greater than 4,100 people (approximately $6M using three percent discount rate) is the same under the AIP and Alternative option. This is expected because the provisions for PWSs serving greater than 4,100 are the same under either option. Monitoring requirements for PWSs serving greater than 4,100 people remain essentially unchanged under either the AIP or Alternative option. The observed overall net increase in costs for PWSs serving greater than 4,100 people is driven primarily by the requirements to conduct assessments and to correct any sanitary defects that are found.

Exhibit VI-17 Total and Net Change in Annualized Costs to PWSs by PWS Size and Type ($Millions, 2007$)

PWS Size (Population Served)	3% Discount Rate					7% Discount Rate				
	TCR - Total	AIP - Total	AIP - Net	Alternative Option - Total	Alternative Option - Net	TCR - Total	AIP - Total	AIP - Net	Alternative Option - Total	Alternative Option - Net
	A	B	C=B-A	D	E=D-A	F	G	H=G-F	I	J=I-F
Community Water Systems (CWSs)										
≤100	$7.4	$7.5	$0.1	$7.6	$0.2	$7.1	$7.3	$0.2	$7.4	$0.3
101-500	$9.0	$9.3	$0.3	$9.4	$0.4	$8.6	$9.1	$0.4	$9.2	$0.6
501-1,000	$3.7	$3.8	$0.0	$3.8	$0.1	$3.6	$3.7	$0.1	$3.7	$0.1
1,001-4,100	$13.2	$13.6	$0.3	$13.6	$0.3	$12.7	$13.1	$0.4	$13.1	$0.4
4,101-33,000	$42.4	$44.7	$2.3	$44.7	$2.3	$40.7	$42.7	$2.0	$42.7	$2.0
33,001-96,000	$34.9	$36.4	$1.5	$36.4	$1.5	$33.5	$34.8	$1.3	$34.8	$1.3
96,001-500,000	$34.7	$36.2	$1.5	$36.2	$1.5	$33.4	$34.6	$1.2	$34.6	$1.2
500,001-1 Million	$6.5	$6.7	$0.2	$6.7	$0.2	$6.2	$6.4	$0.1	$6.4	$0.1
> 1 Million	$5.6	$5.5	($0.0)	$5.5	($0.0)	$5.3	$5.3	($0.0)	$5.3	($0.0)
Total	**$157.4**	**$163.6**	**$6.2**	**$163.9**	**$6.5**	**$151.3**	**$157.0**	**$5.7**	**$157.3**	**$6.0**
Nontransient Noncommunity Water Systems (NTNCWSs)										
≤100	$2.6	$2.6	$0.1	$3.6	$1.0	$2.5	$2.6	$0.2	$3.8	$1.3
101-500	$1.9	$2.0	$0.1	$2.7	$0.9	$1.8	$2.0	$0.2	$2.9	$1.1
501-1,000	$0.6	$0.6	$0.0	$0.8	$0.3	$0.6	$0.6	$0.1	$0.9	$0.3
1,001-4,100	$1.2	$1.3	$0.1	$1.3	$0.1	$1.1	$1.2	$0.1	$1.2	$0.1
4,101-33,000	$0.4	$0.5	$0.1	$0.5	$0.1	$0.4	$0.5	$0.0	$0.5	$0.0
33,001-96,000	$0.1	$0.1	$0.0	$0.1	$0.0	$0.1	$0.1	$0.0	$0.1	$0.0
96,001-500,000	$0.1	$0.1	($0.0)	$0.1	($0.0)	$0.1	$0.1	($0.0)	$0.1	($0.0)
500,001-1 Million	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
> 1 Million	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total	**$6.9**	**$7.2**	**$0.4**	**$9.1**	**$2.3**	**$6.6**	**$7.2**	**$0.6**	**$9.4**	**$2.8**
Transient Noncommunity Water Systems (TNCWSs)										
≤100	$13.4	$18.5	$5.1	$26.7	$13.4	$12.8	$18.0	$5.1	$27.8	$14.9
101-500	$4.9	$6.4	$1.5	$9.1	$4.2	$4.7	$6.2	$1.5	$9.4	$4.7
501-1,000	$0.6	$0.8	$0.2	$1.1	$0.5	$0.6	$0.8	$0.2	$1.2	$0.5
1,001-4,100	$0.9	$1.0	$0.1	$1.0	$0.1	$0.9	$1.0	$0.1	$1.0	$0.1
4,101-33,000	$0.4	$0.5	$0.1	$0.5	$0.1	$0.4	$0.5	$0.0	$0.5	$0.0
33,001-96,000	$0.1	$0.1	($0.0)	$0.1	($0.0)	$0.1	$0.1	($0.0)	$0.1	($0.0)
96,001-500,000	$0.1	$0.1	($0.0)	$0.1	($0.0)	$0.1	$0.1	($0.0)	$0.1	($0.0)
500,001-1 Million	$0.2	$0.2	($0.0)	$0.2	($0.0)	$0.2	$0.2	($0.0)	$0.2	($0.0)
> 1 Million	$0.3	$0.3	$0.0	$0.3	$0.0	$0.3	$0.3	$0.0	$0.3	$0.0
Total	**$20.9**	**$27.8**	**$6.9**	**$39.1**	**$18.2**	**$20.1**	**$27.1**	**$7.0**	**$40.4**	**$20.3**
Grand Total	**$185.2**	**$198.7**	**$13.5**	**$212.1**	**$26.9**	**$177.9**	**$191.2**	**$13.2**	**$207.0**	**$29.1**

Note: Detail may not add due to independent rounding. Because only the incremental costs of some rule components are considered as part of the cost analysis, references to "total" costs in this exhibit do not refer to the complete costs for regulatory implementation but only to the specific costs considered to calculate net changes in costs.
Source: Proposed RTCR cost model.

a. *Rule implementation and annual administration.* Under the AIP and Alternative options, all PWSs subject to the proposed RTCR incur one-time costs that include time for staff to read the RTCR, become familiar with its provisions, and to train employees on rule requirements. No additional implementation burden or costs will be incurred by PWSs if the current TCR option is maintained. Under the AIP and Alternative options, all PWSs subject to the proposed RTCR perform additional or transitional implementation activities. Based on previous experience with rule implementation, EPA estimated that PWSs require a total of four hours to

read and understand the rule, and a total of eight hours to plan and assign appropriate personnel and resources to carry out rule activities.

b. *Revising sampling plans.* Under the AIP and Alternative options, all PWSs subject to the proposed RTCR incur one-time costs to revise existing sampling plans to identify sampling locations and collection schedules that are representative of water throughout the distribution system. Under the TCR, no additional burden or costs are expected to be incurred by PWSs to revise sampling plans, as these PWSs are already collecting total coliform samples in accordance with a written sampling plan. Based on previous experience, EPA estimated that PWSs require 2–8 hours to revise their sampling plan, depending on PWS size.

c. *Monitoring.* Monitoring costs for PWSs are calculated by multiplying the total numbers of routine, additional routine, and repeat samples required under the current TCR, AIP, and Alternative options by the monitoring costs per sample. Under the AIP, the increased stringency to qualify for reduced monitoring results in more routine samples being taken over time (fewer PWSs are on reduced monitoring). For the Alternative option, this effect is combined with the requirement that all PWSs start the implementation period on monthly monitoring. The Alternative option also prohibits annual monitoring, resulting in a greater increase in the number of routine samples compared to the AIP option. The resulting increases in costs due to increased monitoring are reflected in the routine monitoring costs.

The overall reductions in the numbers of additional routine samples required under the AIP and Alternative option result in reduced costs. Under the AIP and Alternative options, additional routine monitoring is no longer required for systems that monitor at least monthly, and when additional routine monitoring is required, the number of samples required is reduced from five to three. Cost reductions are greater under the Alternative option than under the AIP because under the Alternative option all PWSs start on monthly monitoring and are not required to take additional routine samples during that period.

Under the current TCR, PWSs serving 1,000 or fewer people take four repeat samples at and within five service connections upstream and downstream of the initial total coliform positive occurrence location over the course of 24 hours following the event. Under the AIP and Alternative options, they will only need to take three repeat samples, and they have greater flexibility about where to take them, consistent with the system sample siting plan that is developed in accordance with RTCR requirements and subject to review and revision by the State. The number of repeat samples required for PWSs serving more than 1,000 people is the same under the current TCR and the AIP and Alternative options, although they too have greater flexibility in sample location.

Exhibit VI–18 summarizes the cumulative number of samples taken by PWS size and category for routine, additional, and repeat monitoring under the TCR, AIP, and Alternative option over the entire 25-year period of analysis. Under the current TCR option, approximately 82.1 million samples are taken over the 25-year period of analysis compared to approximately 82.2 million samples under the AIP option and approximately 87.9 million samples under the Alternative option (less than 10 percent more than current TCR option). Appendix A of the Proposed RTCR EA (USEPA 2010a) presents additional information on the number of samples taken each individual year during the analysis period.

The annualized net present value total and net change cost estimates for PWSs and States to perform monitoring under the TCR, AIP, and Alternative options are presented in Exhibit VI–19.

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Exhibit VI-18 Cumulative Number of Samples over 25-Year Period of Analysis for Baseline (TCR) and Regulatory Alternatives (AIP and Alternative option)

PWS Size (Population Served)	TCR			AIP			Alternative Option		
	Routine Monitoring Samples	Additional Routine Monitoring Samples	Repeat Monitoring Samples	Routine Monitoring Samples	Additional Routine Monitoring Samples	Repeat Monitoring Samples	Routine Monitoring Samples	Additional Routine Monitoring Samples	Repeat Monitoring Samples
	A	B	C	D	E	F	G	H	I
Community Water Systems (CWSs) - SW									
≤100	304,098	23,747	19,160	308,849	-	12,875	308,849	-	12,875
101-500	562,214	26,578	21,338	567,486	-	15,333	567,486	-	15,333
501-1,000	306,733	14,501	11,641	309,610	-	8,366	309,610	-	8,366
1,001-4,100	1,920,789	55,202	33,730	1,950,717	-	32,222	1,950,717	-	32,222
4,101-33,000	10,636,296	-	186,781	10,636,296	-	175,689	10,636,296	-	175,689
33,001-96,000	11,058,960	-	194,204	11,058,960	-	182,671	11,058,960	-	182,671
96,001-500,000	10,190,400	-	178,951	10,190,400	-	168,324	10,190,400	-	168,324
500,001-1 Million	2,019,600	-	35,466	2,019,600	-	33,360	2,019,600	-	33,360
> 1 Million	1,686,960	-	29,624	1,686,960	-	27,865	1,686,960	-	27,865
Total	**38,686,051**	**120,028**	**710,896**	**38,728,879**	**-**	**656,704**	**38,728,879**	**-**	**656,704**
Community Water Systems (CWSs) - GW									
≤100	2,815,951	286,073	194,462	2,870,075	8,760	156,897	2,908,469	7,545	158,439
101-500	3,344,578	243,895	171,252	3,391,200	6,127	136,906	3,428,876	5,264	137,959
501-1,000	1,072,202	70,803	51,673	1,085,730	1,844	39,659	1,098,488	1,616	39,580
1,001-4,100	3,997,293	160,710	100,618	4,079,328	-	96,939	4,079,328	-	96,939
4,101-33,000	9,145,224	-	230,201	9,145,224	-	217,321	9,145,224	-	217,321
33,001-96,000	4,884,000	-	122,938	4,884,000	-	116,060	4,884,000	-	116,060
96,001-500,000	1,945,680	-	48,976	1,945,680	-	46,236	1,945,680	-	46,236
500,001-1 Million	253,440	-	6,380	253,440	-	6,023	253,440	-	6,023
> 1 Million	269,280	-	6,778	269,280	-	6,399	269,280	-	6,399
Total	**27,727,648**	**761,481**	**933,279**	**27,923,956**	**16,731**	**822,439**	**28,012,784**	**14,425**	**824,956**
Nontransient Noncommunity Water Systems (NTNCWSs) - SW									
≤100	65,009	4,918	4,005	65,986	-	2,840	65,986	-	2,840
101-500	66,038	3,734	3,008	66,766	-	2,073	66,766	-	2,073
501-1,000	22,970	1,299	1,046	23,223	-	721	23,223	-	721
1,001-4,100	41,740	2,147	1,351	42,751	-	1,183	42,751	-	1,183
4,101-33,000	50,424	-	1,632	50,424	-	1,395	50,424	-	1,395
33,001-96,000	34,320	-	1,111	34,320	-	950	34,320	-	950
96,001-500,000	31,680	-	1,025	31,680	-	877	31,680	-	877
500,001-1 Million	-	-	-	-	-	-	-	-	-
> 1 Million	-	-	-	-	-	-	-	-	-
Total	**312,182**	**12,097**	**13,179**	**315,151**	**-**	**10,038**	**315,151**	**-**	**10,038**
Nontransient Noncommunity Water Systems (NTNCWSs) - GW									
≤100	971,538	128,775	84,992	932,025	48,142	68,123	1,281,321	34,581	89,002
101-500	725,785	66,525	43,597	678,688	25,630	35,860	952,008	18,114	46,996
501-1,000	190,649	16,037	10,680	180,145	6,166	8,601	247,132	4,674	11,689
1,001-4,100	460,470	28,214	17,790	473,352	-	15,887	473,352	-	15,887
4,101-33,000	153,648	-	5,936	153,648	-	5,157	153,648	-	5,157
33,001-96,000	23,760	-	918	23,760	-	797	23,760	-	797
96,001-500,000	-	-	-	-	-	-	-	-	-
500,001-1 Million	-	-	-	-	-	-	-	-	-
> 1 Million	-	-	-	-	-	-	-	-	-
Total	**2,525,850**	**239,551**	**163,913**	**2,441,617**	**79,938**	**134,426**	**3,131,221**	**57,369**	**169,528**
Transient Noncommunity Water Systems (TNCWSs) - SW									
≤100	345,443	39,654	32,349	353,461	-	20,787	353,461	-	20,787
101-500	128,109	15,365	12,541	131,149	-	7,816	131,149	-	7,816
501-1,000	22,683	2,720	2,220	23,222	-	1,384	23,222	-	1,384
1,001-4,100	39,816	3,990	2,590	42,209	-	2,118	42,209	-	2,118
4,101-33,000	40,656	-	-	40,656	-	2,040	40,656	-	2,040
33,001-96,000	-	-	-	-	-	-	-	-	-
96,001-500,000	-	-	-	-	-	-	-	-	-
500,001-1 Million	-	-	-	-	-	-	-	-	-
> 1 Million	102,960	-	-	102,960	-	5,167	102,960	-	5,167
Total	**679,667**	**61,730**	**49,700**	**693,657**	**-**	**39,312**	**693,657**	**-**	**39,312**
Transient Noncommunity Water Systems (TNCWSs) - GW									
≤100	4,493,808	905,554	600,315	6,076,163	446,166	631,105	9,100,613	289,563	867,968
101-500	1,614,924	316,238	210,714	1,940,946	135,822	194,697	2,886,164	91,085	268,893
501-1,000	177,264	32,730	22,064	206,130	14,078	20,078	295,928	9,578	27,084
1,001-4,100	335,283	29,957	19,113	348,480	-	16,027	348,480	-	16,027
4,101-33,000	156,288	-	8,909	156,288	-	7,188	156,288	-	7,188
33,001-96,000	34,320	-	1,956	34,320	-	1,578	34,320	-	1,578
96,001-500,000	26,400	-	1,505	26,400	-	1,214	26,400	-	1,214
500,001-1 Million	63,360	-	3,612	63,360	-	2,914	63,360	-	2,914
> 1 Million	-	-	-	-	-	-	-	-	-
Total	**6,901,647**	**1,284,479**	**868,188**	**8,852,088**	**596,065**	**874,801**	**12,911,552**	**390,226**	**1,192,865**
Grand Total	**76,833,044**	**2,479,366**	**2,739,154**	**78,955,347**	**692,734**	**2,537,720**	**83,793,244**	**462,020**	**2,893,404**

Note: (B), (E), (H) For modeling purposes, additional routine sample counts include regular routine samples taken in the same month.

Source: Appendix A - Total PWS Counts (A.1z, A.2z, A.3z)

Exhibit VI-19 Annualized National PWS and State Monitoring Cost Estimates ($Millions, 2007$)

	3% discount rate	7% discount rate
TCR - Total	$ 179.57	$ 172.57
AIP - Total	$ 180.65	$ 173.46
AIP - Net Change	$ 1.08	$ 0.90
AIP - Percent Change	0.60%	0.52%
Alternative option – Total	$ 192.53	$ 187.53
Alternative option - Net Change	$ 12.96	$ 14.96
Alternative option - Percent Change	7.22%	8.67%

Note: Detail may not add due to independent rounding.
Source: Proposed RTCR EA (USEPA 2010a)

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The overall estimated increase in monitoring costs seen under the AIP is driven by increases in routine monitoring due to stricter requirements to qualify for reduced monitoring. However, this is mostly offset by reductions in additional routine and repeat monitoring required under the revised regulations. For the Alternative option, the requirement for all PWSs to sample on a monthly basis at the beginning of rule implementation results in a much larger cost differential that is only partially offset by reduced costs due to reductions in additional routine monitoring requirements.

d. *Annual site visits.* Under the AIP, any PWS on an annual monitoring schedule is required to also have an annual site visit conducted by the State or State-designated third party. A voluntary Level 2 site assessment can also satisfy the annual site visit requirement. For years in which the State performs a sanitary survey (at least every five years for NCWSs and three years for CWSs), a sanitary survey performed during the same year can also be used to satisfy this requirement. EPA uses the same assumptions to estimate costs associated with site visits for both the AIP and Alternative options.

e. *Assessments.* Annualized cost estimates for Level 1 and Level 2 assessments under the TCR, AIP, and Alternative options are calculated in the Proposed RTCR EA (USEPA 2010a) by multiplying the number of assessments estimated by the predictive modeling (summarized in Exhibit 7.13 of the EA) by the unit costs (summarized in Exhibits 7–11 and 7–12 of the EA). Appendix A of the Proposed RTCR EA (USEPA 2010a) provides a detailed breakout of the number of Level 1 and Level 2 assessments estimated by the occurrence model. Annualized cost estimates are presented in Exhibit VI–20 of this preamble.

Exhibit VI-20 Annualized National PWS Costs Estimates for Assessment Activity (current TCR) and Level 1 and Level 2 Assessments (AIP and Alternative Options) ($Millions, 2007$)

	3% discount rate	7% discount rate
	Level 1 Assessments	
TCR - Total	$ 1.13	$ 1.08
AIP - Total	$ 1.63	$ 1.57
AIP - Net Change	$ 0.50	$ 0.49
Alternative Option - Total	$ 1.73	$ 1.69
Alternative Option - Net Change	$ 0.60	$ 0.60
	Level 2 Assessments	
TCR - Total	$ 0.70	$ 0.68
AIP - Total	$ 0.90	$ 0.88
AIP - Net Change	$ 0.20	$ 0.20
Alternative Option - Total	$ 1.23	$ 1.27
Alternative Option - Net Change	$ 0.52	$ 0.60

Note: EPA estimated the level of assessment activity conducted by PWSs thought to occur under the current TCR, as discussed in chapter 7 of Proposed RTCR EA (USEPA 2010a)
Detail may not add due to independent rounding.
Source: Proposed RTCR cost model, described in chapter 7 of the Proposed RTCR EA (USEPA 2010a)

Under the proposed RTCR, all PWSs are required to conduct assessments of their systems when they exceed Level 1 or Level 2 treatment technique triggers. While PWSs are not required to conduct assessments under the current TCR, some PWSs do currently engage in assessment activity (which may or may not meet the proposed RTCR criteria) following non-acute and acute MCL violations. EPA estimates both the costs to PWSs to conduct assessments under the proposed RTCR as well as the level of effort that PWSs already put towards assessment activities under the current TCR. These estimates are based on the work of the stakeholders in the Technical Work Group (TWG) during the proceedings of the TCRDSAC. These estimates allowed EPA to determine the average net costs to conduct assessments under the proposed RTCR. EPA assumes that the numbers of non-acute and acute MCL violations would remain steady under a continuation of the current TCR (based on review of SDWIS/FED violation data). Under the proposed RTCR, EPA assumes that the numbers of assessments decreases from the steady state level seen under the current TCR over time to a new steady state level as a function of reduced fecal indicator occurrence associated with the effects of requiring assessments and corrective action.

The overall number of assessments is larger under the Alternative option compared to the AIP option. This is a result of the initial monthly monitoring requirements for all PWSs under this analysis. The modeling results indicate that a greater number of samples early in the implementation period results in more positive samples and associated assessments despite the predicted long term reductions in occurrence as informed by the assumptions. This increase in total assessments performed, combined with the higher unit cost of performing assessments compared to existing practices under the TCR, results in a higher net cost increase for the Alternative option than under the AIP. The total net change in cost for the Alternative option is estimated to be positive, and nearly twice as high as under the AIP option. *See* Exhibit 7.15 of the Proposed RTCR EA (USEPA 2010a).

f. *Corrective actions.* Under the AIP and Alternative options, all PWSs are required to correct sanitary defects found through the performance of Level 1 or Level 2 assessments. For modeling purposes, EPA estimated the net change in the number of corrective actions performed under the AIP and Alternative options. EPA assumed that any corrective actions based on a positive source water sample are accounted for under the GWR and not under the proposed RTCR. Based on discussions with State representatives, EPA assumed that additional corrective actions are performed for only 10 percent of the assessments undertaken as a result of the proposed RTCR representing the net increase over the current TCR.

To estimate the costs incurred for the correction of sanitary defects, EPA assumed the percent distribution of PWSs that perform different types of corrective actions as presented in the compliance forecast shown in Exhibit VI–21 based on best professional judgment. The compliance forecast presented in this section was informed by discussions of the TCRDSAC Technical Work Group and focuses on broad categories of types of corrective actions anticipated. EPA used best professional judgment to make simplifying assumptions on the distribution of these categories that are implemented by different systems based on size and type of system. For each of the categories listed, a PWS is assumed to take a specific action that falls under that general category. Detailed compliance forecasts showing the specific corrective actions used in the cost analysis are provided in Appendix D of the Proposed RTCR EA (USEPA 2010a), along with summary tables of the unit costs used in the analysis. Each corrective action in the detailed compliance forecast is also assigned a representative unit cost. Detailed descriptions of the derivation of unit costs are provided in Exhibits 5–1

through 5–47 of the *Technology and Cost Document for the Proposed Revised Total Coliform Rule* (USEPA 2010b).

Exhibit VI-21 Compliance Forecast for Corrective Actions based on Level 1 and Level 2 Assessments

PWS Size (Population Served)	PWS Flushing	Sampler Training	Replace/Repair of Distribution System Components	Maintenance of Adequate Pressure	Maintenance of appropriate Hydraulic Residence Time	Storage Facility Maintenance	Booster Disinfection	Cross-connection Control and Backflow Prevention	Addition or Upgrade of On-line Monitoring and Control	Addition of Security Measures	Development and Implementation of an Operations Plan
	A	B	C	D	E	F	G	H	I	J	K
Level 1 Compliance Forecast											
≤100	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
101-500	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
501-1,000	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
1,001-4,100	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
4,101-33,000	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
33,001-96,000	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
96,001-500,000	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
500,001-1 Million	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
> 1 Million	39%	15%	12%	9%	8%	6%	4%	1%	3%	1%	2%
Level 2 Compliance Forecast											
≤100	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
101-500	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
501-1,000	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
1,001-4,100	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
4,101-33,000	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
33,001-96,000	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
96,001-500,000	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
500,001-1 Million	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%
> 1 Million	15%	4%	18%	15%	15%	11%	8%	2%	6%	2%	4%

Source: (A) - (K) Percent of PWSs performing corrective actions based on Level 1 and Level 2 assessments reflect EPA estimate.

As shown in the compliance forecast in Exhibit VI–21, EPA estimated that corrective actions found through Level 1 assessments result in corrective actions that focus more on transient solutions or training (columns A and B) than on permanent fixes to the PWS. However, in the case of flushing, EPA assumed that in a majority of instances, PWSs implement a regular flushing program as opposed to a single flushing, based on EPA and stakeholder best professional judgment. Level 1 assessments generally are less involved than Level 2 assessments and may result in finding less complex problems.

Corrective actions taken as a result of Level 2 assessments are expected to find a higher proportion of structural/technical issues (columns C–K) resulting in material fixes to the PWSs and distribution system. Consistent with the discussions of the TCRDSAC regarding major structural fixes or replacements, EPA did not include these major costs in the analysis. Distribution system appurtenances such as storage tanks generally have a useful life that is accounted for in water system capital planning and the assessments conducted in response to RTCR triggers could identify when that useful life has ended but are not solely responsible for the need to correct the defect. In addition, EPA ran two sensitivity analyses to assess the potential impacts of different distributions within the compliance forecast. Results of the sensitivity analyses are presented in Exhibit 7–24 of the Proposed RTCR EA (USEPA 2010a), which indicates that the low bound estimates of annualized net change in costs at three percent discount rate are approximately $3M for the AIP option and $15M for the Alternative option, and the high bound estimates are approximately $25M for the AIP option and $40M for the Alternative option. Varying the assumptions about the percentage of corrective actions identified and the effectiveness of those actions had less than a linear effect on outcomes, and the AIP option continues to be less costly than the Alternative option under all scenarios modeled.

As indicated in the more detailed analysis presented in chapter 7 of the Proposed RTCR EA (USEPA 2010a), PWSs also incur reporting and recordkeeping burden to notify the State upon completion of each corrective action. PWSs may also consult with the State or with outside parties to determine the appropriate corrective action to be implemented.

Annualized cost estimates for PWSs to perform corrective actions are estimated by multiplying the number of Level 1 and Level 2 corrective actions estimated by the predictive model, (*i.e.,* 10 percent of Level 1 and Level 2 assessments) by the percentages in the compliance forecast and unit costs of corrective actions and associated reporting and recordkeeping. Exhibit 7.13 of the proposed RTCR EA (USEPA 2010a) presents the estimated totals of non-acute and acute MCL violations (current TCR) and Level 1 and Level 2 assessments (AIP and Alternative options). The model predicts a total of approximately 109,000 single non-acute MCL violations, 58,000 cases of a second non-acute MCL violation, and 16,000 acute MCL violations for the current TCR, under which some PWSs currently engage in assessment activity which may or may not meet the proposed RTCR criteria (*see* section 7.4.5 of the proposed RTCR EA (USEPA 2010a) for details). For the AIP option, the model predicts approximately 104,000 Level 1 assessments and 52,000 Level 2 assessments. For the Alternative option, the model predicts approximately 115,000 Level 1 assessments and 78,000 Level 2 assessments. The total and net change costs of corrective actions are shown in Exhibit VI–22.

EXHIBIT VI–22—ANNUALIZED PWS COST ESTIMATES FOR CORRECTIVE ACTIONS BASED ON LEVEL 1 AND LEVEL 2 ASSESSMENTS

[$Millions, 2007$]

	3% Discount rate	7% Discount rate
	Corrective Actions based on Level 1 Assessments	
TCR—Total	.....	.....
AIP—Total	$9.17	$7.77
AIP—Net Change	9.17	7.77
Alternative option—Total	9.39	8.01
Alternative option—Net Change	9.39	8.01
	Corrective Actions based on Level 2 Assessments	
TCR—Total	.....	.....
AIP—Total	$2.72	$2.41
AIP—Net Change	2.72	2.41
Alternative option—Total	3.53	3.36
Alternative option—Net Change	3.53	3.36

Note: Detail may not add due to independent rounding.
Source: Proposed RTCR cost model, described in chapter 7 of the Proposed RTCR EA (USEPA 2010a).

The differences in the net change in corrective action costs between the AIP and Alternative option are a function of the different number of assessments estimated to be performed in the predictive model.

g. *Public notification.* Estimates of PWS unit costs for PN are derived by multiplying PWS labor rates from section 7.2.1 of the Proposed RTCR EA (USEPA 2010a) and burden hour estimates derived from the *Draft Information Collection Request for the Public Water System Supervision Program* (USEPA 2008c). PWS PN unit cost estimates are presented in Exhibit 7.19 of that document.

Total and net change in annualized net present value costs for PN are estimated by multiplying the model estimates of PWSs with acute (Tier 1 public notification) and non-acute (Tier 2 public notification) violations by the PWS unit costs for performing PN activities. The proposed RTCR cost model assumed that all violations are addressed following initial PN, and no burden is incurred by PWSs for repeat notification. Annualized total and net cost estimates for PWSs and States to perform public notification under the TCR, AIP, and Alternative options are presented in Exhibit VI–23.

EXHIBIT VI–23—ANNUALIZED NATIONAL PWS COST ESTIMATES FOR PUBLIC NOTIFICATION

[$Millions, 2007$]

	3% Discount rate	7% Discount rate
TCR—Total	$3.75	$3.60
AIP—Total	$0.26	$0.26
AIP—Net Change	$(3.49)	$(3.35)
AIP—Percent Change	−93%	−93%
Alternative Option—Total	$0.34	$0.35
Alternative Option—Net Change	$(3.41)	$(3.26)
Alternative Option—Percent Change	−91%	−90%

Note: Detail may not add due to independent rounding.
Source: Proposed RTCR cost model, described in chapter 7 of the Proposed RTCR EA (USEPA 2010a).

A significant reduction in costs is estimated due to the elimination of Tier 2 public notification for non-acute/monthly MCL violations under both the AIP and Alternative options.

3. State Costs

EPA estimated that all States nationally together incur a net increase in national annualized present value costs under the AIP option of $0.1M (at three percent discount rate) and $0.4M (at seven percent discount rate) and under the Alternative option of $0.3M (at three percent discount rate) and $0.6M (at seven percent discount rate). State costs include implementing and administering the rule, revising sampling plans, reviewing sampling results, conducting annual site visits, reviewing completed assessment forms, tracking corrective actions, and public notifications. The following sections summarize the key assumptions that EPA made to estimate the costs of the proposed RTCR. Chapter 7 of the Proposed RTCR EA (USEPA 2010a) provides a description of the analysis.

a. *Rule implementation and annual administration.* States incur administrative costs to implement the proposed RTCR. These implementation costs are not directly required by specific provisions of the proposed RTCR alternatives, but are necessary for States to ensure the provisions of the proposed RTCR are properly carried out. States need to allocate time for their staff to establish and maintain the programs necessary to comply with the proposed RTCR, including developing and adopting State regulations and

modifying data management systems to track new required PWS reports to the States. Time requirements for a variety of State agency activities and responses are estimated in this EA. Exhibit 7.4 of the Proposed RTCR EA (USEPA 2010a) lists the activities required to revise the program following promulgation of the proposed RTCR along with their respective costs and burden including, for example, the net change in State burden associated with tracking the monitoring frequencies of PWSs (captured under "modify data management systems"). EPA estimated a net increase in national annualized cost estimates incurred by States for rule implementation of $0.18M (three percent discount rate) and $0.26M (seven percent discount rate) under either the AIP or the Alternative option. Because time requirements for implementation and annual administration activities vary among State agencies, EPA recognizes that the unit costs used to develop national estimates may be an over- or under-estimate for some States.

b. *Revising sampling plans.* Under the AIP and Alternative options, States are expected to incur one-time costs to review sampling plans and recommend any revisions to PWSs. Under the TCR option, no additional burden or costs are incurred by States to review sampling plans, as these PWSs' sampling plans have already been reviewed and approved. State costs are based on the number of PWSs submitting revised sampling plans to PWSs each year. Based on previous experience, EPA estimated that States require one to four hours to review revised sampling plans and provide any necessary revisions to PWSs, depending on PWS size. EPA estimated a net increase in national annualized cost estimates incurred by States for revising sampling plans of $0.42M (three percent discount rate) and $0.59M (seven percent discount rate) under either the AIP or the Alternative option.

c. *Monitoring.* EPA assumed that States incur a monthly 15-minute burden to review each PWS's sample results under the current TCR. This estimate reflects the method used to calculate reporting and recordkeeping burden under the current TCR in the *Draft Information Collection Request for the Microbial Rules* (USEPA 2008a). Because the existing method calculates cost on a per PWS basis and the total number of PWSs is the same for cost modeling under the TCR and both proposed RTCR options, the net change in costs for reviewing monitoring results is assumed to be zero for the AIP and Alternative options. Specific actions by States related to positive samples are accounted for under the actions required in response to those samples.

d. *Annual site visits.* Under the AIP option, any PWS on an annual monitoring schedule is required to also have an annual site visit conducted by the State or State-designated third party. A voluntary Level 2 site assessment can also satisfy the annual site visit requirement. In many cases a sanitary survey performed during the same year can also be used to satisfy this requirement. Although similar site visits are not currently required under the current TCR, discussions with States during the TCRDSAC proceedings revealed that some do, in fact, conduct such site visits for PWSs on annual monitoring schedules. Because of the high cost for an annual site visit by a State, for this analysis EPA assumed that no States choose to conduct annual site visits unless they already do so under the current TCR. Therefore, for overall costing purposes, no net change in State or PWS costs are assumed for annual monitoring site visits under the AIP option or Alternative option.

e. *Assessments.* States incur burden to review completed assessment forms required to be filed by PWSs under the AIP and Alternative options. Although specific forms are not required under the current TCR, EPA assumes that PWSs engage in some form of consultation with the State. For costing purposes, EPA assumes that the level of effort required for such consultations under the current TCR is the same as that which would be required to review assessment forms under the AIP and Alternative options. State costs are based on the number of PWSs submitting assessment reports. EPA estimated that State burden to review PWS assessment forms ranges from one to eight hours depending on PWS size and type, as well as the level of the assessment. This burden includes any time required to consult with the PWS about the assessment report.

Although some States may choose to conduct assessments for their PWSs, EPA does not quantify these costs. The costs are attributed to PWSs that are responsible for insuring that assessments are done.

The reduction in the number of assessments under the AIP option compared to the current TCR (as explained in chapter 7 of the Proposed RTCR EA (USEPA 2010a), based on discussions with the technical workgroup supporting the advisory committee, EPA assumes a certain level of assessment activity already occurs under the current TCR) is estimated to translate directly to a small national cost savings ($0.08M at either three or seven percent discount rate) while the increase in the number of assessments under the Alternative option is estimated to translate directly to a national cost increase ($0.03M at three percent discount rate and $0.07M at seven percent discount rate). Under the AIP, the overall number of assessments decreases as a function of reduced occurrence over time. The overall number of assessments is higher under the Alternative option as a result of the initial monthly monitoring requirements for all PWSs.

f. *Corrective actions.* For each corrective action performed under AIP and Alternative option, States incur recordkeeping and reporting burden to review and coordinate with PWSs. This includes burden incurred from any optional consultations States may conduct with PWSs or outside parties to determine the appropriate corrective action to be implemented. The number of corrective actions under either the AIP or Alternative option is estimated to translate to a national net annualized cost increase to States of $0.01M at either three or seven percent discount rate

g. *Public notification.* Under the TCR, AIP, and Alternative options, States incur recordkeeping and reporting burden to provide consultation, review the public notification certification, and file the report of the violation. A significant reduction in costs is estimated due to the elimination of Tier 2 public notification for non-acute MCL violations under the AIP and Alternative options. Because State costs are calculated on a per-violation basis, State costs decline. Under the Alternative option, some of the decrease in cost is offset by additional Tier 1 public notification from the increase in the number of *E. coli* MCL violations detected. Burden hour estimate for State unit PN costs are derived from the *Draft Information Collection Request for the Public Water System Supervision Program* (USEPA 2008b). Exhibit VI–24 summarizes annualized State cost estimates for public notification.

EXHIBIT VI–24—ANNUALIZED STATE COST ESTIMATES FOR PUBLIC NOTIFICATION

[$Millions, 2007$]

	3% Discount rate	7% Discount rate
TCR—Total	$0.44	$0.42
AIP—Total	$0.06	$0.06
AIP—Net Change	$(0.38)	$(0.36)
AIP—Percent Change	−86%	−86%
Alternative Option—Total	$0.08	$0.08
Alternative Option—Net Change	$(0.36)	$(0.34)
Alternative Option—Percent Change	−82%	−80%

Note: Detail may not add due to independent rounding.
Source: Proposed RTCR cost model, described in chapter 7 of the Proposed RTCR EA (USEPA 2010a).

4. Nonquantifiable Costs

EPA believes that all of the rule elements that are the major drivers of the net change in costs from the current TCR have been quantified to the greatest degree possible. However, cost reductions related to fewer monitoring and reporting violations are not specifically accounted for in the cost analysis, and their exclusion from consideration may result in an overestimate of net change in cost between the TCR option and the AIP option or Alternative option.

In addition under the TCR, AIP, and Alternative options, Tier 3 public notification for monitoring and reporting violations are assumed to be reported once per year as part of the Consumer Confidence Reports (CCRs). Because of the use of the CCR to communicate Tier 3 public notification on a yearly basis, no cost differential between the current TCR and the AIP and Alternative options is estimated in the cost model. However, the advisory committee concluded that significant reductions in monitoring and reporting violations may be realized through the revised regulatory framework of the proposed RTCR, which includes new consequences for failing to comply with monitoring provisions such as the requirement to conduct an assessment or ineligibility for reduced monitoring. These possible reductions have not been quantified. System resources used to process monitoring violation notices for the CCR and respond to customer inquiries about the notices, as well as State resources to remind systems to take samples, may be reduced if significant reductions are realized. Exclusion of this potential cost savings may lead to an underestimate of the PN cost savings under both the AIP and Alternative option. Such cost savings to States may be significant given the high occurrence of monitoring and reporting violations under the current TCR.

Additionally, as an underlying assumption to the costing methodology, EPA assumed that all PWSs subject to the proposed RTCR requirements are already complying with the current TCR. There may be some PWSs that are not in full compliance with the current TCR, and if so, additional costs and benefits are incurred.

G. Potential Impact of the Proposed RTCR on Households

The household cost analysis considers the potential increase in a household's annual water bill if a CWS passed the entire cost increase resulting from the proposed rule on to their customers. This analysis is a tool to gauge potential impacts and should not be construed as a precise estimate of potential changes to household water bills. State costs and costs to TNCWSs and NTNCWSs are not included in this analysis since their costs are not typically passed through directly to households. Exhibit VI–25 presents the mean expected increases in annual household costs for all CWSs, including those systems that do not have to take corrective action. Exhibit VI–25 also presents the same information for CWSs that must take corrective action. Household costs tend to decrease as system size increases, due mainly to the economies of scale for the corrective actions.

The first category in Exhibit VI–25 presents net costs per household under the AIP and Alternative options for all rule components spread across all CWSs. In this scenario, comparison to the current TCR shows a cost savings for some households. For those households that are expected to see a cost increase, the average annual water bill is expected to increase by less than five cents on average.

While the average increase in annual household water bills to implement the AIP option is less than a dollar, customers served by a small CWS that have to take corrective actions as a result of the proposed rule incur slightly larger increases in their water bills. The subsequent categories of the exhibit present net costs per household for three different subsets of CWSs: (1) CWSs that perform assessments but no corrective actions, (2) CWSs that perform corrective actions, and (3) CWSs that do not perform assessments or corrective actions. Approximately 77 percent of households are served by CWSs that perform assessments but do not perform corrective actions over the 25-year period of analysis (because no sanitary defects are found). These households experience a slight cost savings on an annual basis. The nine percent of households belonging to CWSs that perform corrective actions over the 25-year period of analysis experience an increase in annual net household costs of less than $0.70 on average for CWSs serving greater than 4,100 people to approximately $4 on average for CWSs serving 4,100 or fewer people on an annual basis. EPA estimated that 14 percent of households are served by CWSs that do not perform assessments or corrective actions over the 25-year period of analysis. This group of households served by small systems (4,100 or fewer people) experiences a slight cost change on an annual basis, comparable to those performing assessments but no corrective actions. Overall, the main driver of additional household costs under the proposed RTCR is corrective actions.

EXHIBIT VI–25—SUMMARY OF NET ANNUAL PER-HOUSEHOLD COSTS FOR THE PROPOSED RTCR (2007$)

Population served by PWS	3% Discount rate		7% Discount rate	
	AIP option net cost per household	Alternative option net cost per household	AIP option net cost per household	Alternative option net cost per household
All Community Water Systems (CWSs)				
≤ 4,100	$0.07	$0.09	$0.10	$0.12
> 4,100	0.05	0.05	0.04	0.04
Total	0.05	0.06	0.05	0.05
Community Water Systems (CWSs) performing Level 1/Level 2 Assessments (and no Corrective Actions)				
≤ 4,100	(0.22)	(0.19)	(0.16)	(0.13)
> 4,100	(0.02)	(0.01)	(0.01)	(0.01)
Total	(0.02)	(0.01)	(0.01)	(0.01)
Community Water Systems (CWSs) performing Corrective Actions				
≤ 4,100	4.11	4.14	3.63	3.68
> 4,100	0.65	0.65	0.54	0.54
Total	0.78	0.78	0.66	0.66
Community Water Systems (CWSs) not performing Level 1/Level 2 Assessments, or Corrective Actions				
≤ 4,100	0.00	0.02	0.04	0.06
> 4,100	0.00	0.00	0.00	0.00
Total	0.00	0.01	0.01	0.02

Source: Proposed RTCR EA (USEPA 2010a).

H. Incremental Costs and Benefits

The proposed RTCR regulatory options achieve increasing levels of benefits at increasing levels of costs. The regulatory options for this proposed rule, in order of increasing costs and benefits (Option 1 lowest, and option 3 highest) are as follows:

- *Option 1:* Current TCR option
- *Option 2:* AIP option
- *Option 3:* Alternative option

More information about the options is provided in the Proposed RTCR EA (USEPA 2010a).

Incremental costs and benefits are those that are incurred or realized to reduce potential illnesses and deaths from one alternative to the next more stringent alternative. Estimates of incremental costs and benefits are useful when considering the economic efficiency of different regulatory alternatives considered by EPA. One goal of an incremental analysis is to identify the regulatory alternatives where net social benefits are maximized. However, incremental net benefits analysis is not possible when benefits are not monetized as in the case with the proposed RTCR.

However, incremental analysis can still provide information on relative cost-effectiveness of different regulatory options. For the proposed RTCR, only costs were monetized. While benefits were not quantified, an indirect proxy for benefits was. To compare the additional net cost increases and associated incremental benefits of the AIP and the Alternative options, benefits are presented in terms of corrective actions performed since performance of corrective actions is expected to have an impact that is most directly translatable into potential health benefits.

Exhibit VI–26 shows the incremental cost of the AIP over the current TCR and the Alternative option over the AIP option for costs annualized using three percent and seven percent discount rates. The incremental benefits of the Alternative option in terms of incremental corrective actions performed (114 at three percent and 135 and seven percent discount rates) are fewer than for the AIP (202 at three percent and 189 at seven percent discount rates), despite the increased costs. The non-monetized corrective action endpoints are discounted in order to make them comparable to monetized endpoints. The relationship between the incremental costs and benefits is examined further with respect to cost effectiveness in section VI.M of this preamble.

EXHIBIT VI–26—INCREMENTAL NET CHANGE IN ANNUALIZED PRESENT VALUE COSTS ($MILLIONS, 2007$) AND BENEFITS (NUMBER OF CORRECTIVE ACTIONS)

Regulatory option	Costs		Benefits (L2 corrective actions)	
	3%	7%	3%	7%
Current TCR	$186.1	$178.4	[3] No change	[3] No change
AIP	199.8	192.5	202	189
Incremental AIP [1]	13.7	13.7	202	189

EXHIBIT VI–26—INCREMENTAL NET CHANGE IN ANNUALIZED PRESENT VALUE COSTS ($MILLIONS, 2007$) AND BENEFITS (NUMBER OF CORRECTIVE ACTIONS)—Continued

Regulatory option	Costs		Benefits (L2 corrective actions)	
	3%	7%	3%	7%
Alternative	213.3	208.5	317	323
Incremental Alternative [2]	13.5	16.0	114	135

[1] Represents the incremental net change of the AIP option over the current TCR option.

[2] Represents the incremental net change of the Alternative option over the AIP option. Add incremental net change for Alternative option to incremental net change for AIP option to calculate the total net change of the Alternative option over the current TCR option.

Note: The RTCR occurrence model yields the number of corrective actions that are expected to be implemented in addition to (net of) those already implemented under the current TCR. The model does not incorporate an estimate of the number of corrective actions implemented per year under the current TCR and does not yield a total for the AIP and Alternative option that includes the current TCR corrective actions. Benefits shown include corrective actions based on L2 assessments. Detailed benefits and cost information is provided in Appendices A and C, respectively, of the Proposed RTCR EA (USEPA 2010a).

[3] As explained in section VI.F.2.f of this preamble, for modeling purposes, EPA estimates the net change only in the number of corrective actions performed under the AIP and Alternative options compared to the current TCR and thus did not quantify the (non-zero) baseline number of corrective actions performed under the Current TCR.

I. Benefits From Simultaneous Reduction of Co-Occurring Contaminants

As discussed in section VI.E, the potential benefits from the proposed RTCR include avoidance of a full range of health effects from the consumption of fecally contaminated drinking water, including the following: acute and chronic illness, endemic and epidemic disease, waterborne disease outbreaks, and death.

Systems may choose corrective actions that also address other drinking water contaminants. For example, correcting for a pathway of potential contamination into the distribution system can mitigate a variety of potential contaminants. For example, eliminating a cross connection reduces the potential for chemical contamination as well as microbial. Due to a lack of contamination co-occurrence data that could relate to the effect that treatment corrective action may have on contamination entering through distribution system pathways, EPA has not quantified such potential benefits.

J. Change in Risk From Other Contaminants

All surface water systems are already required to disinfect under the SWTR (USEPA 1989b, 54 FR 27486, June 29, 1989) but this rule could impact currently non-disinfecting ground water systems. When disinfection is first introduced into a previously undisinfected GW system, the disinfectant can react with pipe scale causing increased risk from some contaminants that may be entrained in the pipe scales and other water quality problems. Examples of contaminants that could be released include lead, copper, and arsenic. Disinfection could also possibly lead to a temporary discoloration of the water as the scale is loosened from the pipe. These risks can be addressed by gradually phasing in disinfection to the system, by targeted flushing of distribution system mains, and by maintaining a proper corrosion control program.

Introducing a disinfectant could also result in an increased risk from disinfection byproducts (DBPs). Risk from DBPs has already been addressed in the Stage 1 Disinfection Byproducts Rule (DBPR) (USEPA 1998c) and additional consideration of DBP risk has been addressed in the final Stage 2 DBPR (USEPA 2006e). In general, ground water systems are less likely to experience high levels of DBPs than surface water systems because they have lower levels of naturally occurring organic materials (generally represented by total organic carbon (TOC)) that contribute to DBP formation.

EPA does not expect many previously undisinfected systems to add disinfection as a result of either the AIP or Alternative rule options. Ground water systems that are not currently disinfecting may eventually install disinfection if RTCR distribution system monitoring and assessments, and/or subsequent source water monitoring required under the GWR, result in the determination that source water treatment is required. However, these impacts were already accounted for and costed under the GWR and EPA does not project additional systems switching to disinfection as a result of the RTCR. *See* section 7.4.6 of the Proposed RTCR EA (USEPA 2010a) for a discussion on corrective action.

K. Effects of Fecal Contamination and/or Waterborne Pathogens on the General Population and Sensitive Subpopulations

As discussed previously in this preamble, fecal contamination may contain waterborne pathogens including bacteria, viruses, and parasitic protozoa. Fecal contamination and waterborne pathogens can cause a variety of illnesses, including acute gastrointestinal illness (AGI) with diarrhea, abdominal discomfort, nausea, vomiting, and other symptoms. Most AGI cases are of short duration and result in mild illness. Other more severe illnesses caused by waterborne pathogens include hemolytic uremic syndrome (HUS) (kidney failure), hepatitis, and bloody diarrhea (WHO 2004). Chronic disease such as irritable bowel syndrome, reduced kidney function, hypertension and reactive arthritis can result from infection by a waterborne agent (Clark *et al.* 2008).

When humans are exposed to and infected by an enteric pathogen, the pathogen becomes capable of reproducing in the gastrointestinal tract. As a result, healthy humans shed pathogens in their feces for a period ranging from days to weeks. This shedding of pathogens often occurs in the absence of any signs of clinical illness. Regardless of whether a pathogen causes clinical illness in the person who sheds it in his or her feces, the pathogen being shed may infect other people directly by person-to-person spread, contact with contaminated surfaces, and other means which are referred to as secondary spread. As a result, waterborne pathogens that are initially waterborne may subsequently infect other people through a variety of routes (WHO 2004).

The general population typically experiences acute gastrointestinal illness (some illnesses may be severe such as kidney failure) when exposed to fecal contamination and/or waterborne pathogens. When sensitive subpopulations experience the same exposure as the general population,

more severe illness (and sometimes death) can occur.

Examples of sensitive subpopulations are provided in chapter 2 of the Proposed RTCR EA (USEPA 2010a). This section discusses the potential health effects associated with sensitive population groups, especially children, pregnant women, and the elderly.

It is anticipated that the requirements of the proposed RTCR will help reduce pathways of entry for fecal contamination and/or waterborne pathogens into the distribution system, thereby reducing risk to both the general population as well as to sensitive subpopulations.

1. Risk to Children, Pregnant Women, and the Elderly

Children and the elderly are particularly vulnerable to kidney failure (hemolytic uremic syndrome) caused by the pathogenic bacterium *E. coli* O157:H7. Waterborne outbreaks due to *E. coli* O157:H7 have caused kidney failure in children and the elderly as the result of disease outbreaks from consuming ground water in Cabool, Missouri (Swerdlow *et al.* 1992); Alpine, Wyoming (Olsen *et al.* 2002); Washington County, New York (NY State DOH 2000); and Walkerton, Ontario, Canada (Health Canada 2000).

The risk of acute illness and death due to viral contamination of drinking water depends on several factors, including the age of the exposed individual. Infants and young children have higher rates of infection and disease from enteroviruses than other age groups (USEPA 1999). Several enteroviruses that can be transmitted through water can have serious health consequences in children. Enteroviruses (which include poliovirus, coxsackievirus, and echovirus) have been implicated in cases of flaccid paralysis, myocarditis, encephalitis, hemorrhagic conjunctivitis, and diabetes mellitus (Dalldorf and Melnick 1965; Smith 1970; Berlin *et al.* 1993; Cherry 1995; Melnick 1996; CDC 1997; Modlin 1997). Women may be at increased risk from enteric viruses during pregnancy (Gerba *et al.* 1996). Enterovirus infections in pregnant women can also be transmitted to the unborn child late in pregnancy, sometimes resulting in severe illness in the newborn (USEPA 2000d).

Waterborne viruses can also be particularly harmful to children. Rotavirus disproportionately affects children less than five years of age (Parashar *et al.* 1998). However, the pentavalent rotavirus vaccine licensed for use in the United States has been shown to be 74 percent effective against rotavirus gastroenteritis of any severity (Dennehy 2008). For echovirus, children are disproportionately at risk of becoming ill once infected (Modlin 1986). According to CDC, echovirus is not a vaccine-preventable disease (CDC 2009).

The elderly are particularly at risk from diarrheal diseases (Glass *et al.* 2000) such as those associated with waterborne pathogens in the US. Approximately 53 percent of diarrheal deaths occur among those older than 74 years of age, and 77 percent of diarrheal deaths occur among those older than 64 years of age. In Cabool, Missouri (Swerdlow *et al.* 1992), a waterborne *E. coli* O157:H7 outbreak in a ground water system resulted in four deaths, all among the elderly. One death occurred from hemolytic uremic syndrome (kidney failure), the others from gastrointestinal illness.

Hospitalizations due to diarrheal disease are higher in the elderly than younger adults (Glass *et al.* 2000). Average hospital stays for individuals older than 74 years of age due to diarrheal illness are 7.4 days compared to 4.1 days for individuals aged 20 to 49 (Glass *et al.* 2000).

It is anticipated that the requirements of the proposed RTCR will help reduce pathways of entry for fecal contamination and/or waterborne pathogens into the distribution system, thereby reducing risk to both the general population as well as to sensitive subpopulations such as children, pregnant women, and the elderly.

2. Risk to Immunocompromised Persons

AGI symptoms may be more severe in immunocompromised persons (Frisby *et al.* 1997; Carey *et al.* 2004). Such persons include those with acquired immune deficiency syndrome (AIDS), cancer patients undergoing chemotherapy, organ transplant recipients treated with drugs that suppress the immune system, and patients with autoimmune disorders such as lupus. In AIDS patients, *Cryptosporidium,* a waterborne protozoa, has been found in the lungs, ear, stomach, bile duct, and pancreas in addition to the small intestine (Farthing 2000). Immunocompromised patients with severe persistent cryptosporidiosis may die (Carey *et al.* 2004).

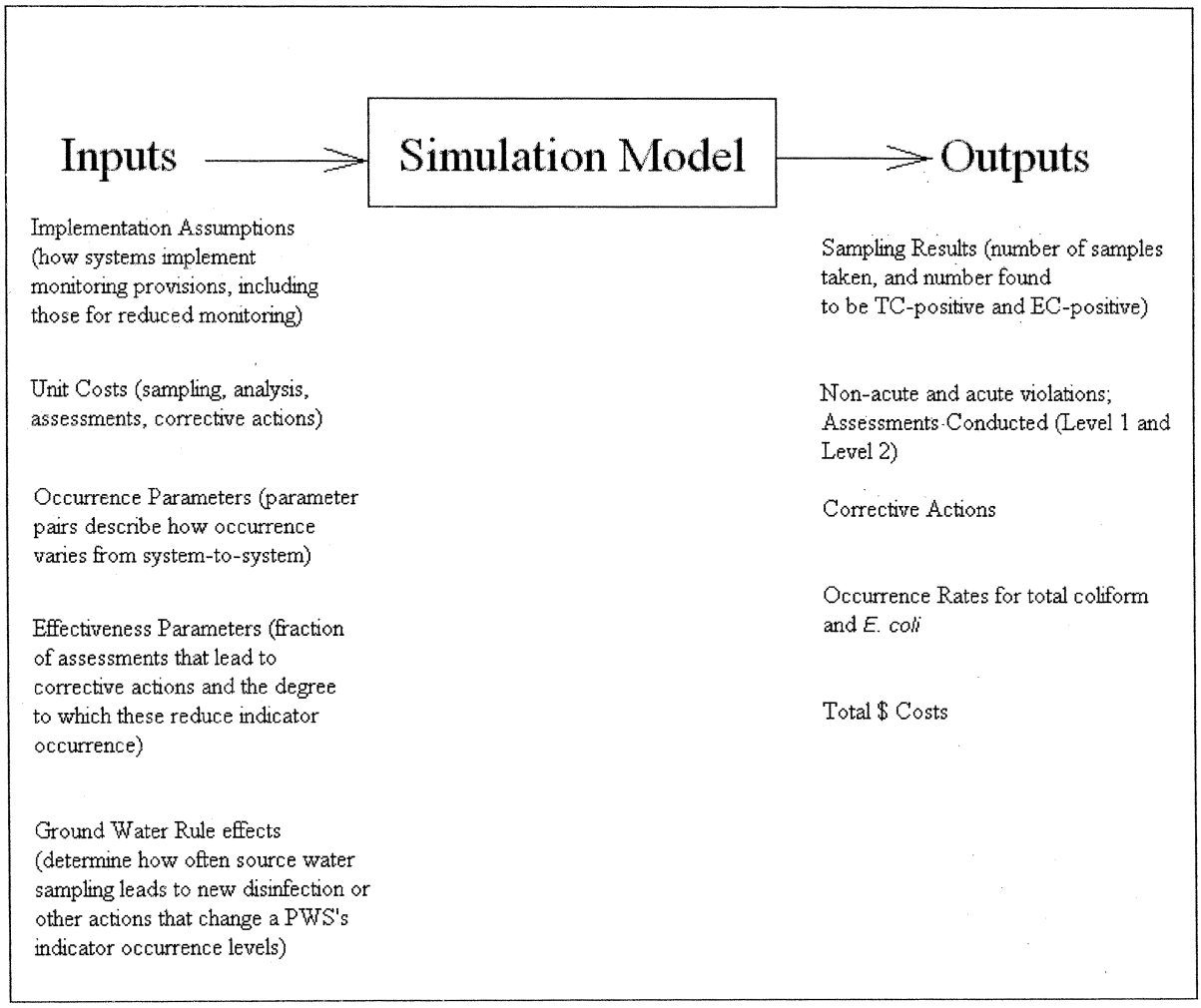
For the immunocompromised, Gerba *et al.* (1996) reviewed the literature and reported that enteric adenovirus and rotavirus are the two waterborne viruses most commonly isolated in the stools of AIDS patients. For patients undergoing bone-marrow transplants, several studies cited by Gerba *et al.* (1996) reported mortality rates greater than 50 percent among patients infected with enteric viruses.

It is anticipated that the requirements of the proposed RTCR will help reduce pathways of entry for fecal contamination and/or waterborne pathogens into the distribution system, thereby reducing risk to both the general population as well as to sensitive subpopulations such as the immunocompromised.

L. Uncertainties in the Benefit and Cost Estimates for the Proposed RTCR

A computer simulation model was used to estimate costs and indicators of benefits of the proposed RTCR. Exhibit VI–27 shows that these outputs depend on a number of key model inputs. This section describes analyses that were conducted to understand how uncertainties in these inputs contributed to uncertainty in model outputs.

Exhibit VI-27 Simulation Model, Inputs, and Outputs



1. Inputs and Their Uncertainties

It is anticipated that the requirements of the proposed RTCR will help reduce pathways of entry for fecal contamination and/or waterborne pathogens into the distribution system, thereby reducing exposure and illness from these contaminants in drinking water.

These exposure and illness reductions could not be modeled and estimated quantitatively, due to a lack of a quantitative relationship between indicators and pathogens. Section VI.E.3 of this preamble and chapter 6 of the Proposed RTCR EA (USEPA 2010a) discuss this issue qualitatively.

Model outputs include two important indicators of microbial exposure: *E. coli* occurrence in routine total coliform samples and the occurrence of Level 1 and 2 assessments. These outputs were monitored as endpoints in the sensitivity analyses described in this section.

Quantified national cost estimates include costs of required monitoring, assessments, corrective actions, and public notifications. Total costs were monitored as end-points in the sensitivity analyses described in this section.

None of the inputs shown in Exhibit VI–27 is perfectly known, so each has some degree of uncertainty. Some of these inputs are informed directly by data, so their uncertainties are due to limitations of the data. For example, uncertainty about the statistical model used to characterize occurrence is due to the limited numbers of systems and measurements per system in the Six-Year Review 2 dataset (USEPA 2010e). Other inputs are informed by professional judgment, so their uncertainties are expressed in terms of reasonable upper and lower bounds that are, themselves, based on expert judgment. For example, 10 percent of assessments (representing the incremental increase over the current TCR) are expected to result in effective corrective actions, based on professional judgment, with reasonable upper and lower bounds of 20 percent and 5 percent, respectively.

Sensitivity analyses were conducted to assess the degree to which uncertainties about selected inputs contribute to uncertainty in the resulting cost estimates. The analyses focused on the inputs that are listed in Exhibit VI–27. Varying the assumptions about the percentages of corrective actions identified and the effectiveness of those actions has a less than linear effect on outcomes, and the AIP option continues to be less costly than the Alternative option under all scenarios modeled. Exhibits 5.22a and 5.22b of the Proposed RTCR EA (USEPA 2010a) provide summaries of the driving model parameters and indicate where in the proposed RTCR EA the full discussion of uncertainty on each parameter is contained.

Not shown in Exhibit VI–27 are some inputs that are very well known. These are inventory data, which include the list of all PWSs affected by the proposed RTCR and, for each system, information on its source water type, disinfection practice, and population served. Although this information is not perfect, any uncertainty is believed to have negligible impact on model outputs. EPA did not conduct sensitivity analyses to evaluate the importance of these small uncertainties.

2. Sensitivity Analysis

Default values of the model inputs are considered reasonable best-estimates. Model outputs that are obtained when the inputs are set to these default values are also considered to be reasonable best-estimates. EPA conducted sensitivity analyses to learn how much the outputs might change when individual inputs are changed from their default values. The approach taken was to change each input to some reasonable upper and lower bounds, based on professional judgment.

Many of the uncertainties are expected to impact the model output in a similar fashion for the current TCR, AIP, and the Alternative options. For example, an increase in a total coliform occurrence tends to increase the total cost and benefit estimates for all of the rule alternatives. Because the benefit and cost analyses focus on net changes among the current TCR, AIP, and Alternative options, these common sources of uncertainty may tend to cancel out in the net change analyses. Other uncertainties were expected to have stronger influence on net changes among the current TCR, AIP, and Alternative options because they influence some options, but not others. For example, assumptions about the effectiveness of corrective actions influences total costs of the proposed RTCR options, but not the current TCR option itself.

Results of the sensitivity analyses (reported in the Proposed RTCR EA (USEPA 2010a)) showed that the fundamental conclusions of the economic analysis do not change over a wide range of assumptions. Both the AIP and Alternative options provide benefits as compared to the current TCR. Varying key assumptions has a less than linear effect on outcomes, and the AIP option continues to be less costly than the Alternative option under all scenarios modeled. *See* section 5.3.3.1 of the Proposed RTCR EA (USEPA 2010a) for details.

M. Benefit Cost Determination for the Proposed RTCR

Pursuant to SDWA section 1412(b)(6)(A), EPA has determined that the benefits of the proposed RTCR justify the costs. In making this determination, EPA considered quantified and nonquantified benefits and costs as well as the other components of the HRRCA outlined in section 1412(b)(3)(C) of the SDWA.

Additionally, EPA used several other techniques to compare benefits and costs including a break-even analysis and a cost effectiveness analysis. The break-even analysis (*see* chapter 9 of the Proposed RTCR EA (USEPA 2010a)) was conducted using two example pathogens responsible for some (unknown) proportion of waterborne illnesses in the United States: shiga toxin-producing EC O157:H7 [1] (STEC O157:H7) and *Salmonella.* Based on either example pathogen considered in the breakeven analysis, a small number of fatal cases annually would need to be avoided, relative to the CDC's estimate of cases caused by waterborne pathogens, in order to break even with rule costs. For example, under the AIP option, just two deaths would need to be avoided annually using a 3 percent discount rate based on consideration of the bacterial pathogen STEC O157:H7. Alternatively, approximately 3,000 or 8,000 non-fatal cases, using the enhanced or traditional benefits valuations approaches,[2] respectively, would need to be avoided to break even with rule costs. As expected based on its costs, the lower cost of the AIP option relative to the Alternative option means that fewer cases need to be avoided in order to break even. *See* Exhibit VI–28.

As Exhibit VI–28 shows, approximately 2 deaths would need to be avoided from a *Salmonella* infection for the rule to break even. The estimated number of non-fatal *Salmonella* cases that would need to be avoided to break even is approximately 10,000 or 65,000 cases under the enhanced and traditional benefits valuations approaches, respectively. Given the large number of potential waterborne pathogens shown to occur in PWSs and the relatively low net costs of the proposed RTCR, EPA believes, as discussed in this section and in the Proposed RTCR EA (USEPA 2010a), that the AIP option is likely to at least break even. Chapter 9 of the Proposed RTCR EA (USEPA 2010a) has a complete discussion of the break-even analysis and how costs per case were calculated.

EXHIBIT VI–28—ESTIMATED BREAKEVEN THRESHOLD FOR AVOIDED CASES OF E. COLI O157:H7 AND SALMONELLA

Cost of illness (COI) methodology	Discount rate (percent)	AIP option		Alternative option	
		Non-fatal cases only	Fatal cases only [1]	Non-fatal cases only	Fatal cases only [1]
E. coli O157:H7:					
Traditional COI	3	8,000	1.6	16,000	3.1
	7	8,000	1.5	17,000	3.4
Enhanced COI	3	3,000	1.6	5,000	3.1
	7	3,000	1.5	6,000	3.4
Salmonella:					
Traditional COI	3	65,000	1.6	130,000	3.1
	7	65,000	1.6	141,000	3.4
Enhanced COI	3	10,000	1.6	20,000	3.1

[1] According to the Web site of the American Academy of Family Physicians (*http://www.aafp.org/afp/20000401/tips/11.html*), "Shiga toxin-producing *Escherichia coli* is a group of bacteria strains capable of causing significant human disease. The pathogen is transmitted primarily by food and has become an important pathogen in industrialized North America. The subgroup enterohemorrhagic *E. coli* includes the relatively important serotype O157:H7, and more than 100 other non-O157 strains."

[2] Both traditional and enhanced COI approaches count the value of the direct medical costs and of time lost that would been spent working for a wage, but differ in their assessment of the value of time lost that would be spent in nonmarket work (*e.g.*, housework, yardwork, and raising children) and leisure (*e.g.*, recreation, family time, and sleep). They also differ in their valuation of (other) disutility, which encompasses a range of factors of well being, including both inconvenience and any pain and suffering. A complete discussion of the traditional and enhanced COI approaches can be found in Appendix E of the RTCR EA (USEPA 2010a).

EXHIBIT VI–28—ESTIMATED BREAKEVEN THRESHOLD FOR AVOIDED CASES OF E. COLI O157:H7 AND SALMONELLA—Continued

Cost of illness (COI) methodology	Discount rate (percent)	AIP option		Alternative option	
		Non-fatal cases only	Fatal cases only [1]	Non-fatal cases only	Fatal cases only [1]
	7	10,000	1.6	21,000	3.4

[1] Calculations for fatal cases include the non-fatal cost of illness (COI) component for the underlying illness prior to death.

Note: The number of cases needed to reach break-even threshold is calculated by dividing the net change in costs for the proposed RTCR by the average estimated value of avoided cases.

E. coli O157:H7 and *Salmonella* are only two of multiple pathogenic endpoints that could have been used for this analysis. Use of additional pathogenic contaminants in addition to these single endpoints would result in lower threshold values.

Detail may not add due to independent rounding.

Differences in the three percent and seven percent estimates among the AIP and Alternative Analysis can be explained by how costs accrue over the period of analysis. Cost for the AIP are relatively consistent across the period of analysis while greater costs for the Alternative occur early in the rule implementation period due to increases in monitoring and corrective actions.

Cost-effectiveness is another way of examining the benefits and costs of the proposed rule. Exhibit VI–29 shows the cost of the rule per corrective action avoided. The cost-effectiveness analysis, as with the net benefits, is limited because EPA was able to only partially quantify and monetize the benefits of the proposed RTCR. As discussed previously and demonstrated in the Proposed RTCR EA (USEPA 2010a), the proposed rule, *i.e.,* the AIP option, achieves the lowest cost per corrective action avoided among the options considered. The incremental cost-effectiveness analysis shows that the AIP has a lower cost per corrective action than the Alternative option.

EXHIBIT VI–29—TOTAL NET ANNUAL COST PER CORRECTIVE ACTION (CA) IMPLEMENTED UNDER AIP AND ALTERNATIVE OPTIONS, ANNUALIZED (USING THREE PERCENT AND SEVEN PERCENT DISCOUNT RATES)

[$2007]

Regulatory scenario	3% Discount rate	7% Discount rate
AIP Net Cost ($ Millions)	$13.7	$13.7
AIP Net Corrective Actions (L1 & L2)	598	555
AIP Cost Effectiveness Analysis (CEA) (net rule cost/CA)	$22,899	$24,610
Alternative Option Net Cost	$27.2	$29.7
Alternative Option Net Corrective Actions (L1 & L2)	785	765
Alternative Option CEA (net rule cost/CA)	$34,718	$39,812

Note: Corrective actions include those conducted as a result either Level 1 or Level 2 assessments. Total rule costs are shown in Exhibit 9.14 of the Proposed RTCR EA (USEPA 2010a). Detailed benefits and cost information is provided in Appendices A and C, respectively, of the Proposed RTCR EA (USEPA 2010a).

EPA also considered the incremental cost-effectiveness of the AIP option as compared to the Alternative option to determine the additional benefit associated with the portion of cost for the Alternative option that exceeds the cost of the AIP option. Exhibit VI–30 shows that in incremental terms for all PWSs, the AIP option has a far lower unit cost per corrective action than the Alternative option. EPA further considered the group of 60,200 TNCWSs serving 100 or fewer people and using GW, which are the largest subset of systems by size and type. This group is expected to bear the highest aggregate burden under the proposed RTCR because of the number of systems in the group, but the per system cost of this group is relatively low, ($83 annualized at 3% discount in 2007$). The two incremental analyses (Exhibit VI–30 and Exhibit VI–31) together indicate that, using a three percent discount rate to compare incremental benefits and costs, the AIP option is significantly more cost-effective than the Alternative option by a factor of about four for the most burdened subset of systems and by a factor of greater than three when considering all PWSs together. Additional information about this analysis and other methods used to compare benefits and costs can be found in chapter 9 of the Proposed RTCR EA (USEPA 2010a).

EXHIBIT VI–30—INCREMENTAL RULE COST PER CORRECTIVE ACTION (CA) IMPLEMENTED UNDER AIP AND ALTERNATIVE OPTIONS, ANNUALIZED (USING THREE PERCENT AND SEVEN PERCENT DISCOUNT RATES)

[$2007]

Regulatory scenario	3% Discount rate	7% Discount rate
A. AIP Incremental Net Costs ($ millions) [1]	$13.7	$13.7
B. AIP Incremental Net Corrective Actions (L1 & L2) [1]	598	555
C. AIP Incremental Cost per CA ($) (C = A/B)	$22,899	$24,610
D. Alternative Option Incremental Net Costs ($ millions) [2]	$13.5	$16.0
E. Alternative Option Incremental Net Corrective Actions (L1 & L2) [2]	187	210
F. Alternative Option Incremental Cost per CA ($) (F = D/E)	$72,582	$76,299

Notes: Detail may not add due to independent rounding.

Exhibit includes only the number of corrective actions predicted by the RTCR occurrence model to be implemented in addition to those implemented under the current TCR. Includes corrective actions (CAs) in response to both Level 1 and Level 2 assessments. Total net costs for each option and total CAs (not incremental) are shown in Exhibit 9.15 of the Proposed RTCR EA (USEPA 2010a). Detailed benefits and cost information is provided in Appendices A and C, respectively, of the Proposed RTCR EA (USEPA 2010a).

[1] Represents the incremental increase of the AIP option over the current TCR.

[2] Represents the incremental increase of the Alternative option over AIP option. Add incremental net values for Alternative option to incremental net values for AIP option to calculate total net values of Alternative option over current TCR.

EXHIBIT VI–31—INCREMENTAL RULE COST PER CORRECTIVE ACTION (CA) FOR TNCWSS USING GW IMPLEMENTED UNDER AIP AND ALTERNATIVE OPTIONS, ANNUALIZED (USING THREE PERCENT AND SEVEN PERCENT DISCOUNT RATES)

[2007]

Regulatory scenario	3% Discount rate	7% Discount rate
1. AIP Incremental Net Costs ($ millions) [1]	$5.1	$5.1
2. AIP Incremental Corrective Actions (L1 & L2) (TNCWS < 101 only) [1]	279	257
3. AIP Incremental Cost per CA ($)	$18,219	$19,965
4. Alternative Option Incremental Net Costs ($ millions) [2]	$8.3	$9.8
5. Alternative Option Incremental Corrective Actions (L1 & L2) (TNCWS < 101 only) [2]	128	145
6. Alternative Option Incremental Cost per CA ($)	$64,731	$67,762

[1] Represents the incremental increase of the AIP option over the current TCR.

[2] Represents the incremental increase of the Alternative option over AIP option. Add incremental net values for Alternative option to incremental net values for AIP option to calculate total net values of Alternative option over current TCR.

Note: Detail may not add due to independent rounding.

Incremental Net Costs are based on TNCWSs serving < 101 people. Detailed benefits and cost information is provided in Appendices A and C, respectively, of the Proposed RTCR EA (USEPA 2010a).

The preferred option for the proposed RTCR is the AIP option. The analyses performed as part of the Proposed RTCR EA (USEPA 2010a) support the collective judgment and consensus of the advisory committee that the AIP requirements provide for effective and efficient revisions to the current TCR regulatory requirements. The estimated net cost of the AIP option is small ($14M annually) as compared to the current TCR and small compared to the net cost of the Alternative option ($27M–$30M) as compared with the current TCR. In addition, the net benefits are expected to be positive under the AIP option and no backsliding in overall risk is predicted. While the number of corrective actions under the Alternative option is greater than under the AIP option, the achievement of these benefits is not as cost effective as under the AIP option.

EPA's Proposed RTCR EA (USEPA 2010a) shows that additional monitoring is likely to lead to more corrective actions under the Alternative option than under either the current TCR option or the AIP option. The EPA Science Advisory Board (SAB) noted in its analysis of the EA (described in section VII.K of this preamble) that they are not generally supportive of decreased monitoring, and that overall, the Alternative option appears to address and protect public health sooner in time than the AIP proposed implementation. However, EPA concluded that the increased costs associated with the Alternative option are not justified by the increased benefits because under the AIP option, States could conduct site visits in place of increased monitoring and such site visits are more protective of public health. In particular, the cost-effectiveness analysis shows that the Alternative option is not as cost-effective as the proposed AIP option.

N. Request for Comment on the Economic Analysis

EPA requests comment on the following aspects of the Proposed RTCR EA (USEPA 2010a):

• The EPA Science Advisory Board (SAB) noted in its review of the Proposed RTCR EA that overall, the Alternative option appears to address and protect public health sooner in time than the AIP proposed implementation. The SAB is concerned about decreased monitoring in the AIP option, compared to the Alternative option. Although the AIP option contains less overall monitoring than the Alternative option, EPA believes that having States conducting site visits in place of increased monitoring under the AIP option is more protective of public health. As discussed in this section, EPA evaluates the costs and benefits of all options and prefers the AIP option because the increased costs associated with the Alternative option are not justified by the increased short term benefits. EPA requests comment on whether this determination is reasonable and how the RTCR may best address the SAB's concern that the Alternative option appears to protect public health sooner in time than the proposed AIP option.

In addition, the SAB noted in its review that measures other than total coliform may provide valuable supplemental information on the health risks of distributed water. The SAB provided example measures such as water age, biofilm assessment, implementation of Best Management Practices, indicators that would inform the structural and hydraulic integrity of distribution system, etc. The TCRDSAC also suggested that EPA develop measures to evaluate the long-term effectiveness of the rule. EPA requests comment on the measures that may be monitored and tracked to indicate the long-term effectiveness of the RTCR and how these measures may be implemented effectively.

• Major distribution system appurtenances such as storage tanks generally have a useful life that is accounted for in water system capital planning. While the assessments conducted under RTCR could identify when that useful life has ended, EPA assumes the replacement or maintenance of appurtenances is part of a water system's operations and maintenance activities and the associated cost is accounted for in its capital planning. During the TCRDSAC's deliberation, EPA worked closely with stakeholders to derive this assumption and, consistent with the discussions of the TCRDSAC regarding major structural fixes or replacements, EPA's analysis did not account for these costs as part of the cost of the RTCR, although such fixes may be undertaken to address sanitary defects identified in a Level 1 or Level 2 assessment. EPA

requests comment on whether the assumption is reasonable. Are there alternative approaches that could be used to address this issue? If so, what would be the basis?

• In calculating the State cost of the rule, EPA assumed that, based on stakeholder input and the cost of annual site visits, only those States that currently allow annual monitoring and conduct annual site visits under TCR would continue under the RTCR. EPA requests comment on whether this assumption is reasonable. Are there alternative approaches that could be used to derive a more reasonable assumption? If so, what would be the basis?

• In analyzing the potential benefits of the proposed RTCR, EPA assumed that 10 percent of Level 1 and Level 2 assessments under the RTCR would lead to corrective action above what is already occurring under the current TCR. This assumption was based on conversations with States. However, EPA recognizes that information about corrective actions conducted under the current TCR is limited and requests comment on this assumption and any information that relates to it.

• In assessing the benefits of the rule, EPA assumed that because Level 2 assessments would be more comprehensive investigations than Level 1 assessments, they would generally result in finding more substantial problems than Level 1 assessments and would be more effective at reducing future occurrences of total coliforms and *E. coli.* Specifically, for modeling purposes, EPA assumed that, on average, systems performing corrective action as a result of a Level 1 assessment will experience no positive samples for the remainder of the year and one additional year, and will experience a 50 percent reduction in occurrence for three additional years, while systems performing corrective action as a result of a Level 2 assessment will experience no positive sample for the remainder of the year and two additional years, and a 75 percent reduction in occurrence for five additional years. EPA requests comment on whether these assumptions are reasonable, as well as any data or experience that commenters may provide that bears on the effectiveness of corrective action at reducing occurrence. Specifically, what differences between a Level 2 and Level 1 assessment would lead the former to identify more substantial problems and result in greater, longer-lasting occurrence reductions?

VII. Statutory and Executive Order Review

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this action is a significant regulatory action. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under Executive Order 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

EPA estimates that the proposed RTCR will have an overall impact on public water systems of $14 M and that the impact on small entities (PWSs serving 10,000 people or fewer) will be $9.4 M–$9.8 M annualized at 3 and 7 percent discount rates, respectively. These impacts are described in sections VI and VII.C of this preamble, respectively, and in the analysis that EPA prepared of the potential costs and benefits of this action, contained in the Proposed RTCR EA (USEPA 2010a).

B. Paperwork Reduction Act

The information collection requirements for the proposed RTCR have been submitted for approval to the OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR number 1895.06.

The Paperwork Reduction Act requires EPA to estimate the burden on public water systems (PWSs) and State/primacy Agencies of complying with the rule. The information collected as a result of EPA's efforts toward proposing the proposed RTCR should allow States/primacy agencies and EPA to determine appropriate requirements for specific systems and evaluate compliance with the proposed RTCR. Burden is defined at 5 CFR 1320.3(b) and means the total time, effort, and financial resources required to generate, maintain, retain, disclose, or provide information to or for a Federal agency. The burden includes the time needed to conduct the following State and public water system (PWS) activities:

State activities:

• Read and understand the rule;
• Mobilize (including primacy application), plan, and implement;
• Train PWS and consultant staff;
• Track compliance;
• Analyze and review PWS data;
• Review sampling plans and recommend any revisions to PWSs;
• Make determinations concerning PWS monitoring requirements;
• Respond to PWSs with positive samples;
• Recordkeeping;
• Review completed assessment forms and consult with the PWS about the assessment report;
• Review and coordinate with PWSs to determine optimal corrective actions to be implemented; and
• Provide consultation, review public notification certifications, and file reports of violations.

PWS activities:

• Read and understand the rule;
• Planning and mobilization activities;
• Revise existing sampling plans to identify sampling locations and collection schedules that are representative of water throughout the distribution system;
• Conduct routine, additional routine, and repeat monitoring;
• Complete a Level 1 Assessment if the PWS experiences a Level 1 trigger, and submit a timetable to the State to identify sanitary defects detected, corrective actions completed, and a timetable for any corrective actions not already completed;
• Complete a Level 2 Assessment if the PWS experiences a Level 2 trigger, and submit a timetable for any corrective actions not already completed;
• Correct sanitary defects found through the performance of Level 1 or Level 2 assessments;
• Develop and distribute Tier 1 public notices when *E. coli* MCL violations occur;
• Develop and distribute Tier 2 public notices when the PWSs failed to take corrective action; and
• Develop and distribute Tier 3 public notices when the PWSs failed to comply with the monitoring requirements or with mandatory reporting of required information within the specified timeframe.

For the first three years after publication of the final rule in the **Federal Register**, the major information requirements apply to 154,894 respondents. The total incremental burden associated with the change in moving from the information requirements of the current TCR to those in the proposed RTCR over the three years covered by the ICR is 2,518,878 hours, for an average of 839,526 hours per year. The total incremental cost over the three year clearance period is $71.3 million, for an average of $23.8 million per year (simple average over three years). (Note that this is higher than the annualized costs for the proposed rule because in the EA, the up-front costs that occur in the first three years, as well as future costs, are annualized over a 25-year time

horizon). The average burden per response (*i.e.,* the amount of time needed for each activity that requires a collection of information) is 5.4 hours; the average cost per response is $153.4. The collection requirements are mandatory under SDWA (42 U.S.C. 300h *et seq.*). Detail on the calculation of the proposed rule information collection burden and costs can be found in the Information Collection Request for the Proposed Revised Total Coliform Rule (USEPA 2010d) and chapter 7 of the EA (USEPA 2010a). A summary of the burdens and costs of the proposed collection is presented in Exhibit VII–1.

EXHIBIT VII–1—AVERAGE ANNUAL NET CHANGE BURDEN AND COSTS FOR THE PROPOSED RTCR ICR

Respondent type	Annual burden hours	Cost				Annual responses
		Annual labor cost	Annual operation & maintenance (O&M) cost	Annual capital cost	Total annual cost	
PWSs	747,848	$20,171,639	$0	$0	$20,171,639	103,225
States and Territories	91,678	3,595,421	0	0	3,595,421	51,669
Total	839,526	23,767,060	0	0	23,767,060	154,894

Notes: Detail may not add exactly to total due to independent rounding.
"Annual Burden Hours" reflects an annual average for all system sizes over the 3-year ICR period.
Source: Information Collection Request for the Proposed Revised Total Coliform Rule (USEPA 2010d).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9. To comment on EPA's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, EPA has established a public docket for this proposed rule, which includes this ICR, under Docket ID number EPA–HQ–OW–2008–0878. Submit any comments related to the ICR to EPA and OMB. *See* **ADDRESSES** section at the beginning of this notice for where to submit comments to EPA. Send comments to OMB at the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, Attention: Desk Officer for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after July 14, 2010, a comment to OMB is best assured of having its full effect if OMB receives it by August 13, 2010. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

C. Regulatory Flexibility Act (RFA)

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

The RFA provides default definitions for each type of small entity. Small entities are defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any "not-for-profit enterprise which is independently owned and operated and is not dominant in its field." However, the RFA also authorizes an agency to use alternative definitions for each category of small entity, "which are appropriate to the activities of the agency" after proposing the alternative definition(s) in the **Federal Register** and taking comment. 5 USC 601(3)–(5). In addition, to establish an alternative small business definition, agencies must consult with SBA's Chief Counsel for Advocacy.

For purposes of assessing the impacts of the proposed RTCR on small entities, EPA considered small entities to be PWSs serving fewer than 10,000 people. This is the cut-off level specified by Congress in the 1996 Amendments to the Safe Drinking Water Act for small system flexibility provisions. As required by the RFA, EPA proposed using this alternative definition in the **Federal Register** (63 FR 7620, February 13, 1998), requested public comment, consulted with the SBA, and finalized the alternative definition in the Consumer Confidence Reports regulation (63 FR 44524, August 19, 1998). As stated in that Final Rule, the alternative definition would be applied for all future drinking water regulations.

After considering the economic impacts of today's proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. The small entities directly regulated by this proposed rule are small PWSs serving fewer than 10,000 people. These include small CWSs, NTNCWSs, and TNCWSs, entities such as municipal water systems (publicly and privately owned), and privately-owned PWSs and for profit businesses where provision of water may be ancillary, such as mobile home parks, day care centers, churches, schools and homeowner associations. We have determined that only 61 of 150,672 small systems (0.04%) will experience an impact of more than 1% of revenues, and that none of the small systems will experience an impact of 3% or greater of revenue. This information is described further in chapter 8 of the Proposed RTCR EA (USEPA 2010a).

Although this proposed rule will not have a significant economic impact on a substantial number of small entities, EPA nonetheless has tried to reduce the impact of this rule on small PWSs. Provisions in the proposed RTCR that result in reduced costs for many small entities include:

- Reduced routine monitoring for qualifying PWS serving 1,000 or fewer people.
- Reduced number of repeat samples required.
- Reduced additional routine monitoring for PWS serving 4,100 or fewer people.
- Reduced public notification requirements for all systems, including small systems.

EPA also conducted outreach to small entities and convened a Small Business Advocacy Review Panel to obtain advice

and recommendations of representatives of the small entities that potentially would be subject to the proposed rule's requirements. EPA consulted with small entity representatives before and during the review by the Panel. These small entity representatives included representatives from small water systems of various types and sizes, representatives from associations that assist and/or advocate for small systems, and Federal agencies that operate small systems. Panel members included representatives from OMB, the Small Business Administration, and the EPA Office of Ground Water and Drinking Water. The consultation led to the development of a report providing recommendations to EPA on how to revise the TCR to address small system concerns, which EPA considered in drafting this proposed RTCR (SBAR Panel 2008). EPA also made presentations to the advisory committee on the recommendations of the Panel so the advisory committee could consider their recommendations in developing the AIP.

Consistent with the RFA/Small Business Regulatory Enforcement Fairness Act (SBREFA) requirements, the Panel evaluated the assembled materials and small-entity comments on issues and prepared a final report to the EPA Administrator. A copy of the Panel report is included in the docket for this proposed rule. The proposed rule is consistent with the Panel recommendations to use total coliforms as a trigger for investigation and/or corrective action, to balance monitoring requirements and costs with risk, to further differentiate requirements based on differences in water systems, to coordinate requirements with other related rules, and to consider reporting and recordkeeping costs in estimating burden. Consistent with the Panel recommendation to evaluate which parameters are most appropriate for routine monitoring and as potential triggers for investigative and corrective actions, EPA is conducting a review of existing methods for total coliform and *E. coli* analysis and is evaluating its Alternative Test Procedure protocol for approving new methods as described in section III.A.9 of this preamble. EPA is also one of the founding members of a Research and Information Collection Partnership, described in section V of this preamble, which is considering research and information needs to evaluate the magnitude of risks and potential risk mitigation options related to potential distribution system contamination.

We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act (UMRA)

This proposed rule does not contain a Federal mandate that may result in expenditures to State, local, and Tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Expenditures associated with compliance, defined as the incremental costs beyond the current TCR, will not surpass $100 million in the aggregate in any year. Thus, this proposed rule is not subject to the requirements of sections 202 and 205 of UMRA.

This proposed rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. Costs to small entities are generally not significant, as described previously in section VII.C and are detailed in the Proposed RTCR EA (2010a). The regulatory requirements of the proposed RTCR are not unique to small governments, as they apply to all PWSs regardless of size.

E. Executive Order 13132: Federalism

This action does not have Federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government as specified in Executive Order 13132. The net change in cost for State, local, and Tribal governments in the aggregate is estimated to be approximately $0.1M and $0.4M at three percent and seven percent discount rates, respectively. Thus, Executive Order 13132 does not apply to this proposed rule.

Although section 6 of Executive Order 13132 does not apply to the proposed RTCR, EPA conducted a Federalism Consultation, consistent with Executive Order 13132, in July 2008. The consultation included a stakeholder meeting where EPA requested comments on the impacts of the potential revisions to the TCR with respect to State, county and local governments. EPA did not receive any comments in response to this consultation. In addition, the advisory committee included representatives of State, local and Tribal governments, and through this process EPA consulted with State, local, and Tribal government representatives to ensure that their views were considered when the AIP recommendations for the RTCR were developed.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed action from State and local officials.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). Thus, Executive Order 13175 does not apply to this action.

Although Executive Order 13175 does not apply to this action, EPA consulted with Tribal officials in developing this action. EPA has consulted with Tribal governments through the EPA American Indian Environmental Office, included a representative of the Native American Water Association on the advisory committee which developed recommendations regarding the proposed rule and signed the AIP, and has addressed Tribal concerns throughout the regulatory development process, as appropriate. The consultation included participation in three Tribal conference calls (EPA regional Tribal call (February 2008), National Indian Workgroup call (March 2008), and National Tribal Water Conference (March 2008)). EPA requested comments on the current TCR, requested suggestions for current TCR revisions (March 2008), and presented possible revisions to the current TCR to the National Tribal Council (April 2008). In addition, the advisory committee included entities representing Tribal governments, and through this process EPA ensured that their views were considered when the AIP recommendations for the RTCR were developed. None of these consultations identified issues that were particular to Tribal entities. As a result of the Tribal consultations and other Tribal outreach, EPA has determined that the proposed RTCR is not anticipated to have a negative impact on Tribal systems. Thus, Executive Order 13175 does not apply to this action.

EPA specifically solicits additional comment on this proposed action from Tribal officials.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

The proposed RTCR is not subject to Executive Order 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in

Executive Order 12866. This action's health and risk assessments regarding children are contained in section VI.K.1 of this preamble and in the Proposed RTCR EA (USEPA 2010a). EPA expects that the proposed RTCR would provide additional protection to both children and adults who consume drinking water supplied from PWSs. EPA also believes that the benefits of the proposed rule, including reduced health risk, accrue more to children because young children are more susceptible than adults to some waterborne illnesses. For example, the risk of mortality resulting from diarrhea is often greatest in the very young and elderly (Rose 1997; Gerba *et al.* 1996), and viral and bacterial illnesses often disproportionately affect children. Any overall benefits of the rule would reduce this mortality risk for children.

The public is invited to submit comments or identify peer-reviewed studies and data that assess effects of early life exposure to drinking water that contains fecal contaminants.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

The proposed RTCR is not a "significant energy action" as defined in Executive Order 13211 (66 FR 28355, May 22, 2001), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Additionally, none of the proposed RTCR requirements involve the installation of treatment or other components that use a measurable amount of energy.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104–113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when EPA decides not to use available and applicable voluntary consensus standards.

The proposed RTCR involves technical voluntary consensus standards. EPA proposes to use several analytical methods to monitor for total coliforms and/or *E. coli* as they are described in *Standard Methods for the Examination of Water and Wastewater,* 20th and 21st editions (Clesceri *et al.* 1998; Eaton *et al.* 2005). Methods included in *Standard Methods* are voluntary consensus standards. The proposed rule includes 11 methods that can be used to test for total coliforms. Four of the 11 are described in *Standard Methods.*

EPA welcomes comments on this aspect of the proposed rulemaking and, specifically, invites the public to identify potentially-applicable voluntary consensus standards and to explain why such standards should be used in this regulation.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629, February 16, 1994) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission. Agencies must do this by identifying and addressing as appropriate any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. The proposed RTCR applies uniformly to all PWSs. Consequently, the proposed RTCR provides health protection equally to all income and minority groups served by PWSs. The proposed RTCR and other drinking water regulations are expected to have a positive effect on human health regardless of the social or economic status of a specific population. To the extent that contaminants in drinking water might be disproportionately high among minority or low-income populations (which is unknown), the proposed RTCR contributes toward removing those differences by assuring that all public water systems meet drinking water standards and take appropriate corrective action whenever appropriate. Thus, the proposed RTCR meets the intent of the Federal policy requiring incorporation of environmental justice into Federal agency missions.

The Agency requests comment on whether there are any specific environmental justice considerations that EPA should analyze and consider.

K. Consultations With the Science Advisory Board, National Drinking Water Advisory Council, and the Secretary of Health and Human Services

In accordance with section 1412(d) and (e) of the SDWA, EPA consulted with the Science Advisory Board (SAB), the National Drinking Water Advisory Council (NDWAC), and the Secretary of the U.S. Department of Health and Human Services on the proposed RTCR.

EPA met with the Drinking Water Committee of the SAB to discuss the proposed RTCR on May 20, 2009 (teleconference) and June 9 and 10, 2009 (Washington, DC). The SAB Drinking Water Committee (DWC) review focused on (1) the data sources used to estimate baseline total coliform and *E. coli* occurrence, public water system profile, and sensitive subpopulations in the United States; (2) the occurrence analysis used to inform the benefits analysis; (3) the qualitative analysis used to assess the reduction in risk due to implementation of the rule requirements; and (4) analysis of the engineering costs and costs to States resulting from implementation of the revisions.

Overall, the SAB DWC supported EPA's analysis. SAB members commended EPA for making use of the best available data to assess the impacts of the proposed rule. The SAB DWC supported the decision by EPA not to quantify public health benefits, acknowledging that EPA had insufficient data to do so. However, they noted in their analysis of the EA that they are not generally supportive of decreased monitoring, and that overall, the Alternative option appears to address and protect public health sooner in time than the AIP proposed implementation. The SAB DWC recommended that EPA clarify rationales for assumptions; expand explanations of sensitivity analyses that were included; provide further justification in those areas in which sensitivity analyses were not conducted; and collect data after promulgation of the rule to allow EPA to better understand the public health impacts of the RTCR.

In response to the SAB DWC recommendations, EPA conducted sensitivity analyses to explore a wider range of assumptions regarding the

percentage of assessments leading to corrective actions and to demonstrate that using an annual average for occurrence provided results comparable to varying the occurrence based on the season. EPA also added an exhibit in the EA that summarizes all significant model parameters and assumptions, their influence on variability and uncertainty, and their most likely effect on benefits or costs. In addition, EPA added a request for comment to this preamble to obtain suggestions about what data should be collected and used to better understand the impacts of the RTCR. The added exhibits and expanded and clarified text can be found in the Proposed RTCR EA (USEPA 2010a). A copy of the SAB report (SAB 2010) is available in the docket for the proposed RTCR.

EPA consulted with NDWAC on May 28, 2009, in Seattle, Washington, to discuss the proposed RTCR. NDWAC members expressed concern that a rule based on the AIP sounds complicated. Education was a common theme in the responses from NDWAC members. Some members recommended that EPA provide the utilities and States with tools to help them understand the revised rule provisions and to assist with providing public education. A few members stated that they would like to provide EPA with additional advice on public notification. In response to NDWAC's concern, EPA is requesting comment on whether the proposed RTCR would result in requirements that would be easier to implement compared to the current TCR.

NDWAC members also suggested that EPA request comment on the costs and benefits of reduced monitoring. Specifically, NDWAC expressed concern that a reduction in the number of certain samples taken (such as the reduction in the number of repeat and additional routine samples for some small systems) could lessen the opportunity for systems to identify violations. Thus, EPA is requesting comment on the cost and benefit of reduced monitoring.

A few NDWAC members stated that they would like to provide EPA with additional advice on public notification. To follow up on this request, EPA met with several NDWAC members on July 1, 2009, to review and discuss the current TCR public notification requirements, the advisory committee's recommendations on revisions to the public notification requirements, and to obtain feedback from NDWAC members. At this meeting, NDWAC members discussed potential changes to health effects language. They noted that while some portions of the health effects language would still be appropriate under the proposed RTCR, some changes or additions may be appropriate. Potential inclusions include the use of two different types of Tier 2 public notice to account for the difference between failure to conduct assessments and failure to complete corrective actions, as well as language concerning customer actions in response to violations (such as boiling water before use), and a change in the description of health effects of coliform exposure by sensitive subpopulations. They also recommended that EPA look at the public notification requirements for the GWR as they may also be appropriate for the proposed RTCR. EPA considered the recommendations from NDWAC in developing the public notification requirements for the proposed rule and is requesting comment on these issues (*see* section III.A.7.c of this preamble).

EPA completed its consultation with the US Department of Health and Human Services on October 5, 2009, as required by SDWA section 1412(d). EPA also provided an informational briefing to the Food and Safety Group of the Food and Drug Administration.

L. Impacts on Sensitive Subpopulations as Required by Section 1412(b)(3)(C)(i) of the 1996 Amendments of the Safe Drinking Water Act (SDWA)

EPA is required to seek public comment regarding the effects of contamination associated with the proposed RTCR on the general population and sensitive subpopulations. Sensitive subpopulations include "infants, children, pregnant women, the elderly, individuals with a history of serious illness, or other subpopulations that are identified as likely to be at greater risk of adverse health effects due to exposure to contaminants in drinking water than the general population" (SDWA section 1412(b)(3)(C)(i)(V), 42 U.S.C 300g–1(b)(3)(C)(i)(V)).

Pregnant and lactating women may be at an increased risk from pathogens as well as act as a source of infection for newborns. Infection during pregnancy may also result in the transmission of infection from the mother to the child *in utero,* during birth, or shortly thereafter. Since very young children do not have fully developed immune systems, they are at increased risk and are particularly difficult to treat.

Infectious diseases are also a major problem for the elderly because immune function declines with age. As a result, outbreaks of waterborne diseases can be devastating on the elderly community (*e.g.,* nursing homes) and may increase the possibility of significantly higher mortality rates in the elderly than in the general population.

Immunocompromised individuals are a growing proportion of the population with the continued increase in HIV/AIDS, the aging population, and the escalation in organ and tissue transplantations. Immunocompromised individuals are more susceptible to severe and invasive infection. These infections are particularly difficult to treat and can result in a significantly higher mortality than in immunocompetent persons.

It is anticipated that the requirements of the proposed RTCR will help reduce pathways of entry for fecal contamination and/or waterborne pathogens into the distribution system, thereby reducing exposure and risk from these contaminants in drinking water to the entire general population. The proposed RTCR seeks to provide a similar level of drinking water protection to all groups including sensitive subpopulations, thus meeting the intent of this Federal policy.

M. Plain Language

Executive Order 12866 requires each agency to write its rules in plain language. Readable regulations help the public find requirements quickly and understand them easily. Readable regulations may also increase compliance, strengthen enforcement, and decrease mistakes, frustration, phone calls, appeals, and distrust of government. EPA has made every effort to write this preamble to the proposed rule in as clear, concise, and unambiguous manner as possible. EPA requests comments on how to improve rule language to enhance readability and make it easier to understand.

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List of Subjects

40 CFR Part 141

Environmental protection, Chemicals, Indian-lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

Environmental protection, Administrative practice and procedure, Chemicals, Indian-lands, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: June 16, 2010.

Lisa P. Jackson,

Administrator.

For the reasons set forth in the preamble, Title 40 chapter 1 of the Code of Federal Regulations is proposed to be amended as follows:

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

1. The authority citation for part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

2. Section 141.4 is revised to read as follows:

§ 141.4 Variances and exemptions.

(a) Variances or exemptions from certain provisions of these regulations may be granted pursuant to sections 1415 and 1416 of the Act and subpart K of part 142 of this chapter (for small system variances) by the entity with primary enforcement responsibility, except that variances or exemptions from the MCLs for total coliforms and *E. coli* and variances from any of the treatment technique requirements of subpart H of this part may not be granted.

(b) EPA has stayed the effective date of this section relating to the total coliform MCL of § 141.63(a) for systems that demonstrate to the State that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system rather than fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system. This is stayed until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], at which time the total coliform MCL is no longer effective.

§ 141.13 [Removed and reserved]

3. Section 141.13 is removed and reserved.

4. Section 141.21 is amended by adding paragraph (h) to read as follows:

§ 141.21 Coliform sampling.

* * * * *

(h) The provisions of paragraphs (a) and (d) are applicable until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE]. The provisions of paragraphs (b), (c), (e), (f), and (g) are applicable until all required repeat monitoring under paragraph (b) and fecal coliform or *E. coli* testing under paragraph (e) that was initiated by a total coliform-positive sample taken before [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE] is completed, as well as analytical method, reporting, recordkeeping, public notification, and consumer confidence report requirements associated with that monitoring and testing. After [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], the provisions of subpart Y of this part are applicable, with systems required to begin regular monitoring at the same frequency as the frequency required on [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

§ 141.22 [Removed and reserved]

5. Section 141.22 is removed and reserved.

6. Section 141.52 is revised to read as follows:

§ 141.52 Maximum contaminant level goals for microbiological contaminants.

(a) MCLGs for the following contaminants are as indicated:

Contaminant	MCLG
(1) *Giardia lamblia*	zero.
(2) Viruses	zero.
(3) *Legionella*	zero.
(4) Total coliforms (including fecal coliforms and *Escherichia coli*).	zero.
(5) *Cryptosporidium*	zero.
(6) *Escherichia coli (E. coli)*	zero.

(b) The MCLG identified in paragraph (a)(4) of this section is applicable until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE]. The MCLG identified in paragraph (a)(6) of this section is applicable beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

7. Section 141.63 is revised to read as follows:

§ 141.63 Maximum contaminant levels (MCLs) for microbiological contaminants.

(a) Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], the total coliform MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

(1) For a system that collects at least 40 samples per month, if no more than 5.0 percent of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms.

(2) For a system that collects fewer than 40 samples per month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.

(b) Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], any fecal coliform-positive repeat sample or *E. coli*-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli*-positive routine sample, constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in subpart Q of this part, this is a violation that may pose an acute risk to health.

(c) Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], a system is in compliance with the MCL for *E. coli* for samples taken under the provisions of subpart Y of this part unless any of the conditions identified in paragraphs (c)(1) through (c)(4) of this section occur. For purposes of the public notification requirements in subpart Q of this part, violation of the MCL may pose an acute risk to health.

(1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.

(2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.

(3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample.

(4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.

(d) Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], a public water system must determine compliance with the MCL for total coliforms in paragraphs (a) and (b) of this section for each month in which it is required to monitor for total coliforms. Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], a public water system must determine compliance with the MCL for *E. coli* in paragraph (c) of this section for each month in which it is required to monitor for total coliforms.

(e) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total coliforms in paragraphs (a) and (b) of this section and for achieving compliance with the maximum contaminant level for *E. coli* in paragraph (c) of this section:

(1) Protection of wells from fecal contamination by appropriate placement and construction;

(2) Maintenance of a disinfectant residual throughout the distribution system;

(3) Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection control, and continual maintenance of positive water pressure in all parts of the distribution system;

(4) Filtration and/or disinfection of surface water, as described in subparts H, P, T, and W of this part, or disinfection of ground water, as described in subpart S of this part, using strong oxidants such as chlorine, chlorine dioxide, or ozone; and

(5) For systems using ground water, compliance with the requirements of an EPA-approved State Wellhead Protection Program developed and implemented under section 1428 of the SDWA.

8. Section 141.74 is amended by revising paragraphs (b)(6)(i) and (c)(3)(i) to read as follows:

§ 141.74 Analytical and monitoring requirements.

* * * * *

(b) * * *

(6)(i) Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], the residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §§ 141.854 through 141.857. The State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.

* * * * *

(c) * * *

(3)(i) The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21, and as specified in §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], except that the State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.

* * * * *

9. Section 141.132 is amended by revising paragraph (c)(1)(i) to read as follows:

§ 141.132 Monitoring requirements.

* * * * *

(c) * * *

(1) * * *

(i) Routine *monitoring.* Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], community and non-transient non-community water systems that use chlorine or chloramines must measure the residual disinfectant level in the distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], community and non-transient non-community water systems that use chlorine or chloramines must measure the residual disinfectant level in the distribution system at the same point in the distribution system and at the same time as total coliforms are sampled, as specified in §§ 141.854 through 141.857. Subpart H systems of this part may use the results of residual disinfectant concentration sampling conducted under § 141.74(b)(6)(i) for unfiltered systems or § 141.74(c)(3)(i) for systems which filter, in lieu of taking separate samples.

* * * * *

10. Section 141.153 is amended as follows:

(a) By revising paragraph (d)(4)(vii) introductory text.

(b) By revising paragraph (d)(4)(viii).

(c) By adding paragraphs (d)(4)(x) and (d)(4)(xi).

§ 141.153 Content of the reports.

* * * * *

(d) * * *

(4) * * *

(vii) For total coliform analytical results until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE]:

* * * * *

(viii) For fecal coliform until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE]: The total number of positive samples;

* * * * *

(x) For total coliform taken under subpart Y:

(A) The number of Level 1 and Level 2 assessments required and completed; and

(B) The corrective actions required and completed; and

(xi) For *E. coli:* The total number of positive samples.

* * * * *

11. In Appendix A to Subpart O of Part 141, the table is amended by revising the entries for "Total Coliform Bacteria" and "Fecal Coliform and *E. coli,*" adding a second entry for "Total

Coliform Bacteria," adding as a fourth entry "*E. coli,*" and adding two endnotes, to read as follows:

APPENDIX A TO SUBPART O OF PART 141—REGULATED CONTAMINANTS

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
Microbiological contaminants:						
Total Coliform Bacteria.†.	MCL (systems that collect ≥40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample.	.....	MCL (systems that collect ≥40 samples/month) 5% of monthly samples are positive; (systems that collect <40 samples/month) 1 positive monthly sample.	0	Naturally present in the environment.	Coliforms are bacteria that 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.
Total Coliform Bacteria‡.	TT	.....	TT	N/A	Naturally present in the environment.	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. The water system found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, public water systems are required to conduct assessments to identify problems and to correct any problems that are found. [THE SYSTEM MUST USE THE FOLLOWING APPLICABLE SENTENCES.] The water system failed to conduct the required assessment(s). The water system failed to correct all identified sanitary defects.
Fecal coliform and *E. coli*†.	0	.....	0	0	Human and animal fecal waste.	Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
E. coli‡	Routine and repeat samples are total coliform-positive and either is *E. coli*-positive or system fails to take repeat samples following *E. coli*-positive routine sample or system fails to analyze total coliform-positive repeat sample for *E. coli.*	.....	In compliance unless one of the following conditions occurs: (1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample (2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample (3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample (4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform	0	Human and animal fecal waste.	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems.

APPENDIX A TO SUBPART O OF PART 141—REGULATED CONTAMINANTS—Continued

Contaminant (units)	Traditional MCL in mg/L	To convert for CCR, multiply by	MCL in CCR units	MCLG	Major sources in drinking water	Health effects language
*	*	*	*	*	*	*

* * * * *

† Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

‡ Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

* * * * *

12. Section 141.202(a), Table 1, is amended by adding a new sentence at the end of entry (1) to read as follows:

§ 141.202 Tier 1 Public Notice—Form, manner, and frequency of notice.

* * * * *

TABLE 1 TO § 141.202—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 1 PUBLIC NOTICE

(1) * * * Violation of the MCL for *E. coli* (as specified in § 141.63(c));						
*	*	*	*	*	*	*

13. Section 141.203(b)(2) is revised to read as follows:

§ 141.203 Tier 2 Public Notice—Form, manner, and frequency of notice.

* * * * *

(b) * * *

(2) The public water system must repeat the notice every three months as long as the violation or situation persists, unless the primacy agency determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the primacy agency to allow less frequent repeat notice for an MCL or treatment technique violation under the Total Coliform Rule or subpart Y of this part or a treatment technique violation under the Surface Water Treatment Rule or Interim Enhanced Surface Water Treatment Rule. It is also not appropriate for the primacy agency to allow through its rules or policies across-the-board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. Primacy agency determinations allowing repeat notices to be given less frequently than once every three months must be in writing.

* * * * *

14. Section 141.204(a), Table 1, is amended by revising entries (4) and (5) and adding entry (6) to read as follows:

§ 141.204 Tier 3 Public Notice—Form, manner, frequency of notice.

(a) * * *

TABLE 1 TO § 141.204—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 3 PUBLIC NOTICE

*	*	*	*	*	*	*
(4) Availability of unregulated contaminant monitoring results, as required under § 141.207;						
(5) Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under § 141.208; and						
(6) Reporting violations under subpart Y of 40 CFR part 141.						

* * * * *

15. Appendix A to subpart Q of Part 141 is amended by revising entries I.A.1 and I.A.2 and adding two endnotes to read as follows:

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring, testing and reporting procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR): [3]				
A. Microbiological Contaminants				
1.a Total coliform bacteria †	2	141.63(a)	3	141.21(a)–(e)
1.b Total coliform (TT violations resulting from failure to perform assessments or corrective actions) ‡	2	141.860(b)	3	141.860(c)
2.a Fecal coliform/*E. coli* †	1	141.63(b)	1,3	141.21(e)
2.b *E. coli* ‡	1	141.63(c)	3	141.860(d)(2)
*	*	*	*	*

Appendix A—Endnotes

† Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

‡ Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

* * * * *

16. Appendix B to subpart Q of Part 141 is amended as follows:

(a) By revising entries 1a and 1b.
(b) By adding entries 1e and 1f.
(c) By adding two endnotes.

APPENDIX B TO SUBPART Q OF PART 141—STANDARDS HEALTH EFFECTS LANGUAGE FOR PUBLIC NOTIFICATION

Contaminant	MCLG;[1] mg/L	MCL[2] mg/L	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR)			
A. Microbiological Contaminants			
1a. Total coliform †	Zero	See footnote [3]	Coliforms are bacteria that 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.
1b. Fecal coliform/*E. coli*.†.	Zero	Zero	Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
*	*	*	* * * *
1e. Subpart Y Coliform Assessment and/or Corrective Action Violations.‡.	N/A	TT [3]	Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. The water system found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, public water systems are required to conduct assessments to identify problems and to correct any problems that are found. [THE SYSTEM MUST USE THE FOLLOWING APPLICABLE SENTENCES.] The water system failed to conduct the required assessment. The water system failed to correct all identified sanitary defects.
1f. *E. coli*‡	Zero	In compliance unless one of the following conditions occurs: (1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample. (2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample. (3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample. (4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.	*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.
*	*	*	* * * *

Appendix B—Endnotes
† Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].
‡ Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

* * * * *

17. Section 141.402 is amended by revising paragraph (a) to read as follows:

§ 141.402 Ground water source microbial monitoring and analytical methods.

(a) *Triggered source water monitoring*—

(1) *General requirements.* A ground water system must conduct triggered source water monitoring if the conditions identified in paragraphs (a)(1)(i) and either (a)(1)(ii) or (a)(1)(iii) of this section exist.

(i) The system does not provide 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 each ground water source; and either

(ii) The system is notified that a sample collected under § 141.21(a) is total coliform-positive and the sample is not invalidated under § 141.21(c) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or

(iii) The system is notified that a sample collected under §§ 141.854 through 141.857 is total coliform-positive and the sample is not invalidated under § 141.853 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

(2) *Sampling requirements.* A ground water system must collect, within 24 hours of notification of the total coliform-positive sample, at least one ground water source sample from each ground water source in use at the time the total coliform-positive sample was collected under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or collected under §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], except as provided in paragraph (a)(2)(ii) of this section.

(i) The State may extend the 24-hour time limit on a case-by-case basis if 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.

(ii) If approved by the State, systems with more than one ground water source may meet the requirements of this paragraph (a)(2) by sampling a representative ground water source or sources. If directed by the State, systems must submit for State approval a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's sample siting plan under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or under § 141.853 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], and that the system intends to use for representative sampling under this paragraph.

(iii) Until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the requirements of § 141.21(b) and to satisfy the monitoring requirements of paragraph (a)(2) of this section for that ground water source only if the State approves the use of *E. coli* as a fecal indicator for source water monitoring under this paragraph (a). If the repeat sample collected from the ground water source is *E. coli*-positive, the system must comply with paragraph (a)(3) of this section.

(iv) Beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], a ground water system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet both the requirements of subpart Y and to satisfy the monitoring requirements of paragraph (a)(2) of this section for that ground water source only if the State approves the use of *E. coli* as a fecal indicator for source water monitoring under this paragraph (a) and approves the use of a single sample for meeting both the triggered source water monitoring requirements in this paragraph (a) and the repeat monitoring requirements in § 141.858. If the repeat sample collected from the ground water source is *E. coli*-positive, the system must comply with paragraph (a)(3) of this section.

(3) *Additional requirements.* If the State does not require corrective action under § 141.403(a)(2) for a fecal indicator-positive source water sample collected under paragraph (a)(2) of this section that is not invalidated under paragraph (d) of this section, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.

(4) *Consecutive and wholesale systems*—

(i) In addition to the other requirements of this paragraph (a), a consecutive ground water system that has a total coliform-positive sample collected under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or under §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample.

(ii) In addition to the other requirements of this paragraph (a), a wholesale ground water system must comply with paragraphs (a)(4)(ii)(A) and (a)(4)(ii)(B) of this section.

(A) A wholesale ground water system that receives notice from a consecutive system it serves that a sample collected under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or collected under §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], is total coliform-positive must, within 24 hours of being notified, collect a sample from its ground water source(s) under paragraph(a)(2) of this section and analyze it for a fecal indicator under paragraph (c) of this section.

(B) If the sample collected under paragraph (a)(4)(ii)(A) of this section is fecal indicator-positive, the wholesale ground water system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive within 24 hours of being notified of the ground water source sample monitoring result and must meet the requirements of paragraph (a)(3) of this section.

(5) *Exceptions to the triggered source water monitoring requirements.* A ground water system is not required to comply with the source water monitoring requirements of paragraph (a) of this section if either of the following conditions exists:

(i) The State determines, and documents in writing, that the total coliform-positive sample collected under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or under §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], is caused by a distribution system deficiency; or

(ii) The total coliform-positive sample collected under § 141.21(a) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or under §§ 141.854 through 141.857 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], is collected at a location that meets State criteria for distribution system conditions that will cause total coliform-positive samples.

* * * * *

18. Section 141.405 is amended by revising paragraph (b)(4) to read as follows:

§ 141.405 Reporting and recordkeeping for ground water systems.

* * * * *

(b) * * *

(4) For consecutive systems, documentation of notification to the wholesale system(s) of total coliform-positive samples that are not invalidated under § 141.21(c) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or under § 141.853 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE]. Documentation

shall be kept for a period of not less than five years.

* * * * *

19. Section 141.803 is amended by revising paragraphs (a)(3) and (a)(5) to read as follows:

§ 141.803 Coliform sampling.

(a) * * *

(3) Air carriers must conduct analyses for total coliform and *E. coli* in accordance with the analytical methods approved in §§ 141.21(f)(3) and 141.21(f)(6) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], and under § 141.852 beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE].

* * * * *

(5) The invalidation of a total coliform sample result can be made only by the Administrator in accordance with §§ 141.21(c)(1)(i), (ii), or (iii) or by the certified laboratory in accordance with § 141.21(c)(2) until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], or in accordance with § 141.853(c) beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], with the Administrator acting as the State.

* * * * *

20. Part 141 is amended by adding a new subpart Y to read as follows:

Subpart Y—Revised Total Coliform Rule

Sec.

141.850 General.
141.851 Definitions.
141.852 Analytical methods and laboratory certification.
141.853 General monitoring requirements for all public water systems.
141.854 Routine monitoring requirements for non-community water systems serving 1,000 or fewer people using only ground water.
141.855 Routine monitoring requirements for community water systems serving 1,000 or fewer people using only ground water.
141.856 Routine monitoring requirements for subpart H public water systems of this part serving 1,000 or fewer people.
141.857 Routine monitoring requirements for public water systems serving more than 1,000 people.
141.858 Repeat monitoring and *E. coli* requirements.
141.859 Coliform treatment technique requirements for protection against potential fecal contamination.
141.860 Violations.
141.861 Reporting and recordkeeping.

Subpart Y—Revised Total Coliform Rule

§ 141.850 General.

(a) *General.* The provisions of this subpart include both maximum contaminant level and treatment technique requirements.

(b) *Applicability.* The provisions of this subpart apply to all public water systems.

(c) *Compliance date.* Systems must comply with the provisions of this subpart beginning [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], unless otherwise specified in this subpart.

§ 141.851 Definitions.

Clean compliance history is, for the purposes of subpart Y, a record of no MCL violations under § 141.63; no monitoring violations under § 141.21 or subpart Y; and no treatment technique trigger exceedances or treatment technique violations under subpart Y.

Sanitary defect is a defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure in a barrier that is already in place.

Seasonal system is a non-community water system that is operated in three or fewer calendar quarters per calendar year.

§ 141.852 Analytical methods and laboratory certification.

(a) *Analytical methodology.* (1) The standard sample volume required for analysis, regardless of analytical method used, is 100 ml.

(2) Systems need only determine the presence or absence of total coliforms and *E. coli;* a determination of density of either is not required.

(3) The time from sample collection to initiation of test medium incubation may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

(4) If chlorinated water is to be analyzed, sufficient sodium thiosulfate ($Na_2S_2O_3$) must be added to the sample bottle before sterilization to neutralize any residual chlorine in the water sample. Dechlorination procedures are addressed in Section 9060A.2 of *Standard Methods for the Examination of Water and Wastewater* (20th and 21st editions).

(5) Systems must conduct total coliform analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in Appendix A to subpart C of part 141.

Organism	Methodology category	Method [1]	Citation
Total Coliforms	Lactose Fermentation Methods	Total Coliform Multiple Tube Fermentation Technique.	9221 B.1, B.2 [1 2]
		Presence-Absence (P–A) Coliform Test	9221 D.1, D.2 [1 12]
	Membrane Filtration Methods	Total Coliform Membrane Filter Technique	9222 B, C [1 3]
		Membrane Filtration using MI medium	EPA Method 1604 [3 4]
		m-ColiBlue24® Test.[3 5]	
		Chromocult.[3 6]	
	Enzyme Substrate Methods	Colilert®	9223 B [1 7]
		Colisure®	9223 B [1, 7, 8]
		E*Colite® Test.[9]	
		Readycult® Test.[10]	
		modified Colitag® Test.[11]	
Escherichia coli	*Escherichia coli* Procedure (following Lactose Fermentation Methods).	EC–MUG medium	9221 F.1 [1]
	Escherichia coli Partition Method	EC broth with MUG (EC–MUG)	9222 G.1*a*(2) [1 13]
		NA–MUG medium	9222 G.1*a*(1) [1]
	Membrane Filtration Methods	Membrane Filtration using MI medium	EPA Method 1604 [3 4]
		m-ColiBlue24® Test.[3 5]	
		Chromocult.[3 6]	
	Enzyme Substrate Methods	Colilert®	9223 B [1 7]
		Colisure®	9223 B [1 7 8]
		E*Colite® Test.[9]	
		Readycult® Test.[10]	

Organism	Methodology category	Method [1]	Citation
		modified Colitag® Test.[11]	

The procedures must be done in accordance with the documents listed below. For vendor methods, the date of the method listed here is the date/version of the approved method. The methods listed are the only versions that may be used for compliance with this rule. Laboratories should be careful to use only the approved versions of the methods, as product package inserts may not be the same as the approved versions of the methods.

The Director of the Federal Register approved the incorporation by reference of the documents listed in footnotes 1, 4, 5, 6, 9, 10, and 11 in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.

Copies of the documents may be obtained from the sources listed below. Information regarding these documents can be obtained from the Safe Drinking Water Hotline, telephone (800) 426–4791. Documents may be reviewed at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460 (Telephone: 202–566–2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741–6030, or go to: *http://www.archives.gov/federal-register/cfr/ibr-locations.html.*

[1] Methods are described in *Standard Methods for the Examination of Water and Wastewater,* 20th edition (1998), or 21st edition (2005). American Public Health Association, 800 I Street, NW., Washington, DC 20001. The cited methods published in either of these two editions may be used. In addition, the following online versions may also be used: 9221 B.1, B.2–99, D.1, D.2–99, 9222 B–97, 9222 C–97, and 9223 B–97. Standard Methods Online is available at *http://www.standardmethods.org.* The year in which each method was approved by the Standard Methods Committee is designated by the last two digits following the hyphen in the method number. The methods listed are the only online versions that may be used.

[2] Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between lactose broth and lauryl tryptose broth using the water normally tested, and if the findings from this comparison demonstrate that the false-positive rate and false-negative rate for total coliforms, using lactose broth, is less than 10 percent.

[3] All filtration series must begin with membrane filtration equipment that has been sterilized by autoclaving. Exposure of filtration equipment to UV light is not adequate to ensure sterilization. Subsequent to the initial autoclaving, exposure of the filtration equipment to UV light may be used to sanitize the funnels between filtrations within a filtration series.

[4] EPA Method 1604: Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium); September 2002, EPA 821–R–02–024. The method is available at *http://www.epa.gov/nerlcwww/1604sp02.pdf* or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[5] The m-ColiBlue24® test is described in the document "Membrane Filtration Method m-ColiBlue24® Broth, Revision 2, August 17, 1999", available from the Hach Company, P.O. Box 389, Loveland, CO 80539.

[6] The Chromocult test is described in the document "Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters," November 2000, Version 1.0, available from EMD Chemicals (an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. (Telephone (800) 222–0342).

[7] Multiple-tube and multi-well enumerative formats for this method are approved for use in presence-absence determination under this regulation.

[8] Colisure® results may be read after an incubation time of 24 hours.

[9] The E*Colite® test is described in the document "Charm E*Colite™ Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water", January 9, 1998, available from Charm Sciences, Inc., 659 Andover Street, Lawrence, MA 01843–1032.

[10] The Readycult® test is described in the document "Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Finished Waters, January 2007, Version 1.1," available from EMD Chemicals (an affiliate of Merck KGaA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. (Telephone (800) 222–0342). Internet address *http://www.readycult.com.*

[11] The Colitag® test is described in the document "Modified Colitag™ Test Method for the Simultaneous Detection of *E. coli* and other Total Coliforms in Water," August 28, 2009, available from CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA 95403. (Telephone (800) 878–7654, Fax (707) 545–7901). Internet address *http://www.cpiinternational.com.*

[12] A multiple tube enumerative format, as described in *Standard Methods for the Examination of Water and Wastewater* 9221, is approved for this method for use in presence-absence determination under this regulation.

[13] The following changes must be made to the EC broth with MUG (EC–MUG) formulation: Potassium dihydrogen phosphate, KH_2PO_4, must be 1.5g, and 4-methylumbelliferyl-Beta-D-glucuronide must be 0.05 g.

(b) *Laboratory certification.* Systems must have all compliance samples required under this subpart analyzed by a laboratory certified by the EPA or a primacy State to analyze drinking water samples. The laboratory used by the system must be certified for each method and contaminant used for compliance monitoring under this rule.

§ 141.853 General monitoring requirements for all public water systems.

(a) *Sample siting plans.* (1) Systems must develop a written sample siting plan that identifies sampling sites and a sample collection schedule that are representative of water throughout the distribution system not later than [DATE THREE YEARS AFTER PUBLICATION OF FINAL RULE]. Systems must collect total coliform samples according to the written sample siting plan. These plans are subject to State review and revision. Monitoring required by §§ 141.854 through 141.858 may take place at a customer's premise, dedicated sampling station, or other designated compliance sampling location. Routine and repeat sample sites and any sampling points necessary to meet the requirements of subpart S must be reflected in the sampling plan.

(2) Systems must collect samples at regular time intervals throughout the month, except that systems that use only ground water and serve 4,900 or fewer people may collect all required samples on a single day if they are taken from different sites.

(3) A system may conduct more monitoring than is required by this subpart to investigate potential problems in the distribution system and use monitoring as a tool to assist in uncovering problems. A system may take more than the minimum number of required routine samples and include the results in calculating whether the coliform treatment technique trigger has been exceeded only if the samples are taken in accordance with the existing sample siting plan and are representative of water throughout the distribution system.

(4) Systems must identify repeat monitoring locations in the sample siting plan. Unless the provisions of paragraphs (a)(4)(i) or (a)(4)(ii) of this section are met, the system must collect at least one repeat sample from the sampling tap where the original total coliform-positive sample was taken, and at least one repeat sample at a tap within five service connections upstream and at least one repeat sample at a tap within five service connections downstream of the original sampling site. If a total coliform-positive sample is at the end of the distribution system, or one service connection away from the end of the distribution system, the State may waive the requirement to collect at least one repeat sample upstream or

downstream of the original sampling site. Except as provided for in paragraph (a)(4)(ii) of this section, systems required to conduct triggered source water monitoring under § 141.402(a) must take ground water source sample(s) in addition to repeat samples required under this subpart.

(i) Systems may propose repeat monitoring locations to the State that the system believes to be representative of a pathway for contamination of the distribution system. A system may elect to specify either alternative fixed locations or criteria for selecting repeat sampling sites on a situational basis in a standard operating procedure (SOP) in its sample siting plan. The system must design its SOP to focus the repeat samples at locations that best verify and determine the extent of potential contamination of the distribution system area based on specific situations. The State may modify the SOP as needed.

(ii) Ground water systems serving 1,000 or fewer people may propose repeat sampling locations to the State that differentiate potential source water and distribution system contamination (*e.g.* by sampling at entry points to the distribution system). A ground water system required to conduct triggered source water monitoring may, with written State approval, take one of its repeat samples at the monitoring location required for triggered source water monitoring under § 141.402(a) if the system demonstrates to the State's satisfaction that the sample siting plan remains representative of water quality in the distribution system. If approved by the State, the system may use that sample result to meet the monitoring requirements in both § 141.402(a) and this section.

(A) If a repeat sample taken at the monitoring location required for triggered source water monitoring is *E. coli*-positive, the system has violated the *E. coli* MCL and must also comply with § 141.402(a)(3). If a system with a limited number of monitoring locations takes more than one repeat sample at the monitoring location required for triggered source water monitoring, the system may reduce the number of additional source water samples required under § 141.402(a)(3) by the number of repeat samples taken at that location that were not *E. coli*-positive.

(B) If a system with a limited number of monitoring locations takes more than one repeat sample at the monitoring location required for triggered source water monitoring under § 141.402(a), and more than one repeat sample is *E. coli*-positive, the system has violated the *E. coli* MCL and must also comply with § 141.403(a)(1).

(5) States may review, revise, and approve, as necessary, repeat sampling proposed by systems under paragraphs (a)(4)(i) and (ii) of this section. The system must demonstrate to the State's satisfaction that the sample siting plan remains representative of the water quality in the distribution system. The State may determine that monitoring at the entry point to the distribution system (especially for undisinfected ground water systems) is effective to differentiate between potential source water and distribution system problems.

(b) *Special purpose samples.* Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, must not be used to determine whether the coliform treatment technique trigger has been exceeded. Repeat samples taken pursuant to § 141.858 are not considered special purpose samples, and must be used to determine whether the coliform treatment technique trigger has been exceeded.

(c) *Invalidation of total coliform samples.* A total coliform-positive sample invalidated under this paragraph (c) of this section does not count toward meeting the minimum monitoring requirements of this subpart.

(1) The State may invalidate a total coliform-positive sample only if the conditions of paragraph (c)(1)(i), (ii), or (iii) of this section are met.

(i) The laboratory establishes that improper sample analysis caused the total coliform-positive result.

(ii) The State, on the basis of the results of repeat samples collected as required under § 141.858(a), determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The State cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative (*e.g.,* a State cannot invalidate a total coliform-positive sample on the basis of repeat samples if all the repeat samples are total coliform-negative, or if the system has only one service connection).

(iii) The State has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition that does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required under § 141.858(a), and use them to determine whether a coliform treatment technique trigger in § 141.859 has been exceeded. To invalidate a total coliform-positive sample under this paragraph, the decision and supporting rationale must be documented in writing, and approved and signed by the supervisor of the State official who recommended the decision. The State must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. The State may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(2) A laboratory must invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (*e.g.,* the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (P–A) Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (*e.g.,* Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The State may waive the 24-hour time limit on a case-by-case basis.

§ 141.854 Routine monitoring requirements for non-community water systems serving 1,000 or fewer people using only ground water.

(a) *General.* (1) The provisions of this section apply to non-community water systems using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 or fewer people.

(2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.

(3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform

treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

(b) *Monitoring frequency for total coliforms.* Systems must monitor each calendar quarter that the system provides water to the public, except for seasonal systems or as provided under paragraphs (c) though (h) and (j) of this section. Seasonal systems must meet the monitoring requirements of paragraph (i) of this section.

(c) *Transition to subpart Y.* (1) Systems, including seasonal systems, must continue to monitor according to the total coliform monitoring schedules under § 141.21 that were in effect on [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE] unless any of the conditions for increased monitoring in paragraph (f) of this section are triggered on or after [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE] or unless otherwise directed by the State.

(2) After [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], the State must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the State has performed the special monitoring evaluation during each sanitary survey, the State may modify the system's monitoring schedule as necessary. For seasonal systems on quarterly or annual monitoring, this evaluation must include review of the approved sample siting plan, which must designate the time period(s) for monitoring based on site-specific considerations (*e.g.* during periods of highest demand or highest vulnerability to contamination). The seasonal system must collect compliance samples during these time periods.

(d) *Annual site visits.* Beginning no later than [DATE FOUR YEARS AFTER PUBLICATION OF THE FINAL RULE], systems on annual monitoring, including seasonal systems, must have an initial and recurring annual site visit by the State or an annual voluntary Level 2 assessment by a party approved by the State to remain on annual monitoring.

(e) *Reduced monitoring provisions.* Beginning [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], the State may reduce the monitoring frequency for a well-operated ground water system from quarterly routine monitoring to no less than annual monitoring, if the system demonstrates that it meets the criteria for reduced monitoring in paragraphs (e)(1) through (e)(3) of this section, except for a system that has been on increased monitoring under the provisions of paragraph (f) of this section. A system on increased monitoring under paragraph (f) of this section must meet the provisions of paragraph (g) of this section to go to quarterly monitoring and must meet the provisions of paragraph (h) of this section to go to annual monitoring.

(1) The most recent sanitary survey shows that the system is free of sanitary defects, has a protected water source, and meets approved construction standards;

(2) The system has a clean compliance history for a minimum of 12 months; and

(3) The State has conducted an annual site visit (recurring) within the last 12 months and the system has corrected all identified sanitary defects. The system may substitute a Level 2 assessment by a party approved by the State for the State annual site visit.

(f) *Increased Monitoring Requirements.* A system on quarterly or annual monitoring that experiences any of the events identified in paragraphs (f)(1) through (f)(4) of this section must begin monthly monitoring the month following the event. The system must continue monthly monitoring until the requirements in paragraph (g) of this section for quarterly monitoring or paragraph (h) of this section for annual monitoring are met. A system on monthly monitoring for reasons other than those identified in paragraphs (f)(1) through (f)(4) of this section is not considered to be on increased monitoring for the purposes of paragraphs (g) and (h) of this section.

(1) The system triggers a Level 2 assessment or two Level 1 assessments in a rolling 12 month period.

(2) The system has an *E. coli* MCL violation.

(3) The system has a coliform treatment technique violation.

(4) The system has two subpart Y monitoring violations in a rolling 12-month period for a system on quarterly monitoring or one subpart Y monitoring violation for a system on annual monitoring.

(g) *Requirements for returning to quarterly monitoring.* To be eligible to return to quarterly monitoring from monthly monitoring triggered under paragraph (f) of this section, a system on increased monitoring under paragraph (f) of this section must meet the criteria in paragraphs (g)(1) and (g)(2) of this section.

(1) Within the last 12 months, the system must have a completed sanitary survey or a site visit by the State or a voluntary Level 2 assessment by a party approved by the State, be free of sanitary defects, and have a protected water source; and

(2) The system must have a clean compliance history for a minimum of 12 months.

(h) *Requirements for annual monitoring.* To be eligible for annual monitoring, a system on increased monitoring under paragraph (f) of this section must meet the criteria in paragraph (g) of this section plus the criteria in paragraphs (h)(1) and (h)(2) of this section.

(1) An annual site visit (recurring) by the State and correction of all identified sanitary defects. The system may substitute a voluntary Level 2 assessment by a party approved by the State for the State annual site visit in any given year.

(2) The system must have in place or adopt one or more additional enhancements to the water system barriers to contamination in paragraphs (h)(2)(i) through (h)(2)(v) of this section.

(i) Cross connection control, as approved by the State.

(ii) An operator certified by an appropriate State certification program, which may include regular visits by a circuit rider.

(iii) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State.

(iv) Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3).

(v) Other equivalent enhancements to water system barriers as approved by the State.

(i) *Seasonal systems.* (1) Beginning [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for a startup sample prior to serving water to the public.

(2) Seasonal systems have a routine monitoring frequency of monthly.

(3) A seasonal system must meet the criteria in paragraphs (i)(3)(i) through (iii) of this section to be eligible for monitoring less frequently than monthly after [DATE THREE YEARS AFTER PUBLICATION OF FINAL RULE], except as provided under paragraph (c) of this section.

(i) The seasonal system must have an approved sample siting plan that designates the time period for monitoring based on site-specific

considerations (*e.g.* during periods of highest demand or highest vulnerability to contamination). The system must collect compliance samples during this time period.

(ii) To be eligible for reduced quarterly monitoring, the system must meet the criteria in paragraph (g) of this section.

(iii) To be eligible for reduced annual monitoring, the system must meet the criteria under paragraph (h) of this section.

(j) *Additional routine monitoring.* Systems collecting samples on a quarterly or annual frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the State may waive this requirement if the conditions of paragraph (j)(1), (2), or (3) of this section are met. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations.

(1) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State, or an agent approved by the State, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.

(2) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

(3) The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

§ 141.855 Routine monitoring requirements for community water systems serving 1,000 or fewer people using only ground water.

(a) *General.* (1) The provisions of this section apply to community water systems using only ground water (except ground water under the direct influence of surface water, as defined in § 141.2) and serving 1,000 or fewer people.

(2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.

(3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

(b) *Monitoring frequency for total coliforms.* The monitoring frequency for total coliforms is one sample/month, except as provided for under paragraphs (c) through (f) of this section.

(c) *Transition to subpart Y.* (1) All systems must continue to monitor according to the total coliform monitoring schedules under § 141.21 that were in effect on [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE] unless any of the conditions in paragraph (e) of this section are triggered on or after [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE] or unless otherwise directed by the State.

(2) After [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], the State must perform a special monitoring evaluation during each sanitary survey to review the status of the system, including the distribution system, to determine whether the system is on an appropriate monitoring schedule. After the State has performed the special monitoring evaluation during each sanitary survey, the State may modify the system's monitoring schedule as necessary.

(d) *Reduced monitoring requirements.* (1) The State may reduce the monitoring frequency from monthly monitoring to no less than quarterly monitoring if the system is in compliance with State certified operator provisions and demonstrates that it meets the criteria in paragraphs (d)(1)(i) through (d)(1)(iii) of this section. A system that loses its certified operator must return to monthly monitoring the month following that loss.

(i) The most recent sanitary survey shows the system is free of sanitary defects (or has an approved plan and schedule to correct them), has a protected water source and meets approved construction standards.

(ii) The system has a clean compliance history for a minimum of 12 months.

(iii) The system meets at least one of the following criteria:

(A) An annual site visit by the State or a Level 2 assessment by a party approved by the State and correction of all identified sanitary defects (or an approved plan and schedule to correct them).

(B) Cross connection control, as approved by the State.

(C) Continuous disinfection entering the distribution system and a residual in the distribution system in accordance with criteria specified by the State.

(D) Demonstration of maintenance of at least a 4-log removal or inactivation of viruses as provided for under § 141.403(b)(3).

(E) Other equivalent enhancements to water systems as approved by the State.

(e) *Return to routine monitoring requirements.* Systems on quarterly monitoring that experience any of the events in paragraphs (e)(1) through (e)(4) of this section must begin monthly monitoring the month following the event. The system must continue monthly monitoring until it meets the reduced monitoring requirements in paragraph (d) of this section.

(1) The system triggers a Level 2 assessment or two Level 1 assessments in a rolling 12-month period.

(2) The system has an *E. coli* MCL violation.

(3) The system has a coliform treatment technique violation.

(4) The system has two subpart Y monitoring violations in a rolling 12-month period.

(f) *Additional routine monitoring.* Systems collecting samples on a quarterly frequency must conduct additional routine monitoring the month following one or more total coliform-positive samples (with or without a Level 1 treatment technique trigger). Systems must collect at least three routine samples during the next month, except that the State may waive this requirement if the conditions of paragraph (f)(1), (2), or (3) of this section are met. Systems may either collect samples at regular time intervals throughout the month or may collect all required routine samples on a single day if samples are taken from different sites. Systems must use the results of additional routine samples in coliform treatment technique trigger calculations.

(1) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State, or an agent approved by the State, performs a site visit before the end of the next month in which the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.

(2) The State may waive the requirement to collect three routine samples the next month in which the system provides water to the public if the State has determined why the sample was total coliform-positive and has established that the system has corrected the problem or will correct the problem before the end of the next month in which the system serves water to the public. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and the public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

(3) The State may not waive the requirement to collect three additional routine samples the next month in which the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. If the State determines that the system has corrected the contamination problem before the system takes the set of repeat samples required in § 141.858, and all repeat samples were total coliform-negative, the State may waive the requirement for additional routine monitoring the next month.

§ 141.856 Routine monitoring requirements for subpart H public water systems serving 1,000 or fewer people.

(a) *General.* (1) The provisions of this section apply to subpart H public water systems of this part serving 1,000 or fewer people.

(2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.

(3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

(4) Beginning [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for a startup sample prior to serving water to the public.

(b) *Routine monitoring frequency for total coliforms.* Subpart H systems of this part (including consecutive systems) must monitor monthly. Systems may not reduce monitoring.

(c) *Unfiltered subpart H systems.* A subpart H system of this part that does not practice filtration in compliance with subparts H, P, T, and W must collect at least one total coliform sample near the first service connection each day the turbidity level of the source water, measured as specified in § 141.74(b)(2), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection *and identifies an alternative sample collection schedule.* Sample results from this coliform monitoring must be included in determining whether the coliform treatment technique trigger in § 141.859 has been exceeded.

§ 141.857 Routine monitoring requirements for public water systems serving more than 1,000 people.

(a) *General.* (1) The provisions of this section apply to public water systems serving more than 1,000 persons.

(2) Following any total coliform-positive sample taken under the provisions of this section, systems must comply with the repeat monitoring requirements and *E. coli* analytical requirements in § 141.858.

(3) Once all monitoring required by this section and § 141.858 for a calendar month has been completed, systems must determine whether any coliform treatment technique triggers specified in § 141.859 have been exceeded. If any trigger has been exceeded, systems must complete assessments as required by § 141.859.

(4) Beginning [DATE THREE YEARS AFTER PUBLICATION OF THE FINAL RULE], all seasonal systems must demonstrate completion of a State-approved start-up procedure, which may include a requirement for a startup sample prior to serving water to the public.

(b) *Monitoring frequency for total coliforms.* The monitoring frequency for total coliforms is based on the population served by the system, as follows:

TOTAL COLIFORM MONITORING FREQUENCY FOR PUBLIC WATER SYSTEMS SERVING MORE THAN 1,000 PEOPLE

Population served	Minimum number of samples per month
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300

TOTAL COLIFORM MONITORING FREQUENCY FOR PUBLIC WATER SYSTEMS SERVING MORE THAN 1,000 PEOPLE—Continued

Population served	Minimum number of samples per month
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

(c) *Unfiltered subpart H systems.* A subpart H system of this part that does not practice filtration in compliance with subparts H, P, T, and W must collect at least one total coliform sample near the first service connection each day the turbidity level of the source water, measured as specified in § 141.74(b)(2), exceeds 1 NTU. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection and identifies an alternative sample collection schedule. Sample results from this coliform monitoring must be included in determining whether the coliform treatment technique trigger in § 141.859 has been exceeded.

(d) *Reduced monitoring.* Systems may not reduce monitoring, except for non-community water systems using only ground water (and not ground water under the direct influence of surface water) serving 1,000 or fewer people in some months and more than 1,000 persons in other months. In months when more than 1,000 persons are served, the systems must monitor at the frequency specified in paragraph (a) of this section. In months when 1,000 or fewer people are served, the State may reduce the monitoring frequency, in writing, to a frequency allowed under § 141.854 for a similarly situated system that always serves 1,000 or fewer people, taking into account the provisions in § 141.854(e) through (g).

§ 141.858 Repeat monitoring and E. coli requirements.

(a) *Repeat monitoring.* (1) If a sample taken under §§ 141.854 though 141.857 is total coliform-positive, the system must collect a set of repeat samples within 24 hours of being notified of the positive result. The system must collect no fewer than three repeat samples for each total coliform-positive sample found. The State may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of an extension, the State must specify how much time the system has to collect the repeat samples. The State cannot waive the requirement for a system to collect repeat samples in paragraphs (a)(1) through (a)(3) of this section.

(2) The system must collect all repeat samples on the same day, except that the State may allow a system with a single service connection to collect the required set of repeat samples over a three-day period or to collect a larger volume repeat sample(s) in one or more ample containers of any size, as long as the total volume collected is at least 300 ml.

(3) The system must collect an additional set of repeat samples in the manner specified in paragraphs (a)(1) through (a)(3) of this section if one or more repeat samples in the current set of repeat samples is total coliform-positive. The system must collect the additional set of repeat samples within 24 hours of being notified of the positive result, unless the State extends the limit as provided in paragraph (a)(1) of this section. The system must continue to collect additional sets of repeat samples until either total coliforms are not detected in one complete set of repeat samples or the system determines that a coliform treatment technique trigger has been exceeded as a result of a repeat sample being total coliform-positive and notifies the State. If a trigger identified in § 141.859 is exceeded as a result of a routine sample being total coliform-positive, systems are required to conduct only one round of repeat monitoring for each total coliform-positive routine sample.

(4) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

(5) Results of all routine and repeat samples taken under §§ 141.854 through 141.858 not invalidated by the State must be used to determine whether a coliform treatment technique trigger § 141.859 has been exceeded.

(b) *Escherichia coli (E. coli) testing.* (1) If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if *E. coli* are present. If *E. coli* are present, the system must notify the State by the end of the day when the system is notified of the test result, unless the system is notified of the result after the State office is closed, in which case the system must notify the State before the end of the next business day.

(2) The State has the discretion to allow a system, on a case-by-case basis, to forgo *E. coli* testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is *E. coli*-positive. Accordingly, the system must notify the State as specified in paragraph (b)(1) of this section and the provisions of § 141.63(c) apply.

§ 141.859 Coliform treatment technique requirements for protection against potential fecal contamination.

(a) *Treatment technique triggers.* Systems must conduct assessments in accordance with paragraph (b) of this section after exceeding treatment technique triggers in paragraphs (a)(1) and (a)(2) of this section.

(1) Level 1 treatment technique triggers.

(i) For systems taking 40 or more samples per month, the system exceeds 5.0% total coliform-positive samples for the month.

(ii) For systems taking fewer than 40 samples per month, the system has two or more total coliform-positive samples in the same month.

(iii) The system fails to take every required repeat sample after any single total coliform-positive sample.

(2) Level 2 treatment technique triggers.

(i) An *E. coli* MCL violation, including failure to collect repeat samples within the required time following an *E. coli*-positive routine sample.

(ii) A second Level 1 trigger as defined in paragraph (a)(1) of this section, within a rolling 12-month period, unless the State has determined a likely reason that the initial samples that caused the Level 1 treatment technique trigger were total coliform-positive and has established that the system has corrected the problem.

(iii) For systems with approved annual monitoring, a Level 1 trigger in two consecutive years.

(b) *Requirements for assessments.* (1) Systems must ensure that Level 1 and 2 assessments are conducted in order to identify the possible presence of sanitary defects and defects in distribution system coliform monitoring practices. Level 2 assessments must be conducted by parties approved by the State.

(2) When conducting assessments, systems must ensure that the assessor evaluates minimum elements that include review and identification of inadequacies in sample sites; sampling protocol; sample processing; atypical events that could affect distributed water quality or indicate that distributed water quality was impaired; changes in distribution system maintenance and operation that could affect distributed water quality (including water storage); source and treatment considerations that bear on distributed water quality, where appropriate (*e.g.,* small ground water systems); and existing water quality monitoring data. The State may tailor specific assessment elements to the size and type of the system. Systems may tailor their assessment activities based on the characteristics of the distribution system (consistent with any State directives).

(3) Level 1 Assessments. A system must conduct a Level 1 assessment consistent with State requirements if the system exceeds one of the treatment technique triggers in paragraph (a)(1) of this section.

(i) The system must complete a Level 1 assessment as soon as practical after failure to take a repeat sample or after notification of monitoring results. In the completed assessment form, the system must identify sanitary defects detected, corrective actions completed, and a timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified. The system must submit the completed Level 1 assessment form to the State within 30 days after determination of exceeding the trigger.

(ii) If the State reviews the completed Level 1 assessment and determines that the assessment is not sufficient, the State must consult with the system. If necessary after consultation, the system must submit a revised assessment form to the State on an agreed-upon schedule not to exceed 30 days from the date of the consultation. Upon completion and submission of the assessment form by the system, the State must determine if the system has identified a likely cause for the Level 1 trigger and, if so, establish that the system has corrected the problem, or has included a schedule acceptable to the State for correcting the problem.

(4) Level 2 Assessments. A system must ensure that a Level 2 assessment consistent with State requirements is conducted if the system exceeds one of the treatment technique triggers in paragraph (a)(2) of this section. The State may direct expedited actions or additional actions in the case of an *E. coli* MCL violation.

(i) The system must ensure that a Level 2 assessment is completed by the State or by a party approved by the State as soon as practical after failure to take a repeat sample or after notification of monitoring results. The system must submit a completed Level 2 assessment form to the State within 30 days after the determination of exceeding the trigger. The assessment form must describe sanitary defects detected, corrective actions completed, and a timetable for any corrective actions not already completed. The assessment form may also note that no sanitary defects were identified.

(ii) The system may conduct Level 2 assessments if the system has staff or management with the certification or qualifications specified by the State unless otherwise directed by the State.

(iii) If the State reviews the completed Level 2 assessment and determines that the assessment is insufficient, the State must consult with the system. If necessary after consultation, the system must submit a revised assessment form to the State on an agreed-upon schedule not to exceed 30 days. Upon completion and submission of the assessment form by the system, the State must determine if the system has identified a likely cause for the Level 2 trigger and determine whether the system has corrected the problem, or has included a schedule acceptable to the State for correcting the problem.

(c) *Corrective Action.* Systems must correct sanitary defects found through either Level 1 or 2 assessments conducted under paragraph (b) of this section. For corrections not completed by the time of submission of the assessment form, the system must complete the corrective action(s) in compliance with a schedule determined by the State in consultation with the system. The system must notify the State when each scheduled corrective action is completed.

(d) *Consultation.* At any time during the assessment or corrective action phase, either the water system or the State may request a consultation with the other party to determine the appropriate actions to be taken. The system may consult with the State on all relevant information that may impact on its ability to comply with a requirement of this subpart, including the method of accomplishment, an appropriate timeframe, and other relevant information.

§ 141.860 Violations.

(a) *E. coli MCL Violation.* A system is in violation of the MCL for *E. coli* when any of the conditions identified in paragraphs (a)(1) through (a)(4) of this section occur.

(1) The system has an *E. coli*-positive repeat sample following a total coliform-positive routine sample.

(2) The system has a total coliform-positive repeat sample following an *E. coli*-positive routine sample.

(3) The system fails to take all required repeat samples following an *E. coli*-positive routine sample.

(4) The system fails to test for *E. coli* when any repeat sample tests positive for total coliform.

(b) *Treatment technique violation.* A treatment technique violation occurs when a system exceeds a treatment technique trigger specified in § 141.859(a) and then fails to conduct the required assessment or corrective actions within the timeframe specified in § 141.859(b) and (c).

(c) *Monitoring violations.* Failure to take every required routine or additional routine sample in a compliance period is a routine monitoring violation. Failure to analyze for *E. coli* following a total coliform routine sample is a monitoring violation.

(d) *Reporting violations.* (1) Failure to submit a monitoring report or completed assessment form after a system properly conducts monitoring or assessment is a reporting violation.

(2) Failure to notify the State following an *E. coli*-positive sample as required by § 141.858(b)(1) is a reporting violation.

§ 141.861 Reporting and recordkeeping.

(a) *Reporting.* (1) A system that has violated the *E. coli* MCL must report the violation to the State no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subpart Q of this part. A system must notify the State no later than the end of the next business day after it learns of an *E. coli*-positive sample.

(2) A system that has violated the treatment technique for total coliforms in § 141.859 must report the violation to the State no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subpart Q of this part. The system must notify the State in accordance with § 141.859(c) when each scheduled corrective action is completed for corrections not completed by the time of submission of the assessment form.

(3) A system that has failed to comply with a coliform monitoring requirement must report the monitoring violation to the State within 10 days after the system discovers the violation, and notify the

public in accordance with subpart Q of this part.

(b) *Recordkeeping.* The system must maintain any assessment form, regardless of who conducts the assessment, and documentation of corrective actions completed as a result of those assessments, or other available summary documentation of the sanitary defects and corrective actions taken under § 141.858 for State review. This record must be maintained by the system for a period not less than five years after completion of the assessment or corrective action.

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

21. The authority citation for part 142 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

22. Section 142.14 is amended by revising paragraph (a)(1)(iii) and adding a new paragraph (a)(10) to read as follows:

§ 142.14 Records kept by States.

(a) * * *

(1) * * *

(iii) The analytical results, set forth in a form that makes possible comparison with the limits specified in §§ 141.63, 141.71, and 141.72 of this chapter and with the limits specified in subpart Y of this chapter.

* * * * *

(10) Records of each of the following decisions made pursuant to the provisions of subpart Y of part 141 must be made in writing and retained by the State.

(i) Records of the following decisions or activities must be retained for five years.

(A) Sections 141.858(a), 141.853(b)(2), 141.856(c), and 141.857(c) of this chapter—Any decision to waive the 24-hour time limit for collecting repeat samples after a total coliform-positive routine sample, or to extend the 24-hour limit for collection of samples following invalidation, or for an unfiltered subpart H system of this part to collect a total coliform sample following a turbidity measurement exceeding 1 NTU.

(B) Sections 141.854(j) and 141.855(f) of this chapter—Any decision to allow a system to waive the requirement for three routine samples the month following a total coliform-positive sample. The record of the waiver decision must contain all the items listed in those sections.

(C) Section 141.853(c) of this chapter—Any decision to invalidate a total coliform-positive sample. If the decision to invalidate a total coliform-positive sample as provided in § 141.853(c)(1) of this chapter is made, the record of the decision must contain all the items listed in that section.

(D) Section 141.859 of this chapter—Completed and approved subpart Y assessments, including reports from the system that corrective action has been completed as required by § 141.861(a)(2) of this chapter.

(ii) Records of each of the following decisions must be retained in such a manner so that each system's current status may be determined:

(A) Section 141.855(d) of this chapter—Any decision to reduce the total coliform monitoring frequency for a community water system serving 1,000 or fewer people to less than once per month, as provided in § 141.855(d) of this chapter, including what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

(B) Section 141.854(e) of this chapter—Any decision to reduce the total coliform monitoring frequency for a non-community water system using only ground water and serving 1,000 or fewer people to less than once per quarter, as provided in § 141.854(e) of this chapter, including what the reduced monitoring frequency is. A copy of the reduced monitoring frequency must be provided to the system.

(C) Section 141.857(d) of this chapter—Any decision to reduce the total coliform monitoring frequency for a non-community water system using only ground water and serving more than 1,000 persons during any month the system serves 1,000 or fewer people, as provided in § 141.857(d) of this chapter. A copy of the reduced monitoring frequency must be provided to the system.

(D) Section 141.858(b)(2) of this chapter—Any decision to allow a system to forgo *E. coli* testing of a total coliform-positive sample if that system assumes that the total coliform-positive sample is *E. coli*-positive.

* * * * *

23. Section 142.15 is amended by adding paragraph (c)(3) to read as follows:

§ 142.15 Reports by States.

* * * * *

(c) * * *

(3) *Total coliforms under subpart Y.* A list of systems that the State is allowing to monitor less frequently than once per month for community water systems or less frequently than once per quarter for non-community water systems as provided in §§ 141.855 and 141.854 of this chapter, including the applicable date of the reduced monitoring requirement for each system.

* * * * *

24. Section 142.16 is amended by adding a new paragraph (q) to read as follows:

§ 142.16 Special primacy requirements.

* * * * *

(q) *Requirements for States to adopt 40 CFR part 141 subpart Y—Revised Total Coliform Rule.* In addition to the general primacy requirements elsewhere in this part, including the requirements that State regulations be at least as stringent as federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, subpart Y, must contain the information specified in this paragraph (q).

(1) In their application to EPA for approval to implement the federal requirements, the primacy application must indicate what baseline and reduced monitoring provisions of 40 CFR part 141, subpart Y the State will adopt and must describe how they will implement 40 CFR part 141, subpart Y in these areas so that EPA can be assured that implementation plans meet the minimum requirements of the rule.

(2) The State's application for primacy for subpart Y must include a written description for each provision included in paragraphs (q)(2)(i) through (viii) of this section.

(i) Sample Siting Plans—The frequency and process used to review and revise sample siting plans in accordance with 40 CFR part 141, subpart Y to determine adequacy.

(ii) Reduced Monitoring Criteria—An indication of whether the State will adopt the reduced monitoring provisions of 40 CFR part 141, subpart Y. If the State adopts the reduced monitoring provisions, it must describe the specific types or categories of water systems that will be covered by reduced monitoring and whether the State will use all or a reduced set of the optional criteria. For each of the reduced monitoring criteria, both mandatory and optional, the State must describe how the criteria will be evaluated to determine when systems qualify.

(iii) Assessments and Corrective Actions—The process for implementing the new assessment and corrective action phase of the rule, including the elements in paragraphs (q)(2)(iii)(A) through (D) of this section.

(A) Elements of Level 1 and Level 2 assessments. This must include an explanation of how the State will ensure

that Level 2 assessments provide a more detailed examination of the system (including the system's monitoring and operational practices) than do Level 1 assessments through the use of more comprehensive investigation and review of available information, additional internal and external resources, and other relevant practices.

(B) Examples of sanitary defects.

(C) Examples of assessment forms or formats.

(D) Methods that systems may use to consult with the State on appropriate corrective actions.

(iv) Invalidation of routine and repeat samples collected under 40 CFR part 141, subpart Y—The criteria and process for invalidating total coliform and *E. coli*-positive samples under 40 CFR part 141, subpart Y. This description must include criteria to determine if a sample was improperly processed by the laboratory, reflects a domestic or other non-distribution system plumbing problem or reflects circumstances or conditions that do not reflect water quality in the distribution system.

(v) Approval of individuals allowed to conduct Level 2 assessments under 40 CFR part 141, subpart Y—The criteria and process for approval of individuals allowed to conduct Level 2 assessments under 40 CFR part 141, subpart Y.

(vi) Special monitoring evaluation—The procedure for performing special monitoring evaluations during sanitary surveys for ground water systems serving 1,000 or fewer people to determine whether systems are on an appropriate monitoring schedule.

(vii) Seasonal systems—How the State will identify seasonal systems, how the State will determine when systems on less than monthly monitoring must monitor, and what start-up provisions seasonal system must meet under 40 CFR part 141, subpart Y.

(viii) Additional criteria for reduced monitoring—How the State will require systems on reduced monitoring to demonstrate:

(A) Continuous disinfection entering the distribution system and a residual in the distribution system.

(B) Cross connection control.

(C) Other enhancements to water system barriers.

25. Section 142.63 is amended by revising paragraph (b) to read as follows:

§ 142.63 Variances and exemptions from the maximum contaminant level for total coliforms.

* * * * *

(b) EPA has stayed this section as it relates to the total coliform MCL of § 141.63(a) of this chapter for systems that demonstrate to the State that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system rather than fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system. This stay is applicable until [DATE THREE YEARS FOLLOWING PUBLICATION OF THE FINAL RULE], at which time the total coliform MCL is no longer applicable.

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